





STATE WILDLIFE ACTION PLAN

2005 2025

TENNESSEE











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The mission of the Tennessee Wildlife Resources Agency is to preserve, conserve, protect, and enhance the fish and wildlife of the state and their habitats for the use, benefit, and enjoyment of the citizens of Tennessee and its visitors. The Agency will foster the safe use of the state's waters through a program of law enforcement, education, and access.

In keeping with this mission, the Agency recognizes its long-standing partnership with sportsmen and the significant contributions that sportsmen have made and continue to make to benefit all fish and wildlife, including non-game species. In submitting this State Wildlife Action Plan, the Agency expresses its intent that implementation of this plan be conducted in a way to achieve the Agency's mission, while sustaining and promoting hunting and fishing in Tennessee.

The Nature Conservancy is the largest nonprofit conservation organization in the world and works collaboratively with individuals & communities, governments, nonprofits and companies across the globe. The mission of The Nature Conservancy is to conserve the lands and waters on which all life depends.

BILL LEE
GOVERNOR
STATE OF TENNESSEE

September 22, 2025

Mr. Mike Oetker
U.S. Fish and Wildlife Service
Regional Director, Southeast Region
1875 Century Boulevard
Atlanta, GA 30345

Dear Mr. Oetker:

I am proud to offer my full support for the Tennessee State Wildlife Action Plan (SWAP), coordinated by the Tennessee Wildlife Resources Agency (TWRA) in conjunction with the Tennessee Chapter of Nature Conservancy. This plan represents a proactive and collaborative approach to conserving our state's rich natural heritage and ensuring future generations of Tennesseans can enjoy the abundant fish, wildlife, and habitats that make our state unique.

Tennessee is home to some of the most biologically diverse ecosystems in the country, which play a critical role in our economy, our culture, and our way of life. This State Wildlife Action Plan provides the framework to conserve species and protect the natural systems that support both wildlife and people.

I commend the Tennessee Wildlife Resources Agency and its many partners for their commitment to collaboration, science, and stewardship in developing this plan. It reflects Tennessee's values and demonstrates how public agencies, private landowners, nonprofit organizations, and local partners can work together to sustain our natural resources.

Additionally, I support continued federal investment through programs like the State and Tribal Wildlife Grants Program, which provides essential funding to implement this plan on the ground. These investments are essential to maintaining Tennessee's natural legacy and protecting the wildlife and lands that contribute to our outdoor recreation economy and our quality of life.

As Governor, I look forward to seeing the continued success of the Tennessee State Wildlife Action Plan and reaffirm my administration's commitment to preserving Tennessee's natural treasures for generations to come.

Sincerely,

Bill Lee

Bill Lee
Governor









Governor Bill Lee joined the TWRA in October 2024 on the Duck River and assisted with mussel and fish surveys and the tagging of rare mussels.



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Executive Summary

Congress first funded the State and Tribal Wildlife Grants Program (SWG Program) in 2001, and the program requires states to develop comprehensive plans to guide the conservation of nongame species. The SWG Program addresses important wildlife issues that have traditionally been underfunded, and it is now the nation's core program for preventing endangered species listings. To receive funds, each state and territory is required to develop a "Comprehensive Wildlife Conservation Strategy," popularly known as a State Wildlife Action Plan or SWAP. At a minimum, SWAPs must be updated every 10 years. This report represents the second revision of Tennessee's SWAP, originally issued in 2005, and updated for the first time in 2015. This revision has 10 chapters, outlined below. As in 2015, the chapters have been organized along the lines of the "8 Required Elements," which must be addressed in all SWAPs according to Congressional mandate; however, three new chapters in 2025 cover the topics of a changing environment, regional conservation, and private lands.

The TN-SWAP was developed based upon two key assumptions: (1) that although the focus is conservation of nongame wildlife species, many nongame conservation strategies and actions are habitat based and therefore benefit a wide range of species, including those that are common or hunted recreationally, and (2) that the TN-SWAP serves to promote common understanding of problems facing species and habitats across the state to encourage and prioritize collective action among a wide range of conservation partners.

The Introduction elucidates the intent of the 2025 SWAP, provides a summary of revisions, and reviews the history of the SWG program and SWAPs. It describes the guidance materials used during the Plan revision. It also explains the Tennessee Wildlife Resources Agency's (TWRA) approach in revising the Plan: the revision team structure—including formation of a standing SWAP Steering Committee—and the public outreach and communications employed to engage SWAP partners and obtain public input.

Chapter 1, State of Tennessee, provides a broad overview of the State of Tennessee: its history, habitats, and major taxa of wildlife and plants. The discussions of species and habitats are organized by the eight major terrestrial ecoregions commonly recognized in Tennessee, as well as the state's five major aquatic regions and six subterranean regions. The chapter also provides a broad overview of population changes that have occurred since 2015, as well as a breakdown of the type, extent, and distribution of land cover by ecoregion.

Chapter 2, TN SWAP Accomplishments, is a testament to the importance the State Wildlife Grant program guided by the SWAP. The chapter examines just a few of the significant conservation successes from 2015 through 2024 covering (a) restoration and management of oak savanna habitats, (b) aquatic restoration through barrier removal, (c) control of invasive species (carp, feral swine), (d) improved decision-making through data collection and analysis, (e) protection of high priority caves and other specialized habitats critical to Species of Greatest Conservation Need (SGCN), (e) data-driven planning, and (f) species reintroductions (Eastern

Hellbender, Yellowfin Madtom, and freshwater mussels). (A more comprehensive 2015-2024 list of major conservation projects conducted by key conservation partners is provided in Appendix C). A series of 19 two-page Highlights tell the stories of individual species and habitat conservation projects implemented since 2015, interspersed throughout chapters 3 through 8.

Chapter 3, SGCN and Priority Habitats, focuses on the identification, distribution, and abundance of SGCN as well as the identification of priority habitats for the conservation of those species (#1 and # 2 of the 8 required Elements). It summarizes updates to the SGCN list, "element occurrence" data (i.e., individual records of species occurrence), and the methodologies for prioritizing habitats critical to SGCN as well as mapping of threats to SGCN and their habitats. The categories used to identify and rank SGCN in 2025 are the same as those employed in 2015, with the exception that TWRA conducted an additional layer of analysis for their state Threatened & Endangered (T&E) species list. The 2025 SWAP identified 1,598 aquatic, terrestrial, and subterranean SGCN species in Tennessee, and of those, 436 are regional priorities (i.e., priorities for additional states bordering Tennessee). In 2025, over 1,100,000 species occurrence records were added to Tennessee's SWAP analysis, more than triple the 316,000 occurrence records available during the 2015 revision. Methods for mapping and prioritizing SGCN habitats are described, including a summary of new data incorporated into the SWAP relational database system since 2015: updated land use base layers, proprietary flood frequency data, and an updated mapping unit system. Habitat priorities within each of Tennessee's eight ecoregions are summarized.

Chapter 4, Problems Affecting Species and Habitats, identifies, categorizes, and prioritizes threats to SGCN species and habitats (#3 of the 8 Required Elements). Ten major threat categories defined by the Conservation Measures Partnership were identified in 2025, adding Climate Change as a major category since 2015. Urbanization; agricultural land management; forestry practices; water management; energy development; transportation and utility corridors; biological resource use/natural system modifications; and invasive and problematic species and pathogens were identified as the top issues affecting SGCN and their habitats in 2025.

Chapter 5, Resilience in a Changing Environment, focuses on how changing environmental conditions are likely to have pervasive impacts on natural habitats, ecological processes, and ecosystem services in the coming years. Trends in weather data and modeling of future conditions generally point to more hot days and more intense heat waves; an increase in the number of extremely dry days; a decrease in the number of extremely cold days; and an increased trend in number and intensity of extreme precipitation events. Species vulnerability to environmental change is assessed using two methods: (1) the CCVI, which summarizes both a species exposure and sensitivity to change, and (2) ecological niche models, which estimate changes to suitable habitat for species. Mussels, fish, plants, and amphibians in Tennessee are likely to have the most species vulnerable to changing environmental conditions.

Chapter 6, Conservation Actions and Strategies, focuses on the type of projects and management that can address identified problems (#4 of the 8 Required Elements). The SWAP planning team determined that the 2015 strategy hierarchy remained applicable to SGCN statewide conservation efforts. In 2025, the team elaborated in detail on 27 General Actions (in 7 Classes) that are most commonly implemented by TWRA and partners to address the major problems affecting SGCN and their habitats. Conservation Opportunity Areas (COAs) previously defined in 2015 were updated with input from key conservation partners, resulting in the identification of eight new COAs and 17 COAs with regional (multi-state) importance. Eleven COAs retained their original boundaries and one was eliminated.

Chapter 7, Regional Conservation Assessment, highlights the importance of collaborating at landscape scales by using a list of priority regional animal species developed by the Southeast Association of Fish and Wildlife Agencies (SEAFWA) and priority regional plant species developed by the Southeast Plant Conservation Alliance. Known as Regional Species of Greatest Conservation Need (RSGCN), these species' ranges are shared across states in the Southeast (and sometimes beyond), helping to identify opportunities for collaboration and coordination of activities. The range of Tennessee's RSGCN also helped to identify which COAs should be considered Regional COAs (17 out of 36). Four case studies of Regional COAs are provided.

Chapter 8, Private Lands Conservation, was created both to highlight the critical role that private lands and landowners play in conserving Tennessee's natural heritage and to serve as a resource for private landowners and conservation practitioners. It recognizes that landowner priorities drive conservation on private lands. It summarizes top environmental concerns of landowners in Tennessee, as well as sources of support for stewardship and protection of private lands, illustrated with numerous project examples. A Landowner's Conservation Planning Guide helps answer:

- What are the natural and economic characteristics of your property?
- What are your conservation goals?
- What is your capacity for working on the land?
- Who are the potential partners that can help you reach your goals?

Chapter 9, Implementing the Tennessee SWAP 2025-2034, highlights future use of the SWAP to help (1) data-backed support for funding requests, (2) guide organizations and individuals by showing them where to work, and (3) indicate knowledge gaps and incomplete understanding of SGCN and the habitats vital to their survival. The chapter addresses the importance of effectiveness monitoring in Tennessee (#5 of the 8 Required Elements), which is imperative for both adaptive management and for increased understanding/modeling of species and habitat changes through time. The chapter lists and highlights the utility of regional-scale monitoring efforts, including a proposed ESRI-based SWAP conservation project reporting tool, which will be shared annually among cooperating partners to allow consolidation of a variety of project and monitoring data.

Chapter 10, Tennessee SWAP Review and Revision, acknowledges the continuing requirement to update SWAPs every 10 years. It summarizes how TWRA intends to use information and products provided annually by the Steering Committee and supporting working groups to provide the foundation for the next ten-year comprehensive SWAP review in 2035. Existing strategic, operational, and project planning cycles within TWRA will be integrated into SWAP review procedures with the goal of producing a digital SWAP in 2035. Updates to the SWAP Relational Database, as well as emerging issues such as Highly Pathogenic Avian Influenza, will be incorporated into future SWAPs. The chapter concludes with lessons learned.

Highlights of appendices to this SWAP include:

- The revised 2025 list of SGCN
- A SWAP Map Atlas that can be used independently or in conjunction with the SWAP
- A set of factsheets about each of Tennessee's 37 COAs, which include descriptions of habitats, issues, conservation and monitoring priorities, and partners as well as COA maps and detailed lists of GCN species occurrences within each COA.

In addition, the following sections of the SWAP can be used independently of the plan itself:

- 19 Conservation Highlights targeted to practitioners and laypersons alike, which can be used for outreach and education.
- The Tennessee Landowner's Conservation Planning Guide, a Tennessee Private Landowner Resources table, and a Calendar of Seasonal Conservation Actions can serve as useful guidance and outreach materials for landowners.

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Summary of Changes

In the 2025 Tennessee SWAP, enough has changed since 2015 that a detailed summary of changes would be virtually a recapitulation of the entire document. Each chapter—with the exception of Chapter 1 (Tennessee), and Chapter 2 (Accomplishments, all new since 2015), Chapter 7 (Regional, all new since 2015)—provides a summary of the chapter's content, usually in the beginning, sometimes later. Please refer to these summaries, which list new methods, new approaches, and new data summaries.

Moreover, chapters 5 (Resilience in a Changing Environment), 7 (Regional Conservation Assessment), and 8 (Private Lands Conservation) are all completely new in 2025. They are evidence of the commitment that TWRA, TNC, and conservation partners bring to achieving the goal of preserving Tennessee's precious natural heritage for current and future generations.

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Acronyms

AFWA	Association of Fish and Wildlife Agencies
AKN	Avian Knowledge Network
ALAN	Artificial Light at Night
ANS	Aquatic Nuisance Species
APSU	Austin Peay State University
ATV	All Terrain Vehicle
B. suis	*Brucella suis*
Bd	Chytrid fungus
BLM	Bureau of Land Management
BMPs	Best Management Practices
Bsal	*Batrachochytrium salamandrivorans*
CASC	Climate Adaptation Science Center
CCVI	Climate Change Vulnerability Index
CDC	Centers for Disease Control and Prevention
CDL	Cropland Data Layer
CFI	Conservation Fisheries Incorporated
CITES	The Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLO	Clothianidin
cm	centimeter(s)
CMP	Conservation Measures Partnership
CNF	Cherokee National Forest
COA	Conservation Opportunity Area
CRAC	Cumberland River Aquatic Center
CRCS	Center for Resilient Conservation Science
CSAPR	Cross-State Air Pollution Rule
CWA	Clean Water Act
DNA	Division of Natural Areas
DU	Ducks Unlimited
E. coli	*Escherichia coli*
EAB	Emerald Ash Borer
EEB	Dept. of Ecology and Evolutionary Biology
EGCPJV	East Gulf Coastal Plain Joint Venture
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FAP	Forest Action Plan
ft	foot/feet
FUTURES	Future Urban-Regional Environment Simulation
G-Rank	Global Rarity
GA DNR	Georgia Department of Natural Resources
GAP	Gap Analysis Project

GHG	Greenhouse GasGIS Geographic Information Systems
GLC	GAP/LANDFIRE and Cropland Data Layer
GSMNP	Great Smoky Mountains National Park
GWL	Global Warming Level
HPAI	Highly Pathogenic Avian Influenza
HR	High Resolution
HR	Herbicide-resistant
HUC12	12-digit hydrologic units
HWA	Hemlock Woolly Adelgid
IMI	Imidacloprid
in	inch(es)
INOM	In Need of Management
IRP	Integrated Resource Plan
IUCN	International Union for Conservation of Nature
km	kilometer(s)
LMP	Landscape Management Plan
m	meter(s)
MAP	Mississippi Alluvial Plain
MATS	Mercury and Air Toxics Standards
mi	mile(s)
MSA	Metropolitan Statistical Area
MTSU	Middle Tennessee State University
NABat	North American Bat Monitoring Program
NALCC	North Atlantic Landscape Conservation Cooperative
NF	National Forest
NFWF	National Fish and Wildlife Foundation
NGOs	Nongovernmental Organizations
NHDPlusV2	National Hydrography Plus, Version 2
NID	National Inventory of Dams
NOAA	National Oceanic and Atmospheric Administration
NOx	Nitric Oxide + Nitrogen Dioxide
NP	National Park
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NWF	National Wildlife Federation
NWR	National Wildlife Refuge
OHV	Off Highway Vehicle
OHV	Off Highway Vehicle
PAD	Protected Area Database
PARCAs	Priority Amphibian and Reptile Conservation Areas
PCB	Polychlorinated Biphenyl
Pd.	*Pseudogymnoascus destructans*
PFAS	Per-and polyfluoroalkyl

PV	Photovoltaic
QF	Quail Forever
RC&D	Resource, Conservation, and Development Agency
RCPP	Regional Conservation Partnership Program
RCN	Resilient and Connected Network
RCOA	Regional Conservation Opportunity Areas
RCPs	Representative Concentration Pathways
RSGCN	Regional Species of Greatest Conservation Need
S-Rank	State Rarity
SARP	Southeast Aquatic Resources Partnership
SC	Steering Committee
SE CASC	Southeast Climate Adaptation Science Center
SEAFWA	Southeast Association of Fish and Wildlife Agencies
SEAR	Southeastern Avian Research ??
SECAS	Southeast Conservation Adaptation Strategy
SF	State Forest
SFD	Snake fungal disease
SGCN	Species of Greatest Conservation Need
SGI	Southeastern Grasslands Institute
SHSD	Suitable Habitat Separation Distance
SNA	State Natural Area
SNAPS	Student Network for Amphibian Pathogen Surveillance
SO2	Sulfur Dioxide
SP	State Park
SPB	Southern Pine Beetle
SPI	Shortleaf Pine Initiative
SSA	Species Status Assessment
SSPs	Shared Socioeconomic Pathways
SWG	State and Tribal Wildlife Grants
T&E	Threatened and Endangered
TACT	Tennessee Aquatic Connectivity Team
TCF	The Conservation Fund
TDA	Tennessee Department of Agriculture
TDEC	Tennessee Department of Environment and Conservation
TDF	Tennessee Division of Forestry
TDOT	Tennessee Department of Transportation
TGLC	TennGreen Land Conservancy
THS	Tennessee Herpetological Society
TN AQ	Tennessee Aquarium
TN-IPC	Tennessee Invasive Plant Council
TNACI	Tennessee Aquarium Conservation Institute
TNBWG	Tennessee Bat Working Group
TNC	The Nature Conservancy

TNFO	Tennessee Field Office (of USFWS)
TOS	Tennessee Ornithological Society
TRGT	Tennessee River Gorge Trust
TSI	Timber Stand Improvement
TSU	Tennessee State University
TTU	Tennessee Tech University
TWRA	Tennessee Wildlife Resources Agency
US	United States
UAH	University of Alabama in Huntsville
UBT	Urban Bird Treaty
UM	University of Memphis
UNEP	UN Environment Programme
USACE	US Army Corps of Engineers
USDA	US Department of Agriculture
USFS	US Forest Service
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
USNVC	US National Vegetation Classification
UTC	University of Tennessee, Chattanooga
UTK	University of Tennessee, Knoxville
VA TECH	Virginia Tech
WDNR	Wisconsin Department of Natural Resources
WG	Working Group
WMA	Wildlife Management Area
WNS	White-nose syndrome
WNV	West Nile Virus
WTRBA	West Tennessee River Basin Authority
WUI	Wildland Urban Interface
WWF	World Wildlife Fund

TENNESSEE STATE WILDLIFE ACTION PLAN 2025



SINCE 2000, WHEN THE US CONGRESS first funded the State and Tribal Wildlife Grants (SWG) Program, each state, territory, and the District of Columbia has been required to develop comprehensive plans to guide the conservation of a diverse array of wildlife and associated habitats, including species that are not hunted or fished (Pub. L. 106-153, § 902(a) 2000, AFWA 2022). The SWG Program addresses important wildlife issues that have traditionally been underfunded, and it is now the nation's core program for preventing endangered species listings and to keep common species common. To receive funds, each state and territory must develop a "Comprehensive Wildlife Conservation Strategy," better known as a State Wildlife Action Plan or SWAP.

In 2005, each state submitted its first SWAP to Congress. State plans addressed eight elements required by the US Fish and Wildlife Service to receive SWG Program funds.

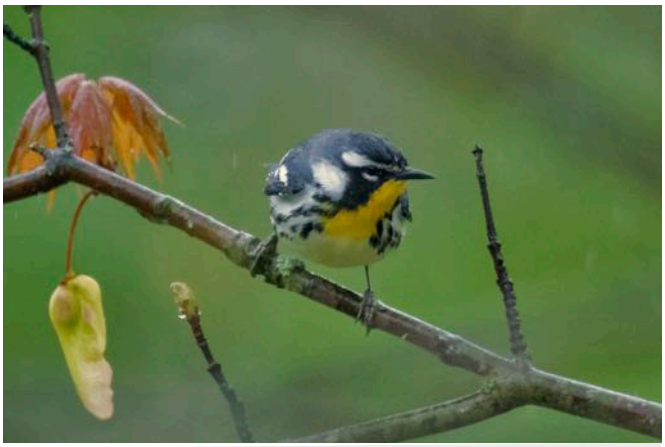
Fall colors in middle Tennessee / Greg Wathen

Plans are revised and updated on a 10-year cycle to explore and implement the most innovative approaches to conservation and to reflect changing conditions. This is Tennessee's second comprehensive update to its SWAP.

As one of the nation's most biologically diverse states, Tennessee must continue to provide suitable habitat for its endemic and geographically rare species, especially aquatic species, in the face of growing threats. Tennessee's SWAP is a collaborative, living guide, intended for use by all Tennesseans to conserve, protect, and manage wildlife, fish, and plant Species of Greatest Conservation Need (SGCN) and the ecological communities they need to survive.

Tennessee's SWAP is a statewide plan focused on conservation of the state's immense biodiversity. From this perspective, there are number of anthropogenic activities that have been identified as significant threats or sources of stress to SGCN. The identification of a source of stress or threat has not occurred to cast blame or single out individual user groups or industries, but rather to identify ways in which on-the-ground practices and policies can be improved, modified, or replaced with alternatives to reduce or eliminate the stresses and threats. Addressing the threats and sources of stress is a critical component to species conservation and recovery. The goal of Tennessee's SWAP is to conserve and recover SGCN, all while keeping common species common.

A systematic analysis of observational data and conditions across the state drives each 10-year revision. After identifying species and habitats most in need of protection and/or restoration, stressors affecting those species and habitats are assessed for mitigation. Lastly, through the evaluation of partner priorities and resources, the revision team stacks the resulting data layers to reveal Conservation Opportunity Areas (COAs), in which stewardship projects can be anticipated to attain maximum impact.



Yellow-throated Warbler (*Setophaga dominica*), a SGCN in Tennessee / Daniel Istvanko, TWRA

The 27 types of conservation strategies outlined and described within the SWAP are guided by science, leading scientists, conservationists, private landowners, and other stakeholders to protect and address the decline of the state's 1,598 SGCN and their habitats. Federal, state, and local governments, private organizations, and individuals are engaged during SWAP development to prioritize, plan for, and fund conservation across Tennessee.

I-1. Intent of the SWAP 2025 Revision

By engaging conservation-focused governmental agencies and private organizations during the SWAP development process, we seek to maximize project efficiency and achieve the following outcomes through the 2025 SWAP revision:

- Identify conservation priorities and goals shared between partners
- Leverage resources through accountable collaboration
- Cooperatively monitor environmental and disease stressors
- Assess priority conservation areas of opportunity
- Work together to plan and guide future conservation successes across Tennessee.

This revision includes critical updates to species status and needs, monitoring guidelines, and programs to conduct disease surveillance and prevention. Additionally, due to the increasing rate of land development, urban sprawl, and associated impacts on native species, we are incorporating a new chapter on private lands to highlight conservation resources available to private landowners. By involving more partners, we focus Tennessee's conservation objectives and strategies and enhance collaboration in the protection and recovery of SGCN. Lastly, the 2025 revision will include analyses of species and habitat conservation priorities shared between Tennessee and neighboring states in the Southeast Region to foster collaboration and improved results, and to avoid unnecessary duplication of effort.

I-1.1. From 2005 to 2025: Overview of the SWAP Revisions

Tennessee's first SWAP (at that time, called *Tennessee's Comprehensive Wildlife Conservation Strategy*) was completed in 2005. In developing the 2005 SWAP, the Tennessee Wildlife Resources Agency (TWRA), in collaboration with The Nature Conservancy (TNC), invested in the development of an integrated relational database and Geographic Information Systems (GIS) tool to serve three main purposes: (1) consolidate numerous datasets on species occurrences and habitats managed by different agencies and organizations in the state; (2) link the species and habitat data to a GIS platform to facilitate conservation priority mapping statewide; and (3) promote common understanding of problems facing species and habitats across the state to encourage and prioritize collective action (TWRA 2005, pp. 28-29).

This revision includes critical updates to species status and needs, monitoring guidelines, and programs to conduct disease surveillance and prevention.

The 2015 SWAP update was a comprehensive revision intended to build upon the original 2005 assessment methods, tools, and planning process addressing the Eight Required Elements (see I-2.1). Likewise, in the creation of this 2025 revision document, the emphasis is placed on highlighting where data and methods have been added, revised, and updated; how decisions on addressing priority problems and strategies have been made; and the rationale for decision-making throughout the process.

Key attributes of this 2025 comprehensive revision include:

- The use of EPA Level III Ecoregions to define ecoregions across the state, making them congruent with many national datasets

- Updated statewide maps to include priority problems affecting habitats, including updated land use data and updated urbanization projections
- The revision of Conservation Opportunity Area boundaries based on partner/expert input
- Creation of a SWAP Steering Committee comprised of government agency and non-governmental organizations to help guide the SWAP, identify conservation opportunities, and monitor progress
- Targeting of priority conservation actions with the formal participation of Steering Committee partners
- Creation of ad hoc Working Groups comprised of experts who can address specific issues and questions
- Incorporation of 2020 State Forest Action Plan information, objectives, and priorities as appropriate
- The addition of a Private Lands Conservation chapter to provide greater focus on conservation opportunities for private landowners
- The addition of a Regional Conservation Assessment chapter that integrates the priorities of bordering states' wildlife and rare plants that are shared with Tennessee
- The addition of a chapter on Climate and Resilience and how these issues impact SGCNs and priority habitats
- An appendix on the One Health approach to addressing wildlife diseases, focusing on pathogens, disease vectors, toxicants, and environmental and community stressors that exacerbate disease risk (Appendix J)
- Developing content with a view to future, more user-friendly modes of sharing SWAP data online
- Participation of the Steering Committee



Mink (*Neovison vison*), not a SGCN / Daniel Istvanko, TWRA

I-2. Precedents and Requirements for State Wildlife Action Plans and Revisions

The development of State Wildlife Action Plans in every state and territory in 2005 and their revisions by the year 2015 were historic milestones. All states completed plans following a similar, recommended format, which set the stage for better collaboration and decision-making on conservation priorities.

Although the focus of the SWG program and SWAPs is conservation of nongame wildlife species, many nongame conservation strategies and actions are habitat-based and therefore benefit a wide range of species, including those that are common or hunted recreationally. SWAPs are intended to serve as adaptive management plans to be updated at regular intervals, and the maximum interval is 10 years. The 2015 update plan was Tennessee's first comprehensive revision of all Eight Elements from its 2005 SWAP, and this 2025 update is its second.

I-2.1. SWAPs Must Address 8 Key Elements

In its directive to states on the development of State Wildlife Action Plans, Congress identified eight required elements and directed that the strategies must identify and focus on the "species in greatest need of conservation," as well as address the "full array of wildlife" and wildlife-related issues (TWRA 2005). The following summarizes the Eight Required Elements and the chapters of this revision document that address each element:

1. Information on the distribution and abundance of species of wildlife, including low and declining populations as the state fish and wildlife agency deems appropriate, that are indicative of the diversity and health of the state's wildlife; [Ch 3]

2. Descriptions of extent and condition of habitats and community types essential to conservation of species identified in (1); [Ch 3]

3. Descriptions of problems which may adversely affect species identified in (1) or their habitats, and priority research and survey efforts needed to identify factors that may assist in restoration and improved conservation of these species and habitats; [Ch 4, 5, 6]

4. Descriptions of conservation actions proposed to conserve the identified species and habitats and priorities for implementing such actions; [Ch 6, 7, 8]

5. Proposed plans for monitoring species identified in (1) and their habitats, for monitoring the effectiveness of the conservation actions proposed in (4), and for adapting these conservation actions to respond appropriately to new information or changing conditions; [Ch 7, 9]

6. Descriptions of procedures to review the plan at intervals not to exceed ten years; [Ch 10]

7. Plans for coordinating the development, implementation, review, and revision of the plan with federal, state, and local agencies and Indian tribes that manage significant land and water areas within the state or administer programs that significantly affect the conservation of identified species and habitats; [Ch 1,7, 10]

8. Processes for broad public participation in developing, revising, and implementing these plans, the projects that are carried out in accordance with these plans, and the designation of species in greatest need of conservation. [Ch 1, 3, 8, 10]

I-2.2. Agency Guidance for Plan Revision and Implementation

Since the first round of State Wildlife Action Plans completed in 2005, the US Fish and Wildlife Service, the Association of Fish and Wildlife Agencies, and conservation partners have developed voluntary guidance to help states revise and improve their plans. These flexible guidance documents focus on identifying best practices for meeting each of the Eight Required Elements and also assist states in determining their approach to addressing climate change vulnerabilities for species and their habitats. Below are the most up-to-date guidance documents used to guide the 2025 version of the Tennessee SWAP:

- 2012 Association of Fish & Wildlife Agencies (AFWA) Best Practices for State Wildlife Action Plans
- 2017 SWAP Revision Guidance
- 2019 Fish and Wildlife Relevancy Roadmap
- 2022 Voluntary Climate Adaptation Guidance for SWAPs 2nd Edition
- 2022 Guidance to Add Plants to SWAPs
- 2024 State Wildlife Action Plan Digital Revision Interim Guidance
- 2024 National Fish, Wildlife, and Plants Climate Adaptation Network Climate Adaptation Strategy

The 2025 revision team has used these guidance materials throughout the update development process. Although Tennessee does not contain land and water areas currently under Indian Tribal management, a plan to redistribute over 76 acres in Monroe County to the Cherokee Tribe via the Eastern Band of Cherokee Historic Lands Reacquisition Act has passed the US House five times, most recently in February 2025, and is awaiting consideration by the Senate. It is essential for conservation planners to stay informed on such matters and proactively engage with Tribal natural resources partners, should such actions be implemented. During the 2025 SWAP revision, multiple attempts were made to coordinate with conservation-focused members of the Eastern Band of Cherokee Indians to obtain their feedback and input. While the revision team was unable to connect directly with Tribal representatives, numerous opportunities exist for Tribal collaboration to both serve Tennessee's conservation needs and expand the protection and appreciation of culturally important species and sites.



Spring Salamander, (*Gyrinophilus porphyriticus*) / Daniel Istvanko, TWRA



Rainbow Darter (*Etheostoma caeruleum*) / Daniel Istvanko, TWRA

I-3. Approach to the 2025 Plan Revision

Each iteration of Tennessee's SWAP illustrates many of the features highlighted in AFWA guidance documents issued at the time. The 2015 SWAP used the NatureServe ranking methodology to assess species conservation status; standardized habitat classifications; problem and strategy hierarchies; mapping of habitat priorities statewide; and the input of many public and private partners in the plan's development. The 2015 SWAP also included the designation of Conservation Opportunity Areas, plants as SGCN, and a section focusing on climate change.



Janie Becker, TNC, leading a discussion at the first SWAP Steering Committee meeting in July 2024 / Daniel Istvanko, TWRA

This 2025 update effort expands on these approaches, with the formal creation of a Steering Committee that not only provides knowledge and priorities for conservation, but which is also committed to serving over the next 10-year SWAP period to implement SWAP priorities, monitor and report back on conservation successes, and share information related to SWAP goals.

I-3.1. Alignment with Tennessee Wildlife Resources Agency (TWRA) Strategic and Operational Planning

In 2005, Tennessee's planning team developed the first SWAP document in alignment with the guidance available from the US Fish and Wildlife Service (USFWS) at the time. The next step after completing the SWAP was to develop a 2006-2012 Operational Plan (TWRA 2006) to align agency nongame species and habitat conservation activities with the Tennessee Wildlife Resource Agency's overall strategic planning approach.

In 2014, TWRA completed its 2014-2020 Strategic Plan, which provides an overarching vision, broad-based goals, and strategies for achieving those goals in four main areas of operation: wildlife management, outdoor recreation, law enforcement, and information/education (TWRA 2014). To a significant degree, the operations of all four of these programs are essential to successfully managing Tennessee's SGCN. The planning approach of the 2005 SWAP, particularly the approach to using standardized habitat classification and species data, influenced the development of TWRA's 2014 Strategic Plan. For the first time, a habitat-based approach to defining priority management outcomes was used as the focus of the agency's Wildlife Resource Program. TWRA maintained the habitat-based approach when updating its strategic plan in 2021.

For this reason, the 2025 SWAP Revision aligns with TWRA's 2021-2027 Strategic Plan in the following ways:

- The plans use the same classification scheme for defining habitats.
- The plans focus on habitat conservation priorities to facilitate species management.
- The plans are oriented toward achieving similar high-level outcomes.

The 2025 SWAP revision team worked intentionally with other divisions of TWRA to maintain collaboration and identification of shared conservation priorities using common understandings of habitats and problems affecting species and habitats statewide.

I-3.2. Revision Team Structure, Planning Objectives, and Database Updates

TWRA and TNC have made continuous investments in species monitoring data development and the SWAP relational database/GIS tool since the publication of the first SWAP in 2005 and revision in 2015. Chapter 2 of this plan highlights many examples of on-the ground conservation implementation as well as improvements to conservation data and planning methods. TWRA also completed an internal revision of the 2005 SWAP examining potential climate vulnerabilities of species and habitats statewide in 2009.



Josh Campbell, TWRA Biodiversity Chief, presenting at the first SWAP Steering Committee meeting in July 2024 / Daniel Istvanko, TWRA

For the 2015 Comprehensive Review process, TWRA and TNC designed a team planning process (see Figure 1) focused on the following objectives:

- Take advantage of core competencies within TWRA staff and meet capacity gaps with additional technical advisors (e.g., subject matter experts, communications, and technical writing).
- Effectively engage all TWRA divisions and leadership at appropriate junctures in the planning process.
- Achieve broad review of updated species list by technical experts.
- Effectively engage government and non-government conservation partners to identify priorities for collaboration.

- Develop the foundation for improved public communications, access, and engagement with the SWAP.

In addition, a separate report, Climate Change Vulnerability Assessment for Tennessee Wildlife and Habitats (2015), was jointly prepared by the National Wildlife Federation and TNC to inform the 2015 SWAP.

As in previous iterations of the SWAP, the core planning team designed a 2025 project approach to ensure a comprehensive review of all Eight Required Elements using the 2012 AFWA Best Practice Guidance recommendations wherever feasible.

The overarching objectives of the 2025 revision process were to expand from the solid data assimilation and methodological approaches developed by the team in 2015, re-engage a diverse set of technical reviewers and collaborators, and revise previously created Conservation Opportunity Areas as an additional strategic framework to continue on-the-ground conservation delivery with a variety of partners. For the first time in 2025, separate chapters on climate-related threats and regional conservation opportunities were included in the SWAP.

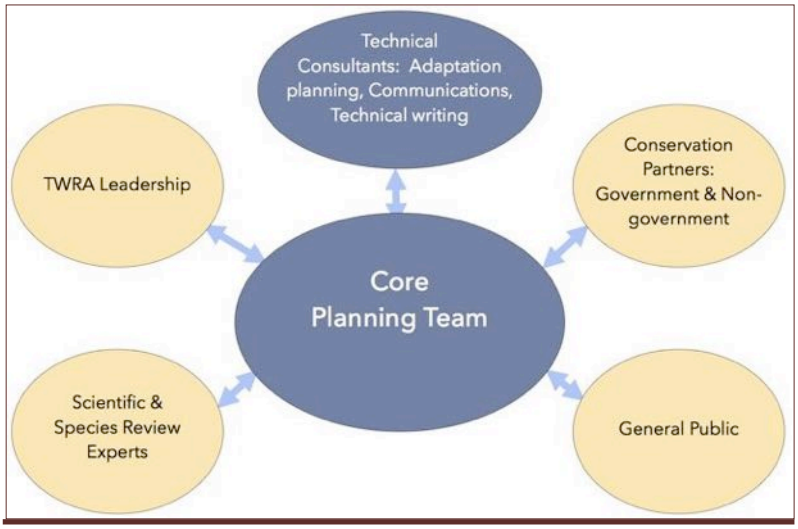


Figure I-1. Conceptual diagram of the relationship between the core planning team, advisors, partners, and the general public

I-3.3. Conservation Partners Engagement

This SWAP is a collaborative, living guide, intended to be used by all Tennesseans. It is a customized document, designed to direct efforts to conserve, protect, and manage wildlife, fish, and plant SGCN, as well as the ecological communities they depend on for survival. A systematic analysis of observational data and conditions across the state drives each 10-year revision. After identifying species and habitats most in need of protection and/or restoration, stressors affecting those species and habitats are assessed for mitigation. Lastly, through the evaluation of partner priorities and resources, the revision team stacks the resulting data layers to reveal COAs in which stewardship projects can be anticipated to attain maximum impact.

The strategies outlined and described within the SWAP are guided by leading scientists, conservationists, private landowners, and other stakeholders to protect and address the decline of SGCN and their habitats. Federal, state, and local governments, private organizations, and individuals are engaged during SWAP development to prioritize, plan for, and fund conservation across Tennessee.

I-3.4. Public Outreach and Communications: Process, website, press release, public comments

For maximum efficiency during the public comment period, a new SWAP web page was cross-linked with the TWRA website (hosted on www.tn.gov) in 2025, while TWRA's existing public comment function was used to solicit and capture public comments on the draft SWAP. Comments were sorted by category or topic, then considered and answered by the appropriate experts on the SWAP team. Appendix A provides an explanation of what actions, if any, were taken in response to comments raised during the review period.

Email communications were maintained regularly between the SWAP Coordinator and Steering Committee, with outreach to other experts conducted by various TWRA personnel as needed.

The final 2025 Tennessee State Wildlife Action Plan will be hosted on a stand-alone website sponsored by TWRA, with links to it provided on all of TWRA's pages with a focus on non-game wildlife. This will allow increased efficiency and greater flexibility for TWRA's Biodiversity staff to maintain the site with up-to-date information.



Group photo from April 2025 meeting of the Tennessee 2025 SWAP Steering Committee / Lee Wilmot, TWRA

I-3.5. Revision Process Timeline and Activities

The time schedule on the following page provides a summary of the major activities executed during the comprehensive review period from February 2023 through September 2025. Chapters 3 through 10 provide detailed information regarding approaches, results, and outcomes of the revision.



Eastern Newt (*Notophthalmus viridescens*) in the Red Eft stage / Chris Simpson, TWRA

2025 SWAP Revision Time Schedule of Major Activities

January – December 2023: Project Launch

- Notify USFWS of intent to perform comprehensive revision
- Notification to the Service of the formal revision process
- Core planning team formed and subject matter experts identified
- Subject Matter Experts engaged to review 2015 SGCN list, rerank species, and make recommendations

January - March 2024: Updates to Database

- Initiate compilation of species occurrence data
- Update definitions for Tennessee ecoregions, using the 8 Level III Ecoregions defined
- Core team review of initial update document draft to approve format and primary content
- Development of draft "Highlight" documents begins for the purpose of providing examples and context for species and habitat conservation
- USFWS Science Applications staff engaged to develop Regional chapter
- Coordinate with Southeast Climate Adaptation Science Center (SE-CASC) and Univ. of Tennessee, Knoxville's Dept. of Ecology & Evolutionary Biology for development of the Climate Resilience chapter to examine potential threats to habitats in TN and surrounding states in the region, as forecast by the latest climate models
- Communications program for key conservation partners across the state developed

April – June 2024: Review of SGCN, Problem and Action Assessments updated for 2025

- First draft of revised SGCN list completed
- First draft of statewide habitat prioritization maps completed
- Private lands partners engaged to provide guidance and comment on Private Lands chapter
- Outlines of new Private Lands, Regional, and Climate Change chapters produced
- Outreach to key conservation partners across the state begins, for participation in SWAP development and recruitment to serve as part of the statewide SWAP Steering Committee

July – September 2024: Stakeholder Participation and COA revisions begin

- SWAP Steering Committee workshop held to obtain input on COA statewide
- COA boundaries revised on the basis of partner input, changes in habitat and GCN species occurrences
- 36 COAs defined/revised in collaboration with Steering Committee partners: 8 new COAs defined; 1 COA eliminated; 15 existing COA boundaries were redefined as RCOAs, i.e., regional COAs extending across state boundaries and 2 new COAs defined as RCOAs; 7 existing COAs had boundaries expanded or adjusted based on watershed information or to follow EPA Level IV Ecoregional boundaries; 11 COAs remain unchanged (see Table 6.2, Summary of COA Changes, for more detail)

October - December 2024: Draft Document and COA Revisions Continue

- Steering Committee workshop held to gather feedback on statewide conservation collaboration process, COAs, and partnership recommendations
- First internal text-only draft of revised SWAP produced

January 2025 – March 2025: Conservation Stressors and Opportunity Areas

- SGCN list revision complete and species occurrence data fully compiled
- Determination of high-level stressors and desired outcomes for COAs and assignment of draft primary conservation actions by core team
- Draft COA factsheets completed

April 2025 – August 2025: Public Comments and Revision of Draft SWAP

- Final draft of revised habitat prioritizations completed
- First draft of illustrated 2025 SWAP pdf completed and posted online for public comment
- Public comments and additional Steering Committee and partners feedback collected

July 2025 – December 2025: Revision and Submission

- 19 Highlight documents completed
- Response to public comments and completion of final 2025 Update report
- Final SWAP maps completed, including third quarter 2025 revisions to the SGCN list
- Submission of Update report to USFWS for review prior to December 15



CHAPTER 1

OVERVIEW OF TENNESSEE AND APPROACH TO THE STATE WILDLIFE ACTION PLAN

1.1. Overview of Tennessee Natural History

TENNESSEE IS RECOGNIZED BY SCIENTISTS, naturalists, and nature lovers as one of North America's most biologically rich states. The state ranks 13th among all states in species diversity and 5th when only considering landlocked states (Stein 2002), giving it global importance. The Volunteer state is made up of a diverse range of habitats from mountain ranges to winding rivers to extensive cave networks to majestic bottomland hardwood forests—a landscape as varied as the plants and animals that call Tennessee home.

According to the Tennessee Wildlife Resources Agency, the state boasts:

- More than 350 fish species*, ranking Tennessee first among all states in freshwater fish diversity
- More than 400 species of native and migratory birds*
- 77 native mammals, 65 reptiles, 401 snails, 97 crayfish, and 140 freshwater mussel species
- 85 amphibians, ranking Tennessee fourth among all states in amphibian diversity (Stein 2002)
- More than 3,020 varieties of plants*

*Total numbers of fish, bird, and plant species are in regular debate as these taxa are incredibly diverse, and genomic analyses of species in each group continually provide new insights into their phylogenetic relationships.

Additionally, all or a portion of six of the highest priority watersheds in the Southeast can be found in Tennessee (Elkins et al. 2016). Tennessee harbors more caves than any other state, and according to The Nature Conservancy, twenty percent of all caves in the United States are located in the state (TNC 2024b).

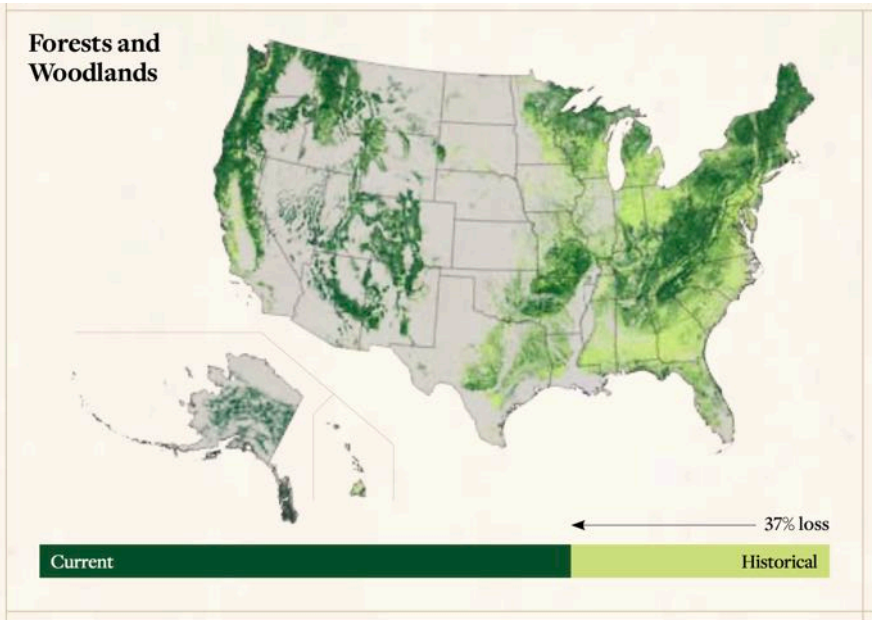
Photo credit: Hatchie River - Visit Brownsville TN; Tennessee silhouette - Gograph.com

1.2. National and Regional Context

1.2.1. Need for Biodiversity Conservation

According to NatureServe, more than one-third of plant and animal species and ecosystems are at high risk in the United States (2022), with 51 percent of temperate grasslands, boreal grasslands, and shrubs at risk along with 40 percent of temperate forests, boreal forests, woodlands, and forest wetlands—these categories encompass most of Tennessee's land area.

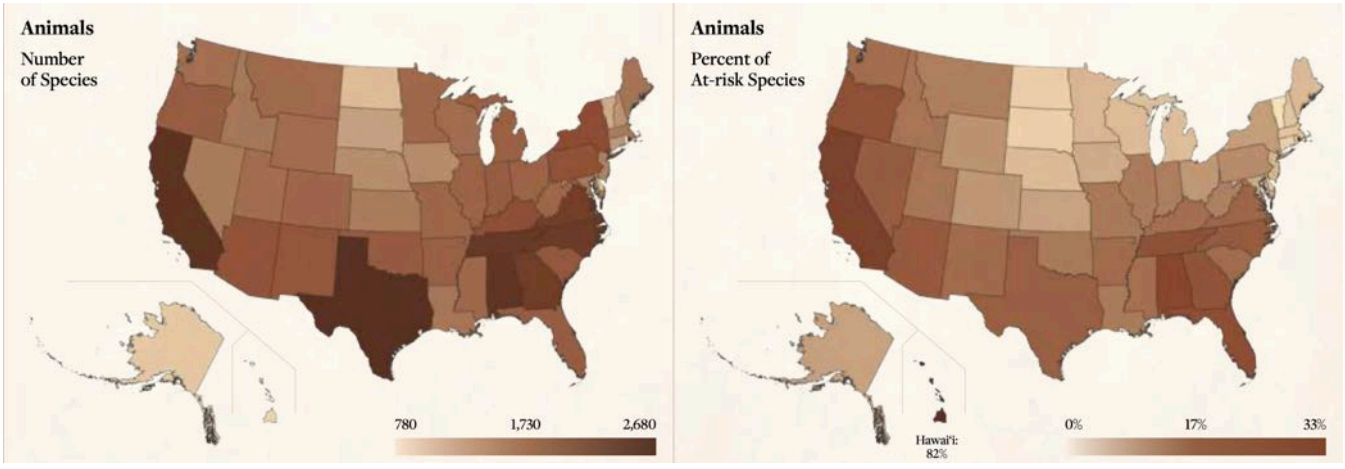
Figure 1.1 Impact of land conversion on US ecosystems



The impact of land conversion on US ecosystems explains these trends, at least in part, as much of Tennessee appears up as either light green (historical impact) or dark green (current impact) (Figure 1.1)

In particular, maps depicting the number of animal species as well as percent of at-risk animal species, show that Tennessee ranks on the high end of both these categories (Figure 1.2). In addition to the ecosystems at risk noted above, the high rate of animal species at risk is likely due to the abundance of rare and declining freshwater organisms in Tennessee (and the Southeast). NatureServe notes, "As a group, species associated with fresh water, including amphibians, snails, mussels, crayfish, and many aquatic insects, have the highest percentage of at-risk species, highlighting the importance of conservation strategies to protect freshwater ecosystems."

Figure 1.2 Number and percent of animal species at risk in the US



1.2.2. Human Population and Land Use

The name Tennessee is derived from the Cherokee village of Tanasi, meaning "place of gathering." In 1796, Tennessee was the first territory admitted as a state under the federal Constitution. Before statehood, it was known as the Territory South of the River Ohio.

Tennessee is located between approximately 35° 00′ to 36° 30′ north latitudes and 81° 45′ to 90° 15′ west longitudes. It covers an area of approximately 120,200 square km or 23 million acres. Tennessee's topography is among the most diverse in the United States, ranging from mountains in the east to wide swampy river bottoms in the west, with rolling hill country, deep gorges and other features in between. From the Mississippi River to Kuwohi (formerly known as Clingman's Dome) in Great Smoky Mountains National Park, the elevation ranges from 253 ft (77 m) to 6,642 ft (2,025 m).



Top to bottom: Lily pads on Reelfoot Lake in W TN; Harpeth River in middle TN; Great Smoky Mountains in E TN / Greg Wathen

Tennessee has a predominantly humid, subtropical climate, with high-elevation areas in the Blue Ridge Mountains classified as Oceanic/Highland based on the Köppen climate classification system. The state is on a path of warm, moist air currents from the Gulf of America and cold, relatively dry currents from Canada. Normally, there are four distinct seasons of about equal length. Spring typically includes periods of cool temperatures interrupted by warmer periods. Precipitation occurs as scattered showers and a few general rains. Due to the influx of air from the Gulf of America, summers are warm and humid. Thundershowers are the main form of precipitation. Fall weather includes mild temperatures, low humidity and light to moderate precipitation. Winters are moderately cold and can experience moderate to heavy precipitation. The mean annual temperature ranges from about 62°F (17°C) near Memphis to below 44°F (7°C) atop the highest peaks in the Smoky Mountains. Most of the state receives annual rainfall of approximately 40 in (102 cm) to 60 in (152 cm) depending primarily on regional topography. However, higher elevations of the Blue Ridge Mountains in the eastern part of the state receive an annual average precipitation ranging to >100 in (254 cm) (ETSU [date unknown]).

Like many parts of the world, Tennessee has been strongly shaped by the history of human settlement. For many generations, this area was the hunting grounds for Native American parties. Tribes as distant as the Iroquois of the Great Lakes and the Choctaws from the Gulf Coast came to the state. Later, the Cherokee near the eastern mountains and the Chickasaw near the Mississippi River formed villages and began using the land. Early European settlement brought dramatic change to the landscape, which greatly increased with time. Human population and land use have exhibited a much more dramatic change in the last 100 years and will likely continue to increase into the 21st Century and beyond.

Pre-historic Native American Settlement

By 1000 A.D. many tribes had settled into small indigenous communities. These settlements had great impacts on the native landscape. Much of the grassland and forestland burning that was done by Native Americans was beneficial to many natural plant and animal communities. On the other hand, though necessary for human population growth, the settlement of small villages and the conversion of native land to agricultural land impacted the landscape by degrading or destroying native habitat, which in turn affected many natural plant and animal communities.



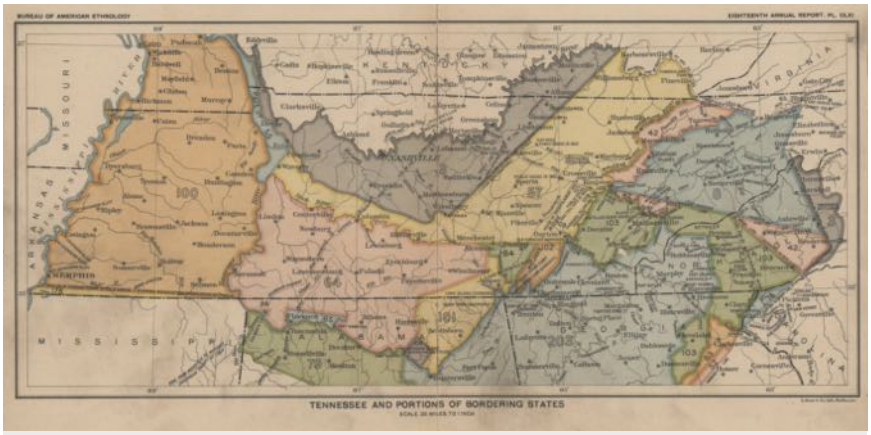
Chucalissa Indian Village was likely occupied by Native Americans of the Mississippian cultural period between 1000 and 1500 CE. / Tennessee Virtual Archive, 1967

By the 1700s, when European settlers became more common in the region, more densely populated settlements inhabited by indigenous populations, such as the Creek, Yuchi, and Shawnee, had become scarce. Although not well-documented, historians theorize that they

died due to disease brought to the area by European explorers, to which the native peoples had no immunity. Around this time, the Cherokee migrated into the area, overtaking other indigenous populations and pushing them southward, out of the lands within present-day Tennessee (Moore [date unknown]).

European Settlement

The earliest Europeans to settle in the region were primarily land seekers of Scots-Irish descent. The first permanent settlement was made in 1769 in the Watauga River valley of East Tennessee. The Watauga Association, the first attempt at government in Tennessee, was formed in 1772. Jonesborough, one of the oldest towns in the state, was founded in 1779. In 1775, the Transylvania Company bought a large region of land from the Cherokee. The famous Wilderness Road was soon created and became the main route from Virginia to the new settlements. Settlement continued westward with the establishment of Fort Nashboro in Middle Tennessee, along the Cumberland River in 1779. Communities were soon established in rich farmlands further west, while some regions in the east remained relatively unsettled until the mid to late part of the 19th century (Manning 1999).



Map of Cherokee and Chickasaw land cessions in Tennessee, Kentucky, North Carolina, Georgia, and Alabama, overlaid on a contemporary map of the region / Tennessee Virtual Archive,1897

By the early 1800s, landscape patterns were already being altered drastically by the masses of European settlers in the state. Settlement of small villages and towns, conversion of natural landscapes to agricultural land, and building of houses and railroads all led to the destruction of native habitat, which in turn had great impacts on plants and animals. In addition to habitat loss, European demand for furs helped to establish many trade connections between native tribes and settlers; however, overhunting took a serious toll on fur-bearing mammals, as well as white-tailed deer, which were devastatingly over-harvested for their pelts.

From the late 1800s to the 1900s, a social and economic transition began to take place as the state shifted from being a rural agricultural society to a modern industrial economy. Despite this change, there is still a tremendous amount of agricultural production taking place in Tennessee. According to the US Department of Agriculture, in 2019, there were 77,300 farms in Tennessee, and each farm averaged 139 acres in size, representing 41% of the state's land acres. Just 4 years later in 2023, the number of farms in Tennessee had declined to 63,100. While the average farm size increased during this time, averaging 169 acres per farm, total agricultural lands in the state were reduced by 100,000 acres (USDA 2024a). This loss of agricultural land and associated semi-natural habitats resulted primarily from conversion to non-natural residential and commercial areas.



Poor forestry in 1930s / Tennessee Virtual Archive

Large-scale forest clearing was also taking place in the late 1800s/early 1900s. This practice, coupled with the agricultural economy of the time, created large amounts of early successional plant communities in Tennessee. However, changes in farming and forestry practices and forest maturation in the last 50 years have resulted in loss of many early successional habitats that are beneficial to many species. Likewise, natural forests covered over 52% of Tennessee's land area or 14.1 million acres in 2020; however, by 2024, more than 54,000 acres of forests had been lost in the state (Global Forest Watch [date unknown]), although this does not account for gains in tree cover over the same period.

Beginning in the 1930s, the impounding of rivers and tributaries in the Tennessee and Cumberland drainages began to take place. During this period, the Tennessee Valley Authority (TVA) was formed to oversee many dam construction and rural improvement projects, as part of President Roosevelt's New Deal Policy. These impoundments destroyed much native habitat and disrupted the natural flow regimes of many of the state's river systems.



Mountain men splitting shingles, Spencer, TN / Tennessee Virtual Archive, 1939

During this time, tall fescue (*Schedonorus arundinaceus*), a non-native grass, was introduced into the United States, and this has resulted in the widespread conversion of native grass pastures and old fields to this exotic grass, which provides inferior wildlife habitat. In Tennessee, it is estimated that two and a half to three million acres have been converted to tall fescue. While useful for pasture, the introduction of this grass has had a tremendous effect on the Tennessee landscape (Keyser et al. 2019).

Introductions of other invasive exotic species and pathogens have also been deleterious to Tennessee's natural systems. Since the early 1900s, the effects of chestnut blight (*Cryphonectria parasitica*) on the American chestnut (*Castanea dentata*) have seriously altered the composition of forests in the state. By some estimates, this tree comprised at least 40 - 45% of the total canopy cover of pre-blight forests in some portions of the state (Vandermast 2002). Loss of this single species has greatly altered the dynamics of forest systems and wildlife in Tennessee (Schlarbaum et al. 1997).

During the 1950s and 1960s channelization of major tributaries of the Mississippi River in Western Tennessee began to take place. This had enormous effects on the natural flow regime of the rivers, and many bottomland hardwood forests were cleared during this time. Some counties in the western portion of the state have lost as much as 90% of their bottomland hardwoods forests since the 1950s (TDF 2020).

In recent decades, other human activities have also had great influence on the state's natural landscapes. According to the Tennessee Department of Environment and Conservation (TDEC), there are many other stresses that are known to affect wildlife. Some of these are sedimentation, municipal discharge, urban runoff, and coal mining operations (TDEC 2024a).

Land Use Today

The US Census Bureau reports that from 1900-2000, the population in Tennessee grew from 2 million to 5.7 million people. In 2020, the population of Tennessee was 6,912,347, which is a 21.4% population increase from the 2000 census, and the 2024 estimate is 7.2 million (US Census Bureau Quick Facts TN 2024). The largest city in the state is Nashville. Other major metropolitan areas include Memphis, Knoxville, Chattanooga, Clarksville and the Tri-Cities area of Bristol, Kingsport, and Johnson City.



Tim's Ford Dam / TVA

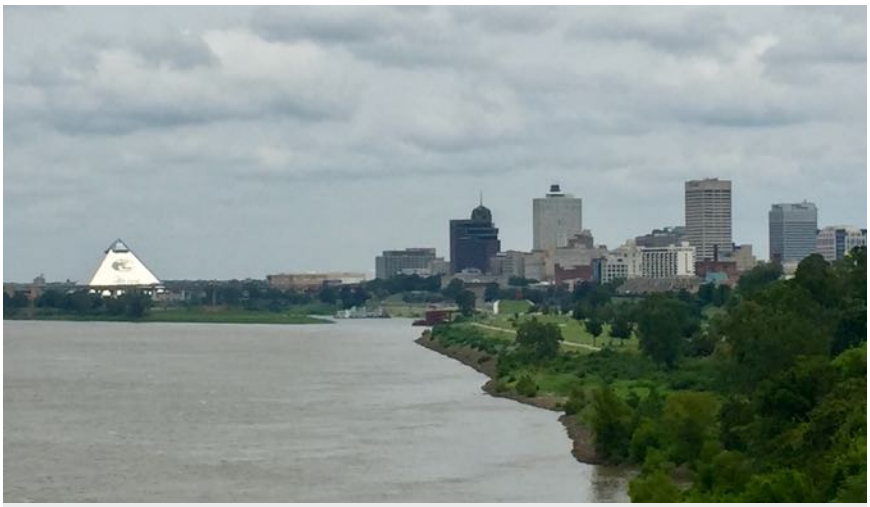
Although Tennessee is now primarily industrial, with most of its people residing in urban areas, many Tennesseans still derive their livelihood from the land. The state's leading crops are cotton, soybeans, and tobacco; cattle, dairy products, and hogs are also principal farm commodities (Farm Bureau 2024). Tennessee's leading mineral, in dollar value, is stone; zinc ranks second, as the state leads the nation in zinc production. Industry is continually diversifying; the state's leading manufactures are chemicals and related products, foods, electrical machinery, primary metals, automobiles, textiles and apparel, and stone, clay, and glass items.

Long-term development of the state will be heavily driven by growth in population and the labor force. Immigration from other nations and even other states is continually trending upward in Tennessee, as is the case with many other Southeastern states. The Tennessee Advisory Commission on Intergovernmental Relations estimates that approximately 1/3 of population growth in the 21st century is occurring in the 13-county Nashville Metropolitan Statistical Area. This population growth could be economically beneficial to the state, but it will pose great challenges when it comes to conserving and protecting Species of Greatest Conservation Need (SGCN).

1.3. Description of Tennessee's Ecoregions, Aquatic Regions, and Subterranean Regions

The following sections provide a broad overview of Tennessee's eight terrestrial, five aquatic, and five subterranean ecoregions. These regions are mutually exclusive (i.e., they do not overlap), and most are not contained wholly within the state (see Fig. 1.7 at the conclusion of this chapter).

However, for conservation planning, habitats must be categorized at a much finer level. For this reason, the Tennessee SWAP has used a habitat hierarchy to describe and categorize appropriate levels of all habitat types utilized by populations of SGCN throughout the state. The hierarchy consists of five levels of habitat classification, which are then used to map priority habitats for SGCN (based on species occurrence data as well as known life history).



Memphis pyramid and skyline / Gregg Elliott, K Gregg Consulting

Appendix E provides a detailed summary of the habitat classification hierarchy used in this SWAP. The habitat hierarchy lists habitat types that span the geographically defined ecoregions described in Section 1.3.1 below. From broadest to most specific, these habitat categories are:

Level 1 Habitat Category: Terrestrial, Aquatic, or Subterranean

Level 2 Habitat Class: Natural, Semi-Natural, or Non-Natural

Level 3 Habitat Alliance: This category includes 12 broad habitat types such as Forest and Woodland or Large River or Cave/Sinkhole.

Level 4 Habitat Group: This category further subdivides each habitat type into more specific categories. For example, a Natural Forest and Woodland includes the following Habitat Alliances: Upland Deciduous Forest, Upland Coniferous Forest, Upland Mixed Forest, and Upland Mixed Woodland. There are 21 alliance groups within Tennessee's terrestrial habitats, seven within its aquatic habitats, and only two within subterranean habitats: either natural karst features or artificially excavated land.

Level 5: Ecological System: This is the most detailed and refined category of habitat, derived from NatureServe. For example, Natural Upland Deciduous Forests include 14 Ecological Systems, often defined by species or geographic location (e.g., "Southern Interior Low Plateau Dry-Mesic Oak Forest"). In all, there are 83 ecological systems recognized in Tennessee.

The information that underpins the terrestrial habitat hierarchy includes the ecological systems developed by NatureServe, which have been adopted for use by other initiatives such as the USGS GAP Analysis Project and LANDFIRE, a federal web portal integral to fire and land management in the US. The hierarchy of habitat categories into which terrestrial ecological systems are nested (i.e., Levels 1-4) was developed by TWRA for use in the first SWAP in the state. These habitat classes were developed to create an accurate and complete habitat hierarchy that fits the uniquely diverse state of Tennessee.

After classifying habitat types, Appendix E also includes a summary of utilized ecological systems for each terrestrial SGCN , categorized as “preferred,” or “suitable,” or “marginal,” or none within each of the eight major Tennessee ecoregions. Some SGCN may have an ecological system categorized as preferred in one ecoregion and the same ecological system may be marginal or suitable in an adjacent ecoregion. Ecological systems are often less "preferred” on the edge of a species range, even though the ecological system is defined the same across ecoregions. Before the TN SWAP's next anticipated revision, in 2035, the TN SWAP Planning Team intends to transition to the US National Vegetation Classification (USNVC).

1.3.1. Tennessee's Eight Major Terrestrial Ecoregions

Tennessee’s combination of terrestrial, aquatic, and subterranean habitats is unlike any other in the United States. A diverse assemblage of terrestrial and aquatic habitats can be found throughout the entire state, while a collection of subterranean habitats is found primarily in the eastern two-thirds of the state. Consequently, the fauna found within these habitats is some of the most biodiverse in the nation (Stein et al. 2000) (see Map 1.1 in **Appendix B, the SWAP Atlas**).

In contrast to the six terrestrial ecoregions described in the 2005 and 2015 SWAPs, the 2025 revision uses eight major terrestrial ecoregions commonly recognized in Tennessee for descriptive and analytical purposes. From west to east (adapted from Griffith et al. 1997), they are:

- Mississippi Alluvial Plain
- Mississippi Valley Loess Plain
- Southeastern Plains
- Interior Plateau
- Southwestern Appalachians
- Central Appalachians
- Ridge and Valley
- Blue Ridge

Descriptions of each Tennessee Level III ecoregion follow.

Mississippi Alluvial Plain

Tennessee’s western boundary is formed by the Mississippi River. Alongside the main body of this river lies a floodplain known as the Mississippi Alluvial Plain or the MAP. Over the millennia, lateral

migrations of the river have created numerous oxbow lakes, meander scars, and natural levees. Much of the area periodically floods, although artificial levees have been constructed to reduce this. In Tennessee, the MAP consists primarily of alluvial (i.e., river-deposited) soils. To the east, the floodplain is bound by the loess (i.e., wind-blown silt) soils of the Chickasaw Bluffs. The Chickasaw Bluffs rise about 100 ft (30 m) above the MAP. Much of the floodplain lies over a portion of the New Madrid Fault, which created the great earthquake of 1811-1812 that shook the entire eastern US, and formed the 33,000-acre Reelfoot Lake in the northwest corner of Tennessee (Nuttli 1973).



Mississippi River's edge at Memphis / Gregg Elliott, K Gregg Consulting

The Mississippi Alluvial Plain is known for its bottomland hardwood swamps. Swamp forests occur in areas with standing water present most of the year, typically in the oxbow lakes. Other types of wetlands are also frequently a prominent landscape feature. Bald cypress (*Taxodium distichum*) and water tupelo (*Nyssa aquatica*) are usually the dominant trees in permanently flooded areas. Areas flooded during the winter and early spring support a diverse forest dominated by red maple (*Acer rubrum*), American sweetgum (*Liquidambar styraciflua*), water hickory (*Carya aquatica*), and many species of mesophytic oaks (*Quercus spp.*). River cane (*Arundinaria gigantea)* often occurs in the understory of the seasonally flooded forest. Dominant trees on the highest, rarely flooded sites include American beech (*Fagus grandifolia*), American elm (*Ulmus americana*), American sweetgum, shagbark hickory (*Carya ovata*), and a variety of oaks. Forested wetlands, including permanently flooded cypress and tupelo, periodically flooded bottomland hardwoods, and periodically flooded streamside (riparian) forests, are common in the MAP and West Tennessee.

Mississippi Valley Loess Plain

The Mississippi Valley Loess Plains primarily consist of gently undulating, irregular plains with broad bottomlands and small cypress swamps. The western boundary of the Loess Plain is the Chickasaw Bluffs and the MAP and the eastern boundary is the Southeastern Plain. Elevations in this ecoregion range from 250–500 ft (76–152 m). Several large river systems with wide floodplains like the Obion, Forked Deer, Hatchie, Loosahatchie, and Wolf (not to be confused with the Wolf River in the Cumberland Plateau, which flows into the Cumberland River), cross the region; however, with the exception of the Hatchie River, most have been channelized. The streams and rivers are low gradient with murky water and silt or sand bottoms. This area was once dominated by oak-hickory forests and floodplain forests with species such as bald cypress

and American sweetgum, but these forests have been largely cleared for agriculture. Soil erosion, sedimentation, and water degradation can be a problem due to agricultural practices. This part of the state is highly productive for crops such as soybeans, corn, cotton and sorghum along with livestock and poultry.

In the Loess Plain, rivers and creeks have created broad floodplains with many of the same wetland features and vegetation as in the MAP. Upland hardwood forests occur at higher elevations in Loess Plains with the predominant trees being oaks and hickories. Southern red oak (*Quercus falcata*) is dominant on drier upland sites and white oak (*Quercus alba*), often in association with tulip poplar (*Liriodendron tulipifera*) and American sweetgum, is dominant on more mesic sites. Shortleaf pines (*Pinus echinata*) are often found on sandy soils in upland areas.



Bald cypress in west TN / Greg Wathen

Southeastern Plains

The Southeastern Plains in Tennessee are located between the Mississippi Valley Loess Plains on the west and the Tennessee River on the east. This area's undulating terrain gradually increases in elevation moving eastward ranging from 400–600ft (122–182m). Elevations and relief are greater than the Loess Plains to the west, but generally less than the Interior Plateau to the east. Soils in the Southeast Plain are composed primarily of sand, silt, and clay topsoils, in contrast with the older limestone, chert, and shale found to the east in the Interior Plateau.

Historically, the natural vegetation was oak-hickory transitioning to oak-hickory-pine towards the south. Floodplain forests consist of bottomland oaks, red maple, green ash (*Fraxinus pennsylvanica*), and areas of bald cypress and water tupelo. Upland forests consist of various oaks, hickories (*Carya* spp.), and pines (*Pinus* spp.), along with American beech, and American sweetgum. Today, much of the area is cropland and pastures with small patches of mixed hardwoods and much of the southern part of the region is dominated by loblolly pine (*Pinus taeda*) plantations



Wolf River / Greg Wathen

associated with the timber, pulp, and paper operations. Streams in this area are relatively low-gradient and sandy-bottomed. The major rivers of the Mississippi Valley Loess Plains (Obion, Forked Deer, Hatchie, Loosahatchie, and Wolf) originate in the Southeastern Plains and flow westward to the Mississippi River. The Tennessee River flows north out of Alabama through the Southeastern Plains in Hardin County before entering the Interior Plateau at the southern edge of Decatur County.



American Beech (*Fagus grandifolia*) / Matthew Paul iNaturalist

Interior Plateau

The Interior Plateau is composed of two primary areas, the Central Basin and the Highland Rim, which are further divided into six distinct subregions. The Central Basin is an elliptically shaped depression measuring about 120 mi (193 km) long by 60 mi (97 km) wide covering an area of 8,600 square mi (22,274 square km) (Miller 1974). It is oriented nearly north/south and encircled by the Highland Rim.

The Central Basin lies in the heart of Middle Tennessee. There are two parts, the Inner and the Outer Basin. The Outer Basin is made up of knobs, narrow ridges and dissected landscape. The Inner Basin is flat with some gently rolling hills dominated by eastern red cedar (*Juniperus virginiana*) and hardwoods interspersed with openings of exposed limestone that underlies one of Tennessee's most unique ecosystems, the Limestone Cedar Glades. These glades are globally significant and contain over two dozen endemic plant species (Estes 2017). In addition, due to the open structure of the glade community, they are also highly vulnerable to incompatible land uses, development, and destruction.



Natchez Trace Parkway in spring / Greg Wathen

The average elevation of the Inner Basin is 590 ft (180 m). The Outer Basin has an average elevation of 754 ft (230 m), with a few hills in the southern portion reaching elevations of approximately 1,250 ft (380 m). The Central Basin was created as resistant siliceous (containing silica) limestone was breached and soluble limestone was removed. Poor surface drainage, shallow soils, and other karst features such as caves, sinkholes, and underground drainages are common in the Inner Basin. The Outer Basin has much greater relief with rolling hills and narrow ridges. It has

deeper phosphoric soils that, prior to European settlement, supported significantly diverse hardwood forests.

The Outer and Inner Basins support forest communities containing mixed mesophytic species such as tulip poplar, American beech, northern red oak (*Quercus rubra*), American yellowwood (*Cladrastis kentukea*), shagbark hickory, sugar maple (*Acer saccharum*), Kentucky coffeetree (*Gymnocladus dioicus*), pawpaw (*Asimina triloba*), bladdernut (*Staphylea trifolia*), spicebush (*Lindera benzoin*), and flowering dogwood (*Cornus florida*) in the ravines, lower terraces and north-facing slopes. Dry ridges are often remnants of the Highland Rim and support acid-loving species like sourwood (*Oxydendrum arboreum*), blackgum (*Nyssa sylvatica*), blueberry (*Vaccinium spp.*), oaks and hickories. Drier limestone sites and south-facing slopes of the Outer Basin resemble Inner Basin forests comprised of eastern red cedar mixed with hardwoods and pure stands of eastern red cedar.

The Highland Rim encircles the Central Basin and stretches from the Tennessee River in the west to the Cumberland Plateau in the east. The Highland Rim is broken into four distinct subregions: the Eastern Highland Rim, the Western Highland Rim, the Northern Highland Rim, and the Pennyroyal Plain. Collectively, these subregions represent remnants of an ancient massive dome that eroded. The Highland Rim today is characterized as an upland area heavily dissected by river and creek valleys. In general, the Highland Rim's elevation ranges from approximately 400 ft (120 m) to 1,000 ft (300 m), with the section in the Eastern Highland Rim being somewhat higher than that in the more expansive Western Highland Rim. The Pennyroyal Plain and Northern Highland Rim sections extend southward from Kentucky into northern Middle Tennessee. Underlain with limestone, the Highland Rim includes extensive areas of karst topography and cave development, especially on the eastern and northern sections.



Eastern Highland Rim May Prairie State Natural Area / Todd Crabtree, TDEC

The Highland Rim is covered with rich oak-hickory-poplar forests with many woodland streams. Species of these forests include white, black, and chinkapin oaks (*Quercus alba, Q. velutina,* and *Q. muehlenbergii*), tulip poplar, American beech, hickory species, and sugar maple. Swamp forests include pin, overcup,



Gray Bats at Bellamy Cave / Josh Campbell, TWRA

water and swamp chestnut oaks (*Quercus palustris, Q. lyrata, Q. nigra,* and *Q. michauxii*), black willow (*Salix nigra*), and red maple. American sweetgum and blackgum occur on poorly drained soils. Extensive nearly flat areas occur in a karst plain on the northern edge of the Pennyroyal Plain and in an area known as the "Barrens" in the Eastern Highland Rim. The vegetation of these Barrens is floristically similar to midwestern prairies that were dominated by big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), Indian grass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), and many forbs (Carman 2001).

Southwestern Appalachians

This region encompasses the Cumberland Plateau and Sequatchie Valley. The Cumberland Plateau cuts diagonally across Tennessee from Alabama to Kentucky, a length of approximately 140 mi (225 km). The average width of the plateau is approximately 40 mi (64 km). The region is flanked to the west by the Interior Low Plateau and to the east by the Ridge and Valley and represents the westernmost extension of the Appalachian Mountain chain.

The Cumberland Plateau is considered a "true" plateau and rises abruptly in elevation along the margins, or escarpment, to gently rolling uplands at the top averaging 1,500 to 1,800 ft (457–549 m) in elevation. Along the escarpment of the Cumberland Plateau, rivers and streams have eroded deep gorges, often referred to as gulfs, with the deeper gulfs located where the Tennessee River cuts through the Cumberland Plateau near Chattanooga. Lookout Mountain, Raccoon Mountain, Signal Mountain, and Walden's Ridge are all fingers of the Cumberland Plateau that were dissected by various rivers. Short Mountain and Caldwell Mountains are erosional remnants separated from the plateau proper by several mi.

The Sequatchie Valley is a unique feature on the southern reaches of the Plateau, which separates Walden's Ridge from the larger plateau. The feature is approximately 1,000 ft (305 m) deep, five mi



Savage Gulf, Cumberland Plateau / Greg Wathen

(7 km) wide, and 120 mi (193 km) long. At the northern end are the Crab Orchard Mountains created by an anticlinal fault system that eroded away along the rest of its length, creating the valley.



Savage Gulf, Cumberland Plateau / Southeastern Grasslands Institute

Sandstone, interbedded with some shale and coal, form the caprock of the Cumberland Plateau. Sandstone bluffs line the top of the plateau escarpment before the elevation drops to layers of limestone that underlie the sandstone caprock. Caves and other karst features are abundant on the escarpment and are home to numerous endemic species of flora and fauna. These surface rock strata have produced a varied range of soils and a diverse array of forest types. The Plateau forests vary widely, from the rich, mixed mesophytic forests containing hemlock (*Tsuga canadensis*), basswood (*Tilia americana*), yellow buckeye (*Aesculus octandra*), and tulip poplar forest found in the cool gorges, to the associations dominated by oaks, hickories, and Virginia pine (Pinus virginiana) found on dry sandy ridges. Out of the gorges but directly below the sandstone bluff lines occur almost pure stands of chestnut oaks (*Quercus montana*). Directly above the bluff lines Virginia pine stands dominate the dry rocky soil. The forest on top of the Plateau varies from the tulip poplar, white oak, and red oak associations that grow in the moister, richer soils, to the post oak (*Quercus stellata*), scarlet oak (*Quercus coccinea*), and hickory stands found in the drier, sandy soils.



Chestnut Oak (*Quercus montana*) / J Brasher, iNaturalist

Central Appalachians

The Cumberland Mountains and dissected Appalachian Plateau make up the Central Appalachian portion of Tennessee. They lie between the Cumberland Plateau to the west and the Ridge and Valley to the east. Like the Cumberland Plateau, the Cumberland Mountains represent a western extension of the Appalachian Mountains. The province covers several states including western Virginia, southwestern West Virginia, and Kentucky and extends south in Tennessee to the Crab Orchard Mountains at the head of the Sequatchie Valley.

The topography of this section is quite complex with a lesser mountainous region known as the Black Mountains protruding from Kentucky and Virginia. The entire area is characterized by rugged

terrain and elevations ranging from approximately 2,000 ft (610 m) up to just over 3,500 ft (1,075 m) on Cross Mountain. A unique feature of the province is Cumberland Mountain, which is a ridge that extends from Caryville, Tennessee, northeastward through Kentucky to Virginia on the eastern edge of the province. Due to its steep and rugged terrain on its eastern escarpment, Cumberland Mountain creates an obstacle to traverse with only one passage through, the Cumberland Gap. The gap forms a pass and was used by Native American nations and early European settlers. Today, the Cumberland Gap and surrounding areas are preserved as a National Historical Park.

Within the Cumberland Mountains, mixed mesophytic forest occupies most of the slopes, with species composition varying with topography and microclimate. Eastern hemlock is usually confined to ravines, and rhododendrons and mountain laurel (*Kalmia latifolia*) often occur in the understory. Dry slopes and ridges often contain oak-pine communities. The oak is usually chestnut oak. Shortleaf, Virginia, and occasionally, pitch pine (*Pinus echinata*, *P. virginiana*, and *P. rigida*) stands occur over the shallow, sandy soils underlain by sandstone.



Cumberland Gap / Don Sniegowski via Flickr Creative Commons

Ridge and Valley

Between the uplands of the Cumberlands and the Blue Ridge Mountains lies the Ridge and Valley. This ecoregion extends from the Coastal Plain of Alabama to southwest Virginia. The Ridge and Valley is creased by several parallel ridges running northeast-southwest. These ridges divide the region into four recognized subregions: the rolling limestone hills, the sandstone hills, the Holston Valley, and the Bristol Valley.

The Ridge and Valley was formed concurrently with the Cumberland Plateau and Mountains as a shallow inland sea that gradually filled with deltaic sediments of marine life. However, the Ridge and Valley contains less impervious sandstone. As a result, the limestone valleys eroded more rapidly into the current system of narrow ridges and broad river valleys. The ridges are higher at the north end at Clinch Mountain, 2,624 ft (800 m), and Bays Mountain, 3,100 ft (945 m). The valley floors slope gently to the southwest from an average elevation of about 980 ft (300 m) in the north to about 750 ft (230 m) in the south.

Forests are dominated by oak-hickory-pine forest types with some mesic northern hardwoods. Mixed-mesophytic communities similar to the nearby Cumberland Mountains also occur on the northern slopes and in the ravines of the Ridge and Valley. Scattered patches of prairie remnants, barrens, and glades also dot the region. These areas have similar floristic components as other natural grasslands in the state (Martin 1989; DeSelm 1984).



Southern Ridge and Valley Limestone Savanna & Glade / Hal R. DeSelm

Blue Ridge

The easternmost portion of Tennessee is characterized by the southern reaches of the Appalachian Mountain chain that runs in a northeast-southwest direction. This area is often referred to as the "Blue Ridge" region.

The Blue Ridge Mountains between Tennessee and North Carolina form the highest peaks in the eastern United States at over 6,600 ft elevation (2,025 m). The Blue Ridge is characterized by a steep topography that is heavily forested. Valleys tend to be narrow and found only along large creeks and rivers. This geologically complex area is comprised of several mountain ranges: the Iron, Holston, Stone, Unaka, Bald, Great Smoky, and Unicoi Mountains. Along the western edge of the Blue Ridge region are a series of outlying mountains, generally lower in elevation than those along the North Carolina border: English, Chilhowee, Starr, and Bean Mountains. Also, the Blue Ridge in Tennessee contains several isolated limestone valleys at low elevations. The most notable of these are Shady Valley, Bumpass Cove, Wear Cove, Cades Cove, and Tuckaleechee Cove. Overall, the Blue Ridge is comprised of two distinct subregions: the Unaka Mountains and the Unicoi Mountains. Some physiographers carve out the Great Smoky Mountains as a third central region.

These Blue Ridge Mountains were created during the Appalachian orogeny (folding of the earth's crust due to lateral compression). The Blue Ridge is part of the oldest land mass in Eastern North America, which has not been affected by marine submersion or continental glaciation (Miller 1974), contributing to the region's high levels of biodiversity and endemism. These mountains are composed of ocean sediment laid down millions of years ago that thrust upward as the huge tectonic plates supporting Africa collided with the North American plate. Land was forced up and over, folding and buckling to form the Smoky Mountains, Chilhowee Mountains, Unicoi Mountains, and the Nantahala ranges. These mountains have undergone continuous erosion over the last 180 million years. Rainfall in the region is 40-100 in (102-254 cm) per year.



Blue Ridge Mountains grass bald, Cherokee NF / Alan Cressler

A multitude of forest types occur in the Blue Ridge. Lowlands support cove hardwood forests composed of tulip poplar, sugar maple, yellow buckeye, and silverbells (*Halesia spp*.). Oak-chestnut forests once dominated this forest community until the chestnut blight virtually eliminated the American chestnut. Hemlock forests are found at slightly higher elevations and are now threatened by Hemlock Wooly Adelgid (see Chapter 4). Hydrangea (*Hydrangea spp*.), blackberry (*Rubus spp*.), and doghobble (*Leucothoe spp.*) can be found in the understory in association with Eastern hemlock. Northern hardwood forests with yellow birch (*Betula alleghaniensis*), American beech, and serviceberry (*Amelanchier spp*.) are usually found above 3,000 ft. South-facing slopes support oak-pine forests. Drier acidic soils support Virginia pine, pitch pine, doghobble, mountain laurel, and trailing arbutus (*Epigaea repens*). At elevations above 5,500 ft are the "Canadian-like" spruce-fir forests, which occur due to the cooler, moister weather. Along this alpine zone, Fraser fir (*Abies fraseri*), a Southern Appalachian endemic, and red spruce (*Picea rubens*) tower over a mossy forest floor where bluets (*Houstonia spp*.), trilliums (*Trillium spp*.), white clintonia (*Clintonia umbellulata*), and a host of other herbaceous flowers grow. As well, treeless areas called "balds" are frequently encountered along these ridges. In some places, heath balds occur, with azaleas and rhododendron (*Rhododendron spp*.). Others are grassy balds with approximately 35 different species of grass growing on them. These high elevations have a short summer season.



Serviceberries (*Amelanchier* sp) / esitver iNaturalist

1.3.2. Tennessee's Five Aquatic Regions

Five aquatic regions drain the state of Tennessee. From west to east, these regions include the following river systems: the Mississippi River, the Tennessee River, the Cumberland River, the Barren River, and the Conasauga River. These river drainages constitute a wide variety of aquatic habitats and collectively compose some of the most biologically important freshwater ecosystems in the country (Smith et al. 2002; Stein et al. 2000; Master et al. 1998). The boundaries of these regions are based on the Natural Resource Conservation Service's (NRCS) watershed mapping system of 12-digit hydrologic units. Likewise, subregions were taken from Ecological Drainage Units developed by The Nature Conservancy's Freshwater Initiative (Smith et al. 2002). Descriptions of each aquatic region are presented in the following sections.

Mississippi River

The Mississippi River drainage lies in the western quarter of Tennessee in the Mississippi Alluvial Plain, Mississippi Valley Loess Plains, and the Southeastern Plains terrestrial ecoregions. The major rivers draining this area include the Forked Deer, Hatchie, Loosahatchie, Obion, and Wolf systems, all of which drain into the Mississippi River. In its natural state, the Mississippi River was dynamic, with meandering and continuously shifting channels, creating many oxbow lakes and swamps. Its

waters are constantly turbid, colored by the heavy silt load it carries from eroded midwestern farmlands.

Levees, wing dams, and dredging altered the natural character of the river. It can no longer seasonally flood its natural floodplain regularly, therefore limiting access to and rejuvenation of marginal swampland. This has had tremendous impacts on the ecology of some fish species, as well as destroying many of the natural gravel bars in the river's main channel. Still, the river is home to several large river fishes found nowhere else in Tennessee (Etnier and Starnes 1993). Both the alluvial plain and Gulf Coastal Plain contain Tennessee's richest agricultural lands. Consequently, aquatic habitats within these areas have suffered greatly because of forest clearing, channelization, and excessive pesticide runoff. The resulting habitats consist of straight ditches with silt bottoms and very little, if any, natural cover for aquatic life. However, the remaining bottomland and floodplain along the Hatchie River harbor some of the best hardwoods and wildlife habitat found anywhere in the state of Tennessee.



Mississippi River Tiptonville 2011 flood / Greg Wathen

The Tennessee River

The Tennessee River drains a major portion of the state. Beech River, Big Sandy River, and several smaller streams—all of which are tributaries of the Tennessee River—drain a sizable part of the Northern Hilly Gulf Coastal Plain. In Middle Tennessee, the Tennessee River receives the drainage from the Western and Eastern Highland Rim regions, including the Duck, Buffalo, and Elk River systems.

The Tennessee River is formed in East Tennessee from the confluence of the French Broad and Holston Rivers. The French Broad and its tributaries all drain from the Southern Blue Ridge ecoregion in North Carolina. These waters are characterized by small headwater streams with a high gradient, numerous riffles and falls over bedrock, and boulder substrates interspersed with pool areas composed of gravel, sand, and bedrock. Many of the smaller streams are near pristine, though acid rain has undoubtedly had some effect, and natural acidification from Anakeesta shales is seen in some parts of the Blue Ridge. While it may lack the diversity of the Ridge and Valley, a distinct fish fauna exists in the associated bodies of water.

After receiving the French Broad and the Holston Rivers, the Tennessee River then flows in a southwesterly direction, along the way receiving the Little Tennessee River, also known as the "Little T." With origins in the Blue Ridge of northeastern Georgia, the Little Tennessee flows through the Chattahoochee, Nantahala, and Cherokee National Forests, while also forming the southwestern boundary of the Great Smoky Mountains National Park. The Tennessee continues southwestward



Tennessee River at Chattanooga / Greg Wathen

into Alabama, turns back to the northwest, returning into Tennessee, and flows north into Kentucky, where it empties into the Ohio River. The Pleistocene era (the last two million years) brought lower sea levels because of water retention from the Earth's glaciers. This in turn cut deep gorges forming the Tennessee River system's unusual configuration.

All the major tributaries in the Ridge and Valley, except the upper portions of the Emory and Little Rivers (the lower sections of the Emory and Little Rivers are impounded), contain large dams constructed by TVA from the 1930s to the 1970s (Etnier et al. 1979). Only these upper sections of rivers, along with the Powell and the upper Clinch, have escaped the direct effects of impoundments (Etnier and Starnes 1993). The Ridge and Valley offers great habitat diversity and has a very diverse fish and mussel assemblage. The upper Clinch remains the least altered within this ecoregion and is among the most biodiverse aquatic systems in North America (Stein et al. 2000; Master et al. 1998).

Further downstream along the main channel of the Tennessee River, the natural characteristics have been completely altered by impoundments. These impoundments generally maintain downstream flow, especially in the Kentucky Lake impoundment. The natural spring flooding that once occurred has now been greatly reduced because of the dams. Several species across taxa groups are known to be extirpated from the river because of these man-made impoundments (Etnier et al. 1979).



Clinch River / Cyndy Cox via Flickr Creative Commons

Cumberland River

During the 1950s through the 1970s, the main channel of the Cumberland was impounded over much of its entire length, from Barkley Dam in Kentucky to Cumberland Falls in its headwaters. Thus, its riverine qualities have largely been destroyed and its pre-impoundment fauna is incompletely known. The Red River tributary has suffered immensely in some areas from siltation due to agricultural practices.

The northern half of the Central Basin is drained by tributaries to the Cumberland River, such as the lower Harpeth, Stones, and lower Caney Fork systems. The southern half of the Central Basin drains

to the lower Tennessee River by the Duck and Elk Rivers. The Eastern Highland Rim streams that drain to the Cumberland include the Caney Fork, Roaring, Wolf (not to be confused with the Wolf River in the Mississippi Valley Loess Plains, which flows into the Mississippi River), and Obed Rivers. The impoundment on the upper Caney Fork (Center Hill Reservoir) dramatically altered the natural characteristics of the river and turned most of the lower reach into a cold river that can no longer support a rich aquatic fauna.

Much of the Cumberland Plateau in Tennessee, which tilts slightly to the west, is drained in that direction by tributaries to the Cumberland River, including the Big South Fork, Wolf, and Obed systems and Caney Fork River (Etnier and Starnes 1993).

Cumberland aquatic regions contain the highest number of fish, mussel, and crayfish species, and the highest number of endemic freshwater fauna in North America, with 231 species of fish (67 endemic), 125 species of mussels (20 endemic), and 65 species of crayfish (40 endemic) (Smith et al. 2002). The Duck River alone contains more fish species than are found in all of Europe (Stein et al. 2000).



Duck River/ Brandon Simcox, TWRA

Barren River

North of the Central Basin, in Clay, Macon, and Sumner counties, draining the northward sloping portion of the Eastern Highland Rim, is the Barren River system. This region of Tennessee contains numerous creeks (Drakes Creek, Line Creek, Long Creek, Long Fork Creek, Puncheon Creek, Salt Lick Creek, Sulphur Fork Creek, Trammel Creek, and White Oak Creek) that form the headwaters of the Barren River, which is in Kentucky. The Barren River is a tributary of the Green River, which flows into the Ohio River system. While containing typical Highland Rim habitats (chert, gravel, etc.) this drainage association is quite atypical and remote from the Tennessee and Cumberland River systems, resulting in a considerable degree of faunal distinctness and adding several species to Tennessee's fish fauna (Etnier and Starnes 1993).

Conasauga River

A very small portion of southeast Tennessee (Bradley and Polk counties) is drained by streams that empty the Conasauga River. The Conasauga loops into the state from Georgia and is a tributary of the Mobile River. This region overlaps with the Blue Ridge and Ridge and Valley ecoregions. The headwaters of the Conasauga in the mountainous Blue Ridge region remain in forested cover and have good water quality. However, portions of this watershed run through the agricultural Ridge and Valley region. Recent declines in the molluscan fauna have led to research indicating chronic

and acute toxicity of river sediments from a number of specific herbicides (Sharpe et al. 2003). Shifts to livestock and row crop land use have also resulted in greater water nutrient levels. Despite these problems, the river supports a diverse fish fauna composed of many Mobile Basin endemics, and it is in fact the last stronghold of several of these fishes (Etnier and Starnes 1993).

1.3.3. Tennessee's Six Subterranean Regions

Tennessee's subterranean regions extend from the Tennessee River in the western part of the state to the Blue Ridge Mountains in the east. Overall, the state is thought to have more caves than any other state in the country (nearly 12,000). The regions, as defined by this plan, mainly follow the terrestrial physiographic provinces. Upon initial inspection, caves appear to be scattered throughout the state. However, a closer look reveals patterns of distribution and clustering of known caves within a smaller distinct karst landscape. Therefore, it is necessary to point out more specific subregions to better capture the diversity and differences of the state's subterranean systems and fauna.

Subterranean regions are outlined more from the point of view of related caves and their geologic associations rather than strictly upon fauna. This is because a majority of rare troglobitic species are endemic to a very small area, e.g., a single cave or caves in a particular county. Other faunal groups, particularly aquatic species, can be found across sub-regions and regions, presumably moving through subterranean watersheds that are not well understood at this time. Unfortunately, there is a tremendous lack of information regarding the movement of water into and through Tennessee's underground systems. Yet, this factor should be seriously considered as problems are analyzed and strategies developed for potential protection of sites.

Western Uplands

The Western Uplands subterranean region occurs west of the Tennessee River. This region contains both shallow sandstone caves and limestone caves, mainly along the western portion of the Tennessee River. Most of the rest of the region lacks karst terrain sufficient for the formation of caves.

Central Uplands

This region consists of the area west and north of the Nashville Basin and is considered by many to comprise the Western Highland Rim terrestrial physiographic subregion. However, there are four sub-regions outlined in the Central Uplands: the Loam Hills, the Western Highland Rim, the Pennyroyal Plain, and the Northern Highland Rim. While caves are scattered throughout the landscape in this region, they are more densely clustered in the Pennyroyal Plain.

Nashville Basin

Located in the mid-section of the state, this region is divided into two distinct subregions: the Outer Basin and the Inner Basin. It is in this region where the state's complex geology truly affects cave development and caves are found clustered along physiographic breaks. This is particularly

notable along the eastern border of the Outer Basin where the Eastern Highland Rim rises. Caves are also clustered along the northeast border of the two sub-regions. In the Inner Basin, caves tend to be more interconnected with "sinkholes" and other intricate karst features.

Cumberland-Rim

Most of Tennessee's caves are found in this region. Caves in this area tend to be developed along the western escarpment of the Cumberland Plateau, thereby blurring the terrestrial boundary between the Eastern Highland Rim and the Cumberland Plateau. For this reason, these two regions have been combined. Five sub-regions have been defined in the Cumberland-Rim: the Eastern Highland Rim, the Cumberland Escarpment, the Cumberland Plateau, the Cumberland Mountains, and the South Cumberland-Sequatchie Valley.

Caves are extremely dense in the Cumberland Escarpment sub-region and represent the highest species diversity in the state. Cave entrances are nearly absent from the Cumberland Plateau and the Cumberland Mountains due to a sandstone cap that precludes the necessary solution for development. As the sandstone-capped plateau gives way to the Sequatchie Valley and the many wide coves of the South Cumberlands, caves become numerous again. The karst development in this area extends south into Alabama and shares similar fauna.

Ridge and Valley

The Ridge and Valley region is the geologic transition between the Cumberland Plateau and the Blue Ridge Mountains. It is separated into two sub-regions: the Rolling Limestone Hills and the Eastern Ridge and Valley. Caves are developed along valley breaks and generally concentrated in the northern portion of the region.



A TWRA-owned cave in Fentress Co. / Daniel Istvanko, TWRA

Blue Ridge

The Blue Ridge Mountains of East Tennessee are not as conducive to cave development due to a change in geology from limestone to harder, less soluble rock at higher altitudes. Most of the caves are located in cove bottoms, which are limestone and dolomite. The Blue Ridge is divided into three subregions: the Unaka Mountains, the Great Smoky Mountains, and the Unicoi Mountains.



Unaka Mountains, Cherokee NF / USFS

1.4. Tennessee's Wildlife

Tennessee is well known for biodiversity. In fact, Tennessee is thought to have the most diverse vertebrate fauna of any inland state. As mentioned previously, Tennessee encompasses portions of eight terrestrial ecoregions and has five independent river drainages. The high degree of biodiversity found in Tennessee is strongly influenced by this equally diverse habitat. From the Mississippi Alluvial Plain in the west to the Blue Ridge in the east, the terrestrial and aquatic habitat changes dramatically. While there are animals that have statewide distribution, each ecoregion has unique fauna.



Six-spotted Tiger Beetle (*Cicindela sexguttata*) / johngcalamander via iNaturalist, CC by NC license

In State of the States (Stein 2002), the states were ranked for the following taxonomic groups: vascular plants, all native vertebrate species, and native species in the following invertebrate groups: freshwater mussels; freshwater snails; crayfishes; large branchiopods; butterflies and skippers; underwing moths; tiger beetles; and dragonflies and damselflies. Tennessee was ranked 13th for overall diversity with more than 3,770 species. The richness of the Tennessee fish and amphibian fauna was ranked second nationally for fish and fourth for amphibians. Tennessee was ranked 10th for species at risk, with 10.3 percent of all species at risk. For endemism, Tennessee was ranked 15th with 49 endemic species.

If this diversity is considered on an area-adjusted basis, then Tennessee is likely one of the most biodiverse states in the country. Furthermore, inclusions of subterranean invertebrate fauna, which were not factored into the NatureServe study, would certainly increase Tennessee's ranking. New discoveries of subterranean fauna are being made each year.

In a list compiled by Bob Hatcher of TWRA (2000), it was estimated that there had been 32 probable wildlife extirpations or extinctions in Tennessee, and according to Stein (2002), Tennessee ranks seventh in species extinctions nationally. At present, TWRA lists 66 species deemed In Need of Management (INOM), 47 as threatened, and 31 as endangered (TWRA 2024). Approximately 60 percent of the species listed as threatened, endangered, or INOM in Tennessee are aquatic.

It is important to note that to assess emerging threats to wildlife populations, as well as those well underway, baseline data is necessary for comparison. If little is known about a particular taxon, the degree and rate of decline cannot be determined. Larger, and sometimes, more charismatic

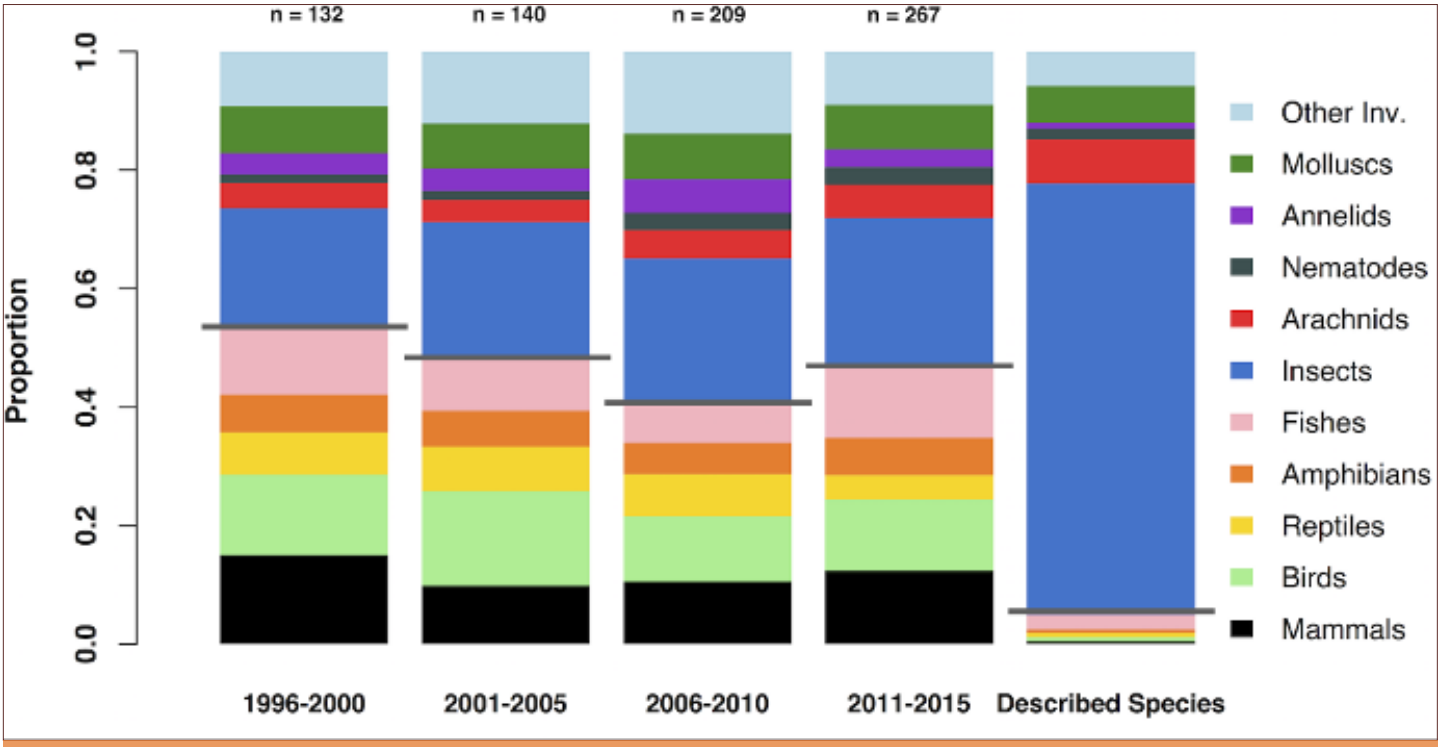


Figure 1.3 The proportions of different animal taxa studied in biodiversity research over the last 20 years. The proportion of different taxonomic groups in the sample of papers with 'biodiversity' in the title is shown for 4 five-year periods since 1996. For comparison, the right-hand column illustrates the 'true' proportions of described species that each group makes up (data from IUCN). Vertebrate and invertebrate taxa are separated by a grey line (figure and caption from Titely et al. 2017).

species (e.g., bears, eagles, and sturgeon) tend to receive greater attention from the research community than other animals with any or a combination of the following characteristics: less visual appeal; less visible (i.e., smaller in size); naturally cryptic, nocturnal, and/or living in relatively difficult-to-access habitats (e.g., underground dens) (Titley et al. 2017).

It is vital to the future of wildlife conservation that we continually acknowledge and document such data gaps so that future research can seek to address these unanswered—and sometimes unknown—questions in a more proportional manner.

1.4.1. Fishes

Tennessee has some of the richest freshwater fauna in the United States. The combination of many independent drainages, physiographic regions, and habitat types coupled with the relative geological stability of the region since Permian times (200 million years ago) has provided a great diversity of habitats and ample time for species to radiate into these habitats. According to the Natural Heritage Program, the result is approximately 350 species of native fishes within the state's boundaries, which is well in excess of that possessed by any other state.

Etnier and Starnes (1993) estimated that there were between 302 and 319 native and introduced species of fish in Tennessee. Warren and Burr (1994) listed 257 native species, 40 of which were



Alligator Gar (*Atractosteus spatula*) / Rob Colvin, TWRA

considered imperiled. According to NatureServe, Tennessee was ranked second nationally for the number of fish species (Stein 2002).

Despite uncertainty as to the actual number of fish in the state, it is clear that many are in jeopardy. Tennessee has the largest number of at-risk freshwater fish species in the United States (Master et al. 1998). There are 8 fish species state listed as endangered, 17 as threatened, and 24 species considered INOM. There are 103 fish SGCN in the 2025 Tennessee SWAP.

1.4.2. Mollusks

Tennessee has the most diverse Mollusk fauna of any inland state (Neves et al. 1997). Bogan and Parmalee (1983) reported the molluscan fauna contained 460 species and forms in Tennessee. According to Bickel (1968) this included 120 species and forms of unionids, 99 aquatic gastropods, and 223 terrestrial gastropods. At least 18 mussel species have become extinct. This is by far the largest number of extinctions for any of the faunal groups considered in this plan. Dams, pollution, and exotic species have taken a great toll on Tennessee's mollusk fauna. Today, 140 species of freshwater mussels are recognized for the state.

There are 41 species of freshwater mussels listed by the US Fish and Wildlife Service (USFWS) as federally endangered and five listed as threatened. There are two species of aquatic snails that are listed as federally endangered in Tennessee (USFWS [date unknown] ESA listed species in Tennessee). There are 90 mussel SGCN and 136 gastropod SGCN in the 2025 SWAP.

Tennessee land snail/slug diversity as represented by NatureServe Explorer includes at least 261 accepted species recorded, including many endemics. TWRA manages a population of an undescribed *Anguispira* cf. *picta* at Bear Hollow Mountain Wildlife Management Area, Franklin County (NatureServe Explorer 2025).



Hatchie River mussels / Naomi Van Tol

It seems that land snails have only recently appeared on the conservation radar. This is surprising, given the number of land snails that occur in Tennessee. The actual status of this whole group is difficult to determine. Most of the research on this group has dealt with taxonomy. Only one species of land snail, the Painted Snake Coiled Forest Snail (*Anguispira picta*), is federally listed as threatened. Two species of aquatic snail, Anthony's Riversnail (*Athearnia anthonyi*) and Royal Springsnail (*Marstonia ogmorhaphe*), are federally listed as endangered (USFWS [date unknown] ESA listed species in Tennessee).

1.4.3. Crustaceans

Tennessee has some of the most diverse crayfish fauna in the United States, with more than 95 species and subspecies of crayfish found in the state (TWRA 2021). It is likely that this number will increase as new species are being described annually.

In recent years, loss of aquatic habitat, pollution, and introductions of exotic species has created management concern among biologists. In 1995, the Division of Natural Heritage listed 12 species with impaired conservation status. In 1996, the American Fisheries Society's Endangered Species Committee assigned a conservation status to all crayfishes of the United States and Canada. Tennessee had 10 species that were considered endangered, two threatened, and two of special concern. Currently, 11 species of crayfish are designated as endangered, 15 species listed as threatened, and four species deemed INOM. These listings represent species known to have very small distributions and live in areas of moderate to heavy human impact. However, little or no monitoring of these populations has been implemented. There is a paucity of data concerning crayfish in Tennessee, but when one considers the status of fishes and mollusks in the state, it is likely that many crayfish species are imperiled. There are 47 crayfish and an additional 52 copepod, isopod, amphipod, and ostracod SGCN in the Tennessee SWAP.



Upland Burrowing Crayfish / Carl Williams

1.4.4. Mammals

Kennedy et al. (2012) identifies 77 native mammal species representing 8 orders in Tennessee, 16 of which are volant (flying) mammals, i.e., bats. Eight species have been introduced, including species such as Brown Rat (*Rattus norvegicus*), Roof Rat (*Rattus rattus*), and Wild Hog (*Sus scrofa*). In the southeastern US, Tennessee ranks sixth for mammal diversity, behind North Carolina, South

Carolina, Georgia, Florida, and Virginia (respectively, first through fifth in the region; Stein 2002). Five mammal species have been extirpated, including the Gray Wolf (*Canis lupus*), Red Wolf (*Canis rufus*), North American Porcupine (*Erethizon dorsatum)*, Snowshoe Hare (*Lepus americanus*), and Cougar (*Puma concolor*) (Kennedy et al. 2012). Five mammal species are federally listed as endangered: Carolina Northern Flying Squirrel (*Glaucomys sabrinus coloratus*), Gray Bat (*Myotis grisescens*), Indiana Bat (*Myotis sodalis*), Northern Long-eared Bat (*Myotis septentrionalis)*, and Virginia Big-eared Bat (*Corynorhinus townsendii virginianus)*. There is one mammal species listed as state endangered, three as threatened, and 13 species considered INOM. There are 36 mammal SGCN in the Tennessee SWAP.



Eastern Woodrat / Daniel Istvanko, TWRA

However, progress is being made on conservation of listed species as well. As of April 2025, in the 5-year review of Gray Bat, USFWS recommended that this species be delisted as it no longer meets the definition of an endangered or threatened species. Tennessee hosts more Gray Bat habitat than any other place in the world. Many people hope that the state's Gray Bat populations are thriving and delisted by 2035, the time of the next SWAP revision.

1.4.5. Amphibians and Reptiles

In terms of amphibian fauna, Tennessee is the fourth most diverse state in the country. Tennessee ranks 8th nationally for at-risk amphibian species. In the introduction to this chapter, the unique fauna of each ecoregion was mentioned. Amphibians, particularly salamanders, exemplify this uniqueness. There are four salamander species designated as state endangered: Streamside Salamander (*Ambystoma barbouri*), Eastern Hellbender (*Cryptobranchus alleganiensis alleganiensis*), Berry Cave Salamander (*Gyrinophilus gulolineatus*), and Yellow-spotted Salamander (*Ambystoma maculatum*). Two species of salamander and one frog species are deemed INOM by TWRA. There are 36 amphibian SGCN in the Tennessee SWAP. Salamanders are especially sensitive to environmental



Tennesse Cave Salamander (*Gyrinophilus palleucus*) Tennessee's state amphibian / Daniel Istvanko, TWRA

changes, such as drought or toxicity, and therefore also serve as an indicator species of ecosystem health.

The public is generally unaware that reptile and amphibian populations are at least equally at risk (Gibbons et al. 2000). The global decline of amphibian populations has received considerable scientific (Azous and Richter 1995; Wake 1991; Booth 1991; Blaustein and Wake 1990) and public attention. However, as is the case for smaller, elusive mammals, there is a paucity in the information describing the distribution and status of reptile species in Tennessee. The Kirtland's Snake (*Clonophis kirtlandii)* and Coachwhip (*Masticophis flagellum*) are designated as state endangered in Tennessee. The Alligator Snapping Turtle (*Macrochelys temminckii*) is state threatened. Additionally, four species of snake, one species of lizard, and one species of skink are also designated as threatened. Three species of snake and one species of turtle are deemed INOM by TWRA. There are 16 reptile SGCN in the Tennessee SWAP.

1.4.6. Birds

For some Tennesseans, birding is a passion. There are approximately 175 species of birds that regularly breed in Tennessee. The majority of the study of birds in Tennessee has been conducted by amateur birders and the ornithological community. Since 1915, the Tennessee Ornithological Society (TOS)—a non-governmental, charitable organization composed of volunteer bird enthusiasts—has played a major role in monitoring bird populations across the state. This effort coupled with research conducted by state agencies and universities has provided a wealth of information on the distribution and status of Tennessee birds.



Barn Owls / Dustin Thames, TWRA

Tennessee ranks 41st nationally for bird diversity, but the state ranks relatively high for at-risk species with an estimated 2.2% of bird species considered at risk (Stein 2002). There is one bird species state listed as endangered, four listed as threatened and 11 species considered INOM by TWRA. Two have been extirpated: the Greater Prairie Chicken (*Tympanuchus cupido*) and Red-cockaded Woodpecker (*Dryobates borealis*) (soon to be reintroduced, see Ch. 6 Conservation Actions and Strategies). The Carolina Parakeet (*Conuropsis carolinensis*), Ivory-billed Woodpecker (*Campephilus principalis*), and Passenger Pigeon (*Ectopistes migratorius*) are extinct. There are 89 bird SGCN in the 2025 Tennessee SWAP.

1.5. Land Ownership and Management in Tennessee

1.5.1. Public Lands in Tennessee

Across Tennessee, there are currently 127 state wildlife management areas and refuges, 84 state natural areas, 62 state parks, 16 state forests, 7 national wildlife refuges, 2 national fish hatcheries, 6 state warmwater fish hatcheries, 4 state coldwater hatcheries, 1 state freshwater mussel propagation facility, 3 national historic trails, 2 national river and recreation areas, 4 national battlefields/military parks, 3 national parks, 2 national parkways, 3 major military installations, 1 major national laboratory, and 2 national forests/recreation areas. There are also numerous county and municipal parks, a portion of which are designated as state natural areas. In total, there are approximately 2,146,000 acres of public lands in the state. Roughly 63% of public lands are under federal ownership, with the remainder in state, county, or municipal ownership.



Eagle Lake WMA / Rob Colvin, TWRA

State Wildlife Management Areas and Refuges

TWRA manages 1.6 million acres across 127 state wildlife management areas and refuges. They vary tremendously, ranging from bottomland hardwoods and wetlands in the west to mountainous terrain in the eastern part of the state. Tennessee's Wildlife Management Areas (WMAs) offer small to large tracts of land with many good opportunities for recreational sportsmen such as hunting/fishing, bird watching, hiking, and even camping in designated areas.

State Forests

The Tennessee Division of Forestry owns 15 state forests totaling 162,371 acres. They are quite varied, ranging from mountain coves to cedar glades to bottomlands along the Mississippi. Tennessee's state forests are undeveloped and offer large tracts of land for hunting, hiking, and bird watching. The Forest Stewardship Council, an internationally recognized third-party group of experts, has certified Tennessee State Forests as having a sustainable strategy of management for many benefits.

State Parks and State Natural Areas

Tennessee currently has a total of 62 state parks in all areas of the state from which to enjoy a wide variety of recreational activities. The purpose of these parks often differs. Some commemorate historical places or are located in urban areas, while others are meant to protect pristine wilderness areas. Several of the state's parks are managed as recreational resorts with activities such as golf, tennis, swimming, and horseback riding. However, many are co-designated as state natural areas

and do not allow development. Other state natural areas are designated solely for the protection of natural resources. In total, there are 84 state natural areas in the state.



Radnor Lake State Natural Area / Greg Wathen

State Fish and Mussel Hatcheries

TWRA manages six warm water fish hatcheries, four cold water fish hatcheries and one freshwater mussel propagation facility located across the state. These 11 facilities are located in west, middle, and east Tennessee; they are used for propagation and augmentation of fish and mussel species into appropriate areas of the state.

National Wildlife Refuges

USFWS manages eight National Wildlife Refuges in the state. Most of these are in West Tennessee (Chickasaw, Cross Creeks, Hatchie, Lower Hatchie, Tennessee, Reelfoot Lake, and Lake Isom), and one refuge is in Middle Tennessee (Paint Rock). Habitats are varied, ranging from bottomland hardwoods and wetlands to more upland xeric type habitats. Bird watching and hiking are allowed year-round, with hunting and fishing allowed during specified times of the year.

National Fish Hatcheries

USFWS owns and operates two National Fish Hatcheries in the state of Tennessee (Dale Hollow and Erwin). The two hatcheries are located in middle and east Tennessee and are used for propagation and relocation of fish and mussel species into appropriate areas of the state.

National Park Service

The National Park Service owns and operates a variety of parks in Tennessee. The only national park in Tennessee, and the most visited national park in the nation, is the Great Smoky Mountains National Park. Other parks include two national military parks (Shiloh and Chickamauga & Chattanooga), two national battlefields (Fort Donelson and Stones River), two national historic parks (Cumberland Gap and Manhattan Project), one national river and recreation area (Big South Fork), one national wild and scenic river (Obed), one national historic site (Andrew Johnson), two national historic trails (Overmountain Victory and Trail of Tears), two national scenic trails (Natchez Trace and Appalachian Trail), and one parkway (Natchez Trace). Lands managed by the National Park Service provide recreational opportunities such as camping, hiking, picnicking, paddling, fishing, and horseback riding. Conservation of these lands also preserves important aspects of Tennessee's cultural history.

Military Bases and Installations

The United States military owns and/or manages four military installations in the state of Tennessee. Several of these installations provide hiking, sightseeing, and hunting/fishing opportunities at designated times in designated locations. Until recently, the three largest military bases in the state were Arnold Engineering and Development Complex, Fort Campbell (also in Kentucky), and Milan Army Ammunition Plant (MLAAP), which together covered approximately 165,000 acres—all with substantial conservation opportunities. However, MLAAP, with a total of 22,357 acres, was formally deactivated on April 10, 2025. This acreage represents the total area of the installation, not the amount decommissioned. In 2022, over 16,000 acres of the MLAAP site were reassigned to the Tennessee National Guard's adjacent facility, Milan Volunteer Training Site, expanding it to over 18,400 acres. This is another potential partner for SWAP-guided natural resource management.

National Laboratory

On behalf of the US Department of Energy, UT-Battelle, LLC manages the Oak Ridge National Laboratory (ORNL), which occupies approximately 10,000 acres within the larger 35,000-acre Oak Ridge Reservation in the Ridge and Valley of East Tennessee. This science and technology laboratory offers tours of the lab and facility, with sightseeing opportunities offered by staff biologists. Hunting/fishing opportunities are restricted but allowed at designated times and locations.



Cherokee National Forest / Gorilla Girl via Flickr Creative Commons

National Forest Service

The United States Forest Service manages two large tracts of land in Tennessee: Cherokee National Forest and Land Between the Lakes National Recreation Area. These National Forests and Recreation Areas provide hiking, camping, sightseeing, boating, biking, and hunting/fishing opportunities.

1.5.2. Tribally Owned Lands

Currently, there are no reservations or other major landholdings owned by Native American tribes in the state of Tennessee.

1.5.3 Private Lands

Approximately 90 percent of Tennessee land is privately owned. This includes urban/developed areas as well as privately owned forests, agriculture, and grasslands. The 2025 SWAP includes a new chapter on Private Lands (chapter 8), which discusses conservation issues and opportunities on private lands across the state.

1.6. Explanation of Ecological Classification Hierarchy used in SWAP

The State Wildlife Action Plan uses the classification of Tennessee's terrestrial, aquatic, and subterranean regions as the background for understanding the distribution of SGCN and their habitats. (See Map 1.1.)

At the broadest level, each of the state's ecoregions defines a regional landscape that supports recognizably distinctive groupings of plants, animals, and natural communities due to regional patterns of climate, landform, soil, and hydrology. Reflecting natural geographic units, ecoregions are more effective for conservation planning than political and jurisdictional boundaries like states and counties. Ecoregions allow visualization of large ecologically related areas and the distribution of species, habitats, and ecosystems across large regions. They provide a structure for understanding relative representation of different habitat types and ecological systems (Landscope America Ecoregions [date unknown]).

Conservation planning for the state's eight ecoregions (as well as aquatic regions and subterranean regions) ensures broad planning for the resources unique to each area.

1.6.1. Habitat Groups and Associated Natural Ecological Systems

For detailed conservation planning and management that will benefit individual species or communities, finer levels of classification beyond ecoregions are required. Ecoregions contain multiple ecosystems, and the same ecosystem can be found across many different ecoregions.



Limestone Seepage Glade, a type of Central Appalachian Alkaline Glade and Woodland / Mason Brock

Ecosystems are distinct assemblages of plant and animal species interacting with their environment. NatureServe has developed ways to define and name them, such as "Longleaf Pine Woodland" and "Central Appalachian Alkaline Glade and Woodland." Ecosystems provide a practical way to understand and conserve biodiversity and complement efforts to conserve individual species (NatureServe 2021). For the 2025 Tennessee State Wildlife Action Plan, ecosystems have been defined using the Descriptions of Ecological Systems for Modeling of LANDFIRE Biophysical Settings (Comer 2003).

Since 2005, the Tennessee SWAP has used a hierarchy of standardized habitat classifications that range from broad habitat categories to ecological systems as defined by NatureServe. For the purposes of illustration, these habitat classifications are shown below for prairie-barrens grasslands in Tennessee. Native grassland ecosystems are among the most imperiled in the state, providing

primary habitat for more than 70 SGCN. The example below lists habitat hierarchies from least to most specific.

- Broad habitat category: Terrestrial
- Broad habitat class: Natural
- Habitat Alliance: Upland grassland and herbaceous
- Habitat Group: Prairie-Barrens
- Ecological Systems: East Gulf Coastal Plain Jackson Plain Prairie and Barrens, East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland, Pennyroyal Karst Plain Prairie and Barrens, Western Highland Rim Prairie and Barrens, Eastern Highland Rim Prairie and Barrens, Cumberland Wet-Mesic Meadow and Savanna, Southern Ridge and Valley Patch Prairie

Many ecological systems can be found in multiple ecoregions; however, the suitability of an ecological system for a given SGCN may not be uniform in all ecoregions across the state. Appendix E lists all SGCN and assigns rankings of "preferred," "suitable," and "marginal" to each ecological system with the potential to support a given species in Tennessee.

1.7. Tennessee Population and Land Cover Status

1.7.1. Population Change in Tennessee

Table 1.1 shows, under Recent Population Totals, how Tennessee's population has changed from 2005 to 2015 through 2020 (the latest date for which data were available) in comparison with the US population. It also shows Future Population Projections, which indicate substantial increases for both for Tennessee and the US that will inevitably translate into urban and rural development.

Table 1.1 Population growth in Tennessee and the US, actual and projected 2005 to 2100

	Recent Population Totals [1]			Future Population Projections [2, 3]				
	2005	2015	2020	2025	2035	2050	2075	2100
United States	281,421,906	326,241,243	331,515,736	347,275,808	363,284,716	380,846,910	402,910,163	421,278,890
Tennessee	5,689,283	6,642,471	6,912,347	7,160,092	7,658,277	8,309,477	9,322,974	9,851,080

[1] US Census Bureau, Population Division. 2024. Annual Estimates of the Resident Population for the United States, Regions, States, District of Columbia, and Puerto Rico: April 1, 2020 to July 1, 2024 (NST-EST2024-POP)

[2] United Nations, Department of Economic and Social Affairs, Population Division (2024). World Population Prospects: The 2024 Revision, custom data acquired via website

[3] Hauer, M. Population projections for US counties by age, sex, and race controlled to shared socioeconomic pathway. Sci Data 6, 190005 (2019). https://doi.org/10.1038/sdata.2019.5

1.7.2. Tennessee Land Cover in 2025

The following graphs and charts show the type, extent, and distribution of land cover by ecoregion in Tennessee as of 2025.

Fig. 1.5 breaks out the total natural land area (shown in green in Fig.1.4) by more detailed land cover type, clearly showing the predominance of forest cover in the state of Tennessee. Fig. 1.6 shows pie charts for each of the eight Level III Ecoregions in Tennessee, which give a detailed summary of land cover status (public, private protected, and private unprotected) by ecoregion.

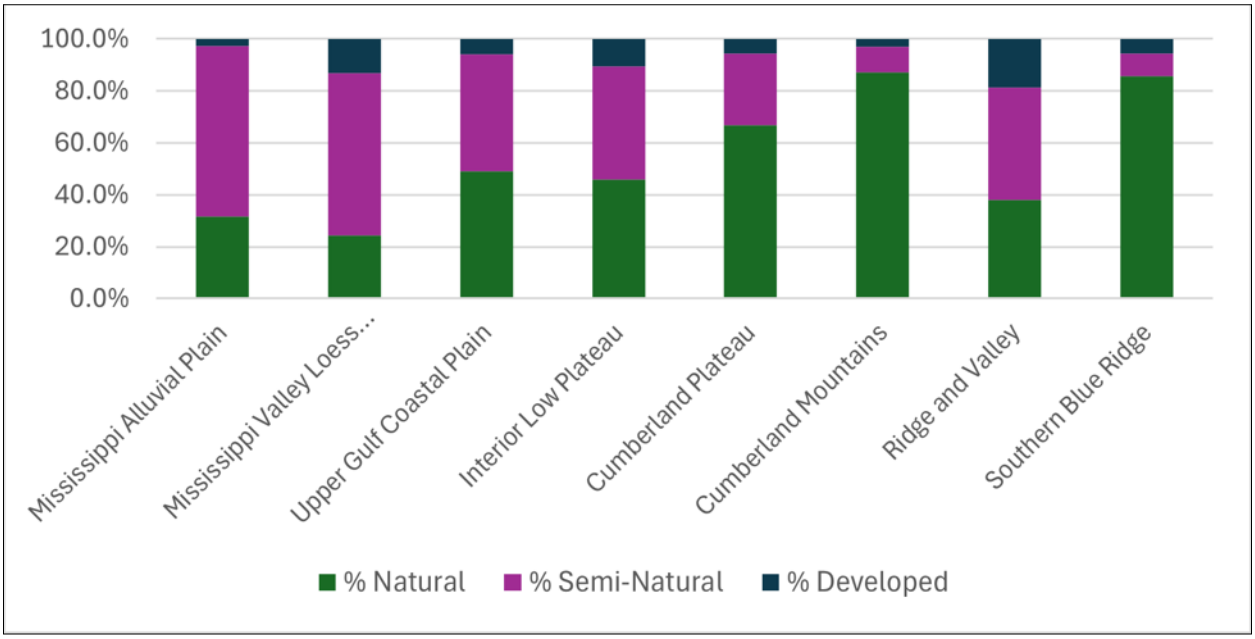


Figure 1.4 Natural, semi-natural, and developed land within TN Level III ecoregions

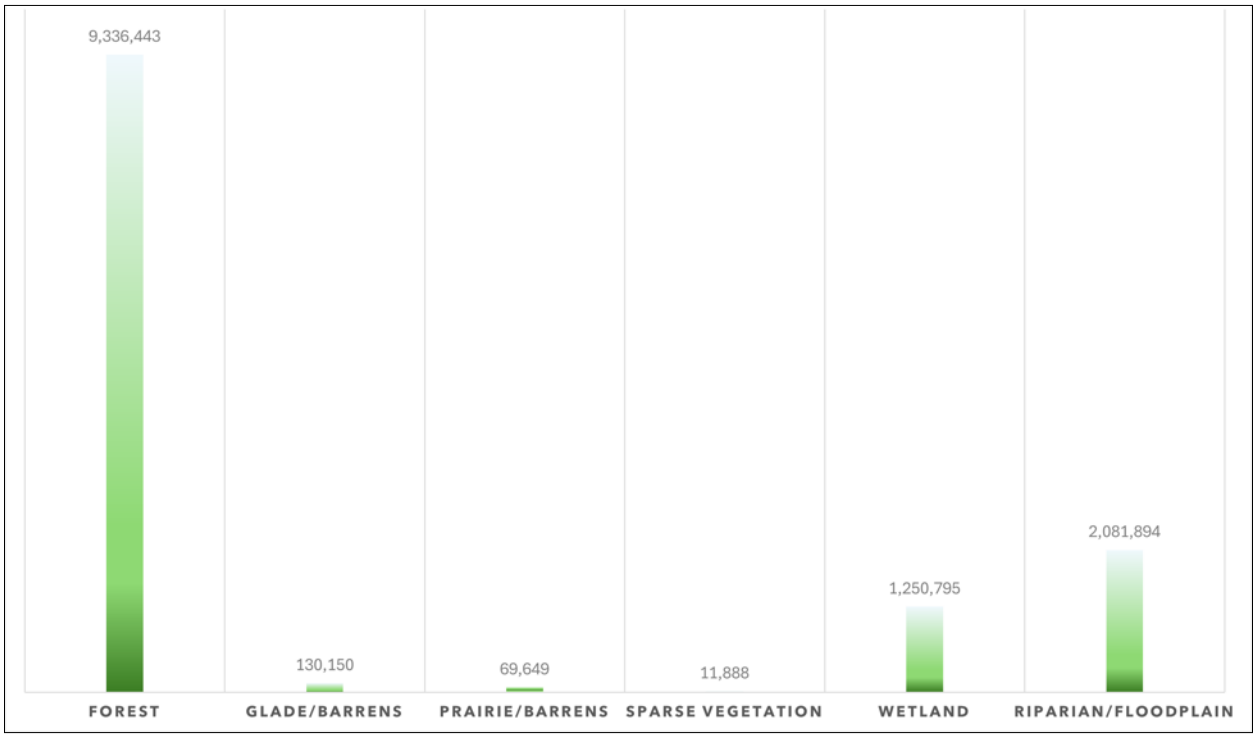


Figure 1.5 Tennessee natural land cover type (acres)

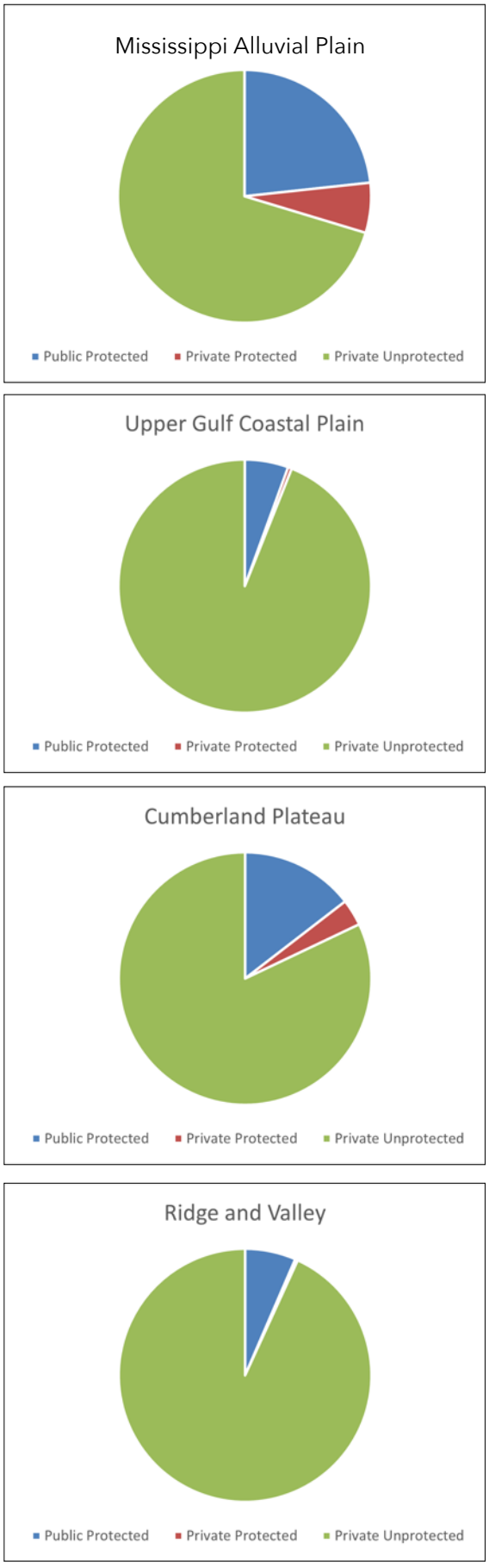


Figure 1.6 Land protection status by ecoregion, in eight pie charts

Public land is any real estate owned and managed by a government entity for the use of the public. Public lands are, for purposes of the 2025 SWAP, assumed to be protected. Lands with protected status are generally not subject to future development or habitat loss. Private lands are any lands, such as family farms or private woodlands, that are not public lands. Private lands may either be protected, usually through conservation easements, or they may be unprotected (see Chapter 8, Private Lands Conservation, for more detail).

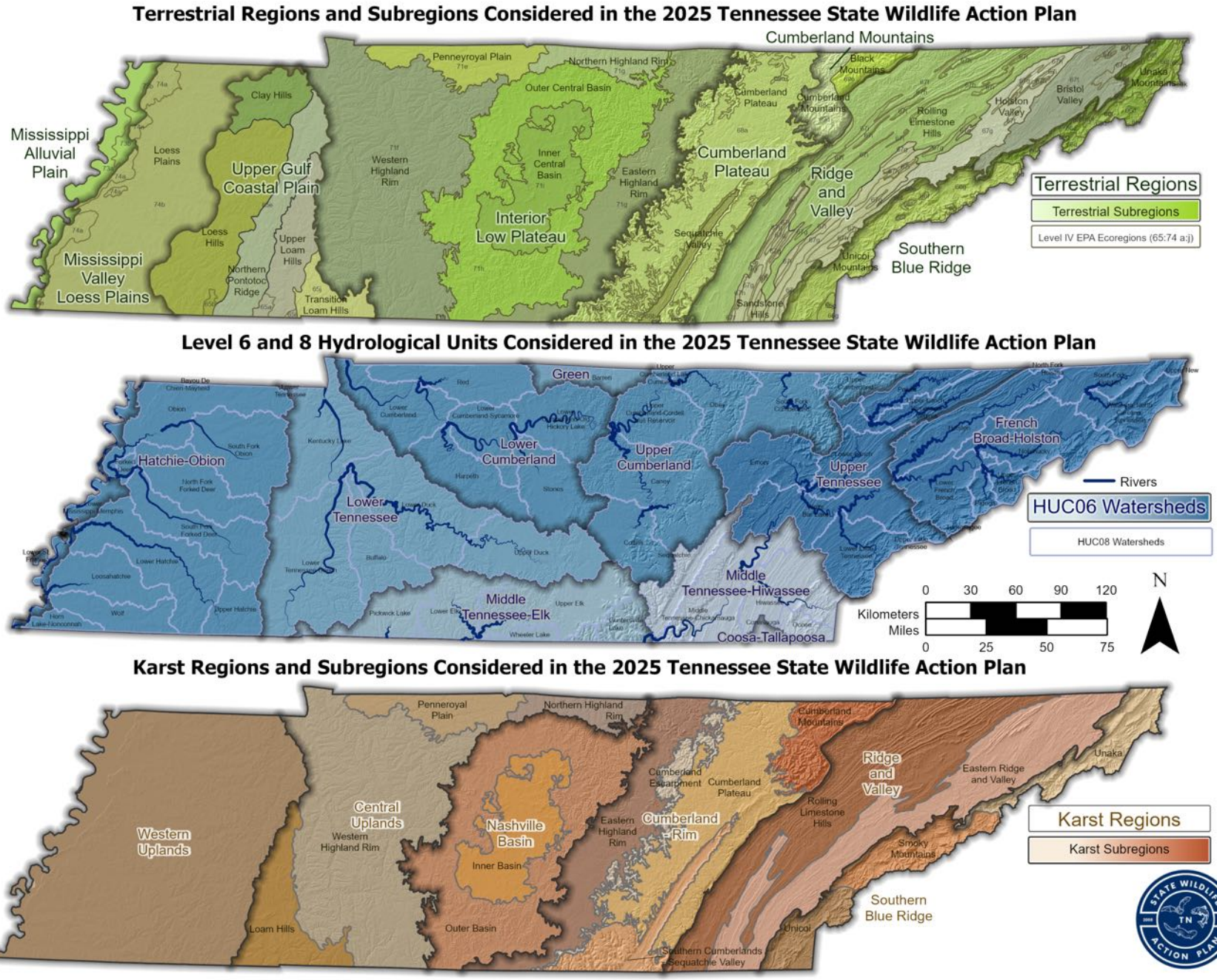


Figure 1.7 Tennessee's eight terrestrial, five aquatic, and five subterranean ecoregions



CHAPTER 2

TENNESSEE STATE ACCOMPLISHMENTS UNDER THE 2015 SWAP

2.1. How the 2015 SWAP Guided Conservation Efforts

Since its inception, Tennessee's State Wildlife Action Plan has guided many agencies and organizations in conducting habitat and nongame species conservation throughout Tennessee. One theme heard consistently from wildlife conservation partners is the utility of the Conservation Opportunity Areas. Additionally, the State Wildlife Grant program (SWG) has provided critical investments that have sustained conservation progress across Tennessee.

These grants were created by Congress to help keep species off state and federal Threatened and Endangered (T&E) Species Lists, but to do so, they must be applied strategically, and that is the role of the State Wildlife Action Plan. The 2005 SWAP identified incompatible land use and development as the primary problem facing the widest variety of species and habitats statewide (TWRA 2005). Alteration of streams and rivers, degraded water quality, poor land management practices, natural fire suppression, and invasive exotic species were other priority problems linked to species and habitat declines in the 2005 SWAP. These threats remained at the top of the list in the 2015 SWAP.

To meet these challenges, SWG funding from 2015 through 2024 has supported habitat restoration, dam and culvert removal, prescribed fire, and species reintroductions aimed at increasing populations of key Species of Greatest Conservation Need (SGCN). SWG funds have also helped to leverage the conservation expenditures of other organizations.

Photo credit: Yellowfin Madtom (*Noturus flavipinnis*) Evan Poellinger, Conservation Fisheries Inc.; Tennessee silhouette - gograph.com

Research and monitoring of a wide variety of species has resulted in vastly improved understanding of the distribution and needs of Tennessee's SGCN, which in turn results in improved management and conservation planning. Research projects are also pioneering ways of combatting white-nose syndrome, which threatens bat populations across the state, and highlighting emerging threats such as Snake fungal disease, chytrid fungus, and Ranavirus—all of which threaten Tenneseee's reptile and amphibian populations. Finally, the extensive SWAP spatial data analysis, combined with strategic granting of SWG dollars, have informed local and state land protection efforts aimed at promoting ecotourism and protecting local heritage and natural areas. (See Appendix C for a list of 2015-2024 SWAP-guided projects submitted by partners).

2.1.1. Restoring and Managing Habitat to Benefit Wildlife

The 2005 SWAP identified "Priority Terrestrial Restoration Portfolios" for six ecoregions of Tennessee, and the 2015 SWAP mapped areas of semi-natural habitat restoration priority in relation to existing priority natural habitats. Both SWAPs also recognized the importance of restoring natural grassland and woodland systems, which would increase overall value to SGCN, since very few good examples of these vegetation types remain. A recommended strategy was to address areas degraded by altered fire regimes through the application of prescribed fire management.

Bringing back oak savanna

At Catoosa Wildlife Management Area (WMA), a project to restore oak savanna and open woodland habitats has been ongoing since 1999. Canopy reduction plays a crucial role in the restoration process. To date, more than 5,800 acres of mixed pine forest has been cleared or thinned. Prescribed fire is applied regularly in the understory to promote native grasses such as big bluestem (*Andropogon gerardii*) and wildflowers such as rattlesnake master (*Eryngium yuccifolium*) and blazing star (*Liatris* sp.) – species that thrive in more open conditions. The new growth provides abundant food in the form of seeds, sprouts, and legumes for birds, deer, and many other species. Native grasses benefit Northern Bobwhite Quail (*Colinus virginianus*), an SGCN whose populations have been in decline for decades, and the scrub-shrub habitat attracts songbirds such as Hooded Warblers (*Setophaga citrina*), Common Yellowthroat (*Geothlypis trichas*), Yellow-breasted Chat (*Icteria virens*), Eastern Towhee (*Pipilo erythrophthalmus*), Field Sparrow (*Spizella pusilla*), and Red-



Keeping common species common: four species from Catoosa that are not SGCN, clockwise from upper left - Rattlesnake Master / j van cise photos; Common Yellowthroat / Christina Butler; big bluestem / Nick Varvel; Eastern Towhee female / Shawn Taylor

headed Woodpeckers (*Melanerpes erythrocephalus*). This project has received support from at least 14 different agencies, organizations, and funders, while also hosting a wide variety of researchers helping to catalog the response of wildlife and plants to the restoration (Woody 2011).

This support reflects the urgency of conservation for oak savannas and other open woodland and grassland community types. The Southeastern Grassland Institute (SGI) is a leader in education and outreach concerning the importance of these habitats in Tennessee and across the Southeast. According to SGI, "Our precious Southern grasslands are nearly extinct and the species that depend on them are fading fast. Many of our Southern grasslands that managed to persist through the past 200 years have disappeared in the past quarter-century."

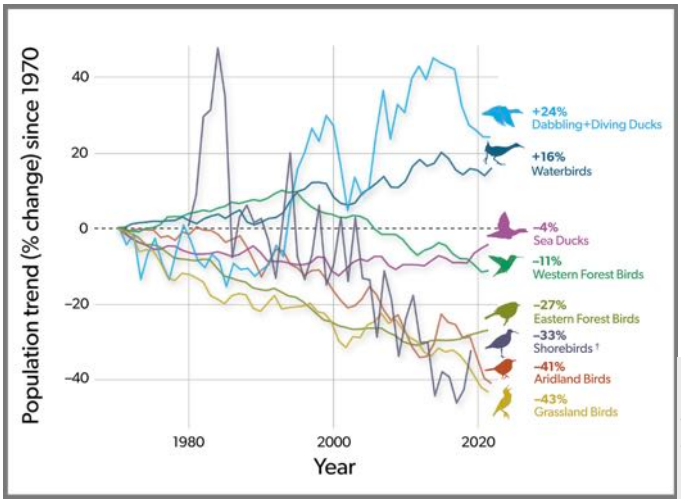
The reasons for these losses are many, interrelated, and complex. They include:

- Grasslands and woodlands were some of the most desirable areas to EuroAmericans who settled these areas for agriculture.
- Agricultural activities could transform woodlands into pine plantations, and grasslands into row crops or pastures planted with European grass species.
- Many of these habitats relied on regular fire and/or disturbance by large herbivores (bison). As lands were settled, fire suppression increased and by the early 1800s, wild bison had disappeared from Tennessee.
- Because of these changes, management of open habitats often requires prescribed fire, mowing, chemical control, and/or periodic thinning of trees (in woodland habitats). Without this stewardship, woodlands that allow plentiful sunlight into their diverse understories become closed canopy and dark. Light-loving plants no longer thrive. In grasslands, prairies, and glades, cedars and other trees can invade—along with invasive plant species that may outcompete rare plant SGCN. Areas transformed in this way can result in the loss of critical habitat to SGCN such as the Northern Bobwhite.



Northern Bobwhite, an SGCN / James Childress (by permission)

For all of the above reasons, grasslands are commonly recognized as the world's most endangered biome, and in North America, grassland birds have experienced the greatest



Long-term decline of birds since 1970; ducks have received the greatest conservation investments and show the greatest increase; all other guilds aside from waterbirds have declined. From 2025 State of the Birds Summary / NABCI

population declines (43%) over the past 50 years compared to all other guilds of birds (NABCI 2025).

Aquatic restoration through small dam removal

The 2005 and 2015 SWAPs highlighted existing impoundments and dam construction as a priority source of stress affecting aquatic habitats throughout much of Tennessee. Since 2005, SWG funds and other partnership efforts have focused on piloting small dam removals to improve stream habitat, water quality, and recreational opportunities.

A relatively new tool now available to select the best dams for removal is the **National Aquatic Barrier Inventory & Prioritization Tool**. Begun as a Southeast Aquatic Resources Partnership (SARP) project, it has been expanded, with support from the USFWS, to cover the nation. Data from this tool, augmented by habitat and species occurrences from the 2015 SWAP database, were key in identifying potential dam removals with the greatest benefits. Harm's Mill ranks in the top five out of 2,000 dam removal priorities identified in Tennessee. As of summer 2025, conservation partners including SARP, Tennessee Wildlife Resources Agency (TWRA), The Nature Conservancy (TNC), Tennessee Dept. of Environment and Conservation (TDEC), Tennessee Valley Authority (TVA) and the US Fish and Wildlife Service (USFWS) have planned and permitted the removal of Harm's Mill Dam on the Elk River in Lincoln County. According to the Aquatic Barrier Inventory, as of spring 2025, 38 dams have been or are actively being removed or mitigated in Tennessee, gaining 1,652 miles of reconnected rivers and streams.

2.1.2. Controlling Destructive Invasive Species

Invasive Carp

The species Silver Carp (*Hypophthalmichthys molitrix*), Bighead Carp (*H. Nobilis*), Black Carp (*Mylopharyngodon piceus*), and Grass Carp (*Ctenopharyngodon idella*)—also noted in Tennessee's Aquatic Nuisance Species (ANS) Plan—are a problem for big river SGCN. Invasive nonnative populations escaped or were released from captivity, and in some instances (i.e., Grass Carp) have been stocked for management purposes. Silver Carp and Bighead Carp compete for food with native plankton-eating species including Paddlefish (*Polyodon spathula)*, Bigmouth Buffalo (*Ictiobus cyprinellus*), Gizzard Shad (*Dorosoma cepedianum*); the larval fishes of many species; and freshwater mussels.



Silver Carp, a highly abundant invasive species that is also dangerous to boaters / Invasive Carp Regional Coordinating Committee

The noise of boat motors can cause Silver Carp to leap out of the water, creating the potential for human injury or fatality. Commercial fishermen have abandoned fishing sites on the Missouri River due to the high numbers of invasive carp in their nets (TANSTF 2008), though in recent years,

commercial fishermen have become an important component of efforts to control these invasive species. Black Carp are molluscivores that pose a significant threat to the many threatened and endangered freshwater mussels and snails in Tennessee.

Tennessee's management of invasive carp is part of a broader national effort by state and federal agencies throughout the Mississippi River basin, for which federally appropriated funding has been critical. Tennessee has established ongoing monitoring efforts to track population expansion to new waters, document recruitment events, evaluate population characteristics in invaded waters, and understand behavior of invasive carp to inform prevention and control. In September 2018, Tennessee established the Tennessee Carp Harvest Incentive Program (TCHIP), which has resulted in commercial fishermen removing more than 36 million pounds of invasive carp from the Tennessee and Cumberland rivers as of December 31, 2024!

Tennessee and partners recognize that removal alone is not a long-term solution to prevention and control of invasive carp. Deterrents are needed at locks to further restrict the movement of carp, and Tennessee has been a strong supporter and advocate for implementation of deterrents at priority locations.

Feral Swine

Feral Swine *(Sus scrofa*), also called feral hogs, were introduced to North America by European settlers and have become extremely destructive to the habitats of native wildlife and agriculture. Feral swine can carry at least 30 diseases (including Brucellosis) and nearly 40 types of parasites that may affect people, pets, livestock, and wildlife (USDA APHIS 2024a). Feral Swine can also transmit foodborne illnesses, such as *E. coli*, toxoplasmosis, and trichinosis. In some areas, feral swine have been the cause of elevated waterborne bacteria levels in streams and irrigation canals, which is another risk for human health (USDA APHIS 2024a).

Feral Swine are prolific reproducers and do massive damage to the land through feeding and wallowing. They are also omnivorous and will eat just about anything they can find. Feral Swine depredation can cause turkeys, ground-nesting birds, amphibians, and reptiles to suffer population decreases (Cox 2014). Feral Swine also root up acres of land, including native plant populations, which requires significant time and money to repair.

Nationwide, Feral Swine's range increased from 17 to 39 states over the last 30 years (Bevins and Franklin 2014). The damage from Feral Swine was likewise increasing until concerted management efforts to control swine began in 2014, when US APHIS established the National Feral Swine Damage Management Program to protect agricultural and natural resources, property, animal health, and human health and safety. Using a One Health approach, multiple APHIS agencies collaborate with other pertinent federal, state, territorial, tribal, and local agencies (including TWRA), as well as private organizations to achieve these goals. The program focuses on minimizing Feral Swine damage, eliminating emergent populations, and controlling populations in urban areas where they pose a danger to people and property (USDA APHIS 2024b). The program's success shows in the maps below. The year 2013 is when TWRA closed Feral Swine hunting (Fig.

2.1), and the Feral Swine Management Program began the next year. After having spread from approximately 15 Tennessee counties in 1982 (TWRA unpublished data) to 89 counties in 2013 (Jerrolds & Derroch 2014), control efforts have reduced the range of feral swine in Tennessee significantly (Fig. 2.2) to approximately 40 counties!

Figure 2.1 Feral Swine range in 2013

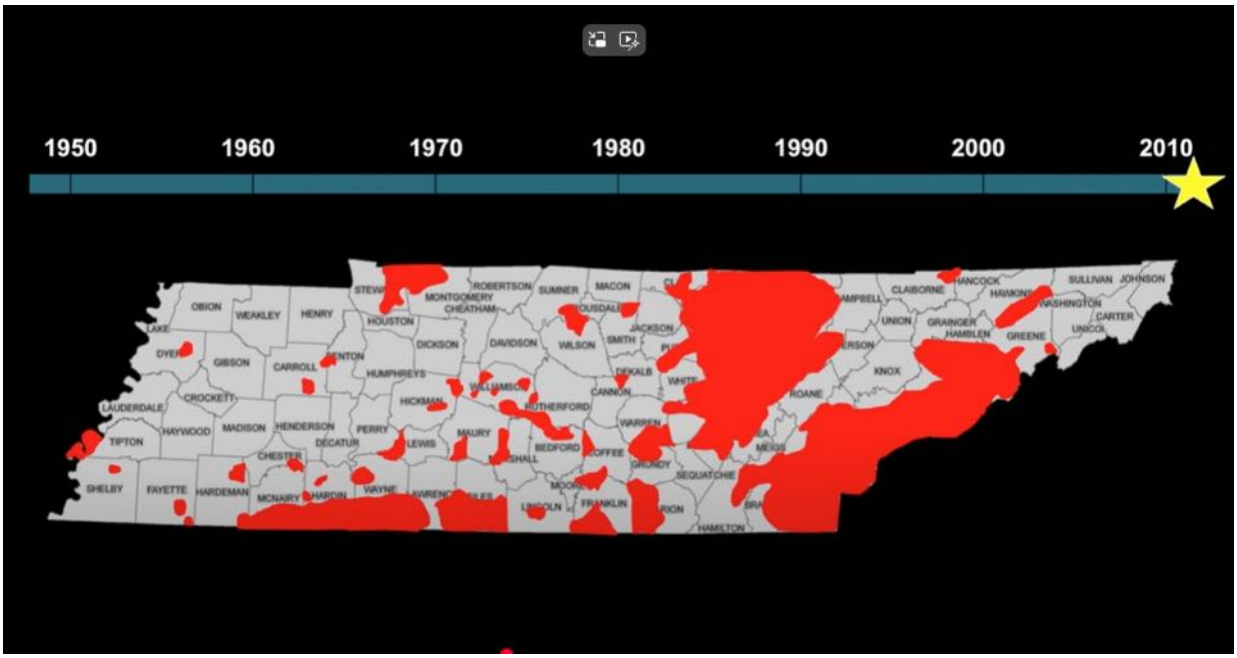
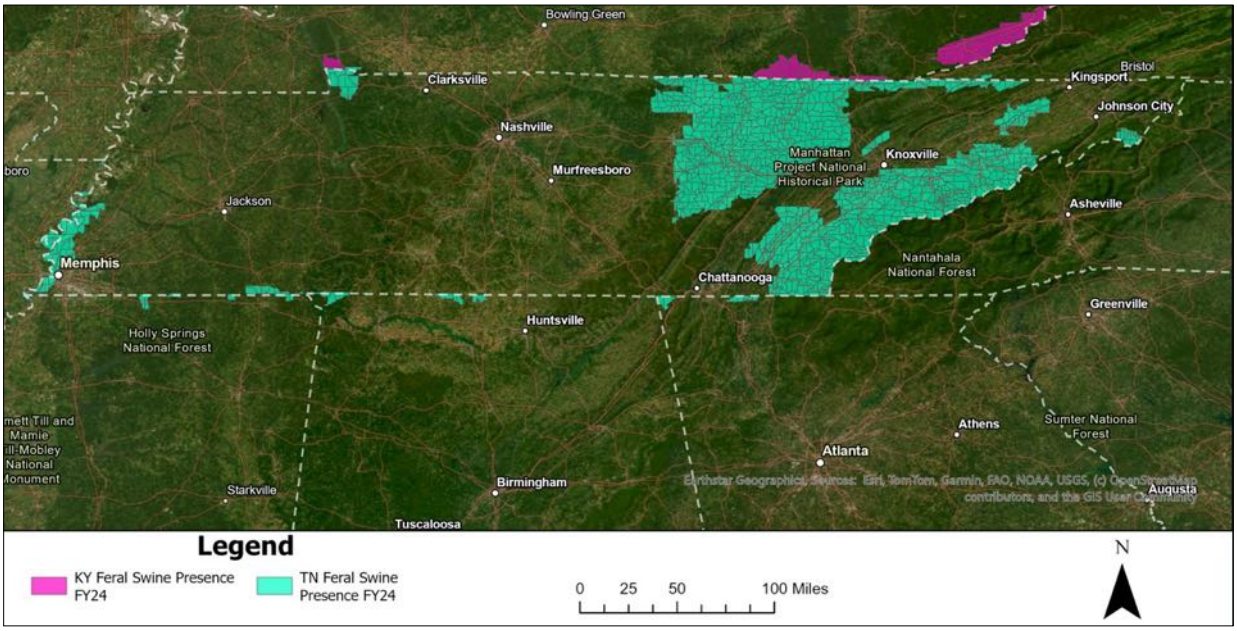


Figure 2.2 Feral Swine range in 2024



2.1.3. Improving Decisions through Data Collection and Analysis

In two TWRA strategic plans issued subsequent to the 2005 SWAP, the lack of information on (1) the status of nongame species populations, (2) their ecological limiting factors, and (3) needed management were identified as priority issues. Since implementation of the 2015 State Wildlife

Action Plan began, TWRA Wildlife Diversity staff have conducted surveys on 51 Wildlife Management Areas (WMAs), three refuges, six wetlands, and six state natural areas/state parks, as well as other key areas across the state.

These surveys have determined the presence, absence, and habitat preferences of SGCNs and have produced over 82,000 observations of herpetofauna and mammals (both volant and non-volant), including 2,735 captures of SGCN. TWRA maintains all survey data, and these data significantly increased occurrence records in the 2015 SWAP Geographic Information Systems (GIS) relational database. Data collected through these and partner survey efforts are incorporated into management plans developed for WMAs and have helped to inform the development of habitat management or restoration projects to directly benefit SGCN. Additional monitoring projects have incorporated the ability to track species' response to management activities.

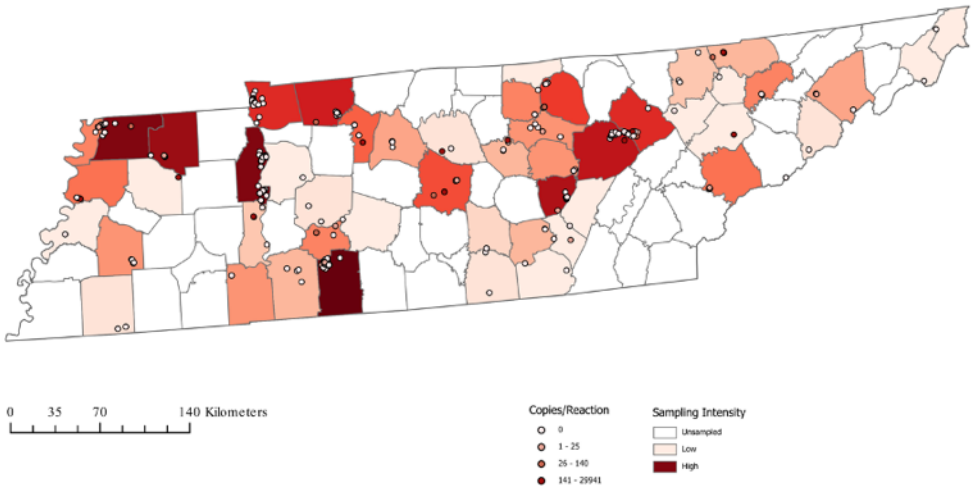


Silver-haired Bat (*Lasionycteris noctivagans*) / Michaela Bass, TWRA

Tracking the effects of a deadly disease

Emerging infectious diseases are increasingly recognized as a significant threat to global biodiversity conservation, leading to an increasing number of studies that quantify how these diseases influence wildlife health. Recent research conducted by Romer et al. (2024) indicates that Snake fungal Disease (Ophidiomycosis or SFD) is an emerging pathogen that may alter the host microbiome by inducing dysbiosis, an ecological state characterized by a reduction in "good" bacteria and an increase in pathobionts (microorganisms that are normally harmless in healthy

Figure 2.3 Sampling intensity for SFD within Tennessee Counties



individuals, but which can become pathogenic under specific circumstances, such as changes in the host's environment, immune system, or diet). The maps below show the results of surveys conducted by Dr. Donald Walker's Microbiome Ecology Lab at Middle Tennessee State University. The maps show where snakes were sampled for the presence of disease (Fig.2.3), based on a predictive model of disease occurrence, which counties were positive for the presence of SFD (Fig. 2.4), and the percent of positive detections (Fig. 2.5).

Figure 2.4 Map showing counties in which SFD was detected, and the types of detections

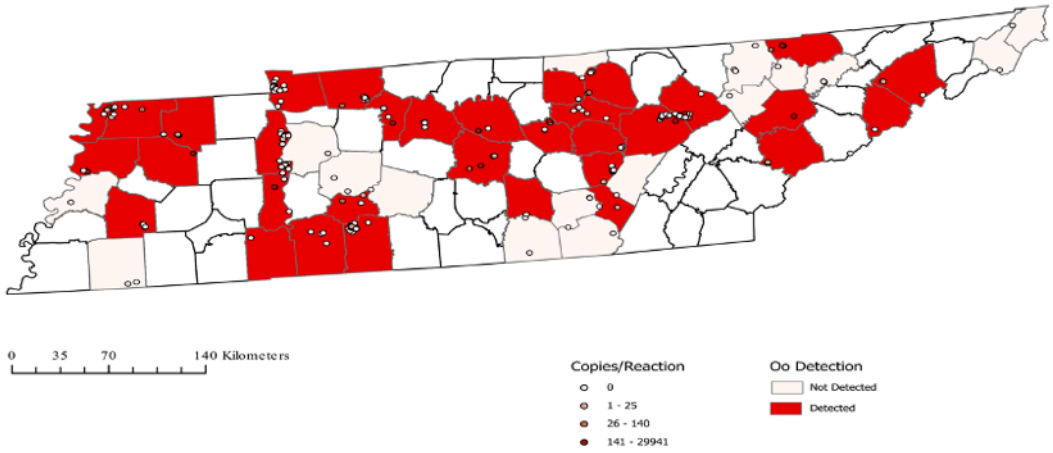
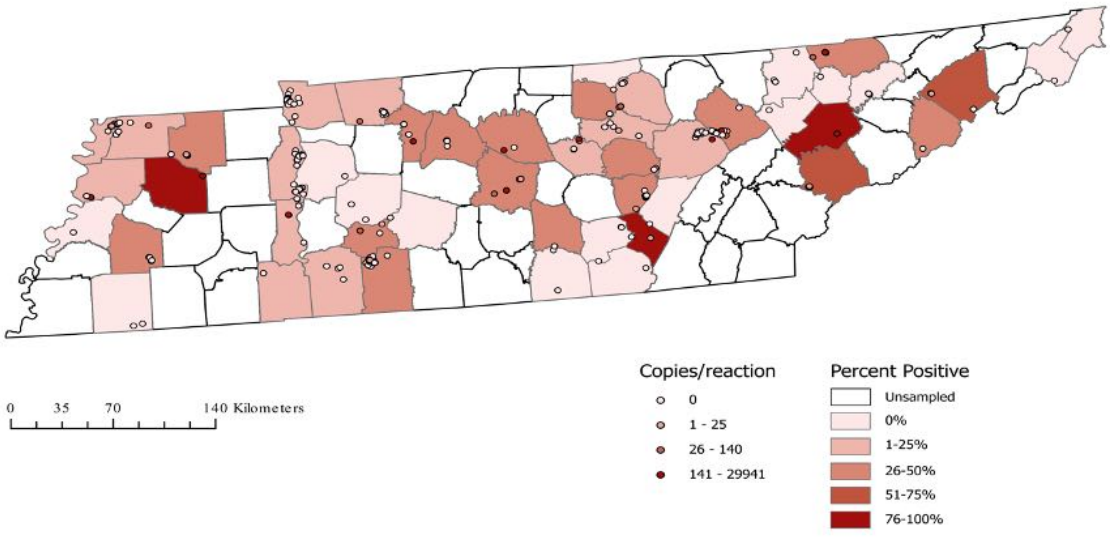


Figure 2.5 Percent of samples testing positive for SFD by county across the state



White-nose Syndrome (WNS)

WNS is a disease impacting some species of cave hibernating bats in North America. The fungal pathogen that causes WNS (*Pseudogymnoascus destructans)* was introduced into North America in 2006, and it has spread across the continent from the epicenter in New York (White-nose syndrome 2025). The disease was discovered in Tennessee in 2010 and has since decimated populations of Northern Long-eared Bats, Tricolored Bats, Indiana Bats, and Little Brown Bats in the state (see photo at right).



Five bat SGCN in Tennessee that are vulnerable to WNS, clockwise from upper left: Tricolored Bat (on top) (*Perimyotis subflavus*) and Little Brown Bat (*Myotis lucifugus*); Northern Long-eared Bat (*Myotis septentrionalis*); Gray Bat (*Myotis grisescens*); Indiana Bats (*Myotis sodalis*) / all photos by Daniel Istvanko, TWRA

Part of the national response to WNS has been the development and implementation of the North American Bat Monitoring Program (NABat; Loeb et al. 2015). The program provides detailed protocols to collect acoustic bat data and serves as a database for a variety of bat data from organizations across the continent. Data submitted to NABat is used to analyze bat population trends and occupancy (where bat species occur on the landscape) at range-wide scales and helps inform conservation management.

With funding support from the USFWS's WNS grants to states and tribes, TWRA has implemented an annual stationary and mobile acoustic bat monitoring program. Bat acoustic data is collected by deploying ultrasonic recording devices to record the high frequency echolocation calls from bats. The calls are analyzed with automated software that can often identify which species were recorded based on the frequency and structure of the echolocation calls. Bat stationary acoustic data is recorded each year at 60 sites across the state by TWRA. The data is then analyzed and uploaded to the NABat database. Additionally, TWRA coordinates bat winter colony count surveys across the state each year. These surveys are critical to understanding the population trend of cave hibernating bats and impacts from WNS. Since the discovery of WNS in Tennessee, TWRA and partners have increased capacity, and an average of 98 bat winter colony count surveys have been completed each year in the state since 2015 (Thames 2025).

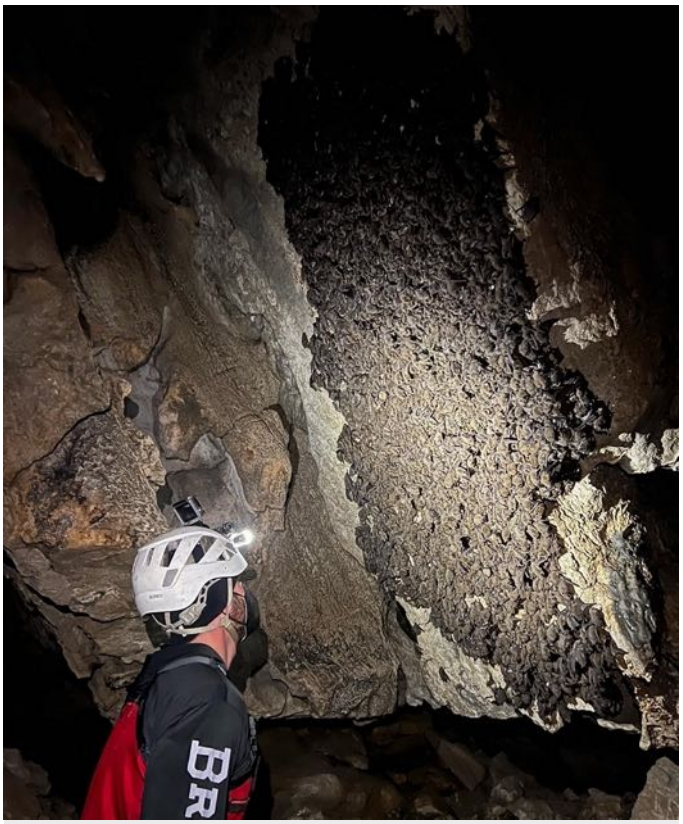
With support from USFWS WNS grants, TWRA has harnessed the Tennessee Bat Working Group's network of bat biologists to host a bat blitz each summer since 2021. A bat blitz is an event where bat biologists come together and conduct mist net surveys over a couple nights in a small geographic area. The bat captures from these events provide critical species and relative abundance data that inform management and conservation. These data allow biologists to assess bat communities on the landscape, providing more reliable information than acoustic monitoring.



BrandenBark (left) and Rocket Box installed on private property in Wilson County, TN / Dustin Thames, TWRA

Monitoring newly discovered bat colonies

Tennessee is home to 16 species of insectivorous bats. Bats provide critical ecosystem services by consuming insects and, therefore, saving farmers across the US billions annually and helping to maintain balance in the ecosystems that humans depend on (Boyles et al. 2011). Unfortunately, ten of the 16 species are SGCNs due primarily to declining populations from a variety of threats. Additionally, the basic life history of many species is poorly understood, making conservation challenging. TWRA initiated a spring migration study in 2009 on federally endangered Indiana Bats. Indiana Bat hibernacula are generally well known in Tennessee and have been monitored for decades. However, prior to a spring migration study that was conducted annually from 2009–2018, it was unknown where the Indiana Bats that hibernate in Tennessee migrate to form maternity colonies.



Gray Bats at Pearson Cave / Mallory Tate Cogburn, TWRA

The project resulted in the discovery of maternity colonies at six sites in Tennessee, and numerous sites out-of-state, including Chattahoochee National Forest in Georgia, Holly Springs National Forest in Mississippi, and Talladega National Forest in Alabama. The most populous maternity sites in Tennessee are located in Wilson County and, unlike the sites out-of-state, the Wilson County colonies are on private property.

To conserve and protect these populations, TWRA harnessed grant funding from TVA to develop license agreements with landowners. These

agreements provide TWRA with access to the property and rights to install artificial roosting structures for the bats. In exchange, the private landowners get an annual monetary payment. Approximately 1,300 acres are currently held in license agreement and 36 artificial roosts were installed on the properties in 2020. The first spring after installation, Indiana Bats formed a maternity colony in one of the artificial roosts. The population using the roost has increased each year with the highest count of 53 Indiana Bats being documented in 2024 (see White-nose Syndrome Highlight).

The success of this project provides a framework for conserving endangered bats on private property. More funding is needed to purchase property in the area to ensure the protection of this maternity colony in perpetuity. TWRA has developed strong relationships with landowners in the area, and these relationships have been critical in educating landowners on the life history and conservation needs of bats.

2.1.4. Protecting Lands and Waters in Perpetuity

Priority bat caves in Tennessee

The previous iterations of Tennessee's SWAP have consistently highlighted the importance of land acquisition in protecting populations of SGCN. SWG funding, along with other funding sources, has been used to protect numerous tracts of land across the state of Tennessee. For example, since 2005 TWRA has purchased property surrounding two of the three largest bat caves in Tennessee: Bellamy Cave in Montgomery County (34 acres in 2007, and 5 acres added in 2013 with a State Wildlife Grant) and Pearson Cave in Hawkins County (102 acres in 2009, and 46 acres added in 2013 with SWG funding).

Bellamy and Pearson Caves are winter hibernacula and summer maternity sites for federally endangered Gray Bats. The number one priority recovery action listed in the Gray Bat recovery plan is the protection of roosts from human disturbance (USFWS 1982). Following TWRA's acquisition of Bellamy Cave and the construction of a gate to protect the site from human disturbance, the winter Gray Bat population increased from 91,000 in 2002 to 348,871 in 2024! The winter population of Gray Bats at Pearson also increased following protection. In 1978 the winter population of Gray Bats at Pearson Cave was estimated to be only 100,000. In 2024, the population was up to 256,202, and the highest number was estimated in 2015 at 431,020. The population at Pearson fluctuates, and over the past 15 years declines at Pearson have corresponded with increases at other sites.

Following TWRA's acquisition of Bellamy Cave and the construction of a gate to protect the site from human disturbance, the winter Gray Bat population increased from 91,000 in 2002 to 348,871 in 2024!

In 2018, TWRA harnessed SWG and other funding sources to purchase Whiteside Cave in Marion County. The site is a winter hibernaculum for Tricolored Bats and receives substantial human disturbance due its accessibility and reputation with cavers and

locals. Prior to the acquisition, TNC and partners constructed a cave gate at the site. Conservation of Tricolored Bats has become a high priority for conservation groups due to population declines from WNS. Prior to WNS Tricolored Bats were among the most common species in Tennessee, and the protection of Whiteside Cave represents a shift in priorities from federally listed bats to WNS-impacted bats.



Tricolored Bat at Whiteside Cave / Daniel Istvanko, TWRA

Additionally, the agency began gating high priority bat caves in the state to reduce human disturbance. TWRA has gated or constructed Powers-style exclusion fencing at Grassy Cove Saltpeter Cave (Cumberland County), Carlton Cave (Franklin County), Keith Cave (Franklin County), a civil war bunker (Tipton County), and Jolley Saltpeter Cave (Union Cave). These efforts reduce anthropogenic disturbance to Tricolored Bats, Indiana Bats, Northern Long-eared Bats, and Little Brown Bats using these caves.

Specialized habitats for SGCN

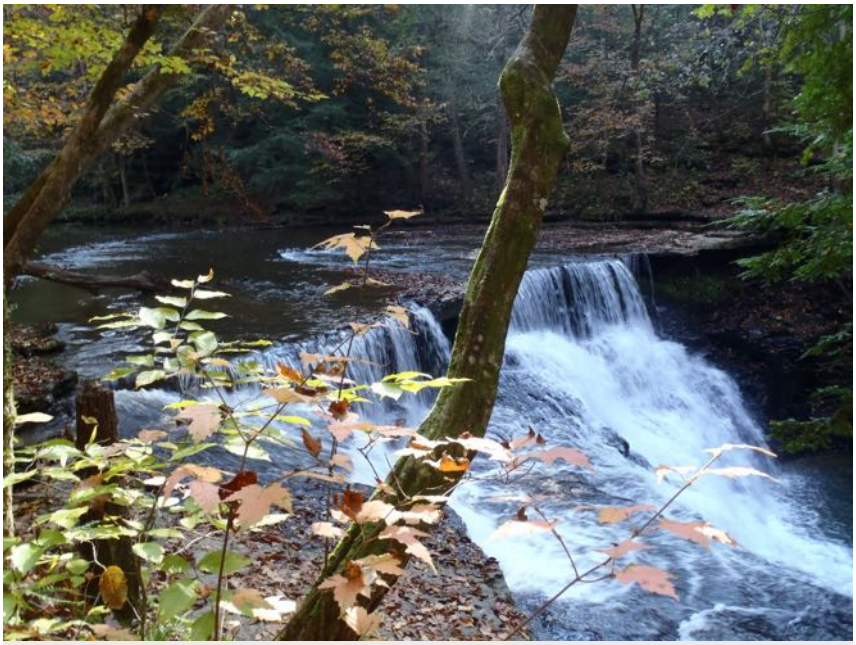
Many other acquisitions of land or conservation easements have occurred since 2015, almost all of which were informed by information provided in the 2015 SWAP, particularly the Conservation Opportunity Areas. For example, TennGreen Land Conservancy completed 62 total acquisitions (fee title or conservation easements) from 2015 to 2024. These acquisitions were often carried out in concert with other partners, such as The Nature Conservancy, The Conservation Fund, or local conservancies (e.g., Wolf River Conservancy, Swan Conservation Trust, etc.). All of these acquisitions address threats to the species posed by development, incompatible forestry, and or protection of priority wildlife habitat or high-value recreational land. The 2025 SWAP Steering Committee is seeking to collect comprehensive data on land acquisitions that have occurred across the state since 2015. That process is ongoing.

State Natural Areas and rare species protection

Tennessee Department of Environment and Conservation's Natural Areas Division has added four new designated State Natural Areas (SNAs) over the last decade, including Window Cliffs SNA, which protects populations of the rare Plains muhly grass (*Muhlenbergia cuspidata*) and Eastern white cedar (*Thuja occidentalis*); Lost Creek (SNA), which is home to a number of biodiverse caves and karst features; Sherwood Forest SNA, which protects the Painted Snake–coiled Forest Snail (*Anguispira picta*) along with numerous rare plant species; and Walnut Knob SNA, which was designated to protect the Braun's rock cress (*Borodinia perstellata*). In total the division has added more than 6,500 acres of protected state natural area lands since 2015.

Since the 2015 Tennessee State Wildlife Action Plan was published, TNC has used the SWAP to prioritize and complete over 93,000 acres of land acquisition projects statewide. TNC did not do

this alone. State and federal agencies, including TWRA, TDEC, Tennessee Division of State Parks/Natural Areas, the USDA Forest Service (USFS), and the US National Park Service (NPS), as well as other nonprofit land trusts, such as The Conservation Fund and TennGreen Land Conservancy, coordinate together to identify, purchase, and manage critical wildlife habitats and the SGCN that rely upon them.



Window Cliffs Class II Natural Scientific State Natural Area / TDEC

Otey Mills Refuge Unit, located within North Cumberland Wildlife Management Area in Claiborne County, is a recent (2022-24) land protection collaboration between TWRA and TNC that exemplifies the SWAP's informative power. The refuge's 3,464 acres match multiple SWAP ranking criteria:

- Both open and forested habitat are used by a monitored elk herd.
- Subterranean karst features support rare and endemic cave invertebrates.
- Native hardwood forest connects to other state and federally-owned public land.
- The unit provides habitat for rare, threatened, and endangered bats and migratory songbirds.
- It provides public access for multi-use outdoor recreation.

2.1.5. Data-driven Planning

The 2005 SWAP recognized sprawl as the single greatest threat to Tennessee's remaining natural landscapes. To address this threat, it provided maps and data that could be used to identify critical watersheds for protection.

Improved agency planning and coordination

Beyond TWRA, organizations and agencies that protect or manage land in perpetuity, such as land trusts, TDEC, USFWS, NPS, and the USFS use the SWAP to identify and justify the protection of critical wildlife tracts. By working with TNC and TWRA GIS staff, species and their associated habitats can be identified for potential protection (See SWAP Relational Database Highlight). Other agencies such as the USDA Natural Resources Conservation Service and Tennessee Division of Forestry can use the current and future plans to identify watersheds and specific sites where improved land management will benefit SGCN and their habitats.

Planning for habitat conservation

TWRA's SWAP has supported local and regional planning initiatives:

- A Gray Bat migration analysis was conducted by TNC in 2021 using updated SWAP data from 2015. TN data was combined with data on all Gray Bat sites across its entire known range (nine Southeast states) to model movement and create a heat map demonstrating the likelihood of landscape use by Gray Bats (Holliday et al. 2023). The study identified two major areas of use during spring and fall migration, as well as four likely movement pathways, which can be used to anticipate bat presence and optimize wind turbine siting to avoid impacts.
- Rural and scenic Cheatham County, located adjacent to the growing metropolis of Nashville, created a Sustainable Tourism Plan by assessing its natural and cultural resources to highlight, among other values, its ecotourism potential (Tennessee Regions' Roundtable Network 2013)
- Cumberland Region Tomorrow used the SWAP GIS database to create "GIS Greenprint Tools" for a 10-county region using SWG funding. The tools highlight critical lands for conservation in open space and transportation planning (Elliott 2010).

2.1.6. Saving Species through Reintroductions

Species reintroductions occur both as a means of preventing listing under the Endangered Species Act and to bring back populations of rare species where they have declined or disappeared. Stocking programs in Tennessee are part of a long-term program designed to restore reproducing populations of native species to Tennessee waters.

Eastern Hellbender

Since the 2015 Tennessee SWAP was completed, conservation for Hellbenders ramped up to include several new species restoration efforts statewide. Two head-start programs, one at the Nashville Zoo and the second at Chattanooga Zoo, along with studies to determine feasibility of releasing head-started hellbenders and translocating them, are taking place to restore this species in several Tennessee watersheds.



Eastern Hellbender held by TWRA Biologist Chris Ogle / Scott Dykes, TWRA

The Eastern Hellbender (*Cryptobranchus alleganiensis*) is Tennessee's largest salamander with adults reaching a total length exceeding 24 in and some exceeding 25 years of age. The scientific name is derived from "Crytptobranchus" which uses the Greek words kryptos meaning hidden, concealed, secret, i.e. cryptic and branchion meaning gill; together the name



Hellbender compared to a Common Mudpuppy (*Necturus maculosus*) / Chris Simpson, TWRA

refers to the absence of external gills. Similarly, "alleganiensis" refers to the Allegheny Mountains, where it was first discovered (Niemiller and Reynolds 2011). The Eastern Hellbender is also referred to as the "snot otter," "devil dog," and "lasagna lizard." Since 2000, the Eastern Hellbender in Tennessee has been listed as a species deemed in need of management. By 2013, an imminent potential for federal listing and a need to better understand the status of hellbenders in Tennessee led TWRA to fund surveys through its SWG program.

Based on surveys conducted by Middle Tennessee State University (Moonshiner 2013), it was determined that hellbenders in the state were likely undergoing declines, and likely extirpations in some watersheds had occurred since the 1990s (Miller and Miller 2005). Surveys indicated many middle Tennessee populations lacked multiple age classes, as juveniles and smaller individuals were not observed, and populations were limited to just a few older individuals. Current science indicates the juvenile stage after hatching appears to be a critical point for recruitment, as very few larvae are found in the wild.



Tanks at the Nashville Zoo for head starting Eastern Hellbenders / Chris Simpson, TWRA

The hellbender was proposed for state listing in 2016 and approved by the Tennessee Wildlife and Fisheries Commission as state endangered in August 2017. In December of 2024, the US Fish and Wildlife Service announced a proposal to list the Eastern Hellbender as an endangered species throughout its range under the Endangered Species Act.

Since 2015, TWRA has been working with the Nashville Zoo to head start Eastern Hellbenders. The Nashville Zoo has been collecting hellbender eggs from nests in the Duck River watershed since 2015 as a part of its head starting program. They have successfully reared more than 200 hellbenders from those eggs in a small trailer behind the scenes at the zoo, allowing them to reach a size that should boost their survival in the wild. Beginning in 2021 and in partnership with Tennessee State University,



TWRA Biologist Kirk Miles and Mark Thurman, TNC with two juvenile hellbenders ready for release / Chris Simpson, TWRA



Biologists measuring and weighing zoo-raised Hellbenders in preparation for release into the wild /Cyna Gehring

24 to 35 hellbenders have been implanted with radio transmitters and released in the Duck River watershed each year. The released individuals have been monitored to check survival, ascertain movement, and to better understand the impacts of releasing the hellbenders back into the watershed. In May 2025 an additional 24 four- to six-year-old hellbenders were released in the Duck River watershed.

In 2020, a new hellbender head-starting project funded by the USFS along with SWG funding supported partners from the Chattanooga Zoo Hiwassee Hellbender Research and Education Facility and Lee University to start the work on hellbenders in southeast Tennessee. The plan was to collect eggs from the wild, hatch and rear them for three to four years, and release them in the Hiwassee watershed in southeast Tennessee. The Chattanooga Zoo and Lee University had their first initial release in 2024, and monitoring of all the released head-started hellbenders is ongoing to determine the success of these releases.



One of the undisclosed sites where head-started hellbenders were released back into a tributary of the Buffalo River in 2025 / Cyna Gehring

Additionally, in 2022 these partners along with TSU—as part of the hellbender work within the Cherokee National Forest—translocated adult hellbenders from several tributaries to neighboring tributaries where hellbender populations had become isolated due to a loss of connectivity. Monitoring of these populations is primarily through telemetry and physical snorkel surveys. The new technology of eDNA is being used to help determine potential presence of hellbenders and direct future surveys through the collection of water samples.

Yellowfin Madtom

The Yellowfin Madtom is a brightly colored miniature catfish and is one of the first species that Conservation Fisheries Inc. (CFI) began working with in the 1980s (see the CFI "Innovation, Success" Highlight). Due in large part to CFI's captive breeding and reintroduction program, the Yellowfin Madtom is currently on the USFWS shortlist for delisting as an endangered species! CFI's program began by reintroducing the madtom into one of its original home streams, Abrams Creek. In the 70s, the species was limited to the Powell River and Citico Creek.

Now, there are established populations in Abrams Creek, Tellico Creek, the North Fork Holston River, the Clinch River, and seven sites in the French Broad River. If all of these populations prove successful, the fish will have met or exceeded the USFWS recovery plan's criteria for delisting. As Bo Baxter, President and Director of CFI states, "Not many species have come off the endangered species list, but the Endangered Species Act has kept them on the planet." Programs such as Section 6, through which the USFWS allocates funding to states for rare species conservation work, are critical to this success. Section 6 grants have supported Yellowfin Madtom recovery since the beginning in 1983.



Yellowfin Madtom / Dick Biggins, USFWS

Freshwater mussels

Tennessee has tremendously rich aquatic fauna, particularly when it comes to freshwater mussels. Except for Alabama, the lakes, streams and rivers of Tennessee once harbored the most diverse and abundant assemblage of mussels known: 140 of 300 mussels species recorded in the country are or were known to occur here. However, mussels make up almost half of the state's federally listed threatened and endangered species. The current level of imperilment of Tennessee's mussel fauna adds greater importance to conservation efforts for species not yet designated in federal listings.

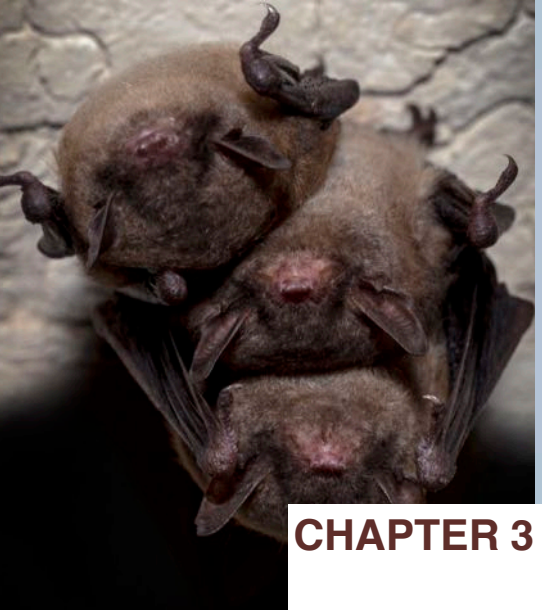
Mussels are important biological water filters for rivers, are used in research, and provide food for other wildlife. Their shells are **sought commercially** for their nacre used to create nuclei used in the

cultured pearl industry. The Tennessee Freshwater Mollusk Strategic Plan (Medlock et al. 2013) calls for the propagation and reintroduction of important mussel species into priority streams; this program has been augmented through SWG-funded equipment and facilities. An outstanding example is the **Cumberland River Aquatic Center** or CRAC, a unique facility built with the partial support of SWG grants, the full dedication of TWRA staff, and partnerships with TVA and the US Army Corps of Engineers. The CRAC focuses on propagation and reintroduction of aquatic species into the Cumberland River.

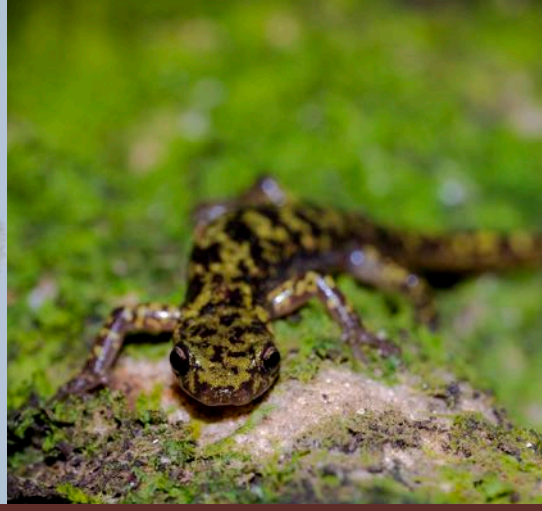
There are currently 11 species housed at CRAC, 7 that are federally listed and 4 that are common throughout Tennessee. Some of the rare species include Pink Mucket (*Lampsilis abrupta*), Birdwing Pearly Mussel *(Lemiox rimosus*), and Sheepnose (*Plethobasus cyphyus*). Since its establishment in 2015, CRAC has worked with 24 freshwater mussel species including 16 that are federally endangered, one that is federally threatened, and one that is proposed endangered. A major breakthrough at CRAC has been the adoption of in-vitro culture technology for mussel propagation, which began in 2018 (See the Pale Lilliput In-Vitro Fertilization Highlight). This innovative method has proven especially valuable for species that are difficult to propagate using traditional techniques. As a result, CRAC has successfully propagated nine endangered species using this method, including the Cracking Pearlymussel (*Hemistena lata*), Duck River Dartersnapper (*Epioblasma ahlstedti*), Pale Lilliput (*Toxolasma cylindrellus*), and Cumberland Monkeyface (*Theliderma intermedia*). Over 10,000 juvenile mussels have been propagated at CRAC and released out into rivers across the state including the Duck River, Elk River, and Nolichucky River.



Tagging mussels as part of TWRA's Capture-Mark-Recapture mussel monitoring program on the Duck River / Brittany Bajo-Walker, TWRA







CHAPTER 3

SPECIES OF GREATEST CONSERVATION NEED AND PRIORITY HABITATS

3.1. SGCN List Review and Updates to Species Occurrence Records

ONE OF THE KEY REQUIREMENTS in developing a State Wildlife Action Plan is the designation of Species of Greatest Conservation Need (SGCN). SGCN are identified by each state as those most at risk and in need of conservation action. In Tennessee, SGCN are typically characterized by low or declining populations and/or vulnerability to threats, especially those related to human activities. Without conservation action, SGCN are those species that may become listed in the foreseeable future.

Documenting current distributions of SGCN involves using a variety of "occurrence records," which are data that show where, when, and how often species have occurred at specific geographically identifiable sites. These occurrence records are, to the maximum extent possible, linked with data on the habitats where they occur. Together, these two types of data form the basis of the habitat priority maps in this and other chapters, and they are foundational for designating conservation priorities in the SWAP.

3.1.1. Updates to the Species of Greatest Conservation Need List

As in 2015, the first major phase of the 2025 update focused on the review of the SGCN list. This process involved examining the 2015 SGCN definition criteria (see Box 3.1);

Three SGCN that represent Tennessee's extraordinary aquatic and cave biodiversity, from left: Indiana Bats (*Myotis sodalis*) / Daniel Istvanko, TWRA; Teardrop Darter (*Etheostoma barbouri*) / Alex Babel, TWRA; Green Salamander (*Aneides aeneus*) / Daniel Istvanko, TWRA

ensuring all species taxonomic names, conservation ranks, and legal designations are current; reviewing the full 2015 SGCN species list by faunal group; and engagement with taxonomic field experts to ascertain that 2025 SGCN selections align with current understandings of population status and the SGCN definition criteria.

In addition, new occurrences of species in the state were added. One such exciting discovery was a bat species overwintering in an east Tennessee cave, new to the state: the federally endangered Virginia Big-eared Bat (*Corynorhinus townsendii virginianus*, featured on the SWAP cover)—named due to its incredibly long ears, roughly one-quarter of its four-inch body length! They use their large ears to echolocate at low amplitude. Until this discovery, Virginia Big-eared Bats were limited to only a few known locations in Virginia, West Virginia, and North Carolina. This discovery brings the total number of bat species in Tennessee to 16 and makes it Tennessee's fourth federally endangered bat species alongside the Gray Bat (*Myotis grisescens*), Indiana Bat (*Myotis sodalis*), and Northern Long-eared Bat (*Myotis septentrionalis*).

Box 3.1 Summary of Rationales for Selection and Non-selection of Species of Greatest Conservation Need (SGCN)

Rationale Categories for Selection as SGCN

1. Globally rare, imperiled, or endangered species (G1-G3 NatureServe rank) or federal status category of LE (Listed Endangered), E/SA (Endangered by Similarity of Appearance), LT (Listed Threatened), T/SA (Threatened by Similarity of Appearance, PE (Proposed Endangered), PT (Proposed Threatened), or C (Candidate species); or state status category of E (Endangered), T (Threatened), or D (Deemed In Need of Management).
2. Special concern species due to declining trends, or otherwise vulnerable due to endemic, limited, disjunct, or peripheral status in region.
3. Special consideration wide-ranging species due to:
    a. **Partners in Flight** (PIF) score of 22 or higher
    b. National Shorebird Prioritization Score of 4 or higher
    c. National Wind Coordinating Collaborative category of 'High'
    d. Being a "keystone" species within a biodiversity "hotspot" or part of a globally significant aggregation of species
    e. Species is strongly dependent upon ecological processes often interrupted across the landscape.

Rationale Categories for Non-selection as SGCN

1. Species occurs in the state but is not significantly imperiled, endangered, declining, or of special management concern.
2. Species range and/or habitat does not sufficiently occur in state to warrant target status.
3. Species is of uncertain taxonomic status.
4. Species is believed to be extinct range-wide.
5. Actively managed game species with sufficient number of viable populations in state.
6. Species is of historic significance but cannot currently be restored in the state.
7. Species distribution in habitats in state is either unknown or too uncertain to warrant target status.

The core planning team determined that the overall SGCN definition and selection rationale from 2015 (which derived from 2005) was appropriate for the 2025 revision. The three main elements defining SGCN include:

- The species' global and state conservation status rankings, derived from NatureServe (Definitions of NatureServe Conservation Status Ranks, n.d.), see Box 3.2
- State and federal legal status designation (i.e., whether state or federally listed as threatened or endangered—T&E), see Box 3.2
- Additional rankings based on general population or habitat condition trends, see Box 3.1.

Box 3.2. TDEC Natural Heritage Program Global and State Ranking System for Species

Global Ranks:

G1 = critically imperiled globally; 5 or fewer occurrences worldwide imperiled globally

G2 = imperiled globally; 6 to 20 occurrences worldwide

G3 = very rare or restricted throughout range; 21 to 100 occurrences worldwide

G4 = apparently secure globally though locally rare sometimes; 100 to 1000 occurrences worldwide

G5 = demonstrably secure globally; over 1000 occurrences worldwide

G? = uncertain global rank

GH = historic global occurrence; possibly extinct

GNR = not ranked currently at global level

G#Q = questionable taxonomy

G#G# = mixed rank due to uncertainty

G#T# = rank of a subspecies or variety

State Ranks:

S1 = critically imperiled in state; 5 or fewer occurrences statewide

S2 = imperiled within state; 6 to 20 occurrences statewide

S3 = rare and uncommon in state; 21 to 100 occurrences statewide

S4 = apparently secure globally though locally rare sometimes; 100 to 1000 occurrences statewide

S5 = demonstrably widespread and secure in the state

S? = uncertain state rank

SH = historical occurrence in state

SNR = not ranked currently at state level

SP = potentially occurs in state

SR = reported to occur in state

SX = believed extirpated from state

S#S# = mixed rank due to uncertainty

(Note: additional global and state ranks are listed in this document, for more complete definitions please refer to the TN Division of Natural Areas' website at: **https://www.tn.gov/environment/section/natural-areas**)

In 2025, Tennessee Wildlife Resources Agency (TWRA) staff conducted an additional layer of analysis for their state T&E species list, adopting methodologies from Millsap et al. (1990) to use additional information for specific taxa to increase justification associated with state listing determinations. Box 3.1 outlines the rationale for selection of an individual species as an SGCN in Tennessee, and Box 3.2 summarizes the definitions of global and state conservation ranks.

TWRA staff conduct a review of the state's threatened and endangered species every two years as required by law. As a part of the 2023 review, TWRA incorporated a reassessment of the SGCN list

for the state. In a similar fashion to the 2005 and 2015 SGCN list reviews, TWRA staff worked with taxonomic and field experts in mammals, birds, reptiles, amphibians, fish, mollusks, crustaceans, and plants to finalize the updated 2025 SGCN list. Taxa leads were identified within TWRA, and these staff members held individual meetings with taxonomic and field experts throughout 2023 to update the SGCN list. Subject matter experts are identified in the front pages of this document.

Plants as SGCN

In consultation with scientific experts, the core planning team made the determination to grant 568 plants SGCN status in 2015 (plant species were not assigned SGCN status during the 2005 planning effort.) This number was updated to 618 in 2025 (see Table 3.1).

Table 3.1 Comparison of SGCN totals by habitat type for 2005, 2015, and 2025, showing % change

Habitat or taxa designation		Number of SGCN by year			% change between revisions	
		2005	2015	2025	From 2005 to 2015	From 2015 to 2025
Terrestrial		188	714	896	280%	23%
Aquatic		241	275	301	14%	7%
Karst habitats	Subterrestrial	139	323	324	132%	<1%
	Subaquatic	38	67	67	76%	0%
Bats		6	9	10	50%	11%
Plants		0	507	618	N/A	22%
Total SGCN		**612**	**1388**	**1598**	**127%**	**13%**

Tennessee and other states have chosen to add plants to their SWAPs for multiple reasons. Native flora share many of the same management issues as native fauna. Many of the same factors that cause broad declines in the nation's native animals—habitat destruction or alteration, spread of invasive alien species, emergence of lethal diseases, and increasingly, shifts in climate—are also taking a toll on the nation's plant life. Because many rare plants are highly localized, growing only in very specific soils or microclimates, they are particularly susceptible to local habitat disturbances and direct damage to individuals and populations.



Yellow Water-

Including plants in the SWAP analysis is a logical action to help prevent federal listings of a greater spectrum of species, to collaborate with additional partners whose focus is on plant conservation, to garner additional funding for overall conservation

efforts, and to help ensure that their SWAP is as comprehensive a conservation blueprint as possible for their states. (AFWA 2012).

Tennessee is ranked 7th in the US for vascular plant diversity (Stein 2002) with a total of 2,407 species. In 2002, Tennessee was also the 19th-ranked state for plant species at risk (Stein 2002). As of 2025, Tennessee has 14 plant species believed or known to occur in the state that are federally listed as endangered and eight federally listed as threatened (TDEC 2021). Without focused conservation attention to the growing plight of plant species, Tennessee could lose significant portions of its wild heritage and the ecological resilience that comes with that diversity (Stein and Gravuer 2008).

Under Tennessee's Rare Plant Protection and Conservation Act of 1985, the Tennessee Department of Environment and Conservation (TDEC) has responsibility and limited authority for protecting rare plant species. Unlike animal species, plants are the property of the landowner, and since plants are generally rooted in the soil, their conservation must involve the private landowner of the land where they occur. It is thus integral to have landowner permission and collaboration to successfully conserve plants on private land (see Ch. 8 Private Lands). A potential threat to a plant population on private land is that the owner(s) has the right to do whatever he/she wants with the plants, which could include eradication and destruction of the habitat.

TDEC maintains the list of plants determined to be at risk in the state (TDEC 2021). TDEC's Natural Heritage Program maintains a Geographic Information Systems (GIS) database that contains information on the distribution and ecology of rare plants, animals, and ecological communities across Tennessee. TDEC also comments on plant conservation aspects of public works projects; promulgates and enforces regulations that prohibit the collection, malicious destruction, or trade of listed plant species; and collaborates with agencies such as TWRA to conserve rare plants in Tennessee (The Rare Plant Protection and Conservation Act of 1985).

As such, TDEC develops the process to select and prioritize rare plant species in Tennessee (see Appendix F for a detailed summary of this process). In 2025, this process included the following steps:

- US Association of Fish & Wildlife Agencies (AFWA) guidance was used to assign plants to categories of highest, high, or moderate conservation concern or data deficient. Global and State ranks (Box 3.1) as well as Regional SGCN designation (see below) and federal listing status under the Endangered Species Act (ESA) were criteria for this process.
- All plant species in the Tennessee's rare species tracking database (TN Biotics) were assessed.
- All plant species were assigned a priority category of moderate, high, highest, or data deficient according to the criteria in Box 3.3.
- Any species that were actively tracked by the Tennessee Natural Heritage Program but were not assigned a priority were assessed individually. Likewise, any species that were not actively tracked but did get a priority assignment were noted and individually assessed.

Box 3.3 Plant Species Priority Tier Reference Guide that May be Used to Help Assign SGCN to Priority Tiers. Source: AFWA

Priority Tier	Definition	Reference Criteria
Highest Conservation Concern	Imperiled species that may become extirpated from my state in the near future unless conservation efforts are continued or enhanced. The population(s) in my state is/are important to the global conservation of the species.	-G1-G2 -RSGCN Very High or High **and** S1-S2 -ESA E -ESA T or C **and** S1-S2 -IUCN CR or EN **and** S1-S2 PIF Red Watchlist Species
High Conservation Concern	Imperiled species that may continue to decline in my state unless conservation efforts are continued or enhanced. The population(s) in my state is/are important to the global or regional conservation of the species. * While Highest Conservation Concern was the most frequently selected category for G5S1 species in the survey, this was a relatively weak preference that represented less than half of respondents (43%). Whether or not to designate G5S1 species as SGCN in your state should take into account the regional and global significance of your state's occurrence.	-G3-G4 **and** S1-S2 -G5 **and** S1* -RSGCN Mod **and** S1-S2 -RSGCN Very High or HIGH **and** S3 -ESA T or C **and** S3 -IUCN CR or EN **and** S3 -IUCN VU **and** S1-S2 PIF Yellow Watchlist Species
Moderate Conservation Concern	Species that may be currently stable but of long-term conservation concern due to increasing or emerging threats or species that are currently stable but are representative of an ecosystem or community in need of conservation or species that are currently stable but represented by a strong population or unique genetic diversity that is worthy of conservation within my state.	G3 **and** S3 RSGCN Mod **and** S3 IUCN VU **and** S3 PIF CBSD
Data Deficient	Species that may be imperiled, but lack of information on their conservation status, taxonomy, life history, and threats precludes the identification of conservation actions.	Any G Rank **and** SU SH or SX species that may be rediscovered IUCN Data Deficient

This process identified 618 species that met criteria for assigning a priority and inclusion in the Tennessee SWAP plant list. (See Appendix F for a detailed summary of the methodology used to select plants as SGCN for the TN SWAP.)

Tier Status

The Congressional mandate to states regarding the creation of State Wildlife Action Plans is to invest in conservation activities that assist in the prevention of future federal listings (e.g., federally endangered or federally threatened). Different state agencies maintain separate jurisdictional authorities over species and habitat management. For these reasons, the 2005 and 2015 SWAPs designated "tiers" to track the legal status and jurisdictional authorities associated

with all SGCN (TWRA 2005, p. 43 and TWRA 2015, p. 29; see Box 3.4). The 2025 core planning team (see SWAP list of contributors in Acknowledgments) decided to maintain the 2015 tier designation system, which included a fourth tier for plants. Box 3.4 summarizes the definitions of each tier designation.

Box 3.4. Summary of Tier Designations for SGCN

Tier 1: Species defined as wildlife under Tennessee Code Annotated 70-8-101, (i.e., amphibians, birds, fish, mammals, reptiles, crustaceans & mollusks), excluding federally listed and game species

Tier 2: All other fauna not defined as wildlife under Tennessee law (i.e., insects and other invertebrates)

Tier 3: Federally listed or game species which have alternative conservation funding

Tier 4: Plant species of Greatest Conservation Need

Including the tier status in the SWAP relational database/GIS system allows planners to efficiently determine which species may be appropriate for different types of conservation project funding and which species are covered by various regulatory and management jurisdictions. TDEC, not TWRA, has legal authority for rare plant species conservation, but TWRA tracks and incorporates the management needs of plants into ongoing conservation activities whenever feasible, particularly with respect to habitat protection and restoration for a broad suite of species.

Regional Species of Greatest Conservation Need

A 2019 analysis and report sponsored by the Southeast Association of Fish and Wildlife Agencies (SEAFWA), TWRA, and others, developed a list of Regional Species of Greatest Conservation Need (RSGCN) to enhance the "ability to work collaboratively and proactively to sustain populations of both endemic and shared SGCN across the southeast US (Rice et al. 2019). (For more information on Tennessee's RSGCN, see Ch. 7 Regional Conservation.)

"The SEAFWA RSGCN list captures the remarkable endemism and biodiversity of the region, particularly in aquatic habitats, and highlights species that would benefit from regional collaborative conservation. The shared RSGCN account for 25 percent of the nearly 2,100 SGCN from seven taxonomic groups reviewed. The list can be sorted to deliver customized priorities:

- Conservation concern (how imperiled is the species)
- Importance of SEAFWA conservation actions (regional responsibility category)
- Collaborative opportunities (number of SEAFWA states sharing a species)
- State stewardship (state occurrence of RSGCN)
- Taxa groups."

(Rice et al. 2019)

In 2023 the Southeastern Plant Conservation Alliance (SEPCA) completed a Southeastern Plants RSGCN list (Radcliffe et al. 2023). The plants RSGCN Level of Conservation Concern (LoCC) was utilized in the selection and prioritization of Tennessee plants as SGCN. While animal RSGCN data

were not included in the SGCN analysis that informed SWAP habitat priority maps, RSGCN data did help to develop Regional Conservation Opportunity Areas (RCOAs). Conservation of many RSGCN is shared among states (i.e., species ranges are shared with more than one state). See Ch. 6 Conservation Actions and Strategies and Appendix I, Conservation Opportunity Areas.

The SGCN list

The 2025 SWAP identified 1,598 aquatic, terrestrial, and subterranean SGCN species in Tennessee. Of those, 436 are RSGCNs.

Table 3.1 (above) summarizes the changes made to the SGCN list from 2005 to 2015 to 2025. Appendix D provides the full updated list of 2025 SGCN, including information on their state and global conservation ranking status, state and federal legal status, and tier designation.

3.1.2. Updates to Species Occurrence Data in the SWAP Relational Database

During the development of the first SWAP in 2005, a GIS-enabled relational database was created to compile and house SGCN occurrence data gathered from a wide variety of data sources (TWRA 2005, p. 45). From 2005 to the present, the Nature Conservancy (TNC) has worked alongside TWRA and other partners, including the TDEC Division of Natural Areas (DNA) and the Tennessee Valley Authority (TVA) Heritage Program, to continue to update and add to this database of known SGCN distributions across the state.

Consistent data collection and assimilation work since publication of the 2015 SWAP has increased the number of species occurrence records available for use in the SWAP revision effort. Table 3.2 compares the differences in occurrence records available for planning in 2005, 2015, and 2025. In 2005, the database included approximately 25,000 aquatic, terrestrial and subterranean animal records, which was expanded to over 316,000 records in 2015. As of 2025, the species occurrence records for Tennessee top 1,100,000! Datasets of observational records for bird SGCN have been improved, and the database now includes over 1 million bird occurrences.

Table 3.2 Comparison of species occurrence records available for planning in 2005, 2015, and 2025 [1]

SGCN by number of occurrence records							
	Terrestrial	Aquatic	Karst habitats		Bats*	Plants	Totals
			Subterrestrial	Subaquatic			
2005	19,396	5,268		961			25,625
2015	160,166	149,224 [2]		7,000		9,779	316,457
2025	1,082,558	34,107	1,729	2,437	8,477	9,887	1,140,455

[1] Occurrences represent additions to SWAP database during each revision, and are not cumulative
[2] High aquatic EOs in 2015 due to a large input (~131,000) of historical fish EO records (of fish known to be reproductive hosts to freshwater mussels) between 2005 and 2015 revisions.

The increase in occurrence data for planning purposes through 2025 is attributable to three major opportunities: (1) better access to information housed in different data management systems, particularly eBird; (2) an increase in occurrence records compiled in TDEC DNA and TVA Natural Heritage databases; and (3) increased levels of SGCN survey efforts and documentation conducted by TWRA and conservation partners.

The Alligator Snapping Turtle Highlight provides insight into how occurrence/monitoring data can be critical to determining the best places for species reintroductions, while the Spotted Skunk Highlight shows the absolute necessity of tracking where species occur if conservation is to be successful.

3.2. A Strategic Focus on Habitat Conservation



Diana Fritillary (*Argynnis diana*), an SGCN in Tennessee / vvee via iNaturalist

The following discussion gives a high-level overview of the major improvements to spatial datasets and habitat prioritization scoring methodologies employed during the 2025 update. These changes, combined with the significant addition of species records to the database, have improved the resolution of the data and created the opportunity for more flexible applications of the outputs for use in a greater variety of more spatially accurate, complete, and precise assessments of habitat priorities, decision-making contexts, and collaborations at different spatial scales. TNC has developed a companion GIS revision report to the 2025 SWAP, Database Development and Spatial Science in Support of Tennessee's State Wildlife Action Plan (Wisby 2025, in draft), to provide detailed information on all spatial science, methods, and formulas used to identify SGCN habitat priorities (Wisby 2025).

3.2.1. SGCN Prioritization Scoring

In the 2015 update, the relative imperilment of SGCN were assessed and scored based on global and state rarity ranks (see Box 3.2), as well as federal and state legal listing status (Tables 3.3, 3.4, and 3.5). The 2025 assessment and scoring formula is the same as that in 2015 with the exception that for some state T&E terrestrial species, TWRA conducted another layer of analysis using additional information for specific taxa.

Species priority ratings of karst species and their occurrences are based only on NatureServe G-Ranks, when available, and on estimates of probable G-Rank designation for species not in the NatureServe database. These choices for karst species ratings were made because knowledge of karst biodiversity, while improving, remains limited, and many species have not been assessed for Global or State rarity ranking or State and Federal legal status.



Alligator Snapping Turtle / Rob Colvin, TWRA

POPULATION RESTORATION WHEN INDIVIDUALS ARE FEW

The **Alligator Snapping Turtle** (*Macrochelys temminckii*) is an apex predator that will "eat just about anything," as **Rob Colvin, Wildlife Biologist** for the western region of TWRA likes to say. "They use their built-in tongue lure, which mimics a worm, to catch large fish, but they also eat ducklings, crawfish, tadpoles, small fish, frogs, you name it." With weights often in excess of 50 pounds, the Alligator Snapping Turtle is credited as being the largest freshwater turtle in North America.

As with many apex predators, this species also has a slow intrinsic rate of reproduction. Females might lay their first clutch of eggs at about 13 years of age (no younger), and they do not necessarily reproduce every year. Their nests consist of roughly 15 to 20 ping pong-sized eggs, which, ironically, are a favorite food of many bottomland forest species, including raccoons and otters.

Factors causing alligator snappers to decline in Tennessee include loss or modification of habitat, bycatch, data gaps in their life history, and limited manpower for the time-intensive effort required to find, trap, tag, and count individuals each year.

The long-term goal for this species is to establish a self-sustaining population through augmentation and habitat management.

ALLIGATOR SNAPPING TURTLES: EAT AND BE EATEN



This species' worm-like tongue serves as lure for its prey / Tishomingo NFH

Collection and nest predation have been major contributors to this species' decline in Tennessee. Until the 1970s, Alligator Snapping Turtles were an ingredient in Campbell's turtle soup!

"Of the only two nests we've found in the last several years," explains Colvin, "both were destroyed within 24 hours before I had time to come back and put fencing around them." Due to their decline, it is illegal to hunt or capture these turtles in Tennessee, but they are still eaten in Mississippi and Louisiana where their preferred bottomland habitat is more abundant.

Channelization of streams throughout west Tennessee has eliminated good habitat in many drainages. These changes also make it hard to survey turtles because the deep and steep slopes of channels make it difficult for biologists to set a net in a way that will allow the trapped turtles to breathe while waiting to be tagged and counted. Staffing is also an issue. Despite having only two TWRA biologists for all of west Tennessee, the agency conducted 405 trap nights over the 2018-2019 field seasons, capturing only four individuals. In 2021, the US Fish and Wildlife Service announced its intention to list the Alligator Snapping Turtle as threatened under the Endangered Species Act, with a final ruling anticipated in 2027.

Along with habitat loss and collection/predation, the Service listed "bycatch associated with freshwater fishing" as a key threat. Limb lines (a single hook hanging from a tree, popular for catfish), trot lines, and nets used for commercial fishing cause the greatest amount of turtle bycatch. As of 2023, West Tennessee has approximately 100 confirmed records of

wild-captured Snappers. These records originate primarily from the Wolf River, Hatchie River, and Big Sandy River drainages as well as Reelfoot Lake and Tennessee River/Kentucky Lake.

POPULATION RESTORATION: A LONG-TERM SOLUTION?

With the long-term goal of restoring the Alligator Snapping Turtle to its former range, biologists in Tennessee have their work cut out for them. The turtles need more and better habitat, with protection from threats such as bycatch and collection. They will benefit when scientists gain a greater understanding of their current range and habitat preferences. Above all, their numbers need to be replenished.

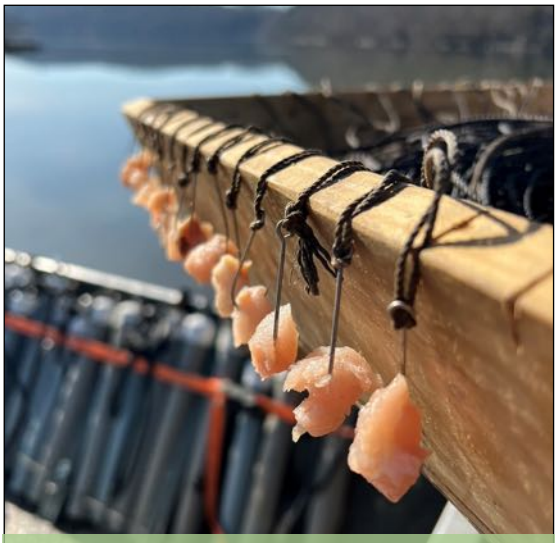
To address habitat needs and bycatch, one option is to strategically focus conservation and management efforts on key state-owned lands (Wildlife Management Areas). Management could include limiting or outlawing the types of fishing known to impact the turtle population. With this in mind, breeding and reintroduction efforts are underway by multiple partners.

Determining which public lands are most critical to the turtles requires more information on how they use habitat. "Currently, there are only one or two places where we are guaranteed to catch Alligator Snapping Turtles, and we don't understand why," says Colvin.

Monitoring is now cost-effective with PIT tags that are inexpensive, easy to attach, and long-lasting. PIT stands for "passive integrated transponder." It consists of a glass vial with electronics, injected by syringe into the base of a turtle's tail. Scanners can then be used to recognize previously tagged individuals, allowing the use of classic mark-recapture calculations to estimate population size. Currently, 23 turtles have been marked with PIT tags from one location, an oxbow near the Hatchie River.

Since 2000 and with the support of State Wildlife Grants, TWRA has worked with various partners to restore turtle populations by raising and releasing turtles (mostly juveniles) into various watersheds. Current efforts involve collecting eggs from the wild (to preserve the genetics of Tennessee turtles), hatching them out at the Humboldt Hatchery, then raising the young at Tishomingo National Fish Hatchery until they are at least five years old (7 to 9 inches long)—this increases survival rates. Even so, modelers say it would take hundreds of years to bring Alligator Snapping Turtles back to historic levels of abundance, and it's not even clear how many need to be reintroduced.

"Over the next several years we hope to gain valuable information regarding the distribution, population status and genetics of Alligator Snapping Turtles in Tennessee," notes Rob Colvin. "With this information we'll be better equipped to make management decisions for future restoration efforts."



Trot line ready to be deployed across a stream / Brandon Simcox, TWRA

Alligator Snapping Turtle Conservation Partners

Humboldt Hatchery
Southeast Missouri State
Tennessee Aquarium Conservation Institute
Tennessee Wildlife Resources Agency
Tishomingo National Fish Hatchery
US Fish and Wildlife Service



TWRA biologist inserting a PIT tag into a turtle's tail / Rob Colvin, TWRA

Federal Register. 2021. Endangered and Threatened Wildlife and Plants; Threatened Species Status With Section 4(d) Rule for Alligator Snapping Turtle. https://www.federalregister.gov/documents/2021/11/09/2021-23994/endangered-and-threatened-wildlife-and-plants-threatened-species-status-with-section-4d-rule-for

TWRA. 2017. Population Status and Conservation of the Alligator Snapping Turtle, Macrochelys temminckii, in Tennessee

TWRA. 2019. Status and Distribution of the Alligator Snapping Turtle (Macrochelys temminckii) in Tennessee, final report to USFWS.

BASIC RESEARCH TO INFORM RARE SPECIES HABITAT NEEDS & THREATS

The Eastern Spotted Skunk (*Spilogale putorius*) is one of four subspecies of Spotted Skunk in the US once common across the Midwest and southeastern states. Annual range-wide harvests once regularly exceeded 100,000 animals (skunks are fur-bearers, which can legally be trapped in Tennessee), but estimates of their decline over the past century approach 99%.

In the last several decades, this subspecies has experienced a precipitous population decline—enough for the state to list the Spotted Skunk as threatened in 2023. The listing means they can no longer be hunted or trapped in Tennessee.

Because the Spotted Skunk is small, completely nocturnal, with a relatively limited home range (~2 mi radius), it is difficult to study, and basic information on its natural history is lacking. So little is known about Spotted Skunks, in fact, that **Lindsay Shaw, the Tennessee Wildlife Resources Agency (TWRA) Biologist** and resident state expert on the species, says that "any research brings up so many more questions!"

Questions that Shaw has been trying to answer while conducting research on the skunks since 2020 include, what are their habitat preferences? What factors influence their den site selection? Where are the skunks most abundant, and what can public land managers do to improve habitat or address threats to the species?



Spotted Skunk, trapped at bait site in TN / Lindsay Shaw, TWRA

ADORABLE BUT FEISTY

When Lindsay Shaw had to select her thesis topic while working toward a master's in wildlife biology at UT Knoxville, she knew she had a limited home range. She was a working mother with two boys, ages 13 and 11. So when the Eastern Spotted Skunk study in Tennessee needed someone to run it, Shaw jumped at the chance. She does not regret her decision. "I love the Spotted Skunks," she says, "They are adorable and feisty—but vicious! They're also strong for an animal about the size of a squirrel."



A Spotted Skunk caught in a live trap / Lindsay Shaw, TWRA

Biologists have enough data on Spotted Skunks to know they are experiencing heavy declines, but they don't know enough to say why. Shaw is the Tennessee representative to the award-winning Eastern Spotted Skunk Collaborative Study Group, which includes a representative from every state where the subspecies occurs, as well as its very own Spotted Skunk YouTube channel.

Since the winter of 2020, Shaw and other TWRA biologists have been conducting baited camera trap surveys to estimate Spotted Skunk populations and locations. The camera traps have been set in all four TWRA regions, mostly on public land (Wildlife Management Areas, or WMAs, and state forests), and baited with open cans of sardines. "In some ways this biases what you can say about the type habitat they are using, but detection is nearly impossible otherwise," explains Shaw.

They have also conducted radio-collar studies to determine preferred habitats for den sites, which involves live trapping to fit a few lucky skunks with radio tracking collars. (If this sounds like a delicate operation—

handling an animal that can spray its malodorous musk up to 20 feet and as many as six times in a row—it is!). After releasing the skunks, biologists returned regularly to the release site with a handheld antenna to try to pick up and follow the skunk's signal. "It's a bit like playing a forest game of Marco Polo," said Shaw. The radio collars led them to a good number of den sites, in trees (as expected), but also in rock shelters and burrows. However, this portion of the study yielded a disappointing total of only three radio-collared males—insufficient to draw conclusions about preferred habitat.

What the study has revealed, however, is that almost all Spotted Skunks appear to be locally abundant on Catoosa WMA, the southern portion of Cherokee National Forest, and the North Cumberland WMA. There appear to be no Spotted Skunks that occur west of Franklin County.

The baiting portion of the study has yielded more than one million trail camera photographs. While precise habitat associations remain unknown, it's clear that occurrence of these skunks in Tennessee appears limited to very large contiguous blocks of forest/savanna habitat.



Shaw with a Spotted Skunk to be fitted with a radio collar / Audrey Shrewsbury

Eastern Spotted Skunk Conservation Partners

Eastern Spotted Skunk Cooperative Study Group
Tennessee Wildlife Resources Agency
USDA Forest Service (Cherokee National Forest)
Univ. of Tennessee Knoxville

THREATS AND SOLUTIONS: HEAD START FOR SPOTTED SKUNKS?

It's likely Spotted Skunks are impacted by increasing levels of development and habitat fragmentation, particularly that which is occurring in rural areas. Other factors causing the species' decline are still not completely understood. Distemper has probably contributed to significant decline in certain populations. The thriving Western Spotted Skunk subspecies has the capacity for delayed implantation, which helps to maximize the chances that young will be born at an optimal time to support new life. The Eastern subspecies do not have this capacity and give birth every year in April/May.



Shaw's sons participating in Spotted Skunk den tracking found a den in this snag. / Lindsay Shaw, TWRA

Despite their relative rarity, the Spotted Skunk is an important mesopredator, occupying that middle section of the food web between apex predators and the organisms at the base of the food chain. They help to provide critical rodent control (which limits the spread of disease, including those that affect people such as leptospirosis and hantavirus), and they also clean up carrion.

One bright spot in the conservation picture is the potential for wildlife rehabilitation to serve as a form of "Head Start" program for Spotted Skunks. In early 2024, one of the skunks tracked using a radio collar had actually been trapped as a nuisance animal after being found peacefully eating cat food on someone's porch with the cats! The skunk was given to a rehabber, where it received distemper and rabies vaccinations (to prevent the diseases' spread to other wildlife) and about a month's worth of great meals. These efforts are important because translocated wildlife tend to struggle for territory and food, and they may be exposed to new pathogens. After the rehabbed Spotted Skunk's release, he did so well that Shaw is hopeful future nuisance Spotted Skunks (and possibly other Species of Greatest Conservation Need or SGCN) can be head started in this way, rather than euthanizing them (the usual practice due to limited resources.)

Shaw is hopeful that her research will yield enough information on landscape-level characteristics to develop a predictive model for where Spotted Skunks are likely to be found in Tennessee. The model can then guide further searches and management for this small, feisty black-and-white furbearer. "Sometimes reporters ask me why should people care about this little-known species?" Shaw concludes. "My response has always been, 'Why *wouldn't* you care?' Everything has its place. We are all in it together."

UTK. 2021. Habitat Associations and Den Site Selection of the Eastern Spotted Skunk (Spilogale putorius) in Tennessee.
"Cool Things You Should Know about Skunks (Yes, Skunks)." n.d. Iowa Department of Natural Resources. Accessed August 6, 2024.

Summary of Habitat Prioritization Methods

Tennessee's basic approach for prioritizing SGCN habitats is evidence-based, relying on location and recency of EOs, as well as the degree of species imperilment. In summary, the 2025 process for creating terrestrial and aquatic habitat models that prioritize habitats according to their importance for SGCN species included the following steps:

- **Conservation Need of SGCN**: Assessed and scored the relative conservation urgency of each SGCN based on rarity and degree of imperilment.
- **Terrestrial Habitat Mapping:** Using the 2011 GAP/LANDFIRE dataset of mapped NatureServe ecological systems as a base, updated mapping of semi- and non-natural systems from 2024 Cropland Data Layer and further supplemented with wetland mapping derived from Fathom flood frequency data.
- **Habitat Preferences:** Based on expert opinion, assigned habitat preferences for new 2025 SGCN to NatureServe ecological systems, and added to existing database of preferences developed in the 2005 and 2015 plans.
- **Mapping Units:** Revised terrestrial, aquatic, and karst units of analysis. Used Uber's H3 hexagons, at 3 different spatial scales, as terrestrial units, which allowed for extrapolation of larger footprints of potential occupancy around documented occurrences that more closely approximate the full range of terrestrial SGCN. As in the 2015 SWAP, NHDPlus v2 catchments and flowlines formed the basis of the aquatic units, but were augmented by flood frequency mapping derived from Fathom, as well as riparian zone buffers around NHDPlus High Resolution (HR) stream features. The aquatic units were also used as karst mapping units, enabling a more accurate assessment of surface flow considerations in potential recharge zones surrounding caves. The new mapping units allowed for higher resolution and greater spatial accuracy in determining priorities and performing subsequent analyses on problems affecting habitats.
- **Occurrence Mapping**: Compiled new occurrences of 2025 SGCN from various sources and added to the existing occurrence database developed in 2005 and 2015 plans. Calculated age score for each occurrence based on the year of last observation.
- **Potential Occupancy Mapping:** Used NatureServe's estimate of dispersal ability of species to calibrate size of footprints around its occurrence records, as well as to select the level of H3 hexagon appropriate for use in modeling potential occupancy for terrestrial SGCN. Terrestrially, the likelihood of species persistence for each H3 hexagon within footprints was calculated based on distance from and age scores of occurrences. Aquatically, the likelihood of persistence was assessed upstream and downstream of each occurrence's segment based on instream distance and occurrence age. Karst occurrences were linked to their caves, with potential occupancy not modeled.
- **Habitat Usage Modeling:** Terrestrially, for each mapped ecological system class within each H3 level 8 hexagon, each SGCN with overlapping footprint(s) was scored based on its preference for the ecological system, its relative imperilment, and its likelihood of persistence within that H3 hexagon. Aquatically, stream segments within each SGCN's footprint were scored based on relative imperilment, likelihood of persistence within the segment, and how closely the stream classification factors of the segment match those of the reference occurrence stream. For subterranean habitats, caves were scored for each SGCN with documented occurrences in the cave based on global rarity, relative dependence of the SGCN on the cave environment, and for bats, age of the occurrence(s).
- **Habitat Priority Assessment:** For each assessed habitat unit, raw habitat priority scores are the sum of individual species scores. Raw habitat priority scores are then normalized and partially stratified by ecoregion (terrestrial), HUC2 basin and HUC4 sub-basin (aquatic). Percentile ranks of resulting normalized/stratified scores are then calculated and used to determine very high, high, medium, and low priority classes of habitats for each major habitat type in each ecoregion of the state.

Table 3.3 Federal species listing designations

Abbreviation	Designation	Explanation
LE	Listed Endangered	Taxon is threatened by extinction throughout all or a significant portion of its range
SAE	Endangered by Similarity of Appearance	Taxon is treated as an endangered species because it may not be easily distinguished from a listed species
LT	Listed Threatened	Taxon is likely to become an endangered species in the foreseeable future
SAT	Threatened by Similarity of Appearance	Taxon is treated as a threatened species because it may not be easily distinguished from a listed species
PE	Proposed Endangered	Taxon proposed for listing as endangered
PT	Proposed Threatened	Taxon proposed for listing as threatened
C	Candidate species***	Taxon for which the USFWS has sufficient information to support proposals to list the species as threatened or endangered, and for which the Service anticipates a listing proposal
(status, XN)	Nonessential experimental population in portion of range	Taxon which has been introduced or re-introduced in an area from which it has been extirpated, and for which certain provisions of the Act may not apply
PXN	Proposed nonessential experimental population	

*** Taxa listed as candidate species may be added to the list of Endangered and Threatened species, and as such, consideration should be given to them in environmental planning. Taxa listed as LE, LT, PE, and PT must be given consideration in environmental planning involving federal funds, lands, or permits, and should be given consideration in all non-federal activities.

Table 3.4 State species listing designations

Abbreviation	Designation	Explanation
E	Endangered	Any species or subspecies whose prospects of survival or recruitment within the state are in jeopardy or are likely to become so within the foreseeable future
T	Threatened	Any species or subspecies that is likely to become an endangered species within the foreseeable future
D	Deemed in Need of Management	Any species or subspecies of wildlife that needs specific management to prevent it from becoming a threatened species within the state in the foreseeable future.
S	Special Concern	Any species or subspecies of plant that is uncommon in Tennessee, or has unique or highly specific habitat requirements or scientific value and therefore requires careful monitoring of its status.

Table 3.5 State species listing designations, additional modifiers for plants

Abbreviation	Designation	Explanation
PE	Proposed Endangered	Any species or subspecies of plant nominated by the Scientific Advisory Committee to be added to the list of Tennessee's endangered species. After approval by the commissioner of the Dept. of Environment & Conservation and the concurrence of the commissioner of Agriculture, these plants will formally become State endangered.
PT	Proposed Threatened	Any species or subspecies of a plant nominated by the Scientific Advisory Committee to be added to the list of Tennessee threatened species. After a public hearing, these plants will formally become State threatened.
E-PT	Endangered-Proposed Threatened	Species which are currently on the state list of endangered plants, but are proposed by the Scientific Advisory Committee to be down- listed to threatened. After approval by the commissioner of the Dept. of Environment & Conservation and the concurrence of the commissioner of Agriculture, these plants will formally become State threatened.
E-PS	Endangered-Proposed Special Concern	Species which are currently on the state list of endangered plants, but are proposed by the Scientific Advisory Committee to be down- listed to special concern. After approval by the commissioner of the Dept. of Environment & Conservation and the concurrence of the commissioner of Agriculture, these plants will formally become State special concern.
T-PE	Threatened-Proposed Endangered	Species which are currently on the state list of threatened plants, but are proposed by the Scientific Advisory Committee to be listed on the state endangered list. After approval by the commissioner of the Dept. of Environment & Conservation and the concurrence of the commissioner of Agriculture, these plants will formally become State endangered.
T-PS	Threatened-Proposed Special Concern	Species which are currently on the state list of threatened plants, but are proposed by the Scientific Advisory Committee to be down- listed to special concern. After a public hearing, these plants will formally become State special concern.
P	Possibly Extirpated	Species or subspecies that have not been seen in Tennessee for the past 20 years. May no longer occur in Tennessee.
C	Commercially Exploited	Due to large numbers being taken from the wild and propagation or cultivation insufficient to meet market demand. These plants are of long-term conservation concern, but the Division of Natural Heritage does not recommend they be included in the normal environmental review process.

3.2.2. Standardized Habitat Classification

The 2005 SWAP effort marked a notable advancement in statewide conservation planning through the intentional use of standardized habitat classification units and preferences linking SGCN to those habitats. The emphasis on habitat classification and mapping improved the ability of conservation partners to make collaborative investments in habitat restoration and protection in all regions of the state. This success encouraged TWRA to adopt the same terrestrial habitat classification approach in the agency's 2014-2020 Strategic Plan (TWRA 2014).

In its 2021-2027 Strategic Plan, TWRA emphasizes the importance of a habitat-based approach to management, since habitat is the cornerstone of providing healthy populations of animals. "Provided that public and private lands and waters can provide ample quality habitat, species should be self-supporting if given the proper protection" (TWRA 2021). The Strategic Plan is now organized around broad habitat types generally corresponding to those used in the 2005 SWAP: Grassland, Forestland, Wetland, Karst, Streams and Rivers (TWRA 2021). The Strategic Plan also includes reservoir impoundments and urban areas as important wildlife management areas for fisheries and other habitat values.

As with the initial 2005 SWAP plan and 2015 update, the 2025 update uses NatureServe's ecological systems to classify terrestrial habitats. Mapping of terrestrial habitats in the 2025 update is based on a compilation of classes derived from three source datasets. Upland systems were mapped using the **2011 GAP/LANDFIRE** dataset. Developed by the **Gap Analysis Project** and released in 2019, this dataset classifies natural land cover from ca. 2011 imagery. Additionally, it incorporates areas of recent disturbance mapped by LANDFIRE. It also does a particularly good job of mapping planted pine, which has been a shortcoming of terrestrial mapping used in previous SWAP iterations. The GAP dataset was upscaled to 10-meter resolution, and updated with mapping of semi- and non-natural classes from the **2024 Cropland Data Layer** (CDL) to reflect current conditions. Potential wetland and riparian ecological systems were mapped from an analysis of **FATHOM flood frequency** data (a proprietary dataset developed in the United Kingdom), and overlaid with the combined GAP/LANDFIRE and CDL (GLC) dataset. Areas of potential wetland/riparian mapped as natural classes in the GLC dataset were incorporated as areas of existing wetland ecological systems. Areas of potential wetland/riparian mapped as currently semi-natural classes in the GLC were identified as areas of potential restoration.

Beginning with the 2015 update, and continuing in the 2025 update, the SWAP has used the National Hydrography Plus, Version 2 (**NHDPlusV2**) datasets from the US Geological Survey and the US Environmental Protection Agency stream network as the basic units of freshwater habitat mapping. For classifying freshwater habitats, the 2025 SWAP update uses the US Stream Classification System, 2019, which categorizes stream segments in the NHDPlusV2 network based on six habitat factors: size, gradient, hydrology, temperature, bifurcation network, and valley confinement. To link the stream habitats to adjacent and upstream land areas, the SWAP

uses a hydrologic model built from the NHDPlusV2 VAA flow network that quantifies instream travel time and percent contribution, at mean annual flow volumes, between each stream segment and all contributing upstream stream segments and their associated local watershed catchments. To further map and assess lateral connectivity between land and stream habitats, land areas are classed based on Fathom-based flood frequency, as well as proximity to the NHDPlus HR stream network.



Belted Kingfisher *(Megaceryle alcyon), SGCN in Tennessee / Don Miller via Flickr Creative Commons*

Cave systems are the basic karst habitat units. The 2025 SWAP update uses a 2024 update of cave systems in Tennessee. Appendix E provides a summary of the SWAP habitat classification hierarchy, including information on the distribution of habitat types by ecoregion.

3.2.3. SGCN Habitat Preferences

In developing the initial 2005 SWAP, expert-derived habitat preferences were assigned for all terrestrial SGCN to NatureServe ecological systems within their expected ranges (TWRA 2005, p. 65), using ratings of "preferred," "suitable," "marginal," or "unsuitable." In both the 2015 and 2025 updates, habitat preferences were assigned for newly designated SGCN and added to the existing database. The preference ratings estimate the relative utility of each ecological system type as habitat for that terrestrial SGCN, and are used as weights in the terrestrial habitat model, with 10 points for preferred, 5 points for suitable, and 2 points for marginal habitat preferences.

For aquatic species in the 2025 update, SGCN occurrences were snapped to their nearest stream segment in the NHDPlusV2 network, and the corresponding habitat factors of that segment in the US Stream Classification System, 2019, were used as reference classes for that species at that location. In evaluating stream segments upstream and downstream of the reference streams for potential habitat suitability, the habitat factors of those upstream and downstream segments were compared to those of the reference stream, with habitat preference calculated based on how closely those factors matched that of the reference stream.

Habitat preferences for karst SGCN are based on their dependence on cave environments for their life cycle. Beginning in 2015, each subterrestrial karst SGCN was classed as being either a troglobiont (i.e., karst obligate, wholly dependent on the cave environment), troglophile (known to inhabit both surface and cave environments, but not restricted to either), or trogloxene (occasionally visiting caves). Similarly, subaquatic SGCN were classed as stygobionts, stygophiles, or stygoxenes.

3.2.4. 2025 Updates to Habitat Mapping Units

Terrestrial habitat mapping units

The 2005 habitat mapping effort used products from the US Census Topologically Integrated Geographic Encoding and Referencing (TIGER) database of roads to segment Tennessee's terrestrial landscape into roadless block sections. These roadless block areas were used as the base units of analysis in assessing priorities. For the 2015 update, the roadless block units were replaced by uniform 100-acre hexagons statewide, subsequently grouped into 700-acre rosettes for use in terrestrial habitat prioritization. In 2025, terrestrial mapping units are based on a hexagonal hierarchical spatial indexing system developed by Uber, known as H3. (Table 3.6). In this system, hexagons at finer levels of detail nest within hexagons at coarser levels, which allows for faster spatial evaluation over larger areas, while maintaining spatial precision in final results. The 2025 SWAP uses hexagon levels 6, 7, and 8 (approximately 8928-, 1275-, and 182-acres in size, respectively) in assessing terrestrial habitats. Use of the H3 system has allowed for the identification of larger potential occupancy footprints around SGCN occurrences, relative to the 2015 methodology, which more closely approximate the full known range of the species.

Aquatic habitat mapping units

Since its initial development, the aquatic component of the database has also been extensively revised and refined. The 2005 version of the SWAP aquatic datasets used 12-digit hydrologic units (HUC12) as the units of analysis. The 2015 and 2025 SWAP updates use a hydrological modeling framework developed by TNC in a Microsoft Access relational database, built upon National Hydrography Plus, Version 2 (NHDPlusV2) datasets (Table 3.6). NHDPlusV2 delineates the catchment areas draining into each individual stream segment in a hydrologic network. The NHDPlusV2 dataset also defines the hydrologic upstream and downstream connections between individual stream segments, as well as providing a number of other relevant attributes, such as mean annual flow velocities and volumes. These factors have been incorporated into the hydrologic model, as well as dam locations and GIS attributions from the National Inventory of Dams (NID) dataset. Dams determined to be on the stream network were linked to their corresponding NHDPlusV2 stream segments, and maximum storage values from NID data, as well as NHDPlusV2 flow volumes at linked stream segments, were used to estimate mean annual residence time of water behind dam impoundments.

The resulting hydrologic model is a relational database table of hydrologic relationships between every upstream and downstream stream segment pair in the network, including travel time, at mean annual flow volumes, taking into account residence time behind impoundments, as well as the relative contribution of each upstream stream segment and its associated catchment to the overall flow of each downstream segment.

The 2015/2025 updates to the SWAP aquatic datasets provide several advantages in both the assessment of habitat priorities and the understanding of problems affecting these habitats. The

Table 3.6 Comparison of 2005, 2015, and 2025 mapping units

General Habitat Category	2005 Base Mapping Unit	2015 Base Mapping Unit	2025 Base Mapping Unit
Terrestrial	TIGER-roadless blocks*	100-acre hexagons, aggregated to 700-acre rosettes	Uber H3 level 6, 7, and 8 nesting hexagons, at 8928-, 1275-, and 182-acre scales respectively.
Aquatic	12-digit Hydrologic Unit Code (HUC) watersheds	National Hydrography Dataset Plus, Version 2 catchments	National Hydrography Dataset Plus, Version 2 catchments
Subterranean	TIGER-roadless blocks*	100-acre hexagons, aggregated to 700-acre rosettes	National Hydrography Dataset Plus, Version 2 catchments

*TIGER stands for Topologically Integrated Geographic Encoding and Referencing system.

grain size of the catchment areas around stream segments is much smaller and more refined than the HUC12 grain size, and the catchments and segments can be aggregated and disaggregated at different watershed spatial scales as needed. The catchment and stream segment connections also allow for assessments of land use and land cover conditions known to be related to stream health and overall habitat integrity. Finally, the upstream and downstream hydrologic connections provide a general means of understanding the linkages between upstream land and water uses on downstream sections of streams and rivers.

3.2.5. 2025 Updates to Species Distribution Footprints

As in 2015, the 2025 SWAP model uses the occurrence observation points of each SGCN as the basis for mapping and estimating its likelihood of occupancy at a given location within footprints around the occurrences. For terrestrial SGCN, both the 2015 and 2025 models use NatureServe's Suitable Habitat Separation Distance (SHSD, Box 3.5) estimate of the dispersal ability of each species to calibrate the radius of those footprints. In 2015, footprint radii of twice (2x) the SHSD were used, with footprint size limited by the number of resulting calculations necessary to calculate potential occupancy for more than 160,000 occurrences of over 1,200 terrestrial SGCN.

In 2025, the H3 hexagon system, as well as increases in computer speed, allowed the use of footprint radii of five times the SHSD, which better approximates the range of species around their documented occurrences. In addition to providing the basis for calculating footprint size, the SHSD were also used in determining the appropriate level of H3 hexagon to use in modeling occupancy for each SGCN, with larger hexagons used for wide-ranging species and smaller hexagons for species with lower dispersal ability. For all hexagons within each occurrence's footprint, the distance from the occurrence to the centroid of the hexagon was measured and, based on its percentage of overall footprint radius, used to calculate a distance score for that occurrence/hexagon pair. This distance score was multiplied by the age score of the occurrence to estimate the likelihood of species persistence at that hexagon based on that occurrence.

Box 3.5. Separation Distance for Suitable Habitat

Suitable habitat is habitat that is capable of supporting the needs of a species for reproduction or used regularly for feeding or other essential life history functions, i.e., a habitat in which one would expect to find the species (assuming appropriate season and conditions). The term intervening suitable habitat can be designated as suitable habitat that is not known to be occupied and its distance from verified species occurrences is great enough to effectively separate occurrences by limiting movement or dispersal of individuals between them. For most animal species, the recommended minimum separation distance for intervening suitable habitat is 2 km (1.2 mi). This is to ensure that occurrences are not separated by unreasonably small distances, which could lead to the misidentification of fragmented populations as potential targets for conservation planning or action (definition adapted from NatureServe).

The 2025 update also uses individual species occurrence observations as the beginning point for mapping occupancy. A few key modifications recognize the limitations inherent in using observations based on general field surveys designed primarily to document species presence only, without recording absence where a species might be expected to occur. In addition, the H3 hexagon framework and NHDPlusV2 updated base mapping units allow for greater flexibility in examining potential species compared to past years.

Because hexagons could fall within multiple occurrence footprints of a given species, the maximum likelihood of persistence score among all occurrences was used for each SGCN/hexagon pair.

For aquatic species, in both the 2015 and 2025 SWAP updates, occurrence points were snapped to their nearest stream segment in the NHDPlusV2 network and used as reference streams for evaluating segments upstream and downstream within one SHSD. Using the hydrologic model, the distance from the reference segment to each segment within the occurrence footprint was measured and, as was done for terrestrial SGCN, used to calculate a distance score based on its percentage of overall footprint length. Also similar to terrestrial species, this distance score was then multiplied by the age score of the reference occurrence to estimate the likelihood of



Smallscale Darter, Harpeth River - an aquatic SGCN in Tennessee / Alex Bybel, TWRA

species persistence at that stream segment based on that occurrence. Finally, as in the terrestrial model, the maximum likelihood of persistence score for each segment/SGCN combination was used among all occurrences.

As in both 2005 and 2015 SWAPs, subterranean species occurrences were linked to their known cave sites, with occurrences combined into one observation point for that species in that cave system. With the exception of bats, which are routinely surveyed in many of their known caves, EO age scores were not calculated from dates of subterranean species observation, as most karst species are surveyed very infrequently, and cave environments are deemed to be relatively stable under most conditions.

3.2.6. Mapping Terrestrial, Aquatic, and Subterranean Priority Habitats

The next step in assembling the final habitat prioritization models involved combining the SGCN imperilment prioritization scores, the likelihood of persistence scores, and habitat preference scores for habitats within the potential occupancy footprints.

For terrestrial SGCN, mapped ecological system habitats were combined with the most detailed, H3 level 8 hexagons used in the terrestrial model, resulting in unique instances of mapped ecological systems within each hexagon. For each species whose potential occupancy footprints overlapped a given hexagon, its relative imperilment score, maximum likelihood of persistence score at that hexagon, and preference score for each ecological system mapped within the hexagon were multiplied together, resulting in a priority score for that species at that mapped instance of ecological system in that hexagon. These scores were then added together to give the overall 'raw' priority score for that ecological system/hexagon unit. These raw priority scores were then normalized and partially stratified, by calculating its percentage of the maximum score statewide, as well as its percentage of the maximum score within each ecoregion, and then averaging the two percentages. Finally, percentile ranks of the resulting scores, weighted by area, were calculated, and converted to Very High (90-100%), High (70-90%), Medium (50-70%), Low (10-50%), and Very Low (<10%) classes.

Aquatic habitat priorities were calculated for each stream segment within the occupancy footprints of each SGCN by multiplying together the relative imperilment score of the SGCN, the maximum likelihood of persistence score of the SGCN at that stream segment among all its scored occurrences, and the habitat preference of the species, as calculated from the degree to which the habitat classification factors match those of the reference occurrence stream segment. The individual SGCN priority scores were then added together for each stream segment to calculate its overall 'raw' priority. As in the terrestrial model, the raw scores were then normalized and partially stratified by calculating percent of maximum statewide, as well as within each basin and subbasin, and then averaging the percentages together. Land conservation priorities adjacent to and upstream of the priority stream habitats were also assessed using the hydrologic model, taking into account a number of factors, including overall health of each priority stream segment's contributing watershed, lateral position relative to the stream network, intactness of

the riparian zone, and distance to and percent contribution to overall flow at each priority stream segment. As with the terrestrial model, the percentile ranks of the land conservation priority scores, weighted by area, were calculated and used to class results into five Very High to Very Low classes, using the same percentile breaks as in the terrestrial model.

Karst habitat priorities were calculated for each cave system based on multiplying the relative imperilment of each SGCN documented in the cave by its affinity for cave environments, and for bats by its age score as well, and then adding these scores. Unlike in the terrestrial and aquatic models, raw priority scores were not stratified. Land conservation priorities nearby and upstream of priority cave habitats were also assessed using the NHDPlusV2 stream network and associated local catchments of each stream segment, as well as the hydrologic model. The minimum elevation of each cave was calculated by subtracting the maximum total explored depth of the cave from its entrance elevation, minus 20' to account for potential mapping and/or measurement error. Catchments within 2.5 km and perched above the minimum elevation were scored as potential material contribution zones, and catchments above minimum elevation within 5km were scored as potential proximal recharge zones for each cave system. Using the hydrologic model, the conservation value of land upstream of the proximal recharge zones were also scored based on their potential to contribute surface flow. As with the terrestrial and aquatic habitat priority assessments, these land conservation scores were converted to area-weighted percentile ranks and grouped into five classes (see the SWAP Database Highlight for an example analysis).



Rafinesque's Big-eared Bats (*Corynorhinus rafinesquii*) - SGCN in Tennessee / Daniel Istvanko, TWRA

3.2.7. 2025 Statewide Habitat Priority Maps

Maps of priority habitats for terrestrial, aquatic, and subterranean SGCN (Maps 3.1, 3.2, and 3.3), as well as all priority habitats combined (Map 3.4), can be found in **Appendix B, the 2025 TN SWAP Atlas**. We determined that having maps in one location would make it easier to refer to them throughout the SWAP, rather than spreading them among chapters.

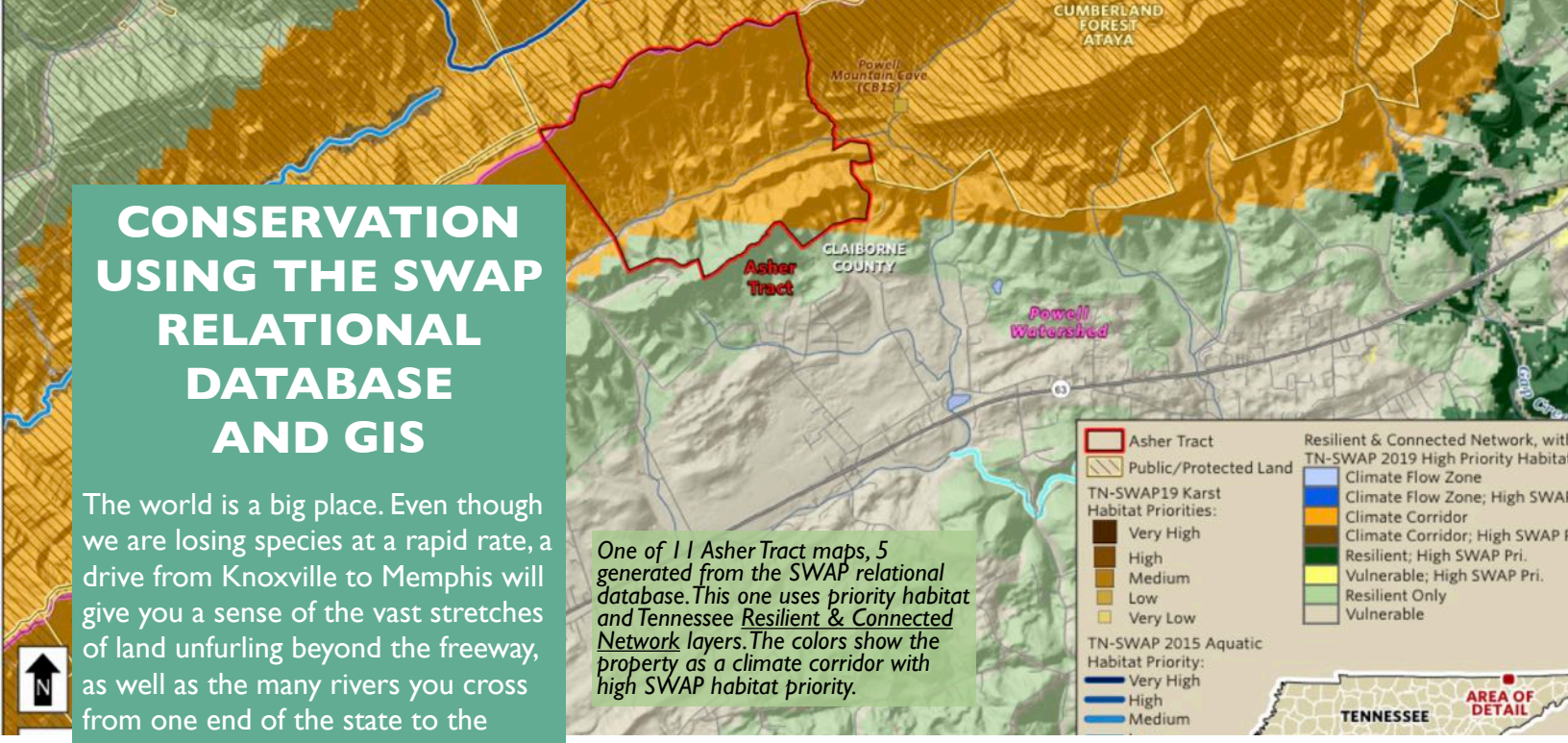
CONSERVATION USING THE SWAP RELATIONAL DATABASE AND GIS

The world is a big place. Even though we are losing species at a rapid rate, a drive from Knoxville to Memphis will give you a sense of the vast stretches of land unfurling beyond the freeway, as well as the many rivers you cross from one end of the state to the other.

In addition to the vast extent of land, almost 90% of Tennessee is privately owned—severely limiting what biologists know about these lands, including the type and quality of habitats, the type and number of species, and their population health.

So how do conservationists make sense of the landscape? How do land trusts prioritize their acquisitions and easements? How do municipal, state, and federal agencies ensure your tax dollars are well spent on sites that deserve permanent protection? And, of particular concern due to the state's extremely high aquatic species diversity and endemism, how does society protect life in the rivers and streams that belong to us all?

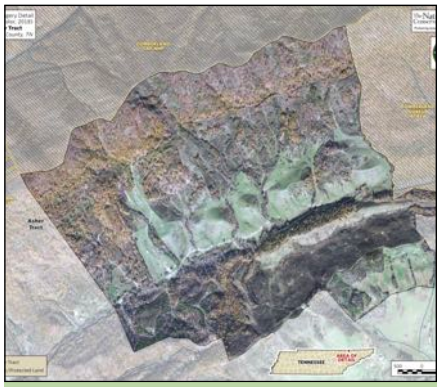
Creating tools that can answer these questions is the metier of **Joey Wisby, GIS Manager for The Nature Conservancy (TNC) in TN** —a simple title that belies the complexity of the tasks Wisby has undertaken for the past 24+ years. Wisby manages the huge relational database that underlies and supports the maps, appendices, and Conservation Opportunity Areas of the TN State Wildlife Action Plan.



One of 11 Asher Tract maps, 5 generated from the SWAP relational database. This one uses priority habitat and Tennessee Resilient & Connected Network layers. The colors show the property as a climate corridor with high SWAP habitat priority.

SPATIAL ANALYSIS AND DATA TOOLS

"The biggest single ongoing use of the State Wildlife Action Plan (SWAP) is applying spatial analysis and data tools to evaluate potential protection projects," says Wisby. Protection projects involve the acquisition of private land for conservation, which can mean a conservation easement (landowners retain ownership of the land with certain stipulations for conservation), but more often this means fee title acquisition for long-term public ownership and designation as a protected area.



Aerial photo of Asher tract, green shows pasture, brown shows forest /TNC

The SWAP is all about protecting and managing Species of Greatest Conservation Need (SGCN), i.e. those that are most at risk and in need of conservation action. One of the primary ways of doing this is to protect the habitats these species require. Since 2005, the TN SWAP has relied on amassing and interpreting SGCN "element occurrence" (EO) data for SGCN. Each EO tells what species was positively identified, its relative rarity (e.g., state, federal, and global designations), when it was identified, and where on the landscape it occurred. These EO data layers are then "overlaid" on publicly available terrestrial and aquatic data layers that describe habitats on the landscape.

Wisby's magic combines land cover data with EO data in a way that allows conservation partners to tease out where the most important species and habitats of interest are likely to occur. He has created a tool that combines SGCN data (see SWAP Appendix D) into a relational database (in Access) that essentially shows which ecological systems (see Appendix E) provide the best and worst habitat for each species. This is no small task in a state with 83 ecological systems, over 1500 SGCN, and EO records that mushroomed from ~25,000 in 2005 to over 1million in 2025!

The SWAP relational database includes sophisticated analyses and assumptions that allow interpretation of EO and habitat data, including:

- NatureServe values on each species' mobility (are they small with limited range or large and wide-ranging?)
- Designations of preferred ecological system habitat by each species (an exercise completed when the first TN SWAP was developed in 2004, and also completed for each new SGCN)
- Assumptions about how much weight to give an EO in the model, depending on its age (was it seen 2 or 20 years ago?)
- The creation of standardized habitat units that allow comparisons across the landscape
- For terrestrial species, techniques that allow extrapolation of larger footprints of potential occupancy around documented occurrences of SGCN to more closely approximate the species' full range
- For aquatic species, assumptions about upstream and downstream movement depending upon innate characteristics and stream connectivity, as well as linkages between land uses within a watershed and downstream aquatic habitats
- Definitions of distance between EOs of the same species (specific to each one) that lead to recognition of distinct populations and the need for connectivity.



Asher tract in Claiborne County

TN SWAP RELATIONAL DATABASE PARTNERS for the ASHER TRACT

Rocky Mountain Elk Foundation
Tennessee Wildlife Resources Agency
Tennessee Chapter of The Nature Conservancy
The Conservation Fund
Kentucky & Tennessee Imperiled Bat Conservation Funds

MUD HOLLOW FARM (ASHER TRACT)

In 2021, the Asher tract was a conservation priority not only for Tennessee, but for a much larger area. The Central Appalachians have a globally significant, connected and resilient, temperate hardwood forest comprising the single most critical landscape east of the Mississippi for climate resilience for both nature and ecological services (clean water, clean air, carbon storage)—benefiting tens of millions of people and thousands of communities. The Asher tract was a key site connecting two parcels totaling 100,337 acres and spanning the Tennessee and Kentucky border. It formed a critical linkage between four existing protected areas in both states. Located in the headwaters of the Cumberland River system, which harbors the federally endangered Blackside Dace (*Phoxinus cumberlandensis*), it also lay within the swarming zone for a winter colony of federally endangered Indiana Bats (*Myotis sodalis*) that roost just to the north in the Cumberland Gap National Historical Park. (The swarming zone is an area where, in fall, bats fly in large numbers around the cave or mine entrances of their winter hibernacula). With a mix of mature forest and open pasture (seen as green in the aerial photo), it is also frequented by the Tennessee/Kentucky elk herd.

Tract	Presumed Status	Taxonomic Group	Scientific Name	Common Name	G-Rank	S-Rank in TN	Federal Status	TN Status	Species Priority	Last Obs. Year	Min. Obs. Dist. (m)	Avg. Priorty Score	Foot-print Score	% Preferred Habitat	% Suitable Habitat	% Marginal Habitat
Asher	**Extant**	Bat	*Myotis grisescens*	Gray Bat	G4	S2	LE	E	41.0	2012	12,638	1.1	93.4		47.1%	
Asher	**Extant**	Bat	*Myotis leibii*	Eastern Small-footed Bat	G4	S2S3		D	20.4	2012	12,095	0.6	55.0		47.1%	
Asher	**Extant**	Bat	*Myotis septentrionalis*	Northern Myotis	G1G2	S4	LT	T	53.1	2003	8,167	0.4	33.6	0.2%	37.5%	
Asher	**Extant**	Bat	*Perimyotis subflavus*	Tricolored Bat	G2G3	S5		T	25.9	2003	8,616	0.3	23.8	28.8%	0.3%	
Asher	**Extant**	Bird	*Accipiter striatus*	Sharp-shinned Hawk	G5	S3	No Status	D	12.0	2013	2,665	1.2	101.4		98.8%	0.4%
Asher	**Extant**	Bird	*Aquila chrysaetos*	Golden Eagle	G5	S1		D	34.5	2013	33,442	1.1	94.7		46.9%	
Asher	**Extant**	Bird	*Bonasa umbellus*	Ruffed Grouse	G5	S4			5.1	2001	18,548	0.2	14.1	1.3%	80.2%	

The partners on this project (see box above) requested the "full package" of analyses from Wisby to assess and justify their land purchase, which includes the series of maps, GAP analyses (showing where important sites on the landscape remain unprotected), and data tables (see table above) showing SGCN priority scores and the amount of habitat for each SGCN on the site. "Every acquisition by TNC depends on Joey's SWAP analysis," says **Gabby Lynch, TNC Director of Land**. "TennGreen Land Conservancy and other land trusts use the data too." Since it was created in 2005, Wisby estimates that hundreds of potential projects have been assessed using the SWAP database. "Extinction to me is an absolute crime," says Wisby. "For every species that's gone that we had a hand in, we have failed our grandchildren and the planet. Preventing as many species as possible from going extinct is my motivator. SWAP is a perfect fit for that."

3.2.8. Statewide Priority Habitat Summaries

Tables 3.7 through 3.14 summarize information on the priority terrestrial natural and semi-natural habitats by Level III Ecoregion (see Chapter 2 for summary of ecoregions). The data in these tables are ordered according to the average SGCN priority score for that habitat, with the scoring stratified down to the subregion scale. In certain instances, semi-natural habitats show higher priority scores than natural habitats in an ecoregion. This is due to the typically larger distribution footprint of species that can utilize semi-natural habitats (e.g. birds) and the fact that some natural habitats (e.g. cliffs or rockhouses) are very small in overall acreage, limiting the potential number of species that occupy them overall. In the Southeastern Plains and Mississippi River Alluvial Plain, bottomland and riparian forest habitats are most significant, and large acreages of upland forest types also occur in the Southeastern Plains. In the Interior Plateau, floodplain and riparian forests are again significant, as are both mesophytic and dry-mesic forests. The data for the Interior Plateau also demonstrate the significance of prairie, woodland, and limestone glade & barren habitats for a variety of rare SGCN. Prairie, woodland, and limestone glade habitats can be smaller and more isolated in terms of their overall acreages in the ecoregion; however, they are home to many distinct plant and animal species.

Forest habitat types also rank highest in priority within the Southwestern and Central Appalachian Ecoregions, which encompass the Cumberland Plateau and Mountains, as well as the Ridge and Valley ecoregion, although the specific forest system type shifts according to the ecoregion. In the Blue Ridge, the dominant forest system, Southern Appalachian oak forest, ranks highly, as does a variety of other systems distributed in cove and high elevation settings in the ecoregion.



American Toad (*Anaxyrus americanus*) / Chris Simpson, TWRA

Table 3.15 summarizes the number of stream miles of highly-ranked habitat within each aquatic subregion across Tennessee. While the total amounts of the Conasauga and Barren River subregion watersheds within Tennessee are small in comparison to others, a good percentage of their stream miles in the state are ranked as high priority SGCN habitat. The Cumberland, Tennessee, and Coastal Plain-Mississippi aquatic regions have an average of approximately 15%, 12% and 6% of their total stream miles within the state of Tennessee ranked as medium, high, or very high priority habitat.

Table 3.7 Summary of terrestrial habitat priorities within the Mississippi Alluvial Plain Ecoregion by ecological system, showing land with high to very high rank

Level III ecoregion: Mississippi Alluvial Plain	Land cover type	Total acres of habitat type in ecoregion	Total acres of land ranked as high to very high priority	% of terrestrial system within ecoregion ranked as high to very high priority
Natural Habitats				
Mississippi River High Floodplain (Bottomland) Forest	Wetland	10,171.62	0.00	0.00%
Mississippi River Low Floodplain (Bottomland) Forest	Wetland	124,021.79	124,018.88	100.00%
Mississippi River Riparian Forest	Wetland	37,800.25	37,800.25	100.00%
Mississippi River Bottomland Depression	Wetland	533.38	531.25	99.60%
Semi-Natural Habitats				
Forest Plantation	Forest Plantation	13.07	0.00	0.00%
Old Field / Successional	Recently Disturbed	156.37	80.83	51.69%
Pasture	Pasture	11,551.24	5,290.35	45.80%
Cropland	Cropland	262,543.73	0.00	0.00%

Table 3.8 Summary of terrestrial habitat priorities within the Mississippi Valley Loess Plain Ecoregion by ecological system, showing land with high to very high rank

Level III ecoregion: Mississippi Valley Loess Plains	Land cover type	Total acres of habitat type in ecoregion	Total acres of land ranked as high to very high priority	% of terrestrial system within ecoregion ranked as high to very high priority
Natural Habitats				
East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Forest	172,150.83	0.00	0.00%
East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Forest	11,820.31	0.00	0.00%
East Gulf Coastal Plain Northern Loess Bluff Forest	Forest	41,292.03	0.00	0.00%
East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Forest	7,331.76	0.00	0.00%
South-Central Interior / Upper Coastal Plain Flatwoods	Forest	16,703.26	0.00	0.00%
South-Central Interior Mesophytic Forest	Forest	11.96	11.96	100.00%
East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Forest	0.96	0.00	0.00%
East Gulf Coastal Plain Large River Floodplain Forest	Wetland	277,123.99	135,364.13	48.85%
East Gulf Coastal Plain Small Stream and River Floodplain Forest	Wetland	180,570.28	22,550.37	12.49%
East Gulf Coastal Plain Northern Seepage Swamp	Wetland	621.96	0.00	0.00%
South-Central Interior / Upper Coastal Plain Wet Flatwoods	Wetland	557.74	0.00	0.00%
South-Central Interior Small Stream and Riparian	Riparian/Floodplain	3,856.25	3,834.98	99.45%
Semi-Natural Habitats				
Forest Plantation	Forest Plantation	7,292.87	0.00	0.00%
Old Field / Successional	Recently Disturbed	29,540.14	6,503.99	22.02%
Pasture	Pasture	459,584.70	64,466.51	14.03%
Cropland	Cropland	1,302,438.42	0.00	0.00%

Table 3.9 Summary of terrestrial habitat priorities within the Southeastern Plains Ecoregion by ecological system, showing land with high to very high rank

Level III ecoregion: Southeastern Plains (Upper Gulf Coastal Plain)	Land cover type	Total acres of habitat type in ecoregion	Total acres of land ranked as high to very high priority	% of terrestrial system within ecoregion ranked as high to very high priority
Natural Habitats				
East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Forest	18,880.43	0.00	0.00%
East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Forest	586,257.02	0.00	0.00%
East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Forest	285,614.06	0.00	0.00%
South-Central Interior / Upper Coastal Plain Flatwoods	Forest	173.54	0.00	0.00%
East Gulf Coastal Plain Limestone Forest	Forest	314.47	0.00	0.00%
South-Central Interior Mesophytic Forest	Forest	873.27	706.05	80.85%
East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Forest	124,826.96	0.00	0.00%
East Gulf Coastal Plain Large River Floodplain Forest	Wetland	209,026.07	90,991.12	43.53%
East Gulf Coastal Plain Small Stream and River Floodplain Forest	Wetland	381,430.38	23,603.70	6.19%
East Gulf Coastal Plain Northern Seepage Swamp	Wetland	2,079.71	0.00	0.00%
South-Central Interior / Upper Coastal Plain Wet Flatwoods	Wetland	1,219.51	0.00	0.00%
South-Central Interior Small Stream and Riparian	Floodplain/Riparian	16.95	14.60	86.15%
Semi-Natural Habitats				
Forest Plantation	Forest Plantation	79,998.27	0.00	0.00%
Old Field / Successional	Recently Disturbed	100,166.32	10,578.09	10.56%
Pasture	Pasture	684,809.12	74,839.89	10.93%
Cropland	Cropland	566,801.43	0.00	0.00%

Table 3.10 Summary of terrestrial habitat priorities within the Interior Plateau Ecoregion by ecological system, showing land with high to very high rank

Level III ecoregion: Interior Plateau	Land cover type	Total acres of habitat type in ecoregion	Total acres of land ranked as high to very high priority	% of terrestrial system within ecoregion ranked as high to very high priority
Natural Habitats				
Southern Interior Low Plateau Dry-Mesic Oak Forest	Forest	2,462,673.62	1,214,095.35	49.30%
South-Central Interior Mesophytic Forest	Forest	881,308.65	770,640.19	87.44%
Southern Appalachian Low-Elevation Pine Forest	Forest	4,905.29	0.89	0.02%
Nashville Basin Limestone Glade and Woodland	Glade/Barrens	130,150.21	10,345.76	7.95%
Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	69,648.73	33,306.57	47.82%
Central Interior Highlands and Appalachian Sinkhole and Depression Pond	Wetland	17,186.82	6.75	0.04%
South-Central Interior Small Stream and Riparian	Riparian/Floodplain	935,342.17	569,890.00	60.93%
South-Central Interior Large Floodplain	Riparian/Floodplain	94,068.62	70,321.79	74.76%
Central Interior Acidic Cliff and Talus	Sparse Vegetation	705.91	0.00	0.00%
Central Interior Calcareous Cliff and Talus	Sparse Vegetation	2,839.93	0.00	0.00%
Semi-Natural Habitats				
Forest Plantation	Forest Plantation	154,079.79	0.00	0.00%
Old Field / Successional	Recently Disturbed	246,527.08	28,313.43	11.48%
Pasture	Pasture	3,097,669.28	209,073.34	6.75%
Cropland	Cropland	643,140.80	0.00	0.00%

Table 3.11 Summary of terrestrial habitat priorities within the Southwestern Appalachians (Cumberland Plateau) Ecoregion by ecological system, showing land with high to very high rank

Level III ecoregion: Southwestern Appalachians (Cumberland Plateau)	Land cover type	Total acres of habitat type in ecoregion	Total acres of land ranked as high to very high priority	% of terrestrial system within ecoregion ranked as high to very high priority
Natural Habitats				
Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Forest	424,012.84	135,789.57	32.02%
Allegheny-Cumberland Dry Oak Forest and Woodland	Forest	814,199.53	465,092.70	57.12%
South-Central Interior Mesophytic Forest	Forest	214,584.95	214,576.30	100.00%
Southern and Central Appalachian Cove Forest	Forest	2,355.63	1,659.71	70.46%
Southern Appalachian Low-Elevation Pine Forest	Forest	106,608.20	4,507.99	4.23%
Southern Appalachian Montane Pine Forest and Woodland	Forest	3.04	0.00	0.00%
Appalachian (Hemlock)-Northern Hardwood Forest	Forest	84,601.74	77,938.72	92.12%
Central Interior Highlands and Appalachian Sinkhole and Depression Pond	Wetland	3,341.78	0.00	0.00%
South-Central Interior Small Stream and Riparian	Riparian/Floodplain	387,017.90	344,519.46	89.02%
South-Central Interior Large Floodplain	Riparian/Floodplain	13,703.50	11,615.56	84.76%
Cumberland Acidic Cliff and Rockhouse	Sparse Vegetation	5,807.84	0.00	0.00%
Semi-Natural Habitats				
Forest Plantation	Forest Plantation	103,289.13	0.00	0.00%
Old Field / Successional	Recently Disturbed	198,116.94	16,140.40	8.15%
Pasture	Pasture	505,805.32	1,293.05	0.26%
Cropland	Cropland	19,263.87	0.00	0.00%

Table 3.12 Summary of terrestrial habitat priorities within the Central Appalachians (Cumberland Mountains) Ecoregion by ecological system, showing land with high to very high rank

Level III ecoregion: Central Appalachians (Cumberland Mountains)	Land cover type	Total acres of habitat type in ecoregion	Total acres of land ranked as high to very high priority	% of terrestrial system within ecoregion ranked as high to very high priority
Natural Habitats				
Allegheny-Cumberland Dry Oak Forest and Woodland	Forest	365,951.53	340,465.99	93.04%
Southern and Central Appalachian Cove Forest	Forest	47,887.42	47,887.42	100.00%
Southern Appalachian Low-Elevation Pine Forest	Forest	1,801.92	99.44	5.52%
Southern Appalachian Montane Pine Forest and Woodland	Forest	3,685.13	0.00	0.00%
Appalachian (Hemlock)-Northern Hardwood Forest	Forest	10,605.81	10,560.77	99.58%
Central Interior Highlands and Appalachian Sinkhole and Depression Pond	Wetland	204.83	7.88	3.85%
South-Central Interior Small Stream and Riparian	Riparian/Floodplain	65,569.78	64,488.10	98.35%
South-Central Interior Large Floodplain	Riparian/Floodplain	785.97	785.97	100.00%
Cumberland Acidic Cliff and Rockhouse	Sparse Vegetation	85.57	0.00	0.00%
Semi-Natural Habitats				
Forest Plantation	Forest Plantation	1,609.00	0.00	0.00%
Old Field / Successional	Recently Disturbed	32,839.64	5,642.35	17.18%
Pasture	Pasture	17,440.75	28.52	0.16%
Cropland	Cropland	114.34	0.00	0.00%

Table 3.13 Summary of terrestrial Hhabitat priorities within the Ridge and Valley Ecoregion by ecological system, showing land with high to very high rank

Level III ecoregion: Ridge and Valley	Land cover type	Total acres of habitat type in ecoregion	Total acres of land ranked as high to very high priority	% of terrestrial system within ecoregion ranked as high to very high priority
Natural Habitats				
Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Forest	844,604.14	86,857.00	10.28%
Allegheny-Cumberland Dry Oak Forest and Woodland	Forest	336,934.26	80,325.63	23.84%
South-Central Interior Mesophytic Forest	Forest	192,473.44	190,676.07	99.07%
Southern and Central Appalachian Cove Forest	Forest	3,338.96	2,564.83	76.82%
Southern Appalachian Oak Forest	Forest	12,631.21	6,243.24	49.43%
Southern Appalachian Low-Elevation Pine Forest	Forest	96,359.58	0.00	0.00%
Southern Appalachian Montane Pine Forest and Woodland	Forest	1,140.79	0.00	0.00%
Appalachian (Hemlock)-Northern Hardwood Forest	Forest	11,738.00	7,748.66	66.01%
Central Interior Highlands and Appalachian Sinkhole and Depression Pond	Wetland	4,502.16	0.00	0.00%
South-Central Interior Small Stream and Riparian	Riparian/Floodplain	340,166.30	293,319.45	86.23%
South-Central Interior Large Floodplain	Sparse Vegetation	36,905.16	33,676.34	91.25%
Cumberland Acidic Cliff and Rockhouse	Sparse Vegetation	517.83	0.00	0.00%
Southern Appalachian Montane Cliff and Talus	Sparse Vegetation	45.54	0.00	0.00%
Semi-Natural Habitats				
Forest Plantation	Forest Plantation	62,639.56	0.00	0.00%
Old Field / Successional	Recently Disturbed	116,047.68	8,335.43	7.18%
Pasture	Pasture	1,656,039.37	75,463.61	4.56%
Cropland	Cropland	66,848.87	0.00	0.00%

Table 3.14 Summary of terrestrial habitat priorities within the Blue Ridge Ecoregion by ecological system, showing land with high to very high rank

Level III ecoregion: Blue Ridge	Land cover type	Total acres of habitat type in ecoregion	Total acres of land ranked as high to very high priority	% of terrestrial system within ecoregion ranked as high to very high priority
Natural Habitats				
Allegheny-Cumberland Dry Oak Forest and Woodland	Forest	1,413.76	698.81	49.43%
Southern and Central Appalachian Cove Forest	Forest	98,883.10	95,650.93	96.73%
Southern Appalachian Oak Forest	Forest	818,119.83	658,458.64	80.48%
Southern Appalachian Northern Hardwood Forest	Forest	15,867.33	15,584.42	98.22%
Southern Appalachian Low-Elevation Pine Forest	Forest	131,826.17	0.00	0.00%
Southern Appalachian Montane Pine Forest and Woodland	Forest	7,869.27	0.00	0.00%
Central and Southern Appalachian Spruce-Fir Forest	Forest	8,554.89	4,996.05	58.40%
Appalachian (Hemlock)-Northern Hardwood Forest	Forest	63,306.77	62,396.01	98.56%
Southern Appalachian Grass and Shrub Bald	Sparse Vegetation	659.52	0.00	0.00%
Southern and Central Appalachian Bog and Fen	Wetland	425.69	0.00	0.00%
South-Central Interior Small Stream and Riparian	Riparian/ Floodplain	201,824.13	191,820.00	95.04%
South-Central Interior Large Floodplain	Riparian/ Floodplain	2,642.30	1,911.85	72.36%
Southern Appalachian Montane Cliff and Talus	Sparse Vegetation	962.52	0.00	0.00%
Southern Appalachian Rocky Summit	Sparse Vegetation	263.91	0.00	0.00%
Semi-Natural Habitats				
Forest Plantation	Forest Plantation	18,511.11	0.00	0.00%
Old Field / Successional	Recently Disturbed	20,417.40	2,078.23	10.18%
Pasture	Pasture	85,007.73	2,844.65	3.35%
Cropland	Cropland	1,090.30	0.00	0.00%

Table 3.15 Summary of aquatic habitat priorities within HUC 6 aquatic regions, divided by HUC 8 subregions, showing stream miles with high to very high rank

HUC 6 aquatic region	HUC 8 aquatic subregion	Linear stream miles in subregion	Linear stream miles ranked as high to very high priority	% of stream miles ranked as high to very High priority
Barren River	Barren River	555.46	77.45	13.94%
Conasauga River	Conasauga River	215.96	60.02	27.79%
Cumberland River	Cumberland Mountain	1,787.99	338.24	18.92%
Cumberland River	Cumberland River - Nashville Basin	2,353.45	181.34	7.71%
Cumberland River	Lower Cumberland River	4,314.54	250.42	5.80%
Cumberland River	Upper Cumberland River	5,039.83	537.00	10.66%
Mississippi River	Coastal Plain	13,876.92	928.80	6.69%
Tennessee River	Lower Tennessee River	10,901.73	737.19	6.76%
Tennessee River	Tennessee River - Blue Ridge	8,130.51	416.12	5.12%
Tennessee River	Tennessee River - Cumberland Plateau	4,419.73	411.97	9.32%
Tennessee River	Tennessee River - Nashville Basin	4,613.90	443.71	9.62%
Tennessee River	Tennessee River - Ridge and Valley	6,582.25	373.96	5.68%



CHAPTER 4 PROBLEMS AFFECTING SPECIES AND HABITATS

4.1. Assessing Problems Affecting Species and Habitats

CONDUCTING A REVIEW OF THE PROBLEMS that may be adversely affecting Species of Greatest Conservation Need (SGCN) and their habitats in Tennessee in 2024 revealed that although the problems differ across geography, flora, and faunal groups, all designated SGCN face one or more threats to their survival. These include threats to habitat health and persistence and/or population stressors such as pollution and disease.

Certain issues, often related to human activities and management of lands and waters, pose threats to a range of habitat types and SGCN across the state. It is important to note, however, that in many cases people can make adjustments or implement "best practices" to mitigate or even eliminate the threats their activities pose. To the extent practicable, this linkage between stressor and conservation action is recognized in this chapter and Chapter 6 by providing internal links in the document.

Over the past decade, conservation scientists and planners have become increasingly focused on understanding larger, or "landscape-scale," patterns of change in lands and waters as a means of evaluating challenges to habitat or population persistence. In addition, the negative impacts from volatile climate scenarios and extreme weather events are of increasing concern to the short- and long-term health of SGCN and their habitats across the US (NFWPCAP 2012).

Photo credit: OHV damage in east TN showing massive ruts and erosion on a nature trail / Scott Dykes, TWRA

4.1.1. Review and Update of Major Statewide Problems

Summary: 2025 process for identifying and prioritizing problems affecting SGCN and their habitats

1. Review and revise problems identified in 2015. The planning team determined 2015 SWAP problems are still representative of current problems for SGCN and habitats.
2. Categorize problems. Using the standardized hierarchy originally developed by the Conservation Measures Partnership, now called the Conservation Standards for the Practice of Conservation (2016), the team cross-walked 2015 problems to the most recent updated threats classification 2.0 from 2016. Two problem categories were added: a) Climate Change & Severe Weather and b) Removing/ Reducing Human Maintenance.
3. Prioritize threats. The team focused on the most consistently highly-ranked problems from 2015 and, when possible, for a particular problem, added a spatial assessment component to help identify the location of problem sources relative to priority SGCN habitats. Problem rankings for individual species were not changed or updated from 2005/2015.
4. Incorporate climate change as a major new source of stress. A separate chapter in this plan (Chapter 5) focuses on Climate and Resilience and was prepared for Tennessee by members of the Southeast Climate Adaptation Science Center (SE CASC), building on the 2015 climate change vulnerability assessment for Tennessee conducted by The National Wildlife Federation and TNC. The chapter examines data on species vulnerability (due to both inherent factors and potential landscape/habitat changes) and landcape resilience, as well as case studies, to gain a better understanding of the range of SGCN vulnerabilities across the state.
5. Summarize threats, their sources and impacts, and major species groups affected. The major categories of problems in the 2025 Tennessee SWAP are Statewide Land and Water Uses (for economic and recreational purposes), Biological Resource Use and Natural System Modifications, Invasive and Problematic Species and Pathogens, and Pollution (See Table 4.1).

The 2025 SWAP team used the Best Practice recommendations (AFWA 2012), as well as the *Voluntary Guidance for States to Incorporate Climate Adaptation into State Wildlife Action Plans and Other Management Plans* (AFWA 2022) to assist with the review of problems facing species and habitats. In the 2005 planning effort, Tennessee followed a best practice, using a standardized process and hierarchy for identifying stresses and sources of stress aligned with broader categories defined by the Conservation Measures Partnership (CMP) (Salafsky et al. 2008). Over 33 "sources" or problems, were identified and linked to 10 major ecological stress types. The stress and source combinations were linked to every SGCN and then evaluated for the scope, severity, timing, reversibility, and contribution to potential population declines in different regions of the state.

These evaluation assignments were captured in the SWAP database and summarized to create cumulative ranking scores to identify the major problems facing SGCN distributed in the major terrestrial, aquatic, and subterranean regions of the state (see Ch. 1, State of Tennessee).

The 2025 SWAP team reviewed the 2015 SWAP major stresses and potential sources of stress hierarchies and determined that they were still representative of current problems (Appendix G). The team also determined that the 2015 stresses to new SGCN identified as part of the update



Agricultural conversion causes loss of native habitat, and some agricultural practices can be detrimental to wildlife. On the other hand, loss of prime farmland is also a conservation issue in Tennessee. / Greg Wathen

process remain the same. One additional major problem as defined by CMP was added during the 2025 revision process: Climate Change & Severe Weather. In addition, Removing/Reducing Human Maintenance, which is one of the threats listed under the major category Natural System Modifications, was added. A crosswalk exercise was completed between the 2015 sources of stress and the more recent CMP Open Standards (hereafter Conservation Standards) threats classification (Version 2, Beta – February 2016). Appendix G provides a summary of the crosswalk exercise and shows the addition of the new potential source of stress for 2025. A summary of major problems and threats is provided in Table 4.1.

Stressors and threat categories listed below follow the Conservation Standards classification to the extent possible, retaining the names of key threat categories and subcategories. However, the presentation of threats is organized in a manner that corresponds to their extent and location across the state, as well as commonalities in management approaches to address them. (For example, addressing the issues of "Overuse of Biological Resources"—e.g., collection—as well as "Recreation" usually requires public education, signage, rules, enforcement, and/or physical barriers to entry. They are both listed under the major category "Biological Resource Use and Natural System Modifications," whereas the CMP puts Recreation in its own category, "Human Intrusions & Disturbance.")

Urbanization, agricultural land management, forestry practices, water management, energy development, transportation and utility corridors, biological resource use/natural system modifications, and invasive and problematic species and pathogens are top issues in 2025.

Documenting and prioritizing sources of stress

In reviewing the 2015 prioritization assessments for the terrestrial, subterranean, and aquatic regions, the 2025 planning team identified patterns in which sources of stress consistently emerged as top issues across all the regions and grouped these sources by general category (for more details, see TWRA 2005, pp. 84-146). The team also documented which of these 2015 problems, and any emerging issues since 2015, warrant the greatest focus moving forward.

In assessing problems for the 2025 revision, the planning team chose to focus on the major sources of stress across the state, using new spatial information and analyses (see Chapter 3) to understand where major problem sources intersect with priority SGCN habitats (See Ch. 4 maps in **Appendix B**, the

Table 4.1 Summary of CMP level 1 and 2 threats to SGCN and SWAP-identified priority habitats in TN

CMP Level 1	CMP Level 2 Descriptor
1. Residential & Commercial Development	Housing & urban areas - Primary residential development
	Commercial & industrial areas
	Tourism & recreation areas
2. Agriculture and Aquaculture	Annual & perennial non- timber crops - Incompatible row crop agricultural practices
	Wood and pulp plantations
	Livestock farming & ranching - Incompatible grazing/pasture management practices
3. Energy Production & Mining	Oil & gas drilling
	Mining & quarrying
	Renewable energy
4. Transportation & Service Corridors	Roads & Railroads
	Utility & Service lines
5. Biological Resource Use	Hunting & collecting terrestrial animals
	Gathering terrestrial plants
	Logging & wood harvesting
	Fishing & harvesting aquatic resources
6. Human Intrusions & Disturbance	Recreational activities - non-vehicular
	Recreational activities - vehicular
7. Natural System Modifications	Fire & Fire suppression
	Dams & water management/use - Channelization of rivers/streams
	Dams & water management/use - Construction of dams/impoundments
	Dams & water management/use - Construction of ditches/dikes/drainage/diversion systems
	Dams & water management/use - Excessive groundwater withdrawal
	Dams & water management/use - Excessive surface water withdrawal

Table 4.1 Summary of CMP Level 1 and 2 threats to SGCN and SWAP-identified Priority Habitats in TN

CMP Level 1	CMP Level 2 Descriptor
	Dams & water management/use - Operation of dams/reservoirs
	Dams & water management/use - Operation of drainage/diversion systems
	Other ecosystem modifications - Incompatible species management practices
	Removing/Reducing Human Maintenance
8. Invasive & Problematic Species, Pathogens & Genes	Invasive non-native/alien species plants & animals
	Problematic native plants & animals
	Pathogens & Microbes
9. Pollution	Household sewage & urban wastewater - Municipal wastewater treatment/stormwater runoff
	Industrial & military effluents
	Agriculture & forestry effluents - Incompatible Forestry Practices
	Agriculture & forestry effluents - Incompatible grazing/pasture management practices
	Agriculture & forestry effluents -Incompatible row crop agricultural practices
	Garbage & solid waste
	Air-borne pollutants - Acid rain
	Air-borne pollutants - Low-level ozone air pollution
10. Climate Change & Severe Weather	Habitat shifting and alteration
	Droughts
	Temperature extremes
	Storms and Flooding

2025 TN SWAP Atlas) rather than conducting new species-by-species rankings. Examining problems in this fashion allowed the team to focus on the highest priority issues and the major landscape-scale drivers of change in Tennessee to better inform conservation investments and collaborations with conservation partners.



Signs of Hemlock Woolly Adelgid infestation: small cottony sacks at the base of needles / Nicholas A. Tonelli

As detailed in Section 3.2 and elaborated further in Section 4.2, the SWAP GIS database design allows for flexible assessments of habitat priorities and sources of stress to SGCN at a variety of scales in Tennessee when spatially relevant data are available. For example, urbanization issues were identified as a major problem in the 2005 SWAP; however, the specificity of where urbanization pressures intersected with SGCN and habitats was not specified. By using spatial analyses for the 2015 and 2025 updates, the planning team has identified where urbanization pressures in Tennessee must be addressed to protect SGCN and habitats. In addition, the associated database features allow planners to identify which SGCN, how many occurrences, and which habitat types are under pressure at a given location when that type of information is needed for project-specific work (see the SWAP Relational Database Highlight).

The most frequently documented potential source of stress listed in each COA in 2025 was natural system modifications, which includes water management, followed by agricultural land management, and urbanization (its associated infrastructure and water uses). In addition, biological resource use/forestry practices, energy development, transportation and utility corridors, and invasive and problematic species and pathogens appeared frequently as threats. These land and water use issues typically have a landscape-level footprint across one or more regions of Tennessee, and effectively managing for better habitat outcomes requires education and active engagement of the private sector and government agencies involved in land and water management, transportation, and compensatory mitigation decisions (AFWA 2012).

Fire suppression is a significant issue for multiple grassland, forest, and woodland habitat types statewide, and managing certain recreational activities remains a challenge for protecting species and habitats in specific locations. The collection of particular plant and animal species in different regions of the state must be monitored, and regulations enforced, to prevent overharvest and declines in species populations. Additional areas receiving increased emphasis for the 2025 update are problems associated with the ongoing spread of several disease pathogens and invasive exotic species, particularly those affecting cave-dwelling bat species, reptiles, amphibians, and forest habitats. Airborne pollutants remain a challenge, as acid rain and deposition of bioaccumulative toxic metals, such as mercury, damage both terrestrial and aquatic habitats,

particularly in the eastern two-thirds of Tennessee. Water pollution is also an issue, as runoff from agriculture and forestry can carry chemicals and contribute to stream siltation, and microplastics are now a known concern in the Tennessee River.



Topographical variation creates landscape diversity, which contributes to resilience. Savage Gulf, western edge of Cumberland Plateau / Greg Wathen

4.1.2. Climate and Resilience

In 2009, TWRA published an update report for the SWAP entitled *Climate Change and Potential Impacts to Wildlife in Tennessee* (TWRA 2009). This report served as the first comprehensive review of the scientific literature on climate change at the time, as well as its potential impacts on fish, wildlife, and habitats in Tennessee.

In 2015, the *Climate Change Vulnerability Assessment for Tennessee Wildlife and Habitats* was prepared by the National Wildlife Federation and The Nature Conservancy, under contract with TWRA (Glick et al. 2015). The primary emphasis of the 2015 assessment was to examine three major aspects of climate change impacts: species vulnerabilities, terrestrial and aquatic habitat changes, and landscape resilience.



Some amphibians may suffer disproportionately from a shifting climate in Tennessee. Long-tailed Salamander (E*urycea longicauda*) / Daniel Istvanko, TWRA

In 2025, an entire chapter on Climate and Resilience has been included, focusing on species vulnerability and landscape resilience alongside current temperature and precipitation projections for Tennessee and the surrounding Southeast Region. Species vulnerability is assessed using existing Climate Change Vulnerability Index analyses combined with Ecological Niche Models, which focus on habitat suitability for each species.

4.2. Updates to SWAP GIS and Database Information on Major Problems

In the decade since the 2015 SWAP was developed, through a variety of different project collaborations, TNC and TWRA have compiled a wide array of additional GIS data and spatial analyses to improve understanding of the major landscape-scale problems facing SGCN and

habitats across the state. These improvements allow mapping, for the first time ever, at a 10-meter resolution. Additional GIS data used in the 2025 SWAP analysis include:

- 2011 GAP/LANDFIRE, the basis for SWAP terrestrial mapping
- FATHOM, a proprietary dataset that shows wetland and riparian ecological systems based in part on a model of flood frequency
- The National Inventory of Dams
- The USDA Cropland Data layer (which provides landcover data nationally at a 10-meter resolution, not just for croplands)
- FUTURES, a model for predicting future urbanization
- The US Office of Surface mining/Tennessee Division of Geology permitted lands.

In addition, field survey and planning efforts conducted by many partners to track the spread of pathogens, such as white-nose syndrome in bats and Hemlock Woolly Adelgid in native hemlock forests, have also been used to map the current spatial extent of these problems.



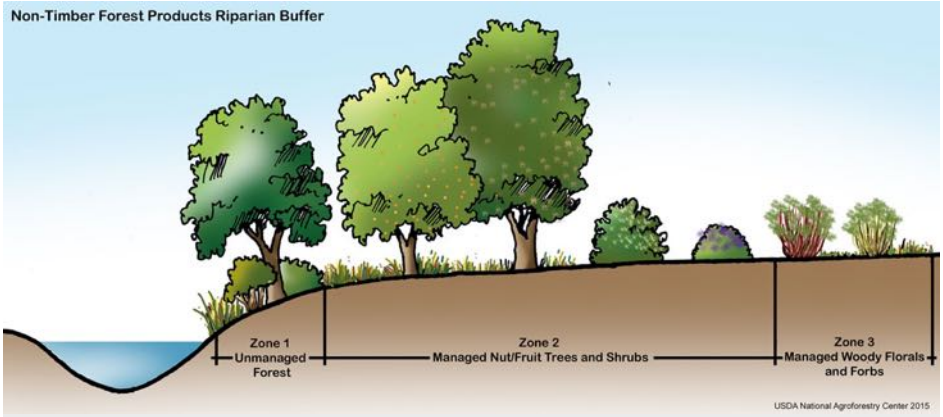
TWRA biologists surveying for Southern Appalachian Brook Trout, now found in only the coldest, clearest headwater streams of the eastern part of the state. The water quality these fish rely on is affected by surrounding land use. / Sally Petre, TWRA

The 2025 SWAP Section 3.2.4. *Updates to Habitat Mapping Units* describes the basic unit of assessment for terrestrial, subterranean, and aquatic habitat priority maps (nested hexagons of roughly 8928-, 1275-, and 182-acres in size for terrestrial and NHDPlus v2 catchments for aquatic and subterranean). These same mapping units are used for assessments of potential problems. The GIS and relational database capacity makes it possible to look at the intersection of different types of land and water uses with the priority habitats identified for SGCN, and the mapping units allow for these data to be summarized at a variety of different spatial scales.

Understanding the current and potential spatial footprint of major land and water uses, as well as how these uses intersect with priority habitats, is critical to identifying habitat protection, restoration, and management needs and opportunities.

The maps and data summaries provided in this 2025 SWAP are intended to represent the scope and distribution of major potential problems including urbanization, agriculture, river and stream management, and non-renewable energy development. Also included are example distribution maps of various pathogens with ranges that have changed significantly since 2015.

It is important to emphasize that these assessments are intended to direct attention to *potential* problems for habitats based on known issues with land and water management practices in general; they do not provide information on the presence or absence of best management practices in a given situation. The existence of actual problems always must be verified in the field with site specific knowledge and assessments.



Improving agricultural management practices in priority areas can improve outcomes for freshwater SGCN and overall water quality. / USDA National Agroforestry Center

For example, improving agricultural management practices in priority areas can improve outcomes for freshwater SGCN and overall water quality. These investments are being made by state and federal partners and private landowners across the state. However, Map 4.4 Potential Risk from Agriculture to Downstream Aquatic Habitat Priorities is associated with agricultural land management but does not contain information about where actual on-the-ground agricultural practices are being used. Instead, these maps emphasize where BMPs may be targeted to achieve better outcomes for SGCN.

In addition, the data associated with permitted activities are not intended to substitute for the standard reviews and decision-making performed in a regulatory context by both state and federal agencies. Rather, these data should be complementary to those reviews, as it can provide both a local- and a landscape-scale context of the associated activities with respect to important SGCN habitats.

SWAP data is becoming integrated with models for renewable energy. While no renewable energy analysis is included in the 2025 SWAP threats analysis, the **Geospatial Energy Mapper** contains maps that show the potential for the development of both solar energy farms and wind turbine farms across the region. Additionally, TNC is conducting a renewable energy siting assessment for the Southeast using terrestrial priority data from the TN and KY SWAPs; aquatic priority data from TN, KY, and the Southern Appalachians; and karst priorities from TN. See Table 6.3 within the Conservation Actions & Strategies chapter for a compilation of principles and best practices for renewable energy site selection.


Actual problems always must be verified in the field: MTSU conducting research on snake microbiome/fungal disease. / Rob Colvin, TWRA



Eastern Pinesnake with shy demeanor on display / Jesse Eaker, TWRA

PINESNAKE IN TENNESSEE

Very little is known about the **Eastern Pinesnake (*Pituophis melanoleucus*)** in Tennessee. Named from the Greek words meaning black (melano) and white (leukos), this handsome snake is both cryptic and shy. Those qualities, combined with habitat degradation and loss, have reduced the snake to a handful of small populations about which little is known.

While pine and mixed pine forests cover approximately one third of the southeastern United States, loblolly pine (*Pinus taeda*) is the most abundant species. Loblolly has spread beyond its historic range because it is popular as a forest plantation tree, often grown as a monoculture with low tree species diversity and low diversity in the understory. Lower habitat diversity generally supports lower wildlife diversity.

The flip side of this situation is a significant potential to restore and maintain ecologically beneficial pine savanna habitats within stands of *P. taeda*. Tennessee's abundance of pine forests could provide ample opportunity to restore and maintain pine savannas important to at-risk species of wildlife like the pinesnake.

At least one landowner in Tennessee is enthusiastically working to restore Eastern Pinesnake habitat after a hunter on his property found one in 2021. Aware that this was a rare species, the hunter posted his find on the Tennessee snake identification and education page on Facebook, which is monitored by the Tennessee Wildlife Resources Agency (TWRA).

CROWD SOURCING CONSERVATION

TWRA Biodiversity staff Jesse Eaker and Mallory Cogburn were notified of the pinesnake Facebook post almost immediately. They both rushed to the site where they found the hunter waiting for them near a tree stump in which the snake had holed up. The location was a private property with acreage leased out to hunting clubs, as well as loblolly pine planted and harvested for pulpwood.



Adult Eastern Pinesnake in the hand / Jesse Eaker, TWRA

John Ross, the landowner, expressed interest in managing his land to benefit the snake. "It's rare to find someone with so much property, and it's rare to find someone with the interest to set aside some of their land for conservation—it's doubly rare to find both," says Eaker. Studies have shown that pinesnakes prefer an "open" (i.e., less dense) canopy (less than 50% canopy cover). Ross was able to obtain management support via the EQIP and Conservation Stewardship Programs (CSP), both offered by the Natural Resources Conservation Service. Since 2022, he's had a habitat improvement project ongoing on over 600 acres, which includes forest thinning and prescribed burning. The added light that reaches the forest floor rejuvenates the herbaceous understory, which springs back from the seed bank. Ross said that the project absolutely benefits many types of wildlife in the savanna, including deer and Wild Turkey.

Eaker is studying this elusive species, state listed as threatened in Tennessee, by relying on citizen science: sightings of the snake shared by the public through social media or email that include a georeferenced photo voucher. He is also using museum specimens from Austin Peay State University. These locations across the state will provide insight on landscapes preferred by this species.



A drift fence, whose undulating shape across the landscape echoes the pinesnake itself, with funnel traps placed at each end. / Jesse Eaker, TWRA

PINESNAKE TELEMETRY

Partners for Eastern Pinesnake Conservation

Austin Peay State University
Landowner John Ross
Nashville Zoo
Tennessee Dept. of Agriculture Division of Forestry
Tennessee State University (TSU)
Tennessee Tech University
Tennessee Wildlife Resources Agency (TWRA)
USDA Natural Resources Conservation Service

Eaker designed his project to get a better idea of the range and specific habitats used by Eastern Pinesnakes (as well as to serve as his Master's thesis at Tennessee State University). Agencies and conservation NGOs can use that information to guide restoration and management. To study these snakes, step one was to find them. Unlike salamanders that can be difficult to find as well, pinesnakes can cover a lot of ground. Eaker's project revolves around drift fences and funnel traps to catch snakes, and telemetry to monitor their movements and habitat use. He has placed a total of 26 funnel traps across the managed habitat. His design includes a perpendicular arrangement of drift fences (bottom right).



Rob Colvin, TWRA installing a drift fence / Jesse Eaker, TWRA

That first pinesnake in 2021, an adult male, was implanted the same day with a small transmitter 1.7 inches long (which involved surgery in the field by a researcher from Tennessee Tech). The transmitter emits a constant pulse for ~two years, which Eaker can pick up using a handheld antenna. He explains, "You turn on the receiver and try to get a beep, and usually you can. It's kind of like a geiger counter, with the signal getting louder as you get closer."



Scarlett Kingsnake / Jesse Eaker, TWRA

Eaker's research includes tracking snakes once per week and recording micro habitat data at each relocation, including percentage of litter, bare ground, vegetation, rocks, slash, and coarse woody debris, as well as weather, temperature, and canopy density. To date, the male pinesnake, known as 681Pm (a reference to his frequency number), has roamed over 150 acres. Another male came into his home range, then left. A female with overlapping home range was also found, but her transmitter died prematurely (which could have indicated predation). Pinesnakes mate in spring, and females lay eight to nine eggs in an excavated nest or existing burrow. Eaker wants to know if they actually dig their nests and what they do if the soil isn't sufficiently sandy to do so. He hasn't yet found a nest, but he has found a male digging!



Jesse Eaker shown with perpendicular drift fences installed on the Ross property / Michaela Zaidan, TWRA

As of summer 2025, Eaker has captured and implanted transmitters in five pinesnakes on the Ross property with the help of Dr. Bill Sutton from Tennessee State and veterinarians from the Nashville Zoo. His results so far confirm that Eastern Pinesnakes prefer the less dense forest areas. He has also found other rare open pine species in his traps, such as Scarlett Snake (*Cemophora coccinea*), Scarlett Kingsnake (*Lampropeltis elapsoides,* at right), Eastern Spadefoot (*Scaphiopus holbrookii*), and a diversity that is represented by 43 species of reptiles, amphibians, small mammals, and birds identified to date—proving that management targeted to one rare species can benefit many others.

Eaker, Jesse, R. Colvin, J. Ross, and W. B. Sutton. 2025. Private Lands, Ecological Restoration, and Herpetofauna as Ecological Indicators: A Pinesnake Case Study from Tennessee. Southeast Partners in Amphibian and Reptile Conservation annual meeting.

Compared to 2015, the data development effort for the 2025 update allows TWRA and its many partners to conduct a variety of more detailed problem assessments to serve specific project needs. Efforts already in progress include collaboration with the Southeast Aquatic Resources Partnership to identify dams that would yield the greatest benefits to aquatic SGCN, if removed. Another example is the use of SWAP priority habitat data in combination with the Resilient and Connected Network data layer, which will help conservation practitioners identify the most resilient sites to focus on for the long-term conservation of SGCN. A more detailed methods explanation for the landscape analyses of major problems will be available in The Nature Conservancy's publication Database Development and Spatial Science in Support of Tennessee's State Wildlife Action Plan (Wisby 2025, in draft).

4.3. Major Statewide Land and Water Uses

This plan is a statewide plan focused on conservation of Tennessee's immense biodiversity. From this perspective, some economic or recreational uses of land—especially those occurring in places where populations of species exist—pose significant threats to SGCN. While numerous land and water management strategies have their positives, some forms of management pose significant threats to SGCN and are identified as such in this document.

This section describes land and water uses that have large footprints in Tennessee and can result in widespread detrimental impacts to species and habitats. Threats—even when beneficial economically (such as some forms of production forestry) are still threats. The main point to take away from highlighting a threat related to a specific user group or industry, is not to point the finger at these groups, but to identify ways in which their practices can and are being improved to reduce or eliminate the threats that some of their management approaches create. Some of these beneficial practices are described in Chapter 6.

4.3.1. Residential and Commercial Development

Residential, commercial, and industrial development can lead to a host of impacts to habitats, wildlife, and plants. Developmental sprawl consumes land and puts pressure on surface and ground water resources to provide drinking water and dilute wastewater (Thurman and Terry 2011). These negative effects can include:

- direct loss of habitat through land conversion to other uses or stream habitat destruction
- habitat fragmentation
- increased runoff as a result of increasing levels of impervious surface, leading to erosion, reduced groundwater recharge, and water pollution
- increased flooding
- expanding transportation or service corridors that can fragment habitat or block the movement of smaller, less mobile species.

Specifically with respect to forest habitats, urbanization can

- introduce exotic pests when people travel from urban areas to rural communities for outdoor recreation
- cause increases in mismanaged forest areas that are typically used for recreation
- result in a decreased probability of timber harvesting practices (TDF 2020) that can benefit people and wildlife
- decrease the ability to conduct prescribed fire and fight wildfires, due to the location of buildings in the wildland/urban interface.

A study conducted in 2022 (Hogue and Breon) determined the relative magnitude of five major threats worldwide to species identified by the International Union for Conservation of Nature (IUCN) as threatened with extinction. For the 20,784 species for which data were available, threats constituting the main factor pushing each species toward extinction were ranked as follows: habitat destruction 71.3% of species, overexploitation 7.4%, invasives 6.8%, pollution 4.7%, and climate change and weather 1.8%.

According to the National Wildlife Federation, sixty percent of the rarest and most imperiled species in the US occur in metropolitan areas, especially the fastest growing large metro areas. From 2021 to 2022, Nashville was among the nation's top 10 largest gaining metro areas countrywide (Wilder and Mackun 2024).

Impacts to terrestrial habitats



Urbanizing land use patterns affect terrestrial species and habitats in a variety of ways (Middle Tennessee) / Greg Wathen

Urbanizing land use patterns affect terrestrial species and habitats in a variety of ways (see Box 4.1.). For example, urbanization can result in a shift in the types of species that live and thrive in a region, with non-native species often competing with or replacing native species. A review of 105 studies on the effects of urbanization found trends of increasing proportions of nonnative species toward urban cores in plants, birds, mammals, and insects. The effects of moderate urbanization (i.e., suburbs) varied significantly, with most studies indicating an increase in plant species richness, due in part to exotic species introductions, whereas most studies of invertebrates and non-avian vertebrates show decreasing species richness with increasingly intense urbanization (McKinney 2008). In a systematic review of 159 studies on soil invertebrates, abundance showed an increase, whereas species richness significantly decreased with increasing urbanization (Szabó et al. 2023).

Box 4.1. Three SGCN Impacted by Urbanization in Davidson and Williamson Counties

The Mill Creek COA consists of approximately 100 square miles of the Mill Creek watershed of Davidson and Williamson counties. Long known as the flagship drainage of the federally endangered Nashville Crayfish (*Faxonius shoupi*), the watershed has experienced significant landscape alterations since the species was listed in 1986. Most obvious is the conversion of forest and farm in greater Nolensville—the origins of Mill Creek—from a more agricultural setting to urban/suburban cover types.

Mill Creek's headwaters are also unique in Tennessee and the world for being the only known landscape where three legally protected SGCN co-occur, the other two being Redband Darter (*Etheostoma luteovinctum*) and Streamside Salamander (*Ambystoma barbouri*).

While the rapid expansion of residential and commercial spaces in its headwaters seems contraindicated for the persistence of Nashville Crayfish in Mill Creek, data collected at multiple mainstem monitoring sites suggest that local populations remain stable or increasing during the last decade (Nashville Zoo, 2024).

However, the influences of urbanization are more readily apparent in Mill Creek's numerous unnamed feeder streams where more localized landscape and watershed alterations can be more easily detected. While the federally protected Nashville Crayfish is well-known from Mill Creek proper and its larger named tributaries, it also ekes out an existence in smaller, unnamed perennial feeder streams with numerous related species competing for the same spaces and resources.

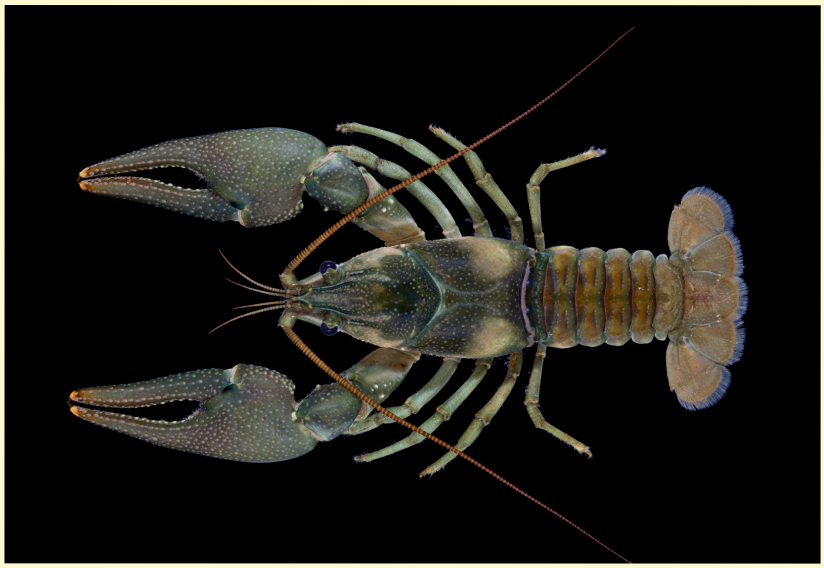
As smaller tributaries are impacted by nearby development more immediately than Mill Creek itself, the persistence of the Nashville Crayfish in such waterways remains unclear. Moreover, as Nashville Crayfish appears to be less tolerant of smaller streams with less reliable flows, they are generally displaced in such systems by more robust cousins – most notably the Saddle Crayfish (*Faxonius durelli*).

Additionally, the Tennessee endemic Redband Darter, a species In Need of Management reported infrequently from unnamed perennial streams in Nolensville, is periodically observed alongside or near Nashville Crayfish. (The darter is named for the vertical red and blue bands associated with males as they enter the springtime breeding period.)

Though most commonly reported from perennial segments, the species can also extend into seasonal, intermittently flowing streams during breeding season. In such instances they may share habitats with yet another area SGCN, the state endangered Streamside Salamander.

First reported in Nolensville in 2015, the seasonal breeding streams used by this mole salamander have been severely impacted by area development, most notably from improper sediment discharges to its occupied streams (smothering of eggs and habitat) or dewatering of critical stream segments, or both. While the persistence of the species under such circumstances remains dubious, evidence from other parts of its range in Tennessee suggests that recovery may be possible once occupied landscapes are stabilized and returned to proper hydrology (see White Oak Stream Restoration Highlight).

The presence of these three protected species at the head of Mill Creek illustrates the complex impacts of urbanization and drives home the importance of Conservation Opportunity Areas (see Ch 6 Conservation Actions and Appendix I) and the conservation focus they may bring to these under-appreciated landscapes.







The “triumvirate” of SGCN concentrated in Mill Creek and its tributaries, from top:

Nashville Crayfish / Carl Williams

Redband Darter / Mark Blakewell, N.A. Native Fishes Association

Streamside Salamander / Matt Niemiler, Univ. of Alabama

Land fragmentation and changes in land use

The concept of landscape connectivity was first introduced in 1984 (Merriam 1984). After several years of research, Merriam and colleagues defined it in 1993 as, "the degree to which the landscape impedes or facilitates movement among resource patches" (Taylor et al. 1993). Connectivity provides the ability for species to move across optimal habitats unimpeded. This ability to move is necessary for aquatic and terrestrial species alike. Without connectivity, natural ecological processes and animal movement are greatly hindered.

Natural processes like migration, food/water availability, gene flow, predator-prey and other species relationships, colonization, disease spread, and movement to resting and breeding areas are critical to species survival. As natural processes (e.g., fire, drought, precipitation patterns, temperature) and habitats change, a shift in the abundance and distribution of species occurs. In Tennessee this often takes the form of changing species composition in forests and the herbaceous understory. As more habitat is fragmented, these animals are faced with potential isolation and an inability to conduct vital life processes (Collinge 1996).

For example, landscape changes are considered a major threat for amphibian populations (Gibbs 1998, Green 1997, Dodd and Smith 2003, Cushman 2006). Snyder et al. looked at the effects of landscape connectivity on the movement of Red-backed Salamanders (2021). These species have much lower vagility and are not often evaluated for the effects of interruption in habitat connectivity compared to other species such as birds and large mammals. Their findings showed that recapture rates of individual salamanders were statistically higher in open forest, compared to forested habitat with obstacles that broke the connectivity of the habitat.

Likewise, habitat loss is at the top of the list of threats to butterflies, which the US is losing at a rate of 1.3% per year in the contiguous US and .25% per year in the Southeast (an almost 5 percent decrease between 2000 and 2020) (Schultz et al. 2025).



Recreation, vacation homes, and continued timber harvest near public lands can disrupt habitat connectivity used by a variety of species. / Sarah Stitch

Even plants, which are intrinsically less mobile, may be susceptible to habitat fragmentation and succession. Fragmentation can occur in a variety of settings, including development in and around existing public lands. For example, development in the eastern mountains of Tennessee on steep mountain slopes and ridges can damage viewsheds and decrease tree cover, leading to erosion and habitat fragmentation (Thurman and Terry 2011). These areas are becoming more popular for recreation, vacation homes, and continued timber harvest. Such activities in and around public lands can disrupt habitat connectivity used by a variety of species. This

creates the need for greater attention to planning and proper management strategies on public lands.

On the other hand, a fragmented landscape may still support viable populations of wildlife depending upon where habitat has been lost and where species tend to aggregate (May et al. 2019). For this reason, it is still important to maintain habitat quality in a fragmented landscape.

There are a variety of threats to connectivity. Development, changes in climate, deforestation, energy production, and changes in noise and light levels are a few. Another problem associated with loss of habitat connectivity is an increase in human-wildlife conflict, as humans and wildlife compete for the same space and resources. The connection of vital habitat that allows wildlife to move to areas less inhabited by humans is becoming more and more scarce. The World Wildlife Fund stated that, "our planet will only survive if our ecosystems are connected" (WWF 2025).

According to new data from the University of Tennessee, the state lost 1.5 million acres of farmland from 1997 to 2022. That equates to the loss of six counties worth of pasture and forestland across the state. In rural areas, development is converting farmland to other uses at a rate of 237 acres per day, which is almost ten acres every hour (Kessler et al. 2023). Land development is one of the top threats associated with loss of habitat and landscape connectivity. An increased risk of land development can also be associated with forestland ownership.



Tennessee lost six counties worth of pasture and forestland in the 25 years from 1997 to 2022. (Williamson County) / Gregg Elliott, K Gregg Consulting

For example, on the Cumberland Plateau, much forestland held for decades by timber companies has been sold to institutional investors, with various plans for both development and conservation. However, depending on the income planning horizon and expectations, increased pressure may be placed on harvesting forest products and selling land assets for other types of development. Reduction of forestlands can also negatively impact water quality and quantity, the health and diversity of habitats, and other land values such as recreation, timber, and forest products (Thurman and Terry 2011).

In addition, as development fans out into rural areas—also called rural sprawl—a phenomenon known as parcelization can occur, in which larger landholdings are subdivided into smaller and smaller ownership units. Even in the absence of habitat fragmentation (in terms of actual land use change), parcelization increases the difficulty of providing coordinated and coherent habitat management on a scale suitable for many wildlife and plant species. For example, when private lands with a history of conservation management using prescribed fire are subdivided, it will take

far more effort and coordination among multiple landowners to conduct prescribed burns over the same acreage (EGCPJV 2014). The result is not only fragmented habitat, but also the inability to effectively manage remaining habitat.

Unplanned development

Unplanned development patterns also have a high cost to local communities, their economies, and cultural heritage. From 1982 to 2007, the state's percentage of cropland decreased by more than 25%. From 2001 to 2016, 148,100 acres of Tennessee's agricultural land was converted to "urban and highly developed land use" (American Farmland Trust 2022).

Under a "business as usual" scenario, Tennessee is likely to lose 1,014,600 acres of farmland by 2040. Smart growth policies, which help cities and towns grow more compactly, implemented in just four states—Texas, North Carolina, Tennessee, and Ohio—would save over a million acres of Nationally Significant farmland (the most important land for long-term food security and environmental health) (Hunter et al. 2022). Local governments, taxpayers, and utility rate payers often subsidize the real cost of sprawl through expensive and inefficient infrastructure expansions (Thurman and Terry 2011).

The fastest growing part of the state is in the counties surrounding Metropolitan Nashville-Davidson County. Approximately one million additional people will live in the greater Nashville region by 2035, according to projections made by the Nashville Area Metropolitan Planning Organization (TACIR 2024).



Tennessee farmland can help provide connectivity between preferred habitat patches for various species of wildlife. / Joel Kramer

Light pollution

Artificial light at night (ALAN)—commonly referred to as light pollution—has emerged as a significant environmental threat, particularly as human development expands into formerly dark and natural areas. While artificial lighting provides safety, security, and convenience for people, it severely disrupts ecosystems and poses critical risks to wildlife. Light pollution alters natural biological processes that have evolved over millions of years, influencing species' sleep patterns, feeding behaviors, reproductive cycles, migration routes, and habitat use. If not addressed, the increasing prevalence of artificial light will continue to degrade ecosystems and contribute to global biodiversity loss. This plan outlines the key ecological issues caused by light pollution and presents targeted conservation actions that can help mitigate these impacts.

One of the primary effects of light pollution is the disruption of circadian rhythms in wildlife. Many species rely on natural light-dark cycles to regulate essential behaviors, including sleep, feeding,

and breeding. ALAN can disturb these cycles, leading to increased stress, behavioral changes, and lower survival rates. This is especially harmful to nocturnal species such as bats, moths, amphibians, and small mammals, which depend on darkness to forage and avoid predators. Disorientation caused by artificial lighting can interfere with their ability to navigate or hunt, making them more vulnerable and less effective in their ecological roles.



Insects, particularly flying species, are among the most visibly impacted groups. Drawn to artificial lights, many become trapped in a cycle of circling until they are exhausted or predated upon. This phenomenon—sometimes called the "vacuum cleaner effect"—not only reduces insect populations but also disrupts entire food webs. Species that rely on insects for food, such as birds, bats, and frogs, suffer as their prey base declines. Migratory birds are also highly vulnerable. Many species navigate using the moon and stars, and bright urban lights can disorient them, resulting in fatal collisions with buildings, communication towers, and other structures. Others may become trapped in illuminated areas, flying in circles until they collapse from exhaustion or are preyed upon.

Artificial light can also alter predator-prey relationships by giving visual predators an advantage. In well-lit areas, predators can more easily locate and capture prey, while prey species tend to avoid these areas, leading to habitat loss and reduced access to resources. Additionally, reproduction in several species is tied to natural darkness. Sea turtle hatchlings, for example, use moonlight to orient toward the ocean, but beachfront lighting can lead them inland instead, greatly reducing survival. Amphibians like frogs and toads may cease their nighttime mating calls in lit environments, further impacting reproduction. The cumulative effects of light pollution can also fragment habitats. Continuous lighting across urban and suburban areas creates barriers to movement, isolating wildlife populations and limiting their access to mates, food, and safe shelter.

Impacts to aquatic habitats

The complex relationship between land use and stream/wetland health means that land urbanization will likely continue to contribute to declines in the state's water resources and its aquatic species. Tennessee's growth adds to the demand for water supply, placing additional stress on the state's aquatic resources at a time when freshwater conservation efforts are already needed. Urban development can alter the streamflow, habitat quality, and water chemistry of streams in both direct and indirect ways (USGS 2019b). It may also have greater potential to impact wetlands in the future (see Map 4.3 in **Appendix B, the TN SWAP Atlas**).

Urban development often results in direct alterations of streams, either to accommodate development of a specific site, improve site drainage, or access a site. Direct stream alteration can degrade the physical habitat and contribute to downstream channel erosion, sedimentation, or lower stream flows. All of these changes can impact reproductive success, feeding, and living spaces of aquatic organisms (USGS 2019b).


Runoff and flooding, Saltillo, TN / Lindsey Turner

Faster and more frequent runoff, i.e., stream "flashiness," from paved and built surfaces also increases and destabilizes normal stream flow, which also alters streams and increases erosion. In urbanized areas, small streams are often overlooked or forgotten, but these streams can provide habitat (see Box 4.1), reduce contamination, ease flash flooding, and improve the aesthetics and livability of the daily environment (USGS 2019b).

Rapid runoff carries surface pollutants directly to streams and reduces natural water infiltration and aquifer recharge. Lowered aquifers may then contribute to lower stream flows, particularly in summer months (USGS 2019b). Flooding can be exacerbated by both development in the floodplain and the failure to plan for stormwater management. For example, a study of 21 stream sites in the Ridge and Valley ecoregion of Tennessee and Georgia revealed that watersheds with increased levels of urbanization were characterized by increased proportions of fine sediments and pool areas, coupled with reduced variation in stream channel complexity. Urbanized watersheds exhibited declines in biotic integrity, species diversity, richness, and evenness (Smith 2009). Table 4.2 shows some of the top impacts of stream and lake impairment in Tennessee, and Table 4.3 shows the top sources. "Over time, the most common causes of pollution in rivers and streams have been found to be habitat alteration, siltation, pathogens and nutrients coming primarily from agriculture, hydrologic modification and municipal dischargers. The most common causes of pollution in lakes and reservoirs have been found to be metals and toxic organics such as PCBs and dioxins" (TDEC 2024a). Waters can have pollution from more than one source and totals in the tables are not additive. Illegal dumping and roadside litter are significant issues across the state as well, and they impact both waterways and terrestrial sites.

Wetlands

Development can also impact wetlands, particularly in the wake of the May 2023 US Supreme Court decision Sackett v. Environmental Protection Agency. The court found that the federal Clean Water Act no longer applied to adjacent wetlands that lacked a continuous surface connection with navigable waters. This overturned the long-standing interpretation and enforcement of the country's primary law protecting wetlands (Schaeffer 2024).

Table 4.2 Top Impacts of pollution to impaired rivers, streams, reservoirs, and lakes in Tennessee (TDEC 2024a)

RELATIVE IMPACTS OF POLLUTION IN TENNESSEE			
In Impaired Rivers and Streams		***In Impaired Reservoirs and Lakes***	
pH	1%	*E. coli*	1%
Organics	1%	Other**	2%
Flow Alterations	2%	Flow Alterations	4%
Other*	2%	Siltation	7%
Metals	3%	Nutrient Related	10%
Nutrient Related	17%	Organics	38%
Siltation	25%	Metals	53%
E. coli	31%		
Habitat Alteration	38%		

Table 4.3 Top sources of pollutants to impaired rivers, streams, reservoirs, and lakes in Tennessee (TDEC 2024a)

% POLLUTANT CONTRIBUTION OF POTENTIAL SOURCES IN TENNESSEE			
In Impaired Rivers and Streams		***In Impaired Reservoirs and Lakes***	
Atmospheric Deposition	2%	Hydrologic Modifications	1%
Land Application/Waste Sites	2%	Industrial Permitted Discharge	2%
Permitted Resource Extraction	2%	Habitat Alteration	3%
Legacy/Historical	2%	Construction	3%
Construction	3%	Agriculture	4%
Other	7%	Legacy/Historical	24%
Municipal Pointand Non-point Dischargers	15%	Other	27%
Hydrologic Modification	19%	Atmospheric Deposition	36%
Agriculture	47%		

*Includes golf courses, military bases, ORVs, and unknown

**Includes internal nutrient recycling, sources outside state borders, and unknown

Tennessee has wetland protections that extend beyond the Clean Water Act. TDEC is charged with protecting the wetlands of the state of Tennessee. The Division of Water Resources carries out this mission by requiring any activity that may alter a wetland to obtain an Aquatic Resource Alteration Permit (ARAP). In 2025, the Tennessee State legislature passed into law a bill maintaining regulations for large and/or higher habitat value wetlands, while creating a less restrictive regulatory framework for smaller/lower resource value wetlands. "Isolated wetlands" in Tennessee are often hydrologically connected with underground waterways and aquifers. While this may not be the case with every isolated wetland (due to the karst geology found in much of the state), even though an isolated wetland may not be adjacent to surface water, they can reduce stormwater runoff and allow water to seep into groundwater flows which are critical to recharge of surface waters (Zedler 2003; Calhoun et al. 2017). They also perform a variety of important functions, such as supporting water quality and supply, flood protection, and above all from the standpoint of the SWAP, wildlife habitat (see the Wetland Highlight).



Reelfoot Lake, site of some of Tennessee's most famous wetlands / Nathan Reed via Flickr Creative Commons

Impacts to karst habitats

Karst landscapes are characterized by caves, sinkholes, underground streams, and other features formed by the slow dissolving, rather than mechanical eroding, of bedrock (Veni et al. 2001). With more than 11,000 documented, Tennessee has the greatest number of caves in the country



A large cave room in Blount County, TN / Matt Tomlinson



An ephemeral wetland in Hickory Flats, TN that likely would not receive wetland protections under the Supreme Court's 2023 decision / Josh Campbell, TWRA

WETLANDS IN TN AFTER 2023 COURT DECISION

In May 2023, the US Supreme Court held in *Sackett v. Environmental Protection Agency* that the federal Clean Water Act no longer applied to adjacent wetlands that lacked a "continuous surface connection with that water, making it difficult to determine where the 'water' ends and the wetland begins"—overturning the long-standing interpretation and enforcement of our primary law protecting wetlands (Schaeffer 2024).

Yet, in talking about "isolated wetlands" scientists caution not to conflate the concepts "continuous surface connection" and "hydrologically isolated." The vast majority of wetlands in TN that do not drain to streams are in fact hydrologically connected because they drain to groundwater or karst features like sinkholes or caves. Hydrologically isolated locations such as bogs are rarities in the state. Moreover, "isolated" wetlands without a direct *surface* connection to navigable waters are among the most important wetland types for wildlife and rare plants.

Following the Supreme Court case, a bill was introduced in the Tennessee State legislature proposing to remove state level regulations for geographically isolated wetlands. In 2025, the bill was amended and a version passed into law maintaining regulations for large and/or higher habitat value wetlands, while creating a less restrictive regulatory framework for smaller/lower resource value wetlands.

WETLAND VALUES FOR PEOPLE

Wetlands are crucial ecosystems that harbor high biodiversity, improve water quality, help to recharge surface and/or groundwater supply, mitigate flood impacts, and store carbon—whether or not they are connected to navigable waterways. In fact, scientific studies have shown that small, geographically isolated wetlands are powerful water purifiers due to the increased amount of time that water is retained in these systems, compared to those with a surface water connection (TDEC 2024).



The Streamside Salamander is dependent on "isolated wetlands" / Matt Niemiller

In addition, these same wetlands play an important role in groundwater movement and aquifer recharge, critical to the water supply of areas in karst-rich Middle Tennessee, such as the Duck and the Stones Rivers. When distributed throughout a watershed, especially in the upper reaches, geographically isolated wetlands mitigate flood potential by capturing and gradually releasing stormwater runoff (40%-50% reduction) (TDEC 2024).

WETLANDS FOR WILDLIFE & PLANTS

Wetlands are important for many forms of wildlife and plants. Both bogs and geographically isolated wetlands often host rare plant communities, which include species such as the federally-endangered green pitcher plant (*Sarracenia oreophila*) and the exquisite white fringeless orchid (*Platanthera integrilabia*) (Estes et al. 2016).

Amphibians, in particular, require geographically isolated wetlands because they provide breeding pools absent of fish, which prey on eggs and larvae (TDEC 2024). A 2003 scientific study (Semlitsch & Bodie) estimated habitat buffers based on the biological requirements of amphibians and

reptiles that use wetlands (often "isolated") as part of their breeding cycle. Buffer size ranged from 127 to 290 m from the edge of aquatic sites. The clear biological interdependence between aquatic and terrestrial habitats that is essential for the persistence of these wildlife populations shows how elimination of such wetlands would have impacts to wildlife over an area orders of magnitude larger than the wetland's size.

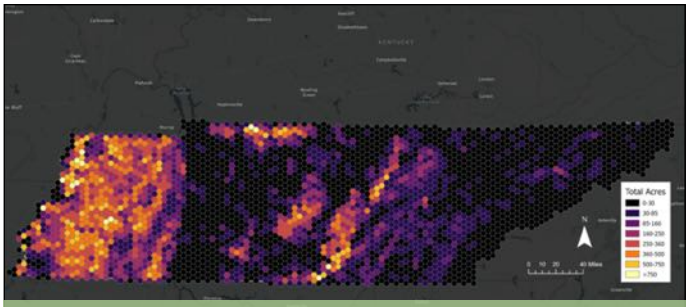
Wetlands also provide direct economic values in the form of recreation. Wetlands of all types provide habitat, food, and water for many waterfowl and fish species popular among hunters and anglers. They also attract a wide diversity of bird species, which is a draw for bird watchers as well.

Wetland Conservation Partners Across the State
(Not a comprehensive list)

Harpeth Conservancy
Hatchie River Conservancy
Protect Our Aquifer
Southern Environmental Law Center
Skytec LLC
Tennessee Dept. of Environment and Conservation
Tennessee Wildlife Resources Agency
The Nature Conservancy
Tennessee Wildlife Federation
Tennessee Ecological Restoration Association

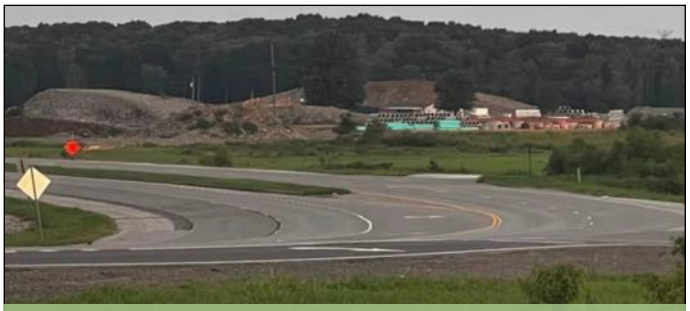
WETLAND REGULATION IN TENNESSEE

TWRA plays a regular role in the issuance of Division of Water Resources permits, specifically when a permit application occurs in proximity to a rare species record. In this way, the current (as of 2024) wetland regulatory structure allows the agency to address impacts to waters of the state, which is extremely helpful in preserving rare aquatic species. Reducing TWRA's ability to offer protective measures for wildlife species that are listed or Species of Greatest Conservation Need (SGCN) would negatively impact those species.



Summary of isolated wetland areas within 15-square-mile hexagons, as predicted by Skytec LLC's Enhanced Wetland Identification Model.

"Isolated" wetlands also provide habitat for many aquatic species that are still common, but likely to become less so as such sites are impacted. To keep common species common, the ability to mitigate for impacts to even small, "isolated" wetlands must be retained.



Wetlands and ephemeral streams at this site support what may be the largest and most robust population of a state-endangered salamander species, but review and mitigation to reduce impacts were provided and the development was implemented. / TWRA.

The US Fish and Wildlife Service's *Wetlands Status and Trends Report* makes it clear that US wetland protection policies and laws are already insufficient. Of a total 116 million acres, 221,000 wetland acres were lost from 2009 to 2019 (Lang at al. 2024). In Tennessee, loss of wetland protections could threaten not only wildlife, but also the drinking water supply, the integrity of rivers such as the Hatchie (at risk from filling of wetlands and increased deposition), stormwater retention, and farmland—which would be easier to develop without such protections (TDEC 2024).

In 2025, TDEC released a predictive model of wetlands in Tennessee created by Skytec LLC. This screening tool should prove valuable to stakeholders in evaluating conservation priorities, development potential and costs, permit submittals, and wetland restoration or mitigation suitability. In September 2025, the model estimated >320,000 acres of "isolated" wetlands in Tennessee.

Estes, D., M. Brock, M. Homoya, A. Dattilo. 2016. A Guide to Grasslands of the Mid-South. Published by the Natural Resources Conservation Service, Tennessee Valley Authority, Austin Peay State University and the Botanical Research Institute of Texas.

Lang, M.W., Ingebritsen, J.C., Griffin, R.K. 2024. Status and Trends of Wetlands in the Conterminous United States 2009 to 2019. US Department of the Interior; Fish and Wildlife Service, Washington, D.C. 43 pp.

Schaeffer. E. 2024. One Year After Key Supreme Court Decision, Almost Half of States Leave Many Wetlands Unprotected. Environmental Integrity Project Report.

Semlitsch, R.D. and J.R. Bodie. 2003. Biological criteria for buffer zones around wetlands and riparian habitats for amphibians and reptiles. Conservation Biology 17: 1219-1228

[TDEC] Tennessee Department of Environment & Conservation. 2024c. Wetlands Report: Stakeholder Engagement & Commissioner Recommendations and Appendix D, Written Comments Provided by Steering Committee Members.

equaling about 20% of all known US caves (Wisby and Palmer 2015). Most Tennessee caves are associated with karst composed of limestone in the central and eastern regions of Tennessee. Karst areas present unique challenges because so many of the processes key to their formation and stewardship are located underground, invisible from the surface. For this reason, the complex hydrology of karst aquifers and other processes critical to their integrity require specialized monitoring and assessment (Veni et al. 2001).

Karst regions are rich in water and mineral resources, providing unique habitats and spectacular recreational opportunities. Problems associated with living on karst can threaten both people and natural resources. Risks for people include sinkhole collapse, sinkhole flooding, and easily polluted groundwater that rapidly moves contaminants to wells and springs. Problems for the unique biota associated with caves and aquatic habitats include sediment and pollutants that infiltrate from the surface and alteration of drainage conditions that impact the aquifer itself (Veni et al. 2001).



The nature of karst: an unreported cave in Cumberland County, TN / Matt Tomlinson

A variety of BMPs exist to help reduce these types of potential impacts. BMPs rely on knowledge of the location of karst and aquifers, combined with practices designed largely to avoid impacts from contamination or hydrological alteration. BMPs for living and working in karst regions cover the following activities:

- buffers around sinkholes and sinking streams to minimize polluted runoff into groundwater (USFS [date unknown])
- development and road construction
- wells and groundwater mining
- septic and sewage systems
- timber harvest

(Veni et al. 2001)

Insufficient delineation of sinkholes and incomplete knowledge of their characteristics can result in development patterns that exacerbate sinkhole flooding (Bradley and Hileman 2006). Since many of Tennessee's growing urban areas are located in karst regions, the understanding and mapping of these habitats is critical.

The caves, sinkholes, and underground streams of karst areas are threatened not only by habitat loss and degradation, but also groundwater contamination, and climate change. Yet few studies

have quantitatively evaluated their potential impacts and best means of mitigation. Indeed, the state of knowledge of cave-dependent species (both troglobiotic, i.e. cave-dwelling and stygobiotic, groundwater-dwelling) is poor compared to other taxa, with clear biases toward particular taxonomic groups that specialize in caves (i.e., bats, salamanders, fishes, and crayfishes). A 2025 assessment of troglobiotic and stygobiotic taxa in the United found 1,460 species: 930 troglobionts and 530 stygobionts, dominated by arthropods and crustaceans. All groups exhibited high levels of extinction threat, while threat information was lacking for most species of nearly all major taxonomic groups (except for decapods, fishes, and salamanders). Comparatively few species have been listed under the Endangered Species Act. After Texas (at 274), Tennessee had the greatest number of cave-dependent species (215). "The under recognition of invertebrate subterranean taxa listed under the ESA is particularly striking but mirrors trends for invertebrates in general in which > 90% of IUCN-listed invertebrates are not listed in the United States under the ESA" (Niemiller et al. 2025).

Mapping urbanization in Tennessee

Tennessee's population increased by 16.7% from 1990 to 2000, and by 11.5% from 2000 to 2010 (US Census 2000 and 2010). The 2020 US Census recorded Tennessee's population at 6,910,840 (over 7 million in 2025) representing an 8.9% increase since the 2010 census (US Census 2020).

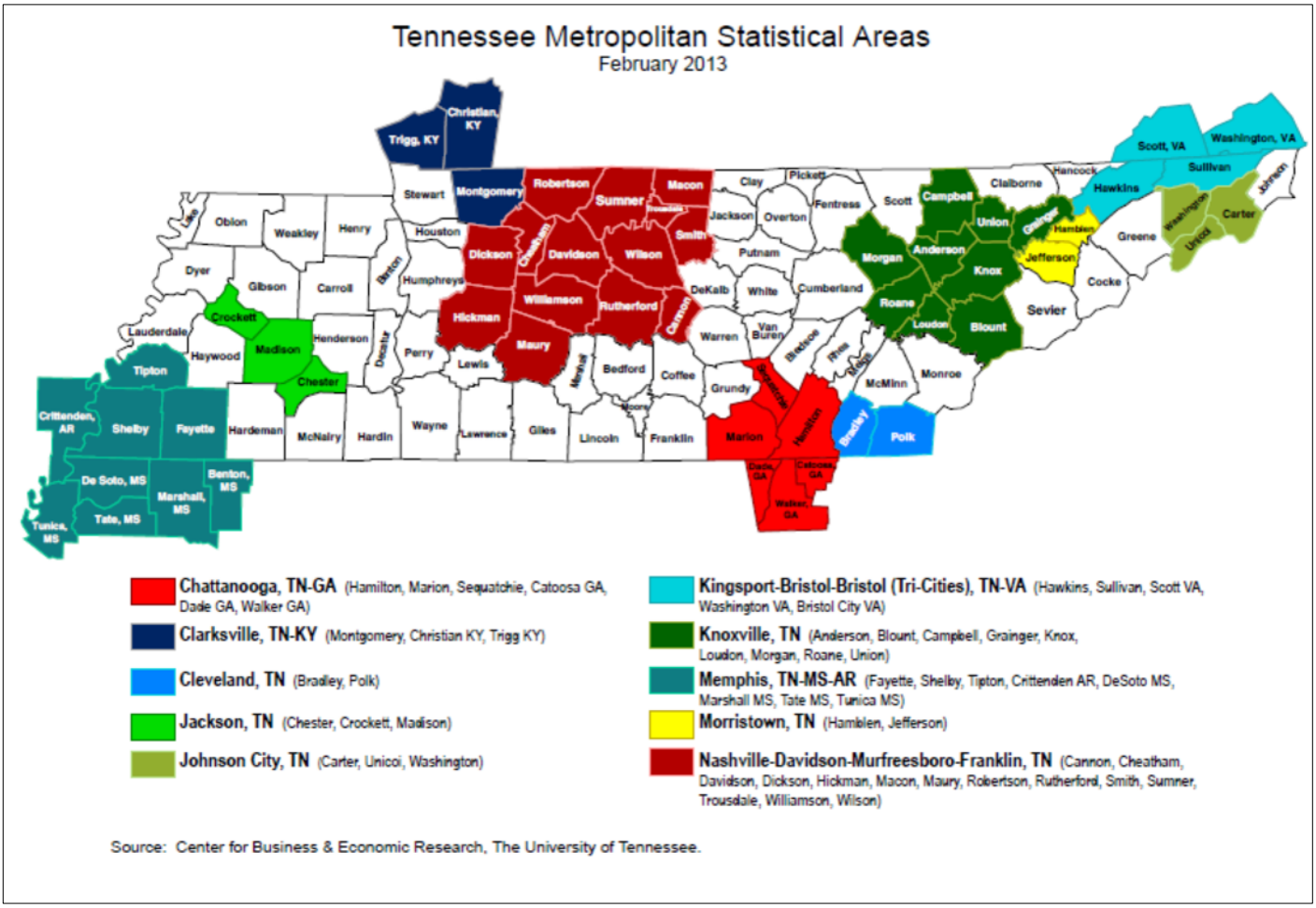


Figure 4.1 Tennessee Metropolitan Statistical Areas

The 2005 SWAP identified development-related issues as the most consistently high-ranked stressors to terrestrial, aquatic, and subterranean SGCN. In 2025, development is the second most high-ranked stressor after natural system modifications (e.g., dams and fire suppression).

Map 4.1. in **Appendix B, the 2025 TN SWAP Atlas** shows the probability of new development by 2100, using the FUTURES model. Map 4.2. shows the potential risk from future development to terrestrial habitat priorities in Tennessee—essentially assessing risk by multiplying habitat importance (priority) by the stress level (development).

The result in Map 4.1 is a colored heat map that shows locations across the state where SGCN habitats and species are predicted to be at risk without proper planning for habitat protection. These maps, and the underlying species and habitat data, can help inform decision-making so that conservation strategies can be implemented in advance. While the potential expansion footprint may not appear visually large in some places, such as far eastern Tennessee, urbanization can result in localized habitat fragmentation effects that can interrupt habitat connectivity at larger scales. Fig. 4.1 also shows the boundaries of Metropolitan Statistical Areas (MSAs) of Tennessee. The maps group the ten MSAs of Tennessee into a smaller subset of 5 combined areas. For planning collaborations with SWAP conservation partners, the data can be analyzed and presented for any specific MSA or combination of MSAs at the desired spatial scale.

4.3.2. Agriculture

Agricultural conversion and incompatible management practices pose challenges to sustaining populations of certain wildlife and plant species. Opportunities exist to improve agricultural practices in a way that will benefit a variety of SGCN. In fact, certain forms of agricultural management can be beneficial for wildlife and plant conservation or can be managed to lessen negative impacts. Many such practices are promoted through incentive programs for landowners administered by the US Department of Agriculture Natural Resources Conservation Service (NRCS) and the Tennessee Department of Agriculture (TDA). Agriculture as a conservation solution is described in both Ch. 6 and Ch. 8.



Habitat loss from conversion to agriculture / Rob Colvin, TWRA

Impacts to terrestrial habitats

Changes in land use can pose a threat to terrestrial species when important grasslands or forests are converted to cropland or pasture, contributing to overall loss or fragmentation of habitat. This is especially true when natural plant communities are replaced with introduced species of grasses, such as fescue. Loss of riparian habitat impacts avian SGCN such as Prothonotary Warblers, Swainson's Warblers, and many others.

Wetlands provide important services such as water filtration and groundwater recharge, and they provide critical habitat to many species at various points in their life cycle as well. As with so many wetland areas of the United States, these highly localized habitats have been vastly reduced due to human activity. Tennessee lost 59% of its wetlands from the 1780's to the 1980's, according to estimates by the US Fish and Wildlife Service (Dahl 1990) (see Wetland Highlight). There is historical context exacerbating the loss of wetlands in the United States. Although the American Beaver (*Castor canadensis*) is currently not a conservation concern in Tennessee, overharvest to supply the European fur trade caused these large rodents to be almost eliminated from the state by the late 19th century. Informally described as "nature's engineers" due to their ability to build highly complex wetland ecosystems by damming streams, reduced populations of Beaver resulted in corresponding loss of wetland generation, which was (and continues to be) compounded by practices of drainage and clearing "would-be" wetlands for agriculture. The rate of loss of US wetlands even increased by 50% from 2009 to 2019 (Lang et al. 2024).

Contemporary estimates of Tennessee's wetland area range from approximately 1,065,000 to 1,800,000 acres (Skytec 2025). Wetlands are ecologically and economically valuable to Tennessee, despite making up a relatively small percentage of the state. The state's 430,000 acres of isolated wetlands alone have been estimated to provide ecosystem services totaling approximately $21.5 billion (UT Institute of Agriculture 2024). Bottomland forests are the state's most common type of wetland, located primarily in west Tennessee. Major causes of modern day wetland loss or degradation in Tennessee include:

- agricultural conversions
- logging
- reservoir construction
- channelization
- sedimentation
- urbanization

(USGS 1997b).

Agricultural land uses can also impact habitat for wildlife and plants, such as through the application of pesticides or herbicides. "Since 1974 in the US, over 1.6 billion kilograms of glyphosate active ingredient have been applied, or 19% of estimated global use of glyphosate (8.6 billion kilograms). Globally, glyphosate use has risen almost 15-fold since so-called 'Roundup

Ready,' genetically engineered glyphosate-tolerant crops were introduced in 1996" (Benbrook 2016).

Milkweed and many other flowering herbs and shrubs that serve as sources of seed and nectar for birds and other pollinators have suffered collateral damage from the widespread use of herbicides. One study in 2012 showed a direct correlation between declining Monarch Butterfly (*Danaus plexippus*) numbers and increasing adoption of herbicide tolerant soybeans and corn (Pleasants & Oberhauser 2013). Also, studies by Purdue University have shown that herbicides making their way into streams have the potential to adversely affect SGCN such as Eastern Hellbenders (*Cryptobranchus alleganiensis alleganiensis*) by altering growth and development of larval stages (Solis et al. 2007).

Impacts to aquatic habitats

Incompatible agricultural management practices are the number one source of damage to streams across Tennessee (see Table 4.2). One reason for this ranking is that a relatively large proportion (41%) of Tennessee's landscape is covered by some form of agriculture. Management practices that can impair stream health include streamside vegetation removal; grazing livestock along stream banks with unrestrained access to the stream; poor farm nutrient, waste, and herbicide management; channelizing and dredging streams; creating impoundments on streams; and unsustainable surface water or groundwater withdrawals for irrigation (USGS [date unknown]).



Agricultural runoff / Chris Lee, NRCS

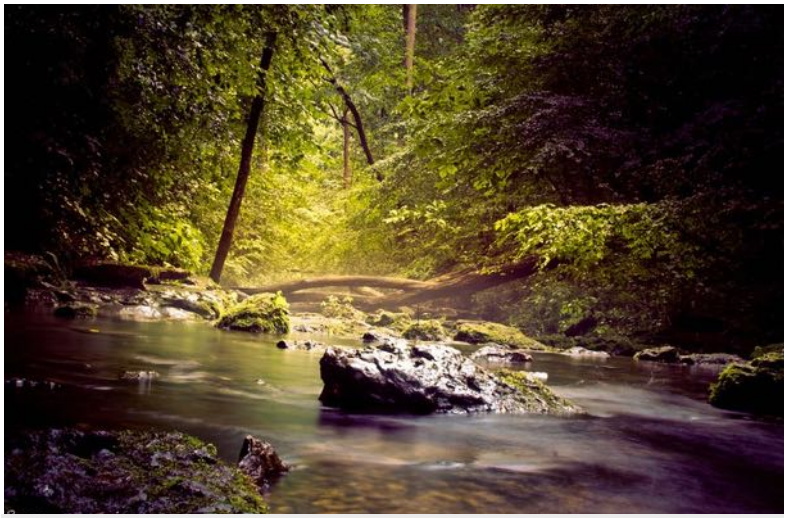
Insufficient farm nutrient and waste management can contribute to pollution by *Escherichia coli* (*E. coli*) pathogens as well as nitrogen and phosphorus inputs to streams and rivers. Excess nutrients result in stream eutrophication, which lowers the dissolved oxygen in water available for freshwater animals, including insects, to breathe.

Excess sedimentation from farm fields and eroding stream banks may well be the greatest threat to freshwater SGCN in Tennessee. Map 4.4 shows the potential risk from agriculture to downstream aquatic habitat priorities.

According to a USGS study of 20 streams in Tennessee's Eastern Highland Rim ecoregion, nutrient concentrations, stream gradient, width, and substrate embeddedness (the degree to which fine particles surround coarse substrates) were all related to cropland density in a particular watershed. However, results suggest that fish communities respond primarily, and negatively, to the cumulative effects of sedimentation (Powell 2003). Channelization of streams and rivers to increase land available for agricultural production is a major contributor to sedimentation. This increase in

sedimentation covers clean gravel used by many SGCN for spawning habitat and also leads to floodplain disconnection. It has eliminated seasonal flooding that is important to several species in west Tennessee (see White Oak Restoration Highlight).

Impacts to karst habitats



Bobo Creek, fed by springs at Short Springs State Natural Area / Brenton Rogers

Tennessee's landscape is dotted with thousands of natural springs, most of which are associated with karst composed of limestone in middle and eastern Tennessee. Enhanced interactions between surface and groundwater processes occur in karst. Caves are considered subsurface extensions of karst landscapes, with most caves forming at or just below the water table. Caves above the water table are tributaries to caves below the water table. Water percolating downward passes through caves, which serve as "natural pipes" and the water can often re-emerge at the surface as springs or seeps (Veni et al. 2001).

In rural and agricultural areas, karst aquifers are subject to contamination from numerous sources. Chemical fertilizers, pesticides, herbicides, and elevated pathogen concentrations can be flushed through soils into aquifers beneath farmland, pastures, and feedlots. In addition to the impacts of sedimentation listed previously, sediments can affect the flow of groundwater through karst and may also carry contaminants, making programs to minimize soil loss critically important for many karst areas.

Another improper practice common in rural areas is dumping of refuse, construction materials, and dead livestock into sinkholes. Common harmful products include bacteria from dead animals; used motor oil and antifreeze; and empty herbicide, solvent, and paint containers. These substances readily enter the aquifer and rapidly travel to nearby water wells and springs. "Few people would throw a dead cow into a sinkhole if they realized that the water flowing over the carcass might be coming out of their kitchen faucet a few days later." (Veni et al. 2001).

Mapping agricultural land use and priority freshwater habitats

Improving agricultural management practices in priority areas can improve outcomes for freshwater SGCN and overall water quality across Tennessee. For the 2025 update, the SWAP team used a similar but more sophisticated approach compared to 2015, in which important watersheds for freshwater species conservation were intersected with different agricultural land uses that may degrade habitat or water quality (see Map 4.4). In 2025, using the Cropland data layer, all nonpoint sources of agricultural runoff were identified, and impacts were assumed for priority stream segments downstream. However, no point sources of pollution (such as permitted outfalls) were

included. The results show specific locations across the state where SGCN and their habitats may be at risk without the use of agricultural BMPs. It is important to note that these maps do not take into consideration where BMPs may already be in place; therefore, they are not representative of actual site-specific habitat conditions.

4.3.3. Forestry Issues

Lack of diversity in forest structure and age class

This is one of the most widespread issues facing Tennessee forests. Maintaining vertical structure (understory, midstory, and canopy) is critical to supporting SGCN in hardwood systems (including mixed oak-pine). Forests that include a mix of young and late-successional habitat across the landscape provide niches for a wider range of species. The lack of young and late-successional habitat has led to loss of tree species (for example, white oak, shortleaf pine, eastern hemlock, native plums and crabapples, serviceberry) and forested habitats that benefit wildlife (for example, oak, pine, hickory woodlands and savanna/grasslands). In addition, the lack of timber markets for low quality wood products makes forest management such as thinning more difficult for landowners to perform and can lead to high grading. Landscape-level coordination is encouraged.

Of the 14 million acres of forest in Tennessee, approximately nine million acres (64%) are considered fire-adapted because they contain tree, shrub, and other plant species that are adapted to frequent fire (Pers. Comm. Britt Townsend). However, much of Tennessee's public land, (as well as the surrounding region) is comprised of closed canopy forests, roughly 80-120 years old. These conditions are largely the result of industrial logging in the 1900s, followed by fire suppression policies. Forests have dramatically departed from desired ecological conditions without the proper distribution of early, mid, and late successional forest conditions.

When fire-adapted forests develop closed tree canopies, they block the majority of sunlight from reaching the ground. This suppresses the herbaceous layer. Fire intolerant trees are out-competing fire-adapted vegetation and greatly altering plant and animal communities. Unfortunately, native woodlands and grasslands have been virtually eliminated from this landscape, transformed into dense forests that lack the habitat diversity that many at-risk species require. Forest composition has also shifted, and there have been long-term declines in shortleaf pine and oak species (i.e., white oak).

Young oak-pine forests have been declining due to mesophication (a process in which fire-suppressed forests transition from being dominated by fire-adapted species like oaks to being dominated by shade-tolerant, fire-sensitive species like maple) and a lack of broadscale adoption of pre-harvest and post-harvest silvicultural treatments that establish and recruit oak-pine trees into the canopy (Pers. Comm. B. Townsend). Species like the Golden-winged Warbler that depend on early successional habitats have declined over time, and their habitat restoration has become a priority (USFSb 2015).

Conversely, there is also growing interest in restoring and maintaining late-successional forest structure throughout the southern Appalachians, with efforts focused on protecting native biodiversity and ecosystems services such as clean water and carbon storage (Pers. Comm B. Townsend).


Golden-winged Warbler / Alan Schmierer

On a landscape scale, achieving a biologically significant interspersion of young forest habitat in balance with middle-aged, open woodland, mature, and late-successional forest conditions is critical to the survival of many SGCN. Appropriate forestry practices are key (see the Woodlands and Savannas Highlight for more detail.)

Forestry practices

Forestry practices (referred to in the Conservation Standards as "Logging and Wood Harvesting") influence the conservation of Species of Greatest Conservation Need (SGCN) in both direct and indirect ways. While certain practices can alter habitat structure or reduce native biodiversity if applied without ecological consideration, sustainable forest management offers one of the most effective tools for maintaining and restoring high-quality wildlife habitat at scale, which includes achieving the mix of young and late-successional habitat noted above. This section identifies forest conditions and land use trends relevant to SGCN, and outlines how strategic management, guided by science and supported by the 2020 Tennessee Forest Action Plan (FAP), can help address these concerns.

Chapter 6 further discusses forestry as a conservation solution in detail and provides recommendations aligned with Tennessee's 2020–2030 FAP.

Both the SWAP and the FAP identify challenges facing Tennessee forests that decrease forest habitat extent, alter habitat structure, and contribute sediment and nutrients to streams. Specifically, challenges to the health of forests and forest wildlife habitat that have been identified in the FAP include the following.

Parcelization and fragmentation

One of the greatest challenges to long-term forest stewardship in Tennessee is the increasing parcelization and fragmentation of forestland. Parcelization refers to the subdivision of larger properties into smaller ownerships, often reducing landowner capacity to engage in active management. Fragmentation refers to the physical breaking apart of contiguous forest (or other habitat) into isolated patches, which can disrupt wildlife movement and ecological processes.

Approximately 77% of family forest ownerships with 10+ acres fall within the 10–49 acre size class, while the majority of forested acreage is concentrated in parcels over 100 acres owned by relatively few landowners (National Woodland Owner Survey). This distribution limits opportunities for landscape-scale management, reduces economies of scale for thinning or prescribed fire, and makes it less accessible for landowners to implement long-term forest management. Encouraging multiple-use management through technical assistance is essential to overcoming these challenges.



Cleared and fenced horse pasture / Joel Kramer

Impacts associated with climate change

Climate change introduces a range of stressors to forest ecosystems that directly and indirectly affect SGCN. These include shifts in species distributions, more frequent and severe drought, increased wildfire risk, and heightened activity from insects and pathogens. These changes underscore the importance of resilient forest management practices that encourage wildlife species diversity.

Non-native insect and disease pests and non-native invasive plants

Non-native pests, pathogens, and invasive plants continue to reshape Tennessee's forest composition. Emerald Ash Borer, oak decline, and other pathogens have altered canopy dynamics, while invasive understory species displace native flora and reduce food and cover for wildlife. Although only 2% of Tennessee's forest area was estimated to be at high mortality risk from pests in 2018, localized impacts can be severe. Management strategies such as targeted thinning, native species planting, mechanical and chemical control, and prescribed fire can help maintain ecological function and limit the spread of invasives.

Wildfire

While many ecosystems need fire to thrive, wildfires outside historic fire return intervals may be ecologically harmful. If burned too often, ecosystems may not have adequate time to recover. Wildfires can also impact water quality and water supply. After fires, soils may be less able to absorb water, and heavy storms can be especially dangerous then (Wibbenmeyer and McDarris 2021).

All of these threats to forest health, connectivity, and integrity likewise threaten SGCN habitats and populations.

Inappropriate timber harvest practices

Vertical structure in forests (i.e., understory, mid-story, and canopy) is important, as hardwood forests with this structure support a far greater diversity of wildlife than those without (LMVJV

2025). Maintaining the structure and diversity of late successional and young forest habitats and their connectivity across the landscape is critical to conservation of many SGCN plants and animals. Without proper planning with respect to landscape-level habitat requirements for multiple species, including those dependent on different types of habitats, management practices that lessen diversity in forest structure can be detrimental.

Inappropriate timber harvest practices or an absence of management can contribute to degraded forest structure in several ways, many of which interact with one another on the landscape:

1. ***Lack of forest management planning:*** Planning is a significant issue that affects landholdings of all parcel sizes and ownership arrangements (i.e., public lands, as well as land held by individuals and families, corporations, and other private organizations and associations). Example impacts of reduced or absent forest planning include fire suppression that may rob a forest of an important natural disturbance process and/or unchecked spread of invasive species, causing a reduction in biodiversity.



Tennessee Healthy Hardwoods field days educate forest landowners about good forestry practices / Adam Taylor

2. ***The practice of high grading*** **("regeneration harvests"):** The selective removal of only high-value timber without regard to stand structure ("take the best and leave the rest") reduces species diversity and degrades long-term stand quality. This practice persists partly due to limited market options, especially in East Tennessee where pulp and low-grade wood markets have declined. Market diversification efforts, especially for pine in West Tennessee, are helping address this gap

3. ***Clear cutting and even-aged management:*** Clearcutting is a harvesting method where all or nearly all trees in a designated area are cut down. In areas with high SGCN concentrations, where regeneration goals are not clearly defined, or Best Management Practices are not followed, indiscriminate clearcutting can reduce habitat quality.



A dense pine plantation in central Tennessee / Lindsay Shaw, TWRA

5. ***Pine management:*** A pine monoculture is by definition far less diverse than a native pine or mixed pine-oak forest. Some pine plantation management may suppress the development of the understory (using chemical or mechanical means)

which contains much of the plant diversity and habitat value of an open pine ecosystem. However, contemporary pine sawtimber stands in Tennessee (especially those managed on longer rotations and thinned periodically) can support high levels of herbaceous diversity and wildlife use, particularly when managed to mimic open pine woodland conditions. While older models of dense, short-rotation monocultures were less ecologically valuable, today's pine management practices in Tennessee are increasingly integrated with habitat considerations.

6. ***Exotic tree plantations:*** The use of non-native species for afforestation or carbon offset projects can displace native vegetation and reduce habitat value. Many carbon programs in Tennessee do not allow the establishment of exotic monocultures, and best practice emphasizes planting native species adapted to the site.

To support forest and water resource sustainability, Tennessee has adopted voluntary Best Management Practices (BMPs) for forestry operations. These guidelines (to be used in road building, skidding, and harvest planning) protect soil, water quality, and habitat features. Average compliance with forestry BMPs is 89% and is monitored by the Tennessee Division of Forestry (TDF). TDEC is responsible for regulating the Water Quality Control Act (Clatterbuck et al. 2017).

Improper execution or disregard for BMPs, can, however, lead to the following:

- Soil compaction and erosion
- Impaired water quality from erosion, altered drainage patterns, and concentrated flows
- Loss of a healthy understory and wildfire-resistant forest ecosystem
- Conditions that promote the establishment and spread of invasive species or insect pests
- Lack of prescribed fire and impacts to other natural processes

(USFS 2015c).

4.3.4. Energy Production and Mining

Non-renewable energy development

Resource extraction for non-renewable energy sources includes mining for coal as well as drilling for oil and natural gas. Tennessee's coal production is relatively small (232,000 short tons), and in 2018 accounted for 1.4 percent of the state's total mineral production value. Tennessee's oil and gas production is also small by national standards (211,000 barrels in 2018) and gas production in 2018 (3.6 billion cubic feet) represented about 88% of the value of oil production. Nevertheless, these activities can involve significant impacts to natural habitats. Without proper advance planning, management, and mitigation, they can cause long-term and even irreversible damage. (See Maps 4.5 and 4.6).

Coal mining

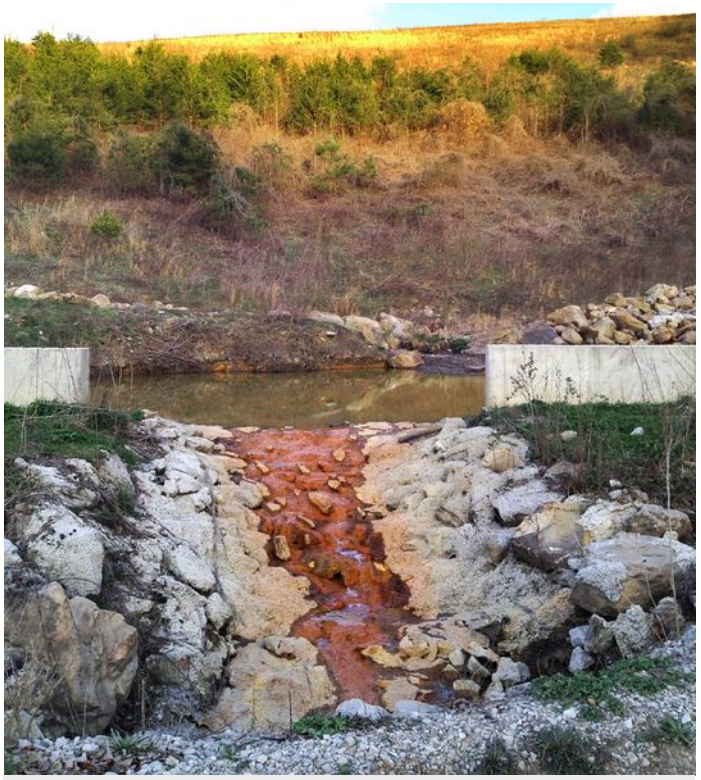
Coal mining activities, from site preparation to post-mining impacts, can introduce a spectrum of problems for SGCN and their habitats. For example, the Yellow-spotted Woodland Salamander (*Plethodon pauleyi*) is found in shale and sandstone rock faces in West Virginia, Virginia, Kentucky and Tennessee, the same sites sometimes targeted for mountaintop removal mining. This species

was petitioned for listing under the Endangered Species Act in 2022 (Center for Biological Diversity 2024).

A 2002 Clinch and Powell Valley Watershed Ecological Risk Assessment conducted by the EPA analyzed associations between land use and in-stream habitat and their effects on fish and mussels. Their findings show that coal mining activities can cause “unacceptable losses of valuable and rare native fish and mussels” (EPA 2002).

Forest loss can fragment habitat and severely affect interior forest-dwelling birds and other species. A current threat facing the region is that of mountaintop removal coal mining, which, even with reclamation, leaves landforms permanently altered (SELC 2015, USDOI 2025).

All of Tennessee's current coal production is bituminous coal from the Cumberland Plateau and Cumberland Mountains regions. These regions have experienced decades of long-term environmental impacts from coal mining, including problems associated with contour mining, deep mining, cross-ridge mining (i.e., mountaintop removal), and re-mining of areas. Such activities destroy terrestrial habitats and permanently disrupt and degrade the hydrologic and ecological function of surrounding forests, spring seeps, streams, and riparian zones. These activities also disrupt and degrade the ecological function and connectivity of ridgeline habitat corridors.



Reconstructed stream below strip mine in TN /Appalachian Voices

Coal mining conducted prior to the passage of the 1977 Surface Mining Control and Reclamation Act (SMCRA), which required post-mining site repair activities to take place, left clear cuts, polluted rivers, and unstable slopes in its wake. Issues from older abandoned mines that were either never reclaimed or improperly reclaimed have degraded both water quality and aquatic wildlife diversity (EPA 2014c).

For example, in the Big South Fork National River and Recreation Area, numerous abandoned coal mine sites are found throughout the park. These sites have become sources of contaminated water affecting the river and its tributaries (NPS 2014). TDEC’s Abandoned Mine Land Program reclaims open or improperly filled coal mine shafts, dilapidated mine buildings and equipment, toxic mine refuse and drainage, landslides, mine fires, highwalls and subsidence. Since its inception in 1981, the program has reclaimed over 5,000 acres of abandoned mine lands at a cost of $60 million, the majority of which came from federal and state sources (TDEC AML Program [date unknown]).

An additional land management challenge in Tennessee comes from the "split estate" ownership status separating subsurface mineral rights from surface rights. Even in many cases where the state or federal government protects and manages the land surface, the mineral rights may be privately owned. According to the US Bureau of Land Management, in these situations, "the mineral owner must show due regard for the interests of the surface estate owner and occupy only those portions of the surface that are reasonably necessary to develop the mineral estate." (BLM [date unknown]). In addition, many coal mining operations are currently undergoing bankruptcy and forfeiting the mineral owner's or lessee's reclamation performance bonds. This results in mines that are not properly reclaimed (i.e., they are abandoned), with negative impacts left in place that affect the surface owners.

Maps 4.5 and 4.6 demonstrate where currently permitted coal mining activity intersects with priority SGCN habitats in Tennessee. Collaborative planning and management at site and regional scales may help reduce the potential for negative impacts.

Oil and gas

Both public and private lands in the Northern Cumberland Mountains and Cumberland Plateau have experienced historic impacts from oil wells and are now facing new challenges from natural gas developments. Big South Fork National River and Recreation Area and Obed Wild and Scenic River have over 300 private oil and gas operations. "Many of the past and existing oil and gas operations in these NPS units are adversely impacting resources and values, human health and safety, and visitor use and experience; most are not in compliance with federal and state regulations." (NPS 2012, NPS 2021).



Charit Creek, Big South Fork National River and Recreation Area / Gregg Elliott, K Gregg Consulting

In 1994, 82 percent of Tennessee's total oil production, and 60 percent of its total gas production, came from counties within the watershed of the Big South Fork River. By 2006, 50% of Tennessee's total oil production and 99% of its gas production came from these same watershed counties (NPS 2012).

The National Park System's Oil and Gas Management Plan for these areas states that many of these operations are not in compliance with federal and state regulations. The plan is a strategy to help park managers ensure their park units are protected from current as well as potential future threats from new development. The plan provides park-specific guidance for oil and gas owners and

operators who wish to establish new oil and gas extraction sites (NPS 2012, NPS 2021).

Different processes for extracting natural gas have raised concerns about potential negative impacts to both surface streams and groundwater affecting both freshwater species and overall water quality (Entrekin et al. 2011). In addition to the drilling process itself, the infrastructure development associated with production—particularly new well pads, pipelines, and roads—poses a major challenge to long term forest habitat integrity, both locally and across broader landscapes where production is increasing (Drohan et al. 2012, Fisher 2012). Tennessee has yet to experience the landscape-scale level of development similar to other states such as Pennsylvania; however, Tennessee does retain natural gas resources that are currently being developed and may be developed more in the future. Maps 4.5 and 4.6 demonstrate where permitted oil and natural gas activity intersects with priority SGCN habitats. As with potential coal mining impacts, use of these data in a collaborative planning framework may help reduce negative outcomes for species.

Renewable energy development

The development of renewable energy resources is a stated goal for many governments across the US as a means of decreasing emissions of greenhouse gases that cause climate change. Renewable sources such as wind, solar, and biofuels/biomass, are currently being developed at smaller scales across Tennessee. Hydropower, also considered a renewable source, has been a significant provider of peak electrical power for many decades.



Solar arrays developed on the site of former coal mines in the Appalachians / The Nature Conservancy

To meet the power demands of a developing Tennessee landscape, the Tennessee Valley Authority's (TVA, whose service area includes the entirety of the state) draft 2025 Integrated Resource Plan recommendations include significant renewables expansion and a decreased reliance on coal-generated power through 2035 (TVA 2025). Each type of renewable source has its own potential conflicts with species and habitat conservation needs. Maps 4.5 and 4.6 depict areas of risk to combined conservation priorities from renewable solar and wind development, respectively, with areas most suitable for development and least harmful to SGCN habitats in blue. However, since these technologies are new, there is more opportunity and potential to address conflicts through responsible siting, construction, and management of renewable energy infrastructure (see Ch. 6). In addition, the extent to which these new technologies will expand across the state is unclear.

Well-designed approaches for overall land uses need to consider the potential of the land for all human needs as well as for biodiversity protection, placing each use in its most suitable location. Primary considerations for all renewable energy development types include eliminating or reducing direct species impacts, habitat losses, and fragmentation of habitat across the landscape.

TVA is the nation's largest public power provider, and its service area includes the entirety of Tennessee. Its long-term Integrated Resource Plan, updated every five years, provides direction on how TVA can best meet future demand for power. The draft 2025 plan, the most current at the time of the 2025 SWAP's development, noted that land requirements for new power resources increase for all potential strategies, primarily driven by solar expansion.

Bioenergy

Biofuels (liquid fuels) and biomass (solid fuels) are both forms of renewable energy derived from biological materials, such as plants, vegetable oils, forest products, or waste materials. A 2010 analysis of the implications of biofuels for land use and biodiversity points out that perennial bioenergy crops could be considered an appropriate component of conservation farming systems when their use is integrated with land use planning along with rotations that improve soil quality, reduce erosion, and minimize runoff of agricultural inputs (Dale et al. 2010). Several species of perennial warm season grasses, such as switchgrass (native to the North American prairie from Mexico to Canada) provide excellent wildlife habitat.



Switchgrass, grown as a biofuel / Laura Hubers, USFWS

Continued crop breeding innovations will almost certainly expand the range of growing conditions for bioenergy feedstocks, making even more areas that are important habitats for wildlife suitable for agriculture. Also, while native warm season grasses do provide excellent habitat, the design of production fields for biofuels may not be structured to provide the spacing and pattern of habitat needed on the ground. Thus, the risk of conversion to cropland in such areas merits special attention, protection, and planning (Dale et al. 2010).

Within the last decade, more research and development projects have been directed toward understanding the potential of forest biomass to supply alternative energy sources. The US Forest Service anticipates that woody biomass can help replace up to 30 percent of petroleum consumption by the year 2030 (USFS 2010). Harvesting of forest products is also seen as a positive mechanism for improving overall forest health while providing woody biomass for fuels (USDA

2014). Proper planning and utilization of these management practices in forests will be important for conserving terrestrial and freshwater habitats at both local and landscape scales.

Wind

TVA's existing wind contracts expire in the early 2030s. Beginning in 2029, TVA will have the alternative to purchase wind power from three regional sources (Mid-continent Independent System Operator (MISO), Southeast High-Hub wind, and High Voltage Direct Current wind.) Wind additions have the potential to add more diversity and carbon-free energy to TVA's energy resource mix (TVA 2025).



Buffalo Mountain wind farm / Tennessee Valley Infrastructure Group

TVA currently purchases all of the power produced by the Buffalo Mountain wind farm in Anderson County, Tennessee, one of the largest wind farms in the Southeast, with 15 turbines and 27 MW of maximum sustained capacity (TVA 2019). TVA's potential plans for added wind power through 2038, will likely contribute to direct mortality of birds and bats as well as habitat alteration due to construction/conversion. Improperly sited or operated wind turbines can directly affect native plant populations and wildlife, particularly during aerial migration at distinct geographic locations (Fiedler 2004, Nicholson et al. 2005). Negative effects can include direct mortality of animals, habitat loss, and habitat fragmentation. Birds and bats can be attracted to wind turbines by different lighting or operational features, and management attention to such features is warranted (Nicholson et al. 2005). If wind facilities expand significantly, consideration should be given to the cumulative impacts on population sizes and species ranges (Fiedler 2004).



Mussels from the Hatchie River, an undammed river in west Tennessee with high aquatic diversity / Naomi Van Ton

Hydropower

Dam construction and operations, including hydropower and other water management practices, have already significantly degraded natural river habitats in Tennessee (see Section 4.4.3). Alteration of existing dam structures to produce hydropower or the construction of new hydropower facilities

must be considered in the context of these historic resource losses and with an eye to preventing further species and habitat declines (Grimm 2002).

TVA monitors the flow of 49 dams in the Tennessee River watershed, 29 of which include conventional hydro generating units at 29 dams (National Hydropower Association 2020), along with a long-term power purchase agreement with the US Army Corps of Engineers for eight dams on the Cumberland River system. TVA has a perpetual program to invest in and maintain its hydroelectric fleet, which includes two to three modernization projects per year.

Since TVA does not anticipate the construction of additional hydro facilities, and the degradation of aquatic resources as a result of existing projects has already occurred, it is incumbent upon TVA and society to conserve aquatic species and/or reduce past and current deleterious impacts. Changes to benefit aquatic species could include water alteration (i.e., changes made to the natural flow, quantity, or characteristics of water bodies) or improvement of release/control operations at hydroelectric facilities, as well as other beneficial technologies that could be installed as part of the modernization program. All such improvements should be considered at every opportunity and coordinated with partners.

Solar

TVA's Draft 2025 Integrated Resource Plan notes that since 2019, TVA has gained experience with increasing amounts of new solar generation and is installing its first owned and operated grid-scale battery storage on the system. Four out of five of TVA's future strategies for energy supply include solar; some strategies emphasize proven carbon-free technologies like wind, solar, and storage, at both utility-scale and through customer partnerships, while others emphasize distributed energy. The plan estimates that by 2035, 3 to 20 gigawatts of energy could be supplied by solar and that land requirements for new power resources are primarily driven by solar expansion. In short, the land area occupied by solar facilities could greatly increase.

TVA's Plan includes a strategy of supporting distributed energy resources, with options that include distributed solar and storage. TVA has provided local power company partners the flexibility to generate up to 5% of their own energy to meet consumer demand for new renewables and address other local needs (TVA 2025) .



Rooftop solar / Vivint

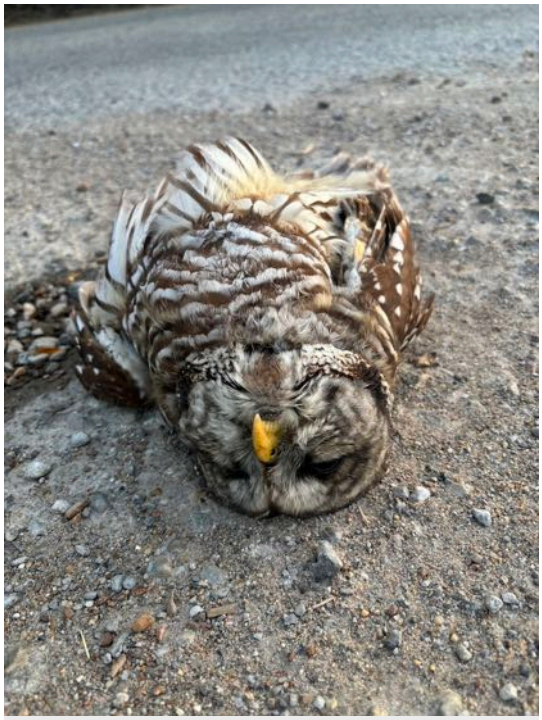


Solar array on top of a former landfill / Wikimedia

What distinguishes distributed generation from utility-scale solar is both project size and the fact that distributed generation generally sells electricity directly to end-use consumers, not to wholesale utility buyers (SEIA 2024). Another distinction is that utility scale solar projects generally have higher environmental and social impacts due to using large land areas, which can include impacts to natural habitat, biodiversity, and water as well as increased waste, visual, or noise pollution. Distributed solar photovoltaic (PV) systems, on the other hand, generally have lower impacts because they are sited on existing structures, and they have minimal water and waste processing requirements. Distributed alternatives for solar generation that do not require land valuable as habitat include rooftop solar, solar canopies mounted over parking lots, solar thermal collectors mounted on buildings, and solar farms sited over brownfields where soil cannot be disturbed. Distributed solar may provide a win-win for the environment and people, as rooftop solar is also the most popular clean energy product among consumers (SEIA 2024). Also, distributed energy capacity enhances local resiliency (TVA 2025).

4.3.5. Transportation and Service Corridors

Roads and other forms of transport, whether for people, utilities, energy, or goods, can directly impact habitats by damaging sensitive ecosystems, fragmenting habitat, and creating barriers to movement of both species and the natural flow of water in wetlands and riverine habitats. Transportation routes are responsible for linear branch development, and the construction of highways and roads can cause rapid outgrowth from urban cores. For these reasons they are commonly considered in forecasting urban sprawl (Bhatta 2010).



Barred Owl hit by a car. Owls are regular victims of collisions with cars and trucks. / Gregg Elliott, K Gregg Consulting

Current transportation and service corridors in Tennessee include:

Highway System

- bridges: 20,034, including 8,443 state owned bridges, 11,591 locally owned bridges
- interstate miles: 1,201
- state maintained highway miles: 14,462
- total highway miles: 96,187

Rail System

- short line railroads on 817 miles of mainline rail
- class I rail lines on 2,138 route miles of rail

Transit System

28 transit systems serving all 95 counties:

- 4 large urban systems, eight small urban systems,
- 10 rural systems,
- 1 regional commuter transit system in Middle Tennessee, and
- local transit in five towns

Waterways

976 main channel miles of commercially navigable waterways and two ferries

Bicycle/Pedestrian System

- 4,557 highway miles with 4-foot or greater shoulders to accommodate bicycles
- 216 miles of state routes with designated bike lanes
- 487 miles of greenways, sidewalks and trails
- 172 miles of designated US Bicycle Routes
- 934 miles of sidewalks on state routes

(TDOT [date unknown])

Improperly designed road crossings such as bridges and culverts can fragment stream habitats, cause erosion, prevent the migration of species throughout a watershed, and impact local abundance and species richness of fishes in a stream. For example, one study in West Virginia found that in stream sections located above impassable culverts, fewer than half the number of species and less than half the total fish abundance occurred when compared with sections upstream of passable culverts (Nislow et al. 2011).



Sturgeon, an SGCN whose river bottom habitats can be impacted by dredging. / Brandon Simcox, TWRA

Dredging

In river environments, dredging for navigational channel maintenance is a key issue, particularly on the Mississippi, Tennessee, and Cumberland River mainstems—a necessity that will only become more frequent as climate-related droughts increase in frequency. Additionally, both the TDEC and USACE permit removal of dredged bed material from rivers and streams for commercial and agricultural purposes. Such material is often used in the construction of roads and other public and private infrastructure projects, and removal of such material may be necessary for various industrial and commercial operations on major waterways.

Dredging, whether to maintain riverine navigation channels (such as the Mississippi River, which has required dredging in response to droughts in recent years) or for mining gravel, destroys or

degrades river bottom habitats, bottom-dwelling species such as sturgeon, and benthic organisms such as crustaceans and mollusks that live in or on the bottom sediments. Dredging also stirs up sediment, affecting downstream habitats. For these reasons, coordination with both the US Fish and Wildlife Service and TWRA are often required to avoid or mitigate impacts to rare aquatic species where dredging is permitted. Additional monitoring and the relocation of species from project sites may be necessary to protect them.

Even where dredging does not directly impact individual organisms, impacts are also realized through habitat loss, where many big river species require gravel substrates, often targeted by dredging operations. Removal of such material reduces the reproductive potential of these populations.

4.4. Biological Resource Use & Natural System Modifications

4.4.1. Fire Suppression

Many of Tennessee's upland systems, as well as some types of wetlands, have been shaped and maintained by periodic fire—a process that was historically maintained to a large degree by Native Americans and lightning strikes. Decades of fire suppression have not only degraded these systems, but have also allowed fuel loads to increase, which leads to more intense wildfires. The lack of controlled fire (i.e., prescribed fire, see 4.4.2.) on the landscape has changed the human perception of fire and its role in the ecosystem (EGCPJV 2014).



The Wildland-Urban Interface in Gatlinburg / Beaman Photography

Fire suppression, the lack of fuel load reduction, and the growing wildland-urban interface (WUI) all contribute to catastrophic wildfires. Since the 2015 SWAP was written, the state experienced its most extreme wildfire in eastern Tennessee—vast in scale and devastating to both communities and landscapes.

Moreover, the risk of wildfire is increasing annually with population expansion and rural development. Landowners residing in forested settings, as well as the public at large, are often not well-informed about the dangers of wildfire, its impact on the environment, the cost of suppression, and how to mitigate it, including through the judicious application of prescribed fire.

The wildland/urban interface or WUI (pronounced woo-ee) is expanding across the state as development proceeds in Nashville, Knoxville, Memphis, and Chattanooga. This expansion of the WUI has affected fire suppression as well as other land management techniques.

The WUI risk index rates the potential impact of a wildfire on people and their property. Significant areas of at least moderate WUI risk classifications exist across Tennessee, with dense pockets of high WUI risk evident in eastern Tennessee's mountainous terrain (TDF 2020).

Additionally, the disturbance cycle of quickly developing rural areas often leads to the rapid spread of invasive species (e.g., kudzu). Increases in housing correlate with increases in invasive exotic plants (Gavier-Pizarro et al. 2010). These plants not only degrade habitat but can also make suppression during wildfire more difficult, as they may burn even when green.

4.4.2 Removing/Reducing Human Maintenance

Fire, particularly prescribed fire that does not burn too hot and out of control, consumes vegetative debris, provides open structure at ground level, and facilitates travel and foraging for wildlife. Many species depend on the plant communities that develop following a fire, particularly birds dependent upon grasslands and woodlands (EGCPJV 2014).

Prescribed fire (the controlled application of fire in selected habitat areas) is a management practice that can directly address the problem of altered fire regimes and fire suppression. By using controlled fire, fuel loads found within different habitats can be safely reduced and aid in the reduction of wildfires. Prescribed fire not only reduces the risk of wildfire, but it also costs far less. In addition, restoration of oak and pine savannas and woodlands, native grasslands, and high-quality early successional habitat require fire, although the



Prescribed fire at Arnold Air Force Base / Arnold Air Force Base

application, timing, and intensity of fire required differs depending on the natural system (Harper and Birckhead 2012).

However, prescribed fire is not widely and publicly recognized, embraced, or supported as a beneficial practice (EGCPJV 2014, TNPFC 2015). Long-term suppression of fire over more than one hundred years contributes to the high intensity wildfires that the US is experiencing now. People in Tennessee and many parts of the South have, for the most part, lost touch with their 19th century traditions of burning for agriculture and land renewal. They may be averse to fire in general and prescribed fire in particular due to a lack of understanding of this complex topic and the science demonstrating prescribed fire's benefits.

A hopeful example of the use of prescribed fire occurs at Arnold Air Force Base in the Barrens region of Tennessee's Eastern Highland Rim. There, prescribed fire has been incorporated into the management regime to benefit natural communities while also accomplishing a highly complex military mission. The prescribed fires are used to restore barrens habitat—Tennessee's prairie ecosystems—and to manage fuel loads in the Tennessee Army National Guard's weapons firing area as a means of preventing wildfire that interrupts training (DOD 2006).

4.4.3. Dams and Water Management/Use



Chickamauga Dam, located on the Tennessee River east of downtown Chattanooga / Tennessee Valley Authority

Tennessee's rivers and streams provide habitat that supports some of the highest levels of aquatic diversity (Smith et al. 2002, Master et al. 1998) within the Southeast, which itself ranks as a worldwide center of temperate freshwater biodiversity (Bo Baxter, Pers. Comm. March 15, 2024). Additionally, the Middle Tennessee River system, followed by the Alabama River, the Upper Tennessee, and Cumberland River systems support the highest aquatic species endemism (including fishes, mussels, and crayfish) within the Southeast (Elkins et al. 2019).

Yet, for the last century, government agencies and private businesses have developed the state's water resources to provide flood control, river navigation, electricity, drinking water, agricultural improvements, and recreation benefits. While transforming state and local economic opportunities, the construction of dams and other water infrastructure has also caused significant damage to aquatic habitats and even extirpation of species from some watersheds, fundamentally changing Tennessee's rivers and tributaries from their original interconnected, free-flowing conditions. Indeed, dams and water management are listed among the stressors in more

than half (nineteen) of the 36 Conservation Opportunity Areas (Appendix I). As of 2025, the total number of dams inventoried in Tennessee stands at 8,772, including 38 that have either been removed or mitigated, resulting in a gain of 1,652 miles of reconnected rivers and streams. Nationally, there are 558,203 dams inventoried, and 3,182 have been removed gaining 207,441 miles of reconnected rivers and streams (Southeast Aquatic Resources Partnership 2025).

The flow regime of a stream or river system, along with the influence of interconnected tributaries, plays a pivotal role in shaping the structure and functionality of aquatic and riparian ecosystems. However, measuring how stream flow characteristics impact aquatic systems is highly complex. A study of the Tennessee River Basin across three ecoregions, which related the species richness of 11 fish groups to hydrologic conditions, showed that cumulative departure from hydrologic reference conditions led to a decrease in species richness (Knight et al. 2014).



Tangerine Darter, a native fish species threatened by impoundments that fragment its habitat (Nolichucky River). / Sally Petre, TWRA

Dam construction can modify flow dynamics by transforming river systems into a sequence of expansive pool reservoirs. Flow alteration, as a result of dams both large and small, has significant impacts on aquatic species, fragmenting the river network, impeding the movement of resident and diadromous fish species, and eliminating or altering in-stream habitat. By preventing many species of fish and invertebrates from accessing river reaches upstream and downstream of the structures, dams essentially disconnect populations from large sections of their habitat. In addition, dams pose threats to native aquatic systems—and larger dams tend to pose larger threats--by changing several key characteristics of the streams that occur downstream of reservoirs: natural flow patterns, dissolved oxygen, temperature, nutrient loads, and water chemistry (Brown et al. 2024).

Water withdrawals are also a concern if the timing or amount of withdrawal is sufficient to alter basic flow patterns and affect ecological responses, posing a threat to aquatic wildlife and plants. Both channelization and upstream impoundments, which can affect flow patterns, are listed among the top ten sources of impairment to Tennessee river and stream health (TDEC 2012/EPA 2015) (see Table 4.3). In addition to reducing habitat for aquatic species, flow alteration can also affect water quality, water temperature, and water availability (USGS 2013).

Groundwater is water held underground in the soil or in pores and crevices in rock. Karst aquifers are a vital groundwater resource; however, features such as rapid recharge and flow make them highly vulnerable to land-surface contamination (Musgrove et al. 2023). Groundwater withdrawals

for both drinking water and agriculture are increasing, which can impact both stream flows and karst habitats. More than 2000 new wells were drilled in the state each year from 2007 to 2021 (TDEC 2022). Groundwater depletion is increasing in many areas of the US, primarily caused by sustained groundwater pumping. Some of the negative effects of groundwater depletion:

- lowered water table (wells go dry)
- reduction of water in streams and lakes
- deterioration of water quality
- increased pumping costs
- land subsidence

(USGS 2018).

The construction of dams and other water infrastructure has caused extirpation of species from some places, fundamentally changing Tennessee's rivers and tributaries from their original interconnected, free-flowing conditions.

Resource management challenges of large dams and reservoirs

Rivers below dams are commonly referred to as tailwaters or tailraces. Many hydropower and flood control dams, operated by the Tennessee Valley Authority (TVA) in the Tennessee River system and the US Army Corps of Engineers (USACE) in the Cumberland River system, release cold water into the tailwaters. Cold water releases can degrade or reduce habitat for native fishes and mussels.

Likewise, some tailwaters are low in dissolved oxygen, especially by the end of the summer, because decaying organic matter in reservoirs uses up oxygen at the bottom of the reservoir, and the heavier, colder water does not mix with the surface. It is also these waters that are discharged from the dam. These are issues that TVA, USACE, TWRA, and the US Fish and Wildlife Service (USFWS) have worked to address in recent decades, by creating flow regimes and improving downstream water quality to benefit at-risk and endangered species in key river reaches.

Since 1991, TVA has spent more than $135 million constructing capital projects to address the problem of low dissolved oxygen, installing a variety of equipment and technologies designed to increase dissolved oxygen concentrations below 16 dams. TVA also monitors key aspects of ecological health in the tailwater sections to achieve biological and recreation objectives (TVA [date unknown] Tailwater Improvements).

In recognition of the importance of stream flows, TVA also changed their policy for operating the Tennessee River and reservoir system in May 2004. The policy now focuses on managing the flow of water through the system rather than storage. It specifies flow requirements for individual reservoirs, to prevent riverbeds below dams from drying out, and for the system as a whole. (TVA [date unknown] Tailwater Improvements). Their operations now maintain wetted habitat in 180 miles of river that previously were intermittently dry (Yarbrough 2013).

Similarly, the USACE has conducted watershed assessments in key watersheds where they operate. These are collaborative processes with state, federal, tribal, interstate, local government, and stakeholder organizations that produce watershed plans to balance needs for water supply, public safety (flood control), wildlife habitat, and aquatic diversity (USACE 2015).

In some cases, agencies recognize that cold tailwaters are inevitable and present an opportunity to provide a sport fishery. Because cold water released into the tailwaters below dams creates a new type of habitat, TWRA stocks trout to diversify the state's angling opportunities. TVA's monitoring program on the Elk River allows the agency to adjust the operation of Tims Ford Dam to protect the variety of life in the river, including a cold-water trout fishery, endangered species, and sport fish that require warm water (TVA [date unknown] Running hot and cold).

Resource management challenges of small dams and stream barriers

Even small impoundments, which are constructed on smaller or headwater streams for various reasons, have the potential to adversely affect aquatic life. Such impoundments eliminate flowing stream habitat in the flooded pool zone, making habitat unsuitable for native stream species. These dams also may alter the physical, chemical, and biological components of downstream reaches. They create barriers that can result in isolated populations, and with no provision for minimum flows, they may result in insufficient flow downstream, particularly during summer months (Arnwine et al. 2006). In addition, improperly placed culverts can also pose barriers to aquatic life (see Ch. 8 for examples of culvert projects to benefit species).

All of these factors combined are a recipe for reduced biotic integrity, altered flows, and negative impacts on water quality downstream of the impoundment. Results from one study indicate that small impoundments affect the biological community for at least one-quarter mile downstream (Arnwine et al. 2006).

As recognition of these impacts has grown, momentum has increased among a variety of constituents across the country to remove dams, particularly those that no longer serve their original purpose or that pose significant threats to public safety. The Tennessee Aquatic Connectivity Team represents partners interested in advancing dam removal as a restoration strategy in Tennessee (SARP 2024).

Negative impacts of stream and river channelization

Channelization of rivers and the use of levees and dikes to prevent flooding in former natural floodplains are two major contributing factors to the imperilment of many fish SGCN, particularly within the Mississippi River and its tributaries in western Tennessee. Straightening streams means removing the meanders that produce habitat structure in the form of pools and riffles, which are essential to a diversity of fish and other aquatic life. Channelization can also lead to greater erosion, sedimentation (TWRA and USFWS 2002), and bank instability (Robbins and Simon 1983) (see the White Oak Restoration Highlight).

Disconnecting streams from their floodplains through channelization, levees, or dike construction can cause the following problems:

- loss of sediment
- deposition outside of the streambed
- downcutting, headward erosion
- downstream aggradation
- accelerated scour
- bank instabilities
- decrease in groundwater recharge
- elimination of spawning and nursery habitat for fish and amphibians.

(TWRA and USFWS 2002, Robbins and Simon 1983).



Channelized stream tributary to the Middle Fork of the Forked Deer in West Tennessee / West Tennessee River Basin Authority

4.4.4. Recreation

Tennessee's landscapes provide a wonderful array of recreational activities that contribute to the quality of life of both citizens and visitors, and which support the state and local economies. Though considered less impactful than resource extraction, recreation can cause negative impacts to the natural environment (Larson et al. 2019). Proper management of recreational activities in many situations can be critical to promoting the protection of habitat and species, which are themselves one of the prime draws for visitors. When not properly managed, recreational use of managed lands can be detrimental to wildlife from overuse, defoliation of plants, erosion, pollution (including light and noise), spread of exotics and pathogens, and numerous other factors. For wildlife species dependent on those same areas, coexisting with humans is a major undertaking.



Black bear sow and cubs crossing the road at Cades Cove in Great Smoky Mountains National Park / from "Adventure is Out There"

Several studies have shown that animals will shift their patterns to avoid human interactions (George and Crooks 2006, Barrueto et al. 2014, Reilly et al. 2017, Gaynor et al. 2018). In fact, humans induce stronger fear reactions in wildlife than natural predators (Clinchy et al. 2016; Suraci et al. 2019). And when wildlife must share recreational spaces with humans, they will separate themselves from humans either in space or in time.

Animals may choose to completely avoid highly trafficked recreational areas (George and Crooks 2006, Barrueto et al. 2014, Reilly et al. 2017, Gaynor et al. 2018), resulting in being pushed from an area to find more suitable habitat where humans do not occur. Some animals will shift to complete



White Oak canal in the middle of the White Oak WMA / Chad Harden, TWRA

STREAM AND FLOODPLAIN RESTORATION

In the early 1900s, many west Tennessee streams and rivers were channelized in a misguided effort to control flooding and increase the availability of arable acreage. In fact, throughout the entire lower Mississippi Valley, there is only one tributary to the Mississippi that remains unchannelized (the Hatchie).

Over time, the problems associated with channelized streams—including massive erosion of the erodible west Tennessee soils that clogged canals and prevented them from serving their intended purpose—led to a greater awareness of the importance of stream and riparian function.

As noted by the Tennessee Division of Forestry's *Tennessee Urban Riparian Buffer Handbook,* "Healthy creeks, streams and rivers are dependent on healthy forested riparian buffers." These buffers benefit not only individual land-owners but also everyone living downstream. They help stabilize eroding stream banks, filter out sediments and chemicals before they reach the waterway, recharge groundwater, reduce flooding impacts by absorbing high-velocity stream flows, and preserve or improve wildlife and aquatic habitat, adding to the land's scenic and economic value.

White Oak Stream and Floodplain Restoration Partners

West Tennessee River Basin Authority
Tennessee Wildlife Resources Agency
White Oak Wildlife Management Area

WHITE OAK WMA STREAM AND FLOODPLAIN RESTORATION

The restoration of White Oak Creek on the White Oak Wildlife Management Area (WMA) in west Tennessee is a recent example of the trend among private landowners and conservationists around the country to "work with nature" by facilitating processes that conserve water, restore soils, cycle nutrients, improve habitat, and benefit wildlife.



White Oak Creek restoration design / WTRBA

THE LITIGIOUS HISTORY OF WHITE OAK CANAL

The White Oak WMA encompasses approximately 7,000 acres in Hardin County, straddling the outlet of 160 square miles of the creek's watershed into the Tennessee River. Thus, its location is strategic in its impact to flows from the watershed into the river, and a large percentage of the WMA (75%) is within the TVA flood easement associated with the Kentucky Lake dam.

In the early 1900s, most of the White Oak Creek and its tributaries were channelized, and adjacent landowners along the stream conducted maintenance to keep the channel clear. However, when the Clean Water Act was passed in 1972, creating a requirement for wetland permits to conduct this work, much of it stopped. As a result, the heavy sediment loads associated with the stream were confined to the canal.

In 1984, the Tennessee Wildlife Resources Agency (TWRA) began purchasing land in the area for the WMA. Erosion was a problem, resulting in sedimentation, timber loss, and diversion of stream flows into alternate flow paths. In short, the stream was no longer functioning normally, and it

continued degrading over time to such an extent that in 2005 a West Tennessee River Basin Authority (WTRBA) study of the stream channel showed that its heavily silted bottom was now higher than the surrounding floodplain!

TWRA was sued three times from 1990 to 2015 over water flow through state-owned property in the White Oak WMA. Upstream landowners were dealing with floodwaters backing up from the clogged portions of the channels. TWRA staff attempted to maintain water flow using a variety of "bandaid" measures, as described by then manager of the WMA, **Chad Harden (now WMA Coordinator for Region 2 in Tennessee**), which included backhoes and explosives to breach levees, which would allow pooled water to flow.

A PROGRAM TO PRESERVE NATURAL FLOW AND FUNCTION OF STREAMS

The Obion-Forked Deer Basin Authority was created in 1972 primarily to maintain channelized streams. It was renamed the West Tennessee River Basin Authority (WTRBA) when it became part of the Tennessee Dept. of Environment and Conservation in 1996, with an updated mandate to preserve the natural flow and function of West Tennessee's streams and rivers through environmentally sensitive stream maintenance.

White Oak stream and floodplain restoration began with a comprehensive evaluation of the watershed, including meetings with landowners, surveys of channel depths, and installation of stream gauges, with the goal of reconnecting stream meander sections and abandoning the channel (i.e., returning the stream close to its pre-channelization form). The project also intentionally focused on how water enters and exits the floodplain, with the goal of maintaining connectivity between the stream and its floodplain.

It included work on 54,000 feet of stream (>10 miles) and was completed on time and under budget in 2021. The system has definitely been tested with flows, and several adjacent farmers have commended the reduced residence time of floods after an event. Maintenance has gone from three to four times per year to zero requests on the WMA in the last four years. "It's very difficult to replicate all the benefits of a meandering channel connected to its natural floodplain. We try to restore these natural dynamics whenever possible, and White Oak is a perfect example of the results," says **David Blackwood, Executive Director at WTRBA.**



An amphibious trackhoe works on the "new" White Oak Creek meander. Through analysis of LiDAR data, the lowest point in the floodplain was selected for the location of new stream meanders. Where dredging was necessary, spoil was placed on the outside of each stream bend with the inside of the bend left at natural grade to allow floodwaters to naturally exit and return to the channel.



Lower end of White Oak project immediately post construction, facing southwest with the parallel canals of White Oak and Mud Creek still visible in the top right. This section was permanently flooded cypress, tupelo, willow, maple and buttonbush forest and marsh trapped between two parallel canals. The project restored old meanders wherever possible.

Results for recreational users have been mixed—with fishing success declining at some spots. Hunters have enjoyed improved access, but reduced waterfowl harvest (part of a statewide trend) has been attributed to the project. "We recognize restoration is causing some of our most traditionally productive locations for fishing and wildlife to go away, but new ones will develop over time," says Chad Harden. "A properly functioning stream and wetland will provide better habitat for more fish and more wildlife over the long-term, and that is our goal."

Tennessee Division of Forestry. 2015. Tennessee Urban Riparian Buffer Handbook. Accessed May 13, 2024. https://www.tn.gov/content/dam/tn/agriculture/archive-can't-be-altered-after-placed/documents/forestry/UrbanRiparianBufferHandbook.pdf
US Army Corps of Engineers, ERDC. 2013. Draft report White Oak Creek Watershed Study: Conceptual Sediment Budget.

nocturnal patterns (separation in time) because of recreational impacts (Lewis et al. 2021, Gaynor et al. 2018). These shifts in animal patterns can cause increased predator/prey overlap and greater competition among species. (Lewis et al. 2015a, Gaynor et al. 2018).

Wildlife-related recreation is important in the overall US economy. Proof of this was again shown in the 2022 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation completed by the US Fish and Wildlife Service. According to their survey results, $394.8 billion was spent on "Wildlife-Related Recreation" in 2022 in the US. The authors stated, "the Survey data demonstrate yet again that fishing, hunting, boating, and watching wildlife are part of the American lifestyle, and that these pursuits fuel economies and create enduring social and cultural bonds" (USDOI 2022). The survey included data collected from people aged 16 years and older who participated in wildlife-associated recreation.

Many types of outdoor recreation don't necessarily fall into the "wildlife-associated" category. However, the activities, equipment used, and where they occur can have huge impacts on wildlife species.

One example is the growing concern that rock climbing, which has exploded in popularity in recent decades, could adversely affect the diversity of plant species that grow in specialized environments. The Obed River Gorge is a popular rock-climbing destination, yet its sensitive vascular plants, bryophytes, and lichens make up one of the richest floras in the southeastern US (Walker et al. 2009). Research on this topic indicated some impacts of foot traffic on vascular and non-vascular species, with a slight shift in lichen species composition on the cliff faces in response to climbing (Walker et al. 2009).

Twenty percent of known caves in the United States (12,000+) are located in Tennessee.

Similarly, recreational caving can have adverse effects on bats and other species, such as crustaceans, insects, and arachnids, found within those ecosystems. Twenty percent of known caves in the United States (12,000+) are in Tennessee. Many of these caves are critical to the survival of multiple species of bats, some of which are federally endangered.

Since bats are sensitive to disturbances within caves, recreational caving has the potential to disrupt hibernation. Cave entry also has the potential to spread the invasive fungus *Pseudogymnoascus destructans* (Pd.), the cause of white-nose syndrome (WNS), an epidemic responsible for killing millions of cave-dwelling bats in the eastern and central United States.



Tricolored Bat, a species that declined 84% from 2013 to 2022, largely due to white-nose syndrome / Michaela Bass, TWRA

The origin of the fungus's introduction into the United States in 2006/07 is thought to have been unintentional spore transfer from the gear/clothing of people who had visited caves in Europe where the fungus was known to occur. Both disruption and WNS cause hibernating bats to wake up prematurely, using valuable fat stores they need to survive through the winter (see WNS Highlight).

Another recreation issue is the importance of proper planning and management of horse-riding trails. Studies have shown that damage to vegetation and stream water quality can occur when trails are not properly located, have maintenance issues, or are not appropriately followed by riders (Marion and Olive 2006). Good planning and maintenance can reduce potential damage and keep horse trails safe and enjoyable for the public.

The impacts of all-terrain vehicles (ATVs) and other off-highway vehicles (OHVs) can be significant in certain cases, but they are highly localized. TWRA allows restricted use on dedicated trails on some WMAs; however, the demand for trail access has grown significantly over the last five years. Without sufficient resources for signage and enforcement, this type of use in areas set aside for wildlife could pose a more significant threat. In addition, while most riders are responsible, as the number of riders increases, pressure on public and private lands will also increase. Additionally, irresponsible riders are creating their own trails, riding on trails that are closed, and engaging in other illegal activities, such as riding in creeks as trails or washing their vehicles in creeks.

Generally, people may not realize the extent to which ATVs and OHVs can damage the environment (TVA 2006). Mangled vegetation, destroyed wildlife habitats, severe soil erosion, and stream sedimentation are the primary impacts of ATVs and OHVs in sensitive or inappropriate areas. Vehicular impacts are most likely when use is high, when users blaze new trails, when they



Typical size of today's Off-Highway Vehicles (OHVs) / Scott Dykes, TWRA



OHV damage: Massive ruts and erosion on a nature trail / Scott Dykes, TWRA

do not use designated stream crossings, or when they ride within streambeds. The damage caused to wildlife and water quality by riding in streams has caused some states, such as Missouri, Georgia, and Alabama, and some land management agencies in Tennessee (USFS, upper Tellico)



American Ginseng (*Panax quinquefolius*) / Jacob Bigelow (1786-1879), text and coloured engravings from www.botanicus.org

to outlaw the activity. TWRA initially allowed ATVs on a small portion of North Cumberland WMA, prior to the invention of the OHVs of today.

4.4.5. Overuse of Biological Resources

This category includes Conservation Standards threat categories Hunting & Collecting Terrestrial Animals and Gathering Terrestrial Plants. The collection of certain plant and animal species in different regions of the state must be monitored, and regulations enforced, to prevent over-harvest and species population declines. Illegal poaching of desirable plants, particularly medicinal species, from both public and private lands is an issue in Tennessee.

According to the Tennessee Department of Environment and Conservation, American ginseng (*Panax quinquefolius*) is the number one poached plant (Lincicome 2015). This species has historically been used for medicine by Native Americans and is still valued for this purpose, particularly for use in Asian products. Goldenseal and orchids are also highly popular species.

The trade of ginseng and many other plant species is regulated under CITES, the Convention on International Trade in Endangered Species of Wild Fauna and Flora. TDEC administers a licensing program to regulate and monitor the harvest and export of American ginseng from Tennessee, and collection of ginseng on the Cherokee National Forest requires a permit from the US Forest Service.



Eastern Box Turtle with transmitter attached for research purposes. / Michaela Bass, TWRA

People are also putting tremendous global pressure on turtles (and most reptiles) through illegal trade. Animals are illegally caught and collected in the wild, then sold for profit. "There exists tremendous global pressure on turtles (and most reptiles) as a commodity. This demand exists for North American native species, for example, Eastern Box Turtles (*Terrapene carolina carolina*). North American species are experiencing high levels of illegal collection as a result of this demand" (Midwest Turtle workshop). Adopting wild animals is part of a web of interrelated issues. For example, as development fragments habitat, Box Turtles near urban areas increasingly encounter humans, domestic pets, and automobiles—all of which can lead to direct mortality, impacts to overall health, and removal of reproductive individuals from wild populations (Andrews et al. 2013). This is significant, as loss of adults can cause declines in turtle populations regardless of reproductive rates (Bowen et al. 2004).

4.5. Invasive and Problematic Species and Pathogens

4.5.1. Pathogens



Little Brown Bat with white-nose syndrome / US Fish and Wildlife Service

Novel pathogens are a continuing and growing problem in Tennessee as well as other parts of the US and the world. Emerging infectious diseases pose a growing threat to wildlife, yet appropriate actions to manage outbreaks before, during, and after invasion are only in the beginning stages. Researchers active in this field have proposed definitions for recognizable stages of pathogen invasion and means for control or treatment appropriate to each stage. However, one of the best means of addressing this threat will be prevention at the federal level, through quarantine and trade restrictions on common vectors for the introduction of new pathogens (Langwig et al. 2015).

White-nose syndrome

WNS is a disease that impacts hibernating bats. It is caused by a fungal pathogen, *Pseudogymnoascus destructans*, that was introduced into North America in 2006. The disease is

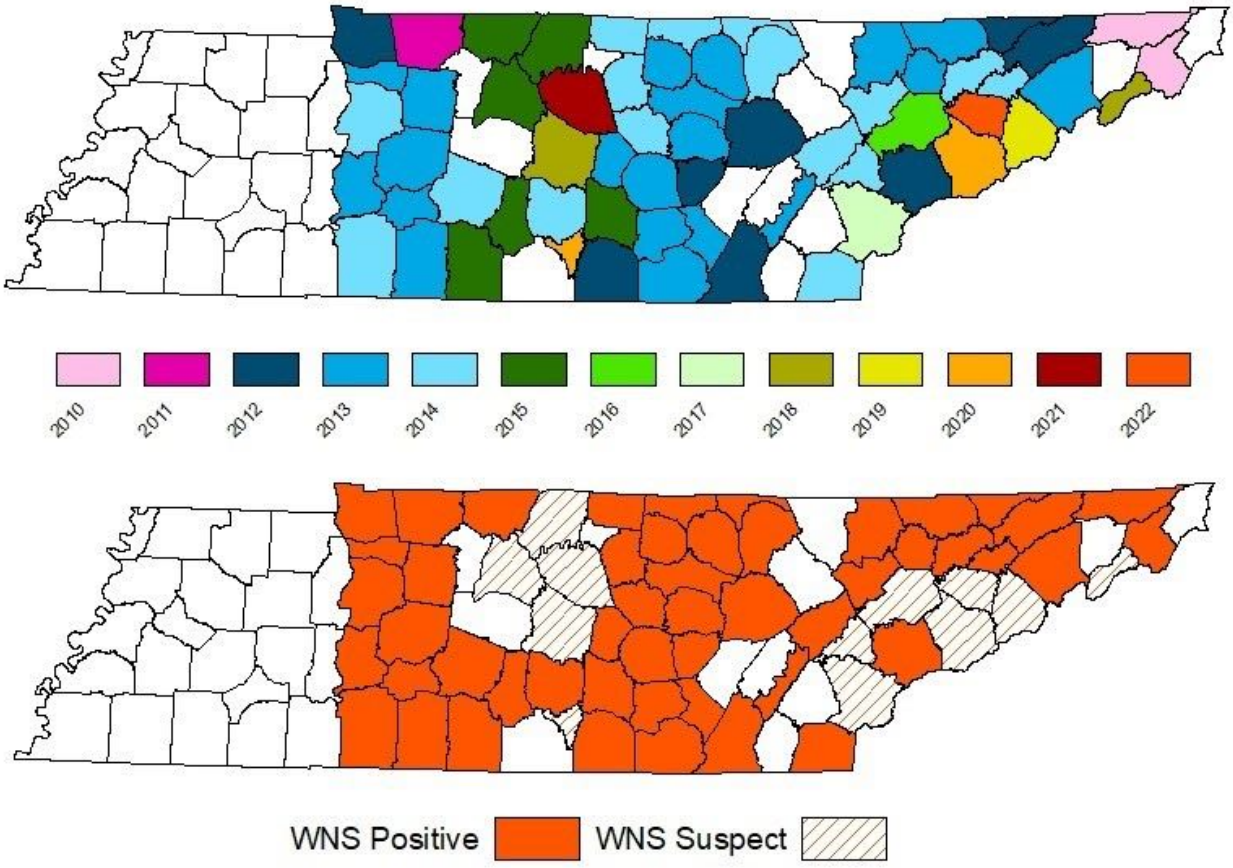


Figure 4.2 Degree of known and suspected white-nose syndrome and spread through Tennessee counties by year. Source: TWRA survey data.

called WNS because it often appears as a white, fuzzy fungal growth on the nose and other unfurred body parts of hibernating bats. WNS causes depletion of fat reserves during hibernation, among other physiological effects, leading to starvation and, in some cases, mortality. WNS and its causal pathogen were not known to science in 2005 when SWAPs were first created. It was first discovered in New York in 2006, and in 2024, it was present in 40 US states and 9 Canadian provinces. WNS illustrates how rapidly a pathogen can devastate wildlife populations (see WNS Highlight).

WNS was discovered in Tennessee in 2010. As of 2024, WNS and/or the pathogen that causes the disease has been documented in 62 of Tennessee's 95 counties (Fig. 4.2). Eighty percent of the counties in Tennessee with caves have been documented as WNS positive or suspect (presence of the pathogen or WNS field signs). Of the 16 bat species that occur in Tennessee, 7 have been confirmed WNS positive and the pathogen has been documented on 5 other species without diagnostic disease (Thames 2025). Population impacts caused by WNS differ among species. Northern long-eared bats have declined by almost 99% due to WNS. Tri-colored bats, Indiana bats, and Little Brown Bat populations have also declined substantially due to the disease (Cheng 2021, Thames 2024). Several potential treatments for WNS have been developed through the national WNS response. However, most of the treatments could disrupt the natural function of fungi and bacteria in natural cave ecosystems, and their use has primarily been confined to man-made structures such as mines.

Chytrid fungus

Another highly publicized pathogen is the chytrid fungus (*Batrachochytrium dendrobatidis*) which threatens over 350 species, but especially frogs, worldwide—including in Tennessee, where it affects the steeply declining Hellbender. Both WNS and chytrid have caused mass mortality events and extinctions or extirpations in multiple species (Langwig et al. 2015).

Ranavirus

Ranaviruses are emerging pathogens of amphibians, reptiles, and fish, which have been associated with die-offs in the Americas, Europe, and Asia. With death rates often 90% or greater during an outbreak, as well as mounting evidence that some ranaviruses can be transmitted among all three of these vertebrate classes, these pathogens pose a substantial risk to Tennessee's biodiversity (Global Ranavirus Consortium 2015).



Several populations of the wild Fire Salamander, Europe's largest, have declined by 90 to 96% due to Bsal. / Frank Lassen

Bsal

Batrachochytrium salamandrivorans (Bsal) is a pathogenic chytrid fungus that was



The gate installed at Carlton Cave in Franklin Co. to protect Tricolored Bats / Dustin Thames, TWRA

WHITE-NOSE SYNDROME: AN ONGOING THREAT

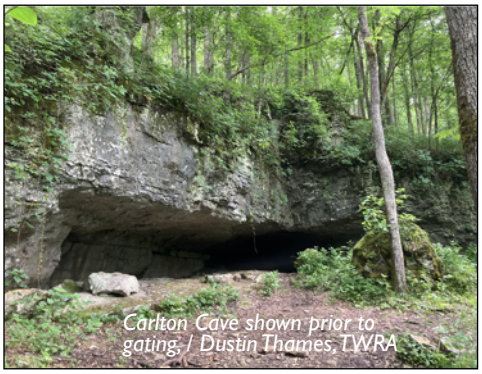
Since its introduction into upstate New York in 2006, white-nose syndrome (WNS) has become the scourge of many North American bat species. The disease is caused by a cold-loving fungus *Pseudogymnascus destructans (Pd)*, which grows best in high humidity environments at 54 to 59 degrees Fahrenheit, common for caves and mines in Tennessee. Hibernating bats become the perfect petrie dish for the fungus.

This pathogen is found across a large part of Europe and Asia (the likely source of introduction), but doesn't appear to cause substantial mortality there. Bats there have likely evolved resistance over thousands of years. The core conundrum is developing solutions to fight a disease that causes high mortality and against which native species have little to no resistance.

The problem is even more complex because bats, like many at-risk species, are impacted by numerous threats such as habitat loss, improper forestry methods, and cave disturbance by humans.

Efforts to protect bat populations in Tennessee have centered on mitigating threats and monitoring bat populations closely to determine how WNS is affecting their numbers. At the same time, multiple lines of research are ongoing to investigate methods for reducing the prevalence and spread of the disease.

TENNESSEE #1 IN BAT WINTER COLONY COUNTS



Carlton Cave shown prior to gating. / Dustin Thames, TWRA

Since WNS was first documented in Tennessee in 2010, the Tennessee Wildlife Resources Agency (TWRA) and partner organizations have conducted ~1,300 bat winter colony counts at over 550 sites, primarily caves, across the state. These surveys are essential to understanding both the scope of WNS, which is now considered endemic, as well as its impact on bat populations.

The silver lining is that organizations are working cooperatively more than ever before to conserve bat populations in Tennessee and across the nation, and some species are showing resilience. Nationally, the US Fish and Wildlife Service and US Geological Survey formed the North American Bat Monitoring Program with the goal of using multiple lines of evidence to understand where, when, and how bat populations change over time. Due to the collaborative efforts of partners, Tennessee ranks as number 1 contributor of bat winter colony count data in the US.

BAT SUPERPOWERS

Bats are often viewed as potential reservoirs of disease that could spread to humans (WNS does not affect people). However, very little is shared about the amazing abilities that bats have to combat infection.

Bats are small, flying mammals whose extremely high metabolism produces high levels of free radicals with the constant potential to damage their own cells. Bat internal systems allow them to repair their cellular material quickly; they can even repair their own DNA! These adaptations also enable them to resist infections, especially viruses.

When WNS spores land on the unfurred skin of a bat's wing, the fungus starts growing directly into the bat's skin cells. The bat's response to infection is to wake from their winter torpor, which allows their amazing powers of recovery to clear the infection. However, if this happens too often, they run out of fat reserves and leave their caves to look for water and food at a time of year when there is no food, and water may be frozen. If bats with WNS can make it through the winter, they will likely survive the infection.

BOILING BOOTS AND CAVE GATES

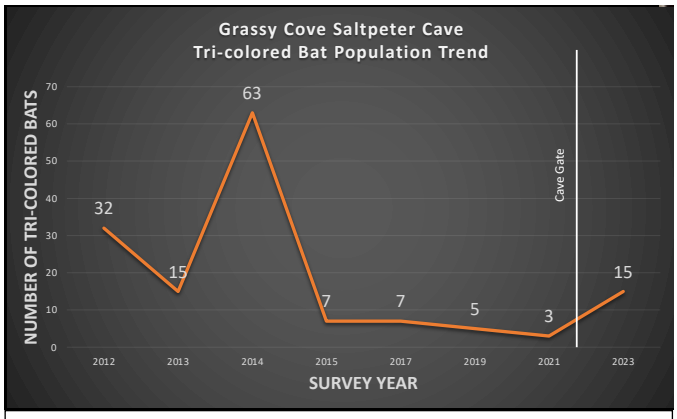
Biologists studying bats follow elaborate decontamination protocols to avoid transferring Pd spores from one cave to another. Upon exiting a cave, they bag up their gear and later use pressure washers and alcohol to decontaminate hard gear, while reserving the age-old cleaning custom of boiling in water for coveralls and boots!

Human cave disturbance threatens bats in two ways: (1) the possible direct contamination of caves with fungal spores and (2) additional disturbance (beyond WNS) that wakes bats in winter. In general, avoiding recreational caving during critical hibernation periods is recommended. All caves on state and federal property are closed to human visitation (with the exception of some permits issued when bats are absent). TWRA and partners encourage private landowners to manage visitation in their caves to limit disturbance to bats.

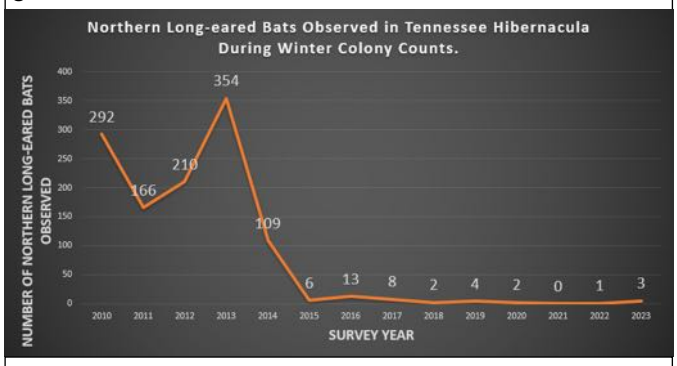
It's no wonder that a primary conservation approach to managing this disease is to install gates on the entrances to caves with significant human disturbance where overwintering bats susceptible to WNS also occur. Gating a single cave can cost from $4000 to $50,000. The data show that cave gating works and is helping to bring back populations of the bats most affected by WNS (see Grassy Cove Saltpeter Cave graph, upper right).

Additional lines of research to address WNS include

- Attempts to cool down caves past the range of preferred temperature for the spores (species like Gray Bats that roost in the cave's coldest areas are far less affected)
- Anti-fungal agents to be sprayed in caves or on bats
- The use of UV light to kill fungal spores in critical cave zones.



Grassy Cove Saltpeter Cave, Cumberland Co., Tricolored Bat population trend, 2012-2023, showing response to cave gate installation.



Northern Long-eared Bats, the species hit hardest by WNS in Tennessee, show an almost 100% decline. The graph shows bats observed in Tennessee hibernacula during winter colony counts 2010-2023.

White-nose Syndrome Conservation Partners

Arnold Air Force Base
The National Park Service
The Nature Conservancy
Tennessee Wildlife Resources Agency
US Fish and Wildlife Service (USFWS)
North American Bat Monitoring Program
Tennessee Bat Working Group
Tennessee Valley Authority

Bat Species affected by WNS	Percent Decline (TN) from 2013 to 2022	Status
Northern Long-eared Bat *(Myotis septentrionalis)*	>99%	Listed federally threatened in 2015 and federally endangered in 2022
Little Brown Bat (*Myotis lucifugus*)	80%	Listed state threatened in 2018, status assessment underway by USFWS
Indiana Bat *(Myotis sodalis)*	85%	Listed endangered since 1967
Tri-colored Bat *(Perimyotis subflavus)*	84%	Proposed federally endangered (2024)

All of these approaches are being tested in human-made mines to avoid unintended impacts to sensitive cave ecosystems. In the meantime, to buy more time for Tennessee's declining bat populations, "There are still so many caves that need gates," says **Dustin Thames, Biodiversity Coordinator** for TWRA. "Current estimates are that we still need dozens to protect our imperiled bats."

Trust, Bat Conservation. n.d. "White-Nose Syndrome in Europe and the UK - White-Nose Syndrome." Bat Conservation Trust. Accessed May 3, 2024. https://www.bats.org.uk/about-bats/threats-to-bats/white-nose-syndrome/white-nose-syndrome-in-europe.
Tennessee Bat Working Group. 2023. White-nose Syndrome in Tennessee. Available from http://www.tnbwg.org/TNBWG_WNS.html

first identified in the Netherlands in 2010 as the causal agent in the extirpations of wild populations of Fire Salamanders (*Salamandra salamandra)* (Martel et al. 2013). Many species of salamanders and newts are susceptible, but certain frogs and toads are also vulnerable (Towe et al. 2021; Gray et al. 2023).

Research suggests that Bsal originated in Asia and was likely spread to Europe via the pet trade. Due to the international trade of amphibians, both legal and illegal, the probability of Bsal introduction into North America is high, despite the regulation of injurious wildlife under the Lacey Act. If Bsal makes it to North America, lab studies and models predict that biodiversity loss is expected to be greatest in the Appalachian Region and along the west coast of the United States. It is believed that Bsal may be actively spread by carriers (e.g., salamanders, anurans) and passively spread by birds and other species, as well as by humans through means such as water, waders, and equipment (AFWA 2024).

Proactive management to prevent introduction of Bsal will be most effective at preventing or mitigating catastrophic declines in native species. As stated by Priya Nanjappa, Amphibian and Reptile Program Manager for the Association of Fish and Wildlife Agencies, "Because the pathogen has not yet been found in North America, we have a rare opportunity to redefine what it means to be proactive by planning ahead of its expected arrival. However, such planning and prevention will require concerted outreach and communication to retail pet stores, pet owners, and outdoor enthusiasts" (AFWA 2024).

Pre-detection strategies to prevent the introduction or spread of Bsal recommended by the Association of Fish and Wildlife Agencies (AFWA 2024) include:

- Establish and implement prevention protocols (such as a biosecurity protocol for work in aquatic habitats)
- Establish surveillance efforts to test for Bsal in the field and in captivity
- Engage in proactive management, which includes the above as well as area closures, habitat management, and education
- Establish a rapid response and management plan (to include notification contacts, response funding, habitat management recommendations, etc)

(AFWA 2024).



Progression of snake fungal disease in a Gray Rat Snake (*Pantherophis spiloides*) over the course of 18 days / Sam Robinson

Snake fungal disease

Another prime example of an emerging pathogen threat is snake fungal disease, an infection that has afflicted populations of snakes, primarily venomous species, from the

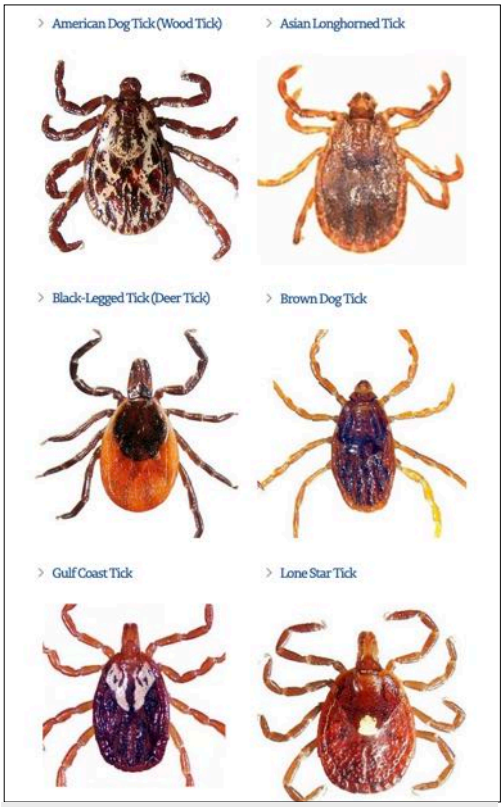
northeast through the Midwest, and the South, including Tennessee. This disease appears to be triggered by the fungus *Ophidiomyces ophiodiicola*, which is relatively new to science. It is not currently known whether this fungus has always been present in the environment, if it was introduced, or if perhaps it has recently mutated, allowing it to cause more severe disease (NEPARC 2013). Researchers at University of Tennessee at Knoxville, Cumberland University, Tennessee State University, Middle Tennessee State University and TWRA have been working to document the spread of fungal infection in Timber Rattlesnakes and other reptile species.

Recent research conducted by MTSU has observed a higher pathogen load in areas predicted to be suitable habitat for this pathogen. However, habitat suitability had no clear effect on dysbiosis (the imbalance in the skin microbiome that causes problems for snakes), suggesting that dysbiosis is a multifaceted process influenced by factors beyond presence of the pathogen (Donald M. Walker, Pers. Comm. June 20, 2024).

West Nile Virus

West Nile Virus (*Orthoflavivirus nilense*) is primarily a disease of birds that affects the central nervous system and is transmitted by the bite of mosquitoes carrying the virus. Humans and other mammals can become infected, but they are considered dead-end hosts. People cannot generally spread the disease to each other. West Nile Virus has been found in more than 250 species of birds (as well as many wild mammals), but crows, jays, and ravens are most susceptible to the disease. West Nile virus is maintained in the environment through interactions between mosquitoes and birds. Birds with West Nile Virus often show neurological signs, including loss of coordination, head tilt, tremors, weakness, and lethargy. Most infected crows and jays will die within 3 weeks (Commonwealth of PA 2024).

When infected, most people do not usually show symptoms. However, it can cause febrile illness or neurologic disease, including meningitis or encephalitis. There is currently no treatment for West Nile (CDC 2024a). By sharing information, US and state agencies have been able to provide guidance on the disease and lessen its spread.



The six most commonly encountered species of tick in Tennessee, all of which can transmit pathogens to animals, and some of them also pose a health threat to people. / Tennessee Wildlife Resources Agency

Ticks

Ticks were the first arthropods to be established as vectors of pathogens, and currently they are recognized, along with mosquitoes, as the main arthropod vectors of disease agents to humans and domestic animals globally. Tick-borne diseases are common occurrences in both medical and veterinary clinical settings (Dantas-Torres et al. 2012), and their incidence is increasing worldwide. Notorious for transmission of Lyme

disease in the US, there are at least 898 recognized species of tick globally, which can transmit a wide array of diseases. Many tick-borne diseases are important zoonotic diseases, including anaplasmosis, babesiosis, ehrlichiosis, and Lyme borreliosis.

Another human illness caused by exposure to ticks is alpha galactose allergy, aka "alpha gal," a condition that, unfortunately, is becoming common in Middle Tennessee. The linkage between wildlife health and ticks is reciprocal, as healthy wildlife populations, such as snakes, help control rodent populations and associated tick populations (Beck 2016).

In addition to the constraints related to their diagnosis and clinical management, the control and prevention of these diseases is often difficult because it requires the disruption of a complex transmission chain involving vertebrate hosts (often wildlife species) and ticks. The principle of the One Health approach (see Appendix J) for the management of tick-borne diseases is to increase the level of communication between physicians and veterinarians dealing with patients with a past or present history of tick bites, particularly those with unexplained febrile illness in areas where such diseases are endemic. (Dantas-Torres et al. 2012).

Introduced tick species—such as the Asian Long-horned Tick, which has been in east Tennessee since 2019, add another layer of complexity to this picture. What will be the impacts of this new species, both in terms of serving as possible vectors of disease and their effects within native ecosystems?

4.5.2. Toxicants

Toxicants are toxic substances that are not produced by a living organism (e.g., toxins). Examples include lead, mercury, pesticides, and industrial chemicals.

Neonics threaten about 11% of the entire US endangered species list, including many pollinators and birds.

Neonicotinoids

Neonicotinoids (neonics), a class of relatively highly selective insecticides, have swept one-fourth of the global market since the launch of imidacloprid (IMI) in 1991 (Zhang and Lu 2022).

Neonics pose widespread problems to species and habitats for several reasons:

- They are extraordinarily toxic.
- They are extremely widespread in use.
- They contaminate the environment far beyond where they are applied (e.g., leach into water, contaminate non-target organisms).
- They are transmissible through the environment and highly persistent.

Unlike contact pesticides, which merely stay on the plant surface, neonics are systemic and can be absorbed throughout the plant (Simon-Delso et al. 2015). They can be released to the air along with pollen, diffuse into soil and water, or persistently exist in crops. Neonics have high water

solubility (Zhang and Lu 2022), and one study in Arkansas, Mississippi, and Tennessee detected neonicotinoid insecticides in 23 per cent of wildflower samples around recently planted fields of corn, cotton, and soybean (Stewart et al. 2014). Epidemiological studies are scarce but have linked neonics exposure to oxidative stress, neurological symptoms, metabolic changes, osteoporosis, and liver cancer in humans (Zhang and Lu 2022).

While there is a need to further clarify the effects of neonics on human populations, the science is much clearer with respect to birds and pollinators: An increase in neonicotinoid use led to statistically significant reductions in bird biodiversity between 2008 and 2014, particularly for grassland and insectivorous birds (of Li et al. 2020). In 2023, an EPA assessment predicted profound impacts on over 200 threatened and endangered species, many of which are pollinators, from the three most used neonicotinoid insecticides. Neonics threaten about 11% of the entire US endangered species list—including pollinators like the Rusty-patched Bumblebee, Hine's Emerald Dragonfly, and Karner Blue Butterfly (EPA 2023b). As the most widely used insecticides worldwide, twenty years of research now identify neonics not only as a leading driver of mass pollinator losses, but also connect their use to similar bird declines, collapsing aquatic ecosystems, and significant risks to human health (Pisa et al. 2021).



Bee on echinacea / Ryan Hagerty, USFWS

While large-scale epidemiological studies may yet be needed to elucidate human health outcomes associated with neonics exposure, indirect species and ecosystem impacts are considered significant enough to monitor, regulate, limit, and/or prohibit the use of these chemicals. Since 2018, the European Union (EU) has prohibited all outdoor use of IMI, thiacloprid (THI), and clothianidin (CLO) with a few exceptions, mainly due to their risks to non-target organisms, especially pollinators.

Most countries, including the US, have not restricted their use—yet. However, in late 2023, New York became the first US state to prohibit the use of neonicotinoids on outdoor ornamental plants and turf, as well as the seeds of corn, soybeans, and wheat. (NY State Senate Bill 2023-S1856A [date unknown]).

PFAS (Per- and polyfluoroalkyl chemicals)

Per- and polyfluoroalkyl substances, known as PFAS, are a group of thousands of man-made chemicals that have been manufactured for a variety of consumer and industrial uses in the US since the 1940s. PFAS are widely used, long-lasting or "forever" chemicals, components of which

break down very slowly over time. PFAS are a concern for humans, wildlife, and natural systems due to the following:

- PFAS contamination can migrate to groundwater and surface water, potentially impacting drinking water sources.
- Because of their widespread use and persistence in the environment, many PFAS are found in the blood of people and animals all over the world and are present at variable levels in a variety of food products and in the environment.
- Unsafe storage, improper disposal, inadequate containment, and illegal discharges have resulted in contamination of soil, water, and air in some locations.
- Scientific studies have shown that exposure to some PFAS in the environment may be linked to harmful health effects in humans and animals (TDEC [date unknown] PFAS, EPA 2021), including certain cancers, thyroid dysfunction, changes in cholesterol, and small reductions in birth weight (National Academies of Sciences, Engineering, and Medicine 2022).
- PFAS compounds can securely bind to soil particles and can even be taken up by plant roots and stored in varying concentrations throughout plant tissues (Xu et al. 2022).

In 2024, two reports from the Sierra Club reported that 60 percent of rivers in Northeastern Tennessee contain PFAS and that record levels of PFAS were found in Northeast Tennessee sewage sludge used as crop fertilizer (Pauling 2024).

4.5.3. Invasive Species

Invasive species, both plants and animals, pose a significant management challenge across the state, requiring substantial financial and labor resources to manage and control them effectively. Invasive plants alter the composition, structure, and function of native ecosystems, while invasive animals can directly destroy habitat and reduce species populations through predation, competition, or extirpation via hybridization (Harrington et al. 2020). Both intensive and extensive management actions are often necessary to prevent invasive species from causing undesirable ecosystem alterations and the removal of native species. These management strategies may involve direct physical removal, chemical treatments, biological control, and habitat restoration, depending on the specific invasive species and the severity of the infestation.



Bigclaw Crayfish / Zack Graham

Most invasive species are introduced non-native exotic species that have been unintentionally or intentionally translocated. Though not all invasive species come from outside of the state, some are native species that have been released into areas or drainages where they are not native, which causes the collapse of local species assemblages and alterations to the local environment (e.g., Big Claw Crayfish, *Faxonius placidus* introduced into the Obed and Emory River drainages.

Invasive and exotic plants

According to a survey and research conducted in Tennessee, invasive plants cost the state of Tennessee at least $2.6 million annually. (Pfennigwerth and Kuebbing 2012) .This figure only includes direct costs of control, mapping, and outreach. It does not include indirect costs associated with:

- Decreased agricultural yields
- Lower property values
- Diminished recreational opportunity
- Decreased diversity and wildlife habitat.

The **Tennessee Invasive Plant Council** lists **64 species of plant**s (TN-IPC [date unknown]) that are either established or emerging threats in Tennessee's natural areas, and the list is even longer for invasives in disturbed habitats. The following examples illustrate some of the current threats they pose:

Chinese lespedeza (*Lespedeza cuneata*) and **shrub lespedeza** (*Lespedeza bicolor)* are particularly challenging to manage when using prescribed fire as a management tool, as they are tolerant of fire and may even respond positively. These introduced species replace native vegetation, alter wildlife habitats, reduce biodiversity, and can limit restoration options because they can prevent grass growth and impede tree establishment (USFS [date unknown] Fire effects…).



Spines of the invasive Callery Pear / Nancy Loewenstein

Japanese stiltgrass (*Microstegium vimineum*) and **Chinese privet** (*Ligustrum sinense*) are both insidious invasive species problems. Once established, they can be resource intensive to remove or control.

Tree-of-heaven (*Ailanthus altissima*), kudzu (*Pueraria montana*), and **multiflora rose** (Rosa multiflora) are also species categorized as severe threats due to their ability to spread rapidly into native plant communities and displace native vegetation. Of growing concern is the invasion of natural habitats, particularly in Middle Tennessee, by **Callery pear** (*Pyrus calleryana).* Although the cultivated variety, the Bradford pear—which for decades was incorrectly advertised as sterile, despite producing viable seeds—has since been dispersed and distributed by birds and other

wildlife, the offspring revert to the species' characteristics of aggressive growth and production of thorny spurs, further exacerbating the spread of this invasive species.

Autumn olive (*Elaeagnus umbellata)* has been actively promoted by state and federal agencies for shelter belts, erosion control, strip mine reclamation, wildlife habitat, and was widely marketed as an ornamental. The shrub has now become naturalized in suitable habitats scattered throughout the eastern and midwestern US. It is adaptive, competitive, and vigorous, especially on open, sunny sites, and it produces abundant fruit crops, which are spread by birds and small mammals (TN-IPC 2025).

TDEC is responsible for protecting and maintaining native plant species while also managing exotic invasive plant species in all state waters. In addition, the Tennessee Valley Authority (TVA) and the US Army Corps of Engineers (USACE) conduct aquatic plant management actions when aquatic invasive plant species impact navigation, flood control, or hydroelectric power generation. These agencies coordinate their efforts to mitigate the ecological and economic impacts of invasive aquatic plants. (Tennessee Aquatic Nuisance Species Task Force 2008).

Invasive species are otherwise controlled by federal, state, and municipal land management agencies, as well as private landowners, throughout the state. However, the inability of non-botanically trained individuals to identify, notice, or recognize invasive plants contributes to a lack of awareness and, therefore, a lack of prevention concerning invasive plants in cities and suburbs.

Invasive and exotic insects

Several invasive insect pests threaten Tennessee forests annually. These include the following, all of which are introduced except for pine beetles:

- Hemlock Woolly Adelgid
- Emerald Ash Borer
- Southern Pine Beetle
- European Spongy Moth (formerly Gypsy Moth)
- Spotted Lanternfly

The ***Hemlock Woolly Adelgid*** (*Adelges tsugae*) exemplifies the issues surrounding invasive insects. Hemlocks (*Tsuga* spp.) are slow-growing, long-lived evergreens critical to the ecosystems in which they occur because they provide dense shade that helps to keep forest streams cool throughout the hot summer months. Since 2002, the Hemlock Woolly Adelgid has been causing hemlock mortality across the state, killing trees that are hundreds of years old in as little as three years. The Hemlock Woolly Adelgid has caused extensive hemlock mortality in the Great Smoky Mountains National Park and the Cherokee National Forest. As of 2022, essentially all counties in Tennessee with native hemlocks have these infestations (TN Division of Forestry) (see Figs. 4.3 and 4.4).

While effective chemical treatments for these pests are available to individual landowners, they are cost-prohibitive and impractical to address the problem on a landscape scale. Researchers and natural resource managers are working to find an effective combination of chemical and biological

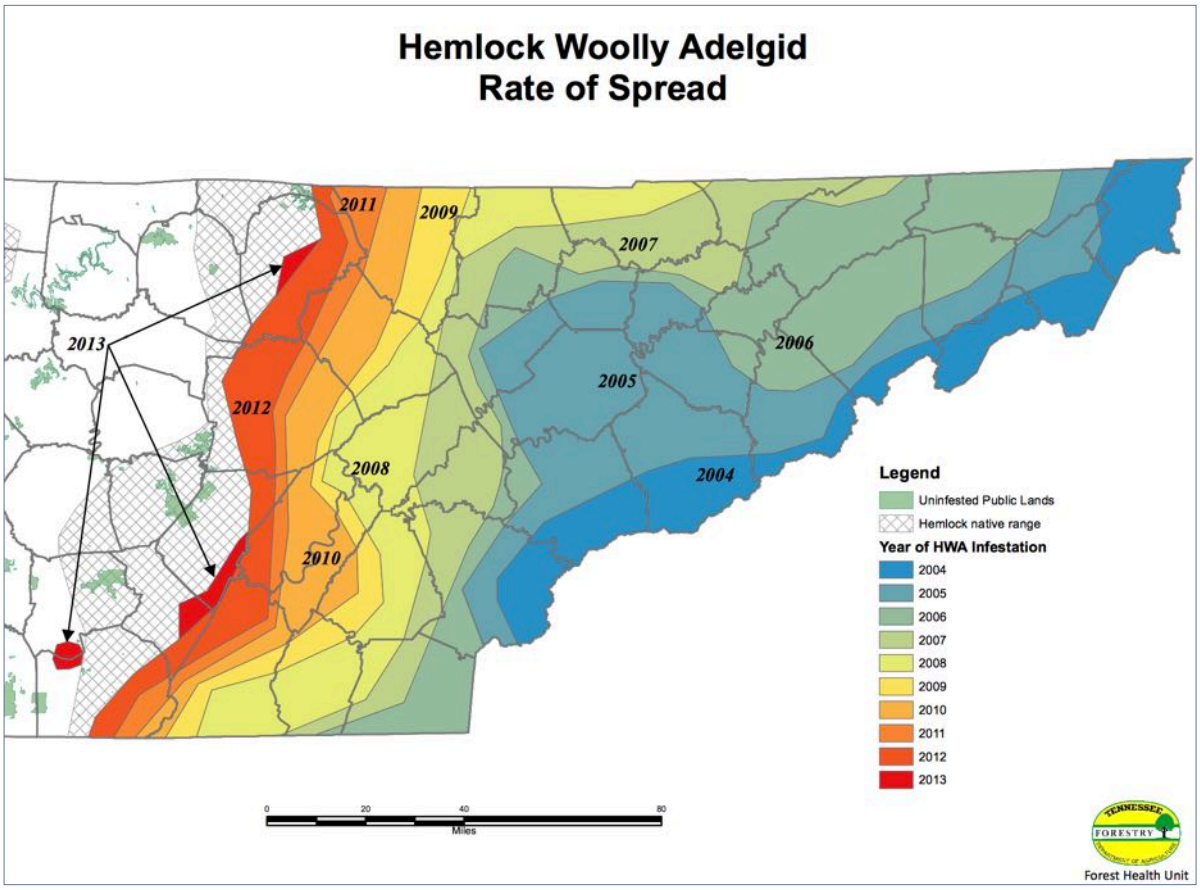


Figure 4.3 Hemlock Wooly Adelgid rate of spread

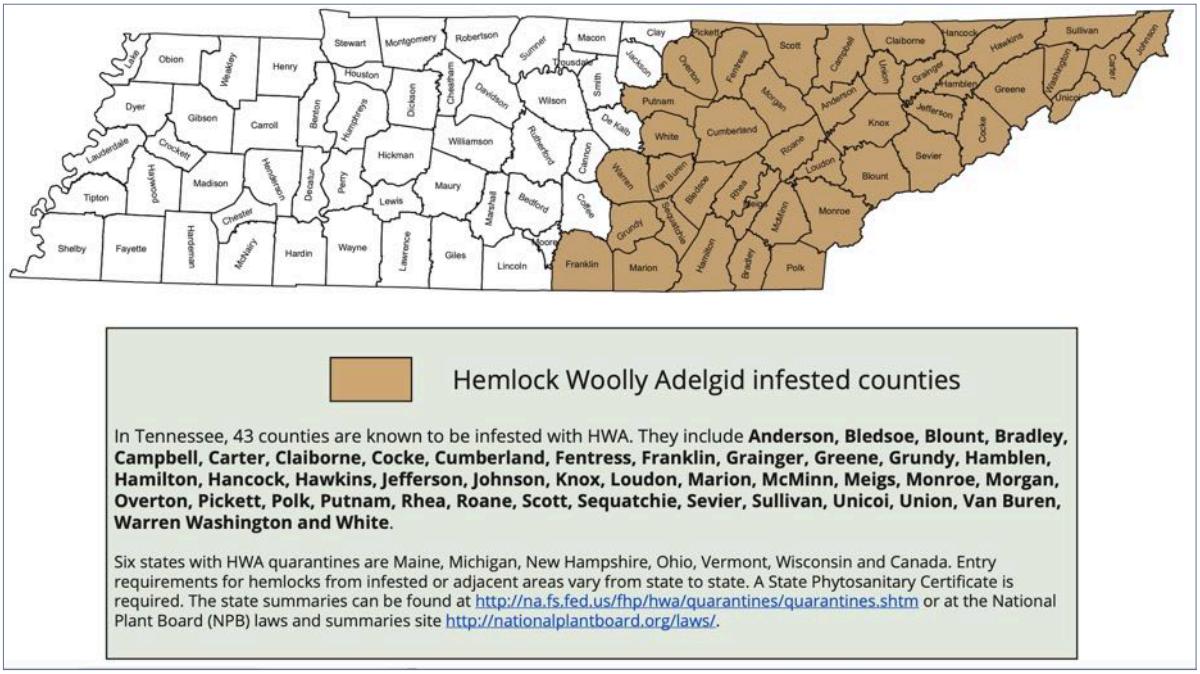
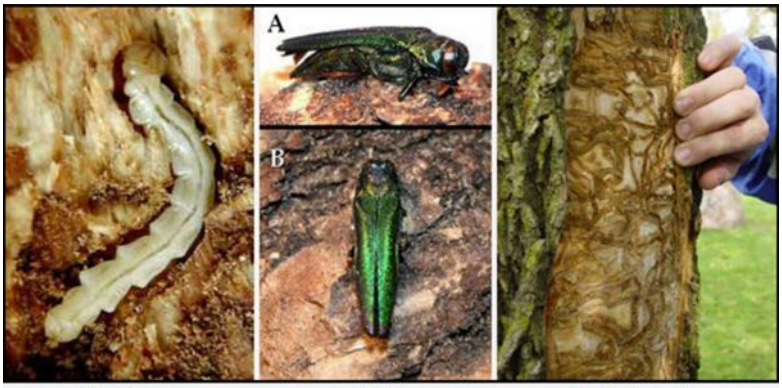


Figure 4.4 Tennessee Counties infested with Hemlock Wooly Adelgid, 2017

controls that can help protect some hemlock populations or slow down infestations (Wisby and Palmer 2015).



Emerald Ash Borer / Nebraska Dept. of Agriculture

The Emerald Ash Borer (*Agrilus planipennis*) is another example of a relatively recent insect pest that has affected Tennessee's forests. Originally from Asia, it was first discovered in Michigan in 2002. It has since caused widespread tree mortality and decline in ash (*Fraxinus* spp.) trees in 35 states, including Tennessee. The Emerald Ash Borer is transported mainly by humans through infected nursery stock, firewood, unprocessed saw logs, and other ash products. While this beetle has been a quarantined pest since its initial detection in the US, both the state and federal quarantines were lifted in 2021 following federal deregulation of this pest.

The Emerald Ash Borer was identified in Tennessee at a truck stop on I-40 in Knox County in July 2010. Since that introduction, 66 counties have confirmed the presence of EAB as it has spread across Tennessee (see Fig. 4.5). Ash trees are often planted along residential streets and in parks, and are also common in forests throughout many areas of Tennessee. Because of this, the Emerald



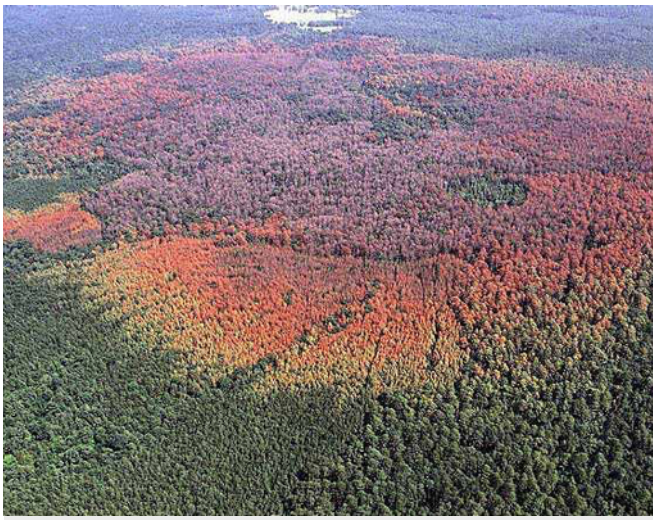
Figure 4.5 EAB county detection map 2023

Ash Borer has caused significant economic costs in both these residential and forested areas since its discovery in 2010 (Protect TN Forests [date unknown])

European Spongy Moth (formerly Gypsy Moth) (*Lymantria dispar dispar*) is a nonnative moth that has defoliated over 95 million acres of hardwood forests throughout the northeastern United States over the course of the past century. It is native to Europe and northern Africa but was brought to Massachusetts in 1869. Since then, it has spread southward through the northeastern states into southwestern Virginia and eastern Tennessee.

In 2015, at the time of the last SWAP, there were no established Spongy Moth populations in Tennessee. However, by 2022, Spongy Moth populations had surged in East Tennessee. Surveys conducted in 2022 detected significant moth presence in the region. In spring 2023, the Tennessee Department of Agriculture and USDA Forest Service began application of spongy moth mating pheromone in eastern Tennessee. The goal is to disrupt the moth's mating practices to halt population growth. "This insect pest is one of the greatest threats to Tennessee's forests," State Forester David Arnold said. "High populations of this moth can result in widespread tree defoliation and over consecutive years, that can lead to tree decline. This treatment will protect the forest by reducing the population of this invasive pest" (TDA 2023). The lack of established populations in more of Tennessee has been primarily due to the success of the extensive preventive trapping and treatments that have been conducted over the past 50 years.

The ***Southern Pine Beetle*** (*Dendroctonus frontalis*) is one of the most widespread and destructive insect pests of pine. Loblolly pine (*Pinus taeda*), shortleaf pine (*Pinus echinata*), pitch pine (*Pinus rigida*), pond pine (*Pinus serotina*), and Virginia pine (*Pinus virginiana*) are the favored host species, although other pine tree species may be susceptible during outbreaks. The Southern Pine Beetle population gradually built to outbreak levels in 1998 and killed approximately 350,000 acres and $358 million of pine tree stock in the succeeding years. These die-offs drove pine prices down as markets were flooded with salvaged pine sawtimber and pulpwood (ProtectTNForests.org [date unknown]). While this pest is native to North America, its periodic outbreaks have caused significant economic losses in Tennessee and many other states in the southern and eastern US.



Southern Pine Beetle forest damage / Ronald F. Billings, Texas A&M Forest Service, Bugwood.org

The ***Spotted Lanternfly*** (*Lycorma delicatula*) is an invasive plant hopper native to China, India, Japan, South Korea, and Vietnam and was first detected in the United States in Pennsylvania in September 2014. Since the initial detection, this pest has spread to 14 states, with recent detections in southwest Virginia and western North Carolina, and as of 2024, in Davidson and Wilson Counties in Tennessee.

This pest is primarily known to attack its preferred host, Tree of Heaven (*Ailanthus altissima*), itself an invasive exotic species--although well over 70 species of plants can be impacted. Some of these other host plants include apples, grapes, and hops, and a variety of other fruit and ornamental trees, shrubs, and vines. This insect also feeds on maple, walnut, and poplar.

Spotted Lanternflies are invasive and can spread rapidly when introduced to new areas. While the insect can fly short distances, its long-distance spread is facilitated by people who move infested



Spotted Lanternflies from left to right: Nymphs, fourth instar / Stephen Ausmus, USDA-ARS; Adult Lanternflies / Lance Cheung, USDA; Newly laid egg mass with an adult nearby / Lance Cheung, USDA

material or items containing egg masses. Given its current limited distribution, Tennessee's focus is on monitoring and surveying for Spotted Lanternfly so that managers can respond to any new detections in the state.

Invasive and exotic animals

Exotic animals pose similar problems to invasive plants and insects, and in addition they can directly impact native animal populations through competition, predation, and displacement from their habitat. The following are examples of current threats posed by exotic animals.

Invasive crayfish pose a significant ecological threat in many areas of the state, as highlighted in the Tennessee Aquatic Nuisance Species (ANS) Management Plan (TANSTF 2008). Competition from both translocated native crayfish, often introduced to new drainages through bait bucket releases, and nonnative crayfish species can displace or contribute to the decline of native populations, reducing overall biodiversity. For example, the invasive Kentucky River Crayfish (*Faxonius juvenilis*), Rusty Crayfish (*Faxonius rusticus*), and Virile Crayfish (*Faxonius virilis*) are all known for aggressive behavior and ability to outcompete native species. The Surgeon Crayfish (*Faxonius forceps*) has been outcompeted and extirpated from such a large area of its total range it was elevated to Threatened status on the Tennessee State Threatened and Endangered list.

Asiatic Carp species (*Hypophthalmichthys* and *Ctenopharyngodon* spp.), also noted in Tennessee's ANS Plan, are a problem for big river SGCN. Invasive nonnative populations escaped from aquaculture facilities or were in shipments of stocked grass carp. Silver carp (*H. molitrix*) compete for food with native plankton-eating species including Paddlefish (*Polyodon spathula*), Bigmouth Buffalo *(Ictiobus cyprinellus*), Gizzard Shad (*Dorosoma cepedianum*), the larval fishes of many species, and freshwater mussels. The noise of boat motors cause Silver Carp to leap out of the water, creating the potential for human injury or fatality. Commercial fishermen have abandoned fishing sites on the Missouri River due to the high numbers of invasive carp in their nets (TANSTF 2008).

Alabama Bass (*Micropterus henshalli)* introductions have the potential to significantly disrupt native black bass (*Micropterus spp.*) populations. In areas where they have been illegally introduced, Alabama Bass have also hybridized with Smallmouth Bass (*Micropterus dolomieu*) and

drastically reduced some populations, leading to the possible extirpation of native Smallmouth Bass fisheries of great cultural and economic importance. Alabama Bass are nearly identical in appearance to Tennessee's native Spotted Bass. Physical characteristics are often indistinguishable between these species and can require genetic analysis to properly identify. In instances of hybridization with Smallmouth Bass, visual identification can be nearly impossible, creating issues for anglers and law enforcement when following or enforcing regulations, respectively. Recent introductions in North Carolina and Georgia have altered bass populations and significantly reduced their numbers through competition and hybridization. In the case of Georgia's Chatuge and Blue Ridge lakes, the introduction of Alabama Bass has decimated the local Smallmouth Bass fishery. Likewise, North Carolina's Lake Norman has seen dramatic declines in Largemouth Bass (*Micropterus nigricans*) populations. In Tennessee, reservoirs on much of the Tennessee River system have been impacted, including resources such as Ft. Loudon, Watts Bar, Chickamauga, Nickajack, and Pickwick. Further introduction of Alabama Bass to Tennessee's premier Smallmouth Bass fisheries, such as Dale Hollow, could be devastating. Tennessee has initiated efforts to evaluate baseline genetics of Black Bass and will continue to monitor the impact of Alabama Bass introductions and work to educate anglers about the negative impacts of illegal fish stockings. Additionally, Tennessee has had to make changes to Black Bass regulations as a result of the introduction of Alabama Bass.



Alabama Bass (*Micropterus henshalli)* / TWRA

Mosquitofish (*Gambusia* spp.) are widely introduced as mosquito control agents. According to the Tennessee ANS Plan, critical reviews of the literature do not support the view that they are very effective in reducing either mosquito populations or mosquito-borne diseases. Depending on what they choose to eat, Mosquitofish introductions can lead to algal blooms or even cause an increase in mosquitoes (USFWS 2016). Mosquitofish are extremely aggressive and can affect native fishes through direct competition and often attack, kill, or eat other fishes. In Tennessee, they pose a threat to imperiled Barren's Topminnow (*Fundulus julisia*) causing the extirpation of multiple populations and threatening others in the few remaining sites where this species occurs (TANSTF 2008).

Feral Swine (*Sus scrofa*), also known as feral hogs, were introduced to North America by European settlers and are hunted in the US; however, they also have extremely destructive impacts on the habitats of native wildlife and agriculture. They cause extensive damage to agriculture, wildlife habitat, and plant populations; contribute to erosion and water pollution; and carry diseases harmful to livestock and other animals as well as humans. (They can carry at least 30 diseases,

including Brucellosis, and nearly 40 types of parasites, such as toxoplasmosis and trichinosis, which may affect people, pets, livestock, and wildlife. (USDA APHIS 2024a).

Swine brucellosis is an infectious disease caused by the bacteria *Brucella suis* (*B. suis*). It was eliminated from commercially raised swine in the US in 2011, but pigs are still at risk of contracting the disease from feral hogs (USDA 2024b) In some areas, feral swine have been the cause of elevated waterborne bacteria levels in streams and irrigation canals, which is another risk for human health (USDA APHIS 2024a). Feral swine are prolific reproducers and do massive damage to the land through feeding and wallowing. They are also omnivorous and will eat just about anything they can find. Feral swine depredation can cause turkeys, ground-nesting birds, amphibians, and reptiles to suffer population decreases (Cox 2014). Feral swine also root up acres of land, including native plant populations, which requires significant time and money to repair. The damage that feral swine cause has become more common as they have spread from approximately 15 Tennessee counties in 1982 (TWRA unpublished data) to 89 counties in 2013 (Jerrolds & Derroch 2014). Nationwide, they range has increased from 17 to 39 states in the US in the last 30 years (Bevins and Franklin 2014). (Ch. 6 and Appendix J both discuss control of Feral Swine).



Feral Swine rooting in a stream / USDA APHIS WS Ohio

Double-crested Cormorants *(Phalacrocorax auritus)* in Tennessee illustrate that, in some circumstances, even native species can become invasive and cause damage to other wildlife species or conflict with humans. To learn more, see the Managing Populations That are Too Large Highlight.

4.6. Pollution

4.6.1. Air Pollution

Acid Rain

Acid precipitation is caused by air pollution, primarily nitrogen oxides and sulfur dioxide from the burning of fossil fuels for electricity production and, to a lesser degree, nitrogen oxides in automobile exhaust. These chemicals react in the atmosphere to form nitric and sulfuric acids, which fall to earth as both wet and dry deposition (EPA 2024a).

MANAGING POPULATIONS THAT ARE "TOO LARGE"

The **Double-crested Cormorant** (*Phalacrocorax auritus*) is one of nine colonial nesting waterbird species that breeds in Tennessee. Colonial nesters tend to nest together, often with other similar species, in colonies called rookeries.

The Double-crested Cormorant (DCCO) is also a species whose populations in the state and across the country have exploded over recent decades, for reasons uncertain. The bird has expanded its breeding range in Tennessee from a few nests in two counties in the 1980s to over 3700 nests at 25 sites across the state in 2018.

The cormorant is a diving bird that fishes for a living, and as such it is considered far too successful by some. "Conflicts are wide-ranging but are most often associated with the need to reduce predation-related losses of wild or stocked fisheries (both private and commercial) and stocks at aquaculture facilities and hatcheries" (USFWS 2022).

In 2016, a US District Court vacated two depredation orders issued by the US Fish and Wildlife Service (USFWS) to control DCCO populations (through lethal means) until a more thorough environmental assessment (EA) could be prepared, which would take a "hard look" at the effects of the orders on cormorants and fish as well as examine other potential management alternatives (USDOI 2018).



Black-crowned Night Heron, an SGCN believed to be suffering from competition with Double-crested Cormorants in Tennessee / j van cise photos

"TAKE" - HOW MUCH IS TOO MUCH?

In 2021, after developing a new Environmental Assessment (EA) of its DCCO depredation orders, the US Fish and Wildlife Service stated, "To meet obligations under the Migratory Bird Treaty Act, all Service actions must be compatible with the conservation of migratory species. Therefore, to allow *this level of take*, the Service must ensure the cormorant population data are sufficient to assess the cormorant populations in the future" (USFWS n.d.).



Two Great Blue Herons / David Hanni, TWRA

"This level of take" refers to the new maximum allowable take levels developed by the USFWS in the new EA. The continental (US and Canada) DCCO population in 2020 was estimated at from 870,000 to >1 million birds. Under the final rule that establishes the new permit, the maximum allowable take of cormorants totals 121,504 cormorants per year within the lower 48 states. The new depredation order is dependent on good monitoring data so that all concerned will understand the impacts to cormorants and other species.

The new EA allows take for reasons related to health, human safety, and aquaculture. To accomplish the monitoring required, a "cross-flyway" monitoring team was established to coordinate information among all four continental flyways. Prior to this, coordinated monitoring with shared objectives and standardized methods (allowing comparison of data across states and flyways) did not exist.

The cross-flyway team recommended next steps for the years 2022 - 2026. The rigorous collection of data is meant to accomplish three goals:

- Adequately assess cormorant abundance and ensure the populations remain at sustainable levels;

- Test the model used for developing the "maximum allowable take";
- Ensure that the regulation of take allows maximum flexibility to manage cormorants when needed.

David Hanni, Tennessee's Bird Conservation Coordinator said TWRA opted to begin its monitoring program with a census of all colonial waterbird sites. For this work, **Maddy Buckner** was hired as a seasonal **Colonial Waterbird Coordinator**, and in 2024 she conducted >170 surveys. The Tennessee DCCO population seems to be leveling off or decreasing. TWRA's 2024 effort, part of a nationwide survey, counted approximately 3400 nests in Tennessee. Final national, regional, and state-specific surveys were reported in September 2025, and USFWS decisions on annual allowable take will follow. These reported numbers will be used for future management decisions related to DCCO.



Double-crested Cormorants on the nest / David Hanni, TWRA

Double-crested Cormorant/Colonial Nesting Survey Partners

DCCO Cross-Flyway Monitoring Teams
Tennessee Wildlife Resources Agency
US Fish and Wildlife Service

WHAT DCCO HAVE IN COMMON WITH PEOPLE

Double-crested Cormorant numbers in Tennessee have grown, and in some cases are impacting other Species of Greatest Conservation Need (SGCN). Hanni is concerned that cormorant fecal matter in rookeries can be so great (creating a "whitewash" effect on vegetation) that it kills the shrubby layer or all the vegetation beneath their nesting trees. "This may be affecting Black-crowned Night Herons, which nest in the shrubby layer and have been declining in recent years. For example, their nest sites on Little Elder Island have been almost completely destroyed. While these birds occupy different habitat niches, they nest in the same places."



Nesting Double-crested Cormorant and Great Blue Heron sharing rookery habitat / David Hanni, TWRA

Threats to human safety also arise after rookery vegetation dies. Since colonies are concentrated on islands or peninsulas (for protection from predators), they are often near areas of heavy boat recreation use. Wave action from boats erodes the islands that have lost vegetation, and as the island subsides, the barely submerged vegetation poses a navigational risk to boaters. Hatchery trout pit tags recovered from beneath a cormorant rookery also seem to indicate heavy cormorant predation of these fish.

No one really knows why DCCO numbers have taken off in Tennessee. Questions that Hanni would like to answer include, did the birds stop migrating further north to nest, and if so why? Is habitat to the north saturated? What are the juveniles doing? What is their foraging range? Has their diet changed? Hanni believes that "take is not going to solve the problem, it will be more habitat manipulation and controlling productivity [such as oiling eggs or destroying nests]. The overarching issue is how can we all live together?" So many of the issues that affect birds come from human use of the landscape (habitat loss, window strikes, cat predation, hatcheries). "As our use of the landscape changes and species' use changes to take advantage of that, we usually focus on species, not our own impacts and behavior."

The reality is Double-crested Cormorant numbers are taking off and causing huge problems for other species—kind of like people.

USFWS. 2022c. US Fish and Wildlife Service Final Report: Recommendations for Implementing a Monitoring Strategy for Double-crested Cormorant Subpopulations in the United States.

USFWS. ("Expanding Management of Conflicts Associated with Double-crested Cormorants | US Fish & Wildlife Service," n.d.) https://www.fws.gov/regulations/cormorant/populations

USDOI. 2018. ("Cormorant Mismanagement | US Department of the Interior" 2018) https://www.doi.gov/ocl/cormorant-mismanagement

Decades of research have made it clear that acid rain causes slower growth, injury, or death of forests by:

- damaging leaves
- limiting the nutrients available to plants
- exposing plants to toxic substances that are slowly released from the soil.

(EPA 2024a, USFS 2013)

Acid rain has contributed to forest and soil degradation in many areas of the eastern US, particularly high elevation forests of the Appalachian Mountains that include areas such as the Great Smoky Mountains National Park (EPA 2024a). Acid rain, coupled with other problems such as invasive exotic species, pathogens, and climate change, has decimated Tennessee's high elevation spruce-fir forest. These forests provide important habitat for several rare and endangered species, such as the Spruce-fir Moss Spider (Gunnarsson and Johnson 1989, TWRA 2005).



Southern Appalachian Brook Trout range / National Park Service

The effects of acid deposition in aquatic systems are no less severe. It causes a cascade of effects that harm or kill individual fish, reduce populations, extirpate fish species from a waterbody, and decrease biodiversity. In watersheds where soils do not have a buffering capacity, acid rain also releases aluminum from the ground into lakes and streams. Both increased acidity and aluminum are toxic to fish (EPA 2024a).

TDEC has listed 41 miles of park streams as having a very low pH level (very acidic) and considers them to be impaired, which means the streams are less able to support mayflies, caddisflies and salamanders. Acidic streams are suspected to be the main cause for the decline of the native Brook Trout (*Salvelinus fontinalis* population in the park (NPS 2015a).

The range of the Southern Appalachian Brook Trout is greater than just the Great Smoky Mountains National Park, but the Park has been a pioneer in research related to Brook Trout genetics, population monitoring, restoration, and other Brook Trout studies by local, state, and federal agencies and a myriad of universities (NPS 2015c).

While all streams in the park are more acidic than they were 20 years ago and may still require decades to recover, air quality is improving. From 1995-2022, nationwide annual emissions of

sulfur dioxide from power plants fell by 93 percent and annual emissions of nitrogen oxides from power plants fell by 87 percent (EPA 2023a).

From 1995-2022, annual emissions of SO2 from power plants fell by 93 percent and annual emissions of NOX from power plants fell by 87 percent. In 2022, sources in both the Cross-State Air Pollution Rule SO2 annual program and the Acid Rain Program together emitted 0.85 million tons, a reduction of 11 million tons from 1995 levels. In 2022, sources in both the Cross-State Air Pollution Rule NOX annual program and the Acid Rain Program together emitted 0.75 million tons, a reduction of 5.1 million tons from 1995 levels (US EPA 2023a).

Ozone Pollution

Ground level ozone pollution (as opposed to the protective stratospheric layer) is a problem in GSMNP and other regions of the state. It derives from sources similar to those that create acid rain, i.e., from pollutants emitted by cars, power plants, refineries, and other industrial sources. Specifically, chemical reactions between oxides of nitrogen (NOx) and volatile organic compounds (VOC) create ground level ozone (EPA 2024b). Ozone exposure levels on park ridge tops are up to twice as high as those in Knoxville and Atlanta. These levels are sufficient not only to injure trees and plants, but also to threaten human health. Research has found that the following plants show signs of ozone damage in GSMNP: black cherry (*Prunus serotina*), milkweed (*Asclepius* sp.), tuliptree (*Liriodendron tulipifera*), sassafras (*Sassafras albidum*), winged sumac (*Rhus copallinum)*, blackberry (*Rubus* sp.), and cutleaf coneflower (*Rudbeckia laciniata*) (NPS 2015b).

4.6.2. Mercury

Mercury can cause both air and water pollution and is thus dealt with in its own category. Fish sampling surveys in the US have shown widespread mercury contamination in streams, wetlands, reservoirs, and lakes, with 33 states—including Tennessee—having issued fish consumption advisories due to mercury contamination. Metals, which include mercury, are the most common cause of pollution in Tennessee lakes and reservoirs (TDEC 2024a). As of 2022, Sections of 21 rivers and streams have been posted for elevated levels of mercury in fish tissue (TDEC 2022a).



Smoke stack, a significant source of mercury / Dave Sizer

Levels of mercury measured in air and surface water are low, and in natural waters, inorganic mercury is generally not a health concern. The real issue is methylmercury, an organic form that is highly toxic to the nervous system. Methylmercury is produced from inorganic mercury by

methylation, a microbial process. More than 95 percent of all mercury in fish is methylmercury, and this form of mercury biomagnifies to high concentrations at the top of food chains (USGS 2019a).

Bioaccumulation is the process by which organisms (including humans) can take up contaminants more rapidly than their bodies can eliminate them, causing mercury levels in their bodies to accumulate over time. This can contribute to biomagnification, the buildup of contaminants through the food chain.

Mercury contamination is global and affects many waters that have no obvious mercury source, since mercury emissions disperse widely in the atmosphere before being deposited to the earth's surface. Mercury is emitted by natural sources, such as volcanoes and geothermal springs, while human-related sources primarily include coal combustion, waste incineration, industrial uses, and mining. During the last 150 years, human activities have more than doubled natural amounts of mercury in the atmosphere (USGS 2019a).

However, from 2013 to 2022, releases of mercury to air in the US decreased by 57%. An 85% reduction (-41,000 pounds) in mercury air emissions from electric utilities drove the overall decline. EPA's 2012 Mercury and Air Toxics Standards or MATS, set technology-based emissions standards for mercury and other hazardous air pollutants (HAP). MATS—along with a shift from coal to other fuel sources and the installation of pollution control technologies at coal-fired power plants (EPA 2024c)—has achieved significant health and environmental benefits by reducing a broad range of hazardous air pollutants. By 2017 mercury emissions had dropped by 86 percent, down to approximately 4 tons. In 2025, the current US administration plans to reconsider this rule (EPA 2025).

4.6.3. Water Pollution

The Tennessee Water Quality Control Act of 1977 defines pollution as activity that will result or will likely result in harm, potential harm or detriment to the public health, safety, or welfare or will likely result in harm, potential harm, or detriment to the health of animals, birds, fish, or aquatic life.

As TDEC regulates and monitors surface waters in Tennessee, it is unlawful for any person to carry out any activity which results in the alteration of the physical, chemical, radiological, biological, or bacteriological properties of any waters of the state, including wetlands, except in accordance with the conditions of a valid permit.

Tennessee contains 60,447 miles of streams, and 586,985 acres of lakes and reservoirs. Approximately 50% of streams and 98% of lakes and reservoirs are monitored, and this has demonstrated that approximately 60% of streams and rivers and 48% of lakes and reservoirs are impaired largely due to pollution (TDEC 2024b).

Since 2014, the percentage of stream mileage capable of fully supporting aquatic usages has decreased (Fig. 4.6).

Aquatic habitat and life can both be negatively affected by pollutants—often a result of land use impacts related to development, industrial discharge, agricultural runoff, or other activities.

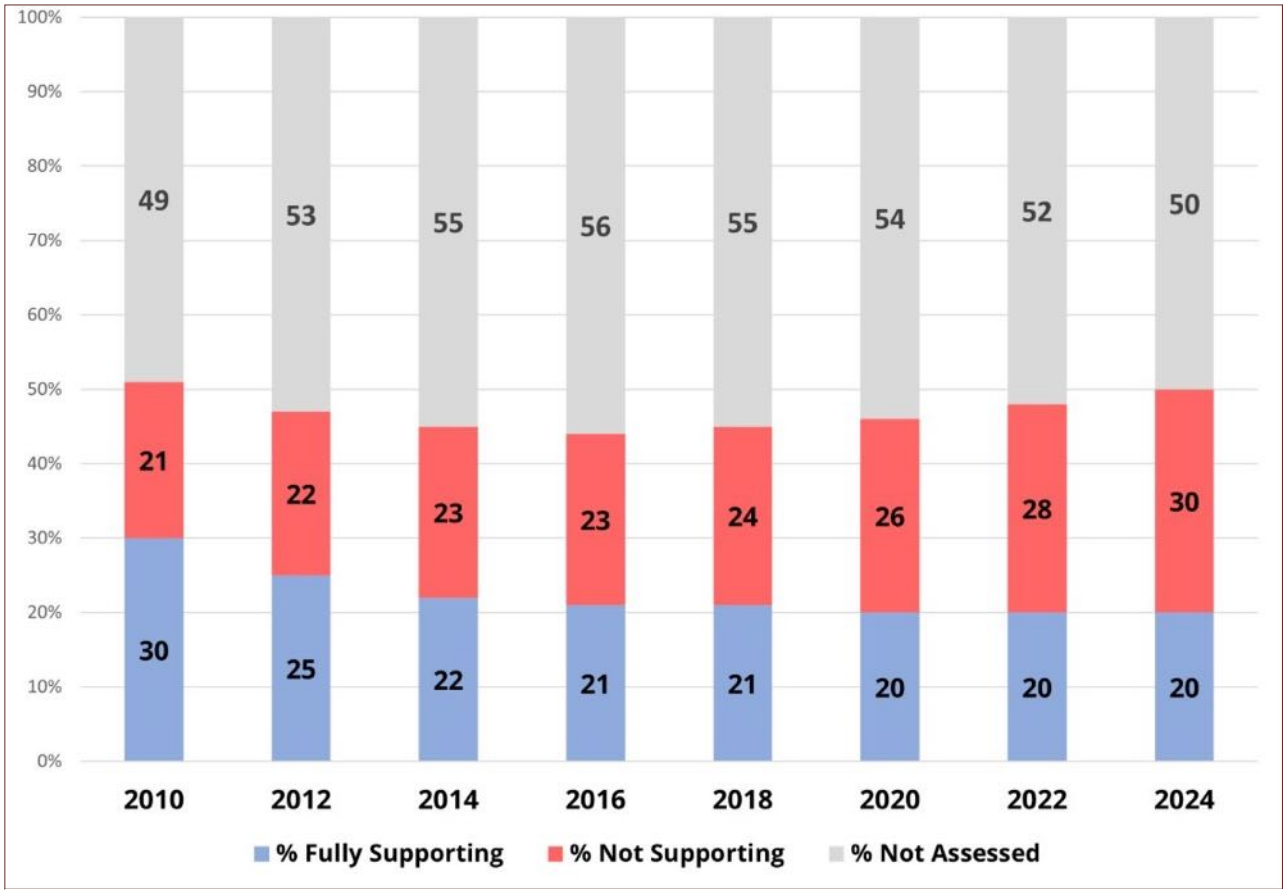


Figure 4.6 Overall use support status for streams in Tennessee

Pollutants are often carried in sediments, and sedimentation can lead to embeddedness of stream substrates (wherein fine sediments like sand and silt cover or surround larger rocks and gravel), which in turn degrades aquatic habitats.

Sources of pollution from developed areas commonly include fertilizers, pesticides, animal waste, septic tanks, sewage, trash, erosion from construction, vehicular fluids, and industrial and commercial site runoff. These sources contribute in-stream contaminants, including nitrogen, chloride, insecticides, and polycyclic aromatic hydrocarbons (PAHs). A USGS study found that aquatic invertebrate communities begin to degrade from the onset of urban development, which indicates that some species are highly sensitive to physical and chemical changes associated with urban development (USGS 2009). In 2018, a German chemist floated the length of the Tennessee River collecting samples and found alarmingly high levels of microplastics, ranging from 16,000 to 18,000 particles per cubic meter, compared to 200 particles per cubic meter in Germany's Rhine



Single use plastic along the banks of the Tennessee River / Tennessee Aquarium

River (Gibbens 2018). Dumping of garbage into Tennessee rivers has also been identified as an issue in several COAs.

Tennessee's Clean Water Act Monitoring & Assessment Report (TDEC 2024b) provides a comprehensive summary of water quality assessments (see Tables 4.2. and 4.3.). Agriculture, hydrologic modification, and municipal and non-point dischargers are identified as the top three sources of pollutants to impaired Tennessee streams. The most common causes of pollution in lakes and reservoirs have been found to be metals and toxic organics such as PCBs and dioxins, and the sources are atmospheric deposition (e.g., mercury in the air) and legacy/historical sources (e.g., abandoned mines) (TDEC 2024a).

4.7. Climate and Resilience

The primary emphasis of Tennessee's 2015 SWAP companion report, Climate Change Vulnerability Assessment for Tennessee Wildlife and Habitats (Glick et al. 2015) was to use a multi-faceted approach and examine three major aspects of climate change impacts: species vulnerabilities, terrestrial and aquatic habitat changes, and landscape resiliency. Fig. 4.7 summarizes these three major elements: assessment of species vulnerability using NatureServe's Climate Change Vulnerability Index (CCVI) (Young et al. 2011); assessment of terrestrial habitat vulnerability to climate stress including vegetation change; and evaluation of relative landscape resilience based on geophysical settings (Anderson et al. 2014.) The focus on these elements together was intended to provide managers with a more comprehensive picture of climate change vulnerability by incorporating factors relevant to both species and habitats. The three-element approach is adapted from ideas piloted by the North Atlantic Landscape Conservation Cooperative for the Connecticut River watershed (NALCC [date unknown]).

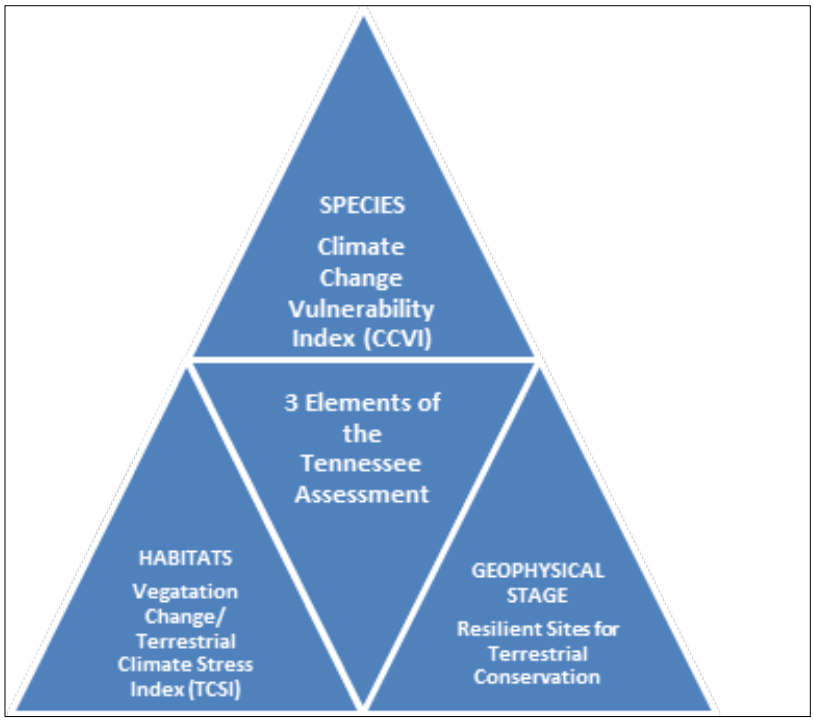


Figure 4.7 Three elements of the Tennessee Assessment

The text and maps in the following sections are excerpted from the Tennessee Climate Change Vulnerability Assessment companion report to serve as a general overview of the results and application of the assessment work for informing further prioritization and strategy development during the SWAP updates. A more exhaustive and systematic analysis of climate change and

severe weather impacts as well as adaptation measures and the importance of resilience in landscapes is provided in Chapter 5.

4.7.1. Species and Habitat Vulnerability Summaries

State fish and wildlife experts used NatureServe's Climate Change Vulnerability Index (CCVI) (Young et al. 2011) to assess a total of 189 plant and animal SGCN, including 15 mammals, 51 birds, 17 reptiles, 26 amphibians, 19 fish, 27 freshwater mussels, 8 crayfish, and 26 plants. Sixty-three percent (119) of the 189 species assessed scored as "Presumed Stable" or "Increase Likely," and 37 percent (70 species) were considered at least Moderately Vulnerable (see Glick et al. 2015 for detailed species scores).

Mammals, birds, and reptiles comprised most of the species ranked as Presumed Stable or Increase Likely due, in part, to their mobility and other factors that enhance their adaptive capacity. Plants, fish, and mussels comprised the greatest number of species that ranked as Moderately, Highly, or Extremely Vulnerable for a variety of reasons, including the presence of natural and anthropogenic barriers to dispersal, restricted habitat range, and high levels of sensitivity to changes in temperature and moisture. Fig. 4.8 provides a comparison of the CCVI vulnerability scores summarized across taxonomic groups. For more specific information on the scoring process and results, see Glick et al. (2015).

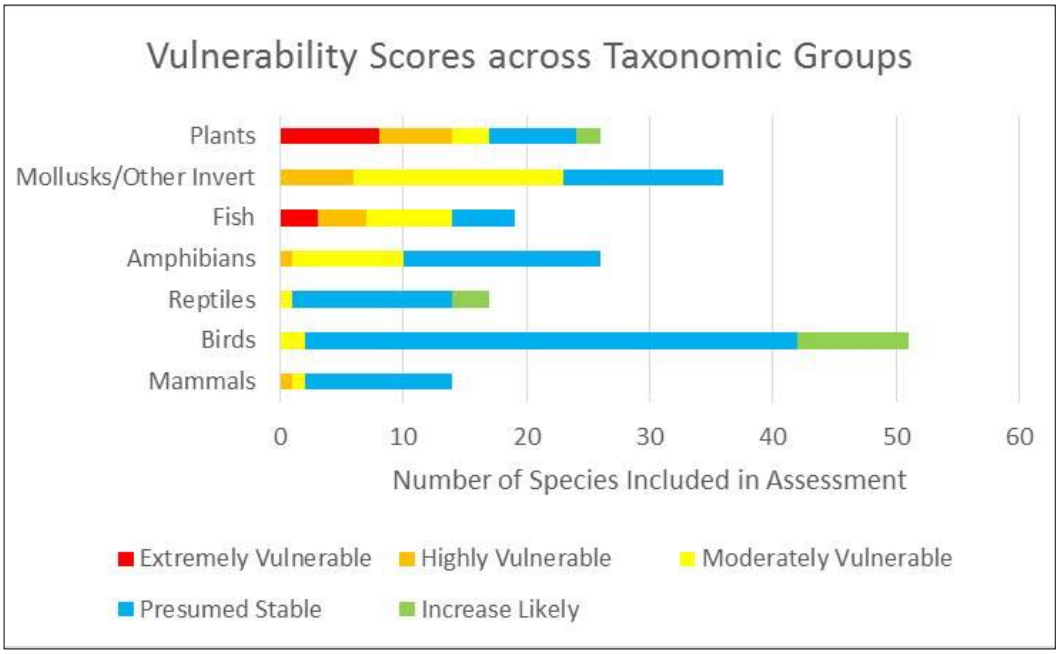


Figure 4.8 Comparison of CCVI vulnerability scores across taxonomic groups (For more specifics on the scoring process and results, see Glick et al. 2015.)

Some of the most significant impacts of climate change on Tennessee's fish and wildlife species will be associated with potential changes to their habitats. Notable impacts include the following:

- Changes in the composition of plant communities in both forest and grassland systems, particularly in the western portion of the state

- An increase in the frequency and severity of disturbances such as wildfires and outbreaks of already-problematic species such as Southern Pine Beetle (*Dendroctonus frontalis*) and Hemlock Wooly Adelgid (*Adelges tsugae*)
- Shifts in the location and extent of suitable habitat for fish and other aquatic species due to higher water temperatures and altered water quality, with areas of coldwater habitat in mountain streams likely to decline and warmwater habitat projected to expand
- Changes in the timing and magnitude of stream flows and other hydrological conditions, including increased drying of ephemeral pools important to amphibians and other wildlife.

Given the complexities and uncertainties in climate projections and associated impacts, the general challenge for managers may be to consider how to transition Tennessee from its current mix of terrestrial habitats to a different mix without losing biodiversity (Joyce et al. 2008). The state's upland forest systems, for instance, support a great diversity of wildlife due in part to the variety of different habitats and niches found within a structurally diverse forest system (TWRA 2014). A study conducted at the Tennessee Aquarium Conservation Institute (Hoffacker 2018) demonstrated the vulnerability of salamander communities rises in stream water temperatures. Warmer stream temperatures mean salamander communities will not be structured the same way, which could have broader ripple effects through their communities. Managing for a diversity of habitat types, even if the composition of associated vegetation changes, may still support desired conditions for valued fish and wildlife.

With many of Tennessee's highly diverse aquatic species already considered at-risk for a variety of reasons, the additional threat from climate change is likely to exacerbate conservation concerns (TWRA 2009). Indeed, it is the combination of climate change and other stressors such as polluted runoff and barriers to stream connectivity that will have the greatest impact on aquatic habitats and the species that depend on them (Sun et al. 2008). An integrated approach to managing aquatic species and habitats that takes into account multiple stressors, including climate change, will be important to help the state meet its short- and long-term wildlife conservation goals.

4.7.2. Spatial Vulnerability Assessment Maps

Tennessee's 2015 vulnerability assessment also included a spatial analysis of climate change vulnerability across terrestrial habitats to help inform a landscape level understanding of potential issues across the state. The landscape vulnerability assessment drew from the approaches used by Joyce et al. (2008), Kershner and Mielbrecht (2012), and Anderson et al. (2014), with a focus on terrestrial habitat priorities updated by the 2015 SWAP (Glick et al. 2015). Several existing datasets and maps from these approaches were synthesized in the assessment, including:

- Terrestrial SGCN Habitat Priority areas in Tennessee
- Potential vegetation change using a Terrestrial Climate Stress Index
- Resilient Sites for Terrestrial Conservation in Tennessee.

Since 2015, the science of landscape-level climate resilience has grown, and much of the accumulated knowledge and tools for measuring climate impacts, mapping resiliency, and prioritizing sites for conservation have been collected into the **Center for Resilient Conservation Science** (CRCS), a project of The Nature Conservancy. The site includes interactive maps and conservation datasets that showcase the results of CRCS projects, as well as the **Resilient and Connected Network Tool**. This topic, as well as resilient landscape mapping is discussed in more detail in Ch. 6 Conservation Actions.



Seal Salamander (*Desmognathus monticola*), one species that could be affected by rises in stream water temperatures / Peter Paplanus



CHAPTER 5 RESILIENCE IN A CHANGING ENVIRONMENT

5.1. Changing Environmental Conditions in the Southeast

In the Southeast, changing environmental conditions may have pervasive impacts on natural habitats, ecological processes, and ecosystem services. Regional efforts to mitigate or adapt to these impacts may be extremely important. Conditions in the Southeast may change dramatically. Models indicate that current trends may continue, such as increasing frequency, intensity, and duration of heatwaves; increasing wildfire risk; and rising sea levels.

The most pertinent projected changes include extreme heat, extreme precipitation events, drought, and sea-level rise, as well as decreases in the intensity and frequency of cold-season events.

Despite the significant threat changing environmental conditions pose to the landscape, understanding the tools and resources available to address it is difficult. As part of the survey administered to SWAP coordinators in 2021, the majority of SEAFWA states/territories reported integrating changing environmental conditions as one of the most challenging aspects of the upcoming SWAP revision (USFWS and SEAFWA). Some SWAP coordinators noted that it is difficult to discern what tools are available, decide which tool is the right one to use, and choose the appropriate scale and timeframe when using tools. Some reported that it is also challenging to determine what environmental change threats to include and how to represent their impacts spatially.

Photo credit: Flooding in East Tennessee from Hurricane Helene in 2024 / Brianna Paciorka, *Knoxville News Sentinel*

Summary: Resilience in a Changing Environment in Tennessee

1. Environmental projections use the best available physical science to predict how earth systems may respond to changes in human activities, but not all projections are developed in the same manner.
2. Two approaches for projecting future environmental impacts are used throughout this chapter: 1) global warming levels (GWLs), which correspond to projected changes in temperature and 2) scenarios, which depend on trajectories of warming affected by human responses, which can help inform when the planet may reach a certain global warming level (GWL).
3. Tennessee is predicted to experience a number of environmental impacts, though the magnitude of change often varies by ecoregion, shared socioeconomic pathway (SSP, i.e., alternative societal future), and future timeframe. Generally, these impacts include hotter summers, warmer winters, more frequent extreme precipitation events, and drought.
4. The number of extremely hot days as well as the number and intensity of heat waves are projected to increase, most likely exceeding historical record levels by the middle of this century.
5. Future changes in the annual number of consecutive extreme dry days in Tennessee are fortunately not projected to increase substantially.
6. In general, the number of extremely cold days (i.e., days with low temperatures of at least 32°F or lower) in Tennessee is predicted to decrease in the future.
7. Annual precipitation is projected to increase in Tennessee, while the recent increasing trend in number and intensity of extreme precipitation events is expected to continue.
8. Landslides, flooding, and large amounts of surface water runoff from extreme precipitation and hurricanes have many negative impacts on wildlife, including increased sediment and contaminated floodwater draining into waterways, flooding of animal nests, erosion, and more.
9. A species' vulnerability to changing environmental conditions is determined both by its exposure and its sensitivity to change. Vulnerability is assessed using two methods. (1) the CCVI uses data about species plus expert opinion to assign a vulnerability score based on the species' direct and indirect exposure to changing environmental conditions as well as its sensitivity to those conditions. (2) Ecological Niche Models focus on habitat, allowing researchers to create spatially explicit estimates of suitable environmental conditions for a species—whether likely to remain stable, become more widespread, or more rare in the future.
10. CCVI-assessed fish, mussels, and plant Species of Greatest Conservation Need (SGCN) have the largest proportion of species vulnerable to changing environmental conditions. Niche models of evaluated species indicate Tennessee's amphibian and reptile SGCN are projected to have the greatest proportion of species that may experience reductions in environmentally suitable land area. Of those assessed, 19 amphibian SGCN may face a large decrease of environmentally suitable habitat.
11. For species evaluated using both CCVI and niche models, amphibian and plant SGCN in Tennessee are projected to have many species vulnerable to changing environmental conditions. Available CCVI for aquatic taxa suggest that many fish and mussel SGCN in Tennessee may be extremely vulnerable to changing environmental conditions.
12. Tennessee is a hotspot for freshwater mussel diversity with >140 species. Of those, 89 are SGCN, and 41 of the 89 mussel SGCN are listed as Endangered under the Endangered Species Act (ESA), while nearly all SGCN are considered by NatureServe to be Critically Imperiled, Imperiled, or Vulnerable. Mussels may be adversely affected by increasing temperatures, potential loss of host fish (required for mussel reproduction), decreased water quality due to extreme weather events, and drought.
13. Resilience emphasizes diverse landscapes where species are likely to be able to move and adjust to changing environmental conditions. For example, high spatial overlap between landslide susceptibility and biodiversity in the Appalachians provides an opportunity to achieve resilience and co-benefits for both species conservation and people if these vulnerable sites are protected and restored.
14. Environmental adaptation decisions may discern which approach(es) meet specific conservation goals, while recognizing limits to adaptation, such as funding, staffing, and degree of management needed.

5.1.1. Changing Environmental Conditions in Tennessee

Like the rest of the Southeast, Tennessee is expected to experience a number of impacts related to changing environmental conditions, although the magnitude of change varies by ecoregion, shared socioeconomic pathway (SSP) and future timeframe. Generally, these impacts include hotter summers, warmer winters, more frequent extreme precipitation events, and drought (Hoffman et al. 2023).

The majority of Southeastern states/territories reported that integrating changing environmental conditions is one of the most challenging aspects of this SWAP revision.

Hotter summers, warmer winters, and more intense droughts

Generally, the number of extremely hot days (i.e., days with afternoon high temperatures of at least 95°F) is predicted to increase, although there are differences in how many hotter days are expected across the state (Table 5.1; Fig. 5.1). Temperatures in Tennessee have risen by 0.5°F since the beginning of the 20th century, which is less than a third of the average warming for the contiguous US (Runkle et al. 2022). However, some recent years have been exceptionally warm, including 2012 (2nd warmest), 2016 (3rd warmest), 2017 (5th warmest), and 2019 (7th warmest on record) (Runkle et al. 2022). Annual average temperatures are projected to most likely exceed historical record levels by the middle of this century and could reach unprecedented levels (Runkle et al. 2022).



A hot day in Oak Ridge, TN / Oleg Shpyrko

The number and intensity of heat waves are likely to increase in the future (Runkle et al. 2022). Heatwaves in the US have become hotter, more frequent, larger, and longer-lasting in recent decades and are projected to continue, which has implications for drought in the region (Hoffman et al. 2023). The number of extremely hot days (days with maximum temperatures ≥95°F) may increase

Table 5.1 Approximate observed historical and future projected number of extremely hot days per year (i.e., days with afternoon high temperatures of at least 95°F) by EPA Level III ecoregion within Tennessee. The table summarizes projected future number of days for low, moderate, and high SSP scenarios and extreme event metric projections (Alder 2024) summarized at the ecoregion level. For each future time period, numbers in parentheses represent the percent change between the models' future projections and the models' historical simulations. Observed historical summaries were generated with data from Pierce et al. (2021).

Table 5.1. Historical & future projections: Average number of days with maximum temperatures ≥ 95°F (from all models being averaged)			
SSP	Observed Historical Average **1950-2014**	**2025-2049** projections (Percent change from historical simulation)	**2050-2074** projections (Percent change from historical simulation)
Blue Ridge Ecoregion			
Low (SSP2-4.5)	0.5 days/year	5 days/year (750%↑)	9 days/year (1566%↑)
Moderate (SSP3-7.0)		5 days/year (646%↑)	11 days/year (1831%↑)
High (SSP5-8.5)		6 days/year (873%↑)	17 days/year (2819%↑)
Central Appalachians Ecoregion			
Low (SSP2-4.5)	0.9 days/year	5 days/year (681%↑)	11 days/year (1485%↑)
Moderate (SSP3-7.0)		5 days/year (574%↑)	13 days/year (1925%↑)
High (SSP5-8.5)		7 days/year (831%↑)	20 days/year (2815%↑)
Southwestern Appalachians Ecoregion			
Low (SSP2-4.5)	1.5 days/year	8 days/year (514%↑)	14 days/year (1008%↑)
Moderate (SSP3-7.0)		7 days/year (437%↑)	16 days/year (1172%↑)
High (SSP5-8.5)		9 days/year (602%↑)	25 days/year (1792%↑)
Ridge and Valley Ecoregion			
Low (SSP2-4.5)	3 days/year	16 days/year (453%↑)	26 days/year (799%↑)
Moderate (SSP3-7.0)		15 days/year (407%↑)	29 days/year (921%↑)
High (SSP5-8.5)		18 days/year (512%↑)	40 days/year (1286%↑)
Interior Plateau Ecoregion			
Low (SSP2-4.5)	7 days/year	26 days/year (283%↑)	38 days/year (455%↑)
Moderate (SSP3-7.0)		24 days/year (251%↑)	42 days/year (507%↑)
High (SSP5-8.5)		29 days/year (313%↑)	54 days/year (678%↑)
Mississippi Alluvial Plain Ecoregion			
Low (SSP2-4.5)	14 days/year	40 days/year (202%↑)	56 days/year (238%↑)
Moderate (SSP3-7.0)		39 days/year (187%↑)	58 days/year (254%↑)
High (SSP5-8.5)		44 days/year (221%↑)	70 days/year (303%↑)
Mississippi Valley Loess Plains Ecoregion			
Low (SSP2-4.5)	13 days/year	40 days/year (231%↑)	55 days/year (350%↑)
Moderate (SSP3-7.0)		38 days/year (212%↑)	58 days/year (378%↑)
High (SSP5-8.5)		43 days/year (251%↑)	70 days/year (471%↑)
Southeastern Plains Ecoregion			
Low (SSP2-4.5)	11 days/year	35 days/year (223%↑)	49 days/year (345%↑)
Moderate (SSP3-7.0)		34 days/year (203%↑)	52 days/year (378%↑)
High (SSP5-8.5)		38 days/year (243%↑)	64 days/year (484%↑)

across Tennessee, with the largest percentage increases occurring in the eastern portion of the state (Table 5.1). These trends are projected to continue, which has implications for drought in the region (Runkle et al. 2022; Hoffman et al. 2023).

Higher temperatures throughout the year in Tennessee may cause more rapid loss of soil moisture during consecutive dry days (i.e., consecutive days without rainfall), increasing the intensity of naturally occurring droughts in the future (Runkle et al. 2022). However, future changes in the annual number of consecutive extreme dry days in Tennessee fortunately are not projected to increase substantially (Alder, 2024).

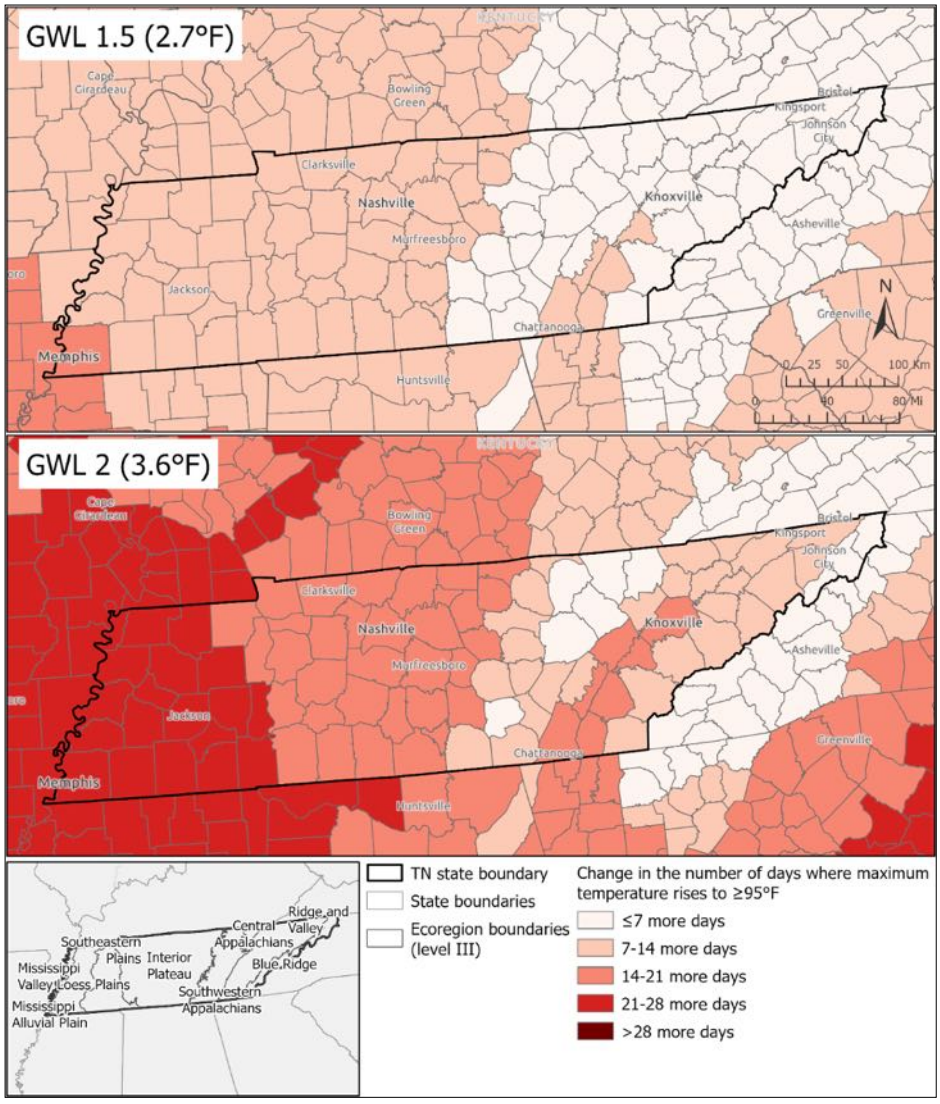


Figure 5.1. Projected future changes in the number of extremely hot days (i.e., days with maximum temperatures at or above 95°F) compared to preindustrial levels (1851-1900) in Tennessee. Projections at both lower and higher Global Warming Levels of 1.5 (i.e., global average temperature increases of 1.5°C, or 2.7°F) and 2 (i.e., global average temperature increases of 2°C, or 3.6°F) are shown. Figure created from data in the following web tool: https://www.arcgis.com/apps/instant/atlas/index.html and overlaid with the North America Terrestrial Level 3 Ecoregions in ArcGIS Pro accessed on 1 February 2024.

Although hydrological droughts have become less frequent in eastern regions of the country since the 19th century, higher increases in evapotranspiration (the processes by which water is transferred to the atmosphere from Earth's surface) have generally made the Southeast more drought-prone than the Northeast (Hoffman et al. 2023). Droughts are a regular occurrence in Tennessee. In about half of the weeks since 2000, at least some portion of the state has been in drought status; in 15% of those weeks, at least half of the state experienced some degree of drought conditions (Runkle et al. 2022).



The Duck River in summer 2024 during a prolonged drought. / Brittany Bajo-Walker, TWRA

Table 5.1. summarizes historical observed and future projections of extremely hot days (maximum temperatures ≥95°F) under different SSP scenarios and at GWL 2 (3.6°F warmer than the 1991-2020 time period) for Tennessee ecoregions. Fig. 5.1 shows the change in the projected number of extremely hot days in Tennessee at GWL 1.5 (2.7°F warmer than the 1991-2020 time period) and GWL 2 (3.6°F warmer than the 1991-2020 time period). Overall, projections indicate that the number of extremely hot days (maximum temperatures ≥95°F) may increase across Tennessee, with the greatest increase in number occurring in the southwest portion of the state, though the magnitude of change often varies greatly by GWL or SSP scenario and location within the state (Hoffman et al. 2023).

Another way to look at future projections is through the lens of GWLs. If the earth surpasses a GWL of 1.5 (2.7°F) or 2 (3.6°F) for a sustained period, the number of days where the temperature reaches 95°F or higher may increase across Tennessee, compared to the past 30 years (1991-2020) (Fig. 5.1.).

Additionally, projections indicate that the number of extremely cold days (days with low temperatures of freezing or below [≤ 32°F]) may decrease across Tennessee, with the most pronounced decreases occurring throughout many northern counties of the state, but the magnitude of change often varies greatly by GWL or SSP scenario and location within the state (Table 5.2; Fig. 5.2). Any substantial increase in temperature may lead to decreased cold wave

Table 5.2. Approximate observed historical and future projected number of extremely cold days per year (i.e., days with minimum low temperatures of ≤32°F) by EPA Level III ecoregions within Tennessee. The table summarizes projected future number of days for low, moderate, and high SSP scenarios and extreme event metric projections (Alder 2024) summarized at the ecoregion level. For each future time period, numbers in parentheses represent the percent change between the models' future projections and the models' historical simulations. Observed historical summaries were generated with data from Pierce et al. (2021).

Table 5.2. Historical & future projections: Average number of days with low temperatures of ≤32°F (from all models being averaged)			
SSP	Observed Historical **1950-2014**	**2025-2049** projections (Percent change from historical simulation)	**2050-2074** projections (Percent change from historical simulation)
Blue Ridge Ecoregion			
Low (SSP2-4.5)	116 days/year	93 days/year (18%↓)	85 days/year (25%↓)
Moderate (SSP3-7.0)		93 days/year (18%↓)	83 days/year (28%↓)
High (SSP5-8.5)		91 days/year (20%↓)	77 days/year (33%↓)
Central Appalachians Ecoregion			
Low (SSP2-4.5)	115 days/year	94 days/year (17%%↓)	87 days/year (23%↓)
Moderate (SSP3-7.0)		94 days/year (16%%↓)	86 days/year (25%↓)
High (SSP5-8.5)		93 days/year (18%%↓)	80 days/year (30%↓)
Southwestern Appalachians Ecoregion			
Low (SSP2-4.5)	91 days/year	72 days/year (22%↓)	66 days/year (28%↓)
Moderate (SSP3-7.0)		72 days/year (20%↓)	65 days/year (30%↓)
High (SSP5-8.5)		71 days/year (23%↓)	59 days/year (36%↓)
Ridge and Valley Ecoregion			
Low (SSP2-4.5)	90 days/year	71 days/year (21%↓)	64 days/year (29%↓)
Moderate (SSP3-7.0)		71 days/year (20%↓)	61 days/year (32%↓)
High (SSP5-8.5)		69 days/year (23%↓)	56 days/year (37%↓)
Interior Plateau Ecoregion			
Low (SSP2-4.5)	87 days/year/year	67 days/year (22%↓)	61 days/year (29%↓)
Moderate (SSP3-7.0)		69 days/year (21%↓)	59 days/year (31%↓)
High (SSP5-8.5)		66 days/year (24%↓)	54 days/year (38%↓)
Mississippi Alluvial Plain Ecoregion			
Low (SSP2-4.5)	65 days/year	48 days/year (29%↓)	41 days/year (39%↓)
Moderate (SSP3-7.0)		48 days/year (27%↓)	38 days/year (42%↓)
High (SSP5-8.5)		46 days/year (32%↓)	35 days/year (48%↓)
Mississippi Valley Loess Plains Ecoregion			
Low (SSP2-4.5)	69 days/year	52 days/year (27%↓)	45 days/year (36%↓)
Moderate (SSP3-7.0)		52 days/year (25%↓)	43 days/year (39%↓)
High (SSP5-8.5)		49 days/year (30%↓)	39 days/year (45%↓)
Southeastern Plains Ecoregion			
Low (SSP2-4.5)	80 days/year	61 days/year (24%↓)	51 days/year (31%↓)
Moderate (SSP3-7.0)		61 days/year (22%↓)	52 days/year (33%↓)
High (SSP5-8.5)		59 days/year (26%↓)	48 days/year (40%↓)

intensity (Runkle et al. 2022). If the Earth surpasses a GWL of 1.5 (2.7°F) or 2 (3.6°F) for a sustained period, the number of days where the temperature reaches 32°F or lower (freezing temperatures) may decrease across the state, compared to the years between 1991 and 2020 (Table 5.2).

As low temperatures rise, some species may also be impacted. Warmer nights can have a profound impact on animal and plant health because temperatures are generally lower at night, normally allowing the environment to cool down. Winter months are the fastest-warming season in most of

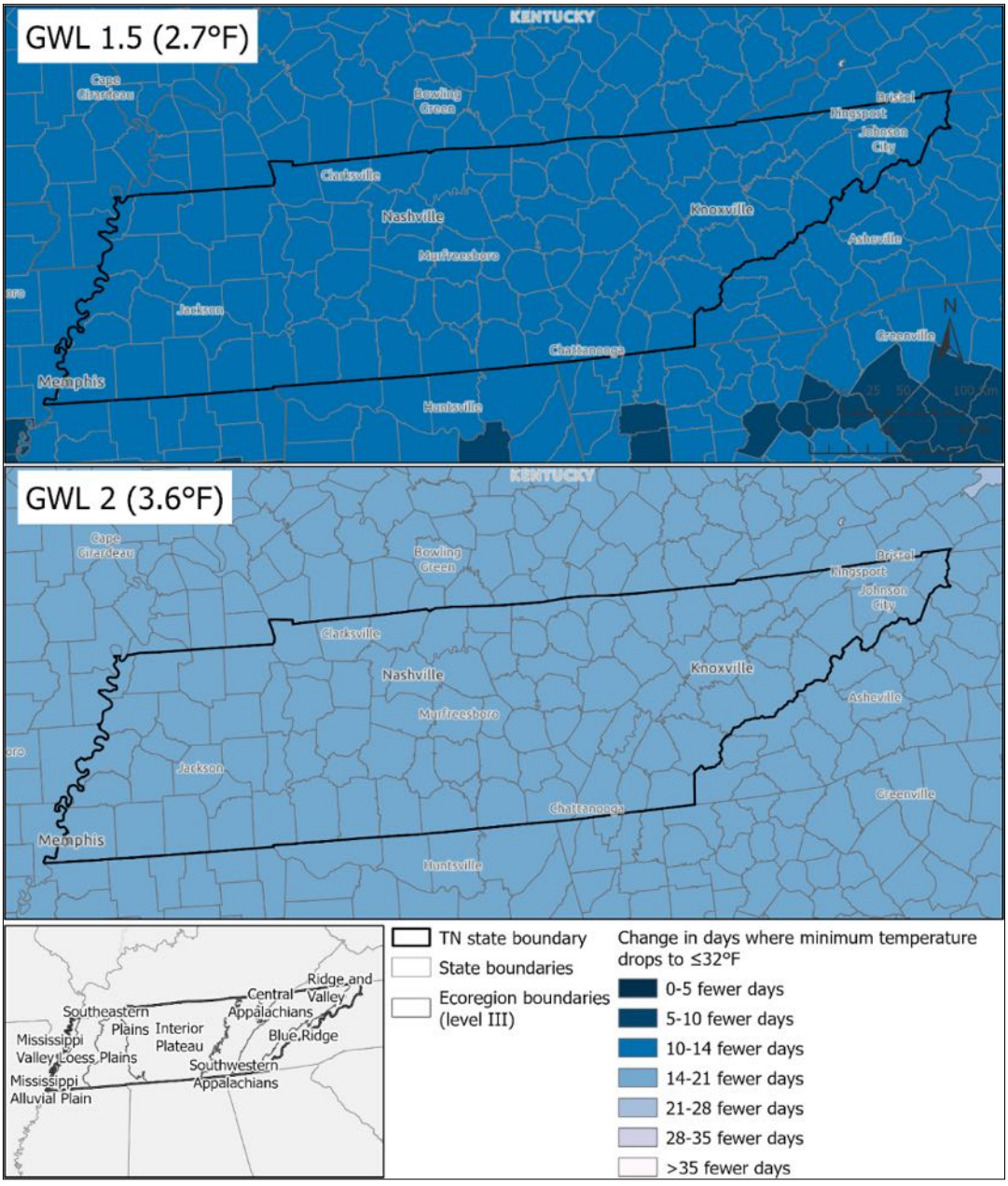


Figure 5.2. Change in days with minimum temperatures reaching or below freezing (32°F) compared to preindustrial levels (1851-1900) in Tennessee based on GWL 1.5C (global temperature increase of 2.7°F) and GWL 3C (global temperature increase of 2.7°F). Figure created from data in the following web tool: https://www.arcgis.com/apps/instant/atlas/index.html and overlaid with the North America Terrestrial Level 3 Ecoregions in ArcGIS Pro accessed on 1 February 2024.

the US. In general, the number of extremely cold days (i.e., days with low temperatures of at least 32°F or lower) in Tennessee is predicted to decrease in the future (Table 5.2). Winter conditions are key drivers of individual species performance and community composition in terrestrial habitats because species vary in susceptibility to these winter drivers (Williams et al. 2014). Shorter and warmer winters may cause species range shifts that would allow for warm-adapted species to dominate and shift distributions of cold-adapted species. For example, overwintering bird populations are responding to warming conditions (e.g., poleward shifts) by favoring the formation of winter bird communities dominated by warm-adapted species instead of cold-adapted species (Princé & Zuckerberg 2015, Osland et al. 2021).



Frozen web / jlcwalker via Flickr Creative Commons

Additionally, winter conditions (e.g., snowfall, low temperatures) have a major effect on ecological processes such as litter decomposition, mineralization rates, nutrient leaching, and gas fluxes in the soil and hydrological processes. Winter soil freezing also affects insect and microbial communities for the subsequent warm season (Campbell et al. 2005).

More extreme precipitation events

Other potential hazards, such as extreme precipitation events, are expected to increase in the future and often manifest as extreme weather and increased flooding (Wong et al. 2014). Changing environmental conditions projections suggest that the Southeast as a region may get slightly wetter overall, with increases to some seasonal averages and the annual average. Additionally, extreme precipitation amounts are expected to increase across the region, primarily driven by more frequent and intense events (e.g., precipitation of three or more inches within 24 hours) at higher levels of global warming (Hoffman et al. 2023). In other words, although little change in total annual precipitation is projected over this century, the timing and intensity of precipitation events may change (Hoffman et al. 2023).

Continuing recent trends, annual precipitation and the number and intensity of extreme precipitation events are projected to increase in Tennessee.

However, annual precipitation is projected to increase in Tennessee, as the state is part of a large area across the northern and central US that shows projected increases in precipitation by midcentury (Runkle et al. 2022; Fig. 5.3). Additionally, the number and intensity of extreme precipitation events are also projected to increase, continuing recent trends. The wettest consecutive 5-year interval for Tennessee was 2016–2020, with the wettest year on record being 2018 (statewide total of 67 inches) (Runkle et al. 2022). Extreme precipitation events that frequently occur in Tennessee



Debris left behind in Tennessee in the wake of Hurricane Helene, 2024 / Brittany Bajo-Walker, TWRA

High spatial overlap between landslide susceptibility and biodiversity in the Appalachians provides an opportunity to achieve benefits for people and wildlife through restoration and conservation.

include severe thunderstorms, winter storms, and flooding. Since 2000, the state has received 33 major disaster declarations involving severe storms and flooding. One example is the extreme rainfall and flooding event that occurred in August 2021 when 20.73 inches of rain fell in less than 23 hours in the McEwen area of Middle Tennessee, breaking the state record by far (Runkle et al. 2022).

Table 5.3 summarizes approximate values for historical observed and future projected extreme rainfall under different SSP scenarios for Tennessee ecoregions. Fig. 5.3 shows the projected future percent change in the number of days per year with extreme precipitation (e.g., days with the top 1% of rainfall) in Tennessee at GWL 1.5 (2.7°F warming) and GWL 2 (3.6°F warming) compared to the last 30 years. Estimates of when these GWL might be reached depend on the emission scenario. While all ecoregions within Tennessee may experience changes in days with extreme precipitation, the western to middle part of the state—the Mississippi Alluvial Plain, Mississippi Valley Loess Plain, and Central Appalachians Ecoregions—are projected to experience the greatest percent change by GWL3.

In the Appalachian Mountains, where the susceptibility to landslides is already high, increases in extreme rainfall may lead to increases in landslides (Mirus et al. 2020). Hurricanes can produce widespread and damaging landslides in the mountains, as seen in the recent Hurricane Helene, which dumped heavy rain across eastern Tennessee (Martinez et al. 2024).

Landslides, flooding, and large amounts of surface water runoff from extreme precipitation events and hurricanes have many negative impacts on wildlife, including increased sediment and contaminated floodwater draining into waterways, flooding of animal nests, erosion and more (Mirus et al. 2020). There is high spatial overlap between landslide susceptibility and biodiversity in the Appalachians, which provides an opportunity to achieve co-benefits in both species' conservation and development if these vulnerable sites are protected and restored (Li et al. 2022).

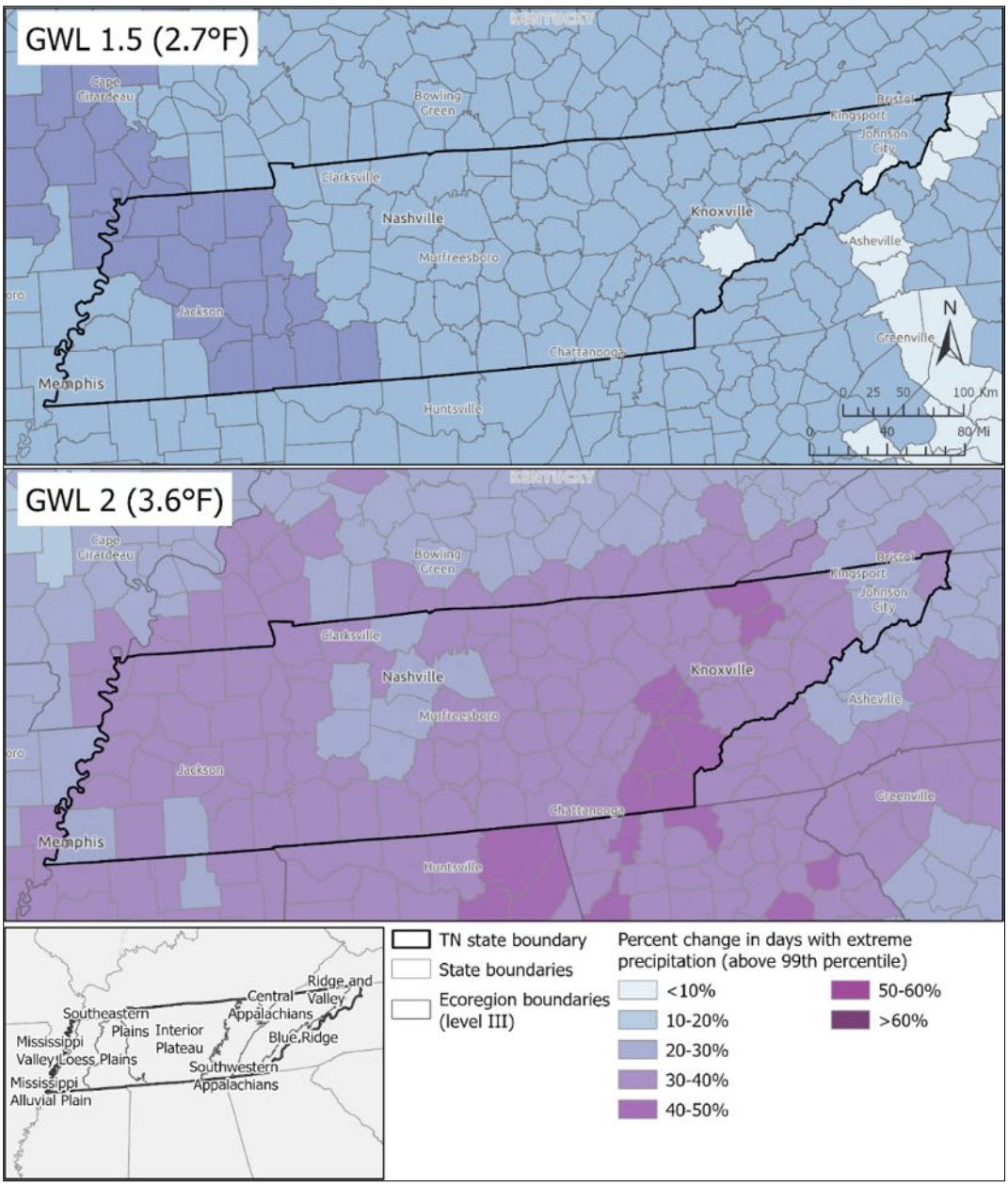


Figure 5.3. Change in days with extreme rainfall events compared to preindustrial levels (1851-1900) in Tennessee based on GWL 1.5C (global temperature increase of 2.7°F) and GWL 3C (global temperature increase of 2.7°F). Figure created from data in the following web tool: https://www.arcgis.com/apps/instant/atlas/index.html and overlaid with the North America Terrestrial Level 3 Ecoregions in ArcGIS Pro accessed on 1 February 2024.

Table 5.3. Approximate observed historical number of days with extreme rainfall per year (i.e., days with the top 1% of rainfall) and future projected increases by EPA Level III ecoregion within Tennessee. The table summarizes projected future number of days for low, moderate, and high SSP scenarios and extreme event metric projections (Alder 2024) summarized at the ecoregion level. Observed historical summaries were generated with data from Pierce et al. (2021). Raw numbers not provided, as numbers are very small.

Table 5.3. Historical & future projections: Average number of days of extreme precipitation (from all models being averaged)			
SSP	Observed Historical **1950-2014**	**2025-2049** projections (Percent change from historical simulation)	**2050-2074** projections (Percent change from historical simulation)
Blue Ridge Ecoregion			
Low (SSP2-4.5)	0.5 days/year	29% increase	34% increase
Moderate (SSP3-7.0)		29% increase	36% increase
High (SSP5-8.5)		30% increase	45% increase
Central Appalachians Ecoregion			
Low (SSP2-4.5)	0.9 days/year	36% increase	45% increase
Moderate (SSP3-7.0)		32% increase	51% increase
High (SSP5-8.5)		39% increase	50% increase
Southwestern Appalachians Ecoregion			
Low (SSP2-4.5)	1.5 days/year	32% increase	39% increase
Moderate (SSP3-7.0)		33% increase	43% increase
High (SSP5-8.5)		36% increase	48% increase
Ridge and Valley Ecoregion			
Low (SSP2-4.5)	3 days/year	32% increase	37% increase
Moderate (SSP3-7.0)		32% increase	40% increase
High (SSP5-8.5)		31% increase	46% increase
Interior Plateau Ecoregion			
Low (SSP2-4.5)	7 days/year	30% increase	37% increase
Moderate (SSP3-7.0)		29% increase	46% increase
High (SSP5-8.5)		32% increase	43% increase
Mississippi Alluvial Plain Ecoregion			
Low (SSP2-4.5)	14 days/year	28% increase	38% increase
Moderate (SSP3-7.0)		27% increase	48% increase
High (SSP5-8.5)		37% increase	56% increase
Mississippi Valley Loess Plains Ecoregion			
Low (SSP2-4.5)	13 days/year	28% increase	37% increase
Moderate (SSP3-7.0)		26% increase	50% increase
High (SSP5-8.5)		35% increase	51% increase
Southeastern Plains Ecoregion			
Low (SSP2-4.5)	11 days/year	30% increase	39% increase
Moderate (SSP3-7.0)		27% increase	50% increase
High (SSP5-8.5)		35% increase	47% increase

5.2. Species' Responses to Changing Environmental Conditions

The Southeast has the highest aquatic diversity of any temperate system; however, the ecological relationships and life histories of many endemic species are not yet well understood, particularly within the context of changing environmental conditions (Ingram et al. 2013). Freshwater ecosystems (e.g., streams, rivers, lakes, and wetlands) of the Southeast are highly vulnerable to warming. Impacts on rare species of fish and mussels are of particular concern in a changing environment. The combined effects of warming and changes in precipitation may likely alter overall hydrology, including increased evapotranspiration and reduced stream base flow.

Currently, many species declines are associated with widespread alteration of flow regimes and are expected to be exacerbated by changing environmental conditions. Impacts of changing environmental conditions on riverine and wetland ecosystems are predicted to also include increased water temperatures, which dictate ranges for many species and exacerbate low dissolved oxygen conditions (Ingram et al. 2013). For example, temperature increases driven by changing environmental conditions, heated discharges, vegetation clearing, and other human alterations pose an existential threat to Southern Appalachian Brook Trout (*Salvelinus fontinalis*). In general, temperature regimes of freshwater ecosystems are projected to increase in parallel with shifts in air temperatures, which may alter plant and animal communities, including migratory birds (Princé and Zuckerberg 2015).

As the regional landscape and weather patterns change, there is value in identifying regional strategies and conservation actions to support the Species of Greatest Conservation Need (SGCN) and Regional SGCN that are most vulnerable to impacts. A species is considered vulnerable to changing environmental conditions if it is both sensitive and exposed to the impacts of those changing conditions (Williams et al. 2008). For example, a species may be exposed to changing environmental conditions because it experiences an impact such as warmer stream temperatures, but if it is resilient to that change or able to disperse into new habitats, it may ultimately have low vulnerability. Conversely, a species that would be sensitive to changing environmental conditions but is unlikely to experience any impacts is therefore not exposed and may also have low vulnerability. Understanding if a species is sensitive and may be exposed to changing conditions can help managers develop strategies to support the species most likely to be impacted.



Tennessee Yellow-eyed Grass (*Xyris-tennesseensis*), just one of the plant species that could be impacted by changing environmental conditions / Al Schotz, Alabama Natural Heritage Program, Copyrighted, All Rights Reserved - Used by Permission

The **CCVI** is a worksheet-based tool where users apply readily available information about a species' natural history, distribution, landscape circumstances, and expert opinions to predict whether it may likely suffer a range contraction and/or population reduction due to changing environmental conditions, which is then summarized in the form of a vulnerability score. By design, this score is distinct from NatureServe's national vulnerability ranking system that considers other threats. A species could score as not particularly vulnerable in terms of its Global or State rank (G- or S-rank), which is based on other factors, but could still be rated as vulnerable to changing environmental conditions.

CCVI is based on an evaluation of the species' direct and indirect exposure to changing environmental conditions and its sensitivity to changing environmental conditions. To date, several SEAFWA states (West Virginia, Byers & Norris 2011; Tennessee, Glick et al. 2015; Florida, DuBois et al. 2011; and Louisiana) have used the CCVI tool to conduct assessments of their SGCN to inform previous SWAPs, management priorities, and research and conservation planning. Their previous CCVI assessments can be accessed from their 2015 SWAPs or from an archived online integrated dataset collated by the Armsworth lab at the University of Tennessee - Knoxville (Armsworth et al. 2025a) and can serve as references for what has been done before and to shape future planning and conservation efforts.

The CCVI focuses on species vulnerability whereas Ecological Niche Models focus on habitat availability.

Ecological niche models (also called species distribution models) are a common approach by the academic community for evaluating a species' vulnerability to changing environmental conditions. These models start by identifying shared environmental conditions at sites where a species is known to have occurred and then predict where similar conditions may be found on the landscape in the future. Some models also consider the ability of a species to disperse to new areas whose environment may become unsuitable. The models' predictions allow researchers to create spatially explicit estimates of whether suitable environmental conditions for a species are likely to remain stable, become more widespread in the landscape (i.e., increase), or become more geographically rare in the future (i.e., decrease). For example, if suitable environmental conditions for a species were projected to decrease greatly in an area in the future, then the species would be considered more vulnerable to changing environmental conditions than a species for which such conditions were predicted to remain stable. It is important to note that raw data from niche models (e.g., spatial raster data) is not usually readily available to the public due to the large size of the files but instead is available in summary form in the research literature (i.e., academic journal articles). Therefore, more translational effort is needed with niche model results as the form of the data might not be readily interpretable by users.

Niche model results can be used in tandem with CCVI estimates to enhance the understanding of a given species' vulnerability, because CCVIs and niche models have complementary strengths that can help resource managers make informed conservation decisions. Niche models offer more refined and spatially explicit predictions (i.e., changes in suitable habitat) about the direct

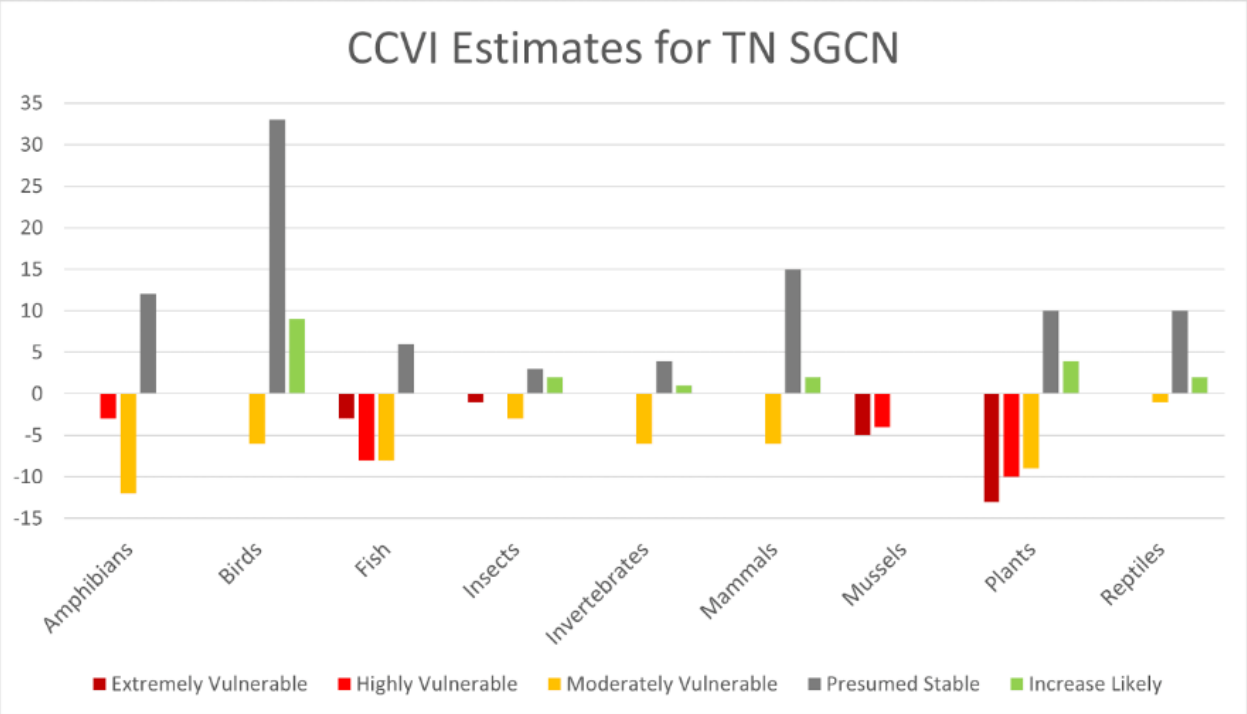


Figure 5.4. Tennessee SGCN that are considered vulnerable, stable, or may increase in population based on available CCVI estimates from SEAFWA states (i.e., in their 2015 SWAPs) and other sources compiled by Armsworth et al. (2025a).

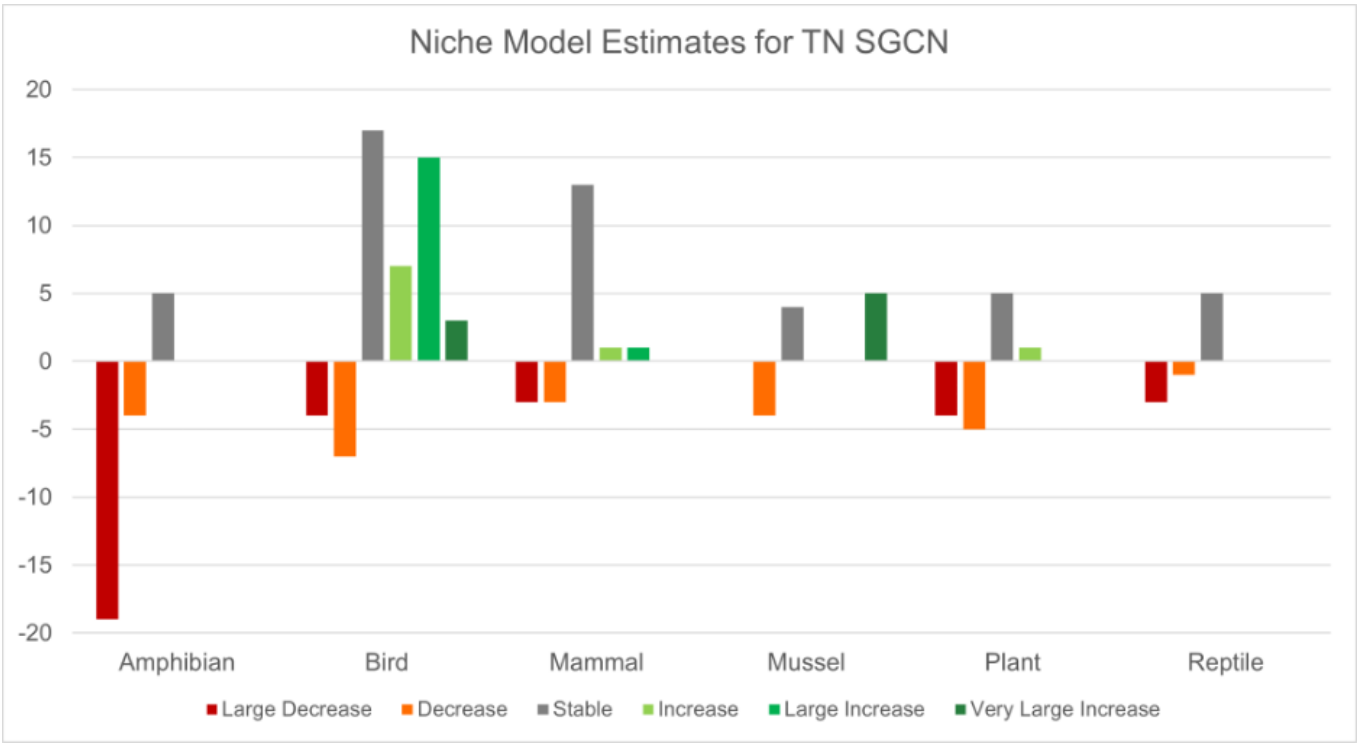


Figure 5.5. Tennessee SGCN that may decrease, remain stable, or increase based on available niche model estimates for eastern North America ranges, from the literature compiled by Armsworth et al. (2025b) and from Yoon et al. (2024).

exposure of a species to changing environmental conditions but are only available for a limited set of species, in part because the models require extensive data on a species before they can be applied. CCVI estimates use an expert judgment-based approach that allows integration of different types of species information and what characteristics might make them vulnerable to changing environmental conditions (e.g., their natural history). It is important to compare CCVI estimates with available ecological niche model predictions (when available) for SGCN to fully understand a given species' vulnerability to changing environmental conditions while keeping in mind the geographic (e.g., region or habitat evaluated) and biological contexts (e.g., estimated dispersal distance) of these assessments.

5.2.1. Summary of Available Changing Environmental Conditions Vulnerability Indices

For Tennessee, 211 SGCN have been scored via CCVI estimates by Southeast states to date or by other regional institutions, and to date, most have focused on birds (Armsworth et al. 2025a & 2025b). Many of these CCVI assessments indicate that while some bird species may be vulnerable, a larger proportion may remain stable or increase under changing climatic conditions (Fig. 5.4). Though more assessments are needed for other taxa, especially those that are not as well studied (e.g., invertebrates), these current CCVI estimates show that assessed fish, mussels, and plant SGCN have the largest proportion vulnerable to changing environmental conditions; and reptiles have the least. For example, all of the assessed mussel SGCN in Tennessee are vulnerable to changing environmental conditions (Fig. 5.4).

5.2.2. Summary of Available Ecological Niche Models

For Tennessee, 126 SGCN have been modeled by researchers via ecological niche models (i.e., species distribution models) to date (Armsworth et al. 2025b; Yoon et al. 2024). Fig. 5.5 summarizes the combined results for these ecological niche models. Based on these available niche model estimates to date, we can see that all assessed taxa have some SGCN for Tennessee that may experience decreases in their environmentally suitable landscape. However, Tennessee's amphibian SGCN that have been modeled show the largest numbers (19 species) potentially facing a large decrease of suitable habitat (Fig. 5.5).

Similar to the CCVI assessments, most niche models to date have focused on birds and have found, relatively speaking, many species may experience increases in their environmentally suitable landscape within the Southeast region as a result of changing environmental conditions. While all assessed taxa may see some decreases (i.e., a decrease or large decrease) for SGCN in environmentally suitable landscapes within the Southeast Region, these estimates suggest that amphibian and reptile SGCN are projected to have the greatest proportion of evaluated species that may experience reductions in suitable land area with changing environmental conditions. However, more assessments need to be done for more species and for taxa not included here (e.g., fish and invertebrates).



Four amphibian species that could be affected by habitat changes in Tennessee, clockwise from upper left: Green frog (*Rana clamitans*) and Spring Salamander (*Gyrinophilus porphyriticus*) / Daniel Istvanko, TWRA; Mountain Chorus Frog (*Pseudacris brachyphona*) / Chris Simpson, TWRA; Red Salamander (*Pseudotriton ruber*) / Dustin Thames, TWRA

5.2.3. Comparing CCVI and Available Ecological Niche Model Results

Comparing the results of the ecological niche models to the CCVI estimates for SGCN within Tennessee reveals similar trends for taxa that were evaluated using both methods. For example, we can see that all of Tennessee's evaluated taxa may experience some vulnerability (i.e., moderately, highly, extremely vulnerable) and some decreases (i.e., decrease or large decrease) (Figs. 5.4 & 5.5). Birds have the greatest number of SGCN with predicted stable or increasing populations across both approaches, partially due to how many more bird SGCN have been evaluated compared to other taxa (Figs. 5.4 & 5.5).

Currently, few species overlap between both the CCVI and ecological niche model datasets, which limits the scope of comparisons. But looking beyond birds, results from both CCVI and niche models suggest that amphibian and plant SGCN in Tennessee are projected to have many species vulnerable to changing environmental conditions (Figs. 5.4 & 5.5). Niche model estimates are not yet available for many aquatic species, such as fishes, which the scientific literature suggests may be some of the most vulnerable to changing environmental conditions in Tennessee and the Southeast region (Halpern and Kappel 2012; Poff et al. 2012; Ingram et al. 2013). However, the available CCVI for these aquatic taxa suggest that many fish and mussel SGCN of Tennessee may be extremely vulnerable to changing environmental conditions (Fig. 5.4).



Slackwater Darter (*Etheostoma boschungi*) spawning habitat, Middle Cypress Creek - easy to see how water level changes could affect this habitat and thus the species. / Alex Bybel, TWRA

Example: Changing environmental conditions and human impacts to mussels in Tennessee

North America hosts a significant diversity of freshwater mussels, with over 300 species, most of which reside in the Southeastern US (Williams et al. 2017). Freshwater mussels are critically important species that provide important ecosystem services (e.g., biofiltration, habitat engineering, nutrient recycling, and storage) and function as indicators of overall ecosystem health (Aldridge et al. 2022; Vaughn 2018). Approximately 65% of freshwater mussel species in the US are considered either endangered, threatened, or vulnerable and over 25 extinctions have been reported in the past century (Hopper et al 2023).

CCVI for aquatic taxa suggest that many of Tennessee's fish and mussel SGCN may be extremely vulnerable to changing environmental conditions.

Tennessee's many freshwater rivers and streams make the state a hotspot for freshwater mussel diversity, with 140 species occurring throughout the state, many of which are rare (Table 4.4; Dinkins et al. 2020). For example, the only two remaining populations of the White Wartyback (*Plethobasus cicatricosus*), exist below the Wilson and Pickwick Dams on the lower Tennessee River, despite the species having once been distributed across the Ohio, Cumberland, and Tennessee drainages (USFWS 2022d). As seen in Table 4.4, this once widespread species is now listed as Endangered under the federal ESA and considered critically endangered by other sources such as the IUCN Redlist. In another case, the Littlewing Pearly Mussel (*Pegias fabula*), also endangered, is now found only in six streams where previously they had existed throughout tributaries of the Tennessee and Cumberland Rivers in multiple states across 24 streams (NCWRC [date unknown]). Another example is the Finelined Pocketbook (*Hamiota altilis*), which is found in Tennessee in the small portion of the Conasauga River that briefly meanders into the southeastern part of the state (Williams et al. 2022). The Finelined Pocketbook is listed as Threatened under the ESA and of concern by other metrics shown in Table 5.4.



A selection of mussel shells from the Duck River, summer 2024, showing the diversity of species. Shells were abundant as a result of a mussel die-off caused by drought. / Brittany Bajo-Walker, TWRA

Tennessee's abundant freshwater sources include several sites of particularly high conservation value for mussels. The Duck River, one of the most biodiverse rivers in North America, contains over 60 mussel species, many of which are federally listed (Ahlstedt et al 2017). To monitor this delicate and biologically diverse system, TWRA biologists have deployed several programs over the last two decades. A Capture-Mark-Recapture study was initiated in 2022 and uses colored and numbered individually

unique tags to study the population structure at three different locations. A Long-Term Monitoring Program also exists at five locations and includes snorkel surveys of quadrats every five years to monitor population shift through time. Governor Bill Lee signed Executive Order 108 in 2024 to conserve the Duck River and surrounding watershed (Tennessee Governor's Office 2025).



A team of biologists participating in the Duck River Capture-Mark-Recapture study of mussels / Brittany Bajo-Walker, TWRA

Another well-known hotspot for freshwater mussel diversity is the Clinch River in the Upper Tennessee River Basin. The Clinch supports roughly 50 extant species, of which 24 are federally listed as Endangered (Cope et al. 2021). Ongoing efforts to conserve mussel species in the Clinch River region include the Kyles Ford Preserve, which was established in this watershed to aid in mussel conservation and contains at least 35 species, some of which are unique to this section of the Clinch River (TNC 2025). A long-term monitoring program initiated and continued by the Virginia Polytechnic Institute and State University (Virginia Tech) has also been monitoring mussel population health for multiple decades.

The status of Tennessee's mussels

Along with setting aside protected regions for conservation, significant work has gone into Species Status Assessments (SSA) to determine species resiliency, redundancy, and representation





Two well-named Tennessee mussel SGCN: Rabbitsfoot Mussel (*Theliderma cylindrica)*, left and Cumberland Rockshell (formerly called Monkeyface) (*Theliderma intermedia*), right / Brittany Bajo-Walker, TWRA

(collectively known as the "3 Rs"). Of the finalized SSAs, 16 species of mussels are also included in the Tennessee SGCN list. For example, a recent SSA for the Tennessee Heelsplitter (*Lasmigona holstonia*) evaluated its current range, preferred habitat, and resiliency to threats (USFWS 2022b). Forty mussel species on Tennessee's SGCN list are Endangered under the ESA (Table 5.4). Increased environmental and anthropogenic threats have raised concern for mussel populations across the country where declines have been observed (Haag 2012).

The reasons for these declines are multifaceted. Although it is common for land-dwelling species to move toward more suitable habitat as temperatures rise, aquatic freshwater mussels are unable to do so. One reason for this is habitat connectivity issues due to dams or impoundments (Inoue and Berg 2016). Freshwater mussel populations are negatively impacted by a number of anthropogenic disturbances, including the construction of impoundments and canals, the introduction of invasive and non-native species, and over-harvesting (Aldridge et al. 2022). The Tennessee Riffleshell (*Epioblasma propinqua*) is one mussel that is now extinct due to habitat loss and degradation (Hagg 2012). Changing environmental conditions pose an additional challenge for these mussel species and may interact with existing anthropogenic disturbances, amplifying mussel declines. Warming water temperatures, declining water and sediment quality, natural disasters, host species declines, and drought are commonly cited negative impacts on mussel population persistence. In addition, up to 94% of mussel species may exclusively use native fish species as hosts for larvae. Even if they are not identified as SGCN, host species are indispensable for the role they play in ensuring native mollusks thrive in Tennessee's waterways, and host fish are likewise vulnerable to changes in water quantity (Modesto et al. 2018).

Table 5.4 is Tennessee's updated list of mussel SGCN and Regional SGCN. Table 5.4 includes summary indicators of species overall status from **NatureServe Explorer** and **IUCN Red List of Threatened Species** assessments. The table also indicates whether the species is listed under the ESA, again reflecting the species' overall conservation status. Finally, the table shows results of two different approaches to evaluating a species vulnerability to future changing environmental conditions, an emergent threat driver for mussel species and other groups.

The first of these assessment approaches for vulnerability is the NatureServe CCVI assessment (Lyons et al. 2024). CCVI assessments combine a worksheet-based exercise informed by expert judgment about species traits and environmental factors with physical environmental data. The second set of vulnerability assessments comes from ecological niche models, which project whether climatically suitable conditions may become more widespread or more restricted in the future. The niche model results shown in the table are based on the predicted range changes for each species within the 55 watersheds of Tennessee. These predictions come from an analysis that considers both impoundments and environmental impacts in evaluating how species-specific suitable areas might change over time (Yoon et al. 2024). Many of Tennessee's SGCN are also regional species of greatest conservation need (RSGCN), meaning that other states in the Southeast also consider mussels to be a priority and are indicated as such in Table 5.4.

Table 5.4. Tennessee mussel SGCN conservation status and vulnerability assessments

Available assessments of vulnerability to environmental change based on a summary of NatureServe CCVI calculations from southeastern states (Armsworth et al. 2024a); Ecological niche model vulnerability scores from recent studies using eastern North America geographic areas summarized by Armsworth et al. (2024b). The niche model results are based on the predicted range changes for each species within the 55 watersheds of Tennessee and come from an analysis where both impoundments and environmental impacts were considered in evaluating how species-specific environmentally suitable areas might change over time (Yoon et al. 2024).

Key. Colors listed in order from greatest to least level of endangerment: possibly extirpated: extinct: no data: not assessed:

*Denotes genetic uncertainty with the species at the time of this report

Mussel Species		Broad Risk Assessment Measures				Vulnerability Measures	
Common Name	Scientific Name	RSGCN	Nature Serve State Rank	ESA Status	IUCN Redlist	Niche Model Output for TN Watersheds	Nature Serve CCVI by SE States
Alabama Clubshell	*Pleurobema troschelianum*			Not Listed	Extinct	Not Assessed	Not Assessed
Alabama Creekmussel	*Pseudodontoideus connasaugaensis*	Y	Critically Imperiled	Not Listed	Near Threatened	Not Assessed	Moderately Vulnerable
Alabama Lampmussel	*Lampsilis virescens*	Y	Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Not Assessed
Alabama Moccasinshell	*Medionidus acutissimus*	Y	Critically Imperiled	Threatened	Endangered	Not Assessed	Not Assessed
Alabama Rainbow	*Cambarunio nebulosus*	Y	Imperiled	Not Listed	No Data	Not Assessed	Not Assessed
Alabama Spike	*Elliptio arca*	Y	Imperiled	Not Listed	Data Defecient	Not Assessed	Not Assessed
Appalachian Elktoe	*Alasmidonta raveneliana*	Y	Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Not Assessed
Appalachian Rockshell	*Theliderma sparsa*	Y	Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Not Assessed
Barrens Heelsplitter (Barrens Bankclimber)	*Lasmigona sp. 1 cf. holstonia**			Not Listed	No Data	Not Assessed	Moderately Vulnerable
Birdwing Pearlymussel	*Lemiox rimosus*	Y	Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Not Assessed
Black Sandshell	*Ligumia recta*		Secure	Not Listed	Near Threatened	Stable	Extremely Vulnerable
Catspaw	*Epioblasma obliquata*	Y	Critically Imperiled	Endangered	Endangered	Not Assessed	Not Assessed
Clubshell	*Pleurobema clava*	Y	Possibly Extirpated	Endangered	Critically Endangered	Not Assessed	Highly Vulnerable
Coosa Creekshell	*Leaunio umbrans*	Y	Imperiled	Not Listed	No Data	Not Assessed	Not Assessed

Mussel Species		Broad Risk Assessment Measures				Vulnerability Measures	
Common Name	Scientific Name	RSGCN	Nature Serve State Rank	ESA Status	IUCN Redlist	Niche Model Output for TN Watersheds	Nature Serve CCVI by SE States
Coosa Moccasinshell	*Medionidus parvulus*	Y	Critically Imperiled	Endangered	Endangered	Not Assessed	Not Assessed
Cracking Pearlymussel	*Hemistena lata*	Y	Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Not Assessed
Creeper	*Strophitus undulatus*		Secure	Not Listed	No Data	Decrease	Presumed Stable
Cumberland Bean	*Venustaconcha troostensis*		Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Not Assessed
Cumberland Elktoe	*Alasmidonta atropurpurea*	Y	Critically Imperiled	Endangered	Endangered	Not Assessed	Not Assessed
Cumberland Moccasinshell	*Medionidus conradicus*	Y	Critically Imperiled	Proposed Endangered	Near Threatened	Not Assessed	Moderately Vulnerable
Cumberland Rockshell	*Theliderma intermedia*	Y	Critically Imperiled	Endangered	Endangered	Not Assessed	Not Assessed
Cumberland Papershell	*Anodontoides denigratus*	Y	Critically Imperiled	Not Listed	No Data	Not Assessed	Not Assessed
Cumberland Pigtoe	*Pleuronaia gibber*	Y	Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Not Assessed
Cumberlandian Combshell	*Epioblasma brevidens*	Y	Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Not Assessed
Delicate Spike	*Elliptio arctata*	Y	Imperiled	Not Listed	No Data	Very Large Increase	Not Assessed
Dromedary Pearlymussel	*Dromus dromas*	Y	Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Not Assessed
Elktoe	*Alasmidonta marginata*		Apparently Secure	Not Listed	Least Concern	Stable	Moderately Vulnerable
Fanshell	*Cyprogenia stegaria*	Y	Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Moderately Vulnerable
Fat Pocketbook	*Potamilus capax*	Y	No Status Rank	Endangered	Vulnerable	Not Assessed	Highly Vulnerable
Fatmucket	*Lampsilis siliquoidea*		Imperiled	Not Listed	Least Concern	Not Assessed	Not Assessed
Finelined Pocketbook	*Hamiota altilis*	Y	Critically Imperiled	Threatened	Endangered	Very Large Increase	Not Assessed
Finerayed Pigtoe	*Fusconaia cuneolus*	Y	Critically Imperiled	Endangered	Endangered	Not Assessed	Not Assessed
Fluted Kidneyshell	*Ptychobranchus subtentus*	Y	Imperiled	Endangered	Near Threatened	Not Assessed	Not Assessed
Georgia Pigtoe	*Pleurobema hanleyianum*		Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Moderately Vulnerable
Green Floater	*Lasmigona subviridis*	Y	Imperiled	Proposed Threatened	Least Concern	Not Assessed	Highly Vulnerable
Hickorynut	*Obovaria olivaria*		Imperiled	Not Listed	Least Concern	Stable	Moderately Vulnerable

Mussel Species		Broad Risk Assessment Measures				Vulnerability Measures	
Common Name	Scientific Name	RSGCN	Nature Serve State Rank	ESA Status	IUCN Redlist	Niche Model Output for TN Watersheds	Nature Serve CCVI by SE States
Little Spectaclecase	*Leaunio lienosus*		Apparently Secure	Not Listed	No Data	Not Assessed	Not Assessed
Littlewing Pearlymussel	*Pegias fabula*	Y	Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Not Assessed
Longsolid	*Fusconaia subrotunda*	Y	Vulnerable	Threatened	Vulnerable	Not Assessed	Highly Vulnerable
Mountain Creekshell	*Leaunio vanuxemensis*	Y	Apparently Secure	Not Listed	No Data	Decrease	Highly Vulnerable
Mucket	*Actinonaias ligamentina*		Apparently Secure	Not Listed	Least Concern	Stable	Not Assessed
Ohio Pigtoe	*Pleurobema cordatum*		Vulnerable	Not Listed	Near Threatened	Not Assessed	Moderately Vulnerable
Orangefoot Pimpleback	*Plethobasus cooperianus*	Y	Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Highly Vulnerable
Ovate Clubshell	*Pleurobema perovatum*		Possibly Extirpated	Endangered	Extinct	Not Assessed	Not Assessed
Oyster Mussel	*Epioblasma capsaeformis*	Y	Critically Imperiled	Endangered	Endangered	Not Assessed	Not Assessed
Painted Clubshell	*Pleurobema chattanoogaense*			Not Listed	Critically Endangered	Not Assessed	Not Assessed
Painted Creekshell	*Cambarunio taeniatus*	Y	Vulnerable	Not Listed	Least Concern	Not Assessed	Highly Vulnerable
Pale Lilliput	*Toxolasma cylindrellus*	Y	Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Not Assessed
Pheasantshell	*Actinonaias pectorosa*	Y	Apparently Secure	Not Listed	Near Threatened	Not Assessed	Moderately Vulnerable
Pink Mucket	*Lampsilis abrupta*	Y	Imperiled	Endangered	Vulnerable	Not Assessed	Moderately Vulnerable
Purple Lilliput	*Toxolasma lividum*		Critically Imperiled	Not Listed	Least Concern	Not Assessed	Moderately to Extremely Vulnerable
Rabbitsfoot	*Theliderma cylindrica*		Vulnerable	Threatened	Near Threatened	Not Assessed	Moderately Vulnerable
Rainbow	*Cambarunio iris*		Secure	Not Listed	No Data	Decrease	Highly Vulnerable
Rayed Bean	*Paetulunio fabalis*		Critically Imperiled	Endangered	Endangered	Not Assessed	Highly Vulnerable
Rayed Kidneyshell	*Ptychobranchus foremanianus*	Y	Critically Imperiled	Not Listed	No Data	Not Assessed	Not Assessed
Ring Pink	*Obovaria retusa*	Y	Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Extremely Vulnerable

Mussel Species		Broad Risk Assessment Measures				Vulnerability Measures	
Common Name	Scientific Name	RSGCN	Nature Serve State Rank	ESA Status	IUCN Redlist	Niche Model Output for TN Watersheds	Nature Serve CCVI by SE States
Rough Fatmucket	*Lampsilis straminea*			Not Listed	No Data	Very Large Increase (missing subspecies name)	Not Assessed
Rough Pigtoe	*Pleurobema plenum*	Y	Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Extremely Vulnerable
Round Hickorynut	*Obovaria subrotunda*	Y	Imperiled	Threatened	Endangered	Not Assessed	Highly Vulnerable
Salamander Mussel	*Simpsonaias ambigua*		Critically Imperiled	Proposed Endangered	Vulnerable	Not Assessed	Highly Vulnerable
Scaleshell	*Potamilus leptodon*	Y	Critically Imperiled	Not Listed	Near Threatened	Not Assessed	Not Assessed
Sheepnose	*Plethobasus cyphyus*	Y	Imperiled	Endangered	Endangered	Not Assessed	Highly Vulnerable
Shiny Pigtoe	*Fusconaia cor*	Y	Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Not Assessed
Slabside Pearlymussel	*Pleuronaia dolabelloides*	Y	Imperiled	Endangered	Endangered	Not Assessed	Moderately Vulnerable
Slippershell Mussel	*Alasmidonta viridis*	Y	Vulnerable	Not Listed	Least Concern	Not Assessed	Moderately Vulnerable
Snuffbox	*Epioblasma triquetra*	Y	Vulnerable	Endangered	Endangered	Not Assessed	Extremely Vulnerable
Southern Acornshell	*Epioblasma othcaloogensis*		Presumed Extirpated	Not Listed	Critically Endangered	Not Assessed	Not Assessed
Southern Clubshell	*Pleurobema decisum*	Y	Possibly Extirpated	Endangered	Endangered	Very Large Increase	Not Assessed
Southern Hickorynut	*Obovaria arkansasensis*	Y	Critically Imperiled	Not Listed	Vulnerable	Not Assessed	Not Assessed
Southern Pigtoe	*Pleurobema georgianum*	Y	Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Not Assessed
Southern Rainbow	*Villosa vibex*		Imperiled	Not Listed	No Data	Not Assessed	Not Assessed
Spectaclecase	*Cumberlandia monodonta*	Y	Imperiled	Endangered	Endangered	Not Assessed	Not Assessed
Tan Riffleshell	*Epioblasma walkeri*	Y	Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Not Assessed
Tapered Pondhorn	*Uniomerus declivis*		Imperiled	Not Listed	No Data	Not Assessed	Not Assessed
Tennessee Bean	*Villosa trabalis*			Endangered	Critically Endangered	Not Assessed	Not Assessed
Tennessee Clubshell	*Pleurobema oviforme*	Y	Imperiled	Proposed Endangered	Vulnerable	Not Assessed	Highly Vulnerable

Mussel Species		Broad Risk Assessment Measures				Vulnerability Measures	
Common Name	Scientific Name	RSGCN	Nature Serve State Rank	ESA Status	IUCN Redlist	Niche Model Output for TN Watersheds	Nature Serve CCVI by SE States
Tennessee Heelsplitter	*Lasmigona holstonia*	Y	Imperiled	Not Listed	Least Concern	Not Assessed	Moderately Vulnerable
Tennessee Pigtoe	*Pleuronaia barnesiana*	Y	Imperiled	Proposed Endangered	Least Concern	Not Assessed	Moderately Vulnerable
Triangular Kidneyshell	*Ptychobranchus greenii*			Endangered	Endangered	Not Assessed	Not Assessed
Upland Combshell	*Epioblasma metastriata*		Possibly Extirpated	Not Listed	Critically Endangered	Not Assessed	Not Assessed
Warrior Pigtoe	*Pleurobema rubellum*			Not Listed	Critically Endangered	Not Assessed	Not Assessed
White Heelsplitter	*Lasmigona complanata*		Secure	Not Listed	Least Concern	Decrease	Presumed Stable
White Wartyback	*Plethobasus cicatricosus*	Y	Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Not Assessed
Winged Mapleleaf	*Quadrula fragosa*	Y	Critically Imperiled	Endangered	Critically Endangered	Not Assessed	Not Assessed
A mussel	*Venustaconcha sima**			Not Listed	No Data	Not Assessed	Not Assessed

Forty of the 87 species are listed as Endangered under the ESA and nearly all species are considered by NatureServe to be Critically Imperiled, Imperiled, or Vulnerable. Risk designations concur with NatureServe designations for some species such as the Shiny Pigtoe (*Fusconaia cor*), Clubshell (*Pleurobema clava),* Ring Pink (*Obovaria retusa)*, and Rough Pigtoe (*Pleurobema plenum)* (Table 5.4).

The Impacts of changing environmental conditions on Tennessee mussels

Changing environmental conditions may exacerbate existing stressors for mussel species (Tarter et. al 2022). This is particularly worrying for species such as the Ring Pink (*Obovaria retusa*) and Rough Pigtoe (*Pleurobema plenum*), which are already evaluated by IUCN, NatureServe, and their ESA listing as being in critical condition and also are projected to be highly vulnerable to future changing environmental conditions. Even for species that are currently of least concern, niche model projections suggest their suitable range might decrease as the environmental conditions change, as is the case for the Rainbow (*Villosa iris*)*,* White Heelsplitter (*Lasmigona complanata*), and Round Pigtoe (*Pleurobema sintoxia*). In contrast, for other species such as the Finelined Pocketbook (*Hamiota altilis*), niche models suggest the impacts of changing environmental conditions may not be as substantial, with a predicted increase in climatically suitable area.

There are some discrepancies in the estimates of species vulnerability between the niche model outputs and the CCVI method, such as with the Elktoe (*Alasmidonta marginata*). There can be different reasons for this, not least that the two methods include different kinds of information. It may also be due to the niche models representing the projected trend for the whole region due to the effects of changing environmental conditions and impoundments, whereas CCVI assessments were conducted at the state level (Table 5.4). Additionally, to date, many species have either not been assessed using the NatureServe CCVI tool or been the subject of regional ecological niche modeling efforts as is indicated by the gray "Not Assessed" boxes in Table 5.4.

Species Status Assessment reports (SSAs), produced by the US Fish and Wildlife Service, provide another source of valuable information for enhancing the conservation of freshwater mussels in Tennessee. SSAs generally integrate population and demographic data, current and projected environmental data, and data quantifying a variety of potential risks (e.g., pollutant concentrations, land use change) to both assess the current status of individual mussel populations and predict how this may change under future changing environmental conditions. For example, in the 2022 SSA for the Snuffbox (*Epioblasma triquetra*), multifactor assessments of demographic condition and risk factors were combined to determine individual population statuses (delineated by USDA HUC8 units). Demographic condition was assessed on a scale from high to functional extirpation, based on demographic factors including population size, population extent, and reproduction and recruitment rates. Risk factors are assessed on a scale from high to low for five categories - water quality/contaminants, landscape, hydrological regime, connectivity, and invasive species presence. The SSA concludes that the five remaining contemporary populations in the Tennessee region are in moderate or low demographic condition with high to moderate risk of extirpation.

Increased water temperature

Freshwater mussels are experiencing thermal stress as changing environmental conditions increase average air and water temperatures and extend the summer season (van Ee et al. 2022). This negatively affects freshwater mussel survival, as elevated water temperatures have been shown to be associated with mussel die-offs (van Ee et al. 2022, Waller and Cope 2019). Moreover, as water temperatures increase, a timing mismatch between freshwater mussels and their fish hosts can occur, leading to further declines in abundance (Osterling 2014).

Mussels depend on host species populations to be relatively dense to achieve reproductive success. This is because most freshwater mussels reproduce by releasing larvae called glochidia, which embed in a host fish's gills until their juvenile phase, after which they are released back into the habitat (Lane et al. 2021). This is an obligate parasitic relationship, and freshwater mussels often specialize on specific fish host species. Some mussels have highly specialized "lure" appendages that attract specific fish hosts, increasing the probability of a successful egg release (Lane et al. 2021). The Oyster Mussel (*Epioblasma capsaeformis*) is one such species. Female Oyster Mussels have colorful, expandable lures to entice their fish host (Lane et al. 2021). The mantle can inflate to keep its host species still so that its glochidia can implant successfully (Lane et al. 2021). As seen in Table 5.4, the Oyster Mussel is now listed as Endangered by the ESA and considered of significant concern by other metrics.



Closeup showing the white lures resembling prey that a mussel uses from its spot on the riverbed to entice fish, which may then serve as host for the mussel glochidia (larvae). Both mussels and host fish may be susceptible to threats related to changing environmental conditions. / Brittany Bajo-Walker, TWRA

Host fish are also susceptible to threats related to changing environmental conditions, such as warming temperatures and extreme weather events (Aldridge et. al 2022). Loss of a fish host can lead to an extinction of the mussel species that relies on the obligate relationship to reproduce. Some freshwater mussels are long term brooders, rearing their glochidia in early summer, brooding over winter, and then releasing them late spring or early summer (Österling 2014). Warming temperatures may cause freshwater mussels to release their glochidia earlier in the year, prior to their host species population reaching suitable abundance in the same area to support an adequate amount of glochidia (Moore et al. 2018). This can lead to a reduction in recruitment, especially in slower growing mussels (Moore et al. 2018). Therefore, host species declines and phenological mismatches due to warming temperatures are of concern to mussel conservation.

Loss of a fish host can lead to an extinction of the mussel species that relies on the obligate relationship to reproduce.

Increased extreme weather events and impacts on water quality

Changing environmental conditions are expected to alter disturbance regimes (e.g., flooding, storms) resulting in more frequent and extreme weather events, such as the destruction caused by Hurricane Helene in eastern Tennessee in 2024 (Tarter et al. 2022). These events can heavily impact both water and sediment quality, features that are critical to mussel health. As benthic filter-feeders, mussels are particularly sensitive to pollution in the sediment and water column (Haag et al. 2019). Extreme weather events can also lead to increases in the levels of contaminants, which is often correlated to mussel declines (Cope et. al 2021). Studies have shown that mussel health is negatively affected by dissolved metals, ammonia, chlorine, and major ions in dissolved solids (Cope et al. 2021, Price et al. 2014). For example, at Ellejoy Creek in Blount County, Tennessee, the presence of nearby roads and an eroding stream bank have increased turbidity and levels of suspended sediment in the water, which is associated with notable declines in mussel density downstream (Schilling et al. 2017). Increased rainfall due to changing environmental conditions can lead to additional runoff from human populations and contribute to streambank erosion and bedload instability.



Mussel filtering - as benthic filter feeders, mussels contribute to water quality and are especially sensitive to sedimentation and pollution / Brittany Bajo-Walker, TWRA

Extreme flooding and increased stormwater runoff are also expected to become more frequent in Tennessee as changing environmental conditions progress (Lomardi & Davis 2023). For the Spectaclecase Mussel (*Cumberlandia monodonta*), prolonged increases in the stream velocity due to extreme flooding poses two major threats: (1) the spatial displacement and mortality of juvenile mussels and glochidia, and (2) the alteration of streambed habitat, particularly due to the accumulation of debris (USFWS 2022a). Spatial displacement in the wake of these extreme weather events can alter community composition in the long-term, with disturbance-tolerant species becoming more abundant (Tarter et al. 2022). The Spectaclecase Mussel (*Cumberlandia monodonta*) tends to inhabit areas with variable stream velocity at the interface between swift and slow-flowing water. However, the magnitude and length of increased velocity expected with increases in extreme flooding events may likely exceed the tolerance range for this species (USFWS 2022a). The fate of displaced mussels that have been relocated by flooding or extreme weather events remains unclear (Sotola et al. 2020). Habitat alteration has major consequences for mussel life history events, as it can prevent both mussels and their host fish from being able to persist or reestablish in each area post-flood.

Increased drought

Changing environmental conditions are expected to increase the frequency and intensity of droughts (IPCC 2023). These changes pose a particularly difficult challenge for sedentary organisms like mussels, which have a limited ability to track suitable climatic conditions in space. Stressors related to drought include emersion (periods of low water exposure), desiccation (complete drying or dehydration), and increased predation pressure. These stressors occur when water levels decrease, which leads to increases in water temperature and hypoxia (lack of suitable oxygen in the waterway) (Cushway et al. 2025).



Emersion of a mussel (partially out of the water) in the Duck River is a stressor and signifies a potentially detrimental habitat change associated with drought. / Brittany Bajo-Walker, TWRA

As water scarcity increases, the concentration of solutes, including pollutants, increases. These stressors disrupt mussel physiology (e.g., reduce the availability of lipids, proteins, and carbohydrates, slow ATP production) and hinder filter feeding, resulting in declines in body condition, energy availability, and slowed growth rates (Jeffery et al. 2018). A number of studies have demonstrated that drought can lead to mass mussel mortality and increases the risk of population extirpation (Lombardi & Davis 2023). Some mussel species may be more heavily impacted due to unique niche partitioning. Those that are often found near banks or in shallow water are often stranded more readily than those that live in the center of the river (ie., the thalweg). Drought can also alter mussel population structure, either due to impacts on host species availability or the increased vulnerability of juvenile mussels relative to adult individuals (Jeffery et al. 2018).

As flow regimes change in the Southeast, predicting droughts is essential to inform conservation efforts. In 2017, the US Geological Survey in collaboration with the Gulf Coastal Plains and Ozarks Landscape Conservation Cooperative developed a model that simulates water availability in the Southeast based on historical and simulated weather records (LaFontaine et al. 2019). Tools such as this one that project stream flow, may be useful in helping managers to predict which streams may be suitable for freshwater mussel populations, which in turn can help guide restoration efforts.

Summary of mussel population declines and impacts from changing environmental conditions

In summary, declines in mussel populations and impacts from changing environmental conditions reported in studies cited here are worrisome and signal the need for conservation action. The Tennessee Wildlife Resources Agency has a number of projects dedicated to mussel conservation,

such as the partnership with Dale Hollow National Fish Hatchery and the Cumberland River Aquatic Center to raise and propagate (respectively) Endangered and Threatened mussels to nearly adult size before releasing them into the wild (see In-Vitro Mussel Fertilization Highlight). Other mussel restoration efforts are also being explored within the state, such as a study at the University of Tennessee, Knoxville exploring the feasibility of restoration of the Slippershell (*Alasmidonta viridis*) and Spike (*Eurynia dilata*) Mussels in Abrams Creek (Moses et al, in prep). Since mussels are mainly stationary organisms that reside in streams, reservoirs, and rivers, monitoring and maintaining favorable water conditions across Tennessee is also fundamental to the survival of these species. For species with limited data as shown in Table 5.4, such as the Rough Fatmucket (*Lampsilis straminea*), additional monitoring and sampling efforts could improve understanding of their potential responses to ongoing changing environmental conditions. These conservation efforts are needed to preserve these critically important species and understand how mussels may react to changing environmental conditions and human impacts.

5.3. Adaptation Strategies

A framework developed by federal, state, and tribal managers to build ecosystem resilience provides recommendations for the future. The report presents 13 management recommendations, spanning education, refugia, invasive species, and cross-sector coordination, with an emphasis on integrating people into the approach to environmental adaptation, which can serve as an effective guide to adaptive management in Tennessee. Identifying specific adaptation strategies (i.e., management responses to changing environmental conditions) to address impacts and vulnerability is a step towards resilience. Environmental adaptation and mitigation come in various forms, and multiple frameworks have been built to support planning for and implementing environmental adaptation. Most adaptation frameworks generally include:

- Recognizing limitations to adaptation, such as the degree of natural resource management, availability of funding, or staffing capacity
- Deciding which type(s) of adaptation approach(es) meet specific conservation goals.

Two well-known examples of frameworks include the Resist-Accept-Direct (RAD) Framework developed by the US. National Park Service and the Resistance, Resilience and Transition (RRT) Framework developed by Colorado State University. There are also multiple sources for adaptation and mitigation strategies. The **Adaptation Workbook**, a compilation of resources developed by a multi-institutional partnership led by the US Forest Service, provides an excellent overview of strategies.

The Adaptation Workbook is broken down into sections, one of which is **Adaptation Strategies and Approaches**. In this section, environmental adaptation strategies are listed in what are known as "menus"—categorized by focus areas—with the goal of the menus being to provide conservationists with specific, actionable adaptation options from which to select. The menus are not all-encompassing, nor are they intended to serve as guidance for management decisions. They



IN-VITRO MUSSEL FERTILIZATION, ANOTHER FIRST FOR CONSERVATION

In 2015, the critically endangered **Pale Lilliput** mussel (*Toxolasma cylindrellus*), was thought to be extirpated from Tennessee until **Don Hubbs and David Sims of TWRA** discovered a population in Lick Creek, a small tributary of the famously biodiverse Duck River. Seizing on the discovery, **Dan Hua, TWRA Senior Scientist** (now retired) at the Cumberland River Aquatic Center (CRAC), had 10 gravid females collected from the wild in 2016 for use as "broodstock" to produce juvenile mussels for reintroduction.

Raising mussels is a process that Dan Hua has helped to pioneer for over 20 species (many of them threatened or endangered) across the Southeast. Freshwater mussels have evolved a complex and highly specialized reproductive cycle that requires a fish host species specific to each mussel species to help grow their young from newly hatched glochidia larvae to juveniles. This process had already been duplicated in the CRAC lab to raise mussels for reintroduction.

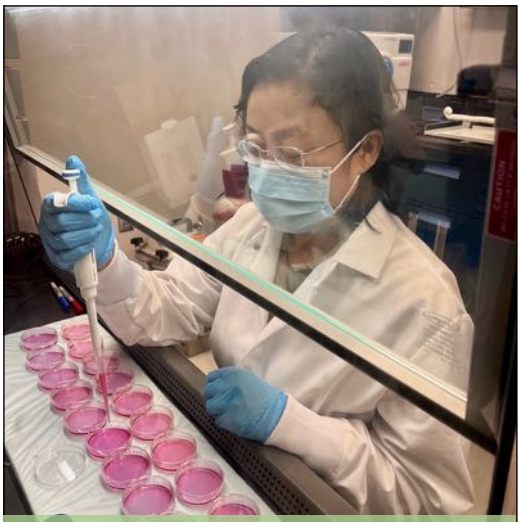
With her hallmark approach to innovation, in 2022 Hua began working to raise young mussels in-vitro, i.e. in a petrie dish chock full of nutrients and antibiotics (to ward of the bacteria that also thrive in the same medium). Her in-vitro technique allowed her to bump up glochidia production from about 2-300 per host fish to ~3000 per petrie dish!



Left: Juvenile Pale Lilliput mussels labeled with bee tags; Right: Pale Lilliput adult. Photos by Dan Hua

BRINGING BACK THE PALE LILLIPUT FROM THE BRINK OF EXTINCTION

Historically, the Pale Lilliput mussel occurred in a wide variety of habitats from small creeks to large rivers, and it was found from the middle reaches of the Tennessee River system, across northern Alabama, and in the Duck River system in central Tennessee (USFWS 2021).



Dr. Dan Hua working with her Pale Lilliput in-vitro culture / Heather Kerns.

However, it currently seems to persist only in headwater-sized streams, usually in less than three feet of water (USFWS 2021). While all freshwater mussels are indicators of water quality, Hua speculates that this species may be more sensitive to environmental change compared to others.

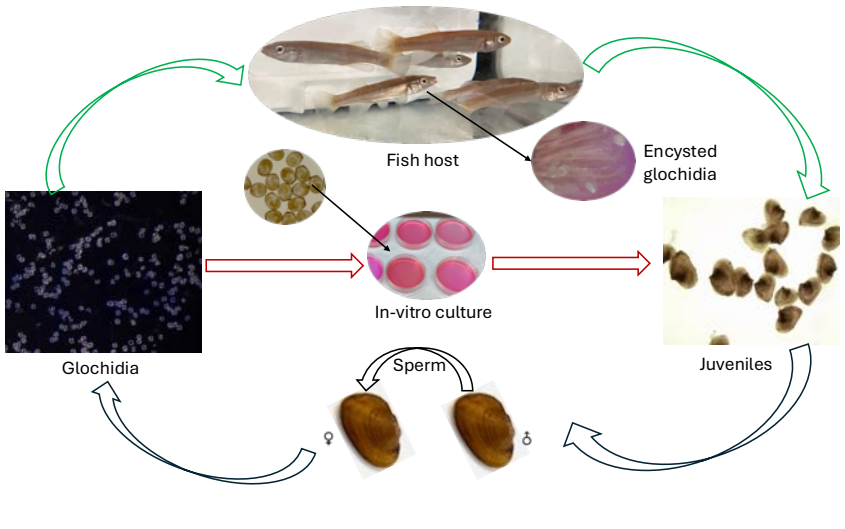
It's likely that in the past, threats to Pale Lilliput from non-point sources, including erosion, sedimentation, urban development, and agricultural runoff, were exacerbated by a lack of riparian vegetation, livestock fencing, and vehicle fording sites. To reduce sedimentation, partners have installed native tree and shrub landscaping, as well as streambank stabilization and channel enhancements along Duck River tributaries. Lick Creek may have been the last stronghold because its watershed has ~12,800 acres of wildlife management area with little to no urban development (USFWS 2021).

After nearly 50 years as an endangered species, researchers currently have high hopes that as a result of nine years of propagation work, the

Pale Lilliput could be downlisted within the next 5 to 10 years. Propagation by both the Alabama Aquatic Biodiversity Center and CRAC, along with the relatively secure status of current natural populations in both Tennessee and Alabama, has led the USFWS to judge the potential for Pale Lilliput recovery as "high" (USFWS 2021). This work has been funded through State Wildlife Grants, Section 6 funds for endangered species recovery, and Inflation Reduction Act funding from the USFWS.

FISH VS GLASS IN THE LIFE CYCLE OF PALE LILLIPUT

Since 2013, when the Alabama Aquatic Biodiversity Center (AABC) discovered a population in the Paint Rock River, the AABC has propagated juveniles for reintroduction into the Duck River in TN. Currently, there is more appropriate habitat for the Pale Lilliput in TN than in AL. Since 2022, Pale Lilliput larvae grown the traditional way (using fish hosts) have been reintroduced as juveniles into the Buffalo River, and in the fall of 2024, the first Pale Lilliput larvae produced using Hua's in-vitro techniques were reintroduced! (See figure above.)



The Life Cycle of the Pale Lilliput Mussel: Fertilization occurs in the wild. Green arrows show the natural route of larval development via fish host. Red arrows show the in-vitro route of larval development pioneered at Cumberland River Aquatic Center. Diagram created by Dan Hua.

Hua says, "We can produce several species in-vitro and it costs less than using fish hosts! There are so many uncertainties when working with host fish. By using in-vitro techniques, we can eliminate one source of mortality (fish hosts dying) and less space is required—no tanks needed for the fish!" So far, health markers tested at CRAC indicate that the in-vitro juvenile mussels are healthy. One question that Hua would like to pursue, with the help of a graduate student, is how the in-vitro F2 generation will fare (i.e. the first offspring produced by the original F1 in-vitro generation).

Pale Lilliput Conservation Partners

Mussel Propagation & Reintroduction Partners in TN

Cumberland River Aquatic Center (CRAC)
Alabama Aquatic Biodiversity Center (AABC)
Tennessee Valley Authority
Tennessee Wildlife Resources Agency
US Fish and Wildlife Service

Habitat Restoration Partners in TN

Environmental Protection Agency
The Nature Conservancy of Tennessee
Participating landowners
Tennessee Dept. of Agriculture

When mussels are reintroduced into habitat for the first time, CRAC conducts a number of tests to ensure their survival. Juveniles of a certain size are marked with tiny PIT tags and placed in silos and cages on the appropriate river substrate. To assess the sites' suitability, CRAC biologists return in a couple months to assess the survival and growth of juveniles. They relocate the mussels via the PIT tags, which have small coded bar tags that can be recognized using a handheld wand. The wand emits a signal with each tag recorded (similar to grocery store bar codes).

While CRAC and partners are making enormous progress in re-establishing the Pale Lilliput, freshwater mussels continue to face new threats. It appears that there is currently an unknown mussel disease devastating mussel communities on a global level (USFWS 2021). Changing environmental conditions are also considered a threat to the Pale Lilliput, as they will almost certainly affect aquatic habitats, particularly through more intense or frequent droughts (USFWS 2021). This would mean discrete species populations are more vulnerable to extirpation from random events—making ongoing propagation and reintroductions of this and other freshwater mussel species even more critical.

US Fish and Wildlife Service South Atlantic – Gulf Region ,Alabama Ecological Services Field Office. 2021. Pale Lilliput (Toxolasma cylindrellus) 5-Year Review: Summary and Evaluation.

simply serve as a starting point for those interested in environmental adaptation so that they do not have to start from scratch. Adaptation menus and the recommended strategies and approaches that apply to the US Southeast include:

- Agriculture
- Fire-Adapted Ecosystems
- Forests
- Forest Carbon Management
- Forested Watersheds
- Grasslands
- Non-Forested Wetlands
- Recreation
- Saltwater Coastal Ecosystems
- Tribal Perspectives
- Urban Forests
- Wildlife Management

Resilience emphasizes diverse landscapes where species are likely to be able to move and adjust to changing conditions.

Regardless of the projected impacts of hazards related to changing environmental conditions, some portions of the State are predicted to be more resilient than others. Focusing conservation action within resilient places is a smart investment.

5.3.1. Tennessee's Terrestrial Resilience

Much of Tennessee's natural landscape is considered a resilient terrestrial site. The Nature Conservancy (TNC) developed a data set called the **Resilient Land Data**, which identifies areas with different landscape characteristics and depicts an area's capacity to maintain species diversity and ecosystem function in the face of changing environmental conditions. It measures two factors that influence resilience.

- Landscape diversity reflects the number of microhabitats and climatic gradients created by topography, elevation, and hydrology.
- Local connectedness reflects the degree of habitat fragmentation and the strength of barriers to species movement.

Highly resilient sites contain many different habitat niches that support biodiversity and allow species to move freely through the landscape to find suitable microclimates as environmental conditions change. Resilience emphasizes diverse landscapes where species are likely to be able to move and adjust to changing conditions. While the species themselves may change, these areas are likely to remain capable of hosting a continued diversity of species into the future.

Example: Adapting to changing weather patterns that affect prescribed burning

Wildland fire has shaped much of the biodiversity across the Southeast. Not only do many SGCN rely on habitats maintained by fire, but also several game species such as Wild Turkey and Bobwhite quail do as well. Prescribed fire, also called prescribed burning or controlled burning, is

a critical tool for managing wildlife habitat, reducing wildfire risk, and meeting ecological objectives—for example, suppressing invasive species and maintaining disturbance-dependent habitats (including prairies, grasslands, pine-oak woodlands, and shortleaf pine savannas —see the Woodlands and Savannas Highlight). Historically, wildland fire occurred at large landscape-levels with fire return intervals of from ~4 to 10 years for most of Tennessee, with additional fire return intervals up 18 years in higher elevations (Guyette et al. 2012).



Prescribed fire being used according to a private landowner's management plan to improve habitat for rare plants. / Robby Cogburn, Partners for Fish & Wildlife, USFWS

To conduct prescribed burns safely, land managers may burn during times when specific meteorological and health criteria are met. These include:

- Suitable weather conditions within which burning may occur based on maximum daily temperature
- Daily average relative humidity
- Daily average wind speed
- Social/health criteria set by nearby municipalities (Kupfer et al. 2021).



The same property two years post-fire. / Robby Cogburn, Partners for Fish and Wildlife, USFWS

Based on available research for Southeast region historical and future prescribed burn windows (i.e., when there are suitable weather conditions to conduct a prescribed burn safely), changes in environmental conditions are projected to shift the available time windows for prescribed fire (Kupfer et al. 2021). Moreover, rapid urban expansion near managed forests may reduce opportunities to use prescribed fire, which could lead to declines in native species, increases in nonnative species, increases in wildfire occurrence, and negative impacts to economic and human health (see Chapter 4: Threats and Stressors).

Given that the Southeast is a historically fire-adapted landscape, this has significant implications for its overall ecosystem health and for adapting the practice of prescribed fire. Many animal and plant SGCN and RSGCN are fire-dependent, such as Prairie Warbler (*Setophaga discolor*), Eastern

Pinesnake *(Pituophis melanoleucus*), pitcher plant species, and smooth purple coneflower (*Echinacea laevigata*). According to the **2023 Southeast Blueprint Fire Frequency Indicator**, an estimated 687,527 acres were burned from 2013-2021 in Tennessee, with only slightly more than 40,000 acres burned three times or more (USFWS 2024).

Understanding how burn windows may shift is important for land managers not only for managing habitats but also for securing the labor and resources required to conduct burns, including fire specialists, burn crews, equipment, and permits. A USGS evaluation of the potential impacts of these changes to burn opportunities considered how many days per season met the conditions to conduct prescribed burns under two RCP scenarios: RCP 4.5, representing an intermediate scenario, and RCP 8.5, representing a very high scenario.

As a baseline for comparison, from 2010 to 2017, seasonal trends showed suitable conditions throughout the Southeast during the winter burn season and widespread opportunities during the summer months. However, the number of suitable burning days across the Southeast was projected to decrease during the warm-season months, a drop from 64.9% to 40.6% under the RCP 4.5 scenario and a drop from 64.9 to 21.9% under the RCP 8.5 scenario. There were still opportunities to conduct burns during the growing season, which is important because summer growing season burns can help control invasive plants and improve habitat quality for many species. These changes to potential burn windows are even more significant for land management, given that summers may start earlier, be hotter, last longer, and have more periods of drought.

Overall, the state may likely continue to experience favorable conditions to conduct prescribed burns during the fall, spring, and winter seasons (Fig. 5.6). In addition, other states with shared RSGCN stewardship responsibility with Tennessee, such as Georgia and Alabama, are projected to experience much more dramatic declines in the percentage of suitable days for conducting prescribed burns. Therefore, Tennessee might be in a better position than other Southeastern states to conduct prescribed burning to maintain important fire-dependent habitats, as well as contribute to local and regional goals for prescribed burning.

With a constricted window for conducting summer prescribed burns, more practitioners may likely burn in concentrated timeframes when and where conditions are suitable. This may lead to concerns about overwhelming airsheds, as they can only hold so much smoke. If transport winds or dispersion are low, smoke may remain in the airshed for longer periods. This may impact the size or duration of burns through the burn permit system, especially with recent changes in the National Ambient Air Quality Standards. One adaptive strategy may be to balance what are currently considered marginal or poor days for burning against future opportunities, while also considering information on fine particulate matter, i.e., microscopic particles with a diameter of 2.5 micrometers or less (PM 2.5).

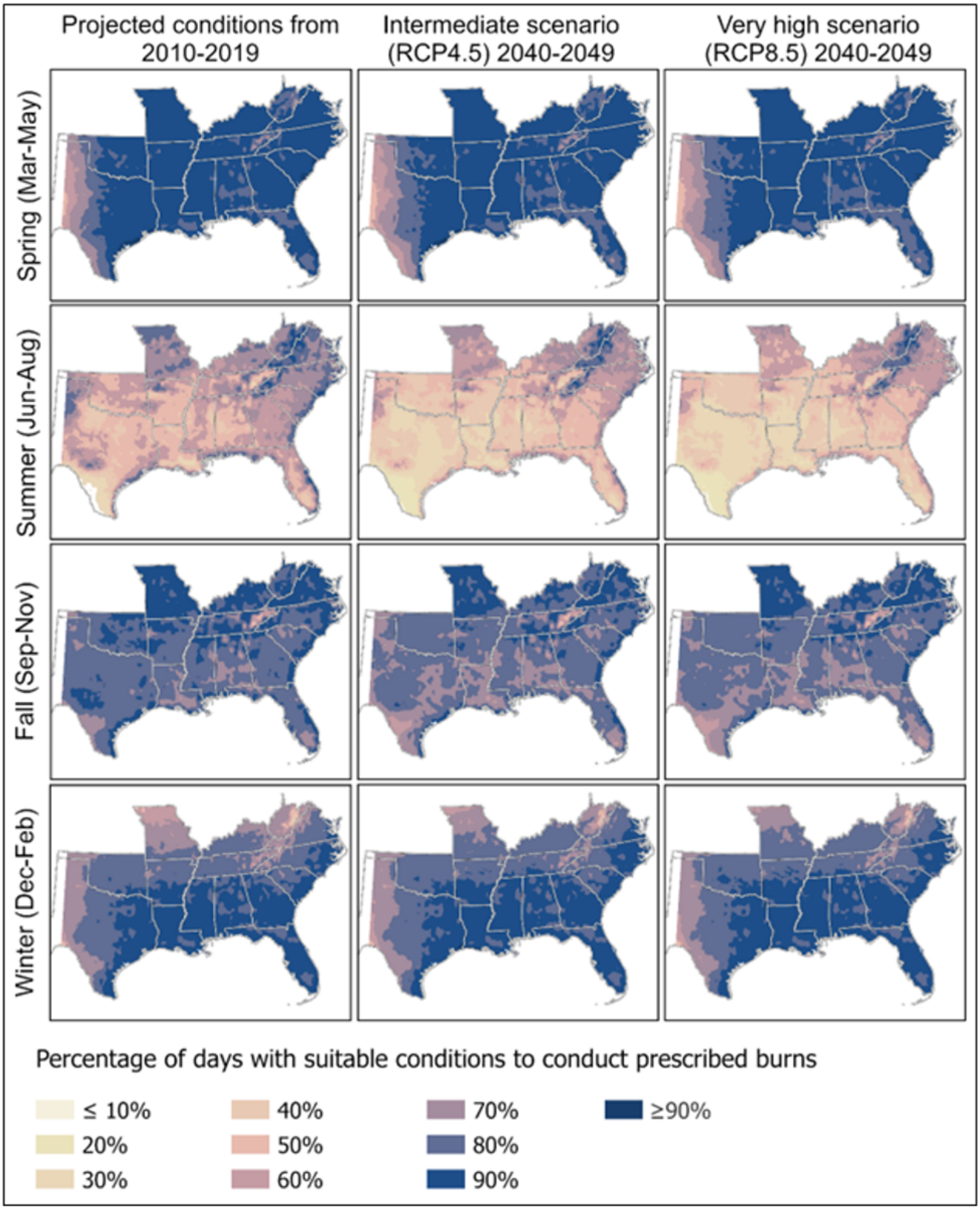


Figure 5.6. Projected percentage of days with suitable conditions to conduct prescribed burns based on medium and high concentration scenarios. The baseline model of 2010-2019 is a close reflection of Tennessee's current conditions. This baseline is compared to the forecasted percent of suitable prescribed burning conditions for 2040-2049 under both the RCP4.5 (medium concentrations) and the RCP8.5 (high concentrations).



CHAPTER 6 CONSERVATION ACTIONS AND STRATEGIES

6.1. Defining Conservation Actions

THE 2025 SWAP PLANNING TEAM reviewed statewide conservation action priorities identified in the 2015 SWAP. Since the initial SWAP was prepared in 2005, the development team has used a standardized hierarchy to organize and define strategies, an approach now recognized as a Best Practice (AFWA 2012). The Tennessee SWAP hierarchy is an adaptation of a format developed by the Conservation Measures Partnership (CMP) and consists of two broad categories, which are (a) Conservation, Science, Stewardship, and Protection and (b) Conservation Financial, Legal, & Political Development. Subsets of these broad categories include seven major classes, 25 general actions, and over 90 specific conservation actions. The Specific Conservation Actions are evaluated during each comprehensive revision for their capacity to abate problems. The 2025 planning team determined that the 2015/2005 strategy hierarchy remains applicable to the conservation efforts for Species of Greatest Conservation Need (SGCN) statewide, with only minor updates made to the Specific Actions (Appendix H).

The 2005 Strategy ranking information, compiled in the SWAP database, allowed for a general determination of which Specific Actions could be most appropriate to abate problems for terrestrial, aquatic, and subterranean species (see TWRA 2005, pp. 147-178). In 2015, risks of impacts from energy extraction activities and urban growth were analyzed and mapped.

Photo credit: Release of Alligator Snapping Turtles raised at state and partner facilities from wild eggs until 5 to 7-inch size to increase survival rates / Jesse Eaker, TWRA

In 2025, new analyses have been added to highlight potential risks from new development and potential risk from agriculture to aquatic habitats, both of which influence the selection of conservation strategies.

Table 6.1. provides a summary of the 27 General Actions (in seven Classes) most needed to address the decline of SGCN and/or the habitat vital to their survival.

The SWAP conservation actions summarized in Table 6.1. and provided fully in Appendix H, individually and collectively, will focus on addressing the major problems affecting SGCN and their habitats, as outlined in Chapter 4. Conservation opportunities have been identified to counter most (if not all) of the threats described in Chapter 4. These include addressing impacts from a wide variety of land and water uses; improving habitat quality and quantity; restoring species populations; and management to abate the negative effects of invasive species, pathogens, and climate change.

Summary: 2025 process for identifying and prioritizing conservation actions to conserve SGCN and their habitats

1. Identify statewide conservation action priorities. Referring to the actions identified in the 2005 SWAP and adopted again in the 2015 SWAP, the 2025 SWAP planning team determined that the 2005 strategy hierarchy, including all the General and Specific Actions, remained applicable to SGCN statewide conservation efforts.
2. Focus on a subset of the most important actions for addressing major problems identified in Chapter 4. In 2025, the team chose to elaborate in detail on 27 General Actions (in 7 Classes) that are most commonly implemented by TWRA and that address the major problems affecting SGCN and their habitats.
3. Develop a standing Steering Committee to guide SWAP development and oversee its implementation and monitoring. The Steering Committee is composed of leading federal and state agencies, nongovernmental organizations and land trusts, and academic institutions working to achieve natural resource conservation results across the state.
4. Steering Committee recommends updates to the Conservation Opportunity Areas (COAs), resulting in the addition of eight new COAs and the elimination of one, bringing the total to 36. Adjust boundaries for 11 of the original 29 COAs, with the remaining COAs receiving adjustments to boundaries primarily based on watersheds, new analyses of SGCNs, a regional approach to conservation (crossing state boundaries), and in some cases, splitting a COA when a new COA was created. As in past years, the Steering Committee acknowledges that COAs are not intended to artificially constrain decisions about what strategic actions are needed and where they apply.
5. Incorporate adaptive management, as outlined in Ch. 5 Resilience in a Changing Environment, to respond to climate shifts in Tennessee.
6. Develop a new chapter on private lands, since 89% of the total land area in Tennessee is privately owned. As such, it merits a tailored approach to the needs of individual landowners (see Ch. 8 Private Lands Conservation).
7. Develop a new chapter on regional conservation, acknowledging the continuation of key habitats and SGCN occurrences in neighboring states. One aspect of this approach resulted in the definition of 17 Regional COAs (RCOAs) with boundaries that recognize the continuation of priority habitats and SGCN occurrences in bordering states (see Ch. 7 Regional Conservation Assessment).

Successful conservation actions necessarily involve an emphasis on partnerships to achieve the following outcomes:

Table 6.1. Summary of most-needed actions to support SGCN and SWAP-identified priority habitats

Action Class	General Action (ABC)	Intent of Action(s)
1. Habitat acquisition	1A. Fee-title Ownership	Build upon and connect the existing public lands base to protect priority habitat and to allow landscape scale conservation actions
	1B. Permanent Protective Easements	
2. Information collection and dispersal	2A. Communications & Public Relations	Spread awareness of conservation needs and activities to increase engagement & relevancy to all Tennesseans
	2B. Conservation Planning	Facilitate sharing within the TN conservation community to increase collaboration and improve data collection and consistent compilation
	2C. Formal Education, Training, Outdoor Education, & Recreation	Develop SWAP-specific outreach and educational materials
	2D. Monitoring	Monitoring and research to increase knowledge base regarding SGCN, their habitats, and the stressors they face. Assess the effectiveness of past and ongoing conservation actions.
	2E. Research	
3. Management and restoration of species and habitats	3A. Compatible Resource Use	Compatible resource use
	3B. Conservation Area Management	Conservation area management
	3C. Control/Prevention of Invasive Exotic Species & Pathogens	Control and prevention of invasive exotic species and pathogens
	3D. Habitat/Natural Processes Restoration	Habitat and natural process restoration
	3E. Species Restoration	Species restoration
4. Capacity building	4A. Alliances & Partnerships	Build ownership of SWAP through collective assessment, planning, and problem-solving
	4B. Conservation Finance	Increase financial efficiency through sharing resources, collaborative fund-seeking, and leveraging successful partnerships
	4C. Institutional Improvement	Land use planning and zoning
5. Commercial incentives	5A. Conservation Enterprises	Develop and bolster opportunities for businesses that align with conservation goals
	5B. Market Forces	Support, guide local leaders to aid conservation-minded decision-making
6. Law & Policy	6A. Compliance & Enforcement	Develop tools and provide funding to support compliance and enforcement of existing environmental quality laws and regulations
	6B. Land-use Planning & Zoning	Agreement on a rational approach to land use that can prevent problems, promote ecosystem health & water quality, allow best use of land & waters
	6C. Legislation	Use of the legislative framework to address funding issues and reduce stressors and threats to SGCNs
	6D. Policies & Regulations	Review state & federal conservation regulations and revise as needed
	6E. Standards	Develop standards supporting improved habitat quality or best management practices
7. Climate Adaptation	7A. Research	Understand and plan for how species adapt and how future changes are likely to affect SGCN
	7B. Adaptation Planning	Identify preliminary adaptation options and monitor progress
	7C. Habitat Acquisition	Acquisition of fee title or easements to protect resilient areas
	7D. Conservation Area Management	Implement active conservation area management
	7E. Habitat/Natural Processes Restoration	Promote the health of the land and water quality by harnessing and mimicking natural processes integral to natural systems; for example, flooding, fire, and other forms of disturbance.

- Well-coordinated land and water management planning at a variety of spatial scales (i.e., regional, state, and local)
- Effective environmental review and regulatory programs
- Expanded habitat acquisition and management
- Greater incentives for private landowner engagement in conservation
- Education, research, and monitoring that foster learning and improve our adaptive management capacity.



Gate erected at the entrance to Keith Cove cave to protect bats from disturbance caused by repeated human visitation / Dustin Thames, TWRA

All SWAP partners and stakeholders are encouraged to engage in these types of enabling strategies as best fits their organizational mission or individual expertise; however, prior to the 2025 revision, there was no formalized system to allow inter-organization contributions to the SWAP on a continual basis.

With this in mind, in 2024, the planning team invited a diverse array of state conservation leaders to participate in a standing SWAP Steering Committee. Representatives from more than 20 agencies, conservation groups, and research institutions working across the state joined the Steering Committee, which is intended to provide a forum for partners to share their expertise during the SWAP revision as well as to increase inter-organizational implementation of the plan.



Mussels collected from the wild for use as broodstock in captive rearing / Brittany Bajo-Walker, TWRA

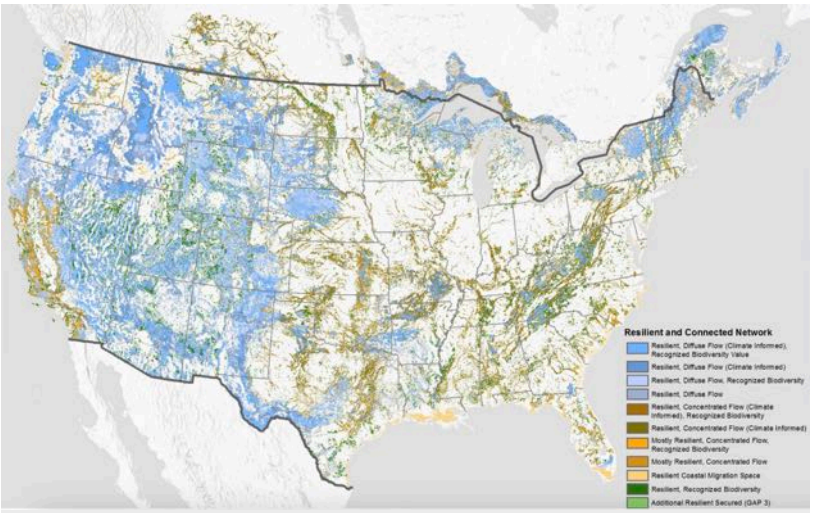
The structure of the Committee encourages the collective use of SWAP data, analyses, and strategies to reflect the living nature of the SWAP. The SWAP Steering Committee has agreed to use the SWAP as a common basis for assessing, implementing, and evaluating conservation activities occurring across Tennessee. More background on the SWAP Steering Committee can be found in the SWAP Introduction, Ch. 9 (Implementing the TN SWAP 2025 – 2034), and Ch. 10 (SWAP Review and Revision).

6.2 Resilient and Connected Network (RCN)

Connectivity is critical to species for movement, dispersal, access to prey and other food sources, reproduction, migration, and overall support of resilience, biodiversity, and natural processes. As such, it is a component of many aspects of conservation action, including but not limited to climate change planning and adaptation, the definition of priority habitats for SGCN, the designation of COAs and other conservation land uses, and land acquisition decisions.

For example, a critical component of habitat acquisition (whether fee-title or easements) is making decisions about what and where to protect land. Connectivity to high priority habitats for species of interest is a key factor when considering habitat parcels for acquisition. Also, changes in climatic patterns drive shifts in species, and conservation plans based on current biodiversity patterns will become less effective over time.

For these reasons, TNC spearheaded a collaborative effort among more than 289 scientists in 14 regions of the conterminous US over 12 years to develop a resilient and connected network of conservation sites. It is designed to represent all habitats, while supporting dynamic shifts in ranges and changes in ecosystem composition. The network is based on principles of representation, resilience, connectivity, and recognized biodiversity value, with each factor mapped in a way that anticipates climate change (Anderson et al. 2023).



This RCN map represents a version of the national dataset that has been reviewed and augmented by science and conservation staff in each of The Nature Conservancy's seven North America Divisions. The augmentations reflect local site knowledge, field checking of connectivity linkages, and restoration work to restore resilience.

"Among the things that make these places special are their diverse physical characteristics—steep slopes, tall mountains, deep ravines, diverse soil types— that create numerous microclimates and allow plants and animals to move around their local 'neighborhood' to find suitable habitat where they can escape climate threats. The landscapes also have good connectivity — 'natural highways' that allow movement across local microclimates and between climate resilient landscapes" (TNC 2023).

This effort inspired the formation of TNC's **Center for Resilient Conservation Science** (CRCS). The Center provides the science, data, tools, and leadership needed to enable and achieve continental-scale land and water conservation to sustain biodiversity in the face of climate change and other threats. The Center includes authoritative case studies and a **Resilient Land Mapping Tool**.

Map 6.1 in **Appendix B, the TN SWAP Atlas** shows the combined SWAP terrestrial, aquatic, and karst habitat priorities that are integrated with the RCN data; the SWAP combined habitat priorities

data layers replace the biodiversity component of the RCN. (The **NatureServe Map of Biodiversity Importance** (MoBI) is another useful tool to identify areas of unprotected biodiversity importance.)

6.3. Conservation Opportunity Areas

Chapter 3 described the process for updating the SWAP terrestrial, aquatic, and subterranean habitat priorities. These habitat priorities are the most current geographic representation of the lands and waters across the state that are significant for protecting and restoring SGCN populations. Determining where and how to implement conservation actions involves not only consideration of habitat priorities and connectivity, but also many additional factors, including the problems affecting different places on the ground, the resources available to address the problems, and developing shared outcomes with conservation partners. The identification of Conservation Opportunity Areas is intended to provide a framework for guiding voluntary and partnership-focused conservation action to address priority problems and achieve improved outcomes for species and habitats. COAs do not create nor presume to create new jurisdictional boundaries, regulatory authorities, or land use restrictions.

6.3.1. Designation Process for Conservation Opportunity Areas

Unlike the standard lexicon for classifying problems and conservation actions, COA designations vary from state to state and do not follow a specific method. Each state designates COAs in a manner consistent with its data availability, planning process, and priorities. The same criteria originally used in 2015 to define COAs were used in 2025 to update them. Three major attributes were considered: SGCN habitat priority, the problems affecting the habitats, and the on-the-ground opportunities to implement conservation actions (Fig. 6.1). Additionally, during a gathering in July 2024, the SWAP Steering Committee reviewed the 2015 COA boundaries in relation to an updated SWAP habitat prioritization. The committee provided suggestions and rationale for revisions to Tennessee's COAs, ultimately recommending the addition of eight new COAs, the elimination of one, and revisions to the boundaries of 17.

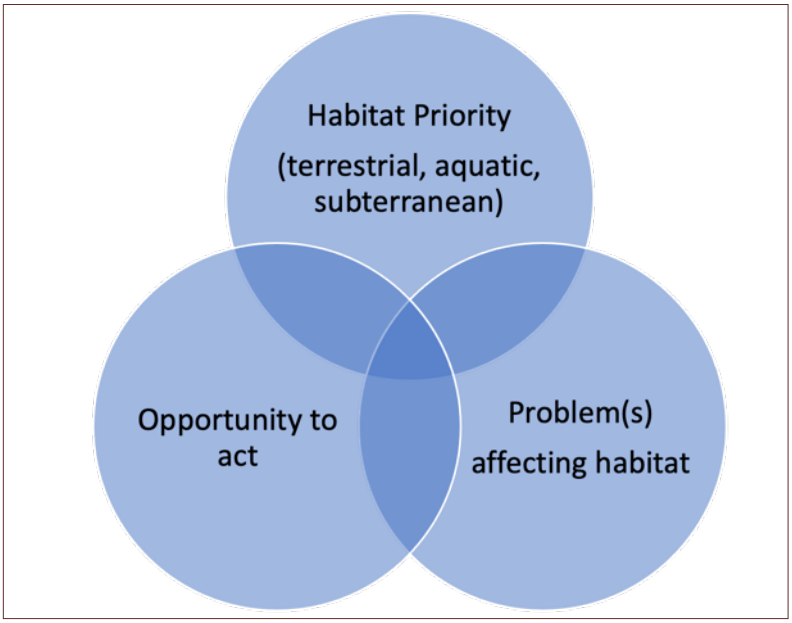


Figure 6.1. Conceptual design of Conservation Opportunity Area selection

To update the COA list and existing COA boundaries, in July 2024, the Tennessee Wildlife Resources Agency (TWRA) hosted a workshop for the organizations that would later become the Steering Committee (see above), in which participants used updated SGCN habitat priority maps (see maps 3.1, 3.2, and 3.3 in **Appendix B, the 2025 TN SWAP Atlas**) as the background data for identifying and updating COAs. Participants

from across the state contributed their expertise and knowledge of conservation opportunities in the areas where they work. The boundary outlines of the COAs were then drawn and/or updated using GIS-based uniform habitat mapping units to capture a geographic footprint where one or more conservation actions are needed to conserve SGCNs or their habitats (these include actions such as agricultural best management practices, i.e., BMPs, expanded conservation areas, urban stormwater management, and habitat restoration). The outer extent of watersheds determines most COA boundaries, the only exception being when the prioritized habitat within a COA contains only terrestrial species.

COAs are intended to provide a framework for guiding voluntary and partnership-focused conservation action to address priority problems and achieve improved outcomes for species and habitats.

In addition, a new type of COA, the Regional COA or RCOA, was defined in 2025. RCOAs recognize that in some cases, priority habitats and SGCN ranges do not stop at state borders. The availability of terrestrial SGCN data from Kentucky, aquatic SGCN data from all neighboring states east of the Mississippi River, and the designation of Regional SGCNs by the Southeast Association of Fish and Wildlife Agencies (SEAFWA) made these designations possible (see Ch. 7 Regional Conservation). It is with this awareness that the 2025 TN SWAP habitat prioritization model contains occurrence data collected from almost all neighboring states (exceptions include Arkansas and Missouri).



Conservation Opportunity Areas planning meeting, July 16, 2024 / Gregg Elliott, K Gregg Consulting

In addition to the standing members of the Steering Committee, subject matter experts from additional organizations were invited to participate in issue-specific SWAP Working Groups. The planning team also used compilations of partner-provided 2015 – 2024 project summaries (Appendix C) to capture the list of partners active in each Conservation Opportunity Area Summary (Appendix I) and to identify opportunities for future work that could build on past project successes.

6.3.2. Criteria for Defining Conservation Opportunity Areas

The planning committee, Steering Committee, and stakeholders considered the following factors when selecting and defining the boundaries of Conservation Opportunity Areas:

- GCN habitat priority
- Problems affecting specific habitat types
- On-the-ground opportunities to implement conservation actions

- Strategic places to focus actions and partner engagement
- Areas with the greatest opportunity for conserving, preserving, or restoring habitat critical to SGCN and for facilitating outreach and coordination with partners, extending the reach and effectiveness of state resource agencies
- Important geographies across the state where focused collaborations can improve outcomes for SGCN and habitats.

Data that were considered in COA Selection include:

1. SGCN occurrences
2. Habitat availability or restoration potential
3. Heat maps indicating terrestrial, aquatic, and karst habitat priorities (elements 1, 2, and 3 were captured in the SWAP's priority habitat mapping)
4. Landscape
5. Priority Amphibian and Reptile Conservation Areas (PARCAs)
6. TNC's science-based **Resilient Land Mapping Tool**, a proposed conservation network of representative climate-resilient sites designed to sustain biodiversity and ecological functions into the future under a changing climate
7. The **Resilient and Connected Network** spatial data
8. Strategic Habitat Units (USFWS)
9. Connectivity, terrestrial or aquatic
10. Ongoing projects that could be expanded (e.g., Paint Rock NWR)
11. 2005 Tennessee Heritage Conservation Trust Fund Act of 2005 review to generate a list of additional public lands within each COA
12. 2017 TWRA Wildlife Legacy Plan
13. 2021 TWRA Wildlife Legacy Plan Areas of Interest Maps
14. New GIS Wildlife Management Area (WMA) layer to update the lists of WMAs within COAs
15. Tennessee Dept. of Environment and Conservation (TDEC) GIS layer for state parks and state natural areas.



Great Egret (*Ardea alba*), an SGCN in Tennessee / I am birdaspoetry via Flickr Creative Commons

Several regional and statewide conservation planning efforts have been completed by other agencies since 2015. Many of these agencies collaborated with TWRA, using SWAP habitat priorities to help inform their designations of significant conservation areas. In designing the COAs, the 2025 SWAP team referenced the following documents:

- Tennessee Department of Environment and Conservation's **Tennessee 2020 plan** (TDEC 2009)
- Tennessee Division of Forestry's **Tennessee Forest Resource Assessment and Strategy** (2010)
- **Tennessee Forest Action Plan 2020 - 2030** (2020), written in collaboration between the Tennessee Department of Agriculture - Division of Forestry (TDF) and the Tennessee Chapter of the Nature Conservancy (TNC)
- TWRA Strategic Plan 2014-2020 (TWRA 2014)
- TWRA Tennessee Wildlife Legacy Plan (TWLP Team 2017)
- Southeast Association of Fish and Wildlife Agencies, **Regional Species of Greatest Conservation Need in the Southeastern United States** (2019)
- East Gulf Coastal Plain Joint Venture, **Landbird Conservation Plan** (2021) & **Waterbird Conservation Plan** (2024)

The COAs for Tennessee capture populations of SGCN and high-quality habitats, and, as appropriate, define the geographically relevant framework for achieving conservation outcomes. The COAs currently designed for Tennessee are large geographies, with the expectation that further prioritization and goal setting for specific habitat outcomes can be achieved through collaborations with partners on shared objectives. For those COAs containing SGCN habitats for which major stressors have been identified (see Ch. 4), this spatial data can also be utilized at different scales to target appropriate conservation actions or interventions in collaboration with partners (see Table 6.1).

The COA boundary designations do not carry any new legal, regulatory, or jurisdictional authorities, nor do they place any restrictions on land uses or activities occurring within these areas. COA designations help to identify focal areas in which to prioritize effort and are intended to foster partnership collaborations, investments, and voluntary actions to conserve habitat within a given region of the state. This general approach to COA development is consistent with other states such as Illinois, Missouri, and Pennsylvania.

COA boundary designations do not carry any new legal, regulatory, or jurisdictional authorities, nor do they place any restrictions on land uses or activities occurring within these areas

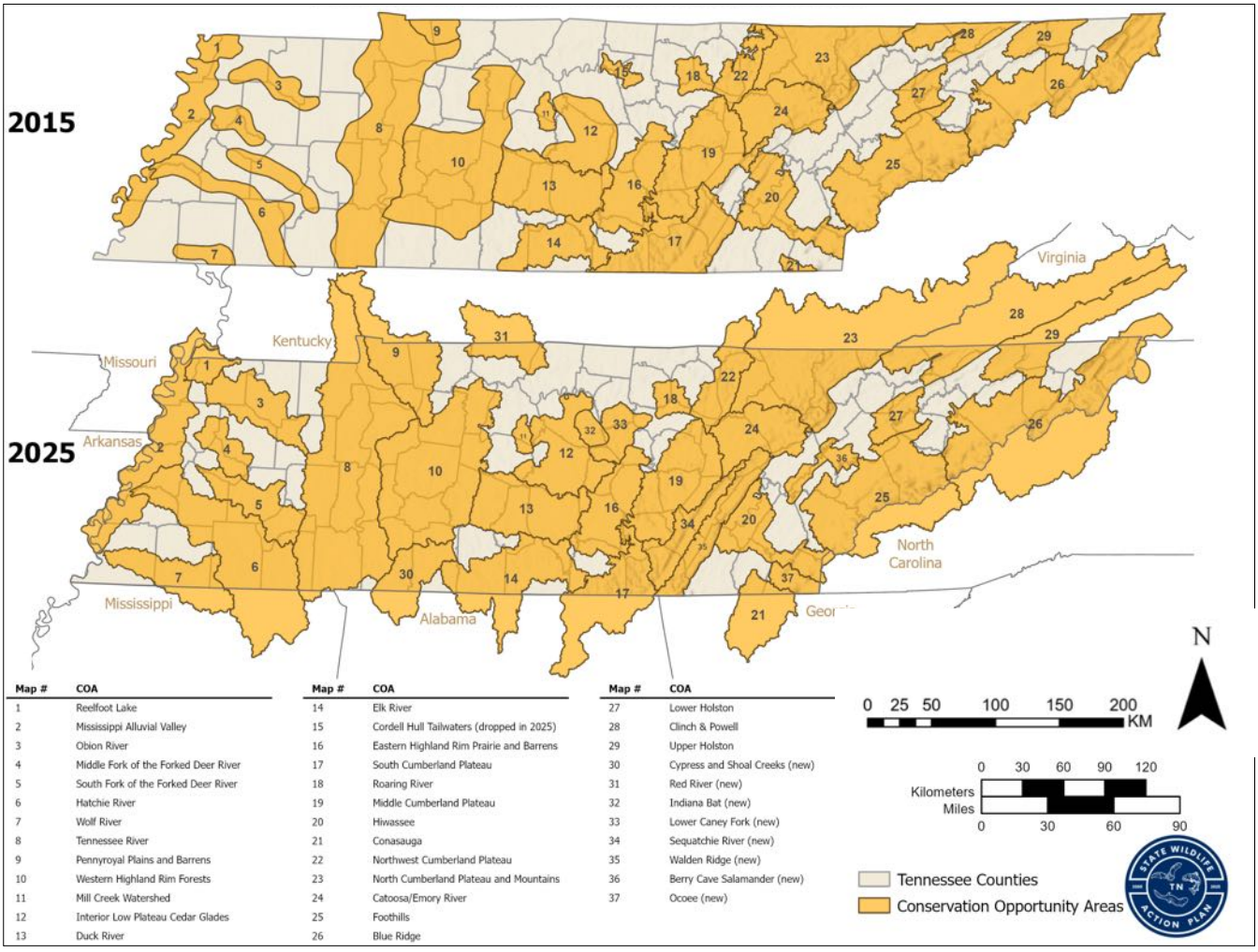
Another important consideration is that COAs are not intended to be fixed, limiting geographic boundaries. In fact, the 2025 SWAP Steering Committee agreed that as more projects are designed and executed with various partners, changes to the COA designations may be useful to better represent new information or the footprint of a particular project opportunity. In addition, achieving habitat conservation objectives will require adequate consideration of all terrestrial, aquatic, and subterranean priorities regardless of whether they are physically located within a COA

boundary at this time. Finally, other wide-ranging collaborations on issues such as maintaining forest health can potentially benefit many different geographies and COAs at once.

Table 6.2. summarizes the Tennessee COAs—new, regional, and revised—within their respective ecoregions. Fig. 6.2 shows updated COA boundaries in 2025 compared to COAs in 2015. In **Appendix B, the 2025 TN SWAP Atlas**, Map 6.2 shows the locations of COAs in reference to statewide terrestrial habitat. Map 6.3. shows COAs in reference to statewide aquatic habitat priorities. Map 6.4 shows COAs in reference to statewide karst habitat priorities. Map 6.5. shows COAs and combined Land Conservation Priorities. This map is different from Map 3.4, which shows the three habitat priority data layers combined. Map 6.5 has as its basemap the maximum of



Heat map showing the Tennessee River/Nashville portion of the combined terrestrial, aquatic, and karst habitat priorities from the 2025 SWAP, used to help identify COAs / Joey Wisby, TNC



Map #	COA	Map #	COA	Map #	COA
1	Reelfoot Lake	14	Elk River	27	Lower Holston
2	Mississippi Alluvial Valley	15	Cordell Hull Tailwaters (dropped in 2025)	28	Clinch & Powell
3	Obion River	16	Eastern Highland Rim Prairie and Barrens	29	Upper Holston
4	Middle Fork of the Forked Deer River	17	South Cumberland Plateau	30	Cypress and Shoal Creeks (new)
5	South Fork of the Forked Deer River	18	Roaring River	31	Red River (new)
6	Hatchie River	19	Middle Cumberland Plateau	32	Indiana Bat (new)
7	Wolf River	20	Hiwassee	33	Lower Caney Fork (new)
8	Tennessee River	21	Conasauga	34	Sequatchie River (new)
9	Pennyroyal Plains and Barrens	22	Northwest Cumberland Plateau	35	Walden Ridge (new)
10	Western Highland Rim Forests	23	North Cumberland Plateau and Mountains	36	Berry Cave Salamander (new)
11	Mill Creek Watershed	24	Catoosa/Emory River	37	Ocoee (new)
12	Interior Low Plateau Cedar Glades	25	Foothills		
13	Duck River	26	Blue Ridge		

Figure 6.2 General comparisons of COAs for the 2015 and 2025 revisions of the Tennessee State Wildlife Action

Table 6.2 Summary of Conservation Opportunity Area changes in 2025

2025 Conservation Opportunity Area	Terrestrial Ecoregion(s)	Aquatic Subregion(s)	New COA?	Regional COA?	Change and Rationale
Berry Cave Salamander	Ridge and Valley	Tennessee River - Ridge and Valley	Yes	No	New COA created due to presence of a highly sensitive species with distribution limited to the Upper Tennessee and Clinch Rivers.
Blue Ridge	Blue Ridge & Ridge and Valley	Tennessee River - Blue Ridge ——— Tennessee River - Ridge and Valley	No	Yes	Unchanged
Catoosa/Emory River	Cumberland Plateau (SW Appalachians) & Cumberland Mountains (Central Appalachians)	Tennessee River - Cumberland Plateau	No	No	Unchanged
Clinch and Powell	Ridge and Valley	Tennessee River - Ridge and Valley	No	Yes	Unchanged
Conasauga	Blue Ridge & Ridge and Valley	Conasauga River	No	Yes	COA boundaries defined by the entire Conasauga River watershed.
Cordell Hull Tailwater	Interior Plateau	Upper Cumberland River	No		Shift in priorities due to the difficulties of implementing conservation actions.
Cypress & Shoal Creeks	Interior Plateau - Western Highland Rim & Transition Loess Hills	Lower Tennessee River	Yes	Yes	This new COA focuses on the headwaters for high priority aquatic habitat in Alabama. Because it is defined based on aquatic priorities, all boundaries are defined using watershed boundaries.
Duck River	Interior Plateau	Tennessee River - Nashville Basin	No	No	Unchanged
Eastern Highland Rim Prairie and Barrens	Interior Plateau	Tennessee River - Nashville Basin ——— Upper Cumberland River	No	No	Unchanged

2025 Conservation Opportunity Area	Terrestrial Ecoregion(s)	Aquatic Subregion(s)	New COA?	Regional COA?	Change and Rationale
Elk River	Interior Plateau	Tennessee River - Nashville Basin	No	Yes	COA boundaries slightly expanded based on a new a new aquatic analysis showing high priority species and habitats.
Foothills	Blue Ridge & Ridge and Valley	Tennessee River - Blue Ridge	No	Yes	Unchanged
Hatchie River	Upper Gulf Coastal Plain	Mississippi River	No	Yes	New boundary follows the watershed boundary and the EPA level IV ecoregional boundary on the west where it meets the Mississippi Alluvial Valley COA. The entire watershed defines the COA because it is more aquatic in focus. This expansion captured the Lone Oaks area south of Bolivar.
Hiwassee	Cumberland Plateau (SW Appalachians) & Ridge and Valley	Tennessee River - Blue Ridge ——————— Tennessee River - Cumberland Plateau	No	Yes	Boundary adjusted to create the Walden Ridge COA, making Hiwassee slightly smaller.
Indiana Bat	Interior Plateau	Upper Cumberland River	Yes	No	New COA designated due to presence of highly sensitive species. Boundaries defined by taking all recent Indiana Bat maternity occurrences and adding a 5 km buffer, except where it meets the IP Cedar Glades COA.
Interior Plateau Cedar Glades	Interior Plateau - Outer Nashville Basin & Eastern Highland Rim	Tennessee River - Nashville Basin ——————— Upper Cumberland River	No	No	Expanded to include upper reaches of the Stones River watershed, which harbors high diversity of crayfish and other aquatic species. Also includes, Bartons, Spring, and Cedar Creek watersheds, which harbor highly vulnerable Spring Creek bladderpod populations.

2025 Conservation Opportunity Area	Terrestrial Ecoregion(s)	Aquatic Subregion(s)	New COA?	Regional COA?	Change and Rationale
Lower Caney Fork	Interior Plateau - Outer Central Basin	Cumberland River - Nashville Basin ——————— Upper Tennessee RIver	Yes	No	New COA boundary based on watershed boundary of the lower river.
Lower Holston	Ridge and Valley	Tennessee River - Ridge and Valley	No	No	Unchanged
Middle Cumberland Plateau	Cumberland Plateau (SW Appalachians)	Tennessee River - Cumberland Plateau ——————— Upper Cumberland River	No	No	Boundary adjusted to create the new Sequatchie River COA, which put Grassy Cove in Sequatchie and removed it from Middle Cumberland, making this COA slightly smaller. Also, the headwaters of the Caney Fork are now included in this COA.
Middle Fork of the Forked Deer River	Upper Gulf Coastal Plain	Mississippi River	No	No	Expanded boundary to capture intact floodplain.
Mill Creek Watershed	Interior Plateau	Cumberland River - Nashville Basin	No	No	Unchanged
Mississippi Alluvial Valley	Mississippi River Alluvial Plain	Mississippi River	No	No	Followed EPA level IV Ecoregion boundaries (subregions) more closely than previously. Largely unchanged.
North Cumberland Plateau and Mountains	Cumberland Mountains (Central Appalachians)	Cumberland River - Cumberland Mountain ——————— Upper Cumberland River	No	Yes	Unchanged
Northwest Cumberland Plateau	Cumberland Plateau (SW Appalachians)	Upper Cumberland River	No	Yes	Boundaries adjusted to include the Wolf River (east TN) on the upper Cumberland Plateau, which contains numerous aquatic conservation priorities.
Obion River	Upper Gulf Coastal Plain	Mississippi River	No	No	Expanded boundary to capture intact floodplain.
Ocoee	Blue Ridge & Ridge and Valley	Conasauga River	Yes	No	Created new COA using watershed boundaries to capture rare plants of the Ocoee River gorge.

2025 Conservation Opportunity Area	Terrestrial Ecoregion(s)	Aquatic Subregion(s)	New COA?	Regional COA?	Change and Rationale
Pennyroyal Plains and Barrens	Interior Plateau	Lower Cumberland River	No	Yes	Included the Lower Cumberland watershed into the Pennyroyal Plains and Barrens.
Red River	Interior Plateau - Western Pennyroyal Karst	Cumberland River	Yes	Yes	This is a new COA, which focuses on the headwaters for high priority aquatic habitat in Kentucky. Because it is defined based on aquatic priorities, all boundaries are defined using watershed boundaries.
Reelfoot Lake	Mississippi River Alluvial Plain	Mississippi River	No	Yes	Boundary modified to capture the watershed draining into Reelfoot.
Roaring River	Interior Plateau - Eastern Highland Rim	Upper Cumberland River	No	No	Unchanged
Sequatchie River	Cumberland Plateau (SW Appalachians) - Sequatchie Valley	Tennessee River - Cumberland Plateau	Yes	No	New Sequatchie River COA created and defined by watershed and surrounding COA boundaries. Grassy Cove originally in Middle Cumberland COA is now part of Sequatchie.
South Cumberland Plateau	Cumberland Plateau (SW Appalachians)	Tennessee River - Cumberland Plateau	No	Yes	This boundary was changed to split off the new Walden Ridge COA.
South Fork of the Forked Deer River	Upper Gulf Coastal Plain	Mississippi River	No	No	Boundary change to follow EPA Level IV Ecoregion boundaries.
Tennessee River	Interior Plateau - Western Highland Rim	Lower Tennessee River	No	Yes	Expanded this COA by splitting out a portion of the Western Highland Rim and putting all direct tributaries draining to the mainstem river into the new Tennessee River COA, which is now defined by its watershed boundary. This COA cuts off where the Buffalo and Duck Rivers drain into the Tennesssee River.
Upper Holston	Ridge and Valley	Tennessee River - Ridge and Valley	No	Yes	Unchanged

2025 Conservation Opportunity Area	Terrestrial Ecoregion(s)	Aquatic Subregion(s)	New COA?	Regional COA?	Change and Rationale
Walden Ridge	Cumberland Plateau (SW Appalachians)	Tennessee River - Cumberland Plateau	Yes	No	Defined new Walden Ridge COA using Level IV Ecoregion boundaries on eastern edge at HIwassee. Western edge at Sequatchie is watershed boundary.
Western Highland Rim Forests	Interior Plateau - Western Highland Rim	Lower Tennessee River ——————— Lower Cumberland River	No	No	Boundaries now defined by a mixture of watershed and ecoregional boundaries; includes Cheatam WMA, and the lower Duck and Buffalo River watersheds. Areas within the new Cypress & Shoal Creeks COA have been removed.
Wolf River	Upper Gulf Coastal Plain	Mississippi River	No	Yes	New boundary follows the watershed boundary. This expansion captured the Ames Plantation.

terrestrial habitat priorities, land priorities upstream of aquatics, and land priorities adjacent to/upstream of karst, and also includes the COAs.

Appendix I provides summary information in the form of a stand-alone factsheet for each Conservation Opportunity Area across the state. This information includes a description of the area, a COA map, lists of SGCN and habitats, general desired conservation outcomes and associated monitoring strategies, as well as ongoing or proposed conservation partnerships.

Examples of work performed in COAs since 2015:

- Hellbender reintroduction and conservation
- Land acquisitions (Skinner Mountain, Whiteside Cave)
- Streambank stabilizations
- Pinesnake habitat work (see Pinesnake in Tennessee Highlight)
- Freshwater mussel releases

(See also Appendix C, Summary of major conservation projects by key conservation partners.)

As discussed in the following section, SGCN and valuable habitat exist beyond COA boundaries. However, these spatial designations can be valuable communication tools used to convey the ecological value within a COA's local landscape, as well as the connectedness of different habitat types within a COA. COA boundaries are largely based on the limits of key watersheds found within areas of priority habitat, with consideration also given to the selection criteria noted earlier in this section. Identifying and labeling these focal zones across the state provides the opportunity for local education, advocacy, and expanded conservation collaboration.

6.3.3. Taking Action Outside of Conservation Opportunity Areas

The identification of Conservation Opportunity Areas helps define important geographies across the state where focused collaborations can improve outcomes for SGCN and habitats. However, not all populations of SGCN fall within COAs, and several types of significant conservation actions—such as land use planning, environmental reviews, and research—address issues that affect species and habitats across many different geographies.

One excellent example of this is a tool that covers the entirety of Tennessee and other states across the country. The Southeast Aquatic Resources Partnership's **National Aquatic Barrier Inventory & Prioritization Tool** helps to improve aquatic connectivity by prioritizing aquatic barriers for removal using the best available data. The tool provides an inventory of barriers, based on data shared by state and local authorities, combined



Flame Chub (*Hemitremia flammea*) an SGCN from the upper Duck River watershed. Many Tennessee native fish are beautifully colored but tiny, making even small culverts under roads barriers to movement. / Alex Bybel, TWRA

with a variety of national inventories related to waterways, stream crossings, dams, and wetlands, among others. Likewise, a plethora of state and national-level data tools and the latest science on resilience in landscape conservation is available at The Nature Conservancy's **Center for Resilient Conservation Science**. Actions taken outside COA boundaries, such as stream barrier removals or using best practices for stormwater management, can show net benefits in both the local project area and for downstream aquatic habitats. Many of Tennessee's existing public lands contain one or more habitats important for SGCN, and while most public lands are captured within COAs, some are not. As the assessment of potential climate vulnerabilities demonstrates, vegetation types may change over time, resulting in habitat and distribution shifts from what are identified as priorities on the landscape today.



TWRA biologists raising an Indiana Bat artificial roost structure in McNairy County / Rob Colvin, TWRA

Examples of conservation work performed outside of COAs:

- Reelfoot Lake watershed investigation
- White Oak restoration (see White Oak Restoration Highlight)
- Indiana bat artificial roost structures installed in McNairy County (see Artificial Roosts for Indiana Bats Highlight; the Indiana Bat COA is new in 2025).
- Surveys for stream dwelling SGCN crayfish species in Sugar Creek, Barren, Harpeth, and Lower Cumberland Rivers (outside of the Lower Cumberland COA), as well as Upper Tennessee and Flint Rivers

- Surveys for SGCN cave crayfish, cave macroinvertebrates, cave salamanders, and cave fish in the Cumberland River Drainage
- Mussel surveys in Upper Richland Creek (Elk River tributary)
- Burrowing SGCN crayfish surveys in the Upper Tennessee River Drainage



The Cumberland Dusky Salamander / Chris Simpson, TWRA

6.4. Overview of Priority Conservation Strategies in Tennessee

The 2025 SWAP update explains conservation actions that are recommended statewide to benefit SGCN and their habitats, irrespective of COA boundaries. This section on priority conservation strategies is organized according to the Class level of the SWAP conservation strategy hierarchy (see Table 6.1 and Appendix H). The project examples are intended to illustrate the application of general and specific conservation actions both within and outside Conservation Opportunity Areas. They include actions best deployed at a statewide scale (e.g., policy or standards development) and others that must be tailored to habitat protection or restoration outcomes in specific locations (e.g., application of prescribed fire).



Cedar Glade at Flatrock Glades & Barrens State Natural Area / Alan Cressler, courtesy of SGI

As noted in Chapter 4, "Problems Affecting Species and Habitats," certain human activities and management of lands and waters (such as agriculture, forestry, and water use) can pose threats to a range of habitat types and SGCN across the state. However, in this chapter, the focus will be how the very same land and water uses can make adjustments or implement "best practices" to mitigate or eliminate threats and/or improve SGCN habitat.

6.4.1. Habitat Acquisition

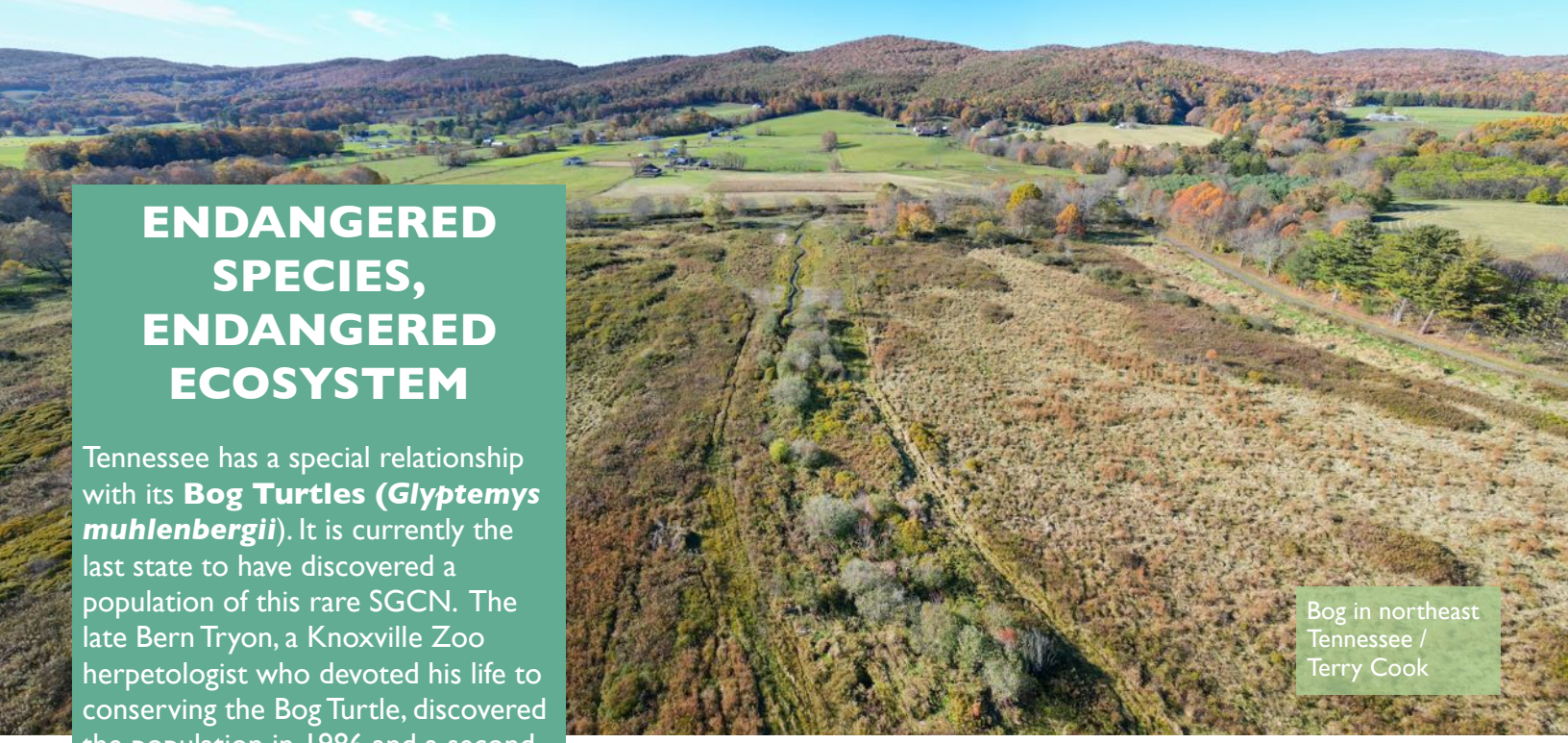
Land acquisition of quality habitat or restorable habitat (with the ability to support suites of SGCN) for conservation purposes continues to be a major need in Tennessee. Strategies for improving public and private funding for land acquisition statewide are important. A primary tenet guiding many, though not all, conservation acquisitions is to build upon and connect the existing public lands base. Conservation Opportunity Areas highlight geographies where this type of focus may be successful. (For an overview of threats that can be addressed by land acquisition, see section 4.3. and 4.4. in chapter 4.)

Another major tenet is to help private landowners as well as local governments who are already engaged in conservation (such as Resource Conservation Districts or local Natural Resources Conservation Service, i.e., NRCS offices) to retain land in private ownership while promoting land and water resource values through education, technical assistance, or financial support (see Ch. 8 for more detail).

In many cases, where limited or highly dispersed priority habitats remain, or where land use threats are high, acquisition may be the primary and most effective strategy for preventing further habitat destruction and achieving conservation goals (see Bog Turtle Highlight). The cedar glades and barrens of middle Tennessee and the bogs of northeast Tennessee are both prime examples of acquisition helping to protect both rare and highly dispersed habitats.



East Tennessee summer landscape of forested mountains / Greg Wathen



Bog in northeast Tennessee / Terry Cook

ENDANGERED SPECIES, ENDANGERED ECOSYSTEM

Tennessee has a special relationship with its **Bog Turtles (*Glyptemys muhlenbergii*)**. It is currently the last state to have discovered a population of this rare SGCN. The late Bern Tryon, a Knoxville Zoo herpetologist who devoted his life to conserving the Bog Turtle, discovered the population in 1986 and a second one a few years later. Tennessee is also the first state (and first place in the world) where scientists are using the Motus wildlife tracking system, which uses a fixed radio-telemetry array, to study Bog Turtle movements.

The US Fish and Wildlife Service (USFWS) recognizes two distinct Bog Turtle populations separated by a distance of about 250 miles: the Northern and Southern (of which Tennessee's turtles are a part). The Northern population was federally listed as threatened in 1997, and the Southern population is listed "Threatened by similarity of appearance."

As of 2024, a species status assessment is underway for federal listing of the Southern population of Bog Turtles. All southern states with these turtles are in favor of the listing due to:

- limited habitat
- limited range
- threats associated with illegal harvest for the pet trade
- the need for continuous management of existing habitat due to a loss of natural hydrology and disturbance processes.

THE LILLIPUTIAN WORLD OF BOGS AND BOG TURTLES



Adult Bog Turtle / Scott Dykes, TWRA

Bog Turtles, weighing in as adults at a mighty four ounces (110 gm) and no more than 4.5 inches long, are the smallest turtle species in North America. Yet they occupy a kind of "ecosystem engineer" role in the miniature world of bog ecosystems.

Bogs are found in low-lying areas where water pools. They support sphagnum and peat moss that grow ankle to waist deep, along with cranberries, rare orchids, pitcher plants, and other carnivorous plants. Relatively speaking, the Bog Turtle is one of the largest denizens of these wetlands, eating all manner of slugs, worms, spiders, and possibly even cranberries. The turtles are able to traverse through and over hummocks of moss and sedges, leaving trails used by voles, frogs, and salamanders. Depending on the season, they use all habitats within the bog for basking; digging tunnels for resting—singly or in small groups—during their brumation (a kind of reptilian hibernation); and foraging. Females travel farther from their usual habitats to lay their clutches of two to four eggs.

Two sites with Bog Turtles are located in northeast Tennessee. The names of specific locations are not divulged to safeguard them from unscrupulous individuals who might take turtles for the pet trade. Unfortunately, they are attractive as pets because they are small and rare.

In fact, the Bog Turtle is one of the most imperiled turtle species in the continental US and globally (USFWS 2019). This is largely due to the loss and degradation of its rare bog habitat. While Southern Appalachian

Partners for Bog Turtle Conservation

The Knoxville Zoo
The Nature Conservancy in Tennessee
Tennessee Wildlife Resources Agency (TWRA)

Mountain Bogs often occurred in small patches, they are now one of North America's rarest habitats, defined by their nutrient-poor, acidic, and saturated soil (TNC 2024). Over time, such areas created ideal conditions for rare plants and animals to thrive, but the combination of hydrology, fire, and most likely beaver that formerly created and maintained these habitats has now been altered or lost (Estes et al. 2016). For this reason, bog restoration and management is complicated. In northeast TN, a complex of over 1000 acres of bogs had been reduced to fewer than 10 acres by 1965, through a combination of drainage and channelization projects for agriculture prior to passage of the Clean Water Act (CWA). Based on a recent analysis, the Bog Turtle's range has contracted by 39% in the Northern population, but this figure is unknown for the Southern population (USFWS 2019).

HEAD STARTS FOR ALL



TWRA Biologist Chris Ogle with Bog Turtle / Scott Dykes, TWRA

Gabrielle Lynch has been **Director of Land for TNC in Tennessee** for more than 30 years, and it's fitting that the Bog Turtle gave her career a "head start." The very first real estate deal she helped to seal with a landowner protected a tract of bog that is now part of TNC's preserve network in Tennessee. "The Bog Turtle is my totem species," explains Lynch, "Our bog protection work has been like stitching a quilt to protect rare bog sites, acre by acre. Bog protection is a long game." Over the years, Lynch has helped cobble together 17 individual land transactions, protecting more than 150 acres around two bog sites. TNC also assists with funding, herbiciding of invasive plants, and intensive stream and wetland restoration to achieve functioning wetland hydrology.

Since the first discovery of Bog Turtles by Bern Tryon, the Knoxville Zoo has become an integral partner in conducting research to assess habitat management and restoration, as well as monitoring Bog Turtle movements and habitat preferences, and conducting head starting. Head starting involves giving tiny hatchling turtles an edge by temporarily removing them into a controlled environment where they will stay safe and continue eating all winter. Baby turtles who would normally begin the spring after their hatch year at ~5 gm will instead begin at 25 to 30 gm, five times larger! This improves overall survival in this slow-reproducing species.



Knoxville Zoo has proven the effectiveness of camera bucket traps (taking a photo of anything that moves under the bucket) to find bog turtles. / Scott Dykes, TWRA

TWRA supplies the permits to assist head starting, aids in purchasing property with assistance from State Wildlife Grants, and provides workers to help remove invasives such as Japanese barberry (*Berberis thunbergii*), multiflora rose (*Rosa multiflora*), and reed canary grass (*Phalaris arundinacea*). "You couldn't ask for a better partnership," says **Michael Ogle, Curator of Herpetology & Birds at the Knoxville Zoo** in describing the roles of each of the three organizations.

However, threats to isolated wetlands such as the bogs in question recently multiplied across the country as a result of the 2023 Sackett vs. EPA Supreme Court decision, which interpreted the CWA to mean that only wetlands with a continuous surface water connection to navigable waters are federally protected under the law (Holland and Knight 2023). Tennessee's bog turtle sites have secure status as a wetland mitigation bank, but without such a designation, it's possible other bogs could lose their wetland protection status, adding another threat to the already long list of issues affecting bogs, their rare plants, and the tiny but charismatic reptile species that relies on them.

Estes, D., M. Brock, M. Homoya, A. Dattilo. 2016. A Guide to Grasslands of the Mid-South. Published by the Natural Resources Conservation Service, Tennessee Valley Authority, Austin Peay State University and the Botanical Research Institute of Texas.

Holland & Knight. 2023. Sackett Decision Provides Clarity, Substantially Restricts Clean Water Act Jurisdiction Scope. https://www.hklaw.com/en/insights/publications/2023/05/sackett-decision-provides-clarity-substantially

The Nature Conservancy. 2024. Southern Appalachian Mountain Bogs. https://www.nature.org/en-us/about-us/where-we-work/united-states/north-carolina/stories-in-north-carolina/mountain-bogs/

USFWS. 2019. Bog Turtle Conservation Plan.

Habitat Acquisition Example

Otey Mills Refuge Unit, located within North Cumberland Wildlife Management Area in Claiborne County, is a recent (2022-24) land protection collaboration between Tennessee Wildlife Resources Agency (TWRA) and TNC that exemplifies the SWAP's informative power. The refuge's 3,464 acres match multiple SWAP ranking criteria:

- Both open and forested habitat for the Tennessee/Kentucky elk herd
- Subterranean karst (limestone) features that support rare and endemic cave invertebrates
- Native hardwood forest that connects to other state and federally-owned public land
- Habitat for rare, threatened, and endangered bats and migratory songbirds
- Public access for multi-use outdoor recreation

Landscape-scale habitat conservation

Landscape conservation is an approach that brings people together across geographies, sectors, and cultures to collaborate on conserving important landscapes and the myriad ecological, cultural, and economic benefits they provide. Landscape conservation differs fundamentally from traditional conservation approaches in three ways:

- Larger Size: Decades of scientific research have shown that to sustain biodiversity, ecological function, and climate resilience, conservation must look beyond parcel boundaries and work at a larger scale across geographic, ownership, and jurisdictional boundaries.
- Integrated Perspective: Wildlands, farmlands, timberlands, tribal lands, places of cultural and historical significance, rural communities, urban areas, and other private and public lands are all part of a fully integrated whole—a landscape—and do not exist independent of one another.
- Partnership process: This approach is generally characterized by a horizontal process and collaborative governance structure with long-term participation by a meaningful diversity of stakeholders.

(Network for Landscape Conservation 2017).

The 2020 Forest Action Plan advocates the creation and implementation of a state-wide Landscape Management Plan (LMP) that will allow natural resource professionals to deliver consistent and comprehensive information designed to better inform forest landowners of forest management practices at the landscape level and to make specific recommendations on practices that will lead to accomplishing landscape-level goals. The development of this LMP would support the engagement of family forest owners and aid the identification and accomplishment of their management objectives. This project will also significantly reduce the burden of individual management plan development, remove the barriers to forest certification and participation in the

Forest Stewardship program, and provide additional access to certified materials for forest industry partners (2020 FAP).

Additional resources related to landscape conservation and multistate collaboration can be found in Ch. 7.

Landscape Conservation Example, Grasslands

The Southeastern Grasslands Institute (SGI) is one example of an organization that is thinking, conducting research, and working at a landscape scale. SGI is a collaboration of leaders in international biodiversity conservation led by the Austin Peay State University. SGI seeks to integrate research, consultation, and education, along with the administration of grants, to create innovative solutions to address the multitude of complex issues facing Southeastern grasslands, the most imperiled ecosystems in eastern North America.



Trail through Boone's Prairie, a site restored by SGI working with volunteers and state park personnel, at Dunbar Cave State Park / Amanda Blount

SGI's focus is the "biogeographic Southeast," which encompasses parts or all of 24 states, including all of Tennessee. SGI works in partnership with many agencies (such as USDA NRCS, NPS, and TDEC), nonprofits (such as Quail Forever and TNC), and private landowners. SGI helps to protect land; manage grasslands using a variety of approaches (such as prescribed fire and planting); protect and cultivate the genetic diversity of disappearing grasslands through seedbanking; mobilize volunteers and resources from a wide array of sources; educate both the public and conservation practitioners; and conduct research that will further their conservation goals. While their focus is on grasslands and other "open" ecosystems, which in some cases may be quite small (a few acres), they recognize grasslands are embedded in a matrix of land use that is critical to the long-term success of any conservation endeavor.

Landscape Conservation Example, Forests

The Shortleaf Pine Initiative (SPI) is another landscape scale effort in the Southeast, which focuses on shortleaf pine (*Pinus echinata*) forests and associated habitats that once covered a vast area stretching across 22 states from eastern Texas and Oklahoma to the eastern seaboard and from New Jersey down to Florida. Although this historic range is estimated to have covered over 280 million acres, less than 10% of forests previously dominated by this species remain, with the most significant decline taking place east of the Mississippi River. The loss stems from massive pine beetle outbreaks in poorly managed stands, changes in timber management practices, altered

Box 6.1 Landscape Conservation Example: Managing Pine and Oak Woodlands for Species Recovery

One of Tennessee's natural treasures and its first State Natural Area (SNA) is Savage Gulf, which is an 18,236-acre SNA located in Grundy and Sequatchie counties on Tennessee's Cumberland Plateau, within a landscape unit encompassing lands that are (1) ranked as high or highest priority in the **Southeast Conservation Blueprint**, and (2) included in the Middle Cumberland Plateau Conservation Opportunity Area. The site is cooperatively managed by two divisions within the Tennessee Department of Environment and Conservation (TDEC): State Parks and the Division of Natural Areas (DNA) (see map below).



Map of Savage Gulf State Park and Natural Area with pine-oak woodland project area outlined in blue.

Investigations of vegetation on the plateau surface of Savage Gulf have documented the presence of a regionally significant, pine-oak mixed forest and evidence of historical and contemporary disturbance processes and patterns that contributed to its establishment and persistence (Hart et al. 2012, Goode et al. 2021, Goode et al. 2022). Complementary historical and dendrochronological evidence of fire's influence on Cumberland Plateau vegetation have also been published from Savage Gulf and other study sites with shortleaf pine (*Pinus echinata*) stands, which are suitable for reconstructing fire history using tree-ring data (Stambaugh et al. 2020).

The results of these investigations all point to a need for active management to prevent a transition of Savage Gulf's current pine-oak dominated canopy vegetation to a future condition dominated by maple species through a process termed "mesophication" (Nowacki and Abrams 2008). To provide conditions that would maintain the pine (*Pinus*) and oak (*Quercus*) components—species vital for wildlife conservation—the authors proposed combining spatially appropriate silvicultural entries, such as thinning or harvests, with prescribed fire (Hart et al. 2012, Goode et al. 2021, Goode et al. 2022).

Located within the Savage Gulf SNA, north of Savage Creek, a site known as the "Meadow Creek Unit" harbors a population of white fringeless orchid (*Platanthera integrilabia*), a Regional SGCN that was listed as threatened under the Endangered Species Act (ESA) in 2016. The species recovery plan describes six actions needed for the species' recovery, including the following Priority 1 action: "Work with partners to protect, restore, and manage habitat where populations are extant or could be restored" (USFWS 2023a).

The Meadow Creek unit was acquired by the State of Tennessee in 2014, when the vegetation consisted of a planted loblolly pine (*Pinus teada*) plantation with an overly dense mid-story of deciduous tree species, such as tulip poplar (*Liriodendron tulipifera*), red maple (*Acer rubrum*), and blackgum (*Nyssa sylvatica*)–

see “midstory vegetation” photo. By 2017 the white fringeless orchid population at the site had dwindled to a low of 24 flowering individuals where there had been more than 1,000 found in 1997. Shading due to overly dense mid-story vegetation structure, along with White-tailed Deer (*Odocoileus virginianus*) herbivory, were the causes for this decline.

With support from endangered species recovery grants from the USFWS, DNA began mid-story thinning in a small area, established fire breaks, conducted prescribed burns, and controlled invasive plants. By 2019, Timberland Investment Resources, Inc., who retained rights to the pine timber when the property was transferred to the State, removed the loblolly pine canopy. The response to the changes that resulted from these actions was dramatic, with more than 2,000 flowering white fringeless orchids observed in 2021. Meadow Creek now supports one of the largest known populations of the species in a diverse plant community.



Midstory vegetation conditions in the Meadow Creek unit of Savage Gulf SNA ca. 2016, prior to removal of deciduous species to increase light availability for white fringeless orchid / Geoff Call, USFWS, retired

These vegetation changes also led to an increase in abundance of Horseflyweed (*Baptisia tinctoria*), a host plant for the Frosted Elfin (*Callophyrs irus*) butterfly, a Tennessee SGCN that has been found in other Cumberland Plateau Shortleaf pine-oak woodlands on Catoosa WMA.

Recent searches and habitat modeling efforts have increased awareness of known and potential suitable habitat for white fringeless orchid at Savage Gulf SNA. These data, combined with other lines of evidence, demonstrate the need for increasing the spatial scale of efforts to restore these pine-oak woodlands and acidic seep communities, which have suffered from decades of fire exclusion. Discovery of a white fringeless orchid population in 2018 approximately 1.3 miles north of the known Meadow Creek population, and re-discovery of a historical population in 2022 at nearby Hobbs Bog, have highlighted the need for restoring forest structure in the landscape where these small, isolated populations exist, to increase light availability, improve hydrologic conditions, and enhance connectivity among them.

Additional biological evidence points to benefits that landscape-scale restoration will provide:

- Potential to increase abundance of heliophytic (aka sun-loving) wetland species of conservation concern, such as the Regional SGCN Tennessee death camas (*Stenanthium tennesseense*)
- Building on observed responses of woodland/savanna species (e.g., the host plant for the Frosted Elfin mentioned above) to further expand their populations

- Increasing availability of vegetation communities that provide floral and nesting resources for a diverse array of bees, butterflies, and other pollinators.

With funding support from the USFWS and the "Iris Fund," which raises money through sales of a crested iris-adorned (*Iris cristata*) license plate for native landscaping and managing ecosystems in Tennessee's State Parks, the DNA embarked on a project to expand the pine-oak conservation effort to encompass approximately 3,000 acres. Work began in 2024 to conduct timber stand improvement (TSI) treatments over more than 500 of these acres, increasing light availability that will be needed for regeneration of shortleaf pine and white oak, two dominant canopy species in the Savage Gulf woodlands. Increased light availability will also encourage growth of native grasses and wildflowers, which along with oak and hickory leaf litter will provide fuels to carry fire through the understory. The DNA will use prescribed fire to build on the positive effects of the TSI work, reversing the effects of mesophication and exposing mineral soil needed for shortleaf pine germination and recruitment.

Pine-oak woodland conservation at Savage Gulf is a shining example of efforts being implemented across several Southeastern states to recover the white fringeless orchid, which will benefit efforts to recover other SGCN as well. Increasing light availability through midstory canopy thinning in wetland habitats where the species occurs and promoting open woodland conditions in surrounding upland forests have produced positive responses from white fringeless orchid populations in sites ranging from Alabama to Kentucky. The project at Savage Gulf exemplifies the benefits of managing habitats at a landscape scale, as it will benefit populations of multiple SGCN that occupy the pine-oak woodlands. It is also expected to help with protecting water quality and maintaining stream flows in downstream aquatic habitats of the Collins River, extending benefits of managing native woodlands to offsite Federally listed species and SGCN, as well as downstream human communities.

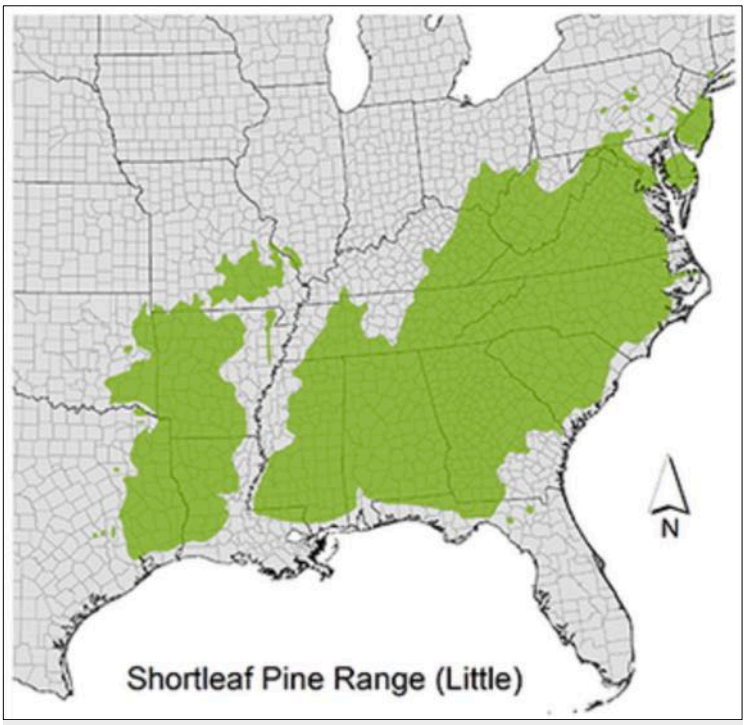
Increasing the scale of pine-oak woodland conservation at Savage Gulf not only benefits species currently known to use the site, it could set the stage for reintroducing species that have been lost from Tennessee's natural heritage. For example, proper planning and management of these pine-oak woodlands could once again provide conditions that support reintroduction of species extirpated from the Tennessee landscape, e.g., the **Red-cockaded Woodpecker**. In fact, TWRA along with its partners at TDEC and USFWS, launched a species reintroduction plan, announced publicly at Tennessee's inaugural biodiversity summit in October 2025. The program will include establishment of artificial cavity nests and prescribed burns in shortleaf pine forest, and, of course, live bird reintroductions (TWRA 2025).



Savage Gulf State Park and Natural Area / Greg Wathen

fire regimes, disease, and land use changes. Yet, these forested landscapes still represent an extraordinary diversity of cultural, ecological, and economic values centered on wildlife and recreation, water quality, and a high-value wood products industry. The varied nature of threats affecting shortleaf pine, the geographic extent of its range, and the multiple benefits that nature and society derive from these open forest habitats, make landscape scale conservation the only truly effective approach to saving shortleaf.

The SPI focuses on providing tools and resources necessary to restore shortleaf pine ecosystems—currently in the form of training, information resources, publications, guides for conservation practitioners, and perhaps most important of all, a growing network of researchers, organizations, and practitioners wishing to collaborate to bring back this forest type.



Historic range of shortleaf pine published by E.L. Little, 1971, USDA Forest Service / courtesy of Shortleaf Pine Initiative

Large landscape acquisitions (tens of thousands of acres) can ensure the following results:

- Working forestland is protected, sustaining forest-based jobs and the industries that rely on forestry well into the future.
- Current and future generations will continue to enjoy access to the protected area for health and recreation.
- Forests are more easily well-managed, for example through thinning or prescribed fire, which keeps the forest healthy and maintains water quality in local communities that depend upon these watersheds; healthy forests also deter floods and erosion.
- Rare ecological lands are added to state ownership, benefiting SGCN and future generations.

Conservation in developing areas

In areas of rapid urban/suburban development where land values are increasingly high, permanent conservation easements can provide an excellent alternative to fee title purchase. On the other hand, sometimes what is needed is not protection but increased collaboration among the many entities that reside in a city. A more holistic examination of both legacy impacts and pending impacts to small seasonal streams, for example, could prompt additional study and due diligence to protect the integrity of often overlooked features and the SGCN they contain.

Conservation in Developing Areas Example

The Urban Bird Treaty (UBT) program facilitates collaborative conservation efforts by partnering with cities to enhance their livability for nesting and migrating birds. The treaty is a partnership agreement between a US city and the USFWS that promotes the benefits of urban bird conservation to the city and its communities and expresses the city's support for helping achieve the goals of the UBT program.



The Urban Bird Treaty aims to conserve all bird species, including those that are still relatively common like this Blue-gray Gnatcatcher (*Polioptila caerulea)* / Daniel Istvanko, TWRA

The City of Nashville joined the UBT program in May 2023. By promoting simple actions like keeping pets indoors and minimizing nighttime lighting during migration seasons, the **Nashville UBT** empowers individuals and communities to contribute to bird conservation. Almost 70 organizations have participated in developing specific action items and have committed to these actions to increase awareness of the city's birds and habitats, as well as how essential they are to the welfare of Nashville's residents and visitors. UBT partners work towards systemic changes that integrate bird conservation and education into urban development, ensuring sustainable outcomes for birds, which in turn enrich the lives of people.

6.4.2. Information Collection and Dispersal

The information collection and dispersal class of strategies includes the following types of General Conservation Actions: improved communications and public relations, education, and conservation planning, monitoring, and research. Improved communications include a focus on raising awareness of stewardship issues on public lands, specific SGCN conservation issues, how animal and human health issues are often inextricably linked (see Appendix J One Health) and opportunities to partner in private lands conservation.



TWRA biologists monitoring Lake Sturgeon at Watts Bar Reservoir / Brandon Simcox, TWRA

This approach includes the use of new conservation planning data in the 2025 SWAP GIS model to help identify and implement a variety of projects. The agency will continue to invest in SGCN, their habitats, and in addressing particular problems that threaten them. Such monitoring can often best be accomplished through

investments and collaborations with researchers. Teaching and engaging the public and volunteers in monitoring activities, sometimes called citizen science, also is growing in popularity and can be helpful in achieving a variety of monitoring objectives.

Communications and public relations

Partnerships among agencies and other organizations are effective means of increasing public awareness about important stewardship issues where knowledge can translate into conservation results. A good example of this in Tennessee is the Urban Bird Treaty program noted above. Another example is the Tennessee Scenic Rivers Association (TSRA), which has been leading public events such as river clean-ups, river days, guided paddles, and interactive forums. In 2024, TSRA, in partnership with TDEC and TWRA, restored a degraded riverbank along the Duck River. This hands-on example of community and agency collaboration not only revitalized the habitat but also reinforced the power of shared conservation goals. TSRA maintains that "building an emotional connection with our state's natural heritage is vital for sustained public support."

The role of non-profit groups and the myriad ways in which they can provide opportunities for citizens to volunteer in conservation projects is also invaluable. This includes the expanded use of citizen-led monitoring initiatives, such as **eBird** and the **Tennessee Amphibian Monitoring Program**.

Monitoring and research

From 2015 to 2025, TWRA wildlife diversity biologists continued to spend a significant amount of time monitoring SGCN populations, assessing their response to management activities, and contributing to the improvements in the GIS and relational database noted in Chapter 3 (see in particular the following Highlights: Pine Snake Telemetry, Basic Research to Inform Rare Species Habitat Needs and Threats [Spotted Skunk], and Conservation Using the SWAP Relational Database).

Citizen science refers to research collaborations between interested citizens and researchers to collect data about the natural world. Citizen science monitoring programs represent an opportunity to expand the agency's capacity for monitoring certain SGCN. The following are current examples of TWRA citizen science, which could be expanded or replicated for different species:

- eBird data contributed by birders across the state has informed conservation planning efforts on the Cumberland Plateau as well as habitat prioritization in the 2025 SWAP.
- Training volunteers to recognize and monitor the spread of the destructive Hemlock Woolly Adelgid (*Adelges tsugae)*, has helped to track an introduced insect pest that kills native hemlocks in east Tennessee's highlands.
- A number of citizen groups currently monitor bat houses.

- TWRA added a picture of the Spotted skunk to the annual hunting guide. Citizens were asked to provide information related to sightings of the species to better our understanding of Spotted Skunk distribution.

TWRA also supports research by or in collaboration with partners from academia and other institutions. For example, the **Student Network for Amphibian Pathogen Surveillance** (SNAPS) is a network of more than 62 institutions made up of students, instructors, and scientists who are taking action to save North American amphibians. The network leverages student power to conduct ongoing and cost-effective surveillance for pathogens (Bsal is the current focus) by incorporating surveillance into undergraduate curricula (SNAPS 2025).

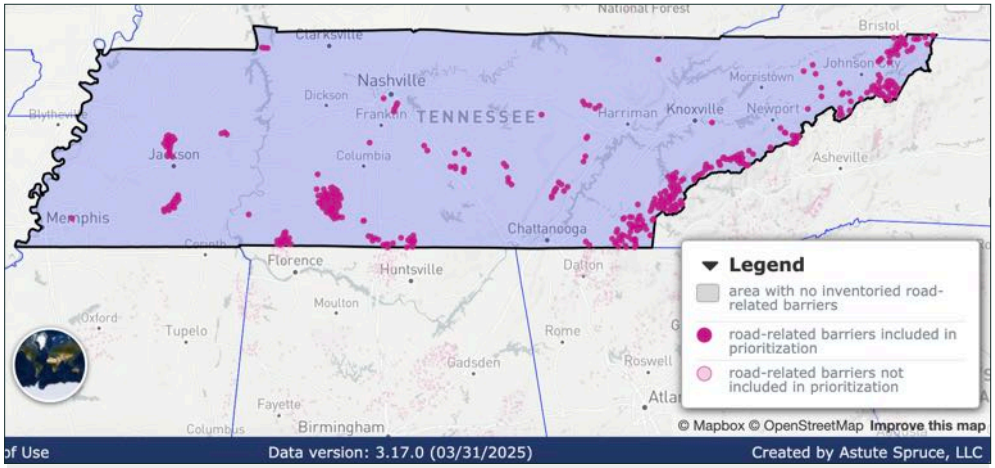
Information needs can be critical when it comes to taking effective conservation action. For example, the East Gulf Coastal Plain Waterbird Plan identifies critical knowledge gaps for waterbirds, such as:

- Identification of key concentration areas for non-coastal colonial nesting species and migratory and non-breeding flocking species
- Identification of specific features and metrics that define high quality habitat for certain priority species (Schwarzer et al. 2024).



Nesting Great Blue Heron at Radnor Lake State Park / Sharon Molerus

In some cases, monitoring data can translate into direct conservation priorities, such as when simple monitoring protocols detect differences in local abundance and species richness in streams upstream and downstream of barriers, which can point to problems. These issues can be addressed through better advance planning to avoid streams, improved engineering designs, and the use of less problematic materials (Warren and Pardew 1998, USDOT-FHA 2007). (See also Understanding and Conserving Cryptic Species Highlight [Green Salamander].)



Road-related barriers in TN from the Aquatic Barrier Inventory (Oct 2025). Out of almost 143,000 road/stream crossings in TN, only about 2% have been assessed for impacts to aquatic organisms. Of those, ~1800 are likely to impact aquatic organisms, and 863 have been analyzed using the National Aquatic Barrier Inventory & Prioritization Tool.

Members of the Tennessee Aquatic Connectivity Team

UNDERSTANDING AND CONSERVING CRYPTIC SPECIES

For little-known species, basic life history research can be life-saving. The Green Salamander is the only species of the North American genus *Aneides* (climbing salamanders) endemic to the eastern United States, ranging across much of the southern Appalachians and Cumberland Plateau from AL to southern PA (SEAFWA 2020). Yet, because it is a small species that hides and is well camouflaged, it is rarely seen, difficult to monitor, and consequently very little is known about its basic biology.

The US Fish and Wildlife Service has been petitioned to list the **Green Salamander (*Aneides aeneus*)** under the US Endangered Species Act; in 2015 the agency determined the listing may be warranted and initiated a status review.

In 2016, well over 10 institutions in six states collaborated to receive a competitive State Wildlife Grant (SWG) worth $233,800 from the federal program established to support conservation of Species of Greatest Conservation Need (SGCN) identified in State Wildlife Action Plans.

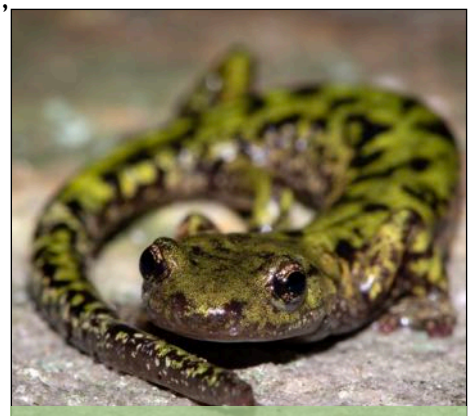
The grant included $70,000 in federal funding with a $23,333 match for TN. It funded over 120 surveys conducted at historical and potential locations in TN and northern AL between Oct. 2017 and Nov. 2019. The goals of the study were to (1) identify priority populations, (2) address knowledge gaps in the species' ecology and life history, and (3) complete a comprehensive threat assessment.



Green Salamander hiding in the cleft of a rock outcrop / Daniel Istvanko, TWRA

HOW BASIC CONSERVATION BIOLOGY MAKES A DIFFERENCE FOR SPECIES

For a species like the Green Salamander, it can take all day for surveying biologists to find just two individuals. On the other hand, **Daniel Istvanko, Biodiversity Coordinator** for the Tennessee Wildlife Resource Agency (TWRA) Region 3, lucked out when he found ~40 salamanders in one crevice. "There were so many juveniles running around, I couldn't count them all!"



Adult Green Salamander / Daniel Istvanko, TWRA

The surveys and research that Daniel and others conducted in 2017-19 increased the total number of Green Salamander sites in the state from 44 to 160 (SEAFWA 2020). From these data, TWRA developed a species distribution model using mathematics to determine which habitat factors (represented by GIS data layers) are most predictive of Green Salamander occurrence. Rock outcroppings, tree canopy cover, and elevation were at the top of the list (Thames et al. 2021). Elevation was indicative of where preferred rock outcrops tend to occur, but biologists believe that tree canopy cover is important to maintain the temperatures and moisture levels preferred by these salamanders. (A later dissertation by UT-Chattanooga student Erin Gaylord expanded on this study to produce the most sophisticated Green Salamander model currently available.)

As a result of these findings, TWRA and other partners now focus on protecting forests surrounding rock outcrops to conserve this species. Although it is unknown precisely how much forest is sufficient to maintain the salamander's preferred microclimate, current recommendations for 200-ft buffers around water and rock outcrops are in place.

"This is a big accomplishment of the SWG program," says **Dustin Thames, TWRA Biodiversity Coordinator** for Region 2. "With dedicated funding for nongame species conservation, we can now spend more time studying species before they are listed. With the Green Salamander, we thought we had very few, but we looked and found out that in appropriate habitat they are pretty much all over the place! If we ever get **RAWA funding,** we can really start addressing issues of decline before a species' situation becomes dire. There are many similar little-known species, such as the Star-nosed Mole, Cave Crayfish, and just about any fish that live in caves."

RESEARCH IS CRITICAL TO LIST AND PREVENT LISTING OF SPECIES

In addition to habitat data, this study yielded 113 genetic samples. Genetic analyses support the idea that the Green Salamander may not be simply one species but a "cryptic species complex," with two lineages that occur in different geographies across Tennessee. Istvanko explains this idea as "evolution in process."

Skin swabs and tissue samples were also analyzed for the presence of pathogens, which showed that Bsal (a disease in Europe that biologists want to prevent in the US) and Ranavirus were not detected; whereas chytrid fungus (*Batrachochytrium dendrobatidis*, the scourge of amphibian populations worldwide) was detected at 9 of 19 sites screened (Niemiller et al. 2022).

The Green Salamander has a surprisingly complex life history. Scientists know that females lay 10–30 eggs on the roof of rock crevices or under tree bark, and they stay with their eggs until they hatch 80 to 90 days later. Furthermore, the mother will guard her young for one or two months, and juveniles do not reach maturity until the age of three. While males breed annually, females breed every other year.

But, how many are there overall? How much are their populations affected by pathogens or habitat fragmentation from forestry and roads? How far do they move when breeding or dispersing? Despite a huge advance in understanding as a result of the competitive State Wildlife Grant, this species remains largely a mystery. "We need long-term monitoring to determine population trends and disease risk," says Thames. "To list or prevent listing of any species, we need basic demographic data such as how long they live, how successfully they reproduce, and whether their populations are growing, stable, or decreasing."

Partners for Green Salamander Conservation

Amphibian and Reptile Conservancy and Tangled Bank Conservation
Illinois Natural History Survey, Prairie Research Institute
National Park Service
Southeastern Association of Fish & Wildlife Agencies (SEAFWA)
The Amphibian Foundation
Tennessee Wildlife Resources Agency (TWRA)
US Fish and Wildlife Service (USFWS)
University of Alabama in Huntsville
University of Tennessee, Knoxville Center for Wildlife Health

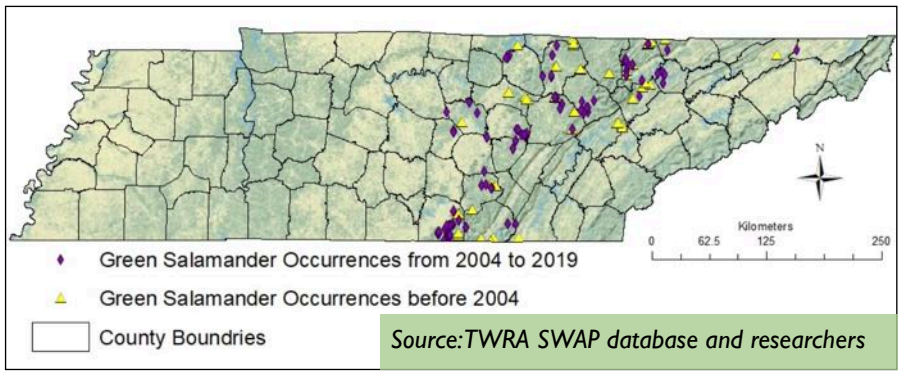
Cooperating states in the SWG project: GA, MS, NC, SC, TN, and VA



Biologist Dustin Thames using a flashlight to search for salamanders at Bear Hollow Mountain 2018 / Matthew L. Niemiller



Green Salamander / Daniel Istvanko, TWRA



Source: TWRA SWAP database and researchers

SEAFWA. 2020. Final Report: Assessment of Geographic Range, Habitat & Population Genetics of the Green Salamander in TN. (Authors Niemiller, M. L., R. Hardman, D. Thames, D. Istvanko, C. Ogle, M.A. Davis, M. Tan, J. J. Apodaca, J. Benito, J. Campbell, T. Clark, K. Dooley, D. Miller, K. D. Kendall Niemiller, C. Simpson, and P. Upchurch.)

Matthew L. Niemiller, R. Hardman, D. Thames, D. Istvanko, M. A. Davis, C. Ogle, K. D. Kendall Niemiller, K. E. Dooley, and T. M. Clark. The Distribution and Conservation Status of the Green Salamander (Aneides aeneus) in Tennessee, USA. 2022. Herpetological Conservation and Biology 17(2):249–265.

Thames, D. B., J. R. Campbell, C. S. Ogle, and D. R. Istvanko. 2021. Landscape selection of green salamanders, Aneides aeneus, and a model of their potential distribution to guide future surveys in Tennessee. The Tennessee Journal of Herpetology 4:4-13.

have begun looking at this issue in depth, with the intention of working with state, county, and municipal departments during scheduled road maintenance to replace barriers with passage-friendly culverts and crossings across the Tennessee landscape. (For an example of a culvert project, see Ch. 8).

Core stewardship practices include compatible resource use on public and private lands, conservation area management, exotic species/pathogen control, habitat and natural process restoration, species restoration, and removal of stream barriers.

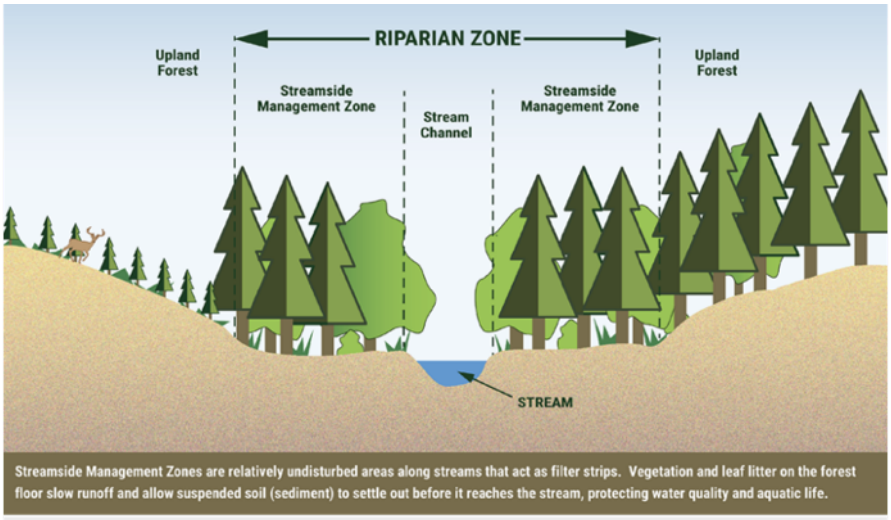
6.4.3. Management and Restoration of Species and Habitats

Management and restoration of species and habitats includes a number of General Conservation Actions that form the core stewardship practices designed to maintain ecosystem health: compatible resource use on public and private lands, conservation area management, exotic species/pathogen control, habitat and natural process restoration, species restoration, and removal of stream barriers. This class of conservation strategies focuses on better direct resource management and planning on both public and private lands.

Compatible resource use

A general principle of compatible resource use is often termed "working with nature" or "sustainable resource use." From principles of regenerative agriculture to mimicking natural water flows using dam releases to nature-based solutions for large problems, such as protection of forests and grasslands as carbon sinks—the concept is to use what nature has provided in a way that makes sense for both people and the planet. Implementation of this broad principle can take many forms, depending on the problem, the location, and the local culture.

Compatible resource use often begins with effective environmental reviews that ensure species and habitat needs are adequately considered and incorporated into land and water resource use decisions. Compatible resource use also includes such diverse habitat management practices as following guidelines for forestry BMPs, protection of streamside management zones (SMZ), fencing cattle out of riparian zones, mowing



An illustration of the SMZ / PotlatchDeltic

or other means of maintaining desired habitats, and following posted boating speeds while on the water.

BMP adherence is not only a water quality measure, it is also foundational to maintaining the long-term viability of our working forests. Proper implementation of forest BMPs:

- Maintains soil productivity and reduces erosion
- Protects aquatic habitat and downstream water quality
- Preserves understory vegetation and reduces fire risk
- Prevents road failure and ensures future access for forest treatments
- Limits the spread of invasive species through responsible equipment use

When used appropriately and guided by a forest management plan, even-aged methods such as clearcutting can regenerate species like tulip poplar or loblolly pine that require full sunlight. High-quality reserve trees (that remain uncut) can serve as seed trees to promote regeneration and can also serve as valuable wildlife trees. These methods can also create edge habitat and early successional conditions beneficial to wildlife. For example, Ruffed Grouse (*Bonasa umbellus*), an SGCN, use small group selections as critical brood habitats in the summer in the Southern Appalachians (Jones and Harper 2007). Clearcutting is also a method mentioned in best management practices for the Golden-winged Warbler (Golden-winged Warbler Working Group, 2013). However, site index (the potential of the site to grow trees), species objectives, and long-term planning should drive decisions about even-aged management.

In Tennessee, from 2015 to 2024, a total of 245,000 grassland acres on public lands have received management (or about 24,500 acres per year on average) and of that, approximately 48,000 acres have received prescribed fire. Management activities include annual maintenance of open lands, idle fields, shrub/scrub, or native grass vegetation, as well as prescribed fire. Grassland management is conducted by a variety of conservation partners, including TWRA, TDEC, Quail Forever, and SGI.

Likewise, from 2015 to 2024, actively managed forestland—defined as implementation of Forest Management Plans on existing and new WMAs—totaled 106,463 acres (10,646 on average each year) of forestland. Included in this is 68,871 acres burned over the same time period (~6,887 annually). Annual maintenance of forest lands is conducted to improve wildlife habitat, control invasives, and reduce fuels.

To achieve habitat improvements on public and private lands, it is necessary to make use of a variety of funding sources, especially state and federal incentive programs designed to assist landowners with practices that benefit habitat values as well as their own properties and operations (see Ch. 8 Private Lands Conservation).

Habitat restoration can be categorized into two main types: (1) restoring natural processes to let nature do the work, such as barrier removal to restore stream flows or reintroduction of fire to improve plant diversity and structure, and (2) restoring specific habitats and vegetation types for



Volunteers collecting seeds of Indian grass (*Sorghastrum nutans)* to be used in restoration / Laura Hunt, SGI



Interseeding, the practice of sowing seeds of desired native grasses and forbs into existing grassland vegetation to increase biodiversity and native cover / Laura Hunt, SGI

particular species, such as planting forests, using grading or water control structures to improve wetlands, and seeding native grasslands. (In **Appendix B, the 2025 SWAP Map Atlas**, Map 6.6 identifies grassland systems in the state, which are often remnants. Map 6.7 identifies grassland priorities for conservation—whether protection or management. Map 6.10 identifies riparian zones and floodplains whose habitat restoration would most benefit in-stream aquatic species downstream.)

Species restoration efforts become necessary in certain cases, such as with several fish and freshwater mussel species, when precipitous declines require direct population recovery strategies. In particular, restoration of habitats for federally-listed (threatened or endangered) species—as well as actions to address at-risk species that could result in precluding the need to list them under the ESA—can be supported through the **USFWS Recovery** and **Partners for Fish and Wildlife** programs.

Habitat restoration can often be integrated into land uses designated for purposes other than conservation. For example, one-fifth of America's native pollinator species (both vertebrate and invertebrate) face an elevated extinction risk (Cornelisse et al. 2025). The Xerces Society argues that insect pollinator habitat should be woven into all parts of our landscapes—farmland, utility corridors, solar arrays, bike paths, roadsides, natural areas, and backyard and community gardens (Schultz et al. 2025). Such an approach could be qualified as landscape in scale, without the necessity of planning an integrated approach across all of these areas. Land management knowledge coupled with applied science will be important to success. However, an "all-hands-on-deck" approach also allows everyone to contribute to the solution. The following are more specific examples of compatible resource use in Tennessee.

Mitigating Light Pollution

The widespread and interrelated threats associated with light pollution can be mitigated using several approaches, which will also ensure a future for pollinators, birds, insects, and other species that provide society innumerable benefits.



Shaded street lamps / Phil Nash from Wikimedia Commons

1. **Lighting infrastructure should be redesigned to be wildlife-friendly.** Fixtures that are shielded to direct light downward can greatly reduce unnecessary light spill and skyglow. Installing motion sensors and timers ensures that lights are used only when needed, and switching to low-intensity, warm-colored lights—such as amber or red—minimizes disturbance, particularly for nocturnal and migratory species. (More resources are available at DarkSky.org.)

2. **Conservation efforts should also focus on protecting and restoring dark sky habitats.** This includes establishing "Dark Sky Reserves" in ecologically sensitive areas like wetlands, forests, and migration corridors, and creating buffer zones around protected lands to limit nearby lighting. In addition, specific lighting reduction measures should be implemented in areas critical for breeding, nesting, or migration. These efforts can be supported through partnerships with local governments, land managers, and developers to integrate light pollution mitigation into land-use planning and building practices.

3. **Public education and community involvement are essential.** Outreach campaigns can raise awareness about how outdoor lighting impacts wildlife and encourage individuals and businesses to adopt responsible lighting practices. Citizen science programs, such as Globe at Night, can engage the public in monitoring light pollution and contribute to data collection for research and planning. Policymakers should also incorporate light pollution reduction strategies into conservation frameworks, including wildlife management plans, environmental reviews, and urban development regulations. Developing and enforcing local ordinances that limit unnecessary lighting, particularly near sensitive habitats, can create meaningful change at a landscape level.

4. **Monitoring wildlife responses to lighting changes is vital for evaluating success and guiding future action.** Continued research can help conservationists understand species-specific impacts and refine mitigation strategies. Adaptive management based on ecological data ensures that efforts remain effective over time and are responsive to emerging threats or new technological developments.

The ecological consequences of light pollution are far-reaching and serious, but they are also reversible. Through intentional lighting design, habitat protection, policy development, and public engagement, the impacts of artificial light on wildlife can be reduced. By prioritizing the needs of sensitive species and ecosystems, conservation planning to promote dark skies and mitigate artificial light at night provides a pathway toward restoring natural darkness where it is most needed and ensuring that wildlife can continue to thrive in a rapidly changing world.

Tennessee's 2020 Forest Action Plan

The 2005 and 2015 SWAPs, the updated 2025 SWAP, and the Tennessee Division of Forestry's (TDF) 2020 **Forest Action Plan** all agree that opportunities exist for collaboration among TWRA, TDF, and private landowners to improve forest management for the benefit of wildlife and plants.

The Tennessee Department of Agriculture's (TDA) TDF developed its first Forest Resource Assessment and Strategy, also called the Forest Action Plan (FAP), in 2010, and it was updated in 2020. Where possible, the FAP complements other state plans including the SWAP. Both plans identify conservation challenges and objectives for Tennessee forests. Similar to the SWAP, which is a prerequisite for receiving State Wildlife Grant funds, the completion of the FAP is a requirement before states are eligible to apply, compete for, and receive federal funds through an annual grant cycle for the 10-year plan period.

The Tennessee Forest Action Plan is a 10-year plan that guides forest management and conservation priorities across the state of Tennessee. The purpose of the FAP is to determine the status of forest resources—what is needed to maintain and improve them—through an assessment: what's there, who owns it, what are areas of opportunity, how can partners collaborate to address the threats, and how can resources be leveraged to develop strategic partnerships and procure funding assistance.

TDF partnered with TNC to co-author the 2020-2030 FAP. This collaboration resulted in a focused plan that includes recommendations and specific action items to achieve Tennessee's conservation goals. A key goal of this FAP is not only to address national private forest conservation priorities, but also to be a useful tool to a wide range of organizations and individuals in Tennessee to address forest resource issues pertinent to them. The 2020 Forest Action Plan outlined 4 overarching objectives:



Family forest and farmland in middle TN / Greg Wathen

- Enhancing forest health and resiliency
- Expanding market diversification
- Improving connected landscapes
- Enhancing wildfire resiliency.

Both the SWAP and the FAP identify problems facing TN forests that decrease forest habitat extent, alter habitat structure, and contribute sediment and nutrients to streams. Specifically, more active forest management that fosters native systems is the proactive action to address climate change, loss of diversity, and other impacts from lack of disturbance.

In order to address the short-term impacts, the Tennessee FAP will focus on strategies that encourage strategic silvicultural disturbance events in forests to create tree age class and species diversity, spatial and vertical diversity, and habitat diversity. For example, various types of timber harvest can provide edge habitats and diversification of habitat and/or species composition. Clear cutting can be incompatible in some situations, but at times it can be a viable option for forest management in an area. As a result of disturbance, forests will be more resilient to spikes in insect or disease populations, wildfires, and other climate derived stressors.

Additionally, riparian restoration activities such as tree planting and invasive species removal can improve the health and resiliency of these areas in both rural and urban settings.

Land managers must also be diligent in trying to understand the role of fire in altering forest ecological processes and apply fire, or continue to prevent its occurrence, based on landowner and public safety objectives, ecological function, and forest resilience. With a better understanding of where prescribed fire is appropriate for forest management and fire's role in impacting forest stand dynamics, land managers can slowly reintroduce prescribed fire to improve forest resilience. As a secondary impact, prescribed fire will also "aid in reducing fuels that may increase severity and frequency of wildland fire." (2020 FAP)



Part of a riparian restoration planting in the Wolf River floodplain / Gregg Elliott, K Gregg Consulting

Proper management of forest resources, including the promotion of landscape-level forest habitat health, helps to protect a diversity of habitats for SGCN. It also promotes many other beneficial forest uses, such as protection of public drinking water supplies, recreation opportunities, and local forest-product related economic activities (TDF 2010).

Important programs that help achieve these goals while also fostering the economics of forestry are certification programs for forests. Forests certified through programs like the Sustainable Forestry Initiative (SFI) and Forest Stewardship Council (FSC) include a focus on biodiversity conservation. Tennessee State Forests are certified through SFI. One certification area of focus is the protection of high conservation value habitats for plant and animal species, in particular G1-G2 species.

Long-term strategies include developing awareness of our changing climate conditions and increasing markets to incentivize forest management techniques such as removal/treatment of invasive species, planting appropriate tree species, and managing for tree species that are appropriate for the location. For more information on the impacts of the changing climactic

conditions on our forests see the 2015 Climate Change Vulnerability Assessment for TN Wildlife and Habitats (Glick et al. 2015, TDF 2020).

Proactive and sustainable forest management practices provide the mechanism to ensure healthy, productive, and resilient forests. Forests at their highest ecological potential will benefit all who depend on the ecosystem services they provide. They will be better positioned to endure climatic, ecological, and abiotic threats.

Education and outreach are featured prominently in the plan's strategy. The FAP outlines a strong commitment to engaging landowners, community members, and partner organizations through technical assistance and public education. This is critical to expanding the reach of conservation tools and ensuring broad understanding of how forest management contributes to water quality, climate adaptation, biodiversity, and economic stability.

Partnerships were foundational to the FAP's development and implementation. The plan was informed by input from TDF, TNC, TWRA, University of TN, USDA Forest Service (USFS), NRCS, Tennessee Forestry Association (TFA), and others to ensure that the strategies it outlines are not only technically sound but also aligned with related state and regional efforts. The FAP also supports integration with the current SWAP, active Community Wildfire Protection Plans (CWPPs), and broader initiatives such as the Southeast Conservation Adaptation Strategy (SECAS).

Together, the 2020 FAP and 2025 SWAP can provide a coordinated framework to sustain Tennessee's forest ecosystems and their associated wildlife. The FAP's actionable strategies offer direct mechanisms for implementation, particularly through landowner engagement, market diversification, and partnership that can advance the goals of both plans.



Natural Resources Conservation Service meeting with a private landowner / NRCS

Agriculture and Private Land Conservation Programs

With nearly 40% of the land in Tennessee devoted to agriculture (Tennessee Farm Bureau 2020), the impacts—both negative and positive—of agricultural practices are profound. A diverse array of both federal and state programs, as well as private conservation groups, such as Quail Forever, work with private landowners to provide conservation planning, technical assistance, training, matching funds, and grants for work that benefits everyone by maintaining and improving the ecosystem services provided by natural systems. These services include clean water (see **Appendix B, the 2025 TN SWAP Atlas**, Map 6.11), fertile soils, pollinator habitats, etc. This is such a large and important topic that it is dealt with in a separate chapter, new in the 2025 SWAP, on Private Land Conservation (see Ch. 8).

Compatible Resource Use Example: Solar Energy Development

Solar energy facilities show great potential for providing sustainably sourced electricity. Because solar power generation is new and expanding, often for the first time, into regions across the country, solar developers have an extraordinary opportunity to consider the impact of their facilities on the landscape and ensure that these facilities provide maximum value to both people and natural communities.

Utility scale solar projects generally have higher environmental and social impacts due to using large land areas. Therefore, siting these facilities in ways that avoid, minimize, and mitigate potential impacts to the environment is critical. One of the best ways to avoid solar impacts to habitat is the use of distributive solar, sited on rooftops and in urban environments.



Solar arrays on a former mine site, a project of TNC's Cumberland Forest Project, which develops projects on former coal mines in a way that engages with people in the local area so that communities can benefit. / SunTribe

However, large, ground-mounted utility scale solar photovoltaic projects enjoy a significant competitive advantage, and therefore it is in everyone's interest that these projects be developed responsibly. TNC has developed a set of **guiding principles for solar siting and design** (see Table 6.3.) to inform and potentially guide solar energy developers, operators, and other stakeholders to site, construct, and operate solar facilities in ways that minimize impacts to natural ecosystems and biodiversity (TNC 2019).

BMPs for operating facilities are site-specific; operators can benefit from collaborations with organizations that support both solar and biodiversity conservation. An adaptive management approach can be used to test and monitor new practices, such as "wildlife permeable fencing," which has larger holes than chainlink fence.

One example of a state program that encourages beneficial siting, design, and management of solar is the **Virginia Pollinator-Smart Program**, a program to encourage pollinator-friendly solar energy developments throughout the Commonwealth of Virginia. The program provides incentives and tools for the solar industry to adopt a native plant strategy to meet soil and water control regulations, community needs, and the needs of the biosphere. The program includes:

- Guidance for establishing and maintaining pollinator and bird-smart solar sites
- A solar site native plant finder, to help the plant industry find native species with potential to be developed into new market commodities
- Outreach and education on the program to city and county governments and local boards

- An invasive plant species list of plants to be avoided or managed at a site
- Establishment of a Virginia native seed nursery to jumpstart the native seed industry in the state by establishing best practices for farmers to grow Virginia native ecotype species.

(VADCR 2025).

Table 6. 3. Principles for low-impact solar siting and design

Principle	Siting	Design
1. Avoid areas of high native biodiversity and high quality natural communities	Avoid siting in resilient areas	
2. Allow for wildlife connectivity, now and in the face of climate change	Avoid siting in and fragmenting climate corridors	Where appropriate, use wildlife-friendly fencing or unfenced wildlife passageways
3. Preferentially use disturbed or degraded lands	Preferentially site on degraded lands with little vegetation and/or poor soil quality	Retain or plant vegetation/ trees in buffers or outside of perimeter fence
4. Protect water quality and avoid erosion	Do not site in floodplains	Buffer streams and wetlands
5. Restore native vegetation and grasslands		Integrate the planting of native and/or pollinator vegetation where appropriate
6. Provide wildlife habitat		Protect and restore on-site wildlife habitat features (e.g., wetlands, vegetated buffers); provide supplemental habitat as appropriate

Conservation planning

Advance planning and effective environmental reviews to mitigate problems and protect sensitive resources are important strategies for both public and private lands. A prime example of an advance planning tool is the **Tennessee Wetland Screening Tool**, developed by Skytec LLC and TDEC. The Wetland Screening Tool does not definitively confirm the presence or absence of jurisdictional wetlands, but serves as a predictive model that uses machine learning, advanced topographical analyses, and information from a large dataset of existing Tennessee wetlands to identify areas where wetlands are likely to occur.



Tree frog tadpole - wetlands are critical to the survival of amphibians and many other species of wildlife / Greg Wathen

It is the starting point from which the actual presence or absence of wetlands, their jurisdictional status, and their exact location and extent can be ground truthed, delineated, and assessed. The model should prove extremely valuable to stakeholders in evaluating conservation priorities, development potential and costs, permit submittals, and for assessing restoration or mitigation suitability.

Advance planning at a regional scale is evident in **Tennessee 2020: Vision for Parks, People and Landscapes**. In the last 20 years, Tennessee has increasingly leveraged the federally funded state comprehensive outdoor recreation plan process to consider recreation and conservation in the broadest sense as a determinant of Tennesseans' quality of life. Two Tennessee 2020 objectives of relevance to conservation are

- To develop an issues-oriented vision to serve as a consistent compass for the state's conservation and recreation agenda in the next ten years.
- To develop an implementation-oriented action program to move the state toward achieving this vision in the next five years.

Conservation Planning Example

One of the best examples of designated areas for conservation since SWAPs were initiated occurred in 2016. In the past, TWRA has determined that new contour, cross-ridge, or mountaintop removal coal mining was wholly incompatible with agency management and restoration for the North Cumberland WMA, where over 150 wildlife and plant SGCN depend upon the habitat features and their ecological function within the WMA. In 2016, at the request of the State of Tennessee, the Department of the Interior agreed to designate approximately 75,000 acres of mountain ridgelines in east Tennessee as unsuitable for surface coal mining operations. In its petition, the State said coal mining in the North Cumberland Wildlife Management Area and Emory River Tract Conservation Easement would be incompatible with existing local and State land use plans and programs, and that such mining would result in significant damage to natural systems and cultural, scientific, and aesthetic values.



North Cumberland WMA / The Conservation Fund

Other planning initiatives that have or could benefit in future from TN SWAP data and recommendations include:

- **Tennessee Volunteer Emission Reduction Strategy** (TVERS) - a plan in development by TDEC with support from the US Environmental Protection Agency seeks to reduce greenhouse gas (GHG) emissions and other harmful air pollutants.
- **Forever Tennessee** - a strategic conservation plan from The Land Trust for Tennessee aimed at protecting land resources for the long term. It focuses on conserving land for local economies, public health, historic preservation, biodiversity, and sense of place. The plan envisions protecting farms, forests, historic sites, recreation areas, wildlife habitat, and scenic landscapes.
- **The Strategic Land Conservation Plan** (SLCP) - a plan from TennGreen Land Conservancy uses data such as rates of urbanization, priority habitat for rare species, and where conservation work has historically been done, to identify four priority focal types of conservation: a) lands along rivers and streams; b) large, connected natural areas; c) land for public benefit; and d) biodiverse lands under the threat of development.

Conservation area management

TWRA Biodiversity staff strive to work effectively with other TWRA divisions, the TDA's Forestry Division, and TDEC on management issues within WMAs. This is a frequent goal of conservation area management in the 2025 SWAP. Collaboration between agencies with different expertise and jurisdictional authorities helps achieve balance between a variety of management objectives and will help improve habitat zones for all SGCN. For example, many rare plants occur in rare and/or small patch habitats that also may include SGCN wildlife.

Proactive management to prevent damage by licensed motorized off-highway vehicles (OHVs) and non-licensed All-Terrain Vehicles (ATVs) is critical, given the level of impact from these activities in Tennessee. This often consists of driver education, limits to use, and enforcement. Guidance to riders on where these different vehicles are allowed and not allowed on Wildlife Management Areas is important. New limits in some areas include road closures and increased enforcement against the use of alcohol where prohibited.



Damage from ATVs and ORVs in east Tennessee / Scott Dykes, TWRA

Conservation Area Management Example

An excellent recent example of ATV/ORV damage and response comes from the TDF. In May of 2024, the agency implemented temporary restrictions to address the significant damage caused by off-road vehicles to areas at Pickett State Forest. This ongoing damage compromised forest health, inhibited management activities, and jeopardized the safety and welfare of visitors and forestry staff. Following months of restoration of roads and trails in Pickett State Forest, the northwestern portion of the forest reopened to motorized vehicles on February 1, 2025 (TDF 2025).

Restoration included rehabilitation of nearly five miles of roads and trails in Pickett State Forest. Crews restored the surface, eliminated mudholes, sowed seed, and installed cables and gates to close designated areas. Preventive measures include some roads that have been reclassified as seasonal (to avoid damage during the wet season), gates to block entry to areas closed to traffic, and through an agreement with TDEC, state park rangers will patrol Pickett State Forest to enforce usage restrictions (TDA 2025).

Control/prevention of invasive exotic species and pathogens

When exotic or introduced species threaten SGCN and their habitats, a hierarchy of approaches to prevention and control is needed. Over the long-term, the most cost-effective, but also potentially a very labor intensive and difficult approach is to monitor for new outbreaks or invasions. Often control or even eradication of invasive species is possible before they become well established. After an exotic species has become established, a variety of control mechanisms is available, depending on the species, but eradication is unlikely. Monitoring is appropriate to determine the level of threat and the effectiveness of management actions.



Predator beetles on Hemlock Woolly Adelgid / Chris Simpson, TWRA

Example: Invasive Exotics Control and Prevention

The Hemlock Woolly Adelgid (HWA) is an insect that has destroyed many hemlock forests in the eastern United States. The predatory beetle species *Laricobius nigrinus*, native to the Pacific Northwest, eats the HWA. A program to introduce this species into the Park as a biological control began soon after the HWA was discovered in 2002. The National Park Service reports that they have released over half a million biocontrol beetles to treat 250,000 trees in 100 hemlock conservation areas, including Frozen Head State Park and the Cherokee National Forest. Each week during the beetle release season, one of these locations

receives a small army of 300 beetles, which Park foresters and biologists place on understory hemlocks in the hopes that the insects will climb the "ladder" of plants to feed on HWA in the highest hemlock branches.

In 2005, managers began monitoring the health of treated versus untreated hemlocks. They found that the beetles have become established in the Park, and they do help the hemlocks, as long as the insects are used with other forms of HWA control such as soil drenching. Beetles are the long-term control plan.

TDF's Hemlock Woolly Adelgid Strike Team is one of the leading approaches to HWA control in North America. This initiative has won two Pursuit of Excellence Awards during the Governor's Environmental Stewardship Awards in 2023 and 2020.

One Health

Diseases that can spread between humans and animals are called zoonotic. Approximately 70 percent of emerging infectious disease cases in humans and livestock are a consequence of spillover events from wildlife (University of Tennessee One Health Initiative [date unknown]). One Health recognizes that the health of people is closely connected to the health of animals (domestic and free-ranging) and our shared environment. One Health approaches to wildlife health and zoonotic diseases in Tennessee rely heavily on research, monitoring, and public education (for example, how to recognize and avoid West Nile virus or ticks, which are vectors of many diseases). For more information and examples of the One Health approach, see Appendix J).

Habitat and natural process restoration

Restoration of habitats and the natural processes that maintain their health is an important strategy for a large majority of SGCN. Within Conservation Opportunity Areas, restoration activities may be prioritized to improve or connect existing habitat areas. Important management techniques can include prescribed fire; removal of stream and river barriers; restoration and reconstruction of wetland and stream habitats; and reestablishment and management of native forest conditions and grasslands. (See **Appendix B, the 2025 TN SWAP Atlas**, Map 6.7. Terrestrial Priorities of Grassland Habitats, Map 6.8 Fire Need of Existing Terrestrial Habitats by Mean Fire Return Interval, and Map 6.10. Floodplain/Riparian Restoration Priorities for Downstream Aquatic Habitats).

Natural Process Restoration Example: Prescribed Fire

"Dramatically increasing the amount of beneficial fire on our landscapes is essential. Wildfire is a natural process, and the use of fire is vital to both fire-adapted ecosystems and fire-adapted communities. Fires serve to reduce flammable materials that fuel undesirable high-severity wildfires, thus mitigating risk to communities and fire-adapted landscapes" (Wildland Fire Mitigation and Management Commission 2023). Beneficial fire includes prescribed burning, cultural burning, and wildfire managed for resource benefit. In most fire-adapted ecosystems, significantly more fire on the land and around communities is needed, not less, which will require

Box 6.2 Natural Process Restoration Example: Fire for Forbs

Limestone glades in Nashville's Central Basin have long held the fascination of Tennessee's conservation community. Recognized since the early 1900s for supporting a diversity of species that are found nowhere else in the world, this regionally unique and globally significant ecosystem has inspired scientific investigation. Conservation partners including The Nature Conservancy, TennGreen, TDEC Division of Natural Areas (DNA), Tennessee Wildlife Resources Agency (TWRA), Missouri Botanical Garden, and others have been working with the US Fish and Wildlife Service (USFWS) to recover Federally listed plant species associated with limestone glades for decades.

In a testament to the success of land protection efforts to conserve limestone glades, in 2011 the USFWS declared the Tennessee coneflower (*Echinacea tennesseensis*) was recovered and removed the species from the List of Threatened and Endangered Wildlife and Plants. To some this might have been a signal that limestone glade conservation had been accomplished; for others, glade conservation was just heating up.



Tennessee Coneflower / Jason Allen courtesy of SGI

Limestone glades of the Central Basin face many threats associated with the rapid sprawl of development in the Nashville Metropolitan area and surrounding communities, including conversion to other land uses, changes in hydrology, and increasing pressure from invasive plant species. But there is another, less obvious, threat affecting diversity in the limestone glades. Commonly referred to as "cedar glades," it is true that limestone glades of middle Tennessee feature eastern red cedar (*Juniperus virginiana*) prominently. But a nuanced look at the system reveals that, despite being a namesake of the glades, cedar trees can also diminish diversity when they become overly abundant in limestone glades, shading out species that should otherwise thrive in characteristically diverse glade plant communities. To effectively conserve limestone glades requires more than removing the threat of development through land purchases or conservation easements; active management is needed to prevent cedar encroachment from pushing aside glade-associated grasses and wildflowers that depend on sunlight to flourish.

Two species that have influenced where and how limestone glades are being conserved are leafy prairie-clover (*Dalea foliosa*) and Pyne's ground plum (*Astragalus bibullatus*), both of which are listed as endangered under the Endangered Species Act. With support from the USFWS, the DNA is carrying the torch to manage glades owned by the State of Tennessee, and partners including TennGreen, Quail Forever,

and TWRA are working with the Partners for Fish and Wildlife Program to provide complementary management on nearby privately owned lands (see Conservation on Private Lands Highlight).

The tool of choice for long-term maintenance of limestone glades? Prescribed fire!

Over the last two decades, TDEC DNA has built a fire management program to manage a growing system of State Natural Areas (SNAs), including those where limestone glades were the reason for conservation investment. Recovery Land Acquisition grants from the USFWS have supported the work of TNC, TennGreen, and DNA to assemble a network of limestone glade reserves owned and managed by the State of Tennessee. These grants are issued for the express purpose of recovering populations of threatened and endangered species, and the recovery and delisting of Tennessee coneflower demonstrates their effectiveness.

Tennessee coneflower is at home in the shallowest soils or exposed bedrock of limestone glades, where cedar is slower to invade, so simply protecting land from development reduced the risk of the species going extinct. However, leafy prairie-clover and Pyne's ground plum require areas with slightly deeper soil, where cedar encroachment happens more rapidly if left unchecked, necessitating active management to appreciate the value of past investments in these precious protected areas. Enter the drip torches!

The USFWS has supported DNA's investment in training, gear, and equipment that are needed for a professionally run fire management program. Through a Recovery Land challenge grant from the USFWS in 2021, DNA was able to expand its prescribed fire program to manage several hundred acres both at Cedars of Lebanon State Natural Area and SNAs that overlay the Yanahli Wildlife Management Area. A separate award from the USFWS enabled DNA to expand limestone glade management to approximately 500 acres across three separate sites in SNAs or State Parks.



Drip torch, an essential tool for prescribed burns / Lori Iverson, USFWS

The areas where management has been expanded include populations of leafy prairie-clover and those offering suitable habitat to establish introduced populations of the exceedingly rare Pyne's ground plum. A partnership with Missouri Botanical Garden has capitalized on these strategic habitat conservation efforts, establishing populations of Pyne's ground plum by planting seedlings grown from seeds collected from wild populations.

The USFWS's Partners for Fish and Wildlife Program has also enlisted willing private landowners in lighting up limestone glades, working through a recently established agreement with Quail Forever to offer technical and financial assistance, including planning and conducting prescribed fires (see Ch. 8 Private Land Conservation and Conservation on Private Lands Highlight). While not completely out of the woods yet in recovering threatened and endangered plants of limestone glades, the future looks bright and the path to success is well lit.

adaptation, mitigation, and policy change (Wildland Fire Mitigation and Management Commission 2023).

Prescribed fire is a management approach that provides measurable benefits to early successional and fire-adapted habitats in Tennessee, thereby benefiting many wildlife and plant SGCN, such as Golden-winged Warbler (*Vermivora chrysoptera*), Prairie Warbler (*Setophaga discolor*), Eastern Spotted Skunk (*Spilogale putorius*), and Pale-green orchid (*Platanthera flava var. herbiola*). TWRA and other partners will promote the application of prescribed fire in the COAs where fire suppression has occurred, on both public and private lands. (See **Appendix B, TN SWAP Atlas** Map 6.8. to see where existing vegetation in Tennessee is adapted to fire and would benefit from prescribed fire. See Map 6.9. to see fire priorities of existing habitats to benefit terrestrial SGCN.)

There are partners across the state working diligently to get beneficial fire back on the landscape where it is ecologically appropriate. For example, the **Southern Blue Ridge Fire Learning Network**, formed in 2007, implements prescribed fire guided by science and cultural history, using an adaptive learning (burn and learn) approach. "Plant and animal communities seem to come to life when sunlight can penetrate the tree canopy, and science solidly supports the value of restoring fire to fire-dependent natural communities. Fire creates diversity of light and moisture environments, productive ground cover and thus diverse life forms" (Warwick 2021).



Prescribed fire at Bridgestone/Firestone WMA / Oak Woodlands and Forests Fire Consortium

With support from the Tennessee Prescribed Fire Council and the Tennessee Wildlife Federation, the Tennessee Prescribed Burning Act was signed into law May 10, 2012. This legislation provides liability protection for landowners who use prescribed fire appropriately, and it also authorizes TDF to provide public training programs that teach basic fire ecology and the safe and appropriate use of prescribed fire.

Restoring Aquatic Connectivity

Natural process restoration for aquatic habitats in Tennessee usually means managing large dam infrastructure and reservoir releases, to improve water quality and habitat conditions for aquatic SGCN. Another type of activity gaining positive momentum is the restoration of stream habitat connectivity and stream flow through small dam removals or removal of other barriers to flow, such as culverts. Many small dams on streams and rivers no longer serve the purpose for which they

Box 6.3 Natural Process Restoration Example: Reconnecting Aquatic Habitats for Slackwater Darter

Slackwater Darter (*Etheostoma boschungi*) is a federally threatened freshwater fish species only found in Tennessee and Alabama. Their habitat is severely fragmented by road-stream crossings and dams. In Tennessee, there are 695 road-stream crossings in the range of Slackwater Darter, and 311 that have been identified as a barrier to small-bodied fishes. There are also 112 dams within the known range of the Slackwater Darter. Slackwater Darters are migratory; they spend their adult lives in larger streams (third order and above), and when it is time to spawn in the winter, they migrate high up into the watershed to ephemeral seeps. It is theorized that these darters are able to "sniff out" groundwater to make their journey to these ephemeral seeps in order to spawn.

A large effort, led by the Southeast Aquatic Resources Partnership (SARP) and USFWS has been ongoing towards the recovery of the Slackwater Darter. In collaboration with TWRA, Tennessee Valley Authority (TVA), and many other partners, the team has surveyed over 1,200 road-stream crossings for aquatic passage in the range of Slackwater Darter. These surveys rank each crossing from minor to severe in terms of fish passability at the structure. Following this effort, the team has formulated a list of tier 1 and tier 2 high priority road-stream crossings for replacement.

Replacing these structures to allow for aquatic passage would benefit both aquatic organisms by reconnecting their habitats, as well as local underserved communities. Many of these road-stream crossings that are barriers to aquatic organism passage are also safety problems for the local community.

Undersized culverts often flood and wash out roads and low-water crossings (or fords), creating dangerous conditions during floods that often result in swift-water rescues. The topography that makes up the range of Slackwater Darter is considered very “flashy," meaning that when there is a moderate rain, water levels can rise quickly and fall quickly within a short time period. But this flashiness has forced the counties to close schools when they get a moderate to heavy rain because the creeks rise so quickly, they can’t be crossed to pick up students. Most of the Slackwater Darter range is within an underserved community.

This project is necessary and important not only to help recover a federally listed fish species, but also to benefit underserved communities. The team has been working to establish local connections and build trust with the local communities over the past six months and have made positive progress towards cooperatively replacing their road-stream crossings. While partners seek funding to replace all tier 1 priority structures, they will continue to monitor for Slackwater Darter to track its movement before and after replacement of these structures.



Slackwater Darter / Alex Bybel, TWRA

were originally built, and many pose public safety hazards.

Since 2015, several dam removals have taken place in Tennessee. Since 2015, two projects have focused on dam removal from the Roaring River and Elk River, both located in middle Tennessee (see Dam Removal Highlight).



Low flow conditions on the Elk River unveil the remnants of debris ladders behind Harms Mill Dam / Josh Campbell, TWRA

In collaboration with the Tennessee Dam Removal Partnership, TWRA has removed small and other river obstructions if they address the following criteria in a thorough planning effort designed to balance all resource values:

- The property owner is agreeable.
- Public safety can be improved.
- River ecology can be improved.
- Funding is available.
- There is support from the public, including but not limited to, local watershed associations and recreational users.
- The dam no longer serves its original or current purpose.

Species restoration

TWRA and others have undertaken a number of species restoration projects to benefit animals and plants that are rare, declining, or locally extirpated (see Chapter 2). Species restorations occur primarily through one of two means: (1) propagation of plants/captive breeding (i.e., an ark) and release of animals or (2) the transplanting of "seed stock" (both plants and animals). An important component of species restoration is ensuring good habitat is available. Map 6.11 in **Appendix B, the 20256 TN SWAP Atlas** shows the best sites for land restoration that would benefit aquatic species downstream. Species restoration may occur to augment populations that are in trouble or to reintroduce species to sites where they have been extirpated. For example, successful captive breeding and reintroduction programs for dozens of rare, listed, or declining native fish species in streams of the Tennessee River Basin—one of the world's most biologically diverse temperate river systems—have been conducted over the years by Conservation Fisheries, Inc. (see Innovation, Success, and Continuity Highlight).



Harm's Mill dam on the Elk River, circa 2022, from the Biological Assessment prepared by Griggs & Maloney Inc.

DAM REMOVAL FOR AQUATIC RENEWAL

Dam removal is an aquatic conservation solution that scientists and river conservationists have widely embraced in recent decades. Since 1975, approximately 1,200 dams have been removed from rivers in the United States, the majority of which were less than 8 meters tall.

Removing dams increases connectivity in a river literally overnight. Connectivity is critical to aquatic species because it allows movement, exchange of genetic material throughout the system, and makes it possible for fish to fulfill their role in transporting juvenile mussels to new locations upstream.

Human use of river networks has left them fragmented by barriers such as dams and culverts. In the biodiverse but densely settled Southeast, rivers contain the largest number of at-risk fish and invertebrates compared to the rest of the country. As of 2024, Tennessee's river connectivity was broken by over 8,700 dams, as well as 2,427 road-related barriers.

The Harm's Mill Dam Removal project on the Elk River in Lincoln County will mark 38 dams removed or mitigated in Tennessee. The removal is largely funded via the US Fish and Wildlife Service (USFWS) National Fish Passage Program. **Rob Bullard, Director of Freshwater Programs** for The Nature Conservancy (TNC) says, "This is probably the largest and most significant dam removal, from a conservation standpoint, in state history."

HARM'S MILL DAM - A SIGN OF THE TIMES



Harm's Mill ca. 1922 from Griggs & Maloney Inc.

The Harm's Mill dam on the Elk River was constructed in 1905 to update power for the local water-powered textile mill built in 1870. "All dams are built with a purpose," says **Josh Campbell, Biodiversity Chief** at Tennessee Wildlife Resources Agency (TWRA). "For a lot of these dams, the purpose has run its course, and they are now failing." Bullard adds, "Because they were instrumental in founding communities and jump-starting economies, it's a tricky balancing act to recognize when structures have outlived their purpose and then pursue the benefits of removal while respecting the community's connection."

A relatively new tool at the disposal of the conservation community in making these determinations is the National Aquatic Barrier Inventory & Prioritization Tool, a Southeast Aquatic Resources Partnership project that began in the Southeast and has been expanded, with support from the USFWS, to cover the nation. (The tool also includes data on road stream crossing barriers, mostly culverts, which pose similar but distinct issues for aquatic wildlife).

Data from this tool, augmented by habitat and species occurrences from the 2015 SWAP database, were key in identifying potential dam removals with the greatest benefits. "As far as I know," explains Bullard, who also co-lead's Tennessee's Aquatic Connectivity Team, "this is the first project in which partners have strategically prioritized dams, targeted landowners who owned dam properties, and pursued the project strictly for its conservation value—and were successful!" Harm's Mill ranks in the top five out of 2,000 dam removal priorities identified in Tennessee.

DAM REMOVAL BIG PICTURE

Harm's Mill Dam Removal Partners

Tennessee Wildlife Resources Agency (TWRA)
Southeast Aquatic Resources Partnership (SARP)
The Nature Conservancy (TNC)
Tennessee Dept. of Environment and Conservation (TDEC)
Tennessee Valley Authority (TVA)
US Fish and Wildlife Service (USFWS)

The Bipartisan Infrastructure Law (BIL), working through multiple agencies, provided $200 million over five years to restore fish and wildlife passage by removing in-stream barriers, some of them dams. "This is an unprecedented time for addressing our failing infrastructure," says **Shawna Fix, Aquatic Connectivity Teams Facilitator** for SARP. "Old, outdated dams present a huge safety hazard. Our hope is that the value of dam removal will become clear in the coming years so that states will continue to support these projects past 2026."

Benefits associated with Harm's Mill Dam Removal

Aquatic Species	Habitat	Public
35 extant species of mussels (down from 58 that historically were found in the Elk River) will gain new/improved habitat.	Reconnect 1,118 upstream miles of the Elk River mainstem and tributaries, including 402 perennial stream miles.	Remove a safety hazard posed by the dam to fishermen, boaters, and kayakers.
19 species listed under the federal Endangered Species Act (many of them are mussels) and 2 candidates for listing will gain new/improved habitat.	Reconnect 7,855 downstream miles of the Elk River, including lower order streams in the network (5,941 are perennial stream miles).	Provide interpretive signs and information to the community about the history of Harm's Mill dam and the ecological importance of dam removal.
46 Species of Greatest Conservation Need (SGCN) will gain new/improved habitat.		
139 other fish species will gain new/improved habitat.		

In the case of Harm's Mill Dam, the benefits of removal are clear (see table). As the Biological Assessment for the project concluded, "The benefits of the dam removal and restoring the Elk River to an unregulated riverine flow regime should result in increased biotic diversity, protection of aquatic species of concern, improved water quality, and an overall healthier Elk River system."

Cautions commonly associated with dam removal include redistribution of sediments trapped behind a dam, toxics associated with those sediments, and the timing of removal. In the case of Harm's Mill, because the dam had already been partially breached and testing showed no significant toxics in the sediments, these impacts will be minimal. Dam removal occurred on October 21, 2025! Fall is a time of low flows and outside the reproductive period of most aquatic species within the project site.

UNLEASHING THE SELF-HEALING POWER OF RIVERS



Boulder Darter (*Etheostoma wapiti*), federally listed endangered since 1988. Conservation Fisheries Inc. will collect fish from just downstream of the dam (one of the best habitats for this species in the whole river) and hold them at CFI facilities during teardown, returning the fish after sediment and disturbance have subsided. Photo by CFI.

The endangered Boulder Darter provides an excellent example of the potential for ecological benefit from removing the Harm's Mill Dam. This species, which is no longer found upstream of the dam, could recolonize rapidly. "Boulder Darters are literally at the base of the dam just waiting to make their way upstream!" declares Campbell. Moreover, river response to dam removal is incredibly fast. Several studies show that following dam removal, sediments have successfully been flushed out of river channels, with natural flows and sediment transport soon restored. On the Roaring River in east Tennessee, for example, riffle-dwelling species recolonized the previously impounded area within six months to one year of dam removal. "Dam removal is compelling as a restoration strategy," says Bullard. "It's expensive and time consuming, but at the end of two to ten years of permitting and planning, removal allows the river to come back almost on its own, within a matter of weeks to months to years. It's really the best bang for the buck, mile for mile, in river restoration."

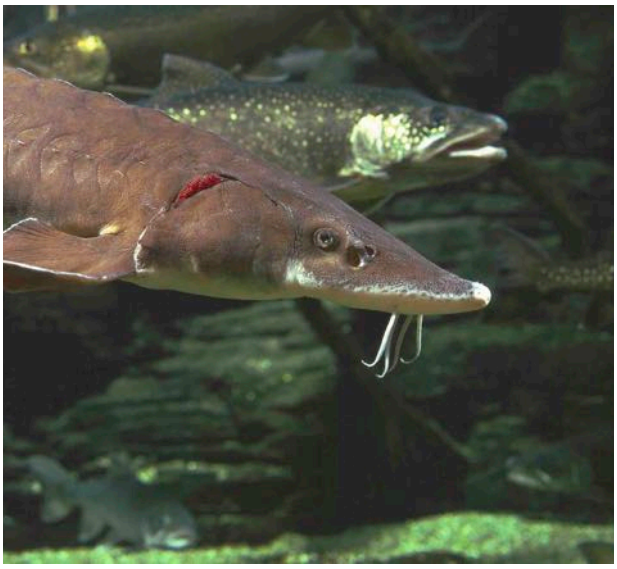
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Griggs & Maloney, Inc. 2022. Biological Assessment: Harms Mill Dam Removal Project. Lincoln County, Tennessee.





Four species with captive breeding and reintroduction programs ongoing in Tennessee, clockwise from upper left: Alligator Gar (*Atractosteus spatula)* / Rob Colvin, TWRA; Alligator Snapping Turtle (*Macrochelys temminckii)* / Katie Gregory; Lake Sturgeon (*Acipenser fulvescens)* / Todd Stanley, Tennessee Aquarium; Pale Lilliput Mussel (*Toxolasma cylindrellus)* / Dan Hua, TWRA, retired





6.4.4. Capacity Building

Capacity building is essential if governments and organizations are to meet the challenges faced by SGCN and their habitats statewide. The problems, and often the solutions, are complex, requiring the intentional development of partnerships and fundraising from a variety of sources. Investments in designing and maintaining successful partnerships are important conservation strategies that amplify the ability to deliver better on-the-ground outcomes in more places and for more species.

A critical area of capacity building by TWRA and partners is the arena of local law and habitat protections. In many cases, local habitat protections cannot be accomplished outright by state or federal actions. This is why conservation partners must become versed in local laws that may suffice instead. Establishing regular communication with planning commissions, governmental



Fishes of CFI / Joel Sartore, Derek Whea
Zach Alley and Julia Wood

INNOVATION, SUCCESS, AND CONTINUITY

Never underestimate the power of passion to change the world! Patrick Rakes and J.R. Shute, founders of Conservation Fisheries, Inc. (CFI), are embodiments of that lesson. Their passion for fish led them to begin CFI as graduate students in ichthyology working under Dr. David Etnier (discoverer of the Snail Darter, *Percina tanasi*).

In 1986, Dr. Etnier approached them about reintroducing the Smoky Madtom (*Noturus baileyi*) and Yellowfin Madtom (*N. flavipinnis*) back into one of their original home streams, Abrams Creek. These miniature catfish species are two of the tiny but colorful native fish of the incredibly diverse streams of eastern Tennessee (with Yellowfin now close to being delisted). Due to the small number of individuals remaining in the wild, the team had to learn how to propagate these fish in the controlled conditions of an aquarium.

Fast forward 40 years, and CFI has now raised 81 species of nongame freshwater fish in North America for 15 states; 51 of those species are in Tennessee and 16 are federally listed as threatened or endangered. Rakes and Shute have retired, and new leadership at CFI is developing a succession plan to ensure the accumulated wisdom and expertise of CFI as an institution will live on.

"Creating baby CFIs is our next step," says **Bo Baxter**, the current **President and Director** who, fittingly, was also CFI's first paid employee.

THE SOUTHEASTERN EPICENTER OF FRESHWATER AQUATIC BIODIVERSITY



Yellowfin Madtom / Evan Poellinger

Neck and neck with neighboring Alabama in the contest for the state harboring the greatest number of freshwater fish species (currently about 350 each, depending on the state of taxonomic research at any given time), Tennessee is at the core of a region in the Southeastern US that ranks as a worldwide center of temperate freshwater biodiversity. Streams in the state are sometimes described as "underwater rainforests of aquatic life."

The Tennessee River Basin is one of the most biologically diverse temperate river systems in the world with over 250 species of native fishes and 100+ native mussels. There are more fish species in the Duck River than in all of Europe! One of the factors contributing to this aquatic (and also terrestrial) biodiversity is the fact that glaciers never reached the state during the last ice age, so southeastern streams provided the last strongholds (refugia) for many aquatic species.

HOW TO WORK WITH RARE FISH 101

Because the kind of fish that CFI work with are so rare, they can't just catch some fish and transplant them to another site. "You could lose the existing population, and the reintroduction may not be successful," explains Baxter. Plus, the fish they work with are extremely variable in their life history and productivity, with generally low reproductive rates.

For example, from 16 Pearl Darters (*Percina aurora*) caught in the wild, CFI could produce 500 to 800 babies in 2024, whereas Spotfin Chubs (*Erimonax monachus*) can produce 10,000 fish in a year! They must

reproduce the optimal conditions for each species to spawn—gravel, cavities, the undersides of rocks—and they need to recreate those conditions in their aquariums. Sometimes it's unknown what a species requires to spawn, so they must be observed in the wild. "It takes decades," says Baxter, "you have to dedicate a lifetime to this pursuit to become successful."

NEXT GENERATION FISH CONSERVATION: ADVANCING FISH POPULATIONS, NOT JUST PRESERVING THEM

The key to CFI's success, in addition to passion and curiosity, is its laser focus on making a difference for wild fish populations through ecological restoration, attending to the many elements of the system upon which their fish rely. The organization works not only to bring back extirpated populations, but also to augment populations that are in decline, expand the distribution of wild species to their historic ranges, and conduct research to prevent impacts before they even happen.

"Bringing rare species back and getting them off the endangered species list starts with the protection of water and air quality," explains Baxter. "This is an aspect of our work that relies on the successes of other organizations before we even get involved. Most people don't realize that the Clean Air Act (which has improved the quality of rainwater) and the Clean Water Act have been huge drivers of the work to bring back stream biodiversity."

A current example of collaboration with Tennessee Wildlife Resources Agency and the Cumberland River Aquatic Center (C-RAC) is to benefit the **Bluemask Darter** (*Etheostoma akatulo*), a federally endangered species, by helping it to expand into habitat upstream of the dam at Caney Fork, into the Collins, Rocky, and Calfkiller rivers. CFI is working with the professionals at C-RAC, who specialize in rearing freshwater mussels, teaching them how to raise these endangered fish so that C-RAC can assume this role in the conservation story.



Bluemask Darter / Andrew Zimmerman

Partners for Bluemask Darter

Conservation Fisheries Inc.
Cumberland River Aquatic Center
Tennessee Valley Authority
Tennessee Wildlife Resources Agency (TWRA)
US Fish and Wildlife Service

"CFI can't be the only one doing this work," says Baxter. "This project fits with our succession plan goal of shifting from a production hatchery to a teaching hatchery. CFI needs to exist as a knowledge center because collectively our staff and volunteers have 200 years of experience in this kind of work. We want to focus on putting our knowledge in the hands of state and federal hatcheries and the next generation of students." Baxter's plan is also to find the right people who are passionate. "People are here because they care about the fish–we are seeking people who are ready to dedicate their lives to this."

One source of support that has been critical to CFI—supporting their work on Yellowfin and Smoky Madtom since the beginning—is Section 6 funding. Section 6 dollars are granted from the US Fish and Wildlife Service to states who then "pass through" the money to their partners working to conserve species that are listed or candidates for listing under the Endangered Species Act. "I believe this is our longest-running continuous Section 6 grant, approved annually since 1983," said **Chris Simpson, TWRA Wildlife Diversity Coordinator.** Because CFI has often struggled to find funding adequate to the conservation need, they will soon be expanding their fundraising to the private sector. When asked what CFI could accomplish with three times the resources, Baxter's instantaneous reply: "We'd do 10 times the work! Because we really can stretch a dollar around here!"



councils, the Tennessee Stormwater Association, and municipal and county MS4/stormwater programs can achieve mutual conservation interests.

MS4s are Municipal Separate Storm Sewer Systems, which serve Tennessee's four largest cities as well as about 100 cities and counties. They are required under the Clean Water Act to obtain a stormwater discharge permit and to implement a set of programs that manages the quality of stormwater runoff from their storm sewer systems. TDEC permits require many MS4s to report annually on measures to protect at least aquatic habitats under their jurisdiction.

Given the time lag of enforcement actions, if applicable, corrective measures can't remedy impacts from poorly planned or implemented development. Take of individuals or species' habitats can be vast. Critical to prevention of these impacts is a broader understanding by applicants or actors of the ramifications of their actions and a deeper engagement by SWAP partners to educate actors, specifically, and the public, generally. In so doing, more effective amelioration of any probable take or harm due to permitted or unpermitted projects, may be achieved through avoidance, minimization, and mitigation.

Capacity Building Examples

The Southeast Lake Sturgeon Working Group (WG) is an example of one such partnership. The group began in the late 90s as the Tennessee & Cumberland Lake Sturgeon WG, which included TVA, the USFWS, TWRA, and the Tennessee Aquarium, among others. The goal of the group was to reintroduce this ancient fish species back into waters of the state from which it had disappeared. The last Lake Sturgeon was seen in Tennessee in the Cumberland River in 1972.

The WG tackled how to start a reintroduction program, and their first stocking of Lake Sturgeon into the Tennessee River occurred in 2000. Stockings have occurred every year since then, with the exception of the Covid year, 2020. The WG soon expanded, adding partners in GA, NC, KY, and AL to become the Southeast Lake Sturgeon WG. The WG is now seeking to restore the species across its range in the Southeast (Southeastern Lake Sturgeon Working Group. 2014). (See the Lake Sturgeon, Back from the Brink Highlight.)

The **Tennessee Herpetological Society** (THS) is another example of capacity building. A not-for-profit organization dedicated to promoting the study and conservation of reptiles and amphibians worldwide, THS focuses particularly on Tennessee, with conservation and research goals accomplished through the education of the general public and the hard work of its members. Officially established in 1999, the THS publishes a scientific journal, holds an annual meeting, and bestows awards, scholarships, and grants to recognize outstanding achievements, support research, and aid students who wish to attend the annual meeting. In addition to promoting scientific understanding of species that are often cryptic, hard to see, and not well-known, THS provides abundant educational resources about Tennessee's reptiles and amphibians via its website and other information resources.

The **Tennessee Aquatic Connectivity Team** is a diverse group of individuals from many organizations across several states. The group is composed of participants representing city, state,



Eastern Gray Treefrog (*Hyla versicolor*) showing tremendous camouflage/Jesse Eaker, TWRA



Blue Ridge Two-lined Salamander *(Eurycea wilderae)*; Tennessee ranks 4th among all states for amphibian diversity / Daniel Istvanko, TWRA

and federal entities as well as nongovernmental organizations (NGOs). These include TWRA, TDEC, the Southeast Aquatic Resources Partnership, universities, the US Fish and Wildlife Service, the US Army Corps of Engineers, environmental consultants, individual citizens and NGOs such as American Rivers, the Tennessee Clean Water Network, the Cumberland River Compact, and TNC.

This group has held dam removal workshops facilitated by American Rivers and has supported directly or indirectly the removal of three dams since its creation. Members of the group are actively documenting and mapping obstructions that impact stream health as well as developing prioritization tools to help plan for Tennessee's dam removals in the future. Aquatic organism passage has been a major focus. The Tennessee Dam Removal Partnership is organized and poised to deal with dam removal issues and opportunities that will no doubt present themselves in the near future.

The Tennessee Bat Working Group (TNBWG) continues its partnership in the state, established in the summer of 2004 to meet the need for cooperation in the coordination of bat conservation in Tennessee. The goal of the TNBWG is to conserve bats and their habitats in the southeastern United States through collaborative research, education, and management. The scope of the group's efforts is wide-ranging, including research, management, and information exchange concerning bats and their habitats anywhere they occur in the state, regardless of regulatory authority. Members of the TNBWG have played a pivotal role in addressing white-nose syndrome through its collaborative monitoring, research, and public education efforts.

There is also potential for evaluating the comprehensive suite of cave resource needs across the state. Tennessee has the potential to be a national leader in understanding karst biodiversity. In addition to fauna such as bats and salamanders, more work is needed to understand and benefit cave fish, crayfish, and a suite of invertebrates. The timing may be right to look back at the now-expired Cave Conservation Agreement for Karst-dependent Species of Greatest Conservation Need.

By resurrecting and revising the document, cave conservation partners can better coordinate and fund efforts such as the fencing of Ament Cave in Cookeville.

The **Tennessee Plant Conservation Alliance** (TPCA) formed in 2017 modeled after the Georgia Plant Conservation Alliance, celebrating its 30th anniversary in 2025. The mission of the TPCA is to promote and coordinate the cooperative conservation of Tennessee's rare plant species and natural communities to ensure no local extinctions. The TPCA is an action-oriented group of partners focused on implementing plant conservation actions on the ground.

The **Southeastern Plant Conservation Alliance** (SE PCA) was formed in 2020 and covers 17 Southeast states and territories. The SE PCA seeks to bridge gaps between local and national plant conservation efforts by fostering regional cooperation and promoting a diversity of partners. The Alliance is tailored to multiple interests to provide training opportunities, fill information gaps, identify conservation needs, prioritize efforts, and work collaboratively to conserve imperiled plants.



Larkspur tickseed (*Coreopsis delphiniifolia*) a plant SGCN, Polk County / Mason Brock

A critical feature of capacity building efforts is the willingness to invest substantial funding in support of collaborative efforts. Funding from both the public and private sectors, and the sharing of dedicated staff resources whenever possible, are the primary mechanisms that support successful partnerships. State and federal funding resources are regularly matched by private donations and grant funds raised by NGOs, and other private sector actors. Philanthropic foundations, individual businesses, and corporations often combine to make joint projects successful. Ongoing and future conservation are dependent upon effective relationships supported by intentional funding and the commitment of staff and volunteers.

6.4.5. Commercial Incentives

Commercial incentives in Tennessee largely take two forms: Commercial enterprises and market forces. Commercial enterprises that benefit conservation seek to achieve or support conservation goals, and in some cases, they may be certified as B Corp entities. Given that 97% of commercial activity in Tennessee comes from small businesses, the goal of B Corp certification is to harness this activity for good. The B Corp business is validated to be a good corporate citizen with a triple bottom line business model (focusing not only on profit, but also people and planet). The B Corp is legally required to consider the impact of its decisions on all stakeholders, not just shareholders. In Tennessee, a corporation seeking B Corp certification must convert to a Public Benefit Corporation, but LLCs and sole proprietors can also become B Corp certified (Christopher 2022).

For example, Handsome Brook Farms is a certified B Corp and the nation's leading producer of organic pasture-raised eggs. Founded in upstate New York with five hens, Handsome Brook has grown into the largest producer of organic pasture raised eggs in the country, with partner farms/facilities in 10 states, including Tennessee. Their conservation management includes organic and regenerative farming practices such as prioritizing animal welfare, fostering soil health, investing in solar and energy-efficient lighting, and minimizing environmental impact through practices like prescribed grazing, cover cropping, and reducing soil disturbance.

Market forces can also be deployed to advance conservation when benefits through the free market also accrue to conservation goals. An excellent new example is the **Family Forest Carbon Program**. The program helps landowners with 30 or more forested acres reach their goals by providing extra income, improving wildlife habitat and timber value, and increasing carbon stored on their land. The program does this by harnessing market forces through carbon markets, where companies seek to neutralize their emissions by purchasing verified carbon credits. The credits are generated from the additional carbon captured by a landowner's implementation of the science-based climate-smart forestry practices prescribed by the Family Forest Carbon Program.

Another example in Tennessee is the private stream and wetland mitigation industry. Mitigation projects of this type seek to restore, enhance, or preserve wetlands or streams, as offsets to impacts to such resources elsewhere. Mitigation credits generated by such activities may be sold by mitigation practitioners or purchased as offsets to stream and wetland impacts as a result of development. Mitigation sites are then set aside in perpetuity to preserve these resources. The US Army Corps of Engineers exercises regulatory oversight of mitigation activities in Tennessee in coordination with other agencies such as the EPA, TDEC, TWRA, and the USFWS, which comprise the Interagency Review Team (IRT).



Impacts to streams/wetlands may trigger the requirement for mitigation / TDOT Environmental Mitigation Office

Government entities such as TDOT or private developers that cause unavoidable adverse impacts to wetlands must be issued permits to proceed with their projects, and are sometimes required to mitigate for such impacts. Mitigation projects may be run by private, for-profit organizations. They are professionally run, certified by both state and federal entities, and provide economies of scale for TDOT and commercial, residential, and agricultural land development projects that are required to mitigate their impacts to wetlands or streams (TDOT [date unknown] Environmental Mitigation).

6.4.6. Law and Policy

Some of the problems that SGCN face are statewide in scope. The problems may be quite large, dispersed over vast areas, or accelerated by widespread economic needs and incentives. In some cases, a policy decision may actually pose a threat, in which case engagement and the identification of shared interests is essential (see Wetlands in TN Highlight).

The major land and water use issues outlined in Chapter 4—urbanization, agricultural land use, forestry practices, water management, energy development, and transportation and utility corridors—are contributors to these types of wide-ranging problems, particularly if done without concern for best practices or co-benefits to wildlife. Over-collection or illegal collection of several plant and animal species also can be a widespread problem in regions of the state. To address such challenges to SGCN and their habitats, the application of different federal, state, and local policies and regulations often is required. For example, designation of Exceptional Tennessee Waters can have beneficial outcomes for aquatic SGCN. Much can be accomplished through a collaborative approach, the identification of shared interests and goals, and cooperative planning. Using these strategies, a variety of objectives may be achieved, including conservation of species and their habitats.

Land use planning and zoning

By promoting and sharing information in the 2025 SWAP with local planning agencies, municipalities, nongovernmental organizations, and many other partners, TWRA will amplify the ability of those groups to effectively plan for the conservation of their community's natural wealth, which underpins quality of life. Information in the 2025 SWAP about priority SGCN, SGCN habitats, and COAs can improve planning and provide additional rationale for long-term comprehensive approaches designed to avoid urban sprawl.

Policies and regulations

Information on SGCN and their priority habitats also can help better inform a variety of existing environmental policies. This is one of the reasons monitoring and basic life history research is so valuable, particularly for rare species about which little is known. Protecting SGCN and habitats, in the context of many land and water resource use decisions, requires cooperation among partners and commitment to incorporating available information on species and habitat needs into planning and regulatory processes.



The Spotted Skunk has been removed from the list of furbearer species acceptable to harvest in Tennessee, due to its rarity. / Lindsay Shaw, TWRA

For example, as of 2025, both Spotted Skunk and Long-tailed Weasel have been removed from the furbearer list of acceptable species to harvest. This was required when each was listed as threatened and in need of management. For the Spotted Skunk, this has removed one stressor contributing to their already low numbers.

Compliance and enforcement

Regulations that limit or prohibit the take of wild animals or plants are written to protect the health of species populations. TWRA law enforcement officers investigate and apprehend violators for wildlife offenses ranging from the illegal sale of certain crayfish species as live bait to the illegal take and commercialization of Common Snapping Turtles (*Chelydra serpentina*) to the illegal harvest (against regulations) of Ginseng. Without enforcement, such illegal activities would continue unabated and possibly increase.

6.4.7. Climate Adaptation

Preparing for and coping with current and future climate impacts is an emerging field known as climate change adaptation. One of the most authoritative guides to environmental adaptation is the National Fish, Wildlife, and Plants Climate Adaptation Strategy, updated in 2021 (National Fish, Wildlife, and Plants Climate Adaptation Network 2021). This report provides a high-level review of the changes that have occurred since its original publication in 2012, detailing the extent to which the Strategy has been implemented, and offers recommendations for the future. This topic is covered in Ch 5. Resilience in a Changing Environment, a new chapter added since SWAP 2015, reflecting the growing need and urgency for understanding and adapting to climate impacts, while planning for a future with the greatest resiliency to meet climate-related challenges.



Flooding that occurred along the Mississippi River at Memphis during the flood of 2011 / Greg Wathen

Moving forward, TWRA, in collaboration with its conservation partners, will use climate-based information and resiliency recommendations to generate additional adaptation options for priority SGCN and habitats. This effort may include, but is not limited to, identification of new priority areas for acquisition and management; strategies for managing current high priority habitats as they transition to new vegetation states; new priorities for aquatic habitat and species restoration activities; and decisions regarding alternative management approaches to SGCN populations.



Thunderstorms, winter storms, and flooding occur frequently in Tennessee (see Chapter 5)

Box 6.4 - Climate Adaptation Example: Race to Save the Laurel Dace

Populations of the endangered Laurel Dace (*Chrosomus saylori*) are known to have historically existed in eight Tennessee streams, seven on Walden Ridge and one in Grassy Cove. The species' currently occupied range includes only two of these streams, Bumbee Creek and Youngs Creek, in Bledsoe and Rhea counties. Drought conditions that affected Walden Ridge during 2016 are thought to have contributed to the species' most-recent disappearance from a historically occupied stream, Moccasin Creek. With the species in dire circumstances, the team at the Tennessee Aquarium Conservation Institute (TNACI) have been working on multiple fronts with the US Fish and Wildlife Service (USFWS) and other partners to lead conservation in a "Race to Save the Laurel Dace".

With support from TWRA, the USFWS, universities, and private donors TNACI has carried out a research program that

- Improved knowledge of the microhabitats where Laurel Dace live
- Identified barriers that potentially fragment habitats and populations of the species
- Investigated the prevalence and risks from a trematode infestation that has emerged in some populations
- Studied the species' behavioral and reproductive ecology through the lens of another SGCN surrogate, the Tennessee Dace (*Chrosomus tennesseensis*). (A surrogate is a more abundant and closely related species with similar habitat preferences and life history attributes.)

Recognizing that restoring habitats to recover this endangered fish meant getting out of the streams and working with private landowners to improve conditions on the land in watersheds where Laurel dace occurs, TNACI have also led a coalition of partners to secure funding from the Natural Resources Conservation Service (NRCS) through the Ridges to Rivers Resources Conservation Partnership Program (RCPP). Through this RCPP award, TNACI is leading a coalition of partners to improve water quality in the Sequatchie River Valley and Walden Ridge areas by partnering with farmers to implement farming practices that benefit both the landowners and the environment.

During the summer and fall of 2024, drought again developed on Walden Ridge and other parts of Tennessee, and researchers from TNACI alerted the USFWS Tennessee Ecological Services Field Office (TNFO) that streamflow had ceased in Bumbee and Youngs Creeks, leaving only isolated pools in which aquatic species could persist. The near elimination of suitable habitat within streams where Laurel Dace lives exacerbated existing threats from poor habitat conditions, parasite infestation, and small population sizes. Because of the acute extinction risk brought on by drought, the TNFO coordinated with the USFWS Southeast Region Office, TWRA, and Wolf Creek National Fish Hatchery to support a TNACI-led rescue, removing Laurel Dace from the wild to hold in human care.



In July/August of 2024, a stream atop Walden Ridge north of Chattanooga that harbored the world's last populations of Laurel Dace began to run dangerously dry. / Doug Strickland, Tennessee Aquarium



An “ark” population of Laurel Dace that is being maintained at the Tennessee Aquarium / Doug Strickland, Tennessee Aquarium

In total, almost 300 fish were rescued, approximately 265 from Bumbee Creek and 34 from Youngs Creek. The fish from Bumbee Creek were divided among three facilities, including TNACI, another Tennessee Aquarium Animal Care Facility, and the Wolf Creek National Fish Hatchery, while all individuals from Youngs Creek were held at the TNACI facility. The USFWS, TWRA, and TNACI kept about 30 of these fish to establish and maintain an ark population (a conservation practice that safeguards the species against the possibility of extinction in the wild.). They will be held in human care until populations are secure enough in the wild to reduce the risk of the species going extinct.

In March 2025, more than 200 Laurel Dace were returned to Bumbee Creek, where flows had improved with inputs from winter rainfall and water temperatures were warming. The partners who had rescued these fish from isolated pools just a few months earlier breathed a sigh of relief as they released well-nourished, healthy fish to this stream ahead of the soon-to-begin spawning season.

Small victories like this one inject hope that the broader effort to recover this species will ultimately succeed. For their successful efforts, partners were awarded the US Fish and Wildlife Service’s Southeast Region **Recovery Champion Award for 2024**. Partners continue to work with TNACI, through the Ridges to Rivers RCPP, to increase local awareness and appreciation of the Laurel Dace and engage willing landowners in reducing land-based threats to the species, connecting the lands and waters needed for their recovery.


Laurel Dace in its native habitat / Casey Phillips, Tennessee Aquarium

The team at TNACI worked with local leaders to hold the inaugural Laurel Dace Day on May 17, 2025, in Spring City, increasing local awareness of this species that lives up on the ridge above the community and nowhere else. It is hoped that the activities of the day –including vendors, live music, a farmer’s market, and a 5K run and half-mile fun run–will increase local awareness and pride in the Laurel Dace. Instilling local pride about this globally rare fish will be vital to efforts to restore habitats in streams that flow through privately owned lands. As habitat conditions are improved through work with willing landowners, populations will be restored to stream reaches that the Laurel Dace once occupied, inching us ever closer to the day when Tennesseans will celebrate victory in the Race to Save the Laurel Dace.



CHAPTER 7 REGIONAL CONSERVATION ASSESSMENT

7.1. Overview of the Regional Conservation Approach

In 2018, the Association of Fish and Wildlife Agencies (AFWA) adopted a resolution on landscape conservation that recognized "the importance of collaborating at landscape scales to help fish and wildlife agencies meet their statutory and regulatory responsibilities to conserve fish and wildlife and their habitats." In response to the resolution, AFWA established a President's Task Force on Shared Science and Landscape Conservation Priorities in 2020, which recommended that State Wildlife Action Plans (SWAPs) serve as a framework for regional coordination and collaboration.

Within this Plan, Tennessee has identified Species of Greatest Conservation Need (SGCN) and outlined strategies to sustain them, including conservation actions to promote species recovery and prevent federal listings under the Endangered Species Act. But to sustain the species that are Tennessee's responsibility to protect—and that also reflect the rich biodiversity, culture, and history of the State—Tennessee must consider its role and the influences of the larger Southeast landscape.

This chapter examines regional, landscape-scale considerations for Tennessee and serves as a means for the State to find potential collaborations to best support the State's SGCN and Regional SGCN (RSGCN). Additionally, some of the threats that impact SGCN (e.g., climate change) have consequences locally, statewide, and regionally.

Photo credit: Head-started Eastern Hellbenders (*Cryptobranchus alleganiensis*), a Regional SGCN that inhabits streams flowing between North Carolina and Tennessee. / Chris Simpson, TWRA

RSGCN were selected from among southeastern SGCN using criteria of regional stewardship responsibility (including endemism), conservation concern and status, and biological/ecological significance. Addressing threats to RSGCN effectively requires aligning conservation strategies across state boundaries. By using consistent regional information shared by other states to inform their own SWAPs, Tennessee can better contribute to regional conservation priorities, identify potential landscape-level threats, and help connect the Southeast region's lands and waters.

7.2. Tennessee's Conservation Portfolio: Shared Resources, Shared Priorities

The **Southeast Conservation Adaptation Strategy** (SECAS) is a regional conservation initiative that spans the Southeastern United States and Caribbean. SECAS brings together diverse partners around an ambitious goal: a 10% or greater improvement in the health, function, and connectivity of Southeastern ecosystems by 2060. The Southeast Conservation Blueprint (Blueprint) is the primary product of SECAS. The Blueprint is a living, spatial plan that identifies priority areas where conservation action would make an impact toward creating a connected network of lands and waters, based on a suite of natural and cultural resource indicators and a connectivity analysis. At the time of publishing of this SWAP, the 2024 Blueprint was the most recent Blueprint available.

The 2024 Blueprint recognizes more than 13.1 million acres, or roughly 49% of the state, as a priority for connecting the region's lands and waters (Table 7.1, Fig. 7.1). About 6 million acres are rated as highest or high priority. An additional 4.7 million acres are rated as medium priority. An additional 2.3 million acres are considered priority connections, or key linkages between priority areas that can help facilitate the flow of species and ecological processes within the State while also considering connectivity within the broader region. Together, these classes represent the most important areas for shared conservation action to connect lands and waters and improve ecosystem health.

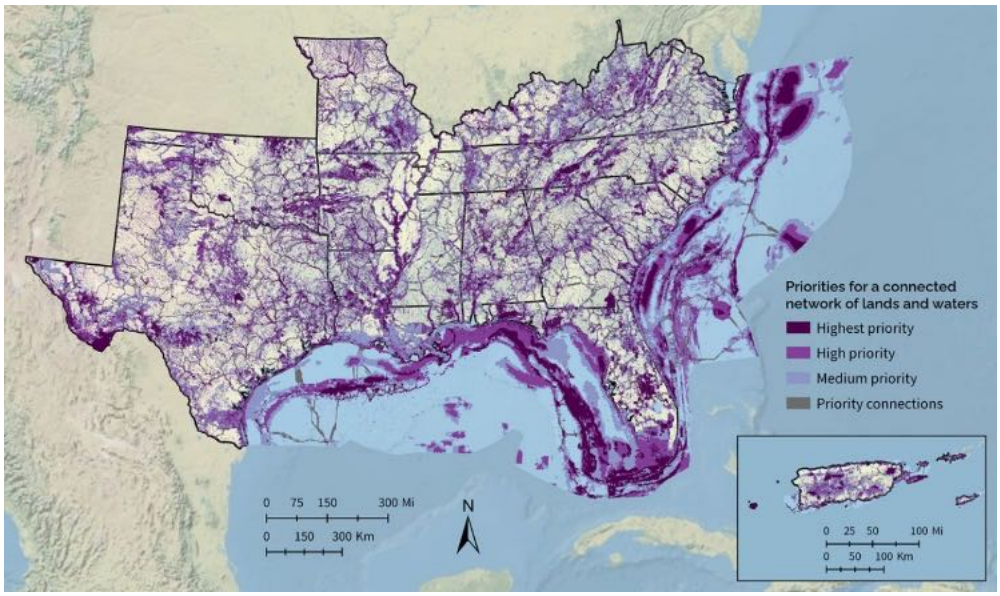


Figure 7.1 Map of the 2024 Southeast Conservation Blueprint

The Blueprint includes more than 60 indicators that collectively represent ecosystem health, function, and connectivity across terrestrial, freshwater, and coastal and marine systems. Examples include imperiled aquatic SGCN, cores of intact natural habitat, natural floodplain landcover,

prescribed fire frequency, and more. Indicator data is available on the **Blueprint page of the SECAS Atlas**.

Tennessee supports a wide diversity of habitats, culturally and historically significant landscapes, and ecosystems that provide benefits to the State as well as the broader Southeast Region. Tennessee plays an important role in connecting the lands and waters of the Southeast Region, as well as hosting regionally important ecosystems and habitat types, such as the mixed hardwood forests in the Appalachian Mountains of eastern Tennessee to the open grasslands and savannas in middle Tennessee and Cumberland Plateau to the bottomland hardwood forests in western Tennessee. Many regional and local partners and partnerships are working with the Tennessee Wildlife Resources Agency (TWRA) to help conserve the State's iconic landscapes.

USGS Protected Areas Database (PAD) 4.0 manages a dataset depicting protected conservation lands within the state. Based upon the PAD 4.0 data, more than 2.65 million acres (11%) of the State are considered protected (Fig. 7.2.). This includes important landscapes like National Wildlife Refuges, National Forests, National Parks, Military Bases, State Wildlife Management Areas, State Forests, State Natural Areas, and private conservation easements.

The vast majority (90%) of lands currently conserved in Tennessee are identified by the Blueprint as a priority for connecting the lands and waters of the Southeast (Table 7.1). This means that while

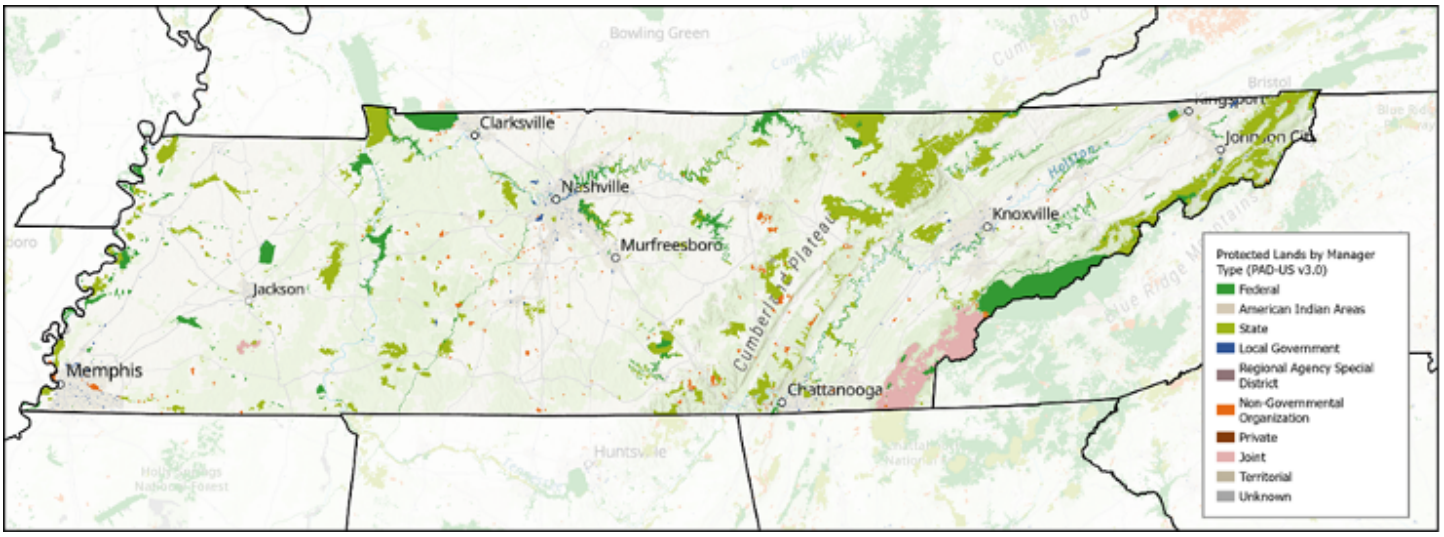


Figure 7.2 Map of the protected lands in Tennessee, displayed by land manager type, using the Protected Areas Database (PAD-US) 4.0.

*** Note that some protected lands on this map may not show current management status.**

these conserved areas are contributing to the state-wide landscape and represent unique habitats and locally important areas, many of them are also contributing to a wider regional conservation strategy. The State's conservation portfolio exemplifies a complementary landscape-scale approach to conservation that links local actions with conservation outcomes impacting a broader geographic scale.

The Southeast Blueprint also includes a least-cost path connectivity analysis that identifies corridors that link coastal and inland areas and span climate gradients. The corridors connect hubs

Table 7.1 Lands and waters considered protected within Tennessee. These numbers are estimates based on the Protected Areas Database of the United States (PAD-US v4.0) and may not reflect the most up-to-date information.

Priority for a connected network	Acres of each Blueprint (v2024) priority category within Tennessee	Acres of conserved lands (PAD 4.0) prioritized in the Blueprint and their percentage of total protected lands
Highest	2,545,550 (9.4%)	1,242,234 (42%)
High	3,512,256 (13.0%)	744,347 (25%)
Medium	4,706,389 (17.5%)	586,402 (20%)
Priority connections	2,389,629 (8.9%)	78,749 (3%)
Lower priority	14,808,948 (51.2%)	277,112 (10%)
Total	**26,962,771 (100%)**	**2,928.843 (100%)**

across the shortest distance possible, while also routing through as much Blueprint priority areas as possible. The hubs that anchor the connectivity analysis are large patches of highest priority Blueprint areas and/or protected lands. About 9.2 million acres (32%) within Tennessee are considered a hub or corridor, providing many conservation opportunities to support species movement and migration—an important strategy for helping wildlife adapt to landscape-level changes (Fig. 7.3).

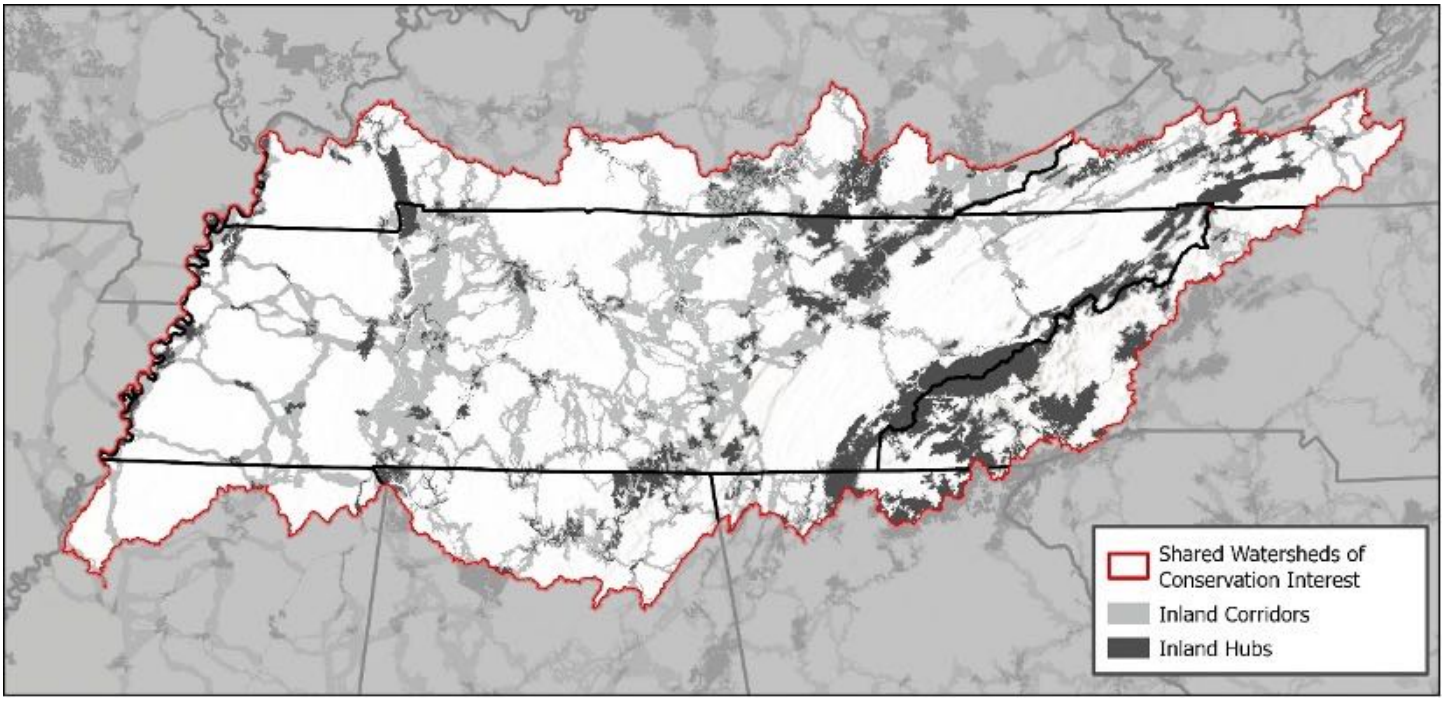


Figure 7.3 Southeast Blueprint connectivity analysis showing hubs and corridors in Tennessee and surrounding watersheds from neighboring states

Ensuring landscape connectivity across jurisdictional boundaries is becoming increasingly important for species management as changes in land use, climate, and weather patterns shift species distributions. Collaborating with the neighboring states of Kentucky, Virginia, North Carolina, Georgia, Alabama, Mississippi, Arkansas, and Missouri to identify cross-boundary species migration and habitat pathways can increase regional connectivity for state SGCN and RSGCN. The maps below show the Southeast Conservation Blueprint (2024) priorities and connectivity analysis.

Ensuring landscape connectivity across jurisdictional boundaries is becoming increasingly important for species management as changes in land use, climate, and weather patterns shift species distributions.

The maps also include a boundary that extends beyond the State and includes watersheds where Tennessee shares a conservation or species management interest with its neighboring states (Fig. 7.4). This boundary was developed by identifying all watersheds (HUC 8) within 1.5 kilometers of the State boundary and then selecting shared watersheds of conservation interest with TWRA staff. By looking beyond the State's boundaries, Tennessee can consider how to best align conservation actions and identify cross-jurisdictional opportunities with neighboring states to maximize benefits for SGCN with wider ranges. These data were considered in defining Tennessee's Regional COAs, however the Regional COAs identified during the 2025 SWAP revision through the updated habitat prioritization model are much more refined than what is shown on the map in Fig. 7.4.

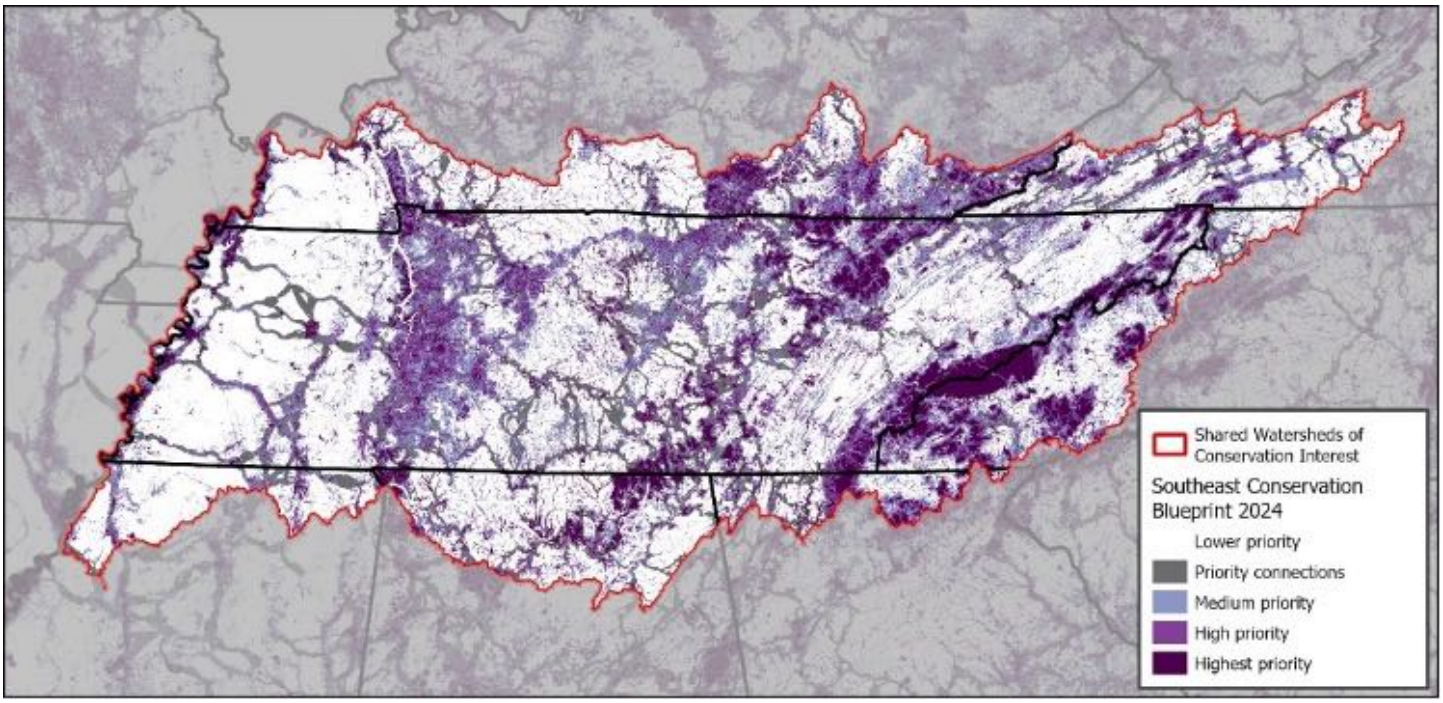


Figure 7.4 Southeast Blueprint (v2024) priorities within Tennessee and surrounding watersheds shared with neighboring states

7.3. Tennessee's Regional Species of Greatest Conservation Need (RSGCN)

Each state's wildlife action plan identifies SGCN, or the species most in need of proactive conservation attention (see Appendix D for a list of Tennessee's SGCN). After the 2015 SWAP revisions, SGCN within the 15 Southeastern Association of Fish and Wildlife Agencies (SEAFWA) states were further evaluated for regional conservation priority to create RSGCN designations for both animal (Rice et al. 2019) and plant (Radcliffe et al. 2023) taxa.

Effectively managing and conserving these species requires actions and management strategies that will best allow for species movement and ensure the availability of key ecological attributes provided by different habitats across the landscape at different times. The following sections describe the methods used for selecting RSGCN within southeastern states.

7.3.1. Animal RSGCN

In 2019, the Vital Futures project funded by the US Geological Survey prioritized the large number of SGCN collectively identified in the previous iteration of 15 Southeastern SWAPs. This initial compilation contained approximately 6,700 species of vertebrates, invertebrates, and plants. Plants were extracted from this RSGCN analysis, as well as most invertebrates (mussels, crayfish, and bumblebees remained), with noted intent to evaluate these groups in future studies. The SEAFWA Wildlife Diversity Committee collaborated with the National Wildlife Federation and other partners to evaluate the remaining 2,100 animal SGCN species and produce a list of regional priority animal RSGCN. A report, "*Regional Species of Greatest Conservation Need in the Southeastern United States*" (Rice et al. 2019), was written to detail the methodology used to develop the animal RSGCN list, which is hosted on the **Georgia biodiversity portal** (GADNR 2024). This effort aligns with the Northeast Association of Fish and Wildlife Agencies' similar project to develop an animal RSGCN list for the Northeast Region.



Female Snuffbox Mussel, a RSGCN that is also federally listed as endangered / Megan Bradley, USFWS

Identifying animal RSGCN drew upon a collaborative process among Southeastern state fish and wildlife agencies and partners that involved more than 100 experts and used a set of consistent criteria to review current scientific information and evaluate state-identified SGCN. Species were evaluated based on several primary factors, including: 1) the level of conservation concern (i.e., extinction risk), 2) regional stewardship responsibility (i.e. importance of the Southeast in

conservation of the species), and 3) biological or ecological significance (e.g., unique evolutionary lineages). The regional assessment focused on species in key taxonomic groups, including vertebrates (mammals, birds, reptiles, amphibians, and fishes) as well as several better-known groups of invertebrate animals (freshwater mussels, crayfish, and bumblebees; Table 7.2). Scientific experts in each of these groups convened to evaluate and identify those species that warranted identification as a regional priority. Additionally, the science teams characterized the level of conservation concern for each regional priority, ranging from moderate to high and very high concern. Through this established process, the RSGCN list can be updated as the states' SGCN lists change over time.

Table 7.2 List of Southeast animal RSGCN by taxa and their level of concern (very high, high, or moderate). Fish have the most species categorized as "very high concern" and represent 30% of all RSGCN within the Southeast region. This list totals 1,034 (versus 960) because it includes subspecies.

Animal RSGCN taxonomic group	Very high concern	High concern	Moderate concern	Total
Amphibians	30	52	34	116 (11%)
Birds	10	56	18	84 (8%)
Bumblebees	2	1	2	5 (.4%)
Crayfish	53	86	34	173 (17%)
Fishes	101	120	96	317 (30%)
Mammals	18	37	30	85 (8%)
Mussels	69	55	13	139 (13%)
Reptiles	18	58	39	115 (11%)
Total	302	466	266	1,034 (100%)

The number of RSGCN that are considered the stewardship responsibilities of each state varies widely. These patterns reflect the underlying diversity of species in each state—particularly the number of imperiled and/or limited range species—which is also influenced by a state's size and diversity of habitats. These patterns are also influenced by the "regional stewardship responsibility" criterion in the assessment of priority species. About 40% of all RSGCN freshwater fish occur in Tennessee, an impressive number that speaks to the importance of the state's aquatic resources and riverine habitats, while highlighting the great responsibilities of our state's conservation partners for safeguarding its unique fauna as well as the need for resources in support of this work.

Nearly 70% of regional priority species are endemic to the 15-state SEAFWA region. Overall, more than half (55%) of RSGCN are shared by multiple states, presenting opportunities for cross-state conservation collaboration. In some cases, especially for birds such as the Golden-winged Warbler (an RSGCN), species range far beyond the Southeast and cross international borders into other parts of North America, Central America, and South America (see "Conservation of Species that

Cross International Borders" Highlight). The remaining 45% of RSGCN have narrow ranges and are found in just one or two states. By taxa, fish and crayfish represent 47% of all RSGCN within the region. Many aquatic habitats and ecosystems within the Southeast are highly fragmented, resulting in severe limitations to ecosystem integrity and species persistence regionwide. Habitat fragmentation in rivers and streams is a determining factor in the decline in abundance of numerous species such as Eastern Brook Trout (*Salvelinus fontinalis*), freshwater mussels, and amphibians like the Eastern Hellbender (*Cryptobranchus alleganiensis alleganiensis*). For this reason, increasing stream connectivity through the Aquatic Connectivity Team, the National Aquatic Barrier Inventory & Prioritization Tool, and work to remove old out-of-use dams and to improve culverts and other stream crossings is heavily emphasized in Tennessee (see Chapter 6 Conservation Actions for more details).

7.3.2. Plant RSGCN

The Southeast is home to more than 11,000 native plant species, 30% of which are endemic (i.e., found only in the Southeast; Noss et al. 2015). In 2023, the Southeast Plant Conservation Alliance (PCA) released the first plant RSGCN list in the nation (Radcliffe et al. 2023). The PCA worked with a broad coalition of partners including the Atlanta Botanical Garden, NatureServe, and Terwilliger Consulting, and received funding from the US Fish and Wildlife Service. This list narrows down the vast number of plants native to the Southeast to 1,824 species that are a regional conservation priority based on criteria such as rarity, threats, and needed conservation actions. This list includes narrow endemics in each state (i.e., species restricted to only one or several states). The plant

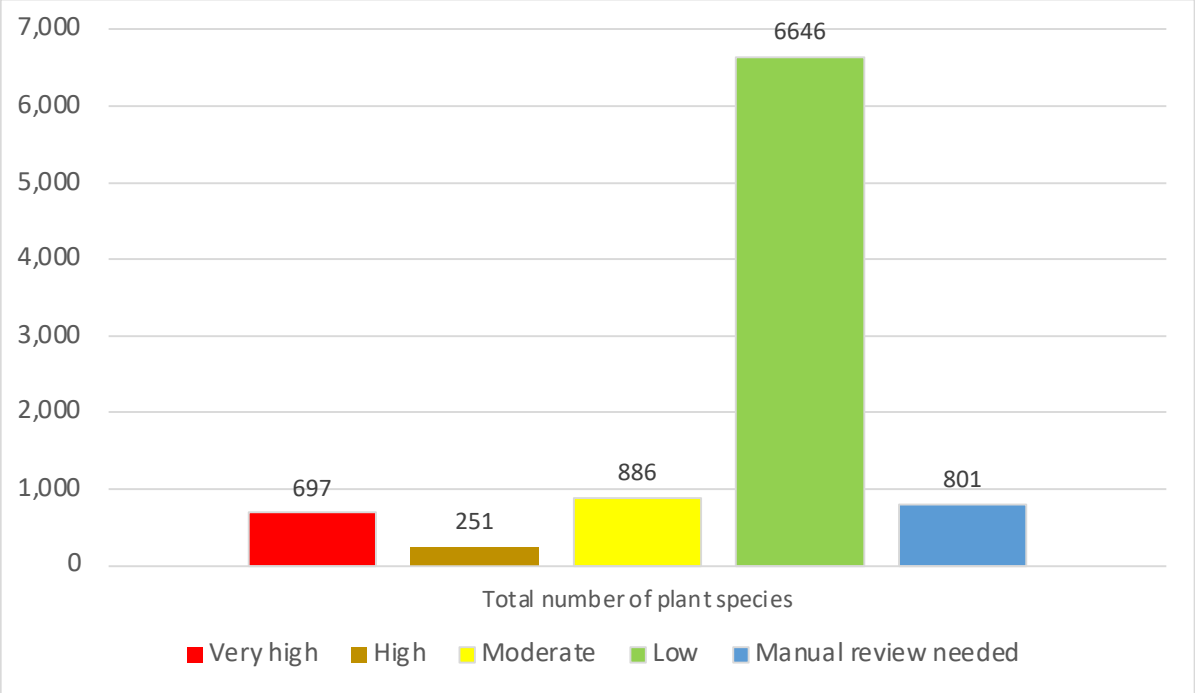


Figure 7.5 Plants with a very high, high, or moderate level of conservation concern are considered plant RSGCN



Golden-winged Warbler / Andy Reago & Chrissy McClarren

CONSERVATION OF SPECIES THAT CROSS INTERNATIONAL BORDERS

Southern Wings is a program of the Association of Fish & Wildlife Agencies that facilitates state agency participation in the conservation of priority migratory birds across their annual cycle (breeding, migration, and nonbreeding sites).

Because many migratory bird species cross international borders, habitat conservation in one country may only address a fraction of the problems that affect them. Effective conservation requires that scientists and practitioners obtain a holistic picture of the problems as well as the ability to make improvements where needed across their ranges.

As of 2024, 41 state fish and wildlife agencies have contributed over $4.2 million to the conservation of 81 migratory bird Species of Greatest Conservation Need (SGCN) through Southern Wings. Funds spent on stop-over sites and wintering grounds in 24 different projects across 11 countries complement US investments for the same species.

The Golden-winged Warbler provides an example of how sharing knowledge and resources across two continents to achieve conservation on both nesting and wintering grounds is critical to the survival of a rapidly declining species. In 2025, this bird is under review for potential listing under the Endangered Species Act (ESA) due to its declining populations and habitat loss.

THE PLIGHT OF THE GOLDEN-WINGED WARBLER



Golden-winged Warbler chick / Greg Cleereman, Marinette County WI

The **Golden-winged Warbler** (*Vermivora chrysoptera*) is a beautiful, tiny bird that has suffered a 60% population loss since 1970 (Rosenberg et al. 2016). With a small population of approximately 390,000 birds worldwide (PIF Avian Conservation Assessment Database)—roughly comparable to the number of people living in Arlington, TX—this species is on the Partners in Flight red list and has been petitioned for listing under the federal Endangered Species Act. This warbler is also state-listed as threatened and is an SGCN in Tennessee.

SOLVING THE GOLDEN-WINGED WARBLER MYSTERY

Appalachian-breeding Golden-winged Warblers have experienced steep population declines compared to birds of the same species breeding in Great Lakes states. They are one of the highest priority birds for conservation across the Americas.

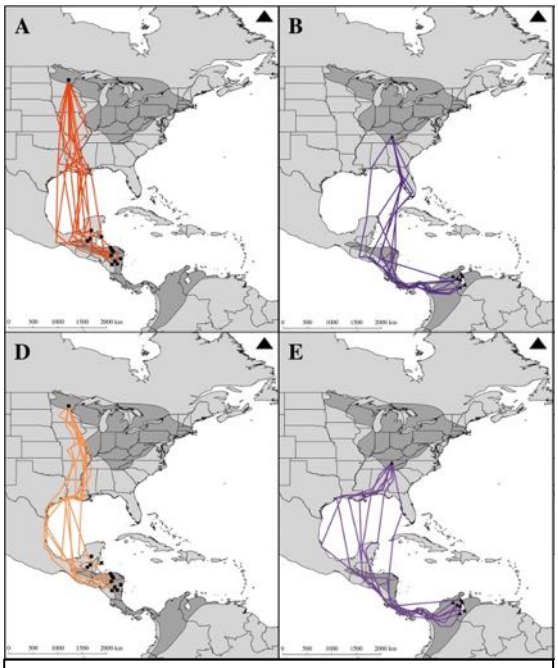
Until 2014, golden-wings were known to overwinter in Central America. Scientists then deployed geolocators on a number of birds in 2014, only to find that the Tennessee/Appalachian population was overwintering along the border of Colombia and Venezuela in South America! This finding implied that differential survival on the wintering grounds could be contributing to the disparity between populations. (Geolocators provide data similar to Motus—see Motus Highlight—but only when physically tracked by researchers or retrieved from netted or deceased birds.)

WHAT A DIFFERENCE A LOCATION MAKES

This information now informs the Southern Wings program, which has contributed money to Central and South American partner organizations working on the warbler's winter ranges, in a manner similar to the way work on duck nesting habitat has occurred for decades in Canada.

During four winter seasons, from 2020 through 2023, South American collaborators SELVA (Colombia) and ProVita (Venezuela), as well as numerous US agency and academic partners, (see Conservation Partners box), have worked to design and implement broad-scale Golden-winged Warbler (GWWA) surveys and community education programs across these two countries. The following summarizes this partnership's goals and progress to date.

1. **Goal:** Consolidate a conservation corridor in Colombia connecting two protected areas. **Outcome:** Corridor launched in 2022 with local coffee farms, conservation agencies, and parks. This included development of a native tree database and nursery to provide species beneficial to the GWWA, along with education and on-the-ground restoration activities.
2. **Goal:** Develop a future plan for a conservation corridor in Santander, Colombia. **Outcome:** An assessment of Santander's protected forest areas was completed, along with a 12-point action plan.
3. **Goal:** Conduct surveys for GWWA in two localities in Colombia using an established GWWA survey protocol. **Outcome:** 262 individual surveys completed recording a decline in detections compared to previous seasons.
4. **Goal:** Continue outreach activities in Santander, Caldas, and Santa Marta Mountains, Colombia, including a screening of the video "Golden-winged Warbler, a Traveler in Peril" along with Q&A sessions. **Outcome:** 125 students engaged to date.
5. **Goal:** Design, print and distribute a poster about GWWA. **Outcome:** Two permanent displays created in two strategic locations.
6. **Goal:** Install a Motus receiving station in La Dorada, Colombia. **Outcome:** New station installed in the Magdalena Valley, Colombia thanks to a direct donation from the Tennessee Wildlife Resources Agency. (Incidentally, no less than five different Swainson's Thrushes (*Catharus ustulatus*)—another migratory songbird in decline—were detected at the station between April 18-26, 2023. These birds had origins from across North America, including British Colombia, Montana and Quebec, highlighting the strategic location of the Magdalena Valley in funneling South America-wintering birds from multiple populations.)



Red tracks A & D show fall and spring migration routes from the Great Lakes; Purple tracks B & E show fall and spring routes from Tennessee birds (Kramer et al.)

Golden-winged Warbler Conservation Partners

United States

American Bird Conservancy
Appalachian Mountains Joint Venture
Appalachian Trail Conservancy
Southern Wings
Cornell Lab of Ornithology
Tennessee Wildlife Resources Agency
Virginia Commonwealth University
Virginia Dept. of Wildlife Resources
North Carolina Wildlife Resources Commission
University of Tennessee, Knoxville

International

Selva (working in Colombia)
Provita (working in Venezuela)

Rosenberg, K.V. et al. Partners in Flight Landbird Conservation Plan: 2016 Revision for Canada and Continental United States. Partners in Flight Science Committee. 119 pp. Available from https://partnersinflight.org/resources/the-plan/

Partners in Flight Avian Conservation Assessment and Population Estimates Databases, Bird Conservancy of the Rockies, accessed 4/3/2024.

Kramer, G. Et al. 2017. Nonbreeding isolation and population-specific migration patterns among three populations of Golden-Winged Warblers. The Condor: Ornithological Applications 119:108–121. American Ornithological Society.

Bayly, N.J., Leon, J.F., Toro, Y., Cano, N., & Sandino, J.C. 2023. Golden-winged Warbler conservation, monitoring and public outreach in Colombia. Technical Report. SELVA: Investigación para la Conservación en el Neotropico, Bogotá D.C.

RSGCN list complements the Southeastern animals RSGCN list developed in 2019 to create a more complete picture of the region's exceptional biodiversity (Fig. 7.5).

To develop a pool of potential species to draw from, the PCA worked with NatureServe to compile an initial list of 10,437 vascular plants native to any of the SEAFWA states, considering the G-Rank (global rarity), S-Rank (state rarity), and endemism of each species. Unfortunately, due to data limitations, plants native to Puerto Rico and the US Virgin Islands could not be included in this assessment but will be evaluated when feasible.

The full list received extensive review from botany experts, a technical team composed of representatives from each state, and NatureServe. Based on partner feedback, the technical team assigned each species a level of conservation concern rating ranging from low to very high or "manual review needed". Any plant scoring moderate or above was ultimately considered an RSGCN. After removing 1,166 redundancies from the initial list, the complete Southeastern plant list evaluated 9,271 species and prioritized 1,824 as RSGCN; 72% of the plant RSGCN are endemic to the Southeast.

By far, the U.S. National Vegetation Classification group that supports the most plant RSGCN within Tennessee is the Southern Appalachian-Interior Mesic Forest. These diverse forests are characterized by tall, deciduous broad-leaved trees ranging from about 125 m (400 feet) elevation to generally 1,375 m (4500 feet) (NatureServe Explorer 2024). Stands are most extensive, diverse, and well-developed on lower slopes and in sheltered areas (NatureServe Explorer 2024).

7.4. Tennessee's Stewardship of Animal RSGCN

Within the Southeast region, Tennessee is one of the top five states with the most identified SGCN and has stewardship responsibility for 317 RSGCN based on the 2015 SWAP revisions. The most common RSGCN taxa represented in Tennessee are fishes (111) and mussels (66) (Fig. 7.6.).

While Tennessee shares stewardship of their SGCN and RSGCN with multiple other states, it has the most animal RSGCN in common with Alabama, Georgia, Kentucky, and Virginia (Fig. 7.7.). In particular, the state shares 51 fish RSGCN with Alabama and 53 with Kentucky. For mussels, Tennessee shares 37 RSGCN with Alabama and 47 with Kentucky (Table 7.3).

Tennessee is also home to multiple species that are not only endemic to the SEAFWA region but are also only found in one other state. For example, Tennessee supports four amphibian RSGCN that are only shared with one other state, such as the Santeetlah Dusky Salamander (*Desmognathus santeetlah*) that also occurs in North Carolina. There are 12 fish RSGCN that only occur within Tennessee and Kentucky, including the Blackfin Sucker (*Thoburnia atripinnis*) and several darter species. Tennessee shares 13 animal RSGCN that only occur within the state and Alabama and 21 animal RSGCN that only occur within the state and Kentucky.

By identifying shared SGCN and RSGCN with neighboring states, Tennessee can prioritize conservation actions that not only provide benefits within its boundaries, but also support a regional landscape. For example, Tennessee can identify conservation strategies aimed at

improving aquatic connectivity, which also improves water quantity and quality in watersheds and streams that cut across state lines. For an ongoing example of how regional collaboration is advancing conservation of highly mobile species, such as birds and bats, in the Southeast and beyond, see the "Motus Wildlife Tracking System Highlight."

Several regional datasets can help Tennessee to identify lands and waters that support both animal and plant RSGCN and to find opportunities to collaborate with other states. For example, habitat maps at the species level from the USGS Gap Analysis Project (GAP) are available for

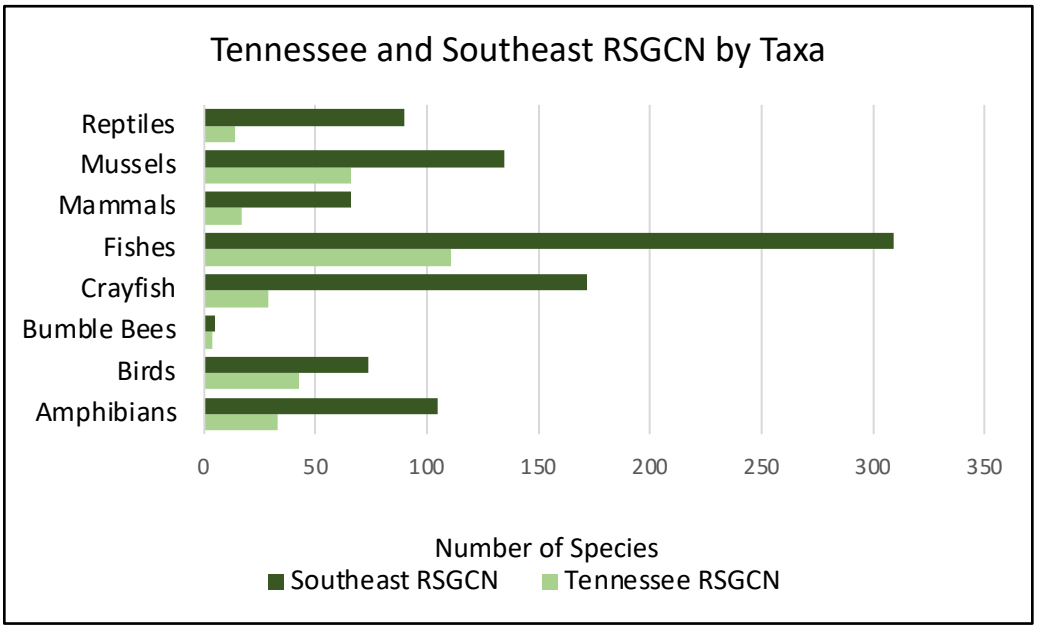


Figure 7.6 The number of animal RSGCN that occur in Tennessee compared to the overall Southeast Region

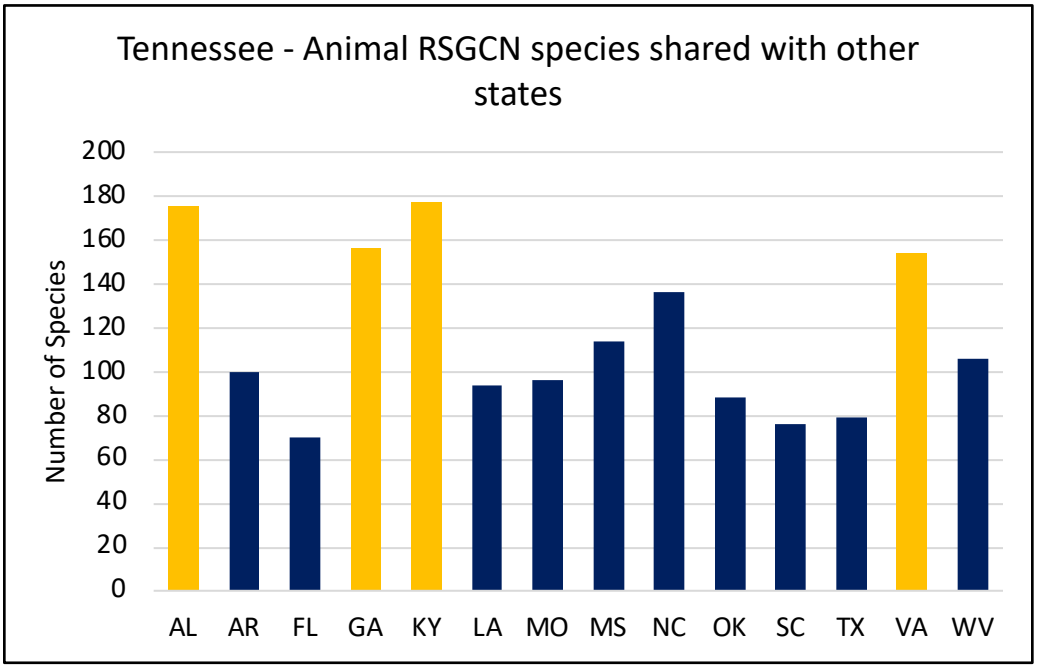


Figure 7.7 States that share animal RSGCN with Tennessee

approximately 290 animal species and 90 sub-species on the RSGCN list. While GAP does not include species habitat maps for invertebrates or plants, it does include a high percentage of vertebrate RSGCN (93% of amphibians, 92% of birds, 76% of mammals, and 77% of reptiles). Using GAP species habitat models in combination with other tools, such as the SWAP and the Southeast Blueprint, can help identify areas where conservation actions are likely to yield co-benefits for other species, habitats, and ecosystem services. All data, including model inputs, are available from the **USGS Gap Analysis Project Species Habitat Maps on ScienceBase**.

Table 7.3 Based on 2015 data, Tennessee's RSGCN have the most animal RSGCN in common with Alabama, Georgia, Kentucky, and Virginia. (This data is being updated in 2025)

Animal RSGCN taxonomic group	AL	GA	KY	VA
Amphibians	14	14	11	15
Birds	41	38	31	35
Bumblebees	2	4	3	4
Crayfish	7	4	6	1
Fishes	51	40	53	40
Mammals	12	14	14	17
Mussels	37	31	47	32
Reptiles	11	11	12	10
Total	**175**	**156**	**177**	**154**

7.5. Regional Conservation Opportunity Areas

To build off the work of identifying RSGCN conducted by the SEAFWA Wildlife Diversity Committee, Tennessee developed Regional Conservation Opportunity Areas (RCOAs) in a similar fashion as in 2015 when Conservation Opportunity Areas were developed for the state. As with the 2015 COAs, RCOAs are intended to provide a framework for guiding voluntary and partnership-focused conservation action to address priority problems and achieve improved outcomes for species and habitats, increasing the ability for collaborative partnerships at regional scales to be developed. The conservation of many RSGCN is shared because the species ranges are shared with more than one state (Fig. 7.8). RCOAs serve as a means for conservation of both RSGCN and SGCN and their habitats that occur beyond state administrative boundaries, increasing the success of recovery objectives (see COA discussion in Chapter 6 for more detail).

The RCOAs are roughly 8-digit HUC boundaries that intersect state lines to extend the COAs across the state lines. The initial selection of RCOAs was driven by areas with highest priority habitats, described in Chapter 6. Input on the selection of RCOAs was provided by the SWAP Steering Committee and stakeholders.

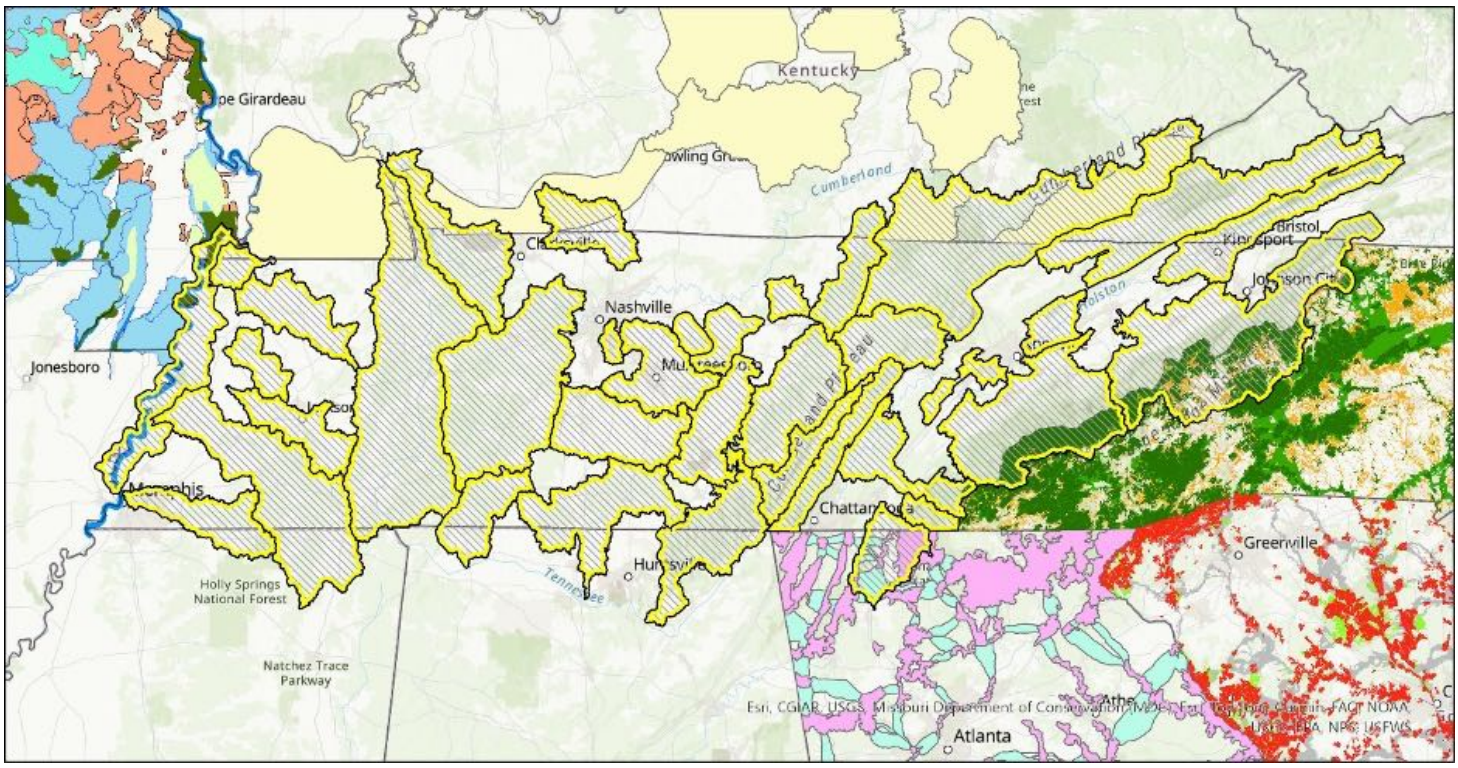


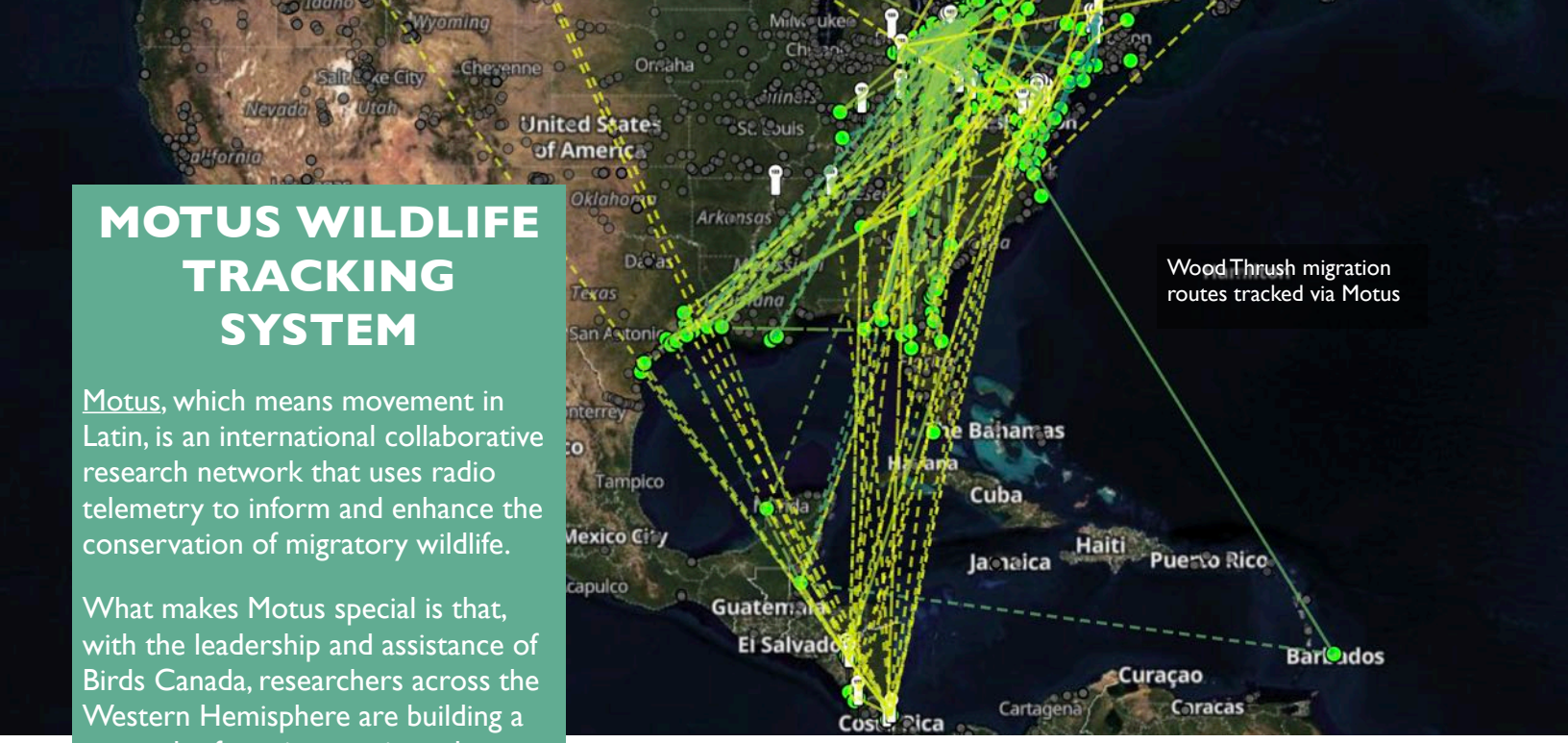
Figure 7.8 Map of Tennessee's Conservation Opportunity Areas relative to the COAs of the surrounding states. At time of publication of this chapter, Mississippi, Alabama, and Virginia's COAs were still in development. It is anticipated that this map will be updated after the final release of the SWAP with the newest spatial data.

The RCOAs are opportunities for collaboration and sharing resources with surrounding states. Table 7.4. shows the acreage for each RCOA for Tennessee and each neighboring state. Since Kentucky shares the longest state boarder with Tennessee, it is natural that it has the most acreage for RCOAs. Map 7.1. and 7.2. in **Appendix B, the 2025 TN SWAP Map Atlas**, demonstrate the value of shared conservation beyond borders, showing shared terrestrial priorities with KY and shared aquatic priorities with KY and the Southern Appalachians, respectively.

7.5.1. Four Case Studies of Regional COAs that Include Lands and Waters in Tennessee

Four case studies of the RCOAs are provided to demonstrate how information can be collected from other State Wildlife Action Plans to begin (or continue) conversations for landscape scale management and conservation of SGCN, highlighting shared SGCN, threats, and management actions.

At the time of publication of this SWAP, surrounding states were at varying stages of development of their SWAPs. Further refinement of species lists, threats, and management actions will be needed once all of the SWAPs are complete. For this case study, **NatureServe Explorer Pro** was used to generate a species list for each RCOA until more data can be gathered across state lines. This allows comparison of the species list generated from NatureServe Explorer Pro to each state's final SGCN list and the RSGCN list to find how many SGCN each state has in common for an RCOA.



MOTUS WILDLIFE TRACKING SYSTEM

Motus, which means movement in Latin, is an international collaborative research network that uses radio telemetry to inform and enhance the conservation of migratory wildlife.

What makes Motus special is that, with the leadership and assistance of Birds Canada, researchers across the Western Hemisphere are building a network of receiver stations that are monitoring the *same* frequency and *sharing* the data. This allows collaboration in studying many species of tagged animals across a much broader area than ever before.

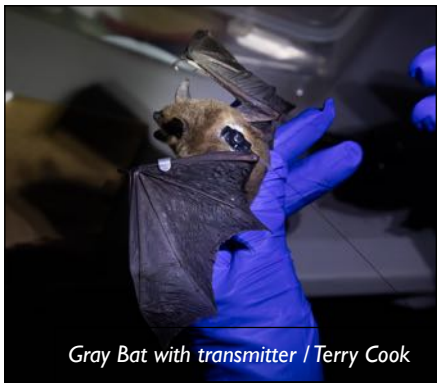
For Motus tracking studies, animals are captured, fitted with transmitters weighing 3 to 5% of an individual's body weight, then released. Motus stations, which consist of antennae and recording computers, will record any tagged individual coming within a roughly 10-km range, whether or not it is a target of the study.

The Motus network's breadth of coverage (27 stations in Tennessee as of 2024) and sharing of data are helping researchers to better understand species' full annual life cycles, (which include movements throughout the year), and to identify key habitats for breeding, migration routes, stopovers, and non-breeding (wintering).

KEY ISSUES FOR MIGRATORY BIRDS & BATS

In the Western Hemisphere, neotropical migratory birds (which migrate between the tropics of Central or South America and North America) have been in decline for decades. A 2019 study found steep, long-term losses across virtually all groups of birds (except waterfowl, raptors, and some game birds) in the US and Canada (Rosenberg et al. 2019). Causes of the declines are complex, and vary among species. Contributors include habitat loss/fragmentation, migration mortality, climate change, unmet habitat management needs (e.g. prescribed fire), and low reproductive success.

Likewise, many species of bats in North America migrate and have also been declining. According to Bat Conservation International, "Today, bats are under unprecedented threat from widespread habitat destruction, accelerated climate change, invasive species, and other stresses. Without concerted international action, their populations will continue to fall, driving many species to extinction."


Gray Bat with transmitter / Terry Cook

Well-known for its karst topography, Tennessee is home to nearly 12,000 caves—over 20% of the US total and more than any other state, placing it in a special position to help bat populations through research and conservation. **Cory Holliday, Cave and Karst Program Director for The Nature Conservancy in TN** says, "I think of it as bonus habitat that doesn't exist elsewhere—it gives us additional places for animals to live and thrive."

Motus is now providing the vehicle for concerted action to assist many declining species. **David Hanni, TWRA Bird Conservation Coordinator** says, "This technology is amazing because states are now coordinating their efforts across borders to identify individual species migratory paths, which was not really available before Motus."

MAKING A DIFFERENCE WITH MOTUS

The **Wood Thrush** (*Hylocichla mustelina*) has suffered a 59% population loss since 1970, making it a bird pecies of Conservation Concern in Tennessee, 24 additional states, and Canada. (Rosenberg et al. 2016). It is also a Tipping Point Species as defined by the Road to Recovery Partnership. Scientists have long understood that Wood Thrush require relatively large, high quality forest habitats for nesting. However, they do not understand what is behind steep Wood Thrush declines across the Atlantic states and New England. *What is happening during migration and in stopover habitats? Are they getting the resources they need to migrate? To reproduce successfully? Is there variation in stopover or overwintering mortality? If so, what might be the cause?*


Wood Thrush / Cynthia Routledge

TN Motus Wood Thrush Partners

Appalachian Conservation Institute
Austin Peay State University
Tennessee River Gorge Trust
Tennessee Wildlife Resources Agency
University Tennessee, Chattanooga
University of Tennessee, Knoxville
Warner Park Nature Center, BIRD Research Program

TN Motus Gray Bat Partners

Tennessee Wildlife Resources Agency
Tennessee Chapter of The Nature Conservancy
Tennessee Valley Authority

To address the decline of Wood Thrush and other species, a project deploying 600 Motus tags across the breeding and non-breeding ranges of Wood Thrush aims to better understand migratory connections, routes, timing, and survival across their full life cycle. The data will inform conservation and management for this species, (Kendrick 2023) whose flute-like song is often considered the most beautiful in North America.

EYE-OPENING GRAY BATS

The **Gray Bat** (*Myotis grisescens*) has been federally listed as endangered since 1976. This species concentrates in large numbers to hibernate in just 12 known caves, and largely due to cave protection, they are bouncing back. The goal is to get them removed from the T&E list. To secure the Gray Bat's future, and that of other bat species, Tennessee partners have established a Motus monitoring system to better understand these small, long-lived, and highly mobile animals. "We don't know what Gray Bats are doing when they are foraging or during migration. We don't understand which parts of the landscape are critical habitat. It's unbelievable the amount of data we've been able to get through Motus over just three years, really eye-opening!" exclaims Holliday.


Gray Bat biologists / Terry Cook

Gray Bats move around a lot. While it had previously been assumed they forage within about 25 miles of their summer roosts, researchers are finding a lot of movement, sometimes 50 miles in one night. They roost switch. "It costs them energetically, so there has to be a reason," explains Holliday. As a result, the conservation needs of Gray Bats are expanding beyond big focal caves. Moreover, seasonal migration occurs over months and is still poorly understood, limited by the one-month life-span of current bat transmitters. A larger Motus network will help to shed light on their needs and inform conservation, as well as land development and wind energy projects, which could potentially impact aerial wildlife.

THE MOTUS "HARVEST"

The 20th century population declines of many waterfowl species have been reversed through coordinated efforts over decades to understand the full annual life cycles of ducks and geese. Conservation for songbirds, bats, and other species now seeks to achieve these same goals. Duck banding studies have yielded much of the essential data, often when banded birds were harvested by hunters. Motus is, in effect, creating a network of "harvest" locations for monitored animals, obtaining data without actually collecting the animals!

Rosenberg KV, Dokter AM, Blancher PJ , Sauer JR , Smith AC, Smith PA , Stanton JC , Panjabi A, Helft L, Parr M, Marra PP. 2019. Decline of the North American Avifauna. Science, Vol. 366, Issue 6461. https://www.science.org/doi/10.1126/science.aaw1313

Bat Conservation International. [date unknown]. Bats 101. Accessed March 18, 2024. https://www.batcon.org/about-bats/bats-101/.

Kendrick, S. 2023. Range-wide Motus Tracking of Wood Thrush to Inform Conservation across the Full Annual Cycle. USFWS.

Rosenberg et al. 2016. . Partners in Flight Landbird Conservation Plan: 2016 Revision for Canada and Continental United States. Partners in Flight Science Committee. 119 pp.

Table 7.4. Tennessee's Regional Conservation Opportunity Areas (RCOA), showing acreage by state for each RCOA.

Regional COA	Tennessee	Alabama	Arkansas	Georgia	Kentucky	Mississippi	North Carolina	Virginia	West Virginia	Total Acreage per RCOA
Blue Ridge	1,192,569						1,003,661	103,670		2,299,900
Clinch & Powell	301,319				287			1,158,738	17	1,460,361
Conasauga	82,114			383,320						465,434
Cypress & Shoal Creeks	308,501	143,530								452,031
Elk River	701,011	214,112								915,123
Foothills	1,103,163						389,842			1,493,005
Hatchie River	1,111,891					470,289				1,582,180
Hiwassee	494,388						19,690			514,078
Lower Cumberland/ Pennyroyal Plains and Barrens	510,952				247,678					758,630
Mississippi Alluvial Valley	642,756		98,188		30,734					884,297
North Cumberland Plateau and Mountains	931,967				1,540,104			293		2,472,364
Northwest Cumberland Plateau	331,727				88,503					420,230
Red River	187,289				266,858					454,147
Reelfoot Lake	115,673				37,731					153,404
South Cumberland Plateau	353,217	467,310								820,527
Tennessee River	2,309,839				232,079	23,852				2,565,770
Upper Holston	256,145							458,033		714,178
Wolf River	364,134					157,605				521,739
Total Acreage per State	**11,298,655**	**824,952**	**98,188**	**383,320**	**2,443,974**	**651,746**	**1,413,193**	**1,720,734**	**17**	

Tools such as the Landscape Recovery Tool and the SWAP Dashboard (both in development) can be used to identify shared threats and conservation activities for some of these species. In all cases, refer to the RCOA fact sheet for more information specific to Tennessee (Appendix I). (For full lists of species in the four examples that follow, see Ch. 7.)

Lower Cumberland/Pennyroyal Plains and Barrens Regional Conservation Opportunity Area

The Lower Cumberland/Pennyroyal Plains and Barrens RCOA overlaps with the Big Barrens COA in Kentucky and is directly adjacent to the Jackson Purchase COA in Kentucky (Figs. 7.9, 7.10). Collaborating with Kentucky to support management work in the 200,000+ acres that overlap between the state designated COAs would provide redundancy to the species populations. Redundancy in species populations is a major factor in keeping common species common, delisting, and precluding the need to list them under the Endangered Species Act.

Using the method described above, 58 species that are SGCN in both Tennessee and Kentucky were found. Of those 58 species, 31 are also designated as an RSGCN (Table 7.5).



buffalo clover (*Trillium reflexum*), a plant that is not an RSGCN but is shared between KY and TN within the Lower Cumberland/Pennyroyal Plains & Barrens RCOA / Eric Hunt - Own work, CC BY-SA 4.0

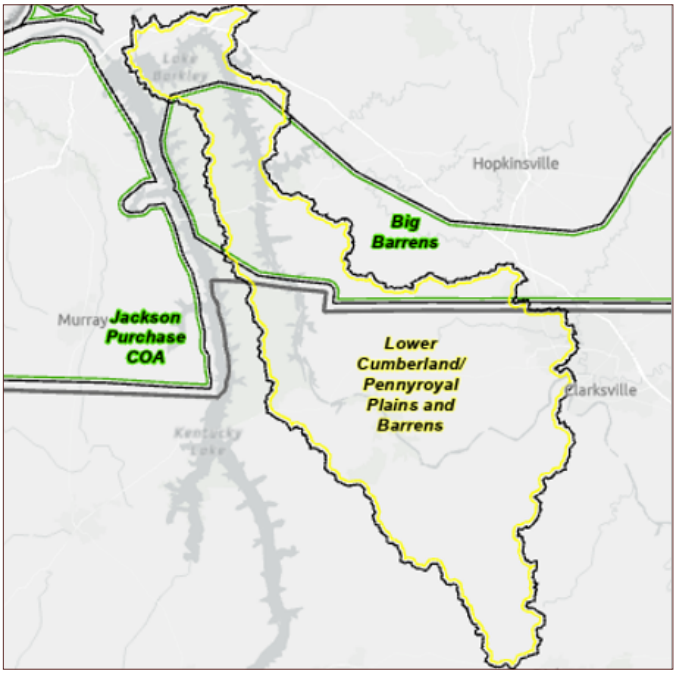


Figure 7.9 Map of Lower Cumberland/ Pennyroyal RCOA with overlapping COAs in Kentucky

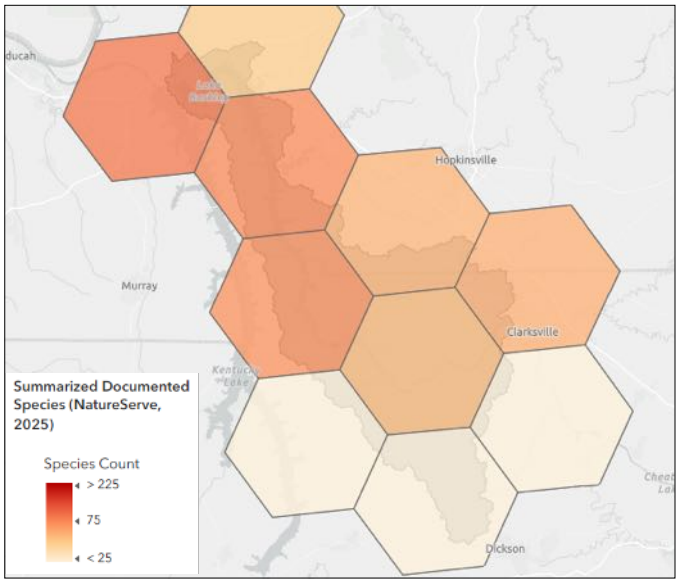


Figure 7.10 Map from NatureServe Explorer Pro illustrating areas around the Lower Cumberland/Pennyroyal RCOA that have the highest density of species.

As the SWAPs are updated, data integration tools can be used to identify shared threats and management activities. These species and management activities could be starting points of conversations for biologists and local stakeholders to develop local conservation initiatives.

Table 7.6 lists the 58 species that are SGCN for both Tennessee and Kentucky and are assumed to fall within the Lower Cumberland/Pennyroyal and Barrens RCOA. If the species is also federally listed under the Endangered Species Act (ESA), its status is also listed. If the species is recognized as RSGCN, it is labeled as well.

Table 7.5 Total counts of species by taxa groups found within the Lower Cumberland/Pennyroyal RCOA

Taxa Group	Listed in TN & KY only	Listed in TN, KY, and are RSGCN	Grand Total
Amphibian		2	2
Bat		7	7
Bird	8	5	13
Bivalve	2	10	12
Crustacean	1	2	3
Fish	1	3	4
Gastropod	1		1
Mammal	4		4
Plant	8		8
Reptile	2	2	4
Grand Total	27	31	58



Cerulean Warbler (*Setophaga cerulea*), an RSGCN of the Pennyroyal Plains & Barrens RCOA / Alan Schmierer

Table 7.6. List of species designated as SGCN in both Tennessee and Kentucky within the Lower Cumberland/Pennyroyal Plains and Barrens RCOA

Group	Scientific Name	Common Name	ESA Status	RSGCN
Amphibian	*Cryptobranchus alleganiensis*	Hellbender		Yes
Amphibian	*Dryophytes gratiosus*	Barking Treefrog		Yes
Bat	*Myotis lucifugus*	Little Brown Myotis	Under Review	Yes
Bat	*Myotis austroriparius*	Southeastern Myotis		Yes
Bat	*Myotis grisescens*	Gray Myotis	Endangered	Yes
Bat	*Myotis sodalis*	Indiana Myotis	Endangered	Yes
Bat	*Myotis leibii*	Eastern Small-footed Myotis		Yes
Bat	*Myotis septentrionalis*	Northern Myotis	Endangered	Yes
Bat	*Perimyotis subflavus*	Tricolored Bat	Proposed endangered	Yes
Bird	*Botaurus lentiginosus*	American Bittern		
Bird	*Ardea alba*	Great Egret		
Bird	*Nycticorax nycticorax*	Black-crowned Night Heron		
Bird	*Nyctanassa violacea*	Yellow-crowned Night Heron		Yes
Bird	*Accipiter striatus*	Sharp-shinned Hawk		
Bird	*Falco peregrinus*	Peregrine Falcon		
Bird	*Sternula antillarum athalassos*	Interior Least Tern	Delisted	
Bird	*Thryomanes bewickii*	Bewick's Wren		
Bird	*Lanius ludovicianus*	Loggerhead Shrike		Yes
Bird	*Vireo bellii*	Bell's Vireo		Yes
Bird	*Setophaga cerulea*	Cerulean Warbler		Yes
Bird	*Peucaea aestivalis*	Bachman's Sparrow		
Bird	*Centronyx henslowii*	Henslow's Sparrow		Yes
Bivalve	*Cumberlandia monodonta*	Spectaclecase	Endangered	Yes
Bivalve	*Cyprogenia stegaria*	Fanshell	Endangered; Experimental population, non-essential	Yes
Bivalve	*Fusconaia subrotunda*	Longsolid	Threatened	Yes
Bivalve	*Lampsilis abrupta*	Pink Mucket	Endangered	Yes

Table 7.6. List of species designated as SGCN in both Tennessee and Kentucky within the Lower Cumberland/Pennyroyal Plains and Barrens RCOA

Group	Scientific Name	Common Name	ESA Status	RSGCN
Bivalve	*Ligumia recta*	Black Sandshell		
Bivalve	*Obovaria retusa*	Ring Pink	Endangered; Experimental population, non-essential	Yes
Bivalve	*Plethobasus cooperianus*	Orangefoot Pimpleback	Endangered; Experimental population, non-essential	Yes
Bivalve	*Plethobasus cyphyus*	Sheepnose	Endangered	Yes
Bivalve	*Pleurobema oviforme*	Tennessee Clubshell	Proposed endangered	Yes
Bivalve	*Potamilus capax*	Fat Pocketbook	Endangered	Yes
Bivalve	*Theliderma cylindrica*	Rabbitsfoot	Endangered	Yes
Bivalve	*Toxolasma lividum*	Purple Lilliput		
Crustacean	*Cambarus friaufi*	Hairy Crayfish		
Crustacean	*Orconectes pellucidus*	Mammoth Cave Crayfish		Yes
Crustacean	*Faxonius burri*	Blood River Crayfish		Yes
Fish	*Acipenser fulvescens*	Lake Sturgeon		Yes
Fish	*Cycleptus elongatus*	Blue Sucker		Yes
Fish	*Typhlichthys subterraneus*	Southern Cavefish		
Fish	*Nothonotus microlepidus*	Smallscale Darter		Yes
Gastropod	*Lithasia armigera*	Armored Rocksnail		
Mammal	*Sorex cinereus*	Cinereus Shrew		
Mammal	*Sorex hoyi*	Eastern Pygmy Shrew		
Mammal	*Sorex longirostris*	Southeastern Shrew		
Mammal	*Synaptomys cooperi*	Southern Bog Lemming		
Plant	*Prenanthes barbata*	Barbed Rattlesnake-root		
Plant	*Physaria globosa*	Globe Bladderpod	Endangered	
Plant	*Apios priceana*	Price's Potato-bean	Threatened	
Plant	*Trifolium reflexum*	Buffalo Clover		
Plant	*Actaea rubifolia*	Appalachian Bugbane		

Table 7.6. List of species designated as SGCN in both Tennessee and Kentucky within the Lower Cumberland/Pennyroyal Plains and Barrens RCOA

Group	Scientific Name	Common Name	ESA Status	RSGCN
Plant	*Agalinis auriculata*	Earleaf False Foxglove		
Plant	*Aureolaria patula*	Spreading Yellow False Foxglove		
Plant	*Fimbristylis perpusilla*	Harper's Fimbry	Under Review	
Reptile	*Macrochelys temminckii*	Alligator Snapping Turtle	Proposed threatened	Yes
Reptile	*Ophisaurus attenuatus longicaudus*	Eastern Slender Glass Lizard		
Reptile	*Pituophis melanoleucus melanoleucus*	Northern Pinesnake		Yes
Reptile	*Sistrurus miliarius streckeri*	Western Pygmy Rattlesnake		

North Cumberland Plateau and Mountains Regional Conservation Opportunity Area

The North Cumberland Plateau and Mountains RCOA overlaps two COAs in Kentucky: The South Fork Cumberland COA and the Cumberland Mountain COA. The North Cumberland Plateau and Mountains RCOA spans over 2.4 million acres, with over 931,000 acres in Tennessee and over 1.5 million acres in Kentucky (Figs. 7.11, 7.12).

The NatureServe Explorer Pro tool reports occurrences for 98 different species that are SGCN in both Tennessee and Kentucky. Of those 98 species, half (49) are also designated as RSGCN (Table 7.7).

As the SWAPs are updated, data integration tools can be used to identify shared threats and management activities. These species and management activities could be starting points of conversations for biologists and local stakeholders to develop local conservation initiatives.

Table 7.7 Total counts of species by taxa groups found within the North Cumberland Plateau and Mountains RCOA

Taxa Group	Listed in TN & KY only	Listed in TN, KY, and are RSGCN	Grand Totals
Amphibian	2	2	4
Bat		8	8
Bird	4	5	9
Bivalve	5	18	23
Crustacean	1	2	3
Fish	2	11	13
Insect	1		1
Mammal	7	1	8
Plant	26		26
Reptile	1	2	3
Grand Totals	49	49	98

Table 7.8 below lists the 98 species that are SGCN for both Tennessee and Kentucky and are assumed to fall within the North Cumberland Plateau and Mountains RCOA. If the species is also federally listed under the ESA, its status is also listed. If the species is recognized as RSGCN, it is labeled as well.

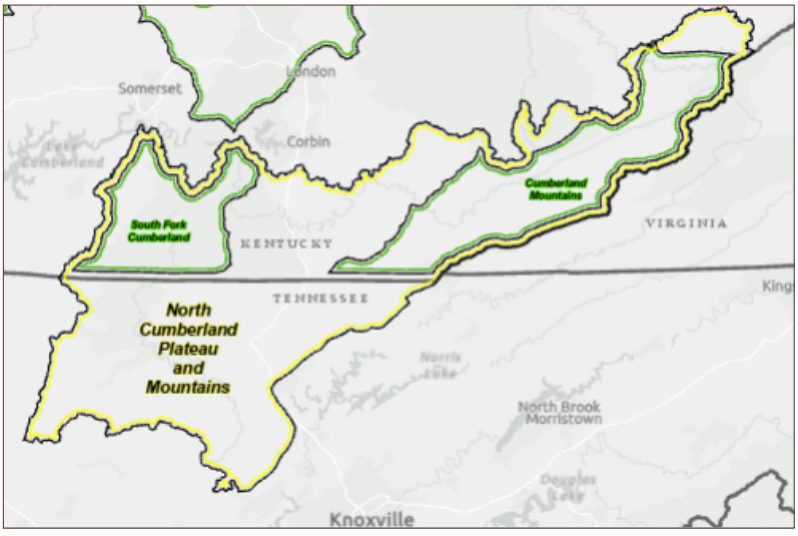


Figure 7.11 Map of North Cumberland Plateau and Mountains RCOA overlapping 2 COAs in Kentucky

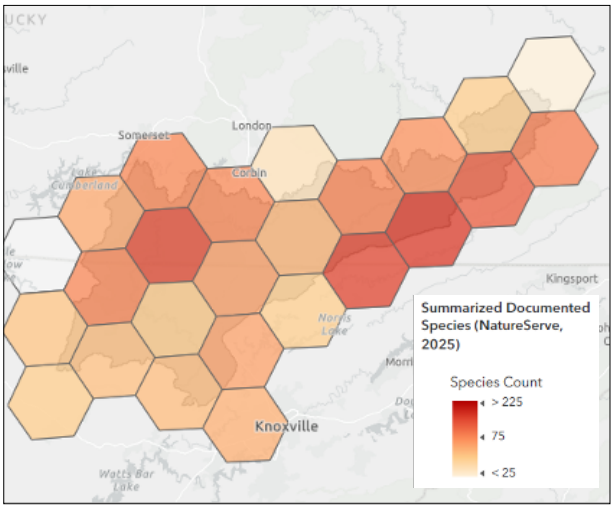


Figure 7.12 Map from NatureServe Explorer Pro showing areas around the North Cumberland Plateau and Mountains RCOA with the highest density of species.

Table 7.8. List of species designated as SGCN Need in both Tennessee and Kentucky within the North Cumberland Plateau and Mountains RCOA

Group	Scientific Name	Common Name	ESA Status	RSGCN
Amphibian	*Cryptobranchus alleganiensis*	Hellbender		Yes
Amphibian	*Aneides aeneus*	Green Salamander		
Amphibian	*Desmognathus welteri*	Black Mountain Salamander		Yes
Amphibian	*Plethodon pauleyi*	Yellow-spotted Woodland Salamander		
Bat	*Myotis lucifugus*	Little Brown Myotis	Under Review	Yes
Bat	*Myotis grisescens*	Gray Myotis	Endangered	Yes
Bat	*Myotis sodalis*	Indiana Myotis	Endangered	Yes
Bat	*Myotis leibii*	Eastern Small-footed Myotis		Yes
Bat	*Myotis septentrionalis*	Northern Myotis	Endangered	Yes
Bat	*Perimyotis subflavus*	Tricolored Bat	Proposed endangered	Yes
Bat	*Corynorhinus townsendii virginianus*	Virginia Big-eared Bat	Endangered	Yes
Bat	*Corynorhinus rafinesquii*	Rafinesque's Big-eared Bat		Yes
Bird	*Accipiter striatus*	Sharp-shinned Hawk		
Bird	*Falco peregrinus*	Peregrine Falcon		
Bird	*Empidonax minimus*	Least Flycatcher		
Bird	*Lanius ludovicianus*	Loggerhead Shrike		Yes
Bird	*Vermivora chrysoptera*	Golden-winged Warbler	Under Review	Yes
Bird	*Setophaga cerulea*	Cerulean Warbler		Yes
Bird	*Limnothlypis swainsonii*	Swainson's Warbler		Yes
Bird	*Cardellina canadensis*	Canada Warbler		
Bird	*Centronyx henslowii*	Henslow's Sparrow		Yes
Bivalve	*Ortmanniana pectorosa*	Pheasantshell		Yes
Bivalve	*Alasmidonta atropurpurea*	Cumberland Elktoe	Endangered	Yes
Bivalve	*Anodontoides denigratus*	Cumberland Papershell		Yes
Bivalve	*Cumberlandia monodonta*	Spectaclecase	Endangered	Yes

Table 7.8. List of species designated as SGCN Need in both Tennessee and Kentucky within the North Cumberland Plateau and Mountains RCOA

Group	Scientific Name	Common Name	ESA Status	RSGCN
Bivalve	*Dromus dromas*	Dromedary Pearlymussel	Endangered; Experimental population, non-essential	Yes
Bivalve	*Epioblasma brevidens*	Cumberlandian Combshell	Endangered; Experimental population, non-essential	Yes
Bivalve	*Epioblasma capsaeformis*	Oyster Mussel	Endangered; Experimental population, non-essential	Yes
Bivalve	*Epioblasma walkeri*	Tan Riffleshell	Endangered	Yes
Bivalve	*Epioblasma triquetra*	Snuffbox	Endangered	Yes
Bivalve	*Hemistena lata*	Cracking Pearlymussel	Endangered; Experimental population, non-essential	Yes
Bivalve	*Pleuronaia dolabelloides*	Slabside Pearlymussel	Endangered	Yes
Bivalve	*Ligumia recta*	Black Sandshell		
Bivalve	*Medionidus conradicus*	Cumberland Moccasinshell	Proposed endangered	Yes
Bivalve	*Obovaria subrotunda*	Round Hickorynut	Threatened	Yes
Bivalve	*Pegias fabula*	Littlewing Pearlymussel	Endangered	Yes
Bivalve	*Plethobasus cooperianus*	Orangefoot Pimpleback	Endangered; Experimental population, non-essential	Yes
Bivalve	*Plethobasus cyphyus*	Sheepnose	Endangered	Yes
Bivalve	*Pleurobema oviforme*	Tennessee Clubshell	Proposed endangered	Yes
Bivalve	*Ptychobranchus subtentus*	Fluted Kidneyshell	Endangered	Yes
Bivalve	*Toxolasma lividum*	Purple Lilliput		
Bivalve	*Leaunio lienosus*	Little Spectaclecase		
Bivalve	*Cambarunio iris*	Rainbow		
Bivalve	*Venustaconcha troostensis*	Cumberland Bean	Endangered; Experimental population, non-essential	Yes

Table 7.8. List of species designated as SGCN Need in both Tennessee and Kentucky within the North Cumberland Plateau and Mountains RCOA

Group	Scientific Name	Common Name	ESA Status	RSGCN
Crustacean	*Cambarus bouchardi*	Big South Fork Crayfish		Yes
Crustacean	*Cambarus deweesae*	Valley Flame Crayfish		
Crustacean	*Orconectes barri*	Cumberland Plateau Cave Crayfish		Yes
Fish	*Acipenser fulvescens*	Lake Sturgeon		Yes
Fish	*Hemitremia flammea*	Flame Chub		Yes
Fish	*Notropis albizonatus*	Palezone Shiner	Endangered	Yes
Fish	*Chrosomus cumberlandensis*	Blackside Dace	Threatened	Yes
Fish	*Carpiodes velifer*	Highfin Carpsucker		Yes
Fish	*Typhlichthys subterraneus*	Southern Cavefish		
Fish	*Ammocrypta clara*	Western Sand Darter		Yes
Fish	*Etheostoma sagitta*	Arrow Darter		Yes
Fish	*Etheostoma susanae*	Cumberland Darter	Endangered	Yes
Fish	*Etheostoma lemniscatum*	Tuxedo Darter		Yes
Fish	*Allohistium maydeni*	Redlips Darter		
Fish	*Percina macrocephala*	Longhead Darter		Yes
Fish	*Percina squamata*	Olive Darter		Yes
Insect	*Callophrys irus*	Frosted Elfin		
Mammal	*Sorex cinereus*	Cinereus Shrew		
Mammal	*Sorex hoyi*	Eastern Pygmy Shrew		
Mammal	*Sorex longirostris*	Southeastern Shrew		
Mammal	*Sorex fumeus*	Smoky Shrew		
Mammal	*Parascalops breweri*	Hairy-tailed Mole		
Mammal	*Neotoma magister*	Allegheny Woodrat		Yes
Mammal	*Synaptomys cooperi*	Southern Bog Lemming		
Mammal	*Mustela nivalis*	Least Weasel		

Table 7.8. List of species designated as SGCN Need in both Tennessee and Kentucky within the North Cumberland Plateau and Mountains RCOA

Group	Scientific Name	Common Name	ESA Status	RSGCN
Plant	*Thaspium pinnatifidum*	Cutleaf Meadow-parsnip		
Plant	*Helianthus eggertii*	Eggert's Sunflower	Delisted	
Plant	*Silphium wasiotense*	Appalachian Rosinweed		
Plant	*Solidago faucibus*	Gorge Goldenrod		
Plant	*Solidago arenicola*	Southern Racemose Goldenrod		
Plant	*Ageratina luciae-brauniae*	Lucy Braun's White Snakeroot		
Plant	*Eurybia saxicastelli*	Rockcastle Wood-aster		
Plant	*Berberis canadensis*	American Barberry		
Plant	*Minuartia cumberlandensis*	Cumberland Sandwort	Delisted	
Plant	*Silene ovata*	Ovate Catchfly		
Plant	*Paxistima canbyi*	Canby's Mountain-lover		
Plant	*Conradina verticillata*	Cumberland False Rosemary	Threatened	
Plant	*Pycnanthemum torreyi*	Torrey's Mountainmint		
Plant	*Monotropsis odorata*	Sweet Pinesap		
Plant	*Actaea rubifolia*	Appalachian Bugbane		
Plant	*Spiraea virginiana*	Virginia Spiraea	Threatened	
Plant	*Parnassia grandifolia*	Largeleaf Grass-of-Parnassus		
Plant	*Schisandra glabra*	Bay Starvine		
Plant	*Agalinis decemloba*	Blue Ridge False Foxglove		
Plant	*Aureolaria patula*	Spreading Yellow False Foxglove		
Plant	*Vitis rupestris*	Rock Grape		
Plant	*Carex roanensis*	Roan Mountain Sedge		
Plant	*Cypripedium kentuckiense*	Southern Lady's-slipper		

Table 7.8. List of species designated as SGCN Need in both Tennessee and Kentucky within the North Cumberland Plateau and Mountains RCOA

Group	Scientific Name	Common Name	ESA Status	RSGCN
Plant	*Platanthera integrilabia*	White Fringeless Orchid	Threatened	
Plant	*Calamovilfa arcuata*	Rivergrass		
Plant	*Potamogeton tennesseensis*	Tennessee Pondweed	Under Review	
Reptile	*Ophisaurus attenuatus longicaudus*	Eastern Slender Glass Lizard		
Reptile	*Plestiodon anthracinus*	Coal Skink		Yes
Reptile	*Pituophis melanoleucus melanoleucus*	Northern Pinesnake		Yes

Conasauga Regional Conservation Opportunity Area

The Conasauga RCOA overlaps with many COAs in Georgia. Georgia's COAs were delineated using priority species and habitats, as well as the Southeast Conservation Blueprint's Hubs and Corridors layer (Fig. 7.13).

The Conasauga RCOA spans over 465,000 acres, with over 82,000 acres in Tennessee and over 383,000 acres in Georgia. Many SGCN in this RCOA are aquatic (Fig. 7.14). The Conasauga River has its headwaters in Georgia, flows into Tennessee, and then back to Georgia before it joins with the Oostanaula River. Actions in the headwaters of the Conasauga River impact the Tennessee portion of the Conasauga River. While actions in Tennessee impact the downstream portions of the river in Georgia.



Blue Shiner (*Cyprinella caerulea*) Blue shiner is a RSGCN that is found in both TN and GA and is also federally listed as Threatened. / Ryan Hagerty, USFWS

The NatureServe Explorer Pro tool reports occurrences for 76 different species that are SGCN in both Tennessee and Georgia. Of those 76 species, 38 are also designated as RSGCN (Table 7.9).

As the SWAPs are updated, data integration tools can be used to identify shared threats and management activities. These species and management activities could be starting points of conversations for biologists and local stakeholders to develop local conservation initiatives.

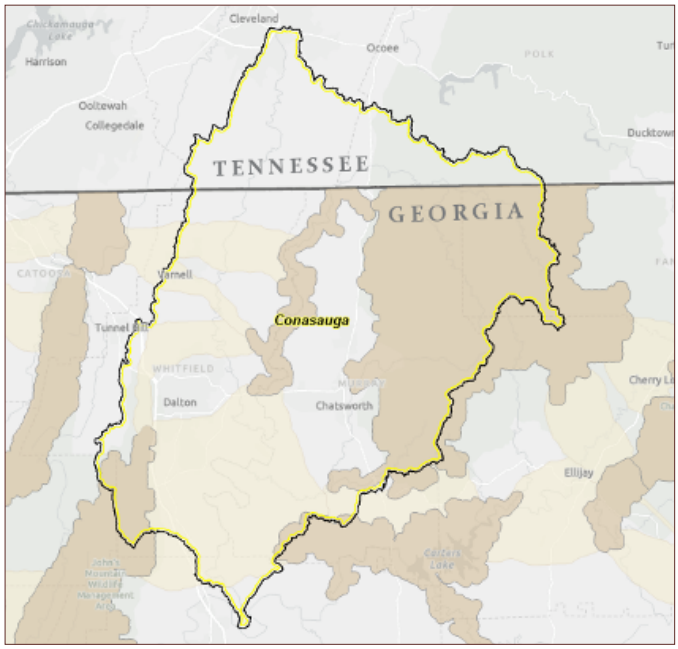


Figure 7.13 Map of Conasauga RCOA with overlapping COAs in Georgia

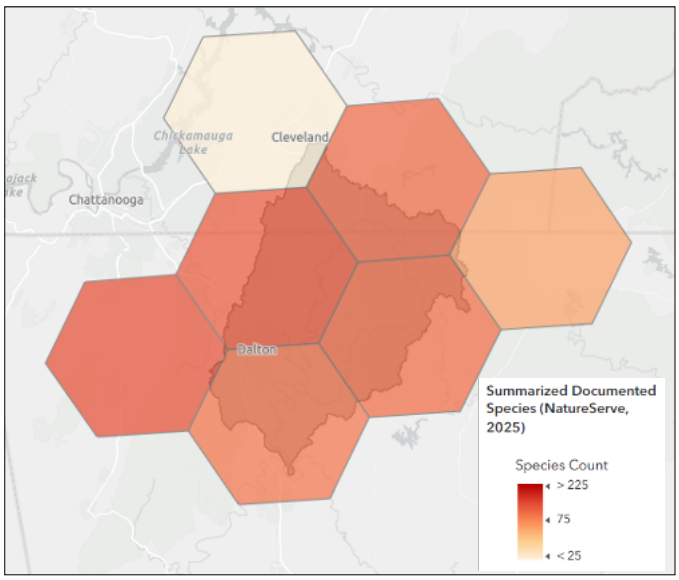


Figure 7.14 Map from NatureServe Explorer Pro illustrating areas around the Conasauga RCOA that have the highest density of species

Table 7.10 lists the 76 species that are SGCN for both Tennessee and Georgia and are assumed to fall within the Conasauga RCOA. If the species is also federally listed under the ESA, its status is also listed. If the species is recognized as RSGCN, it is labeled as well.

Table 7.9 Total counts of species by taxa groups found within the Conasauga RCOA

Taxa Group	Listed in TN & GA only	Listed in TN, GA, and are RSGCN	Grand Totals
Amphibian	1	2	3
Bat	6	2	8
Bird		1	1
Bivalve	1	15	16
Crustacean		3	3
Fish	1	15	16
Insect	3		3
Mammal	3		3
Plant	23		23
Grand Totals	38	38	76



Swainson's Warbler (*Limnothlypis swainsonii)* is a shared RSGCN that occurs in both TN and GA portions of the Conasauga RCOA / Alan Schmierer

Table 7.10. List of species designated as SGCN in both Tennessee and Georgia within the Conasauga RCOA

Taxa	Scientific Name	Common Name	ESA Status	RSGCN
Amphibian	Cryptobranchus alleganiensis (including alleganiensis and bishopi)	Hellbender		Yes
Amphibian	*Aneides aeneus*	Green Salamander		
Amphibian	*Eurycea aquatica*	Brown-backed Salamander		Yes
Bat	*Myotis lucifugus*	Little Brown Bat	Under Review	Yes
Bat	*Myotis grisescens*	Gray Bat	Endangered	Yes
Bat	*Myotis sodalis*	Indiana Bat	Endangered	Yes
Bat	*Myotis leibii*	Eastern Small-footed Bat		Yes
Bat	*Myotis septentrionalis*	Northern Long-eared Bat	Endangered	Yes
Bat	*Perimyotis subflavus*	Tri-colored Bat	Proposed endangered	Yes
Bat	*Lasiurus cinereus*	Northern Hoary Bat		
Bat	*Corynorhinus rafinesquii*	Rafinesque's Big-eared Bat (Eastern and Mountain pop)		Yes
Bird	*Limnothlypis swainsonii*	Swainson's Warbler		Yes
Bivalve	*Elliptio arca*	Alabama Spike	Under Review	Yes
Bivalve	*Elliptio arctata*	Delicate Spike	Under Review	Yes
Bivalve	*Pleuronaia barnesiana*	Tennessee Pigtoe	Proposed endangered	Yes
Bivalve	*Hamiota altilis*	Finelined Pocketbook	Threatened	Yes
Bivalve	*Lasmigona holstonia*	Tennessee Heelsplitter (including Barrens)		Yes
Bivalve	*Pleuronaia dolabelloides*	Slabside Pearlymussel	Endangered	Yes
Bivalve	*Medionidus acutissimus*	Alabama Moccasinshell	Threatened	Yes
Bivalve	*Medionidus parvulus*	Coosa Moccasinshell	Endangered	Yes
Bivalve	*Pleurobema georgianum*	Southern Pigtoe	Endangered	Yes
Bivalve	*Pleurobema hanleyianum*	Georgia Pigtoe	Endangered	Yes
Bivalve	*Pleurobema decisum*	Southern Clubshell	Endangered	
Bivalve	*Ptychobranchus foremanianus*	Rayed Kidneyshell		Yes

Table 7.10. List of species designated as SGCN in both Tennessee and Georgia within the Conasauga RCOA

Taxa	Scientific Name	Common Name	ESA Status	RSGCN
Bivalve	*Pseudodontoideus connasaugaensis*	Alabama Creekmussel		Yes
Bivalve	*Cambarunio nebulosus*	Alabama Rainbow	Under Review	Yes
Bivalve	*Leaunio vanuxemensis*	Mountain Creekshell		Yes
Bivalve	*Leaunio umbrans*	Coosa Creekshell	Under Review	Yes
Crustacean	*Cambarus conasaugaensis*	Mountain Crayfish		Yes
Crustacean	*Cambarus cymatilis*	Conasauga Blue Burrower		Yes
Crustacean	*Cambarus manningi*	Greensaddle Crayfish		Yes
Fish	*Acipenser fulvescens*	Lake Sturgeon		Yes
Fish	*Hemitremia flammea*	Flame Chub		Yes
Fish	*Hybopsis lineapunctata*	Lined Chub		Yes
Fish	*Notropis asperifrons*	Burrhead Shiner		Yes
Fish	*Chrosomus tennesseensis*	Tennessee Dace		Yes
Fish	*Cyprinella caerulea*	Blue Shiner	Threatened	Yes
Fish	*Macrhybopsis etnieri*	Coosa Chub		Yes
Fish	*Noturus munitus*	Frecklebelly Madtom		Yes
Fish	*Etheostoma ditrema*	Coldwater Darter		Yes
Fish	*Etheostoma rupestre*	Rock Darter		Yes
Fish	*Etheostoma trisella*	Trispot Darter	Threatened	Yes
Fish	*Etheostoma brevirostrum*	Holiday Darter		Yes
Fish	*Percina antesella*	Amber Darter	Endangered	Yes
Fish	*Percina aurolineata*	Goldline Darter	Threatened	Yes
Fish	*Percina jenkinsi*	Conasauga Logperch	Endangered	Yes
Fish	*Percina kusha*	Bridled Darter		
Insect	*Argynnis diana*	Diana Fritillary		
Insect	*Stenogomphurus consanguis*	Cherokee Clubtail	Under Review	
Insect	*Ophiogomphus edmundo*	Edmund's Snaketail	Under Review	
Mammal	*Sorex cinereus*	Cinereus Shrew		

Table 7.10. List of species designated as SGCN in both Tennessee and Georgia within the Conasauga RCOA

Taxa	Scientific Name	Common Name	ESA Status	RSGCN
Mammal	*Tamiasciurus hudsonicus*	North American Red Squirrel		
Mammal	*Spilogale putorius*	Alleghanian Spotted Skunk		
Plant	*Megaceros aenigmaticus*	Headwaters Hornwort		
Plant	*Drepanolejeunea appalachiana*	Appalachian Threadwort		
Plant	*Lejeunea blomquistii*	Blomquist Leafy Liverwort		
Plant	*Panax quinquefolius*	American Ginseng		
Plant	*Asclepias purpurascens*	Purple Milkweed		
Plant	*Coreopsis latifolia*	Broadleaf Tickseed		
Plant	*Silene ovata*	Ovate Catchfly		
Plant	*Sedum nevii*	Nevius' Stonecrop		
Plant	*Thermopsis fraxinifolia*	Ashleaf Bush-pea		
Plant	*Sabatia capitata*	Appalachian Rose-gentian		
Plant	*Ribes curvatum*	Granite Gooseberry		
Plant	*Fothergilla major*	Mountain Witch-alder		
Plant	*Agastache scrophulariifolia*	Purple Giant-hyssop		
Plant	*Scutellaria montana*	Large-flower Skullcap	Threatened	
Plant	*Monotropsis odorata*	Sweet Pinesap		
Plant	*Lysimachia fraseri*	Fraser's Loosestrife		
Plant	*Trientalis borealis*	Northern Starflower		
Plant	*Aureolaria patula*	Spreading Yellow False Foxglove		
Plant	*Cymophyllus fraserianus*	Fraser's Sedge		
Plant	*Xerophyllum asphodeloides*	Eastern Turkeybeard		
Plant	*Platanthera grandiflora*	Large Purple Fringed Orchid		

Table 7.10. List of species designated as SGCN in both Tennessee and Georgia within the Conasauga RCOA

Taxa	Scientific Name	Common Name	ESA Status	RSGCN
Plant	*Platanthera integrilabia*	White Fringeless Orchid	Threatened	
Plant	*Xyris tennesseensis*	Tennessee Yellow-eyed-grass	Endangered	

Blue Ridge Regional Conservation Opportunity Area

The Blue Ridge RCOA overlaps North Carolina and part of Virginia. Half of the RCOA (1.2 million acres) covers Tennessee, with 1 million acres in North Carolina and 103,000 acres in Virginia, totaling approximately 2.3 million acres (Fig. 7.15).

The NatureServe Explorer Pro tool reports occurrences for 331 different species that are SGCN in both Tennessee and North Carolina. (At the time of this report, the Virginia SGCN list was not available.) (Fig. 7.16). See the "Lake Sturgeon Highlight" for information about regional collaboration to conserve this wide-ranging ancient fish in TN, NC, GA, and KY. However, most of the Blue Ridge shared SGCN are plants, showcasing that this area of the Southern Appalachians is home to incredible plant biodiversity. Table 7.11 shows that 60 species are Regional SGCN in the Blue Ridge RCOA.

Table 7.11 Total counts of species by taxa groups found within the Blue Ridge RCOA

Taxa Group	Listed in TN & NC only	Listed in TN, NC, and are RSGCN	Grand Total
Amphibian	2	6	8
Bat	1	8	9
Bird	13	4	17
Bivalve	3	16	19
Crustacean	3	1	4
Fish	2	16	18
Freshwater Snails	1		1
Insect	12	1	13
Mammal	13	5	18
Other Terrestrial or Freshwater Invertebrates	2		2
Plant	194		194
Reptile		3	3
Terrestrial Snails	15		15
Grand Total	261	60	321

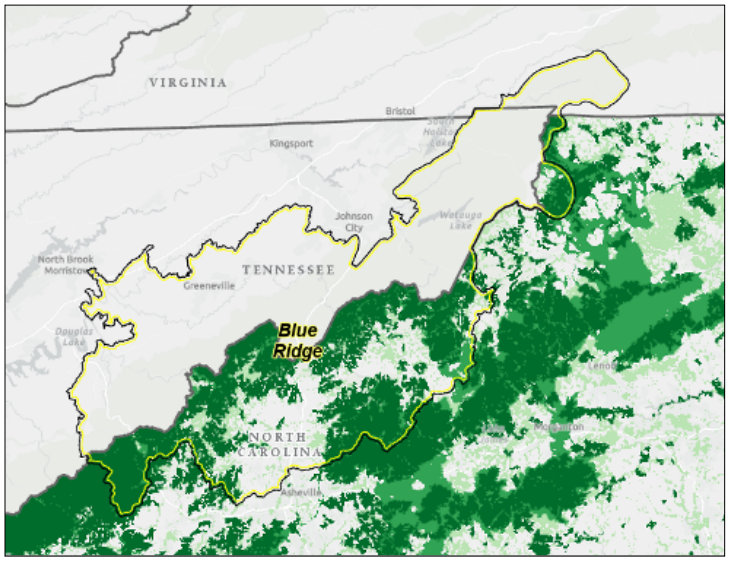


Figure 7.15 Map of Blue Ridge RCOA showing overlap in North Carolina and Virginia

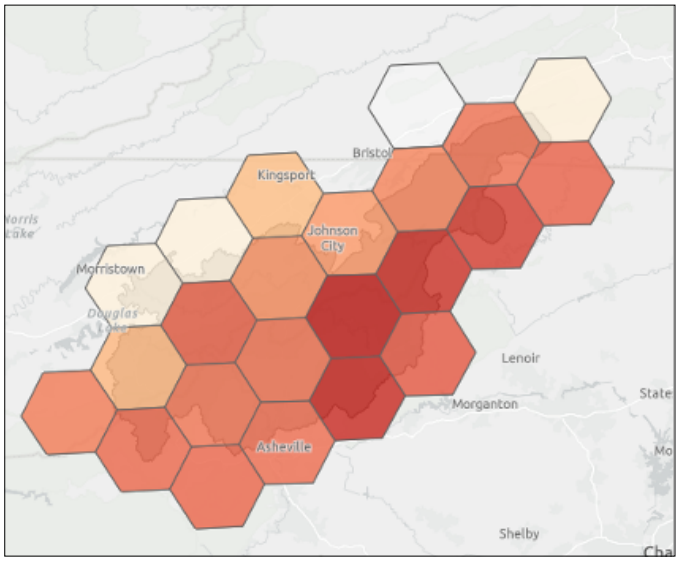


Figure 7.16 Map from NatureServe Explorer Pro illustrating areas around the Blue Ridge RCOA that have the highest density of species.



Lake Sturgeon fry / Brandon Simcox, TWRA

LAKE STURGEON: BACK FROM THE BRINK IN TN

By the late 1980s, water pollution in Tennessee had improved, the Tennessee Valley Authority (TVA) had developed a reservoir release improvement program to benefit aquatic life, and the **Lake Sturgeon** (*Acipenser fulvescens*) had been designated a protected species under the state Endangered Species Act. There was only one problem: Lake Sturgeon had already disappeared from the state entirely.

It had been almost 20 years since the last sighting of Lake Sturgeon below Cordell Hull dam (the Cumberland River system). The species had disappeared from the Tennessee River system by 1960. However, wildlife biologists are rarely pessimists about the species they value, and in 1998 the Tennessee Aquarium Conservation Institute spearheaded the TN Lake Sturgeon Reintroduction Working Group.

Composed of experts from TVA, TWRA, USFWS, and the Aquarium, the working group tackled the question of how to start a Lake Sturgeon reintroduction program for the Cumberland and Tennessee Rivers. Befitting the dawn of a new millennium, the first official stocking of sturgeon back into Tennessee waters took place in 2000. Lake Sturgeon have been re-introduced every year since that time with the exception of the Covid year 2020. The fish can now be found in the Holston, French Broad, Tennessee and Cumberland Rivers, and biologists expect to find solid evidence of successful breeding any year now.

THE COMPLEX REINTRODUCTION OF A SPECIES THAT HAS DISAPPEARED



Lake Sturgeon / B. Simcox, TWRA

Tennessee's Lake Sturgeon are a study in the complexity of bringing back an aquatic species once it has disappeared. While the public is accustomed to managed stocking programs that supplement their catch with fish that would not otherwise occur in an area, the Lake Sturgeon effort aims to bring back thriving populations of naturally reproducing fish at a level that will be self-sustaining over the long term.

Problem #1 is figuring out and addressing the problems that contribute to decline (see below). Problem #2 for Lake Sturgeon is that these are long-lived and slow-reproducing fish. Males live to age 50 to 55, while females can live to age 80 to 100. It takes 15-20 years for Lake Sturgeon to reach reproductive age, and females typically spawn only every three to five years.

As one of the oldest fish in the fossil record for Tennessee, the Lake Sturgeon is a living dinosaur, growing to six feet and several hundred pounds—no other sturgeon in Tennessee approaches this size.

Since the reintroduction program began, there have been tantalizing hints of reproductive success. A male fish collected from the Tennessee River was producing milt (sperm). Reportedly large numbers of sturgeon grouped together at night in a tributary to the Cumberland (a behavior associated with spawning).

DEATH BY A THOUSAND CUTS

Lake Sturgeon in Tennessee succumbed to a pattern of species overuse familiar from earlier decades: the White-tailed Deer, Wood Duck, and Wild Turkey have all come close to extirpation in the state. Human beings seem to consistently underestimate their impacts on wildlife species and habitats—or to overestimate the resilience of nature in the face of awe-inspiring abundance.

The Lake Sturgeon range spans North America from the Hudson Bay to the Mississippi, Tennessee, and Coosa Rivers. In the early 1900s, they were so numerous that in the northern part of their range they were considered trash fish—commonly thrown onto riverbanks and dried to be burned as "cordwood" on steamships! Yet in a natural world built on dynamic equilibrium among many species, removal of this large fish can have consequences. **Michael Fulghum, Warm Springs National Fish Hatchery (NFH) project leader** and hatchery manager for the USFWS, explains, "They eat mollusks, macroinvertebrates, crustaceans, and they scavenge. When Lake Sturgeon were removed from the system, they were no longer present to keep things in check. The populations of their prey could have increased, eating more algae and plankton. Since algae and plankton are the base of the food chain, it likely affected the whole ecosystem."

After overexploitation for fuel, meat, and caviar, Lake Sturgeon were impacted by water pollution, habitat alteration from hydroelectric dams that altered flows and created anoxic zones, and habitat fragmentation from silt that smothered spawning shoals. Until its addition to the Tennessee state Threatened and Endangered List in 1989, sturgeon fishing was subject to no regulation at all. The listing automatically provided the protections of no harvest (for caviar) and no fishing.



Jason Henegar (left, Fisheries Division Chief) and Brandon Simcox shown holding a young Lake Sturgeon caught in Chickamauga Reservoir on the Tennessee River / TWRA

Partners for Lake Sturgeon Reintroduction

Tennessee Valley Authority (TVA)
Tennessee Aquarium
Tennessee Wildlife Resources Agency (TWRA)
University of Tennessee
US Fish and Wildlife Service (USFWS) National Fish Hatchery System
Wisconsin Dept. of Natural Resources

Additional states in the Southeast Lake Sturgeon Working Group

Georgia
North Carolina
Kentucky

LEAVING A LEGACY FOR FUTURE GENERATIONS

The reintroduction program, funded by TN sportfish restoration and federal endangered species funds, gathers fertilized eggs from Wisconsin each year to be raised by Warm Springs NFH. It has put ~4,000 fingerlings (7-8 in. size) per year back into Tennessee Rivers (along with another 65,000 fry shared with other fish hatcheries around the Southeast). The original working group has also expanded across the Southeast (see "Partners" at right). Population monitoring occurs via annual sampling as well as an innovative Angler Recognition program, both of which indicate excellent success. Biologists are now capturing fish from all the year classes that have been stocked since 2000. As a result of these efforts and the strength of the collaborative partnerships, TWRA's proposal to downlist the Lake Sturgeon in TN from state endangered to threatened was accepted in 2023.

An effort begun by people who have never seen spawning of Lake Sturgeon in Tennessee may take decades to reach a point where the newly established wild populations are consistently spawning. For **Brandon Simcox, Statewide Rivers and Streams Program Coordinator** for TWRA, this is highly motivating. "It's exciting because it feels like we are leaving a legacy. Many of the fish stocked as part of this project will outlive me, as they can live upwards of 100 years. Our work will have long-lasting generational impact." Fulghum adds, "I'm thankful not only to be a citizen of the US but also to do such cool work for the rest of US citizens." In 2023, fish caught in Georgia's Coosa River were precisely aged to the year 2020, the Covid year in which no fish were introduced! This is a strong indicator of natural recruitment in the population. For Tennessee, it is only a matter of time.

As the SWAPs are updated, data integration tools can be used to identify shared threats and management activities. These species and management activities could be starting points of conversations for biologists and local stakeholders to develop local conservation initiatives.

Table 7.12 lists the 265 species that are SGCN for both Tennessee and North Carolina and are assumed to fall within the Blue Ridge RCOA. If the species is also federally listed under the ESA, its status is also listed. If the species is recognized as RSGCN, it is labeled as well.



Four Blue Ridge RSGCN clockwise from top left: Brook Trout (*Salvelinus fontinalis*)/ USFWS; Loggerhead Shrike (*Lanius ludovicianus)* / Alan Schmierer; Timber Rattlesnake (*Crotalus horridus*) / Daniel Istvanko, TWRA; Tangerine Darter *(Percina aurantiaca)* photographed during a survey / Sally Petre, TWRA

Table 7.12. List of species designated as SGCN in both Tennessee and North Carolina within the Blue Ridge RCOA

Group	Scientific Name	Common Name	ESA Status	Regional
Amphibian	*Cryptobranchus alleganiensis*	Hellbender		Yes
Amphibian	*Desmognathus wrighti*	Pygmy Salamander		Yes
Amphibian	*Desmognathus organi*	Northern Pygmy Salamander		Yes
Amphibian	*Eurycea junaluska*	Junaluska Salamander		Yes
Amphibian	*Hemidactylium scutatum*	Four-toed Salamander		
Amphibian	*Plethodon welleri*	Weller's Salamander		Yes
Amphibian	*Plethodon yonahlossee*	Yonahlossee Salamander		Yes
Amphibian	*Necturus maculosus*	Mudpuppy		
Bird	*Accipiter striatus*	Sharp-shinned Hawk		
Bird	*Aquila chrysaetos*	Golden Eagle		
Bird	*Falco sparverius*	American Kestrel		
Bird	*Falco peregrinus*	Peregrine Falcon		
Bird	*Aegolius acadicus*	Northern Saw-whet Owl		
Bird	*Sphyrapicus varius*	Yellow-bellied Sapsucker		
Bird	*Riparia riparia*	Bank Swallow		
Bird	*Poecile atricapillus*	Black-capped Chickadee		
Bird	*Certhia americana*	Brown Creeper		
Bird	*Thryomanes bewickii*	Bewick's Wren		
Bird	*Troglodytes hiemalis*	Winter Wren		
Bird	*Lanius ludovicianus*	Loggerhead Shrike		Yes
Bird	*Vermivora chrysoptera*	Golden-winged Warbler	Under Review	Yes
Bird	*Setophaga cerulea*	Cerulean Warbler		Yes
Bird	*Limnothlypis swainsonii*	Swainson's Warbler		Yes
Bird	*Pooecetes gramineus*	Vesper Sparrow		
Bird	*Dolichonyx oryzivorus*	Bobolink		
Fish	*Polyodon spathula*	Paddlefish		
Fish	*Salvelinus fontinalis*	Brook Trout		Yes

Table 7.12. List of species designated as SGCN in both Tennessee and North Carolina within the Blue Ridge RCOA

Group	Scientific Name	Common Name	ESA Status	Regional
Fish	*Chrosomus tennesseensis*	Tennessee Dace		Yes
Fish	*Erimonax monachus*	Spotfin Chub	Threatened; Experimental population, non-essential	Yes
Fish	*Erimystax dissimilis*	Streamline Chub		Yes
Fish	*Erimystax insignis*	Blotched Chub		Yes
Fish	*Carpiodes velifer*	Highfin Carpsucker		Yes
Fish	*Cycleptus elongatus*	Blue Sucker		Yes
Fish	*Noturus crypticus*	Chucky Madtom	Endangered	Yes
Fish	*Etheostoma gutselli*	Tuckasegee Darter		Yes
Fish	*Nothonotus microlepidus*	Smallscale Darter		Yes
Fish	*Nothonotus acuticeps*	Sharphead Darter		Yes
Fish	*Nothonotus vulneratus*	Wounded Darter		Yes
Fish	*Percina aurantiaca*	Tangerine Darter		Yes
Fish	*Percina squamata*	Olive Darter		Yes
Fish	*Percina tanasi*	Snail Darter	Delisted	Yes
Fish	*Percina williamsi*	Sickle Darter	Threatened	Yes
Fish	*Percina burtoni*	Blotchside Logperch		
Mammal	*Sorex cinereus*	Cinereus Shrew		
Mammal	*Sorex hoyi*	Eastern Pygmy Shrew		
Mammal	*Sorex longirostris*	Southeastern Shrew		
Mammal	*Sorex fumeus*	Smoky Shrew		
Mammal	*Sorex dispar*	Long-tailed Shrew		
Mammal	*Sorex albibarbis*	Eastern Water Shrew		
Mammal	*Parascalops breweri*	Hairy-tailed Mole		
Mammal	*Condylura cristata*	Star-nosed Mole		
Bat	*Myotis lucifugus*	Little Brown Myotis	Under Review	Yes
Bat	*Myotis grisescens*	Gray Myotis	Endangered	Yes
Bat	*Myotis sodalis*	Indiana Myotis	Endangered	Yes

Table 7.12. List of species designated as SGCN in both Tennessee and North Carolina within the Blue Ridge RCOA

Group	Scientific Name	Common Name	ESA Status	Regional
Bat	*Myotis leibii*	Eastern Small-footed Myotis		Yes
Bat	*Myotis septentrionalis*	Northern Myotis	Endangered	Yes
Bat	*Perimyotis subflavus*	Tricolored Bat	Proposed endangered	Yes
Bat	*Lasiurus cinereus*	Northern Hoary Bat		
Bat	*Corynorhinus townsendii virginianus*	Virginia Big-eared Bat	Endangered	Yes
Bat	*Corynorhinus rafinesquii*	Rafinesque's Big-eared Bat		Yes
Mammal	*Sylvilagus obscurus*	Appalachian Cottontail		Yes
Mammal	*Glaucomys sabrinus coloratus*	Carolina Northern Flying Squirrel	Endangered	Yes
Mammal	*Neotoma floridana haematoreia*	Southern Appalachian Woodrat		Yes
Mammal	*Neotoma magister*	Allegheny Woodrat		Yes
Mammal	*Microtus chrotorrhinus carolinensis*	Southern Rock Vole		Yes
Mammal	*Synaptomys cooperi*	Southern Bog Lemming		
Mammal	*Zapus hudsonius*	Meadow Jumping Mouse		
Mammal	*Napaeozapus insignis*	Woodland Jumping Mouse		
Mammal	*Mustela nivalis*	Least Weasel		
Mammal	*Spilogale putorius*	Alleghanian Spotted Skunk		
Reptile	*Glyptemys muhlenbergii*	Bog Turtle	Threatened; Threatened due to similarity of appearance	Yes
Reptile	*Plestiodon anthracinus*	Coal Skink		Yes
Reptile	*Crotalus horridus*	Timber Rattlesnake		Yes
Crustacean	*Pseudobaicalasellus incurvus*	Incurved Cave Isopod		
Crustacean	*Caecidotea recurvata*	Southwestern Virginia Cave Isopod		
Crustacean	*Stygobromus barryi*	a cave obligate amphipod		

Table 7.12. List of species designated as SGCN in both Tennessee and North Carolina within the Blue Ridge RCOA

Group	Scientific Name	Common Name	ESA Status	Regional
Crustacean	*Cambarus reburrus*	French Broad Crayfish		Yes
Insect	*Pseudanophthalmus paradoxus*	Ridgetop Cave Beetle		
Insect	*Atheta annexa*	Annexed Minute Rove Beetle		
Insect	*Bombus affinis*	Rusty-patched Bumble Bee	Endangered	Yes
Insect	*Argynnis diana*	Diana Fritillary		
Insect	*Stenogomphurus consanguis*	Cherokee Clubtail	Under Review	
Insect	*Ophiogomphus edmundo*	Edmund's Snaketail	Under Review	
Insect	*Ophiogomphus howei*	Pygmy Snaketail		
Insect	*Macromia margarita*	Mountain River Cruiser	Under Review	
Insect	*Allocapnia brooksi*	Sevier Snowfly	Under Review	
Insect	*Megaleuctra williamsae*	Smokies Needlefly	Under Review	
Insect	*Oconoperla innubila*	Hairy Springfly		
Insect	*Microhexura montivaga*	Spruce-fir Moss Spider	Endangered	
Insect	*Nesticus paynei*	a cave cobweb spider		
Bivalve	*Alasmidonta marginata*	Elktoe		
Bivalve	*Alasmidonta raveneliana*	Appalachian Elktoe	Endangered	Yes
Bivalve	*Cumberlandia monodonta*	Spectaclecase	Endangered	Yes
Bivalve	*Epioblasma brevidens*	Cumberlandian Combshell	Endangered; Experimental population, non-essential	Yes
Bivalve	*Epioblasma capsaeformis*	Oyster Mussel	Endangered; Experimental population, non-essential	Yes
Bivalve	*Epioblasma triquetra*	Snuffbox	Endangered	Yes
Bivalve	*Pleuronaia barnesiana*	Tennessee Pigtoe	Proposed endangered	Yes

Table 7.12. List of species designated as SGCN in both Tennessee and North Carolina within the Blue Ridge RCOA

Group	Scientific Name	Common Name	ESA Status	Regional
Bivalve	*Fusconaia cor*	Shiny Pigtoe	Endangered; Experimental population, non-essential	Yes
Bivalve	*Fusconaia cuneolus*	Finerayed Pigtoe	Endangered; Experimental population, non-essential	Yes
Bivalve	*Lampsilis abrupta*	Pink Mucket	Endangered	Yes
Bivalve	*Lasmigona holstonia*	Tennessee Heelsplitter		Yes
Bivalve	*Lasmigona subviridis*	Green Floater	Proposed threatened	Yes
Bivalve	*Lemiox rimosus*	Birdwing Pearlymussel	Endangered; Experimental population, non-essential	Yes
Bivalve	*Pleuronaia dolabelloides*	Slabside Pearlymussel	Endangered	Yes
Bivalve	*Pegias fabula*	Littlewing Pearlymussel	Endangered	Yes
Bivalve	*Pleurobema oviforme*	Tennessee Clubshell	Proposed endangered	Yes
Bivalve	*Ptychobranchus subtentus*	Fluted Kidneyshell	Endangered	Yes
Bivalve	*Strophitus undulatus*	Creeper		
Bivalve	*Venustaconcha trabalis*	Tennessee Bean	Endangered	
Terrestrial Snails	*Vertigo clappi*	Cupped Vertigo Snail		
Terrestrial Snails	*Vertigo parvula*	Smallmouth Vertigo		
Terrestrial Snails	*Helicodiscus notius specus*	Hollow Coil		
Terrestrial Snails	*Discus bryanti*	Sawtooth Disc		
Terrestrial Snails	*Pilsbryna vanattai*	Honey Bud		
Terrestrial Snails	*Paravitrea lamellidens*	Lamellate Supercoil		
Terrestrial Snails	*Paravitrea tridens*	Whitefoot Supercoil		
Terrestrial Snails	*Paravitrea umbilicaris*	Open Supercoil		

Table 7.12. List of species designated as SGCN in both Tennessee and North Carolina within the Blue Ridge RCOA

Group	Scientific Name	Common Name	ESA Status	Regional
Terrestrial Snails	*Pilsbryna aurea*	Ornate Bud		
Terrestrial Snails	*Pseudohyalina exigua*	Ribbed Striate Snail		
Terrestrial Snails	*Ventridens coelaxis*	Bidentate Dome		
Terrestrial Snails	*Ventridens decussatus*	Crossed Dome		
Terrestrial Snails	*Inflectarius subpalliatus*	Velvet Covert		
Terrestrial Snails	*Stenotrema altispira*	Highland Slitmouth		
Terrestrial Snails	*Triodopsis anteridon*	Carter Threetooth		
Freshwater Snails	*Io fluvialis*	Spiny Riversnail	Under Review	
Other Terrestrial or Freshwater Invertebrates	*Calohypsibius schusteri*	Schuster's Tardigrade		
Other Terrestrial or Freshwater Invertebrates	*Hypsibius roanensis*	a tardigrade		
Plant	*Megaceros aenigmaticus*	Headwaters Hornwort		
Plant	*Acrobolbus ciliatus*	a liverwort		
Plant	*Sphenolobus saxicola*	Curled Notchwort		
Plant	*Bazzania nudicaulis*	a liverwort		
Plant	*Cephaloziella massalongoi*	a liverwort		
Plant	*Cephaloziella spinicaulis*	a liverwort		
Plant	*Drepanolejeunea appalachiana*	Appalachian Threadwort		
Plant	*Gymnomitrion laceratum*	a liverwort		
Plant	*Lejeunea blomquistii*	Blomquist Leafy Liverwort		
Plant	*Leptoscyphus cuneifolius ssp. cuneifolius*	Wedge Flapwort		
Plant	*Lophocolea muricata*	a crestwort		

Table 7.12. List of species designated as SGCN in both Tennessee and North Carolina within the Blue Ridge RCOA

Group	Scientific Name	Common Name	ESA Status	Regional
Plant	*Lophocolea appalachiana*	Appalachian Crestwort		
Plant	*Marsupella funckii*	a liverwort		
Plant	*Plagiochila exigua*	a liverwort		
Plant	*Sphenolobopsis pearsonii*	Horsehair Threadwort		
Plant	*Brachydontium trichodes*	Peak Moss		
Plant	*Leptodontium viticulosoides var. sulphureum*	Grandfather Mountain Leptodontium Moss		
Plant	*Mielichhoferia elongata*	Mielichhofer's Copper Moss		
Plant	*Scopelophila cataractae*	Agoyan Cataract Moss		
Plant	*Tetrodontium brownianum var. brownianum*	Brown's Four-toothed Moss		
Plant	*Syntrichia ammonsiana*	Ammons' Screw Moss		
Plant	*Leptohymenium sharpii*	Mount Leconte Moss		
Plant	*Heracleum maximum*	Cow-parsnip		
Plant	*Hydrocotyle americana*	American Water-pennywort		
Plant	*Thaspium pinnatifidum*	Cutleaf Meadow-parsnip		
Plant	*Panax quinquefolius*	American Ginseng		
Plant	*Hexastylis virginica*	Virginia Heartleaf		
Plant	*Chrysogonum virginianum*	Green-and-gold		
Plant	*Coreopsis latifolia*	Broadleaf Tickseed		
Plant	*Eutrochium steelei*	Steele's Joe-pyeweed		
Plant	*Helianthus glaucophyllus*	Whiteleaf Sunflower		
Plant	*Krigia montana*	False Dandelion		
Plant	*Liatris virgata*	Wand Gayfeather		
Plant	*Prenanthes alba*	White Rattlesnake-root		

Table 7.12. List of species designated as SGCN in both Tennessee and North Carolina within the Blue Ridge RCOA

Group	Scientific Name	Common Name	ESA Status	Regional
Plant	*Packera schweinitziana*	New England Ragwort		
Plant	*Silphium wasiotense*	Appalachian Rosinweed		
Plant	*Solidago spithamaea*	Blue Ridge Goldenrod	Threatened	
Plant	*Solidago lancifolia*	Broadleaf Goldenrod		
Plant	*Rugelia nudicaulis*	Rugel's Ragwort		
Plant	*Symphyotrichum pratense*	Barrens Silky Aster		
Plant	*Symphyotrichum praealtum*	Willow Aster		
Plant	*Berberis canadensis*	American Barberry		
Plant	*Caulophyllum giganteum*	Giant Blue Cohosh		
Plant	*Alnus viridis ssp. crispa*	Mountain Alder		
Plant	*Betula cordifolia*	Heartleaf Paper Birch		
Plant	*Onosmodium molle ssp. hispidissimum*	Soft-Hairy False Gromwell		
Plant	*Turritis glabra*	Tower-mustard		
Plant	*Arabis patens*	Spreading Rockcress		
Plant	*Arabis pycnocarpa*	Cream-flower Rockcress		
Plant	*Cardamine clematitis*	Small Mountain Bittercress		
Plant	*Cardamine flagellifera*	Blue Ridge Bittercress		
Plant	*Cardamine rotundifolia*	American Bittercress		
Plant	*Draba ramosissima*	Branched Whitlow-grass		
Plant	*Campanula aparinoides*	Marsh Bellflower		
Plant	*Minuartia godfreyi*	Godfrey's Stitchwort	Under Review	
Plant	*Minuartia groenlandica*	Mountain Sandwort		
Plant	*Paronychia argyrocoma*	Silverling		

Table 7.12. List of species designated as SGCN in both Tennessee and North Carolina within the Blue Ridge RCOA

Group	Scientific Name	Common Name	ESA Status	Regional
Plant	*Silene ovata*	Ovate Catchfly		
Plant	*Stellaria alsine*	Trailing Stitchwort		
Plant	*Stellaria longifolia*	Longleaf Stitchwort		
Plant	*Paxistima canbyi*	Canby's Mountain-lover		
Plant	*Crocanthemum propinquum*	Low Frostweed		
Plant	*Hypericum ellipticum*	Pale St. John's-wort		
Plant	*Hypericum graveolens*	Mountain St. John's-wort		
Plant	*Hypericum mitchellianum*	Blue Ridge St. John's-wort		
Plant	*Triadenum fraseri*	Fraser's Marsh-St. John's-wort		
Plant	*Diervilla lonicera*	Northern Bush-honeysuckle		
Plant	*Diervilla rivularis*	Mountain Bush-honeysuckle		
Plant	*Lonicera canadensis*	American Fly-honeysuckle		
Plant	*Lonicera dioica*	Mountain Honeysuckle		
Plant	*Drosera rotundifolia*	Roundleaf Sundew		
Plant	*Leucothoe racemosa*	Fetterbush		
Plant	*Menziesia pilosa*	Minniebush		
Plant	*Pieris floribunda*	Mountain Fetterbush		
Plant	*Vaccinium macrocarpon*	Large Cranberry		
Plant	*Acalypha deamii*	Deam's Copperleaf		
Plant	*Thermopsis fraxinifolia*	Ashleaf Bush-pea		
Plant	*Thermopsis mollis*	Allegheny Mountain Golden-banner		
Plant	*Trifolium reflexum*	Buffalo Clover		
Plant	*Castanea dentata*	American Chestnut		

Table 7.12. List of species designated as SGCN in both Tennessee and North Carolina within the Blue Ridge RCOA

Group	Scientific Name	Common Name	ESA Status	Regional
Plant	*Adlumia fungosa*	Climbing Fumitory		
Plant	*Capnoides sempervirens*	Pale Corydalis		
Plant	*Gentiana linearis*	Narrowleaf Gentian		
Plant	*Fothergilla major*	Mountain Witch-alder		
Plant	*Hydrophyllum virginianum*	John's-cabbage		
Plant	*Juglans cinerea*	Butternut		
Plant	*Agastache scrophulariifolia*	Purple Giant-hyssop		
Plant	*Meehania cordata*	Heartleaf Meehania		
Plant	*Pycnanthemum beadlei*	Beadle's Mountainmint		
Plant	*Stachys clingmanii*	Clingman's Hedge-nettle		
Plant	*Utricularia cornuta*	Horned Bladderwort		
Plant	*Didiplis diandra*	Water-purslane		
Plant	*Monotropsis odorata*	Sweet Pinesap		
Plant	*Chamerion angustifolium*	Fireweed		
Plant	*Epilobium ciliatum*	Hairy Willowherb		
Plant	*Epilobium leptophyllum*	Linear-leaf Willowherb		
Plant	*Oenothera parviflora*	Northern Evening-primrose		
Plant	*Fallopia cilinodis*	Fringed Black-bindweed		
Plant	*Phlox subulata*	Moss Phlox		
Plant	*Lysimachia hybrida*	Lanceleaf Loosestrife		
Plant	*Lysimachia terrestris*	Swamp Loosestrife		
Plant	*Trientalis borealis*	Northern Starflower		
Plant	*Pyrola americana*	American Wintergreen		

Table 7.12. List of species designated as SGCN in both Tennessee and North Carolina within the Blue Ridge RCOA

Group	Scientific Name	Common Name	ESA Status	Regional
Plant	*Aconitum reclinatum*	White Monkshood		
Plant	*Caltha palustris*	Marsh-marigold		
Plant	*Actaea rubifolia*	Appalachian Bugbane		
Plant	*Delphinium exaltatum*	Tall Larkspur		
Plant	*Rhamnus alnifolia*	Alderleaf Buckthorn		
Plant	*Geum aleppicum*	Yellow Avens		
Plant	*Geum geniculatum*	Bent Avens		
Plant	*Geum laciniatum*	Rough Avens		
Plant	*Geum radiatum*	Spreading Avens	Endangered	
Plant	*Prunus virginiana*	Choke Cherry		
Plant	*Sanguisorba canadensis*	Canada Burnet		
Plant	*Spiraea virginiana*	Virginia Spiraea	Threatened	
Plant	*Spiraea alba*	Narrowleaf Meadowsweet		
Plant	*Sibbaldiopsis tridentata*	Three-toothed Cinquefoil		
Plant	*Galium asprellum*	Rough Bedstraw		
Plant	*Galium palustre*	Marsh Bedstraw		
Plant	*Houstonia purpurea var. montana*	Mountain Bluet	Endangered	
Plant	*Zanthoxylum americanum*	Northern Prickly-ash		
Plant	*Buckleya distichophylla*	Piratebush		
Plant	*Parnassia grandifolia*	Largeleaf Grass-of-Parnassus		
Plant	*Micranthes caroliniana*	Carolina Saxifrage		
Plant	*Micranthes pensylvanica*	Swamp Saxifrage		
Plant	*Chelone obliqua*	Red Turtlehead		

Table 7.12. List of species designated as SGCN in both Tennessee and North Carolina within the Blue Ridge RCOA

Group	Scientific Name	Common Name	ESA Status	Regional
Plant	*Collinsia verna*	Spring Blue-eyed Mary		
Plant	*Pedicularis lanceolata*	Swamp Lousewort		
Plant	*Veronica americana*	American Speedwell		
Plant	*Veronica scutellata*	Marsh Speedwell		
Plant	*Symplocos tinctoria*	Horsesugar		
Plant	*Abies fraseri*	Fraser Fir		
Plant	*Tsuga caroliniana*	Carolina Hemlock	Under Review	
Plant	*Taxus canadensis*	Canadian Yew		
Plant	*Symplocarpus foetidus*	Skunk-cabbage		
Plant	*Carex argyrantha*	Hay Sedge		
Plant	*Carex bromoides ssp. montana*	Brome-like Sedge		
Plant	*Carex buxbaumii*	Buxbaum's Sedge		
Plant	*Carex canescens ssp. disjuncta*	Silvery Sedge		
Plant	*Carex folliculata*	Long Sedge		
Plant	*Carex hitchcockiana*	Hitchcock's Sedge		
Plant	*Carex interior*	Inland Sedge		
Plant	*Carex misera*	Wretched Sedge		
Plant	*Carex pallescens*	Pale Sedge		
Plant	*Carex roanensis*	Roan Mountain Sedge		
Plant	*Carex ruthii*	Ruth's Sedge		
Plant	*Carex manhartii*	Manhart's Sedge		
Plant	*Carex fumosimontana*			
Plant	*Carex fraseriana*	Fraser's Sedge		

Table 7.12. List of species designated as SGCN in both Tennessee and North Carolina within the Blue Ridge RCOA

Group	Scientific Name	Common Name	ESA Status	Regional
Plant	*Eriophorum virginicum*	Tawny Cotton-grass		
Plant	*Trichophorum cespitosum*	Tufted Clubrush		
Plant	*Juncus brachycephalus*	Small-head Rush		
Plant	*Allium tricoccum var. burdickii*	Narrowleaf Wild Leek		
Plant	*Lilium grayi*	Gray's Lily		
Plant	*Maianthemum stellatum*	Starflower Solomon's-plume		
Plant	*Melanthium latifolium*	Broadleaf Bunchflower		
Plant	*Melanthium woodii*	Ozark Bunchflower		
Plant	*Streptopus amplexifolius*	Clasping Twisted-stalk		
Plant	*Streptopus lanceolatus*	Rosy Twisted-stalk		
Plant	*Trillium rugelii*	Southern Nodding Trillium		
Plant	*Xerophyllum asphodeloides*	Eastern Turkeybeard		
Plant	*Corallorhiza maculata*	Spotted Coralroot		
Plant	*Cypripedium reginae*	Showy Lady's-slipper		
Plant	*Goodyera repens*	Dwarf Rattlesnake-plantain		
Plant	*Isotria medeoloides*	Small Whorled Pogonia	Threatened	
Plant	*Liparis loeselii*	Loesel's Twayblade		
Plant	*Listera smallii*	Kidneyleaf Twayblade		
Plant	*Platanthera flava var. herbiola*	Pale-green Orchid		
Plant	*Platanthera grandiflora*	Large Purple Fringed Orchid		
Plant	*Platanthera psycodes*	Small Purple Fringed Orchid		
Plant	*Spiranthes lucida*	Shining Ladies'-tresses		
Plant	*Spiranthes ochroleuca*	Yellow Nodding Ladies'-tresses		

Table 7.12. List of species designated as SGCN in both Tennessee and North Carolina within the Blue Ridge RCOA

Group	Scientific Name	Common Name	ESA Status	Regional
Plant	*Brachyelytrum aristosum*	Northern Shorthusk		
Plant	*Calamagrostis cainii*	Cain's Reedgrass		
Plant	*Calamagrostis porteri*	Porter's Reedgrass		
Plant	*Glyceria canadensis var. laxa*	Limp Mannagrass		
Plant	*Glyceria nubigena*	Smoky Mountains Mannagrass		
Plant	*Milium effusum var. cisatlanticum*	Tall Millet Grass		
Plant	*Poa palustris*	Fowl Bluegrass		
Plant	*Potamogeton epihydrus*	Nuttall's Pondweed		
Plant	*Sparganium androcladum*	Branching Bur-reed		
Plant	*Athyrium filix-femina ssp. angustum*	Northeastern Ladyfern		
Plant	*Dryopteris carthusiana*	Spinulose Shieldfern		
Plant	*Dryopteris cristata*	Crested Shieldfern		
Plant	*Woodsia appalachiana*	Appalachian Woodsia		
Plant	*Hymenophyllum tayloriae*	Taylor's Filmy Fern		
Plant	*Dendrolycopodium dendroideum*	Treelike Clubmoss		
Plant	*Huperzia appalachiana*	Appalachian Fir-clubmoss		
Plant	*Lycopodiella inundata*	Bog Clubmoss		
Plant	*Botrychium jenmanii*	Alabama Grapefern		
Plant	*Botrychium oneidense*	Blunt-lobe Grapefern		
Plant	*Botrychium simplex*	Least Grapefern		
Plant	*Botrychium matricariifolium*	Chamomile Grapefern		
Plant	*Phegopteris connectilis*	Northern Beech Fern		

7.6. Implementing Regional Conservation

Multi-state shared species lists and the collaborative conservation planning that has already occurred across state boundaries make an excellent starting point for collaboration and prioritizing actions across jurisdictions and RCOAs. To date, all TN SWAP Steering Committee (SC) members have agreed to report on an annual basis the species-specific and landscape management projects implemented by their respective agencies/organizations.

In addition, the SC's Landscape Scale Management Working Group will focus on identifying recommendations based on landscape objectives and multi-agency initiatives ongoing in the state. Inviting other state experts that represent projects and initiatives in shared RCOAs could be a potential next step.

There is some discussion of a COA Coordinator that rotates between partner organizations to organize yearly meetings with stakeholders in COAs, which would focus on achieving the following:

- Enhance collaboration among partners.
- Enhance collaboration across state borders.
- Discuss and update priorities.
- Share data.
- Co-fundraise.



CHAPTER 8 PRIVATE LANDS CONSERVATION

8.1. Private Lands in Tennessee

PRIVATE LANDS ARE ANY LANDS, such as family farms or private woodlands, that are not public lands (held by federal, state, county, or local governments), excluding Indigenous People's trust lands (Law Insider [date unknown]). In the state of Tennessee, 89% of land is privately held. Eighty-three percent of forestland in the state is privately owned. An estimated 17 percent of Tennessee's forestland is publicly-owned and administered, with 5 percent being managed by the Forest Service as National Forests and 12 percent held by state, local, and other federal agencies (TDF 2020). Thus, landowners are integral to achieving natural resource conservation objectives. A study of 24 vertebrates listed under the US Endangered Species Act across various categories of land ownership found that over 31 years, imperiled species lost the least amount of habitat on federal lands (3.6%), whereas losses on private lands without conservation easements were twice as high (8.1%) (Eichenwald et al. 2000).

Despite the clearly demonstrated need for conservation activities on private lands, however, there are numerous challenges to their successful implementation. Examples of such hurdles include the following:

- Landowner perceptions of conservation as a practice
- Landowner ability to evaluate habitat value
- Landowner access to information on project design, execution, and/or maintenance

Photo credit: Farm along the Duck River in central Tennessee / Corey Giles

- Prioritizing among various conservation needs
- Selecting appropriate seed mixes or plant material, and installation expertise
- Access to labor and equipment needed to construct conservation measures
- Means to fund project installation, maintenance, and/or monitoring
- Long-term relationship building and planning for continued landowner engagement on the part of technical advising organizations.

This document, developed as a component of Tennessee's 2025 State Wildlife Action Plan (SWAP), is intended for use by both property owners who may be newly acquainted with conservation strategies and natural resources professionals who provide technical expertise to the public. The resources included in this chapter are not intended to be all-encompassing or static, but rather to provide a starting point and reference to support decision-making for conservation efforts on private lands in our state.

Organizations that provide technical assistance to landowners need internal plans for building multi-year relationships and offering long-term support. It is the responsibility of these providers to stay current with the latest implementation tools. Educational resources and the science of conservation itself are ever-expanding, making it a challenge to keep all options in mind. Similarly, sources of external financial and technical support fluctuate over time. For these reasons, conservation practitioners are encouraged to revisit the content provided, making note of programs made available post-2025, as well as changes to existing ones presented here.

8.2. Type, Location, and Importance of Tennessee Private Lands to Biodiversity Conservation

Summary of Status and Importance of Private Lands in Tennessee

- Tennessee lands are 89% privately owned, and roughly 88% of private lands in Tennessee remain unprotected.
- However, when focusing on private lands ranking high to very high priority for SGCN conservation, only 28% remain unprotected.
- The top five concerns of Tennessee Family Forest (10+ acres) owners are property taxes, keeping land intact, government regulation, trespassing/poaching, and insects/disease.
- Management to maintain the "working" part of the privately-owned landscape often overlaps with, reinforces, or complements management required to maintain ecosystem health and wildlife values because land productivity is highly dependent on ecological services such as soil formation and water provision.
- Environmental concerns are the common link between private landowners and agencies, organizations, and programs seeking to achieve wildlife and plant conservation goals. When considering programs, partners, and approaches to conservation management, landowner priorities drive the decision-making process.
- Support for private land conservation is addressed broadly as programs that benefit stewardship and programs that benefit land protection. A representative, but not exhaustive, list of each type of program is provided, along with examples of specific projects.

The term "working lands" is often used to refer to lands in a natural or semi-natural state, which provide habitat and many ecosystem service benefits, but which also provide economic returns in some form, such as through grazing, timber, agriculture, or recreation. Examples include managed forests, leased hunting land, grazing pastures, or pollinator strips. Such lands also require management by landowners for a variety of reasons, such as to protect or enhance soil and water resources, restore or maintain healthy forest for harvest, or feed livestock. Management to maintain the "working" part of the landscape often overlaps with, reinforces, or complements management required to maintain ecosystem health and wildlife values. In fact, "agricultural [and other working lands] productivity is highly dependent on ecosystem services, including pollination, soil formation, water provision, and genetic diversity" (Vergez 2025).



Bottomlands in west Tennessee / Mark Godfrey

8.2.1. High Priority Lands for the Conservation of SGCN

As explained in Chapter 3, the SWAP terrestrial, aquatic, and karst habitat prioritization models use Element Occurrence data and each species' preference for an ecological system, its relative imperilment, and its likelihood of persistence to rank habitats as very high, high, medium, and low priority for conservation of SGCN.

The following tables list priority habitat acreages using the priority model that combines terrestrial, aquatic, and karst habitat priorities, as well as the terrestrial model alone. The tables illustrate the amount of combined high to very high (HVH) terrestrial priority acreage by Tennessee Level III ecoregion (Table 8.1) and ecological system type (Table 8.3). Table 8.2 shows ownership of HVH combined priority acreage. It is worth noting that the overall total of high to very high combined priority acres in Tennessee is 2.8 million acres greater than that designated as HVH in the terrestrial model alone because adding the aquatic and karst priorities increases the priority total.



American Goldfinch (*Spinus tristis*) on coneflower / Greg Wathen

Table 8.1 Tennessee SWAP high to very high terrestrial priority land by ecoregion

TN Terrestrial Ecoregions (west to east)	Total acres	High to very high SWAP priority in acres
Mississippi Alluvial Plain	547,789	167,703
Mississippi Valley Loess Plains	2,918,278	232,731
Upper Gulf Coastal Plain (SE Plains)	3,290,336	200,733
Interior Plateau	10,055,714	2,905,994
Cumberland Plateau (Southwestern Apps)	3,084,634	1,273,130
Cumberland Mountains (Central Apps)	569,183	469,966
Ridge and Valley	4,930,290	785,209
Blue Ridge	1,578,928	1,036,414

Table 8.2 Tennessee SWAP high to very high combined priority land by ownership

Ownership Category	High to very high SWAP priority in acres
Federal	1,193,295
State	758,996
County	46,263
Local	47,498
Other land in acres	3,723
Private Protected	84,964
Private Easement	160,022
Private Leased for WMA	16,306
Private Unprotected	7,562,555

Table 8.3 Tennessee SWAP high to very high terrestrial priority land by ecological system

Ecological System Name	Acres high to very high priority
South-Central Interior Small Stream and Riparian	1,467,884
Southern Interior Low Plateau Dry-Mesic Oak Forest	1,214,095
South-Central Interior Mesophytic Forest	1,176,609
Allegheny-Cumberland Dry Oak Forest and Woodland	886,583
Southern Appalachian Oak Forest	664,687
Pasture	433,299
East Gulf Coastal Plain Large River Floodplain Forest	226,355
Southern Ridge and Valley / Cumberland Dry Calcareous Forest	222,645
Appalachian (Hemlock)-Northern Hardwood Forest	158,643
Southern and Central Appalachian Cove Forest	147,762
Mississippi River Low Floodplain (Bottomland) Forest	124,002
South-Central Interior Large Floodplain	118,311
Old Field / Successional	77,673
East Gulf Coastal Plain Small Stream and River Floodplain Forest	46,154
Mississippi River Riparian Forest	37,799
Eastern Highland Rim Prairie and Barrens	33,307
Southern Appalachian Northern Hardwood Forest	15,577
Nashville Basin Limestone Glade and Woodland	10,346
Central and Southern Appalachian Spruce-Fir Forest	4,995
Southern Appalachian Low-Elevation Pine Forest	4,608
Mississippi River Bottomland Depression	531
Central Interior Highlands and Appalachian Sinkhole and Depression Pond	15

CONSERVATION ON PRIVATE LANDS

The majority of land is privately owned in much of the eastern US, including Tennessee (which is approximately 90% private). In recognition of this fact, in recent decades many conservation programs at the federal and state level (such as the Farm Bill and Tennessee Division of Forestry's Landowner Assistance Program), as well as private entities (such as Quail Forever, The Nature Conservancy, and TennGreen) provide support and advice directly to private landowners.

Support takes many forms and is voluntary on the part of the landowner—from advice to planning to training to cost share to provision of volunteer or paid labor or specialized equipment to conservation easements to grants.

Private lands conservation programs are focused on helping landowners to manage their land for wildlife, native plants, forest health, and other forms of biodiversity—depending on the goals of the landowner and the goals of the assistance program.

Since 2020, a **Rockvale couple** has been collaborating with USFWS, TDEC, TWRA, and others to restore populations of **Pyne's ground-plum** (*Astragalus bibullatus*) on their property. Likewise, since 2021, **Mr. Bob Loftis** has been working with USFWS and TDEC to bring back a population of **leafy prairie-clover** (*Dalea foliosa*) on his. Both projects are providing habitat benefits for important and declining wildlife species as well.



Left: leafy prairie-clover (*Dalea foliosa*); right: Pyne's ground-plum (*Astragalus bibullatus*) / Robert Cogburn, PFW/USFWS

A TALE OF TWO PROJECTS

The two projects featured here are in Rutherford County, TN and are being led by the landowners working with **Robert Cogburn, a Partners for Fish and Wildlife (PFW) Program Biologist.** Both were initiated to benefit plant species federally listed as endangered. By tending to the requirements of these species, both projects also are benefiting many more native plants, as well as wildlife species. One of these is the **Streamside Salamander** (*Ambystoma barbouria),* a Species of Greatest Conservation Need (SGCN) on the Loftis property, and cave-dwelling species on the Rockvale property.



Loftis prescribed burn conducted with assistance from TDEC, / Robby Cogburn, PFW



Loftis property in spring, after prescribed burn / Robby Cogburn, PFW

Both of these properties face similar threats: their limestone glades are threatened by dense thickets of cedar. This is a problem that open habitats, such as grasslands, glades, barrens, balds and savannas are facing across the country—largely as a result of fire suppression. Fire likely prevented cedars from shading out limestone glades until suppression began in the early1800s (Estes et al. 2016). Urban sprawl and land development also pose threats to limestone glades and the species that occur there.

The overarching theme of these two restoration projects, unsurprisingly, involves cedar removal to benefit SGCN. But one each is unique.

CONSERVING THE PLANTS OF OPEN HABITATS

The Rockvale landowners' property is 50 acres, with 1/4 acre actively managed for **Pyne's ground-plum**. The landowners are extremely dedicated to their project for its ecological values, and they have personally undertaken all management activities, such as hand-cutting and removing cedars and mowing every February (to reduce competition from other plants). They have received technical assistance and volunteer labor from the Tennessee Dept. of Environment and Conservation (TDEC) and PFW. The landowners have been working with PFW and the Missouri Botanical Garden to monitor Pyne's ground-plum and collect seeds for future propagation and reintroduction efforts across its native range.

Private Lands Conservation Partners

Partners for Fish and Wildlife/USFWS (PFW)
Tennessee Wildlife Resources Agency (TWRA)
Tennessee Dept. of Environment and Conservation (TDEC)
Tennessee Valley Authority (TVA)
University of Alabama
(Note: These partners are specific to the projects described here, but there are many more agencies and groups working with private landowners in TN.)

The Loftis property is 14 acres, with eight under management to benefit **leafy prairie-clover**. It has received stewardship support through a PFW agreement, and the property will soon receive a conservation easement from TDEC. The agency wishes to acquire 71 acres adjacent to Loftis, and with his managed property, the intention is to designate the entire area as Rocky Hill State Natural Area (SNA). (The Loftis property ownership will remain private.) Loftis restoration began with opening the canopy by cutting and mulching dense areas of cedar. Next they conducted a prescribed burn in the spring of 2022. Because glade soil is thin and rocky, plants do not grow back quickly, so the recommended fire interval is likely to be from 4 to 6 years.

LANDOWNERS AS RARE AS THE PLANTS THEY ARE RESTORING?

Historically, cost-share programs for landowners have been marketed either to farmers or hunters; however, more and more landowners do not fit those categories. **Mallory Tate Cogburn, Wildlife Manager for TWRA,** has also supported these projects. Both she and Robert Cogburn are interested in reaching a broader private lands conservation audience, and they believe those landowners are out there. Mallory Tate says, "Landowners who are directly interested in SGCN will have far more impact, and their results will be more reliable because they have buy-in. Land is the one thing we can't make more of; it's the limiting resource for 90% of our SGCN. In future, private land will be more impactful than public land because of connectivity and overall acreage."

For these two sets of landowners, the ecosystem's response to their efforts has been their reward. Pyne's ground-plum went from a population of only 41 plants that were not producing fruit in 2015 to well over 740 individuals by 2023, which began producing fruit the year after cedar removal! The leafy prairie-clover, discovered by Loftis (an amateur botanist) on his own property, went from a count of 8 plants to 45 plants two years after cedar removal. And the Streamside Salamander T-shirts he enthusiastically had made are now his favorite garment!





Rockvale property restoration photos from left to right: 1) Monitoring of cedars prior to removal, 2) Immediately post-removal of cedars, 3) Monitoring of restored glade. Photos by Robert Cogburn, USFWS PFW

Estes, D., M. Brock, M. Homoya, A. Dattilo. 2016. A Guide to Grasslands of the Mid-South. Published by the Natural Resources Conservation Service, Tennessee Valley Authority, Austin Peay State University and the Botanical Research Institute of Texas.

8.2.2. Ownership and Protection Status of Lands in Tennessee

The following figures focus on protection status and ownership of land in Tennessee. Habitat priority is illustrated using either the SWAP combined habitat priority model (Figs. 8.1 - 8.4) or using only the terrestrial model (Fig. 8.5).

Protected lands are defined as those held by a governmental agency (local, county, state, or federal), lands held by private conservation organizations (typically only temporarily before being transferred to a governmental organization), as well as lands on which there is an easement held by another party and which may restrict certain activities on the property in perpetuity. (In the latter instance, the easement may be implicitly intended for conservation of natural resources, or it may be focused on preservation of other resources, such as farmland, heritage, or recreation. These properties are still considered protected as such easements will restrict future development on the site, among other activities.)

Private lands that remain unprotected include lands leased to Wildlife Management Areas, as these leases may be revoked, and all other privately held land. Unprotected private lands are assumed to be subject to potential future habitat loss. Since Tennessee is ~90% privately-owned, it is unsurprising that the vast majority of land remains unprotected (Fig. 8.1).

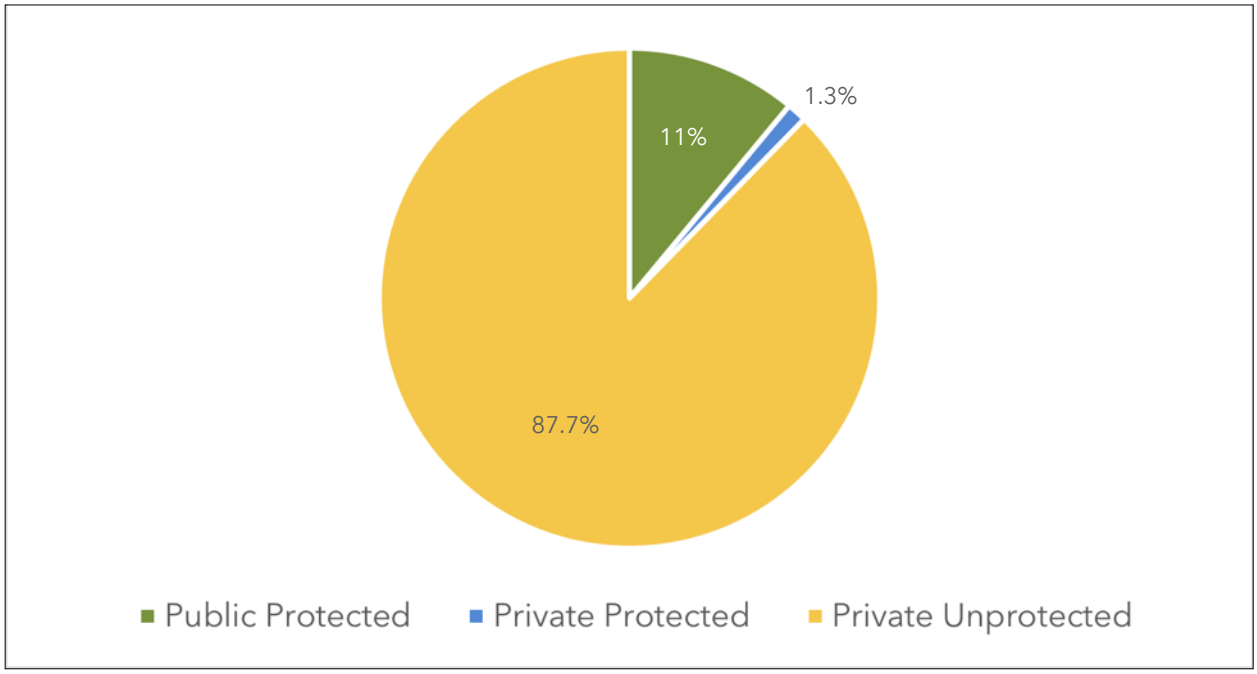


Figure 8.1 Tennessee land protection status, public and private

However, Fig. 8.2 shows that a much smaller percentage (28%) of private lands that rank as high to very high combined priority for SGCN conservation remain unprotected.

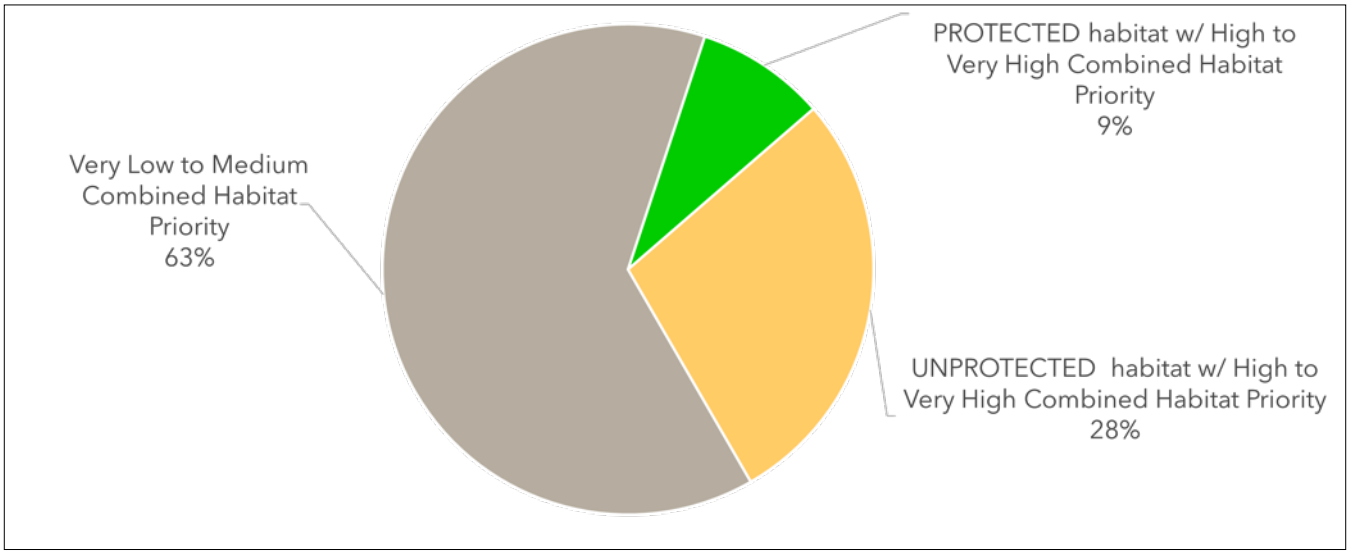


Figure 8.2 Tennessee combined high to very high habitat priority and land protection status

The next two figures show Tennessee land protection status for aquatic species and caves (i.e., subterranean habitats and cave species). Fig. 8.3 assesses only high to very high combined priority lands important to conservation of aquatic habitats, while Fig. 8.4 assesses all lands that contain caves (i.e., surround cave entrances) without regard to combined priority status according to the SWAP model.

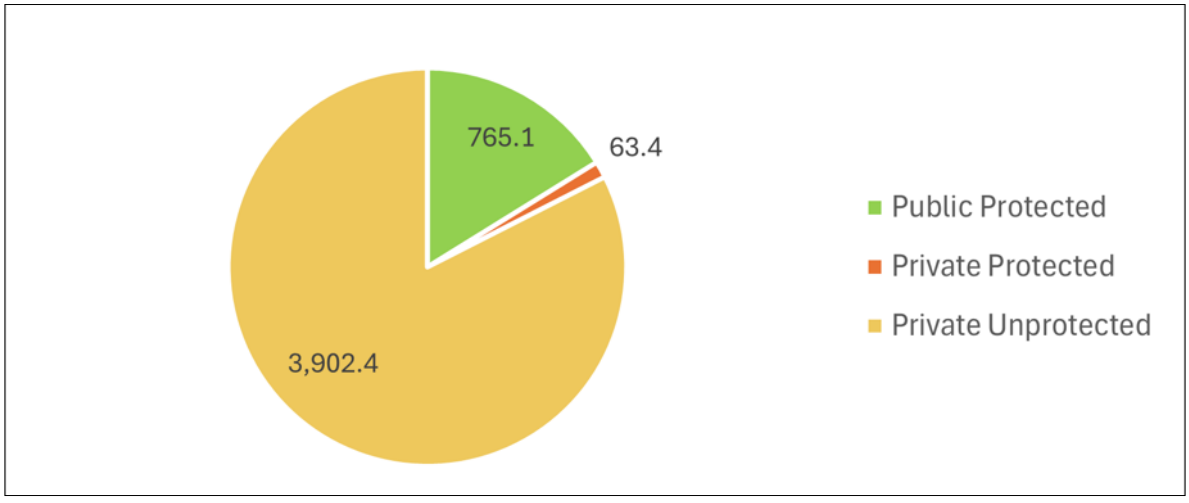


Figure 8.3 Ownership and protection status of Tennessee land bordering aquatic habitat and having high to very high combined priority (measured in river miles)

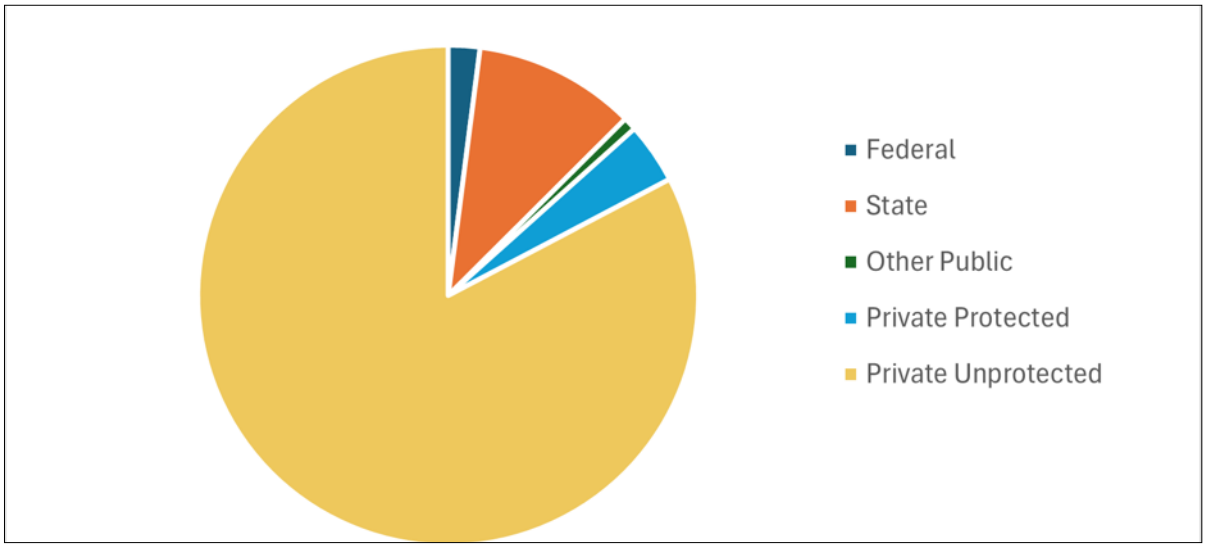


Figure 8.4 Tennessee ownership and protection status of caves
(Other public lands include railroads and utility corridors.)

Fig. 8.5 is a bar graph showing land by ecoregion, sorted by protection status and ownership. The red section of each bar shows the proportion of private, unprotected high to very high terrestrial priority land for SGCN in each ecoregion.

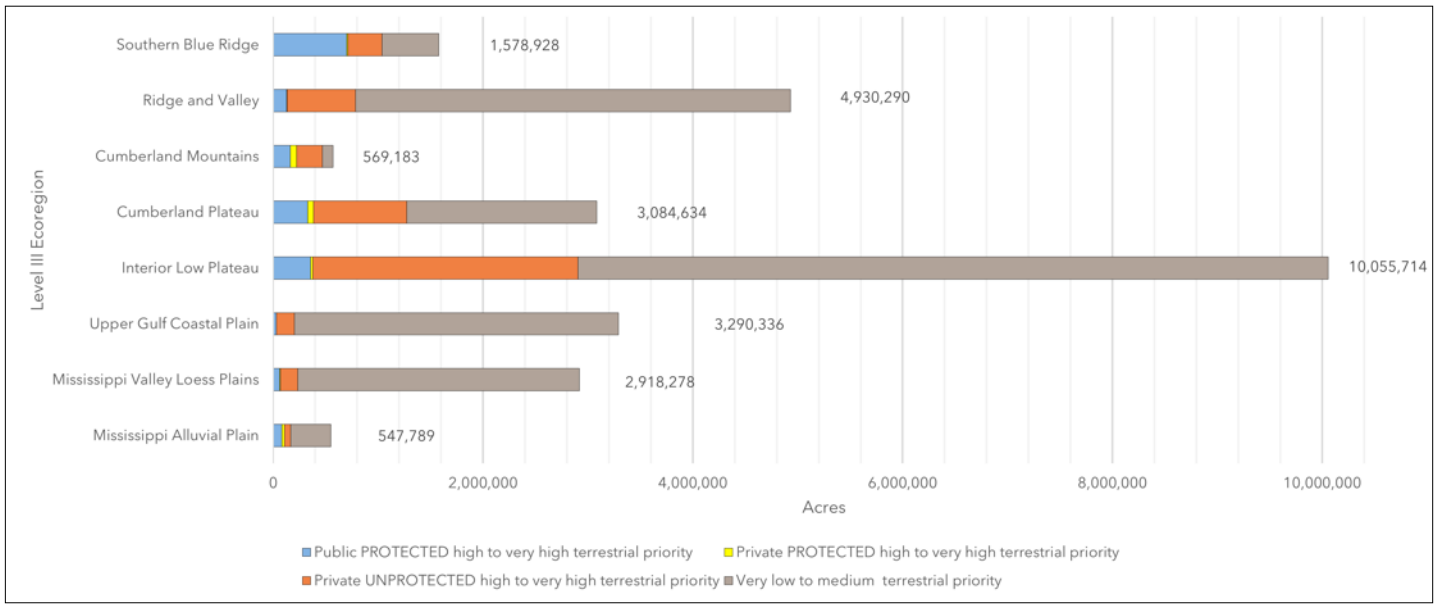


Figure 8.5 Protection status by owner and SWAP terrestrial priority withinTN Level III ecoregions

8.3. Landowner Priorities Drive Conservation on Private Lands

Anyone who owns property knows that land ownership comes with an entire array of concerns. For example, the top five concerns of Tennessee Family Forest (10+ acres) owners are property taxes, keeping land intact, government regulation, trespassing/poaching, and insects/disease (USDA Forest Service 2021). Environmental concerns are the common link between private landowners and agencies, organizations, and programs seeking to achieve wildlife and plant conservation goals.

Environmental concerns are the common link between private landowners and agencies, organizations, and programs seeking to achieve wildlife and plant conservation goals.

When considering programs, partners, and approaches to conservation management, landowner priorities drive the decision-making process. In developing this chapter to address Tennessee's private lands, a Landowner's Conservation Planning Guide was developed to assist landowners in identifying their key concerns and conservation priorities. The questions within this resource are designed to guide landowners in considering key aspects of their property and to inform them of the technical and financial assistance programs that may be available to them. By understanding the current state of the property, as well as any limitations it may have, one can select the range of conservation activities that may be compatible with both the land's natural properties and the landowner's objectives.

The Landowner's Conservation Planning Guide, located at the end of the chapter, helps you, the landowner, to understand four main issues by posing a series of questions that will help to clarify these issues:

- What are the natural and economic characteristics of your property?
- What are your conservation goals?
- What is your capacity for working on the land?
- Who are the potential partners that can help you reach your goals?

Landowners can address many of the concerns they have about the profitability or aesthetics of their land while also promoting healthier soil, water, and wildlife habitat. Many voluntary, non-regulatory programs exist for this purpose.

In planning for this work, you are likely to receive a property analysis from a partner or other expert, and you may find opportunities that did not originally come to mind, such as identifying that your property falls near or within a Conservation Opportunity Area (COA) as identified by the SWAP or that it contains SWAP-designated priority habitats with high conservation value. Chapter 6 within the SWAP covers conservation actions and strategies, and Appendix I contains fact sheets

RESTORATION OF THE "HAPPY" LANDSCAPES OF TENNESSEE

Light, open, sunny, airy, breezy—these qualities describe ways of being that are universally recognized as good, even "happy." They also describe habitats in Tennessee that were once far more abundant. These include prairies, savannas, woodlands, small-patch barrens and glades (occurring on thin soils), balds (relicts of alpine tundra), and river scours, fens, bogs, and depression ponds characterized in part by water and moist soils.

These habitats all share the characteristics of having an herbaceous layer dominated by grasses, other grass-like plants, and forbs, i.e., wildflowers (Noss 2012). However, 200 years of fire suppression have resulted in the transformation of many of these landscapes into dense, dark forests that lack the habitat diversity required by many at-risk species.

Most Tennessee forests now consist of an ~80-year-old closed canopy mix of maple, oak, pine, and hickory, but some of the most valuable trees for wildlife and the economy, such as white oak (*Quercus alba*), not to mention the wildflowers essential to pollinators, have trouble regenerating in dark closed canopy forests.

The good news is scientists and conservationists have been hard at work in recent decades to bring a happier aspect to many of Tennessee's landscapes. Since >80% of the state's forest is privately owned, it's even better news that landowners are increasingly interested!



Catoosa WMA after restoration using selective thinning and prescribed fire / Clarence Coffey

WOODLANDS AND SAVANNAS

Most people, if given the opportunity to ramble through the area shown in the photo above, would be delighted. "Landowners love these types of forests and tend to see them as quite beautiful," says **Britt Townsend**, a forester with the title **Director of Forestry at The Nature Conservancy**. "The dappled light playing over grasses and wildflowers and the diversity of species that can be seen and heard are so inviting."

This type of forest has a more specific name: it's a woodland. A woodland has an open structure that lets sunlight to the ground, but still has enough trees that they cast shade (30-70% tree cover). The sunlight is critical: it supports an incredibly diverse array of understory plants. The Southeastern Grasslands Institute (SGI) conservation plan for the Cumberland Plateau (Noss et al. 2025, in draft) catalogued evidence of 210 plant species of conservation concern that require this level of sunlight.



Prescribed fire at Bridgestone WMA / Craig Harper, UT Extension

Only recently have ecologists had the tools to document that large areas of the Southeast were once covered by woodlands, as well as other open ecosystems. These habitats were maintained by fire originating from lightning strikes and burning by Indigenous people, as well as disturbance by large herbivores such as elk and bison. (Noss 2012). Of the 14 million acres of forest in Tennessee, approximately nine million (64%) are considered fire-adapted (B. Townsend, pers. comm.)

"In places like the Cumberland Plateau, what you should find is a mosaic or 'matrix' of habitats," says **Zach Irick, botanist and Southern Appalachian Grasslands Ecologist with SGI**. "There are still savannas

(sparse trees) interspersed with glades (rock outcrops) and seepage wetlands like bogs or ponds, intermixed with woodlands, but sometimes I feel like I'm working in a living museum, because those plants and animals don't have other populations to interact with. They are fragmented and isolated." This mosaic of woodland/grassland habitats was once characteristic of the Southern Appalachians, but also well into central Tennessee.

"I'm extremely passionate about woodlands and savannas because they are so dynamic and full of diversity," says Townsend. "Working with private landowners is essential if we are going to restore these ecosystems at scale." Both Townsend and Irick agree that for landowners who are interested, woodlands are a stepping stone to achieving open habitats in the right places. Irick advises a surgical approach to restoration. "Over five years, you can take out much of the midstory maples and sweetgums without an explosion of woody plants, and for woodlands you can burn every three to five years. If you keep burning it at two-year intervals, parts may even become healthy savanna." In essence, let the land decide.

Partners for TN Grassland/Woodland/ Open Pine Restoration & Conservation
(not a complete list)

The Nature Conservancy in Tennessee (TNC)
Quail Forever
Ruffed Grouse Society / American Woodcock Society (RGS & AWS)
Shortleaf Pine Initiative
Southeastern Grasslands Institute (SGI)
Tennessee Forestry Association
Tennessee River Gorge Trust
Tennessee Wildlife Resources Agency (TWRA)
USDA Forest Service (Cherokee NF)
UT Extension
White Oak Initiative



Native warm season grasses and wildflowers flourish in a shortleaf pine savanna / Britt Townsend, TNC

This approach of working with nature characterizes much of the forest restoration work ongoing in Tennessee today. At Bridgestone Nature Reserve at Chestnut Mountain in White Co., analyses including Ecological Zone (Ecozone) classification and mapping of historic vegetation (Simon et al. 2005) have estimated that approximately 4,000 acres were historically dry oak-hickory forests and shortleaf pine (*Pinus echinata*)-oak savannas and woodlands. Since 2015, approximately 250 acres of shortleaf pine-oak woodland have been restored with another 1,000 acres currently undergoing restoration!

Restoring these open systems will help re-establish habitat for birds such as Bobwhite quail and Prairie Warbler; roosting cavities for bats and woodpeckers; and a critical food source for birds, mammals, and hundreds of pollinator species, such as the once common, now at-risk, American Bumblebee (*Bombus pensylvanicus*). Yes, wildlife need the trees—but the species of animals and plants in decline actually need sun in the understory more.



Before and after forest treatments to restore shortleaf pine and oak savannas at the Bridgestone Nature Reserve at Chestnut Mountain / Britt Townsend, TNC

Likewise, at the "the Grand Canyon of southeast Tennessee," the Tennessee River Gorge Trust has completed midstory canopy clearing, a burn plan, and fire breaks under Irick's tutelage in preparation for restoring a unique savanna/woodland/marsh complex at Aetna Mountain Bogs. "This kind of restoration is achievable by a lot of people to restore imperiled grassland communities," says Irick. Happily, more and more projects of this type are occurring on the landscape. Irick believes the critical factor is that we can no longer think on one- to five-year timelines. "We have to think on hundreds-of-years timelines." The modern cycle of quarterly reports and 3-year grant cycles will not cut it. "It's a long-term commitment to being part of the landscape that you want."

Noss, Reed. 2012. Forgotten Grasslands of the South: Natural History and Conservation.

Noss, R.F., D. Estes, T. Witsell, E. Bohnett, S. Simon, C. Morgan, K. Elliott, C. Thomas-Hill, and L. Dunlap. 2025. Comprehensive Status Assessment and Conservation Plan for the Grasslands, Savannas, and Other Open Ecosystems of the Cumberland Plateau. Southeastern Grasslands Institute, Austin Peay State University, Clarksville, TN (in draft).

Simon, S.A., T.K. Collins, G.L. Kauffman, W.H. McNab, and C.J. Ulrey. 2005. Ecological Zones in the Southern Appalachians: first approximation. Res. Pap. SRS-41, Asheville, NC: US Department of Agriculture, Forest Service, Southern Research Station

that may provide landowners with insights to guide the enhancement of natural habitats found on site or suggestions for suitable habitat restoration projects.

Landowners can address many of the concerns they have about the profitability or aesthetics of their land while also promoting healthier soil, water, and wildlife habitat.

In addition, if you choose to seek funding or other support for your project, it may provide leverage to note in your application that your project site lies within a COA, as your actions may contribute directly to prioritized goals within the COA.

Even if one's property lies outside the boundaries of a state COA, there may be high priority habitat to manage or to restore. Landowners have a unique and valuable responsibility for the direction and quality of their conservation efforts. For example, one property could potentially support:

- A prairie meadow restoration that promotes habitat for pollinators and birds
- A wetland enhancement aimed at improving stormwater runoff filtration and wildlife habitat
- Development of a transitional "soft" forest edge habitat to support an increase in bird diversity
- An assortment of small-scale improvements that incorporate otherwise limited or absent wildlife habitat support.

Landowners are commonly faced with environmental challenges that require creative solutions. Oftentimes, there are financial incentives and assistance programs to make such solutions more feasible; more details on this can be found in Section 5, Sources of Support for Private Land Conservation.

8.4. Environmental Concerns of Landowners in Tennessee

The top environmental concerns expressed by private landowners in Tennessee are described below.

8.4.1 Erosion

Erosion includes wind, gully, and stream or lake bank erosion. These forms of erosion are most commonly addressed through livestock exclusion, cover crops, bank stabilization, no-till agricultural methods, and vegetated buffer development. Offsite transport of sediment to surface water degrades water quality and limits its use for a variety of purposes, including drinking water and aquatic species habitat.

8.4.2 Water Resources

Water resources include both water quality and supply. Water quality can be affected by nutrients, sediments, pesticides, pathogens, heavy metals, and other chemicals. Water quality can be

improved through a variety of practices that are primarily aimed at decreasing or slowing runoff into surface waters. Depending on the source of pollution, such practices may include plans for how to reduce chemical use or improve the storage of nutrients, as well as pollution mitigation buffers that slow, filter, and reduce the level runoff flowing into surface waters (see below for a discussion of groundwater). Such practices include riparian buffers and edge-of-field practices. Water supply can be impacted by surface or groundwater depletion, and overuse of water for irrigation and other purposes, as well as prolonged drought (due to climate change or other factors). These issues can be managed by adapting withdrawal rates to the level of supply, improving soil conditions (to allow greater infiltration of precipitation into groundwater), improving irrigation efficiency.

8.4.3. Groundwater

Groundwater is a source of both drinking and irrigation water in Tennessee. Its protection is critical because karst (limestone) habitat in Tennessee exceeds that of any other state except Kentucky (Siska 2008). Karst is a diverse, complex landform characterized by soluble rocks, poor surface drainage, well-developed subsurface drainage, caves, disappearing streams, and an abundance of springs and well-defined depressions. In the Western Highland Rim of Tennessee and Kentucky, rates of urban development in karst are among the highest in the southeastern United States (Siska 2008).



Karst at Jackson Cave, TN / Kyle Hartshorn

Karst-dominated landscapes where underground aquifers are closely connected to surface activities are particularly susceptible to water quality problems due to the direct and often short connections between surface water and groundwater. Protecting groundwater is critical because contaminants like fertilizers, pesticides, animal waste, and petroleum products can easily enter and spread through these underground systems. Karst buffers are lands that are left undeveloped and/or improved to serve as protection from adjacent land uses. In karst landscapes, buffers can be used around sinkholes and sinking streams (surface streams that disappear underground) to minimize polluted runoff entering directly into the groundwater system ("1.2 Karst Landscapes," [date unknown]).

Landowners can help protect groundwater by:

- Establishing and maintaining vegetated buffers around sinkholes, springs, and ephemeral streams to slow runoff and filter pollutants

- Properly storing and disposing of hazardous materials like fuels, chemicals, and fertilizers
- Fencing livestock away from sinkholes and cave entrances to prevent waste from entering groundwater systems
- Using nutrient and pesticide application best practices (e.g., following soil tests, avoiding overuse, and avoiding application before heavy rain)

In karst areas, landowners are strongly encouraged to avoid development or heavy disturbance near sinkholes, sinking streams, or exposed limestone features. These features act as direct conduits into the aquifer system, and programs like EQIP may offer cost-share support for implementing protective buffers or fencing.



Common Eastern Bumblebee (*Bombus impatiens*) / Preston 0518 via iNaturalist

8.4.4. Pollinator/Wildlife Habitat

Pollinator/wildlife habitat is terrestrial habitat for wildlife and invertebrates that provides sufficient quantity, quality, or connectivity of food, cover, space, and/or water to meet species requirements. Options for improving habitat quantity and quality depend upon the type of land and the target species of concern (e.g. native bees, butterflies, birds, honeybees).

8.4.5. Forest Management

Forest management is critical to prevent or respond to excessive pest damage to trees and understory plants, which may occur from undesired plants (competition), diseases, animals, soil borne pathogens, and nematodes. Technical assistance can assist landowners to promote healthy forests and to address invasive plant, animal, and insect species, while forest management plans allow landowners to be proactive in preventing problems from developing.

8.4.6. Wildfire Hazard from Biomass Accumulation

Wildfire hazard from biomass accumulation is a problem that is becoming more widespread through the combined effects of climate change, human settlement in the wildland-urban interface, and insufficient or improper forest management. Hazards posed may threaten human safety, structures, plants, animals, and air quality. Programs to assist landowners with prescribed burns and other measures help to limit surface and ladder fuels while providing a defensible space around structures. To reduce wildfire risks, landowners can request assistance from **TDF** for prescribed burn planning or connect with their local **Fire Adapted Communities** network to explore equipment loans, training, or community fuel mitigation projects.

8.4.7. Plant Productivity and Health

Plant productivity and health are of prime concern to those who raise plants for a living. Improper fertility, management, or plants that are not adapted to a site all negatively impact plant productivity, vigor, and/or quality. Plants are also a critical element of wildlife habitat, and some native plant species are conservation targets. For these reasons, a variety of programs are available to landowners to improve plant productivity and health, which vary depending on land use (crops, forest, range, pasture).

8.5. Sources of Support for Private Land Conservation

Voluntary, non-regulatory programs exist at virtually all levels of government to help landowners achieve conservation goals for their properties, and these are supplemented by many programs operated by nonprofit conservation organizations. Support may come in the form of free technical assistance, management planning, or financial support for a wide variety of conservation activities.

Private land conservation, in general, can be divided into two primary categories: stewardship and protection. Stewardship is a term that encompasses all of the land management activities that can or must be undertaken to maintain healthy soils, wildlife, and plant populations (which more often than not tend to also support healthy economic returns for the landowner.) Such management activities vary by land use and natural system. For example, regular prescribed fire in a pine or mixed pine/oak forest is one of the best and most cost-effective ways to promote plant and wildlife diversity, as well as maintain the health of the trees. On the other hand, in riparian zones along rivers from west to east Tennessee, proper management of cattle may include fencing, gates, fords, and management systems that protect the riparian vegetation and all wildlife dependent upon it, as well as the health of the cows. (See Box 8.1 and Brawley's Fork Crayfish example).

Protection is generally used to refer to measures that will provide some level of improved management and/or protected status to land in perpetuity. It refers to acquisition of certain rights to land, which can run the gamut from 100% fee-title ownership (such as when private land is sold to a state government for addition to a park) to a conservation easement that permanently restricts new construction or limits certain land uses. It is critical to note that protection does not always mean "selling the farm!" Conservation easements, in particular, are quite variable and flexible, and can be defined depending on the needs of the landowner. (See easement discussion in 8.5.2.)

Sources of support for stewardship and protection are generally as distinctly different as the activities themselves; a summary of each follows.

8.5.1. Private Land Stewardship

Technical assistance and financial support

In accessing voluntary, nonregulatory sources of support for land stewardship, the key is for landowners to match their needs and goals with the appropriate program that shares their goals. In fact, it is common for landowners to work with biologists (variously titled "habitat," "private

lands," or "wildlife" biologists) to develop a conservation plan that will, over time, make use of multiple programs established for different purposes.

Federal programs to support private land stewardship and technical assistance are needed for numerous reasons. Landowners can incur expenses associated with wildlife use including damaged crops and fences, reduced livestock forage, potential for disease transmission, and adjustments to business operations to account for wildlife use. Pressures to develop and subdivide are a significant challenge for conservation of privately-owned lands. Also, when important wildlife habitats such as migration corridors are documented on private lands, landowners have expressed concern over the potential for increased regulations and restrictions on their land.



No till planting / United Soybean Board

In addition, good stewardship provides public benefits, such as clean water, clean air, and healthy soil. Aldo Leopold, the father of modern wildlife ecology, recognized this when he wrote in 1934 that "the thing to be encouraged is the use of private land in such a way as to combine the public and the private interest to the greatest degree possible." That means finding ways of "rewarding the private landowner who conserves the public interest."(Leopold 1953).

Private landowners who wish to prioritize biodiversity/wildlife conservation goals on their property also have the opportunity to partner with agencies and organizations in additional ways, including:

- Collaborating on research, monitoring, and species reintroductions on their property
- Providing proprietary information about species occurrences and habitat conditions on private land
- Creating opportunities for field tours and training to occur on their property.

The following section describes some of the largest and most successful private lands conservation programs in Tennessee, but it is by no means an exhaustive list.

State programs

The Tennessee Wildlife Resources Agency (TWRA) provides technical assistance and development of management plans free of charge; this service does not need to be linked to participating in a formal conservation program. TWRA, through a partnership with (United States Department of Agriculture's Natural Resources Conservation Service (USDA NRCS), has helped to establish tens of thousands of acres of wildlife habitat in Tennessee through its Wildlife Habitat Biologist and Partner's positions. The majority of habitat programs and funding are from Farm Bill programs administered through the USDA system. To be most effective, TWRA Wildlife Habitat Biologists and

ARTIFICIAL ROOSTS FOR INDIANA BATS

Indiana Bats (*Myotis sodalis*) have been in decline for decades and were one of the first mammals to be listed as endangered predating the 1973 Endangered Species Act. As with many difficult-to-solve problems, the reasons for this decline are numerous and complex.

Habitat changes since European settlement have affected both their foraging habitat and their maternity roosts. Adapted to hunt for insects in forests where the understory was kept relatively open via the action of fire and bison, these conditions have become limited as fire and bison have disappeared from the landscape. In addition, female Indiana Bats are very selective about the trees they use as maternity roosts. They require dead trees with sloughing bark and high solar exposure.

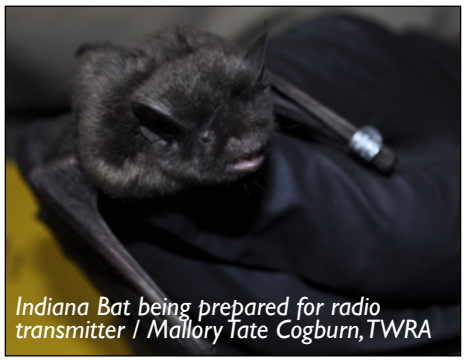
This bat species seeks out very cold, dry conditions in winter. While they are susceptible to white-nose syndrome (WNS), they are often able to clear these infections rapidly after arousing from winter torpor—the issue is surviving through the winter with WNS. Human disturbance in winter, compounded by WNS, is also a major threat to the species.

Given the long-term decline of Indiana Bats and the relatively recent advent of WNS, biologists began asking what might be limiting their reproduction? That is how several projects conducted from 2009 to the present led, not only to the discovery of new maternity sites, but also to the use of artificial maternity roosts!



Hibernating Indiana Bats / Dustin Thames, TWRA

MIGRATION TELEMETRY AND REGIONAL COLLABORATION



Indiana Bat being prepared for radio transmitter / Mallory Tate Cogburn, TWRA

In 2009, TWRA began a 10-year Indiana Bat aerial telemetry project in collaboration with Copperhead Consulting, the US Fish and Wildlife Service, and others. Bats were removed from their hibernacula when they would have naturally migrated, received tiny transmitters glued to their backs, and released. Then began a chase through woods and fields as biologists sought to track bat transmitter signals from small planes and vehicles equipped with telemetry receivers and antennas. (The life of each transmitter is only about 21 days). Researchers needed to follow the female bats to find out exactly where they were going to give birth and raise their pups.

This project led to some major discoveries. Several Indiana Bat maternity roosts with up to 74 individuals each were discovered in Wilson County, Tennessee in 2013. For the first time, Indiana Bat maternity roosts were also discovered in Georgia, west Tennessee, and Alabama. An Indiana Bat was also tracked to Mississippi, but the roost location could not be found. These states began including Indiana Bats in their conservation planning.

Subsequent to their discovery in Alabama, TWRA reached out and began working with researchers from Talladega National Forest to help them monitor the Indiana bat populations newly found in their district.

"Our suspicions that Indiana Bats were present on the Talladega were confirmed from 2011 to 2019 when females coming from caves in Tennessee and Alabama were tracked to one of the largest Alabama forests managed with prescribed fire," says **Jonathan Stober, District**

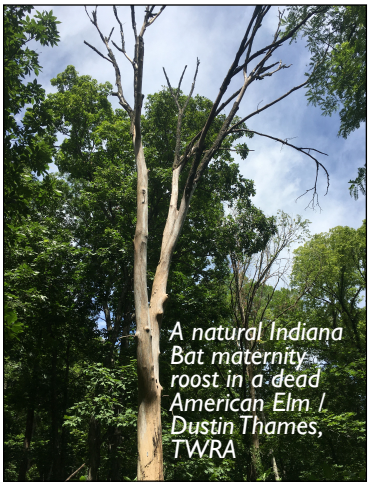
Biologist on the Shoal Creek Ranger District. "The Shoal Creek is also home to a Red-cockaded Woodpecker recovery population. With the overlap of these two endangered species, we began capturing and tagging Indiana Bats to look at habitat and roost selection. We found the bats selected habitats that had been managed with prescribed fire as a primary tool, due to the abundance of snags and insects."

PRIVATE LAND PARTNERSHIPS BENEFIT BAT PUPS

The telemetry project revealed the location of key maternity roosts in Tennessee, and they were all in dead trees on private property. TWRA biologists decided to test the use of artificial roost sites for maternity colonies by developing special agreements with landowners. With a grant from TVA, they completed the first license agreement with a private landowner in 2019. TWRA leases the landowner's property (in this case, 850 acres) for a nominal annual fee for 10 years, and in return they are allowed to install artificial roosts and to access them for monitoring and research. The research goal was to determine if the bats would use artificial roosts and, if so, what kind.

Natural maternity roosts are limiting because Indiana Bats will only use the same tree to raise their pups for one to two years. The optimal window for Indiana Bat roosting in a dead or dying tree is relatively small. In the Midwest, Indiana Bats have responded positively to a type of roosting structure called a rocket box, which allows bats to partition their roosting by temperature within the box.

In 2019, TWRA installed and began monitoring nine rocket boxes and 15 artificial roosts made from "Branden Bark"—a synthetic product that mimics the structure of shaggy tree bark. Emergence counts demonstrated that by 2020, Indiana Bats were successfully using Branden Bark for maternity roosting (to the exclusion of rocket boxes)! This has continued, and by 2024, the bats had selected the same artificial roosts for five consecutive years.



A natural Indiana Bat maternity roost in a dead American Elm / Dustin Thames, TWRA

"If you build it they will come," this is how **Dustin Thames, Regional Biodiversity Coordinator** for TWRA and member of the Tennessee Bat Working Group, describes this project. "The roosts help not only because sites are limiting, but also they help female bats eliminate their expenditure of energy while flying around in spring looking for the perfect tree." In 2022-23, a TWRA student technician monitored the artificial roosts, conducting weekly emergence counts and looking for evidence that the roosts may be getting too hot. So far, the artificial roosts do not appear to be overheating. In 2022 TWRA completed their second private land license for installation of Indiana Bat maternity roosts. Ultimately, conservation partners want to purchase property in Wilson County near the roosts for protection in perpetuity and to manage it specifically for Indiana Bats with open forests and artificial roosts.



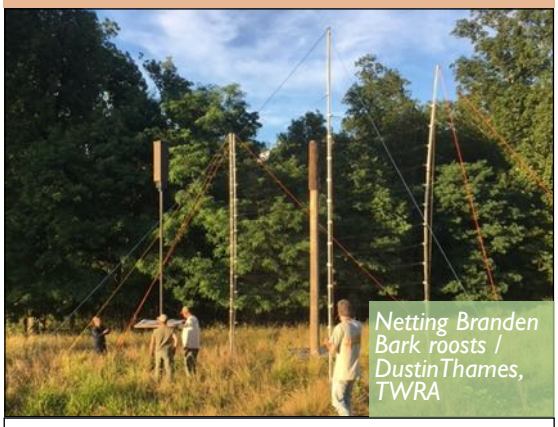
Installing Branden Bark by Dustin Thames, TWRA

Installation of an artificial maternity roost requires heavy equipment.

Indiana Bat Conservation Partners

Indiana Bat Telemetry (2009-2019)
Talladega National Forest, Alabama, USDA Forest Service
Tennessee Valley Authority (TVA)
Tennessee Wildlife Resources Agency (TWRA)
The Nature Conservancy
US Fish and Wildlife Service (USFWS)
University of Tennessee, Knoxville

Artificial Maternity Roosts (beginning in 2019)
Copperhead Environmental Consulting, Inc.
Tennessee Valley Authority
Tennessee Wildlife Resources Agency
Private landowners who have willingly provided access to their properties



Netting Branden Bark roosts / Dustin Thames, TWRA

Mist netting to capture bats emerging from Branden Bark structures. Some bats from each roost are tagged and tracked to determine site fidelity and movement between sites.

Dustin Thames. 2021. "If you build it, they will come: Indiana Bat conservation and artificial roost trees in Wilson County, Tennessee." Presentation.

most Quail Forever Farm Bill Biologists (sometimes collectively referred to as "Farm Bill Biologists") are housed within USDA NRCS offices.

For landowners or producers with a serious interest in wildlife habitat enhancement, technical assistance from a TWRA or conservation partner biologist is recommended. Technical assistance and development of management plans are provided free of charge and do not need to be linked to participating in a formal conservation program.

TWRA private lands programs include:

- The **Tennessee Riparian Incentives Program** (TRIP) assists cities, schools, community organizations, civic groups, watershed organizations, conservation groups, and other relevant organizations with riparian (streamside) tree planting projects.
- Quail Focal Areas in Tennessee, in which TWRA has designated five of its wildlife management areas (WMAs) across the state to serve as anchors within a quail focal area. Landowners interested in improving their lands for quail should contact their local **TWRA or Quail Forever Habitat Biologist**.

The Tennessee Department of Agriculture-Tennessee Division of Forestry (TDF) operates the My Tennessee Woods program for private forest landowners. The overarching goal of TDF programs is to maintain and improve the health of urban and rural forests and related economies, as well as to protect the forests and citizens of the state. Landowners can contact their Tennessee Division of Forestry (TDF) Area Forester for free, personalized forest management advice, including help with developing a Forest Stewardship Plan or identifying cost-share opportunities. These plans help guide decisions about harvesting, wildlife habitat, invasive species control, and more. Visit **My Tennessee Woods** for more information.

TDF's Forest Stewardship Program aims to maximize cost effectiveness through the use of partnerships in program delivery and increase forestland value and sustainability, a goal that is becoming more urgent. Tennessee's forest industry relies on 14 million acres of forestland in the state, approximately 83 percent of which is privately owned. However, as Tennessee's population grows and shifts toward urban centers, an increasing number of forest landowners are out-of-state, absentee, are not focused on long-term forest health and sustainability, and/or don't have the experience and expertise needed to manage their forest resource.



Logs after harvest / Greg Lobinski

The Division assists landowners in achieving forest resource conservation and management objectives on their land, engaging an average of 20,000 citizens per year and providing forest planning for an

average of 62,000 acres per year. Specifically, financial assistance is available through the **Tennessee Agricultural Enhancement Program** and the **Southern Pine Beetle Cost Share for Landowners**. TDF's professional foresters provide technical advice, and the following vendor services can be supplied when unavailable through the private sector:

- Prescribed burning
- Timber marking
- Firebreak installation
- Tree planting

TDF's **East Tennessee Nursery** is an excellent resource for tree seedlings. Located in Polk County, the nursery grows and distributes over 3 million seedlings each year. Small nursery stock (usually one-year-old or younger) typically transplants more successfully and is more likely to survive than larger, older trees and shrubs. Using seedlings is also cost-effective and allows one to undertake reforestation projects on a greater scale.

A variety of guidance materials in support of private non-industrial forest landowners can be found on TDF's My Tennessee Woods Forest Landowner Resources page. Additional state support of private lands stewardship, education, and forestry projects, including financial assistance, are available through the Tennessee Department of Agriculture.

Federal programs

Federal programs are often national in scope and tend to focus resources on the issues that are most prevalent in each state.

The Natural Resources Conservation Service (NRCS) provides support for private lands conservation through a variety of programs. The following are the primary programs that provide technical assistance and financial support for land management. NRCS programs that support land protection through easements are covered in 8.5.2.

- **Conservation Planning** (or **Conservation Technical Assistance**, CTA) provides the nation's farmers, ranchers and forestland owners with the knowledge and tools they need to conserve, maintain and restore the natural resources on their land and improve the health of their operations for the future. NRCS offers this assistance at no cost to producers. The goal is to give landowners personalized advice and information, based on the latest science and research, to help them make informed decisions.
- The **Environmental Quality Incentives Program** (EQIP) provides technical and financial assistance to agricultural producers and forest landowners to address natural resource concerns, such as:
    - Improved water and air quality
    - Conserved ground and surface water
    - Increased soil health

- Reduced soil erosion and sedimentation
- Improved or created wildlife habitat
- Mitigation against drought and increasing weather volatility.

EQIP helps producers make conservation work for them. Financial assistance for practices may be available through EQIP. Some producers may also qualify for advance payment.



The Cumberland Dusky Salamander / Chris Simpson, TWRA

- The **Conservation Stewardship Program** (CSP) helps landowners build on existing conservation efforts while strengthening their operations.

  CSP offers annual payments for implementing additional practices on land while operating and maintaining existing conservation efforts. The program represents a genuine commitment to conservation – CSP contracts are for five years, with the opportunity to compete for a contract renewal if the landowner successfully fulfills the initial contract and agrees to achieve additional conservation objectives. CSP can help landowners who are already taking steps to improve the condition of their land to find new ways to meet their goals.
  NRCS works one-on-one with producers to develop a conservation plan that outlines and enhances existing efforts, using new conservation practices or activities, based on management objectives for the operation. Producers implement practices and activities in their conservation plan that expand on the benefits of cleaner water and air, healthier soil, and better wildlife habitat—all while improving their agricultural operations. For example, after experience planting a cover crop, landowners may decide to try an enhancement for a multi-species cover crop or implement a deep-rooted cover crop to break up soil compaction and further improve the health of their soil.

- The **Regional Conservation Partnership Program**, first authorized by Congress in 2014, is a partner-driven approach to conservation that funds solutions to natural resource challenges on agricultural land. RCPP projects may include a range of on-the-ground conservation activities implemented by farmers, ranchers and forest landowners. These activities include:
  - Land management/land improvement/restoration practices
  - Land rentals
  - Entity-held easements
  - United States-held easements
  - Public works/watersheds

  Half of RCPP funding focuses on critical conservation areas designated by the Secretary of Agriculture and half is available as single or multi-state funding pools. RCPP funding is of two types: (1) funding that supports producers via traditional NRCS programs (listed above) and

easements, working in collaboration with partners or (2) RCPPs in which NRCS supplies funding directly to partners for use on eligible lands.

In 2024, the USDA announced a historic $1.5 billion for 92 partner-driven RCPP projects, with partners providing $968 million in contributions to amplify the impact of the federal investment. For example, one RCPP project in Tennessee will improve water and soil quality by establishing diverse habitats on the edges of production sites across six counties, supporting ecosystem services that reduce synthetic inputs.

USFWS - **Partners for Fish and Wildlife** (PFW) is a voluntary, non-regulatory program of the US Fish and Wildlife Service offered to private landowners, managers, tribes, corporations, schools, and non-profits interested in improving wildlife habitat on their land. The Program supports the recovery of federally listed species and the conservation of at-risk species.

Projects are custom-designed to meet landowners' needs, balancing the need for a working landscape with conservation priorities. Landowners must be willing to enter into a minimum 10-year agreement with the Service, at least one Federal Trust Resource must benefit, and the landowner's management objectives must align with the Service's. (Federal trust resources are the fish and wildlife resources managed by the USFWS and other agencies as a public trust for people today and for future generations. The public is considered the owner of these resources, which the government protects and maintains.) Projects are selected subject to ranking factors that are developed at the national, regional, and local levels. Individuals interested in participation are asked to work with their local contacts to develop a proposal that meets shared priorities.

In Tennessee, PFW tends to work with landowners and partner organizations seeking to control erosion associated with livestock production, restore fish passage and improve aquatic habitat connectivity, and manage upland sites for game and non-game species. The latter often includes



A severe barrier situation was addressed by replacing a culvert with a concrete bridge and box to allow more water to flow through the culvert in a more natural way / Robby Cogburn, Partners for Fish and Wildlife, USFWS



TWRA Fish Biologist Sally Petre explains that the wider bridge compared to the old narrow culvert it replaced allows more water flow, which is good for the fish and reduces flooding. — formerly a common occurrence / WLAF News

assisting with prescribed fire that is necessary to maintain desirable vegetative communities. The

PFW Program has terrestrial focal areas within the state; aquatic priorities of the US Fish and Wildlife Service (represented by Strategic Habitat Units) serve as aquatic focal areas. Private lands play a critical role in addressing threats to aquatic ecosystems, which include sedimentation, non-point source pollution, loss of riparian habitat, and other factors leading to unstable stream banks.

Example: Partners for Fish and Wildlife, a win/win for county and threatened fish

USFWS, TWRA, and Campbell County Highway Dept. Partnered to build two new bridges across Coontail Branch in the Elk Valley. The project included improved "bottomless" culverts to allow the passage of tiny aquatic species, most notably the federally threatened Blackside Dace and the Arrow Darter, state listed as threatened. The new bridges were paid for with $211,000 in federal funds (PFW), with in-kind match provided by the road department.

Example: Improving the health of cattle and Brawleys Fork Crayfish population

PFW partnered with a private landowner, Tennessee Department of Agriculture, Natural Resource Conservation Service, Cumberland and Cannon County Soil Conservation Districts to deliver a project targeting improvements to aquatic habitat to benefit the Brawleys Fork Crayfish (*Cambarus williami*). Winter livestock feeding presented challenges for the landowner, including weather patterns, short days, and sometimes sick cattle. Winter feeding also impacted the stream that flows through the farm. Together, the conservation partners devised a strategy to address the landowner's working lands management needs while also producing species outcomes. To achieve these mutual goals, the Service provided cost-share to the landowner to relocate his winter feeding operation away from the creek, allowing nutrients and sediment to filter.



Before Restoration: Livestock Winter Feeding 2020-2021 / Dustin Boles, Partners for Fish and Wildlife, USFWS



Two new heavy-use area concrete feeding pads, cross fencing, alternative water sources, and an access road allow the landowner to rotate his cattle more efficiently throughout the year. With feeding pads on either side of the creek, the landowner can move his herd across a stabilized creek crossing. /Lauren Neale, TN Cattleman's Association

The **Family Forest Carbon Program** (FFCP) was developed in 2024 as a collaboration between the American Forest Foundation and The Nature Conservancy, two national conservation nonprofits. FFCP pays family landowners to implement practices on their forestland that promote carbon storage and sequestration. The minimum acreage needed to enroll is low –only 30 acres,

Example: Managing Limestone Cedar Glades on private lands

PFW works with partners at Southeastern Grasslands Institute, Quail Forever, Tennessee Department of Environment and Conservation State Natural Areas (TDEC SNA), NRCS, and TWRA to collaboratively develop projects with landowners that meet both land management and species conservation objectives in Tennessee's Central Basin. The area is a hotspot for plant and animal diversity that is adapted to the basin's assortment of interwoven karst habitats, ranging from caves, springs, and sinkholes to limestone glades and barrens.



Federally endangered leafy prairie clover (*Dalea foliosa*) / Robby Cogburn, Partners for Fish and Wildlife, USFWS



Forestry mulcher clearing encroaching eastern red cedar and other undesirable vegetation / Cooper Breeden, SGI



- Implementing prescribed fire / Credit Sam King, TDEC, SNA



Site following eastern red cedar removal and prescribed fire / Dustin Boles, Partners for Fish and Wildlife, USFWS

Nonprofit conservation programs

The Tennessee Wildlife Federation's Habitat Restoration Program partners with private landowners and public agencies to restore and conserve habitat in four major habitat types in Tennessee: wetlands, grasslands, forests, and streams. The program also leverages the Federation's expertise and connections to facilitate the acquisition of critical lands and to improve access to Tennessee's most prized public lands.

compared to 3,000+ acres that many other programs require. On top of that, FFCP provides technical assistance and forest management education to help landowners create healthy forests aligned with their personal goals. As of 2025, FFCP is available in Alabama, Kentucky, Ohio, Pennsylvania, Tennessee, West Virginia, and western Maryland. In less than two years, FFCP has enrolled over 70 Tennessee landowners and more than 15,100 forested acres. Across the seven participating states, the program has partnered with nearly 1,200 landowners to protect and responsibly manage over 165,000 acres of forested land.

8.5.2. Private Land Protection

Protecting the natural state and ecological value of private property can bring a landowner many benefits. One gratifying outcome is knowing that present and future generations will enjoy the property's natural beauty and value. There can also be substantial tax advantages for current landowners and their heirs. (TNC)

For private landowners interested in voluntary conservation of their land in perpetuity, this generally means a choice between:

a. Protecting land while transferring title to their property, or
b. Protecting land while retaining title via conservation easement(s), retained life estate, or other legal mechanism.

Often, a landowner's objective is to dispose of his or her real estate. Land trusts are private, nonprofit organizations that generally specialize in acquiring interests in real estate for the purpose of meeting conservation goals. Land trusts across the country work in their communities to conserve habitat for wildlife and plants, secure water quality, ensure land is available for future generations, provide equitable access to nature, protect family farms and ranches, tackle climate change, build healthy communities, and more ("About Land Trusts," 2024).

Alternatively, a landowner may choose to retain all property rights except those specifically relinquished or restricted by a conservation easement. Conservation easements are voluntary, permanent, and legally binding agreements that are incorporated into the property deed. This means the easement is tied to the land itself, not to any one landowner. Whether the property is sold, inherited, or transferred to another private landowner or even to a public agency, the easement and its conservation restrictions remain in effect. Future owners of the property are bound by the same terms, and the organization holding the easement has the legal responsibility to monitor and enforce those terms forever. While landowners retain ownership and many traditional rights (such as farming, forestry, hunting, or recreation, depending on the easement language), the conservation commitments cannot be removed or ignored by subsequent owners.

Conservation easements are designed to forever protect important natural resources from detrimental land practices by donating or selling those rights to a qualified nonprofit organization (land trust) or government agency. The conservation easement holder then has the right and

responsibility to enforce the terms of the easement. Every conservation easement is unique, specifically tailored to the particular land being protected as well as to the unique circumstances of the landowner(s).

Land protection via nonprofit land trusts

The **Land Trust Alliance** (LTA), the national leader for land trust policies and standards, is a good source of information about the land trusts operating in each state. Landowners wishing to protect their land through fee title transfer or through easements or other tools can seek help from a land trust to explore a range of options and possible sources of funding, assist in determining their conservation interests, and provide general information on legal and tax issues. It is essential, however, that landowners also obtain their own independent and professional legal, tax, and financial advice. It is advisable to seek a land trust accredited by the LTA to ensure that the organization has adopted best practices pursuant to legal and IRS regulations.

For a successful partnership, land trusts and landowners must generally share conservation goals. For example, TennGreen's strategic land conservation plan uses the State Wildlife Action Plan to prioritize landscapes of interest. Therefore, landowners who own property within Conservation Opportunity Areas may find common ground with them.

There are numerous land trusts engaged in land protection across the state. A compilation of those most active in conserving wildlife and habitat across Tennessee is provided in the Private Lands Resources (Table 8.4) at the end of this chapter.

Federal easement programs in Tennessee

The NRCS **Agricultural Conservation Easement Program** (ACEP) helps landowners, land trusts, and other entities protect, restore, and enhance wetlands or protect working farms and ranches through conservation easements.

Box 8.1 Conservation Easements: What Stays the Same / What Changes

What Stays the Same

- You still own the land – it remains private property.
- You can sell it, lease it, or pass it on to heirs.
- You can typically continue farming, forestry, hunting, recreation, and other traditional uses, as long as they are compatible with conservation goals.
- You can continue to enjoy the land's natural beauty and use it as a family legacy.

What Changes

- Certain activities are restricted (such as subdivision, industrial or commercial development, or surface mining) depending on the terms of the easement.
- The easement becomes part of the deed, meaning the restrictions apply to all future landowners.
- The land trust or agency holding the easement will conduct annual monitoring visits to ensure the conservation agreement is upheld.
- Some activities (like new structures or timber harvests) may require advance notice or approval from the easement holder.

ACEP protects the agricultural viability and related conservation values of eligible land by (a) limiting nonagricultural uses that negatively affect agricultural uses and conservation values, (b) protecting grazing uses and related conservation values by restoring or conserving eligible grazing land, and (c) protecting and restoring and enhancing wetlands on eligible land.

ACEP has two components:

- **Agricultural Land Easements** (ALE) help private and tribal landowners, land trusts, and other entities such as state and local governments protect croplands and grasslands on working farms and ranches by limiting non-agricultural uses of the land through conservation easements.
- **Wetland Reserve Easements** (WRE) help private and tribal landowners protect, restore and enhance wetlands that have been previously degraded due to agricultural uses. A subset of this program is the **Wetland Reserve Enhancement Partnership** (WREP), which leverages resources with local partners to carry out high priority wetland protection, restoration, and enhancement; improve wildlife habitat; and mitigate climate change on agricultural lands.



NRCS easement boundary sign / Beverly Moseley, NRCS

The **NRCS Healthy Forests Reserve Program** helps landowners, land trusts, and other entities protect, restore, and enhance wetlands or protect working farms and ranches through conservation easements. This program provides landowners with 10-year restoration agreements and 30-year or permanent easements for specific conservation actions. American Indian tribes have an additional enrollment option of a 30-year restoration agreement.

The **Tennessee Forest Legacy Program** identifies and permanently protects environmentally important private forestlands that are threatened by conversion to non-forest uses. This is a USDA Forest Service Program, authorized by the Farm Bill, which works to identify and maintain well-managed, working forests on the landscape through grants to the states. Tennessee manages and decides on the tracts to be protected under the Legacy Program. Each tract must have a detailed forest management plan, known as a Forest Stewardship Plan. The Program currently conserves 53,315 acres across Tennessee and is growing. Over half of the $59 million land value ($32.9 million) was funded with Forest Legacy grants with the balance being private, non-federal matching lands and funds.

Benefits of conservation easements

Restricting the uses of a property such as through a conservation easement may lead to a reduced tax assessment for that property, depending upon the county. Tax assessments are based on the property's value as determined by a local assessor. In addition, potential federal and estate tax benefits may result when donating easements. The federal income tax benefits of donating a

properly structured conservation easement were increased by Congress in 2015 to encourage more taxpayers to use this effective land protection tool. The law now allows a landowner to take a deduction for the value of the donated easement up to 50% of their AGI for the year of the donation (100% for farmers). If a deduction amount exceeds these limits, the balance of the deduction may be carried over for up to 15 succeeding years.

By conserving a property with a conservation easement, landowners can preserve their vision for the land and also create a lasting legacy. Conservation easements are one of the most powerful, effective tools available for the conservation of private lands. Their use has successfully protected millions of acres of wildlife habitat and open space in the United States and other countries, while allowing the landowners to continue owning and using the property in ways that do not negatively impact the land's conservation values as defined by the easement.

8.6. Landowner Engagement, Responsibilities, and Commitments

Conservation programs for private lands require varying levels of effort, planning, and commitment from the landowner. As noted at the beginning of this chapter, there are a number of potential challenges that may impact landowner conservation projects. Key factors to consider include the following:

- Knowledge gaps (e.g., information about habitats and species appropriate to the sites; the science behind various conservation action(s); or even recognition of the value of conducting conservation efforts in the first place)
- Complexity of funding programs and their requirements
- Project design, implementation, and maintenance
- Time and financial constraints.

Federal programs that provide financial assistance often require the landowner (or a private source) to provide matching funds or a match of in-kind labor and equipment. Programs also vary in time commitment, often with no guarantee of future support. For example, under the NRCS EQIP program, applications are accepted throughout the year (possibly with state deadlines for ranking and funding decisions), with successful applicants receiving one contract for support over one or more years. However, the execution of an easement under ACEP is a permanent commitment of the land and can take much longer to implement. Landowners must also be observant and careful, practicing due diligence to protect their own interests (whether by consulting experts or hiring professionals). Perhaps the most critical requirement for participating successfully in these



A USFWS biologist and private landowner holding a tiny Brawley's Fork Crayfish / Lauren Neale, TN Cattleman's Association

programs is the landowner's willingness to learn and to spend the time required to successfully implement their chosen actions.

8.7. Additional Resources for Private Lands Conservation

Finally, three printable, shareable hands-on resources for landowners are provided. The Landowner's Conservation Planning Guide is a two-page self-assessment that allows landowners to record their answers to a series of questions critical to thinking through conservation project planning. Table 8.4, Tennessee Private Lands Resources, provides a wealth of information and web links for private land conservation information, organized by the following categories:

- Educational resources for private landowners
- Nonprofit land trusts
- Wildlife research programs and organizations
- Plant resources
- Water and wetland protection

Finally, Fig. 8.6 is a Seasonal Conservation Calendar specific to Tennessee that can serve as a reminder in planning management and stewardship activities throughout the year.

DATE: / /

TENNESSEE LANDOWNER'S CONSERVATION PLANNING GUIDE

LANDOWNER & PROPERTY INFORMATION

Name(s):

Phone Number: **Email:**

Property Address:

City: **Zip Code:** **County:**

Mailing Address (if different):

Total Acreage: **Acreage of Potential Project Acrea(s):**

UNDERSTANDING YOUR PROPERTY

Current Land Use:

- ☐ Agriculture
  - Please Specify:
  - __ Livestock
  - __ Row Crops
  - __ Mixed Produce
  - __ Dairy
  - __ Nursery/Greenhouse
  - __ Other
- ☐ Forestry
- ☐ Early Successional/ Old Field
- ☐ Open Space
- ☐ Residential
- ☐ Suburban/Development
- ☐ Other: _____

Existing Easements:

- ☐ Mining
- ☐ Timber
- ☐ Conservation
- ☐ Agriculture
- ☐ Utility/Access Right of Way
- ☐ Other
  - If checked, please note easement holder(s):
  - _____

Adjacent Land Uses (Check all that apply)

- ☐ Residential
- ☐ Suburban/ Development
- ☐ Industrial
- ☐ Agricultural
- ☐ Forested
- ☐ Public and/or Protected Land
- ☐ Other: _____

Watershed/ Nearest Surface Water (if known):

GOALS FOR YOUR LAND

Improve Wildlife Habitat

__ Manage for a variety of species

__ Focus on specific habitats (prairie, hardwood forest, aquatic areas, etc.)

Restore or Establish Native Plant Communities

__ Forest restoration

__ Prairie or grassland restoration

Protect or Restore Your Land

__ Control erosion

__ Manage invasive species

__ Recover from storm or fire damage

Plan for Your Land's Future

__ Manage or sell timber

__ Participate in carbon markets

__ Establish a conservation easement

Enhance Water Resources

__ Protect or restore riparian buffers

__ Improve pond, wetland, or stream habitat

Diversify Working Lands

__ Harvest non-timber forest products (nuts, mushrooms, decorative greenery)

__ Agroforestry or silvopasture systems

Preserve Cultural or Historic Features

__ Archaeological sites, homesteads, cemeteries, etc.

Other: _____

_____

_____

_____

_____

LANDOWNER CAPACITY & PLANNING

Primary Reasons for Owning Your Land (Check all that apply):

- ☐ Income Generation
- ☐ Family Legacy
- ☐ Recreation (hunting, fishing, trails, etc.)
- ☐ Stewardship (forestry/wildlife)
- ☐ Farming
- ☐ Timber Production
- ☐ Other: _____

Special Considerations Present (Check all that apply):

- ☐ River and/or Stream
- ☐ Spring
- ☐ Sinkhole
- ☐ Cave
- ☐ Known Rare Species
- ☐ Historic Site
- ☐ Other: _____

How much time can you devote to conservation activities each year?

- ☐ Minimal
  (occasional involvement, prefer contractors)
- ☐ Moderate
  (seasonal or project-based work)
- ☐ High
  (hands-on management, frequent involvement)

Estimated time commitment for project implementation and maintenance:

- ☐ Less than 5 Years
- ☐ 5-15 Years
- ☐ 15-30 Years
- ☐ Permanent
- ☐ Uncertain

PARTNERSHIPS & IMPLEMENTATION

Partners you've worked with before:

- ☐ NRCS and/or Local Soil & Water Conservation District
- ☐ Tennessee Division of Forestry
- ☐ TWRA
- ☐ UT/TSU Extension
- ☐ Other: _____
- ☐ None

Interested in:

- ☐ Technical Assistance
- ☐ Financial Assistance
- ☐ Tax Incentives
- ☐ Reduced Management Costs (shared equipment, group contracts)
- ☐ Disaster Recovery Programs
- ☐ Conservation Easements

PARTNERSHIPS & IMPLEMENTATION

Briefly summarize past projects or assistance recieved (if any):

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Other notes or special considerations:

_____

_____

_____

_____

_____

Table 8.4 Tennessee private lands resources

Technical Advisors	Resources and Education of Private Landowners	Nonprofit Land Trusts	Wildlife Research	Plant Resources	Water and Wetland Protection Organizations
Biodiversity Division - Tennessee Wildlife Resources Agency	DarkSky	American Farmland Trust	American Bird Conservancy	Center for Plant Conservation	BluewaysTN
Division of Natural Areas - TN Department of Environment & Conservation	Fire Adapted Communities Network	Ducks Unlimited	Bat Working Group	East Tennessee Nursery	Boone Lake Association
Land and Water Stewardship Section - Tennessee Department of Agriculture	Habitat Conservation Program - TNWF	Foothills Land Conservancy	Bog Learning Network	Southeast Exotic Pest Plant Council Invasive Plant Manual	Cumberland River Compact
Partners for Fish and Wildlife - US Fish & Wildlife Service	Hatchie River Conservancy	Land Trust Alliance	Conservation Fisheries	Southern Appalachian Botanical Society	Duck River Watershed Planning Partnership
Quail Forever	Invasive Species Assistance	Legacy Parks Foundation	Freshwater Mollusk Conservation Society	Tennessee-Kentucky Plant Atlas	Duck River Watershed Society
Southeastern Grasslands Institute	Landscape Management Plan	Open Space Institute Land Trust	Knoxville Zoo	The Shortleaf Pine Initiative	Emory River Watershed Association
Tennessee Division of Forestry	Landscape Management Plan - TN Division of Forestry	Swan Conservation Trust (active on the western Highland Rim)	Memphis Zoo	University of Tennessee Herbarium	Friends of the Duck River
Tennessee Wildlife Federation	My Tennessee Woods	Tennessee Wildlife Federation	Motus	USDA NRCS Plant Database	Harpeth River Watershed Association

Technical Advisors	Resources and Education of Private Landowners	Nonprofit Land Trusts	Wildlife Research	Plant Resources	Water and Wetland Protection Organizations
TN Natural Resources Conservation Service - US Department of Agriculture	National Alliance of Forest Owners	TennGreen Land Conservancy	Nashville Urban Bird City		Little River Watershed Association
University of Tennessee Extension	Protect TN Forests	The Conservation Fund	Nashville Zoo		Obed Watershed Community Association
	Tennessee Agricultural Enhancement Program	The Land Trust for Tennessee	Tennessee Amphibian Monitoring Program		Protect our Aquifer
	Tennessee Invasive Plant Council	The Nature Conservancy	Tennessee Aquarium		Sewanee Mountain Grotto
	The Family Forest Carbon Program	Wolf River Conservancy	Tennessee Herpetological Society		Southeast Aquatic Resources Partnership (SARP)
	TN Forestry Association		US North American Bird Conservation Initiative (NABCI)		Southern Alliance for Clean Energy
	Tennessee Naturalist Program				Stones River Watershed Association
	TN Prescribed Fire Council				Tennessee Scenic Rivers Association
	TN Wildland Fire Prevention				Tennessee Section of the American Water Resources Association

Technical Advisors	Resources and Education of Private Landowners	Nonprofit Land Trusts	Wildlife Research	Plant Resources	Water and Wetland Protection Organizations
					Tennessee Stormwater Association
					Watts Bar Lake Association
					Wetlands America Trust
					Wolf River Conservancy

Seasonal Conservation Actions for Tennessee Landowners

Practical actions you can take each season to care for your land and wildlife

Spring

March - June

- Conduct early growing season prescribed burns
- Mow fields before green-up to control woody growth; be mindful of nesting activity
- Spot spray exotic invasive plants
- Plant warm-season grasses, pollinator habitats, and bare-root seedlings
- Slowly draw down water impoundments
- Monitor for emerging forest pests

Summer

June - September

- Conduct late growing season prescribed burns
- Timber Stand Improvement (TSI; selective removal of less desirable trees)
- Treat woody invasives with herbicide
- Check water passage structures; clear blockages
- Plant cool-season food plots or cover crops
- Monitor for erosion on disturbed sites
- Pond maintenance

Fall

September - December

- Prepare firebreaks and remove snags
- Spray fescue and other cool-season grasses
- Continue Timber Stand Improvement
- Plant cool season cover crops to reduce erosion
- Protect young trees and install nest boxes
- Order tree seedlings for late winter planting
- Mitigate fuels around structures ahead of fire season

Winter

December - March

- Conduct dormant season prescribed burns
- Continue TSI until sap flow begins
- Disk fields and fell browse species to encourage stump sprouts
- Plant trees, shrubs, and wildflower mixes
- Clean and install nest boxes
- Prune woody trees and shrubs
- Remove old fencing
- Check water passage structures; clear blockages

Year Round Activities

- Construct brush piles for wildlife habitat
- Watch for invasive species, pests, and disease
- Maintain trails, roads, and fences
- Monitor wildlife activity and habitat use
- Keep field notes on management activities

Early detection and maintenance saves time and money!

Actions and schedule may vary by region and site objectives. Consult your local TDF, TWRA, NRCS, or UT/TSU Extension office for site-specific guidance.

Figure 8.6 Seasonal conservation actions for Tennessee landowners



CHAPTER 9

IMPLEMENTING THE TENNESSEE SWAP: 2025-2034

THIS PLAN IS INTENDED TO SERVE AS A GUIDE AND RESOURCE for meaningful and impact-focused conservation action in Tennessee over the 10-year period spanning from 2025 to 2034. Planning means little without implementation, so the 2025 Tennessee SWAP revision has been designed to (1) provide data-backed support for funding requests, (2) guide organizations and individuals by showing them where to work, and (3) indicate where we have gaps in our knowledge and understanding of SGCN and the habitats vital to their survival.

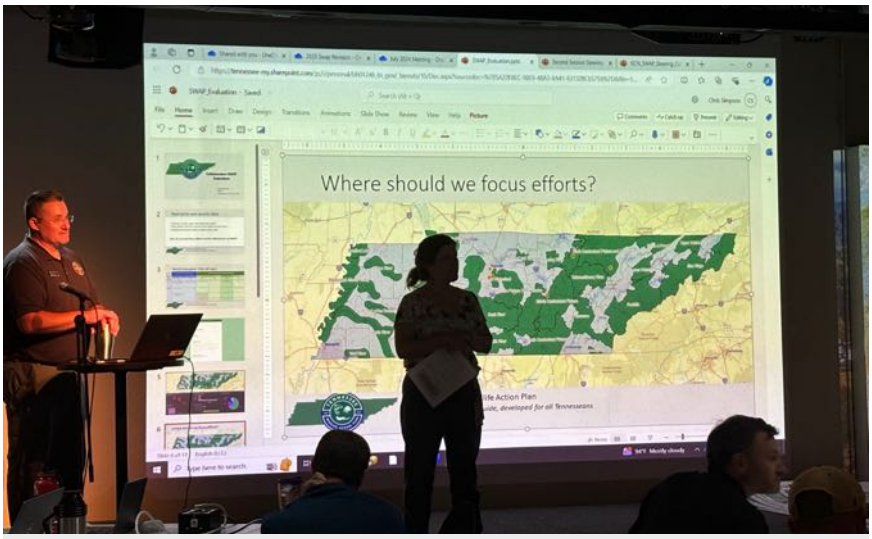
The materials and analysis within this plan can be used in project design and selection of appropriate conservation actions to fit a multitude of on-the-ground scenarios. It also can be used to support and justify funding and grant proposals. Users are encouraged to explore this guide and to revisit each section during the next decade to gain ideas that will aid project planning.

The SWAP has not been built to direct precise scheduling of action, but rather to take a high-level, large-scale look at the natural systems of this state and the myriad forces acting upon them. However, it is also designed to be operationalized and, to the extent possible, to be put to work by each conservation partner working in the Tennessee landscape. Readers are encouraged to use the guide to ingest the priorities (for species, habitats, landscapes, issues, and conservation actions) determined by the SWAP analysis, and apply them for on-the-ground work, for collaboration, for fundraising, and for public awareness.

Counting Gray Bats at a TWRA-owned cave / Daniel Istvanko, TWRA

Useful elements of the 2025 SWAP include:

- Historical and existing ecological conditions
- Analysis of the rich biodiversity in TN, and expert-selected lists of Species of Greatest Conservation Need—literally those that are already experiencing population decline or are forecast to decline without human intervention
- Projection of changes to land use, existing and emerging threats to SGCNs, and the habitats they require
- Methods of action to counter the damaging/destructive impact of these threats
- Tools to monitor and assess the success of conservation actions
- Where the efforts of the conservation community can be expected to see the most value through employing conservation actions
- Highlighting the resources in Tennessee available for conservation and the successes already achieved.
- An assessment of lessons learned to inform the process of SWAP review and revision (see Ch. 10).



At the Conservation Opportunity Area planning meeting in 2024. / Gregg Elliott, K. Gregg Consulting

A key feature of the 2025 SWAP development is the intentional, persistent inclusion of conservation partners. Successful implementation of a plan with the scope of SWAP requires each conservation partner to take ownership and responsibility for maximizing use of SWAP data and achieving SWAP goals across the state. This plan can be used to nurture existing partnerships, identify opportunities for collaboration, and creatively expand partnerships.

9.1. Monitoring for Adaptive Management

Much of conservation is about management of lands, waters, species, and human uses of the landscape, and monitoring is a key element of the adaptive management cycle. Species and habitat monitoring data help to (1) provide long-term understanding of trends in populations or ecosystem health, (2) provide greater understanding of species responses and needs relative to problems and changing environmental conditions, and (3) assess the results and effectiveness of conservation actions – the key to adaptive management. The first two purposes are collectively referred to as status monitoring, while the last is called effectiveness monitoring.

9.1.1. The Standards for Measuring Effectiveness of Actions

Summary: Monitoring and adaptive management goals in the 2025 SWAP

1. Continue to improve effectiveness monitoring in Tennessee. The 2005 SWAP provided an inventory of TWRA and partner status monitoring programs for species and habitats. The 2015 SWAP introduced effectiveness monitoring, and the 2025 SWAP outlines steps for integrating these monitoring approaches into existing agency programs and planning cycles.
2. Develop an effectiveness measures framework. TWRA will incorporate status monitoring objectives and effectiveness measures into its existing planning cycles through triennial SWAP reviews and updates beginning in FY 2029.
3. Maximize knowledge and conservation effectiveness through participation in shared monitoring databases.

TWRA has long conducted status monitoring programs to assess and track various wildlife populations (see TWRA 2005, Appendix H "Sampling Protocols for Select Faunal Groups"), both for purposes of management and to identify problems. The results of individual conservation projects are likewise tracked, although often final assessments may consist of cataloguing actions successfully completed. Indeed, almost all conservation organizations must track their progress and report results.



Drift fence trap installation. A drift fence stops animals and guides them until they fall into a bucket or funnel. This allows biologists to passively trap and monitor animals, such as lizards and salamanders, that otherwise would be difficult to catch. / Rob Colvin, TWRA

However, the Association of Fish and Wildlife Agencies in its 2011 *Measuring the Effectiveness of State Wildlife Grants* report notes that, "it has been much more difficult [for state agencies] to bring these two sets of data together to attribute changes in species or habitat status to the effects of any one action" (AFWA 2011). In Tennessee, much of the difficulty lies in ascertaining the status of resources at different spatial scales and the connection between different types of conservation actions and results, particularly at landscape scales that necessarily must include at least some private lands.

To assist states with making the connections between different types of monitoring, AFWA developed guidance on how to measure the effectiveness of conservation actions funded through the State Wildlife Grants (SWG), including recommendations for how to track and report that effectiveness. The importance of this tracking ultimately goes beyond a consideration of dollars and cents; it cuts to the heart of the stewardship

enterprise by providing insight into the overall effectiveness of planning, management, and adaptation to benefit species and habitats.

The Effectiveness Measures report developed a framework for use by states and their partners in evaluating the effectiveness of actions funded under State Wildlife Grants, as well as broader conservation strategies outlined in SWAPs (see Figure 9.1., taken from AFWA's 2011 Effectiveness Measures report). The report also provides comprehensive examples of connecting conservation actions to outcomes, including suggested objective statement formats and monitoring indicators for 11 generic conservation actions. All of these actions are identified in the 2025 TN-SWAP, and conservation partners are encouraged to use these examples as a resource to help design and implement successful conservation projects.

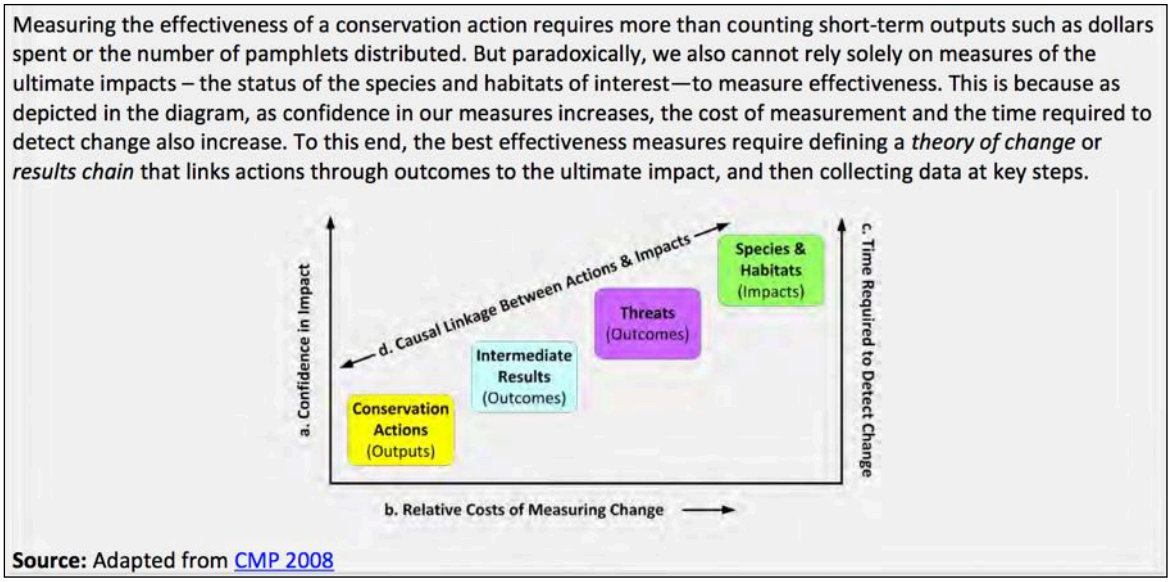


Figure 9.1. Measuring effectiveness requires linking conservation actions to impact

9.2 TWRA Adoption and Adaptation of Standardized Effectiveness Measures

The Effectiveness Measures report made several overarching recommendations to states, and TWRA has implemented the following:

- Adopted the proposed effectiveness measures framework to improve accountability and project management of State Wildlife Grants.

  The TN-specific actions are the result of combining conservation actions quantified in USFWS TRACS with the 11 categories of action suggested in the AFWA framework, then adapted to meet the goals of the Tennessee conservation community. Following a review of the most impactful stressors within each Conservation Opportunity Area, conservation actions were prescribed for each COA based on their suitability to address key stressors (Appendix I).

- Integrated the effectiveness measures framework into agencies' adaptive management, grant application, and reporting processes. For the 2025 SWAP, TWRA and conservation partners on the SWAP Steering Committee have agreed to supply data via an annual partner survey, which is based in part on measures listed in the 2011 AFWA report.

TWRA will incorporate monitoring objectives and effectiveness measures into its existing planning cycles through triennial SWAP reviews and updates.

TWRA also intends to incorporate status monitoring objectives and effectiveness measures into its existing planning cycle through triennial SWAP reviews and updates. These reviews will provide an opportunity to assess conservation achievements in COAs; to prepare and analyze monitoring results; to make adaptive management decisions; and to identify emerging issues and appropriate responses. These reviews will then influence allocation of SWG funds and development of new partnerships.

Development and implementation of an effectiveness measures framework is helping TWRA and its conservation partners in the following ways:

- Provides a means to evaluate conservation actions so that successful ones can be replicated and communicated while less successful ones are improved or abandoned
- Establishes a standardized and accessible body of project performance data to help guide current and future wildlife managers
- Provides a cost-efficient mechanism for reporting to Congress, other policy makers, conservation partners, and taxpayers about the value of the SWG program, SWAPs, and the conservation needs and efforts underway across Tennessee.



TWRA MOTUS tower at Massengale Mountain on North Cumberland WMA for monitoring migratory birds / David Hanni, TWRA

9.3. Regional-scale Monitoring Collaborations

Replicating project strategies and analyzing multiple sets of results over time allows scientists to assess wildlife responses to management. The projects serve, in essence, as multiple experiments testing the same management strategies. In addition, monitoring habitats and populations over a sufficient geographic area and timeframe can

provide insight into how wildlife populations are changing or responding to change. Both of these objectives can be achieved when agencies (1) cooperate to leverage one another's work and knowledge by using monitoring standards that make data comparable, and (2) consolidate and share data in formats that promote collaborative use.

Several examples of monitoring efforts and information sharing include the Tennessee River watershed Index of Biotic Integrity (IBI) work conducted by the Tennessee Valley Authority (TVA); the Great Smoky Mountains National Park All Taxa Biotic Inventory (ATBI); inventory and monitoring conducted by the US Forest Service on federal forest lands; stream flow and biological monitoring managed by the US Geological Survey; and multi-state freshwater mollusk recovery and monitoring activities with the US Fish and Wildlife Service and academic institutions. Table 9.1

Table 9.1. Regional-scale monitoring efforts that include Tennessee

Regional Scale Monitoring Efforts that include Tennessee (not an exhaustive list)			
SGCN Focus	Initiative Name	Lead Agency/Lead in Tennessee	States Included
Lake Sturgeon	Lake Sturgeon Reintroduction Working Group	USFWS/TWRA	GA, KY, NC, TN (WI is the source for fertilized sturgeon eggs)
Bats (all species occurring) -includes winter cave surveys and summer bat monitoring	North American Bat Monitoring Program	USGS/TWRA	nationwide
Eastern Hellbender	Giant Salamander Network	North Carolina Wildlife Resources Commission/ TWRA	GA, NC, SC, TN, VA
Eastern Spotted Skunk	Eastern Spotted Skunk Collaborative Study Group	SEAFWA/TWRA	TN and 23 additional southeastern states
Alligator Gar	Southern Division of the American Fisheries Society Alligator Gar Technical Committee	USFWS/TWRA	AL, AR, FL, IL, LA, MS, MO, TN, TX
Migratory Birds	Breeding Bird Survey, Christmas Bird Counts	USGS/Audubon	All 50 states
Colonial Waterbirds	Cross-Flyway Double Crested Cormorant Monitoring Team	USFWS/TWRA	Contiguous United States
Passive Monitoring of Migratory Birds	Southeast Motus Collaborative	American Bird Conservancy/TNC/Bird Studies Canada	TN + 24 eastern states and Canada, with overwintering areas in Central and South America
Bog Turtle (southern population)	Southern Bog Turtle Working Group	TWRA/TNC	GA, NC, SC, TN, VA

lists additional multi-state monitoring efforts that include Tennessee partners. These program activities, as well as those of many other partners, provide foundational habitat and species population status information that is instrumental to making sound management decisions over time.



Bat Blitz organized by the Tennessee Bat Working Group (2023). Biodiversity blitzes involve an intensive effort to count species over a short period of time, often heavily supported by volunteers. A blitz is a cost-effective way of cataloguing a relatively comprehensive list of the species in an area at a given time. In 2024, the Bat Blitz captured 268 bats of 7 species. / Dustin Thames, TWRA

For wide-ranging species such as many birds and bats, TWRA recognizes that regional, national, or flyway-wide databases enhance each state's ability to manage and conserve these species across broad and biologically meaningful geographic areas. Specifically, the **Avian Knowledge Network** (AKN) is currently in use and becoming more widely adopted by many federal, state, and non-profit organizations. The AKN is extremely effective in providing secure data storage capabilities, facilitating the application of monitoring standards to make datasets comparable across institutions and political boundaries, and developing shared tools for data analysis. As a result, it has become more widely adopted, and the network's shared data has become even more powerful, providing an incentive for greater participation.



A Brown Thrasher (*Toxostoma rufum*) about to be banded / Gregg Elliott, K Gregg Consulting



Biologist Michaela Bass holding a Garter Snake (*Thamnophis sirtalis*) / Mathew Alexander

The AKN's Eastern Avian Data Center is an online node that now serves as Tennessee's data entry, storage, and retrieval website. TWRA considers the exchange and integration of avian data into a permanent centralized

data management system a priority action that is occurring via programs such as colonial waterbird monitoring and Partners in Flight, under the guidance of TWRA's Bird Conservation Coordinator.

Since 2005, TWRA has also invested in the reorganization of its internal data management systems. Currently, database portals allow consolidation of a variety of project and monitoring data managed internally by TWRA.

In 2024, TWRA developed an ESRI-based SWAP conservation project reporting tool, which will be shared annually among cooperating partners to allow consolidation of a variety of project and monitoring data. Compilation of these data will ultimately improve TWRA's ability to use and communicate information to partners and to participate in or promote regional and landscape-scale monitoring and restoration efforts.



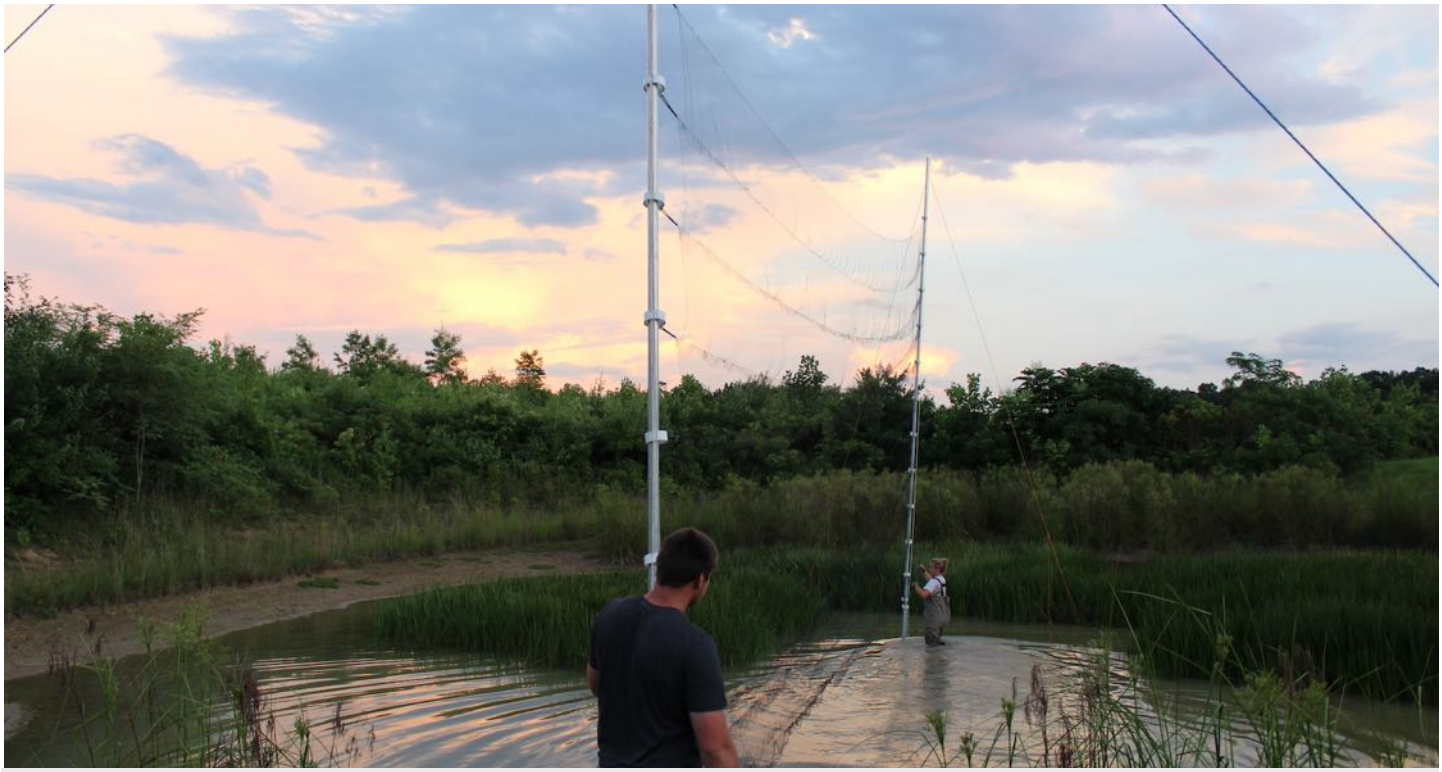
Initial entries into TWRA's Esri-based SWAP conservation reporting tool.

9.4. Improving Tennessee's Partnerships Through the SWAP

To further regional-scale collaborations, the Steering Committee first formed to assist with the 2005 SWAP was relaunched and retooled for the 2025 revision. Comprised of over fifty biologists and conservationists from federal and state agencies and NGOs operating in the state, the Steering Committee will continue to meet past the approval of the 2025 SWAP. It will function to increase communication throughout the conservation community and to foster collaborations across different agencies, organizations, and jurisdictions to achieve shared conservation goals in Tennessee. To date, Steering Committee members have agreed to report all species-specific and landscape management projects being implemented by their respective agency/organization

annually. The Steering Committee will use this information, updated annually, to further conservation efforts across the state by:

- Identifying where conservation capacities can be increased in areas where individual projects are ongoing
- Determining common objectives for partners with landscape-scale projects that span agencies and organizations with differing missions
- Pinpointing successes and failures of past projects to increase successes of future projects
- Identifying critical data gaps for species and habitats
- Leveraging funding across all partners to increase the scope and geographic scale of conservation projects.



Mist-netting for bats as the sun sets in Franklin County / Dustin Thames, TWRA

To achieve its objectives, the Steering Committee will be comprised of the following six working groups with differing objectives and goals.

Landscape Scale Management

This working group will focus on identifying recommendations based on landscape objectives and initiatives ongoing in the state (e.g., bottomland hardwood forest and grassland restoration) and current multi-agency projects being implemented in the state. Assessing current work being implemented will allow this working group to prioritize areas where future projects may be implemented. Annual products will include an annual report with recommendations, acres managed and restored, etc. which will include an evaluation of the effectiveness of completed and ongoing projects, as well as challenges associated with implementation.

Species Driven Management

While landscape-scale management impacts habitats for a number of SGCNs, there are species that will require a finer scale approach to increase conservation. This working group will assess the adequacy of species-specific projects being implemented within Tennessee to ensure such conservation actions are not too focused on one group of SGCNs (i.e. savanna restoration compared to minimal work occurring for aquatic species). Additionally, this working group will strive to identify species-specific projects needed in future years, as well as species-specific research necessary to address data gaps and effective monitoring techniques. Annual products will include an annual report with recommendations, acres managed, focal species, etc. which will include an evaluation of the effectiveness of completed and ongoing projects, as well as challenges associated with implementation.



Hoary Bat (*Lasiurus cinereus*) / Daniel Istvanko, TWRA

Climate and Resilience

The effects of changing climate in Tennessee will be vastly different as one moves from west to east in the state, and it will impact species differently, increasing the challenges associated with addressing these threats. This working group will work to update current climate models for the state, assess CCVIs for individual species, and identify climate-specific threats and impacts within the state. Annual products will include an annual report summarizing the work accomplished, with recommendations for future land acquisitions based on resiliency models, locations of climate resilient landscapes in the state, and where landscape-scale management actions can benefit from climate-informed action.



Eastern Milk Snake (*Lampropeltis triangulum*) caught in a funnel trap used for monitoring / Jesse Eaker, TWRA

Data/Trend Tracking and Analysis

This working group will work to synthesize large data sets to determine population trends for SGCNs in the state. To effectively perform, this working group must also work to identify mechanisms that will aid in overcoming significant data sharing gaps amongst all partners. Annual

products will include an annual report summarizing all work performed; identifying annual trends in habitats (i.e. grasslands, wetlands) and species; and making recommendations to all partners concerning data gaps identified and data that is not being incorporated into decision-making processes.



TWRA Biologists taking measurements from a sedated Eastern Woodrat (*Neotoma floridana*) / Mallory Tate Cogburn, TWRA

Outreach, Education, and Engagement

After 20 years of SWAP, many Tennesseans are still not familiar with SWAP and how it can benefit the resources of the state. This working group will work to educate the public on SWAP and how it can be used. Most importantly, this working group will identify ways to communicate SWAP to the non-science public. Additionally, the working group will work to increase communication of SWAP goals and conservation results with stakeholders and communities throughout the state. Annual products will include an annual report summarizing all work performed, identifying communications and outreach successes, and providing updated information for the TNSWAP website.



Tricolored Bat roost in Franklin County, with only transmitter and antenna visible! / Dustin Thames, TWRA

Identified Needs and Ideas for Future Development by Steering Committee Working Groups

Landscape scale management needs

- Enhance outreach and land stewardship education targeted at private landowners, aiming to improve communication and engagement with this segment of Tennesseans.
- Categorize landscape-scale conservation projects according to priority benefit for SGCN and feasibility.
- Foster cross-boundary regional partnerships with neighboring states to collaborate within RCOAs identified in the TN SWAP.
- Develop incremental goals to measure progress of landscape scale initiatives.

Species driven management

- Publish SGCN highlights on the SWAP website quarterly. Highlight content should focus on public education, species' needs, relevant legislation, and funding opportunities.
- Develop and manage resource lists of subject matter experts by SGCN, identifying those with the greatest familiarity with individual species and taxa groups.
- Convene Subject Matter Experts by taxa group biannually between SWAP revision cycles and report a summary of updates to the SWAP Steering Committee.
- Explore wildlife crossing opportunities to mitigate habitat fragmentation of wide-ranging SGCN and to preserve the function of priority habitat corridors.
- Partner with neighboring states to develop a comprehensive list of Tennessee SGCN that have also been ranked as SGCN in neighboring states within the most recent SWAP assessments to guide collaborative opportunities. Include RSGCN in the analysis.
- Seek expertise to better understand the status and conservation needs of insect populations in TN.
- In coordination with the Outreach, Education, and Engagement Workgroup, identify specific conservation actions to benefit a selection of SGCN, including "flagship" species, to use as a public outreach tool.

Climate and resilience

- Coordinate with USACE to regulate in-stream flow rates through dams.
- Continue to target removal of in-stream barriers, cooperating across state and jurisdictional boundaries to reduce impacts of an increase in extreme precipitation events and to improve connectivity.
- Work with partners to increase public awareness of the values of floodplain conservation and restoration in terms of both habitat value and extreme weather mitigation.

- Promote studies and modeling to fill data gaps needed for long-term resiliency planning in key areas (e.g., shifts in vegetation phenologies and composition affecting SGCN, long-term streamflow data, increased monitoring of trends in temperature, storms, drought, fire events, etc.).

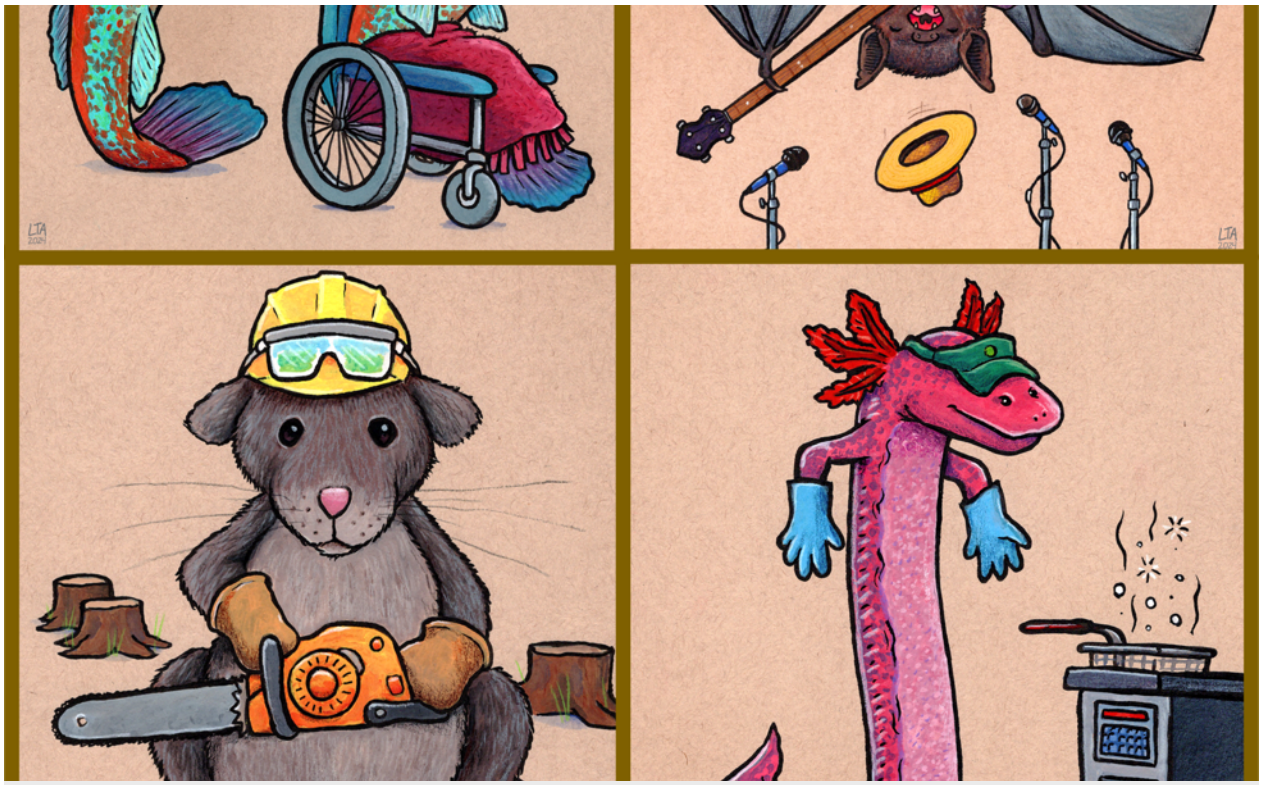
Data trend tracking and analysis

- Create a list of existing datasets (species population monitoring, foraging and breeding habits, other trends, etc.) and data flow (how it gets into the SWAP and throughout the conservation community).
- Clarify the myriad SGCN datasets utilized for creating SWAP priority areas and the extent to which such data are curated before export between partner agencies including for aggregate analyses.
- Work closely with other SWAP Workgroups and conservation partners to acquire and incorporate new data into existing databases.
- Develop improved procedures for data-sharing among partners, such as shared versions of field maps and an ArcGIS tool.
- Create an interactive online SWAP dashboard to showcase projects, SGCN news, and educational resources.
- In coordination with the Outreach, Education, and Engagement Workgroup, develop/promote citizen science initiatives tied to SWAP awareness.

Outreach, education, and engagement

- Engage multiple SWAP partners whenever possible to underscore Tennessee's collaborative conservation community.
- Prioritize routine contact with organizations such as Tennessee's Heritage Conservation Fund and non-profit land trusts, and professional collectives focused on conservation management of water, forests, grasslands, karst, taxa groups, and location-focused partners, to provide education and awareness of the analyses and resources available in the SWAP that can help them to meet their own specific goals.
- Specifically, engage with MS4s in each TWRA Region so that the goals of the SWAP and relevant SGCN in each MS4 are communicated to local county/municipal personnel engaged in land use decisions at the local level. This should also include training for local staff in how to recognize "their" SGCN and potential SGCN habitats under their jurisdiction. Provide them with the means to supply the TWRA and SWAP working group members meaningful SGCN data in a timely manner.
- Develop a media plan to engage and educate Tennesseans about SGCN, their diverse habitats, and how SWAP is used to guide conservation.
- Highlight Tennessee's large number of endemic species with a storymap.
- Select terrestrial, aquatic, and karst flagship SGCN to elevate public awareness of SGCN, the state's rich biodiversity, wide-ranging and unique habitats, and how to use the SWAP to understand more about conservation needs and actions.

- Create SWAP presentation template and use to introduce to new audiences.
- Create factsheets to highlight key metrics gleaned from annual conservation partner survey.
- Engage leaders at the local level. Create county-specific maps with SWAP habitat prioritization to share with counties, municipalities, as well as locally-focused educators (e.g., UTU/TSU Extension, NRCS, etc.) and conservation organizations.
- Develop SWAP-based curriculum tools for K-12 students.



Art by Lucas Antoniak, part of a series intended to increase awareness of SGCN animals and the underappreciated roles they play in our environment. Clockwise from top left: Barrens Top Minnow, Gray Bat, Berry Cave Salamander, and Eastern Woodrat.

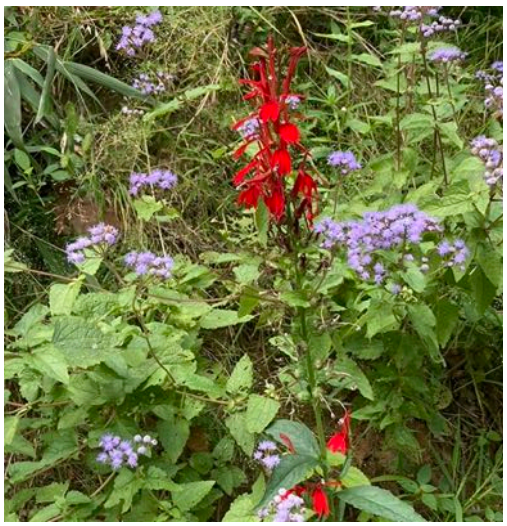


CHAPTER 10

TENNESSEE SWAP REVIEW AND REVISION

STATE WILDLIFE ACTION PLANS (SWAPS) MUST BE UPDATED at intervals of 10 years or less, according to requirements of the US Fish and Wildlife Service (USFWS). Per recommendations of the Association of Fish and Wildlife Agencies (AFWA), for updating state wildlife action plans, the Tennessee Wildlife Resources Agency (TWRA) and The Nature Conservancy (TNC) brought together representatives of conservation-focused governmental agencies and private organizations during the 2025 SWAP development process, which met several times in 2024-25 to participate in and guide development of the SWAP (Ch. 9).

In addition, AFWA recommends that SWAP reviews align with other relevant internal conservation planning efforts, for example in Tennessee, TWRA's Strategic Plan. Finally, AFWA also recommends landscape scale conservation be considered when developing SWAPs. This entails working at large scales, across jurisdictions, toward shared conservation priorities (AFWA 2023) and is addressed in Ch. 7 Regional Conservation.



TWRA will use information and products provided annually by the Steering Committee and supporting working groups to provide the foundation for the next ten-year comprehensive SWAP review to be submitted on September 30, 2035.

Photos top to bottom: Chris Simpson at 2024 Meeting of the SWAP Steering Committee in Murfreesboro, TN / Daniel Istvanko, TWRA; cardinal flower (*Lobelia cardinalis*) / Rob Colvin, TWRA

Summary: The SWAP Review and Revision Process 2025-2035

1. Align SWAP reviews with the overall TWRA agency planning cycle. Specifically, integrate TWRA's cycles for SWAP planning with strategic planning, operational planning, and annual planning.
2. Improve and expand data sharing through shared databases and GIS information. Partner engagement in SWAP implementation and planning will be greatly enhanced through the Steering Committee. TWRA will build upon relationships to reciprocally share and upgrade, on a regular basis, databases and GIS information with the most recent information collected by partners.
3. Develop an online dashboard accessible by the public to increase conservation opportunities in the state and on private lands, with an eye to developing a digital SWAP in 2035.

10.1. Integrating Conservation Implementation, SWAP Review, and TWRA Planning Cycles

SWAP interim reviews and updates will be incorporated into the agency's comprehensive planning cycle (see Fig. 10.1), by coordinating and sharing information across planning processes and divisions within the agency. Table 10.1. shows the overlap and relationship of the various planning cycles over the SWAP's 10-year timeframe for implementation and revision.

Strategic Planning Cycle

TWRA's Strategic Planning cycle recurs at six-year intervals. The Strategic Plan sets forth the agency's legal responsibilities, policies, and program structure; it also identifies goals, objectives, problems, and strategies for each program. The SWAP helps inform the planning components for the next iteration of TWRA's strategic plan process, and both the Strategic Plan and SWAP help to guide annual budgetary and operational planning in subsequent years. In year three of the Strategic Planning cycle, a mid-term evaluation is conducted to determine program progress toward Strategic Plan goals. An end-of-cycle evaluation also occurs in year six.

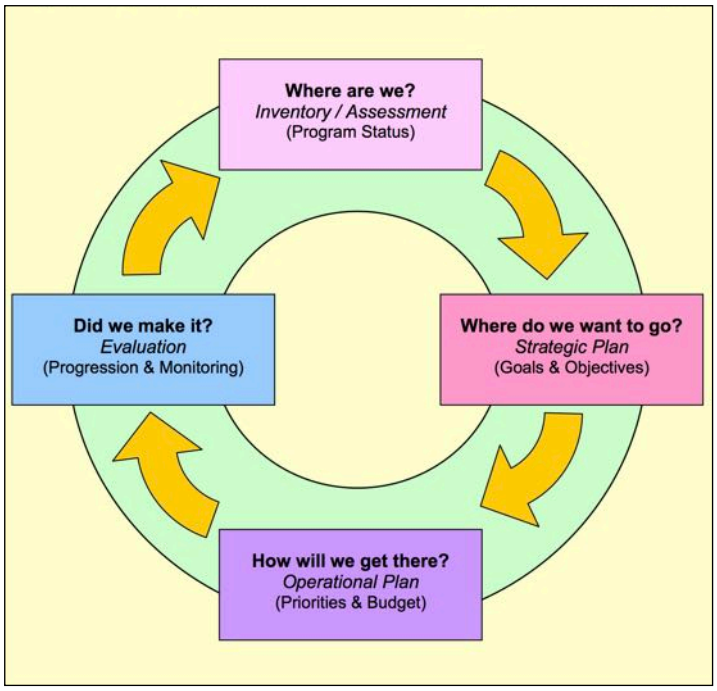


Figure 10.1 Graphic representation of the TWRA's planning system and iterative cycle

Operational Planning Cycle

Operational Plans are site-specific plans that guide the management of discrete state-owned units, such as WMAs. The primary management objectives for WMAs typically focus on game species. The role of diversity staff in operational planning is mainly to ensure that the impacts to Species of Greatest Conservation Need (SGCN)—both animals and plants—and significant natural communities are minimal, while promoting management strategies that improve SGCN habitat. Operational Plans are informed by both Strategic Plan Goals and SWAP priorities.

Table 10.1 TWRA planning cycles

	The Strategic Plan focuses on priority habitats identified in the SWAP; uses project evaluations and SWAP 3-year reviews to assess progress	Operational plans guide specific stewardship activities to achieve Strategic Plan goals; GCN species and habitat priorities are guided by the SWAP	Project evaluations inform TWRA management, COA projects and partnerships; are entered spatially in GIS relational database and reported	Annual budgets are informed by past project priorities and results; they factor in SWG and partner funding proposals	SWAP triennial reviews/ updates: include key partners, review of annual project evaluations, response to emerging issues, and development of new projects and funding partnerships as needed
Year	**Strategic Plan Cycle (2024 = year 1)**	**Operational Planning (WMA and other plans)**	**Annual Project Evaluations, (SWGs +)**	**Annual Budget Planning Cycle**	**State Wildlife Action Plan Cycle (2026 = year 1)**
2025				Data/results from previous year project evaluations informs budgeting	SWAP Update Approval; finalize steering committee and working groups framework and objectives; complete biennial review of state Threatened and Endangered species list (Tenn. Code Ann. § 70-8-105) and SGCN list review.
2026		SWAP GCN species habitat priorities, objectives, and stewardship recommendations developed for incorporation into Operational Plans developed to achieve Strategic Plan goals on TWRA-owned lands	First annual review of projects under SWAP 2025, according to Effectiveness Measures guidelines	Data/results from previous year project evaluations informs budgeting	

Table 10.1 TWRA planning cycles

	The Strategic Plan focuses on priority habitats identified in the SWAP; uses project evaluations and SWAP 3-year reviews to assess progress	Operational plans guide specific stewardship activities to achieve Strategic Plan goals; GCN species and habitat priorities are guided by the SWAP	Project evaluations inform TWRA management, COA projects and partnerships; are entered spatially in GIS relational database and reported	Annual budgets are informed by past project priorities and results; they factor in SWG and partner funding proposals	SWAP triennial reviews/ updates: include key partners, review of annual project evaluations, response to emerging issues, and development of new projects and funding partnerships as needed
Year	**Strategic Plan Cycle (2024 = year 1)**	**Operational Planning (WMA and other plans)**	**Annual Project Evaluations, (SWGs +)**	**Annual Budget Planning Cycle**	**State Wildlife Action Plan Cycle (2026 = year 1)**
2027	3-year evaluation of agency program progress toward achieving Strategic Plan goals; Next Strategic Plan Cycle begins; incorporates annual project reviews and SWAP review data		Annual review of projects/ effectiveness	Data/results from previous year project evaluations informs budgeting	Complete biennial review of state Threatened and Endangered species list (Tenn. Code Ann. § 70-8-105) and SGCN list review.
2028	New Strategic Plan approved (2028-2034)		Annual review of projects/ effectiveness	Data/results from previous year project evaluations informs budgeting	1st triennial review: Evaluation of the Steering Committee and its working groups assessing conservation progress and effectiveness, communications, data transfers, and reporting
2029			Annual review of projects/ effectiveness	Data/results from previous year project evaluations informs budgeting	Complete biennial review of state Threatened and Endangered species list (Tenn. Code Ann. § 70-8-105) and SGCN list review.

Table 10.1 TWRA planning cycles

	The Strategic Plan focuses on priority habitats identified in the SWAP; uses project evaluations and SWAP 3-year reviews to assess progress	Operational plans guide specific stewardship activities to achieve Strategic Plan goals; GCN species and habitat priorities are guided by the SWAP	Project evaluations inform TWRA management, COA projects and partnerships; are entered spatially in GIS relational database and reported	Annual budgets are informed by past project priorities and results; they factor in SWG and partner funding proposals	SWAP triennial reviews/ updates: include key partners, review of annual project evaluations, response to emerging issues, and development of new projects and funding partnerships as needed
Year	**Strategic Plan Cycle (2024 = year 1)**	**Operational Planning (WMA and other plans)**	**Annual Project Evaluations, (SWGs +)**	**Annual Budget Planning Cycle**	**State Wildlife Action Plan Cycle (2026 = year 1)**
2030		Quinquennial review of Operational Plans and projects evaluating effectiveness.	Annual review of projects/ effectiveness	Data/results from previous year project evaluations informs budgeting	
2031	3-year evaluation of agency program progress toward achieving Strategic Plan goals		Annual review of projects/ effectiveness	Data/results from previous year project evaluations informs budgeting	2nd triennial review: Evaluation of the Steering Committee and its working groups assessing conservation progress and effectiveness, communications, data transfers, and reporting; complete biennial review of state Threatened and Endangered species list (Tenn. Code Ann. § 70-8-105) and SGCN list review.

Table 10.1 TWRA planning cycles

	The Strategic Plan focuses on priority habitats identified in the SWAP; uses project evaluations and SWAP 3-year reviews to assess progress	Operational plans guide specific stewardship activities to achieve Strategic Plan goals; GCN species and habitat priorities are guided by the SWAP	Project evaluations inform TWRA management, COA projects and partnerships; are entered spatially in GIS relational database and reported	Annual budgets are informed by past project priorities and results; they factor in SWG and partner funding proposals	SWAP triennial reviews/ updates: include key partners, review of annual project evaluations, response to emerging issues, and development of new projects and funding partnerships as needed
Year	**Strategic Plan Cycle (2024 = year 1)**	**Operational Planning (WMA and other plans)**	**Annual Project Evaluations, (SWGs +)**	**Annual Budget Planning Cycle**	**State Wildlife Action Plan Cycle (2026 = year 1)**
2032		Review and revise recommendations developed for incorporation into Operational Plans developed to achieve Strategic Plan goals on TWRA-owned lands	Annual review of projects/ effectiveness	Data/results from previous year project evaluations informs budgeting	
2033			Annual review of projects/ effectiveness	Data/results from previous year project evaluations informs budgeting	Complete biennial review of state Threatened and Endangered species list (Tenn. Code Ann. § 70-8-105) and SGCN list review.
2034	3-year evaluation of agency program progress toward achieving Strategic Plan goals; coordinate with SWAP Update		Annual review of projects/ effectiveness	Data/results from previous year project evaluations informs budgeting	3rd triennial review: Evaluation of the Steering Committee and its working groups assessing conservation progress and effectiveness, communications, data transfers, and reporting

Table 10.1 TWRA planning cycles

	The Strategic Plan focuses on priority habitats identified in the SWAP; uses project evaluations and SWAP 3-year reviews to assess progress	Operational plans guide specific stewardship activities to achieve Strategic Plan goals; GCN species and habitat priorities are guided by the SWAP	Project evaluations inform TWRA management, COA projects and partnerships; are entered spatially in GIS relational database and reported	Annual budgets are informed by past project priorities and results; they factor in SWG and partner funding proposals	SWAP triennial reviews/ updates: include key partners, review of annual project evaluations, response to emerging issues, and development of new projects and funding partnerships as needed
Year	**Strategic Plan Cycle (2024 = year 1)**	**Operational Planning (WMA and other plans)**	**Annual Project Evaluations, (SWGs +)**	**Annual Budget Planning Cycle**	**State Wildlife Action Plan Cycle (2026 = year 1)**
2035		Quinquennial review of Operational Plans and projects evaluating effectiveness.	Annual review of projects/ effectiveness	Data/results from previous year project evaluations informs budgeting	SWAP Update #2: incorporate 3 previous triennial Steering Committee reviews; complete biennial review of state Threatened and Endangered species list (Tenn. Code Ann. § 70-8-105) and SGCN list review.

Annual Project Evaluation Cycle

Within 90 days of the fiscal year closing, every TWRA project is subjected to an annual evaluation according to established performance measures. Beginning in 2026, this process will include evaluation according to the Effectiveness Measures guidelines recommended by AFWA (see Chapter 9), while project spatial data will be entered into the SWAP GIS relational database. These evaluations will assess the effectiveness of SWG-funded and other projects, inform future SWAP priorities, and provide a measure of progress toward Strategic Plan goals.

By including partners in SWAP 3-year reviews, the agency is fostering the incorporation of SWAP priorities into the strategic planning efforts of other agencies and organizations.

SWAP Planning Cycle

The effectiveness of the steering committee and its working groups will be reviewed iteratively on a cycle of three-year reviews and will focus on evaluating conservation progress and effectiveness, communications across all partners and collaborators, annual data transfers, and the development and completion of annual reports. The results of three triennial reviews would then be incorporated into a draft SWAP update in year 10.

The USFWS is supportive of this approach and will collaborate with partners to share data, align resources, provide feedback and expertise when adaptively managing species and/or habitats, and support designing the digital 2035 SWAP.

Additionally, and as required by Tenn. Code Ann. § 70-8-105, TWRA will perform a review of the state In Need of Management, Threatened, and Endangered Species lists biennially. This will require convening agency biologists and SMEs biennially to ensure reviews are performed in accordance with previously established procedures. Because all species designated by the state In Need of Management, Threatened, and Endangered Species list are also SGCN, biennial reviews will include reviews of SGCN. This approach increases the frequency of SGCN reviews from every ten years to every two years. All information produced from these reviews will be incorporated into the next 10-year revision of the SWAP.



Morefield's leather-flower (*Clematis morefieldii*), a federally endangered plant species that also occurs on the Tennessee Natural Heritage Program's Rare Plant List / TDEC

10.2. SWAP GIS Relational Database Updates



Grassland “bald” at Roan Mountain, a type of natural grassland in the Southeast / Alan Cressler

In addition to documenting project evaluation data annually, and to ensure that Tennessee's SWAP remains a “living plan,” TWRA will build upon relationships already established between the Agency and TNC, the Natural Heritage Inventory Program within the Tennessee Department of Environment and Conservation (TDEC) Division of Natural Areas, and the Tennessee Valley Authority to reciprocally share and update, on a regular basis, databases with the most recent information each organization has collected.

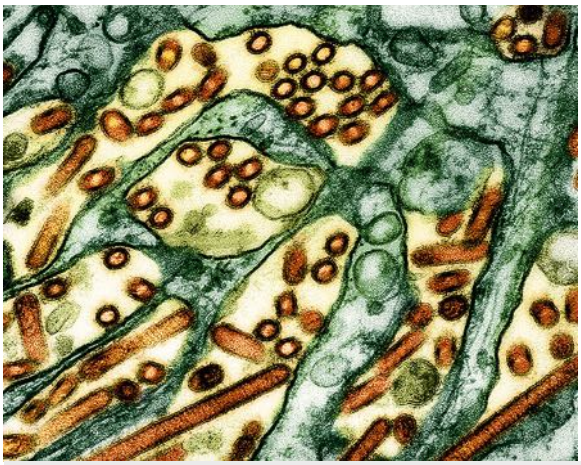
TWRA will continue partnerships with agencies, such as Tennessee Division of Forestry, Tennessee Department of Transportation, U.S Department of Agriculture (USDA) Natural Resources Conservation Service, and the USFWS, while exploring partnerships with other organizations as appropriate. TWRA also will explore opportunities to share information on priorities and projects through different types of website interfaces for partners and the general public, with access and data protocols designed to protect sensitive information and ensure appropriate application of the data.

10.3. Emerging Issues

New issues inevitably arise between each 10-year comprehensive review cycle for State Wildlife Action Plans. SWAP Best Practices guidance indicates that these emerging issues can be addressed through “documented coordination with the US Fish and Wildlife Service . . . as long as the issue is included in the next revision” (AFWA 2012).

At the time of this writing, Highly Pathogenic Avian Influenza (HPAI) is a growing threat having devastating effects on wildlife, human health, and the economy. In 2022, the first HPAI infection since 2016 was found in wild birds in the U.S (CDC 2025b). Wild birds can be infected with HPAI and show no signs of illness (USDA APHIS 2025). On the other hand, HPAI can also cause significant mortality among birds—particularly waterfowl, waterbirds, and raptors (AOS 2022). This virus has infected wild birds around the globe, hitting colonially nesting seabirds and birds of prey particularly hard. In June 2022, the first large-scale outbreak in wild mammals (so called “spillover”

into new taxa) occurred in Harbor and Gray Seals along the US coast of Maine (Puryear and Runstadler 2024). By the end of 2023, HPAI had been confirmed in 502 wild bird and 60 mammal species worldwide, primarily carnivores. (Puryear and Runstadler 2024).



Colorized transmission electron micrograph of avian influenza A H5N1 virus particles (yellow/red), otherwise known as highly pathogenic avian influenza (HPAI) / CDC

Next, in March 2024 a multistate outbreak of HPAI in dairy cows was reported—the first time that a bird flu virus had been found in cows. In the United States, since 2022, USDA APHIS has reported HPAI virus detections in more than 200 mammals, including dogs and cats (CDC 2025). By April 2, 2025, 168,257,258 poultry had been affected in 51 US jurisdictions along with 996 dairy herds with outbreaks among dairy cattle in 17 states. Poultry infections are deadly. In dairy cattle they cause illness and a decline in milk production, but strict containment and decontamination protocols can help prevent spread among dairy herds (USDA APHIS 2024b).

At least 51 US jurisdictions have recorded avian flu in wild bird populations. "High-pathogenicity Avian Influenza has expanded into wildlife in unprecedented numbers and species diversity, with unmatched disease severity for influenza in wildlife" (Puryear and Runstadler 2024). As of April 2, 2025, HPAI had also infected 70 people in the US, with one fatality (CDC 2025).

HPAI is a classic "One Health" issue (see Appendix H) in that the pathogen is shared among many wildlife species as well as humans, and the virus can be spread between species. Currently, there is no cure for wildlife or people infected with the virus; therefore, prevention and further research are critical.



Monarch butterfly in a power line right-of-way / Adam Dattilo

Other examples of potential emerging issues in the future may involve consideration of the special habitat needs of insect pollinators. Pollinators play a crucial role in the overall health of ecosystems and maintenance of plant diversity in many habitat types (The Heinz Center 2013). Assessing the status of pollinators in Tennessee and their potential management needs could be considered emerging issues in future plan iterations.

Addressing complex challenges requires a commitment to collaboration among many agencies and stakeholders, particularly through advance planning and a willingness to share

information in transparent decision-making processes. For the SWAP, emerging issues will be addressed on the planning cycle described, documented with the USFWS, and summarized in subsequent revision documents.

10.4. Lessons Learned from Tennessee's SWAP Review and Revision

The following is a list of ideas and potential next-step actions from Tennessee's SWAP planning team that could improve TWRA's processes in preparing for the next iteration of SWAP revision:

- Organize all plans, monitoring reports, and other useful documents on a comprehensive internal server and staff-accessible drive to facilitate compiling pertinent information for the next revision.
- Assess robustness of internal and external datasets used in creation and maintenance of the SWAP and weed out unreliable data. Such will require internal quality control (QC) between data collection and data distribution so that any errors are not promoted to external aggregate datasets where QC may be nearly impossible.
- Improve TWRA staff training in use and application of SWAP GIS data and Steering Committee databases.
- Maintain regularly updated maps of conservation action and project locations.
- Complete development of a comprehensive database, simplifying data transfers with partners and increasing conservation planning decision-making activities.



Scott Dykes holding the first recorded over-wintering Virginia Big-eared Bat (*Corynorhinus townsendii virginianus*) in Tennessee / Scott Dykes, TWRA

- Ensure that data entry protocols for projects are established and clear and that all individuals conducting data entry work are trained in data QC standards as appropriate.
- Communicate regularly and intentionally with agency partners, non-governmental organizations, and other stakeholders about ongoing work to foster collaborative efforts and engagement in conservation efforts.

These types of specific activities, in conjunction with a more standardized review process aligned with TWRA's overall planning cycles, will help the agency more efficiently address the SWAP revision requirements of the USFWS over time, improve public awareness and engagement with species and habitat conservation in Tennessee, and ultimately increase the success of conservation efforts.

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Glossary

acid deposition - also known as acid rain, is an environmental phenomenon caused by air pollutants, mainly nitrates (NOX) and sulfates (SOX) primarily from burning fossil fuels. Acid deposition is characterized by extremely high acidity which is particularly harmful to sensitive ecosystems.

aquatic ecological system - dynamic spatial assemblages of ecological communities (e.g. rivers, streams, and lakes) with similar geomorphological patterns tied together by ecological processes (e.g. hydrologic and nutrient regimes, access to floodplains) or environmental gradients (e.g. temperature, chemical and habitat volume), and form a cohesive, distinguishable unit on a hydrography map.

barrens - Tennessee's barrens ecosystems are a mosaic of open canopy woodlands with a grassy understory and areas of essentially treeless grassland.
biodiversity - The variety of life that exists in any one place at one time. Biodiversity can be measured in a number of ways, and may encompass genetic, species, community, and ecosystem diversity.

Best Management Practices (BMPs) - site-specific guidelines—usually voluntary in Tennessee—for methods to conduct land or water management in a way that reduces impacts, protects resources, and maintains or improves environmental quality for target wildlife, plant species, or habitat types.

bioaccumulation - the process by which organisms (including humans) can take up contaminants more rapidly than their bodies can eliminate them.

biodiversity - the full range of natural variety and variability within and among living organisms, and the ecological and environmental complexes in which they occur. It encompasses multiple levels of organization, including genes, species, communities, and ecological systems or ecosystems.

bioenergy - a general term that encompasses both biofuel and biomass as sources of energy generation.

biofuels - biofuels, generally defined as liquid fuels derived from biological materials, can be made from plants, vegetable oils, forest products, or waste materials. The raw materials can be grown specifically for fuel purposes, or can be the residues or wastes of existing supply and consumption chains, such as agricultural residues or municipal garbage.

biomagnification - also known as bioamplification or biological magnification, is the sequence of processes in an ecosystem by which higher concentrations of a particular chemical, such as DDT or mercury, are reached in organisms higher up the food chain, generally through a series of prey-predator relationships.

biomass - solid organic materials produced in a renewable manner for energy generation. Two categories of biomass fuels, woody fuels and animal wastes, comprise the vast majority of available biomass fuels.

buffer - conservation buffers are small areas or strips of land in permanent vegetation, designed to slow water runoff, provide shelter and stabilize riparian or other habitat areas. Strategically placed buffer strips in the agricultural landscape can effectively mitigate the movement of sediment, nutrients, and pesticides within farm fields and from farm fields.

conservation action - any act taken to directly abate a stress or source of stress to a target species or habitat, or to prevent the future development of a stress upon a species or its habitat.

conservation goal - in conservation planning, the number and spatial distribution of on-the- ground occurrences of targeted species, natural communities, and ecological systems that are needed to adequately conserve the target in an ecoregion.

Conservation Opportunity Area (COA) - Priority areas for conservation, spatially depicted on the landscape, that offer the best opportunities and potential for conservation of species of greatest conservation need and their habitats.

dam - any structure that impounds or diverts water.

decline/declining - the historical or recent decrease of a conservation target through all or part of its range. Declining species exhibit significant, long-term decreases in habitat and/or numbers, are subject to a high degree of threat, or may have unique habitat or behavioral requirements that expose them to great risk.

diadromous - Fish that can live in and are migratory between fresh waters and salt waters.

disjunct - distributional range of a species or community which is found in an ecoregion a significant distance from its primary range in other disconnected ecoregions. Disjunct species have populations that are geographically isolated.

distribution pattern - the overall pattern of occurrence for a particular conservation target. In ecoregional planning, distribution patterns are often described in terms of the relative proportion of the target's natural range occurring within a given ecoregion (i.e. endemic, limited, disjunct, peripheral, and widespread).

dry bed retention dam - a dry detention basin temporarily detaina and storea collected stormwater runoff for a period of time, releasing the stormwater slowly to reduce flooding and remove pollutants. It is referred to as "dry" because it dries out between rain events. Pollutants are removed by allowing particulates and solids to settle out from the water. Detention does not normally occur until the inflow rate exceeds the design outflow rate.

dry-mesic (forest) - Oak or oak-hickory forest type, characterized by well-drained soils and episodic fire.

ecological systems - ecological systems are dynamic assemblages of native plant and/or animal communities that 1) occur together on the landscape or in the water, 2) are tied together by similar ecological processes (e.g., fire, hydrology), underlying environmental features (e.g., soils, geology), or environmental gradients (e.g., elevation).

ecoregion - a relatively large geographic unit of land and water defined by the climate, vegetation, geology, and other ecological and environmental patterns.

element occurrence (EO) - a term originating from methodology of the Natural Heritage Program network that refers to species, natural communities, or other entities (e.g. migratory bird stopovers, ecological systems) of biodiversity that serve as both conservation targets and as units for organizing and tracking information.

endemic - distributional range of a species or community which primarily or only occurs in one ecoregion.

eutrophication - the process by which a body of water acquires a high concentration of nutrients, especially phosphates and nitrates. These typically promote excessive growth of algae. As the algae die and decompose, high levels of organic matter and the decomposing organisms deplete the water of available oxygen, causing the death

of other organisms, such as fish. Eutrophication may be a natural, slow-aging process for a water body, but human activity can greatly speed up or amplify the process.

global rank - a numeric assessment of a biological element's relative imperilment and conservation status across its range of distribution ranging from G1 (critically imperiled) to G5 (secure). Assigned by the Natural Heritage Programs, global ranks for species and natural communities are determined primarily by the number of occurrences or total area of coverage (communities only), modified by other factors such as condition, historic trend in distribution or condition, vulnerability, and threats.

green infrastructure - a strategically planned and managed network of natural lands, working landscapes, and other open spaces that conserve ecosystem values and functions and provide associated benefits to human populations.

habitat fragmentation - occurs when large ecosystems are separated into smaller pieces, separating and isolating groups of species and habitats from one another, which impacts breeding patterns and may lead to inbreeding.

headwaters - the source of a river or stream.

hibernacula - (single hibernaculum) places of abode in which a creature seeks refuge, such as bats using a cave to overwinter.

incompatible management practices - incompatible practices modify habitat composition or type in a way that is not compatible with the needs of target wildlife or plant species.

instream flow - the natural variations of water levels in rivers and streams, critical to the maintenance of biodiversity and other values, such as recreation, in aquatic ecosystems. This simple concept belies the difficulty of determining what that flow should be among competing uses for water, such as irrigation, public supply, recreation, hydropower, and aquatic habitat.

invasive exotic species - nonindigenous species which have been introduced either intentionally or accidentally into areas outside their natural range and that have the capacity to outcompete native species either reproductively or for natural resources.

karst - landscape formed from the dissolution of soluble rocks including limestone, dolomite and gypsum. Karst is characterized by sinkholes, caves, and underground drainage systems.

keystone species - species with an important role in ecosystem function, such as pollinators and top carnivores.

limited - distributional range of a species or natural community which occurs in the ecoregion and within a few other adjacent ecoregions.

mesophytic (forest) - a forest that generally receives a moderate amount of moisture.

natural communities - terrestrial plant communities of definite floristic composition, uniform habitat conditions, and uniform physiognomy. Natural communities are defined by the finest level of classification, the "plant association" level of the National Vegetation Classification. Like ecological systems, natural plant communities are characterized by both a biotic and abiotic component. Even though natural communities are classed based upon dominant vegetation, they are also used as inclusive conservation units that include all component species (plant and animal) and the ecological processes that support them.

natural process - processes in nature that play a vital role in ecosystem function by causing change or disturbance on a cyclical basis, such as flooding, fire, or plant succession. Habitat restoration can sometimes be achieved by incorporating natural processes into conservation designs. For example a stretch of levee can be removed from a river, which reconnects the floodplain to river flow and flood processes, facilitating the restoration of floodplain habitats for both terrestrial and aquatic organisms.

occurrence - a spatially referenced location of a species or a location of a natural plant community or ecological system. Many occurrences are tracked by the various Natural Heritage Programs and are known as Element Occurrences. Occurrences may also be more loosely defined locations delineated through the definition/mapping or other spatial data or through the identification of areas by experts.

parcelization - generally refers to the division of ownerships that result in smaller holdings of land which, in turn, results in constrained management options and potentially adverse effects on ecosystem health and wildlife habitat. Parcelization is caused by subdividing large tracts into smaller forest tracts, ranchettes for residential use, or sale of large tracts to buyers who further subdivide the land.

prescribed fire - fire that is purposely lit under controlled conditions and guided by a burn plan to improve ecological health, reduce fuel loads that contribute to catastrophic fire, or achieve desired habitat conditions.

propagation - the breeding of plants or animals for reintroduction into suitable habitats as supplementation of existing populations or as a means of restoring locally extirpated populations.

population – a collection of occurrences of a species within reasonable proximity for breeding or interaction. Populations were delimited by NatureServe's element occurrence separation buffer distances.

problem - the combined concept of ecological stresses to a target and the sources of that stress to the target.

refugia - (single refugium) areas in which a population of organisms can survive through a period of unfavorable conditions, such as glaciation.

rockhouse - a rockhouse is an area that typically has been eroded away by a stream under a large rock or bluff line. Common on the Cumberland Plateau, they are typically found in sandstone where the old stream meandered next to a rock bluff. They should not be confused with caves; in Tennessee, such a formation must be deeper than 50 feet to be considered a cave.

sinkhole - a cavity in the ground, especially in limestone bedrock, caused by water erosion and providing a route for surface water to disappear underground.

source (of stress) - an extraneous factor, either human (i.e. activities, policies, land uses) or biological (e.g. non-native species), that infringes upon a conservation target in a way that results in stress.

Species of Greatest Conservation Need (SGCN) - a designation determined by each state's fish and wildlife agency, which identifies the species and their associated habitats that are most at risk, threatened, or deserving of conservation action for other reasons.

species richness - the number of different species represented in an ecological community, landscape or region; this is a simple count of species and does not reflect relative abundance.

split estate - in split estate situations, the surface rights and subsurface rights (such as the rights to develop minerals) for a piece of land are owned by different parties. In these situations, mineral rights are considered the dominant estate, meaning they take precedence over other rights associated with the property, including those associated with owning the surface. However, the mineral owner must show due regard for the interests of the surface estate owner and occupy only those portions of the surface that are reasonably necessary to develop the mineral estate.

sprawl - low-density decentralized development at the fringes of a central city. It is characterized by a spreading out of development over a wide area with little or no connectivity to the contiguously developed area. Sprawl is usually characterized by: (1) low-density residential development; (2) rigid and large-scale separation of homes, shops, and workplaces; (3) a lack of distinct, thriving activity centers, such as strong downtowns or suburban town centers; and (4) a network of roads marked by very large block size and poor pedestrian access from one place to another.

stream connectivity - streams, from headwaters to large rivers, provide pathways for the transport of a wide range of materials, energy and aquatic life. This transport moves upstream and downstream, between surface and groundwater, between channel and floodplain and in time, i.e. seasonal flooding or scouring.

stress - something which impairs or degrades the size, condition, or landscape context of a conservation target, resulting in reduced viability.

stocking - relative to fish or other aquatic organisms, the practice of raising organisms in a hatchery and releasing them into appropriate lake, stream, or other aquatic habitat.

stygobiont – a species bound to subterranean groundwater habitat at all life stages, which exhibits at least some morphological, physiological, and behavioral adaptations for living in subterranean habitats

stygophile - an animal that lives in ground water systems that inhabits both surface and subterranean aquatic environments

stygoxene – animals like stygophiles, but which are defined as having accidental or occasional presence in subterranean waters

substrate embeddedness - the degree to which fine sediments surround coarse substrates on the surface of a streambed is referred to as embeddedness.

succession - the process of change in the species structure of an ecological community over time. Generally resulting in increasing complexity over time until a community becomes relatively stable or self-perpetuating in the absence of disturbance.

tailwater - waters located immediately downstream from a hydraulic structure, most often a dam in Tennessee.

target – Specific components of biodiversity used to design ecoregional conservation approaches and develop and prioritize conservation strategies. Conservation targets consist of ecological systems, natural communities, and species.

translocation - the capture, transport, and release or introduction of species, habitats or other ecological material from one location to another. This practice may be done for conservation or other purposes (such as recreation).

troglobiont – a species bound to subterranean terrestrial (cave) habitats at all life stages, which exhibits at least some morphological, physiological, and behavioral adaptations for living in subterranean habitats

troglophile - an animal able to live its entire life in a cave, but usually maintain some of their senses such as partial pigmentation and are usually only partially blind.

trogloxene - an animal that uses caves for shelter but does not complete its life cycle in them, for example bats.

umbrella species - a species or group of species, such as forest interior dwelling birds, whose habitat needs overlap those of other animals and plants.

viable/viability - the ability of a species to persist for many generations or a natural community or ecological system to persist over some time period. An assessment of viability will often focus on the minimum area and number of occurrences necessary for persistence.

viewshed - the geographical area that is visible from a location. It includes all surrounding points that are in line-of-sight with that location and excludes points that are beyond the horizon or obstructed by terrain and other features (e.g., buildings, trees).

volant - able to fly or glide.

widespread - distributional range of a species or natural community which is typically found in the ecoregion, but common in many others also; the bulk of distribution may be elsewhere however.

vulnerability - the inability to withstand the effects of a hostile environment, generally measured by degree of exposure to hostile elements or change, inherent sensitivity to that exposure, and adaptive capacity to accommodate change.

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Appendix A

Summary of Major Comments by Conservation Partners/Public Reviewers and Responses to Comments

Organization Represented	University of Tennessee	Private Citizen	Xerces Society for Invertebrate Conservation
TN 2025 SWAP Comments Submitted by	Sarah Bolivar	Lorena Sutton	Avery Young
email	sbolivar@utk.edu	sutton5446@gmail.com	avery.young@xerces.org

Organization Represented	University of Tennessee	Private Citizen	Xerces Society for Invertebrate Conservation
TN 2025 SWAP Comments Submitted by	Sarah Bolivar	Lorena Sutton	Avery Young
Summary of comments	Voiced strong support forthe outreach and education goals presented in Chapters 9 and 10. Requested greater detail on plans for efforts to engage public on the role citizen science can play in SWAP implementation.	Noted anecdotal evidence of excessive Longnose Gar in Tim Ford's Lake,an increase of Periwinkle snails in the Rutledge Falls/Normandy Lake watersheds, and an increase in leeches in many TN waterways.	Requested the inclusion of four bumblebee species as SGCN: *Bombus fraternus, Bombus pensylvanicus, Bombus terricola, Bombus fervidus*. The first three of these species are all listed as RSGCN. B. fervidus is listed as "vulnerable" by the IUCN and TN is at the edge of its range.

Organization Represented	University of Tennessee	Private Citizen	Xerces Society for Invertebrate Conservation
TN 2025 SWAP Comments Submitted by	Sarah Bolivar	Lorena Sutton	Avery Young
Changes made in response	Added identified needs and aspirations of each SWAP Working Group, as developed during the revision, to Chapter 9.	Given the anecdotal nature of the evidence, these comments were not incorporated. However, they do fit the general pattern noted in the SWAP of ecosystems out of balance due to direct human impacts and loss of natural processes.	Spurred review of draft SGCN list and subsequent correlation effort between previous versions. Helped to identify multiple species inadvertantly hidden from SGCN list. All species of concern in the comment are in the final TN SGCN list.

Organization Represented	past resident, currently the Environmental Programs Administer for the City of Phoenix	Tennessee Valley Chapter of Wild Ones board member; TN business owner providing Nature Therapy; TN resident	TWRA (retired)
TN 2025 SWAP Comments Submitted by	Nancy Allen	Holli Richey	Bart Carter
email	easternboxturtle@yahoo.com	herichey@gmail.com	bcgowest@outlook.com

Organization Represented	past resident, currently the Environmental Programs Administer for the City of Phoenix	Tennessee Valley Chapter of Wild Ones board member; TN business owner providing Nature Therapy; TN resident	TWRA (retired)
TN 2025 SWAP Comments Submitted by	Nancy Allen	Holli Richey	Bart Carter
Summary of comments	Provided a detailed review of chapters 1 through 4,	Remarked on the global importance of Tennessee conservation and the issue of development contributing to loss of farmland and loss of a diverse native forest understory.	Noted an additional protection example and noted some inconsistencies in the lists of SGCN for the COAs.

Organization Represented	past resident, currently the Environmental Programs Administer for the City of Phoenix	Tennessee Valley Chapter of Wild Ones board member; TN business owner providing Nature Therapy; TN resident	TWRA (retired)
TN 2025 SWAP Comments Submitted by	Nancy Allen	Holli Richey	Bart Carter
Changes made in response	All comments were incorporated with the following exceptions: 1)Adding date and location to each photo. Whenever possible, location data was added to captions, but original date captured was not available for most photos. 2) Discussions of taxa groups and their conservation needs individually, although with merit, is not feasible at this late date. However, creating stand-alone summaries of select faunal groups as viewed through the lens of SWAP has been noted as a potential future educational project. 3) Also noted that in subsequent revisions, the importance of various types of public lands to conservation could be fleshed out in greater detail.	Comments were incorporated into Ch 1 and Ch 4.	All comments were incorporated, with the exception of adding a protection example in Chapter 2. Based upon the spurious records noted within COA factsheet SGCN lists, a full review of fish SGCN was completed and the list has been regenerated.

Organization Represented	Boating / Fishing guidelines.	Wolf River Conservancy	USFWS
TN 2025 SWAP Comments Submitted by	Barry Gray	Ryan Hall	Emily Granstaff
email	barry.gray@comcast.net	ryan.hall@wolfriver.org	emily_granstaff@fws.gov

Organization Represented	Boating / Fishing guidelines.	Wolf River Conservancy	USFWS
TN 2025 SWAP Comments Submitted by	Barry Gray	Ryan Hall	Emily Granstaff
Summary of comments	Requested guidelines or regulations for night bow fishing and related boat lighting, which is having significant impacts on sleeping residents, including children.	Noted the need to add illegal dumping as a conservation problem both statewide and in the Wolf River COA. Also requested an additional conservation action for rare Sand Post Oak communities in the watershed.	Suggestions were made to add aspirational goals for the SWAP Steering Committee; improve visuals and sources for data; improve map legends and discussion; clarify mussel species classification/scientific name/ status; and overall improve/ clarify language in some chapters, with some suggested additions for conservation projects and partners in the new COAs.

Organization Represented	Boating / Fishing guidelines.	Wolf River Conservancy	USFWS
TN 2025 SWAP Comments Submitted by	Barry Gray	Ryan Hall	Emily Granstaff
Changes made in response	No addition to the SWAP was made; this policy issue is beyond the scope of the SWAP but was referred to those in TWRA with authority over these matters.	All comments incorporated, added problem in Ch. 4; added problem as well as conservation action to the Wolf River COA.	All suggested changes were incorporated into all chapters, as well as Appendix H, the COA summaries.

Organization Represented	SELC	Ruffed Grouse Society & American Woodcock Society
TN 2025 SWAP Comments Submitted by	Delaney King, Stepahnie Biggs, George Nolan, Ramona McGee, & Emma C. Wellbaum	Sean Barry
email	dking@selc.org; sbiggs@selc.org; gnolan@selc.org; rmcgee@selc.org; ewellbaum@selc.org	SeanB@ruffedgrousesociety.org

Organization Represented	SELC	Ruffed Grouse Society & American Woodcock Society
TN 2025 SWAP Comments Submitted by	Delaney King, Stepahnie Biggs, George Nolan, Ramona McGee, & Emma C. Wellbaum	Sean Barry
Summary of comments	Noted legal basis for the SWAP, commended TWRA on its conservation programs and commended its inclusion of climate stressors in collaboration with SECAS, asking that TWRA continue working to address climate-related threats. Comments reiterated more forcefully many of the points made in the draft SWAP, including additional context on the importance of TN within the Southeast region. They further supported the karst habitat priorities, the focus on bat conservation, and the inclusion of recommendations from the Tennessee Forest Action Plan. They encouraged TWRA to continue prioritizing land acquisition or working with landowners to provide protection to overlapping, high-priority areas. They noted ongoing and increasing threats to Eastern Hellbender/salamander habitat, as well as climate change impacts. They expressed appreciation for the inclusion of Highlights on mussel species, and encouraged further public education efforts. They specifically recommended TWRA coordinate with TDEC when projects are planned in important biodiversity hotspots *before* they are implemented. They support the work to protect Brook Trout, species in the Interior Low Plateau where urbanization is great, and the Hatchie River watershed. They strongly support continued restoration, conservation, and aquisition of wetlands, particularly isolated wetlands which may be at greater risk. They also commend and support work to increase aquatic habitat connectivity, in particular removing obsolete dams, and using monitoring of such projects to further understand impacts. Closed by complimenting SWAP chapters and maps as great tools for conservation partners, and support for hosting an online dashboard for SWAP materials.	Comments focused on support for Ruffed Grouse as an SGCN and the need for greater recognition and discussion the lack of structural and age class diversity in Tennessee forests, particularly Appalachian forests, and the need to recognize the utility of clearcuts as a forest management technique that can sometimes be beneficial for wildlife.

Organization Represented	SELC	Ruffed Grouse Society & American Woodcock Society
TN 2025 SWAP Comments Submitted by	Delaney King, Stepahnie Biggs, George Nolan, Ramona McGee, & Emma C. Wellbaum	Sean Barry
Changes made in response	While we appreciate the thorough review and feedback, no additions or revisions were made to SWAP based upon these comments.	All comments were accepted by greatly expanding a section that had been labeled "intermediate age management" and renaming it "lack of structural and age class diversity." The lack of young trees and early successional habitat, as well as the need for a mosaic of forest habitats was recognized and expanded upon in Ch. 4, and this was the focus of the Woodland/Savanna highlight (in prep during the public comment period).

Organization Represented	TDEC DNA	Southern Beaver Alliance	TennGreen
TN 2025 SWAP Comments Submitted by	David Lincicome	Tony Able & Catherine Crafa	Jon Bumpas
email	David.Lincicome@tn.gov	southeastbeaver@gmail.com	Jon@tenngreen.org

Organization Represented	TDEC DNA	Southern Beaver Alliance	TennGreen
TN 2025 SWAP Comments Submitted by	David Lincicome	Tony Able & Catherine Crafa	Jon Bumpas
Summary of comments	We appreciate the attention to detail in the review.	Highlights the beaver as an important ally for conservation of aquatic and wetland ecosystems which house species of greatest conservation need ("SGCN"). Requests inclusion of further research on the benefits of beavers to SGCN and ecosystem services in Tennessee and specific provisions for beaver conservation when related to the restoration and maintenance of habitat of SGCN. Listed several specific ecosystem services provided by beavers, including wetland creation, flood mitigation, sediment trapping,wildlife refugia during wildfire, generally positive impact on wildli.fe, particular SGCN that are disturbance dependent, such as GWWA.	Noted the importance of the SWAP to the work of TennGreen in aligning with state goals, strategic partnerships, identification and protection of high priority habitats, seeking federal funding, and building science-backed cases for funding. Expressed appreciation for SWAP data and participation in SWAP Steering Committee.

Organization Represented	TDEC DNA	Southern Beaver Alliance	TennGreen
TN 2025 SWAP Comments Submitted by	David Lincicome	Tony Able & Catherine Crafa	Jon Bumpas
Changes made in response	All corrections and a large majority of comments were incorporated, including additional discussion of the need for biodiversity conservation, addition of biodiversity conservation map tools, discussions of threats to specialized groups of organisms such as pollinators and cave-dwelling species. We also included some additional local parks and natural areas in the COA summaries. Some suggestions were not taken because, while useful, they would have required too much time to include in this version of the SWAP (such as reorganizing tables), but we will save those changes for the online SWAP dashboard.	Appreciated the review and highlighting the important ecosystem services provided by beaver. Added historical information in discussion of threats posed to wetlands, noting that the overhunting of beaver to supply the fur trade following European settlement had subsequent negative impacts on natural bottomland wetland habitat and SGCN. Due to the complexities, and sometimes controversial, nature of managing conservation goals with this species, however, it was decided to no delve further into the topic within SWAP. The authors agree that this keystone species can play a vital role in restoration an health of certain SGCN habitats.	No additions or revisions to SWAP were made based upon these comments.

Organization Represented	TNC, Forest Action Plan Update Coordinator	LMVJV	Citizen
TN 2025 SWAP Comments Submitted by	Allana Funderburk	Anne Mini	Linda Kemp
email	a.funderburk@TNC.ORG	amini@abcbirds.org	kempl@earthlink.net

Organization Represented	TNC, Forest Action Plan Update Coordinator	LMVJV	Citizen
TN 2025 SWAP Comments Submitted by	Allana Funderburk	Anne Mini	Linda Kemp
Summary of comments	Additions and clarifications in ch 4 and ch 6 based on the Forest Action Plan, specifically improved definitions of clear cut, advantages of BMPs.	Provided comments in support of the SGCN list generally, and Eastern Whip-poor-will and Chuck-will's-widow in particular. Supported inclusion of the Mississippi Alluvial Valley COA and noted the utility of Forest Breeding Bird Decision Support Model for making restoration decisions.	A master watershed steward, she provided comments on the impact of trapping on SGCN and statistics about trapping contributions to soil disturbance and runoff. Asked for trapping in TN to be reconsidered in light of wildlife decline and its relatively indiscriminate nature.

Organization Represented	TNC, Forest Action Plan Update Coordinator	LMVJV	Citizen
TN 2025 SWAP Comments Submitted by	Allana Funderburk	Anne Mini	Linda Kemp
Changes made in response	All comments incorporated into Chapters 4 and 6.	Amended the Mississippi Alluvial Valley COA to add the LMVJV as a partner and listed the Forest Breeding Bird Decision Support Model in the COA summary.	No change to the SWAP due to lack of scientific support for soil disturbance numbers. Comment was referred to those in TWRA Wildlife Division with authority over these matters.

Organization Represented	Tennessee Scenic Rivers Association	Citizen
TN 2025 SWAP Comments Submitted by	Samantha Satterfield	Andy and Tanya Todd
email	samantha@paddletsra.org	todd4513@bellsouth.net

Organization Represented	Tennessee Scenic Rivers Association	Citizen
TN 2025 SWAP Comments Submitted by	Samantha Satterfield	Andy and Tanya Todd
Summary of comments	Recommended inclusion of more TWRA/TDEC partnerships relative to water quality asked for more local examples of threats; recommended inclusion of TSRA as a river conservation partner; recommended additional focus on educational outreach to the public to help build an emotional connection to nature.	Expressed appreciation for nature and to the SWAP team.

Organization Represented	Tennessee Scenic Rivers Association	Citizen
TN 2025 SWAP Comments Submitted by	Samantha Satterfield	Andy and Tanya Todd
Changes made in response	Included additions to chapter 6 under the " Information Collection and Dispersal" conservation actions, noting TSRA as a partners, calling for more ooportunities for citizen involvement, and emphasizing the utility of citizen-led monitoring initiatives such as eBird and TAMP (Tennessee Amphibian Monitoring Program).	No additions or revisions to SWAP were made based upon these comments.

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Appendix B

TN SWAP Map Atlas

Chapter 1: Introduction - Tennessee State Wildlife Action Plan 2025

- Map 1.1 Land Cover Types (Cropland Data Layer 2024; GAP/LandFire, 2019; TN SWAP Wetlands 2025)

Chapter 3 - Species of Greatest Conservation Need and Priority Habitats

- Map 3.1 Terrestrial Habitat Priorities (entire state)
- Map 3.1.a Terrestrial Habitat Priorities in West Tennessee
- Map 3.1.b Terrestrial Habitat Priorities in Middle Tennessee
- Map 3.1.c Terrestrial Habitat Priorities in East Tennessee

- Map 3.2 Aquatic Habitat Priorities
- Map 3.2.a Aquatic Habitat Priorities in West Tennessee
- Map 3.2.b Aquatic Habitat Priorities in Middle Tennessee
- Map 3.2.c Aquatic Habitat Priorities in East Tennessee

- Map 3.3 Karst Habitat Priorities
- Map 3.3.a Karst Habitat Priorities in West Tennessee
- Map 3.3.b Karst Habitat Priorities in Middle Tennessee
- Map 3.3.c Karst Habitat Priorities in East Tennessee

- Map 3.4 Combined Land Conservation Priorities for Terrestrial, Aquatic, and Karst SGCN
- Map 3.4.a Combined Land Conservation Priorities for Terrestrial, Aquatic, and Karst SGCN in West Tennessee
- Map 3.4.b Combined Land Conservation Priorities for Terrestrial, Aquatic, and Karst SGCN in Middle Tennessee
- Map 3.4.c Combined Land Conservation Priorities for Terrestrial, Aquatic, and Karst SGCN in East Tennessee

Chapter 4 - Problems Affecting Species and Habitats

- Map 4.1 Probability of New Development by 2100 (FUTURES v3, maximum of all scenarios
- Map 4.2 Potential Risk from Future Development (FUTURES v3) to Terrestrial Habitat Priorities
- Map 4.3 Potential Risk from Future Development (FUTURES v3) to Downstream Aquatic Habitat Priorities

Map 4.4 Potential Risk from Agriculture to Downstream Aquatic Habitat Priorities
Map 4.5 Potential Risk from Renewable Solar Development to Combined Conservation Priorities
Map 4.6 Potential Risk from Renewable Wind Development to Combined Conservation Priorities

Chapter 6 - Conservation Actions and Strategies

Map 6.1 TNC Resilient and Connected Network, 2024, and Combined Habitat Priorities
Map 6.2 Conservation Opportunity Areas and Terrestrial Habitat Priorities
Map 6.3 Conservation Opportunity Areas and Aquatic Habitat Priorities
Map 6.4 Conservation Opportunity Areas and Karst Habitat Priorities
Map 6.5 Conservation Opportunity Areas and Combined Land Conservation Priorities for Terrestrial, Aquatic, and Karst SGCN
Map 6.6 Grassland Ecological Systems from GAP/LANDFIRE, 2019
Map 6.7 Terrestrial Priorities of Grassland Habitats
Map 6.8 Fire Need of Existing Terrestrial Habitats by Mean Fire Return Interval (MFRI)
Map 6.9 Fire Priorities of Existing Habitats for Terrestrial SGCN
Map 6.10 Floodplain/Riparian Restoration Priorities for Downstream Aquatic Habitats

Chapter 7 - Regional Conservation Assessment

Map 7.1 Terrestrial Habitat Priorities of the Kentucky SWAP 2023, and the Tennessee SWAP 2025
Map 7.2 Freshwater Aquatic Habitat Priorities: Kentucky, Tennessee, and the Southern Appalachians

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Appendix C

Summary of major conservation projects since 2015 by key conservation partners, listed by Conservation Opportunity Area

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Blue Ridge	Propagation of the Tangerine Darter for reintroduction into Pigeon River and appropriate streams of east TN	Completed	CFI	TWRA	
Blue Ridge	Habitat restoration for the Bog Turtle	Completed	TNC	TWRA	
Blue Ridge	Lick Creek Bottoms WMA (Rice) Land Acquisition	Completed	TNC	TWRA	
Blue Ridge	Shady Valley/Birch Branch Easement	Completed	TNC		
Blue Ridge	Shady Valley/Orchard Road Bog Land Acquisition	Completed	TNC		
Blue Ridge	Shady Valley/Schoolyard Springs Land Acquisition	Completed	TNC		
Blue Ridge	Shady Valley/Orchard Bog Land Acquisition	Completed	TNC	TWRA	
Blue Ridge	eDNA survey for the Chucky Madtom	Completed	TTU	TWRA	
Blue Ridge	Surveys and Monitoring of the Bog Turtle	In progress	Zoo Knoxville	TWRA	
Blue Ridge	Antimicrobial advantages of paternal care in madtom catfishes (Ictaluridae: Noturus)	Completed	USFWS	UT	
Blue Ridge	Erwin National Fish Hatchery Acquisition	Completed	TGLC	USFWS	
Blue Ridge, Foothills, Hiwassee	Life history research of the Tennessee Dace	Completed	TNASI	TWRA, USFWS	
Blue Ridge, Upper Holston, Clinch & Powell, Hiwassee	Monitoring Freshwater Mussels at Population Restoration Sites in the Upper Tennessee River Basin, Tennessee and Virginia	Completed	USFWS	VA Tech, TWRA	
Catoosa/Emory River	Obed Wild and Scenic River Land Acquisition	Completed	TCF	TNC	
Catoosa/Emory River	Obed Wild and Scenic River Land Acquisition	Completed	TCF	TNC	
Catoosa/Emory River	Obed Wild and Scenic River Land Acquisition	Completed	TNC		

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Catoosa/Emory River	Obed Wild and Scenic River Land Acquisition	Completed	TNC	NPS	
Catoosa/Emory River	Flat Fork Homeplace Conservation Easement	Completed	TGLC		
Catoosa/Emory River	Solomon Hollow Conservation Easement	Completed	TGLC		
Catoosa/Emory River	Catoosa Acquisition	Completed	TGLC		
Catoosa/Emory River	Lone Star Acquisition	Completed	TGLC	TCF, TWRA	
Catoosa/Emory River	Emory River Acquisition	Completed	TGLC		
Catoosa/Emory River	Surveys and monitoring of the Clinch Dace	Completed	TNASI	TWRA, USFWS	
Catoosa/Emory River	Alpine Mountain Easement	Completed	TNC	TWRA	
Catoosa/Emory River	Mt. Roosevelt WMA Land Acquisition	Completed	TNC	TWRA	
Catoosa/Emory River	Obed Wild and Scenic River Land Acquisition	Completed	TNC	TWRA	
Catoosa/Emory River	Cumberland Plateau mussel surveys	Completed	UTK	TWRA	
Catoosa/Emory River	Obed Point Conservation Easement	Completed	TGLC		
Catoosa/Emory River	Clear Creek Acquisition	Completed	TGLC		
Catoosa/Emory River, Middle Cumberland Plateau, Southern Cumberland Plateau	Cumberland Dusky Salamander Distributional/occurrence surveys	Completed	University of the South	TWRA	
Catoosa/Emory River, Upper Holston, Foothills, Western Highland Rim Forests	Population genetics of spotfin chub	Completed	USFWS	Auburn University	
Catoosa/Emory River, Foothills, Middle Cumberland Plateau	Distribution surveys for the for the Sickle Darter	Completed	UTK	TWRA	
Catoosa/Emory River, Middle Cumberland Plateau	Genetic assessment of the Pristine Crayfish	Completed	APSU	TWRA	Species monitoring

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Clinch & Powell	Environmental DNA surveillance of the federally threatened Slender Chub in the Clinch and Powell rivers	Completed	USFWS	TTU, USGS	
Clinch & Powell, Elk River	Propagation and restoration of cracking pearlymussel	Completed	USFWS	TWRA, TVA	
Conasauga	Status surveys for six federally listed fishes in the Mobile River Basin	Completed	TN AQ	USFWS	
Conasauga	Monitoring status of Bridled Darters and assessing threats to federally threatened Blue Shiners	Completed	TN AQ	NFWF, USFWS, University of West Alabama	
Conasauga	Trispot Darter Monitoring	In Progress	TN AQ	USFWS, NFWF, GA DNR, Limestone Valley RC&D	
Cordell Hull Tailwater	Analysis of self-compatibility, germination, shade tolerance, and plasticity of the endangered plant Physaria globosa (Brassicaceae)	Completed	USFWS	TTU	
Cordell Hull Tailwater	Experimental seed ecology of Short's bladderpod (*Physaria globosa*)	Completed	USFWS	Missouri Botanical Garden	
Cordell Hull Tailwater, Western Highland Rim Forests	Examining pollination, reproductive success, and life history traits in Short's bladderpod	Completed	USFWS	TTU	
Cypress & Shoal Creeks	Barrier Inventory for the Federally Listed Slackwater Darter	Completed	SARP	TWRA, USFWS, Private Landowners	
Duck River	Assessment of *Percina macrocephala* and *Etheostoma cinereum* Populations within the Duck River System	Completed	TN AQ	TWRA, USFWS	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Duck River	Species assessment of the Ashy Darter in the Duck River	Completed	TNASI	TWRA, USFWS	
Duck River	Species assessment of the Longhead Darter in the Duck River	Completed	TNASI	TWRA	
Duck River	Duck River Land Acquisition	Completed	TNC	TWRA	
Duck River	Duck River mussel surveys	Completed	TTU	TWRA	
Duck River	Population status demographic history and genetics of the Striated Darter	Completed	TTU	TWRA, USFWS	
Duck River	Propagation and monitoring - Duck River Dartersnapper	In progress	TWRA	USFWS	
Duck River	Propagation and culture of winged mapleleaf mussel for restoration in the Duck River, Tennessee	Completed	USFWS	Missouri State University, TWRA	
Duck River	A comprehensive freshwater mussel database for the Duck River drainage	Completed	USFWS	USGS	
Duck River	Duck River Trailer House Reconstruction: Transforming into a Research Station for Endangered Mussel Propagation and Conservation	In Progress	USFWS	TWRA	
Duck River	Surveys Duck and Harpeth River tributaries	Completed	UTK	TWRA	
Eastern Highland Rim Prairie and Barrens	Propagation and monitoring of the Barrens Topminnow	In progress	CFI	TWRA, USFWS	
Eastern Highland Rim Prairie and Barrens	Banks Pisgah Conservation Easement	Completed	TGLC		
Eastern Highland Rim Prairie and Barrens	Lusk Cove Conservation Easement	Completed	TGLC		
Eastern Highland Rim Prairie and Barrens	Propagation and reintroduction plan development for the Barrens Topminnow	Completed	TNASI	TWRA, USFWS, CFI	
Eastern Highland Rim Prairie and Barrens	Development of monitoring protocol for the Brawley's Fork Crayfish	Completed	TTU	TWRA, USFWS	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Eastern Highland Rim Prairie and Barrens	Conservation Genetics of the Barrens topminnow	Completed	USFWS	TTU, TN AQ	
Eastern Highland Rim Prairie and Barrens	Ark population of Barrens topminnow	Completed	USFWS	TN AQ	
Eastern Highland Rim Prairie and Barrens	Range wide population status assessment for the rare Barrens darter	Completed	USFWS	TTU	
Eastern Highland Rim Prairie and Barrens	Bark Camp Barrens Acquisition	Completed	TGLC		
Elk River	Propagation and monitoring of the Boulder Darter	In progress	CFI	TWRA, USFWS	
Elk River	Joy Gleghorn Preserve at Wells Hill Park Conservation Easement, Acqusition	Completed	TGLC		
Elk River	Removal of Harms Mill Dam	In progress	TWRA	USACE, USFWS, TVA, TNC	
Elk River	Analysis of road-stream crossings in the Elk River watershed	Completed	USFWS	TTU	
Elk River	Elk River Mussel Propagation and Augmentation/Reintroduction to Support Recovery	In Progress	USFWS	TWRA, ADCNR	
Elk River, Eastern Highland Rim Prairie and Barrens	Ark Population of Barrens Topminnow (*Fundulus julisia)* at the Tennessee Aquarium, Chattanooga, TN	In Progress	TN AQ	USFWS, CFI, Dale Hollow National Fish Hatchery, Mohamed bin Zayed Foundation, TWRA	
Foothills	Propagation and monitoring of the Marbled Darter	Completed	CFI	TWRA, USFWS	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Foothills	Propagation and monitoring of the Duskytail Darter	In progress	CFI	TWRA, USFWS	
Foothills	Propagation and monitoring of the Citico Darter	In progress	CFI	TWRA, USFWS	
Foothills	Propagation and monitoring of the Smoky Madtom	In progress	CFI	TWRA, USFWS	
Foothills	Propagation and monitoring of the Yellowfin Madtom	In progress	CFI	TWRA, USFWS	
Foothills	Surveys of Clinch and Powell Rivers for the Yellowfin Madtom	Completed	CFI	TWRA, USFWS	
Foothills	Restoration of Blotchside Logperch to Citico Creek	Completed	CFI	TWRA, USFS	
Foothills	Factors Regulating the Presence And Abundance Of The Invasive Alga, Didymosphenia geminata, In The Upper Tennessee River Watershed Land Acquisition	Completed	Tallassee Fund	TTU	
Foothills	Hemlock Conservation Land Acquisition	Completed	Tallassee Fund	NPS	
Foothills	Exotic Plant Removal	Completed	Tallassee Fund	NPS	
Foothills	Fire Management within the Tallassee Region	Completed	Tallassee Fund	TWRA	
Foothills	TAPOCO Term Easement Lands	Completed	Tallassee Fund	TNC	
Foothills	Tallassee Fund Branding	Completed	Tallassee Fund	Sequoyah Birthplace Museum	
Foothills	Propagation of Blotchside logperch	Completed	Tallassee Fund	CFI	
Foothills	Treatment of Eastern Hemlock	Completed	Tallassee Fund	NPS	
Foothills	Wild Hog Control	Completed	Tallassee Fund	NPS	
Foothills	Exotic Plant Removal	Completed	Tallassee Fund	NPS	
Foothills	Evaluation of Stream Connectivity	Completed	Tallassee Fund	Trout Unlimited	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Foothills	Propagation of Ashy Darter, *Etheostoma cinereum*, to reintroduce into the Tellico River and Citico River.	Completed	Tallassee Fund	CFI	
Foothills	Archaeological Reconnaissance Survey within selected areas of the Little Tennessee River Watershed, Great Smoky Mountains National Park; Blount County.	Completed	Tallassee Fund	NPS	
Foothills	Fire management tool for the Great Smoky Mountains National Park, Sevier County.	Completed	Tallassee Fund	TNC	
Foothills	Prioritizing Fish Reintroduction in Lower Abrams Creek, Great Smoky Mountains National Park.	Completed	Tallassee Fund	TTU	
Foothills	Creating a film on Southern Appalachian Aquatic biodiversity and conservation issues, Sevier County.	Completed	Tallassee Fund	Freshwater Illustrated	
Foothills	Thermal Imaging to improve the efficiency and effectiveness of wild hogs	Completed	Tallassee Fund	NPS	
Foothills	Removal of Exotic Invasive Plants	Completed	Tallassee Fund	NPS	
Foothills	Treatment of Eastern Hemlock	Completed	Tallassee Fund	NPS	
Foothills	Characterizing the hydrologic behavior of ecologically critical karst stream in the Great Smokey Mountains	Completed	Tallassee Fund	USGS	
Foothills	Objective is to identify restoration land protection projects in the Little Tennessee basin.	Completed	Tallassee Fund	American Rivers	
Foothills	Propagation of Ashy Darter, *Etheostoma cinereum*, to reintroduce to Tellico River and Citico Creek, Sevier County.	Completed	Tallassee Fund	CFI	
Foothills	Thermal imaging to improve the efficiency and effectiveness of wild hogs	Completed	Tallassee Fund	NPS	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Foothills	Provides treatment of Eastern Hemlock stands and Ash Trees in the Great Smoky Mountains National Park	Completed	Tallassee Fund	NPS	
Foothills	Reintroduction of the Tan Riffleshell, Cumberland Moccainshell and Tennessee Clubshell into Citico Creek, TN	Completed	Tallassee Fund	UTK	
Foothills	Cherokee National Forest Aquatic Habitat Connectivity Assessment.	Completed	Tallassee Fund	USFS	
Foothills	Treatment of Eastern Hemlock Stands for Hemlock Wooly Adelgid and Ash Trees	Completed	Tallassee Fund	NPS	
Foothills	Wild hog control and disease monitoring	Completed	Tallassee Fund	NPS	
Foothills	Restore watershed burned by wildfire	Completed	Tallassee Fund	NPS	
Foothills	Inventory of lichens on the Little Tennessee River.	Completed	Tallassee Fund	New York Botanical Garden	
Foothills	Analysis of Habitat for Reintroduction of the Blotchside logperch (*Percina burtoni*)	Completed	Tallassee Fund	TTU	
Foothills	Inventory of lichens on the Little Tennessee River.	Completed	Tallassee Fund	University of Colorado	
Foothills	Propagation of Ashy Darter, *Etheostoma cinereum*, to Reintroduce to Tellico River and Citico Creek	Completed	Tallassee Fund	CFI	
Foothills	Bioblitzing the Great Smoky Mountains National Park	Completed	Tallassee Fund	Discover Life in America	
Foothills	Sharing Hidden Rivers (film) with rural communities and K-12 classrooms	Completed	Tallassee Fund	Freshwater Illustrated	
Foothills	Restoration of the historically fire-maintained Tallassee Landscape	Completed	Tallassee Fund	NPS	
Foothills	Complete Stream Restoration Project on Chilogatee Branch	Completed	Tallassee Fund	NPS	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Foothills	Treatment of Eastern Hemlock stands for Hemlock Wooly Adelgid and treatment of ash trees for Emerald Ash Borer.	Completed	Tallassee Fund	NPS	
Foothills	Wild hog control and disease monitoring in the Southwestern portion of Great Smoky Mountains National Park	Completed	Tallassee Fund	NPS	
Foothills	Little Tennessee Film	Completed	Tallassee Fund	American Rivers	
Foothills	Aquatic Habitat Connectivity Assessment	Completed	Tallassee Fund	USFS	
Foothills	Little Citico In-stream and Riparian Restoration	Completed	Tallassee Fund	USFS	
Foothills	Restore Blotchside logperch to Citco Creek, Monroe County	Completed	Tallassee Fund	CFI	
Foothills	Creating a film highlighting the Cherokee's utilization of the Tennessee River	Completed	Tallassee Fund	Eastern Band of Cherokee Indians	
Foothills	Improve habitat and species recover for Virginia spiraea	Completed	Tallassee Fund	NPS	
Foothills	Treatment of Eastern Hemlock stands for Hemlock Wooly Adelgid and treatment of ash trees for Emerald Ash Borer.	Completed	Tallassee Fund	NPS	
Foothills	Wild hog control and disease monitoring in the Southwestern portion of Great Smoky Mountains National Park	Completed	Tallassee Fund	NPS	
Foothills	Inventory of insects along a powerline right-of-way	Completed	Tallassee Fund	Discover Life in America	
Foothills	Wild Hog Control and Disease Monitoring	Completed	Tallassee Fund	NPS	
Foothills	Surveying and restoring wetlands	Completed	Tallassee Fund	NPS	
Foothills	Treatment of Eastern Hemlock	Completed	Tallassee Fund	NPS	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Foothills	DNA barcoding Tallassee-region insects from Great Smoky Mountains National Park	Completed	Tallassee Fund	Discover Life in America	
Foothills	Wild Hog Control and Disease Monitoring	Completed	Tallassee Fund	NPS	
Foothills	Treatment of Eastern Hemlock Stands for Hemlock Woolly Adelgid and Treatment of Ash Trees for Emerald Ash Borer in Tallassee Fund Area of Great Smoky Mountains National Park	Completed	Tallassee Fund	NPS	
Foothills	Bumble Bee Habitat Assessment and Surveys	Completed	Tallassee Fund	Enivronmental Solutions and Innovations, Inc.	
Foothills	Restoration of Blotchside Logperch to Citico Creek, Monroe County, TN	Completed	Tallassee Fund	CFI	
Foothills	A Roadmap to Restoration of the Abrams Creek Mussel Fauna	Completed	Tallassee Fund	UTK	
Foothills	Blochside Logperch studies 2019	Completed	TN AQ	TVA	
Foothills	Ecological and climate assessment for Northern Flying Squirrels	Completed	UM	TWRA, USFWS	
Foothills	Low-head dam removal on Little River	In Progress	USACE	TDEC, TWRA	
Foothills	Establishment of a non-essential experimental population of duskytail darter	In Progress	USFWS	CFI, TVA	
Foothills	Swainson's Warbler Habitat and Distribution Modeling	Completed	UTK	TWRA	
Foothills	Old River, New Fish, a collective effort to restore Yellowfin Madtom to the French Broad River in Tennessee	In Progress	USFWS	CFI, TVA	
Foothills, Hiwassee	Inter-agency Agreement between USFWS Tennessee ES Field Office and USFS Cherokee NF	In Progress	USFWS	USFS	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Foothills, Lower Holston, North Cumberland Plateau and Mountains, Hiwassee, and South Cumberland Plateau	Assimilation of Collection Data for the Snail Darter	Completed	TN AQ	TWRA	
Hatchie	Survival of Age-0 Alligator Gar Following Surgical Implantation of Acoustic Transmitters	In Progress	UTK	USFWS, TWRA	
Hiwassee	Piney River Land Acquisition	Completed	TCF	TNC	
Hiwassee	Piney River Land Acquisition	Completed	TCF	TNC	
Hiwassee	Soak Creek Farm Land Donation Acquisition	Completed	TGLC		
Hiwassee	Piney River Bluffs Acquisition	Completed	TGLC		
Hiwassee	Life History of the TN Dace as Surrogate for the Laurel Dace	Completed	TN AQ	TWRA	
Hiwassee	Monitoring historical and modeled sites for the Laurel Dace, *Chrosomus saylori*	Completed	TN AQ	TWRA	
Hiwassee	Species interactions between invasive sunfishes and Laurel Dace (*Chrosomus saylori*)	Completed	TN AQ	TWRA	
Hiwassee	Propagation and reintroduction plan development for the Laurel Dace	Completed	TNASI	TWRA, USFWS	
Hiwassee	Walden Ridge Land Acquisition	Completed	TNC	TWRA	
Hiwassee	Piney River Land Acquisition	Completed	TNC		
Hiwassee	Monitoring Program, Propagation Protocols and Genetics for Laurel Dace	Completed	USFWS	TN AQ	
Hiwassee	New Surveys and Reassessment of the Conservation Status of the Berry Cave Salamander	Completed	USFWS	UAH	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Hiwassee	Determining physical and biological barriers to reintroduction of the Federally endangered laurel dace	Completed	USFWS	TN AQ, Auburn University	
Hiwassee	Managing for Acute Extinction Risk of the Federally Endangered Laurel Dace	In Progress	USFWS	TN AQ	
Hiwassee, Elk River Watershed, Eastern Highland Rim Prairie and Barrens	Laurel Dace and Barrens Topminnows Propagation and Reintroduction Plan	Completed	TN AQ	TWRA	
Hiwassee, Foothills	Mussel Surveys of the Little Tennessee, Red, and upper Hiwassee Rivers	Completed	DJH	TWRA	
Hiwassee, Middle Cumberland Plateau	Monitoring program and propagation protocols for the Laurel Dace *Chrosomus saylori*	Completed	TN AQ	USFWS, TWRA	
Hiwassee, Middle Cumberland Plateau	Determining physical and biological barriers to reintroduction of the Federally endangered Laurel Dace	Completed	TN AQ	USFWS, Auburn, TWRA	
Hiwassee, South Cumberland Plateau, and Middle Cumberland Plateau	Increasing Adoption of Soil Health Practices on the Cumberland Plateau	Completed	TN AQ	NFWF, NRCS Pikeville Office, TDEC, Bledsoe County Soil Conservation District, USFWS	
Interior Low Plateau Cedar Glades	Couchville Cedar Glade Land Acquisition	Completed	TNC		
Interior Low Plateau Cedar Glades	Cedars of Lebanon Acquisition	Completed	TGLC		
Interior Low Plateau Cedar Glades	Lamar Cedar Glades and Woodlands Conservation Easement	Completed	TGLC		

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Interior Low Plateau Cedar Glades	Removal of Browns Mill Dam	Completed	TWRA	USACE, USFWS, TNC	
Interior Low Plateau Cedar Glades	Population management of Pyne's ground plum for Strategic Habitat Conservation in limestone glades of Tennessee's Nashville Basin	Completed	USFWS	Missouri Botanical Garden	
Interior Low Plateau Cedar Glades	Pollination biology and mating system of Pyne's ground plum	Completed	USFWS	MTSU	
Interior Low Plateau Cedar Glades	Strategic Habitat Conservation for recovery of two Federally listed species in Tennessee	Completed	USFWS	TDEC, Missouri Botanical Garden, Furman University	
Interior Low Plateau Cedar Glades	Expand SHC for Endangered Plant Species in Central Basin Limestone Glades and Barrens	Completed	USFWS	TDEC	
Interior Low Plateau Cedar Glades	Cedars of Lebanon Acquisition	Completed	TGLC		
Interior Low Plateau Cedar Glades	Cedar Forest Mitigation Bank Conservation Easement	Completed	TGLC		
Interior Low Plateau Cedar Glades, Duck River, Mill Creek	Streamside Salamander - Distribution surveys	Completed	TDEC	TWRA	
Interior Low Plateau Cedar Glades, Duck River, Mill Creek	Assessing Clade-specific Thermal Responses of Tennessee Streamside Salamanders (*Ambystoma barbouri*) across the lifespan	Completed	TTU	TWRA	
Interior Low Plateau Cedar Glades, Duck River, Mill Creek	Streamside Salamander - Demographics and ecology related to impacts from urbanization	In progress	TWRA	TSU	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Interior Low Plateau Cedar Glades, Duck River, Mill Creek	Streamside Salamander - Genetics	In progress	TWRA	TTU	
Interior Low Plateau Cedar Glades, Duck River, Mill Creek	Streamside Salamander - Emigration research	Completed	TWRA		Assess BMPs for adequacy
Lower Caney Fork	Environmental Flow Modeling to Promote Lake Sturgeon Spawning below Center Hill Dam	Ongoing	USACE	TWRA	
Lower Caney Fork	Impacts of Incidental Catch of Lake Sturgeon in the Caney Fork River	Ongoing	TWRA		
Lower Holston, Foothills, Hiwassee, South Cumberland Plateau	Species delimitation of the snail darter	Completed	Yale University	USFWS, TVA	
Middle Cumberland Plateau	Collins River Land Acquisition	Completed	TCF	TNC	
Middle Cumberland Plateau	Middle Cumberlands Land Acquisition	Completed	TCF	TNC	
Middle Cumberland Plateau	Karst Forest at Grassy Cove Acquisition	Completed	TGLC		
Middle Cumberland Plateau	Dry Creek Headwaters Acquisition	Completed	TGLC		
Middle Cumberland Plateau	Interior Dog Cove Acquisition	Completed	TGLC		
Middle Cumberland Plateau	Hinch Mountain Acquisition	Completed	TGLC		
Middle Cumberland Plateau	Bee Rock Conservation Easement	Completed	TGLC		
Middle Cumberland Plateau	Fall Creek Falls Inholdings Acquisition	Completed	TGLC		
Middle Cumberland Plateau	Cardwell Mountain Acquisition	Completed	TGLC	TNC, TCF	
Middle Cumberland Plateau	Hardie Tract at Virgin Falls Wilderness State Park Acquisition	Completed	TGLC	Friends of Virgin Falls	
Middle Cumberland Plateau	Fall Creek Falls Acquisition	Completed	TGLC	TNC, TCF	
Middle Cumberland Plateau	Haston Point Gulf Acquisition	Completed	TGLC		
Middle Cumberland Plateau	Middle Cumberlands Land Acquisition	Completed	TGLC	TNC, TCF	
Middle Cumberland Plateau	Collins River Land Acquisition	Completed	TGLC	TNC, TCF	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Middle Cumberland Plateau	Middle Cumberlands Easement	Completed	TNC	TCF	
Middle Cumberland Plateau	Middle Cumberlands Land Acquisition	Completed	TNC		
Middle Cumberland Plateau	Middle Cumberlands Working Woodlands Easement	Completed	TNC		
Middle Cumberland Plateau	Assessment of newly discovered Barrens Topminnow (*Fundulus julisia*) population in the Middle Collins River Watershed	In progress	TTU	TWRA, USFWS	
Middle Cumberland Plateau	Construction of a cave gate at Grassy Cove SLP Cave	Completed	TWRA	TNC, TVA, USFWS, TDEC, Private Consultants	
Middle Cumberland Plateau	Assessing and enhancing the success of transplantation to support white fringeless orchid conservation	Completed	USFWS	UTC, TWRA, TVA	
Middle Cumberland Plateau	Determining Bluemask Darter Ecological Requirements at Multiple Spatial Scales to Support Reintroductions in the Calfkiller River System	Completed	USFWS	TTU, TVA	
Middle Cumberland Plateau	Shortleaf Pine-Oak Woodland Restoration – Strategic Landscape Conservation for White Fringeless Orchid and other Listed and At-risk Species	In Progress	USFWS	TDEC	
Middle Cumberland Plateau	Fall Creek Falls - Turkey Scratch Acquisition	Completed	TGLC	TCF	
Middle Cumberland Plateau	Savage Gulf TIR Acquisition	Completed	TGLC	TNC, TCF	
Middle Cumberland Plateau, Interior Low Plateau Cedar Glades, Eastern Highland Rim Prairie and Barrens	Species Status Assessments for two Tennessee crayfishes proposed for Federal listing under the ESA	Completed	USFWS	TTU	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Middle Cumberland Plateau, Tennessee River	Conservation Science to Support Recovery Implementation for the Hardin Crayfish and Pristine Crayfish: Genetics, Life History, and Species Status Assessment	Completed	USFWS	TTU	
Middle Forked Deer	Middle Fork Forked Deer River Land Acquisition	Completed	TNC	State of Tennessee	
Middle Forked Deer	Middle Fork Forked Deer River Land Acquisition	Completed	TNC	TWRA	
Middle Forked Deer	Middle Fork Forked Deer River Land Acquisition	Completed	TNC	TWRA	
Middle Forked Deer	Middle Fork Forked Deer River Land Acquisition	Completed	TNC	TWRA	
Middle Forked Deer	Middle Fork Forked Deer River Land Acquisition	Completed	TNC	TWRA	
Middle Forked Deer	Middle Fork Forked Deer River Land Acquisition	Completed	TNC	TWRA	
Middle Forked Deer	Middle Fork Forked Deer River Easement	Completed	TNC		
Middle Forked Deer	Middle Fork Forked Deer River Easement	Completed	TNC		
Middle Forked Deer	Middle Fork Forked Deer River Land Acquisition	Completed	TNC		
Middle Forked Deer	Middle Fork Forked Deer River Land Acquisition	Completed	TNC		
Middle Forked Deer	Middle Fork Forked Deer River Land Acquisition	Completed	TNC		
Middle Forked Deer	Middle Fork Forked Deer River Land Acquisition	Completed	TNC		
Mill Creek	Surveys and monitoring of the Nashville Crayfish	In progress	Nashville Zoo	TWRA, USFWS	
Mississippi Alluvial Valley	Construction of cave gate at Tipton County Civil War Bunker	Completed	TWRA	USFWS	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
MS Alluvial Valley	N Farm Conservation Easement	Completed	TGLC		
North Cumberland Plateau	Wendell's Pass Conservation Easement	Completed	TGLC		
North Cumberland Plateau and Mountains	Northern Cumberlands Land Acquisition	Completed	TCF	TNC, TWRA	
North Cumberland Plateau and Mountains	Northern Cumberlands Land Acquisition	Completed	TCF	TNC, TWRA	
North Cumberland Plateau and Mountains	Big South Fork Land Acquisition	Completed	TCF	TNC	
North Cumberland Plateau and Mountains	Big South Fork Land Acquisition	Completed	TCF	TNC	
North Cumberland Plateau and Mountains	Northern Cumberlands Land Acquisition	Completed	TCF	TNC	
North Cumberland Plateau and Mountains	Northern Cumberlands Land Acquisition	Completed	TCF	TNC	
North Cumberland Plateau and Mountains	Northern Cumberlands Land Acquisition	Completed	TCF	TNC	
North Cumberland Plateau and Mountains	Wendell's Airpark Conservation Easement	Completed	TGLC		
North Cumberland Plateau and Mountains	Northern Cumberlands Land Acquisition	Completed	TGLC	TNC, TCF, State of Tennessee	
North Cumberland Plateau and Mountains	Northern Cumberlands Land Acquisition	Completed	TNC	State of Tennessee	
North Cumberland Plateau and Mountains	Northern Cumberlands Land Acquisition	Completed	TNC	State of Tennessee	
North Cumberland Plateau and Mountains	Northern Cumberlands Land Acquisition	Completed	TNC	TWRA	
North Cumberland Plateau and Mountains	Northern Cumberlands Land Acquisition	Completed	TNC	TWRA	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
North Cumberland Plateau and Mountains	Northern Cumberlands Land Acquisition	Completed	TNC	TWRA	
North Cumberland Plateau and Mountains	Tackett Creek Conservation Easement Assist Easement	Completed	TNC	TWRA	
North Cumberland Plateau and Mountains	Northern Cumberlands Easement	Completed	TNC	TWRA	
North Cumberland Plateau and Mountains	Big South Fork Easement	Completed	TNC		
North Cumberland Plateau and Mountains	Northern Cumberlands Land Acquisition	Completed	TNC		
North Cumberland Plateau and Mountains	Northern Cumberlands Land Acquisition	Completed	TNC		
North Cumberland Plateau and Mountains	Laurel Trace Conservation Easement	Completed	TGLC		
North Cumberland Plateau and Mountains	Royal Blue Harris Acquisition	Completed	TGLC	TNC, TCF	
North Cumberland Plateau and Mountains, Clinch and Powell	Population Genetic Assessment of the Endangered Cumberland Darter (*Etheostoma susanae*)	Completed	TN AQ	USFWS, Kentucky Waterways Alliance, USFWS	
Northern Cumberland Plateau and Mountains	Big South Fork Land Acquisition	Completed	TCF	TNC, NPS	
Northern Cumberland Plateau and Mountains	Big South Fork Land Acquisition	Completed	TNC	NPS	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Northern Cumberland Plateau and Mountains	Golden-winged Warbler Habitat Assessment	Completed	UTK	TWRA	Expand habitat management and restoration activities within the breeding range of the state
Northern Cumberland Plateau and Mountains	New River mussel survey	Completed	UTK	TWRA	
Northwest Cumberland Plateau	Skinner Mountain Acquisition	Completed	TGLC	TNC, TCF, TWRA, TDF	
Northwest Cumberland Plateau	Stewart Creek Gorge Acquisition	Completed	TGLC		
Northwest Cumberland Plateau	Pogue Creek SNA - Musto Acquisition	Completed	TGLC		
Northwestern Cumberland Plateau	Mussels of the Wolf River, TN: A resurvey of unionids in an inundated Cumberland tributary.	Completed	USFWS	TTU, USGS	
Obion River, Hatchie River, Wolf River	Distribution surveys for the Piebald Madtom	Completed	APSU	TWRA, USFWS	
Roaring River	Tuckaway Conservation Easement	Completed	TGLC		
Roaring River	Spring Creek Cabin Conservation Easement	Completed	TGLC		
Roaring River	Removal of Roaring River Dam	Completed	TWRA	USACE, USFWS, TNC	
Roaring River	Circling Cranes Community Conservation Easement	Completed	TGLC	Circling Cranes Land Trust	
Roaring River	Blackburn Fork Inholding Acquisition	Completed	TGLC	TWRA	
Roaring River	Hidden Springs Conservation Easement Amendment	Completed	TGLC		
Roaring River	Blackburn Fork Acquisition	Completed	TGLC	TCF, TWRA	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Roaring River	Cummins Falls House Acquisition	Completed	TGLC		
South Cumberland Plateau	Bear Hollow Mountain Acquisition	Completed	TGLC	TWRA	
South Cumberland Plateau	Mitchell Cove Conservation Easement	Completed	TGLC	South Cumberland Regional Land Trust	
South Cumberland Plateau	Fiery Gizzard Acquisition	Completed	TGLC	TCF	
South Cumberland Plateau	Lusk Cove Conservation Easement	Completed	TGLC		
South Cumberland Plateau	Custard Hollow Cove Conservation Easement	Completed	TGLC	TNC	
South Cumberland Plateau	TFB Properties - Carter Expansion Acquisition	Completed	TGLC	TNC, TCF	
South Cumberland Plateau	Mapping karst groundwater flowpaths and delineating recharge areas for spring in the Little Sequatchie and Pryor Cove watersheds, Tennessee	Completed	USGS	USFWS	
South Cumberland Plateau	Carter SNA Expansion Acquisition	Completed	TGLC		
South Fork of the Forked Deer River	Tull Bottom WMA Acquisition	Completed	TGLC		
Southern Cumberland Plateau	Presence / Absence surveys for *Anguispira picta*	Completed	Dinkins Biological	USFWS, TWRA	
Southern Cumberland Plateau	Development of a Monitoring plan for *Anguispira picta*	In progress	Dinkins Biological	USFWS, TWRA	
Southern Cumberland Plateau	Southern Cumberlands LCA Land Acquisition	Completed	TCF	TNC, TWRA	
Southern Cumberland Plateau	Southern Cumberlands LCA Land Acquisition	Completed	TCF	TNC	
Southern Cumberland Plateau	Southern Cumberlands LCA Land Acquisition	Completed	TGLC	TNC, TCF	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Southern Cumberland Plateau	Southern Cumberlands LCA Land Acquisition	Completed	TGLC	TNC, TCF	
Southern Cumberland Plateau	Southern Cumberlands LCA Land Acquisition	Completed	TNC	TWRA	
Southern Cumberland Plateau	Southern Cumberlands LCA Easement	Completed	TNC	TGLC	
Southern Cumberland Plateau	Southern Cumberlands LCA Land Acquisition	Completed	TNC	TCF	
Southern Cumberland Plateau	Southern Cumberlands LCA Land Acquisition	Completed	TNC		
Southern Cumberland Plateau	Southern Cumberlands LCA Land Acquisition	Completed	TNC		
Southern Cumberland Plateau	Southern Cumberlands LCA Land Acquisition	Completed	TNC	USFWS	
Southern Cumberland Plateau	Construction of a cave gate at Carlton Cave	Completed	TWRA	TNC	
Southern Cumberland Plateau	Construction of cave gates at Keith Cove Cave	Completed	TWRA	TNC	
Southern Cumberland Plateau COA	Cumberland Trail Land Acquisition	Completed	TNC	State of Tennessee	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Southern Cumberland Plateau, Eastern Highland Rim Prairie and Barrens	Tricolored Bat roosting ecology research	Completed	TWRA	UTK	Information on female tricolored bat roost and foraging range selection within the Southern Cumberland Plateau and in other geographic areas with different landscape proportions, spring migration for both make and female tricolored bats, and what landscape features are females seeking to form maternity colonies.
Statewide	Survey of Snake Fungal Disease in Tennessee	In Progress	MTSU	TSU	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Statewide	Development of FIN (Freshwater Information Network)	Completed	TN AQ	Institute of Museum and Library Services, TTU	
Statewide	Status Surveys for Conservation Status of Ashy (*Etheostoma cinereum*) and Redlips (*Etheostoma maydeni*) Darters	Completed	TN AQ	USFWS	
Statewide	Lake Sturgeon Restoration	In Progress	TWRA	USFWS, TVA, WDNR, UTK, TN AQ	
Statewide	Golden Eagle Surveys	Completed	TWRA	Eastern Golden Eagle WG, USFWS	
Statewide	Eastern Spotted Skunk Surveys	In progress	TWRA	UTK, TTU, UM	
Statewide	Indiana Bat Migration	Completed	TWRA	Copperhead Environmental Consulting, USFWS, TVA, TNC	Maternity colony monitoring
Statewide	WNS Surveys	In progress	TWRA	AAFB, APSU, NPS, TDEC, TNC, TRGT, TVA, University of the South, USFWS, UTK	Continued long-term monitoring, Disease abatement research
Statewide	NA Bat Acoustic Surveys	In progress	TWRA		Continued long-term monitoring

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Statewide	Alligator Snapping Turtle Rearing and Reintroduction	In progress	TWRA	Nashville Zoo	Recruitment surveys, Increase Propagation Efforts
Statewide	Woodrat Distribution and genetics	Completed	TWRA	TTU, USFS, TVA, UTK, UM	Additional collection of genetic samples to further elucidate subpopulation genetics
Statewide	SGCN P/A surveys on TWRA WMAs	In progress	TWRA		
Statewide	Multi-state hellbender distributional surveys	Completed	TWRA	TSU, MTSU, TTU, Lee University	
Statewide	Utilization of in vitro culture Techniques for Propagation of Endangered Mussels	In progress	TWRA	MTSU	
Statewide	Colonial Waterbird Monitoring	Completed	TWRA		Development of long-term monitoring program
Statewide	Active Management of TWRA WMAs	Completed	TWRA	QF, SGI	Continued management
Statewide	Conversion Grassland on TWRA WMAs	Completed	TWRA		

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Statewide	Active Management of Forestland on TWRA WMAs	Completed	TWRA	Ruffed Grouse/ American Woodcock Society, National Fish and Wildlife Federation.	
Statewide	Forestlands Conversion on TWRA WMA	Completed	TWRA		
Statewide	Active Management of TWRA WMA Wetlands	Completed	TWRA	DU, Delta Waterfowl, WTRBA	
Statewide	Prescribed Buring of Grasslands on TWRA WMAs	Completed	TWRA	TDF	
Statewide	Prescribed Burning of Forestlands on TWRA WMAs	Completed	TWRA	TDF, USFS	
Statewide	Wetlands Conversion on TWRA WMAs	Completed	TWRA	DU, Delta Waterfowl	
Statewide	Asian Carp Deterrent System	In Progress	USACE	USFWS, USGS, TWRA	
Statewide	Army Corps of Engineers CRAC Mussel Recovery Project	Completed	USFWS	Corps of Engineers, TWRA	
Statewide	Transforming captive propagation and reintroduction of rare fish in the Southeast	In Progress	USFWS	CFI	
Statewide	Captive Propagation of Tangerine Darter as host fish for Slabside Pearlymussel	Completed	TN AQ	TWRA	
Statewide	Captive Propagation of the Common Logperch (*Percina carpodes*) as host fish for Slabside Pearlymussel	Completed	TN AQ	TWRA	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Statewide (within species range)	Brook Trout Restoration	Ongoing	TWRA	TN AQ, USFS, NPS, Trout Unlimited	
Statewide (within species range)	Alligator Gar Restoration	Ongoing	TWRA	USFWS	
Statewide (within species range)	Monitoring of watershed ecology for instream brook trout	Completed	APSU	TWRA	
Statewide (within species range)	Collection of baseline data for long-term monitoring - Brook Trout	Completed	Botanical Research Institute of TX	TWRA	
Statewide (within species range)	Characterization of the microbial fauna and benthic invertebrate communities within high elevation brook trout stream	Completed	ETSU	TWRA	
Statewide (within species range)	Aquatic system toxicology for eastern brook trout	Completed	MTSU	TWRA	
Statewide (within species range)	Characterizations of ecologically at-risk high elevation streams	Completed	MTSU	TWRA	
Statewide (within species range)	Movement Ecology of Juvenile Alligator Snapping Turtles to Determine Conservation Value of Sites in West Tennessee for the Future Release of Propagated Individuals	Completed	TN AQ	Columbus Zoo	
Statewide (within species range)	Reassessment of the status and distribution of the Pale Lilliput	Completed	TTU	TWRA	
Statewide (within species range)	Range wide population status of the Striated Darter	Completed	TTU	TWRA, USFWS	
Statewide (within species range)	Green Salamander Surveys	Completed	TWRA	UAH, MTSU, TTU	Disease monitoring
Statewide (within species range)	Secretive Marshbird Monitoring	Completed	TWRA	TTU	Development of monitoring protocols

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Statewide (within species range)	Loggerhead Shrike Subpopulation Delineation	Completed	TWRA	Nashville Zoo, SEAR	Habitat management and restoration
Statewide (within species range)	Tennessee Cave Salamander Distributional/ occurrence surveys	Completed	UAH	TWRA, USFWS	
Statewide (within species range)	Berry Cave Salamander Distributional/ occurrence surveys	Completed	UAH	TWRA, USFWS	
Tennessee River	Walker Branch SNA Land Acquisition	Completed	TCF	TNC, TN SNA	
Tennessee River	Walker Branch SNA Land Acquisition	Completed	TCF	TNC	
Tennessee River	Piney River Land Acquisition	Completed	TNC	State of Tennessee	
Tennessee River	Mussel Survey of TN River Mile 154.2 – 155.1	Completed	USACE		Mussel relocation may occur at later date
Tennessee River	TN National Wildlife Refuge Visitor Center glass retrofit for bird collisions	Planned	USFWS		
Tennessee River	Neill Forest Conservation Easement	Completed	TGLC	TNC	
Western Highland Rim Forests	Propagation and monitoring of the Spotfin Chub	In progress	CFI	TWRA, USFWS	
Western Highland Rim Forests	Mayberry Hollow Conservation Easement	Completed	TGLC		
Western Highland Rim Forests	Rockdale Trace Conservation Easement	Completed	TGLC	Swan Conservation Trust	
Western Highland Rim Forests	Star Branch Headwaters Conservation Easement	Completed	TGLC	Swan Conservation Trust	
Western Highland Rim Forests	Hellbender Distribution and ecology for restoration	Completed	TSU	TWRA	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
Western Highland Rim Forests	Hellbender Restoration within the Buffalo River Watershed	In progress	TWRA	TSU	
Western Highland Rim Forests	Dry Fork Hollow Conservation Easement	Completed	TGLC		
Western Highland Rim Forests	Big Swan Headwaters	Completed	TGLC	Swan Conservation Trust	
Western Highland Rim Forests	Mayberry Hollow Conservation Easement II	Completed	TGLC		
Western Highland Rim Forests, Interior Low Plateau Cedar Glades, Duck River, Mill Creek	Propagation of species of greatest conservation need	In progress	TWRA	Nashville Zoo	Identifying additional species to target for propagation and rearing
Wolf River	Wolf River - LaGrange Point Acquisition	Completed	TGLC	Wolf River Conservancy	
Wolf River	Wolf River Pleasants Farm Acquisition	Completed	TGLC	Wolf River Conservancy	
	Amphibian Conservation: Understanding the Effects of Invasive Species on Native Vertebrates in Headwater Systems	Completed	TN AQ	Aquarium and Zoo Facilities Association Clark Wadram Conservation Fund	
	Piper Cave Land Acquisition	Completed	TNC		
	Taylor Hollow Land Acquisition	Completed	TNC		
	Taylor Hollow Land Acquisition	Completed	TNC		
	Construction of a exclusion fence at Jolley SLP Cave	Completed	TWRA	TNC, UTK	

COA Name(s) or Location	Conservation / Research Project	Status	Lead Agency/ Org	Other Partners Engaged	Future Needs
	MYSO Artificial Roost	In progress	TWRA	TVA, USFWS, Private landowners	
	Mussel Surveys - Chickamauga Lock	Completed	USACE	TVA	
	Mussel Surveys of TN River Mile 468.7 – 469.3	Completed	USACE	City of Chattanooga	
	Population Status of the Teardrop Darter in the Barren River Watershed	In Progress	TWRA	KYDWF	
North Cumberland Plateau and Mountains	Population Status of the Silverjaw Minnow	Completed	TWRA	KYDWF	
North Cumberland Plateau and Mountains	Population Status of the Blackside Dace and Cumberland Arrow Darter	In Progress	TWRA		
Statewide (within species range)	Blackside Dace distribution for 5 year review	Completed	USFWS	TWRA	
Statewide (within species range)	Tennessee Dace Species Distribution	Completed	TWRA		
North Cumberland Plateau and Mountains	Multi-species AOP projects	Completed	USFWS	TWRA, TDOT, Campbell County, Private Landowner	

Tennessee 2025 State Wildlife Action Plan

Appendix D

Revised 2025 SGCN list, including additions and removals since 2015

Table D-1 2025 Revised Species of Greatest Conservation Need
organized by Scientific Name

Taxa Group	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status	SWAP Tier	NatureServe Element Code	New in 2025	RSGCN
Amphibian	*Acris gryllus*	Southern Cricket Frog	G5	S2S3			1	AAABC01020		
Amphibian	*Ambystoma barbouri*	Streamside Salamander	G4	S3	UR	E	1	AAAAA01170		Y
Amphibian	*Ambystoma texanum*	Small-Mouthed Salamander	G5	S5			1	AAAAA01130		
Amphibian	*Aneides aeneus*	Green Salamander	G3G4	S3S4			1	AAAAD01090		Y
Amphibian	*Cryptobranchus alleganiensis*	Hellbender	G3	S3		E	1	AAAAC01010		Y
Amphibian	*Desmognathus abditus*	Cumberland Dusky Salamander	G2G3	S2S3	UR	D	1	AAAAD03190		Y
Amphibian	*Desmognathus aeneus*	Seepage Salamander	G4	S2	UR		1	AAAAD03010		Y
Amphibian	*Desmognathus imitator*	Imitator Salamander	G3G4	S3			1	AAAAD03050		Y
Amphibian	*Desmognathus orestes*	Blue Ridge Dusky Salamander	G4	S3			1	AAAAD03150	Y	
Amphibian	*Desmognathus organi*	Northern Pygmy Salamander	G3	S1		D	1	AAAAD03200		Y
Amphibian	*Desmognathus welteri*	Black Mountain Salamander	G4	S3			1	AAAAD03090		Y
Amphibian	*Desmognathus wrighti*	Pygmy Salamander	G3	S2S3			1	AAAAD03100		Y
Amphibian	*Dryophytes gratiosus*	Barking Treefrog	G5	S3			1	AAABC02100		Y
Amphibian	*Dryophytes versicolor*	Gray Treefrog	G5	S5			1	AAABC02130		
Amphibian	*Eurycea aquatica*	Brown-backed Salamander	G3	SNR			1	AAAAD05320		Y
Amphibian	*Eurycea junaluska*	Junaluska Salamander	G2G3	S2		D	1	AAAAD05020		Y
Amphibian	*Gyrinophilus gulolineatus*	Berry Cave Salamander	G1Q	S1		E	1	AAAAD06040		Y
Amphibian	*Gyrinophilus palleucus*	Tennessee Cave Salamander	G2G3	S2		D	1	AAAAD06010		Y
Amphibian	*Gyrinophilus palleucus necturoides*	Big Mouth Cave Salamander	G2G3T1	S1		D	1	AAAAD06012		Y
Amphibian	*Gyrinophilus palleucus palleucus*	Pale Salamander	G2G3T2	S1		D	1	AAAAD06013		Y
Amphibian	*Hemidactylium scutatum*	Four-toed Salamander	G5	S3		D	1	AAAAD08010		
Amphibian	*Lithobates areolatus*	Crawfish Frog	G4	S3		D	1	AAABH01010		Y
Amphibian	*Lithobates capito*	Gopher Frog	G2G3	S1	UR		1	AAABH01270		Y
Amphibian	*Necturus maculosus*	Mudpuppy	G5	S5			1	AAAAE01042		
Amphibian	*Plethodon aureolus*	Tellico Salamander	G2G3	S2			1	AAAAD12250		Y
Amphibian	*Plethodon jordani*	Red-cheeked Salamander	G4	S2S3			1	AAAAD12090		Y
Amphibian	*Plethodon kentucki*	Cumberland Plateau Salamander	G4	S1S2		D	1	AAAAD12260	Y	Y
Amphibian	*Plethodon montanus*	Northern Gray-cheeked Salamander	G4	S3			1	AAAAD12430		
Amphibian	*Plethodon pauleyi*	Yellow-spotted Woodland Salamander	GNR	SNR		E	1	AAAAD12590	Y	
Amphibian	*Plethodon richmondi*	Southern Ravine Salamander	G5	S3			1	AAAAD12150		Y
Amphibian	*Plethodon shermani*	Red-legged Salamander	G3	S2			1	AAAAD12470		Y
Amphibian	*Plethodon welleri*	Weller's Salamander	G3	S2		D	1	AAAAD12230		Y
Amphibian	*Plethodon yonahlossee*	Yonahlossee Salamander	G4	S2			1	AAAAD12240		Y
Amphibian	*Pseudacris brachyphona*	Mountain Chorus Frog	G5	S4			1	AAABC05200		
Amphibian	*Pseudotriton montanus*	Mud Salamander	G5	S5			1	AAAAD13010		Y
Amphibian	*Siren nettingi*	Western Siren	G5	S5			1	AAAAG02012		
Arachnid	*Agyneta sp.*	Trussell Cave Sheet-web Spider	G1	S?			2			
Arachnid	*Anthrobia mammouthia*	Mammoth Cave Spider	G5	S1			2	ILARA26010		
Arachnid	*Antrodiaetus sp.*	a foldingdoor trap-door spider	G?	S?			2			
Arachnid	*Apochthonius minor*	a cave obligate pseudoscorpion	G1	S1			2	ILARA29150		
Arachnid	*Apochthonius sp.*	a pseudoscorpion	G1	S?			2			
Arachnid	*Appaleptoneta sp.*	a cave leptonetid spider	G1	S?			2	ILARASWG01		
Arachnid	*Appaleptoneta sp. 1*	a cave leptonetid spider	G1	S1			2	ILARAU3010		
Arachnid	*Bathyphantes alboventris*	Notch-tipped Shield Sheetweaver	GNR	SNR			2	ILARA46020		
Arachnid	*Bathyphantes pallidus*	Pale Sheetweb Weaver	G5	SNR			2	ILARA46030		
Arachnid	*Bishopella sp. Probably laciniosa*	a harvestman	G?	S?			2			
Arachnid	*Calymmaria persica*	Cave Funnel-web Spider	GNR	S?			2	ILARA53070		
Arachnid	*Chitrella archeri*	a cave obligate pseudoscorpion	G1G2	S1S2			2	ILARA31050		

Taxa Group	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status	SWAP Tier	NatureServe Element Code	New in 2025	RSGCN
Arachnid	*Cicurina breviaria*	a funnel-web spider	G4	S?			2			
Arachnid	*Cicurina placida*	Big-eyed Meshweaver	GNR	S?			2	ILARA73530		
Arachnid	*Coras taugynus*	a funnel-web spider	G3G4	S?			2			
Arachnid	*Cryptachaea porteri*	a cobweb weaver	GNR	S?			2	ILARA61020		
Arachnid	*Cybaeopsis pantopla*	a hackledmesh weaver	G3	S2			2	ILARAU5010		
Arachnid	*Eidmannella pallida*	Pale Nest Spider	GNR	S?			2	ILARA97010		
Arachnid	*Erebomaster sp.*	a harvestmen	G?	S?			2			
Arachnid	*Hesperochernes mirabilis*	Southeastern Cave Pseudoscorpion	G5	S3			2	ILARA48030		
Arachnid	*Hesperonemastoma sp.*	a harvestmen	G?	S?			2			
Arachnid	*Kleptochthonius affinis*	a cave obligate pseudoscorpion	G1G2	S1S2			2	ILARA30130		
Arachnid	*Kleptochthonius barri*	a cave obligate pseudoscorpion	G1G2	S1S2			2	ILARA30150		
Arachnid	*Kleptochthonius charon*	a cave obligate pseudoscorpion	G1G2	S1S2			2	ILARA30170		
Arachnid	*Kleptochthonius daemonius*	a cave obligate pseudoscorpion	G1G2	S1S2			2	ILARA30180		
Arachnid	*Kleptochthonius infernalis*	a cave obligate pseudoscorpion	G1	S1			2	ILARA30220		
Arachnid	*Kleptochthonius magnus*	a cave obligate pseudoscorpion	G1	S1			2	ILARA30240		
Arachnid	*Kleptochthonius myopius*	a cave obligate pseudoscorpion	G1	S1			2	ILARA30260		
Arachnid	*Kleptochthonius pluto*	a cave obligate pseudoscorpion	G1	S1			2	ILARA30280		
Arachnid	*Kleptochthonius rex*	a cave obligate pseudoscorpion	G1	S1			2	ILARA30290		
Arachnid	*Kleptochthonius sp.*	a cave obligate pseudoscorpion	G1	S1			2	ILARASWG03		
Arachnid	*Kleptochthonius sp.*	a pseudoscorpion	G?	S?			2			
Arachnid	*Kleptochthonius sp.*	Round Cove cave pseudoscorpion	G1	S?			2			
Arachnid	*Kleptochthonius sp.*	Sells cave pseudoscorpion	G1	S?			2			
Arachnid	*Kleptochthonius stygius*	a cave obligate pseudoscorpion	G1	S1			2	ILARA30300		
Arachnid	*Kleptochthonius tantalus*	a cave obligate pseudoscorpion	G1	S1			2	ILARA30310		
Arachnid	*Kleptochthonius undescribed sp.*	a cave pseudoscorpion	G1	S?			2			
Arachnid	*Liocranoides archeri*	Archer's Two-clawed Spider	G2	S2			2	ILARAA0030		
Arachnid	*Liocranoides coylei*	Coyle's tengellid spider	G3	S?			2			
Arachnid	*Liocranoides gertschi*	a spider	GNR	S?			2	ILARAA0040		
Arachnid	*Liocranoides sp.*	a cave two-clawed spider	G1G2	S?			2	ILARASWG04		
Arachnid	*Liocranoides sp.*	Two-clawed spider	G2	S?			2			
Arachnid	*Liocranoides tennesseensis*	Tennessee Two-clawed Spider	G1	S1			2	ILARAA0020		
Arachnid	*Liocranoides unicolor*	a cave obligate spider	GU	SNR			2	ILARAA0010		
Arachnid	*Macrocheles sp. 1*	a mite	G?	S?			2			
Arachnid	*Macrocheles sp. 2*	a mite	G?	S?			2			
Arachnid	*Macrocheles sp. 3*	a mite	G?	S?			2			
Arachnid	*Maymena ambita*	Minute Cave Spider	GNR	S3			2	ILARA60010		
Arachnid	*Meta ovalis*	Eastern Cave Long-jawed Spider	G5	S?			2	ILARA17040		
Arachnid	*Microcreagris nickajackensis*	a cave obligate pseudoscorpion	G1G2	S1			2	ILARA20060		
Arachnid	*Microhexura montivaga*	Spruce-fir Moss Spider	G2	S1	LE		3	ILARA33010		
Arachnid	*Nemasatosoma sp.*	a harvestmen	G?	S?			2			
Arachnid	*Nesticus barri*	a cave obligate spider	G3	S3			2	ILARA36220		
Arachnid	*Nesticus barrowsi*	a cave obligate spider	G1G2	S1S2			2	ILARA36230		
Arachnid	*Nesticus dilutus*	Grassy Creek Cave Spider	G1	S1			2	ILARA36030		
Arachnid	*Nesticus furtivus*	Crystal Caverns Cave Spider	G1	S1			2	ILARA36040		
Arachnid	*Nesticus paynei*	a cave cobweb spider	G3G4	S3			2	ILARA36100		
Arachnid	*Nesticus pecki*	Monteagle Cave Spider	GNR	S1			2	ILARA36270		
Arachnid	*Nesticus stygius*	a cave cobweb spider	G1G2	S1S2			2	ILARA36260		
Arachnid	*Nesticus tennesseensis*	Tennessee Cave Spider	G3G4	S2S4			2	ILARA36010		

Taxa Group	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status	SWAP Tier	NatureServe Element Code	New in 2025	RSGCN
Arachnid	*Nesticus valentinei*	Valentine's Cave Spider	G1	S1S2	MC		2	ILARA36060		
Arachnid	*Oreonetides sp.*	cave sheet-web spiders	G1	S?			2			
Arachnid	*Phalangodes appalachius*	a cave obligate harvestman	G3G4	S3			2	ILARAB2010		
Arachnid	*Phalangodes sp.*	cave harvestmen	G2	S?			2			
Arachnid	*Phanetta subterranea*	Subterranean Sheetweb Spider	G5	S4			2	ILARA28010		
Arachnid	*Poecilophysis weyerensis*	a cave mite	G3?	S2S3			2	ILACA02020		
Arachnid	*Porrhomma cavernicola*	Appalachian Cave Spider	G5	S1?			2	ILARA21010		
Arachnid	*Rhagidia species s. latu*	a mite	G?	S?			2			
Arachnid	*Theromaster sp. 1*	a cave obligate harvestman	G1	S1			2	ILARAU4010		
Arachnid	*Tolus sp.*	a harvestman	G?	S?			2			
Arachnid	*Tyrannochthonius fiskei*	a cave obligate pseudoscorpion	G1	S1			2	ILARAD2130		
Arachnid	*Tyrannochthonius halopotamus*	a cave obligate pseudoscorpion	G1	S1			2	ILARAD2150		
Arachnid	*Tyrannochthonius steevesi*	a cave obligate pseudoscorpion	G1	S1			2	ILARAD2290		
Bat	*Corynorhinus rafinesquii*	Rafinesque's Big-eared Bat	G3G4	S3		D	1	AMACC08020		Y
Bat	*Corynorhinus townsendii virginianus*	Virginia Big-eared Bat	G4T3	S1	LE	E	3	AMACC08012		Y
Bat	*Lasiurus cinereus*	Northern Hoary Bat	G3G4	S5			1	AMACC05032	Y	Y
Bat	*Myotis austroriparius*	Southeastern Bat	G4	S3			1	AMACC01030		Y
Bat	*Myotis grisescens*	Gray Bat	G3G4	S2	LE	E	3	AMACC01040		Y
Bat	*Myotis leibii*	Eastern Small-footed Bat	G4	S2S3		D	1	AMACC01130		Y
Bat	*Myotis lucifugus*	Little Brown Myotis	G3G4	S3	UR	T	1	AMACC01010		Y
Bat	*Myotis septentrionalis*	Northern Long-eared Bat	G2G3	S1S2	LT	T	3	AMACC01150		Y
Bat	*Myotis sodalis*	Indiana Bat	G2	S1	LE	E	3	AMACC01100		Y
Bat	*Perimyotis subflavus*	Tricolored Bat	G3G4	S2S3	PE	T	1	AMACC03020		Y
Bird	*Accipiter striatus*	Sharp-shinned Hawk	G5	S3B	(PS)		1	ABNKC12020		
Bird	*Aegolius acadicus*	Northern Saw-whet Owl	G5	S1			1	ABNSB15020		
Bird	*Ammodramus savannarum*	Grasshopper Sparrow	G5	S4	(PS)	D	1	ABPBXA0020		Y
Bird	*Ammospiza leconteii*	LeConte's Sparrow	G5	S1N			1	ABPBXA0040		Y
Bird	*Ammospiza nelsoni*	Nelson's Sparrow	G5	S?			1	ABPBXA0070	Y	Y
Bird	*Anas acuta*	Northern Pintail	G5	S4N			1	ABNJB10110	Y	
Bird	*Anas rubripes*	American Black Duck	G5	S3S4N			1	ABNJB10040		
Bird	*Antrostomus carolinensis*	Chuck-will's-widow	G5	S3S4			1	ABNTA07010		Y
Bird	*Antrostomus vociferus*	Eastern Whip-poor-will	G5	S3S4		D	1	ABNTA07070		Y
Bird	*Aquila chrysaetos*	Golden Eagle	G5	S1			1	ABNKC22010		
Bird	*Ardea alba*	Great Egret	G5	S2B, S3N			1	ABNGA04040		
Bird	*Arenaria interpres*	Ruddy Turnstone	G5	S3N			1	ABNNF09010	Y	
Bird	*Asio flammeus*	Short-eared Owl	G5	S3N			1	ABNSB13040		
Bird	*Asio otus*	Long-eared Owl	G5	S2N			1	ABNSB13010	Y	
Bird	*Bonasa umbellus*	Ruffed Grouse	G5	S4			1	ABNLC11010		
Bird	*Botaurus exilis*	Least Bittern	G4	S2B		D	1	ABNGA02010		Y
Bird	*Botaurus lentiginosus*	American Bittern	G5	S1			1	ABNGA01020		
Bird	*Calidris alpina*	Dunlin	G5	S3N			1	ABNNF11170	Y	
Bird	*Calidris canutus*	Rufa Red Knot	G4T2	S2N	LT	T	3	ABNNF11021		Y
Bird	*Calidris fuscicollis*	White-rumped Sandpiper	G5	S4N			1	ABNNF11110	Y	
Bird	*Calidris himantopus*	Stilt Sandpiper	G5	S3N			1	ABNNF11190		
Bird	*Calidris mauri*	Western Sandpiper	G5	S4N			1	ABNNF11050		
Bird	*Calidris melanotos*	Pectoral Sandpiper	G5	S4N			1	ABNNF11130	Y	
Bird	*Calidris pusilla*	Semipalmated Sandpiper	G5	S4N			1	ABNNF11040		
Bird	*Calidris subruficollis*	Buff-breasted Sandpiper	G4	S3N			1	ABNNF14010		

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Bird	*Cardellina canadensis*	Canada Warbler	G5	S3B, S4N			1	ABPBX16030		
Bird	*Catharus fuscescens*	Veery	G5	S4B			1	ABPBJ18080	Y	
Bird	*Centronyx henslowii*	Henslow's Sparrow	G4	S1B		T	1	ABPBXA0030		Y
Bird	*Certhia americana*	Brown Creeper	G5	S2B, S4N			1	ABPBA01010		
Bird	*Chaetura pelagica*	Chimney Swift	G4G5	S5		D	1	ABNUA03010		Y
Bird	*Charadrius melodus melodus*	Piping Plover (Atlantic subspecies)	G3T3	S2N	LT	T	1	ABNNB03071		Y
Bird	*Chordeiles minor*	Common Nighthawk	G5	S4			1	ABNTA02020		
Bird	*Circus hudsonius*	Northern Harrier	G5	S4N			1	ABNKC11011		
Bird	*Clangula hyemalis*	Long-tailed Duck	G5	S3N			1	ABNJB16010	Y	
Bird	*Coccothraustes vespertinus*	Evening Grosbeak	G5	S4N			1	ABPBY09020	Y	
Bird	*Coccyzus americanus*	Yellow-billed Cuckoo	G5	S4S5	(PS)		1	ABNRB02020	Y	Y
Bird	*Colinus virginianus*	Northern Bobwhite	G4G5	S2S3	(PS)		1	ABNLC21020		Y
Bird	*Contopus cooperi*	Olive-sided Flycatcher	G4	S1			1	ABPAE32010		
Bird	*Dolichonyx oryzivorus*	Bobolink	G5	SHB, S4N			1	ABPBXA9010	Y	
Bird	*Egretta caerulea*	Little Blue Heron	G5	S2B, S3N		D	1	ABNGA06040		Y
Bird	*Egretta thula*	Snowy Egret	G5	S2B, S3N			1	ABNGA06030	Y	Y
Bird	*Empidonax minimus*	Least Flycatcher	G5	S3			1	ABPAE33070		
Bird	*Empidonax traillii*	Willow Flycatcher	G5	S2S3	(PS)		1	ABPAE33040		
Bird	*Euphagus carolinus*	Rusty Blackbird	G4	S4N			1	ABPBXB5010		Y
Bird	*Falco peregrinus*	Peregrine Falcon	G4	S1B	DL		1	ABNKD06070		
Bird	*Falco sparverius*	American Kestrel	G5	S5			1	ABNKD06020	Y	Y
Bird	*Geothlypis formosa*	Kentucky Warbler	G5	S4			1	ABPBX11010		Y
Bird	*Grus americana*	Whooping Crane	G1	SX	LE, XN	E	1	ABNMK01030		Y
Bird	*Helmitheros vermivorum*	Worm-eating Warbler	G5	S4			1	ABPBX08010		Y
Bird	*Hylocichla mustelina*	Wood Thrush	G4	S4			1	ABPBJ19010		Y
Bird	*Icterus galbula*	Baltimore Oriole	G5	S4			1	ABPBXB9190	Y	
Bird	*Icterus spurius*	Orchard Oriole	G5	S4			1	ABPBXB9070		
Bird	*Ictinia mississippiensis*	Mississippi Kite	G5	S2S3			1	ABNKC09010		
Bird	*Lanius ludovicianus*	Loggerhead Shrike	G4	S1B, S2N	(PS)	D	1	ABPBR01030		Y
Bird	*Laterallus jamaicensis*	Eastern Black Rail	G3T1	S1	LT	T	3	ABNME03042	Y	Y
Bird	*Limnodromus griseus*	Short-billed Dowitcher	G3	S3N			1	ABNNF16010	Y	
Bird	*Limnothlypis swainsonii*	Swainson's Warbler	G4	S3		D	1	ABPBX09010		Y
Bird	*Limosa haemastica*	Hudsonian Godwit	G4	S?			1	ABNNF08020		
Bird	*Megaceryle alcyon*	Belted Kingfisher	G5	S5			1	ABNXD01020	Y	
Bird	*Megascops asio*	Eastern Screech-Owl	G5	S5			1	ABNSB01030	Y	
Bird	*Melanerpes erythrocephalus*	Red-headed Woodpecker	G5	S4			1	ABNYF04040		
Bird	*Nyctanassa violacea*	Yellow-crowned Night Heron	G5	S3			1	ABNGA13010	Y	Y
Bird	*Nycticorax nycticorax*	Black-crowned Night Heron	G5	S2S3B		D	1	ABNGA11010		
Bird	*Oporornis agilis*	Connecticut Warbler	G4G5	S3N			1	ABPBX11020	Y	
Bird	*Parkesia motacilla*	Louisiana Waterthrush	G5	S4			1	ABPBX10030		Y
Bird	*Peucaea aestivalis*	Bachman's Sparrow	G3	S1B		E	1	ABPBX91050		Y
Bird	*Pheucticus ludovicianus*	Rose-breasted Grosbeak	G5	S4B, S5N			1	ABPBX61030	Y	
Bird	*Pluvialis dominica*	American Golden-Plover	G5	S3N			1	ABNNB02030		
Bird	*Pluvialis squatarola*	Black-bellied Plover	G5	S4N			1	ABNNB02010	Y	
Bird	*Poecile atricapillus*	Black-capped Chickadee	G5	S2B			1	ABPAW01010		
Bird	*Pooecetes gramineus*	Vesper Sparrow	G5	S1B, S4N			1	ABPBX95010	Y	
Bird	*Protonotaria citrea*	Prothonotary Warbler	G5	S4			1	ABPBX07010		Y
Bird	*Rallus elegans*	King Rail	G4	S2		T	1	ABNME05070		Y

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Bird	*Riparia riparia*	Bank Swallow	G5	S3			1	ABPAU08010		
Bird	*Scolopax minor*	American Woodcock	G5	S4B			1	ABNNF19020		Y
Bird	*Setophaga caerulescens*	Black-throated Blue Warbler	G5	S4			1	ABPBX03050		
Bird	*Setophaga cerulea*	Cerulean Warbler	G4	S3B		D	1	ABPBX03240		Y
Bird	*Setophaga discolor*	Prairie Warbler	G5	S3S4			1	ABPBX03190		Y
Bird	*Setophaga dominica*	Yellow-throated Warbler	G5	S4			1	ABPBX03130		Y
Bird	*Setophaga fusca*	Blackburnian Warbler	G5	S3B, S4N			1	ABPBX03120		
Bird	*Sitta pusilla*	Brown-headed Nuthatch	G4	S2B		D	1	ABPAZ01040		Y
Bird	*Sphyrapicus varius*	Yellow-bellied Sapsucker	G5	S1B, S4N			1	ABNYF05010		
Bird	*Sternula antillarum athalassos*	Interior Least Tern	G4T3Q	S2S3B	DL	T	1	ABNNM08102		Y
Bird	*Sturnella magna*	Eastern Meadowlark	G5	S5			1	ABPBXB2040		Y
Bird	*Thryomanes bewickii*	Bewick's Wren	G5	S1		D	1	ABPBG07010		
Bird	*Tringa flavipes*	Lesser Yellowlegs	G5	S5N			1	ABNNF01030	Y	
Bird	*Tringa semipalmata*	Willet	G5	S3N			1	ABNNF02010	Y	Y
Bird	*Troglodytes hiemalis*	Winter Wren	G5	S3B, S4N			1	ABPBG09100		
Bird	*Tyto alba*	American Barn Owl	G5	S3			1	ABNSA01030		
Bird	*Vermivora chrysoptera*	Golden-winged Warbler	G4	S3B	UR	T	1	ABPBX01030		Y
Bird	*Vireo bellii*	Bell's Vireo	G5	S1B	(PS)		1	ABPBW01110		Y
Bird	*Vireo solitarius*	Blue-headed Vireo	G5	S4			1	ABPBW01160	Y	
Bivalve	*Alasmidonta atropurpurea*	Cumberland Elktoe	G1	S1S2	LE	E	3	IMBIV02020		Y
Bivalve	*Alasmidonta marginata*	Elktoe	G4	S4			1	IMBIV02040		
Bivalve	*Alasmidonta raveneliana*	Appalachian Elktoe	G1	S1	LE	E	3	IMBIV02060		Y
Bivalve	*Alasmidonta viridis*	Slippershell Mussel	G4G5	S3			1	IMBIV02110		Y
Bivalve	*Anodontoides denigratus*	Cumberland Papershell	G1	S1			1	IMBIV05030		Y
Bivalve	*Cambarunio iris*	Rainbow	G4G5	S5			1	IMBIV4C010		
Bivalve	*Cambarunio nebulosus*	Alabama Rainbow	G3	S2	UR		1	IMBIV47080		Y
Bivalve	*Cambarunio taeniatus*	Painted Creekshell	G4	S3			1	IMBIV47130		Y
Bivalve	*Cumberlandia monodonta*	Spectaclecase	G2	S2S3	LE	E	3	IMBIV08010		Y
Bivalve	*Cyprogenia stegaria*	Fanshell	G1	S1	LE, XN	E	3	IMBIV10020		Y
Bivalve	*Dromus dromas*	Dromedary Pearlymussel	G1	S1	LE, XN	E	3	IMBIV12010		Y
Bivalve	*Elliptio arca*	Alabama Spike	G2G3	S2	UR		1	IMBIV14030		Y
Bivalve	*Elliptio arctata*	Delicate Spike	G2G3	S2	UR		1	IMBIV14040		Y
Bivalve	*Epioblasma ahlstedti*	Duck River Dartersnapper	G1	S1	LE	E	3	IMBIV16230	Y	Y
Bivalve	*Epioblasma brevidens*	Cumberlandian Combshell	G1	S1	LE, XN	E	3	IMBIV16030		Y
Bivalve	*Epioblasma capsaeformis*	Oyster Mussel	G1	S1	LE, XN	E	3	IMBIV16040		Y
Bivalve	*Epioblasma metastriata*	Upland Combshell	GX	SH	DL		1	IMBIV16100		
Bivalve	*Epioblasma obliquata*	Catspaw	G1	S1	LE, XN	E	1	IMBIV16111		Y
Bivalve	*Epioblasma othcaloogensis*	Southern Acornshell	GX	SX	DL		1	IMBIV16120		
Bivalve	*Epioblasma triquetra*	Snuffbox	G2G3	S3	LE	E	3	IMBIV16190		Y
Bivalve	*Epioblasma walkeri*	Tan Riffleshell	G1	S1	LE	E	3	IMBIV16062		Y
Bivalve	*Fusconaia cor*	Shiny Pigtoe	G1	S1	LE, XN	E	3	IMBIV17040		Y
Bivalve	*Fusconaia cuneolus*	Finerayed Pigtoe	G1	S1	LE, XN	E	3	IMBIV17050		Y
Bivalve	*Fusconaia subrotunda*	Longsolid	G3	S3	LT	T	3	IMBIV17120		Y
Bivalve	*Hamiota altilis*	Finelined Pocketbook	G3	S1S2	LT	T	1	IMBIV21010		Y
Bivalve	*Hemistena lata*	Cracking Pearlymussel	G1	S1	LE, XN	E	3	IMBIV20010		Y
Bivalve	*Lampsilis abrupta*	Pink Mucket	G1G2	S2	LE	E	3	IMBIV21110		Y
Bivalve	*Lampsilis siliquoidea*	Fatmucket	G5	S2			1	IMBIV21280		
Bivalve	*Lampsilis straminea*	Rough Fatmucket	G5	SNR			1	IMBIV21210		

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Bivalve	*Lampsilis virescens*	Alabama Lampmussel	G1	S1	LE, XN	E	3	IMBIV21260		Y
Bivalve	*Lasmigona complanata*	White Heelsplitter	G5	S5			1	IMBIV22012		
Bivalve	*Lasmigona holstonia*	Tennessee Heelsplitter	G3	S2			1	IMBIV22050		Y
Bivalve	*Lasmigona sp. 1 cf. holstonia*	Barrens Bankclimber	GNR	S1			1	IMBIV22070		
Bivalve	*Lasmigona subviridis*	Green Floater	G2G3	S2	PT	T	1	IMBIV22060		Y
Bivalve	*Leaunio lienosus*	Little Spectaclecase	G5	S4			1	IMBIV47070		
Bivalve	*Leaunio umbrans*	Coosa Creekshell	G1	S2	UR		1	IMBIV47152		Y
Bivalve	*Leaunio vanuxemensis*	Mountain Creekshell	G4	S4			1	IMBIV47150		Y
Bivalve	*Lemiox rimosus*	Birdwing Pearlymussel	G1	S1	LE, XN	E	3	IMBIV23010		Y
Bivalve	*Ligumia recta*	Black Sandshell	G4G5	S5			1	IMBIV26020		
Bivalve	*Medionidus acutissimus*	Alabama Moccasinshell	G2	S1	LT	T	3	IMBIV28010		Y
Bivalve	*Medionidus conradicus*	Cumberland Moccasinshell	G3	S3	PE	E	1	IMBIV28020		Y
Bivalve	*Medionidus parvulus*	Coosa Moccasinshell	G1?	S1	LE	E	3	IMBIV28040		Y
Bivalve	*Obovaria arkansasensis*	Southern Hickorynut	G3G4	S1			1	IMBIV31070		Y
Bivalve	*Obovaria olivaria*	Hickorynut	G4	S2			1	IMBIV31020		
Bivalve	*Obovaria retusa*	Ring Pink	G1	S1	LE, XN	E	3	IMBIV31030		Y
Bivalve	*Obovaria subrotunda*	Round Hickorynut	G3	S2S3	LT	T	3	IMBIV31050		Y
Bivalve	*Ortmanniana ligamentina*	Mucket	G5	S4			1	IMBIV01020		
Bivalve	*Ortmanniana pectorosa*	Pheasantshell	G4	S4			1	IMBIV01030		Y
Bivalve	*Paetulunio fabalis*	Rayed Bean	G2	S1	LE	E	3	IMBIV47050		
Bivalve	*Pegias fabula*	Littlewing Pearlymussel	G1	S1	LE	E	3	IMBIV32010		Y
Bivalve	*Plethobasus cicatricosus*	White Wartyback	G1	S1	LE, XN	E	3	IMBIV34010		Y
Bivalve	*Plethobasus cooperianus*	Orangefoot Pimpleback	G1	S1	LE, XN	E	3	IMBIV34020		Y
Bivalve	*Plethobasus cyphyus*	Sheepnose	G2G3	S2S3	LE	E	3	IMBIV34030		Y
Bivalve	*Pleurobema chattanoogaense*	Painted Clubshell	G1Q	S1?			1	IMBIV35050		
Bivalve	*Pleurobema clava*	Clubshell	G1G2	SH	LE, XN	E	3	IMBIV35060		Y
Bivalve	*Pleurobema cordatum*	Ohio Pigtoe	G3G4	S3			1	IMBIV35090		
Bivalve	*Pleurobema decisum*	Southern Clubshell	G3	SH	LE	E	3	IMBIV35410		Y
Bivalve	*Pleurobema georgianum*	Southern Pigtoe	G1?	S1	LE	E	3	IMBIV35140		Y
Bivalve	*Pleurobema hanleyianum*	Georgia Pigtoe	G1	S1	LE	E	3	IMBIV35160		
Bivalve	*Pleurobema oviforme*	Tennessee Clubshell	G2G3	S2S3	PE	E	1	IMBIV35220		Y
Bivalve	*Pleurobema perovatum*	Ovate Clubshell	G1G2	SH	LE	E	3	IMBIV35230		
Bivalve	*Pleurobema plenum*	Rough Pigtoe	G1	S1	LE, XN	E	3	IMBIV35240		Y
Bivalve	*Pleurobema rubellum*	Warrior Pigtoe	G1	SH			1	IMBIV35280		
Bivalve	*Pleurobema troschelianum*	Alabama Clubshell	G1Q	S1			1	IMBIV35310		
Bivalve	*Pleuronaia barnesiana*	Tennessee Pigtoe	G2G3	S2	PE	E	1	IMBIV17020		Y
Bivalve	*Pleuronaia dolabelloides*	Slabside Pearlymussel	G2	S2	LE	E	3	IMBIV25010		Y
Bivalve	*Pleuronaia gibber*	Cumberland Pigtoe	G1	S1	LE	E	3	IMBIV35150		Y
Bivalve	*Potamilus capax*	Fat Pocketbook	G3	SNR	LE	E	3	IMBIV37030	Y	Y
Bivalve	*Potamilus leptodon*	Scaleshell	G1G2	SX	LE	E	1	IMBIV24020		Y
Bivalve	*Pseudodontoideus connasaugaensis*	Alabama Creekmussel	G3	S1			1	IMBIV42010		Y
Bivalve	*Ptychobranchus foremanianus*	Rayed Kidneyshell	G1	S1		E	1	IMBIV38060		Y
Bivalve	*Ptychobranchus greenii*	Triangular Kidneyshell	G1G2		LE		3	IMBIV38020	Y	Y
Bivalve	*Ptychobranchus subtentus*	Fluted Kidneyshell	G2?	S2	LE	E	3	IMBIV38050		Y
Bivalve	*Quadrula fragosa*	Winged Mapleleaf	G1	S1	LE, XN		3	IMBIV39050		Y
Bivalve	*Simpsonaias ambigua*	Salamander Mussel	G1G2	S1	PE	E	1	IMBIV41010		
Bivalve	*Strophitus undulatus*	Creeper	G5	S5			1	IMBIV42030		
Bivalve	*Theliderma cylindrica cylindrica*	Rabbitsfoot	G3T3	S3	LT	T	3	IMBIV39041		Y

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Bivalve	*Theliderma intermedia*	Cumberland Rockshell	G1	S1	LE, XN	E	1	IMBIV39070		Y
Bivalve	*Theliderma sparsa*	Appalachian Rockshell	G1	S1	LE, XN	E	3	IMBIV39150		Y
Bivalve	*Toxolasma cylindrellum*	Pale Lilliput	G1	S1	LE	E	3	IMBIV43020		Y
Bivalve	*Toxolasma lividum*	Purple Lilliput	G3	S1S2			1	IMBIV43030		
Bivalve	*Uniomerus declivis*	Tapered Pondhorn	G5	S2			1	IMBIV46020		
Bivalve	*Venustaconcha sima*	a mussel	G?	S?			1	IMBIVSWG01		
Bivalve	*Venustaconcha trabalis*	Tennessee Bean	G1	S1	LE	E	3	IMBIVA4030		
Bivalve	*Venustaconcha troostensis*	Cumberland Bean	G1	S1	LE, XN	E	3	IMBIVA4040		
Bivalve	*Villosa vibex*	Southern Rainbow	G5	S2			1	IMBIV47170		
Crustacean	*Acanthocyclops parasensitivus*	a cyclopoid copepod	G2	S2			1	ICCOP04030		
Crustacean	*Amerigoniscus nicholasi*	a cave obligate isopod	G1G2	S1S2			1	ICMAL02070		
Crustacean	*Bactrurus angulus*	Cumberland Gap Cave Amphipod	G1	S1			1	ICMAL25050		
Crustacean	*Bactrurus undescribed sp.*	a groundwater amphipod	G1	S?			1			
Crustacean	*Barbicambarus cornutus*	Bottle Brush Crayfish	G4	S2		T	1	ICMAL49010		Y
Crustacean	*Barbicambarus simmonsi*	Tennessee Bottlebrush Crayfish	G1G2	S1S2		T	1	ICMAL49020	Y	Y
Crustacean	*Bryocamptus (Limocamptus) sp.*	a copepod	G1	S?			1			
Crustacean	*Caecidotea bicrenata*	a cave obligate isopod	G5	SR			1	ICMAL01540		
Crustacean	*Caecidotea bicrenata bicrenata*	a cave obligate isopod	G5T3T4	SR			1	ICMAL01541		
Crustacean	*Caecidotea bicrenata whitei*	a cave obligate isopod	G5T3T4	S1?			1	ICMAL01542		
Crustacean	*Caecidotea circulus*	a cave obligate isopod	G1G2	S1			1	ICMAL01590		
Crustacean	*Caecidotea nickajackensis*	Nickajack Cave Isopod	G1	S1			1	ICMAL01180		
Crustacean	*Caecidotea nortoni*	a cave obligate isopod	G2G3	S1S2			1	ICMAL01640		
Crustacean	*Caecidotea recurvata*	Southwestern Virginia Cave Isopod	G5	S2			1	ICMAL01120		
Crustacean	*Caecidotea richardsonae*	Tennessee Valley Cave Isopod	G5	SNR			1	ICMAL01130		
Crustacean	*Caecidotea scypha*	a cave obligate isopod	G1G2	S1			1	ICMAL01680		
Crustacean	*Caecidotea sp.*	a cave isopod	G?	S?			1			
Crustacean	*Caecidotea stygia*	Stygian Cave Isopod	G5	S3			1	ICMAL01200		
Crustacean	*Cambarus andersoni*	Florence Crayfish	GNR	S2			1	ICMAL07040	Y	
Crustacean	*Cambarus angularis*	Angled Crayfish	G3	S3			1	ICMAL07890		
Crustacean	*Cambarus bouchardi*	Big South Fork Crayfish	G2	S1		E	1	ICMAL07030		Y
Crustacean	*Cambarus brachydactylus*	Shortfinger Crayfish	G2G4	S3			1	ICMAL07370		
Crustacean	*Cambarus clivosus*	Short Mountain Crayfish	G2	S2		T	1	ICMAL07A30		Y
Crustacean	*Cambarus conasaugaensis*	Mountain Crayfish	G3	S1		E	1	ICMAL07400		Y
Crustacean	*Cambarus crinipes*	Hairyfoot Crayfish	G3	S3			1	ICMAL07140		
Crustacean	*Cambarus cymatilis*	Conasauga Blue Burrower	G1G2	S1		E	1	ICMAL07450		Y
Crustacean	*Cambarus deweesae*	Valley Flame Crayfish	G4	S1		E	1	ICMAL07460		
Crustacean	*Cambarus dubius*	Upland Burrowing Crayfish	G5	S5			1	ICMAL07010	Y	
Crustacean	*Cambarus extraneus*	Chickamauga Crayfish	G2?	S1S2		E	1	ICMAL07190		Y
Crustacean	*Cambarus friaufi*	Hairy Crayfish	G4	S3			1	ICMAL07500	Y	
Crustacean	*Cambarus hamulatus*	Prickly Cave Crayfish	G3G4	S3		D	1	ICMAL07170		Y
Crustacean	*Cambarus hiwasseensis*	Hiwassee Crayfish	G3G4	S1		T	1	ICMAL07570		Y
Crustacean	*Cambarus intermontanus*	Cumberland Block Crayfish	GNR	SNR		T	1		Y	
Crustacean	*Cambarus jezerinaci*	Spiny Scale Crayfish	G3?	S2	UR	D	1	ICMAL07940	Y	Y
Crustacean	*Cambarus lentiginosus*	Speckled Crayfish	GNR	S1		E	1	ICMAL07330	Y	
Crustacean	*Cambarus manningi*	Greensaddle Crayfish	G4	S3		T	1	ICMAL07630		Y
Crustacean	*Cambarus nyx*	Midnight Blue Burrower	G1	SNR		T	1	ICMAL14B30	Y	
Crustacean	*Cambarus obeyensis*	Obey Crayfish	G1	S1		E	1	ICMAL07200		Y
Crustacean	*Cambarus polypilosus*	Hillbilly Hairy Crayfish	GNR	SNR			1	ICMAL07D50	Y	

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Crustacean	*Cambarus pristinus*	Pristine Crayfish	G2	S2		E	1	ICMAL07690		Y
Crustacean	*Cambarus reburrus*	French Broad Crayfish	G3	SNR		E	1	ICMAL07270	Y	Y
Crustacean	*Cambarus rusticiformis*	Depression Crayfish	G5	S4			1	ICMAL07730	Y	
Crustacean	*Cambarus sp. 1*	Emory River Crayfish	G1	S1			1	ICMAL07X10		Y
Crustacean	*Cambarus sp?*	Obed Crayfish	G1Q	SNR			1			Y
Crustacean	*Cambarus stockeri*	Cocoa Crayfish	GNR	S1S2		D	1	ICMAL07A60		Y
Crustacean	*Cambarus tenebrosus*	Cavespring Crayfish	G5	S5			1	ICMAL07800		
Crustacean	*Cambarus williami*	Brawleys Fork Crayfish	G2	S2	PT	T	1	ICMAL07920		Y
Crustacean	*Crangonyx antennatus*	Appalachian Valley Crangonyctid	G5	S4			1	ICMAL06050		
Crustacean	*Crangonyx sp.*	an amphipod	G?	S?			1			
Crustacean	*Creaserinus hortoni*	Hatchie Burrowing Crayfish	G1	S1	UR	T	1	ICMAL15140		Y
Crustacean	*Dactylocythere steevesi*	a cave obligate shrimp	G4	S2S3			1	ICOST01100		
Crustacean	*Diacyclops nearticus*	Nearctic copepod	G3G4	SNR			1			
Crustacean	*Diacyclops sp.*	Indiana Groundwater Copepod	G1	S1			1	ICCOPSWG01		
Crustacean	*Diacyclops yeatmani*	Yeatman's Groundwater Copepod	G2G3	S1			1	ICCOP02040		
Crustacean	*Donnaldsoncythere tuberosa*	a cave obligate shrimp	G2G3	S2?			1	ICOST09020		
Crustacean	*Faxonius alabamensis*	Alabama Crayfish	G5	S2			1	ICMAL11320		
Crustacean	*Faxonius barrenensis*	Barren River Crayfsih	G4	S3		D	1	ICMAL11330		
Crustacean	*Faxonius bellator*	Screaming Eagle Crayfish	G1	SNR			1	ICMAL11950	Y	
Crustacean	*Faxonius burri*	Blood River Crayfish	G2	S1		T	1	ICMAL11800		Y
Crustacean	*Faxonius compressus*	Slender Crayfish	G5	S5			1	ICMAL11360	Y	
Crustacean	*Faxonius cooperi*	Flint River Crayfish	G1	S1		E	1	ICMAL11370		Y
Crustacean	*Faxonius forceps*	Surgeon Crayfish	G5	S4		T	1	ICMAL11410		
Crustacean	*Faxonius pagei*	Mottled Crayfish	G4	S4			1	ICMAL11820		Y
Crustacean	*Faxonius shoupi*	Nashville Crayfish	G1G2	S3	LE, PD	E	3	ICMAL11160		Y
Crustacean	*Faxonius sp. nov.*	Sculpin Crayfish	GNR	SNR			1		Y	
Crustacean	*Faxonius taylori*	Crescent Crayfish	G2	S2		T	1	ICMAL12060		Y
Crustacean	*Faxonius wrighti*	Hardin Crayfish	G2	S2	UR	T	1	ICMAL11550		Y
Crustacean	*Gammarus minus*	a sideswimmer	GNR	SNR			1	ICMAL10080		
Crustacean	*Haplophthalmus danicus*	Terrestrial Cave Isopod	GNR	SNR			1	ICMAL85010		
Crustacean	*Itocyclops undescribed sp.*	a cave copepod	G1	S?			1			
Crustacean	*Ligidium elrodii hancockensis*	a cave obligate isopod	G4G5T1T2	S1?			1	ICMAL78013		
Crustacean	*Megacyclops donnaldsoni*	Donaldson's Cave Copepod	G3G4	S1			1	ICCOP09010		
Crustacean	*Miktoniscus barri*	Barr's Terrestrial Isopod	G2G4	S2?			1	ICMAL08040		
Crustacean	*Miktoniscus medcofi*	Small Alabama Sowbug	GNR	SNR			1	ICMAL08030		
Crustacean	*Orconectes australis*	Southern Cave Crayfish	G5	S3			1	ICMAL11011		
Crustacean	*Orconectes barri*	Cumberland Plateau Cave Crayfish	G2	S1		T	1	ICMAL12050		Y
Crustacean	*Orconectes incomptus*	Tennessee Cave Crayfish	G2	S1		E	1	ICMAL11460		Y
Crustacean	*Orconectes pellucidus*	Mammoth Cave Crayfish	G4	S3		T	1	ICMAL11070		Y
Crustacean	*Pseudobaicalasellus incurvus*	Incurved Cave Isopod	G2G4	S1			1	ICMAL01100		
Crustacean	*Pseudocandona jeanneli*	Jeannel's Cave Ostracod	G3	S1			1	ICOST11010		
Crustacean	*Pseudocandona sp.*	a groundwater ostracod	G1G2	S?			1			
Crustacean	*Sagittocythere barri*	Ectocommensal Ostracod	G5	S3			1	ICOST12010		
Crustacean	*Stygobromus barryi*	a cave obligate amphipod	G1	S1			1	ICMAL05880		
Crustacean	*Stygobromus dicksoni*	a cave obligate amphipod	G5	S1S2			1	ICMAL05900		
Crustacean	*Stygobromus exilis*	Central Kentucky Cave Amphipod	G5	S3			1	ICMAL05440		
Crustacean	*Stygobromus fecundus*	a cave obligate amphipod	G1G2	S1			1	ICMAL05820		
Crustacean	*Stygobromus finleyi*	Finley's Cave Amphipod	G3G4	S1			1	ICMAL05730		

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Crustacean	*Stygobromus mackini*	Southwestern Virginia Cave Amphipod	G5	S2			1	ICMAL05300		
Crustacean	*Stygobromus nortoni*	Norton's Cave Amphipod	G2G3	SH			1	ICMAL05330		
Crustacean	*Stygobromus sp.*	cave amphipods	G?	S?			1			
Crustacean	*Stygobromus sp. 22*	Swamp River Cave Amphipod	G3	S3			1	ICMAL05X80		
Crustacean	*Stygobromus sp. 24*	a cave obligate amphipod	G1	S1			1	ICMAL05XA0		
Crustacean	*Stygobromus sp. 3*	Bosnak's cave amphipod	G2	S?			1			
Crustacean	*Stygobromus sp. 34*	a cave obligate amphipod	G1G2	S1S2			1	ICMAL05XL0		
Crustacean	*Stygobromus sp. 4*	Southern cave amphipod	G3	S?			1			
Crustacean	*Stygobromus sparsus*	Gregory Cave Stygobromid	G1G2	S1S2			1	ICMAL05A60		
Crustacean	*Stygobromus vitreus*	Mammoth Cave Stygobromid	G4	S2			1	ICMAL05720		
Crustacean	*Triconiscus pusillus*	a terrestrial isopod	EX	S?			1			
Fish	*Acipenser fulvescens*	Lake Sturgeon	G3G4	S1		T	1	AFCAA01020		Y
Fish	*Allohistium cinereum*	Ashy Darter	G2G3	S2S3		T	1	AFCQC02H00		Y
Fish	*Allohistium maydeni*	Redlips Darter	G2	S2		T	1	AFCQC02G90		Y
Fish	*Ammocrypta beanii*	Naked Sand Darter	G5	S2			1	AFCQC01020		
Fish	*Ammocrypta clara*	Western Sand Darter	G3	S1		E	1	AFCQC01040		Y
Fish	*Ammocrypta vivax*	Scaly Sand Darter	G5	S2			1	AFCQC01070		Y
Fish	*Anguilla rostrata*	American Eel	G4	S3		D	1	AFCEA01010		Y
Fish	*Atractosteus spatula*	Alligator Gar	G3G4	S1		T	1	AFCBA02010		Y
Fish	*Carpiodes velifer*	Highfin Carpsucker	G4G5	S2S3		D	1	AFCJC01030		Y
Fish	*Chrosomus cumberlandensis*	Blackside Dace	G2	S2	LT	T	3	AFCJB31010		Y
Fish	*Chrosomus saylori*	Laurel Dace	G1	S1	LE	E	3	AFCJB31070		Y
Fish	*Chrosomus sp. cf. saylori*	Clinch Dace	G1	S1	UR	T	1	AFCJB31080	Y	Y
Fish	*Chrosomus tennesseensis*	Tennessee Dace	G3	S3		D	1	AFCJB31060		Y
Fish	*Clinostomus funduloides ssp. 1*	Smoky Dace	G5T3Q	S1S2			1	AFCJB05021		Y
Fish	*Crystallaria cincotta*	Diamond Darter	G1	SX	LE	E	3	AFCQC07010		Y
Fish	*Cycleptus elongatus*	Blue Sucker	G3G4	S2		D	1	AFCJC04010		Y
Fish	*Cyprinella caerulea*	Blue Shiner	G2G3	S1	LT	T	3	AFCJB49020		Y
Fish	*Ericymba dorsalis*	Bigmouth Shiner	G5	S1		D	1	AFCJB28410		
Fish	*Erimonax monachus*	Spotfin Chub	G2	S2	LT, XN	T	3	AFCJB49270		Y
Fish	*Erimystax cahni*	Slender Chub	G1	S1	LT, XN	T	3	AFCJB50010		Y
Fish	*Erimystax dissimilis*	Streamline Chub	G4	S3			1	AFCJB50020		Y
Fish	*Erimystax insignis*	Blotched Chub	G4	S3S4			1	AFCJB50040		Y
Fish	*Etheostoma akatulo*	Bluemask Darter	G1	S1	LE	E	3	AFCQC02XD0		Y
Fish	*Etheostoma baileyi*	Emerald Darter	G4G5	S2		D	1	AFCQC02910		Y
Fish	*Etheostoma barbouri*	Teardrop Darter	G4G5	S2			1	AFCQC02040		Y
Fish	*Etheostoma barrenense*	Splendid Darter	G4	S3			1	AFCQC02900		Y
Fish	*Etheostoma blennius sequatchiense*	Sequatchie Darter	G4T3	S3		D	1	AFCQC02071		
Fish	*Etheostoma boschungi*	Slackwater Darter	G1	S1	LT	T	3	AFCQC02080		Y
Fish	*Etheostoma brevirostrum*	Holiday Darter	G2	S1		T	1	AFCQC02A40		Y
Fish	*Etheostoma cervus*	Chickasaw Darter	G2G3	S2S3		D	1	AFCQC02E60		Y
Fish	*Etheostoma corona*	Crown Darter	G3	S1S2		T	1	AFCQC02A50		
Fish	*Etheostoma ditrema*	Coldwater Darter	G1G2	S1		T	1	AFCQC02190		Y
Fish	*Etheostoma forbesi*	Barrens Darter	G1G2	S1		E	1	AFCQC02B30		Y
Fish	*Etheostoma gutselli*	Tuckasegee Darter	G3G4	S1		D	1	AFCQC02061		Y
Fish	*Etheostoma lemniscatum*	Tuxedo Darter	G1	S1	(LE)	E	3	AFCQC02F20		Y
Fish	*Etheostoma luteovinctum*	Redband Darter	G4	S4		D	1	AFCQC02410		
Fish	*Etheostoma marmorpinnum*	Marbled Darter	G1	S1	(LE)	E	3	AFCQC02F10		Y

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Fish	*Etheostoma neopterum*	Lollypop Darter	G3	S1S2		D	1	AFCQC02470		Y
Fish	*Etheostoma obeyense*	Barcheek Darter	G4	S3			1	AFCQC02510		
Fish	*Etheostoma olivaceum*	Sooty Darter	G3	S3			1	AFCQC02530		
Fish	*Etheostoma percnurum*	Duskytail Darter	G1	S1	LE, XN	E	3	AFCQC02F50		Y
Fish	*Etheostoma pseudovulatum*	Egg-mimic Darter	G1	S1		D	1	AFCQC02A60		Y
Fish	*Etheostoma pyrrhogaster*	Firebelly Darter	G2G3	S2		D	1	AFCQC02990		Y
Fish	*Etheostoma rupestre*	Rock Darter	G4	S3			1	AFCQC02650		Y
Fish	*Etheostoma sagitta*	Arrow Darter	G3	S2		D	1	AFCQC02662		Y
Fish	*Etheostoma sitikuense*	Citico Darter	G1	S1	(LE, XN)	E	3	AFCQC02F30		Y
Fish	*Etheostoma striatulum*	Striated Darter	G1	S1	UR	E	1	AFCQC02750		Y
Fish	*Etheostoma susanae*	Cumberland Darter	G1G2	S1	LE	E	3	AFCQC02D40		Y
Fish	*Etheostoma trisella*	Trispot Darter	G1	S1	LT	T	3	AFCQC02810		Y
Fish	*Etheostoma tuscumbia*	Tuscumbia Darter	G2	SX	UR	E	1	AFCQC02820		Y
Fish	*Fundulus chrysotus*	Golden Topminnow	G5	S1S2		D	1	AFCNB04030		Y
Fish	*Fundulus julisia*	Barrens Topminnow	G1	S1	LE	E	3	AFCNB04240		Y
Fish	*Hemitremia flammea*	Flame Chub	G3	S3		T	1	AFCJB14010		Y
Fish	*Hybognathus placitus*	Plains Minnow	G4	S1		D	1	AFCJB16050		Y
Fish	*Hybopsis lineapunctata*	Lined Chub	G3G4	S1		T	1	AFCJB15040		Y
Fish	*Ichthyomyzon gagei*	Southern Brook Lamprey	G5	S1		D	1	AFBAA01040		
Fish	*Ichthyomyzon unicuspis*	Silver Lamprey	G5	S2		T	1	AFBAA01060		
Fish	*Macrhybopsis etnieri*	Coosa Chub	G3G4	S1		E	1	AFCJB53050		Y
Fish	*Macrhybopsis gelida*	Sturgeon Chub	G3	S1			1	AFCJB53020		Y
Fish	*Macrhybopsis meeki*	Sicklefin Chub	G3	S2			1	AFCJB53030		Y
Fish	*Moxostoma sp. 2*	Sicklefin Redhorse	G1G2	S?			1	AFCJC10210		Y
Fish	*Nothonotus acuticeps*	Sharphead Darter	G3	S2S3			1	AFCQC02890		Y
Fish	*Nothonotus aquali*	Coppercheek Darter	G2G3	S2S3		T	1	AFCQC02010		Y
Fish	*Nothonotus bellus*	Orangefin Darter	G4G5	S3			1	AFCQC02050		
Fish	*Nothonotus denoncourti*	Golden Darter	G2	S2			1	AFCQC02C20		Y
Fish	*Nothonotus maculatus*	Spotted Darter	G3?	SP			1	AFCQC02420		Y
Fish	*Nothonotus microlepidus*	Smallscale Darter	G2G3	S2		D	1	AFCQC02440		Y
Fish	*Nothonotus tippecanoe*	Tippecanoe Darter	G3G4	S1S2		T	1	AFCQC02800		Y
Fish	*Nothonotus vulneratus*	Wounded Darter	G3	S2		D	1	AFCQC02A10		Y
Fish	*Nothonotus wapiti*	Boulder Darter	G1	S1	LE, XN	E	3	AFCQC02A20		Y
Fish	*Notropis albizonatus*	Palezone Shiner	G1	SH	LE	E	3	AFCJB28A90		Y
Fish	*Notropis asperifrons*	Burrhead Shiner	G4	S2			1	AFCJB28110		
Fish	*Notropis buccatus*	Silverjaw Minnow	G5	S1		E	1	AFCJB60010		
Fish	*Notropis chrosomus*	Rainbow Shiner	G4	S3			1	AFCJB28360		
Fish	*Notropis rubellus*	Rosyface Shiner	G5	S2			1	AFCJB28810		
Fish	*Notropis rupestris*	Bedrock Shiner	G2	S2		D	1	AFCJB28B20		Y
Fish	*Noturus baileyi*	Smoky Madtom	G1	S1	LE, XN	E	3	AFCKA02020		Y
Fish	*Noturus crypticus*	Chucky Madtom	G1	S1	LE	E	3	AFCKA02270		Y
Fish	*Noturus fasciatus*	Saddled Madtom	G2	S2		T	1	AFCKA02260		Y
Fish	*Noturus flavipinnis*	Yellowfin Madtom	G1	S1	LT, XN	T	3	AFCKA02060		Y
Fish	*Noturus gladiator*	Piebald Madtom	G3	S3	UR	E	1	AFCKA02290		Y
Fish	*Noturus munitus*	Frecklebelly Madtom	G3	S1	LT	T	3	AFCKA02170		Y
Fish	*Noturus stanauli*	Pygmy Madtom	G1	S1	LE, XN	E	3	AFCKA02210		
Fish	*Percina antesella*	Amber Darter	G1G2	S1	LE	E	3	AFCQC04010		Y
Fish	*Percina apina*	Tennessee Logperch	GNR	S2		D	1	AFCQC04490	Y	

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Fish	*Percina aurantiaca*	Tangerine Darter	G4	S3			1	AFCQC04020		Y
Fish	*Percina aurolineata*	Goldline Darter	G2	SNR	LT	T	3	AFCQC04030	Y	Y
Fish	*Percina burtoni*	Blotchside Logperch	G2G3	S2		T	1	AFCQC04500		Y
Fish	*Percina jenkinsi*	Conasauga Logperch	G1	S1	LE	E	3	AFCQC04320		Y
Fish	*Percina kusha*	Bridled Darter	G1G2	S1		T	1	AFCQC04530		Y
Fish	*Percina macrocephala*	Longhead Darter	G3	S2		E	1	AFCQC04120		Y
Fish	*Percina phoxocephala*	Slenderhead Darter	G5	S3			1	AFCQC04230		
Fish	*Percina smithvanizi*	Muscadine Darter	G3	S1			1	AFCQC04X30		
Fish	*Percina squamata*	Olive Darter	G3	S2			1	AFCQC04280		Y
Fish	*Percina stictogaster*	Frecklebelly Darter	G4G5	S2		D	1	AFCQC04330		Y
Fish	*Percina tanasi*	Snail Darter	G2G3	S2S3	DL	T	1	AFCQC04290		Y
Fish	*Percina williamsi*	Sickle Darter	G2	S2	LT	T	3	AFCQC04450		Y
Fish	*Phenacobius catostomus*	Riffle Minnow	G4	S2		D	1	AFCJB30010		
Fish	*Polyodon spathula*	Paddlefish	G4	S3			1	AFCAB01010		
Fish	*Salvelinus fontinalis*	Brook Trout	G5	S3			1	AFCHA05030		
Fish	*Scaphirhynchus albus*	Pallid Sturgeon	G2	S1	LE	E	3	AFCAA02010		Y
Fish	*Thoburnia atripinnis*	Blackfin Sucker	G3	S2			1	AFCJC13010		Y
Fish	*Typhlichthys subterraneus*	Southern Cavefish	G4	S3		D	1	AFCLA04020		
Flatworm	*Sphalloplana buchanani*	a cave obligate planarian	G1G2	S1			2	IPTUR04100		
Flatworm	*Sphalloplana chandleri*	Chandler's Planarian	G1G2	S1			2	IPTUR04070		
Flatworm	*Sphalloplana consimilis*	Powell Valley Planarian	G2G3	S1			2	IPTUR04040		
Flatworm	*Sphalloplana percoeca*	a cave obligate planarian	G5	S3?			2	IPTUR04170		
Flatworm	*Sphalloplana sp.*	a cave obligate flatworm	G2	S?			2	IPTURSWG01		
Flatworm	*Sphalloplana sp.*	a flatworm	G?	S?			2			
Flatworm	*Sphalloplana sp. 2*	Rumbling Falls Cave Flatworm	G2	S1			2	IPTUR04X20		
Gastropod	*Anguispira alabama*	Alabama Tigersnail	G2	S2			1	IMGAS53110		
Gastropod	*Anguispira cumberlandiana*	Cumberland Tigersnail	G3	S3?			1	IMGAS53020		
Gastropod	*Anguispira knoxensis*	Rustic Tigersnail	G1G2	S1			1	IMGAS53060		
Gastropod	*Anguispira kochi*	Banded Tigersnail	G5	S2?			1	IMGAS53070		
Gastropod	*Anguispira picta*	Painted Snake Coiled Forest Snail	G1	S1	LT	T	3	IMGAS53080		
Gastropod	*Athearnia anthonyi*	Anthony's Riversnail	G1	S1	LE, XN	E	3	IMGASK5260		
Gastropod	*Carychium stygium*	Cave Thorn	G3	S2			1	IMGAS07080		
Gastropod	*Daedalochila auriformis*	Rockpile Liptooth	G4	S1			1	IMGAS96020		
Gastropod	*Daedalochila leporina*	Gulf Coast Liptooth	G4G5	S4?			1	IMGAS96280	Y	
Gastropod	*Discus bryanti*	Sawtooth Disc	G3	S1S2			1	IMGAS54010		
Gastropod	*Discus catskillensis*	Angular Disc Snail	G5	SNA			1	IMGAS54030	Y	
Gastropod	*Discus clappi*	Channelled Disc	G1	S1			1	IMGAS54040		
Gastropod	*Elimia acuta*	Acute Elimia	G2	S1	UR		1	IMGASK2010		
Gastropod	*Elimia arachnoidea*	Spider Elimia	G2G3	S2	UR		1	IMGASK2060		
Gastropod	*Elimia aterina*	Coal Elimia	G2	S1			1	IMGASK2070		
Gastropod	*Elimia christyi*	Christy's Elimia	G2	S2			1	IMGASK2910		
Gastropod	*Elimia porrecta*	Nymph Elimia	G2	S2			1	IMGASK2540		
Gastropod	*Elimia striatula*	File Elimia	G2	S2			1	IMGASK2630		
Gastropod	*Elimia striqosa*	Brook Elimia	G2	S2			1	IMGASK2640		
Gastropod	*Elimia teres*	Elegant Elimia	G1	S1	UR		1	IMGASK2670		
Gastropod	*Elimia troostiana*	Mossy Elimia	G1	S1			1	IMGASK2680		
Gastropod	*Euchemotrema fraternum montanum*	a terrestrial snail	G5T1	S2			1	IMGAS94031		
Gastropod	*Fumonelix archeri*	Ocoee Covert	G1G2	S1			1	IMGAS95040		

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Gastropod	*Fumonelix christyi*	Glossy Covert	G3	S2			1	IMGAS95070		
Gastropod	*Fumonelix jonesiana*	Big-tooth Covert	G1	S1			1	IMGAS95170		
Gastropod	*Fumonelix langdoni*	Talus Covert	G1	SNR			1	IMGAS95510	Y	
Gastropod	*Fumonelix orestes*	Engraved Covert	G1	S?			1	IMGAS95240		
Gastropod	*Fumonelix roanensis*	Roan Mountain Covert	G1	S?			1	IMGAS95530	Y	
Gastropod	*Fumonelix wetherbyi*	Clifty Covert	G2G3	S2S3			1	IMGAS95360		
Gastropod	*Fumonelix wheatleyi clingmanicus*	Clingman Covert	G4T2T3	S2S3			1	IMGAS95371		
Gastropod	*Glyphyalinia junaluskana*	Dark Glyph	G2G3	S2?			1	IMGAS73070		
Gastropod	*Glyphyalinia ocoae*	Blue-gray Glyph	G2	S1			1	IMGAS73110		
Gastropod	*Glyphyalinia pentadelphia*	Pink Glyph	G1G3	S2			1	IMGAS73130		
Gastropod	*Glyphyalinia rimula*	Tongued Glyph	G3	S2			1	IMGAS73180		
Gastropod	*Glyphyalinia sp.*	a terrestrial snail	G?	S?			1			
Gastropod	*Glyphyalinia specus*	Hollow Glyph	G4	S3			1	IMGAS73210		
Gastropod	*Haplotrema kendeighi*	Blue-foot Lancetooth	G2G3	S2			1	IMGAS36080		
Gastropod	*Helicodiscus aldrichianus*	Burrowing Coil	G3	S2			1	IMGAS50210		
Gastropod	*Helicodiscus barri*	Raccoon Coil	G3G4	S3S4			1	IMGAS50010		
Gastropod	*Helicodiscus bonamicus*	Spiral Coil	G1	S1			1	IMGAS50020	Y	
Gastropod	*Helicodiscus enneodon*	Bluff Coil	G3G4Q	S4S5			1	IMGAS50050		
Gastropod	*Helicodiscus hadenoecus*	Cricket Coil	G3	S3			1	IMGAS50070		
Gastropod	*Helicodiscus hexodon*	Toothy Coil	G1	S1			1	IMGAS50080		
Gastropod	*Helicodiscus notius specus*	Hollow Coil	G5T2	S1?			1	IMGAS50121		
Gastropod	*Helicodiscus punctatellus*	Punctate Coil	G1	S1			1	IMGAS50150	Y	
Gastropod	*Helicodiscus sp.*	a terrestrial snail	G?	S?			1			
Gastropod	*Inflectarius downieanus*	Dwarf Globelet	G3	S3			1	IMGAS95110		
Gastropod	*Inflectarius ferrissi*	Smoky Mountain Covert	G2	S2			1	IMGAS95140		
Gastropod	*Inflectarius kalmianus*	Brown Globelet	G3	S3			1	IMGAS95180		
Gastropod	*Inflectarius smithi*	Alabama Shagreen	G2	S2			1	IMGAS95330		
Gastropod	*Inflectarius subpalliatus*	Velvet Covert	G2G3	S2			1	IMGAS95340		
Gastropod	*Inflectarius verus*	Fuzzy Covert	G1	S?			1	IMGAS95420	Y	
Gastropod	*Io fluvialis*	Spiny Riversnail	G1G2	S2	UR		1	IMGASK3010		
Gastropod	*Leptoxis umbilicata*	Umbilicate Rocksnail	G1Q	S1			1	IMGASK5120		
Gastropod	*Leptoxis virgata*	Smooth Mudalia	G2	S1			1	IMGASK5210		
Gastropod	*Lithasia armigera*	Armored Rocksnail	G3G4	S1S2			1	IMGASK6010		
Gastropod	*Lithasia curta*	Knobby Rocksnail	G1	SX			1	IMGASK6020		
Gastropod	*Lithasia duttoniana*	Helmet Rocksnail	G2	S2			1	IMGASK6030		
Gastropod	*Lithasia fuliginosa*	Geniculate River Snail	G3	S2			1	IMGASK6041		
Gastropod	*Lithasia jayana*	Rugose Rocksnail	G1G2	SX			1	IMGASK6060		
Gastropod	*Lithasia lima*	Warty Rocksnail	G2	S2			1	IMGASK6070		
Gastropod	*Lithasia salebrosa*	Muddy Rocksnail	G2G3	S2			1	IMGASK6090		
Gastropod	*Marstonia ogmorhaphe*	Royal Springsnail	G1	S1	LE	E	3	IMGASJ0450		
Gastropod	*Megapallifera wetherbyi*	Blotchy Mantleslug	G2G3	S2			1	IMGASQ0030		
Gastropod	*Mesodon altivagus*	Wandering Globe	G2G3	S2			1	IMGAS95390		
Gastropod	*Mesodon andrewsae*	Balsam Globe	G3	S2			1	IMGAS95010		
Gastropod	*Mesodon sanus*	Squat Globelet	G3	S2S3			1	IMGAS95300		
Gastropod	*Mesomphix andrewsae*	Mountain Button	G3G4	S3S4			1	IMGAS75010		
Gastropod	*Mesomphix subplanus*	Flat Button	G3G4	S3S4			1	IMGAS75140		
Gastropod	*Nesovitrea electrina*	Amber Glass Snail	G5	SP			1	IMGAS76030	Y	
Gastropod	*Pallifera marmorea*	Marbled Mantleslug	G3	S?			1	IMGAS63050	Y	

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Gastropod	*Paravitrea alethia*	Goddess Supercoil	G1	S1?			1	IMGAS78010		
Gastropod	*Paravitrea andrewsae*	High Mountain Supercoil	G2	S2			1	IMGAS78030		
Gastropod	*Paravitrea bellona*	Club Supercoil	G4	S?			1	IMGAS78050		
Gastropod	*Paravitrea blarina*	Shrew Supercoil	G3	S3			1	IMGAS78070		
Gastropod	*Paravitrea calcicola*	Pearl Supercoil	G1	S1?			1	IMGAS78080		
Gastropod	*Paravitrea clappi*	Mirey Ridge Supercoil	G2G3	S2S3			1	IMGAS78110		
Gastropod	*Paravitrea lacteodens*	Ramp Cove Supercoil	G1	S?			1	IMGAS78400	Y	
Gastropod	*Paravitrea lamellidens*	Lamellate Supercoil	G3	S2			1	IMGAS78170		
Gastropod	*Paravitrea lapilla*	Gem Supercoil	G3	S2			1	IMGAS78180		
Gastropod	*Paravitrea metallacta*	Caneyfork Supercoil	G3	S3			1	IMGAS78190		
Gastropod	*Paravitrea reesei*	Round Supercoil	G3	S1S2			1	IMGAS78250		
Gastropod	*Paravitrea seradens*	Barred Supercoil	G3	S?			1	IMGAS78270	Y	
Gastropod	*Paravitrea significans*	Domed Supercoil	G3	S1S2			1	IMGAS78280	Y	
Gastropod	*Paravitrea subtilis*	Slender Supercoil	G2	S2			1	IMGAS78300		
Gastropod	*Paravitrea tantilla*	Teasing Supercoil	G3	S3			1	IMGAS78310		
Gastropod	*Paravitrea ternaria*	Sculpted Supercoil	G1G2	S1S2			1	IMGAS78320		
Gastropod	*Paravitrea tridens*	Whitefoot Supercoil	G2	S2			1	IMGAS78350		
Gastropod	*Paravitrea umbilicaris*	Open Supercoil	G3?	S2?			1	IMGAS78360		
Gastropod	*Paravitrea variabilis*	Variabile Supercoil	G2G3	S2S3			1	IMGAS78370		
Gastropod	*Paravitrea varidens*	Roan Supercoil	G1G2	S1S2			1	IMGAS78380		
Gastropod	*Patera clarki*	Dwarf Proud Globe	G3	S2S3			1	IMGAS95082		
Gastropod	*Philomycus sellatus*	Alabama Mantleslug	G2G3	S2			1	IMGAS64060		
Gastropod	*Philomycus virginicus*	Virginia Mantleslug	G3	S2S3			1	IMGAS64040		
Gastropod	*Pilsbryna aurea*	Ornate Bud	G2	S1			1	IMGAS79010		
Gastropod	*Pilsbryna castanea*	Prominent Bud	G2	S2			1	IMGAS79020		
Gastropod	*Pilsbryna nodopalma*	Oar Tooth Bud	G1G2	S1			1	IMGAS79040	Y	
Gastropod	*Pilsbryna quadrilamellata*	Four Blade Bud	G1	S1			1	IMGAS79050	Y	
Gastropod	*Pilsbryna vanattai*	Honey Bud	G2G3	S2S3			1	IMGAS73230		
Gastropod	*Pleurocera alveare*	Rugged Hornsnail	G3	S2			1	IMGASK7020		
Gastropod	*Pleurocera corpulenta*	Corpulent Hornsnail	G1	S1	UR		1	IMGASK7060		
Gastropod	*Pleurocera picta*	Shortspire Hornsnail	G2	S2			1	IMGASK7070		
Gastropod	*Pleurocera trochiformis*	Sulcate Hornsnail	G2	S2			1	IMGASK7160		
Gastropod	*Pleurocera walkeri*	Telescope Hornsnail	G3	S2			1	IMGASK7190		
Gastropod	*Pseudohyalina exigua*	Ribbed Striate Snail	G5	S1			1	IMGAS81010		
Gastropod	*Somatogyrus aureus*	Golden Pebblesnail	G1	S1			1	IMGASJ2030		
Gastropod	*Somatogyrus georgianus*	Cherokee Pebblesnail	GH	S?			1	IMGASJ2130	Y	
Gastropod	*Somatogyrus parvulus*	Sparrow Pebblesnail	G1G2Q	S1			1	IMGASJ2200		
Gastropod	*Somatogyrus sp. 2*	Hiwassee Pebblesnail	G1Q	S1			1	IMGASJ2380		
Gastropod	*Somatogyrus tennesseensis*	Opaque Pebblesnail	G1	S1			1	IMGASJ2310		
Gastropod	*Stenotrema altispira*	Highland Slitmouth	G3	S2?			1	IMGAS98020		
Gastropod	*Stenotrema calvescens*	Chattanooga Slitmouth	G3	S3S4			1	IMGAS98070		
Gastropod	*Stenotrema cohuttense*	Cohutta Slitmouth	G2	S2			1	IMGAS98080		
Gastropod	*Stenotrema depilatum*	Great Smoky Slitmouth	G2	S2			1	IMGAS98100		
Gastropod	*Stenotrema edgarianum*	Sequatchie Slitmouth	G2G3	S2S3			1	IMGAS98110		
Gastropod	*Stenotrema waldense*	Doaks Creek Slitmouth	G2	S2S3			1	IMGAS98250		
Gastropod	*Striatura milium*	Fine-ribbed Striate Snail	G5	S?			1	IMGAS81040	Y	
Gastropod	*Triodopsis anteridon*	Carter Threetooth	G3	S1S2			1	IMGASA1410		
Gastropod	*Triodopsis claibornensis*	Clairborne Threetooth	G2	S2			1	IMGASA1070		

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Gastropod	*Triodopsis juxtidens*	Atlantic Threetooth	G5	S?			1	IMGASA1420	Y	
Gastropod	*Triodopsis rugosa*	Buttressed Threetooth	G1	S?			1	IMGASA1340	Y	
Gastropod	*Vallonia parvula*	Trumpet Vallonia Snail	G4	SNR			1	IMGAS22060	Y	
Gastropod	*Ventridens coelaxis*	Bidentate Dome	G3	S2S3			1	IMGAS82050		
Gastropod	*Ventridens decussatus*	Crossed Dome	G3	S2?			1	IMGAS82070		
Gastropod	*Ventridens eutropis*	Carinate Dome	G2G3	S2			1	IMGAS82090		
Gastropod	*Ventridens percallosus*	Tennessee Dome	G3	S3			1	IMGAS82160		
Gastropod	*Vertigo clappi*	Cupped Vertigo Snail	G3	S1			1	IMGAS20100		
Gastropod	*Vertigo parvula*	Smallmouth Vertigo	G3	S2S3			1	IMGAS20270		
Gastropod	*Vertigo rugosula*	Striate Vertigo	G4	S2			1	IMGAS20310	Y	
Gastropod	*Vertigo teskeyae*	Swamp Vertigo	G5	S1			1	IMGAS20360		
Gastropod	*Webbhelix multilineata*	Striped Whitelip	G5	S2			1	IMGASA1250		
Gastropod	*Xolotrema obstrictum*	Sharp Wedge	G4	S5			1	IMGASA1280		
Gastropod	*Zonitoides lateumbilicatus*	Striate Gloss	G3G4	S2?			1	IMGAS85040		
Insect	*Agapetus diacanthus*	a saddlecase caddisfly	G1G2	S1S2			2	IITRI33230	Y	
Insect	*Agarodes stannardi*	Stannard's Agarodes Caddisfly	G2	S2			2	IITRI1H030		
Insect	*Aleochara lucifuga*	a rove beetle	GNR	S?			2	IICOLG2010		
Insect	*Aleochara sp.*	a rove beetle	G?	S?			2			
Insect	*Allocapnia brooksi*	Sevier Snowfly	G2	S2	UR		2	IIPLE01020		
Insect	*Allocapnia cunninghami*	Karst Snowfly	G1G2	S1	UR		2	IIPLE01030		
Insect	*Allocapnia fumosa*	Smokies Snowfly	G2	S2			2	IIPLE01080		
Insect	*Allocapnia perplexa*	Perplexing Snowfly	G1	S1			2	IIPLE01250		
Insect	*Aloconota diversiseta*	a rove beetle	G1	S1			2	IICOLJM020		
Insect	*Aloconota insecta*	a rove beetle	GNR	S?			2	IICOLG3010		
Insect	*Aloconota laurentiana*	a rove beetle	G4	S?			2			
Insect	*Amblyscirtes linda*	Linda's Roadside-Skipper	G2G3	S2	UR		2	IILEP80050		
Insect	*Amblyscirtes reversa*	Reversed Roadside-Skipper	G3	S2			2	IILEP80140	Y	
Insect	*Amphinemura mockfordi*	Tennessee Forestfly	G2	S2	UR		2	IIPLE0H060		
Insect	*Anillinus longiceps*	a cave obligate beetle	G?	S?			2			
Insect	*Anillinus sp.*	a ground beetle	G?	S?			2			
Insect	*Anillinus sp.*	an undescribed ground beetle	G1	S?			2			
Insect	*Anillinus sp. 5*	Flag Trail Cave Beetle	G1	S1			2	IICOL6CX50		
Insect	*Argillophora furcilla*	Silver Fork Cane Moth	G3G4	S2?			2	IILEY9R010	Y	
Insect	*Argynnis diana*	Diana Fritillary	G2G3	S3			2	IILEPJ6010		
Insect	*Arianops pecki*	a cave ant beetle	G?	S?			2			
Insect	*Arianops sp.*	a cave ant beetle	G1	S?			2			
Insect	*Arianops stygica*	Cave Ant Beetle	G1	S1			2	IICOL10200		
Insect	*Arrhopalites benitus*	a springtail	G4	S?			2			
Insect	*Arrhopalites caecus*	a springtail	GNR	S?			2			
Insect	*Arrhopalites marshalli*	Marshall's Cave Springtail	G2	S2			2			
Insect	*Arrhopalites pygmaeus*	a springtail	G4	S?			2			
Insect	*Arrhopalites sp.*	a cave obligate springtail	G1	S1			2	IICLLSWG01		
Insect	*Arrhopalites sp. 2 near bimus*	an undescribed cave springtail	G1	S?			2			
Insect	*Arrhopalites sp. 3 near benitus*	an undescribed cave springtail	G1	S?			2			
Insect	*Arrhopalites sp. 4*	an undescribed cave springtail	G1	S1			2	IICLL04220		
Insect	*Arrhopalites sp. 4 near lacuna*	an undescribed cave springtail	G1	S?			2			
Insect	*Atheta annexa*	Annexed Minute Rove Beetle	G5	S?			2	IICOL93010		
Insect	*Atheta lucifuga*	Light Shunning Rove Beetle	G4	S2			2	IICOL93040		

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Insect	*Atheta sp.*	a rove beetle	G?	S?			2			
Insect	*Atheta troglophila*	a rove beetle	G4	S?			2	IICOL93020		
Insect	*Atranus pubescens*	Hairy Harp Ground Beetle	GNR	S?			2	IICOL9Y010		
Insect	*Batriasymmodes jeanneli*	a cave obligate beetle	G3	S1S2			2	IICOL88060		
Insect	*Batriasymmodes quisnamus*	a cave obligate beetle	G3	S3			2	IICOL88070		
Insect	*Batriasymmodes spelaeus*	a cave obligate beetle	G3G4	S2?			2	IICOL88040		
Insect	*Batrisodes barri*	a cave obligate beetle	G1G2	S1S2			2	IICOLA8210		
Insect	*Batrisodes clypeospecus*	a cave obligate beetle	G1G2	S1S2			2	IICOLA8220		
Insect	*Batrisodes ferulifer*	a cave obligate beetle	G1	S1			2	IICOLA8230		
Insect	*Batrisodes gemmoides*	a cave obligate beetle	G1	S1			2	IICOLA8240		
Insect	*Batrisodes gemmus*	a cave obligate beetle	G1	S1			2	IICOLA8250		
Insect	*Batrisodes pannosus*	a cave obligate beetle	G1	S1			2	IICOLA8280		
Insect	*Batrisodes sp.*	an ant beetle	G?	S?			2			
Insect	*Batrisodes specus*	a cave obligate beetle	G3G4	S?			2	IICOLA8110		
Insect	*Batrisodes valentinei*	a cave obligate beetle	G2G4	S1			2	IICOLA8100		
Insect	*Bembidion lacunarium*	Greenbrier Riverbank Ground Beetle	GNR	S?			2	IICOL73150		
Insect	*Bombus affinis*	Rusty-patched Bumble Bee	G2	S1	LE		2	IIHYM24020	Y	Y
Insect	*Bombus fraternus*	Southern Plains Bumble Bee	G3G4	SNR	UR		2	IIHYM24440	Y	Y
Insect	*Bombus pensylvanicus*	American Bumble Bee	G3G4	SNR	UR		2	IIHYM24260	Y	Y
Insect	*Bombus terricola*	Yellow-banded Bumble Bee	G3G4	SNR			2	IIHYM24220	Y	Y
Insect	*Bombus variabilis*	Variable Cuckoo Bumble Bee	G1G2	SNR	UR		2	IIHYM24320	Y	Y
Insect	*Callophrys irus*	Frosted Elfin	G3	S1?			2	IILEPE2220		
Insect	*Catops gratiosus*	Round Fungus Beetle	G5	S?			2	IICOLA6010		
Insect	*Ceratophysella denticulata*	Mushroom Springtail	GNR	S?			2	IICLL09030		
Insect	*Ceratophysella sp.*	a springtail	G?	S?			2			
Insect	*Ceratophysella undescribed sp., Denticulata group*	a springtail	G?	S?			2			
Insect	*Ceuthophilus ensifer*	a cave cricket	G3	S?			2			
Insect	*Ceuthophilus gracilipes vs. stygius*	a cave cricket	G4	S?			2			
Insect	*Ceuthophilus sp.*	a cave cricket	G?	S?			2			
Insect	*Ceuthophilus stygius*	a camel cricket	GNR	S?			2	IIORT47150		
Insect	*Cheumatopsyche helma*	Helma's Net-spinning Caddisfly	G3G4	S1S3			2	IITRI22040		
Insect	*Cicindela ancocisconensis*	Appalachian Tiger Beetle	G3	S2			2	IICOL02070		
Insect	*Cicindela patruela*	Northern Barrens Tiger Beetle	G3	S2			2	IICOL02230	Y	
Insect	*Danaus plexippus*	Monarch	G4	S4	PT		2	IILEPP2010	Y	
Insect	*Darlingtonea kentuckensis*	a cave obligate beetle	G3G4	S1?			2	IICOLJ5010		
Insect	*Desoria trispinata*	a springtail	GNR	S?			2	IICLL11030		
Insect	*Desoria truncata*	Truncated Springtail	GNR	S?			2	IICLL11100		
Insect	*Dissochaetus oblitus*	Forgotten Round Fungus Beetle	GNR	S?			2	IICOLQU500		
Insect	*Ellipsoptera lepida*	Ghost Tiger Beetle	G3	SNR			2	IICOL02250	Y	
Insect	*Erora laeta*	Early Hairstreak	G2G3	S2			2	IILEPF3010	Y	
Insect	*Euhadenoecus puteaus*	a cave cricket	G4	S?			2			
Insect	*Folsomia candida*	White Springtail	GNR	S?			2	IICLL10010		
Insect	*Folsomia sp. 2 nr. macrochaeta*	a cave obligate springtail	G1	S1			2	IICLL10060		
Insect	*Folsomia stella*	Stellate springtail	G4	S?			2			
Insect	*Glyphopsyche sequatchie*	Sequatchie Caddisfly	G1	S1			2	IITRI14020		
Insect	*Gomphurus septima*	Septima's Clubtail	G3	SR	UR		2	IIODO08190		
Insect	*Habrophlebiodes celeteria*	a leptophlebiid mayfly	G2G4	S2			2	IIEPH41020		

Taxa Group	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status	SWAP Tier	NatureServe Element Code	New in 2025	RSGCN
Insect	*Hadenoecini sp.*	cave crickets	G?	S?			2			
Insect	*Hadenoecus barri*	Barr's cave cricket	G4	S?			2			
Insect	*Hadenoecus jonesi*	Jone's Cave Cricket	GNR	S2			2	IIORT9G020		
Insect	*Hadenoecus opilionides*	a cave cricket	G3	S3			2	IIORT9G030		
Insect	*Heterocloeon grande*	a mayfly	G2G3	S2			2	IIEPH78150		
Insect	*Hydroperla rickeri*	Tennessee Springfly	G2	S2			2	IIPLE2P040		
Insect	*Hydropsyche etnieri*	Buffalo Springs Caddisfly	G2	S2			2	IITRI36120		
Insect	*Hydroptila patriciae*	a purse casemaker caddisfly	G1	S1			2	IITRI40210	Y	
Insect	*Hypogastrura antra*	a springtail	G?	S?			2			
Insect	*Hypogastrura sp. 1*	a viatica group springtail	G1	S1			2	IICLL09100		
Insect	*Hypogastrura sp. Denticulata group*	a springtail	G?	S?			2			
Insect	*Hypogastrura undescribed sp.*	a springtail	G?	S?			2			
Insect	*Lepidostoma compressum*	a lepidostomatid caddisfly	G1G2	S1S2			2	IITRI01200	Y	
Insect	*Lepidostoma etnieri*	a lepidostomatid caddisfly	G1G2Q	S1S2			2	IITRI01080	Y	
Insect	*Lesteva pallipes*	Pale-footed Ocellate Rove Beetle	G5	S?			2	IICOLB3010		
Insect	*Lethemurus missus*	Missus Cave Springtail	G4	S2			2	IICLL06030		
Insect	*Litocampa barryi*	a bristletail	G?	S?			2			
Insect	*Litocampa cherokeensis*	a bristletail	G?	S?			2			
Insect	*Litocampa cookei*	Cooke's Cave Dipluran	G5	S3			2	IITHS01030		
Insect	*Litocampa davisi*	a bristletail	G?	S?			2			
Insect	*Litocampa inexspectata*	a bristletail	G?	S?			2			
Insect	*Litocampa sp.*	a bristletail	G?	S?			2			
Insect	*Litocampa sp. 1*	undescribed cave dipluran	G1	S?			2			
Insect	*Litocampa sp. 5*	Rumbling Falls Cave Dipluran	G2	S1			2	IITHS01210		
Insect	*Litocampa sp. 6*	Buffalo Cove Cave Dipluran	G1	S1			2	IITHS01120		
Insect	*Litocampa sp. 7*	Mill Hollow Cave Dipluran	G1	S1			2	IITHS01130		
Insect	*Litocampa sp. 8*	Mountain Eye Cave Dipluran	G1	S1			2	IITHS01140		
Insect	*Litocampa valentinei*	a cave obligate bristletail	G5	S2			2	IITHS01200		
Insect	*Maccaffertium sinclairi*	a flat-headed mayfly	G2G3	S2			2	IIEPH40050		
Insect	*Macrocera nobilis*	Troglophilic Fly	GNR	S?			2	IIDIP90010		
Insect	*Macromia margarita*	Mountain River Cruiser	G3	S2S3	UR		2	IIODO26070		
Insect	*Megaleuctra williamsae*	Smokies Needlefly	G3	S1	UR		2	IIPLE0G060		
Insect	*Megaselia cavernicola*	a fly	GNR	S?			2	IIDIP35010		
Insect	*Neanura sp. 1*	Swamp River Cave Neanura	G1	S1			2	IICLL12040		
Insect	*Nelsonites walteri*	a cave obligate beetle	G3	S3			2	IICOLJ8010		
Insect	*Nemadus horni*	small carrion beetle	G4	S?			2			
Insect	*Neophylax kolodskii*	a uenoid caddisfly	G1	S1			2	IITRI66690	Y	
Insect	*Nicrophorus americanus*	American Burying Beetle	G3	SH	LT, XN		2	IICOL42010		
Insect	*Ochrotrichia elongiralla*	a purse casemaker caddisfly	G1G2	S1			2	IITRI41130	Y	
Insect	*Oconoperla innubila*	Hairy Springfly	G2	S2			2	IIPLE2S010		
Insect	*Onychiurus pseudofimetarius*	a springtail	G4	S?			2			
Insect	*Onychiurus reluctus*	a cave obligate springtail	GNR	S?			2	IICLL17080		
Insect	*Onychiurus sp.*	springtails	G?	S?			2			
Insect	*Onychiurus sp. 2*	Swamp River Cave Onychiurus	G1	S1			2	IICLL17120		
Insect	*Ophiogomphus acuminatus*	Acuminate Snaketail	G3	S2			2	IIODO12010		
Insect	*Ophiogomphus edmundo*	Edmund's Snaketail	G2	S1	UR		2	IIODO12080		
Insect	*Ophiogomphus howei*	Pygmy Snaketail	G3	S3?			2	IIODO12090		
Insect	*Ophiogomphus incurvatus alleghaniensis*	Allegheny Snaketail	G3T2T3Q	S1			2	IIODO12211		

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Insect	*Paraleptophlebia kirchneri*	a prongill mayfly	G1G3	S1			2	IIEPH33270		
Insect	*Perlesta etnieri*	Harpeth Stone	G1G2	S1			2	IIPLE1U190		
Insect	*Phanogomphus sandrius*	Tennessee Clubtail	G1	S1	UR		2	IIODO08390		
Insect	*Photuris forresti*	Loopy Five Firefly	G1	SNR			2	IICOL5Y250	Y	
Insect	*Photuris walldoxeyi*	Cypress Firefly	G2G3	SNR			2	IICOL5Y060	Y	
Insect	*Phyciodes batesii*	Tawny Crescent	G3G4	S1S2			2	IILEPK3040	Y	
Insect	*Platynus tenuicollis*	Slender Ground Beetle	G5	S?			2	IICOL9N090		
Insect	*Pogonognathellus bidentatus*	Two-toothed Springtail	GNR	S?			2	IICLL06020		
Insect	*Prionochaeta opaca*	Opaque Round Fungus Beetle	G5	S?			2	IICOL92010		
Insect	*Pseudanophthalmus acherontis*	Echo Cave Beetle	G1	S1			2	IICOL4E160		
Insect	*Pseudanophthalmus beakleyi*	a cave obligate ground beetle	G3G4	S3			2	IICOL4EAZ0		
Insect	*Pseudanophthalmus bendermani*	Benderman's Cave Beetle	G1G2	S1S2			2	IICOL4E190		
Insect	*Pseudanophthalmus catherinae*	Catherine's Cave Beetle	G1	S1			2	IICOL4E210		
Insect	*Pseudanophthalmus cerberus cerberus*	a cave obligate ground beetle	G3G4T3T4	S?			2	IICOL4EB01		
Insect	*Pseudanophthalmus ciliaris orlindae*	a cave obligate ground beetle	G3G4T1T2	S1S2			2	IICOL4EB13	Y	
Insect	*Pseudanophthalmus colemanensis*	Coleman Cave Beetle	G1	S1	UR		2	IICOL4EC20		
Insect	*Pseudanophthalmus cumberlandus*	a cave obligate ground beetle	G1G2	S1			2	IICOL4EB30		
Insect	*Pseudanophthalmus digitus*	a cave obligate ground beetle	G1G2	S1			2	IICOL4EB60		
Insect	*Pseudanophthalmus engelhardti*	Engelhart's Cave Beetle	G1	S1			2	IICOL4E250		
Insect	*Pseudanophthalmus farrelli*	a cave obligate ground beetle	G1G2	S1S2			2	IICOL4EB90		
Insect	*Pseudanophthalmus fowlerae*	Fowler's Cave Beetle	G1	S1			2	IICOL4E260		
Insect	*Pseudanophthalmus fulleri*	a cave obligate ground beetle	G2G3	S2S3			2	IICOL4EAW0		
Insect	*Pseudanophthalmus hesperus*	a cave obligate ground beetle	G1	S1			2	IICOL4EBA0		
Insect	*Pseudanophthalmus humeralis*	a cave obligate ground beetle	G2	S2			2	IICOL4EAV0		
Insect	*Pseudanophthalmus inquisitor*	Inquirer Cave Beetle	G1	S1			2	IICOL4E350		
Insect	*Pseudanophthalmus insularis*	Baker Station Cave Beetle	G1	S1			2	IICOL4E360		
Insect	*Pseudanophthalmus intermedius*	Intermediate Cave Beetle	G2	S2			2	IICOL4EY30		
Insect	*Pseudanophthalmus jonesi*	Grassy Cove Cave Beetle	G1G2	S1S2			2	IICOL4E380		
Insect	*Pseudanophthalmus loganensis*	a cave obligate ground beetle	G2G3	S1S2			2	IICOL4EBY0		
Insect	*Pseudanophthalmus longiceps*	Long-headed Cave Beetle	G1G2	S1			2	IICOL4E410		
Insect	*Pseudanophthalmus macradyi*	a cave obligate ground beetle	G1G2	S1S2			2	IICOL4EBB0		
Insect	*Pseudanophthalmus nickajackensis*	Nickajack Cave Beetle	G1	S1			2	IICOL4E430		
Insect	*Pseudanophthalmus nortoni*	Norton's Cave Beetle	G1	S1			2	IICOL4E440		
Insect	*Pseudanophthalmus occidentalis*	Western Cave Beetle	G1G2	S1			2	IICOL4E450		
Insect	*Pseudanophthalmus pallidus*	Pale Cave Beetle	G1G2	S1S2			2	IICOL4E460		
Insect	*Pseudanophthalmus paradoxus*	Ridgetop Cave Beetle	G1	S1			2	IICOL4E470		
Insect	*Pseudanophthalmus paulus*	Nobletts Cave Beetle	G1	S1			2	IICOL4E490		
Insect	*Pseudanophthalmus paynei*	Payne's Cave Beetle	G1	S1			2	IICOL4E500		
Insect	*Pseudanophthalmus princeps*	a cave obligate ground beetle	G1G2	S1S2			2	IICOL4EBF0		
Insect	*Pseudanophthalmus productus*	a cave obligate ground beetle	G3G4	S3			2	IICOL4EBG0		
Insect	*Pseudanophthalmus pusillus*	Tiny Cave Beetle	G1	S1			2	IICOL4E550		
Insect	*Pseudanophthalmus robustus*	a cave obligate ground beetle	G3G4	S3			2	IICOL4EBJ0		
Insect	*Pseudanophthalmus rotundatus*	Rotund Cave Beetle	G2	S2			2	IICOL4E770		
Insect	*Pseudanophthalmus scutilus*	a cave obligate ground beetle	G1	S1			2	IICOL4EBK0		
Insect	*Pseudanophthalmus sidus*	Meredith Cave Beetle	G1	S1			2	IICOL4E630		
Insect	*Pseudanophthalmus simplex*	Simple Cave Beetle	G1G2	S1S2			2	IICOL4E640		
Insect	*Pseudanophthalmus sp.*	a cave obligate beetle	G?	S?			2			
Insect	*Pseudanophthalmus sp.*	Aaron Tolletts cave beetle	G1	S?			2			

Taxa Group	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status	SWAP Tier	NatureServe Element Code	New in 2025	RSGCN
Insect	*Pseudanophthalmus sp.*	Baker cave beetle	G1	S?			2			
Insect	*Pseudanophthalmus sp.*	Caney Hollow cave ground beetle	G1	S?			2			
Insect	*Pseudanophthalmus sp.*	cave ground beetles	G1	S?			2			
Insect	*Pseudanophthalmus sp.*	Keyhole cave beetle	G1	S?			2			
Insect	*Pseudanophthalmus sp.*	Sells cave ground beetle	G2	S?			2			
Insect	*Pseudanophthalmus sp.*	Wilmoth cave beetle	G1	S?			2			
Insect	*Pseudanophthalmus sp. 27*	Rumbling Falls Cave Beetle	G1	S1			2	IICOL4EX40		
Insect	*Pseudanophthalmus sp. 29*	Falling Springs Cave Beetle	G1	S1			2	IICOL4EX60		
Insect	*Pseudanophthalmus sp. 30*	Ace in the Hole Cave Beetle	G1	S1			2	IICOL4EX70		
Insect	*Pseudanophthalmus sp. 36*	Gunters Cave Beetle	G?	S1?			2	IICOL4ED30		
Insect	*Pseudanophthalmus sp. 36*	Millers Cave Beetle	GNR	S1?			2	IICOL4ED30		
Insect	*Pseudanophthalmus sp. A englehardti group*	a cave obligate beetle	G?	S?			2			
Insect	*Pseudanophthalmus sp. B englehardti group*	a cave obligate beetle	G?	S?			2			
Insect	*Pseudanophthalmus sp. B jonesi group*	a cave obligate beetle	G?	S?			2			
Insect	*Pseudanophthalmus sp. TN*	a cave obligate beetle	G1	S1			2	IICOLSWG03		
Insect	*Pseudanophthalmus templetoni*	a cave obligate ground beetle	G1	S1			2	IICOL4EBP0		
Insect	*Pseudanophthalmus tennesseensis*	a cave obligate ground beetle	G3	S2			2	IICOL4EBT0		
Insect	*Pseudanophthalmus tiresias*	Indian Cave Point Cave Beetle	G1	S1			2	IICOL4E660		
Insect	*Pseudanophthalmus tullahoma*	Duck River Cave Beetle	G1G2	S1			2	IICOL4E670		
Insect	*Pseudanophthalmus unionis*	Union County Cave Beetle	G1G2	S1			2	IICOL4E680		
Insect	*Pseudanophthalmus valentinei*	a cave obligate ground beetle	G3G4	S2S3			2	IICOL4EBS0		
Insect	*Pseudanophthalmus vanburenensis*	a cave obligate ground beetle	G1	S1			2	IICOL4EC10		
Insect	*Pseudanophthalmus ventus*	Blowing Cave Beetle	G1	S1			2	IICOL4E690		
Insect	*Pseudanophthalmus wallacei*	Wallace's Cave Beetle	G1	S1			2	IICOL4E700		
Insect	*Pseudosinella aera*	a cave obligate springtail	G4	S2			2	IICLL01280		
Insect	*Pseudosinella alba*	White springtail	G4	S?			2			
Insect	*Pseudosinella cf. christianseni*	a cave springtail	G?	S?			2			
Insect	*Pseudosinella cf. gisini*	a cave springtail	G?	S?			2			
Insect	*Pseudosinella cf. nata*	a cave springtail	G?	S?			2			
Insect	*Pseudosinella christianseni*	a cave obligate springtail	G5	S2			2	IICLL01200		
Insect	*Pseudosinella collina*	Hilly Springtail	GNR	S?			2	IICLL01090		
Insect	*Pseudosinella hirsuta*	a cave obligate springtail	G5	S3			2	IICLL01060		
Insect	*Pseudosinella orba*	a cave obligate springtail	G3G4	S2			2	IICLL01030		
Insect	*Pseudosinella pecki*	Peck's Cave Springtail	G2G3	S2			2	IICLL01240		
Insect	*Pseudosinella sp.*	a springtail	G?	S?			2			
Insect	*Pseudosinella sp. 5*	Swamp River Cave Pseudosinella	G1	S1			2	IICLL01290		
Insect	*Pseudosinella sp. 6*	a cave obligate springtail	G1	S1			2	IICLL01300		
Insect	*Pseudosinella sp. 7 nr. Nata*	a cave obligate springtail	G1	S1			2	IICLL01310		
Insect	*Pseudosinella spinosa*	a cave obligate springtail	G5	S2			2	IICLL01250		
Insect	*Pseudosinella undescribed sp. near espanita*	cave springtail	G1	S?			2			
Insect	*Psyllipsocus ramburi*	a cave barklice	G4	S?			2			
Insect	*Ptomaphagus barri*	a cave obligate beetle	G2G3	S1S2			2	IICOLA7050		
Insect	*Ptomaphagus chromolithus*	a cave obligate beetle	G2G3	S1			2	IICOLA7060		
Insect	*Ptomaphagus fecundus*	a cave obligate beetle	G1	S1			2	IICOLA7090		
Insect	*Ptomaphagus hatchi*	a cave obligate beetle	G3	S3?			2	IICOLA7110		

Table D-1
2025 Revised
Arranged by Scientific Name — Species of Greatest Conservation Need

Taxa Group	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status	SWAP Tier	NatureServe Element Code	New in 2025	RSGCN
Insect	*Ptomaphagus hubrichti*	a cave obligate beetle	G2G3	S2			2	IICOLA7140		
Insect	*Pygmarrhopalites pavo*	a cave springtail	G3?	S1			2	IICLL04130		
Insect	*Remenus kirchneri*	Blueridge Springtail	G3	SNR	UR		2	IIPLE2J030	Y	
Insect	*Rhadine caudata*	a carabid beetle	G3	S?			2	IICOL69030		
Insect	*Sciara sp.*	a fungus gnat	G?	S?			2			
Insect	*Semiothisa fraserata*	Fraser Fir Geometrid Moth	G2?	S2?			2	IILEUOD200		
Insect	*Sensillanura barberi*	Barber's Springtail	GNR	S?			2	IICLL24010		
Insect	*Sinella basidens*	a cave obligate springtail	G3G4	S2			2	IICLL05090		
Insect	*Sinella cavernarum*	a cave obligate springtail	G5	S3			2	IICLL05050		
Insect	*Soyedina alexandria*	Cumberland Forestfly	G1G2	S1S2			2	IIPLE1S100	Y	
Insect	*Speleochus steevesi*	a cave obligate beetle	G?	S?			2			
Insect	*Speleochus undescribed species*	a beetle	G?	S?			2			
Insect	*Spelobia tenebrarum*	Cave Dung Fly	G5	S4			2	IIDIP26020		
Insect	*Stenogomphurus consanguis*	Cherokee Clubtail	G3	S1	UR		2	IIODO08080		
Insect	*Stenoponia americana*	a flea	G5	S?			2			
Insect	*Subterrochus ferus*	a cave obligate beetle	G1G2	S1			2	IICOLJD020		
Insect	*Subterrochus sp.*	cave ant beetles	G1	S?			2			
Insect	*Tomocerus dubius*	a springtail	G4	S?			2			
Insect	*Tomocerus flavescens*	Golden springtail	G5	S?			2			
Insect	*Tomocerus sp.*	a springtail	G1	S?			2			
Insect	*Trechus cumberlandus*	Cumberland Ground Beetle	G2	S2			2	IICOL6G120		
Insect	*Trechus tennesseensis tauricus*	a carabid beetle	GNRTNR	S1			2	IICOL6G232		
Insect	*Trechus tennesseensis tennesseensis*	a carabid beetle	GNRTNR	S1			2	IICOL6G231		
Insect	*Trechus tuckaleechee*	a carabid beetle	GNR	S2			2	IICOL6G110		
Insect	*Triacanthella copelandi*	Copeland's Springtail	G1	S1			2	IICLL27010		
Insect	*Tychobythinus strinatii*	a cave obligate beetle	G1G2	S1S2			2	IICOLJE030		
Insect	*Typhlogastrura christianseni*	Christiansen's Cave Springtail	GNR	SNR			2	IICLL20030		
Insect	*Undetermined species*	sepsid Black scavenger fly	G?	S?			2			
Insect	*Zapada chila*	Smokies Forestfly	G2	S1			2	IIPLE0U010		
Mammal	*Clethrionomys gapperi*	Southern Red-backed Vole	G5	S4			1	AMAFF09020	Y	
Mammal	*Condylura cristata*	Star-nosed Mole	G5	S2		D	1	AMABB05010		
Mammal	*Cryptotis parva*	North American Least Shrew	G5	S5			1	AMABA04010	Y	
Mammal	*Glaucomys sabrinus coloratus*	Carolina Northern Flying Squirrel	G5T2	S1S2	LE	E	3	AMAFB09022		Y
Mammal	*Microtus chrotorrhinus carolinensis*	Southern Rock Vole	G5T3	S2		E	1	AMAFF11091		Y
Mammal	*Mustela nivalis*	Least Weasel	G5	S2			1	AMAJF02020		
Mammal	*Napaeozapus insignis*	Woodland Jumping Mouse	G5	S4			1	AMAFH02010		
Mammal	*Neogale frenata*	Long-tailed Weasel	G5	S5		D	1	AMAJF02030	Y	Y
Mammal	*Neotoma floridana haematoreia*	Southern Appalachian Woodrat	G5T4Q	S2		D	1	AMAFF08015		Y
Mammal	*Neotoma floridana illinoensis*	Eastern Woodrat	G5T5	S3		D	1	AMAFF08016		
Mammal	*Neotoma magister*	Allegheny Woodrat	G3G4	S3		D	1	AMAFF08100		Y
Mammal	*Ochrotomys nuttalli*	Golden Mouse	G5	S5			1	AMAFF04010		
Mammal	*Parascalops breweri*	Hairy-tailed Mole	G5	S3		D	1	AMABB03010		
Mammal	*Reithrodontomys humulis*	Eastern Harvest Mouse	G5	S5			1	AMAFF02020	Y	
Mammal	*Sorex albibarbis*	Eastern Water Shrew	G5	S2		D	1	AMABA01290	Y	
Mammal	*Sorex cinereus*	Cinereus Shrew	G5	S4			1	AMABA01010		
Mammal	*Sorex dispar*	Long-tailed Shrew	G4	S2		D	1	AMABA01210		Y
Mammal	*Sorex fumeus*	Smoky Shrew	G5	S4			1	AMABA01180		
Mammal	*Sorex hoyi*	Eastern Pygmy Shrew	G5	S2		D	1	AMABA01050		

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Mammal	*Sorex longirostris*	Southeastern Shrew	G5	S4			1	AMABA01060		
Mammal	*Sorex palustris*	American Water Shrew	G5	S2		D	1	AMABA01420		Y
Mammal	*Spilogale putorius*	Eastern Spotted Skunk	G4	S3		T	1	AMAJF05050		Y
Mammal	*Sylvilagus obscurus*	Appalachian Cottontail	G4	S3			1	AMAEB01090		Y
Mammal	*Synaptomys cooperi*	Southern Bog Lemming	G5	S4		D	1	AMAFF17010		
Mammal	*Tamiasciurus hudsonicus*	North American Red Squirrel	G5	S4S5			1	AMAFB08040		
Mammal	*Zapus hudsonius*	Meadow Jumping Mouse	G5	S4	(PS)	D	1	AMAFH01040		
Millipede	*Ameractis satis*	a cave obligate millipede	G2G4	S?			2	ITUNI77010		
Millipede	*Cambala sp.*	a milliped	G?	S?			2			
Millipede	*Chaetaspis debilis*	a cave obligate millipede	G?	S?			2			
Millipede	*Chaetaspis mollis*	a cave millipede	G1	S1			2	ITUNI63030		
Millipede	*Chaetaspis sp.*	cave millipeds	G?	S?			2			
Millipede	*Chaetaspis sp. 1*	Thunder Run Cave Millipede	G1	S1			2	ITUNI63020		
Millipede	*Delophon holti*	a millipede	GNR	S1			2	ITUNI85010		
Millipede	*Ophyiulus pilosus*	a millipede	G5	S?			2	ITUNI35010		
Millipede	*Pseudotremia acheron*	a cave obligate millipede	G1G2	S1			2	ITUNI03160		
Millipede	*Pseudotremia cercops*	a cave obligate millipede	G1	S1			2	ITUNI03200		
Millipede	*Pseudotremia deprehendor*	a cave obligate millipede	G1	S1?			2	ITUNI03210		
Millipede	*Pseudotremia eburnea*	a cave obligate millipede	G2G4	SNR			2	ITUNI03220		
Millipede	*Pseudotremia garlandae*	Garland's Cave Millipede	G1	S1			2	ITUNI03430		
Millipede	*Pseudotremia lethe*	a cave obligate millipede	G1	S1			2	ITUNI03240		
Millipede	*Pseudotremia lictor*	a cave obligate millipede	G1	S1			2	ITUNI03250		
Millipede	*Pseudotremia manni*	Mann's Cave Millipede	G1	S1			2	ITUNI03410		
Millipede	*Pseudotremia minos*	a cave obligate millipede	G1	S1			2	ITUNI03270		
Millipede	*Pseudotremia n. sp.*	a cave obligate millipede	G?	S?			2			
Millipede	*Pseudotremia nodosa*	a millipede	G4	S2S3			2	ITUNI03030		
Millipede	*Pseudotremia rhadamanthus*	a cave obligate millipede	G1G2	S1			2	ITUNI03290		
Millipede	*Pseudotremia roebuckorum*	Roebuck's Cave Millipede	G1	S1			2	ITUNI03420		
Millipede	*Pseudotremia sp.*	a cave milliped	G?	S?			2			
Millipede	*Pseudotremia sp. 10*	Baker cave milliped	G1	S?			2			
Millipede	*Pseudotremia sp. 5*	Three Forks cave milliped	G1	S?			2			
Millipede	*Pseudotremia sp. 6*	Slippery slit cave milliped	G1	S?			2			
Millipede	*Pseudotremia sp. 7*	Barr's cave milliped	G?	S?			2			
Millipede	*Pseudotremia sp. 8*	Skylight cave milliped	G1	S?			2			
Millipede	*Pseudotremia sp. 9*	Holliday's cave milliped	G1	S?			2			
Millipede	*Pseudotremia undescribed sp.*	Hoffman's cave milliped	G1	S?			2			
Millipede	*Pseudotremia undescribed sp.*	Shear's cave milliped	G1	S?			2			
Millipede	*Pseudotremia valga*	a millipede	G1G2	S1?			2	ITUNI03070		
Millipede	*Pseudotremia wallaceae*	Wallace's Cave Millipede	G1	S1			2	ITUNI03400		
Millipede	*Scoterpes blountensis*	a cave obligate millipede	G?	S?			2			
Millipede	*Scoterpes copei*	a cave obligate millipede	G3G4Q	S1			2	ITUNI01030		
Millipede	*Scoterpes hesperus*	a cave obligate millipede	G?	S?			2			
Millipede	*Scoterpes jackdanieli*	a cave obligate millipede	G?	S?			2			
Millipede	*Scoterpes musicarustica*	a cave obligate millipede	G?	S?			2			
Millipede	*Scoterpes sp.*	a cave milliped	G?	S?			2			
Millipede	*Scoterpes tricorner*	a cave obligate millipede	G?	S?			2			
Millipede	*Scoterpes undescribed sp.*	a cave milliped	G2G3	S?			2			
Millipede	*Scoterpes ventus*	a cave obligate millipede	G3	S1			2	ITUNI01040		

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Millipede	*Tetracion jonesi*	a cave obligate millipede	G3G4	S1S2			2	ITUNI70010		
Millipede	*Tetracion tennesseensis*	a cave obligate millipede	G2G3	S2S3			2	ITUNI70020		
Plant	*Abies fraseri*	Fraser Fir	G2	S1S2		T	4	PGPIN01050		Y
Plant	*Acalypha deamii*	Deam's Copperleaf	G4?	S1		S	4	PDEUP010L1		
Plant	*Aconitum reclinatum*	White Monkshood	G3G4	S1		E	4	PDRAN01080		Y
Plant	*Acrobolbus ciliatus*	a liverwort	G3?	S1		S	4	NBHEP01010		
Plant	*Actaea rubifolia*	Appalachian Bugbane	G3	S3		W	4	PDRAN07060		
Plant	*Adlumia fungosa*	Climbing Fumitory	G4	S2		T	4	PDFUM02010		
Plant	*Agalinis auriculata*	Earleaf False Foxglove	G3	S2		E	4	PDSCR01130		Y
Plant	*Agalinis decemloba*	Blue Ridge False Foxglove	G3G4	S1	(PS)	E	4	PDSCR01060	Y	Y
Plant	*Agalinis heterophylla*	Prairie False Foxglove	G4G5	S1		E	4	PDSCR010E0		
Plant	*Agalinis oligophylla*	Ridge-stem False Foxglove	G4	S1		E	4	PDSCR010M0		
Plant	*Agalinis plukenetii*	Purple Gerardia	G3G5	S1		E	4	PDSCR01170		
Plant	*Agalinis setacea*	Threadleaf Gerardia	G5?	SH		S	4	PDSCR010S0		
Plant	*Agalinis skinneriana*	Pale False Foxglove	G3G4	S1S2		T	4	PDSCR010T0	Y	Y
Plant	*Agastache scrophulariifolia*	Purple Giant-hyssop	G4	S1S2		T	4	PDLAM030E0		Y
Plant	*Ageratina luciae-brauniae*	Lucy Braun's White Snakeroot	G3	S3		T	4	PDASTBX0E0		Y
Plant	*Agrostis mertensii*	Arctic Bentgrass	G5	S1		S	4	PMPOA040T0		
Plant	*Allium tricoccum var. burdickii*	Narrowleaf Wild Leek	G5T5	S1S2		T-CE	4	PMLIL020C0		
Plant	*Allium tricoccum var. tricoccum*	Ramp	G5T5	S1S2		S-CE	4	PMLIL022E0		
Plant	*Alnus viridis ssp. crispa*	Mountain Alder	G5T5	S1		S	4	PDBET01083		
Plant	*Amelanchier sanguinea*	Roundleaf Serviceberry	G5	S2		T	4	PDROS050V0		
Plant	*Ammoselinum popei*	Pope's Sand-parsley	G4	S2		T	4	PDAPI05030		
Plant	*Amsonia tabernaemontana var. gattingeri*	Gattinger's Bluestar	G5T3Q	S3		S	4	PDAPO030J3		Y
Plant	*Anacamptodon splachnoides*	Knothole Moss	G3G5	S3			4	NBMUS08010	Y	
Plant	*Anchistea virginica*	Virginia Chainfern	G5	S2		S	4	PPBLE05040		
Plant	*Anemone caroliniana*	Carolina Anemone	G5	S1S2		E	4	PDRAN04030		
Plant	*Angelica atropurpurea*	Great Angelica	G5	S1			4	PDAPI07040		
Plant	*Antennaria howellii*	Small Pussytoes	G5	S1		S	4	PDAST0H1D0	Y	
Plant	*Aphanorrhegma serratum*	Lidded Earth Moss	G4G5	S1			4	NBMUS0F010	Y	
Plant	*Apios priceana*	Price's Potato-bean	G3	S3	LT	E	3	PDFAB0D020		Y
Plant	*Arabis patens*	Spreading Rockcress	G3	S1		E	4	PDBRA061D0		Y
Plant	*Arabis pycnocarpa*	Cream-flower Rockcress	G5	S1		T	4	PDBRA064G0		
Plant	*Archidium alternifolium*	Clay Moss	G4G5	S1		T	4	NBMUS0G010		
Plant	*Arenaria lanuginosa*	Spreading Sandwort	G5	S1		E	4	PDCAR040E0		
Plant	*Aristida ramosissima*	Branched Three-awn Grass	G5	S1		E	4	PMPOA0K0X0		
Plant	*Arnoglossum plantagineum*	Groove-stem Indian-plantain	G4G5	S2		T	4	PDASTD7060		
Plant	*Asclepias purpurascens*	Purple Milkweed	G4G5	S1		S	4	PDASC021J0		
Plant	*Asplenium bradleyi*	Bradley's Spleenwort	G4	S2S3			4	PPASP02050	Y	
Plant	*Asplenium scolopendrium var. americanum*	American Hart's-tongue Fern	G4T3	S1	LT	E	3	PPASP021E1		Y
Plant	*Astragalus bibullatus*	Pyne's Ground-plum	G1	S1	LE	E	3	PDFAB0FB00		Y
Plant	*Astragalus tennesseensis*	Tennessee Milkvetch	G3	S3		S	4	PDFAB0F8S0		Y
Plant	*Athyrium filix-femina ssp. angustum*	Northeastern Ladyfern	G5T5	S2		S	4	PPDRY02021		
Plant	*Aureolaria patula*	Spreading Yellow False Foxglove	G3	S3		S	4	PDSCR05040		Y
Plant	*Bacopa caroliniana*	Carolina Water-hyssop	G4G5	S1		S	4	PDSCR06010		
Plant	*Baptisia bracteata var. leucophaea*	Cream Wild Indigo	G4G5T4T5	S1S2		S	4	PDFAB0G041		
Plant	*Bazzania nudicaulis*	a liverwort	G2G3	S2		T	4	NBHEP0F030		

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Plant	*Berberis canadensis*	American Barberry	G3G4	S2		S	4	PDBER02010		Y
Plant	*Betula cordifolia*	Heartleaf Paper Birch	G5	S1		E	4	PDBET020C2		
Plant	*Blephilia subnuda*	Smooth Woodmint	G1G2	S1		E	4	PDLAM06030	Y	Y
Plant	*Blephilia woffordii*	Wofford's Woodmint	G1	S1		S	4	PDLAM06040	Y	Y
Plant	*Bolboschoenus fluviatilis*	River Bulrush	G5	S1		S	4	PMCYP0Q0P0		
Plant	*Borodinia dentata*	Short's Rockcress	G5	S1S2		S	4	PDBRA061W0		
Plant	*Borodinia perstellata*	Braun's Rockcress	G2	S1	LE	E	3	PDBRA061G0		Y
Plant	*Botrychium jenmanii*	Alabama Grapefern	G3G4	S1		T	4	PPOPH01060		Y
Plant	*Botrychium matricariifolium*	Chamomile Grapefern	G5	S1		S	4	PPOPH01290		
Plant	*Botrychium oneidense*	Blunt-lobe Grapefern	G4	S1		S	4	PPOPH010C0		
Plant	*Botrychium simplex*	Least Grapefern	G5	S1		E	4	PPOPH010E0		
Plant	*Brachydontium trichodes*	Peak Moss	G3G4	S1		E	4	NBMUS0X010		
Plant	*Brachyelytrum aristosum*	Northern Shorthusk	G5	S2		S	4	PMPOA12020		
Plant	*Brothera leana*	Boar Moss	G3G4	S1			4	NBMUS11010	Y	
Plant	*Bryoxiphium norvegicum*	Sword Moss	G5?	S1		T	4	NBMUS19010		
Plant	*Buckleya distichophylla*	Piratebush	G3	S2		T	4	PDSAN01010		Y
Plant	*Bulbostylis ciliatifolia var. coarctata*	Capillary Hairsedge	G5T3T5	S1		E	4	PMCYP02032		
Plant	*Buxbaumia aphylla*	Bug-on-a-Stick Moss	G5	S1			4	NBMUS1B010	Y	
Plant	*Calamagrostis cainii*	Cain's Reedgrass	G1	S1		E	4	PMPOA17030		Y
Plant	*Calamagrostis porteri*	Porter's Reedgrass	G4	S1		E	4	PMPOA170Z0		
Plant	*Calamovilfa arcuata*	Rivergrass	G2G3	S2		T	4	PMPOA18010		Y
Plant	*Calopogon oklahomensis*	Oklahoma Grass-pink	G2	SH		W-H	4	PMORC0C050		Y
Plant	*Caltha palustris*	Marsh-marigold	G5	S1		E	4	PDRAN06030		
Plant	*Calypogeia muelleriana ssp. blomquistii*	Blomquist's Pouchwort	G5T3	S1			4	NBHEP0M031	Y	
Plant	*Campanula aparinoides*	Marsh Bellflower	G5	S2		S	4	PDCAM02030		
Plant	*Cardamine clematitis*	Small Mountain Bittercress	G3	S2		T	4	PDBRA0K070		Y
Plant	*Cardamine flagellifera*	Blue Ridge Bittercress	G3	S2		T	4	PDBRA0K0E0		
Plant	*Cardamine rotundifolia*	American Bittercress	G4	S2S3		S	4	PDBRA0K120		
Plant	*Carex argyrantha*	Hay Sedge	G5	S1		T	4	PMCYP03110		
Plant	*Carex barrattii*	Barratt's Sedge	G4	S2		E	4	PMCYP031K0		Y
Plant	*Carex bromoides ssp. montana*	Brome-like Sedge	G5T3?	S1		T	4	PMCYP03264		Y
Plant	*Carex bulbostylis*	False Hair Sedge	GNR	SU		S	4	PMCYP03KH0	Y	
Plant	*Carex bullata*	Button Sedge	G5?	S3		S	4	PMCYP03290		
Plant	*Carex buxbaumii*	Buxbaum's Sedge	G5	S1		E	4	PMCYP032B0		
Plant	*Carex canescens ssp. disjuncta*	Silvery Sedge	G5T5	SU		E	4	PMCYP032F3	Y	
Plant	*Carex chapmanii*	Chapman's Sedge	G3	S1			4	PMCYP032R0		Y
Plant	*Carex comosa*	Bristly Sedge	G5	S2		T	4	PMCYP032Y0		
Plant	*Carex cristatella*	Crested Sedge	G5	S1		S	4	PMCYP033A0	Y	
Plant	*Carex davisii*	Davis' Sedge	G5	S1		S	4	PMCYP033G0		
Plant	*Carex decomposita*	Cypress-knee Sedge	G3G4	S2			4	PMCYP033K0	Y	
Plant	*Carex echinata ssp. echinata*	Little Prickly Sedge	G5T5	S1?		S	4	PMCYP03431		
Plant	*Carex floridana*	Florida Sedge	G5?	S1		S	4	PMCYP034U0	Y	
Plant	*Carex folliculata*	Long Sedge	G5	S1		T	4	PMCYP034X0		
Plant	*Carex fumosimontana*	Smoky Mountain Sedge	G2	S2		E	4	PMCYP03LS0	Y	Y
Plant	*Carex gravida*	Heavy-fruit Sedge	G5	S1			4	PMCYP035G0		
Plant	*Carex hirtifolia*	Pubescent Sedge	G5	S1S2		S	4	PMCYP03610		
Plant	*Carex hitchcockiana*	Hitchcock's Sedge	G5	S1		T	4	PMCYP03630		
Plant	*Carex hyalina*	Tissue Sedge	G4	S1		S	4	PMCYP036B0		

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Plant	*Carex interior*	Inland Sedge	G5	S1S2		E	4	PMCYP036K0	Y	
Plant	*Carex lacustris*	Lake-bank Sedge	G5	S1			4	PMCYP036W0		
Plant	*Carex lonchocarpa*	Southern Long Sedge	G5	S2		E	4	PMCYP037N0		
Plant	*Carex lupuliformis*	False Hop Sedge	G4	S2S3			4	PMCYP037T0	Y	Y
Plant	*Carex manhartii*	Manhart's Sedge	G3G4	S2		E	4	PMCYP03EY0		Y
Plant	*Carex misera*	Wretched Sedge	G3	S2		T	4	PMCYP038P0		Y
Plant	*Carex mitchelliana*	Mitchell's Sedge	G4	S1S2			4	PMCYP038R0	Y	
Plant	*Carex muskingumensis*	Muskingum Sedge	G4	S1		E	4	PMCYP03910		
Plant	*Carex ouachitana*	Ouachita Sedge	G4	S1		S	4	PMCYP03FV0		
Plant	*Carex oxylepis var. pubescens*	Sharp-scale Sedge	G5?T3	S1			4	PMCYP039W2		Y
Plant	*Carex pallescens*	Pale Sedge	G5	S1		S	4	PMCYP03A00		
Plant	*Carex pellita*	Woolly Sedge	G5	S1		E	4	PMCYP03710		
Plant	*Carex reniformis*	Reniform Sedge	G4?	S1		S	4	PMCYP03BG0		Y
Plant	*Carex roanensis*	Roan Mountain Sedge	G3	S2		S	4	PMCYP03BL0		Y
Plant	*Carex ruthii*	Ruth's Sedge	G3G4	S2		T	4	PMCYP03BV0		Y
Plant	*Carex socialis*	Social Sedge	G4	S2S3			4	PMCYP03CK0	Y	
Plant	*Carex tetanica*	Rigid Sedge	G4G5	S1		E	4	PMCYP03DN0	Y	
Plant	*Carex utriculata*	Beaked Sedge	G5	S1		W-H	4	PMCYP03H90		
Plant	*Carex woodii*	Pretty Sedge	G4	S1		E	4	PMCYP03EV0	Y	
Plant	*Castanea dentata*	American Chestnut	G3	S2S3		S	4	PDFAG01020		Y
Plant	*Caulophyllum giganteum*	Giant Blue Cohosh	G4G5	S1		T	4	PDBER03020		
Plant	*Cephaloziella massalongoi*	a liverwort	G3G5	S1		E	4	NBHEP0Q0C0		
Plant	*Cephaloziella spinicaulis*	a liverwort	G4	S1		S	4	NBHEP0Q0J0		
Plant	*Cerastium arvense var. velutinum*	Field Chickweed	G5T4?	S1		E	4	PDCAR06053		
Plant	*Ceratophyllum echinatum*	Prickly Hornwort	G4	S1		S	4	PDCER01040		Y
Plant	*Cetradonia linearis*	Rock Gnome Lichen	G3	S1	LE	E	3	NLLEC75010		
Plant	*Chamerion angustifolium*	Fireweed	G5	S1		T	4	PDONA06020		
Plant	*Chelone obliqua*	Red Turtlehead	G4	S1		S	4	PDSCR0F040		
Plant	*Chrysogonum virginianum*	Green-and-gold	G5	S2		T	4	PDAST29010		
Plant	*Clematis fremontii*	Fremont's Virgin's-bower	G5	S1		E	4	PDRAN080C0		
Plant	*Clematis glaucophylla*	Whiteleaf Leatherflower	G4?	S1		S	4	PDRAN080D0		Y
Plant	*Clematis morefieldii*	Morefield's Leatherflower	G2	S2	LE	E	3	PDRAN081A0		Y
Plant	*Clematis vinacea*	Ocoee Leatherflower	G2	S2		E	4	PDRAN08240	Y	Y
Plant	*Clethra alnifolia*	Coastal Sweet-pepperbush	G5	S1		E	4	PDCLE01040		
Plant	*Coeloglossum viride var. virescens*	Long-bracted Green Orchid	G5T5	S1		E	4	PMORC0K011		
Plant	*Coelorachis rugosa*	Wrinkled Jointgrass	G5	S1		T	4	PMPOA1J020	Y	
Plant	*Collinsia verna*	Spring Blue-eyed Mary	G5	S1		E	4	PDSCR0H0J0		
Plant	*Collinsonia verticillata*	Whorled Horsebalm	G3G4	S2S3			4	PDLAM0C040	Y	Y
Plant	*Cololejeunea ornata*	Ornate Cololejeunea	G2G4	S1		T	4	NBHEP0X090		
Plant	*Comptonia peregrina*	Sweet-fern	G5	S1		E	4	PDMCC01010		
Plant	*Conradina verticillata*	Cumberland False Rosemary	G3	S3	LT	T	3	PDLAM0D050		Y
Plant	*Corallorhiza maculata*	Spotted Coralroot	G5	S1		T	4	PMORC0M010		
Plant	*Coreopsis delphiniifolia*	Larkspur Tickseed	G3?	S1			4	PDAST2L100		Y
Plant	*Coreopsis latifolia*	Broadleaf Tickseed	G3	S1S2		E	4	PDAST2L0G0		Y
Plant	*Cornus obliqua*	Pale Dogwood	G5	S2		S	4	PDCOR01022		
Plant	*Corydalis sempervirens*	Pale Corydalis	G5	S1S2		S	4	PDFUM030B0		
Plant	*Coscinodon cribrosus*	Sieve-tooth Moss	G3G4	S1			4	NBMUS96020	Y	
Plant	*Cotinus obovatus*	American Smoketree	G4	S2		S	4	PDANA03020		

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Plant	*Crataegus harbisonii*	Harbison's Hawthorn	G1	S1		E	4	PDROS0H9F0		Y
Plant	*Crocanthemum canadense*	Canada Frostweed	G5	S1		E	4	PDCIS02030		
Plant	*Crocanthemum propinquum*	Low Frostweed	G4	S1S2		E	4	PDCIS020C0		
Plant	*Cymophyllus fraserianus*	Fraser's Sedge	G4	S3		S	4	PMCYP05020		
Plant	*Cyperus dentatus*	Toothed Flatsedge	G4	S1		S	4	PMCYP060N0		
Plant	*Cyperus plukenetii*	Plukenet's Flatsedge	G5	S1		S	4	PMCYP062R0		
Plant	*Cypripedium kentuckiense*	Southern Lady's-slipper	G3	S2		E	4	PMORC0Q0F0		Y
Plant	*Cypripedium reginae*	Showy Lady's-slipper	G4G5	S1		E	4	PMORC0Q0D0		
Plant	*Dalea candida*	White Prairie-clover	G5	S2		T	4	PDFAB1A070		
Plant	*Dalea foliosa*	Leafy Prairie-clover	G2G3	S2S3	LE	E	3	PDFAB1A0K0		Y
Plant	*Dalea gattingeri*	Gattinger's Prairie-clover	G3	S3S4			4	PDFAB1A0N0	Y	
Plant	*Dalea purpurea*	Purple Prairie-clover	G5	S1		E	4	PDFAB1A1D0		
Plant	*Danthonia epilis*	Bog Wild Oatgrass	G4	S1S2		S	4	PMPOA200C0		
Plant	*Delphinium exaltatum*	Tall Larkspur	G3	S2		E	4	PDRAN0B0J0		Y
Plant	*Dendrolycopodium dendroideum*	Treelike Clubmoss	G5	S1		S	4	PPLYC010B0		
Plant	*Desmodium ochroleucum*	Cream Tick-trefoil	G2G3	S1		E	4	PDFAB1D100		Y
Plant	*Diamorpha smallii*	Small's Stonecrop	G4	S1S2		E	4	PDCRA03010		
Plant	*Diarrhena obovata*	Beak Grass	G4G5	S1		S	4	PMPOA23020		
Plant	*Dichanthelium aciculare*	Needleleaf Rosette Grass	G5	S1			4	PMPOA24010		
Plant	*Dichanthelium bicknellii*	Bicknell's Panicgrass	G4?Q	S1		S	4	PMPOA4K2N0	Y	
Plant	*Dichanthelium ensifolium ssp. curtifolium*	Shortleaf Witchgrass	G4T3?	S1		E	4	PMPOA241W2		Y
Plant	*Dichanthelium ensifolium ssp. ensifolium*	Sword-leaf Panicgrass	G4TNR	S2			4	PMPOA241W3		
Plant	*Dichanthelium leucothrix*	Roughish Witchgrass	G4?Q	S1		S	4	PMPOA24130		
Plant	*Dichanthelium spretum*	Eaton's Witchgrass	G5	S1		E	4	PMPOA24110		
Plant	*Didiplis diandra*	Water-purslane	G3G4	S1		T	4	PDLYT04010		
Plant	*Didymoglossum petersii*	Dwarf Filmy Fern	G4	S2		T	4	PPHYM020K0		Y
Plant	*Diervilla lonicera*	Northern Bush-honeysuckle	G5	S2		T	4	PDCPR01010		
Plant	*Diervilla rivularis*	Mountain Bush-honeysuckle	G3	S2		T	4	PDCPR01020		Y
Plant	*Diplophyllum andrewsii*	Andrews' Earwort	G3	S1		S	4	NBHEP15020	Y	
Plant	*Diplophyllum obtusatum*	Blunted Earwort	G2?	S1		S	4	NBHEP15060	Y	
Plant	*Draba cuneifolia*	Wedgeleaf Whitlow-grass	G5	S1S2		S	4	PDBRA110V0		
Plant	*Draba ramosissima*	Branched Whitlow-grass	G4	S2		S	4	PDBRA11250		
Plant	*Drepanolejeunea appalachiana*	Appalachian Threadwort	G3	S1		S	4	NBHEP17010		
Plant	*Drosera brevifolia*	Dwarf Sundew	G5	S2		T	4	PDDRO02020		
Plant	*Drosera capillaris*	Pink Sundew	G5	S1		T	4	PDDRO02030		
Plant	*Drosera intermedia*	Spoonleaf Sundew	G5	S2		S	4	PDDRO02050	Y	
Plant	*Drosera rotundifolia*	Roundleaf Sundew	G5	S1		T	4	PDDRO02070		
Plant	*Dryopteris carthusiana*	Spinulose Shieldfern	G5	S1		T	4	PPDRY0A040		
Plant	*Dryopteris cristata*	Crested Shieldfern	G5	S2		T	4	PPDRY0A090		
Plant	*Echinacea pallida*	Pale Purple Coneflower	G5	S1		E	4	PDAST38040		
Plant	*Echinacea simulata*	Wavyleaf Purple Coneflower	G4	S2		T	4	PDAST38080		
Plant	*Echinacea tennesseensis*	Tennessee Coneflower	G2G3	S2	DL	T	3	PDAST38090		Y
Plant	*Echinochloa walteri*	Walter's Barnyard Grass	G5	S1		S	4	PMPOA2D080		
Plant	*Echinodorus berteroi*	Upright Burhead	G5	S1		S	4	PMALI020B0		
Plant	*Eleocharis compressa var. compressa*	Flat-stem Spikerush	G5T5	S1		S	4	PMCYP09220		
Plant	*Eleocharis elliptica*	Slender Spikerush	G5	S1		E	4	PMCYP090K0	Y	
Plant	*Eleocharis equisetoides*	Horsetail Spikerush	G4	S1		E	4	PMCYP090N0		Y
Plant	*Eleocharis intermedia*	Matted Spikerush	G5?	S1		E	4	PMCYP090V0		

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Plant	*Eleocharis lanceolata*	Lance-like Spikerush	G4G5	S1		S	4	PMCYP090Y0		
Plant	*Eleocharis tortilis*	Twisted Spikerush	G5	S1		S	4	PMCYP091T0		
Plant	*Eleocharis wolfii*	Wolf's Spikerush	G3G5	S1		E	4	PMCYP091Z0		Y
Plant	*Elodea nuttallii*	Nuttall's Waterweed	G5	S2		S	4	PMHYD03080		
Plant	*Elymus svensonii*	Svenson's Wild Rye	G3	S2		T	4	PMPOA2H0J0		Y
Plant	*Entodon brevisetus*	Short-stalk Shiny Moss	G4?	S1			4	NBMUS2N010	Y	
Plant	*Entodon concinnus*	Lime Silk Moss	G4G5	S1		S	4	NBMUS2N040		
Plant	*Entodon sullivantii*	Sullivant's Silk Moss	G3G4	S2			4	NBMUS2N070	Y	
Plant	*Epilobium ciliatum*	Hairy Willowherb	G5	S1		T	4	PDONA06040		
Plant	*Epilobium leptophyllum*	Linear-leaf Willowherb	G5	S1		T	4	PDONA060G0		
Plant	*Eriocaulon decangulare*	Ten-angle Pipewort	G5	S1		E	4	PMERI01030		
Plant	*Eriogonum longifolium var. harperi*	Harper's Umbrella-plant	G4T1T2	S1		E	4	PDPGN083R2		Y
Plant	*Eriophorum virginicum*	Tawny Cotton-grass	G5	S1S2		E	4	PMCYP0A0D0		
Plant	*Eryngium integrifolium*	Savanna Eryngo	GNR	S1		T	4	PDAPI0Z170		
Plant	*Erysimum capitatum*	Western Wallflower	G5	S1S2		E	4	PDBRA160T0		
Plant	*Erythronium rostratum*	Yellow Trout-lily	G5	S2		S	4	PMLIL0U0G0		
Plant	*Eupatorium godfreyanum*	Godfrey's Boneset	G4	S1		S	4	PDAST3P250	Y	
Plant	*Eupatorium leucolepis*	White-bract Thoroughwort	G5	S1		E	4	PDAST3P110		
Plant	*Euphorbia ouachitana*	Ouachita Spurge	G3	S2		S	4	PDEUP0Q470	Y	Y
Plant	*Eurybia saxicastelli*	Rockcastle Wood-aster	G3	S1S2		E	4	PDASTEB0L0		Y
Plant	*Eurybia schreberi*	Schreber's Aster	G4	S1		S	4	PDASTEB0M0		
Plant	*Euthamia gymnospermoides*	Viscid Bushy Goldenrod	G5	S1		E	4	PDAST3R030	Y	
Plant	*Eutrochium steelei*	Steele's Joe-pyeweed	G4	S3		FS	4	PDAST3P260		
Plant	*Evolvulus nuttallianus*	Shaggy Dwarf Morning-glory	G5	S3		S	4	PDCON090C0		
Plant	*Fallopia cilinodis*	Fringed Black-bindweed	G5	S1S2		T	4	PDPGN0L0R0		
Plant	*Festuca paradoxa*	Cluster Fescue	G5	S1		S	4	PMPOA2V0P0		
Plant	*Fimbristylis perpusilla*	Harper's Fimbry	G2	S1	UR	E	4	PMCYP0B0F0		Y
Plant	*Fimbristylis puberula*	Hairy Fimbry	G5	S1S2		T	4	PMCYP0B0G0		
Plant	*Fissidens appalachensis*	Appalachian Pocket Moss	G2G3	S1		T	4	NBMUS2W020	Y	
Plant	*Fissidens exilis*	Small Pocket Moss	G3G4	S1			4	NBMUS2W0C0	Y	
Plant	*Fothergilla major*	Mountain Witch-alder	G3	S2		T	4	PDHAM01020		Y
Plant	*Frullania appalachiana*	Appalachian Scalewort	G3G4	S1?		S	4	NBHEP1A0P0	Y	
Plant	*Frullania caulisequa*	a liverwort	G5	S1		S	4	NBHEP1A0R0		
Plant	*Frullania plana*	a liverwort	G4	S2		S	4	NBHEP1A0J0	Y	
Plant	*Fuirena squarrosa*	Hairy Umbrella-sedge	G5?	S1		S	4	PMCYP0C070		
Plant	*Funaria americana*	American Cord Moss	G3?	S1?		T	4	NBMUS2Z010		
Plant	*Galium asprellum*	Rough Bedstraw	G5	S1		S	4	PDRUB0N080		
Plant	*Galium palustre*	Marsh Bedstraw	G5	S1		S	4	PDRUB0N1P0		
Plant	*Galium uniflorum*	Fragrant Bedstraw	G4G5	S1			4	PDRUB0N2A0		
Plant	*Gaylussacia brachycera*	Box Huckleberry	G3	S2S3			4	PDERI0G020	Y	
Plant	*Gaylussacia dumosa*	Southern Dwarf Huckleberry	G5	S3		T	4	PDERI0G0Y0		
Plant	*Gelsemium sempervirens*	Yellow Jessamine	G5	S1S2			4	PDLOG05020		
Plant	*Gentiana austromontana*	Appalachian Gentian	G3	S3		WL	4	PDGEN06060		Y
Plant	*Gentiana linearis*	Narrowleaf Gentian	G4G5	S1		T	4	PDGEN060F0		
Plant	*Gentiana puberulenta*	Downy Gentian	G4G5	S1		E	4	PDGEN060N0		
Plant	*Geranium robertianum*	Herb-Robert	G5	S1		S	4	PDGER020Z0		
Plant	*Geum aleppicum*	Yellow Avens	G5	S1		E	4	PDROS0S010		
Plant	*Geum geniculatum*	Bent Avens	G2	S1		E	4	PDROS0S050		Y

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Plant	*Geum laciniatum*	Rough Avens	G5	S1		S	4	PDROS0S070		
Plant	*Geum radiatum*	Spreading Avens	G2	S1	LE	E	3	PDROS0S0C0		Y
Plant	*Glyceria acutiflora*	Sharp-scaled Mannagrass	G5	S2		S	4	PMPOA2Y010		
Plant	*Glyceria canadensis var. laxa*	Limp Mannagrass	G5TUQ	S1		E	4	PMPOA2Y042		
Plant	*Glyceria nubigena*	Smoky Mountains Mannagrass	G2G3	S1S2		T	4	PMPOA2Y0B0		Y
Plant	*Goodyera repens*	Dwarf Rattlesnake-plantain	G5	S1		S	4	PMORC17030		
Plant	*Gratiola brevifolia*	Sticky Hedge-hyssop	G4	S1		S	4	PDSCR0R020	Y	
Plant	*Gratiola floridana*	Florida Hedge-hyssop	G4	S1		E	4	PDSCR0R050		
Plant	*Gratiola viscidula*	Short's Hedge-hyssop	G4G5	S1		S	4	PDSCR0R0C0	Y	
Plant	*Grimmia olneyi*	Olney's Dry Rock Moss	G3G5	SH		S	4	NBMUS320V0		
Plant	*Gymnocolea inflata ssp. Acutiloba*	Welsh Notchwort	G5T3Q	S1			4	NBHEP1D010	Y	
Plant	*Gymnomitrion laceratum*	a liverwort	G3G5	S1		T	4	NBHEP1E040		
Plant	*Gymnopogon brevifolius*	Shortleaf Beardgrass	G5	S1S2		S	4	PMPOA2Z020		
Plant	*Hasteola suaveolens*	Sweet-scented Indian-plantain	G4	S2		S	4	PDASTDX010		
Plant	*Helenium brevifolium*	Shortleaf Sneezeweed	G4	S1		E	4	PDAST4L070		Y
Plant	*Helianthus eggertii*	Eggert's Sunflower	G3	S3	DL	S	3	PDAST4N0J0		Y
Plant	*Helianthus glaucophyllus*	Whiteleaf Sunflower	G3G4	S1		T	4	PDAST4N0M0		Y
Plant	*Helianthus occidentalis*	Mcdowell's Sunflower	G5	S2		S	4	PDAST4N110		
Plant	*Helianthus smithiorum*	Smith's Sunflower	G2Q	S1S2			4	PDAST4N1F0	Y	
Plant	*Helianthus verticillatus*	Whorled Sunflower	G1	S1	LE	E	3	PDAST4N240		Y
Plant	*Heracleum maximum*	Cow-parsnip	G5	S2		S	4	PDAPI15040		
Plant	*Heteranthera limosa*	Blue Mud-plantain	G5	S1S2		T	4	PMPON03030		
Plant	*Heteranthera missouriensis*	Missouri Mud-Plantain	G5?	S1		S	4	PMPON03020		Y
Plant	*Heterocladium macounii*	Macoun's Tangle Moss	G4	S2			4	NBMUS3F020	Y	
Plant	*Hexastylis contracta*	Southern Heartleaf	G3	S3			4	PDARI03020	Y	
Plant	*Hexastylis virginica*	Virginia Heartleaf	G4	S2		S	4	PDARI03090		
Plant	*Hieracium longipilum*	Hairy Hawkweed	G4G5	S1		S	4	PDAST4W0X0		
Plant	*Hieracium scabrum*	Rough Hawkweed	G5	S2		T	4	PDAST4W1C0		
Plant	*Homaliadelphus sharpii*	Sharp's Homaliadelphus Moss	G3?	S1		E	4	NBMUS3J010		
Plant	*Hottonia inflata*	Featherfoil	G4	S2		S	4	PDPRI06010		Y
Plant	*Houstonia purpurea var. montana*	Mountain Bluet	G5T2	S1	LE	E	3	PDRUB1T082		Y
Plant	*Huperzia appalachiana*	Appalachian Fir-clubmoss	G5	S1		T	4	PPLYC020J0		
Plant	*Hydrocotyle americana*	American Water-pennywort	G5	S1		E	4	PDAPI16010		
Plant	*Hydrolea ovata*	Ovate False Fiddleleaf	G5	S1		S	4	PDHYD07020		
Plant	*Hydrolea quadrivalvis*	Waterpod	G5	S1		S	4	PDHYD07030	Y	
Plant	*Hydrophyllum virginianum*	John's-cabbage	G5	S3		T	4	PDHYD08080		
Plant	*Hygrohypnum closteri*	Closter's Brook Moss	G3	S1			4	NBMUS3S030	Y	
Plant	*Hygrohypnum subeugyrium*	Large Brook Moss	G3	S1			4	NBMUS3S0D0	Y	
Plant	*Hymenophyllum tayloriae*	Taylor's Filmy Fern	G2	S2		S	4	PPHYM010P0		Y
Plant	*Hypericum adpressum*	Creeping St. John's-wort	G3	S1		E	4	PDCLU03010		Y
Plant	*Hypericum ellipticum*	Pale St. John's-wort	G5	S1		E	4	PDCLU030M0		
Plant	*Hypericum graveolens*	Mountain St. John's-wort	G3	S3		E	4	PDCLU030V0		Y
Plant	*Hypericum mitchellianum*	Blue Ridge St. John's-wort	G3	S2		T	4	PDCLU03140		Y
Plant	*Hypericum nudiflorum*	Pretty St. John's-wort	G5	S2		S	4	PDCLU03180	Y	
Plant	*Iris brevicaulis*	Lamance Iris	G4	S1		E	4	PMIRI09030		Y
Plant	*Iris fulva*	Red Iris	G5	S2		T	4	PMIRI090B0		
Plant	*Iris prismatica*	Slender Blue Iris	G4	S2S3		T	4	PMIRI090S0		
Plant	*Isoetes appalachiana*	Appalachian Quillwort	G4	S1		E	4	PPISO01230	Y	

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Plant	*Isoetes melanopoda*	Blackfoot Quillwort	G5	S1S2		E	4	PPISO010D0		
Plant	*Isoetes tennesseensis*	Tennessee Quillwort	G1	S1		E	4	PPISO01280		Y
Plant	*Isotria medeoloides*	Small Whorled Pogonia	G2G3	S1	LT	E	3	PMORC1F010		Y
Plant	*Juglans cinerea*	Butternut	G3	S3		T	4	PDJUG02030		Y
Plant	*Juncus brachycephalus*	Small-head Rush	G5	S2		S	4	PMJUN010E0		
Plant	*Juncus brachyphyllus*	Shortleaf Rush	G5	S1		S	4	PMJUN010F0	Y	
Plant	*Juncus elliottii*	Bog Rush	G4G5	S1		S	4	PMJUN01120	Y	
Plant	*Juncus gymnocarpus*	Naked-fruit Rush	G4	S3		FS	4	PMJUN011C0		
Plant	*Krigia montana*	False Dandelion	G3	S1		T	4	PDAST5D050		Y
Plant	*Lachnanthes caroliana*	Carolina Redroot	G5	S1		E	4	PMHAE01010		
Plant	*Lachnocaulon anceps*	Whitehead Bogbutton	G5	S1		S	4	PMERI02010		
Plant	*Lathyrus palustris*	Vetchling Peavine	G5	S1		S	4	PDFAB250P0		
Plant	*Lechea pulchella*	Leggett's Pinweed	G5	S1		E	4	PDCIS04090		
Plant	*Lejeunea blomquistii*	Blomquist Leafy Liverwort	G3	S1S2		S	4	NBHEP1R040		
Plant	*Lejeunea ruthii*	a liverwort	G3G4	S2			4	NBHEP1R0N0	Y	
Plant	*Lejeunea sharpii*	Sharp's Pouncewort	G2G3	S1S2		E	4	NBHEP39030		
Plant	*Leptodontium viticulosoides var. sulphureum*	Grandfather Mountain Leptodontium Moss	GNRT2	S1S2		E	4	NBMUS46010		
Plant	*Leptohymenium sharpii*	Mount Leconte Moss	G1	S1		E	4	NBMUS9T010		
Plant	*Leptoscyphus cuneifolius ssp. cuneifolius*	Wedge Flapwort	G4G5T4T5	S1		E	4	NBHEP1U010		
Plant	*Lespedeza angustifolia*	Narrowleaf Bushclover	G4	S2		T	4	PDFAB27010		
Plant	*Leucothoe racemosa*	Fetterbush	G5	S2		T	4	PDERI0P050		
Plant	*Liatris cylindracea*	Slender Blazingstar	G5	S2		T	4	PDAST5X060		
Plant	*Liatris pilosa*	Grass-leaf Gayfeather	GNR	S1		S	4	PDAST5X1V0		
Plant	*Liatris virgata*	Wand Gayfeather	GU	S1		S	4	PDAST5X1F0	Y	
Plant	*Lilium grayi*	Gray's Lily	G1G2	S1		E	4	PMLIL1A060		Y
Plant	*Lilium philadelphicum*	Wood Lily	G5	S1		E	4	PMLIL1A0L0		
Plant	*Liparis loeselii*	Loesel's Twayblade	G5	S1		T	4	PMORC1M040		
Plant	*Listera australis*	Southern Twayblade	G5	S1S2		E	4	PMORC1N020		Y
Plant	*Listera smallii*	Kidneyleaf Twayblade	G4	S3		FS	4	PMORC1N080		
Plant	*Lobelia amoena*	Southern Lobelia	G4?	S1S2		T	4	PDCAM0E010		
Plant	*Lobelia canbyi*	Canby's Lobelia	G4	S2S3			4	PDCAM0E080		
Plant	*Lonicera canadensis*	American Fly-honeysuckle	G5	S1		T	4	PDCPR03040		
Plant	*Lonicera dioica*	Mountain Honeysuckle	G5	S2		S	4	PDCPR03080		
Plant	*Lonicera flava*	Yellow Honeysuckle	G5?	S1		T	4	PDCPR030A0		
Plant	*Lonicera reticulata*	Grape Honeysuckle	G5	S1		E	4	PDCPR03400		
Plant	*Lophocolea appalachiana*	Appalachian Crestwort	G2	S1		S	4	NBHEP1W080		
Plant	*Lophocolea muricata*	a crestwort	G5	S1		T	4	NBHEP1W070		
Plant	*Ludwigia hirtella*	Hairy Ludwigia	G5	S3		S	4	PDONA0B090	Y	
Plant	*Ludwigia sphaerocarpa*	Globe-fruit False Loosestrife	G4	S1		T	4	PDONA0B0S0		
Plant	*Lycopodiella alopecuroides*	Foxtail Bog Clubmoss	G5	S2		T	4	PPLYC03010		
Plant	*Lycopodiella inundata*	Bog Clubmoss	G5	S1		S	4	PPLYC03060	Y	
Plant	*Lysimachia fraseri*	Fraser's Loosestrife	G3	S2		E	4	PDPRI07070		Y
Plant	*Lysimachia hybrida*	Lanceleaf Loosestrife	G5	S2		S	4	PDPRI070A0	Y	
Plant	*Lysimachia lewisii*	Lewis's Yellow Loosestrife	G2	S2		S	4	PDPRI071C0	Y	Y
Plant	*Lysimachia quadriflora*	Four-flower Yellow Loosestrife	G5?	S1		E	4	PDPRI070M0		
Plant	*Lysimachia terrestris*	Swamp Loosestrife	G5	S1		E	4	PDPRI070R0		
Plant	*Lysimachia x producta*	Loosestrife	GNA	S1		S	4	PDPRI07120		

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Plant	*Magnolia virginiana*	Sweetbay Magnolia	G5	S2		T	4	PDMAG020A0		
Plant	*Maianthemum stellatum*	Starflower Solomon's-plume	G5	S1		E	4	PMLIL1D040		
Plant	*Malvastrum hispidum*	Hispid False Mallow	G3G5	S2S3			4	PDMAL0S060	Y	
Plant	*Mannia triandra*	Field Macewort	G3G4	S1		T	4	NBHEP20050		
Plant	*Marchantia quadrata*	Narrow Mushroom-headed Liverwort	G5	S1		T	4	NBHEP2S010		
Plant	*Marshallia obovata*	Spoon-shape Barbara's-buttons	G4G5	S1		E	4	PDAST68050		
Plant	*Marshallia pulchra*	Beautiful Barbara's-Buttons	G3	S2		E	4	PDAST68100	Y	
Plant	*Marshallia trinervia*	Broadleaf Barbara's-buttons	G3	S2S3		T	4	PDAST68080		Y
Plant	*Marsupella funckii*	a liverwort	G4G5	S1		E	4	NBHEP22090		
Plant	*Marsupella paroica*	Dull Rustwort	G3	S1			4	NBHEP220A0	Y	
Plant	*Meehania cordata*	Heartleaf Meehania	G5	S2		T	4	PDLAM11010		
Plant	*Megaceros aenigmaticus*	Headwaters Hornwort	G3	S2S3		S	4	NBANT04010		
Plant	*Melanthium latifolium*	Broadleaf Bunchflower	G4	S1S2		E	4	PMLIL1F010		
Plant	*Melanthium virginicum*	Virginia Bunchflower	G5	S1		E	4	PMLIL1F020		
Plant	*Melanthium woodii*	Ozark Bunchflower	G5	S2		S	4	PMLIL1F030		
Plant	*Menziesia pilosa*	Minniebush	G4G5	S2		S	4	PDERI0S020		
Plant	*Metzgeria uncigera*	a liverwort	G3	S1		S	4	NBHEP27080		
Plant	*Micranthes careyana*	Carey's Saxifrage	G3	S3			4	PDSAX0U090	Y	
Plant	*Micranthes caroliniana*	Carolina Saxifrage	G3	S1S2		E	4	PDSAX0U0A0		Y
Plant	*Micranthes pensylvanica*	Swamp Saxifrage	G5	S1		E	4	PDSAX0U1D0		
Plant	*Microlejeunea globosa*	Cardot's Pouncewort	G3?	S1		S	4	NBHEP1R070		
Plant	*Mielichhoferia elongata*	Mielichhofer's Copper Moss	GNR	S1		S	4	NBMUS4Q022		
Plant	*Milium effusum var. cisatlanticum*	Tall Millet Grass	G5T5	S1		S	4	PMPOA43011		
Plant	*Minuartia cumberlandensis*	Cumberland Sandwort	G3	S2	DL	E	3	PDCAR0G0Z0		Y
Plant	*Minuartia godfreyi*	Godfrey's Stitchwort	G1	S1	UR	E	4	PDCAR0G0D0		Y
Plant	*Minuartia groenlandica*	Mountain Sandwort	G5	S1		E	4	PDCAR0G0E0		
Plant	*Mirabilis albida*	Pale Umbrella-wort	G5	S2		T	4	PDNYC0A020		
Plant	*Monotropsis odorata*	Sweet Pinesap	G3	S2		T	4	PDMON04020		Y
Plant	*Muhlenbergia cuspidata*	Plains Muhly	G5	S1		E	4	PMPOA480D0		
Plant	*Muhlenbergia glabrifloris*	Inland Muhly	G4?	S1		S	4	PMPOA480S0		Y
Plant	*Muhlenbergia torreyana*	Torrey's Dropseed	G3	S1		E	4	PMPOA481U0		Y
Plant	*Myriophyllum pinnatum*	Cutleaf Water-milfoil	G5	S1		E	4	PDHAL040A0		
Plant	*Myurella julacea*	Small Mousetail Moss	G5	SH		S-P	4	NBMUS4U010		
Plant	*Nemopanthus collinus*	Long-stalked Holly	G3	S1		S	4	PDAQU01080		Y
Plant	*Nestronia umbellula*	Nestronia	G4	S1		E	4	PDSAN05010		
Plant	*Neviusia alabamensis*	Alabama Snow-wreath	G3	S2		T	4	PDROS14010		Y
Plant	*Oenothera macrocarpa*	Missouri Evening-primrose	G5	S2		T	4	PDONA0C1P0		
Plant	*Oenothera parviflora*	Northern Evening-primrose	G5	S1		S	4	PDONA0C0Z0		
Plant	*Oligoneuron album*	Prairie Goldenrod	G5	S1S2		E	4	PDAST8P1F0		
Plant	*Onosmodium molle ssp. bejariense*	Soft-hairy False Gromwell	G4G5T3	S1S2		T	4	PDBOR0S035		Y
Plant	*Onosmodium molle ssp. hispidissimum*	Soft-Hairy False Gromwell	G4G5T4	S1		E	4	PDBOR0S031		
Plant	*Onosmodium molle ssp. subsetosum*	False Gromwell	G4G5T4?	S1		E	4	PDBOR0S034		
Plant	*Orthodontium pellucens*	Translucent Orthodontium Moss	G5	SH		S	4	NBMUS54020		
Plant	*Orthotrichum exiguum*	Small Wood-bark Moss	G3?	S1			4	NBMUS56090	Y	
Plant	*Orthotrichum ohioense*	Ohio Orthotrichum	G4	S1			4	NBMUS560L0	Y	
Plant	*Packera crawfordii*	Bog Ragwort	G2	S1		E	4	PDASTE60H0	Y	Y
Plant	*Packera paupercula var. appalachiana*	Prairie Ragwort	G5TNR	S1		S	4	PDASTE60K1	Y	
Plant	*Packera plattensis*	Prairie Ragwort	G5	S1		S	4	PDAST8H2F0		

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Plant	*Packera schweinitziana*	New England Ragwort	G5?	S1		T	4	PDAST8H2U0		
Plant	*Palamocladium leskeoides*	Palamocladium Moss	G3G5	S1		T	4	NBMUS57010		
Plant	*Panax quinquefolius*	American Ginseng	G3G4	S3S4		S-CE	4	PDARA09010		Y
Plant	*Panicum hemitomon*	Maidencane	G5?	S2		S	4	PMPOA4K110		
Plant	*Parnassia grandifolia*	Largeleaf Grass-of-Parnassus	G3	S3		S	4	PDSAX0P060		Y
Plant	*Paronychia argyrocoma*	Silverling	G4	S1S2		T	4	PDCAR0L020		
Plant	*Paxistima canbyi*	Canby's Mountain-lover	G2?	S1		E	4	PDCEL0A010		Y
Plant	*Paysonia densipila*	Duck River Bladderpod	G3	S3		S	4	PDBRA1N0F0		Y
Plant	*Paysonia perforata*	Spring Creek Bladderpod	G1	S1	LE	E	3	PDBRA1N1A0		Y
Plant	*Paysonia stonensis*	Stones River Bladderpod	G1	S1		E	4	PDBRA1N1K0		Y
Plant	*Pedicularis lanceolata*	Swamp Lousewort	G4	S1S2		S	4	PDSCR1K0M0		
Plant	*Pedinophyllum interruptum*	a liverwort	G3G4	S1		S	4	NBHEP2G010		
Plant	*Pellia appalachiana*	Appalachian Pellia	G4	S2		S	4	NBHEP2H040		
Plant	*Peltigera hydrothyria*	Eastern Waterfan Lichen	G4?	S1		T	4	NLVER01020	Y	
Plant	*Penstemon kralii*	Kral's Beardtongue	G2	S1		E	4	PDSCR1L850	Y	Y
Plant	*Penstemon tubiflorus*	White-wand Beardtongue	G5	S1		S	4	PDSCR1L7Q0		
Plant	*Perideridia americana*	Eastern Eulophus	G4	S2		E	4	PDAPI1N010		Y
Plant	*Phacelia ranunculacea*	Blue Scorpionweed	G4	S2S3			4	PDHYD0C420		
Plant	*Phaeophyscia leana*	Lea's Bog Lichen	G2	S1			4	NLLEC6A020	Y	
Plant	*Phegopteris connectilis*	Northern Beech Fern	G5	S1		E	4	PPTHE02050		
Plant	*Phemeranthus calcaricus*	Limestone Fameflower	G3	S3		S	4	PDPOR08050		Y
Plant	*Phemeranthus mengesii*	Large-flower Rock-pink	G3	S2		T	4	PDPOR0A020		Y
Plant	*Phemeranthus teretifolius*	Roundleaf Fameflower	G4	S2		T	4	PDPOR080K0		
Plant	*Philonotis longiseta*	Long-stalked Apple Moss	G3G4	S3			4	NBMUS5C050	Y	
Plant	*Phlox bifida ssp. stellaria*	Cleft Phlox	G5?T3	S3		T	4	PDPLM0D0A2		Y
Plant	*Phlox latifolia*	Mountain Phlox	G4	S2S3		S	4	PDPLM0D260	Y	
Plant	*Phlox subulata*	Moss Phlox	G5	S1		S	4	PDPLM0D1T0		
Plant	*Phyllanthopsis phyllanthoides*	Missouri Buck-brush	G4	S1		T	4	PDEUP06020	Y	
Plant	*Physaria globosa*	Globe Bladderpod	G2	S2	LE	E	3	PDBRA1N0N0		Y
Plant	*Pieris floribunda*	Mountain Fetterbush	G4	S2		T	4	PDERI10010		
Plant	*Pilularia americana*	American Pillwort	G4?	S1S2		S	4	PPMAR02010		
Plant	*Piptatherum racemosum*	mountain ricegrass	G5	S1		E	4	PMPOA4J0A0	Y	
Plant	*Pityopsis ruthii*	Ruth's Silk-grass	G1	S1	LE	E	3	PDAST7B080		Y
Plant	*Plagiochila austinii*	a liverwort	G3	S3		S	4	NBHEP2M060	Y	
Plant	*Plagiochila caduciloba*	Gorge Leafy Liverwort	G3	S2		S	4	NBHEP2M070	Y	
Plant	*Plagiochila echinata*	a liverwort	G3	S2		S	4	NBHEP2M0C1	Y	
Plant	*Plagiochila exigua*	a liverwort	G4?	S1S2		S	4	NBHEP2M090		
Plant	*Plagiochila punctata*	Spotty Featherwort	G5	S1		S	4	NBHEP2M0U0		
Plant	*Plagiochila retrorsa*	Retrorse Leafy Liverwort	G4	S1		S	4	NBHEP2M0N1		
Plant	*Plagiochila sullivantii*	Sullivant's Leafy Liverwort	G3G4	S2		S	4	NBHEP2M0P0	Y	
Plant	*Plagiomnium carolinianum*	Mountain Wavy-leaf Moss	G3	S1		S	4	NBMUS81040		
Plant	*Plantago cordata*	Heartleaf Plantain	G4	S1		E	4	PDPLN02090		Y
Plant	*Platanthera cristata*	Yellow-crested Orchid	G5	S2S3		S	4	PMORC1Y060		
Plant	*Platanthera flava var. herbiola*	Pale-green Orchid	G5T5	S2		T	4	PMORC1Y082		Y
Plant	*Platanthera grandiflora*	Large Purple Fringed Orchid	G5	S2		E	4	PMORC1Y090		
Plant	*Platanthera integra*	Yellow Fringeless Orchid	G3G4	S1		E	4	PMORC1Y0C0		Y
Plant	*Platanthera integrilabia*	White Fringeless Orchid	G2	S2S3	LT	E	3	PMORC1Y0D0		Y
Plant	*Platanthera nivea*	Snowy Orchid	G3G4	S1		E	4	PMORC1Y0H0		Y

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Plant	*Platanthera psycodes*	Small Purple Fringed Orchid	G5	S2		S	4	PMORC1Y0M0		
Plant	*Poa palustris*	Fowl Bluegrass	G5	S1		E	4	PMPOA4Z1X0		
Plant	*Poa saltuensis*	Drooping Bluegrass	G5	S1		T	4	PMPOA4Z1C0		
Plant	*Pogonia ophioglossoides*	Rose Pogonia	G5	S2		E	4	PMORC21010		
Plant	*Pohlia lescuriana*	Pear-shaped Nodding Moss	G4G5	S1			4	NBMUS5S0E0	Y	
Plant	*Polygala boykinii*	Boykin's Milkwort	G4	S2		T	4	PDPGL02060		
Plant	*Polygala mariana*	Maryland Milkwort	G5	S1		S	4	PDPGL020Z0		
Plant	*Polygala nana*	Dwarf Milkwort	G5	S1		E	4	PDPGL02110		
Plant	*Polygala nuttallii*	Nuttall's Milkwort	G4	S1		E	4	PDPGL02120		
Plant	*Polygonella americana*	Southern Jointweed	G5	S1S2		E	4	PDPGN0K010		
Plant	*Polygonum arifolium*	Halberd-leaf Tearthumb	G5	S1		T	4	PDPGN0L080		
Plant	*Polymnia johnbeckii*	John Beck's Leafcup	G1	S1		E	4	PDAST7G050	Y	Y
Plant	*Polymnia laevigata*	Tennessee Leafcup	G3	S3			4	PDAST7G020	Y	
Plant	*Polytaenia nuttallii*	Prairie Parsley	G5	S1		T	4	PDAPI1U010		
Plant	*Polytrichastrum appalachianum*	Appalachian Haircap Moss	G3	S1			4	NBMUS5T0B0	Y	
Plant	*Ponthieva racemosa*	Shadow-witch Orchid	G5	S1		E	4	PMORC24010		
Plant	*Porella gracillima*	Hot Porella	GNR	S1		E	4	NBHEP2Q0G0		
Plant	*Porella wataugensis*	Watauga Porella	G1G2Q	S1S2		T	4	NBHEP2Q0A0		
Plant	*Potamogeton amplifolius*	Largeleaf Pondweed	G5	S1		T	4	PMPOT03020		
Plant	*Potamogeton epihydrus*	Nuttall's Pondweed	G5	S1S2		S	4	PMPOT03080		
Plant	*Potamogeton tennesseensis*	Tennessee Pondweed	G2G3	S2	UR	T	4	PMPOT03130		Y
Plant	*Prenanthes alba*	White Rattlesnake-root	G5	S1		S	4	PDAST7K020		
Plant	*Prenanthes aspera*	Rough Rattlesnake-root	G4?	S1		E	4	PDAST7K040		Y
Plant	*Prenanthes barbata*	Barbed Rattlesnake-root	G3	S2		S	4	PDAST7K060		Y
Plant	*Prenanthes roanensis*	Roan Mountain Rattlesnake-root	G3	S3			4	PDAST7K0B0		Y
Plant	*Prunus pumila*	Sand Cherry	G5	S1		E	4	PDROS1C160		
Plant	*Prunus virginiana*	Choke Cherry	G5	S1		S	4	PDROS1C1E0		
Plant	*Pseudognaphalium helleri*	Catfoot	G4G5	S2		S	4	PDAST44090		
Plant	*Pseudognaphalium helleri ssp. micradenium*	Heller's Cudweed	G4G5T3?	S2		S	4	PDAST44092	Y	
Plant	*Pycnanthemum beadlei*	Beadle's Mountainmint	G3	S1S2		E	4	PDLAM1N0M0		Y
Plant	*Pycnanthemum torreyi*	Torrey's Mountainmint	G2	S1		E	4	PDLAM1N0G0		Y
Plant	*Pycnanthemum verticillatum*	Whorled Mountainmint	G5	S1		E	4	PDLAM1N0H0		
Plant	*Pyrola americana*	American Wintergreen	G5	S2		E	4	PDPYR04010		
Plant	*Quercus margarettiae*	Sand Post Oak	G5	S1		S	4	PDFAG05390		
Plant	*Radula australis*	a liverwort	G3G4	S3			4	NBHEP2V020	Y	
Plant	*Radula sullivantii*	a liverwort	G3	SNR		S	4	NBHEP2V0A0	Y	
Plant	*Radula tenax*	a liverwort	G3G4	S3		S	4	NBHEP2V0B0	Y	
Plant	*Radula voluta*	a liverwort	G3	S2		S	4	NBHEP2V0C0		
Plant	*Ranunculus aquatilis var. diffusus*	Whitewater Crowfoot	G5T5	S1		E	4	PDRAN0L0A5		
Plant	*Ranunculus flabellaris*	Yellow Water-crowfoot	G5	S2		T	4	PDRAN0L0W0		
Plant	*Ranunculus harveyi*	Harvey's Buttercup	G4	S1		S	4	PDRAN0L130	Y	
Plant	*Rhachithecium perpusillum*	Budding Tortula Moss	G4G5	SH		S	4	NBMUS8C010		
Plant	*Rhamnus alnifolia*	Alderleaf Buckthorn	G5	S1		E	4	PDRHA0C010		
Plant	*Rhizomnium magnifolium*	Largeleaf Leafy Moss	G5	S1S2			4	NBMUS9Q080	Y	
Plant	*Rhynchosia latifolia*	Prairie Rhynchosia	G5	S1		T	4	PDFAB3F070		
Plant	*Rhynchospora caduca*	Falling Beakrush	G5	S1		S	4	PMCYP0N050		
Plant	*Rhynchospora capillacea*	Horned Beakrush	G4G5	S1		E	4	PMCYP0N070		

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Plant	*Rhynchospora chalarocephala*	Loose-head Beakrush	G5	S1		T	4	PMCYP0N0B0		
Plant	*Rhynchospora debilis*	Savannah Beakrush	G4?	S1		E	4	PMCYP0N0M0		
Plant	*Rhynchospora harveyi*	Harvey's Beakrush	G4	S1		T	4	PMCYP0N110	Y	Y
Plant	*Rhynchospora inexpansa*	Nodding Beakrush	G5	S1		S	4	PMCYP0N140	Y	
Plant	*Rhynchospora macrostachya*	Tall Beakrush	G4	S1S2		S	4	PMCYP0N1D0	Y	
Plant	*Rhynchospora perplexa*	Pineland Beakrush	G5	S2		T	4	PMCYP0N1Q0		
Plant	*Rhynchospora rariflora*	Few-flowered Beakrush	G5	S1		E	4	PMCYP0N1Z0		
Plant	*Rhynchospora thornei*	Thorne's Beakrush	G3	S1S2			4	PMCYP0N2B0	Y	
Plant	*Ribes aureum var. villosum*	Buffalo Currant	G5T4T5	S1		T	4	PDGRO02033		
Plant	*Ribes curvatum*	Granite Gooseberry	G4	S1		T	4	PDGRO020C0		Y
Plant	*Ribes missouriense*	Missouri Gooseberry	G5	S2		S	4	PDGRO02120		
Plant	*Riccardia jugata*	a liverwort	G2	S2		S	4	NBHEP2Y060	Y	
Plant	*Rorippa aquatica*	Lake-cress	G4?	S2		S	4	PDBRA07010		Y
Plant	*Rudbeckia subtomentosa*	Sweet Coneflower	G5	S2		T	4	PDAST850G0		
Plant	*Rudbeckia triloba var. pinnatiloba*	Pinnate-lobe Black-eyed-Susan	G5T3	S1		E	4	PDAST850H1		Y
Plant	*Ruellia purshiana*	Pursh's Wild Petunia	G3	S1S2			4	PDACA0J0H0		Y
Plant	*Rugelia nudicaulis*	Rugel's Ragwort	G3	S2		E	4	PDASTDV010		Y
Plant	*Sabatia capitata*	Appalachian Rose-gentian	G2	S2		E	4	PDGEN0F090		Y
Plant	*Sacciolepis striata*	Gibbous Panicgrass	G5	S1		S	4	PMPOA59020		
Plant	*Sagittaria brevirostra*	Shortbeak Arrowhead	G5	S1		T	4	PMALI04030		
Plant	*Sagittaria graminea*	Grassleaf Arrowhead	G5	S1		T	4	PMALI040A2		
Plant	*Sagittaria platyphylla*	Ovate-leaf Arrowhead	G5	S2S3		S	4	PMALI040M0		
Plant	*Sagittaria rigida*	Sessile-fruit Arrowhead	G5	S1		E	4	PMALI040N0		
Plant	*Salvia azurea var. grandiflora*	Blue Sage	G4G5T4?	S3		S	4	PDLAM1S052		
Plant	*Sanguisorba canadensis*	Canada Burnet	G5	S1		E	4	PDROS1L020		
Plant	*Sarracenia oreophila*	Green Pitcherplant	G2	SNR	LE		3	PDSAR02050		
Plant	*Schisandra glabra*	Bay Starvine	G3	S2		T	4	PDSCH01020		Y
Plant	*Schlotheimia rugifolia*	Rugged-leaf Schlotheimia Moss	G3G5	S1			4	NBMUS6Q020	Y	
Plant	*Schoenolirion croceum*	Yellow Sunnybell	G4	S3		T	4	PMLIL1S020		
Plant	*Schoenoplectus subterminalis*	Water Bulrush	G5	S1		E	4	PMCYP0Q1G0		
Plant	*Schwalbea americana*	American Chaffseed	G2	SX	LE	W-H	3	PDSCR1Q010		Y
Plant	*Sciuro-hypnum curtum*	Short Ragged Moss	G5	S1			4	NBMUS0Z0Z0	Y	
Plant	*Scleria muehlenbergii*	Muehlenberg's Nutrush	G5	S2		T	4	PMCYP0R0U0	Y	
Plant	*Scleria verticillata*	Low Nutrush	G5	S2		S	4	PMCYP0R0S0		
Plant	*Scopelophila cataractae*	Agoyan Cataract Moss	G3	S1		S	4	NBMUS6U010		
Plant	*Scrophularia lanceolata*	Hare Figwort	G5	SH		S	4	PDSCR1S050	Y	
Plant	*Scutellaria arguta*	Hairy Skullcap	G1?Q	S1		E	4	PDLAM1U070		
Plant	*Scutellaria montana*	Large-flower Skullcap	G4	S4	LT	T	3	PDLAM1U0U0		
Plant	*Scutellaria saxatilis*	Rock Skullcap	G3G4	S3		WL	4	PDLAM1U150		Y
Plant	*Sedum nevii*	Nevius' Stonecrop	G3	S1		E	4	PDCRA0A0Q0		Y
Plant	*Seligeria recurvata*	Recurved Bristle Moss	G4?	S1			4	NBMUS6X060	Y	
Plant	*Sibbaldiopsis tridentata*	Three-toothed Cinquefoil	G5	S1S2		T	4	PDROS20010		
Plant	*Silene caroliniana ssp. pensylvanica*	Carolina Pink	G5T4	S1S2		T	4	PDCAR0U0B2		
Plant	*Silene ovata*	Ovate Catchfly	G3	S2		E	4	PDCAR0U180		Y
Plant	*Silphium brachiatum*	Cumberland Rosinweed	G3	S3		E	4	PDAST8L040		Y
Plant	*Silphium laciniatum*	Compass Plant	G5	S2		T	4	PDAST8L080		
Plant	*Silphium pinnatifidum*	Tansy Rosinweed	G3Q	S2		T	4	PDAST8L0B0		Y
Plant	*Silphium wasiotense*	Appalachian Rosinweed	G3	S2		W	4	PDAST8L0K0		Y

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Plant	*Smilax laurifolia*	Laurel-leaf Greenbrier	G5	S1		S	4	PMSMI010F0		
Plant	*Solenostoma appalachianum*	a liverwort	GNR	S1		S	4	NBHEP3L010		
Plant	*Solenostoma fossombronioides*	a liverwort	G4	S1		S	4	NBHEP1P070		
Plant	*Solenostoma obscurum*	a flapwort	G2G4	S2			4	NBHEP1P050	Y	
Plant	*Solidago arenicola*	Southern Racemose Goldenrod	G3	S1S2			4	PDAST8P3S0		Y
Plant	*Solidago austrina*	Southern Bog Goldenrod	GNR	S1		S	4	PDAST8P410		
Plant	*Solidago faucibus*	Gorge Goldenrod	G3G4	S2		T	4	PDAST8P3N0		Y
Plant	*Solidago gattingeri*	Gattinger's Goldenrod	G3?Q	S1		E	4	PDAST8P0P0		Y
Plant	*Solidago lancifolia*	Broadleaf Goldenrod	G2	S1		E	4	PDAST8P2E0		Y
Plant	*Solidago porteri*	Porter's Goldenrod	G1	S1		E	4	PDAST8P1E0	Y	
Plant	*Solidago rupestris*	Rock Goldenrod	G4?	S1		E	4	PDAST8P1Q0		
Plant	*Solidago spithamaea*	Blue Ridge Goldenrod	G2	S1	LT	E	3	PDAST8P200		Y
Plant	*Solidago tarda*	Late Goldenrod	G4?Q	S1		S	4	PDAST8P2J0		
Plant	*Sparganium androcladum*	Branching Bur-reed	G4G5	S1		E	4	PMSPA01020		
Plant	*Sphenolobopsis pearsonii*	Horsehair Threadwort	G4	S1		E	4	NBHEP36010		
Plant	*Sphenolobus saxicola*	Curled Notchwort	G3G4	S1		S	4	NBHEP04060		
Plant	*Spiraea alba*	Narrowleaf Meadowsweet	G5	S1		E	4	PDROS1Q0T0		
Plant	*Spiraea virginiana*	Virginia Spiraea	G2?	S2	LT	E	3	PDROS1Q0E0		Y
Plant	*Spiranthes lucida*	Shining Ladies'-tresses	G4	S1S2		T	4	PMORC2B0J0		Y
Plant	*Spiranthes magnicamporum*	Great Plains Ladies'-tresses	G3G4	S1		E	4	PMORC2B0K0		Y
Plant	*Spiranthes ochroleuca*	Yellow Nodding Ladies'-tresses	G5	S1		E	4	PMORC2B0M0		
Plant	*Spiranthes odorata*	Sweetscent Ladies'-tresses	G5	S1		E	4	PMORC2B0N0		
Plant	*Sporobolus heterolepis*	Northern Dropseed	G5	S1		T	4	PMPOA5V0E0		
Plant	*Sporobolus junceus*	Sandhill Dropseed	G5	S1		E	4	PMPOA5V0H0		
Plant	*Stachys appalachiana*	Appalachian Hedge-nettle	G1G2	S1		E	4	PDLAM1X1K0	Y	Y
Plant	*Stachys clingmanii*	Clingman's Hedge-nettle	G2	S1S2		T	4	PDLAM1X0A0		Y
Plant	*Stachys glandulosissima*	Hiwassee Hedge Nettle	G1	S1		S	4	PDLAM1X1Q0	Y	Y
Plant	*Stellaria alsine*	Trailing Stitchwort	G5	S1		E	4	PDCAR0X020		
Plant	*Stellaria fontinalis*	Water Stitchwort	G3	S3		S	4	PDCAR0X180		Y
Plant	*Stellaria longifolia*	Longleaf Stitchwort	G5	S1		S	4	PDCAR0X0M0		
Plant	*Stenanthium diffusum*	Rockhouse Featherbells	G1	S1		E	4	PMLIL1W030	Y	Y
Plant	*Stenanthium tennesseense*	Tennessee Death-Camas	G2	S2		T	4	PMLIL1W040		Y
Plant	*Streptopus amplexifolius*	Clasping Twisted-stalk	G5	S1		T	4	PMLIL1X010		
Plant	*Streptopus lanceolatus*	Rosy Twisted-stalk	G5	S2		S	4	PMLIL1X020		
Plant	*Stylisma humistrata*	Southern Morning-glory	G4G5	S1		T	4	PDCON0H030		
Plant	*Sullivantia sullivantii*	Sullivantia	G4	S1		E	4	PDSAX0X050		
Plant	*Symblepharis raui*	Rau's Spur Moss	G3	S2		T	4	NBMUS52010	Y	
Plant	*Symphyotrichum ericoides var. ericoides*	White Heath Aster	G5T5	S1		E	4	PDASTE80L7		
Plant	*Symphyotrichum estesii*	May Prairie Aster	G1	S1		S	4	PDASTE9000	Y	Y
Plant	*Symphyotrichum oolentangiense*	Sky Blue Aster	G5	S1			4	PDASTE8800		
Plant	*Symphyotrichum praealtum*	Willow Aster	G5	S1		S	4	PDASTE8200		
Plant	*Symphyotrichum pratense*	Barrens Silky Aster	G4?	S1		E	4	PDASTE8180		Y
Plant	*Symplocarpus foetidus*	Skunk-cabbage	G5	S1		E	4	PMARA0J010		
Plant	*Symplocos tinctoria*	Horsesugar	G5	S2		S	4	PDSYM01040		
Plant	*Syntrichia ammonsiana*	Ammons' Screw Moss	G4	S1		E	4	NBMUS7L010		
Plant	*Syntrichia amphidiacea*	a screw moss	G3G5	S1		E	4	NBMUS7L0V0	Y	
Plant	*Syntrichia fragilis*	Fragmented Screw Moss	G5	S1		E	4	NBMUS7L0B0		
Plant	*Taxus canadensis*	Canadian Yew	G5	S1		E	4	PGTXA01020		

Taxa Group	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status	SWAP Tier	NatureServe Element Code	New in 2025	RSGCN
Plant	*Tetrodontium brownianum var. brownianum*	Brown's Four-toothed Moss	GNRT3T4	S1		S	4	NBMUS7A010		
Plant	*Thalictrum coriaceum*	Leatherleaf Meadowrue	G4	S1			4	PDRAN0M050		
Plant	*Thalictrum mirabile*	Little Mountain Meadowrue	G4?Q	S2S3			4	PDRAN0M0D0	Y	
Plant	*Thaspium pinnatifidum*	Cutleaf Meadow-parsnip	G2G3	S1		E	4	PDAPI28020		Y
Plant	*Thermopsis fraxinifolia*	Ashleaf Bush-pea	G3?	S3		T	4	PDFAB3Z061		Y
Plant	*Thermopsis mollis*	Allegheny Mountain Golden-banner	G3G4	S2S3		S	4	PDFAB3Z062		Y
Plant	*Torreyochloa pallida*	Pale Manna Grass	G5	S1		S	4	PMPOA61030		
Plant	*Trautvetteria fonticalcarea*	Leatherleaf Tassel-rue	G2?	S1		T	4	PDRAN0N020	Y	Y
Plant	*Triadenum fraseri*	Fraser's Marsh-St. John's-wort	G5	S1?		S	4	PDCLU06010		
Plant	*Triantha glutinosa*	Sticky Bog-asphodel	G5	S1		E	4	PMLIL1Y035		
Plant	*Triantha racemosa*	Coastal False Asphodel	G5	S1		E	4	PMLIL1Y050		
Plant	*Trichophorum cespitosum*	Tufted Clubrush	G5	S1		E	4	PMCYP0Q060		
Plant	*Tridens flavus var. chapmanii*	Chapman's Redtop	G5T3	S1		E	4	PMPOA65071		Y
Plant	*Trientalis borealis*	Northern Starflower	G5	S1		T	4	PDPRI0A013		
Plant	*Trifolium calcaricum*	Running Glade Clover	G1	S1		E	4	PDFAB402L0		Y
Plant	*Trifolium reflexum*	Buffalo Clover	G3G4	S1		E	4	PDFAB40210		Y
Plant	*Trillium decumbens*	Trailing Trillium	G4	S1		E	4	PMLIL20080		
Plant	*Trillium lancifolium*	Lanceleaf Wakerobin	G3	S1		E	4	PMLIL200G0		Y
Plant	*Trillium pusillum*	Least Trillium	G4	S2		E	4	PMLIL200Q0		Y
Plant	*Trillium rugelii*	Southern Nodding Trillium	G4	S2		E	4	PMLIL20130		
Plant	*Trillium tennesseense*	Tennessee Trillium	G1	S1		E	4	PMLIL20180	Y	Y
Plant	*Tsuga caroliniana*	Carolina Hemlock	G3	S3	UR	T	4	PGPIN06020		Y
Plant	*Turritis glabra*	Tower-mustard	G5	S1		S	4	PDBRA060P0		
Plant	*Ulmus crassifolia*	Cedar Elm	G5	S2		S	4	PDULM04030		
Plant	*Utricularia cornuta*	Horned Bladderwort	G5	S1		E	4	PDLNT02030		
Plant	*Utricularia inflata*	Swollen Bladderwort	G5	S1			4	PDLNT02090		
Plant	*Utricularia resupinata*	Northeastern Bladderwort	G4	S1			4	PDLNT020K0		Y
Plant	*Utricularia subulata*	Zigzag Bladderwort	G5	S1		T	4	PDLNT020M0		
Plant	*Vaccinium elliottii*	Elliott's Blueberry	G5	S1		E	4	PDERI18160		
Plant	*Vaccinium macrocarpon*	Large Cranberry	G5	S2		T	4	PDERI180J0		
Plant	*Vandenboschia boschiana*	Appalachian Filmy Fern	G4	S1S2		T	4	PPHYM02040		Y
Plant	*Veronica americana*	American Speedwell	G5	S1		S	4	PDSCR20030		
Plant	*Veronica catenata*	Sessile Water-speedwell	G5	S1		E	4	PDSCR20090		
Plant	*Veronica scutellata*	Marsh Speedwell	G5	S1		E	4	PDSCR200U0		
Plant	*Viburnum bracteatum*	Limerock Arrow-wood	G3	S2		S	4	PDCPR07170		Y
Plant	*Viburnum molle*	Softleaf Arrow-wood	G3	S2		E	4	PDCPR070C0		
Plant	*Viburnum rafinesquianum*	Downy Arrow-wood	G5	S1		S	4	PDCPR070K0	Y	
Plant	*Viola tripartita*	Three-parted Violet	G5	S2S3		WP	4	PDVIO042D0		Y
Plant	*Vitis rupestris*	Rock Grape	G3	S1		E	4	PDVIT040J0		Y
Plant	*Woodsia appalachiana*	Appalachian Woodsia	G4	S1S2		S	4	PPDRY0U020		
Plant	*Xerophyllum asphodeloides*	Eastern Turkeybeard	G4	S3		T	4	PMLIL26010		Y
Plant	*Xyris ambigua*	Coastal Plain Yellow-eyed-grass	G5	S1		E	4	PMXYR01010		
Plant	*Xyris fimbriata*	Fringed Yellow-eyed-grass	G5	S1		E	4	PMXYR01090		
Plant	*Xyris laxifolia var. iridifolia*	Laxleaf Yellow-eyed-grass	G4G5T4T5	S2		T	4	PMXYR010D2		
Plant	*Xyris tennesseensis*	Tennessee Yellow-eyed-grass	G2	S1	LE	E	3	PMXYR010M0		Y
Plant	*Zanthoxylum americanum*	Northern Prickly-ash	G5	S2		S	4	PDRUT0L010		
Plant	*Zigadenus elegans*	White Camas	G5	S1		E	4	PMLIL28032		

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Reptile	*Apalone mutica*	Smooth Softshell Turtle	G5	S4		D	1	ARAAG01020		Y
Reptile	*Clonophis kirtlandii*	Kirtland's Snake	G2	S?		E	1	ARADB06010		
Reptile	*Coluber flagellum*	Common Coachwhip	G5	S2S3?		E	1	ARADB21020		
Reptile	*Crotalus horridus*	Timber Rattlesnake	G4	S4		D	1	ARADE02040		Y
Reptile	*Farancia abacura*	Red-bellied Mudsnake	G5	S5		D	1	ARADB14010	Y	Y
Reptile	*Glyptemys muhlenbergii*	Bog Turtle	G2G3	S1	SAT	T	1	ARAAD02040		Y
Reptile	*Haldea striatula*	Rough Earthsnake	G5	S2S3?		T	1	ARADB39010		
Reptile	*Heterodon platirhinos*	Eastern Hog-nosed Snake	G5	S4		D	1	ARADB17020		
Reptile	*Macrochelys temminckii*	Alligator Snapping Turtle	G3	S2S3	PT	T	3	ARAAB02010		Y
Reptile	*Nerodia cyclopion*	Mississippi Green Watersnake	G5	S2		T	1	ARADB22010		
Reptile	*Ophisaurus attenuatus longicaudus*	Eastern Slender Glass Lizard	G5T5	S3		T	1	ARACB02012		Y
Reptile	*Pituophis melanoleucus*	Eastern Pinesnake	G4T4	S3		T	1	ARADB26010		Y
Reptile	*Plestiodon anthracinus*	Coal Skink	G5	S1		T	1	ARACH01010		Y
Reptile	*Sistrurus miliarius streckeri*	Western Pygmy Rattlesnake	G5T5	S2S3		T	1	ARADE03023		Y
Reptile	*Terrapene carolina*	Eastern Box Turtle	G5	S4			1	ARAAD08010		Y
Reptile	*Thamnophis proximus*	Western Ribbonsnake	G5	S4S5			1	ARADB36090		
Tardigrade	*Calohypsibius schusteri*	Schuster's Tardigrade	GNR	S1			2	IRPRT02010		
Tardigrade	*Hypsibius roanensis*	a tardigrade	GNR	S1			2	IRPRT03010		
Worm	*Cambarincola alienus*	a cave obligate worm	G1G2	S1			2	IAOLI07020		
Worm	*Cambarincola leptadenus*	a cave obligate worm	G1G2	S1			2	IAOLI07050		
Worm	*Cambarincola marthae*	a cave obligate worm	G1G2	S1			2	IAOLI07060		
Worm	*Eremidrilus allegheniensis*	a cave obligate worm	G1G2	S1S2			2	IAOLI03020		

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Amphibian	Barking Treefrog	*Dryophytes gratiosus*	G5	S3			1	AAABC02100		Y
Amphibian	Berry Cave Salamander	*Gyrinophilus gulolineatus*	G1Q	S1		E	1	AAAAD06040		Y
Amphibian	Big Mouth Cave Salamander	*Gyrinophilus palleucus necturoides*	G2G3T1	S1		D	1	AAAAD06012		Y
Amphibian	Black Mountain Salamander	*Desmognathus welteri*	G4	S3			1	AAAAD03090		Y
Amphibian	Blue Ridge Dusky Salamander	*Desmognathus orestes*	G4	S3			1	AAAAD03150	Y	
Amphibian	Brown-backed Salamander	*Eurycea aquatica*	G3	SNR			1	AAAAD05320		Y
Amphibian	Crawfish Frog	*Lithobates areolatus*	G4	S3		D	1	AAABH01010		Y
Amphibian	Cumberland Dusky Salamander	*Desmognathus abditus*	G2G3	S2S3	UR	D	1	AAAAD03190		Y
Amphibian	Cumberland Plateau Salamander	*Plethodon kentucki*	G4	S1S2		D	1	AAAAD12260	Y	Y
Amphibian	Four-toed Salamander	*Hemidactylium scutatum*	G5	S3		D	1	AAAAD08010		
Amphibian	Gopher Frog	*Lithobates capito*	G2G3	S1	UR		1	AAABH01270		Y
Amphibian	Gray Treefrog	*Dryophytes versicolor*	G5	S5			1	AAABC02130		
Amphibian	Green Salamander	*Aneides aeneus*	G3G4	S3S4			1	AAAAD01090		Y
Amphibian	Hellbender	*Cryptobranchus alleganiensis*	G3	S3		E	1	AAAAC01010		Y
Amphibian	Imitator Salamander	*Desmognathus imitator*	G3G4	S3			1	AAAAD03050		Y
Amphibian	Junaluska Salamander	*Eurycea junaluska*	G2G3	S2		D	1	AAAAD05020		Y
Amphibian	Mountain Chorus Frog	*Pseudacris brachyphona*	G5	S4			1	AAABC05200		
Amphibian	Mud Salamander	*Pseudotriton montanus*	G5	S5			1	AAAAD13010		Y
Amphibian	Mudpuppy	*Necturus maculosus*	G5	S5			1	AAAAE01042		
Amphibian	Northern Gray-cheeked Salamander	*Plethodon montanus*	G4	S3			1	AAAAD12430		
Amphibian	Northern Pygmy Salamander	*Desmognathus organi*	G3	S1		D	1	AAAAD03200		Y
Amphibian	Pale Salamander	*Gyrinophilus palleucus palleucus*	G2G3T2	S1		D	1	AAAAD06013		Y
Amphibian	Pygmy Salamander	*Desmognathus wrighti*	G3	S2S3			1	AAAAD03100		Y
Amphibian	Red-cheeked Salamander	*Plethodon jordani*	G4	S2S3			1	AAAAD12090		Y
Amphibian	Red-legged Salamander	*Plethodon shermani*	G3	S2			1	AAAAD12470		Y
Amphibian	Seepage Salamander	*Desmognathus aeneus*	G4	S2	UR		1	AAAAD03010		Y
Amphibian	Small-Mouthed Salamander	*Ambystoma texanum*	G5	S5			1	AAAAA01130		
Amphibian	Southern Cricket Frog	*Acris gryllus*	G5	S2S3			1	AAABC01020		
Amphibian	Southern Ravine Salamander	*Plethodon richmondi*	G5	S3			1	AAAAD12150		Y
Amphibian	Streamside Salamander	*Ambystoma barbouri*	G4	S3	UR	E	1	AAAAA01170		Y
Amphibian	Tellico Salamander	*Plethodon aureolus*	G2G3	S2			1	AAAAD12250		Y
Amphibian	Tennessee Cave Salamander	*Gyrinophilus palleucus*	G2G3	S2		D	1	AAAAD06010		Y
Amphibian	Weller's Salamander	*Plethodon welleri*	G3	S2		D	1	AAAAD12230		Y
Amphibian	Western Siren	*Siren nettingi*	G5	S5			1	AAAAG02012		
Amphibian	Yellow-spotted Woodland Salamander	*Plethodon pauleyi*	GNR	SNR		E	1	AAAAD12590	Y	
Amphibian	Yonahlossee Salamander	*Plethodon yonahlossee*	G4	S2			1	AAAAD12240		Y
Arachnid	a cave cobweb spider	*Nesticus paynei*	G3G4	S3			2	ILARA36100		
Arachnid	a cave cobweb spider	*Nesticus stygius*	G1G2	S1S2			2	ILARA36260		
Arachnid	a cave leptonetid spider	*Appaleptoneta sp.*	G1	S?			2	ILARASWG01		
Arachnid	a cave leptonetid spider	*Appaleptoneta sp. 1*	G1	S1			2	ILARAU3010		
Arachnid	a cave mite	*Poecilophysis weyerensis*	G3?	S2S3			2	ILACA02020		
Arachnid	a cave obligate harvestman	*Phalangodes appalachius*	G3G4	S3			2	ILARAB2010		
Arachnid	a cave obligate harvestman	*Theromaster sp. 1*	G1	S1			2	ILARAU4010		
Arachnid	a cave obligate pseudoscorpion	*Apochthonius minor*	G1	S1			2	ILARA29150		
Arachnid	a cave obligate pseudoscorpion	*Chitrella archeri*	G1G2	S1S2			2	ILARA31050		
Arachnid	a cave obligate pseudoscorpion	*Kleptochthonius affinis*	G1G2	S1S2			2	ILARA30130		
Arachnid	a cave obligate pseudoscorpion	*Kleptochthonius barri*	G1G2	S1S2			2	ILARA30150		
Arachnid	a cave obligate pseudoscorpion	*Kleptochthonius charon*	G1G2	S1S2			2	ILARA30170		

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Arachnid	a cave obligate pseudoscorpion	*Kleptochthonius daemonius*	G1G2	S1S2			2	ILARA30180		
Arachnid	a cave obligate pseudoscorpion	*Kleptochthonius infernalis*	G1	S1			2	ILARA30220		
Arachnid	a cave obligate pseudoscorpion	*Kleptochthonius magnus*	G1	S1			2	ILARA30240		
Arachnid	a cave obligate pseudoscorpion	*Kleptochthonius myopius*	G1	S1			2	ILARA30260		
Arachnid	a cave obligate pseudoscorpion	*Kleptochthonius pluto*	G1	S1			2	ILARA30280		
Arachnid	a cave obligate pseudoscorpion	*Kleptochthonius rex*	G1	S1			2	ILARA30290		
Arachnid	a cave obligate pseudoscorpion	*Kleptochthonius sp.*	G1	S1			2	ILARASWG03		
Arachnid	a cave obligate pseudoscorpion	*Kleptochthonius stygius*	G1	S1			2	ILARA30300		
Arachnid	a cave obligate pseudoscorpion	*Kleptochthonius tantalus*	G1	S1			2	ILARA30310		
Arachnid	a cave obligate pseudoscorpion	*Microcreagris nickajackensis*	G1G2	S1			2	ILARA20060		
Arachnid	a cave obligate pseudoscorpion	*Tyrannochthonius fiskei*	G1	S1			2	ILARAD2130		
Arachnid	a cave obligate pseudoscorpion	*Tyrannochthonius halopotamus*	G1	S1			2	ILARAD2150		
Arachnid	a cave obligate pseudoscorpion	*Tyrannochthonius steevesi*	G1	S1			2	ILARAD2290		
Arachnid	a cave obligate spider	*Liocranoides unicolor*	GU	SNR			2	ILARAA0010		
Arachnid	a cave obligate spider	*Nesticus barri*	G3	S3			2	ILARA36220		
Arachnid	a cave obligate spider	*Nesticus barrowsi*	G1G2	S1S2			2	ILARA36230		
Arachnid	a cave pseudoscorpion	*Kleptochthonius undescribed sp.*	G1	S?			2			
Arachnid	a cave two-clawed spider	*Liocranoides sp.*	G1G2	S?			2	ILARASWG04		
Arachnid	a cobweb weaver	*Cryptachaea porteri*	GNR	S?			2	ILARA61020		
Arachnid	a foldingdoor trap-door spider	*Antrodiaetus sp.*	G?	S?			2			
Arachnid	a funnel-web spider	*Cicurina breviaria*	G4	S?			2			
Arachnid	a funnel-web spider	*Coras taugynus*	G3G4	S?			2			
Arachnid	a hackledmesh weaver	*Cybaeopsis pantopla*	G3	S2			2	ILARAU5010		
Arachnid	a harvestman	*Bishopella sp. Probably laciniosa*	G?	S?			2			
Arachnid	a harvestman	*Tolus sp.*	G?	S?			2			
Arachnid	a harvestmen	*Erebomaster sp.*	G?	S?			2			
Arachnid	a harvestmen	*Hesperonemastoma sp.*	G?	S?			2			
Arachnid	a harvestmen	*Nemasatosoma sp.*	G?	S?			2			
Arachnid	a mite	*Macrocheles sp. 1*	G?	S?			2			
Arachnid	a mite	*Macrocheles sp. 2*	G?	S?			2			
Arachnid	a mite	*Macrocheles sp. 3*	G?	S?			2			
Arachnid	a mite	*Rhagidia species s. latu*	G?	S?			2			
Arachnid	a pseudoscorpion	*Apochthonius sp.*	G1	S?			2			
Arachnid	a pseudoscorpion	*Kleptochthonius sp.*	G?	S?			2			
Arachnid	a spider	*Liocranoides gertschi*	GNR	S?			2	ILARAA0040		
Arachnid	Appalachian Cave Spider	*Porrhomma cavernicola*	G5	S1?			2	ILARA21010		
Arachnid	Archer's Two-clawed Spider	*Liocranoides archeri*	G2	S2			2	ILARAA0030		
Arachnid	Big-eyed Meshweaver	*Cicurina placida*	GNR	S?			2	ILARA73530		
Arachnid	Cave Funnel-web Spider	*Calymmaria persica*	GNR	S?			2	ILARA53070		
Arachnid	cave harvestmen	*Phalangodes sp.*	G2	S?			2			
Arachnid	cave sheet-web spiders	*Oreonetides sp.*	G1	S?			2			
Arachnid	Coyle's tengellid spider	*Liocranoides coylei*	G3	S?			2			
Arachnid	Crystal Caverns Cave Spider	*Nesticus furtivus*	G1	S1			2	ILARA36040		
Arachnid	Eastern Cave Long-jawed Spider	*Meta ovalis*	G5	S?			2	ILARA17040		
Arachnid	Grassy Creek Cave Spider	*Nesticus dilutus*	G1	S1			2	ILARA36030		
Arachnid	Mammoth Cave Spider	*Anthrobia mammouthia*	G5	S1			2	ILARA26010		
Arachnid	Minute Cave Spider	*Maymena ambita*	GNR	S3			2	ILARA60010		
Arachnid	Monteagle Cave Spider	*Nesticus pecki*	GNR	S1			2	ILARA36270		

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Taxa Group	Common Name	Scientific Name	Global Rank	State Rank	Federal Status	State Status	SWAP Tier	NatureServe Element Code	New in 2025	RSGCN
Arachnid	Notch-tipped Shield Sheetweaver	*Bathyphantes alboventris*	GNR	SNR			2	ILARA46020		
Arachnid	Pale Nest Spider	*Eidmannella pallida*	GNR	S?			2	ILARA97010		
Arachnid	Pale Sheetweb Weaver	*Bathyphantes pallidus*	G5	SNR			2	ILARA46030		
Arachnid	Round Cove cave pseudoscorpion	*Kleptochthonius sp.*	G1	S?			2			
Arachnid	Sells cave pseudoscorpion	*Kleptochthonius sp.*	G1	S?			2			
Arachnid	Southeastern Cave Pseudoscorpion	*Hesperochernes mirabilis*	G5	S3			2	ILARA48030		
Arachnid	Spruce-fir Moss Spider	*Microhexura montivaga*	G2	S1	LE		3	ILARA33010		
Arachnid	Subterranean Sheetweb Spider	*Phanetta subterranea*	G5	S4			2	ILARA28010		
Arachnid	Tennessee Cave Spider	*Nesticus tennesseensis*	G3G4	S2S4			2	ILARA36010		
Arachnid	Tennessee Two-clawed Spider	*Liocranoides tennesseensis*	G1	S1			2	ILARAA0020		
Arachnid	Trussell Cave Sheet-web Spider	*Agyneta sp.*	G1	S?			2			
Arachnid	Two-clawed spider	*Liocranoides sp.*	G2	S?			2			
Arachnid	Valentine's Cave Spider	*Nesticus valentinei*	G1	S1S2	MC		2	ILARA36060		
Bat	Eastern Small-footed Bat	*Myotis leibii*	G4	S2S3		D	1	AMACC01130		Y
Bat	Gray Bat	*Myotis grisescens*	G3G4	S2	LE	E	3	AMACC01040		Y
Bat	Indiana Bat	*Myotis sodalis*	G2	S1	LE	E	3	AMACC01100		Y
Bat	Little Brown Myotis	*Myotis lucifugus*	G3G4	S3	UR	T	1	AMACC01010		Y
Bat	Northern Hoary Bat	*Lasiurus cinereus*	G3G4	S5			1	AMACC05032	Y	Y
Bat	Northern Long-eared Bat	*Myotis septentrionalis*	G2G3	S1S2	LT	T	3	AMACC01150		Y
Bat	Rafinesque's Big-eared Bat	*Corynorhinus rafinesquii*	G3G4	S3		D	1	AMACC08020		Y
Bat	Southeastern Bat	*Myotis austroriparius*	G4	S3			1	AMACC01030		Y
Bat	Tricolored Bat	*Perimyotis subflavus*	G3G4	S2S3	PE	T	1	AMACC03020		Y
Bat	Virginia Big-eared Bat	*Corynorhinus townsendii virginianus*	G4T3	S1	LE	E	3	AMACC08012		Y
Bird	American Barn Owl	*Tyto alba*	G5	S3			1	ABNSA01030		
Bird	American Bittern	*Botaurus lentiginosus*	G5	S1			1	ABNGA01020		
Bird	American Black Duck	*Anas rubripes*	G5	S3S4N			1	ABNJB10040		
Bird	American Golden-Plover	*Pluvialis dominica*	G5	S3N			1	ABNNB02030		
Bird	American Kestrel	*Falco sparverius*	G5	S5			1	ABNKD06020	Y	Y
Bird	American Woodcock	*Scolopax minor*	G5	S4B			1	ABNNF19020		Y
Bird	Bachman's Sparrow	*Peucaea aestivalis*	G3	S1B		E	1	ABPBX91050		Y
Bird	Baltimore Oriole	*Icterus galbula*	G5	S4			1	ABPBXB9190	Y	
Bird	Bank Swallow	*Riparia riparia*	G5	S3			1	ABPAU08010		
Bird	Bell's Vireo	*Vireo bellii*	G5	S1B	(PS)		1	ABPBW01110		Y
Bird	Belted Kingfisher	*Megaceryle alcyon*	G5	S5			1	ABNXD01020	Y	
Bird	Bewick's Wren	*Thryomanes bewickii*	G5	S1		D	1	ABPBG07010		
Bird	Black-bellied Plover	*Pluvialis squatarola*	G5	S4N			1	ABNNB02010	Y	
Bird	Blackburnian Warbler	*Setophaga fusca*	G5	S3B, S4N			1	ABPBX03120		
Bird	Black-capped Chickadee	*Poecile atricapillus*	G5	S2B			1	ABPAW01010		
Bird	Black-crowned Night Heron	*Nycticorax nycticorax*	G5	S2S3B		D	1	ABNGA11010		
Bird	Black-throated Blue Warbler	*Setophaga caerulescens*	G5	S4			1	ABPBX03050		
Bird	Blue-headed Vireo	*Vireo solitarius*	G5	S4			1	ABPBW01160	Y	
Bird	Bobolink	*Dolichonyx oryzivorus*	G5	SHB, S4N			1	ABPBXA9010	Y	
Bird	Brown Creeper	*Certhia americana*	G5	S2B, S4N			1	ABPBA01010		
Bird	Brown-headed Nuthatch	*Sitta pusilla*	G4	S2B		D	1	ABPAZ01040		Y
Bird	Buff-breasted Sandpiper	*Calidris subruficollis*	G4	S3N			1	ABNNF14010		
Bird	Canada Warbler	*Cardellina canadensis*	G5	S3B, S4N			1	ABPBX16030		
Bird	Cerulean Warbler	*Setophaga cerulea*	G4	S3B		D	1	ABPBX03240		Y
Bird	Chimney Swift	*Chaetura pelagica*	G4G5	S5		D	1	ABNUA03010		Y

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Bird	Chuck-will's-widow	*Antrostomus carolinensis*	G5	S3S4			1	ABNTA07010		Y
Bird	Common Nighthawk	*Chordeiles minor*	G5	S4			1	ABNTA02020		
Bird	Connecticut Warbler	*Oporornis agilis*	G4G5	S3N			1	ABPBX11020	Y	
Bird	Dunlin	*Calidris alpina*	G5	S3N			1	ABNNF11170	Y	
Bird	Eastern Black Rail	*Laterallus jamaicensis*	G3T1	S1	LT	T	3	ABNME03042	Y	Y
Bird	Eastern Meadowlark	*Sturnella magna*	G5	S5			1	ABPBXB2040		Y
Bird	Eastern Screech-Owl	*Megascops asio*	G5	S5			1	ABNSB01030	Y	
Bird	Eastern Whip-poor-will	*Antrostomus vociferus*	G5	S3S4		D	1	ABNTA07070		Y
Bird	Evening Grosbeak	*Coccothraustes vespertinus*	G5	S4N			1	ABPBY09020	Y	
Bird	Golden Eagle	*Aquila chrysaetos*	G5	S1			1	ABNKC22010		
Bird	Golden-winged Warbler	*Vermivora chrysoptera*	G4	S3B	UR	T	1	ABPBX01030		Y
Bird	Grasshopper Sparrow	*Ammodramus savannarum*	G5	S4	(PS)	D	1	ABPBXA0020		Y
Bird	Great Egret	*Ardea alba*	G5	S2B, S3N			1	ABNGA04040		
Bird	Henslow's Sparrow	*Centronyx henslowii*	G4	S1B		T	1	ABPBXA0030		Y
Bird	Hudsonian Godwit	*Limosa haemastica*	G4	S?			1	ABNNF08020		
Bird	Interior Least Tern	*Sternula antillarum athalassos*	G4T3Q	S2S3B	DL	T	1	ABNNM08102		Y
Bird	Kentucky Warbler	*Geothlypis formosa*	G5	S4			1	ABPBX11010		Y
Bird	King Rail	*Rallus elegans*	G4	S2		T	1	ABNME05070		Y
Bird	Least Bittern	*Botaurus exilis*	G4	S2B		D	1	ABNGA02010		Y
Bird	Least Flycatcher	*Empidonax minimus*	G5	S3			1	ABPAE33070		
Bird	LeConte's Sparrow	*Ammospiza leconteii*	G5	S1N			1	ABPBXA0040		Y
Bird	Lesser Yellowlegs	*Tringa flavipes*	G5	S5N			1	ABNNF01030	Y	
Bird	Little Blue Heron	*Egretta caerulea*	G5	S2B, S3N		D	1	ABNGA06040		Y
Bird	Loggerhead Shrike	*Lanius ludovicianus*	G4	S1B, S2N	(PS)	D	1	ABPBR01030		Y
Bird	Long-eared Owl	*Asio otus*	G5	S2N			1	ABNSB13010	Y	
Bird	Long-tailed Duck	*Clangula hyemalis*	G5	S3N			1	ABNJB16010	Y	
Bird	Louisiana Waterthrush	*Parkesia motacilla*	G5	S4			1	ABPBX10030		Y
Bird	Mississippi Kite	*Ictinia mississippiensis*	G5	S2S3			1	ABNKC09010		
Bird	Nelson's Sparrow	*Ammospiza nelsoni*	G5	S?			1	ABPBXA0070	Y	Y
Bird	Northern Bobwhite	*Colinus virginianus*	G4G5	S2S3	(PS)		1	ABNLC21020		Y
Bird	Northern Harrier	*Circus hudsonius*	G5	S4N			1	ABNKC11011		
Bird	Northern Pintail	*Anas acuta*	G5	S4N			1	ABNJB10110	Y	
Bird	Northern Saw-whet Owl	*Aegolius acadicus*	G5	S1			1	ABNSB15020		
Bird	Olive-sided Flycatcher	*Contopus cooperi*	G4	S1			1	ABPAE32010		
Bird	Orchard Oriole	*Icterus spurius*	G5	S4			1	ABPBXB9070		
Bird	Pectoral Sandpiper	*Calidris melanotos*	G5	S4N			1	ABNNF11130	Y	
Bird	Peregrine Falcon	*Falco peregrinus*	G4	S1B	DL		1	ABNKD06070		
Bird	Piping Plover (Atlantic subspecies)	*Charadrius melodus melodus*	G3T3	S2N	LT	T	1	ABNNB03071		Y
Bird	Prairie Warbler	*Setophaga discolor*	G5	S3S4			1	ABPBX03190		Y
Bird	Prothonotary Warbler	*Protonotaria citrea*	G5	S4			1	ABPBX07010		Y
Bird	Red-headed Woodpecker	*Melanerpes erythrocephalus*	G5	S4			1	ABNYF04040		
Bird	Rose-breasted Grosbeak	*Pheucticus ludovicianus*	G5	S4B, S5N			1	ABPBX61030	Y	
Bird	Ruddy Turnstone	*Arenaria interpres*	G5	S3N			1	ABNNF09010	Y	
Bird	Rufa Red Knot	*Calidris canutus*	G4T2	S2N	LT	T	3	ABNNF11021		Y
Bird	Ruffed Grouse	*Bonasa umbellus*	G5	S4			1	ABNLC11010		
Bird	Rusty Blackbird	*Euphagus carolinus*	G4	S4N			1	ABPBXB5010		Y
Bird	Semipalmated Sandpiper	*Calidris pusilla*	G5	S4N			1	ABNNF11040		
Bird	Sharp-shinned Hawk	*Accipiter striatus*	G5	S3B	(PS)		1	ABNKC12020		

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Bird	Short-billed Dowitcher	*Limnodromus griseus*	G3	S3N			1	ABNNF16010	Y	
Bird	Short-eared Owl	*Asio flammeus*	G5	S3N			1	ABNSB13040		
Bird	Snowy Egret	*Egretta thula*	G5	S2B, S3N			1	ABNGA06030	Y	Y
Bird	Stilt Sandpiper	*Calidris himantopus*	G5	S3N			1	ABNNF11190		
Bird	Swainson's Warbler	*Limnothlypis swainsonii*	G4	S3		D	1	ABPBX09010		Y
Bird	Veery	*Catharus fuscescens*	G5	S4B			1	ABPBJ18080	Y	
Bird	Vesper Sparrow	*Pooecetes gramineus*	G5	S1B, S4N			1	ABPBX95010	Y	
Bird	Western Sandpiper	*Calidris mauri*	G5	S4N			1	ABNNF11050		
Bird	White-rumped Sandpiper	*Calidris fuscicollis*	G5	S4N			1	ABNNF11110	Y	
Bird	Whooping Crane	*Grus americana*	G1	SX	LE, XN	E	1	ABNMK01030		Y
Bird	Willet	*Tringa semipalmata*	G5	S3N			1	ABNNF02010	Y	Y
Bird	Willow Flycatcher	*Empidonax traillii*	G5	S2S3	(PS)		1	ABPAE33040		
Bird	Winter Wren	*Troglodytes hiemalis*	G5	S3B, S4N			1	ABPBG09100		
Bird	Wood Thrush	*Hylocichla mustelina*	G4	S4			1	ABPBJ19010		Y
Bird	Worm-eating Warbler	*Helmitheros vermivorum*	G5	S4			1	ABPBX08010		Y
Bird	Yellow-bellied Sapsucker	*Sphyrapicus varius*	G5	S1B, S4N			1	ABNYF05010		
Bird	Yellow-billed Cuckoo	*Coccyzus americanus*	G5	S4S5	(PS)		1	ABNRB02020	Y	Y
Bird	Yellow-crowned Night Heron	*Nyctanassa violacea*	G5	S3			1	ABNGA13010	Y	Y
Bird	Yellow-throated Warbler	*Setophaga dominica*	G5	S4			1	ABPBX03130		Y
Bivalve	a mussel	*Venustaconcha sima*	G?	S?			1	IMBIVSWG01		
Bivalve	Alabama Clubshell	*Pleurobema troschelianum*	G1Q	S1			1	IMBIV35310		
Bivalve	Alabama Creekmussel	*Pseudodontoideus connasaugaensis*	G3	S1			1	IMBIV42010		Y
Bivalve	Alabama Lampmussel	*Lampsilis virescens*	G1	S1	LE, XN	E	3	IMBIV21260		Y
Bivalve	Alabama Moccasinshell	*Medionidus acutissimus*	G2	S1	LT	T	3	IMBIV28010		Y
Bivalve	Alabama Rainbow	*Cambarunio nebulosus*	G3	S2	UR		1	IMBIV47080		Y
Bivalve	Alabama Spike	*Elliptio arca*	G2G3	S2	UR		1	IMBIV14030		Y
Bivalve	Appalachian Elktoe	*Alasmidonta raveneliana*	G1	S1	LE	E	3	IMBIV02060		Y
Bivalve	Appalachian Rockshell	*Theliderma sparsa*	G1	S1	LE, XN	E	3	IMBIV39150		Y
Bivalve	Barrens Bankclimber	*Lasmigona sp. 1 cf. holstonia*	GNR	S1			1	IMBIV22070		
Bivalve	Birdwing Pearlymussel	*Lemiox rimosus*	G1	S1	LE, XN	E	3	IMBIV23010		Y
Bivalve	Black Sandshell	*Ligumia recta*	G4G5	S5			1	IMBIV26020		
Bivalve	Catspaw	*Epioblasma obliquata*	G1	S1	LE, XN	E	1	IMBIV16111		Y
Bivalve	Clubshell	*Pleurobema clava*	G1G2	SH	LE, XN	E	3	IMBIV35060		Y
Bivalve	Coosa Creekshell	*Leaunio umbrans*	G1	S2	UR		1	IMBIV47152		Y
Bivalve	Coosa Moccasinshell	*Medionidus parvulus*	G1?	S1	LE	E	3	IMBIV28040		Y
Bivalve	Cracking Pearlymussel	*Hemistena lata*	G1	S1	LE, XN	E	3	IMBIV20010		Y
Bivalve	Creeper	*Strophitus undulatus*	G5	S5			1	IMBIV42030		
Bivalve	Cumberland Bean	*Venustaconcha troostensis*	G1	S1	LE, XN	E	3	IMBIVA4040		
Bivalve	Cumberland Elktoe	*Alasmidonta atropurpurea*	G1	S1S2	LE	E	3	IMBIV02020		Y
Bivalve	Cumberland Moccasinshell	*Medionidus conradicus*	G3	S3	PE	E	1	IMBIV28020		Y
Bivalve	Cumberland Papershell	*Anodontoides denigratus*	G1	S1			1	IMBIV05030		Y
Bivalve	Cumberland Pigtoe	*Pleuronaia gibber*	G1	S1	LE	E	3	IMBIV35150		Y
Bivalve	Cumberland Rockshell	*Theliderma intermedia*	G1	S1	LE, XN	E	1	IMBIV39070		Y
Bivalve	Cumberlandian Combshell	*Epioblasma brevidens*	G1	S1	LE, XN	E	3	IMBIV16030		Y
Bivalve	Delicate Spike	*Elliptio arctata*	G2G3	S2	UR		1	IMBIV14040		Y
Bivalve	Dromedary Pearlymussel	*Dromus dromas*	G1	S1	LE, XN	E	3	IMBIV12010		Y
Bivalve	Duck River Dartersnapper	*Epioblasma ahlstedti*	G1	S1	LE	E	3	IMBIV16230	Y	Y
Bivalve	Elktoe	*Alasmidonta marginata*	G4	S4			1	IMBIV02040		

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Bivalve	Fanshell	*Cyprogenia stegaria*	G1	S1	LE, XN	E	3	IMBIV10020		Y
Bivalve	Fat Pocketbook	*Potamilus capax*	G3	SNR	LE	E	3	IMBIV37030	Y	Y
Bivalve	Fatmucket	*Lampsilis siliquoidea*	G5	S2			1	IMBIV21280		
Bivalve	Finelined Pocketbook	*Hamiota altilis*	G3	S1S2	LT	T	1	IMBIV21010		Y
Bivalve	Finerayed Pigtoe	*Fusconaia cuneolus*	G1	S1	LE, XN	E	3	IMBIV17050		Y
Bivalve	Fluted Kidneyshell	*Ptychobranchus subtentus*	G2?	S2	LE	E	3	IMBIV38050		Y
Bivalve	Georgia Pigtoe	*Pleurobema hanleyianum*	G1	S1	LE	E	3	IMBIV35160		
Bivalve	Green Floater	*Lasmigona subviridis*	G2G3	S2	PT	T	1	IMBIV22060		Y
Bivalve	Hickorynut	*Obovaria olivaria*	G4	S2			1	IMBIV31020		
Bivalve	Little Spectaclecase	*Leaunio lienosus*	G5	S4			1	IMBIV47070		
Bivalve	Littlewing Pearlymussel	*Pegias fabula*	G1	S1	LE	E	3	IMBIV32010		Y
Bivalve	Longsolid	*Fusconaia subrotunda*	G3	S3	LT	T	3	IMBIV17120		Y
Bivalve	Mountain Creekshell	*Leaunio vanuxemensis*	G4	S4			1	IMBIV47150		Y
Bivalve	Mucket	*Ortmanniana ligamentina*	G5	S4			1	IMBIV01020		
Bivalve	Ohio Pigtoe	*Pleurobema cordatum*	G3G4	S3			1	IMBIV35090		
Bivalve	Orangefoot Pimpleback	*Plethobasus cooperianus*	G1	S1	LE, XN	E	3	IMBIV34020		Y
Bivalve	Ovate Clubshell	*Pleurobema perovatum*	G1G2	SH	LE	E	3	IMBIV35230		
Bivalve	Oyster Mussel	*Epioblasma capsaeformis*	G1	S1	LE, XN	E	3	IMBIV16040		Y
Bivalve	Painted Clubshell	*Pleurobema chattanoogaense*	G1Q	S1?			1	IMBIV35050		
Bivalve	Painted Creekshell	*Cambarunio taeniatus*	G4	S3			1	IMBIV47130		Y
Bivalve	Pale Lilliput	*Toxolasma cylindrellum*	G1	S1	LE	E	3	IMBIV43020		Y
Bivalve	Pheasantshell	*Ortmanniana pectorosa*	G4	S4			1	IMBIV01030		Y
Bivalve	Pink Mucket	*Lampsilis abrupta*	G1G2	S2	LE	E	3	IMBIV21110		Y
Bivalve	Purple Lilliput	*Toxolasma lividum*	G3	S1S2			1	IMBIV43030		
Bivalve	Rabbitsfoot	*Theliderma cylindrica cylindrica*	G3T3	S3	LT	T	3	IMBIV39041		Y
Bivalve	Rainbow	*Cambarunio iris*	G4G5	S5			1	IMBIV4C010		
Bivalve	Rayed Bean	*Paetulunio fabalis*	G2	S1	LE	E	3	IMBIV47050		
Bivalve	Rayed Kidneyshell	*Ptychobranchus foremanianus*	G1	S1		E	1	IMBIV38060		Y
Bivalve	Ring Pink	*Obovaria retusa*	G1	S1	LE, XN	E	3	IMBIV31030		Y
Bivalve	Rough Fatmucket	*Lampsilis straminea*	G5	SNR			1	IMBIV21210		
Bivalve	Rough Pigtoe	*Pleurobema plenum*	G1	S1	LE, XN	E	3	IMBIV35240		Y
Bivalve	Round Hickorynut	*Obovaria subrotunda*	G3	S2S3	LT	T	3	IMBIV31050		Y
Bivalve	Salamander Mussel	*Simpsonaias ambiqua*	G1G2	S1	PE	E	1	IMBIV41010		
Bivalve	Scaleshell	*Potamilus leptodon*	G1G2	SX	LE	E	1	IMBIV24020		Y
Bivalve	Sheepnose	*Plethobasus cyphyus*	G2G3	S2S3	LE	E	3	IMBIV34030		Y
Bivalve	Shiny Pigtoe	*Fusconaia cor*	G1	S1	LE, XN	E	3	IMBIV17040		Y
Bivalve	Slabside Pearlymussel	*Pleuronaia dolabelloides*	G2	S2	LE	E	3	IMBIV25010		Y
Bivalve	Slippershell Mussel	*Alasmidonta viridis*	G4G5	S3			1	IMBIV02110		Y
Bivalve	Snuffbox	*Epioblasma triquetra*	G2G3	S3	LE	E	3	IMBIV16190		Y
Bivalve	Southern Acornshell	*Epioblasma othcaloogensis*	GX	SX	DL		1	IMBIV16120		
Bivalve	Southern Clubshell	*Pleurobema decisum*	G3	SH	LE	E	3	IMBIV35410		Y
Bivalve	Southern Hickorynut	*Obovaria arkansasensis*	G3G4	S1			1	IMBIV31070		Y
Bivalve	Southern Pigtoe	*Pleurobema georgianum*	G1?	S1	LE	E	3	IMBIV35140		Y
Bivalve	Southern Rainbow	*Villosa vibex*	G5	S2			1	IMBIV47170		
Bivalve	Spectaclecase	*Cumberlandia monodonta*	G2	S2S3	LE	E	3	IMBIV08010		Y
Bivalve	Tan Riffleshell	*Epioblasma walkeri*	G1	S1	LE	E	3	IMBIV16062		Y
Bivalve	Tapered Pondhorn	*Uniomerus declivis*	G5	S2			1	IMBIV46020		
Bivalve	Tennessee Bean	*Venustaconcha trabalis*	G1	S1	LE	E	3	IMBIVA4030		

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Bivalve	Tennessee Clubshell	*Pleurobema oviforme*	G2G3	S2S3	PE	E	1	IMBIV35220		Y
Bivalve	Tennessee Heelsplitter	*Lasmigona holstonia*	G3	S2			1	IMBIV22050		Y
Bivalve	Tennessee Pigtoe	*Pleuronaia barnesiana*	G2G3	S2	PE	E	1	IMBIV17020		Y
Bivalve	Triangular Kidneyshell	*Ptychobranchus greenii*	G1G2		LE		3	IMBIV38020	Y	Y
Bivalve	Upland Combshell	*Epioblasma metastriata*	GX	SH	DL		1	IMBIV16100		
Bivalve	Warrior Pigtoe	*Pleurobema rubellum*	G1	SH			1	IMBIV35280		
Bivalve	White Heelsplitter	*Lasmigona complanata*	G5	S5			1	IMBIV22012		
Bivalve	White Wartyback	*Plethobasus cicatricosus*	G1	S1	LE, XN	E	3	IMBIV34010		Y
Bivalve	Winged Mapleleaf	*Quadrula fragosa*	G1	S1	LE, XN		3	IMBIV39050		Y
Crustacean	a cave copepod	*Itocyclops undescribed sp.*	G1	S?			1			
Crustacean	a cave isopod	*Caecidotea sp.*	G?	S?			1			
Crustacean	a cave obligate amphipod	*Stygobromus barryi*	G1	S1			1	ICMAL05880		
Crustacean	a cave obligate amphipod	*Stygobromus dicksoni*	G5	S1S2			1	ICMAL05900		
Crustacean	a cave obligate amphipod	*Stygobromus fecundus*	G1G2	S1			1	ICMAL05820		
Crustacean	a cave obligate amphipod	*Stygobromus sp. 24*	G1	S1			1	ICMAL05XA0		
Crustacean	a cave obligate amphipod	*Stygobromus sp. 34*	G1G2	S1S2			1	ICMAL05XL0		
Crustacean	a cave obligate isopod	*Amerigoniscus nicholasi*	G1G2	S1S2			1	ICMAL02070		
Crustacean	a cave obligate isopod	*Caecidotea bicrenata*	G5	SR			1	ICMAL01540		
Crustacean	a cave obligate isopod	*Caecidotea bicrenata bicrenata*	G5T3T4	SR			1	ICMAL01541		
Crustacean	a cave obligate isopod	*Caecidotea bicrenata whitei*	G5T3T4	S1?			1	ICMAL01542		
Crustacean	a cave obligate isopod	*Caecidotea circulus*	G1G2	S1			1	ICMAL01590		
Crustacean	a cave obligate isopod	*Caecidotea nortoni*	G2G3	S1S2			1	ICMAL01640		
Crustacean	a cave obligate isopod	*Caecidotea scypha*	G1G2	S1			1	ICMAL01680		
Crustacean	a cave obligate isopod	*Ligidium elrodii hancockensis*	G4G5T1T2	S1?			1	ICMAL78013		
Crustacean	a cave obligate shrimp	*Dactylocythere steevesi*	G4	S2S3			1	ICOST01100		
Crustacean	a cave obligate shrimp	*Donnaldsoncythere tuberosa*	G2G3	S2?			1	ICOST09020		
Crustacean	a copepod	*Bryocamptus (Limocamptus) sp.*	G1	S?			1			
Crustacean	a cyclopoid copepod	*Acanthocyclops parasensitivus*	G2	S2			1	ICCOP04030		
Crustacean	a groundwater amphipod	*Bactrurus undescribed sp.*	G1	S?			1			
Crustacean	a groundwater ostracod	*Pseudocandona sp.*	G1G2	S?			1			
Crustacean	a sideswimmer	*Gammarus minus*	GNR	SNR			1	ICMAL10080		
Crustacean	a terrestrial isopod	*Triconiscus pusillus*	EX	S?			1			
Crustacean	Alabama Crayfish	*Faxonius alabamensis*	G5	S2			1	ICMAL11320		
Crustacean	an amphipod	*Crangonyx sp.*	G?	S?			1			
Crustacean	Angled Crayfish	*Cambarus angularis*	G3	S3			1	ICMAL07890		
Crustacean	Appalachian Valley Crangonyctid	*Crangonyx antennatus*	G5	S4			1	ICMAL06050		
Crustacean	Barren River Crayfsih	*Faxonius barrenensis*	G4	S3		D	1	ICMAL11330		
Crustacean	Barr's Terrestrial Isopod	*Miktoniscus barri*	G2G4	S2?			1	ICMAL08040		
Crustacean	Big South Fork Crayfish	*Cambarus bouchardi*	G2	S1		E	1	ICMAL07030		Y
Crustacean	Blood River Crayfish	*Faxonius burri*	G2	S1		T	1	ICMAL11800		Y
Crustacean	Bosnak's cave amphipod	*Stygobromus sp. 3*	G2	S?			1			
Crustacean	Bottle Brush Crayfish	*Barbicambarus cornutus*	G4	S2		T	1	ICMAL49010		Y
Crustacean	Brawleys Fork Crayfish	*Cambarus williami*	G2	S2	PT	T	1	ICMAL07920		Y
Crustacean	cave amphipods	*Stygobromus sp.*	G?	S?			1			
Crustacean	Cavespring Crayfish	*Cambarus tenebrosus*	G5	S5			1	ICMAL07800		
Crustacean	Central Kentucky Cave Amphipod	*Stygobromus exilis*	G5	S3			1	ICMAL05440		
Crustacean	Chickamauga Crayfish	*Cambarus extraneus*	G2?	S1S2		E	1	ICMAL07190		Y
Crustacean	Cocoa Crayfish	*Cambarus stockeri*	GNR	S1S2		D	1	ICMAL07A60		Y

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Crustacean	Conasauga Blue Burrower	*Cambarus cymatilis*	G1G2	S1		E	1	ICMAL07450		Y
Crustacean	Crescent Crayfish	*Faxonius taylori*	G2	S2		T	1	ICMAL12060		Y
Crustacean	Cumberland Block Crayfish	*Cambarus intermontanus*	GNR	SNR		T	1		Y	
Crustacean	Cumberland Gap Cave Amphipod	*Bactrurus angulus*	G1	S1			1	ICMAL25050		
Crustacean	Cumberland Plateau Cave Crayfish	*Orconectes barri*	G2	S1		T	1	ICMAL12050		Y
Crustacean	Depression Crayfish	*Cambarus rusticiformis*	G5	S4			1	ICMAL07730	Y	
Crustacean	Donaldson's Cave Copepod	*Megacyclops donnaldsoni*	G3G4	S1			1	ICCOP09010		
Crustacean	Ectocommensal Ostracod	*Sagittocythere barri*	G5	S3			1	ICOST12010		
Crustacean	Emory River Crayfish	*Cambarus sp. 1*	G1	S1			1	ICMAL07X10		Y
Crustacean	Finley's Cave Amphipod	*Stygobromus finleyi*	G3G4	S1			1	ICMAL05730		
Crustacean	Flint River Crayfish	*Faxonius cooperi*	G1	S1		E	1	ICMAL11370		Y
Crustacean	Florence Crayfish	*Cambarus andersoni*	GNR	S2			1	ICMAL07040	Y	
Crustacean	French Broad Crayfish	*Cambarus reburrus*	G3	SNR		E	1	ICMAL07270	Y	Y
Crustacean	Greensaddle Crayfish	*Cambarus manningi*	G4	S3		T	1	ICMAL07630		Y
Crustacean	Gregory Cave Stygobromid	*Stygobromus sparsus*	G1G2	S1S2			1	ICMAL05A60		
Crustacean	Hairy Crayfish	*Cambarus friaufi*	G4	S3			1	ICMAL07500	Y	
Crustacean	Hairyfoot Crayfish	*Cambarus crinipes*	G3	S3			1	ICMAL07140		
Crustacean	Hardin Crayfish	*Faxonius wrighti*	G2	S2	UR	T	1	ICMAL11550		Y
Crustacean	Hatchie Burrowing Crayfish	*Creaserinus hortoni*	G1	S1	UR	T	1	ICMAL15140		Y
Crustacean	Hillbilly Hairy Crayfish	*Cambarus polypilosus*	GNR	SNR			1	ICMAL07D50	Y	
Crustacean	Hiwassee Crayfish	*Cambarus hiwasseensis*	G3G4	S1		T	1	ICMAL07570		Y
Crustacean	Incurved Cave Isopod	*Pseudobaicalasellus incurvus*	G2G4	S1			1	ICMAL01100		
Crustacean	Indiana Groundwater Copepod	*Diacyclops sp.*	G1	S1			1	ICCOPSWG01		
Crustacean	Jeannel's Cave Ostracod	*Pseudocandona jeanneli*	G3	S1			1	ICOST11010		
Crustacean	Mammoth Cave Crayfish	*Orconectes pellucidus*	G4	S3		T	1	ICMAL11070		Y
Crustacean	Mammoth Cave Stygobromid	*Stygobromus vitreus*	G4	S2			1	ICMAL05720		
Crustacean	Midnight Blue Burrower	*Cambarus nyx*	G1	SNR		T	1	ICMAL14B30	Y	
Crustacean	Mottled Crayfish	*Faxonius pagei*	G4	S4			1	ICMAL11820		Y
Crustacean	Mountain Crayfish	*Cambarus conasaugaensis*	G3	S1		E	1	ICMAL07400		Y
Crustacean	Nashville Crayfish	*Faxonius shoupi*	G1G2	S3	LE, PD	E	3	ICMAL11160		Y
Crustacean	Nearctic copepod	*Diacyclops nearticus*	G3G4	SNR			1			
Crustacean	Nickajack Cave Isopod	*Caecidotea nickajackensis*	G1	S1			1	ICMAL01180		
Crustacean	Norton's Cave Amphipod	*Stygobromus nortoni*	G2G3	SH			1	ICMAL05330		
Crustacean	Obed Crayfish	*Cambarus sp?*	G1Q	SNR			1			Y
Crustacean	Obey Crayfish	*Cambarus obeyensis*	G1	S1		E	1	ICMAL07200		Y
Crustacean	Prickly Cave Crayfish	*Cambarus hamulatus*	G3G4	S3		D	1	ICMAL07170		Y
Crustacean	Pristine Crayfish	*Cambarus pristinus*	G2	S2		E	1	ICMAL07690		Y
Crustacean	Screaming Eagle Crayfish	*Faxonius bellator*	G1	SNR			1	ICMAL11950	Y	
Crustacean	Sculpin Crayfish	*Faxonius sp. nov.*	GNR	SNR			1		Y	
Crustacean	Short Mountain Crayfish	*Cambarus clivosus*	G2	S2		T	1	ICMAL07A30		Y
Crustacean	Shortfinger Crayfish	*Cambarus brachydactylus*	G2G4	S3			1	ICMAL07370		
Crustacean	Slender Crayfish	*Faxonius compressus*	G5	S5			1	ICMAL11360	Y	
Crustacean	Small Alabama Sowbug	*Miktoniscus medcofi*	GNR	SNR			1	ICMAL08030		
Crustacean	Southern cave amphipod	*Stygobromus sp. 4*	G3	S?			1			
Crustacean	Southern Cave Crayfish	*Orconectes australis*	G5	S3			1	ICMAL11011		
Crustacean	Southwestern Virginia Cave Amphipod	*Stygobromus mackini*	G5	S2			1	ICMAL05300		
Crustacean	Southwestern Virginia Cave Isopod	*Caecidotea recurvata*	G5	S2			1	ICMAL01120		
Crustacean	Speckled Crayfish	*Cambarus lentiginosus*	GNR	S1		E	1	ICMAL07330	Y	

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Crustacean	Spiny Scale Crayfish	*Cambarus jezerinaci*	G3?	S2	UR	D	1	ICMAL07940	Y	Y
Crustacean	Stygian Cave Isopod	*Caecidotea stygia*	G5	S3			1	ICMAL01200		
Crustacean	Surgeon Crayfish	*Faxonius forceps*	G5	S4		T	1	ICMAL11410		
Crustacean	Swamp River Cave Amphipod	*Stygobromus sp. 22*	G3	S3			1	ICMAL05X80		
Crustacean	Tennessee Bottlebrush Crayfish	*Barbicambarus simmonsi*	G1G2	S1S2		T	1	ICMAL49020	Y	Y
Crustacean	Tennessee Cave Crayfish	*Orconectes incomptus*	G2	S1		E	1	ICMAL11460		Y
Crustacean	Tennessee Valley Cave Isopod	*Caecidotea richardsonae*	G5	SNR			1	ICMAL01130		
Crustacean	Terrestrial Cave Isopod	*Haplophthalmus danicus*	GNR	SNR			1	ICMAL85010		
Crustacean	Upland Burrowing Crayfish	*Cambarus dubius*	G5	S5			1	ICMAL07010	Y	
Crustacean	Valley Flame Crayfish	*Cambarus deweesae*	G4	S1		E	1	ICMAL07460		
Crustacean	Yeatman's Groundwater Copepod	*Diacyclops yeatmani*	G2G3	S1			1	ICCOP02040		
Fish	Alligator Gar	*Atractosteus spatula*	G3G4	S1		T	1	AFCBA02010		Y
Fish	Amber Darter	*Percina antesella*	G1G2	S1	LE	E	3	AFCQC04010		Y
Fish	American Eel	*Anguilla rostrata*	G4	S3		D	1	AFCEA01010		Y
Fish	Arrow Darter	*Etheostoma sagitta*	G3	S2		D	1	AFCQC02662		Y
Fish	Ashy Darter	*Allohistium cinereum*	G2G3	S2S3		T	1	AFCQC02H00		Y
Fish	Barcheek Darter	*Etheostoma obeyense*	G4	S3			1	AFCQC02510		
Fish	Barrens Darter	*Etheostoma forbesi*	G1G2	S1		E	1	AFCQC02B30		Y
Fish	Barrens Topminnow	*Fundulus julisia*	G1	S1	LE	E	3	AFCNB04240		Y
Fish	Bedrock Shiner	*Notropis rupestris*	G2	S2		D	1	AFCJB28B20		Y
Fish	Bigmouth Shiner	*Ericymba dorsalis*	G5	S1		D	1	AFCJB28410		
Fish	Blackfin Sucker	*Thoburnia atripinnis*	G3	S2			1	AFCJC13010		Y
Fish	Blackside Dace	*Chrosomus cumberlandensis*	G2	S2	LT	T	3	AFCJB31010		Y
Fish	Blotched Chub	*Erimystax insignis*	G4	S3S4			1	AFCJB50040		Y
Fish	Blotchside Logperch	*Percina burtoni*	G2G3	S2		T	1	AFCQC04500		Y
Fish	Blue Shiner	*Cyprinella caerulea*	G2G3	S1	LT	T	3	AFCJB49020		Y
Fish	Blue Sucker	*Cycleptus elongatus*	G3G4	S2		D	1	AFCJC04010		Y
Fish	Bluemask Darter	*Etheostoma akatulo*	G1	S1	LE	E	3	AFCQC02XD0		Y
Fish	Boulder Darter	*Nothonotus wapiti*	G1	S1	LE, XN	E	3	AFCQC02A20		Y
Fish	Bridled Darter	*Percina kusha*	G1G2	S1		T	1	AFCQC04530		Y
Fish	Brook Trout	*Salvelinus fontinalis*	G5	S3			1	AFCHA05030		
Fish	Burrhead Shiner	*Notropis asperifrons*	G4	S2			1	AFCJB28110		
Fish	Chickasaw Darter	*Etheostoma cervus*	G2G3	S2S3		D	1	AFCQC02E60		Y
Fish	Chucky Madtom	*Noturus crypticus*	G1	S1	LE	E	3	AFCKA02270		Y
Fish	Citico Darter	*Etheostoma sitikuense*	G1	S1	(LE, XN)	E	3	AFCQC02F30		Y
Fish	Clinch Dace	*Chrosomus sp. cf. saylori*	G1	S1	UR	T	1	AFCJB31080	Y	Y
Fish	Coldwater Darter	*Etheostoma ditrema*	G1G2	S1		T	1	AFCQC02190		Y
Fish	Conasauga Logperch	*Percina jenkinsi*	G1	S1	LE	E	3	AFCQC04320		Y
Fish	Coosa Chub	*Macrhybopsis etnieri*	G3G4	S1		E	1	AFCJB53050		Y
Fish	Coppercheek Darter	*Nothonotus aquali*	G2G3	S2S3		T	1	AFCQC02010		Y
Fish	Crown Darter	*Etheostoma corona*	G3	S1S2		T	1	AFCQC02A50		
Fish	Cumberland Darter	*Etheostoma susanae*	G1G2	S1	LE	E	3	AFCQC02D40		Y
Fish	Diamond Darter	*Crystallaria cincotta*	G1	SX	LE	E	3	AFCQC07010		Y
Fish	Duskytail Darter	*Etheostoma percnurum*	G1	S1	LE, XN	E	3	AFCQC02F50		Y
Fish	Egg-mimic Darter	*Etheostoma pseudovulatum*	G1	S1		D	1	AFCQC02A60		Y
Fish	Emerald Darter	*Etheostoma baileyi*	G4G5	S2		D	1	AFCQC02910		Y
Fish	Firebelly Darter	*Etheostoma pyrrhogaster*	G2G3	S2		D	1	AFCQC02990		Y
Fish	Flame Chub	*Hemitremia flammea*	G3	S3		T	1	AFCJB14010		Y

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Fish	Frecklebelly Darter	*Percina stictogaster*	G4G5	S2		D	1	AFCQC04330		Y
Fish	Frecklebelly Madtom	*Noturus munitus*	G3	S1	LT	T	3	AFCKA02170		Y
Fish	Golden Darter	*Nothonotus denoncourti*	G2	S2			1	AFCQC02C20		Y
Fish	Golden Topminnow	*Fundulus chrysotus*	G5	S1S2		D	1	AFCNB04030		Y
Fish	Goldline Darter	*Percina aurolineata*	G2	SNR	LT	T	3	AFCQC04030	Y	Y
Fish	Highfin Carpsucker	*Carpiodes velifer*	G4G5	S2S3		D	1	AFCJC01030		Y
Fish	Holiday Darter	*Etheostoma brevirostrum*	G2	S1		T	1	AFCQC02A40		Y
Fish	Lake Sturgeon	*Acipenser fulvescens*	G3G4	S1		T	1	AFCAA01020		Y
Fish	Laurel Dace	*Chrosomus saylori*	G1	S1	LE	E	3	AFCJB31070		Y
Fish	Lined Chub	*Hybopsis lineapunctata*	G3G4	S1		T	1	AFCJB15040		Y
Fish	Lollypop Darter	*Etheostoma neopterum*	G3	S1S2		D	1	AFCQC02470		Y
Fish	Longhead Darter	*Percina macrocephala*	G3	S2		E	1	AFCQC04120		Y
Fish	Marbled Darter	*Etheostoma marmorpinnum*	G1	S1	(LE)	E	3	AFCQC02F10		Y
Fish	Muscadine Darter	*Percina smithvanizi*	G3	S1			1	AFCQC04X30		
Fish	Naked Sand Darter	*Ammocrypta beanii*	G5	S2			1	AFCQC01020		
Fish	Olive Darter	*Percina squamata*	G3	S2			1	AFCQC04280		Y
Fish	Orangefin Darter	*Nothonotus bellus*	G4G5	S3			1	AFCQC02050		
Fish	Paddlefish	*Polyodon spathula*	G4	S3			1	AFCAB01010		
Fish	Palezone Shiner	*Notropis albizonatus*	G1	SH	LE	E	3	AFCJB28A90		Y
Fish	Pallid Sturgeon	*Scaphirhynchus albus*	G2	S1	LE	E	3	AFCAA02010		Y
Fish	Piebald Madtom	*Noturus gladiator*	G3	S3	UR	E	1	AFCKA02290		Y
Fish	Plains Minnow	*Hybognathus placitus*	G4	S1		D	1	AFCJB16050		Y
Fish	Pygmy Madtom	*Noturus stanauli*	G1	S1	LE, XN	E	3	AFCKA02210		
Fish	Rainbow Shiner	*Notropis chrosomus*	G4	S3			1	AFCJB28360		
Fish	Redband Darter	*Etheostoma luteovinctum*	G4	S4		D	1	AFCQC02410		
Fish	Redlips Darter	*Allohistium maydeni*	G2	S2		T	1	AFCQC02G90		Y
Fish	Riffle Minnow	*Phenacobius catostomus*	G4	S2		D	1	AFCJB30010		
Fish	Rock Darter	*Etheostoma rupestre*	G4	S3			1	AFCQC02650		Y
Fish	Rosyface Shiner	*Notropis rubellus*	G5	S2			1	AFCJB28810		
Fish	Saddled Madtom	*Noturus fasciatus*	G2	S2		T	1	AFCKA02260		Y
Fish	Scaly Sand Darter	*Ammocrypta vivax*	G5	S2			1	AFCQC01070		Y
Fish	Sequatchie Darter	*Etheostoma blennius sequatchiense*	G4T3	S3		D	1	AFCQC02071		
Fish	Sharphead Darter	*Nothonotus acuticeps*	G3	S2S3			1	AFCQC02890		Y
Fish	Sickle Darter	*Percina williamsi*	G2	S2	LT	T	3	AFCQC04450		Y
Fish	Sicklefin Chub	*Macrhybopsis meeki*	G3	S2			1	AFCJB53030		Y
Fish	Sicklefin Redhorse	*Moxostoma sp. 2*	G1G2	S?			1	AFCJC10210		Y
Fish	Silver Lamprey	*Ichthyomyzon unicuspis*	G5	S2		T	1	AFBAA01060		
Fish	Silverjaw Minnow	*Notropis buccatus*	G5	S1		E	1	AFCJB60010		
Fish	Slackwater Darter	*Etheostoma boschungi*	G1	S1	LT	T	3	AFCQC02080		Y
Fish	Slender Chub	*Erimystax cahni*	G1	S1	LT, XN	T	3	AFCJB50010		Y
Fish	Slenderhead Darter	*Percina phoxocephala*	G5	S3			1	AFCQC04230		
Fish	Smallscale Darter	*Nothonotus microlepidus*	G2G3	S2		D	1	AFCQC02440		Y
Fish	Smoky Dace	*Clinostomus funduloides ssp. 1*	G5T3Q	S1S2			1	AFCJB05021		Y
Fish	Smoky Madtom	*Noturus baileyi*	G1	S1	LE, XN	E	3	AFCKA02020		Y
Fish	Snail Darter	*Percina tanasi*	G2G3	S2S3	DL	T	1	AFCQC04290		Y
Fish	Sooty Darter	*Etheostoma olivaceum*	G3	S3			1	AFCQC02530		
Fish	Southern Brook Lamprey	*Ichthyomyzon gagei*	G5	S1		D	1	AFBAA01040		
Fish	Southern Cavefish	*Typhlichthys subterraneus*	G4	S3		D	1	AFCLA04020		

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Fish	Splendid Darter	*Etheostoma barrenense*	G4	S3			1	AFCQC02900		Y
Fish	Spotfin Chub	*Erimonax monachus*	G2	S2	LT, XN	T	3	AFCJB49270		Y
Fish	Spotted Darter	*Nothonotus maculatus*	G3?	SP			1	AFCQC02420		Y
Fish	Streamline Chub	*Erimystax dissimilis*	G4	S3			1	AFCJB50020		Y
Fish	Striated Darter	*Etheostoma striatulum*	G1	S1	UR	E	1	AFCQC02750		Y
Fish	Sturgeon Chub	*Macrhybopsis gelida*	G3	S1			1	AFCJB53020		Y
Fish	Tangerine Darter	*Percina aurantiaca*	G4	S3			1	AFCQC04020		Y
Fish	Teardrop Darter	*Etheostoma barbouri*	G4G5	S2			1	AFCQC02040		Y
Fish	Tennessee Dace	*Chrosomus tennesseensis*	G3	S3		D	1	AFCJB31060		Y
Fish	Tennessee Logperch	*Percina apina*	GNR	S2		D	1	AFCQC04490	Y	
Fish	Tippecanoe Darter	*Nothonotus tippecanoe*	G3G4	S1S2		T	1	AFCQC02800		Y
Fish	Trispot Darter	*Etheostoma trisella*	G1	S1	LT	T	3	AFCQC02810		Y
Fish	Tuckasegee Darter	*Etheostoma gutselli*	G3G4	S1		D	1	AFCQC02061		Y
Fish	Tuscumbia Darter	*Etheostoma tuscumbia*	G2	SX	UR	E	1	AFCQC02820		Y
Fish	Tuxedo Darter	*Etheostoma lemniscatum*	G1	S1	(LE)	E	3	AFCQC02F20		Y
Fish	Western Sand Darter	*Ammocrypta clara*	G3	S1		E	1	AFCQC01040		Y
Fish	Wounded Darter	*Nothonotus vulneratus*	G3	S2		D	1	AFCQC02A10		Y
Fish	Yellowfin Madtom	*Noturus flavipinnis*	G1	S1	LT, XN	T	3	AFCKA02060		Y
Flatworm	a cave obligate flatworm	*Sphalloplana sp.*	G2	S?			2	IPTURSWG01		
Flatworm	a cave obligate planarian	*Sphalloplana buchanani*	G1G2	S1			2	IPTUR04100		
Flatworm	a cave obligate planarian	*Sphalloplana percoeca*	G5	S3?			2	IPTUR04170		
Flatworm	a flatworm	*Sphalloplana sp.*	G?	S?			2			
Flatworm	Chandler's Planarian	*Sphalloplana chandleri*	G1G2	S1			2	IPTUR04070		
Flatworm	Powell Valley Planarian	*Sphalloplana consimilis*	G2G3	S1			2	IPTUR04040		
Flatworm	Rumbling Falls Cave Flatworm	*Sphalloplana sp. 2*	G2	S1			2	IPTUR04X20		
Gastropod	a terrestrial snail	*Euchemotrema fraternum montanum*	G5T1	S2			1	IMGAS94031		
Gastropod	a terrestrial snail	*Glyphyalinia sp.*	G?	S?			1			
Gastropod	a terrestrial snail	*Helicodiscus sp.*	G?	S?			1			
Gastropod	Acute Elimia	*Elimia acuta*	G2	S1	UR		1	IMGASK2010		
Gastropod	Alabama Mantleslug	*Philomycus sellatus*	G2G3	S2			1	IMGAS64060		
Gastropod	Alabama Shagreen	*Inflectarius smithi*	G2	S2			1	IMGAS95330		
Gastropod	Alabama Tigersnail	*Anguispira alabama*	G2	S2			1	IMGAS53110		
Gastropod	Amber Glass Snail	*Nesovitrea electrina*	G5	SP			1	IMGAS76030	Y	
Gastropod	Angular Disc Snail	*Discus catskillensis*	G5	SNA			1	IMGAS54030	Y	
Gastropod	Anthony's Riversnail	*Athearnia anthonyi*	G1	S1	LE, XN	E	3	IMGASK5260		
Gastropod	Armored Rocksnail	*Lithasia armigera*	G3G4	S1S2			1	IMGASK6010		
Gastropod	Atlantic Threetooth	*Triodopsis juxtidens*	G5	S?			1	IMGASA1420	Y	
Gastropod	Balsam Globe	*Mesodon andrewsae*	G3	S2			1	IMGAS95010		
Gastropod	Banded Tigersnail	*Anguispira kochi*	G5	S2?			1	IMGAS53070		
Gastropod	Barred Supercoil	*Paravitrea seradens*	G3	S?			1	IMGAS78270	Y	
Gastropod	Bidentate Dome	*Ventridens coelaxis*	G3	S2S3			1	IMGAS82050		
Gastropod	Big-tooth Covert	*Fumonelix jonesiana*	G1	S1			1	IMGAS95170		
Gastropod	Blotchy Mantleslug	*Megapallifera wetherbyi*	G2G3	S2			1	IMGASQ0030		
Gastropod	Blue-foot Lancetooth	*Haplotrema kendeighi*	G2G3	S2			1	IMGAS36080		
Gastropod	Blue-gray Glyph	*Glyphyalinia ocoae*	G2	S1			1	IMGAS73110		
Gastropod	Bluff Coil	*Helicodiscus enneodon*	G3G4Q	S4S5			1	IMGAS50050		
Gastropod	Brook Elimia	*Elimia striqosa*	G2	S2			1	IMGASK2640		
Gastropod	Brown Globelet	*Inflectarius kalmianus*	G3	S3			1	IMGAS95180		

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Gastropod	Burrowing Coil	*Helicodiscus aldrichianus*	G3	S2			1	IMGAS50210		
Gastropod	Buttressed Threetooth	*Triodopsis rugosa*	G1	S?			1	IMGASA1340	Y	
Gastropod	Caneyfork Supercoil	*Paravitrea metallacta*	G3	S3			1	IMGAS78190		
Gastropod	Carinate Dome	*Ventridens eutropis*	G2G3	S2			1	IMGAS82090		
Gastropod	Carter Threetooth	*Triodopsis anteridon*	G3	S1S2			1	IMGASA1410		
Gastropod	Cave Thorn	*Carychium stygium*	G3	S2			1	IMGAS07080		
Gastropod	Channelled Disc	*Discus clappi*	G1	S1			1	IMGAS54040		
Gastropod	Chattanooga Slitmouth	*Stenotrema calvescens*	G3	S3S4			1	IMGAS98070		
Gastropod	Cherokee Pebblesnail	*Somatogyrus georgianus*	GH	S?			1	IMGASJ2130	Y	
Gastropod	Christy's Elimia	*Elimia christyi*	G2	S2			1	IMGASK2910		
Gastropod	Clairborne Threetooth	*Triodopsis claibornensis*	G2	S2			1	IMGASA1070		
Gastropod	Clifty Covert	*Fumonelix wetherbyi*	G2G3	S2S3			1	IMGAS95360		
Gastropod	Clingman Covert	*Fumonelix wheatleyi clingmanicus*	G4T2T3	S2S3			1	IMGAS95371		
Gastropod	Club Supercoil	*Paravitrea bellona*	G4	S?			1	IMGAS78050		
Gastropod	Coal Elimia	*Elimia aterina*	G2	S1			1	IMGASK2070		
Gastropod	Cohutta Slitmouth	*Stenotrema cohuttense*	G2	S2			1	IMGAS98080		
Gastropod	Corpulent Hornsnail	*Pleurocera corpulenta*	G1	S1	UR		1	IMGASK7060		
Gastropod	Cricket Coil	*Helicodiscus hadenoecus*	G3	S3			1	IMGAS50070		
Gastropod	Crossed Dome	*Ventridens decussatus*	G3	S2?			1	IMGAS82070		
Gastropod	Cumberland Tigersnail	*Anquispira cumberlandiana*	G3	S3?			1	IMGAS53020		
Gastropod	Cupped Vertigo Snail	*Vertigo clappi*	G3	S1			1	IMGAS20100		
Gastropod	Dark Glyph	*Glyphyalinia junaluskana*	G2G3	S2?			1	IMGAS73070		
Gastropod	Doaks Creek Slitmouth	*Stenotrema waldense*	G2	S2S3			1	IMGAS98250		
Gastropod	Domed Supercoil	*Paravitrea significans*	G3	S1S2			1	IMGAS78280	Y	
Gastropod	Dwarf Globelet	*Inflectarius downieanus*	G3	S3			1	IMGAS95110		
Gastropod	Dwarf Proud Globe	*Patera clarki*	G3	S2S3			1	IMGAS95082		
Gastropod	Elegant Elimia	*Elimia teres*	G1	S1	UR		1	IMGASK2670		
Gastropod	Engraved Covert	*Fumonelix orestes*	G1	S?			1	IMGAS95240		
Gastropod	File Elimia	*Elimia striatula*	G2	S2			1	IMGASK2630		
Gastropod	Fine-ribbed Striate Snail	*Striatura milium*	G5	S?			1	IMGAS81040	Y	
Gastropod	Flat Button	*Mesomphix subplanus*	G3G4	S3S4			1	IMGAS75140		
Gastropod	Four Blade Bud	*Pilsbryna quadrilamellata*	G1	S1			1	IMGAS79050	Y	
Gastropod	Fuzzy Covert	*Inflectarius verus*	G1	S?			1	IMGAS95420	Y	
Gastropod	Gem Supercoil	*Paravitrea lapilla*	G3	S2			1	IMGAS78180		
Gastropod	Geniculate River Snail	*Lithasia fuliginosa*	G3	S2			1	IMGASK6041		
Gastropod	Glossy Covert	*Fumonelix christyi*	G3	S2			1	IMGAS95070		
Gastropod	Goddess Supercoil	*Paravitrea alethia*	G1	S1?			1	IMGAS78010		
Gastropod	Golden Pebblesnail	*Somatogyrus aureus*	G1	S1			1	IMGASJ2030		
Gastropod	Great Smoky Slitmouth	*Stenotrema depilatum*	G2	S2			1	IMGAS98100		
Gastropod	Gulf Coast Liptooth	*Daedalochila leporina*	G4G5	S4?			1	IMGAS96280	Y	
Gastropod	Helmet Rocksnail	*Lithasia duttoniana*	G2	S2			1	IMGASK6030		
Gastropod	High Mountain Supercoil	*Paravitrea andrewsae*	G2	S2			1	IMGAS78030		
Gastropod	Highland Slitmouth	*Stenotrema altispira*	G3	S2?			1	IMGAS98020		
Gastropod	Hiwassee Pebblesnail	*Somatogyrus sp. 2*	G1Q	S1			1	IMGASJ2380		
Gastropod	Hollow Coil	*Helicodiscus notius specus*	G5T2	S1?			1	IMGAS50121		
Gastropod	Hollow Glyph	*Glyphyalinia specus*	G4	S3			1	IMGAS73210		
Gastropod	Honey Bud	*Pilsbryna vanattai*	G2G3	S2S3			1	IMGAS73230		
Gastropod	Knobby Rocksnail	*Lithasia curta*	G1	SX			1	IMGASK6020		

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Gastropod	Lamellate Supercoil	*Paravitrea lamellidens*	G3	S2			1	IMGAS78170		
Gastropod	Marbled Mantleslug	*Pallifera marmorea*	G3	S?			1	IMGAS63050	Y	
Gastropod	Mirey Ridge Supercoil	*Paravitrea clappi*	G2G3	S2S3			1	IMGAS78110		
Gastropod	Mossy Elimia	*Elimia troostiana*	G1	S1			1	IMGASK2680		
Gastropod	Mountain Button	*Mesomphix andrewsae*	G3G4	S3S4			1	IMGAS75010		
Gastropod	Muddy Rocksnail	*Lithasia salebrosa*	G2G3	S2			1	IMGASK6090		
Gastropod	Nymph Elimia	*Elimia porrecta*	G2	S2			1	IMGASK2540		
Gastropod	Oar Tooth Bud	*Pilsbryna nodopalma*	G1G2	S1			1	IMGAS79040	Y	
Gastropod	Ocoee Covert	*Fumonelix archeri*	G1G2	S1			1	IMGAS95040		
Gastropod	Opaque Pebblesnail	*Somatogyrus tennesseensis*	G1	S1			1	IMGASJ2310		
Gastropod	Open Supercoil	*Paravitrea umbilicaris*	G3?	S2?			1	IMGAS78360		
Gastropod	Ornate Bud	*Pilsbryna aurea*	G2	S1			1	IMGAS79010		
Gastropod	Painted Snake Coiled Forest Snail	*Anguispira picta*	G1	S1	LT	T	3	IMGAS53080		
Gastropod	Pearl Supercoil	*Paravitrea calcicola*	G1	S1?			1	IMGAS78080		
Gastropod	Pink Glyph	*Glyphyalinia pentadelphia*	G1G3	S2			1	IMGAS73130		
Gastropod	Prominent Bud	*Pilsbryna castanea*	G2	S2			1	IMGAS79020		
Gastropod	Punctate Coil	*Helicodiscus punctatellus*	G1	S1			1	IMGAS50150	Y	
Gastropod	Raccoon Coil	*Helicodiscus barri*	G3G4	S3S4			1	IMGAS50010		
Gastropod	Ramp Cove Supercoil	*Paravitrea lacteodens*	G1	S?			1	IMGAS78400	Y	
Gastropod	Ribbed Striate Snail	*Pseudohyalina exigua*	G5	S1			1	IMGAS81010		
Gastropod	Roan Mountain Covert	*Fumonelix roanensis*	G1	S?			1	IMGAS95530	Y	
Gastropod	Roan Supercoil	*Paravitrea varidens*	G1G2	S1S2			1	IMGAS78380		
Gastropod	Rockpile Liptooth	*Daedalochila auriformis*	G4	S1			1	IMGAS96020		
Gastropod	Round Supercoil	*Paravitrea reesei*	G3	S1S2			1	IMGAS78250		
Gastropod	Royal Springsnail	*Marstonia ogmorhaphe*	G1	S1	LE	E	3	IMGASJ0450		
Gastropod	Rugged Hornsnail	*Pleurocera alveare*	G3	S2			1	IMGASK7020		
Gastropod	Rugose Rocksnail	*Lithasia jayana*	G1G2	SX			1	IMGASK6060		
Gastropod	Rustic Tigersnail	*Anguispira knoxensis*	G1G2	S1			1	IMGAS53060		
Gastropod	Sawtooth Disc	*Discus bryanti*	G3	S1S2			1	IMGAS54010		
Gastropod	Sculpted Supercoil	*Paravitrea ternaria*	G1G2	S1S2			1	IMGAS78320		
Gastropod	Sequatchie Slitmouth	*Stenotrema edgarianum*	G2G3	S2S3			1	IMGAS98110		
Gastropod	Sharp Wedge	*Xolotrema obstrictum*	G4	S5			1	IMGASA1280		
Gastropod	Shortspire Hornsnail	*Pleurocera picta*	G2	S2			1	IMGASK7070		
Gastropod	Shrew Supercoil	*Paravitrea blarina*	G3	S3			1	IMGAS78070		
Gastropod	Slender Supercoil	*Paravitrea subtilis*	G2	S2			1	IMGAS78300		
Gastropod	Smallmouth Vertigo	*Vertigo parvula*	G3	S2S3			1	IMGAS20270		
Gastropod	Smoky Mountain Covert	*Inflectarius ferrissi*	G2	S2			1	IMGAS95140		
Gastropod	Smooth Mudalia	*Leptoxis virgata*	G2	S1			1	IMGASK5210		
Gastropod	Sparrow Pebblesnail	*Somatogyrus parvulus*	G1G2Q	S1			1	IMGASJ2200		
Gastropod	Spider Elimia	*Elimia arachnoidea*	G2G3	S2	UR		1	IMGASK2060		
Gastropod	Spiny Riversnail	*Io fluvialis*	G1G2	S2	UR		1	IMGASK3010		
Gastropod	Spiral Coil	*Helicodiscus bonamicus*	G1	S1			1	IMGAS50020	Y	
Gastropod	Squat Globelet	*Mesodon sanus*	G3	S2S3			1	IMGAS95300		
Gastropod	Striate Gloss	*Zonitoides lateumbilicatus*	G3G4	S2?			1	IMGAS85040		
Gastropod	Striate Vertigo	*Vertigo rugosula*	G4	S2			1	IMGAS20310	Y	
Gastropod	Striped Whitelip	*Webbhelix multilineata*	G5	S2			1	IMGASA1250		
Gastropod	Sulcate Hornsnail	*Pleurocera trochiformis*	G2	S2			1	IMGASK7160		
Gastropod	Swamp Vertigo	*Vertigo teskeyae*	G5	S1			1	IMGAS20360		

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Gastropod	Talus Covert	*Fumonelix langdoni*	G1	SNR			1	IMGAS95510	Y	
Gastropod	Teasing Supercoil	*Paravitrea tantilla*	G3	S3			1	IMGAS78310		
Gastropod	Telescope Hornsnail	*Pleurocera walkeri*	G3	S2			1	IMGASK7190		
Gastropod	Tennessee Dome	*Ventridens percallosus*	G3	S3			1	IMGAS82160		
Gastropod	Tongued Glyph	*Glyphyalinia rimula*	G3	S2			1	IMGAS73180		
Gastropod	Toothy Coil	*Helicodiscus hexodon*	G1	S1			1	IMGAS50080		
Gastropod	Trumpet Vallonia Snail	*Vallonia parvula*	G4	SNR			1	IMGAS22060	Y	
Gastropod	Umbilicate Rocksnail	*Leptoxis umbilicata*	G1Q	S1			1	IMGASK5120		
Gastropod	Variabile Supercoil	*Paravitrea variabilis*	G2G3	S2S3			1	IMGAS78370		
Gastropod	Velvet Covert	*Inflectarius subpalliatus*	G2G3	S2			1	IMGAS95340		
Gastropod	Virginia Mantleslug	*Philomycus virginicus*	G3	S2S3			1	IMGAS64040		
Gastropod	Wandering Globe	*Mesodon altivagus*	G2G3	S2			1	IMGAS95390		
Gastropod	Warty Rocksnail	*Lithasia lima*	G2	S2			1	IMGASK6070		
Gastropod	Whitefoot Supercoil	*Paravitrea tridens*	G2	S2			1	IMGAS78350		
Insect	a beetle	*Speleochus undescribed species*	G?	S?			2			
Insect	a bristletail	*Litocampa barryi*	G?	S?			2			
Insect	a bristletail	*Litocampa cherokeensis*	G?	S?			2			
Insect	a bristletail	*Litocampa davisi*	G?	S?			2			
Insect	a bristletail	*Litocampa inexspectata*	G?	S?			2			
Insect	a bristletail	*Litocampa sp.*	G?	S?			2			
Insect	a camel cricket	*Ceuthophilus stygius*	GNR	S?			2	IIORT47150		
Insect	a carabid beetle	*Rhadine caudata*	G3	S?			2	IICOL69030		
Insect	a carabid beetle	*Trechus tennesseensis tauricus*	GNRTNR	S1			2	IICOL6G232		
Insect	a carabid beetle	*Trechus tennesseensis tennesseensis*	GNRTNR	S1			2	IICOL6G231		
Insect	a carabid beetle	*Trechus tuckaleechee*	GNR	S2			2	IICOL6G110		
Insect	a cave ant beetle	*Arianops pecki*	G?	S?			2			
Insect	a cave ant beetle	*Arianops sp.*	G1	S?			2			
Insect	a cave barklice	*Psyllipsocus ramburi*	G4	S?			2			
Insect	a cave cricket	*Ceuthophilus ensifer*	G3	S?			2			
Insect	a cave cricket	*Ceuthophilus gracilipes vs. stygius*	G4	S?			2			
Insect	a cave cricket	*Ceuthophilus sp.*	G?	S?			2			
Insect	a cave cricket	*Euhadenoecus puteaus*	G4	S?			2			
Insect	a cave cricket	*Hadenoecus opilionides*	G3	S3			2	IIORT9G030		
Insect	a cave obligate beetle	*Anillinus longiceps*	G?	S?			2			
Insect	a cave obligate beetle	*Batriasymmodes jeanneli*	G3	S1S2			2	IICOL88060		
Insect	a cave obligate beetle	*Batriasymmodes quisnamus*	G3	S3			2	IICOL88070		
Insect	a cave obligate beetle	*Batriasymmodes spelaeus*	G3G4	S2?			2	IICOL88040		
Insect	a cave obligate beetle	*Batrisodes barri*	G1G2	S1S2			2	IICOLA8210		
Insect	a cave obligate beetle	*Batrisodes clypeospecus*	G1G2	S1S2			2	IICOLA8220		
Insect	a cave obligate beetle	*Batrisodes ferulifer*	G1	S1			2	IICOLA8230		
Insect	a cave obligate beetle	*Batrisodes gemmoides*	G1	S1			2	IICOLA8240		
Insect	a cave obligate beetle	*Batrisodes gemmus*	G1	S1			2	IICOLA8250		
Insect	a cave obligate beetle	*Batrisodes pannosus*	G1	S1			2	IICOLA8280		
Insect	a cave obligate beetle	*Batrisodes specus*	G3G4	S?			2	IICOLA8110		
Insect	a cave obligate beetle	*Batrisodes valentinei*	G2G4	S1			2	IICOLA8100		
Insect	a cave obligate beetle	*Darlingtonea kentuckensis*	G3G4	S1?			2	IICOLJ5010		
Insect	a cave obligate beetle	*Nelsonites walteri*	G3	S3			2	IICOLJ8010		
Insect	a cave obligate beetle	*Pseudanophthalmus sp.*	G?	S?			2			

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Insect	a cave obligate beetle	*Pseudanophthalmus sp. A englehardti group*	G?	S?			2			
Insect	a cave obligate beetle	*Pseudanophthalmus sp. B englehardti group*	G?	S?			2			
Insect	a cave obligate beetle	*Pseudanophthalmus sp. B jonesi group*	G?	S?			2			
Insect	a cave obligate beetle	*Pseudanophthalmus sp. TN*	G1	S1			2	IICOLSWG03		
Insect	a cave obligate beetle	*Ptomaphagus barri*	G2G3	S1S2			2	IICOLA7050		
Insect	a cave obligate beetle	*Ptomaphagus chromolithus*	G2G3	S1			2	IICOLA7060		
Insect	a cave obligate beetle	*Ptomaphagus fecundus*	G1	S1			2	IICOLA7090		
Insect	a cave obligate beetle	*Ptomaphagus hatchi*	G3	S3?			2	IICOLA7110		
Insect	a cave obligate beetle	*Ptomaphagus hubrichti*	G2G3	S2			2	IICOLA7140		
Insect	a cave obligate beetle	*Speleochus steevesi*	G?	S?			2			
Insect	a cave obligate beetle	*Subterrochus ferus*	G1G2	S1			2	IICOLJD020		
Insect	a cave obligate beetle	*Tychobythinus strinatii*	G1G2	S1S2			2	IICOLJE030		
Insect	a cave obligate bristletail	*Litocampa valentinei*	G5	S2			2	IITHS01200		
Insect	a cave obligate ground beetle	*Pseudanophthalmus beakleyi*	G3G4	S3			2	IICOL4EAZ0		
Insect	a cave obligate ground beetle	*Pseudanophthalmus cerberus cerberus*	G3G4T3T4	S?			2	IICOL4EB01		
Insect	a cave obligate ground beetle	*Pseudanophthalmus ciliaris orlindae*	G3G4T1T2	S1S2			2	IICOL4EB13	Y	
Insect	a cave obligate ground beetle	*Pseudanophthalmus cumberlandus*	G1G2	S1			2	IICOL4EB30		
Insect	a cave obligate ground beetle	*Pseudanophthalmus digitus*	G1G2	S1			2	IICOL4EB60		
Insect	a cave obligate ground beetle	*Pseudanophthalmus farrelli*	G1G2	S1S2			2	IICOL4EB90		
Insect	a cave obligate ground beetle	*Pseudanophthalmus fulleri*	G2G3	S2S3			2	IICOL4EAW0		
Insect	a cave obligate ground beetle	*Pseudanophthalmus hesperus*	G1	S1			2	IICOL4EBA0		
Insect	a cave obligate ground beetle	*Pseudanophthalmus humeralis*	G2	S2			2	IICOL4EAV0		
Insect	a cave obligate ground beetle	*Pseudanophthalmus loganensis*	G2G3	S1S2			2	IICOL4EBY0		
Insect	a cave obligate ground beetle	*Pseudanophthalmus macradyi*	G1G2	S1S2			2	IICOL4EBB0		
Insect	a cave obligate ground beetle	*Pseudanophthalmus princeps*	G1G2	S1S2			2	IICOL4EBF0		
Insect	a cave obligate ground beetle	*Pseudanophthalmus productus*	G3G4	S3			2	IICOL4EBG0		
Insect	a cave obligate ground beetle	*Pseudanophthalmus robustus*	G3G4	S3			2	IICOL4EBJ0		
Insect	a cave obligate ground beetle	*Pseudanophthalmus scutilus*	G1	S1			2	IICOL4EBK0		
Insect	a cave obligate ground beetle	*Pseudanophthalmus templetoni*	G1	S1			2	IICOL4EBP0		
Insect	a cave obligate ground beetle	*Pseudanophthalmus tennesseensis*	G3	S2			2	IICOL4EBT0		
Insect	a cave obligate ground beetle	*Pseudanophthalmus valentinei*	G3G4	S2S3			2	IICOL4EBS0		
Insect	a cave obligate ground beetle	*Pseudanophthalmus vanburenensis*	G1	S1			2	IICOL4EC10		
Insect	a cave obligate springtail	*Arrhopalites sp.*	G1	S1			2	IICLLSWG01		
Insect	a cave obligate springtail	*Folsomia sp. 2 nr. macrochaeta*	G1	S1			2	IICLL10060		
Insect	a cave obligate springtail	*Onychiurus reluctus*	GNR	S?			2	IICLL17080		
Insect	a cave obligate springtail	*Pseudosinella aera*	G4	S2			2	IICLL01280		
Insect	a cave obligate springtail	*Pseudosinella christianseni*	G5	S2			2	IICLL01200		
Insect	a cave obligate springtail	*Pseudosinella hirsuta*	G5	S3			2	IICLL01060		
Insect	a cave obligate springtail	*Pseudosinella orba*	G3G4	S2			2	IICLL01030		
Insect	a cave obligate springtail	*Pseudosinella sp. 6*	G1	S1			2	IICLL01300		
Insect	a cave obligate springtail	*Pseudosinella sp. 7 nr. Nata*	G1	S1			2	IICLL01310		
Insect	a cave obligate springtail	*Pseudosinella spinosa*	G5	S2			2	IICLL01250		
Insect	a cave obligate springtail	*Sinella basidens*	G3G4	S2			2	IICLL05090		
Insect	a cave obligate springtail	*Sinella cavernarum*	G5	S3			2	IICLL05050		
Insect	a cave springtail	*Pseudosinella cf. christianseni*	G?	S?			2			
Insect	a cave springtail	*Pseudosinella cf. gisini*	G?	S?			2			

Taxa Group	Common Name	Scientific Name	Global Rank	State Rank	Federal Status	State Status	SWAP Tier	NatureServe Element Code	New in 2025	RSGCN
Insect	a cave springtail	*Pseudosinella cf. nata*	G?	S?			2			
Insect	a cave springtail	*Pygmarrhopalites pavo*	G3?	S1			2	IICLL04130		
Insect	a flat-headed mayfly	*Maccaffertium sinclairi*	G2G3	S2			2	IIEPH40050		
Insect	a flea	*Stenoponia americana*	G5	S?			2			
Insect	a fly	*Megaselia cavernicola*	GNR	S?			2	IIDIP35010		
Insect	a ground beetle	*Anillinus sp.*	G?	S?			2			
Insect	a lepidostomatid caddisfly	*Lepidostoma compressum*	G1G2	S1S2			2	IITRI01200	Y	
Insect	a lepidostomatid caddisfly	*Lepidostoma etnieri*	G1G2Q	S1S2			2	IITRI01080	Y	
Insect	a leptophlebiid mayfly	*Habrophlebiodes celeteria*	G2G4	S2			2	IIEPH41020		
Insect	a mayfly	*Heterocloeon grande*	G2G3	S2			2	IIEPH78150		
Insect	a prongill mayfly	*Paraleptophlebia kirchneri*	G1G3	S1			2	IIEPH33270		
Insect	a purse casemaker caddisfly	*Hydroptila patriciae*	G1	S1			2	IITRI40210	Y	
Insect	a purse casemaker caddisfly	*Ochrotrichia elongiralla*	G1G2	S1			2	IITRI41130	Y	
Insect	a rove beetle	*Aleochara lucifuga*	GNR	S?			2	IICOLG2010		
Insect	a rove beetle	*Aleochara sp.*	G?	S?			2			
Insect	a rove beetle	*Aloconota diversiseta*	G1	S1			2	IICOLJM020		
Insect	a rove beetle	*Aloconota insecta*	GNR	S?			2	IICOLG3010		
Insect	a rove beetle	*Aloconota laurentiana*	G4	S?			2			
Insect	a rove beetle	*Atheta sp.*	G?	S?			2			
Insect	a rove beetle	*Atheta troglophila*	G4	S?			2	IICOL93020		
Insect	a saddlecase caddisfly	*Agapetus diacanthus*	G1G2	S1S2			2	IITRI33230	Y	
Insect	a springtail	*Arrhopalites benitus*	G4	S?			2			
Insect	a springtail	*Arrhopalites caecus*	GNR	S?			2			
Insect	a springtail	*Arrhopalites pygmaeus*	G4	S?			2			
Insect	a springtail	*Ceratophysella sp.*	G?	S?			2			
Insect	a springtail	*Ceratophysella undescribed sp., Denticulata group*	G?	S?			2			
Insect	a springtail	*Desoria trispinata*	GNR	S?			2	IICLL11030		
Insect	a springtail	*Hypogastrura antra*	G?	S?			2			
Insect	a springtail	*Hypogastrura sp. Denticulata group*	G?	S?			2			
Insect	a springtail	*Hypogastrura undescribed sp.*	G?	S?			2			
Insect	a springtail	*Onychiurus pseudofimetarius*	G4	S?			2			
Insect	a springtail	*Pseudosinella sp.*	G?	S?			2			
Insect	a springtail	*Tomocerus dubius*	G4	S?			2			
Insect	a springtail	*Tomocerus sp.*	G1	S?			2			
Insect	a uenoid caddisfly	*Neophylax kolodskii*	G1	S1			2	IITRI66690	Y	
Insect	a viatica group springtail	*Hypogastrura sp. 1*	G1	S1			2	IICLL09100		
Insect	Aaron Tolletts cave beetle	*Pseudanophthalmus sp.*	G1	S?			2			
Insect	Ace in the Hole Cave Beetle	*Pseudanophthalmus sp. 30*	G1	S1			2	IICOL4EX70		
Insect	Acuminate Snaketail	*Ophiogomphus acuminatus*	G3	S2			2	IIODO12010		
Insect	Allegheny Snaketail	*Ophiogomphus incurvatus alleghaniensis*	G3T2T3Q	S1			2	IIODO12211		
Insect	American Bumble Bee	*Bombus pensylvanicus*	G3G4	SNR	UR		2	IIHYM24260	Y	Y
Insect	American Burying Beetle	*Nicrophorus americanus*	G3	SH	LT, XN		2	IICOL42010		
Insect	an ant beetle	*Batrisodes sp.*	G?	S?			2			
Insect	an undescribed cave springtail	*Arrhopalites sp. 2 near bimus*	G1	S?			2			
Insect	an undescribed cave springtail	*Arrhopalites sp. 3 near benitus*	G1	S?			2			
Insect	an undescribed cave springtail	*Arrhopalites sp. 4*	G1	S1			2	IICLL04220		
Insect	an undescribed cave springtail	*Arrhopalites sp. 4 near lacuna*	G1	S?			2			

Taxa Group	Common Name	Scientific Name	Global Rank	State Rank	Federal Status	State Status	SWAP Tier	NatureServe Element Code	New in 2025	RSGCN
Insect	an undescribed ground beetle	*Anillinus sp.*	G1	S?			2			
Insect	Annexed Minute Rove Beetle	*Atheta annexa*	G5	S?			2	IICOL93010		
Insect	Appalachian Tiger Beetle	*Cicindela ancocisconensis*	G3	S2			2	IICOL02070		
Insect	Baker cave beetle	*Pseudanophthalmus sp.*	G1	S?			2			
Insect	Baker Station Cave Beetle	*Pseudanophthalmus insularis*	G1	S1			2	IICOL4E360		
Insect	Barber's Springtail	*Sensillanura barberi*	GNR	S?			2	IICLL24010		
Insect	Barr's cave cricket	*Hadenoecus barri*	G4	S?			2			
Insect	Benderman's Cave Beetle	*Pseudanophthalmus bendermani*	G1G2	S1S2			2	IICOL4E190		
Insect	Blowing Cave Beetle	*Pseudanophthalmus ventus*	G1	S1			2	IICOL4E690		
Insect	Blueridge Springtail	*Remenus kirchneri*	G3	SNR	UR		2	IIPLE2J030	Y	
Insect	Buffalo Cove Cave Dipluran	*Litocampa sp. 6*	G1	S1			2	IITHS01120		
Insect	Buffalo Springs Caddisfly	*Hydropsyche etnieri*	G2	S2			2	IITRI36120		
Insect	Caney Hollow cave ground beetle	*Pseudanophthalmus sp.*	G1	S?			2			
Insect	Catherine's Cave Beetle	*Pseudanophthalmus catherinae*	G1	S1			2	IICOL4E210		
Insect	Cave Ant Beetle	*Arianops stygica*	G1	S1			2	IICOL10200		
Insect	cave ant beetles	*Subterrochus sp.*	G1	S?			2			
Insect	cave crickets	*Hadenoecini sp.*	G?	S?			2			
Insect	Cave Dung Fly	*Spelobia tenebrarum*	G5	S4			2	IIDIP26020		
Insect	cave ground beetles	*Pseudanophthalmus sp.*	G1	S?			2			
Insect	cave springtail	*Pseudosinella undescribed sp. near espanita*	G1	S?			2			
Insect	Cherokee Clubtail	*Stenogomphurus consanguis*	G3	S1	UR		2	IIODO08080		
Insect	Christiansen's Cave Springtail	*Typhlogastrura christianseni*	GNR	SNR			2	IICLL20030		
Insect	Coleman Cave Beetle	*Pseudanophthalmus colemanensis*	G1	S1	UR		2	IICOL4EC20		
Insect	Cooke's Cave Dipluran	*Litocampa cookei*	G5	S3			2	IITHS01030		
Insect	Copeland's Springtail	*Triacanthella copelandi*	G1	S1			2	IICLL27010		
Insect	Cumberland Forestfly	*Soyedina alexandria*	G1G2	S1S2			2	IIPLE1S100	Y	
Insect	Cumberland Ground Beetle	*Trechus cumberlandus*	G2	S2			2	IICOL6G120		
Insect	Cypress Firefly	*Photuris walldoxeyi*	G2G3	SNR			2	IICOL5Y060	Y	
Insect	Diana Fritillary	*Argynnis diana*	G2G3	S3			2	IILEPJ6010		
Insect	Duck River Cave Beetle	*Pseudanophthalmus tullahoma*	G1G2	S1			2	IICOL4E670		
Insect	Early Hairstreak	*Erora laeta*	G2G3	S2			2	IILEPF3010	Y	
Insect	Echo Cave Beetle	*Pseudanophthalmus acherontis*	G1	S1			2	IICOL4E160		
Insect	Edmund's Snaketail	*Ophiogomphus edmundo*	G2	S1	UR		2	IIODO12080		
Insect	Engelhart's Cave Beetle	*Pseudanophthalmus engelhardti*	G1	S1			2	IICOL4E250		
Insect	Falling Springs Cave Beetle	*Pseudanophthalmus sp. 29*	G1	S1			2	IICOL4EX60		
Insect	Flag Trail Cave Beetle	*Anillinus sp. 5*	G1	S1			2	IICOL6CX50		
Insect	Forgotten Round Fungus Beetle	*Dissochaetus oblitus*	GNR	S?			2	IICOLQU500		
Insect	Fowler's Cave Beetle	*Pseudanophthalmus fowlerae*	G1	S1			2	IICOL4E260		
Insect	Fraser Fir Geometrid Moth	*Semiothisa fraserata*	G2?	S2?			2	IILEUOD200		
Insect	Frosted Elfin	*Callophrys irus*	G3	S1?			2	IILEPE2220		
Insect	a fungus gnat	*Sciara sp.*	G?	S?			2			
Insect	Ghost Tiger Beetle	*Ellipsoptera lepida*	G3	SNR			2	IICOL02250	Y	
Insect	Golden springtail	*Tomocerus flavescens*	G5	S?			2			
Insect	Grassy Cove Cave Beetle	*Pseudanophthalmus jonesi*	G1G2	S1S2			2	IICOL4E380		
Insect	Greenbrier Riverbank Ground Beetle	*Bembidion lacunarium*	GNR	S?			2	IICOL73150		
Insect	Gunters Cave Beetle	*Pseudanophthalmus sp. 36*	G?	S1?			2	IICOL4ED30		
Insect	Hairy Harp Ground Beetle	*Atranus pubescens*	GNR	S?			2	IICOL9Y010		

Table D-1
2025 Revised
Species of Greatest Conservation Need

Arranged by Common Name

Taxa Group	Common Name	Scientific Name	Global Rank	State Rank	Federal Status	State Status	SWAP Tier	NatureServe Element Code	New in 2025	RSGCN
Insect	Hairy Springfly	*Oconoperla innubila*	G2	S2			2	IIPLE2S010		
Insect	Harpeth Stone	*Perlesta etnieri*	G1G2	S1			2	IIPLE1U190		
Insect	Helma's Net-spinning Caddisfly	*Cheumatopsyche helma*	G3G4	S1S3			2	IITRI22040		
Insect	Hilly Springtail	*Pseudosinella collina*	GNR	S?			2	IICLL01090		
Insect	Indian Cave Point Cave Beetle	*Pseudanophthalmus tiresias*	G1	S1			2	IICOL4E660		
Insect	Inquirer Cave Beetle	*Pseudanophthalmus inquisitor*	G1	S1			2	IICOL4E350		
Insect	Intermediate Cave Beetle	*Pseudanophthalmus intermedius*	G2	S2			2	IICOL4EY30		
Insect	Jone's Cave Cricket	*Hadenoecus jonesi*	GNR	S2			2	IIORT9G020		
Insect	Karst Snowfly	*Allocapnia cunninghami*	G1G2	S1	UR		2	IIPLE01030		
Insect	Keyhole cave beetle	*Pseudanophthalmus sp.*	G1	S?			2			
Insect	Light Shunning Rove Beetle	*Atheta lucifuga*	G4	S2			2	IICOL93040		
Insect	Linda's Roadside-Skipper	*Amblyscirtes linda*	G2G3	S2	UR		2	IILEP80050		
Insect	Long-headed Cave Beetle	*Pseudanophthalmus longiceps*	G1G2	S1			2	IICOL4E410		
Insect	Loopy Five Firefly	*Photuris forresti*	G1	SNR			2	IICOL5Y250	Y	
Insect	Marshall's Cave Springtail	*Arrhopalites marshalli*	G2	S2			2			
Insect	Meredith Cave Beetle	*Pseudanophthalmus sidus*	G1	S1			2	IICOL4E630		
Insect	Mill Hollow Cave Dipluran	*Litocampa sp. 7*	G1	S1			2	IITHS01130		
Insect	Millers Cave Beetle	*Pseudanophthalmus sp. 36*	GNR	S1?			2	IICOL4ED30		
Insect	Missus Cave Springtail	*Lethemurus missus*	G4	S2			2	IICLL06030		
Insect	Monarch	*Danaus plexippus*	G4	S4	PT		2	IILEPP2010	Y	
Insect	Mountain Eye Cave Dipluran	*Litocampa sp. 8*	G1	S1			2	IITHS01140		
Insect	Mountain River Cruiser	*Macromia margarita*	G3	S2S3	UR		2	IIODO26070		
Insect	Mushroom Springtail	*Ceratophysella denticulata*	GNR	S?			2	IICLL09030		
Insect	Nickajack Cave Beetle	*Pseudanophthalmus nickajackensis*	G1	S1			2	IICOL4E430		
Insect	Nobletts Cave Beetle	*Pseudanophthalmus paulus*	G1	S1			2	IICOL4E490		
Insect	Northern Barrens Tiger Beetle	*Cicindela patruela*	G3	S2			2	IICOL02230	Y	
Insect	Norton's Cave Beetle	*Pseudanophthalmus nortoni*	G1	S1			2	IICOL4E440		
Insect	Opaque Round Fungus Beetle	*Prionochaeta opaca*	G5	S?			2	IICOL92010		
Insect	Pale Cave Beetle	*Pseudanophthalmus pallidus*	G1G2	S1S2			2	IICOL4E460		
Insect	Pale-footed Ocellate Rove Beetle	*Lesteva pallipes*	G5	S?			2	IICOLB3010		
Insect	Payne's Cave Beetle	*Pseudanophthalmus paynei*	G1	S1			2	IICOL4E500		
Insect	Peck's Cave Springtail	*Pseudosinella pecki*	G2G3	S2			2	IICLL01240		
Insect	Perplexing Snowfly	*Allocapnia perplexa*	G1	S1			2	IIPLE01250		
Insect	Pygmy Snaketail	*Ophiogomphus howei*	G3	S3?			2	IIODO12090		
Insect	Reversed Roadside-Skipper	*Amblyscirtes reversa*	G3	S2			2	IILEP80140	Y	
Insect	Ridgetop Cave Beetle	*Pseudanophthalmus paradoxus*	G1	S1			2	IICOL4E470		
Insect	Rotund Cave Beetle	*Pseudanophthalmus rotundatus*	G2	S2			2	IICOL4E770		
Insect	Round Fungus Beetle	*Catops gratiosus*	G5	S?			2	IICOLA6010		
Insect	Rumbling Falls Cave Beetle	*Pseudanophthalmus sp. 27*	G1	S1			2	IICOL4EX40		
Insect	Rumbling Falls Cave Dipluran	*Litocampa sp. 5*	G2	S1			2	IITHS01210		
Insect	Rusty-patched Bumble Bee	*Bombus affinis*	G2	S1	LE		2	IIHYM24020	Y	Y
Insect	Sells cave ground beetle	*Pseudanophthalmus sp.*	G2	S?			2			
Insect	sepsid Black scavenger fly	*Undetermined species*	G?	S?			2			
Insect	Septima's Clubtail	*Gomphurus septima*	G3	SR	UR		2	IIODO08190		
Insect	Sequatchie Caddisfly	*Glyphopsyche sequatchie*	G1	S1			2	IITRI14020		
Insect	Sevier Snowfly	*Allocapnia brooksi*	G2	S2	UR		2	IIPLE01020		
Insect	Silver Fork Cane Moth	*Argillophora furcilla*	G3G4	S2?			2	IILEY9R010	Y	
Insect	Simple Cave Beetle	*Pseudanophthalmus simplex*	G1G2	S1S2			2	IICOL4E640		

Taxa Group	Common Name	Scientific Name	Global Rank	State Rank	Federal Status	State Status	SWAP Tier	NatureServe Element Code	New in 2025	RSGCN
Insect	Slender Ground Beetle	*Platynus tenuicollis*	G5	S?			2	IICOL9N090		
Insect	small carrion beetle	*Nemadus horni*	G4	S?			2			
Insect	Smokies Forestfly	*Zapada chila*	G2	S1			2	IIPLE0U010		
Insect	Smokies Needlefly	*Megaleuctra williamsae*	G3	S1	UR		2	IIPLE0G060		
Insect	Smokies Snowfly	*Allocapnia fumosa*	G2	S2			2	IIPLE01080		
Insect	Southern Plains Bumble Bee	*Bombus fraternus*	G3G4	SNR	UR		2	IIHYM24440	Y	Y
Insect	springtails	*Onychiurus sp.*	G?	S?			2			
Insect	Stannard's Agarodes Caddisfly	*Agarodes stannardi*	G2	S2			2	IITRI1H030		
Insect	Stellate springtail	*Folsomia stella*	G4	S?			2			
Insect	Swamp River Cave Neanura	*Neanura sp. 1*	G1	S1			2	IICLL12040		
Insect	Swamp River Cave Onychiurus	*Onychiurus sp. 2*	G1	S1			2	IICLL17120		
Insect	Swamp River Cave Pseudosinella	*Pseudosinella sp. 5*	G1	S1			2	IICLL01290		
Insect	Tawny Crescent	*Phyciodes batesii*	G3G4	S1S2			2	IILEPK3040	Y	
Insect	Tennessee Clubtail	*Phanogomphus sandrius*	G1	S1	UR		2	IIODO08390		
Insect	Tennessee Forestfly	*Amphinemura mockfordi*	G2	S2	UR		2	IIPLE0H060		
Insect	Tennessee Springfly	*Hydroperla rickeri*	G2	S2			2	IIPLE2P040		
Insect	Tiny Cave Beetle	*Pseudanophthalmus pusillus*	G1	S1			2	IICOL4E550		
Insect	Troglophilic Fly	*Macrocera nobilis*	GNR	S?			2	IIDIP90010		
Insect	Truncated Springtail	*Desoria truncata*	GNR	S?			2	IICLL11100		
Insect	Two-toothed Springtail	*Pogonognathellus bidentatus*	GNR	S?			2	IICLL06020		
Insect	undescribed cave dipluran	*Litocampa sp. 1*	G1	S?			2			
Insect	Union County Cave Beetle	*Pseudanophthalmus unionis*	G1G2	S1			2	IICOL4E680		
Insect	Variable Cuckoo Bumble Bee	*Bombus variabilis*	G1G2	SNR	UR		2	IIHYM24320	Y	Y
Insect	Wallace's Cave Beetle	*Pseudanophthalmus wallacei*	G1	S1			2	IICOL4E700		
Insect	Western Cave Beetle	*Pseudanophthalmus occidentalis*	G1G2	S1			2	IICOL4E450		
Insect	White Springtail	*Folsomia candida*	GNR	S?			2	IICLL10010		
Insect	White springtail	*Pseudosinella alba*	G4	S?			2			
Insect	Wilmoth cave beetle	*Pseudanophthalmus sp.*	G1	S?			2			
Insect	Yellow-banded Bumble Bee	*Bombus terricola*	G3G4	SNR			2	IIHYM24220	Y	Y
Mammal	Allegheny Woodrat	*Neotoma magister*	G3G4	S3		D	1	AMAFF08100		Y
Mammal	American Water Shrew	*Sorex palustris*	G5	S2		D	1	AMABA01420		Y
Mammal	Appalachian Cottontail	*Sylvilagus obscurus*	G4	S3			1	AMAEB01090		Y
Mammal	Carolina Northern Flying Squirrel	*Glaucomys sabrinus coloratus*	G5T2	S1S2	LE	E	3	AMAFB09022		Y
Mammal	Cinereus Shrew	*Sorex cinereus*	G5	S4			1	AMABA01010		
Mammal	Eastern Harvest Mouse	*Reithrodontomys humulis*	G5	S5			1	AMAFF02020	Y	
Mammal	Eastern Pygmy Shrew	*Sorex hoyi*	G5	S2		D	1	AMABA01050		
Mammal	Eastern Spotted Skunk	*Spilogale putorius*	G4	S3		T	1	AMAJF05050		Y
Mammal	Eastern Water Shrew	*Sorex albibarbis*	G5	S2		D	1	AMABA01290	Y	
Mammal	Eastern Woodrat	*Neotoma floridana illinoensis*	G5T5	S3		D	1	AMAFF08016		
Mammal	Golden Mouse	*Ochrotomys nuttalli*	G5	S5			1	AMAFF04010		
Mammal	Hairy-tailed Mole	*Parascalops breweri*	G5	S3		D	1	AMABB03010		
Mammal	Least Weasel	*Mustela nivalis*	G5	S2			1	AMAJF02020		
Mammal	Long-tailed Shrew	*Sorex dispar*	G4	S2		D	1	AMABA01210		Y
Mammal	Long-tailed Weasel	*Neogale frenata*	G5	S5		D	1	AMAJF02030	Y	Y
Mammal	Meadow Jumping Mouse	*Zapus hudsonius*	G5	S4	(PS)	D	1	AMAFH01040		
Mammal	North American Least Shrew	*Cryptotis parva*	G5	S5			1	AMABA04010	Y	
Mammal	North American Red Squirrel	*Tamiasciurus hudsonicus*	G5	S4S5			1	AMAFB08040		
Mammal	Smoky Shrew	*Sorex fumeus*	G5	S4			1	AMABA01180		

Taxa Group	Common Name	Scientific Name	Global Rank	State Rank	Federal Status	State Status	SWAP Tier	NatureServe Element Code	New in 2025	RSGCN
Mammal	Southeastern Shrew	*Sorex longirostris*	G5	S4			1	AMABA01060		
Mammal	Southern Appalachian Woodrat	*Neotoma floridana haematoreia*	G5T4Q	S2		D	1	AMAFF08015		Y
Mammal	Southern Bog Lemming	*Synaptomys cooperi*	G5	S4		D	1	AMAFF17010		
Mammal	Southern Red-backed Vole	*Clethrionomys gapperi*	G5	S4			1	AMAFF09020	Y	
Mammal	Southern Rock Vole	*Microtus chrotorrhinus carolinensis*	G5T3	S2		E	1	AMAFF11091		Y
Mammal	Star-nosed Mole	*Condylura cristata*	G5	S2		D	1	AMABB05010		
Mammal	Woodland Jumping Mouse	*Napaeozapus insignis*	G5	S4			1	AMAFH02010		
Millipede	a cave milliped	*Pseudotremia sp.*	G?	S?			2			
Millipede	a cave milliped	*Scoterpes sp.*	G?	S?			2			
Millipede	a cave milliped	*Scoterpes undescribed sp.*	G2G3	S?			2			
Millipede	a cave millipede	*Chaetaspis mollis*	G1	S1			2	ITUNI63030		
Millipede	a cave obligate millipede	*Ameractis satis*	G2G4	S?			2	ITUNI77010		
Millipede	a cave obligate millipede	*Chaetaspis debilis*	G?	S?			2			
Millipede	a cave obligate millipede	*Pseudotremia acheron*	G1G2	S1			2	ITUNI03160		
Millipede	a cave obligate millipede	*Pseudotremia cercops*	G1	S1			2	ITUNI03200		
Millipede	a cave obligate millipede	*Pseudotremia deprehendor*	G1	S1?			2	ITUNI03210		
Millipede	a cave obligate millipede	*Pseudotremia eburnea*	G2G4	SNR			2	ITUNI03220		
Millipede	a cave obligate millipede	*Pseudotremia lethe*	G1	S1			2	ITUNI03240		
Millipede	a cave obligate millipede	*Pseudotremia lictor*	G1	S1			2	ITUNI03250		
Millipede	a cave obligate millipede	*Pseudotremia minos*	G1	S1			2	ITUNI03270		
Millipede	a cave obligate millipede	*Pseudotremia n. sp.*	G?	S?			2			
Millipede	a cave obligate millipede	*Pseudotremia rhadamanthus*	G1G2	S1			2	ITUNI03290		
Millipede	a cave obligate millipede	*Scoterpes blountensis*	G?	S?			2			
Millipede	a cave obligate millipede	*Scoterpes copei*	G3G4Q	S1			2	ITUNI01030		
Millipede	a cave obligate millipede	*Scoterpes hesperus*	G?	S?			2			
Millipede	a cave obligate millipede	*Scoterpes jackdanieli*	G?	S?			2			
Millipede	a cave obligate millipede	*Scoterpes musicarustica*	G?	S?			2			
Millipede	a cave obligate millipede	*Scoterpes tricorner*	G?	S?			2			
Millipede	a cave obligate millipede	*Scoterpes ventus*	G3	S1			2	ITUNI01040		
Millipede	a cave obligate millipede	*Tetracion jonesi*	G3G4	S1S2			2	ITUNI70010		
Millipede	a cave obligate millipede	*Tetracion tennesseensis*	G2G3	S2S3			2	ITUNI70020		
Millipede	a milliped	*Cambala sp.*	G?	S?			2			
Millipede	a millipede	*Delophon holti*	GNR	S1			2	ITUNI85010		
Millipede	a millipede	*Ophyiulus pilosus*	G5	S?			2	ITUNI35010		
Millipede	a millipede	*Pseudotremia nodosa*	G4	S2S3			2	ITUNI03030		
Millipede	a millipede	*Pseudotremia valga*	G1G2	S1?			2	ITUNI03070		
Millipede	Baker cave milliped	*Pseudotremia sp. 10*	G1	S?			2			
Millipede	Barr's cave milliped	*Pseudotremia sp. 7*	G?	S?			2			
Millipede	cave millipeds	*Chaetaspis sp.*	G?	S?			2			
Millipede	Garland's Cave Millipede	*Pseudotremia garlandae*	G1	S1			2	ITUNI03430		
Millipede	Hoffman's cave milliped	*Pseudotremia undescribed sp.*	G1	S?			2			
Millipede	Holliday's cave milliped	*Pseudotremia sp. 9*	G1	S?			2			
Millipede	Mann's Cave Millipede	*Pseudotremia manni*	G1	S1			2	ITUNI03410		
Millipede	Roebuck's Cave Millipede	*Pseudotremia roebuckorum*	G1	S1			2	ITUNI03420		
Millipede	Shear's cave milliped	*Pseudotremia undescribed sp.*	G1	S?			2			
Millipede	Skylight cave milliped	*Pseudotremia sp. 8*	G1	S?			2			
Millipede	Slippery slit cave milliped	*Pseudotremia sp. 6*	G1	S?			2			
Millipede	Three Forks cave milliped	*Pseudotremia sp. 5*	G1	S?			2			

Taxa Group	Common Name	Scientific Name	Global Rank	State Rank	Federal Status	State Status	SWAP Tier	NatureServe Element Code	New in 2025	RSGCN
Millipede	Thunder Run Cave Millipede	*Chaetaspis sp. 1*	G1	S1			2	ITUNI63020		
Millipede	Wallace's Cave Millipede	*Pseudotremia wallaceae*	G1	S1			2	ITUNI03400		
Plant	a crestwort	*Lophocolea muricata*	G5	S1		T	4	NBHEP1W070		
Plant	a flapwort	*Solenostoma obscurum*	G2G4	S2			4	NBHEP1P050	Y	
Plant	a liverwort	*Acrobolbus ciliatus*	G3?	S1		S	4	NBHEP01010		
Plant	a liverwort	*Bazzania nudicaulis*	G2G3	S2		T	4	NBHEP0F030		
Plant	a liverwort	*Cephaloziella massalongoi*	G3G5	S1		E	4	NBHEP0Q0C0		
Plant	a liverwort	*Cephaloziella spinicaulis*	G4	S1		S	4	NBHEP0Q0J0		
Plant	a liverwort	*Frullania caulisequa*	G5	S1		S	4	NBHEP1A0R0		
Plant	a liverwort	*Frullania plana*	G4	S2		S	4	NBHEP1A0J0	Y	
Plant	a liverwort	*Gymnomitrion laceratum*	G3G5	S1		T	4	NBHEP1E040		
Plant	a liverwort	*Lejeunea ruthii*	G3G4	S2			4	NBHEP1R0N0	Y	
Plant	a liverwort	*Marsupella funckii*	G4G5	S1		E	4	NBHEP22090		
Plant	a liverwort	*Metzgeria uncigera*	G3	S1		S	4	NBHEP27080		
Plant	a liverwort	*Pedinophyllum interruptum*	G3G4	S1		S	4	NBHEP2G010		
Plant	a liverwort	*Plagiochila austinii*	G3	S3		S	4	NBHEP2M060	Y	
Plant	a liverwort	*Plagiochila echinata*	G3	S2		S	4	NBHEP2M0C1	Y	
Plant	a liverwort	*Plagiochila exigua*	G4?	S1S2		S	4	NBHEP2M090		
Plant	a liverwort	*Radula australis*	G3G4	S3			4	NBHEP2V020	Y	
Plant	a liverwort	*Radula sullivantii*	G3	SNR		S	4	NBHEP2V0A0	Y	
Plant	a liverwort	*Radula tenax*	G3G4	S3		S	4	NBHEP2V0B0	Y	
Plant	a liverwort	*Radula voluta*	G3	S2		S	4	NBHEP2V0C0		
Plant	a liverwort	*Riccardia jugata*	G2	S2		S	4	NBHEP2Y060	Y	
Plant	a liverwort	*Solenostoma appalachianum*	GNR	S1		S	4	NBHEP3L010		
Plant	a liverwort	*Solenostoma fossombronioides*	G4	S1		S	4	NBHEP1P070		
Plant	a screw moss	*Syntrichia amphidiacea*	G3G5	S1		E	4	NBMUS7L0V0	Y	
Plant	Agoyan Cataract Moss	*Scopelophila cataractae*	G3	S1		S	4	NBMUS6U010		
Plant	Alabama Grapefern	*Botrychium jenmanii*	G3G4	S1		T	4	PPOPH01060		Y
Plant	Alabama Snow-wreath	*Neviusia alabamensis*	G3	S2		T	4	PDROS14010		Y
Plant	Alderleaf Buckthorn	*Rhamnus alnifolia*	G5	S1		E	4	PDRHA0C010		
Plant	Allegheny Mountain Golden-banner	*Thermopsis mollis*	G3G4	S2S3		S	4	PDFAB3Z062		Y
Plant	American Barberry	*Berberis canadensis*	G3G4	S2		S	4	PDBER02010		Y
Plant	American Bittercress	*Cardamine rotundifolia*	G4	S2S3		S	4	PDBRA0K120		
Plant	American Chaffseed	*Schwalbea americana*	G2	SX	LE	W-H	3	PDSCR1Q010		Y
Plant	American Chestnut	*Castanea dentata*	G3	S2S3		S	4	PDFAG01020		Y
Plant	American Cord Moss	*Funaria americana*	G3?	S1?		T	4	NBMUS2Z010		
Plant	American Fly-honeysuckle	*Lonicera canadensis*	G5	S1		T	4	PDCPR03040		
Plant	American Ginseng	*Panax quinquefolius*	G3G4	S3S4		S-CE	4	PDARA09010		Y
Plant	American Hart's-tongue Fern	*Asplenium scolopendrium var. americanum*	G4T3	S1	LT	E	3	PPASP021E1		Y
Plant	American Pillwort	*Pilularia americana*	G4?	S1S2		S	4	PPMAR02010		
Plant	American Smoketree	*Cotinus obovatus*	G4	S2		S	4	PDANA03020		
Plant	American Speedwell	*Veronica americana*	G5	S1		S	4	PDSCR20030		
Plant	American Water-pennywort	*Hydrocotyle americana*	G5	S1		E	4	PDAPI16010		
Plant	American Wintergreen	*Pyrola americana*	G5	S2		E	4	PDPYR04010		
Plant	Ammons' Screw Moss	*Syntrichia ammonsiana*	G4	S1		E	4	NBMUS7L010		
Plant	Andrews' Earwort	*Diplophyllum andrewsii*	G3	S1		S	4	NBHEP15020	Y	
Plant	Appalachian Bugbane	*Actaea rubifolia*	G3	S3		W	4	PDRAN07060		

Table D-1
2025 Revised
Species of Greatest Conservation Need

Arranged by Common Name

Taxa Group	Common Name	Scientific Name	Global Rank	State Rank	Federal Status	State Status	SWAP Tier	NatureServe Element Code	New in 2025	RSGCN
Plant	Appalachian Crestwort	*Lophocolea appalachiana*	G2	S1		S	4	NBHEP1W080		
Plant	Appalachian Filmy Fern	*Vandenboschia boschiana*	G4	S1S2		T	4	PPHYM02040		Y
Plant	Appalachian Fir-clubmoss	*Huperzia appalachiana*	G5	S1		T	4	PPLYC020J0		
Plant	Appalachian Gentian	*Gentiana austromontana*	G3	S3		WL	4	PDGEN06060		Y
Plant	Appalachian Haircap Moss	*Polytrichastrum appalachianum*	G3	S1			4	NBMUS5T0B0	Y	
Plant	Appalachian Hedge-nettle	*Stachys appalachiana*	G1G2	S1		E	4	PDLAM1X1K0	Y	Y
Plant	Appalachian Pellia	*Pellia appalachiana*	G4	S2		S	4	NBHEP2H040		
Plant	Appalachian Pocket Moss	*Fissidens appalachensis*	G2G3	S1		T	4	NBMUS2W020	Y	
Plant	Appalachian Quillwort	*Isoetes appalachiana*	G4	S1		E	4	PPISO01230	Y	
Plant	Appalachian Rose-gentian	*Sabatia capitata*	G2	S2		E	4	PDGEN0F090		Y
Plant	Appalachian Rosinweed	*Silphium wasiotense*	G3	S2		W	4	PDAST8L0K0		Y
Plant	Appalachian Scalewort	*Frullania appalachiana*	G3G4	S1?		S	4	NBHEP1A0P0	Y	
Plant	Appalachian Threadwort	*Drepanolejeunea appalachiana*	G3	S1		S	4	NBHEP17010		
Plant	Appalachian Woodsia	*Woodsia appalachiana*	G4	S1S2		S	4	PPDRY0U020		
Plant	Arctic Bentgrass	*Agrostis mertensii*	G5	S1		S	4	PMPOA040T0		
Plant	Ashleaf Bush-pea	*Thermopsis fraxinifolia*	G3?	S3		T	4	PDFAB3Z061		Y
Plant	Barbed Rattlesnake-root	*Prenanthes barbata*	G3	S2		S	4	PDAST7K060		Y
Plant	Barratt's Sedge	*Carex barrattii*	G4	S2		E	4	PMCYP031K0		Y
Plant	Barrens Silky Aster	*Symphyotrichum pratense*	G4?	S1		E	4	PDASTE8180		Y
Plant	Bay Starvine	*Schisandra glabra*	G3	S2		T	4	PDSCH01020		Y
Plant	Beadle's Mountainmint	*Pycnanthemum beadlei*	G3	S1S2		E	4	PDLAM1N0M0		Y
Plant	Beak Grass	*Diarrhena obovata*	G4G5	S1		S	4	PMPOA23020		
Plant	Beaked Sedge	*Carex utriculata*	G5	S1		W-H	4	PMCYP03H90		
Plant	Beautiful Barbara's-Buttons	*Marshallia pulchra*	G3	S2		E	4	PDAST68100	Y	
Plant	Bent Avens	*Geum geniculatum*	G2	S1		E	4	PDROS0S050		Y
Plant	Bicknell's Panicgrass	*Dichanthelium bicknellii*	G4?Q	S1		S	4	PMPOA4K2N0	Y	
Plant	Blackfoot Quillwort	*Isoetes melanopoda*	G5	S1S2		E	4	PPISO010D0		
Plant	Blomquist Leafy Liverwort	*Lejeunea blomquistii*	G3	S1S2		S	4	NBHEP1R040		
Plant	Blomquist's Pouchwort	*Calypogeia muelleriana ssp. blomquistii*	G5T3	S1			4	NBHEP0M031	Y	
Plant	Blue Mud-plantain	*Heteranthera limosa*	G5	S1S2		T	4	PMPON03030		
Plant	Blue Ridge Bittercress	*Cardamine flagellifera*	G3	S2		T	4	PDBRA0K0E0		
Plant	Blue Ridge False Foxglove	*Agalinis decemloba*	G3G4	S1	(PS)	E	4	PDSCR01060	Y	Y
Plant	Blue Ridge Goldenrod	*Solidago spithamaea*	G2	S1	LT	E	3	PDAST8P200		Y
Plant	Blue Ridge St. John's-wort	*Hypericum mitchellianum*	G3	S2		T	4	PDCLU03140		Y
Plant	Blue Sage	*Salvia azurea var. grandiflora*	G4G5T4?	S3		S	4	PDLAM1S052		
Plant	Blue Scorpionweed	*Phacelia ranunculacea*	G4	S2S3			4	PDHYD0C420		
Plant	Blunted Earwort	*Diplophyllum obtusatum*	G2?	S1		S	4	NBHEP15060	Y	
Plant	Blunt-lobe Grapefern	*Botrychium oneidense*	G4	S1		S	4	PPOPH010C0		
Plant	Boar Moss	*Brothera leana*	G3G4	S1			4	NBMUS11010	Y	
Plant	Bog Clubmoss	*Lycopodiella inundata*	G5	S1		S	4	PPLYC03060	Y	
Plant	Bog Ragwort	*Packera crawfordii*	G2	S1		E	4	PDASTE60H0	Y	Y
Plant	Bog Rush	*Juncus elliottii*	G4G5	S1		S	4	PMJUN01120	Y	
Plant	Bog Wild Oatgrass	*Danthonia epilis*	G4	S1S2		S	4	PMPOA200C0		
Plant	Box Huckleberry	*Gaylussacia brachycera*	G3	S2S3			4	PDERI0G020	Y	
Plant	Boykin's Milkwort	*Polygala boykinii*	G4	S2		T	4	PDPGL02060		
Plant	Bradley's Spleenwort	*Asplenium bradleyi*	G4	S2S3			4	PPASP02050	Y	
Plant	Branched Three-awn Grass	*Aristida ramosissima*	G5	S1		E	4	PMPOA0K0X0		
Plant	Branched Whitlow-grass	*Draba ramosissima*	G4	S2		S	4	PDBRA11250		

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Plant	Branching Bur-reed	*Sparganium androcladum*	G4G5	S1		E	4	PMSPA01020		
Plant	Braun's Rockcress	*Borodinia perstellata*	G2	S1	LE	E	3	PDBRA061G0		Y
Plant	Bristly Sedge	*Carex comosa*	G5	S2		T	4	PMCYP032Y0		
Plant	Broadleaf Barbara's-buttons	*Marshallia trinervia*	G3	S2S3		T	4	PDAST68080		Y
Plant	Broadleaf Bunchflower	*Melanthium latifolium*	G4	S1S2		E	4	PMLIL1F010		
Plant	Broadleaf Goldenrod	*Solidago lancifolia*	G2	S1		E	4	PDAST8P2E0		Y
Plant	Broadleaf Tickseed	*Coreopsis latifolia*	G3	S1S2		E	4	PDAST2L0G0		Y
Plant	Brome-like Sedge	*Carex bromoides ssp. montana*	G5T3?	S1		T	4	PMCYP03264		Y
Plant	Brown's Four-toothed Moss	*Tetrodontium brownianum var. brownianum*	GNRT3T4	S1		S	4	NBMUS7A010		
Plant	Budding Tortula Moss	*Rhachithecium perpusillum*	G4G5	SH		S	4	NBMUS8C010		
Plant	Buffalo Clover	*Trifolium reflexum*	G3G4	S1		E	4	PDFAB40210		Y
Plant	Buffalo Currant	*Ribes aureum var. villosum*	G5T4T5	S1		T	4	PDGRO02033		
Plant	Bug-on-a-Stick Moss	*Buxbaumia aphylla*	G5	S1			4	NBMUS1B010	Y	
Plant	Butternut	*Juglans cinerea*	G3	S3		T	4	PDJUG02030		Y
Plant	Button Sedge	*Carex bullata*	G5?	S3		S	4	PMCYP03290		
Plant	Buxbaum's Sedge	*Carex buxbaumii*	G5	S1		E	4	PMCYP032B0		
Plant	Cain's Reedgrass	*Calamagrostis cainii*	G1	S1		E	4	PMPOA17030		Y
Plant	Canada Burnet	*Sanguisorba canadensis*	G5	S1		E	4	PDROS1L020		
Plant	Canada Frostweed	*Crocanthemum canadense*	G5	S1		E	4	PDCIS02030		
Plant	Canadian Yew	*Taxus canadensis*	G5	S1		E	4	PGTXA01020		
Plant	Canby's Lobelia	*Lobelia canbyi*	G4	S2S3			4	PDCAM0E080		
Plant	Canby's Mountain-lover	*Paxistima canbyi*	G2?	S1		E	4	PDCEL0A010		Y
Plant	Capillary Hairsedge	*Bulbostylis ciliatifolia var. coarctata*	G5T3T5	S1		E	4	PMCYP02032		
Plant	Cardot's Pouncewort	*Microlejeunea globosa*	G3?	S1		S	4	NBHEP1R070		
Plant	Carey's Saxifrage	*Micranthes careyana*	G3	S3			4	PDSAX0U090	Y	
Plant	Carolina Anemone	*Anemone caroliniana*	G5	S1S2		E	4	PDRAN04030		
Plant	Carolina Hemlock	*Tsuga caroliniana*	G3	S3	UR	T	4	PGPIN06020		Y
Plant	Carolina Pink	*Silene caroliniana ssp. pensylvanica*	G5T4	S1S2		T	4	PDCAR0U0B2		
Plant	Carolina Redroot	*Lachnanthes caroliana*	G5	S1		E	4	PMHAE01010		
Plant	Carolina Saxifrage	*Micranthes caroliniana*	G3	S1S2		E	4	PDSAX0U0A0		Y
Plant	Carolina Water-hyssop	*Bacopa caroliniana*	G4G5	S1		S	4	PDSCR06010		
Plant	Catfoot	*Pseudognaphalium helleri*	G4G5	S2		S	4	PDAST44090		
Plant	Cedar Elm	*Ulmus crassifolia*	G5	S2		S	4	PDULM04030		
Plant	Chamomile Grapefern	*Botrychium matricariifolium*	G5	S1		S	4	PPOPH01290		
Plant	Chapman's Redtop	*Tridens flavus var. chapmanii*	G5T3	S1		E	4	PMPOA65071		Y
Plant	Chapman's Sedge	*Carex chapmanii*	G3	S1			4	PMCYP032R0		Y
Plant	Choke Cherry	*Prunus virginiana*	G5	S1		S	4	PDROS1C1E0		
Plant	Clasping Twisted-stalk	*Streptopus amplexifolius*	G5	S1		T	4	PMLIL1X010		
Plant	Clay Moss	*Archidium alternifolium*	G4G5	S1		T	4	NBMUS0G010		
Plant	Cleft Phlox	*Phlox bifida ssp. stellaria*	G5?T3	S3		T	4	PDPLM0D0A2		Y
Plant	Climbing Fumitory	*Adlumia fungosa*	G4	S2		T	4	PDFUM02010		
Plant	Clingman's Hedge-nettle	*Stachys clingmanii*	G2	S1S2		T	4	PDLAM1X0A0		Y
Plant	Closter's Brook Moss	*Hygrohypnum closteri*	G3	S1			4	NBMUS3S030	Y	
Plant	Cluster Fescue	*Festuca paradoxa*	G5	S1		S	4	PMPOA2V0P0		
Plant	Coastal False Asphodel	*Triantha racemosa*	G5	S1		E	4	PMLIL1Y050		
Plant	Coastal Plain Yellow-eyed-grass	*Xyris ambigua*	G5	S1		E	4	PMXYR01010		
Plant	Coastal Sweet-pepperbush	*Clethra alnifolia*	G5	S1		E	4	PDCLE01040		

Taxa Group	Common Name	Scientific Name	Global Rank	State Rank	Federal Status	State Status	SWAP Tier	NatureServe Element Code	New in 2025	RSGCN
Plant	Compass Plant	*Silphium laciniatum*	G5	S2		T	4	PDAST8L080		
Plant	Cow-parsnip	*Heracleum maximum*	G5	S2		S	4	PDAPI15040		
Plant	Cream Tick-trefoil	*Desmodium ochroleucum*	G2G3	S1		E	4	PDFAB1D100		Y
Plant	Cream Wild Indigo	*Baptisia bracteata var. leucophaea*	G4G5T4T5	S1S2		S	4	PDFAB0G041		
Plant	Cream-flower Rockcress	*Arabis pycnocarpa*	G5	S1		T	4	PDBRA064G0		
Plant	Creeping St. John's-wort	*Hypericum adpressum*	G3	S1		E	4	PDCLU03010		Y
Plant	Crested Sedge	*Carex cristatella*	G5	S1		S	4	PMCYP033A0	Y	
Plant	Crested Shieldfern	*Dryopteris cristata*	G5	S2		T	4	PPDRY0A090		
Plant	Cumberland False Rosemary	*Conradina verticillata*	G3	S3	LT	T	3	PDLAM0D050		Y
Plant	Cumberland Rosinweed	*Silphium brachiatum*	G3	S3		E	4	PDAST8L040		Y
Plant	Cumberland Sandwort	*Minuartia cumberlandensis*	G3	S2	DL	E	3	PDCAR0G0Z0		Y
Plant	Curled Notchwort	*Sphenolobus saxicola*	G3G4	S1		S	4	NBHEP04060		
Plant	Cutleaf Meadow-parsnip	*Thaspium pinnatifidum*	G2G3	S1		E	4	PDAPI28020		Y
Plant	Cutleaf Water-milfoil	*Myriophyllum pinnatum*	G5	S1		E	4	PDHAL040A0		
Plant	Cypress-knee Sedge	*Carex decomposita*	G3G4	S2			4	PMCYP033K0	Y	
Plant	Davis' Sedge	*Carex davisii*	G5	S1		S	4	PMCYP033G0		
Plant	Deam's Copperleaf	*Acalypha deamii*	G4?	S1		S	4	PDEUP010L1		
Plant	Downy Arrow-wood	*Viburnum rafinesquianum*	G5	S1		S	4	PDCPR070K0	Y	
Plant	Downy Gentian	*Gentiana puberulenta*	G4G5	S1		E	4	PDGEN060N0		
Plant	Drooping Bluegrass	*Poa saltuensis*	G5	S1		T	4	PMPOA4Z1C0		
Plant	Duck River Bladderpod	*Paysonia densipila*	G3	S3		S	4	PDBRA1N0F0		Y
Plant	Dull Rustwort	*Marsupella paroica*	G3	S1			4	NBHEP220A0	Y	
Plant	Dwarf Filmy Fern	*Didymoglossum petersii*	G4	S2		T	4	PPHYM020K0		Y
Plant	Dwarf Milkwort	*Polygala nana*	G5	S1		E	4	PDPGL02110		
Plant	Dwarf Rattlesnake-plantain	*Goodyera repens*	G5	S1		S	4	PMORC17030		
Plant	Dwarf Sundew	*Drosera brevifolia*	G5	S2		T	4	PDDRO02020		
Plant	Earleaf False Foxglove	*Agalinis auriculata*	G3	S2		E	4	PDSCR01130		Y
Plant	Eastern Eulophus	*Perideridia americana*	G4	S2		E	4	PDAPI1N010		Y
Plant	Eastern Turkeybeard	*Xerophyllum asphodeloides*	G4	S3		T	4	PMLIL26010		Y
Plant	Eastern Waterfan Lichen	*Peltigera hydrothyria*	G4?	S1		T	4	NLVER01020	Y	
Plant	Eaton's Witchgrass	*Dichanthelium spretum*	G5	S1		E	4	PMPOA24110		
Plant	Eggert's Sunflower	*Helianthus eggertii*	G3	S3	DL	S	3	PDAST4N0J0		Y
Plant	Elliott's Blueberry	*Vaccinium elliottii*	G5	S1		E	4	PDERI18160		
Plant	Falling Beakrush	*Rhynchospora caduca*	G5	S1		S	4	PMCYP0N050		
Plant	False Dandelion	*Krigia montana*	G3	S1		T	4	PDAST5D050		Y
Plant	False Gromwell	*Onosmodium molle ssp. subsetosum*	G4G5T4?	S1		E	4	PDBOR0S034		
Plant	False Hair Sedge	*Carex bulbostylis*	GNR	SU		S	4	PMCYP03KH0	Y	
Plant	False Hop Sedge	*Carex lupuliformis*	G4	S2S3			4	PMCYP037T0	Y	Y
Plant	Featherfoil	*Hottonia inflata*	G4	S2		S	4	PDPRI06010		Y
Plant	Fetterbush	*Leucothoe racemosa*	G5	S2		T	4	PDERI0P050		
Plant	Few-flowered Beakrush	*Rhynchospora rariflora*	G5	S1		E	4	PMCYP0N1Z0		
Plant	Field Chickweed	*Cerastium arvense var. velutinum*	G5T4?	S1		E	4	PDCAR06053		
Plant	Field Macewort	*Mannia triandra*	G3G4	S1		T	4	NBHEP20050		
Plant	Fireweed	*Chamerion angustifolium*	G5	S1		T	4	PDONA06020		
Plant	Flat-stem Spikerush	*Eleocharis compressa var. compressa*	G5T5	S1		S	4	PMCYP09220		
Plant	Florida Hedge-hyssop	*Gratiola floridana*	G4	S1		E	4	PDSCR0R050		
Plant	Florida Sedge	*Carex floridana*	G5?	S1		S	4	PMCYP034U0	Y	
Plant	Four-flower Yellow Loosestrife	*Lysimachia quadriflora*	G5?	S1		E	4	PDPRI070M0		

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Plant	Fowl Bluegrass	*Poa palustris*	G5	S1		E	4	PMPOA4Z1X0		
Plant	Foxtail Bog Clubmoss	*Lycopodiella alopecuroides*	G5	S2		T	4	PPLYC03010		
Plant	Fragmented Screw Moss	*Syntrichia fragilis*	G5	S1		E	4	NBMUS7L0B0		
Plant	Fragrant Bedstraw	*Galium uniflorum*	G4G5	S1			4	PDRUB0N2A0		
Plant	Fraser Fir	*Abies fraseri*	G2	S1S2		T	4	PGPIN01050		Y
Plant	Fraser's Loosestrife	*Lysimachia fraseri*	G3	S2		E	4	PDPRI07070		Y
Plant	Fraser's Marsh-St. John's-wort	*Triadenum fraseri*	G5	S1?		S	4	PDCLU06010		
Plant	Fraser's Sedge	*Cymophyllus fraserianus*	G4	S3		S	4	PMCYP05020		
Plant	Fremont's Virgin's-bower	*Clematis fremontii*	G5	S1		E	4	PDRAN080C0		
Plant	Fringed Black-bindweed	*Fallopia cilinodis*	G5	S1S2		T	4	PDPGN0L0R0		
Plant	Fringed Yellow-eyed-grass	*Xyris fimbriata*	G5	S1		E	4	PMXYR01090		
Plant	Gattinger's Bluestar	*Amsonia tabernaemontana var. gattingeri*	G5T3Q	S3		S	4	PDAPO030J3		Y
Plant	Gattinger's Goldenrod	*Solidago gattingeri*	G3?Q	S1		E	4	PDAST8P0P0		Y
Plant	Gattinger's Prairie-clover	*Dalea gattingeri*	G3	S3S4			4	PDFAB1A0N0	Y	
Plant	Giant Blue Cohosh	*Caulophyllum giganteum*	G4G5	S1		T	4	PDBER03020		
Plant	Gibbous Panicgrass	*Sacciolepis striata*	G5	S1		S	4	PMPOA59020		
Plant	Globe Bladderpod	*Physaria globosa*	G2	S2	LE	E	3	PDBRA1N0N0		Y
Plant	Globe-fruit False Loosestrife	*Ludwigia sphaerocarpa*	G4	S1		T	4	PDONA0B0S0		
Plant	Godfrey's Boneset	*Eupatorium godfreyanum*	G4	S1		S	4	PDAST3P250	Y	
Plant	Godfrey's Stitchwort	*Minuartia godfreyi*	G1	S1	UR	E	4	PDCAR0G0D0		Y
Plant	Gorge Goldenrod	*Solidago faucibus*	G3G4	S2		T	4	PDAST8P3N0		Y
Plant	Gorge Leafy Liverwort	*Plagiochila caduciloba*	G3	S2		S	4	NBHEP2M070	Y	
Plant	Grandfather Mountain Leptodontium Moss	*Leptodontium viticulosoides var. sulphureum*	GNRT2	S1S2		E	4	NBMUS46010		
Plant	Granite Gooseberry	*Ribes curvatum*	G4	S1		T	4	PDGRO020C0		Y
Plant	Grape Honeysuckle	*Lonicera reticulata*	G5	S1		E	4	PDCPR03400		
Plant	Grassleaf Arrowhead	*Sagittaria graminea*	G5	S1		T	4	PMALI040A2		
Plant	Grass-leaf Gayfeather	*Liatris pilosa*	GNR	S1		S	4	PDAST5X1V0		
Plant	Gray's Lily	*Lilium grayi*	G1G2	S1		E	4	PMLIL1A060		Y
Plant	Great Angelica	*Angelica atropurpurea*	G5	S1			4	PDAPI07040		
Plant	Great Plains Ladies'-tresses	*Spiranthes magnicamporum*	G3G4	S1		E	4	PMORC2B0K0		Y
Plant	Green Pitcherplant	*Sarracenia oreophila*	G2	SNR	LE		3	PDSAR02050		
Plant	Green-and-gold	*Chrysogonum virginianum*	G5	S2		T	4	PDAST29010		
Plant	Groove-stem Indian-plantain	*Arnoglossum plantagineum*	G4G5	S2		T	4	PDASTD7060		
Plant	Hairy Fimbry	*Fimbristylis puberula*	G5	S1S2		T	4	PMCYP0B0G0		
Plant	Hairy Hawkweed	*Hieracium longipilum*	G4G5	S1		S	4	PDAST4W0X0		
Plant	Hairy Ludwigia	*Ludwigia hirtella*	G5	S3		S	4	PDONA0B090	Y	
Plant	Hairy Skullcap	*Scutellaria arguta*	G1?Q	S1		E	4	PDLAM1U070		
Plant	Hairy Umbrella-sedge	*Fuirena squarrosa*	G5?	S1		S	4	PMCYP0C070		
Plant	Hairy Willowherb	*Epilobium ciliatum*	G5	S1		T	4	PDONA06040		
Plant	Halberd-leaf Tearthumb	*Polygonum arifolium*	G5	S1		T	4	PDPGN0L080		
Plant	Harbison's Hawthorn	*Crataegus harbisonii*	G1	S1		E	4	PDROS0H9F0		Y
Plant	Hare Figwort	*Scrophularia lanceolata*	G5	SH		S	4	PDSCR1S050	Y	
Plant	Harper's Fimbry	*Fimbristylis perpusilla*	G2	S1	UR	E	4	PMCYP0B0F0		Y
Plant	Harper's Umbrella-plant	*Eriogonum longifolium var. harperi*	G4T1T2	S1		E	4	PDPGN083R2		Y
Plant	Harvey's Beakrush	*Rhynchospora harveyi*	G4	S1		T	4	PMCYP0N110	Y	Y
Plant	Harvey's Buttercup	*Ranunculus harveyi*	G4	S1		S	4	PDRAN0L130	Y	
Plant	Hay Sedge	*Carex argyrantha*	G5	S1		T	4	PMCYP03110		

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Plant	Headwaters Hornwort	*Megaceros aenigmaticus*	G3	S2S3		S	4	NBANT04010		
Plant	Heartleaf Meehania	*Meehania cordata*	G5	S2		T	4	PDLAM11010		
Plant	Heartleaf Paper Birch	*Betula cordifolia*	G5	S1		E	4	PDBET020C2		
Plant	Heartleaf Plantain	*Plantago cordata*	G4	S1		E	4	PDPLN02090		Y
Plant	Heavy-fruit Sedge	*Carex gravida*	G5	S1			4	PMCYP035G0		
Plant	Heller's Cudweed	*Pseudognaphalium helleri ssp. micradenium*	G4G5T3?	S2		S	4	PDAST44092	Y	
Plant	Herb-Robert	*Geranium robertianum*	G5	S1		S	4	PDGER020Z0		
Plant	Hispid False Mallow	*Malvastrum hispidum*	G3G5	S2S3			4	PDMAL0S060	Y	
Plant	Hitchcock's Sedge	*Carex hitchcockiana*	G5	S1		T	4	PMCYP03630		
Plant	Hiwassee Hedge Nettle	*Stachys glandulosissima*	G1	S1		S	4	PDLAM1X1Q0	Y	Y
Plant	Horned Beakrush	*Rhynchospora capillacea*	G4G5	S1		E	4	PMCYP0N070		
Plant	Horned Bladderwort	*Utricularia cornuta*	G5	S1		E	4	PDLNT02030		
Plant	Horsehair Threadwort	*Sphenolobopsis pearsonii*	G4	S1		E	4	NBHEP36010		
Plant	Horsesugar	*Symplocos tinctoria*	G5	S2		S	4	PDSYM01040		
Plant	Horsetail Spikerush	*Eleocharis equisetoides*	G4	S1		E	4	PMCYP090N0		Y
Plant	Hot Porella	*Porella gracillima*	GNR	S1		E	4	NBHEP2Q0G0		
Plant	Inland Muhly	*Muhlenbergia glabrifloris*	G4?	S1		S	4	PMPOA480S0		Y
Plant	Inland Sedge	*Carex interior*	G5	S1S2		E	4	PMCYP036K0	Y	
Plant	John Beck's Leafcup	*Polymnia johnbeckii*	G1	S1		E	4	PDAST7G050	Y	Y
Plant	John's-cabbage	*Hydrophyllum virginianum*	G5	S3		T	4	PDHYD08080		
Plant	Kidneyleaf Twayblade	*Listera smallii*	G4	S3		FS	4	PMORC1N080		
Plant	Knothole Moss	*Anacamptodon splachnoides*	G3G5	S3			4	NBMUS08010	Y	
Plant	Kral's Beardtongue	*Penstemon kralii*	G2	S1		E	4	PDSCR1L850	Y	Y
Plant	Lake-bank Sedge	*Carex lacustris*	G5	S1			4	PMCYP036W0		
Plant	Lake-cress	*Rorippa aquatica*	G4?	S2		S	4	PDBRA07010		Y
Plant	Lamance Iris	*Iris brevicaulis*	G4	S1		E	4	PMIRI09030		Y
Plant	Lanceleaf Loosestrife	*Lysimachia hybrida*	G5	S2		S	4	PDPRI070A0	Y	
Plant	Lanceleaf Wakerobin	*Trillium lancifolium*	G3	S1		E	4	PMLIL200G0		Y
Plant	Lance-like Spikerush	*Eleocharis lanceolata*	G4G5	S1		S	4	PMCYP090Y0		
Plant	Large Brook Moss	*Hygrohypnum subeugyrium*	G3	S1			4	NBMUS3S0D0	Y	
Plant	Large Cranberry	*Vaccinium macrocarpon*	G5	S2		T	4	PDERI180J0		
Plant	Large Purple Fringed Orchid	*Platanthera grandiflora*	G5	S2		E	4	PMORC1Y090		
Plant	Large-flower Rock-pink	*Phemeranthus mengesii*	G3	S2		T	4	PDPOR0A020		Y
Plant	Large-flower Skullcap	*Scutellaria montana*	G4	S4	LT	T	3	PDLAM1U0U0		
Plant	Largeleaf Grass-of-Parnassus	*Parnassia grandifolia*	G3	S3		S	4	PDSAX0P060		Y
Plant	Largeleaf Leafy Moss	*Rhizomnium magnifolium*	G5	S1S2			4	NBMUS9Q080	Y	
Plant	Largeleaf Pondweed	*Potamogeton amplifolius*	G5	S1		T	4	PMPOT03020		
Plant	Larkspur Tickseed	*Coreopsis delphiniifolia*	G3?	S1			4	PDAST2L100		Y
Plant	Late Goldenrod	*Solidago tarda*	G4?Q	S1		S	4	PDAST8P2J0		
Plant	Laurel-leaf Greenbrier	*Smilax laurifolia*	G5	S1		S	4	PMSMI010F0		
Plant	Laxleaf Yellow-eyed-grass	*Xyris laxifolia var. iridifolia*	G4G5T4T5	S2		T	4	PMXYR010D2		
Plant	Leafy Prairie-clover	*Dalea foliosa*	G2G3	S2S3	LE	E	3	PDFAB1A0K0		Y
Plant	Lea's Bog Lichen	*Phaeophyscia leana*	G2	S1			4	NLLEC6A020	Y	
Plant	Least Grapefern	*Botrychium simplex*	G5	S1		E	4	PPOPH010E0		
Plant	Least Trillium	*Trillium pusillum*	G4	S2		E	4	PMLIL200Q0		Y
Plant	Leatherleaf Meadowrue	*Thalictrum coriaceum*	G4	S1			4	PDRAN0M050		
Plant	Leatherleaf Tassel-rue	*Trautvetteria fonticalcarea*	G2?	S1		T	4	PDRAN0N020	Y	Y

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Plant	Leggett's Pinweed	*Lechea pulchella*	G5	S1		E	4	PDCIS04090		
Plant	Lewis's Yellow Loosestrife	*Lysimachia lewisii*	G2	S2		S	4	PDPRI071C0	Y	Y
Plant	Lidded Earth Moss	*Aphanorrhegma serratum*	G4G5	S1			4	NBMUS0F010	Y	
Plant	Lime Silk Moss	*Entodon concinnus*	G4G5	S1		S	4	NBMUS2N040		
Plant	Limerock Arrow-wood	*Viburnum bracteatum*	G3	S2		S	4	PDCPR07170		Y
Plant	Limestone Fameflower	*Phemeranthus calcaricus*	G3	S3		S	4	PDPOR08050		Y
Plant	Limp Mannagrass	*Glyceria canadensis var. laxa*	G5TUQ	S1		E	4	PMPOA2Y042		
Plant	Linear-leaf Willowherb	*Epilobium leptophyllum*	G5	S1		T	4	PDONA060G0		
Plant	Little Mountain Meadowrue	*Thalictrum mirabile*	G4?Q	S2S3			4	PDRAN0M0D0	Y	
Plant	Little Prickly Sedge	*Carex echinata ssp. echinata*	G5T5	S1?		S	4	PMCYP03431		
Plant	Loesel's Twayblade	*Liparis loeselii*	G5	S1		T	4	PMORC1M040		
Plant	Long Sedge	*Carex folliculata*	G5	S1		T	4	PMCYP034X0		
Plant	Long-bracted Green Orchid	*Coeloglossum viride var. virescens*	G5T5	S1		E	4	PMORC0K011		
Plant	Longleaf Stitchwort	*Stellaria longifolia*	G5	S1		S	4	PDCAR0X0M0		
Plant	Long-stalked Apple Moss	*Philonotis longiseta*	G3G4	S3			4	NBMUS5C050	Y	
Plant	Long-stalked Holly	*Nemopanthus collinus*	G3	S1		S	4	PDAQU01080		Y
Plant	Loose-head Beakrush	*Rhynchospora chalarocephala*	G5	S1		T	4	PMCYP0N0B0		
Plant	Loosestrife	*Lysimachia x producta*	GNA	S1		S	4	PDPRI07120		
Plant	Low Frostweed	*Crocanthemum propinquum*	G4	S1S2		E	4	PDCIS020C0		
Plant	Low Nutrush	*Scleria verticillata*	G5	S2		S	4	PMCYP0R0S0		
Plant	Lucy Braun's White Snakeroot	*Ageratina luciae-brauniae*	G3	S3		T	4	PDASTBX0E0		Y
Plant	Macoun's Tangle Moss	*Heterocladium macounii*	G4	S2			4	NBMUS3F020	Y	
Plant	Maidencane	*Panicum hemitomon*	G5?	S2		S	4	PMPOA4K110		
Plant	Manhart's Sedge	*Carex manhartii*	G3G4	S2		E	4	PMCYP03EY0		Y
Plant	Marsh Bedstraw	*Galium palustre*	G5	S1		S	4	PDRUB0N1P0		
Plant	Marsh Bellflower	*Campanula aparinoides*	G5	S2		S	4	PDCAM02030		
Plant	Marsh Speedwell	*Veronica scutellata*	G5	S1		E	4	PDSCR200U0		
Plant	Marsh-marigold	*Caltha palustris*	G5	S1		E	4	PDRAN06030		
Plant	Maryland Milkwort	*Polygala mariana*	G5	S1		S	4	PDPGL020Z0		
Plant	Matted Spikerush	*Eleocharis intermedia*	G5?	S1		E	4	PMCYP090V0		
Plant	May Prairie Aster	*Symphyotrichum estesii*	G1	S1		S	4	PDASTE9000	Y	Y
Plant	Mcdowell's Sunflower	*Helianthus occidentalis*	G5	S2		S	4	PDAST4N110		
Plant	Mielichhofer's Copper Moss	*Mielichhoferia elongata*	GNR	S1		S	4	NBMUS4Q022		
Plant	Minniebush	*Menziesia pilosa*	G4G5	S2		S	4	PDERI0S020		
Plant	Missouri Buck-brush	*Phyllanthopsis phyllanthoides*	G4	S1		T	4	PDEUP06020	Y	
Plant	Missouri Evening-primrose	*Oenothera macrocarpa*	G5	S2		T	4	PDONA0C1P0		
Plant	Missouri Gooseberry	*Ribes missouriense*	G5	S2		S	4	PDGRO02120		
Plant	Missouri Mud-Plantain	*Heteranthera missouriensis*	G5?	S1		S	4	PMPON03020		Y
Plant	Mitchell's Sedge	*Carex mitchelliana*	G4	S1S2			4	PMCYP038R0	Y	
Plant	Morefield's Leatherflower	*Clematis morefieldii*	G2	S2	LE	E	3	PDRAN081A0		Y
Plant	Moss Phlox	*Phlox subulata*	G5	S1		S	4	PDPLM0D1T0		
Plant	Mount Leconte Moss	*Leptohymenium sharpii*	G1	S1		E	4	NBMUS9T010		
Plant	Mountain Alder	*Alnus viridis ssp. crispa*	G5T5	S1		S	4	PDBET01083		
Plant	Mountain Bluet	*Houstonia purpurea var. montana*	G5T2	S1	LE	E	3	PDRUB1T082		Y
Plant	Mountain Bush-honeysuckle	*Diervilla rivularis*	G3	S2		T	4	PDCPR01020		Y
Plant	Mountain Fetterbush	*Pieris floribunda*	G4	S2		T	4	PDERI10010		
Plant	Mountain Honeysuckle	*Lonicera dioica*	G5	S2		S	4	PDCPR03080		
Plant	Mountain Phlox	*Phlox latifolia*	G4	S2S3		S	4	PDPLM0D260	Y	

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Plant	mountain ricegrass	*Piptatherum racemosum*	G5	S1		E	4	PMPOA4J0A0	Y	
Plant	Mountain Sandwort	*Minuartia groenlandica*	G5	S1		E	4	PDCAR0G0E0		
Plant	Mountain St. John's-wort	*Hypericum graveolens*	G3	S3		E	4	PDCLU030V0		Y
Plant	Mountain Wavy-leaf Moss	*Plagiomnium carolinianum*	G3	S1		S	4	NBMUS81040		
Plant	Mountain Witch-alder	*Fothergilla major*	G3	S2		T	4	PDHAM01020		Y
Plant	Muehlenberg's Nutrush	*Scleria muehlenbergii*	G5	S2		T	4	PMCYP0R0U0	Y	
Plant	Muskingum Sedge	*Carex muskingumensis*	G4	S1		E	4	PMCYP03910		
Plant	Naked-fruit Rush	*Juncus gymnocarpus*	G4	S3		FS	4	PMJUN011C0		
Plant	Narrow Mushroom-headed Liverwort	*Marchantia quadrata*	G5	S1		T	4	NBHEP2S010		
Plant	Narrowleaf Bushclover	*Lespedeza angustifolia*	G4	S2		T	4	PDFAB27010		
Plant	Narrowleaf Gentian	*Gentiana linearis*	G4G5	S1		T	4	PDGEN060F0		
Plant	Narrowleaf Meadowsweet	*Spiraea alba*	G5	S1		E	4	PDROS1Q0T0		
Plant	Narrowleaf Wild Leek	*Allium tricoccum var. burdickii*	G5T5	S1S2		T-CE	4	PMLIL020C0		
Plant	Needleleaf Rosette Grass	*Dichanthelium aciculare*	G5	S1			4	PMPOA24010		
Plant	Nestronia	*Nestronia umbellula*	G4	S1		E	4	PDSAN05010		
Plant	Nevius' Stonecrop	*Sedum nevii*	G3	S1		E	4	PDCRA0A0Q0		Y
Plant	New England Ragwort	*Packera schweinitziana*	G5?	S1		T	4	PDAST8H2U0		
Plant	Nodding Beakrush	*Rhynchospora inexpansa*	G5	S1		S	4	PMCYP0N140	Y	
Plant	Northeastern Bladderwort	*Utricularia resupinata*	G4	S1			4	PDLNT020K0		Y
Plant	Northeastern Ladyfern	*Athyrium filix-femina ssp. angustum*	G5T5	S2		S	4	PPDRY02021		
Plant	Northern Beech Fern	*Phegopteris connectilis*	G5	S1		E	4	PPTHE02050		
Plant	Northern Bush-honeysuckle	*Diervilla lonicera*	G5	S2		T	4	PDCPR01010		
Plant	Northern Dropseed	*Sporobolus heterolepis*	G5	S1		T	4	PMPOA5V0E0		
Plant	Northern Evening-primrose	*Oenothera parviflora*	G5	S1		S	4	PDONA0C0Z0		
Plant	Northern Prickly-ash	*Zanthoxylum americanum*	G5	S2		S	4	PDRUT0L010		
Plant	Northern Shorthusk	*Brachyelytrum aristosum*	G5	S2		S	4	PMPOA12020		
Plant	Northern Starflower	*Trientalis borealis*	G5	S1		T	4	PDPRI0A013		
Plant	Nuttall's Milkwort	*Polygala nuttallii*	G4	S1		E	4	PDPGL02120		
Plant	Nuttall's Pondweed	*Potamogeton epihydrus*	G5	S1S2		S	4	PMPOT03080		
Plant	Nuttall's Waterweed	*Elodea nuttallii*	G5	S2		S	4	PMHYD03080		
Plant	Ocoee Leatherflower	*Clematis vinacea*	G2	S2		E	4	PDRAN08240	Y	Y
Plant	Ohio Orthotrichum	*Orthotrichum ohioense*	G4	S1			4	NBMUS560L0	Y	
Plant	Oklahoma Grass-pink	*Calopogon oklahomensis*	G2	SH		W-H	4	PMORC0C050		Y
Plant	Olney's Dry Rock Moss	*Grimmia olneyi*	G3G5	SH		S	4	NBMUS320V0		
Plant	Ornate Cololejeunea	*Cololejeunea ornata*	G2G4	S1		T	4	NBHEP0X090		
Plant	Ouachita Sedge	*Carex ouachitana*	G4	S1		S	4	PMCYP03FV0		
Plant	Ouachita Spurge	*Euphorbia ouachitana*	G3	S2		S	4	PDEUP0Q470	Y	Y
Plant	Ovate Catchfly	*Silene ovata*	G3	S2		E	4	PDCAR0U180		Y
Plant	Ovate False Fiddleleaf	*Hydrolea ovata*	G5	S1		S	4	PDHYD07020		
Plant	Ovate-leaf Arrowhead	*Sagittaria platyphylla*	G5	S2S3		S	4	PMALI040M0		
Plant	Ozark Bunchflower	*Melanthium woodii*	G5	S2		S	4	PMLIL1F030		
Plant	Palamocladium Moss	*Palamocladium leskeoides*	G3G5	S1		T	4	NBMUS57010		
Plant	Pale Corydalis	*Corydalis sempervirens*	G5	S1S2		S	4	PDFUM030B0		
Plant	Pale Dogwood	*Cornus obliqua*	G5	S2		S	4	PDCOR01022		
Plant	Pale False Foxglove	*Agalinis skinneriana*	G3G4	S1S2		T	4	PDSCR010T0	Y	Y
Plant	Pale Manna Grass	*Torreyochloa pallida*	G5	S1		S	4	PMPOA61030		
Plant	Pale Purple Coneflower	*Echinacea pallida*	G5	S1		E	4	PDAST38040		
Plant	Pale Sedge	*Carex pallescens*	G5	S1		S	4	PMCYP03A00		

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Plant	Pale St. John's-wort	*Hypericum ellipticum*	G5	S1		E	4	PDCLU030M0		
Plant	Pale Umbrella-wort	*Mirabilis albida*	G5	S2		T	4	PDNYC0A020		
Plant	Pale-green Orchid	*Platanthera flava var. herbiola*	G5T5	S2		T	4	PMORC1Y082		Y
Plant	Peak Moss	*Brachydontium trichodes*	G3G4	S1		E	4	NBMUS0X010		
Plant	Pear-shaped Nodding Moss	*Pohlia lescuriana*	G4G5	S1			4	NBMUS5S0E0	Y	
Plant	Pineland Beakrush	*Rhynchospora perplexa*	G5	S2		T	4	PMCYP0N1Q0		
Plant	Pink Sundew	*Drosera capillaris*	G5	S1		T	4	PDDRO02030		
Plant	Pinnate-lobe Black-eyed-Susan	*Rudbeckia triloba var. pinnatiloba*	G5T3	S1		E	4	PDAST850H1		Y
Plant	Piratebush	*Buckleya distichophylla*	G3	S2		T	4	PDSAN01010		Y
Plant	Plains Muhly	*Muhlenbergia cuspidata*	G5	S1		E	4	PMPOA480D0		
Plant	Plukenet's Flatsedge	*Cyperus plukenetii*	G5	S1		S	4	PMCYP062R0		
Plant	Pope's Sand-parsley	*Ammoselinum popei*	G4	S2		T	4	PDAPI05030		
Plant	Porter's Goldenrod	*Solidago porteri*	G1	S1		E	4	PDAST8P1E0	Y	
Plant	Porter's Reedgrass	*Calamagrostis porteri*	G4	S1		E	4	PMPOA170Z0		
Plant	Prairie False Foxglove	*Agalinis heterophylla*	G4G5	S1		E	4	PDSCR010E0		
Plant	Prairie Goldenrod	*Oligoneuron album*	G5	S1S2		E	4	PDAST8P1F0		
Plant	Prairie Parsley	*Polytaenia nuttallii*	G5	S1		T	4	PDAPI1U010		
Plant	Prairie Ragwort	*Packera paupercula var. appalachiana*	G5TNR	S1		S	4	PDASTE60K1	Y	
Plant	Prairie Ragwort	*Packera plattensis*	G5	S1		S	4	PDAST8H2F0		
Plant	Prairie Rhynchosia	*Rhynchosia latifolia*	G5	S1		T	4	PDFAB3F070		
Plant	Pretty Sedge	*Carex woodii*	G4	S1		E	4	PMCYP03EV0	Y	
Plant	Pretty St. John's-wort	*Hypericum nudiflorum*	G5	S2		S	4	PDCLU03180	Y	
Plant	Price's Potato-bean	*Apios priceana*	G3	S3	LT	E	3	PDFAB0D020		Y
Plant	Prickly Hornwort	*Ceratophyllum echinatum*	G4	S1		S	4	PDCER01040		Y
Plant	Pubescent Sedge	*Carex hirtifolia*	G5	S1S2		S	4	PMCYP03610		
Plant	Purple Gerardia	*Agalinis plukenetii*	G3G5	S1		E	4	PDSCR01170		
Plant	Purple Giant-hyssop	*Agastache scrophulariifolia*	G4	S1S2		T	4	PDLAM030E0		Y
Plant	Purple Milkweed	*Asclepias purpurascens*	G4G5	S1		S	4	PDASC021J0		
Plant	Purple Prairie-clover	*Dalea purpurea*	G5	S1		E	4	PDFAB1A1D0		
Plant	Pursh's Wild Petunia	*Ruellia purshiana*	G3	S1S2			4	PDACA0J0H0		Y
Plant	Pyne's Ground-plum	*Astragalus bibullatus*	G1	S1	LE	E	3	PDFAB0FB00		Y
Plant	Ramp	*Allium tricoccum var. tricoccum*	G5T5	S1S2		S-CE	4	PMLIL022E0		
Plant	Rau's Spur Moss	*Symblepharis raui*	G3	S2		T	4	NBMUS52010	Y	
Plant	Recurved Bristle Moss	*Seligeria recurvata*	G4?	S1			4	NBMUS6X060	Y	
Plant	Red Iris	*Iris fulva*	G5	S2		T	4	PMIRI090B0		
Plant	Red Turtlehead	*Chelone obliqua*	G4	S1		S	4	PDSCR0F040		
Plant	Reniform Sedge	*Carex reniformis*	G4?	S1		S	4	PMCYP03BG0		Y
Plant	Retrorse Leafy Liverwort	*Plagiochila retrorsa*	G4	S1		S	4	NBHEP2M0N1		
Plant	Ridge-stem False Foxglove	*Agalinis oligophylla*	G4	S1		E	4	PDSCR010M0		
Plant	Rigid Sedge	*Carex tetanica*	G4G5	S1		E	4	PMCYP03DN0	Y	
Plant	River Bulrush	*Bolboschoenus fluviatilis*	G5	S1		S	4	PMCYP0Q0P0		
Plant	Rivergrass	*Calamovilfa arcuata*	G2G3	S2		T	4	PMPOA18010		Y
Plant	Roan Mountain Rattlesnake-root	*Prenanthes roanensis*	G3	S3			4	PDAST7K0B0		Y
Plant	Roan Mountain Sedge	*Carex roanensis*	G3	S2		S	4	PMCYP03BL0		Y
Plant	Rock Gnome Lichen	*Cetradonia linearis*	G3	S1	LE	E	3	NLLEC75010		
Plant	Rock Goldenrod	*Solidago rupestris*	G4?	S1		E	4	PDAST8P1Q0		
Plant	Rock Grape	*Vitis rupestris*	G3	S1		E	4	PDVIT040J0		Y
Plant	Rock Skullcap	*Scutellaria saxatilis*	G3G4	S3		WL	4	PDLAM1U150		Y

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Plant	Rockcastle Wood-aster	*Eurybia saxicastelli*	G3	S1S2		E	4	PDASTEB0L0		Y
Plant	Rockhouse Featherbells	*Stenanthium diffusum*	G1	S1		E	4	PMLIL1W030	Y	Y
Plant	Rose Pogonia	*Pogonia ophioglossoides*	G5	S2		E	4	PMORC21010		
Plant	Rosy Twisted-stalk	*Streptopus lanceolatus*	G5	S2		S	4	PMLIL1X020		
Plant	Rough Avens	*Geum laciniatum*	G5	S1		S	4	PDROS0S070		
Plant	Rough Bedstraw	*Galium asprellum*	G5	S1		S	4	PDRUB0N080		
Plant	Rough Hawkweed	*Hieracium scabrum*	G5	S2		T	4	PDAST4W1C0		
Plant	Rough Rattlesnake-root	*Prenanthes aspera*	G4?	S1		E	4	PDAST7K040		Y
Plant	Roughish Witchgrass	*Dichanthelium leucothrix*	G4?Q	S1		S	4	PMPOA24130		
Plant	Roundleaf Fameflower	*Phemeranthus teretifolius*	G4	S2		T	4	PDPOR080K0		
Plant	Roundleaf Serviceberry	*Amelanchier sanguinea*	G5	S2		T	4	PDROS050V0		
Plant	Roundleaf Sundew	*Drosera rotundifolia*	G5	S1		T	4	PDDRO02070		
Plant	Rugel's Ragwort	*Rugelia nudicaulis*	G3	S2		E	4	PDASTDV010		Y
Plant	Rugged-leaf Schlotheimia Moss	*Schlotheimia rugifolia*	G3G5	S1			4	NBMUS6Q020	Y	
Plant	Running Glade Clover	*Trifolium calcaricum*	G1	S1		E	4	PDFAB402L0		Y
Plant	Ruth's Sedge	*Carex ruthii*	G3G4	S2		T	4	PMCYP03BV0		Y
Plant	Ruth's Silk-grass	*Pityopsis ruthii*	G1	S1	LE	E	3	PDAST7B080		Y
Plant	Sand Cherry	*Prunus pumila*	G5	S1		E	4	PDROS1C160		
Plant	Sand Post Oak	*Quercus margarettiae*	G5	S1		S	4	PDFAG05390		
Plant	Sandhill Dropseed	*Sporobolus junceus*	G5	S1		E	4	PMPOA5V0H0		
Plant	Savanna Eryngo	*Eryngium integrifolium*	GNR	S1		T	4	PDAPI0Z170		
Plant	Savannah Beakrush	*Rhynchospora debilis*	G4?	S1		E	4	PMCYP0N0M0		
Plant	Schreber's Aster	*Eurybia schreberi*	G4	S1		S	4	PDASTEB0M0		
Plant	Sessile Water-speedwell	*Veronica catenata*	G5	S1		E	4	PDSCR20090		
Plant	Sessile-fruit Arrowhead	*Sagittaria rigida*	G5	S1		E	4	PMALI040N0		
Plant	Shadow-witch Orchid	*Ponthieva racemosa*	G5	S1		E	4	PMORC24010		
Plant	Shaggy Dwarf Morning-glory	*Evolvulus nuttallianus*	G5	S3		S	4	PDCON090C0		
Plant	Sharp's Homaliadelphus Moss	*Homaliadelphus sharpii*	G3?	S1		E	4	NBMUS3J010		
Plant	Sharp's Pouncewort	*Lejeunea sharpii*	G2G3	S1S2		E	4	NBHEP39030		
Plant	Sharp-scale Sedge	*Carex oxylepis var. pubescens*	G5?T3	S1			4	PMCYP039W2		Y
Plant	Sharp-scaled Mannagrass	*Glyceria acutiflora*	G5	S2		S	4	PMPOA2Y010		
Plant	Shining Ladies'-tresses	*Spiranthes lucida*	G4	S1S2		T	4	PMORC2B0J0		Y
Plant	Short Ragged Moss	*Sciuro-hypnum curtum*	G5	S1			4	NBMUS0Z0Z0	Y	
Plant	Shortbeak Arrowhead	*Sagittaria brevirostra*	G5	S1		T	4	PMALI04030		
Plant	Shortleaf Beardgrass	*Gymnopogon brevifolius*	G5	S1S2		S	4	PMPOA2Z020		
Plant	Shortleaf Rush	*Juncus brachyphyllus*	G5	S1		S	4	PMJUN010F0	Y	
Plant	Shortleaf Sneezeweed	*Helenium brevifolium*	G4	S1		E	4	PDAST4L070		Y
Plant	Shortleaf Witchgrass	*Dichanthelium ensifolium ssp. curtifolium*	G4T3?	S1		E	4	PMPOA241W2		Y
Plant	Short's Hedge-hyssop	*Gratiola viscidula*	G4G5	S1		S	4	PDSCR0R0C0	Y	
Plant	Short's Rockcress	*Borodinia dentata*	G5	S1S2		S	4	PDBRA061W0		
Plant	Short-stalk Shiny Moss	*Entodon brevisetus*	G4?	S1			4	NBMUS2N010	Y	
Plant	Showy Lady's-slipper	*Cypripedium reginae*	G4G5	S1		E	4	PMORC0Q0D0		
Plant	Sieve-tooth Moss	*Coscinodon cribrosus*	G3G4	S1			4	NBMUS96020	Y	
Plant	Silverling	*Paronychia argyrocoma*	G4	S1S2		T	4	PDCAR0L020		
Plant	Silvery Sedge	*Carex canescens ssp. disjuncta*	G5T5	SU		E	4	PMCYP032F3	Y	
Plant	Skunk-cabbage	*Symplocarpus foetidus*	G5	S1		E	4	PMARA0J010		
Plant	Sky Blue Aster	*Symphyotrichum oolentangiense*	G5	S1			4	PDASTE8800		
Plant	Slender Blazingstar	*Liatris cylindracea*	G5	S2		T	4	PDAST5X060		

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Plant	Slender Blue Iris	*Iris prismatica*	G4	S2S3		T	4	PMIRI090S0		
Plant	Slender Spikerush	*Eleocharis elliptica*	G5	S1		E	4	PMCYP090K0	Y	
Plant	Small Mountain Bittercress	*Cardamine clematitis*	G3	S2		T	4	PDBRA0K070		Y
Plant	Small Mousetail Moss	*Myurella julacea*	G5	SH		S-P	4	NBMUS4U010		
Plant	Small Pocket Moss	*Fissidens exilis*	G3G4	S1			4	NBMUS2W0C0	Y	
Plant	Small Purple Fringed Orchid	*Platanthera psycodes*	G5	S2		S	4	PMORC1Y0M0		
Plant	Small Pussytoes	*Antennaria howellii*	G5	S1		S	4	PDAST0H1D0	Y	
Plant	Small Whorled Pogonia	*Isotria medeoloides*	G2G3	S1	LT	E	3	PMORC1F010		Y
Plant	Small Wood-bark Moss	*Orthotrichum exiguum*	G3?	S1			4	NBMUS56090	Y	
Plant	Small-head Rush	*Juncus brachycephalus*	G5	S2		S	4	PMJUN010E0		
Plant	Small's Stonecrop	*Diamorpha smallii*	G4	S1S2		E	4	PDCRA03010		
Plant	Smith's Sunflower	*Helianthus smithiorum*	G2Q	S1S2			4	PDAST4N1F0	Y	
Plant	Smoky Mountain Sedge	*Carex fumosimontana*	G2	S2		E	4	PMCYP03LS0	Y	Y
Plant	Smoky Mountains Mannagrass	*Glyceria nubigena*	G2G3	S1S2		T	4	PMPOA2Y0B0		Y
Plant	Smooth Woodmint	*Blephilia subnuda*	G1G2	S1		E	4	PDLAM06030	Y	Y
Plant	Snowy Orchid	*Platanthera nivea*	G3G4	S1		E	4	PMORC1Y0H0		Y
Plant	Social Sedge	*Carex socialis*	G4	S2S3			4	PMCYP03CK0	Y	
Plant	Soft-hairy False Gromwell	*Onosmodium molle ssp. bejariense*	G4G5T3	S1S2		T	4	PDBOR0S035		Y
Plant	Soft-Hairy False Gromwell	*Onosmodium molle ssp. hispidissimum*	G4G5T4	S1		E	4	PDBOR0S031		
Plant	Softleaf Arrow-wood	*Viburnum molle*	G3	S2		E	4	PDCPR070C0		
Plant	Southern Bog Goldenrod	*Solidago austrina*	GNR	S1		S	4	PDAST8P410		
Plant	Southern Dwarf Huckleberry	*Gaylussacia dumosa*	G5	S3		T	4	PDERI0G0Y0		
Plant	Southern Heartleaf	*Hexastylis contracta*	G3	S3			4	PDARI03020	Y	
Plant	Southern Jointweed	*Polygonella americana*	G5	S1S2		E	4	PDPGN0K010		
Plant	Southern Lady's-slipper	*Cypripedium kentuckiense*	G3	S2		E	4	PMORC0Q0F0		Y
Plant	Southern Lobelia	*Lobelia amoena*	G4?	S1S2		T	4	PDCAM0E010		
Plant	Southern Long Sedge	*Carex lonchocarpa*	G5	S2		E	4	PMCYP037N0		
Plant	Southern Morning-glory	*Stylisma humistrata*	G4G5	S1		T	4	PDCON0H030		
Plant	Southern Nodding Trillium	*Trillium rugelii*	G4	S2		E	4	PMLIL20130		
Plant	Southern Racemose Goldenrod	*Solidago arenicola*	G3	S1S2			4	PDAST8P3S0		Y
Plant	Southern Twayblade	*Listera australis*	G5	S1S2		E	4	PMORC1N020		Y
Plant	Spinulose Shieldfern	*Dryopteris carthusiana*	G5	S1		T	4	PPDRY0A040		
Plant	Spoonleaf Sundew	*Drosera intermedia*	G5	S2		S	4	PDDRO02050	Y	
Plant	Spoon-shape Barbara's-buttons	*Marshallia obovata*	G4G5	S1		E	4	PDAST68050		
Plant	Spotted Coralroot	*Corallorhiza maculata*	G5	S1		T	4	PMORC0M010		
Plant	Spotty Featherwort	*Plagiochila punctata*	G5	S1		S	4	NBHEP2M0U0		
Plant	Spreading Avens	*Geum radiatum*	G2	S1	LE	E	3	PDROS0S0C0		Y
Plant	Spreading Rockcress	*Arabis patens*	G3	S1		E	4	PDBRA061D0		Y
Plant	Spreading Sandwort	*Arenaria lanuginosa*	G5	S1		E	4	PDCAR040E0		
Plant	Spreading Yellow False Foxglove	*Aureolaria patula*	G3	S3		S	4	PDSCR05040		Y
Plant	Spring Blue-eyed Mary	*Collinsia verna*	G5	S1		E	4	PDSCR0H0J0		
Plant	Spring Creek Bladderpod	*Paysonia perforata*	G1	S1	LE	E	3	PDBRA1N1A0		Y
Plant	Starflower Solomon's-plume	*Maianthemum stellatum*	G5	S1		E	4	PMLIL1D040		
Plant	Steele's Joe-pyeweed	*Eutrochium steelei*	G4	S3		FS	4	PDAST3P260		
Plant	Sticky Bog-asphodel	*Triantha glutinosa*	G5	S1		E	4	PMLIL1Y035		
Plant	Sticky Hedge-hyssop	*Gratiola brevifolia*	G4	S1		S	4	PDSCR0R020	Y	
Plant	Stones River Bladderpod	*Paysonia stonensis*	G1	S1		E	4	PDBRA1N1K0		Y
Plant	Sullivantia	*Sullivantia sullivantii*	G4	S1		E	4	PDSAX0X050		

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Plant	Sullivant's Leafy Liverwort	*Plagiochila sullivantii*	G3G4	S2		S	4	NBHEP2M0P0	Y	
Plant	Sullivant's Silk Moss	*Entodon sullivantii*	G3G4	S2			4	NBMUS2N070	Y	
Plant	Svenson's Wild Rye	*Elymus svensonii*	G3	S2		T	4	PMPOA2H0J0		Y
Plant	Swamp Loosestrife	*Lysimachia terrestris*	G5	S1		E	4	PDPRI070R0		
Plant	Swamp Lousewort	*Pedicularis lanceolata*	G4	S1S2		S	4	PDSCR1K0M0		
Plant	Swamp Saxifrage	*Micranthes pensylvanica*	G5	S1		E	4	PDSAX0U1D0		
Plant	Sweet Coneflower	*Rudbeckia subtomentosa*	G5	S2		T	4	PDAST850G0		
Plant	Sweet Pinesap	*Monotropsis odorata*	G3	S2		T	4	PDMON04020		Y
Plant	Sweetbay Magnolia	*Magnolia virginiana*	G5	S2		T	4	PDMAG020A0		
Plant	Sweet-fern	*Comptonia peregrina*	G5	S1		E	4	PDMCC01010		
Plant	Sweetscent Ladies'-tresses	*Spiranthes odorata*	G5	S1		E	4	PMORC2B0N0		
Plant	Sweet-scented Indian-plantain	*Hasteola suaveolens*	G4	S2		S	4	PDASTDX010		
Plant	Swollen Bladderwort	*Utricularia inflata*	G5	S1			4	PDLNT02090		
Plant	Sword Moss	*Bryoxiphium norvegicum*	G5?	S1		T	4	NBMUS19010		
Plant	Sword-leaf Panicgrass	*Dichanthelium ensifolium ssp. ensifolium*	G4TNR	S2			4	PMPOA241W3		
Plant	Tall Beakrush	*Rhynchospora macrostachya*	G4	S1S2		S	4	PMCYP0N1D0	Y	
Plant	Tall Larkspur	*Delphinium exaltatum*	G3	S2		E	4	PDRAN0B0J0		Y
Plant	Tall Millet Grass	*Milium effusum var. cisatlanticum*	G5T5	S1		S	4	PMPOA43011		
Plant	Tansy Rosinweed	*Silphium pinnatifidum*	G3Q	S2		T	4	PDAST8L0B0		Y
Plant	Tawny Cotton-grass	*Eriophorum virginicum*	G5	S1S2		E	4	PMCYP0A0D0		
Plant	Taylor's Filmy Fern	*Hymenophyllum tayloriae*	G2	S2		S	4	PPHYM010P0		Y
Plant	Ten-angle Pipewort	*Eriocaulon decangulare*	G5	S1		E	4	PMERI01030		
Plant	Tennessee Coneflower	*Echinacea tennesseensis*	G2G3	S2	DL	T	3	PDAST38090		Y
Plant	Tennessee Death-Camas	*Stenanthium tennesseense*	G2	S2		T	4	PMLIL1W040		Y
Plant	Tennessee Leafcup	*Polymnia laevigata*	G3	S3			4	PDAST7G020	Y	
Plant	Tennessee Milkvetch	*Astragalus tennesseensis*	G3	S3		S	4	PDFAB0F8S0		Y
Plant	Tennessee Pondweed	*Potamogeton tennesseensis*	G2G3	S2	UR	T	4	PMPOT03130		Y
Plant	Tennessee Quillwort	*Isoetes tennesseensis*	G1	S1		E	4	PPISO01280		Y
Plant	Tennessee Trillium	*Trillium tennesseense*	G1	S1		E	4	PMLIL20180	Y	Y
Plant	Tennessee Yellow-eyed-grass	*Xyris tennesseensis*	G2	S1	LE	E	3	PMXYR010M0		Y
Plant	Thorne's Beakrush	*Rhynchospora thornei*	G3	S1S2			4	PMCYP0N2B0	Y	
Plant	Threadleaf Gerardia	*Agalinis setacea*	G5?	SH		S	4	PDSCR010S0		
Plant	Three-parted Violet	*Viola tripartita*	G5	S2S3		WP	4	PDVIO042D0		Y
Plant	Three-toothed Cinquefoil	*Sibbaldiopsis tridentata*	G5	S1S2		T	4	PDROS20010		
Plant	Tissue Sedge	*Carex hyalina*	G4	S1		S	4	PMCYP036B0		
Plant	Toothed Flatsedge	*Cyperus dentatus*	G4	S1		S	4	PMCYP060N0		
Plant	Torrey's Dropseed	*Muhlenbergia torreyana*	G3	S1		E	4	PMPOA481U0		Y
Plant	Torrey's Mountainmint	*Pycnanthemum torreyi*	G2	S1		E	4	PDLAM1N0G0		Y
Plant	Tower-mustard	*Turritis glabra*	G5	S1		S	4	PDBRA060P0		
Plant	Trailing Stitchwort	*Stellaria alsine*	G5	S1		E	4	PDCAR0X020		
Plant	Trailing Trillium	*Trillium decumbens*	G4	S1		E	4	PMLIL20080		
Plant	Translucent Orthodontium Moss	*Orthodontium pellucens*	G5	SH		S	4	NBMUS54020		
Plant	Treelike Clubmoss	*Dendrolycopodium dendroideum*	G5	S1		S	4	PPLYC010B0		
Plant	Tufted Clubrush	*Trichophorum cespitosum*	G5	S1		E	4	PMCYP0Q060		
Plant	Twisted Spikerush	*Eleocharis tortilis*	G5	S1		S	4	PMCYP091T0		
Plant	Upright Burhead	*Echinodorus berteroi*	G5	S1		S	4	PMALI020B0		
Plant	Vetchling Peavine	*Lathyrus palustris*	G5	S1		S	4	PDFAB250P0		
Plant	Virginia Bunchflower	*Melanthium virginicum*	G5	S1		E	4	PMLIL1F020		

Taxa Group	Common Name	Scientific Name	Global Rank	State Rank	Federal Status	State Status	SWAP Tier	NatureServe Element Code	New in 2025	RSGCN
Plant	Virginia Chainfern	*Anchistea virginica*	G5	S2		S	4	PPBLE05040		
Plant	Virginia Heartleaf	*Hexastylis virginica*	G4	S2		S	4	PDARI03090		
Plant	Virginia Spiraea	*Spiraea virginiana*	G2?	S2	LT	E	3	PDROS1Q0E0		Y
Plant	Viscid Bushy Goldenrod	*Euthamia gymnospermoides*	G5	S1		E	4	PDAST3R030	Y	
Plant	Walter's Barnyard Grass	*Echinochloa walteri*	G5	S1		S	4	PMPOA2D080		
Plant	Wand Gayfeather	*Liatris virgata*	GU	S1		S	4	PDAST5X1F0	Y	
Plant	Watauga Porella	*Porella wataugensis*	G1G2Q	S1S2		T	4	NBHEP2Q0A0		
Plant	Water Bulrush	*Schoenoplectus subterminalis*	G5	S1		E	4	PMCYP0Q1G0		
Plant	Water Stitchwort	*Stellaria fontinalis*	G3	S3		S	4	PDCAR0X180		Y
Plant	Waterpod	*Hydrolea quadrivalvis*	G5	S1		S	4	PDHYD07030	Y	
Plant	Water-purslane	*Didiplis diandra*	G3G4	S1		T	4	PDLYT04010		
Plant	Wavyleaf Purple Coneflower	*Echinacea simulata*	G4	S2		T	4	PDAST38080		
Plant	Wedge Flapwort	*Leptoscyphus cuneifolius ssp. cuneifolius*	G4G5T4T5	S1		E	4	NBHEP1U010		
Plant	Wedgeleaf Whitlow-grass	*Draba cuneifolia*	G5	S1S2		S	4	PDBRA110V0		
Plant	Welsh Notchwort	*Gymnocolea inflata ssp. Acutiloba*	G5T3Q	S1			4	NBHEP1D010	Y	
Plant	Western Wallflower	*Erysimum capitatum*	G5	S1S2		E	4	PDBRA160T0		
Plant	White Camas	*Zigadenus elegans*	G5	S1		E	4	PMLIL28032		
Plant	White Fringeless Orchid	*Platanthera integrilabia*	G2	S2S3	LT	E	3	PMORC1Y0D0		Y
Plant	White Heath Aster	*Symphyotrichum ericoides var. ericoides*	G5T5	S1		E	4	PDASTE80L7		
Plant	White Monkshood	*Aconitum reclinatum*	G3G4	S1		E	4	PDRAN01080		Y
Plant	White Prairie-clover	*Dalea candida*	G5	S2		T	4	PDFAB1A070		
Plant	White Rattlesnake-root	*Prenanthes alba*	G5	S1		S	4	PDAST7K020		
Plant	White-bract Thoroughwort	*Eupatorium leucolepis*	G5	S1		E	4	PDAST3P110		
Plant	Whitehead Bogbutton	*Lachnocaulon anceps*	G5	S1		S	4	PMERI02010		
Plant	Whiteleaf Leatherflower	*Clematis glaucophylla*	G4?	S1		S	4	PDRAN080D0		Y
Plant	Whiteleaf Sunflower	*Helianthus glaucophyllus*	G3G4	S1		T	4	PDAST4N0M0		Y
Plant	White-wand Beardtongue	*Penstemon tubiflorus*	G5	S1		S	4	PDSCR1L7Q0		
Plant	Whitewater Crowfoot	*Ranunculus aquatilis var. diffusus*	G5T5	S1		E	4	PDRAN0L0A5		
Plant	Whorled Horsebalm	*Collinsonia verticillata*	G3G4	S2S3			4	PDLAM0C040	Y	Y
Plant	Whorled Mountainmint	*Pycnanthemum verticillatum*	G5	S1		E	4	PDLAM1N0H0		
Plant	Whorled Sunflower	*Helianthus verticillatus*	G1	S1	LE	E	3	PDAST4N240		Y
Plant	Willow Aster	*Symphyotrichum praealtum*	G5	S1		S	4	PDASTE8200		
Plant	Wofford's Woodmint	*Blephilia woffordii*	G1	S1		S	4	PDLAM06040	Y	Y
Plant	Wolf's Spikerush	*Eleocharis wolfii*	G3G5	S1		E	4	PMCYP091Z0		Y
Plant	Wood Lily	*Lilium philadelphicum*	G5	S1		E	4	PMLIL1A0L0		
Plant	Woolly Sedge	*Carex pellita*	G5	S1		E	4	PMCYP03710		
Plant	Wretched Sedge	*Carex misera*	G3	S2		T	4	PMCYP038P0		Y
Plant	Wrinkled Jointgrass	*Coelorachis rugosa*	G5	S1		T	4	PMPOA1J020	Y	
Plant	Yellow Avens	*Geum aleppicum*	G5	S1		E	4	PDROS0S010		
Plant	Yellow Fringeless Orchid	*Platanthera integra*	G3G4	S1		E	4	PMORC1Y0C0		Y
Plant	Yellow Honeysuckle	*Lonicera flava*	G5?	S1		T	4	PDCPR030A0		
Plant	Yellow Jessamine	*Gelsemium sempervirens*	G5	S1S2			4	PDLOG05020		
Plant	Yellow Nodding Ladies'-tresses	*Spiranthes ochroleuca*	G5	S1		E	4	PMORC2B0M0		
Plant	Yellow Sunnybell	*Schoenolirion croceum*	G4	S3		T	4	PMLIL1S020		
Plant	Yellow Trout-lily	*Erythronium rostratum*	G5	S2		S	4	PMLIL0U0G0		
Plant	Yellow Water-crowfoot	*Ranunculus flabellaris*	G5	S2		T	4	PDRAN0L0W0		
Plant	Yellow-crested Orchid	*Platanthera cristata*	G5	S2S3		S	4	PMORC1Y060		
Plant	Zigzag Bladderwort	*Utricularia subulata*	G5	S1		T	4	PDLNT020M0		

Table D-1
2025 Revised
Species of Greatest Conservation Need

Arranged by Common Name

Taxa Group	Common Name	Scientific Name	Global Rank	State Rank	Federal Status	State Status	SWAP Tier	NatureServe Element Code	New in 2025	RSGCN
Reptile	Alligator Snapping Turtle	*Macrochelys temminckii*	G3	S2S3	PT	T	3	ARAAB02010		Y
Reptile	Bog Turtle	*Glyptemys muhlenbergii*	G2G3	S1	SAT	T	1	ARAAD02040		Y
Reptile	Coal Skink	*Plestiodon anthracinus*	G5	S1		T	1	ARACH01010		Y
Reptile	Common Coachwhip	*Coluber flagellum*	G5	S2S3?		E	1	ARADB21020		
Reptile	Eastern Box Turtle	*Terrapene carolina*	G5	S4			1	ARAAD08010		Y
Reptile	Eastern Hog-nosed Snake	*Heterodon platirhinos*	G5	S4		D	1	ARADB17020		
Reptile	Eastern Pinesnake	*Pituophis melanoleucus*	G4T4	S3		T	1	ARADB26010		Y
Reptile	Eastern Slender Glass Lizard	*Ophisaurus attenuatus longicaudus*	G5T5	S3		T	1	ARACB02012		Y
Reptile	Kirtland's Snake	*Clonophis kirtlandii*	G2	S?		E	1	ARADB06010		
Reptile	Mississippi Green Watersnake	*Nerodia cyclopion*	G5	S2		T	1	ARADB22010		
Reptile	Red-bellied Mudsnake	*Farancia abacura*	G5	S5		D	1	ARADB14010	Y	Y
Reptile	Rough Earthsnake	*Haldea striatula*	G5	S2S3?		T	1	ARADB39010		
Reptile	Smooth Softshell Turtle	*Apalone mutica*	G5	S4		D	1	ARAAG01020		Y
Reptile	Timber Rattlesnake	*Crotalus horridus*	G4	S4		D	1	ARADE02040		Y
Reptile	Western Pygmy Rattlesnake	*Sistrurus miliarius streckeri*	G5T5	S2S3		T	1	ARADE03023		Y
Reptile	Western Ribbonsnake	*Thamnophis proximus*	G5	S4S5			1	ARADB36090		
Tardigrade	a tardigrade	*Hypsibius roanensis*	GNR	S1			2	IRPRT03010		
Tardigrade	Schuster's Tardigrade	*Calohypsibius schusteri*	GNR	S1			2	IRPRT02010		
Worm	a cave obligate worm	*Cambarincola alienus*	G1G2	S1			2	IAOLI07020		
Worm	a cave obligate worm	*Cambarincola leptadenus*	G1G2	S1			2	IAOLI07050		
Worm	a cave obligate worm	*Cambarincola marthae*	G1G2	S1			2	IAOLI07060		
Worm	a cave obligate worm	*Eremidrilus allegheniensis*	G1G2	S1S2			2	IAOLI03020		

Table D-2
Species Removed from list of
Species of Greatest Conservation Need in 2025 SWAP Revision

Table D-2
2025 Removals from the Tennessee List of Species of Greatest Conservation Need

Taxa Group	Common Name	Scientific Name
Amphibian	Wehrle's Salamander	Plethodon wehrlei
Bird	Alder Flycatcher	Empidonax alnorum
Bird	Bald Eagle	Haliaeetus leucocephalus
Bird	Blue-winged Warbler	Vermivora cyanoptera
Bird	Common Gallinule	Gallinula galeata
Bird	Greater Prairie-Chicken	Tympanuchus cupido
Bird	Marbled Godwit	Limosa fedoa
Bird	Painted Bunting	Passerina ciris
Bird	Purple Gallinule	Porphyrio martinicus
Bird	Sedge Wren	Cistothorus stellaris
Bird	Snowy Plover	Anarhynchus nivosus
Bird	Upland Sandpiper	Bartramia longicauda
Bird	Virginia Rail	Rallus limicola
Bird	Whimbrel	Numenius phaeopus
Bird	Wilson's Plover	Anarhynchus wilsonia
Bird	Yellow-breasted Chat	Icteria virens
Bivalve	Alabama Pigtoe	Pleurobema johannis
Bivalve	Cumberland Bean	Villosa trabalis
Bivalve	Purple Bean	Villosa perpurpurea
Bivalve	Pyramid Pigtoe	Pleurobema rubrum
Bivalve	Rough Rabbitsfoot	Theliderma cylindrica strigillata
Bivalve	Round Pigtoe	Pleurobema sintoxia
Crustacean	a cave obligate isopod	Amerigoniscus paynei
Fish	Harelip Sucker	Moxostoma lacerum
Gastropod	Alabama Slitmouth	Stenotrema exodon
Gastropod	Appalachian Slitmouth	Stenotrema magnifumosum
Gastropod	Boulder Snail	Athearnia crassa
Gastropod	Bright Glyph Snail	Glyphyalinia wheatleyi
Gastropod	Cherokee Supercoil	Paravitrea petrophila
Gastropod	Cinnamon Covert	Fumonelix wheatleyi
Gastropod	Dryland Ambersnail	Succinea greerii
Gastropod	Fringed Coil	Helicodiscus fimbriatus
Gastropod	Glossy Supercoil	Paravitrea placentula
Gastropod	Hollow Dome	Ventridens lasmodon
Gastropod	Ice Thorn Snail	Carychium exile
Gastropod	Kentucky Slitmouth	Stenotrema angellum
Gastropod	Moss Pyrg	Marstonia scalariformis
Gastropod	Pygmy Slitmouth	Stenotrema pilula
Gastropod	Small Geniculate River Snail	Lithasia pinguis
Gastropod	Twilight Coil	Helicodiscus multidens
Gastropod	Wrinkled Button	Mesomphix rugeli
Insect	a cave obligate ground beetle	Pseudanophthalmus ciliaris ciliaris
Insect	Feather Winged Beetle	Acrotrichis lucidula
Mammal	Fisher	Pekania pennanti
Plant	Alabama Croton	Croton alabamensis
Plant	Bog Fern	Coryphopteris simulata
Plant	Bulbous Adder's-tongue	Ophioglossum crotalophoroides
Plant	Canada Anemone	Anemonastrum canadense
Plant	Canada Lily	Lilium canadense
Plant	Chalk Maple	Acer leucoderme
Plant	Clebsch's Pocket Moss	Fissidens clebschii
Plant	Clinton Lily	Clintonia borealis

Table D-2
2025 Removals from the Tennessee List of Species of Greatest Conservation Need

Taxa Group	Common Name	Scientific Name
Plant	Crenate-lobed False Goat's-beard	Astilbe crenatiloba
Plant	Dioecious Sedge	Carex sterilis
Plant	Downy Phlox	Phlox pilosa ssp. ozarkana
Plant	Dry-spike Sedge	Carex foenea
Plant	Eared Goldenrod	Solidago auriculata
Plant	Foxtail Sedge	Carex alopecoidea
Plant	Giant Whitetop Sedge	Rhynchospora latifolia
Plant	Glade Onion	Allium stellatum
Plant	Goldenseal	Hydrastis canadensis
Plant	Highland Rush	Oreojuncus trifidus
Plant	Hybrid	Carex x aestivaliformis
Plant	Lambkill	Kalmia angustifolia var. carolina
Plant	Large-flowered Barbara's-buttons	Marshallia grandiflora
Plant	Large-tooth Aspen	Populus grandidentata
Plant	Lesser Roundleaf Orchid	Platanthera orbiculata
Plant	Louisiana Broomrape	Orobanche ludoviciana
Plant	Maple-leaf Alumroot	Heuchera longiflora var. aceroides
Plant	Michigan Lily	Lilium michiganense
Plant	Nodding Rattlesnake-root	Prenanthes crepidinea
Plant	Northern White-cedar	Thuja occidentalis
Plant	Oppositeleaf Spotflower	Acmella oppositifolia
Plant	Pasture Gladecress	Leavenworthia exigua var. lutea
Plant	Pineland Squarehead	Tetragonotheca helianthoides
Plant	Pink Lady's-slipper	Cypripedium acaule
Plant	Pitcher's Leatherflower	Clematis pitcheri
Plant	Plains Frostweed	Crocanthemum bicknellii
Plant	Pursh's Rattlebox	Crotalaria purshii
Plant	Royal Catchfly	Silene regia
Plant	Running Strawberry-bush	Euonymus obovatus
Plant	Stiff Clubmoss	Spinulum annotinum
Plant	Tennessee Gladecress	Leavenworthia exigua var. exigua
Plant	Twinflower	Linnaea borealis
Plant	Velvety Sedge	Carex vestita
Plant	Virginia Mallow	Ripariosida hermaphrodita
Plant	Virginia Rose	Rosa virginiana
Plant	Western Lake Quillwort	Isoetes lacustris
Plant	White Beakrush	Rhynchospora alba
Plant	Wright's Beakrush	Rhynchospora wrightiana
Plant	Yaupon Black-senna	Seymeria cassioides
Reptile	Green Anole	Anolis carolinensis
Reptile	Plain-bellied Watersnake	Nerodia erythrogaster
Reptile	Yellowbelly Water Snake	Nerodia erythrogaster flavigaster

Tennessee 2025 State Wildlife Action Plan

Appendix E

Habitat Information for SGCN: Habitat classification hierarchies, list of habitat ecological systems, and SGCN habitat preferences by ecological system

Table E-1

Habitat Classification Hierarchy, including list of ecological systems

Habitat Category	Habitat Class	Habitat Alliance	Habitat Group	Ecological Systems
Terrestrial	Natural	Forest and Woodland	Upland Deciduous Forest	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland, East Gulf Coastal Plain Northern Dry Upland Hardwood Forest, Southern Interior Low Plateau Dry-Mesic Oak Forest, Southern Ridge and Valley / Cumberland Dry Calcareous Forest, Allegheny-Cumberland Dry Oak Forest and Woodland, East Gulf Coastal Plain Northern Loess Bluff Forest, East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest, South-Central Interior / Upper Coastal Plain Flatwoods, East Gulf Coastal Plain Limestone Forest, South-Central Interior Mesophytic Forest, Southern and Central Appalachian Cove Forest, Southern Appalachian Oak Forest, Southern Appalachian Northern Hardwood Forest
			Upland Coniferous Forest	Southern Appalachian Low-Elevation Pine Forest, Southern Appalachian Montane Pine Forest and Woodland, Central and Southern Appalachian Spruce-Fir Forest
			Upland Mixed Forest	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest, Appalachian (Hemlock)-Northern Hardwood Forest
			Upland Mixed Woodland	Central Interior Highlands Dry Acidic Glade and Barrens, Appalachian Shale Barrens
		Savanna and Shrub-Steppe	Glade/Barrens	Central Interior Highlands Calcareous Glade and Barrens, Nashville Basin Limestone Glade and Woodland, Cumberland Sandstone Glade and Barrens, Ridge and Valley Calcareous Valley Bottom Glade and Woodland, Central Appalachian Alkaline Glade and Woodland, Southern and Central Appalachian Mafic Glade and Barrens
		Upland Grassland and Herbaceous	Prairie/Barrens	East Gulf Coastal Plain Jackson Plain Prairie and Barrens, East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland, Pennyroyal Karst Plain Prairie and Barrens, Western Highland Rim Prairie and Barrens, Eastern Highland Rim Prairie and Barrens, Cumberland Wet-Mesic Meadow and Savanna, Southern Ridge and Valley Patch Prairie
			Bald	Southern Appalachian Grass and Shrub Bald
		Woody Wetlands and Riparian	Forested Bottomland Floodplain	Mississippi River High Floodplain (Bottomland) Forest, Mississippi River Low Floodplain (Bottomland) Forest, Mississippi River Riparian Forest, East Gulf Coastal Plain Large River Floodplain Forest, East Gulf Coastal Plain Small Stream and River Floodplain Forest, Cumberland Riverscour
			Forested Seep/Bog/Swamp	East Gulf Coastal Plain Northern Seepage Swamp, Cumberland Seepage Forest, Southern and Central Appalachian Bog and Fen
			Forested Depression/Wet Flatwoods	Mississippi River Bottomland Depression, South-Central Interior / Upper Coastal Plain Wet Flatwoods, Central Interior Highlands and Appalachian Sinkhole and Depression Pond
		Herbaceous Wetland	Open Seep/Fen	Interior Low Plateau Seepage Fen, Southern Appalachian Seepage Wetland
		Mixed Upland and Wetland	Upland Riparian Zone/Floodplain	South-Central Interior Small Stream and Riparian, South-Central Interior Large Floodplain
		Sparsely Vegetated	Cliff/Talus	Central Interior Acidic Cliff and Talus, Central Interior Calcareous Cliff and Talus, Cumberland Acidic Cliff and Rockhouse, Southern Appalachian Spray Cliff, Southern Appalachian Montane Cliff and Talus, Southern Interior Calcareous Cliff
			Mountain Summit	Southern Appalachian Rocky Summit
			Karst Outcrop	Southern Interior Sinkhole Wall
	Semi- Natural	Forest and Woodland	Forest Plantation	Forest Plantation
			Urban/Suburban Managed Forest	Urban / Suburban Managed Forestland
		Savanna and Shrub-Steppe	Old Field/Successional	Old Field / Successional
		Upland Grassland and Herbaceous	Pasture	Pasture
			Cropland	Cropland
			Urban/Suburban Managed Grassland	Urban / Suburban Managed Grassland
		Woody Wetlands and Riparian	Converted/Altered Forested Wetland	Converted Wetland (Lacustrine, Riverine, and Palustrine)
		Sparsely Vegetated	Excavated Land	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)
	Non-Natural	Developed Land	Edifice/Other Man-Made Structure	Edifice / Other Man-made Structure
			Impervious Landscape	Developed Open Space
				Low, Medium, and High Intensity Developed
Aquatic	Natural	Riverine	Large River	Large River
			Medium River	Medium River
			Small River	Small River
			Creek/Headwater Stream	Creek / Headwater Stream
		Lacustrine	Lake/Oxbow	Lake
	Semi- Natural	Riverine	Channelized River/Stream	Channelized River / Stream
		Lacustrine	Reservoir/Excavated Pond	Reservoir
Subterranean	Natural	Karst	Cave/Sinkhole	Subterrestrial Environment
			Cave/Sinkhole	Subaquatic Environment
	Semi-Natural	Artificial Karst	Mine Shaft/Tunnel	Excavated Land (Mine Shaft / Rock Quarry / Tunnel)

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Amphibian	Acris gryllus	Southern Cricket Frog	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Marginal
Amphibian	Acris gryllus	Southern Cricket Frog	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Amphibian	Acris gryllus	Southern Cricket Frog	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Amphibian	Acris gryllus	Southern Cricket Frog	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Preferred
Amphibian	Acris gryllus	Southern Cricket Frog	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Amphibian	Acris gryllus	Southern Cricket Frog	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Amphibian	Acris gryllus	Southern Cricket Frog	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Amphibian	Acris gryllus	Southern Cricket Frog	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Amphibian	Acris gryllus	Southern Cricket Frog	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Amphibian	Acris gryllus	Southern Cricket Frog	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Amphibian	Acris gryllus	Southern Cricket Frog	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Amphibian	Acris gryllus	Southern Cricket Frog	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Amphibian	Ambystoma barbouri	Streamside Salamander	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Amphibian	Ambystoma barbouri	Streamside Salamander	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Amphibian	Ambystoma barbouri	Streamside Salamander	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Amphibian	Ambystoma barbouri	Streamside Salamander	Pond	Forested Depression/Wet Flatwoods	Marginal
Amphibian	Ambystoma barbouri	Streamside Salamander	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Amphibian	Ambystoma barbouri	Streamside Salamander	Forest Plantation	Forest Plantation	Marginal
Amphibian	Ambystoma barbouri	Streamside Salamander	Old Field / Successional	Old Field/Successional	Marginal
Amphibian	Ambystoma barbouri	Streamside Salamander	Pasture	Pasture	Marginal
Amphibian	Ambystoma barbouri	Streamside Salamander	Cropland	Cropland	Marginal
Amphibian	Ambystoma barbouri	Streamside Salamander	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Amphibian	Ambystoma barbouri	Streamside Salamander	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Amphibian	Ambystoma barbouri	Streamside Salamander	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Amphibian	Ambystoma barbouri	Streamside Salamander	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Amphibian	Ambystoma barbouri	Streamside Salamander	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Amphibian	Ambystoma barbouri	Streamside Salamander	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Appalachian Shale Barrens	Upland Mixed Forest	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Southern Appalachian Grass and Shrub Bald	Bald	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Cumberland Riverscour	Forested Bottomland Floodplain	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Interior Low Plateau Seepage Fen	Open Seep/Fen	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Southern Appalachian Seepage Wetland	Open Seep/Fen	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Central Interior Acidic Cliff and Talus	Cliff/Talus	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Southern Appalachian Spray Cliff	Cliff/Talus	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Southern Interior Calcareous Cliff	Cliff/Talus	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Southern Appalachian Rocky Summit	Mountain Summit	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Southern Interior Sinkhole Wall	Karst Outcrop	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Forest Plantation	Forest Plantation	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Old Field / Successional	Old Field/Successional	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Pasture	Pasture	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Pond	Forested Depression/Wet Flatwoods	Preferred
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Amphibian	Ambystoma texanum	Small-Mouthed Salamander	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Amphibian	Aneides aeneus	Green Salamander	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Marginal
Amphibian	Aneides aeneus	Green Salamander	Southern Interior Sinkhole Wall	Karst Outcrop	Marginal
Amphibian	Aneides aeneus	Green Salamander	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Amphibian	Aneides aeneus	Green Salamander	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Preferred
Amphibian	Aneides aeneus	Green Salamander	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Amphibian	Aneides aeneus	Green Salamander	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Amphibian	Aneides aeneus	Green Salamander	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Preferred
Amphibian	Aneides aeneus	Green Salamander	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Amphibian	Aneides aeneus	Green Salamander	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Amphibian	Aneides aeneus	Green Salamander	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Amphibian	Aneides aeneus	Green Salamander	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Amphibian	Aneides aeneus	Green Salamander	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Amphibian	Aneides aeneus	Green Salamander	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Amphibian	Aneides aeneus	Green Salamander	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Amphibian	Aneides aeneus	Green Salamander	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Amphibian	Aneides aeneus	Green Salamander	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Amphibian	Aneides aeneus	Green Salamander	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Amphibian	Aneides aeneus	Green Salamander	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Amphibian	Aneides aeneus	Green Salamander	Central Interior Acidic Cliff and Talus	Cliff/Talus	Suitable
Amphibian	Aneides aeneus	Green Salamander	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Amphibian	Aneides aeneus	Green Salamander	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Amphibian	Desmognathus abditus	Cumberland Dusky Salamander	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Amphibian	Desmognathus abditus	Cumberland Dusky Salamander	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Amphibian	Desmognathus abditus	Cumberland Dusky Salamander	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Amphibian	Desmognathus abditus	Cumberland Dusky Salamander	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Amphibian	Desmognathus abditus	Cumberland Dusky Salamander	Pond	Forested Depression/Wet Flatwoods	Marginal
Amphibian	Desmognathus abditus	Cumberland Dusky Salamander	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Amphibian	Desmognathus abditus	Cumberland Dusky Salamander	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Preferred
Amphibian	Desmognathus abditus	Cumberland Dusky Salamander	Southern Appalachian Spray Cliff	Cliff/Talus	Preferred
Amphibian	Desmognathus abditus	Cumberland Dusky Salamander	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Amphibian	Desmognathus abditus	Cumberland Dusky Salamander	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Amphibian	Desmognathus abditus	Cumberland Dusky Salamander	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Amphibian	Desmognathus aeneus	Seepage Salamander	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Amphibian	Desmognathus aeneus	Seepage Salamander	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Amphibian	Desmognathus aeneus	Seepage Salamander	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Amphibian	Desmognathus aeneus	Seepage Salamander	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Marginal
Amphibian	Desmognathus aeneus	Seepage Salamander	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Amphibian	Desmognathus aeneus	Seepage Salamander	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Amphibian	Desmognathus aeneus	Seepage Salamander	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Amphibian	Desmognathus aeneus	Seepage Salamander	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Amphibian	Desmognathus aeneus	Seepage Salamander	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Amphibian	Desmognathus aeneus	Seepage Salamander	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Amphibian	Desmognathus imitator	Imitator Salamander	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Amphibian	Desmognathus imitator	Imitator Salamander	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Amphibian	Desmognathus imitator	Imitator Salamander	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal
Amphibian	Desmognathus imitator	Imitator Salamander	Southern Appalachian Seepage Wetland	Open Seep/Fen	Marginal
Amphibian	Desmognathus imitator	Imitator Salamander	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Amphibian	Desmognathus imitator	Imitator Salamander	Southern Appalachian Spray Cliff	Cliff/Talus	Marginal
Amphibian	Desmognathus imitator	Imitator Salamander	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Marginal
Amphibian	Desmognathus imitator	Imitator Salamander	Southern Interior Calcareous Cliff	Cliff/Talus	Marginal
Amphibian	Desmognathus imitator	Imitator Salamander	Southern Appalachian Rocky Summit	Mountain Summit	Marginal
Amphibian	Desmognathus imitator	Imitator Salamander	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Amphibian	Desmognathus imitator	Imitator Salamander	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Preferred

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Amphibian	Desmognathus imitator	Imitator Salamander	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Amphibian	Desmognathus imitator	Imitator Salamander	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Amphibian	Desmognathus imitator	Imitator Salamander	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Amphibian	Desmognathus orestes	Blue Ridge Dusky Salamander	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Amphibian	Desmognathus orestes	Blue Ridge Dusky Salamander	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Marginal
Amphibian	Desmognathus orestes	Blue Ridge Dusky Salamander	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Marginal
Amphibian	Desmognathus orestes	Blue Ridge Dusky Salamander	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Amphibian	Desmognathus orestes	Blue Ridge Dusky Salamander	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Amphibian	Desmognathus orestes	Blue Ridge Dusky Salamander	Southern Appalachian Seepage Wetland	Open Seep/Fen	Preferred
Amphibian	Desmognathus orestes	Blue Ridge Dusky Salamander	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Amphibian	Desmognathus orestes	Blue Ridge Dusky Salamander	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Amphibian	Desmognathus orestes	Blue Ridge Dusky Salamander	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Amphibian	Desmognathus orestes	Blue Ridge Dusky Salamander	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Amphibian	Desmognathus orestes	Blue Ridge Dusky Salamander	Southern Appalachian Spray Cliff	Cliff/Talus	Suitable
Amphibian	Desmognathus organi	Northern Pygmy Salamander	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Amphibian	Desmognathus organi	Northern Pygmy Salamander	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Amphibian	Desmognathus organi	Northern Pygmy Salamander	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal
Amphibian	Desmognathus organi	Northern Pygmy Salamander	Southern Appalachian Seepage Wetland	Open Seep/Fen	Marginal
Amphibian	Desmognathus organi	Northern Pygmy Salamander	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Amphibian	Desmognathus organi	Northern Pygmy Salamander	Southern Appalachian Spray Cliff	Cliff/Talus	Marginal
Amphibian	Desmognathus organi	Northern Pygmy Salamander	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Marginal
Amphibian	Desmognathus organi	Northern Pygmy Salamander	Southern Interior Calcareous Cliff	Cliff/Talus	Marginal
Amphibian	Desmognathus organi	Northern Pygmy Salamander	Southern Appalachian Rocky Summit	Mountain Summit	Marginal
Amphibian	Desmognathus organi	Northern Pygmy Salamander	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Amphibian	Desmognathus organi	Northern Pygmy Salamander	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Preferred
Amphibian	Desmognathus organi	Northern Pygmy Salamander	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Amphibian	Desmognathus organi	Northern Pygmy Salamander	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Amphibian	Desmognathus organi	Northern Pygmy Salamander	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Amphibian	Desmognathus wrighti	Pygmy Salamander	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Amphibian	Desmognathus wrighti	Pygmy Salamander	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Amphibian	Desmognathus wrighti	Pygmy Salamander	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Amphibian	Desmognathus wrighti	Pygmy Salamander	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Amphibian	Desmognathus wrighti	Pygmy Salamander	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Amphibian	Desmognathus wrighti	Pygmy Salamander	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Amphibian	Desmognathus wrighti	Pygmy Salamander	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Amphibian	Desmognathus wrighti	Pygmy Salamander	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Amphibian	Desmognathus wrighti	Pygmy Salamander	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Amphibian	Desmognathus wrighti	Pygmy Salamander	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Amphibian	Dryophytes gratiosus	Barking Treefrog	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Amphibian	Dryophytes gratiosus	Barking Treefrog	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Amphibian	Dryophytes gratiosus	Barking Treefrog	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Amphibian	Dryophytes gratiosus	Barking Treefrog	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Amphibian	Dryophytes gratiosus	Barking Treefrog	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Amphibian	Dryophytes gratiosus	Barking Treefrog	Pond	Forested Depression/Wet Flatwoods	Preferred
Amphibian	Dryophytes gratiosus	Barking Treefrog	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Amphibian	Dryophytes gratiosus	Barking Treefrog	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Amphibian	Dryophytes gratiosus	Barking Treefrog	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Amphibian	Dryophytes gratiosus	Barking Treefrog	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Amphibian	Dryophytes gratiosus	Barking Treefrog	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Amphibian	Dryophytes gratiosus	Barking Treefrog	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Amphibian	Dryophytes versicolor	Gray Treefrog	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Amphibian	Dryophytes versicolor	Gray Treefrog	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Amphibian	Dryophytes versicolor	Gray Treefrog	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Marginal
Amphibian	Dryophytes versicolor	Gray Treefrog	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Amphibian	Dryophytes versicolor	Gray Treefrog	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Marginal
Amphibian	Dryophytes versicolor	Gray Treefrog	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Amphibian	Dryophytes versicolor	Gray Treefrog	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Amphibian	Dryophytes versicolor	Gray Treefrog	Forest Plantation	Forest Plantation	Marginal
Amphibian	Dryophytes versicolor	Gray Treefrog	Old Field / Successional	Old Field/Successional	Marginal
Amphibian	Dryophytes versicolor	Gray Treefrog	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Amphibian	Dryophytes versicolor	Gray Treefrog	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Amphibian	Dryophytes versicolor	Gray Treefrog	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Preferred
Amphibian	Dryophytes versicolor	Gray Treefrog	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Amphibian	Dryophytes versicolor	Gray Treefrog	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Amphibian	Dryophytes versicolor	Gray Treefrog	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Amphibian	Dryophytes versicolor	Gray Treefrog	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Amphibian	Dryophytes versicolor	Gray Treefrog	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Amphibian	Dryophytes versicolor	Gray Treefrog	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Amphibian	Dryophytes versicolor	Gray Treefrog	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Amphibian	Dryophytes versicolor	Gray Treefrog	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Amphibian	Dryophytes versicolor	Gray Treefrog	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Amphibian	Dryophytes versicolor	Gray Treefrog	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Amphibian	Dryophytes versicolor	Gray Treefrog	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Amphibian	Dryophytes versicolor	Gray Treefrog	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Amphibian	Dryophytes versicolor	Gray Treefrog	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Amphibian	Dryophytes versicolor	Gray Treefrog	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Amphibian	Dryophytes versicolor	Gray Treefrog	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Amphibian	Dryophytes versicolor	Gray Treefrog	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Amphibian	Dryophytes versicolor	Gray Treefrog	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Amphibian	Dryophytes versicolor	Gray Treefrog	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Suitable
Amphibian	Dryophytes versicolor	Gray Treefrog	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Amphibian	Hemidactylium scutatum	Four-toed Salamander	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Amphibian	Hemidactylium scutatum	Four-toed Salamander	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Amphibian	Hemidactylium scutatum	Four-toed Salamander	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Amphibian	Hemidactylium scutatum	Four-toed Salamander	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Amphibian	Hemidactylium scutatum	Four-toed Salamander	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Amphibian	Hemidactylium scutatum	Four-toed Salamander	Pond	Forested Depression/Wet Flatwoods	Preferred
Amphibian	Hemidactylium scutatum	Four-toed Salamander	Southern Appalachian Seepage Wetland	Open Seep/Fen	Preferred
Amphibian	Hemidactylium scutatum	Four-toed Salamander	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Amphibian	Hemidactylium scutatum	Four-toed Salamander	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Amphibian	Hemidactylium scutatum	Four-toed Salamander	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Amphibian	Hemidactylium scutatum	Four-toed Salamander	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Amphibian	Hemidactylium scutatum	Four-toed Salamander	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Amphibian	Hemidactylium scutatum	Four-toed Salamander	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Amphibian	Hemidactylium scutatum	Four-toed Salamander	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Amphibian	Hemidactylium scutatum	Four-toed Salamander	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Amphibian	Hemidactylium scutatum	Four-toed Salamander	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Amphibian	Lithobates areolatus	Crawfish Frog	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Amphibian	Lithobates areolatus	Crawfish Frog	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Marginal
Amphibian	Lithobates areolatus	Crawfish Frog	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Amphibian	Lithobates areolatus	Crawfish Frog	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Amphibian	Lithobates areolatus	Crawfish Frog	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Marginal
Amphibian	Lithobates areolatus	Crawfish Frog	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Marginal
Amphibian	Lithobates areolatus	Crawfish Frog	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Amphibian	Lithobates areolatus	Crawfish Frog	Pasture	Pasture	Marginal
Amphibian	Lithobates areolatus	Crawfish Frog	Cropland	Cropland	Marginal
Amphibian	Lithobates areolatus	Crawfish Frog	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Amphibian	Lithobates areolatus	Crawfish Frog	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Preferred
Amphibian	Lithobates areolatus	Crawfish Frog	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Preferred
Amphibian	Lithobates areolatus	Crawfish Frog	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Amphibian	Lithobates areolatus	Crawfish Frog	Old Field / Successional	Old Field/Successional	Suitable
Amphibian	Lithobates areolatus	Crawfish Frog	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Suitable
Amphibian	Lithobates areolatus	Crawfish Frog	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Amphibian	Lithobates areolatus	Crawfish Frog	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Suitable
Amphibian	Lithobates capito	Gopher Frog	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Amphibian	Lithobates capito	Gopher Frog	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Amphibian	Lithobates capito	Gopher Frog	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Amphibian	Lithobates capito	Gopher Frog	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Amphibian	Lithobates capito	Gopher Frog	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Preferred
Amphibian	Lithobates capito	Gopher Frog	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Preferred
Amphibian	Lithobates capito	Gopher Frog	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Amphibian	Lithobates capito	Gopher Frog	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Preferred
Amphibian	Lithobates capito	Gopher Frog	Pond	Forested Depression/Wet Flatwoods	Preferred
Amphibian	Lithobates capito	Gopher Frog	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Amphibian	Lithobates capito	Gopher Frog	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Amphibian	Lithobates capito	Gopher Frog	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Amphibian	Lithobates capito	Gopher Frog	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Amphibian	Lithobates capito	Gopher Frog	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Amphibian	Lithobates capito	Gopher Frog	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Amphibian	Lithobates capito	Gopher Frog	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Amphibian	Lithobates capito	Gopher Frog	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Amphibian	Plethodon aureolus	Tellico Salamander	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Amphibian	Plethodon aureolus	Tellico Salamander	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Amphibian	Plethodon aureolus	Tellico Salamander	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Preferred
Amphibian	Plethodon aureolus	Tellico Salamander	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Amphibian	Plethodon aureolus	Tellico Salamander	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Amphibian	Plethodon aureolus	Tellico Salamander	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Amphibian	Plethodon jordani	Red-cheeked Salamander	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Amphibian	Plethodon jordani	Red-cheeked Salamander	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Amphibian	Plethodon jordani	Red-cheeked Salamander	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Preferred
Amphibian	Plethodon jordani	Red-cheeked Salamander	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Amphibian	Plethodon jordani	Red-cheeked Salamander	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Amphibian	Plethodon kentucki	Cumberland Plateau Salamander	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Amphibian	Plethodon kentucki	Cumberland Plateau Salamander	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Marginal

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Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Amphibian	Plethodon kentucki	Cumberland Plateau Salamander	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Marginal
Amphibian	Plethodon kentucki	Cumberland Plateau Salamander	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Marginal
Amphibian	Plethodon kentucki	Cumberland Plateau Salamander	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Amphibian	Plethodon kentucki	Cumberland Plateau Salamander	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Marginal
Amphibian	Plethodon kentucki	Cumberland Plateau Salamander	Appalachian Shale Barrens	Upland Mixed Forest	Preferred
Amphibian	Plethodon kentucki	Cumberland Plateau Salamander	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Preferred
Amphibian	Plethodon kentucki	Cumberland Plateau Salamander	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Amphibian	Plethodon kentucki	Cumberland Plateau Salamander	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Amphibian	Plethodon montanus	Northern Gray-cheeked Salamander	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Amphibian	Plethodon montanus	Northern Gray-cheeked Salamander	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Amphibian	Plethodon montanus	Northern Gray-cheeked Salamander	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal
Amphibian	Plethodon montanus	Northern Gray-cheeked Salamander	Southern Appalachian Seepage Wetland	Open Seep/Fen	Marginal
Amphibian	Plethodon montanus	Northern Gray-cheeked Salamander	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Amphibian	Plethodon montanus	Northern Gray-cheeked Salamander	Southern Appalachian Spray Cliff	Cliff/Talus	Marginal
Amphibian	Plethodon montanus	Northern Gray-cheeked Salamander	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Marginal
Amphibian	Plethodon montanus	Northern Gray-cheeked Salamander	Southern Interior Calcareous Cliff	Cliff/Talus	Marginal
Amphibian	Plethodon montanus	Northern Gray-cheeked Salamander	Southern Appalachian Rocky Summit	Mountain Summit	Marginal
Amphibian	Plethodon montanus	Northern Gray-cheeked Salamander	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Amphibian	Plethodon montanus	Northern Gray-cheeked Salamander	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Preferred
Amphibian	Plethodon montanus	Northern Gray-cheeked Salamander	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Amphibian	Plethodon montanus	Northern Gray-cheeked Salamander	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Amphibian	Plethodon montanus	Northern Gray-cheeked Salamander	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Amphibian	Plethodon pauleyi	Yellow-spotted Woodland Salamander	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Preferred
Amphibian	Plethodon pauleyi	Yellow-spotted Woodland Salamander	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Preferred
Amphibian	Plethodon pauleyi	Yellow-spotted Woodland Salamander	Southern Appalachian Spray Cliff	Cliff/Talus	Suitable
Amphibian	Plethodon pauleyi	Yellow-spotted Woodland Salamander	Southern Interior Sinkhole Wall	Karst Outcrop	Suitable
Amphibian	Plethodon richmondi	Southern Ravine Salamander	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Amphibian	Plethodon richmondi	Southern Ravine Salamander	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Amphibian	Plethodon richmondi	Southern Ravine Salamander	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Marginal
Amphibian	Plethodon richmondi	Southern Ravine Salamander	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Preferred
Amphibian	Plethodon richmondi	Southern Ravine Salamander	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Amphibian	Plethodon richmondi	Southern Ravine Salamander	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Amphibian	Plethodon richmondi	Southern Ravine Salamander	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Amphibian	Plethodon richmondi	Southern Ravine Salamander	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Amphibian	Plethodon shermani	Red-legged Salamander	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Amphibian	Plethodon shermani	Red-legged Salamander	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Amphibian	Plethodon shermani	Red-legged Salamander	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal
Amphibian	Plethodon shermani	Red-legged Salamander	Southern Appalachian Seepage Wetland	Open Seep/Fen	Marginal
Amphibian	Plethodon shermani	Red-legged Salamander	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Amphibian	Plethodon shermani	Red-legged Salamander	Southern Appalachian Spray Cliff	Cliff/Talus	Marginal
Amphibian	Plethodon shermani	Red-legged Salamander	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Marginal
Amphibian	Plethodon shermani	Red-legged Salamander	Southern Interior Calcareous Cliff	Cliff/Talus	Marginal
Amphibian	Plethodon shermani	Red-legged Salamander	Southern Appalachian Rocky Summit	Mountain Summit	Marginal
Amphibian	Plethodon shermani	Red-legged Salamander	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Amphibian	Plethodon shermani	Red-legged Salamander	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Preferred
Amphibian	Plethodon shermani	Red-legged Salamander	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Amphibian	Plethodon shermani	Red-legged Salamander	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Amphibian	Plethodon shermani	Red-legged Salamander	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Amphibian	Plethodon welleri	Weller's Salamander	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Amphibian	Plethodon welleri	Weller's Salamander	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Marginal
Amphibian	Plethodon welleri	Weller's Salamander	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Amphibian	Plethodon welleri	Weller's Salamander	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Amphibian	Plethodon welleri	Weller's Salamander	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Amphibian	Plethodon welleri	Weller's Salamander	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Amphibian	Plethodon welleri	Weller's Salamander	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Amphibian	Plethodon welleri	Weller's Salamander	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Amphibian	Plethodon yonahlossee	Yonahlossee Salamander	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Amphibian	Plethodon yonahlossee	Yonahlossee Salamander	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Amphibian	Plethodon yonahlossee	Yonahlossee Salamander	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Amphibian	Plethodon yonahlossee	Yonahlossee Salamander	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Marginal
Amphibian	Plethodon yonahlossee	Yonahlossee Salamander	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Preferred
Amphibian	Plethodon yonahlossee	Yonahlossee Salamander	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Amphibian	Plethodon yonahlossee	Yonahlossee Salamander	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Amphibian	Plethodon yonahlossee	Yonahlossee Salamander	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Amphibian	Pseudacris brachyphona	Mountain Chorus Frog	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Amphibian	Pseudacris brachyphona	Mountain Chorus Frog	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Amphibian	Pseudacris brachyphona	Mountain Chorus Frog	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Amphibian	Pseudacris brachyphona	Mountain Chorus Frog	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Marginal
Amphibian	Pseudacris brachyphona	Mountain Chorus Frog	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Amphibian	Pseudacris brachyphona	Mountain Chorus Frog	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Amphibian	Pseudacris brachyphona	Mountain Chorus Frog	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Amphibian	Pseudacris brachyphona	Mountain Chorus Frog	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Amphibian	Pseudacris brachyphona	Mountain Chorus Frog	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Amphibian	Pseudacris brachyphona	Mountain Chorus Frog	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Amphibian	Pseudacris brachyphona	Mountain Chorus Frog	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Preferred
Amphibian	Pseudacris brachyphona	Mountain Chorus Frog	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Amphibian	Pseudacris brachyphona	Mountain Chorus Frog	Pond	Forested Depression/Wet Flatwoods	Preferred
Amphibian	Pseudacris brachyphona	Mountain Chorus Frog	Southern Appalachian Seepage Wetland	Open Seep/Fen	Preferred
Amphibian	Pseudacris brachyphona	Mountain Chorus Frog	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Amphibian	Pseudacris brachyphona	Mountain Chorus Frog	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Amphibian	Pseudacris brachyphona	Mountain Chorus Frog	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Amphibian	Pseudotriton montanus	Mud Salamander	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Amphibian	Pseudotriton montanus	Mud Salamander	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Preferred
Amphibian	Pseudotriton montanus	Mud Salamander	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Amphibian	Pseudotriton montanus	Mud Salamander	Pond	Forested Depression/Wet Flatwoods	Preferred
Amphibian	Pseudotriton montanus	Mud Salamander	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Amphibian	Pseudotriton montanus	Mud Salamander	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Arachnid	Microhexura montivaga	Spruce-fir Moss Spider	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Marginal
Arachnid	Microhexura montivaga	Spruce-fir Moss Spider	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Forest Plantation	Forest Plantation	Marginal
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Cumberland Riverscour	Forested Bottomland Floodplain	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Pond	Forested Depression/Wet Flatwoods	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Central Interior Acidic Cliff and Talus	Cliff/Talus	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Southern Interior Sinkhole Wall	Karst Outcrop	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bat	Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bat	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bat	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bat	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bat	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bat	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bat	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bat	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bat	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Bat	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bat	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bat	Corynorhinus townsendii virginianus	Virginia Big-eared Bat	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Marginal
Bat	Lasiurus cinereus	Northern Hoary Bat	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bat	Lasiurus cinereus	Northern Hoary Bat	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Marginal
Bat	Lasiurus cinereus	Northern Hoary Bat	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Marginal
Bat	Lasiurus cinereus	Northern Hoary Bat	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Bat	Lasiurus cinereus	Northern Hoary Bat	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Marginal
Bat	Lasiurus cinereus	Northern Hoary Bat	Central Interior Acidic Cliff and Talus	Cliff/Talus	Marginal
Bat	Lasiurus cinereus	Northern Hoary Bat	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Marginal
Bat	Lasiurus cinereus	Northern Hoary Bat	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Marginal
Bat	Lasiurus cinereus	Northern Hoary Bat	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Marginal
Bat	Lasiurus cinereus	Northern Hoary Bat	Southern Interior Calcareous Cliff	Cliff/Talus	Marginal
Bat	Lasiurus cinereus	Northern Hoary Bat	Southern Interior Sinkhole Wall	Karst Outcrop	Marginal
Bat	Lasiurus cinereus	Northern Hoary Bat	Forest Plantation	Forest Plantation	Marginal
Bat	Lasiurus cinereus	Northern Hoary Bat	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Bat	Lasiurus cinereus	Northern Hoary Bat	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Bat	Lasiurus cinereus	Northern Hoary Bat	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bat	Lasiurus cinereus	Northern Hoary Bat	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Appalachian Shale Barrens	Upland Mixed Forest	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Cumberland Riverscour	Forested Bottomland Floodplain	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bat	Lasiurus cinereus	Northern Hoary Bat	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Pond	Forested Depression/Wet Flatwoods	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Southern Appalachian Spray Cliff	Cliff/Talus	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Southern Appalachian Rocky Summit	Mountain Summit	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Old Field / Successional	Old Field/Successional	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Pasture	Pasture	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Cropland	Cropland	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bat	Lasiurus cinereus	Northern Hoary Bat	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bat	Myotis austroriparius	Southeastern Myotis	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Bat	Myotis austroriparius	Southeastern Myotis	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Bat	Myotis austroriparius	Southeastern Myotis	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Marginal
Bat	Myotis austroriparius	Southeastern Myotis	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Marginal
Bat	Myotis austroriparius	Southeastern Myotis	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Marginal
Bat	Myotis austroriparius	Southeastern Myotis	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Bat	Myotis austroriparius	Southeastern Myotis	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bat	Myotis austroriparius	Southeastern Myotis	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Bat	Myotis austroriparius	Southeastern Myotis	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Bat	Myotis austroriparius	Southeastern Myotis	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Bat	Myotis austroriparius	Southeastern Myotis	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Bat	Myotis austroriparius	Southeastern Myotis	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Bat	Myotis austroriparius	Southeastern Myotis	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred
Bat	Myotis austroriparius	Southeastern Myotis	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Bat	Myotis austroriparius	Southeastern Myotis	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Bat	Myotis austroriparius	Southeastern Myotis	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bat	Myotis austroriparius	Southeastern Myotis	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bat	Myotis austroriparius	Southeastern Myotis	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Bat	Myotis austroriparius	Southeastern Myotis	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bat	Myotis austroriparius	Southeastern Myotis	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bat	Myotis austroriparius	Southeastern Myotis	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bat	Myotis austroriparius	Southeastern Myotis	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bat	Myotis grisescens	Gray Myotis	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Marginal
Bat	Myotis grisescens	Gray Myotis	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Marginal
Bat	Myotis grisescens	Gray Myotis	Forest Plantation	Forest Plantation	Marginal
Bat	Myotis grisescens	Gray Myotis	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Bat	Myotis grisescens	Gray Myotis	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bat	Myotis grisescens	Gray Myotis	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Bat	Myotis grisescens	Gray Myotis	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Bat	Myotis grisescens	Gray Myotis	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Bat	Myotis grisescens	Gray Myotis	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bat	Myotis grisescens	Gray Myotis	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Bat	Myotis grisescens	Gray Myotis	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Bat	Myotis grisescens	Gray Myotis	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Bat	Myotis grisescens	Gray Myotis	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bat	Myotis grisescens	Gray Myotis	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bat	Myotis grisescens	Gray Myotis	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Bat	Myotis grisescens	Gray Myotis	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bat	Myotis grisescens	Gray Myotis	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Bat	Myotis grisescens	Gray Myotis	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bat	Myotis grisescens	Gray Myotis	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bat	Myotis grisescens	Gray Myotis	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bat	Myotis grisescens	Gray Myotis	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Bat	Myotis grisescens	Gray Myotis	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Bat	Myotis grisescens	Gray Myotis	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bat	Myotis grisescens	Gray Myotis	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bat	Myotis grisescens	Gray Myotis	Cumberland Riverscour	Forested Bottomland Floodplain	Suitable
Bat	Myotis grisescens	Gray Myotis	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Bat	Myotis grisescens	Gray Myotis	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bat	Myotis grisescens	Gray Myotis	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Forest Plantation	Forest Plantation	Marginal
Bat	Myotis leibii	Eastern Small-footed Myotis	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Preferred
Bat	Myotis leibii	Eastern Small-footed Myotis	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Cumberland Riverscour	Forested Bottomland Floodplain	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Pond	Forested Depression/Wet Flatwoods	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Central Interior Acidic Cliff and Talus	Cliff/Talus	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Southern Interior Sinkhole Wall	Karst Outcrop	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bat	Myotis leibii	Eastern Small-footed Myotis	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bat	Myotis lucifugus	Little Brown Myotis	Appalachian Shale Barrens	Upland Mixed Forest	Marginal
Bat	Myotis lucifugus	Little Brown Myotis	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Marginal
Bat	Myotis lucifugus	Little Brown Myotis	Forest Plantation	Forest Plantation	Marginal
Bat	Myotis lucifugus	Little Brown Myotis	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Bat	Myotis lucifugus	Little Brown Myotis	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bat	Myotis lucifugus	Little Brown Myotis	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Preferred
Bat	Myotis lucifugus	Little Brown Myotis	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Bat	Myotis lucifugus	Little Brown Myotis	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Bat	Myotis lucifugus	Little Brown Myotis	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Preferred
Bat	Myotis lucifugus	Little Brown Myotis	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Preferred
Bat	Myotis lucifugus	Little Brown Myotis	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Bat	Myotis lucifugus	Little Brown Myotis	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Bat	Myotis lucifugus	Little Brown Myotis	Southern Appalachian Oak Forest	Upland Deciduous Forest	Preferred
Bat	Myotis lucifugus	Little Brown Myotis	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Bat	Myotis lucifugus	Little Brown Myotis	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Preferred
Bat	Myotis lucifugus	Little Brown Myotis	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bat	Myotis lucifugus	Little Brown Myotis	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Bat	Myotis lucifugus	Little Brown Myotis	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Preferred
Bat	Myotis lucifugus	Little Brown Myotis	Southern Appalachian Seepage Wetland	Open Seep/Fen	Preferred
Bat	Myotis lucifugus	Little Brown Myotis	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Bat	Myotis lucifugus	Little Brown Myotis	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred
Bat	Myotis lucifugus	Little Brown Myotis	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	Cumberland Riverscour	Forested Bottomland Floodplain	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	Pond	Forested Depression/Wet Flatwoods	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	Central Interior Acidic Cliff and Talus	Cliff/Talus	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bat	Myotis lucifugus	Little Brown Myotis	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bat	Myotis septentrionalis	Northern Myotis	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal
Bat	Myotis septentrionalis	Northern Myotis	Forest Plantation	Forest Plantation	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bat	Myotis septentrionalis	Northern Myotis	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Bat	Myotis septentrionalis	Northern Myotis	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bat	Myotis septentrionalis	Northern Myotis	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Preferred
Bat	Myotis septentrionalis	Northern Myotis	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Bat	Myotis septentrionalis	Northern Myotis	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bat	Myotis septentrionalis	Northern Myotis	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Bat	Myotis septentrionalis	Northern Myotis	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Bat	Myotis septentrionalis	Northern Myotis	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred
Bat	Myotis septentrionalis	Northern Myotis	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Bat	Myotis septentrionalis	Northern Myotis	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bat	Myotis septentrionalis	Northern Myotis	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bat	Myotis septentrionalis	Northern Myotis	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Bat	Myotis septentrionalis	Northern Myotis	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Bat	Myotis septentrionalis	Northern Myotis	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bat	Myotis septentrionalis	Northern Myotis	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bat	Myotis septentrionalis	Northern Myotis	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bat	Myotis septentrionalis	Northern Myotis	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bat	Myotis septentrionalis	Northern Myotis	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bat	Myotis septentrionalis	Northern Myotis	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Bat	Myotis septentrionalis	Northern Myotis	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Bat	Myotis septentrionalis	Northern Myotis	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bat	Myotis septentrionalis	Northern Myotis	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bat	Myotis septentrionalis	Northern Myotis	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bat	Myotis septentrionalis	Northern Myotis	Pond	Forested Depression/Wet Flatwoods	Suitable
Bat	Myotis septentrionalis	Northern Myotis	Central Interior Acidic Cliff and Talus	Cliff/Talus	Suitable
Bat	Myotis septentrionalis	Northern Myotis	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Bat	Myotis septentrionalis	Northern Myotis	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Bat	Myotis septentrionalis	Northern Myotis	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bat	Myotis sodalis	Indiana Myotis	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal
Bat	Myotis sodalis	Indiana Myotis	Forest Plantation	Forest Plantation	Marginal
Bat	Myotis sodalis	Indiana Myotis	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Bat	Myotis sodalis	Indiana Myotis	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bat	Myotis sodalis	Indiana Myotis	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Preferred
Bat	Myotis sodalis	Indiana Myotis	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Bat	Myotis sodalis	Indiana Myotis	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bat	Myotis sodalis	Indiana Myotis	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Bat	Myotis sodalis	Indiana Myotis	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Bat	Myotis sodalis	Indiana Myotis	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Bat	Myotis sodalis	Indiana Myotis	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred
Bat	Myotis sodalis	Indiana Myotis	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Bat	Myotis sodalis	Indiana Myotis	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Bat	Myotis sodalis	Indiana Myotis	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bat	Myotis sodalis	Indiana Myotis	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bat	Myotis sodalis	Indiana Myotis	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Bat	Myotis sodalis	Indiana Myotis	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Bat	Myotis sodalis	Indiana Myotis	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bat	Myotis sodalis	Indiana Myotis	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bat	Myotis sodalis	Indiana Myotis	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bat	Myotis sodalis	Indiana Myotis	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bat	Myotis sodalis	Indiana Myotis	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bat	Myotis sodalis	Indiana Myotis	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Bat	Myotis sodalis	Indiana Myotis	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Bat	Myotis sodalis	Indiana Myotis	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bat	Myotis sodalis	Indiana Myotis	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bat	Myotis sodalis	Indiana Myotis	Pond	Forested Depression/Wet Flatwoods	Suitable
Bat	Myotis sodalis	Indiana Myotis	Central Interior Acidic Cliff and Talus	Cliff/Talus	Suitable
Bat	Myotis sodalis	Indiana Myotis	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Bat	Myotis sodalis	Indiana Myotis	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Bat	Myotis sodalis	Indiana Myotis	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Marginal
Bat	Perimyotis subflavus	Tricolored Bat	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal
Bat	Perimyotis subflavus	Tricolored Bat	Forest Plantation	Forest Plantation	Marginal
Bat	Perimyotis subflavus	Tricolored Bat	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Bat	Perimyotis subflavus	Tricolored Bat	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Bat	Perimyotis subflavus	Tricolored Bat	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bat	Perimyotis subflavus	Tricolored Bat	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Bat	Perimyotis subflavus	Tricolored Bat	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Bat	Perimyotis subflavus	Tricolored Bat	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Preferred
Bat	Perimyotis subflavus	Tricolored Bat	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Preferred
Bat	Perimyotis subflavus	Tricolored Bat	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Bat	Perimyotis subflavus	Tricolored Bat	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Bat	Perimyotis subflavus	Tricolored Bat	Southern Appalachian Oak Forest	Upland Deciduous Forest	Preferred
Bat	Perimyotis subflavus	Tricolored Bat	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Bat	Perimyotis subflavus	Tricolored Bat	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bat	Perimyotis subflavus	Tricolored Bat	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Bat	Perimyotis subflavus	Tricolored Bat	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Bat	Perimyotis subflavus	Tricolored Bat	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred
Bat	Perimyotis subflavus	Tricolored Bat	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	Central Interior Acidic Cliff and Talus	Cliff/Talus	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bat	Perimyotis subflavus	Tricolored Bat	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Bat	Perimyotis subflavus	Tricolored Bat	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Marginal
Bird	Accipiter striatus	Sharp-shinned Hawk	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Marginal
Bird	Accipiter striatus	Sharp-shinned Hawk	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Marginal
Bird	Accipiter striatus	Sharp-shinned Hawk	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Bird	Accipiter striatus	Sharp-shinned Hawk	Southern Appalachian Grass and Shrub Bald	Bald	Marginal
Bird	Accipiter striatus	Sharp-shinned Hawk	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Marginal
Bird	Accipiter striatus	Sharp-shinned Hawk	Pond	Forested Depression/Wet Flatwoods	Marginal
Bird	Accipiter striatus	Sharp-shinned Hawk	Interior Low Plateau Seepage Fen	Open Seep/Fen	Marginal
Bird	Accipiter striatus	Sharp-shinned Hawk	Cropland	Cropland	Marginal
Bird	Accipiter striatus	Sharp-shinned Hawk	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Bird	Accipiter striatus	Sharp-shinned Hawk	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Bird	Accipiter striatus	Sharp-shinned Hawk	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Bird	Accipiter striatus	Sharp-shinned Hawk	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Bird	Accipiter striatus	Sharp-shinned Hawk	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Accipiter striatus	Sharp-shinned Hawk	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bird	Accipiter striatus	Sharp-shinned Hawk	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Bird	Accipiter striatus	Sharp-shinned Hawk	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Bird	Accipiter striatus	Sharp-shinned Hawk	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Bird	Accipiter striatus	Sharp-shinned Hawk	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Accipiter striatus	Sharp-shinned Hawk	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Southern Appalachian Rocky Summit	Mountain Summit	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Forest Plantation	Forest Plantation	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Old Field / Successional	Old Field/Successional	Suitable
Bird	Accipiter striatus	Sharp-shinned Hawk	Pasture	Pasture	Suitable
Bird	Aegolius acadicus	Northern Saw-whet Owl	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Bird	Aegolius acadicus	Northern Saw-whet Owl	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Bird	Aegolius acadicus	Northern Saw-whet Owl	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Bird	Aegolius acadicus	Northern Saw-whet Owl	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Aegolius acadicus	Northern Saw-whet Owl	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Aegolius acadicus	Northern Saw-whet Owl	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Aegolius acadicus	Northern Saw-whet Owl	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Ammodramus savannarum	Grasshopper Sparrow	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Ammodramus savannarum	Grasshopper Sparrow	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Bird	Ammodramus savannarum	Grasshopper Sparrow	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Marginal
Bird	Ammodramus savannarum	Grasshopper Sparrow	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Bird	Ammodramus savannarum	Grasshopper Sparrow	Cropland	Cropland	Marginal
Bird	Ammodramus savannarum	Grasshopper Sparrow	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Ammodramus savannarum	Grasshopper Sparrow	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Preferred
Bird	Ammodramus savannarum	Grasshopper Sparrow	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Ammodramus savannarum	Grasshopper Sparrow	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Ammodramus savannarum	Grasshopper Sparrow	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Ammodramus savannarum	Grasshopper Sparrow	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Preferred
Bird	Ammodramus savannarum	Grasshopper Sparrow	Pasture	Pasture	Preferred
Bird	Ammodramus savannarum	Grasshopper Sparrow	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Bird	Ammodramus savannarum	Grasshopper Sparrow	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Bird	Ammodramus savannarum	Grasshopper Sparrow	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Bird	Ammodramus savannarum	Grasshopper Sparrow	Old Field / Successional	Old Field/Successional	Suitable
Bird	Ammodramus savannarum	Grasshopper Sparrow	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Suitable
Bird	Ammodramus savannarum	Grasshopper Sparrow	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Suitable
Bird	Ammospiza leconteii	LeConte's Sparrow	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Marginal
Bird	Ammospiza leconteii	LeConte's Sparrow	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Marginal
Bird	Ammospiza leconteii	LeConte's Sparrow	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Marginal
Bird	Ammospiza leconteii	LeConte's Sparrow	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Bird	Ammospiza leconteii	LeConte's Sparrow	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Bird	Ammospiza leconteii	LeConte's Sparrow	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Bird	Ammospiza leconteii	LeConte's Sparrow	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Bird	Ammospiza leconteii	LeConte's Sparrow	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Bird	Ammospiza leconteii	LeConte's Sparrow	Old Field / Successional	Old Field/Successional	Suitable
Bird	Ammospiza nelsoni	Nelson's Sparrow	Old Field / Successional	Old Field/Successional	Marginal
Bird	Ammospiza nelsoni	Nelson's Sparrow	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Bird	Ammospiza nelsoni	Nelson's Sparrow	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Preferred
Bird	Ammospiza nelsoni	Nelson's Sparrow	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Bird	Ammospiza nelsoni	Nelson's Sparrow	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Preferred

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Ammospiza nelsoni	Nelson's Sparrow	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Preferred
Bird	Ammospiza nelsoni	Nelson's Sparrow	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Ammospiza nelsoni	Nelson's Sparrow	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Ammospiza nelsoni	Nelson's Sparrow	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Anas acuta	Northern Pintail	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Preferred
Bird	Anas acuta	Northern Pintail	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Preferred
Bird	Anas acuta	Northern Pintail	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Preferred
Bird	Anas rubripes	American Black Duck	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Anas rubripes	American Black Duck	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Marginal
Bird	Anas rubripes	American Black Duck	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Bird	Anas rubripes	American Black Duck	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Bird	Anas rubripes	American Black Duck	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Marginal
Bird	Anas rubripes	American Black Duck	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Bird	Anas rubripes	American Black Duck	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Bird	Anas rubripes	American Black Duck	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Bird	Anas rubripes	American Black Duck	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Bird	Anas rubripes	American Black Duck	Pasture	Pasture	Marginal
Bird	Anas rubripes	American Black Duck	Cropland	Cropland	Marginal
Bird	Anas rubripes	American Black Duck	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Preferred
Bird	Anas rubripes	American Black Duck	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Preferred
Bird	Anas rubripes	American Black Duck	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Preferred
Bird	Antrostomus carolinensis	Chuck-will's-widow	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Bird	Antrostomus carolinensis	Chuck-will's-widow	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Bird	Antrostomus carolinensis	Chuck-will's-widow	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Marginal
Bird	Antrostomus carolinensis	Chuck-will's-widow	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Bird	Antrostomus carolinensis	Chuck-will's-widow	Forest Plantation	Forest Plantation	Marginal
Bird	Antrostomus carolinensis	Chuck-will's-widow	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Bird	Antrostomus carolinensis	Chuck-will's-widow	Cropland	Cropland	Marginal
Bird	Antrostomus carolinensis	Chuck-will's-widow	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Bird	Antrostomus carolinensis	Chuck-will's-widow	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Antrostomus carolinensis	Chuck-will's-widow	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Preferred
Bird	Antrostomus carolinensis	Chuck-will's-widow	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Antrostomus carolinensis	Chuck-will's-widow	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	Old Field / Successional	Old Field/Successional	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	Pasture	Pasture	Suitable
Bird	Antrostomus carolinensis	Chuck-will's-widow	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Marginal
Bird	Antrostomus vociferus	Eastern Whip-poor-will	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Bird	Antrostomus vociferus	Eastern Whip-poor-will	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Bird	Antrostomus vociferus	Eastern Whip-poor-will	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Forest Plantation	Forest Plantation	Marginal
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Bird	Antrostomus vociferus	Eastern Whip-poor-will	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Preferred
Bird	Antrostomus vociferus	Eastern Whip-poor-will	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Antrostomus vociferus	Eastern Whip-poor-will	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Preferred
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Preferred
Bird	Antrostomus vociferus	Eastern Whip-poor-will	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Appalachian Shale Barrens	Upland Mixed Forest	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Antrostomus vociferus	Eastern Whip-poor-will	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Old Field / Successional	Old Field/Successional	Suitable
Bird	Antrostomus vociferus	Eastern Whip-poor-will	Pasture	Pasture	Suitable
Bird	Aquila chrysaetos	Golden Eagle	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Marginal
Bird	Aquila chrysaetos	Golden Eagle	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Bird	Aquila chrysaetos	Golden Eagle	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bird	Aquila chrysaetos	Golden Eagle	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bird	Aquila chrysaetos	Golden Eagle	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Aquila chrysaetos	Golden Eagle	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Aquila chrysaetos	Golden Eagle	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Aquila chrysaetos	Golden Eagle	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bird	Aquila chrysaetos	Golden Eagle	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Bird	Aquila chrysaetos	Golden Eagle	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Aquila chrysaetos	Golden Eagle	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Bird	Aquila chrysaetos	Golden Eagle	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Bird	Aquila chrysaetos	Golden Eagle	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Bird	Aquila chrysaetos	Golden Eagle	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Bird	Ardea alba	Great Egret	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Marginal
Bird	Ardea alba	Great Egret	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Bird	Ardea alba	Great Egret	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Bird	Ardea alba	Great Egret	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Bird	Ardea alba	Great Egret	Pasture	Pasture	Marginal
Bird	Ardea alba	Great Egret	Cropland	Cropland	Marginal
Bird	Ardea alba	Great Egret	Pasture	Pasture	Marginal
Bird	Ardea alba	Great Egret	Cropland	Cropland	Marginal
Bird	Ardea alba	Great Egret	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Bird	Ardea alba	Great Egret	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Ardea alba	Great Egret	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Ardea alba	Great Egret	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bird	Ardea alba	Great Egret	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Bird	Ardea alba	Great Egret	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Ardea alba	Great Egret	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bird	Ardea alba	Great Egret	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Arenaria interpres	Ruddy Turnstone	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Marginal
Bird	Arenaria interpres	Ruddy Turnstone	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Preferred
Bird	Arenaria interpres	Ruddy Turnstone	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Arenaria interpres	Ruddy Turnstone	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Asio flammeus	Short-eared Owl	Pond	Forested Depression/Wet Flatwoods	Marginal
Bird	Asio flammeus	Short-eared Owl	Interior Low Plateau Seepage Fen	Open Seep/Fen	Marginal
Bird	Asio flammeus	Short-eared Owl	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Bird	Asio flammeus	Short-eared Owl	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Bird	Asio flammeus	Short-eared Owl	Cropland	Cropland	Marginal
Bird	Asio flammeus	Short-eared Owl	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Bird	Asio flammeus	Short-eared Owl	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Bird	Asio flammeus	Short-eared Owl	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Asio flammeus	Short-eared Owl	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Asio flammeus	Short-eared Owl	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Asio flammeus	Short-eared Owl	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Asio flammeus	Short-eared Owl	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Bird	Asio flammeus	Short-eared Owl	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Asio flammeus	Short-eared Owl	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Bird	Asio flammeus	Short-eared Owl	Old Field / Successional	Old Field/Successional	Suitable
Bird	Asio flammeus	Short-eared Owl	Pasture	Pasture	Suitable
Bird	Asio otus	Long-eared Owl	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Bird	Asio otus	Long-eared Owl	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Bird	Asio otus	Long-eared Owl	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Asio otus	Long-eared Owl	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Bird	Asio otus	Long-eared Owl	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Bird	Asio otus	Long-eared Owl	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Marginal
Bird	Asio otus	Long-eared Owl	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Marginal
Bird	Asio otus	Long-eared Owl	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Marginal
Bird	Asio otus	Long-eared Owl	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Marginal
Bird	Asio otus	Long-eared Owl	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Bird	Asio otus	Long-eared Owl	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Bird	Asio otus	Long-eared Owl	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Bird	Asio otus	Long-eared Owl	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Marginal
Bird	Asio otus	Long-eared Owl	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Bird	Asio otus	Long-eared Owl	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Bird	Asio otus	Long-eared Owl	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Marginal
Bird	Asio otus	Long-eared Owl	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Marginal
Bird	Asio otus	Long-eared Owl	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Bird	Asio otus	Long-eared Owl	Old Field / Successional	Old Field/Successional	Marginal
Bird	Asio otus	Long-eared Owl	Pasture	Pasture	Marginal
Bird	Asio otus	Long-eared Owl	Old Field / Successional	Old Field/Successional	Marginal
Bird	Asio otus	Long-eared Owl	Pasture	Pasture	Marginal
Bird	Asio otus	Long-eared Owl	Cropland	Cropland	Marginal
Bird	Asio otus	Long-eared Owl	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Bird	Asio otus	Long-eared Owl	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Bird	Asio otus	Long-eared Owl	Appalachian Shale Barrens	Upland Mixed Forest	Suitable
Bird	Asio otus	Long-eared Owl	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Bird	Asio otus	Long-eared Owl	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Bird	Asio otus	Long-eared Owl	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Suitable
Bird	Asio otus	Long-eared Owl	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Bird	Asio otus	Long-eared Owl	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Suitable
Bird	Asio otus	Long-eared Owl	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Suitable
Bird	Asio otus	Long-eared Owl	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Asio otus	Long-eared Owl	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Bird	Asio otus	Long-eared Owl	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Asio otus	Long-eared Owl	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Asio otus	Long-eared Owl	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Asio otus	Long-eared Owl	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Bird	Asio otus	Long-eared Owl	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Bird	Asio otus	Long-eared Owl	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Bird	Asio otus	Long-eared Owl	Southern Appalachian Rocky Summit	Mountain Summit	Suitable
Bird	Asio otus	Long-eared Owl	Forest Plantation	Forest Plantation	Suitable
Bird	Bonasa umbellus	Ruffed Grouse	Forest Plantation	Forest Plantation	Marginal
Bird	Bonasa umbellus	Ruffed Grouse	Southern Appalachian Oak Forest	Upland Deciduous Forest	Preferred
Bird	Bonasa umbellus	Ruffed Grouse	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Bird	Bonasa umbellus	Ruffed Grouse	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Preferred
Bird	Bonasa umbellus	Ruffed Grouse	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Bonasa umbellus	Ruffed Grouse	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bird	Bonasa umbellus	Ruffed Grouse	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bird	Bonasa umbellus	Ruffed Grouse	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Bonasa umbellus	Ruffed Grouse	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Bonasa umbellus	Ruffed Grouse	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bird	Bonasa umbellus	Ruffed Grouse	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Bird	Bonasa umbellus	Ruffed Grouse	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Bird	Bonasa umbellus	Ruffed Grouse	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Bird	Bonasa umbellus	Ruffed Grouse	Old Field / Successional	Old Field/Successional	Suitable
Bird	Botaurus exilis	Least Bittern	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Botaurus exilis	Least Bittern	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Bird	Botaurus exilis	Least Bittern	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Bird	Botaurus exilis	Least Bittern	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Marginal
Bird	Botaurus exilis	Least Bittern	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Bird	Botaurus exilis	Least Bittern	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Bird	Botaurus exilis	Least Bittern	Cropland	Cropland	Marginal
Bird	Botaurus exilis	Least Bittern	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Bird	Botaurus exilis	Least Bittern	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bird	Botaurus exilis	Least Bittern	Pond	Forested Depression/Wet Flatwoods	Suitable
Bird	Botaurus exilis	Least Bittern	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bird	Botaurus exilis	Least Bittern	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Botaurus exilis	Least Bittern	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bird	Botaurus exilis	Least Bittern	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Botaurus lentiginosus	American Bittern	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Botaurus lentiginosus	American Bittern	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Marginal
Bird	Botaurus lentiginosus	American Bittern	Pasture	Pasture	Marginal
Bird	Botaurus lentiginosus	American Bittern	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Bird	Botaurus lentiginosus	American Bittern	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Bird	Botaurus lentiginosus	American Bittern	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred
Bird	Botaurus lentiginosus	American Bittern	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Botaurus lentiginosus	American Bittern	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Botaurus lentiginosus	American Bittern	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Botaurus lentiginosus	American Bittern	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Botaurus lentiginosus	American Bittern	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Bird	Botaurus lentiginosus	American Bittern	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bird	Botaurus lentiginosus	American Bittern	Pond	Forested Depression/Wet Flatwoods	Suitable
Bird	Botaurus lentiginosus	American Bittern	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Bird	Botaurus lentiginosus	American Bittern	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bird	Botaurus lentiginosus	American Bittern	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Botaurus lentiginosus	American Bittern	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bird	Botaurus lentiginosus	American Bittern	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Calidris alpina	Dunlin	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Bird	Calidris alpina	Dunlin	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Marginal
Bird	Calidris alpina	Dunlin	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Marginal
Bird	Calidris alpina	Dunlin	Pasture	Pasture	Marginal
Bird	Calidris alpina	Dunlin	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Calidris alpina	Dunlin	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Preferred
Bird	Calidris alpina	Dunlin	Cropland	Cropland	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Calidris alpina	Dunlin	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Calidris alpina	Dunlin	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Calidris fuscicollis	White-rumped Sandpiper	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Marginal
Bird	Calidris fuscicollis	White-rumped Sandpiper	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Preferred
Bird	Calidris fuscicollis	White-rumped Sandpiper	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Calidris fuscicollis	White-rumped Sandpiper	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Calidris himantopus	Stilt Sandpiper	Old Field / Successional	Old Field/Successional	Marginal
Bird	Calidris himantopus	Stilt Sandpiper	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Bird	Calidris himantopus	Stilt Sandpiper	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Calidris himantopus	Stilt Sandpiper	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bird	Calidris himantopus	Stilt Sandpiper	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Bird	Calidris himantopus	Stilt Sandpiper	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Bird	Calidris himantopus	Stilt Sandpiper	Pasture	Pasture	Suitable
Bird	Calidris himantopus	Stilt Sandpiper	Cropland	Cropland	Suitable
Bird	Calidris himantopus	Stilt Sandpiper	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Calidris himantopus	Stilt Sandpiper	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bird	Calidris himantopus	Stilt Sandpiper	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Calidris mauri	Western Sandpiper	Old Field / Successional	Old Field/Successional	Marginal
Bird	Calidris mauri	Western Sandpiper	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Bird	Calidris mauri	Western Sandpiper	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Bird	Calidris mauri	Western Sandpiper	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Calidris mauri	Western Sandpiper	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Calidris mauri	Western Sandpiper	Pasture	Pasture	Suitable
Bird	Calidris mauri	Western Sandpiper	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Calidris mauri	Western Sandpiper	Pasture	Pasture	Suitable
Bird	Calidris mauri	Western Sandpiper	Cropland	Cropland	Suitable
Bird	Calidris mauri	Western Sandpiper	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Calidris mauri	Western Sandpiper	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bird	Calidris mauri	Western Sandpiper	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Calidris melanotos	Pectoral Sandpiper	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Preferred
Bird	Calidris melanotos	Pectoral Sandpiper	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Bird	Calidris melanotos	Pectoral Sandpiper	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Bird	Calidris melanotos	Pectoral Sandpiper	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Calidris melanotos	Pectoral Sandpiper	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Calidris pusilla	Semipalmated Sandpiper	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Bird	Calidris pusilla	Semipalmated Sandpiper	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Marginal
Bird	Calidris pusilla	Semipalmated Sandpiper	Pasture	Pasture	Marginal
Bird	Calidris pusilla	Semipalmated Sandpiper	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Bird	Calidris pusilla	Semipalmated Sandpiper	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bird	Calidris pusilla	Semipalmated Sandpiper	Pond	Forested Depression/Wet Flatwoods	Suitable
Bird	Calidris pusilla	Semipalmated Sandpiper	Cropland	Cropland	Suitable
Bird	Calidris pusilla	Semipalmated Sandpiper	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Calidris pusilla	Semipalmated Sandpiper	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bird	Calidris pusilla	Semipalmated Sandpiper	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Calidris subruficollis	Buff-breasted Sandpiper	Old Field / Successional	Old Field/Successional	Marginal
Bird	Calidris subruficollis	Buff-breasted Sandpiper	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Bird	Calidris subruficollis	Buff-breasted Sandpiper	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Calidris subruficollis	Buff-breasted Sandpiper	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Bird	Calidris subruficollis	Buff-breasted Sandpiper	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Calidris subruficollis	Buff-breasted Sandpiper	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Calidris subruficollis	Buff-breasted Sandpiper	Pasture	Pasture	Suitable
Bird	Calidris subruficollis	Buff-breasted Sandpiper	Cropland	Cropland	Suitable
Bird	Calidris subruficollis	Buff-breasted Sandpiper	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Calidris subruficollis	Buff-breasted Sandpiper	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bird	Calidris subruficollis	Buff-breasted Sandpiper	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Cardellina canadensis	Canada Warbler	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Bird	Cardellina canadensis	Canada Warbler	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Bird	Cardellina canadensis	Canada Warbler	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Marginal
Bird	Cardellina canadensis	Canada Warbler	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Marginal
Bird	Cardellina canadensis	Canada Warbler	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Bird	Cardellina canadensis	Canada Warbler	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Bird	Cardellina canadensis	Canada Warbler	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Bird	Cardellina canadensis	Canada Warbler	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Bird	Cardellina canadensis	Canada Warbler	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Marginal
Bird	Cardellina canadensis	Canada Warbler	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Bird	Cardellina canadensis	Canada Warbler	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Bird	Cardellina canadensis	Canada Warbler	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Bird	Cardellina canadensis	Canada Warbler	Old Field / Successional	Old Field/Successional	Marginal
Bird	Cardellina canadensis	Canada Warbler	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Bird	Cardellina canadensis	Canada Warbler	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Bird	Cardellina canadensis	Canada Warbler	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Bird	Cardellina canadensis	Canada Warbler	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Preferred
Bird	Cardellina canadensis	Canada Warbler	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Bird	Cardellina canadensis	Canada Warbler	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bird	Cardellina canadensis	Canada Warbler	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Cardellina canadensis	Canada Warbler	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bird	Catharus fuscescens	Veery	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Bird	Catharus fuscescens	Veery	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Bird	Catharus fuscescens	Veery	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Marginal
Bird	Catharus fuscescens	Veery	Southern Appalachian Seepage Wetland	Open Seep/Fen	Marginal
Bird	Catharus fuscescens	Veery	Southern Appalachian Oak Forest	Upland Deciduous Forest	Preferred
Bird	Catharus fuscescens	Veery	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Bird	Catharus fuscescens	Veery	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Preferred
Bird	Catharus fuscescens	Veery	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Bird	Catharus fuscescens	Veery	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Preferred
Bird	Catharus fuscescens	Veery	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Preferred
Bird	Catharus fuscescens	Veery	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bird	Catharus fuscescens	Veery	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bird	Catharus fuscescens	Veery	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Catharus fuscescens	Veery	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Bird	Catharus fuscescens	Veery	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Bird	Catharus fuscescens	Veery	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Centronyx henslowii	Henslow's Sparrow	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Centronyx henslowii	Henslow's Sparrow	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Bird	Centronyx henslowii	Henslow's Sparrow	Appalachian Shale Barrens	Upland Mixed Forest	Marginal
Bird	Centronyx henslowii	Henslow's Sparrow	Cropland	Cropland	Marginal
Bird	Centronyx henslowii	Henslow's Sparrow	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Centronyx henslowii	Henslow's Sparrow	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Centronyx henslowii	Henslow's Sparrow	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Centronyx henslowii	Henslow's Sparrow	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Centronyx henslowii	Henslow's Sparrow	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Bird	Centronyx henslowii	Henslow's Sparrow	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Bird	Centronyx henslowii	Henslow's Sparrow	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Bird	Centronyx henslowii	Henslow's Sparrow	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Suitable
Bird	Centronyx henslowii	Henslow's Sparrow	Old Field / Successional	Old Field/Successional	Suitable
Bird	Centronyx henslowii	Henslow's Sparrow	Pasture	Pasture	Suitable
Bird	Centronyx henslowii	Henslow's Sparrow	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Suitable
Bird	Certhia americana	Brown Creeper	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Bird	Certhia americana	Brown Creeper	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Bird	Certhia americana	Brown Creeper	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Bird	Certhia americana	Brown Creeper	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Bird	Certhia americana	Brown Creeper	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Certhia americana	Brown Creeper	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Certhia americana	Brown Creeper	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Chaetura pelagica	Chimney Swift	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Bird	Chaetura pelagica	Chimney Swift	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Bird	Chaetura pelagica	Chimney Swift	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Chaetura pelagica	Chimney Swift	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Bird	Chaetura pelagica	Chimney Swift	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Bird	Chaetura pelagica	Chimney Swift	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Marginal
Bird	Chaetura pelagica	Chimney Swift	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Bird	Chaetura pelagica	Chimney Swift	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Bird	Chaetura pelagica	Chimney Swift	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Bird	Chaetura pelagica	Chimney Swift	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Marginal
Bird	Chaetura pelagica	Chimney Swift	Cumberland Riverscour	Forested Bottomland Floodplain	Marginal
Bird	Chaetura pelagica	Chimney Swift	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Marginal
Bird	Chaetura pelagica	Chimney Swift	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Marginal
Bird	Chaetura pelagica	Chimney Swift	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bird	Chaetura pelagica	Chimney Swift	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bird	Chaetura pelagica	Chimney Swift	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Bird	Chaetura pelagica	Chimney Swift	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Bird	Chaetura pelagica	Chimney Swift	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Bird	Chaetura pelagica	Chimney Swift	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Bird	Chaetura pelagica	Chimney Swift	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Bird	Chaetura pelagica	Chimney Swift	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bird	Chaetura pelagica	Chimney Swift	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Bird	Chaetura pelagica	Chimney Swift	Pond	Forested Depression/Wet Flatwoods	Suitable
Bird	Charadrius melodus melodus	Piping Plover (Atlantic subspecies)	Old Field / Successional	Old Field/Successional	Marginal
Bird	Charadrius melodus melodus	Piping Plover (Atlantic subspecies)	Cropland	Cropland	Marginal
Bird	Charadrius melodus melodus	Piping Plover (Atlantic subspecies)	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Bird	Charadrius melodus melodus	Piping Plover (Atlantic subspecies)	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Charadrius melodus melodus	Piping Plover (Atlantic subspecies)	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Bird	Charadrius melodus melodus	Piping Plover (Atlantic subspecies)	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Charadrius melodus melodus	Piping Plover (Atlantic subspecies)	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Charadrius melodus melodus	Piping Plover (Atlantic subspecies)	Pasture	Pasture	Suitable
Bird	Charadrius melodus melodus	Piping Plover (Atlantic subspecies)	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Charadrius melodus melodus	Piping Plover (Atlantic subspecies)	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bird	Charadrius melodus melodus	Piping Plover (Atlantic subspecies)	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Chordeiles minor	Common Nighthawk	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Marginal
Bird	Chordeiles minor	Common Nighthawk	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Marginal
Bird	Chordeiles minor	Common Nighthawk	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Preferred
Bird	Chordeiles minor	Common Nighthawk	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Bird	Chordeiles minor	Common Nighthawk	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Preferred
Bird	Chordeiles minor	Common Nighthawk	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Preferred
Bird	Chordeiles minor	Common Nighthawk	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Preferred
Bird	Chordeiles minor	Common Nighthawk	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Preferred
Bird	Chordeiles minor	Common Nighthawk	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Chordeiles minor	Common Nighthawk	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Chordeiles minor	Common Nighthawk	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Chordeiles minor	Common Nighthawk	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Bird	Chordeiles minor	Common Nighthawk	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Chordeiles minor	Common Nighthawk	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Bird	Chordeiles minor	Common Nighthawk	Old Field / Successional	Old Field/Successional	Suitable
Bird	Circus hudsonius	Northern Harrier	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Circus hudsonius	Northern Harrier	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Bird	Circus hudsonius	Northern Harrier	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Bird	Circus hudsonius	Northern Harrier	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Bird	Circus hudsonius	Northern Harrier	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Circus hudsonius	Northern Harrier	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Circus hudsonius	Northern Harrier	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Circus hudsonius	Northern Harrier	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Circus hudsonius	Northern Harrier	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Bird	Circus hudsonius	Northern Harrier	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Bird	Circus hudsonius	Northern Harrier	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Bird	Circus hudsonius	Northern Harrier	Pond	Forested Depression/Wet Flatwoods	Suitable
Bird	Circus hudsonius	Northern Harrier	Old Field / Successional	Old Field/Successional	Suitable
Bird	Circus hudsonius	Northern Harrier	Pasture	Pasture	Suitable
Bird	Circus hudsonius	Northern Harrier	Cropland	Cropland	Suitable
Bird	Clangula hyemalis	Long-tailed Duck	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Bird	Clangula hyemalis	Long-tailed Duck	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Clangula hyemalis	Long-tailed Duck	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bird	Coccothraustes vespertinus	Evening Grosbeak	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Preferred
Bird	Coccothraustes vespertinus	Evening Grosbeak	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Preferred
Bird	Coccothraustes vespertinus	Evening Grosbeak	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bird	Coccothraustes vespertinus	Evening Grosbeak	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Coccothraustes vespertinus	Evening Grosbeak	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Coccothraustes vespertinus	Evening Grosbeak	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Coccothraustes vespertinus	Evening Grosbeak	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bird	Coccothraustes vespertinus	Evening Grosbeak	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Bird	Coccothraustes vespertinus	Evening Grosbeak	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Bird	Coccothraustes vespertinus	Evening Grosbeak	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Coccothraustes vespertinus	Evening Grosbeak	Forest Plantation	Forest Plantation	Suitable
Bird	Coccyzus americanus	Yellow-billed Cuckoo	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Bird	Coccyzus americanus	Yellow-billed Cuckoo	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Coccyzus americanus	Yellow-billed Cuckoo	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Bird	Coccyzus americanus	Yellow-billed Cuckoo	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Bird	Coccyzus americanus	Yellow-billed Cuckoo	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Marginal
Bird	Coccyzus americanus	Yellow-billed Cuckoo	Forest Plantation	Forest Plantation	Marginal
Bird	Coccyzus americanus	Yellow-billed Cuckoo	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Bird	Coccyzus americanus	Yellow-billed Cuckoo	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Bird	Coccyzus americanus	Yellow-billed Cuckoo	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Preferred
Bird	Coccyzus americanus	Yellow-billed Cuckoo	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Bird	Coccyzus americanus	Yellow-billed Cuckoo	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Bird	Coccyzus americanus	Yellow-billed Cuckoo	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Bird	Coccyzus americanus	Yellow-billed Cuckoo	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bird	Coccyzus americanus	Yellow-billed Cuckoo	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bird	Coccyzus americanus	Yellow-billed Cuckoo	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bird	Coccyzus americanus	Yellow-billed Cuckoo	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Bird	Coccyzus americanus	Yellow-billed Cuckoo	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Coccyzus americanus	Yellow-billed Cuckoo	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Coccyzus americanus	Yellow-billed Cuckoo	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Coccyzus americanus	Yellow-billed Cuckoo	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Coccyzus americanus	Yellow-billed Cuckoo	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Coccyzus americanus	Yellow-billed Cuckoo	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Coccyzus americanus	Yellow-billed Cuckoo	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bird	Coccyzus americanus	Yellow-billed Cuckoo	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Bird	Coccyzus americanus	Yellow-billed Cuckoo	Old Field / Successional	Old Field/Successional	Suitable
Bird	Colinus virginianus	Northern Bobwhite	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Bird	Colinus virginianus	Northern Bobwhite	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Bird	Colinus virginianus	Northern Bobwhite	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Colinus virginianus	Northern Bobwhite	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Bird	Colinus virginianus	Northern Bobwhite	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Bird	Colinus virginianus	Northern Bobwhite	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Marginal
Bird	Colinus virginianus	Northern Bobwhite	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Marginal
Bird	Colinus virginianus	Northern Bobwhite	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Bird	Colinus virginianus	Northern Bobwhite	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Bird	Colinus virginianus	Northern Bobwhite	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Bird	Colinus virginianus	Northern Bobwhite	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Bird	Colinus virginianus	Northern Bobwhite	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Marginal
Bird	Colinus virginianus	Northern Bobwhite	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Marginal
Bird	Colinus virginianus	Northern Bobwhite	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Bird	Colinus virginianus	Northern Bobwhite	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Marginal
Bird	Colinus virginianus	Northern Bobwhite	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Marginal
Bird	Colinus virginianus	Northern Bobwhite	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Bird	Colinus virginianus	Northern Bobwhite	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Colinus virginianus	Northern Bobwhite	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Colinus virginianus	Northern Bobwhite	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Preferred
Bird	Colinus virginianus	Northern Bobwhite	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Colinus virginianus	Northern Bobwhite	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Colinus virginianus	Northern Bobwhite	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Colinus virginianus	Northern Bobwhite	Old Field / Successional	Old Field/Successional	Preferred
Bird	Colinus virginianus	Northern Bobwhite	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Colinus virginianus	Northern Bobwhite	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Bird	Colinus virginianus	Northern Bobwhite	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Bird	Colinus virginianus	Northern Bobwhite	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Bird	Colinus virginianus	Northern Bobwhite	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Bird	Colinus virginianus	Northern Bobwhite	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Bird	Colinus virginianus	Northern Bobwhite	Pasture	Pasture	Suitable
Bird	Colinus virginianus	Northern Bobwhite	Cropland	Cropland	Suitable
Bird	Contopus cooperi	Olive-sided Flycatcher	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Bird	Contopus cooperi	Olive-sided Flycatcher	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Bird	Contopus cooperi	Olive-sided Flycatcher	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Bird	Contopus cooperi	Olive-sided Flycatcher	Southern Appalachian Grass and Shrub Bald	Bald	Marginal
Bird	Contopus cooperi	Olive-sided Flycatcher	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Bird	Contopus cooperi	Olive-sided Flycatcher	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Contopus cooperi	Olive-sided Flycatcher	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Contopus cooperi	Olive-sided Flycatcher	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Contopus cooperi	Olive-sided Flycatcher	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Bird	Contopus cooperi	Olive-sided Flycatcher	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Bird	Dolichonyx oryzivorus	Bobolink	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Marginal
Bird	Dolichonyx oryzivorus	Bobolink	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Marginal
Bird	Dolichonyx oryzivorus	Bobolink	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Bird	Dolichonyx oryzivorus	Bobolink	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Marginal
Bird	Dolichonyx oryzivorus	Bobolink	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Marginal
Bird	Dolichonyx oryzivorus	Bobolink	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Marginal
Bird	Dolichonyx oryzivorus	Bobolink	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Marginal
Bird	Dolichonyx oryzivorus	Bobolink	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Bird	Dolichonyx oryzivorus	Bobolink	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Bird	Dolichonyx oryzivorus	Bobolink	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Marginal
Bird	Dolichonyx oryzivorus	Bobolink	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Marginal
Bird	Dolichonyx oryzivorus	Bobolink	Cropland	Cropland	Marginal
Bird	Dolichonyx oryzivorus	Bobolink	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Dolichonyx oryzivorus	Bobolink	Old Field / Successional	Old Field/Successional	Suitable
Bird	Dolichonyx oryzivorus	Bobolink	Pasture	Pasture	Suitable
Bird	Egretta caerulea	Little Blue Heron	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Preferred
Bird	Egretta caerulea	Little Blue Heron	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Bird	Egretta caerulea	Little Blue Heron	Pond	Forested Depression/Wet Flatwoods	Preferred
Bird	Egretta caerulea	Little Blue Heron	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Bird	Egretta caerulea	Little Blue Heron	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Egretta caerulea	Little Blue Heron	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Egretta caerulea	Little Blue Heron	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Egretta caerulea	Little Blue Heron	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Egretta caerulea	Little Blue Heron	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bird	Egretta caerulea	Little Blue Heron	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Bird	Egretta caerulea	Little Blue Heron	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Bird	Egretta caerulea	Little Blue Heron	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Egretta caerulea	Little Blue Heron	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bird	Egretta caerulea	Little Blue Heron	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Egretta thula	Snowy Egret	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Preferred
Bird	Egretta thula	Snowy Egret	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Empidonax minimus	Least Flycatcher	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Bird	Empidonax minimus	Least Flycatcher	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Bird	Empidonax minimus	Least Flycatcher	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Bird	Empidonax minimus	Least Flycatcher	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Bird	Empidonax minimus	Least Flycatcher	Pasture	Pasture	Marginal
Bird	Empidonax minimus	Least Flycatcher	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Empidonax minimus	Least Flycatcher	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Bird	Empidonax minimus	Least Flycatcher	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bird	Empidonax minimus	Least Flycatcher	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Empidonax minimus	Least Flycatcher	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Empidonax minimus	Least Flycatcher	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Empidonax minimus	Least Flycatcher	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Empidonax minimus	Least Flycatcher	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Empidonax minimus	Least Flycatcher	Old Field / Successional	Old Field/Successional	Suitable
Bird	Empidonax traillii	Willow Flycatcher	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Bird	Empidonax traillii	Willow Flycatcher	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Bird	Empidonax traillii	Willow Flycatcher	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Bird	Empidonax traillii	Willow Flycatcher	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Bird	Empidonax traillii	Willow Flycatcher	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Marginal
Bird	Empidonax traillii	Willow Flycatcher	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Marginal
Bird	Empidonax traillii	Willow Flycatcher	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Marginal
Bird	Empidonax traillii	Willow Flycatcher	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Marginal
Bird	Empidonax traillii	Willow Flycatcher	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Bird	Empidonax traillii	Willow Flycatcher	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Marginal
Bird	Empidonax traillii	Willow Flycatcher	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Bird	Empidonax traillii	Willow Flycatcher	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Bird	Empidonax traillii	Willow Flycatcher	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Marginal
Bird	Empidonax traillii	Willow Flycatcher	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Bird	Empidonax traillii	Willow Flycatcher	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Bird	Empidonax traillii	Willow Flycatcher	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Marginal
Bird	Empidonax traillii	Willow Flycatcher	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Bird	Empidonax traillii	Willow Flycatcher	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Bird	Empidonax traillii	Willow Flycatcher	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Bird	Empidonax traillii	Willow Flycatcher	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Bird	Empidonax traillii	Willow Flycatcher	Cropland	Cropland	Marginal
Bird	Empidonax traillii	Willow Flycatcher	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Bird	Empidonax traillii	Willow Flycatcher	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Empidonax traillii	Willow Flycatcher	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Bird	Empidonax traillii	Willow Flycatcher	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Bird	Empidonax traillii	Willow Flycatcher	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Suitable
Bird	Empidonax traillii	Willow Flycatcher	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Bird	Empidonax traillii	Willow Flycatcher	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Suitable
Bird	Empidonax traillii	Willow Flycatcher	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Suitable
Bird	Empidonax traillii	Willow Flycatcher	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Empidonax traillii	Willow Flycatcher	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Bird	Empidonax traillii	Willow Flycatcher	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Empidonax traillii	Willow Flycatcher	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Empidonax traillii	Willow Flycatcher	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Empidonax traillii	Willow Flycatcher	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Bird	Empidonax traillii	Willow Flycatcher	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Empidonax traillii	Willow Flycatcher	Forest Plantation	Forest Plantation	Suitable
Bird	Empidonax traillii	Willow Flycatcher	Old Field / Successional	Old Field/Successional	Suitable
Bird	Empidonax traillii	Willow Flycatcher	Pasture	Pasture	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Bird	Euphagus carolinus	Rusty Blackbird	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Bird	Euphagus carolinus	Rusty Blackbird	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Euphagus carolinus	Rusty Blackbird	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Bird	Euphagus carolinus	Rusty Blackbird	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Bird	Euphagus carolinus	Rusty Blackbird	Cropland	Cropland	Marginal
Bird	Euphagus carolinus	Rusty Blackbird	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Preferred
Bird	Euphagus carolinus	Rusty Blackbird	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bird	Euphagus carolinus	Rusty Blackbird	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bird	Euphagus carolinus	Rusty Blackbird	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Bird	Euphagus carolinus	Rusty Blackbird	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Bird	Euphagus carolinus	Rusty Blackbird	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Bird	Euphagus carolinus	Rusty Blackbird	Cumberland Riverscour	Forested Bottomland Floodplain	Preferred
Bird	Euphagus carolinus	Rusty Blackbird	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Bird	Euphagus carolinus	Rusty Blackbird	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred
Bird	Euphagus carolinus	Rusty Blackbird	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	Pond	Forested Depression/Wet Flatwoods	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	Old Field / Successional	Old Field/Successional	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	Pasture	Pasture	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bird	Euphagus carolinus	Rusty Blackbird	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Falco peregrinus	Peregrine Falcon	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Falco peregrinus	Peregrine Falcon	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Bird	Falco peregrinus	Peregrine Falcon	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Bird	Falco peregrinus	Peregrine Falcon	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Bird	Falco peregrinus	Peregrine Falcon	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Bird	Falco peregrinus	Peregrine Falcon	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Bird	Falco peregrinus	Peregrine Falcon	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Marginal
Bird	Falco peregrinus	Peregrine Falcon	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Falco peregrinus	Peregrine Falcon	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Bird	Falco peregrinus	Peregrine Falcon	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Marginal
Bird	Falco peregrinus	Peregrine Falcon	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Marginal
Bird	Falco peregrinus	Peregrine Falcon	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Marginal
Bird	Falco peregrinus	Peregrine Falcon	Appalachian Shale Barrens	Upland Mixed Forest	Marginal
Bird	Falco peregrinus	Peregrine Falcon	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Marginal
Bird	Falco peregrinus	Peregrine Falcon	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Marginal
Bird	Falco peregrinus	Peregrine Falcon	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Marginal
Bird	Falco peregrinus	Peregrine Falcon	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Bird	Falco peregrinus	Peregrine Falcon	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Marginal
Bird	Falco peregrinus	Peregrine Falcon	Southern Appalachian Grass and Shrub Bald	Bald	Marginal
Bird	Falco peregrinus	Peregrine Falcon	Cropland	Cropland	Marginal
Bird	Falco peregrinus	Peregrine Falcon	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Bird	Falco peregrinus	Peregrine Falcon	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Falco peregrinus	Peregrine Falcon	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Falco peregrinus	Peregrine Falcon	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Falco peregrinus	Peregrine Falcon	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Falco peregrinus	Peregrine Falcon	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Bird	Falco peregrinus	Peregrine Falcon	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bird	Falco peregrinus	Peregrine Falcon	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Bird	Falco peregrinus	Peregrine Falcon	Central Interior Acidic Cliff and Talus	Cliff/Talus	Suitable
Bird	Falco peregrinus	Peregrine Falcon	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Bird	Falco peregrinus	Peregrine Falcon	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Bird	Falco peregrinus	Peregrine Falcon	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Bird	Falco peregrinus	Peregrine Falcon	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Bird	Falco peregrinus	Peregrine Falcon	Southern Interior Sinkhole Wall	Karst Outcrop	Suitable
Bird	Falco peregrinus	Peregrine Falcon	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Suitable
Bird	Falco peregrinus	Peregrine Falcon	Old Field / Successional	Old Field/Successional	Suitable
Bird	Falco peregrinus	Peregrine Falcon	Pasture	Pasture	Suitable
Bird	Falco peregrinus	Peregrine Falcon	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Suitable
Bird	Falco peregrinus	Peregrine Falcon	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Falco peregrinus	Peregrine Falcon	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bird	Falco sparverius	American Kestrel	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Falco sparverius	American Kestrel	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Bird	Falco sparverius	American Kestrel	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Bird	Falco sparverius	American Kestrel	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Marginal
Bird	Falco sparverius	American Kestrel	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Marginal
Bird	Falco sparverius	American Kestrel	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Bird	Falco sparverius	American Kestrel	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Bird	Falco sparverius	American Kestrel	Forest Plantation	Forest Plantation	Marginal
Bird	Falco sparverius	American Kestrel	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Falco sparverius	American Kestrel	Appalachian Shale Barrens	Upland Mixed Forest	Preferred
Bird	Falco sparverius	American Kestrel	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Preferred
Bird	Falco sparverius	American Kestrel	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Preferred
Bird	Falco sparverius	American Kestrel	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Preferred
Bird	Falco sparverius	American Kestrel	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Preferred
Bird	Falco sparverius	American Kestrel	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Falco sparverius	American Kestrel	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Preferred

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Falco sparverius	American Kestrel	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Falco sparverius	American Kestrel	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Falco sparverius	American Kestrel	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Falco sparverius	American Kestrel	Pasture	Pasture	Preferred
Bird	Falco sparverius	American Kestrel	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Bird	Falco sparverius	American Kestrel	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Bird	Falco sparverius	American Kestrel	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Bird	Falco sparverius	American Kestrel	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Suitable
Bird	Falco sparverius	American Kestrel	Old Field / Successional	Old Field/Successional	Suitable
Bird	Falco sparverius	American Kestrel	Cropland	Cropland	Suitable
Bird	Falco sparverius	American Kestrel	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Bird	Geothlypis formosa	Kentucky Warbler	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Bird	Geothlypis formosa	Kentucky Warbler	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Marginal
Bird	Geothlypis formosa	Kentucky Warbler	Forest Plantation	Forest Plantation	Marginal
Bird	Geothlypis formosa	Kentucky Warbler	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Bird	Geothlypis formosa	Kentucky Warbler	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Bird	Geothlypis formosa	Kentucky Warbler	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Bird	Geothlypis formosa	Kentucky Warbler	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Bird	Geothlypis formosa	Kentucky Warbler	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Bird	Geothlypis formosa	Kentucky Warbler	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Preferred
Bird	Geothlypis formosa	Kentucky Warbler	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Bird	Geothlypis formosa	Kentucky Warbler	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Preferred
Bird	Geothlypis formosa	Kentucky Warbler	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	Pond	Forested Depression/Wet Flatwoods	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bird	Geothlypis formosa	Kentucky Warbler	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Geothlypis formosa	Kentucky Warbler	Old Field / Successional	Old Field/Successional	Suitable
Bird	Grus americana	Whooping Crane	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Bird	Grus americana	Whooping Crane	Old Field / Successional	Old Field/Successional	Marginal
Bird	Grus americana	Whooping Crane	Pasture	Pasture	Marginal
Bird	Grus americana	Whooping Crane	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Bird	Grus americana	Whooping Crane	Cropland	Cropland	Suitable
Bird	Grus americana	Whooping Crane	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Grus americana	Whooping Crane	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bird	Grus americana	Whooping Crane	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Helmitheros vermivorum	Worm-eating Warbler	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Bird	Helmitheros vermivorum	Worm-eating Warbler	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Bird	Helmitheros vermivorum	Worm-eating Warbler	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Bird	Helmitheros vermivorum	Worm-eating Warbler	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Preferred
Bird	Helmitheros vermivorum	Worm-eating Warbler	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bird	Helmitheros vermivorum	Worm-eating Warbler	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Bird	Helmitheros vermivorum	Worm-eating Warbler	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Bird	Helmitheros vermivorum	Worm-eating Warbler	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Bird	Helmitheros vermivorum	Worm-eating Warbler	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Helmitheros vermivorum	Worm-eating Warbler	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bird	Helmitheros vermivorum	Worm-eating Warbler	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bird	Helmitheros vermivorum	Worm-eating Warbler	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Bird	Helmitheros vermivorum	Worm-eating Warbler	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Bird	Helmitheros vermivorum	Worm-eating Warbler	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bird	Helmitheros vermivorum	Worm-eating Warbler	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Bird	Helmitheros vermivorum	Worm-eating Warbler	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bird	Helmitheros vermivorum	Worm-eating Warbler	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Bird	Helmitheros vermivorum	Worm-eating Warbler	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Helmitheros vermivorum	Worm-eating Warbler	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Helmitheros vermivorum	Worm-eating Warbler	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Helmitheros vermivorum	Worm-eating Warbler	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Helmitheros vermivorum	Worm-eating Warbler	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Bird	Helmitheros vermivorum	Worm-eating Warbler	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Helmitheros vermivorum	Worm-eating Warbler	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bird	Helmitheros vermivorum	Worm-eating Warbler	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bird	Hylocichla mustelina	Wood Thrush	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Bird	Hylocichla mustelina	Wood Thrush	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Bird	Hylocichla mustelina	Wood Thrush	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Bird	Hylocichla mustelina	Wood Thrush	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Bird	Hylocichla mustelina	Wood Thrush	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Marginal
Bird	Hylocichla mustelina	Wood Thrush	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Marginal
Bird	Hylocichla mustelina	Wood Thrush	Forest Plantation	Forest Plantation	Marginal
Bird	Hylocichla mustelina	Wood Thrush	Old Field / Successional	Old Field/Successional	Marginal
Bird	Hylocichla mustelina	Wood Thrush	Pasture	Pasture	Marginal
Bird	Hylocichla mustelina	Wood Thrush	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Bird	Hylocichla mustelina	Wood Thrush	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Preferred
Bird	Hylocichla mustelina	Wood Thrush	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Preferred
Bird	Hylocichla mustelina	Wood Thrush	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Preferred
Bird	Hylocichla mustelina	Wood Thrush	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Bird	Hylocichla mustelina	Wood Thrush	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Bird	Hylocichla mustelina	Wood Thrush	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Hylocichla mustelina	Wood Thrush	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Bird	Hylocichla mustelina	Wood Thrush	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Bird	Hylocichla mustelina	Wood Thrush	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Hylocichla mustelina	Wood Thrush	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Hylocichla mustelina	Wood Thrush	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Hylocichla mustelina	Wood Thrush	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Hylocichla mustelina	Wood Thrush	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Hylocichla mustelina	Wood Thrush	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Hylocichla mustelina	Wood Thrush	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Bird	Hylocichla mustelina	Wood Thrush	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bird	Hylocichla mustelina	Wood Thrush	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bird	Hylocichla mustelina	Wood Thrush	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Bird	Hylocichla mustelina	Wood Thrush	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Suitable
Bird	Icterus galbula	Baltimore Oriole	Old Field / Successional	Old Field/Successional	Marginal
Bird	Icterus galbula	Baltimore Oriole	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Bird	Icterus galbula	Baltimore Oriole	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bird	Icterus galbula	Baltimore Oriole	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bird	Icterus galbula	Baltimore Oriole	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Bird	Icterus galbula	Baltimore Oriole	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Bird	Icterus galbula	Baltimore Oriole	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred
Bird	Icterus galbula	Baltimore Oriole	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Preferred
Bird	Icterus galbula	Baltimore Oriole	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Preferred
Bird	Icterus galbula	Baltimore Oriole	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Bird	Icterus galbula	Baltimore Oriole	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bird	Icterus galbula	Baltimore Oriole	Pond	Forested Depression/Wet Flatwoods	Suitable
Bird	Icterus galbula	Baltimore Oriole	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Suitable
Bird	Icterus galbula	Baltimore Oriole	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Suitable
Bird	Icterus spurius	Orchard Oriole	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Bird	Icterus spurius	Orchard Oriole	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Bird	Icterus spurius	Orchard Oriole	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Icterus spurius	Orchard Oriole	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Bird	Icterus spurius	Orchard Oriole	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Bird	Icterus spurius	Orchard Oriole	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Marginal
Bird	Icterus spurius	Orchard Oriole	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Marginal
Bird	Icterus spurius	Orchard Oriole	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Marginal
Bird	Icterus spurius	Orchard Oriole	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Marginal
Bird	Icterus spurius	Orchard Oriole	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Bird	Icterus spurius	Orchard Oriole	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Bird	Icterus spurius	Orchard Oriole	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Bird	Icterus spurius	Orchard Oriole	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Bird	Icterus spurius	Orchard Oriole	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Marginal
Bird	Icterus spurius	Orchard Oriole	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Bird	Icterus spurius	Orchard Oriole	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Marginal
Bird	Icterus spurius	Orchard Oriole	Pasture	Pasture	Marginal
Bird	Icterus spurius	Orchard Oriole	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Icterus spurius	Orchard Oriole	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Icterus spurius	Orchard Oriole	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Icterus spurius	Orchard Oriole	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Icterus spurius	Orchard Oriole	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Preferred
Bird	Icterus spurius	Orchard Oriole	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Bird	Icterus spurius	Orchard Oriole	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Bird	Icterus spurius	Orchard Oriole	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Bird	Icterus spurius	Orchard Oriole	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Icterus spurius	Orchard Oriole	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Bird	Icterus spurius	Orchard Oriole	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Icterus spurius	Orchard Oriole	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Icterus spurius	Orchard Oriole	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Icterus spurius	Orchard Oriole	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Icterus spurius	Orchard Oriole	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bird	Icterus spurius	Orchard Oriole	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Bird	Icterus spurius	Orchard Oriole	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Suitable
Bird	Icterus spurius	Orchard Oriole	Old Field / Successional	Old Field/Successional	Suitable
Bird	Icterus spurius	Orchard Oriole	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Suitable
Bird	Ictinia mississippiensis	Mississippi Kite	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Marginal
Bird	Ictinia mississippiensis	Mississippi Kite	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Bird	Ictinia mississippiensis	Mississippi Kite	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bird	Ictinia mississippiensis	Mississippi Kite	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Bird	Ictinia mississippiensis	Mississippi Kite	Old Field / Successional	Old Field/Successional	Suitable
Bird	Ictinia mississippiensis	Mississippi Kite	Pasture	Pasture	Suitable
Bird	Ictinia mississippiensis	Mississippi Kite	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Suitable
Bird	Ictinia mississippiensis	Mississippi Kite	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Ictinia mississippiensis	Mississippi Kite	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bird	Ictinia mississippiensis	Mississippi Kite	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Lanius ludovicianus	Loggerhead Shrike	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Bird	Lanius ludovicianus	Loggerhead Shrike	Forest Plantation	Forest Plantation	Marginal
Bird	Lanius ludovicianus	Loggerhead Shrike	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Lanius ludovicianus	Loggerhead Shrike	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Lanius ludovicianus	Loggerhead Shrike	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Lanius ludovicianus	Loggerhead Shrike	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Lanius ludovicianus	Loggerhead Shrike	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Preferred
Bird	Lanius ludovicianus	Loggerhead Shrike	Pasture	Pasture	Preferred
Bird	Lanius ludovicianus	Loggerhead Shrike	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Bird	Lanius ludovicianus	Loggerhead Shrike	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Lanius ludovicianus	Loggerhead Shrike	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Bird	Lanius ludovicianus	Loggerhead Shrike	Appalachian Shale Barrens	Upland Mixed Forest	Suitable
Bird	Lanius ludovicianus	Loggerhead Shrike	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Bird	Lanius ludovicianus	Loggerhead Shrike	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Bird	Lanius ludovicianus	Loggerhead Shrike	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Bird	Lanius ludovicianus	Loggerhead Shrike	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Suitable
Bird	Lanius ludovicianus	Loggerhead Shrike	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Lanius ludovicianus	Loggerhead Shrike	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Bird	Lanius ludovicianus	Loggerhead Shrike	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Lanius ludovicianus	Loggerhead Shrike	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Lanius ludovicianus	Loggerhead Shrike	Old Field / Successional	Old Field/Successional	Suitable
Bird	Lanius ludovicianus	Loggerhead Shrike	Cropland	Cropland	Suitable
Bird	Lanius ludovicianus	Loggerhead Shrike	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Limnodromus griseus	Short-billed Dowitcher	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Marginal
Bird	Limnodromus griseus	Short-billed Dowitcher	Pasture	Pasture	Marginal
Bird	Limnodromus griseus	Short-billed Dowitcher	Cropland	Cropland	Marginal
Bird	Limnodromus griseus	Short-billed Dowitcher	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Preferred
Bird	Limnodromus griseus	Short-billed Dowitcher	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Limnodromus griseus	Short-billed Dowitcher	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Limnothlypis swainsonii	Swainson's Warbler	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Bird	Limnothlypis swainsonii	Swainson's Warbler	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Bird	Limnothlypis swainsonii	Swainson's Warbler	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Bird	Limnothlypis swainsonii	Swainson's Warbler	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Bird	Limnothlypis swainsonii	Swainson's Warbler	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Bird	Limnothlypis swainsonii	Swainson's Warbler	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Bird	Limnothlypis swainsonii	Swainson's Warbler	Cumberland Riverscour	Forested Bottomland Floodplain	Marginal
Bird	Limnothlypis swainsonii	Swainson's Warbler	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Marginal
Bird	Limnothlypis swainsonii	Swainson's Warbler	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal
Bird	Limnothlypis swainsonii	Swainson's Warbler	Interior Low Plateau Seepage Fen	Open Seep/Fen	Marginal
Bird	Limnothlypis swainsonii	Swainson's Warbler	Southern Appalachian Seepage Wetland	Open Seep/Fen	Marginal
Bird	Limnothlypis swainsonii	Swainson's Warbler	Old Field / Successional	Old Field/Successional	Marginal
Bird	Limnothlypis swainsonii	Swainson's Warbler	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bird	Limnothlypis swainsonii	Swainson's Warbler	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Bird	Limnothlypis swainsonii	Swainson's Warbler	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Bird	Limnothlypis swainsonii	Swainson's Warbler	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Bird	Limnothlypis swainsonii	Swainson's Warbler	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Bird	Limnothlypis swainsonii	Swainson's Warbler	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Bird	Limnothlypis swainsonii	Swainson's Warbler	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Bird	Limnothlypis swainsonii	Swainson's Warbler	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Bird	Limnothlypis swainsonii	Swainson's Warbler	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bird	Limnothlypis swainsonii	Swainson's Warbler	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Bird	Limnothlypis swainsonii	Swainson's Warbler	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Limnothlypis swainsonii	Swainson's Warbler	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Limnothlypis swainsonii	Swainson's Warbler	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Limnothlypis swainsonii	Swainson's Warbler	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Limnothlypis swainsonii	Swainson's Warbler	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Limnothlypis swainsonii	Swainson's Warbler	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Bird	Limnothlypis swainsonii	Swainson's Warbler	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bird	Limnothlypis swainsonii	Swainson's Warbler	Pond	Forested Depression/Wet Flatwoods	Suitable
Bird	Limnothlypis swainsonii	Swainson's Warbler	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Bird	Limosa haemastica	Hudsonian Godwit	Old Field / Successional	Old Field/Successional	Marginal
Bird	Limosa haemastica	Hudsonian Godwit	Pasture	Pasture	Marginal
Bird	Limosa haemastica	Hudsonian Godwit	Cropland	Cropland	Marginal
Bird	Limosa haemastica	Hudsonian Godwit	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Bird	Limosa haemastica	Hudsonian Godwit	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Bird	Limosa haemastica	Hudsonian Godwit	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Limosa haemastica	Hudsonian Godwit	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Limosa haemastica	Hudsonian Godwit	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Limosa haemastica	Hudsonian Godwit	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bird	Limosa haemastica	Hudsonian Godwit	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Megaceryle alcyon	Belted Kingfisher	Pond	Forested Depression/Wet Flatwoods	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Megaceryle alcyon	Belted Kingfisher	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Preferred
Bird	Megaceryle alcyon	Belted Kingfisher	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Megascops asio	Eastern Screech-Owl	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Marginal
Bird	Megascops asio	Eastern Screech-Owl	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Marginal
Bird	Megascops asio	Eastern Screech-Owl	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Southern Appalachian Grass and Shrub Bald	Bald	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Cumberland Riverscour	Forested Bottomland Floodplain	Marginal
Bird	Megascops asio	Eastern Screech-Owl	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Pond	Forested Depression/Wet Flatwoods	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Interior Low Plateau Seepage Fen	Open Seep/Fen	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Southern Appalachian Seepage Wetland	Open Seep/Fen	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Forest Plantation	Forest Plantation	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Old Field / Successional	Old Field/Successional	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Pasture	Pasture	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Cropland	Cropland	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Bird	Megascops asio	Eastern Screech-Owl	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Megascops asio	Eastern Screech-Owl	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Bird	Megascops asio	Eastern Screech-Owl	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Megascops asio	Eastern Screech-Owl	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Bird	Megascops asio	Eastern Screech-Owl	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bird	Megascops asio	Eastern Screech-Owl	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bird	Megascops asio	Eastern Screech-Owl	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Bird	Megascops asio	Eastern Screech-Owl	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Bird	Megascops asio	Eastern Screech-Owl	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bird	Megascops asio	Eastern Screech-Owl	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Bird	Megascops asio	Eastern Screech-Owl	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Megascops asio	Eastern Screech-Owl	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Megascops asio	Eastern Screech-Owl	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Megascops asio	Eastern Screech-Owl	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Megascops asio	Eastern Screech-Owl	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bird	Megascops asio	Eastern Screech-Owl	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Bird	Megascops asio	Eastern Screech-Owl	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Megascops asio	Eastern Screech-Owl	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Bird	Megascops asio	Eastern Screech-Owl	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Megascops asio	Eastern Screech-Owl	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Bird	Megascops asio	Eastern Screech-Owl	Appalachian Shale Barrens	Upland Mixed Forest	Suitable
Bird	Megascops asio	Eastern Screech-Owl	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Megascops asio	Eastern Screech-Owl	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Megascops asio	Eastern Screech-Owl	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Megascops asio	Eastern Screech-Owl	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Megascops asio	Eastern Screech-Owl	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Megascops asio	Eastern Screech-Owl	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Bird	Megascops asio	Eastern Screech-Owl	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bird	Megascops asio	Eastern Screech-Owl	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bird	Megascops asio	Eastern Screech-Owl	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Bird	Megascops asio	Eastern Screech-Owl	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Marginal
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Marginal
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Interior Low Plateau Seepage Fen	Open Seep/Fen	Marginal
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Forest Plantation	Forest Plantation	Marginal
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Old Field / Successional	Old Field/Successional	Marginal
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Forest Plantation	Forest Plantation	Marginal
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Old Field / Successional	Old Field/Successional	Marginal
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Pasture	Pasture	Marginal
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Pond	Forested Depression/Wet Flatwoods	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Suitable
Bird	Melanerpes erythrocephalus	Red-headed Woodpecker	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Suitable
Bird	Nyctanassa violacea	Yellow-crowned Night Heron	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Bird	Nyctanassa violacea	Yellow-crowned Night Heron	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Bird	Nyctanassa violacea	Yellow-crowned Night Heron	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Marginal
Bird	Nyctanassa violacea	Yellow-crowned Night Heron	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Bird	Nyctanassa violacea	Yellow-crowned Night Heron	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Bird	Nyctanassa violacea	Yellow-crowned Night Heron	Pond	Forested Depression/Wet Flatwoods	Marginal
Bird	Nyctanassa violacea	Yellow-crowned Night Heron	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Bird	Nyctanassa violacea	Yellow-crowned Night Heron	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Bird	Nyctanassa violacea	Yellow-crowned Night Heron	Pasture	Pasture	Marginal
Bird	Nyctanassa violacea	Yellow-crowned Night Heron	Cropland	Cropland	Marginal
Bird	Nyctanassa violacea	Yellow-crowned Night Heron	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Preferred
Bird	Nyctanassa violacea	Yellow-crowned Night Heron	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Nycticorax nycticorax	Black-crowned Night Heron	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Nycticorax nycticorax	Black-crowned Night Heron	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Bird	Nycticorax nycticorax	Black-crowned Night Heron	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Marginal
Bird	Nycticorax nycticorax	Black-crowned Night Heron	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal
Bird	Nycticorax nycticorax	Black-crowned Night Heron	Pond	Forested Depression/Wet Flatwoods	Marginal
Bird	Nycticorax nycticorax	Black-crowned Night Heron	Interior Low Plateau Seepage Fen	Open Seep/Fen	Marginal
Bird	Nycticorax nycticorax	Black-crowned Night Heron	Southern Appalachian Seepage Wetland	Open Seep/Fen	Marginal
Bird	Nycticorax nycticorax	Black-crowned Night Heron	Pasture	Pasture	Marginal
Bird	Nycticorax nycticorax	Black-crowned Night Heron	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bird	Nycticorax nycticorax	Black-crowned Night Heron	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bird	Nycticorax nycticorax	Black-crowned Night Heron	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Bird	Nycticorax nycticorax	Black-crowned Night Heron	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Bird	Nycticorax nycticorax	Black-crowned Night Heron	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Bird	Nycticorax nycticorax	Black-crowned Night Heron	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Bird	Nycticorax nycticorax	Black-crowned Night Heron	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Bird	Nycticorax nycticorax	Black-crowned Night Heron	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Preferred
Bird	Nycticorax nycticorax	Black-crowned Night Heron	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Preferred
Bird	Nycticorax nycticorax	Black-crowned Night Heron	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Preferred
Bird	Nycticorax nycticorax	Black-crowned Night Heron	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Nycticorax nycticorax	Black-crowned Night Heron	Cumberland Riverscour	Forested Bottomland Floodplain	Suitable
Bird	Nycticorax nycticorax	Black-crowned Night Heron	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Bird	Nycticorax nycticorax	Black-crowned Night Heron	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Bird	Nycticorax nycticorax	Black-crowned Night Heron	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bird	Nycticorax nycticorax	Black-crowned Night Heron	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Bird	Oporornis agilis	Connecticut Warbler	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Marginal
Bird	Oporornis agilis	Connecticut Warbler	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Marginal
Bird	Oporornis agilis	Connecticut Warbler	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Bird	Oporornis agilis	Connecticut Warbler	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Bird	Oporornis agilis	Connecticut Warbler	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Oporornis agilis	Connecticut Warbler	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Oporornis agilis	Connecticut Warbler	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Oporornis agilis	Connecticut Warbler	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Bird	Oporornis agilis	Connecticut Warbler	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Bird	Oporornis agilis	Connecticut Warbler	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Bird	Oporornis agilis	Connecticut Warbler	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bird	Parkesia motacilla	Louisiana Waterthrush	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Bird	Parkesia motacilla	Louisiana Waterthrush	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Bird	Parkesia motacilla	Louisiana Waterthrush	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Bird	Parkesia motacilla	Louisiana Waterthrush	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Marginal
Bird	Parkesia motacilla	Louisiana Waterthrush	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Bird	Parkesia motacilla	Louisiana Waterthrush	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Bird	Parkesia motacilla	Louisiana Waterthrush	Cumberland Riverscour	Forested Bottomland Floodplain	Marginal
Bird	Parkesia motacilla	Louisiana Waterthrush	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Marginal
Bird	Parkesia motacilla	Louisiana Waterthrush	Forest Plantation	Forest Plantation	Marginal
Bird	Parkesia motacilla	Louisiana Waterthrush	Old Field / Successional	Old Field/Successional	Marginal
Bird	Parkesia motacilla	Louisiana Waterthrush	Pasture	Pasture	Marginal
Bird	Parkesia motacilla	Louisiana Waterthrush	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Bird	Parkesia motacilla	Louisiana Waterthrush	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bird	Parkesia motacilla	Louisiana Waterthrush	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Bird	Parkesia motacilla	Louisiana Waterthrush	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Bird	Parkesia motacilla	Louisiana Waterthrush	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Bird	Parkesia motacilla	Louisiana Waterthrush	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Bird	Parkesia motacilla	Louisiana Waterthrush	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Bird	Parkesia motacilla	Louisiana Waterthrush	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Parkesia motacilla	Louisiana Waterthrush	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Parkesia motacilla	Louisiana Waterthrush	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Bird	Peucaea aestivalis	Bachman's Sparrow	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Bird	Peucaea aestivalis	Bachman's Sparrow	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Bird	Peucaea aestivalis	Bachman's Sparrow	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Marginal
Bird	Peucaea aestivalis	Bachman's Sparrow	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Marginal
Bird	Peucaea aestivalis	Bachman's Sparrow	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Marginal
Bird	Peucaea aestivalis	Bachman's Sparrow	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Marginal
Bird	Peucaea aestivalis	Bachman's Sparrow	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Bird	Peucaea aestivalis	Bachman's Sparrow	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Bird	Peucaea aestivalis	Bachman's Sparrow	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Bird	Peucaea aestivalis	Bachman's Sparrow	Pasture	Pasture	Marginal
Bird	Peucaea aestivalis	Bachman's Sparrow	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Bird	Peucaea aestivalis	Bachman's Sparrow	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Peucaea aestivalis	Bachman's Sparrow	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Preferred
Bird	Peucaea aestivalis	Bachman's Sparrow	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Peucaea aestivalis	Bachman's Sparrow	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Peucaea aestivalis	Bachman's Sparrow	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Peucaea aestivalis	Bachman's Sparrow	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Preferred
Bird	Peucaea aestivalis	Bachman's Sparrow	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Bird	Peucaea aestivalis	Bachman's Sparrow	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Peucaea aestivalis	Bachman's Sparrow	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bird	Peucaea aestivalis	Bachman's Sparrow	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Peucaea aestivalis	Bachman's Sparrow	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Bird	Peucaea aestivalis	Bachman's Sparrow	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Bird	Peucaea aestivalis	Bachman's Sparrow	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Bird	Peucaea aestivalis	Bachman's Sparrow	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Bird	Peucaea aestivalis	Bachman's Sparrow	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Suitable
Bird	Peucaea aestivalis	Bachman's Sparrow	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Bird	Peucaea aestivalis	Bachman's Sparrow	Forest Plantation	Forest Plantation	Suitable
Bird	Peucaea aestivalis	Bachman's Sparrow	Old Field / Successional	Old Field/Successional	Suitable
Bird	Pluvialis dominica	American Golden-Plover	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Pluvialis dominica	American Golden-Plover	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Pluvialis dominica	American Golden-Plover	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Bird	Pluvialis dominica	American Golden-Plover	Cropland	Cropland	Suitable
Bird	Pluvialis dominica	American Golden-Plover	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Pluvialis dominica	American Golden-Plover	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bird	Pluvialis dominica	American Golden-Plover	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Pluvialis squatarola	Black-bellied Plover	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Preferred
Bird	Pluvialis squatarola	Black-bellied Plover	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Pluvialis squatarola	Black-bellied Plover	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Poecile atricapillus	Black-capped Chickadee	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Preferred
Bird	Poecile atricapillus	Black-capped Chickadee	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Bird	Poecile atricapillus	Black-capped Chickadee	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Poecile atricapillus	Black-capped Chickadee	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Poecile atricapillus	Black-capped Chickadee	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Poecile atricapillus	Black-capped Chickadee	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bird	Poecile atricapillus	Black-capped Chickadee	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Pooecetes gramineus	Vesper Sparrow	Appalachian Shale Barrens	Upland Mixed Forest	Marginal
Bird	Pooecetes gramineus	Vesper Sparrow	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Marginal
Bird	Pooecetes gramineus	Vesper Sparrow	Cropland	Cropland	Marginal
Bird	Pooecetes gramineus	Vesper Sparrow	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Pooecetes gramineus	Vesper Sparrow	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Pooecetes gramineus	Vesper Sparrow	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Preferred
Bird	Pooecetes gramineus	Vesper Sparrow	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Pooecetes gramineus	Vesper Sparrow	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Pooecetes gramineus	Vesper Sparrow	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Pooecetes gramineus	Vesper Sparrow	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Preferred
Bird	Pooecetes gramineus	Vesper Sparrow	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Bird	Pooecetes gramineus	Vesper Sparrow	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Bird	Pooecetes gramineus	Vesper Sparrow	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Bird	Pooecetes gramineus	Vesper Sparrow	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Suitable
Bird	Pooecetes gramineus	Vesper Sparrow	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Bird	Pooecetes gramineus	Vesper Sparrow	Old Field / Successional	Old Field/Successional	Suitable
Bird	Pooecetes gramineus	Vesper Sparrow	Pasture	Pasture	Suitable
Bird	Pooecetes gramineus	Vesper Sparrow	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Suitable
Bird	Protonotaria citrea	Prothonotary Warbler	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Bird	Protonotaria citrea	Prothonotary Warbler	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Protonotaria citrea	Prothonotary Warbler	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Marginal
Bird	Protonotaria citrea	Prothonotary Warbler	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Marginal
Bird	Protonotaria citrea	Prothonotary Warbler	Cumberland Riverscour	Forested Bottomland Floodplain	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Protonotaria citrea	Prothonotary Warbler	Southern Appalachian Seepage Wetland	Open Seep/Fen	Marginal
Bird	Protonotaria citrea	Prothonotary Warbler	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bird	Protonotaria citrea	Prothonotary Warbler	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Bird	Protonotaria citrea	Prothonotary Warbler	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Bird	Protonotaria citrea	Prothonotary Warbler	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Bird	Protonotaria citrea	Prothonotary Warbler	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred
Bird	Protonotaria citrea	Prothonotary Warbler	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Protonotaria citrea	Prothonotary Warbler	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Protonotaria citrea	Prothonotary Warbler	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Bird	Protonotaria citrea	Prothonotary Warbler	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Bird	Protonotaria citrea	Prothonotary Warbler	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bird	Protonotaria citrea	Prothonotary Warbler	Pond	Forested Depression/Wet Flatwoods	Suitable
Bird	Protonotaria citrea	Prothonotary Warbler	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Bird	Protonotaria citrea	Prothonotary Warbler	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bird	Protonotaria citrea	Prothonotary Warbler	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Protonotaria citrea	Prothonotary Warbler	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bird	Protonotaria citrea	Prothonotary Warbler	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Rallus elegans	King Rail	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Bird	Rallus elegans	King Rail	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Marginal
Bird	Rallus elegans	King Rail	Pond	Forested Depression/Wet Flatwoods	Marginal
Bird	Rallus elegans	King Rail	Cropland	Cropland	Marginal
Bird	Rallus elegans	King Rail	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Bird	Rallus elegans	King Rail	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Bird	Rallus elegans	King Rail	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred
Bird	Rallus elegans	King Rail	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Bird	Rallus elegans	King Rail	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Rallus elegans	King Rail	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bird	Rallus elegans	King Rail	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Riparia riparia	Bank Swallow	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Riparia riparia	Bank Swallow	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Bird	Riparia riparia	Bank Swallow	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Bird	Riparia riparia	Bank Swallow	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Bird	Riparia riparia	Bank Swallow	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Bird	Riparia riparia	Bank Swallow	Cropland	Cropland	Marginal
Bird	Riparia riparia	Bank Swallow	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Bird	Riparia riparia	Bank Swallow	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Bird	Riparia riparia	Bank Swallow	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Bird	Riparia riparia	Bank Swallow	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Riparia riparia	Bank Swallow	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Riparia riparia	Bank Swallow	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Bird	Riparia riparia	Bank Swallow	Old Field / Successional	Old Field/Successional	Suitable
Bird	Riparia riparia	Bank Swallow	Pasture	Pasture	Suitable
Bird	Riparia riparia	Bank Swallow	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Suitable
Bird	Riparia riparia	Bank Swallow	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Suitable
Bird	Scolopax minor	American Woodcock	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Marginal
Bird	Scolopax minor	American Woodcock	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Marginal
Bird	Scolopax minor	American Woodcock	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Marginal
Bird	Scolopax minor	American Woodcock	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Scolopax minor	American Woodcock	Pond	Forested Depression/Wet Flatwoods	Marginal
Bird	Scolopax minor	American Woodcock	Forest Plantation	Forest Plantation	Marginal
Bird	Scolopax minor	American Woodcock	Pasture	Pasture	Marginal
Bird	Scolopax minor	American Woodcock	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Bird	Scolopax minor	American Woodcock	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Bird	Scolopax minor	American Woodcock	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Bird	Scolopax minor	American Woodcock	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Bird	Scolopax minor	American Woodcock	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Scolopax minor	American Woodcock	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Bird	Scolopax minor	American Woodcock	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bird	Scolopax minor	American Woodcock	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bird	Scolopax minor	American Woodcock	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Bird	Scolopax minor	American Woodcock	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Bird	Scolopax minor	American Woodcock	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bird	Scolopax minor	American Woodcock	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Bird	Scolopax minor	American Woodcock	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Scolopax minor	American Woodcock	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Scolopax minor	American Woodcock	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Scolopax minor	American Woodcock	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Scolopax minor	American Woodcock	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Bird	Scolopax minor	American Woodcock	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Scolopax minor	American Woodcock	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Scolopax minor	American Woodcock	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Bird	Scolopax minor	American Woodcock	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Scolopax minor	American Woodcock	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Scolopax minor	American Woodcock	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Scolopax minor	American Woodcock	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Bird	Scolopax minor	American Woodcock	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Scolopax minor	American Woodcock	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Scolopax minor	American Woodcock	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Scolopax minor	American Woodcock	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Scolopax minor	American Woodcock	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Bird	Scolopax minor	American Woodcock	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bird	Scolopax minor	American Woodcock	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Bird	Scolopax minor	American Woodcock	Old Field / Successional	Old Field/Successional	Suitable
Bird	Scolopax minor	American Woodcock	Cropland	Cropland	Suitable
Bird	Setophaga caerulescens	Black-throated Blue Warbler	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Preferred
Bird	Setophaga caerulescens	Black-throated Blue Warbler	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bird	Setophaga caerulescens	Black-throated Blue Warbler	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bird	Setophaga caerulescens	Black-throated Blue Warbler	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Setophaga caerulescens	Black-throated Blue Warbler	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Setophaga caerulescens	Black-throated Blue Warbler	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Setophaga caerulescens	Black-throated Blue Warbler	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Setophaga caerulescens	Black-throated Blue Warbler	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Bird	Setophaga cerulea	Cerulean Warbler	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Bird	Setophaga cerulea	Cerulean Warbler	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Bird	Setophaga cerulea	Cerulean Warbler	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Bird	Setophaga cerulea	Cerulean Warbler	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Setophaga cerulea	Cerulean Warbler	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Marginal
Bird	Setophaga cerulea	Cerulean Warbler	Pond	Forested Depression/Wet Flatwoods	Marginal
Bird	Setophaga cerulea	Cerulean Warbler	Forest Plantation	Forest Plantation	Marginal
Bird	Setophaga cerulea	Cerulean Warbler	Old Field / Successional	Old Field/Successional	Marginal
Bird	Setophaga cerulea	Cerulean Warbler	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Bird	Setophaga cerulea	Cerulean Warbler	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Bird	Setophaga cerulea	Cerulean Warbler	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Preferred
Bird	Setophaga cerulea	Cerulean Warbler	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Bird	Setophaga cerulea	Cerulean Warbler	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Bird	Setophaga cerulea	Cerulean Warbler	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Bird	Setophaga cerulea	Cerulean Warbler	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Bird	Setophaga cerulea	Cerulean Warbler	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Bird	Setophaga cerulea	Cerulean Warbler	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Bird	Setophaga cerulea	Cerulean Warbler	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Bird	Setophaga cerulea	Cerulean Warbler	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bird	Setophaga cerulea	Cerulean Warbler	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Bird	Setophaga cerulea	Cerulean Warbler	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Setophaga cerulea	Cerulean Warbler	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Setophaga cerulea	Cerulean Warbler	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Setophaga cerulea	Cerulean Warbler	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Setophaga cerulea	Cerulean Warbler	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Bird	Setophaga cerulea	Cerulean Warbler	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Bird	Setophaga cerulea	Cerulean Warbler	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bird	Setophaga cerulea	Cerulean Warbler	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Bird	Setophaga cerulea	Cerulean Warbler	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Bird	Setophaga discolor	Prairie Warbler	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Bird	Setophaga discolor	Prairie Warbler	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Bird	Setophaga discolor	Prairie Warbler	Appalachian Shale Barrens	Upland Mixed Forest	Marginal
Bird	Setophaga discolor	Prairie Warbler	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Bird	Setophaga discolor	Prairie Warbler	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Bird	Setophaga discolor	Prairie Warbler	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Bird	Setophaga discolor	Prairie Warbler	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Setophaga discolor	Prairie Warbler	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Preferred
Bird	Setophaga discolor	Prairie Warbler	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Setophaga discolor	Prairie Warbler	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Preferred
Bird	Setophaga discolor	Prairie Warbler	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Setophaga discolor	Prairie Warbler	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Setophaga discolor	Prairie Warbler	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Setophaga discolor	Prairie Warbler	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Preferred
Bird	Setophaga discolor	Prairie Warbler	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Bird	Setophaga discolor	Prairie Warbler	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bird	Setophaga discolor	Prairie Warbler	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Setophaga discolor	Prairie Warbler	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Bird	Setophaga discolor	Prairie Warbler	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Bird	Setophaga discolor	Prairie Warbler	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Bird	Setophaga discolor	Prairie Warbler	Forest Plantation	Forest Plantation	Suitable
Bird	Setophaga discolor	Prairie Warbler	Old Field / Successional	Old Field/Successional	Suitable
Bird	Setophaga discolor	Prairie Warbler	Pasture	Pasture	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Setophaga dominica	Yellow-throated Warbler	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Bird	Setophaga dominica	Yellow-throated Warbler	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bird	Setophaga dominica	Yellow-throated Warbler	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bird	Setophaga dominica	Yellow-throated Warbler	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Setophaga dominica	Yellow-throated Warbler	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Setophaga dominica	Yellow-throated Warbler	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Setophaga dominica	Yellow-throated Warbler	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Setophaga dominica	Yellow-throated Warbler	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Bird	Setophaga dominica	Yellow-throated Warbler	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Bird	Setophaga dominica	Yellow-throated Warbler	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Setophaga fusca	Blackburnian Warbler	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Bird	Setophaga fusca	Blackburnian Warbler	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Bird	Setophaga fusca	Blackburnian Warbler	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Preferred
Bird	Setophaga fusca	Blackburnian Warbler	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Preferred
Bird	Setophaga fusca	Blackburnian Warbler	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Setophaga fusca	Blackburnian Warbler	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Setophaga fusca	Blackburnian Warbler	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Bird	Sitta pusilla	Brown-headed Nuthatch	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Bird	Sitta pusilla	Brown-headed Nuthatch	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Bird	Sitta pusilla	Brown-headed Nuthatch	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Marginal
Bird	Sitta pusilla	Brown-headed Nuthatch	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Marginal
Bird	Sitta pusilla	Brown-headed Nuthatch	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Marginal
Bird	Sitta pusilla	Brown-headed Nuthatch	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Marginal
Bird	Sitta pusilla	Brown-headed Nuthatch	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Bird	Sitta pusilla	Brown-headed Nuthatch	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Bird	Sitta pusilla	Brown-headed Nuthatch	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Bird	Sitta pusilla	Brown-headed Nuthatch	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Marginal
Bird	Sitta pusilla	Brown-headed Nuthatch	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Marginal
Bird	Sitta pusilla	Brown-headed Nuthatch	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Bird	Sitta pusilla	Brown-headed Nuthatch	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Preferred
Bird	Sitta pusilla	Brown-headed Nuthatch	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Preferred
Bird	Sitta pusilla	Brown-headed Nuthatch	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Preferred
Bird	Sitta pusilla	Brown-headed Nuthatch	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Bird	Sitta pusilla	Brown-headed Nuthatch	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Sitta pusilla	Brown-headed Nuthatch	Forest Plantation	Forest Plantation	Suitable
Bird	Sphyrapicus varius	Yellow-bellied Sapsucker	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Bird	Sphyrapicus varius	Yellow-bellied Sapsucker	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Sphyrapicus varius	Yellow-bellied Sapsucker	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Sphyrapicus varius	Yellow-bellied Sapsucker	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Sternula antillarum athalassos	Interior Least Tern	Cropland	Cropland	Marginal
Bird	Sternula antillarum athalassos	Interior Least Tern	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Bird	Sternula antillarum athalassos	Interior Least Tern	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Sternula antillarum athalassos	Interior Least Tern	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Sternula antillarum athalassos	Interior Least Tern	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Sternula antillarum athalassos	Interior Least Tern	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Bird	Sternula antillarum athalassos	Interior Least Tern	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Sturnella magna	Eastern Meadowlark	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Sturnella magna	Eastern Meadowlark	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Sturnella magna	Eastern Meadowlark	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Bird	Sturnella magna	Eastern Meadowlark	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Marginal
Bird	Sturnella magna	Eastern Meadowlark	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Marginal
Bird	Sturnella magna	Eastern Meadowlark	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Marginal
Bird	Sturnella magna	Eastern Meadowlark	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Marginal
Bird	Sturnella magna	Eastern Meadowlark	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Bird	Sturnella magna	Eastern Meadowlark	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Bird	Sturnella magna	Eastern Meadowlark	Forest Plantation	Forest Plantation	Marginal
Bird	Sturnella magna	Eastern Meadowlark	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Sturnella magna	Eastern Meadowlark	Pasture	Pasture	Preferred
Bird	Sturnella magna	Eastern Meadowlark	Old Field / Successional	Old Field/Successional	Suitable
Bird	Sturnella magna	Eastern Meadowlark	Cropland	Cropland	Suitable
Bird	Thryomanes bewickii	Bewick's Wren	Appalachian Shale Barrens	Upland Mixed Forest	Marginal
Bird	Thryomanes bewickii	Bewick's Wren	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Bird	Thryomanes bewickii	Bewick's Wren	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Thryomanes bewickii	Bewick's Wren	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Thryomanes bewickii	Bewick's Wren	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Preferred
Bird	Thryomanes bewickii	Bewick's Wren	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Thryomanes bewickii	Bewick's Wren	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Thryomanes bewickii	Bewick's Wren	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Thryomanes bewickii	Bewick's Wren	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Preferred
Bird	Thryomanes bewickii	Bewick's Wren	Pasture	Pasture	Preferred
Bird	Thryomanes bewickii	Bewick's Wren	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Bird	Thryomanes bewickii	Bewick's Wren	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Bird	Thryomanes bewickii	Bewick's Wren	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Bird	Thryomanes bewickii	Bewick's Wren	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Suitable
Bird	Thryomanes bewickii	Bewick's Wren	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Bird	Thryomanes bewickii	Bewick's Wren	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Suitable
Bird	Thryomanes bewickii	Bewick's Wren	Old Field / Successional	Old Field/Successional	Suitable
Bird	Thryomanes bewickii	Bewick's Wren	Cropland	Cropland	Suitable
Bird	Tringa flavipes	Lesser Yellowlegs	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Marginal
Bird	Tringa flavipes	Lesser Yellowlegs	Pasture	Pasture	Marginal
Bird	Tringa flavipes	Lesser Yellowlegs	Cropland	Cropland	Marginal
Bird	Tringa flavipes	Lesser Yellowlegs	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Preferred
Bird	Tringa flavipes	Lesser Yellowlegs	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Tringa flavipes	Lesser Yellowlegs	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Tringa flavipes	Lesser Yellowlegs	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Tringa flavipes	Lesser Yellowlegs	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Tringa semipalmata	Willet	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Marginal
Bird	Tringa semipalmata	Willet	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Preferred
Bird	Tringa semipalmata	Willet	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Tringa semipalmata	Willet	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Bird	Troglodytes hiemalis	Winter Wren	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Bird	Troglodytes hiemalis	Winter Wren	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Bird	Troglodytes hiemalis	Winter Wren	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Troglodytes hiemalis	Winter Wren	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Troglodytes hiemalis	Winter Wren	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Bird	Troglodytes hiemalis	Winter Wren	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Troglodytes hiemalis	Winter Wren	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Tyto alba	Barn Owl	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Bird	Tyto alba	Barn Owl	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Marginal
Bird	Tyto alba	Barn Owl	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Bird	Tyto alba	Barn Owl	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Bird	Tyto alba	Barn Owl	Forest Plantation	Forest Plantation	Marginal
Bird	Tyto alba	Barn Owl	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Bird	Tyto alba	Barn Owl	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Preferred
Bird	Tyto alba	Barn Owl	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Preferred
Bird	Tyto alba	Barn Owl	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Preferred
Bird	Tyto alba	Barn Owl	Pasture	Pasture	Preferred
Bird	Tyto alba	Barn Owl	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Bird	Tyto alba	Barn Owl	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Bird	Tyto alba	Barn Owl	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Tyto alba	Barn Owl	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Bird	Tyto alba	Barn Owl	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Bird	Tyto alba	Barn Owl	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Bird	Tyto alba	Barn Owl	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Suitable
Bird	Tyto alba	Barn Owl	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Bird	Tyto alba	Barn Owl	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Tyto alba	Barn Owl	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Tyto alba	Barn Owl	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Tyto alba	Barn Owl	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Bird	Tyto alba	Barn Owl	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Bird	Tyto alba	Barn Owl	Pond	Forested Depression/Wet Flatwoods	Suitable
Bird	Tyto alba	Barn Owl	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Bird	Tyto alba	Barn Owl	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Bird	Tyto alba	Barn Owl	Old Field / Successional	Old Field/Successional	Suitable
Bird	Tyto alba	Barn Owl	Cropland	Cropland	Suitable
Bird	Tyto alba	Barn Owl	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Suitable
Bird	Vermivora chrysoptera	Golden-winged Warbler	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Vermivora chrysoptera	Golden-winged Warbler	Appalachian Shale Barrens	Upland Mixed Forest	Marginal
Bird	Vermivora chrysoptera	Golden-winged Warbler	Forest Plantation	Forest Plantation	Marginal
Bird	Vermivora chrysoptera	Golden-winged Warbler	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Bird	Vermivora chrysoptera	Golden-winged Warbler	Pasture	Pasture	Marginal
Bird	Vermivora chrysoptera	Golden-winged Warbler	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Bird	Vermivora chrysoptera	Golden-winged Warbler	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Preferred
Bird	Vermivora chrysoptera	Golden-winged Warbler	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Preferred
Bird	Vermivora chrysoptera	Golden-winged Warbler	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Preferred
Bird	Vermivora chrysoptera	Golden-winged Warbler	Old Field / Successional	Old Field/Successional	Preferred
Bird	Vermivora chrysoptera	Golden-winged Warbler	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bird	Vermivora chrysoptera	Golden-winged Warbler	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Bird	Vermivora chrysoptera	Golden-winged Warbler	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Vermivora chrysoptera	Golden-winged Warbler	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Bird	Vermivora chrysoptera	Golden-winged Warbler	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Bird	Vermivora chrysoptera	Golden-winged Warbler	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Bird	Vermivora chrysoptera	Golden-winged Warbler	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Bird	Vermivora chrysoptera	Golden-winged Warbler	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Bird	Vermivora chrysoptera	Golden-winged Warbler	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Bird	Vermivora chrysoptera	Golden-winged Warbler	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Bird	Vermivora chrysoptera	Golden-winged Warbler	Southern Appalachian Rocky Summit	Mountain Summit	Suitable
Bird	Vermivora chrysoptera	Golden-winged Warbler	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Suitable
Bird	Vireo bellii	Bell's Vireo	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Vireo bellii	Bell's Vireo	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Marginal
Bird	Vireo bellii	Bell's Vireo	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Marginal
Bird	Vireo bellii	Bell's Vireo	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Bird	Vireo bellii	Bell's Vireo	Forest Plantation	Forest Plantation	Marginal
Bird	Vireo bellii	Bell's Vireo	Pasture	Pasture	Marginal
Bird	Vireo bellii	Bell's Vireo	Cropland	Cropland	Marginal
Bird	Vireo bellii	Bell's Vireo	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Bird	Vireo bellii	Bell's Vireo	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Bird	Vireo bellii	Bell's Vireo	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Bird	Vireo bellii	Bell's Vireo	Old Field / Successional	Old Field/Successional	Preferred
Bird	Vireo bellii	Bell's Vireo	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Vireo bellii	Bell's Vireo	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Bird	Vireo bellii	Bell's Vireo	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Bird	Vireo bellii	Bell's Vireo	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Bird	Vireo bellii	Bell's Vireo	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Vireo bellii	Bell's Vireo	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Bird	Vireo bellii	Bell's Vireo	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Bird	Vireo bellii	Bell's Vireo	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Bird	Vireo bellii	Bell's Vireo	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Bird	Vireo bellii	Bell's Vireo	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Bird	Vireo bellii	Bell's Vireo	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Bird	Vireo solitarius	Blue-headed Vireo	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Bird	Vireo solitarius	Blue-headed Vireo	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Bird	Vireo solitarius	Blue-headed Vireo	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Bird	Vireo solitarius	Blue-headed Vireo	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Bird	Vireo solitarius	Blue-headed Vireo	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Marginal
Bird	Vireo solitarius	Blue-headed Vireo	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Marginal
Bird	Vireo solitarius	Blue-headed Vireo	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Marginal
Bird	Vireo solitarius	Blue-headed Vireo	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Marginal
Bird	Vireo solitarius	Blue-headed Vireo	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Bird	Vireo solitarius	Blue-headed Vireo	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Marginal
Bird	Vireo solitarius	Blue-headed Vireo	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Marginal
Bird	Vireo solitarius	Blue-headed Vireo	Forest Plantation	Forest Plantation	Marginal
Bird	Vireo solitarius	Blue-headed Vireo	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Bird	Vireo solitarius	Blue-headed Vireo	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Preferred
Bird	Vireo solitarius	Blue-headed Vireo	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Preferred
Bird	Vireo solitarius	Blue-headed Vireo	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Bird	Vireo solitarius	Blue-headed Vireo	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Preferred
Bird	Vireo solitarius	Blue-headed Vireo	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Bird	Vireo solitarius	Blue-headed Vireo	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Bird	Vireo solitarius	Blue-headed Vireo	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Marginal
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Southern Interior Calcareous Cliff	Cliff/Talus	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Old Field / Successional	Old Field/Successional	Marginal
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Preferred
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Southern Appalachian Seepage Wetland	Open Seep/Fen	Preferred
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Suitable
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Suitable
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Crustacean	Cambarus dubius	Upland Burrowing Crayfish	Southern Appalachian Spray Cliff	Cliff/Talus	Suitable
Gastropod	Anguispira alabama	Alabama Tigersnail	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Anguispira alabama	Alabama Tigersnail	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Anguispira alabama	Alabama Tigersnail	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Anguispira alabama	Alabama Tigersnail	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Anguispira alabama	Alabama Tigersnail	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Anguispira alabama	Alabama Tigersnail	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Anguispira alabama	Alabama Tigersnail	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Anguispira cumberlandiana	Cumberland Tigersnail	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Anguispira cumberlandiana	Cumberland Tigersnail	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Anguispira cumberlandiana	Cumberland Tigersnail	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Anguispira cumberlandiana	Cumberland Tigersnail	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Anguispira cumberlandiana	Cumberland Tigersnail	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Anguispira cumberlandiana	Cumberland Tigersnail	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Anguispira cumberlandiana	Cumberland Tigersnail	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Anguispira knoxensis	Rustic Tigersnail	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Anguispira knoxensis	Rustic Tigersnail	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Anguispira knoxensis	Rustic Tigersnail	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Anguispira knoxensis	Rustic Tigersnail	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Anguispira knoxensis	Rustic Tigersnail	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Anguispira knoxensis	Rustic Tigersnail	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Anguispira knoxensis	Rustic Tigersnail	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Anguispira knoxensis	Rustic Tigersnail	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Anguispira knoxensis	Rustic Tigersnail	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Gastropod	Anguispira knoxensis	Rustic Tigersnail	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Gastropod	Anguispira knoxensis	Rustic Tigersnail	Old Field / Successional	Old Field/Successional	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Gastropod	Anguispira knoxensis	Rustic Tigersnail	Pasture	Pasture	Suitable
Gastropod	Anguispira knoxensis	Rustic Tigersnail	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Suitable
Gastropod	Anguispira kochi	Banded Tigersnail	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Gastropod	Anguispira kochi	Banded Tigersnail	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Gastropod	Anguispira picta	Painted Tigersnail	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Gastropod	Anguispira picta	Painted Tigersnail	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Gastropod	Anguispira picta	Painted Tigersnail	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Anguispira picta	Painted Tigersnail	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Anguispira picta	Painted Tigersnail	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Anguispira picta	Painted Tigersnail	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Anguispira picta	Painted Tigersnail	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Daedalochila auriformis	Rockpile Liptooth	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Gastropod	Daedalochila auriformis	Rockpile Liptooth	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Marginal
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Marginal
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Marginal
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Marginal
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Marginal
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Marginal
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Marginal
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	Old Field / Successional	Old Field/Successional	Marginal
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Preferred
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	Pond	Forested Depression/Wet Flatwoods	Suitable
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Gastropod	Daedalochila leporina	Gulf Coast Liptooth	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Gastropod	Discus bryanti	Sawtooth Disc	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Discus bryanti	Sawtooth Disc	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Discus bryanti	Sawtooth Disc	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Discus bryanti	Sawtooth Disc	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Discus bryanti	Sawtooth Disc	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Discus bryanti	Sawtooth Disc	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Discus bryanti	Sawtooth Disc	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Gastropod	Discus bryanti	Sawtooth Disc	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Discus bryanti	Sawtooth Disc	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Discus bryanti	Sawtooth Disc	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Gastropod	Discus bryanti	Sawtooth Disc	Southern Interior Sinkhole Wall	Karst Outcrop	Suitable
Gastropod	Discus catskillensis	Angular Disc Snail	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Gastropod	Discus catskillensis	Angular Disc Snail	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Gastropod	Discus catskillensis	Angular Disc Snail	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Gastropod	Discus catskillensis	Angular Disc Snail	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Gastropod	Discus catskillensis	Angular Disc Snail	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Marginal
Gastropod	Discus catskillensis	Angular Disc Snail	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Marginal
Gastropod	Discus catskillensis	Angular Disc Snail	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Marginal
Gastropod	Discus catskillensis	Angular Disc Snail	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Marginal
Gastropod	Discus catskillensis	Angular Disc Snail	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Marginal
Gastropod	Discus catskillensis	Angular Disc Snail	Pond	Forested Depression/Wet Flatwoods	Marginal
Gastropod	Discus catskillensis	Angular Disc Snail	Interior Low Plateau Seepage Fen	Open Seep/Fen	Marginal
Gastropod	Discus catskillensis	Angular Disc Snail	Southern Interior Sinkhole Wall	Karst Outcrop	Marginal
Gastropod	Discus catskillensis	Angular Disc Snail	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Discus catskillensis	Angular Disc Snail	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Discus catskillensis	Angular Disc Snail	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Discus catskillensis	Angular Disc Snail	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Discus catskillensis	Angular Disc Snail	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Discus clappi	Channelled Disc	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Discus clappi	Channelled Disc	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Euchemotrema fraternum montanum	a terrestrial snail	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Gastropod	Euchemotrema fraternum montanum	a terrestrial snail	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Gastropod	Euchemotrema fraternum montanum	a terrestrial snail	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Euchemotrema fraternum montanum	a terrestrial snail	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Euchemotrema fraternum montanum	a terrestrial snail	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Euchemotrema fraternum montanum	a terrestrial snail	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Euchemotrema fraternum montanum	a terrestrial snail	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Euchemotrema fraternum montanum	a terrestrial snail	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Euchemotrema fraternum montanum	a terrestrial snail	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Euchemotrema fraternum montanum	a terrestrial snail	Southern Interior Sinkhole Wall	Karst Outcrop	Suitable
Gastropod	Fumonelix archeri	Ocoee Covert	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Fumonelix archeri	Ocoee Covert	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Fumonelix archeri	Ocoee Covert	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Fumonelix archeri	Ocoee Covert	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Fumonelix archeri	Ocoee Covert	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Fumonelix archeri	Ocoee Covert	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Fumonelix christyi	Glossy Covert	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Fumonelix christyi	Glossy Covert	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Fumonelix christyi	Glossy Covert	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Fumonelix christyi	Glossy Covert	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Fumonelix christyi	Glossy Covert	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Fumonelix christyi	Glossy Covert	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Fumonelix jonesiana	Big-tooth Covert	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Fumonelix jonesiana	Big-tooth Covert	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Fumonelix jonesiana	Big-tooth Covert	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Gastropod	Fumonelix jonesiana	Big-tooth Covert	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Marginal
Gastropod	Fumonelix jonesiana	Big-tooth Covert	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Fumonelix jonesiana	Big-tooth Covert	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Fumonelix jonesiana	Big-tooth Covert	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Fumonelix langdoni	Talus Covert	Southern Appalachian Spray Cliff	Cliff/Talus	Marginal
Gastropod	Fumonelix langdoni	Talus Covert	Southern Appalachian Rocky Summit	Mountain Summit	Marginal
Gastropod	Fumonelix langdoni	Talus Covert	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Gastropod	Fumonelix langdoni	Talus Covert	Southern Appalachian Oak Forest	Upland Deciduous Forest	Preferred
Gastropod	Fumonelix langdoni	Talus Covert	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Gastropod	Fumonelix langdoni	Talus Covert	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Fumonelix langdoni	Talus Covert	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Gastropod	Fumonelix orestes	Engraved Covert	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Gastropod	Fumonelix orestes	Engraved Covert	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Fumonelix orestes	Engraved Covert	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Fumonelix orestes	Engraved Covert	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Fumonelix orestes	Engraved Covert	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Fumonelix orestes	Engraved Covert	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Gastropod	Fumonelix orestes	Engraved Covert	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Fumonelix roanensis	Roan Mountain Covert	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Gastropod	Fumonelix roanensis	Roan Mountain Covert	Southern Appalachian Oak Forest	Upland Deciduous Forest	Preferred
Gastropod	Fumonelix roanensis	Roan Mountain Covert	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Gastropod	Fumonelix roanensis	Roan Mountain Covert	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Gastropod	Fumonelix roanensis	Roan Mountain Covert	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Gastropod	Fumonelix roanensis	Roan Mountain Covert	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Gastropod	Fumonelix roanensis	Roan Mountain Covert	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Gastropod	Fumonelix roanensis	Roan Mountain Covert	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Fumonelix wetherbyi	Clifty Covert	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Gastropod	Fumonelix wetherbyi	Clifty Covert	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Gastropod	Fumonelix wetherbyi	Clifty Covert	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Fumonelix wetherbyi	Clifty Covert	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Fumonelix wetherbyi	Clifty Covert	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Fumonelix wetherbyi	Clifty Covert	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Fumonelix wetherbyi	Clifty Covert	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Fumonelix wheatleyi clingmanicus	Clingman Covert	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Fumonelix wheatleyi clingmanicus	Clingman Covert	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Fumonelix wheatleyi clingmanicus	Clingman Covert	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Fumonelix wheatleyi clingmanicus	Clingman Covert	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Fumonelix wheatleyi clingmanicus	Clingman Covert	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Fumonelix wheatleyi clingmanicus	Clingman Covert	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Gastropod	Fumonelix wheatleyi clingmanicus	Clingman Covert	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Glyphyalinia junaluskana	Dark Glyph	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Glyphyalinia junaluskana	Dark Glyph	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Glyphyalinia junaluskana	Dark Glyph	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Glyphyalinia ocoae	Blue-gray Glyph	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Glyphyalinia ocoae	Blue-gray Glyph	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Glyphyalinia ocoae	Blue-gray Glyph	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Glyphyalinia ocoae	Blue-gray Glyph	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Glyphyalinia ocoae	Blue-gray Glyph	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Glyphyalinia ocoae	Blue-gray Glyph	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Glyphyalinia pentadelphia	Pink Glyph	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Gastropod	Glyphyalinia pentadelphia	Pink Glyph	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Glyphyalinia pentadelphia	Pink Glyph	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Glyphyalinia pentadelphia	Pink Glyph	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Glyphyalinia pentadelphia	Pink Glyph	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Glyphyalinia pentadelphia	Pink Glyph	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Glyphyalinia pentadelphia	Pink Glyph	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Glyphyalinia pentadelphia	Pink Glyph	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Glyphyalinia pentadelphia	Pink Glyph	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Glyphyalinia rimula	Tongued Glyph	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Glyphyalinia rimula	Tongued Glyph	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Glyphyalinia rimula	Tongued Glyph	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Glyphyalinia rimula	Tongued Glyph	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Glyphyalinia rimula	Tongued Glyph	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Glyphyalinia rimula	Tongued Glyph	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Glyphyalinia rimula	Tongued Glyph	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Glyphyalinia rimula	Tongued Glyph	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Glyphyalinia rimula	Tongued Glyph	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Gastropod	Glyphyalinia rimula	Tongued Glyph	Southern Interior Sinkhole Wall	Karst Outcrop	Suitable
Gastropod	Haplotrema kendeighi	Blue-foot Lancetooth	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Haplotrema kendeighi	Blue-foot Lancetooth	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Haplotrema kendeighi	Blue-foot Lancetooth	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Haplotrema kendeighi	Blue-foot Lancetooth	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Haplotrema kendeighi	Blue-foot Lancetooth	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Haplotrema kendeighi	Blue-foot Lancetooth	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Gastropod	Haplotrema kendeighi	Blue-foot Lancetooth	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Helicodiscus aldrichianus	Burrowing Coil	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Helicodiscus aldrichianus	Burrowing Coil	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Helicodiscus aldrichianus	Burrowing Coil	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Helicodiscus aldrichianus	Burrowing Coil	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Helicodiscus aldrichianus	Burrowing Coil	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Helicodiscus aldrichianus	Burrowing Coil	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Helicodiscus aldrichianus	Burrowing Coil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Helicodiscus aldrichianus	Burrowing Coil	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Helicodiscus aldrichianus	Burrowing Coil	Central Interior Acidic Cliff and Talus	Cliff/Talus	Suitable
Gastropod	Helicodiscus aldrichianus	Burrowing Coil	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Gastropod	Helicodiscus aldrichianus	Burrowing Coil	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Gastropod	Helicodiscus aldrichianus	Burrowing Coil	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Gastropod	Helicodiscus bonamicus	Spiral Coil	Appalachian Shale Barrens	Upland Mixed Forest	Marginal
Gastropod	Helicodiscus bonamicus	Spiral Coil	Southern Appalachian Grass and Shrub Bald	Bald	Preferred
Gastropod	Helicodiscus bonamicus	Spiral Coil	Southern Appalachian Spray Cliff	Cliff/Talus	Preferred
Gastropod	Helicodiscus bonamicus	Spiral Coil	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Preferred
Gastropod	Helicodiscus bonamicus	Spiral Coil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Helicodiscus bonamicus	Spiral Coil	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Helicodiscus bonamicus	Spiral Coil	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Helicodiscus enneodon	Bluff Coil	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Helicodiscus enneodon	Bluff Coil	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Helicodiscus enneodon	Bluff Coil	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Helicodiscus enneodon	Bluff Coil	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Gastropod	Helicodiscus enneodon	Bluff Coil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Helicodiscus enneodon	Bluff Coil	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Helicodiscus enneodon	Bluff Coil	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Helicodiscus enneodon	Bluff Coil	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Gastropod	Helicodiscus enneodon	Bluff Coil	Southern Interior Sinkhole Wall	Karst Outcrop	Suitable
Gastropod	Helicodiscus hexodon	Toothy Coil	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Gastropod	Helicodiscus hexodon	Toothy Coil	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Gastropod	Helicodiscus hexodon	Toothy Coil	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Helicodiscus hexodon	Toothy Coil	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Helicodiscus hexodon	Toothy Coil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Helicodiscus hexodon	Toothy Coil	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Helicodiscus punctatellus	Punctate Coil	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Gastropod	Helicodiscus punctatellus	Punctate Coil	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Gastropod	Helicodiscus punctatellus	Punctate Coil	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Helicodiscus punctatellus	Punctate Coil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Helicodiscus punctatellus	Punctate Coil	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Gastropod	Helicodiscus punctatellus	Punctate Coil	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Gastropod	Helicodiscus punctatellus	Punctate Coil	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Gastropod	Helicodiscus punctatellus	Punctate Coil	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Gastropod	Helicodiscus punctatellus	Punctate Coil	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Gastropod	Helicodiscus punctatellus	Punctate Coil	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Gastropod	Helicodiscus punctatellus	Punctate Coil	Pond	Forested Depression/Wet Flatwoods	Suitable
Gastropod	Helicodiscus punctatellus	Punctate Coil	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Gastropod	Helicodiscus punctatellus	Punctate Coil	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Gastropod	Helicodiscus punctatellus	Punctate Coil	Central Interior Acidic Cliff and Talus	Cliff/Talus	Suitable
Gastropod	Helicodiscus punctatellus	Punctate Coil	Southern Interior Sinkhole Wall	Karst Outcrop	Suitable
Gastropod	Inflectarius downieanus	Dwarf Globelet	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Inflectarius downieanus	Dwarf Globelet	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Inflectarius downieanus	Dwarf Globelet	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Inflectarius downieanus	Dwarf Globelet	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Inflectarius downieanus	Dwarf Globelet	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Inflectarius downieanus	Dwarf Globelet	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Inflectarius downieanus	Dwarf Globelet	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Gastropod	Inflectarius downieanus	Dwarf Globelet	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Gastropod	Inflectarius downieanus	Dwarf Globelet	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Inflectarius ferrissi	Smoky Mountain Covert	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Inflectarius ferrissi	Smoky Mountain Covert	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Inflectarius ferrissi	Smoky Mountain Covert	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Inflectarius ferrissi	Smoky Mountain Covert	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Inflectarius ferrissi	Smoky Mountain Covert	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Inflectarius ferrissi	Smoky Mountain Covert	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Gastropod	Inflectarius ferrissi	Smoky Mountain Covert	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Inflectarius kalmianus	Brown Globelet	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Marginal
Gastropod	Inflectarius kalmianus	Brown Globelet	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Marginal
Gastropod	Inflectarius kalmianus	Brown Globelet	Pasture	Pasture	Marginal
Gastropod	Inflectarius kalmianus	Brown Globelet	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Gastropod	Inflectarius kalmianus	Brown Globelet	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Gastropod	Inflectarius kalmianus	Brown Globelet	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Gastropod	Inflectarius kalmianus	Brown Globelet	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Gastropod	Inflectarius kalmianus	Brown Globelet	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Gastropod	Inflectarius kalmianus	Brown Globelet	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Gastropod	Inflectarius kalmianus	Brown Globelet	Old Field / Successional	Old Field/Successional	Suitable
Gastropod	Inflectarius smithi	Alabama Shagreen	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Inflectarius smithi	Alabama Shagreen	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Inflectarius smithi	Alabama Shagreen	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Inflectarius smithi	Alabama Shagreen	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Inflectarius smithi	Alabama Shagreen	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Inflectarius smithi	Alabama Shagreen	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Inflectarius smithi	Alabama Shagreen	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Inflectarius subpalliatus	Velvet Covert	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Inflectarius subpalliatus	Velvet Covert	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Inflectarius subpalliatus	Velvet Covert	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Inflectarius subpalliatus	Velvet Covert	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Inflectarius subpalliatus	Velvet Covert	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Inflectarius subpalliatus	Velvet Covert	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Gastropod	Inflectarius subpalliatus	Velvet Covert	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Inflectarius verus	Fuzzy Covert	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Gastropod	Inflectarius verus	Fuzzy Covert	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Gastropod	Inflectarius verus	Fuzzy Covert	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Gastropod	Inflectarius verus	Fuzzy Covert	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Inflectarius verus	Fuzzy Covert	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Inflectarius verus	Fuzzy Covert	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Inflectarius verus	Fuzzy Covert	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Inflectarius verus	Fuzzy Covert	Southern Appalachian Spray Cliff	Cliff/Talus	Suitable
Gastropod	Inflectarius verus	Fuzzy Covert	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Gastropod	Inflectarius verus	Fuzzy Covert	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Gastropod	Inflectarius verus	Fuzzy Covert	Southern Interior Sinkhole Wall	Karst Outcrop	Suitable
Gastropod	Megapallifera wetherbyi	Blotchy Mantleslug	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Megapallifera wetherbyi	Blotchy Mantleslug	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Megapallifera wetherbyi	Blotchy Mantleslug	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Megapallifera wetherbyi	Blotchy Mantleslug	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Megapallifera wetherbyi	Blotchy Mantleslug	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Megapallifera wetherbyi	Blotchy Mantleslug	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Megapallifera wetherbyi	Blotchy Mantleslug	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Mesodon altivagus	Wandering Globe	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Gastropod	Mesodon altivagus	Wandering Globe	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Gastropod	Mesodon altivagus	Wandering Globe	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Mesodon altivagus	Wandering Globe	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Mesodon altivagus	Wandering Globe	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Mesodon altivagus	Wandering Globe	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Gastropod	Mesodon altivagus	Wandering Globe	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Mesodon andrewsae	Balsam Globe	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Mesodon andrewsae	Balsam Globe	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Mesodon andrewsae	Balsam Globe	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Mesodon andrewsae	Balsam Globe	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Mesodon andrewsae	Balsam Globe	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Mesodon andrewsae	Balsam Globe	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Gastropod	Mesodon andrewsae	Balsam Globe	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable

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Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Gastropod	Mesodon sanus	Squat Globelet	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Gastropod	Mesodon sanus	Squat Globelet	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Gastropod	Mesodon sanus	Squat Globelet	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Marginal
Gastropod	Mesodon sanus	Squat Globelet	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Mesodon sanus	Squat Globelet	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Mesodon sanus	Squat Globelet	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Mesodon sanus	Squat Globelet	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Gastropod	Mesomphix andrewsae	Mountain Button	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Gastropod	Mesomphix andrewsae	Mountain Button	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Mesomphix andrewsae	Mountain Button	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Mesomphix andrewsae	Mountain Button	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Mesomphix andrewsae	Mountain Button	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Mesomphix andrewsae	Mountain Button	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Mesomphix subplanus	Flat Button	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Mesomphix subplanus	Flat Button	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Mesomphix subplanus	Flat Button	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Mesomphix subplanus	Flat Button	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Mesomphix subplanus	Flat Button	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Mesomphix subplanus	Flat Button	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Gastropod	Mesomphix subplanus	Flat Button	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Nesovitrea electrina	Amber Glass Snail	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Marginal
Gastropod	Nesovitrea electrina	Amber Glass Snail	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Marginal
Gastropod	Nesovitrea electrina	Amber Glass Snail	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Gastropod	Nesovitrea electrina	Amber Glass Snail	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Gastropod	Nesovitrea electrina	Amber Glass Snail	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Gastropod	Nesovitrea electrina	Amber Glass Snail	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Gastropod	Nesovitrea electrina	Amber Glass Snail	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Gastropod	Nesovitrea electrina	Amber Glass Snail	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Gastropod	Nesovitrea electrina	Amber Glass Snail	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Gastropod	Nesovitrea electrina	Amber Glass Snail	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Gastropod	Nesovitrea electrina	Amber Glass Snail	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Gastropod	Nesovitrea electrina	Amber Glass Snail	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Gastropod	Nesovitrea electrina	Amber Glass Snail	Cumberland Riverscour	Forested Bottomland Floodplain	Suitable
Gastropod	Nesovitrea electrina	Amber Glass Snail	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Gastropod	Nesovitrea electrina	Amber Glass Snail	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Gastropod	Nesovitrea electrina	Amber Glass Snail	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Gastropod	Nesovitrea electrina	Amber Glass Snail	Pond	Forested Depression/Wet Flatwoods	Suitable
Gastropod	Nesovitrea electrina	Amber Glass Snail	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Gastropod	Nesovitrea electrina	Amber Glass Snail	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Gastropod	Nesovitrea electrina	Amber Glass Snail	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Gastropod	Nesovitrea electrina	Amber Glass Snail	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Gastropod	Pallifera marmorea	Marbled Mantleslug	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Gastropod	Pallifera marmorea	Marbled Mantleslug	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Pallifera marmorea	Marbled Mantleslug	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Pallifera marmorea	Marbled Mantleslug	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Gastropod	Pallifera marmorea	Marbled Mantleslug	Cumberland Riverscour	Forested Bottomland Floodplain	Marginal
Gastropod	Pallifera marmorea	Marbled Mantleslug	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Marginal
Gastropod	Pallifera marmorea	Marbled Mantleslug	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Gastropod	Pallifera marmorea	Marbled Mantleslug	Interior Low Plateau Seepage Fen	Open Seep/Fen	Marginal
Gastropod	Pallifera marmorea	Marbled Mantleslug	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Pallifera marmorea	Marbled Mantleslug	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Pallifera marmorea	Marbled Mantleslug	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Pallifera marmorea	Marbled Mantleslug	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Pallifera marmorea	Marbled Mantleslug	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Pallifera marmorea	Marbled Mantleslug	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Gastropod	Paravitrea alethia	Goddess Supercoil	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea alethia	Goddess Supercoil	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea alethia	Goddess Supercoil	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea alethia	Goddess Supercoil	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea alethia	Goddess Supercoil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea alethia	Goddess Supercoil	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Paravitrea andrewsae	High Mountain Supercoil	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea andrewsae	High Mountain Supercoil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea andrewsae	High Mountain Supercoil	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea andrewsae	High Mountain Supercoil	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Paravitrea bellona	Club Supercoil	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea bellona	Club Supercoil	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea bellona	Club Supercoil	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea bellona	Club Supercoil	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea bellona	Club Supercoil	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea bellona	Club Supercoil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea bellona	Club Supercoil	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Paravitrea blarina	Shrew Supercoil	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea blarina	Shrew Supercoil	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea blarina	Shrew Supercoil	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea blarina	Shrew Supercoil	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea blarina	Shrew Supercoil	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea blarina	Shrew Supercoil	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea blarina	Shrew Supercoil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea blarina	Shrew Supercoil	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea blarina	Shrew Supercoil	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Paravitrea blarina	Shrew Supercoil	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Gastropod	Paravitrea blarina	Shrew Supercoil	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Gastropod	Paravitrea calcicola	Pearl Supercoil	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea calcicola	Pearl Supercoil	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea calcicola	Pearl Supercoil	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea calcicola	Pearl Supercoil	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea calcicola	Pearl Supercoil	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea calcicola	Pearl Supercoil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea calcicola	Pearl Supercoil	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Paravitrea calcicola	Pearl Supercoil	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Gastropod	Paravitrea clappi	Mirey Ridge Supercoil	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea clappi	Mirey Ridge Supercoil	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea clappi	Mirey Ridge Supercoil	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea clappi	Mirey Ridge Supercoil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea clappi	Mirey Ridge Supercoil	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Gastropod	Paravitrea clappi	Mirey Ridge Supercoil	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Gastropod	Paravitrea clappi	Mirey Ridge Supercoil	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Paravitrea lacteodens	Ramp Cove Supercoil	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea lacteodens	Ramp Cove Supercoil	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea lacteodens	Ramp Cove Supercoil	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea lacteodens	Ramp Cove Supercoil	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea lacteodens	Ramp Cove Supercoil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea lacteodens	Ramp Cove Supercoil	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea lacteodens	Ramp Cove Supercoil	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea lacteodens	Ramp Cove Supercoil	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea lacteodens	Ramp Cove Supercoil	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea lacteodens	Ramp Cove Supercoil	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea lacteodens	Ramp Cove Supercoil	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Gastropod	Paravitrea lacteodens	Ramp Cove Supercoil	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Marginal
Gastropod	Paravitrea lacteodens	Ramp Cove Supercoil	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Marginal
Gastropod	Paravitrea lacteodens	Ramp Cove Supercoil	Southern Appalachian Grass and Shrub Bald	Bald	Marginal
Gastropod	Paravitrea lacteodens	Ramp Cove Supercoil	Pond	Forested Depression/Wet Flatwoods	Marginal
Gastropod	Paravitrea lacteodens	Ramp Cove Supercoil	Interior Low Plateau Seepage Fen	Open Seep/Fen	Marginal
Gastropod	Paravitrea lamellidens	Lamellate Supercoil	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea lamellidens	Lamellate Supercoil	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea lamellidens	Lamellate Supercoil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea lamellidens	Lamellate Supercoil	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea lamellidens	Lamellate Supercoil	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea lamellidens	Lamellate Supercoil	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Paravitrea lapilla	Gem Supercoil	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea lapilla	Gem Supercoil	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea lapilla	Gem Supercoil	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Gastropod	Paravitrea metallacta	Caneyfork Supercoil	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Gastropod	Paravitrea metallacta	Caneyfork Supercoil	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea metallacta	Caneyfork Supercoil	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea metallacta	Caneyfork Supercoil	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Gastropod	Paravitrea metallacta	Caneyfork Supercoil	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Gastropod	Paravitrea reesei	Round Supercoil	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea reesei	Round Supercoil	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea reesei	Round Supercoil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea reesei	Round Supercoil	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea reesei	Round Supercoil	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea reesei	Round Supercoil	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Paravitrea seradens	Barred Supercoil	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea seradens	Barred Supercoil	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea seradens	Barred Supercoil	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Marginal
Gastropod	Paravitrea seradens	Barred Supercoil	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Marginal
Gastropod	Paravitrea seradens	Barred Supercoil	Pond	Forested Depression/Wet Flatwoods	Marginal
Gastropod	Paravitrea seradens	Barred Supercoil	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Gastropod	Paravitrea seradens	Barred Supercoil	Southern Appalachian Spray Cliff	Cliff/Talus	Marginal
Gastropod	Paravitrea seradens	Barred Supercoil	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Marginal
Gastropod	Paravitrea seradens	Barred Supercoil	Southern Appalachian Rocky Summit	Mountain Summit	Marginal
Gastropod	Paravitrea seradens	Barred Supercoil	Southern Interior Sinkhole Wall	Karst Outcrop	Marginal

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Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Gastropod	Paravitrea seradens	Barred Supercoil	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Gastropod	Paravitrea seradens	Barred Supercoil	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea seradens	Barred Supercoil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea seradens	Barred Supercoil	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea seradens	Barred Supercoil	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Gastropod	Paravitrea seradens	Barred Supercoil	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Gastropod	Paravitrea seradens	Barred Supercoil	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Gastropod	Paravitrea significans	Domed Supercoil	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	Cumberland Riverscour	Forested Bottomland Floodplain	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	Pond	Forested Depression/Wet Flatwoods	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	Interior Low Plateau Seepage Fen	Open Seep/Fen	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	Southern Appalachian Seepage Wetland	Open Seep/Fen	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	Central Interior Acidic Cliff and Talus	Cliff/Talus	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	Southern Interior Sinkhole Wall	Karst Outcrop	Marginal
Gastropod	Paravitrea significans	Domed Supercoil	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea significans	Domed Supercoil	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea significans	Domed Supercoil	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea significans	Domed Supercoil	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea significans	Domed Supercoil	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea significans	Domed Supercoil	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea significans	Domed Supercoil	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea significans	Domed Supercoil	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea significans	Domed Supercoil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea significans	Domed Supercoil	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea significans	Domed Supercoil	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Gastropod	Paravitrea subtilis	Slender Supercoil	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea subtilis	Slender Supercoil	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea subtilis	Slender Supercoil	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea subtilis	Slender Supercoil	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal

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Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Gastropod	Paravitrea subtilis	Slender Supercoil	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea subtilis	Slender Supercoil	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea subtilis	Slender Supercoil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea subtilis	Slender Supercoil	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Paravitrea tantilla	Teasing Supercoil	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea tantilla	Teasing Supercoil	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Gastropod	Paravitrea tantilla	Teasing Supercoil	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea tantilla	Teasing Supercoil	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea tantilla	Teasing Supercoil	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea tantilla	Teasing Supercoil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea tantilla	Teasing Supercoil	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea tantilla	Teasing Supercoil	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Paravitrea tantilla	Teasing Supercoil	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Gastropod	Paravitrea tantilla	Teasing Supercoil	Southern Interior Sinkhole Wall	Karst Outcrop	Suitable
Gastropod	Paravitrea ternaria	Sculpted Supercoil	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea ternaria	Sculpted Supercoil	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea ternaria	Sculpted Supercoil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea ternaria	Sculpted Supercoil	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea ternaria	Sculpted Supercoil	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea ternaria	Sculpted Supercoil	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Paravitrea tridens	Whitefoot Supercoil	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea tridens	Whitefoot Supercoil	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea tridens	Whitefoot Supercoil	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea tridens	Whitefoot Supercoil	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea tridens	Whitefoot Supercoil	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea tridens	Whitefoot Supercoil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea tridens	Whitefoot Supercoil	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea tridens	Whitefoot Supercoil	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea tridens	Whitefoot Supercoil	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Paravitrea umbilicaris	Open Supercoil	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea umbilicaris	Open Supercoil	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea umbilicaris	Open Supercoil	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea umbilicaris	Open Supercoil	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea umbilicaris	Open Supercoil	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea umbilicaris	Open Supercoil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea umbilicaris	Open Supercoil	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea umbilicaris	Open Supercoil	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea umbilicaris	Open Supercoil	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Gastropod	Paravitrea umbilicaris	Open Supercoil	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Paravitrea variabilis	Variabile Supercoil	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea variabilis	Variabile Supercoil	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea variabilis	Variabile Supercoil	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea variabilis	Variabile Supercoil	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea variabilis	Variabile Supercoil	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea variabilis	Variabile Supercoil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea variabilis	Variabile Supercoil	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Paravitrea varidens	Roan Supercoil	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Paravitrea varidens	Roan Supercoil	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal

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Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Gastropod	Paravitrea varidens	Roan Supercoil	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea varidens	Roan Supercoil	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea varidens	Roan Supercoil	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Paravitrea varidens	Roan Supercoil	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Gastropod	Paravitrea varidens	Roan Supercoil	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Paravitrea varidens	Roan Supercoil	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Gastropod	Patera clarki	Dwarf Proud Globe	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Patera clarki	Dwarf Proud Globe	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Patera clarki	Dwarf Proud Globe	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Patera clarki	Dwarf Proud Globe	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Patera clarki	Dwarf Proud Globe	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Patera clarki	Dwarf Proud Globe	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Gastropod	Patera clarki	Dwarf Proud Globe	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Philomycus sellatus	Alabama Mantleslug	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Philomycus sellatus	Alabama Mantleslug	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Philomycus sellatus	Alabama Mantleslug	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Philomycus sellatus	Alabama Mantleslug	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Philomycus sellatus	Alabama Mantleslug	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Philomycus sellatus	Alabama Mantleslug	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Philomycus sellatus	Alabama Mantleslug	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Philomycus virginicus	Virginia Mantleslug	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Philomycus virginicus	Virginia Mantleslug	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Philomycus virginicus	Virginia Mantleslug	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Philomycus virginicus	Virginia Mantleslug	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Philomycus virginicus	Virginia Mantleslug	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Philomycus virginicus	Virginia Mantleslug	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Philomycus virginicus	Virginia Mantleslug	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Philomycus virginicus	Virginia Mantleslug	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Pilsbryna aurea	Ornate Bud	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Pilsbryna aurea	Ornate Bud	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Pilsbryna aurea	Ornate Bud	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Pilsbryna aurea	Ornate Bud	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Pilsbryna aurea	Ornate Bud	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Pilsbryna aurea	Ornate Bud	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Pilsbryna castanea	Prominent Bud	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Pilsbryna castanea	Prominent Bud	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Pilsbryna castanea	Prominent Bud	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Pilsbryna castanea	Prominent Bud	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Pilsbryna castanea	Prominent Bud	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Pilsbryna castanea	Prominent Bud	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Pilsbryna castanea	Prominent Bud	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Pilsbryna nodopalma	Oar Tooth Bud	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Gastropod	Pilsbryna nodopalma	Oar Tooth Bud	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Gastropod	Pilsbryna nodopalma	Oar Tooth Bud	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Gastropod	Pilsbryna nodopalma	Oar Tooth Bud	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Gastropod	Pilsbryna nodopalma	Oar Tooth Bud	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Gastropod	Pilsbryna nodopalma	Oar Tooth Bud	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Gastropod	Pilsbryna nodopalma	Oar Tooth Bud	Southern Appalachian Spray Cliff	Cliff/Talus	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Gastropod	Pilsbryna quadrilamellata	Four Blade Bud	Pond	Forested Depression/Wet Flatwoods	Marginal
Gastropod	Pilsbryna quadrilamellata	Four Blade Bud	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Gastropod	Pilsbryna quadrilamellata	Four Blade Bud	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Gastropod	Pilsbryna quadrilamellata	Four Blade Bud	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Gastropod	Pilsbryna quadrilamellata	Four Blade Bud	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Gastropod	Pilsbryna vanattai	Honey Bud	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Pilsbryna vanattai	Honey Bud	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Pilsbryna vanattai	Honey Bud	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Marginal
Gastropod	Pilsbryna vanattai	Honey Bud	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Pilsbryna vanattai	Honey Bud	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Pilsbryna vanattai	Honey Bud	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Pilsbryna vanattai	Honey Bud	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Pseudohyalina exigua	Ribbed Striate Snail	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Gastropod	Pseudohyalina exigua	Ribbed Striate Snail	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Pseudohyalina exigua	Ribbed Striate Snail	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Pseudohyalina exigua	Ribbed Striate Snail	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Pseudohyalina exigua	Ribbed Striate Snail	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Pseudohyalina exigua	Ribbed Striate Snail	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Stenotrema altispira	Highland Slitmouth	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Stenotrema altispira	Highland Slitmouth	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Stenotrema altispira	Highland Slitmouth	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Stenotrema altispira	Highland Slitmouth	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Stenotrema altispira	Highland Slitmouth	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Stenotrema altispira	Highland Slitmouth	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Gastropod	Stenotrema altispira	Highland Slitmouth	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Stenotrema calvescens	Chattanooga Slitmouth	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Marginal
Gastropod	Stenotrema calvescens	Chattanooga Slitmouth	Old Field / Successional	Old Field/Successional	Marginal
Gastropod	Stenotrema calvescens	Chattanooga Slitmouth	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Gastropod	Stenotrema calvescens	Chattanooga Slitmouth	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Stenotrema calvescens	Chattanooga Slitmouth	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Stenotrema calvescens	Chattanooga Slitmouth	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Stenotrema calvescens	Chattanooga Slitmouth	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Stenotrema calvescens	Chattanooga Slitmouth	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Stenotrema calvescens	Chattanooga Slitmouth	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Gastropod	Stenotrema calvescens	Chattanooga Slitmouth	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Gastropod	Stenotrema calvescens	Chattanooga Slitmouth	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Stenotrema cohuttense	Cohutta Slitmouth	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Stenotrema cohuttense	Cohutta Slitmouth	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Stenotrema cohuttense	Cohutta Slitmouth	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Stenotrema cohuttense	Cohutta Slitmouth	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Stenotrema cohuttense	Cohutta Slitmouth	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Stenotrema cohuttense	Cohutta Slitmouth	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Stenotrema depilatum	Great Smoky Slitmouth	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Stenotrema depilatum	Great Smoky Slitmouth	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Stenotrema depilatum	Great Smoky Slitmouth	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Stenotrema depilatum	Great Smoky Slitmouth	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Stenotrema depilatum	Great Smoky Slitmouth	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Stenotrema depilatum	Great Smoky Slitmouth	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Gastropod	Stenotrema depilatum	Great Smoky Slitmouth	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Stenotrema edgarianum	Sequatchie Slitmouth	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Stenotrema edgarianum	Sequatchie Slitmouth	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Stenotrema edgarianum	Sequatchie Slitmouth	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Stenotrema edgarianum	Sequatchie Slitmouth	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Stenotrema edgarianum	Sequatchie Slitmouth	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Stenotrema edgarianum	Sequatchie Slitmouth	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Stenotrema edgarianum	Sequatchie Slitmouth	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Stenotrema waldense	Doaks Creek Slitmouth	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Gastropod	Stenotrema waldense	Doaks Creek Slitmouth	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Gastropod	Stenotrema waldense	Doaks Creek Slitmouth	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Marginal
Gastropod	Stenotrema waldense	Doaks Creek Slitmouth	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Stenotrema waldense	Doaks Creek Slitmouth	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Stenotrema waldense	Doaks Creek Slitmouth	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Gastropod	Striatura milium	Fine-ribbed Striate Snail	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Marginal
Gastropod	Striatura milium	Fine-ribbed Striate Snail	Southern Appalachian Grass and Shrub Bald	Bald	Marginal
Gastropod	Striatura milium	Fine-ribbed Striate Snail	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal
Gastropod	Striatura milium	Fine-ribbed Striate Snail	Southern Appalachian Seepage Wetland	Open Seep/Fen	Marginal
Gastropod	Striatura milium	Fine-ribbed Striate Snail	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Gastropod	Striatura milium	Fine-ribbed Striate Snail	Southern Appalachian Spray Cliff	Cliff/Talus	Marginal
Gastropod	Striatura milium	Fine-ribbed Striate Snail	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Striatura milium	Fine-ribbed Striate Snail	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Striatura milium	Fine-ribbed Striate Snail	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Striatura milium	Fine-ribbed Striate Snail	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Striatura milium	Fine-ribbed Striate Snail	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Striatura milium	Fine-ribbed Striate Snail	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Striatura milium	Fine-ribbed Striate Snail	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Striatura milium	Fine-ribbed Striate Snail	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Striatura milium	Fine-ribbed Striate Snail	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Striatura milium	Fine-ribbed Striate Snail	Southern Interior Sinkhole Wall	Karst Outcrop	Suitable
Gastropod	Triodopsis anteridon	Carter Threetooth	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Triodopsis anteridon	Carter Threetooth	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Triodopsis anteridon	Carter Threetooth	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Triodopsis anteridon	Carter Threetooth	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Triodopsis anteridon	Carter Threetooth	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Triodopsis anteridon	Carter Threetooth	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Triodopsis claibornensis	Clairborne Threetooth	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Triodopsis claibornensis	Clairborne Threetooth	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Triodopsis claibornensis	Clairborne Threetooth	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Triodopsis claibornensis	Clairborne Threetooth	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Triodopsis claibornensis	Clairborne Threetooth	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Triodopsis claibornensis	Clairborne Threetooth	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Triodopsis claibornensis	Clairborne Threetooth	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Triodopsis claibornensis	Clairborne Threetooth	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Vallonia parvula	Trumpet Vallonia Snail	Appalachian Shale Barrens	Upland Mixed Forest	Marginal
Gastropod	Vallonia parvula	Trumpet Vallonia Snail	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Marginal
Gastropod	Vallonia parvula	Trumpet Vallonia Snail	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Marginal
Gastropod	Vallonia parvula	Trumpet Vallonia Snail	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Marginal
Gastropod	Vallonia parvula	Trumpet Vallonia Snail	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Gastropod	Vallonia parvula	Trumpet Vallonia Snail	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Gastropod	Vallonia parvula	Trumpet Vallonia Snail	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Marginal
Gastropod	Vallonia parvula	Trumpet Vallonia Snail	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Marginal
Gastropod	Vallonia parvula	Trumpet Vallonia Snail	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Marginal
Gastropod	Vallonia parvula	Trumpet Vallonia Snail	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Marginal
Gastropod	Vallonia parvula	Trumpet Vallonia Snail	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Gastropod	Vallonia parvula	Trumpet Vallonia Snail	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Gastropod	Vallonia parvula	Trumpet Vallonia Snail	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Marginal
Gastropod	Vallonia parvula	Trumpet Vallonia Snail	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Marginal
Gastropod	Vallonia parvula	Trumpet Vallonia Snail	Southern Appalachian Grass and Shrub Bald	Bald	Marginal
Gastropod	Vallonia parvula	Trumpet Vallonia Snail	Old Field / Successional	Old Field/Successional	Marginal
Gastropod	Vallonia parvula	Trumpet Vallonia Snail	Pasture	Pasture	Marginal
Gastropod	Vallonia parvula	Trumpet Vallonia Snail	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Gastropod	Ventridens coelaxis	Bidentate Dome	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Ventridens coelaxis	Bidentate Dome	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Ventridens coelaxis	Bidentate Dome	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Ventridens coelaxis	Bidentate Dome	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Ventridens coelaxis	Bidentate Dome	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Ventridens coelaxis	Bidentate Dome	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Ventridens coelaxis	Bidentate Dome	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Ventridens coelaxis	Bidentate Dome	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Ventridens coelaxis	Bidentate Dome	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Gastropod	Ventridens coelaxis	Bidentate Dome	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Ventridens coelaxis	Bidentate Dome	Southern Interior Sinkhole Wall	Karst Outcrop	Suitable
Gastropod	Ventridens decussatus	Crossed Dome	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Ventridens decussatus	Crossed Dome	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Ventridens decussatus	Crossed Dome	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Ventridens decussatus	Crossed Dome	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Ventridens decussatus	Crossed Dome	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Ventridens decussatus	Crossed Dome	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Gastropod	Ventridens decussatus	Crossed Dome	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Ventridens eutropis	Carinate Dome	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Ventridens eutropis	Carinate Dome	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Ventridens eutropis	Carinate Dome	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Ventridens eutropis	Carinate Dome	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Ventridens eutropis	Carinate Dome	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Ventridens eutropis	Carinate Dome	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Ventridens eutropis	Carinate Dome	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Ventridens eutropis	Carinate Dome	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Ventridens percallosus	Tennessee Dome	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Ventridens percallosus	Tennessee Dome	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Ventridens percallosus	Tennessee Dome	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Ventridens percallosus	Tennessee Dome	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Ventridens percallosus	Tennessee Dome	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Ventridens percallosus	Tennessee Dome	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Ventridens percallosus	Tennessee Dome	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Ventridens percallosus	Tennessee Dome	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Ventridens percallosus	Tennessee Dome	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Suitable
Gastropod	Vertigo clappi	Cupped Vertigo Snail	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Gastropod	Vertigo clappi	Cupped Vertigo Snail	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Gastropod	Vertigo clappi	Cupped Vertigo Snail	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Vertigo clappi	Cupped Vertigo Snail	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Vertigo clappi	Cupped Vertigo Snail	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Vertigo clappi	Cupped Vertigo Snail	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Vertigo parvula	Smallmouth Vertigo	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Vertigo parvula	Smallmouth Vertigo	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Vertigo parvula	Smallmouth Vertigo	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Gastropod	Vertigo parvula	Smallmouth Vertigo	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Gastropod	Vertigo rugosula	Striate Vertigo	Appalachian Shale Barrens	Upland Mixed Forest	Marginal
Gastropod	Vertigo rugosula	Striate Vertigo	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Marginal
Gastropod	Vertigo rugosula	Striate Vertigo	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Gastropod	Vertigo rugosula	Striate Vertigo	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Gastropod	Vertigo rugosula	Striate Vertigo	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Gastropod	Vertigo rugosula	Striate Vertigo	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Gastropod	Vertigo rugosula	Striate Vertigo	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Suitable
Gastropod	Vertigo rugosula	Striate Vertigo	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Gastropod	Vertigo rugosula	Striate Vertigo	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Suitable
Gastropod	Vertigo rugosula	Striate Vertigo	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Suitable
Gastropod	Vertigo rugosula	Striate Vertigo	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Gastropod	Vertigo rugosula	Striate Vertigo	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Gastropod	Vertigo rugosula	Striate Vertigo	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Gastropod	Vertigo rugosula	Striate Vertigo	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Gastropod	Vertigo rugosula	Striate Vertigo	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Gastropod	Vertigo rugosula	Striate Vertigo	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Gastropod	Vertigo rugosula	Striate Vertigo	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Gastropod	Vertigo rugosula	Striate Vertigo	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Gastropod	Vertigo rugosula	Striate Vertigo	Old Field / Successional	Old Field/Successional	Suitable
Gastropod	Vertigo rugosula	Striate Vertigo	Pasture	Pasture	Suitable
Gastropod	Vertigo teskeyae	Swamp Vertigo	Pond	Forested Depression/Wet Flatwoods	Suitable
Gastropod	Vertigo teskeyae	Swamp Vertigo	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Gastropod	Vertigo teskeyae	Swamp Vertigo	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Gastropod	Vertigo teskeyae	Swamp Vertigo	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Gastropod	Vertigo teskeyae	Swamp Vertigo	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Gastropod	Vertigo teskeyae	Swamp Vertigo	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Gastropod	Webbhelix multilineata	Striped Whitelip	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Gastropod	Webbhelix multilineata	Striped Whitelip	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Gastropod	Webbhelix multilineata	Striped Whitelip	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Gastropod	Xolotrema obstrictum	Sharp Wedge	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Marginal
Gastropod	Xolotrema obstrictum	Sharp Wedge	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Marginal
Gastropod	Xolotrema obstrictum	Sharp Wedge	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Gastropod	Xolotrema obstrictum	Sharp Wedge	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Xolotrema obstrictum	Sharp Wedge	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Xolotrema obstrictum	Sharp Wedge	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Xolotrema obstrictum	Sharp Wedge	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Xolotrema obstrictum	Sharp Wedge	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Gastropod	Zonitoides lateumbilicatus	Striate Gloss	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Gastropod	Zonitoides lateumbilicatus	Striate Gloss	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Gastropod	Zonitoides lateumbilicatus	Striate Gloss	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Gastropod	Zonitoides lateumbilicatus	Striate Gloss	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Gastropod	Zonitoides lateumbilicatus	Striate Gloss	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Gastropod	Zonitoides lateumbilicatus	Striate Gloss	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Gastropod	Zonitoides lateumbilicatus	Striate Gloss	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Insect	Amblyscirtes linda	Linda's Roadside-Skipper	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Insect	Amblyscirtes linda	Linda's Roadside-Skipper	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Insect	Amblyscirtes linda	Linda's Roadside-Skipper	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Marginal
Insect	Amblyscirtes linda	Linda's Roadside-Skipper	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Insect	Amblyscirtes linda	Linda's Roadside-Skipper	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Insect	Amblyscirtes linda	Linda's Roadside-Skipper	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Insect	Amblyscirtes linda	Linda's Roadside-Skipper	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Insect	Amblyscirtes linda	Linda's Roadside-Skipper	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Insect	Amblyscirtes linda	Linda's Roadside-Skipper	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Insect	Amblyscirtes linda	Linda's Roadside-Skipper	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Insect	Amblyscirtes linda	Linda's Roadside-Skipper	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Insect	Amblyscirtes linda	Linda's Roadside-Skipper	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Insect	Amblyscirtes linda	Linda's Roadside-Skipper	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Insect	Amblyscirtes linda	Linda's Roadside-Skipper	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Insect	Argynnis diana	Diana Fritillary	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Insect	Argynnis diana	Diana Fritillary	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Insect	Argynnis diana	Diana Fritillary	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Insect	Argynnis diana	Diana Fritillary	Appalachian Shale Barrens	Upland Mixed Forest	Marginal
Insect	Argynnis diana	Diana Fritillary	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Marginal
Insect	Argynnis diana	Diana Fritillary	Cumberland Riverscour	Forested Bottomland Floodplain	Marginal
Insect	Argynnis diana	Diana Fritillary	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Insect	Argynnis diana	Diana Fritillary	Pasture	Pasture	Marginal
Insect	Argynnis diana	Diana Fritillary	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Insect	Argynnis diana	Diana Fritillary	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Insect	Argynnis diana	Diana Fritillary	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Insect	Argynnis diana	Diana Fritillary	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Insect	Argynnis diana	Diana Fritillary	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Insect	Argynnis diana	Diana Fritillary	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Insect	Argynnis diana	Diana Fritillary	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Suitable
Insect	Argynnis diana	Diana Fritillary	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Insect	Argynnis diana	Diana Fritillary	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Insect	Argynnis diana	Diana Fritillary	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Insect	Argynnis diana	Diana Fritillary	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Insect	Argynnis diana	Diana Fritillary	Old Field / Successional	Old Field/Successional	Suitable
Insect	Argynnis diana	Diana Fritillary	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Insect	Bombus affinis	Rusty-patched Bumble Bee	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Insect	Bombus affinis	Rusty-patched Bumble Bee	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Marginal
Insect	Bombus affinis	Rusty-patched Bumble Bee	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Marginal
Insect	Bombus affinis	Rusty-patched Bumble Bee	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal
Insect	Bombus affinis	Rusty-patched Bumble Bee	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Insect	Bombus affinis	Rusty-patched Bumble Bee	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Marginal
Insect	Bombus affinis	Rusty-patched Bumble Bee	Southern Appalachian Spray Cliff	Cliff/Talus	Marginal
Insect	Bombus affinis	Rusty-patched Bumble Bee	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Insect	Bombus affinis	Rusty-patched Bumble Bee	Appalachian Shale Barrens	Upland Mixed Forest	Preferred
Insect	Bombus affinis	Rusty-patched Bumble Bee	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Preferred
Insect	Bombus affinis	Rusty-patched Bumble Bee	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Insect	Bombus affinis	Rusty-patched Bumble Bee	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Preferred
Insect	Bombus affinis	Rusty-patched Bumble Bee	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Preferred
Insect	Bombus affinis	Rusty-patched Bumble Bee	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Preferred
Insect	Bombus affinis	Rusty-patched Bumble Bee	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Preferred
Insect	Bombus affinis	Rusty-patched Bumble Bee	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Preferred
Insect	Bombus affinis	Rusty-patched Bumble Bee	Southern Appalachian Grass and Shrub Bald	Bald	Preferred
Insect	Bombus affinis	Rusty-patched Bumble Bee	Old Field / Successional	Old Field/Successional	Preferred
Insect	Bombus affinis	Rusty-patched Bumble Bee	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Insect	Bombus affinis	Rusty-patched Bumble Bee	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Insect	Bombus affinis	Rusty-patched Bumble Bee	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Insect	Bombus affinis	Rusty-patched Bumble Bee	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Insect	Bombus affinis	Rusty-patched Bumble Bee	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Insect	Bombus affinis	Rusty-patched Bumble Bee	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Insect	Bombus affinis	Rusty-patched Bumble Bee	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Insect	Bombus affinis	Rusty-patched Bumble Bee	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Insect	Bombus affinis	Rusty-patched Bumble Bee	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Insect	Bombus affinis	Rusty-patched Bumble Bee	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Insect	Bombus affinis	Rusty-patched Bumble Bee	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Insect	Bombus affinis	Rusty-patched Bumble Bee	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Insect	Bombus affinis	Rusty-patched Bumble Bee	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Insect	Bombus affinis	Rusty-patched Bumble Bee	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Insect	Bombus affinis	Rusty-patched Bumble Bee	Pasture	Pasture	Suitable
Insect	Bombus affinis	Rusty-patched Bumble Bee	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Pasture	Pasture	Marginal
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Appalachian Shale Barrens	Upland Mixed Forest	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Insect	Bombus variabilis	Variable Cuckoo Bumble Bee	Old Field / Successional	Old Field/Successional	Suitable
Insect	Callophrys irus	Frosted Elfin	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Insect	Callophrys irus	Frosted Elfin	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Preferred
Insect	Callophrys irus	Frosted Elfin	Appalachian Shale Barrens	Upland Mixed Forest	Suitable
Insect	Callophrys irus	Frosted Elfin	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Insect	Callophrys irus	Frosted Elfin	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Insect	Callophrys irus	Frosted Elfin	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Suitable
Insect	Callophrys irus	Frosted Elfin	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Insect	Callophrys irus	Frosted Elfin	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Insect	Callophrys irus	Frosted Elfin	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Insect	Callophrys irus	Frosted Elfin	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Insect	Callophrys irus	Frosted Elfin	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Insect	Callophrys irus	Frosted Elfin	Old Field / Successional	Old Field/Successional	Suitable
Insect	Cicindela ancocisconensis	Appalachian Tiger Beetle	Cumberland Riverscour	Forested Bottomland Floodplain	Preferred
Insect	Cicindela ancocisconensis	Appalachian Tiger Beetle	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Insect	Cicindela ancocisconensis	Appalachian Tiger Beetle	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Insect	Nicrophorus americanus	American Burying Beetle	Forest Plantation	Forest Plantation	Marginal
Insect	Nicrophorus americanus	American Burying Beetle	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Insect	Nicrophorus americanus	American Burying Beetle	Cropland	Cropland	Marginal
Insect	Nicrophorus americanus	American Burying Beetle	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Insect	Nicrophorus americanus	American Burying Beetle	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Insect	Nicrophorus americanus	American Burying Beetle	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Insect	Nicrophorus americanus	American Burying Beetle	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Insect	Nicrophorus americanus	American Burying Beetle	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Insect	Nicrophorus americanus	American Burying Beetle	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Insect	Nicrophorus americanus	American Burying Beetle	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Insect	Nicrophorus americanus	American Burying Beetle	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Insect	Nicrophorus americanus	American Burying Beetle	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Insect	Nicrophorus americanus	American Burying Beetle	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Insect	Nicrophorus americanus	American Burying Beetle	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Insect	Nicrophorus americanus	American Burying Beetle	Old Field / Successional	Old Field/Successional	Suitable
Insect	Nicrophorus americanus	American Burying Beetle	Pasture	Pasture	Suitable
Insect	Semiothisa fraserata	Fraser Fir Geometrid Moth	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Insect	Semiothisa fraserata	Fraser Fir Geometrid Moth	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Insect	Semiothisa fraserata	Fraser Fir Geometrid Moth	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Insect	Semiothisa fraserata	Fraser Fir Geometrid Moth	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Insect	Semiothisa fraserata	Fraser Fir Geometrid Moth	Forest Plantation	Forest Plantation	Marginal
Insect	Semiothisa fraserata	Fraser Fir Geometrid Moth	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Insect	Semiothisa fraserata	Fraser Fir Geometrid Moth	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Insect	Semiothisa fraserata	Fraser Fir Geometrid Moth	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Mammal	Clethrionomys gapperi	Southern Red-backed Vole	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Mammal	Clethrionomys gapperi	Southern Red-backed Vole	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Marginal
Mammal	Clethrionomys gapperi	Southern Red-backed Vole	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Marginal
Mammal	Clethrionomys gapperi	Southern Red-backed Vole	Southern Appalachian Grass and Shrub Bald	Bald	Marginal
Mammal	Clethrionomys gapperi	Southern Red-backed Vole	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal
Mammal	Clethrionomys gapperi	Southern Red-backed Vole	Southern Appalachian Seepage Wetland	Open Seep/Fen	Marginal
Mammal	Clethrionomys gapperi	Southern Red-backed Vole	Southern Interior Calcareous Cliff	Cliff/Talus	Marginal
Mammal	Clethrionomys gapperi	Southern Red-backed Vole	Southern Appalachian Rocky Summit	Mountain Summit	Marginal
Mammal	Clethrionomys gapperi	Southern Red-backed Vole	Southern Interior Sinkhole Wall	Karst Outcrop	Marginal
Mammal	Clethrionomys gapperi	Southern Red-backed Vole	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Preferred
Mammal	Clethrionomys gapperi	Southern Red-backed Vole	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Mammal	Clethrionomys gapperi	Southern Red-backed Vole	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Mammal	Clethrionomys gapperi	Southern Red-backed Vole	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Mammal	Clethrionomys gapperi	Southern Red-backed Vole	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Mammal	Clethrionomys gapperi	Southern Red-backed Vole	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Clethrionomys gapperi	Southern Red-backed Vole	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Mammal	Clethrionomys gapperi	Southern Red-backed Vole	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Mammal	Clethrionomys gapperi	Southern Red-backed Vole	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Mammal	Clethrionomys gapperi	Southern Red-backed Vole	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Mammal	Clethrionomys gapperi	Southern Red-backed Vole	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Mammal	Condylura cristata	Star-nosed Mole	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Mammal	Condylura cristata	Star-nosed Mole	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Mammal	Condylura cristata	Star-nosed Mole	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Mammal	Condylura cristata	Star-nosed Mole	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Marginal
Mammal	Cryptotis parva	North American Least Shrew	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Marginal
Mammal	Cryptotis parva	North American Least Shrew	Appalachian Shale Barrens	Upland Mixed Forest	Marginal
Mammal	Cryptotis parva	North American Least Shrew	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Marginal
Mammal	Cryptotis parva	North American Least Shrew	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Marginal
Mammal	Cryptotis parva	North American Least Shrew	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Marginal
Mammal	Cryptotis parva	North American Least Shrew	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Marginal
Mammal	Cryptotis parva	North American Least Shrew	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Marginal
Mammal	Cryptotis parva	North American Least Shrew	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Marginal
Mammal	Cryptotis parva	North American Least Shrew	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Mammal	Cryptotis parva	North American Least Shrew	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Mammal	Cryptotis parva	North American Least Shrew	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Marginal
Mammal	Cryptotis parva	North American Least Shrew	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal
Mammal	Cryptotis parva	North American Least Shrew	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Marginal
Mammal	Cryptotis parva	North American Least Shrew	Interior Low Plateau Seepage Fen	Open Seep/Fen	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Mammal	Cryptotis parva	North American Least Shrew	Central Interior Acidic Cliff and Talus	Cliff/Talus	Marginal
Mammal	Cryptotis parva	North American Least Shrew	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Marginal
Mammal	Cryptotis parva	North American Least Shrew	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Marginal
Mammal	Cryptotis parva	North American Least Shrew	Southern Appalachian Spray Cliff	Cliff/Talus	Marginal
Mammal	Cryptotis parva	North American Least Shrew	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Marginal
Mammal	Cryptotis parva	North American Least Shrew	Southern Interior Calcareous Cliff	Cliff/Talus	Marginal
Mammal	Cryptotis parva	North American Least Shrew	Southern Appalachian Rocky Summit	Mountain Summit	Marginal
Mammal	Cryptotis parva	North American Least Shrew	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Mammal	Cryptotis parva	North American Least Shrew	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Mammal	Cryptotis parva	North American Least Shrew	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Mammal	Cryptotis parva	North American Least Shrew	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Mammal	Cryptotis parva	North American Least Shrew	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Mammal	Cryptotis parva	North American Least Shrew	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Mammal	Cryptotis parva	North American Least Shrew	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Mammal	Cryptotis parva	North American Least Shrew	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Suitable
Mammal	Cryptotis parva	North American Least Shrew	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Mammal	Cryptotis parva	North American Least Shrew	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Mammal	Cryptotis parva	North American Least Shrew	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Mammal	Cryptotis parva	North American Least Shrew	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Mammal	Cryptotis parva	North American Least Shrew	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Mammal	Cryptotis parva	North American Least Shrew	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Old Field / Successional	Old Field/Successional	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Mammal	Cryptotis parva	North American Least Shrew	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Suitable
Mammal	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Mammal	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Mammal	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Mammal	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable

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Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Mammal	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Mammal	Glaucomys sabrinus coloratus	Carolina Northern Flying Squirrel	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Mammal	Microtus chrotorrhinus carolinensis	Southern Rock Vole	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Mammal	Microtus chrotorrhinus carolinensis	Southern Rock Vole	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Mammal	Microtus chrotorrhinus carolinensis	Southern Rock Vole	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Mammal	Microtus chrotorrhinus carolinensis	Southern Rock Vole	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Mammal	Microtus chrotorrhinus carolinensis	Southern Rock Vole	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Mammal	Microtus chrotorrhinus carolinensis	Southern Rock Vole	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Mammal	Microtus chrotorrhinus carolinensis	Southern Rock Vole	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Microtus chrotorrhinus carolinensis	Southern Rock Vole	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Mammal	Microtus chrotorrhinus carolinensis	Southern Rock Vole	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Mammal	Mustela nivalis	Least Weasel	Cropland	Cropland	Marginal
Mammal	Mustela nivalis	Least Weasel	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Mammal	Mustela nivalis	Least Weasel	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Mammal	Mustela nivalis	Least Weasel	Appalachian Shale Barrens	Upland Mixed Forest	Suitable
Mammal	Mustela nivalis	Least Weasel	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Mammal	Mustela nivalis	Least Weasel	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Suitable
Mammal	Mustela nivalis	Least Weasel	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Mammal	Mustela nivalis	Least Weasel	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Suitable
Mammal	Mustela nivalis	Least Weasel	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Mammal	Mustela nivalis	Least Weasel	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Mammal	Mustela nivalis	Least Weasel	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Mammal	Mustela nivalis	Least Weasel	Old Field / Successional	Old Field/Successional	Suitable
Mammal	Mustela nivalis	Least Weasel	Pasture	Pasture	Suitable
Mammal	Napaeozapus insignis	Woodland Jumping Mouse	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Mammal	Napaeozapus insignis	Woodland Jumping Mouse	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Mammal	Napaeozapus insignis	Woodland Jumping Mouse	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Mammal	Napaeozapus insignis	Woodland Jumping Mouse	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Mammal	Napaeozapus insignis	Woodland Jumping Mouse	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Mammal	Napaeozapus insignis	Woodland Jumping Mouse	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Mammal	Napaeozapus insignis	Woodland Jumping Mouse	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Napaeozapus insignis	Woodland Jumping Mouse	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Mammal	Napaeozapus insignis	Woodland Jumping Mouse	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Pond	Forested Depression/Wet Flatwoods	Marginal
Mammal	Neogale frenata	Long-tailed Weasel	Forest Plantation	Forest Plantation	Marginal
Mammal	Neogale frenata	Long-tailed Weasel	Pasture	Pasture	Marginal
Mammal	Neogale frenata	Long-tailed Weasel	Cropland	Cropland	Marginal
Mammal	Neogale frenata	Long-tailed Weasel	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Mammal	Neogale frenata	Long-tailed Weasel	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable

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Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Mammal	Neogale frenata	Long-tailed Weasel	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Appalachian Shale Barrens	Upland Mixed Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Cumberland Riverscour	Forested Bottomland Floodplain	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Central Interior Acidic Cliff and Talus	Cliff/Talus	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Southern Appalachian Spray Cliff	Cliff/Talus	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Southern Appalachian Rocky Summit	Mountain Summit	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Old Field / Successional	Old Field/Successional	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Mammal	Neogale frenata	Long-tailed Weasel	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Mammal	Neogale frenata	Long-tailed Weasel	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Mammal	Neotoma floridana haematoreia	Southern Appalachian Woodrat	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Mammal	Neotoma floridana haematoreia	Southern Appalachian Woodrat	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Mammal	Neotoma floridana haematoreia	Southern Appalachian Woodrat	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Neotoma floridana haematoreia	Southern Appalachian Woodrat	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Mammal	Neotoma floridana haematoreia	Southern Appalachian Woodrat	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Mammal	Neotoma floridana haematoreia	Southern Appalachian Woodrat	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Mammal	Neotoma floridana haematoreia	Southern Appalachian Woodrat	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Mammal	Neotoma floridana haematoreia	Southern Appalachian Woodrat	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Mammal	Neotoma floridana haematoreia	Southern Appalachian Woodrat	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Mammal	Neotoma floridana haematoreia	Southern Appalachian Woodrat	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Mammal	Neotoma floridana haematoreia	Southern Appalachian Woodrat	Southern Interior Sinkhole Wall	Karst Outcrop	Suitable
Mammal	Neotoma floridana illinoensis	Eastern Woodrat	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Mammal	Neotoma floridana illinoensis	Eastern Woodrat	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Mammal	Neotoma floridana illinoensis	Eastern Woodrat	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Marginal
Mammal	Neotoma floridana illinoensis	Eastern Woodrat	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Preferred
Mammal	Neotoma floridana illinoensis	Eastern Woodrat	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Mammal	Neotoma floridana illinoensis	Eastern Woodrat	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Mammal	Neotoma floridana illinoensis	Eastern Woodrat	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Mammal	Neotoma floridana illinoensis	Eastern Woodrat	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Mammal	Neotoma floridana illinoensis	Eastern Woodrat	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Mammal	Neotoma floridana illinoensis	Eastern Woodrat	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Mammal	Neotoma floridana illinoensis	Eastern Woodrat	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Mammal	Neotoma floridana illinoensis	Eastern Woodrat	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Mammal	Neotoma floridana illinoensis	Eastern Woodrat	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Mammal	Neotoma floridana illinoensis	Eastern Woodrat	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Mammal	Neotoma floridana illinoensis	Eastern Woodrat	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Mammal	Neotoma floridana illinoensis	Eastern Woodrat	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Mammal	Neotoma magister	Allegheny Woodrat	Southern Interior Calcareous Cliff	Cliff/Talus	Marginal
Mammal	Neotoma magister	Allegheny Woodrat	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Mammal	Neotoma magister	Allegheny Woodrat	Central Interior Acidic Cliff and Talus	Cliff/Talus	Preferred
Mammal	Neotoma magister	Allegheny Woodrat	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Mammal	Neotoma magister	Allegheny Woodrat	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Preferred
Mammal	Neotoma magister	Allegheny Woodrat	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Neotoma magister	Allegheny Woodrat	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Mammal	Neotoma magister	Allegheny Woodrat	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Mammal	Neotoma magister	Allegheny Woodrat	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Mammal	Neotoma magister	Allegheny Woodrat	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Mammal	Neotoma magister	Allegheny Woodrat	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Neotoma magister	Allegheny Woodrat	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Mammal	Neotoma magister	Allegheny Woodrat	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Mammal	Neotoma magister	Allegheny Woodrat	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Mammal	Neotoma magister	Allegheny Woodrat	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Mammal	Neotoma magister	Allegheny Woodrat	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Mammal	Neotoma magister	Allegheny Woodrat	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Mammal	Neotoma magister	Allegheny Woodrat	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Mammal	Neotoma magister	Allegheny Woodrat	Southern Interior Sinkhole Wall	Karst Outcrop	Suitable
Mammal	Ochrotomys nuttalli	Golden Mouse	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Mammal	Ochrotomys nuttalli	Golden Mouse	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Mammal	Ochrotomys nuttalli	Golden Mouse	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Mammal	Ochrotomys nuttalli	Golden Mouse	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Mammal	Ochrotomys nuttalli	Golden Mouse	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Mammal	Ochrotomys nuttalli	Golden Mouse	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Mammal	Ochrotomys nuttalli	Golden Mouse	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Mammal	Ochrotomys nuttalli	Golden Mouse	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Marginal
Mammal	Ochrotomys nuttalli	Golden Mouse	Forest Plantation	Forest Plantation	Marginal
Mammal	Ochrotomys nuttalli	Golden Mouse	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Mammal	Ochrotomys nuttalli	Golden Mouse	Pasture	Pasture	Marginal
Mammal	Ochrotomys nuttalli	Golden Mouse	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Mammal	Ochrotomys nuttalli	Golden Mouse	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Mammal	Ochrotomys nuttalli	Golden Mouse	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Preferred
Mammal	Ochrotomys nuttalli	Golden Mouse	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Preferred
Mammal	Ochrotomys nuttalli	Golden Mouse	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Mammal	Ochrotomys nuttalli	Golden Mouse	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Mammal	Ochrotomys nuttalli	Golden Mouse	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Mammal	Ochrotomys nuttalli	Golden Mouse	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Preferred
Mammal	Ochrotomys nuttalli	Golden Mouse	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Mammal	Ochrotomys nuttalli	Golden Mouse	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Mammal	Ochrotomys nuttalli	Golden Mouse	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Mammal	Ochrotomys nuttalli	Golden Mouse	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Mammal	Ochrotomys nuttalli	Golden Mouse	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Mammal	Ochrotomys nuttalli	Golden Mouse	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Mammal	Ochrotomys nuttalli	Golden Mouse	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Ochrotomys nuttalli	Golden Mouse	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Mammal	Ochrotomys nuttalli	Golden Mouse	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Mammal	Ochrotomys nuttalli	Golden Mouse	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Mammal	Ochrotomys nuttalli	Golden Mouse	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Mammal	Ochrotomys nuttalli	Golden Mouse	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Mammal	Ochrotomys nuttalli	Golden Mouse	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Mammal	Ochrotomys nuttalli	Golden Mouse	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Mammal	Ochrotomys nuttalli	Golden Mouse	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Mammal	Ochrotomys nuttalli	Golden Mouse	Pond	Forested Depression/Wet Flatwoods	Suitable
Mammal	Ochrotomys nuttalli	Golden Mouse	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Mammal	Ochrotomys nuttalli	Golden Mouse	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Mammal	Ochrotomys nuttalli	Golden Mouse	Old Field / Successional	Old Field/Successional	Suitable
Mammal	Parascalops breweri	Hairy-tailed Mole	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Mammal	Parascalops breweri	Hairy-tailed Mole	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Mammal	Parascalops breweri	Hairy-tailed Mole	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Mammal	Parascalops breweri	Hairy-tailed Mole	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Mammal	Parascalops breweri	Hairy-tailed Mole	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Marginal
Mammal	Parascalops breweri	Hairy-tailed Mole	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Mammal	Parascalops breweri	Hairy-tailed Mole	Pasture	Pasture	Marginal
Mammal	Parascalops breweri	Hairy-tailed Mole	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Mammal	Parascalops breweri	Hairy-tailed Mole	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Mammal	Parascalops breweri	Hairy-tailed Mole	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Mammal	Parascalops breweri	Hairy-tailed Mole	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Parascalops breweri	Hairy-tailed Mole	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Mammal	Parascalops breweri	Hairy-tailed Mole	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Mammal	Parascalops breweri	Hairy-tailed Mole	Old Field / Successional	Old Field/Successional	Suitable
Mammal	Reithrodontomys humulis	Eastern Harvest Mouse	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Marginal
Mammal	Reithrodontomys humulis	Eastern Harvest Mouse	Appalachian Shale Barrens	Upland Mixed Forest	Marginal
Mammal	Reithrodontomys humulis	Eastern Harvest Mouse	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Marginal
Mammal	Reithrodontomys humulis	Eastern Harvest Mouse	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Marginal
Mammal	Reithrodontomys humulis	Eastern Harvest Mouse	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Marginal
Mammal	Reithrodontomys humulis	Eastern Harvest Mouse	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Mammal	Reithrodontomys humulis	Eastern Harvest Mouse	Pasture	Pasture	Marginal
Mammal	Reithrodontomys humulis	Eastern Harvest Mouse	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Mammal	Reithrodontomys humulis	Eastern Harvest Mouse	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Mammal	Reithrodontomys humulis	Eastern Harvest Mouse	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Mammal	Reithrodontomys humulis	Eastern Harvest Mouse	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Mammal	Reithrodontomys humulis	Eastern Harvest Mouse	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Preferred
Mammal	Reithrodontomys humulis	Eastern Harvest Mouse	Old Field / Successional	Old Field/Successional	Preferred
Mammal	Reithrodontomys humulis	Eastern Harvest Mouse	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Reithrodontomys humulis	Eastern Harvest Mouse	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Reithrodontomys humulis	Eastern Harvest Mouse	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Reithrodontomys humulis	Eastern Harvest Mouse	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Reithrodontomys humulis	Eastern Harvest Mouse	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Mammal	Reithrodontomys humulis	Eastern Harvest Mouse	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Mammal	Reithrodontomys humulis	Eastern Harvest Mouse	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Mammal	Sorex albibarbis	Eastern Water Shrew	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Mammal	Sorex albibarbis	Eastern Water Shrew	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal
Mammal	Sorex albibarbis	Eastern Water Shrew	Southern Appalachian Seepage Wetland	Open Seep/Fen	Marginal
Mammal	Sorex albibarbis	Eastern Water Shrew	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Mammal	Sorex albibarbis	Eastern Water Shrew	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Mammal	Sorex albibarbis	Eastern Water Shrew	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Mammal	Sorex albibarbis	Eastern Water Shrew	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Mammal	Sorex albibarbis	Eastern Water Shrew	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Mammal	Sorex albibarbis	Eastern Water Shrew	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Sorex albibarbis	Eastern Water Shrew	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Mammal	Sorex albibarbis	Eastern Water Shrew	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Mammal	Sorex albibarbis	Eastern Water Shrew	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Mammal	Sorex albibarbis	Eastern Water Shrew	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Mammal	Sorex albibarbis	Eastern Water Shrew	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Mammal	Sorex albibarbis	Eastern Water Shrew	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Mammal	Sorex cinereus	Cinereus Shrew	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Marginal
Mammal	Sorex cinereus	Cinereus Shrew	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Marginal
Mammal	Sorex cinereus	Cinereus Shrew	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Marginal
Mammal	Sorex cinereus	Cinereus Shrew	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Mammal	Sorex cinereus	Cinereus Shrew	Pasture	Pasture	Marginal
Mammal	Sorex cinereus	Cinereus Shrew	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Mammal	Sorex cinereus	Cinereus Shrew	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Preferred
Mammal	Sorex cinereus	Cinereus Shrew	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Mammal	Sorex cinereus	Cinereus Shrew	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Mammal	Sorex cinereus	Cinereus Shrew	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Mammal	Sorex cinereus	Cinereus Shrew	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Sorex cinereus	Cinereus Shrew	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Mammal	Sorex cinereus	Cinereus Shrew	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Mammal	Sorex cinereus	Cinereus Shrew	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Mammal	Sorex cinereus	Cinereus Shrew	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Mammal	Sorex cinereus	Cinereus Shrew	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Mammal	Sorex cinereus	Cinereus Shrew	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Mammal	Sorex cinereus	Cinereus Shrew	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Mammal	Sorex cinereus	Cinereus Shrew	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Mammal	Sorex cinereus	Cinereus Shrew	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Mammal	Sorex cinereus	Cinereus Shrew	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Mammal	Sorex cinereus	Cinereus Shrew	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Mammal	Sorex cinereus	Cinereus Shrew	Pond	Forested Depression/Wet Flatwoods	Suitable
Mammal	Sorex cinereus	Cinereus Shrew	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Mammal	Sorex cinereus	Cinereus Shrew	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Mammal	Sorex cinereus	Cinereus Shrew	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Mammal	Sorex cinereus	Cinereus Shrew	Old Field / Successional	Old Field/Successional	Suitable
Mammal	Sorex cinereus	Cinereus Shrew	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Suitable
Mammal	Sorex dispar	Long-tailed Shrew	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Mammal	Sorex dispar	Long-tailed Shrew	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Mammal	Sorex dispar	Long-tailed Shrew	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Mammal	Sorex dispar	Long-tailed Shrew	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Mammal	Sorex dispar	Long-tailed Shrew	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Mammal	Sorex dispar	Long-tailed Shrew	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Sorex dispar	Long-tailed Shrew	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Mammal	Sorex dispar	Long-tailed Shrew	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Mammal	Sorex dispar	Long-tailed Shrew	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Mammal	Sorex dispar	Long-tailed Shrew	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Mammal	Sorex fumeus	Smoky Shrew	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Mammal	Sorex fumeus	Smoky Shrew	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Mammal	Sorex fumeus	Smoky Shrew	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Preferred
Mammal	Sorex fumeus	Smoky Shrew	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Sorex fumeus	Smoky Shrew	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Mammal	Sorex fumeus	Smoky Shrew	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Mammal	Sorex fumeus	Smoky Shrew	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Mammal	Sorex fumeus	Smoky Shrew	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Sorex fumeus	Smoky Shrew	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Mammal	Sorex fumeus	Smoky Shrew	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Mammal	Sorex fumeus	Smoky Shrew	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Sorex fumeus	Smoky Shrew	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Sorex fumeus	Smoky Shrew	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Sorex fumeus	Smoky Shrew	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Mammal	Sorex fumeus	Smoky Shrew	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Mammal	Sorex fumeus	Smoky Shrew	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Mammal	Sorex fumeus	Smoky Shrew	Pond	Forested Depression/Wet Flatwoods	Suitable
Mammal	Sorex fumeus	Smoky Shrew	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Mammal	Sorex fumeus	Smoky Shrew	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Mammal	Sorex fumeus	Smoky Shrew	Old Field / Successional	Old Field/Successional	Suitable
Mammal	Sorex hoyi	Eastern Pygmy Shrew	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Mammal	Sorex hoyi	Eastern Pygmy Shrew	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Mammal	Sorex hoyi	Eastern Pygmy Shrew	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Mammal	Sorex hoyi	Eastern Pygmy Shrew	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Mammal	Sorex hoyi	Eastern Pygmy Shrew	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Mammal	Sorex hoyi	Eastern Pygmy Shrew	Pasture	Pasture	Marginal
Mammal	Sorex hoyi	Eastern Pygmy Shrew	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Mammal	Sorex hoyi	Eastern Pygmy Shrew	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Mammal	Sorex hoyi	Eastern Pygmy Shrew	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Mammal	Sorex hoyi	Eastern Pygmy Shrew	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Mammal	Sorex hoyi	Eastern Pygmy Shrew	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Sorex hoyi	Eastern Pygmy Shrew	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Mammal	Sorex hoyi	Eastern Pygmy Shrew	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Mammal	Sorex hoyi	Eastern Pygmy Shrew	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Mammal	Sorex hoyi	Eastern Pygmy Shrew	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Mammal	Sorex hoyi	Eastern Pygmy Shrew	Pond	Forested Depression/Wet Flatwoods	Suitable
Mammal	Sorex hoyi	Eastern Pygmy Shrew	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Mammal	Sorex hoyi	Eastern Pygmy Shrew	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Mammal	Sorex hoyi	Eastern Pygmy Shrew	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Mammal	Sorex hoyi	Eastern Pygmy Shrew	Old Field / Successional	Old Field/Successional	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Mammal	Sorex hoyi	Eastern Pygmy Shrew	Old Field / Successional	Old Field/Successional	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Mammal	Sorex longirostris	Southeastern Shrew	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Mammal	Sorex longirostris	Southeastern Shrew	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Mammal	Sorex longirostris	Southeastern Shrew	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Mammal	Sorex longirostris	Southeastern Shrew	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Mammal	Sorex longirostris	Southeastern Shrew	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Marginal
Mammal	Sorex longirostris	Southeastern Shrew	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Marginal
Mammal	Sorex longirostris	Southeastern Shrew	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Mammal	Sorex longirostris	Southeastern Shrew	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Mammal	Sorex longirostris	Southeastern Shrew	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Mammal	Sorex longirostris	Southeastern Shrew	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Marginal
Mammal	Sorex longirostris	Southeastern Shrew	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Mammal	Sorex longirostris	Southeastern Shrew	Pasture	Pasture	Marginal
Mammal	Sorex longirostris	Southeastern Shrew	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Mammal	Sorex longirostris	Southeastern Shrew	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Mammal	Sorex longirostris	Southeastern Shrew	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Mammal	Sorex longirostris	Southeastern Shrew	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Mammal	Sorex longirostris	Southeastern Shrew	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Mammal	Sorex longirostris	Southeastern Shrew	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Mammal	Sorex longirostris	Southeastern Shrew	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Mammal	Sorex longirostris	Southeastern Shrew	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Mammal	Sorex longirostris	Southeastern Shrew	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Mammal	Sorex longirostris	Southeastern Shrew	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	Pond	Forested Depression/Wet Flatwoods	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	Old Field / Successional	Old Field/Successional	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Mammal	Sorex longirostris	Southeastern Shrew	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Mammal	Sorex palustris	American Water Shrew	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Mammal	Sorex palustris	American Water Shrew	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Mammal	Sorex palustris	American Water Shrew	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Mammal	Sorex palustris	American Water Shrew	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Mammal	Sorex palustris	American Water Shrew	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Marginal
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Marginal
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Marginal
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Marginal
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Marginal
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Preferred
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Central Interior Acidic Cliff and Talus	Cliff/Talus	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Old Field / Successional	Old Field/Successional	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Pasture	Pasture	Suitable
Mammal	Spilogale putorius	Alleghanian Spotted Skunk	Cropland	Cropland	Suitable
Mammal	Sylvilagus obscurus	Appalachian Cottontail	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Mammal	Sylvilagus obscurus	Appalachian Cottontail	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Mammal	Sylvilagus obscurus	Appalachian Cottontail	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Mammal	Sylvilagus obscurus	Appalachian Cottontail	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Mammal	Sylvilagus obscurus	Appalachian Cottontail	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Mammal	Sylvilagus obscurus	Appalachian Cottontail	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Mammal	Synaptomys cooperi	Southern Bog Lemming	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Marginal
Mammal	Synaptomys cooperi	Southern Bog Lemming	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Marginal
Mammal	Synaptomys cooperi	Southern Bog Lemming	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Mammal	Synaptomys cooperi	Southern Bog Lemming	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Mammal	Synaptomys cooperi	Southern Bog Lemming	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Mammal	Synaptomys cooperi	Southern Bog Lemming	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Preferred
Mammal	Synaptomys cooperi	Southern Bog Lemming	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Preferred
Mammal	Synaptomys cooperi	Southern Bog Lemming	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Mammal	Synaptomys cooperi	Southern Bog Lemming	Pond	Forested Depression/Wet Flatwoods	Preferred
Mammal	Synaptomys cooperi	Southern Bog Lemming	Interior Low Plateau Seepage Fen	Open Seep/Fen	Preferred
Mammal	Synaptomys cooperi	Southern Bog Lemming	Southern Appalachian Seepage Wetland	Open Seep/Fen	Preferred
Mammal	Synaptomys cooperi	Southern Bog Lemming	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Mammal	Synaptomys cooperi	Southern Bog Lemming	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Mammal	Synaptomys cooperi	Southern Bog Lemming	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Mammal	Synaptomys cooperi	Southern Bog Lemming	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Mammal	Synaptomys cooperi	Southern Bog Lemming	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Mammal	Synaptomys cooperi	Southern Bog Lemming	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Mammal	Synaptomys cooperi	Southern Bog Lemming	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Synaptomys cooperi	Southern Bog Lemming	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Mammal	Synaptomys cooperi	Southern Bog Lemming	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Synaptomys cooperi	Southern Bog Lemming	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Synaptomys cooperi	Southern Bog Lemming	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Synaptomys cooperi	Southern Bog Lemming	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Mammal	Synaptomys cooperi	Southern Bog Lemming	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Mammal	Synaptomys cooperi	Southern Bog Lemming	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Mammal	Synaptomys cooperi	Southern Bog Lemming	Old Field / Successional	Old Field/Successional	Suitable
Mammal	Tamiasciurus hudsonicus	North American Red Squirrel	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Mammal	Tamiasciurus hudsonicus	North American Red Squirrel	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Mammal	Tamiasciurus hudsonicus	North American Red Squirrel	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Mammal	Tamiasciurus hudsonicus	North American Red Squirrel	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Mammal	Tamiasciurus hudsonicus	North American Red Squirrel	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Mammal	Tamiasciurus hudsonicus	North American Red Squirrel	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Mammal	Tamiasciurus hudsonicus	North American Red Squirrel	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Mammal	Zapus hudsonius	Meadow Jumping Mouse	Pasture	Pasture	Marginal
Mammal	Zapus hudsonius	Meadow Jumping Mouse	Cropland	Cropland	Marginal
Mammal	Zapus hudsonius	Meadow Jumping Mouse	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Mammal	Zapus hudsonius	Meadow Jumping Mouse	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Preferred
Mammal	Zapus hudsonius	Meadow Jumping Mouse	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Mammal	Zapus hudsonius	Meadow Jumping Mouse	Pond	Forested Depression/Wet Flatwoods	Preferred
Mammal	Zapus hudsonius	Meadow Jumping Mouse	Interior Low Plateau Seepage Fen	Open Seep/Fen	Preferred
Mammal	Zapus hudsonius	Meadow Jumping Mouse	Southern Appalachian Seepage Wetland	Open Seep/Fen	Preferred
Mammal	Zapus hudsonius	Meadow Jumping Mouse	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Mammal	Zapus hudsonius	Meadow Jumping Mouse	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Zapus hudsonius	Meadow Jumping Mouse	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Mammal	Zapus hudsonius	Meadow Jumping Mouse	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Zapus hudsonius	Meadow Jumping Mouse	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Zapus hudsonius	Meadow Jumping Mouse	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Mammal	Zapus hudsonius	Meadow Jumping Mouse	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Mammal	Zapus hudsonius	Meadow Jumping Mouse	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Mammal	Zapus hudsonius	Meadow Jumping Mouse	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Mammal	Zapus hudsonius	Meadow Jumping Mouse	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Mammal	Zapus hudsonius	Meadow Jumping Mouse	Old Field / Successional	Old Field/Successional	Suitable
Mammal	Zapus hudsonius	Meadow Jumping Mouse	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Mammal	Zapus hudsonius	Meadow Jumping Mouse	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Mammal	Zapus hudsonius	Meadow Jumping Mouse	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Plant	Abies fraseri	Fraser Fir	Southern Appalachian Grass and Shrub Bald	Bald	Marginal
Plant	Abies fraseri	Fraser Fir	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Plant	Acalypha deamii	Deam's Copperleaf	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Acalypha deamii	Deam's Copperleaf	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Acalypha deamii	Deam's Copperleaf	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Acalypha deamii	Deam's Copperleaf	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Acalypha deamii	Deam's Copperleaf	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Plant	Acalypha deamii	Deam's Copperleaf	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Aconitum reclinatum	White Monkshood	Southern Appalachian Seepage Wetland	Open Seep/Fen	Preferred
Plant	Aconitum reclinatum	White Monkshood	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Acrobolbus ciliatus	a liverwort	Southern Appalachian Spray Cliff	Cliff/Talus	Preferred
Plant	Acrobolbus ciliatus	a liverwort	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Acrobolbus ciliatus	a liverwort	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Actaea rubifolia	Appalachian Bugbane	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Actaea rubifolia	Appalachian Bugbane	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Actaea rubifolia	Appalachian Bugbane	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Plant	Actaea rubifolia	Appalachian Bugbane	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Plant	Adlumia fungosa	Climbing Fumitory	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Adlumia fungosa	Climbing Fumitory	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Adlumia fungosa	Climbing Fumitory	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Plant	Adlumia fungosa	Climbing Fumitory	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Plant	Agalinis auriculata	Earleaf False Foxglove	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Agalinis auriculata	Earleaf False Foxglove	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Agalinis auriculata	Earleaf False Foxglove	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Agalinis auriculata	Earleaf False Foxglove	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Agalinis auriculata	Earleaf False Foxglove	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Agalinis auriculata	Earleaf False Foxglove	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Agalinis auriculata	Earleaf False Foxglove	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Plant	Agalinis auriculata	Earleaf False Foxglove	Cropland	Cropland	Suitable
Plant	Agalinis decemloba	Blue Ridge False Foxglove	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Plant	Agalinis decemloba	Blue Ridge False Foxglove	Pasture	Pasture	Marginal
Plant	Agalinis decemloba	Blue Ridge False Foxglove	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Agalinis decemloba	Blue Ridge False Foxglove	Old Field / Successional	Old Field/Successional	Preferred
Plant	Agalinis decemloba	Blue Ridge False Foxglove	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Agalinis decemloba	Blue Ridge False Foxglove	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Agalinis decemloba	Blue Ridge False Foxglove	Forest Plantation	Forest Plantation	Suitable
Plant	Agalinis heterophylla	Prairie False Foxglove	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Agalinis oligophylla	Ridge-stem False Foxglove	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Agalinis plukenetii	Purple Gerardia	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Agalinis plukenetii	Purple Gerardia	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Agalinis setacea	Threadleaf Gerardia	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Plant	Agalinis skinneriana	Pale False Foxglove	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Agalinis skinneriana	Pale False Foxglove	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Agastache scrophulariifolia	Purple Giant-hyssop	Southern Appalachian Grass and Shrub Bald	Bald	Marginal
Plant	Agastache scrophulariifolia	Purple Giant-hyssop	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Ageratina luciae-brauniae	Lucy Braun's White Snakeroot	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Plant	Ageratina luciae-brauniae	Lucy Braun's White Snakeroot	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Plant	Ageratina luciae-brauniae	Lucy Braun's White Snakeroot	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Preferred
Plant	Ageratina luciae-brauniae	Lucy Braun's White Snakeroot	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Ageratina luciae-brauniae	Lucy Braun's White Snakeroot	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Ageratina luciae-brauniae	Lucy Braun's White Snakeroot	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Agrostis mertensii	Arctic Bentgrass	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Plant	Agrostis mertensii	Arctic Bentgrass	Southern Appalachian Rocky Summit	Mountain Summit	Preferred
Plant	Allium tricoccum var. burdickii	Narrowleaf Wild Leek	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Allium tricoccum var. burdickii	Narrowleaf Wild Leek	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Allium tricoccum var. tricoccum	Ramp	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Allium tricoccum var. tricoccum	Ramp	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Allium tricoccum var. tricoccum	Ramp	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Alnus viridis ssp. crispa	Mountain Alder	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Marginal
Plant	Alnus viridis ssp. crispa	Mountain Alder	Southern Appalachian Grass and Shrub Bald	Bald	Preferred
Plant	Amelanchier sanguinea	Roundleaf Serviceberry	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Plant	Amelanchier sanguinea	Roundleaf Serviceberry	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Preferred
Plant	Amelanchier sanguinea	Roundleaf Serviceberry	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Preferred
Plant	Amelanchier sanguinea	Roundleaf Serviceberry	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Amelanchier sanguinea	Roundleaf Serviceberry	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Suitable
Plant	Amelanchier sanguinea	Roundleaf Serviceberry	Cumberland Riverscour	Forested Bottomland Floodplain	Suitable
Plant	Amelanchier sanguinea	Roundleaf Serviceberry	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Plant	Amelanchier sanguinea	Roundleaf Serviceberry	Old Field / Successional	Old Field/Successional	Suitable
Plant	Amelanchier sanguinea	Roundleaf Serviceberry	Pasture	Pasture	Suitable
Plant	Ammoselinum popei	Pope's Sand-parsley	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	gattingeri	Gattinger's Bluestar	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	gattingeri	Gattinger's Bluestar	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	gattingeri	Gattinger's Bluestar	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Plant	gattingeri	Gattinger's Bluestar	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Plant	gattingeri	Gattinger's Bluestar	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Plant	Anchistea virginica	Virginia Chainfern	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Marginal
Plant	Anchistea virginica	Virginia Chainfern	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal
Plant	Anchistea virginica	Virginia Chainfern	Pond	Forested Depression/Wet Flatwoods	Preferred
Plant	Anchistea virginica	Virginia Chainfern	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Plant	Anemone caroliniana	Carolina Anemone	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Antennaria howellii	Small Pussytoes	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Apios priceana	Price's Potato-bean	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Apios priceana	Price's Potato-bean	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Apios priceana	Price's Potato-bean	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Apios priceana	Price's Potato-bean	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Arabis patens	Spreading Rockcress	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Arabis patens	Spreading Rockcress	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Arabis patens	Spreading Rockcress	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Arabis patens	Spreading Rockcress	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Plant	Arabis pycnocarpa	Cream-flower Rockcress	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Arabis pycnocarpa	Cream-flower Rockcress	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Plant	Archidium alternifolium	Clay Moss	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Marginal
Plant	Archidium alternifolium	Clay Moss	Old Field / Successional	Old Field/Successional	Marginal
Plant	Archidium alternifolium	Clay Moss	Pasture	Pasture	Marginal
Plant	Archidium alternifolium	Clay Moss	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Plant	Archidium alternifolium	Clay Moss	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Suitable
Plant	Arenaria lanuginosa	Spreading Sandwort	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Arenaria lanuginosa	Spreading Sandwort	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Plant	Aristida ramosissima	Branched Three-awn Grass	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Plant	Arnoglossum plantagineum	Groove-stem Indian-plantain	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Asclepias purpurascens	Purple Milkweed	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Asclepias purpurascens	Purple Milkweed	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Plant	Asclepias purpurascens	Purple Milkweed	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Plant	Asclepias purpurascens	Purple Milkweed	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Plant	Asclepias purpurascens	Purple Milkweed	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Asclepias purpurascens	Purple Milkweed	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Plant	americanum	American Hart's-tongue Fern	Southern Interior Sinkhole Wall	Karst Outcrop	Suitable
Plant	Astragalus bibullatus	Pyne's Ground-plum	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Astragalus tennesseensis	Tennessee Milkvetch	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Athyrium filix-femina ssp. angustum	Northeastern Ladyfern	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Plant	Aureolaria patula	Spreading Yellow False Foxglove	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Aureolaria patula	Spreading Yellow False Foxglove	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Aureolaria patula	Spreading Yellow False Foxglove	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Aureolaria patula	Spreading Yellow False Foxglove	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Aureolaria patula	Spreading Yellow False Foxglove	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Aureolaria patula	Spreading Yellow False Foxglove	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Aureolaria patula	Spreading Yellow False Foxglove	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Plant	Aureolaria patula	Spreading Yellow False Foxglove	Forest Plantation	Forest Plantation	Suitable
Plant	Aureolaria patula	Spreading Yellow False Foxglove	Old Field / Successional	Old Field/Successional	Suitable

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Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Baptisia bracteata var. leucophaea	Cream Wild Indigo	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Baptisia bracteata var. leucophaea	Cream Wild Indigo	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Bazzania nudicaulis	a liverwort	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Plant	Berberis canadensis	American Barberry	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Berberis canadensis	American Barberry	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Berberis canadensis	American Barberry	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Berberis canadensis	American Barberry	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Berberis canadensis	American Barberry	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Berberis canadensis	American Barberry	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Berberis canadensis	American Barberry	Cumberland Riverscour	Forested Bottomland Floodplain	Suitable
Plant	Berberis canadensis	American Barberry	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Berberis canadensis	American Barberry	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Berberis canadensis	American Barberry	Old Field / Successional	Old Field/Successional	Suitable
Plant	Betula cordifolia	Heartleaf Paper Birch	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Plant	Betula cordifolia	Heartleaf Paper Birch	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Blephilia subnuda	Smooth Woodmint	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Blephilia woffordii	Wofford's Woodmint	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Bolboschoenus fluviatilis	River Bulrush	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Bolboschoenus fluviatilis	River Bulrush	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Plant	Borodinia dentata	Short's Rockcress	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Borodinia dentata	Short's Rockcress	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Borodinia dentata	Short's Rockcress	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Plant	Borodinia perstellata	Braun's Rockcress	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Borodinia perstellata	Braun's Rockcress	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Borodinia perstellata	Braun's Rockcress	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Botrychium jenmanii	Alabama Grapefern	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Plant	Botrychium jenmanii	Alabama Grapefern	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Botrychium jenmanii	Alabama Grapefern	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Botrychium jenmanii	Alabama Grapefern	Old Field / Successional	Old Field/Successional	Suitable
Plant	Botrychium matricariifolium	Chamomile Grapefern	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Plant	Botrychium matricariifolium	Chamomile Grapefern	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Botrychium matricariifolium	Chamomile Grapefern	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Botrychium matricariifolium	Chamomile Grapefern	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Botrychium matricariifolium	Chamomile Grapefern	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Plant	Botrychium matricariifolium	Chamomile Grapefern	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Botrychium matricariifolium	Chamomile Grapefern	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Plant	Botrychium oneidense	Blunt-lobe Grapefern	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Botrychium oneidense	Blunt-lobe Grapefern	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Botrychium oneidense	Blunt-lobe Grapefern	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Botrychium oneidense	Blunt-lobe Grapefern	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Botrychium oneidense	Blunt-lobe Grapefern	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Botrychium simplex	Least Grapefern	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Plant	Botrychium simplex	Least Grapefern	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Plant	Brachydontium trichodes	Peak Moss	Southern Appalachian Seepage Wetland	Open Seep/Fen	Preferred
Plant	Brachydontium trichodes	Peak Moss	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Brachydontium trichodes	Peak Moss	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Plant	Brachyelytrum aristosum	Northern Shorthusk	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Plant	Brachyelytrum aristosum	Northern Shorthusk	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable

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Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Brachyelytrum aristosum	Northern Shorthusk	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Brachyelytrum aristosum	Northern Shorthusk	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Plant	Bryoxiphium norvegicum	Sword Moss	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Preferred
Plant	Bryoxiphium norvegicum	Sword Moss	Southern Appalachian Spray Cliff	Cliff/Talus	Preferred
Plant	Bryoxiphium norvegicum	Sword Moss	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Buckleya distichophylla	Piratebush	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Buckleya distichophylla	Piratebush	Southern Appalachian Oak Forest	Upland Deciduous Forest	Preferred
Plant	Buckleya distichophylla	Piratebush	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Preferred
Plant	Buckleya distichophylla	Piratebush	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Plant	Bulbostylis ciliatifolia var. coarctata	Capillary Hairsedge	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Plant	Calamagrostis cainii	Cain's Reedgrass	Southern Appalachian Rocky Summit	Mountain Summit	Preferred
Plant	Calamagrostis cainii	Cain's Reedgrass	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Plant	Calamagrostis porteri	Porter's Reedgrass	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Calamagrostis porteri	Porter's Reedgrass	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Calamagrostis porteri	Porter's Reedgrass	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Calamovilfa arcuata	Rivergrass	Cumberland Riverscour	Forested Bottomland Floodplain	Preferred
Plant	Calamovilfa arcuata	Rivergrass	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Calamovilfa arcuata	Rivergrass	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Calamovilfa arcuata	Rivergrass	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Calamovilfa arcuata	Rivergrass	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Calamovilfa arcuata	Rivergrass	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Calamovilfa arcuata	Rivergrass	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Calamovilfa arcuata	Rivergrass	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Calamovilfa arcuata	Rivergrass	Old Field / Successional	Old Field/Successional	Suitable
Plant	Caltha palustris	Marsh-marigold	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Plant	Caltha palustris	Marsh-marigold	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Campanula aparinoides	Marsh Bellflower	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Plant	Campanula aparinoides	Marsh Bellflower	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Campanula aparinoides	Marsh Bellflower	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Cardamine clematitis	Small Mountain Bittercress	Southern Appalachian Seepage Wetland	Open Seep/Fen	Preferred
Plant	Cardamine clematitis	Small Mountain Bittercress	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Cardamine clematitis	Small Mountain Bittercress	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Cardamine clematitis	Small Mountain Bittercress	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Cardamine flagellifera	Blue Ridge Bittercress	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Cardamine flagellifera	Blue Ridge Bittercress	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Cardamine flagellifera	Blue Ridge Bittercress	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Cardamine flagellifera	Blue Ridge Bittercress	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Cardamine rotundifolia	American Bittercress	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Plant	Cardamine rotundifolia	American Bittercress	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Plant	Cardamine rotundifolia	American Bittercress	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Plant	Cardamine rotundifolia	American Bittercress	Southern Appalachian Seepage Wetland	Open Seep/Fen	Preferred
Plant	Cardamine rotundifolia	American Bittercress	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Cardamine rotundifolia	American Bittercress	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Plant	Carex argyrantha	Hay Sedge	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Plant	Carex argyrantha	Hay Sedge	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Plant	Carex argyrantha	Hay Sedge	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Carex argyrantha	Hay Sedge	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Plant	Carex barrattii	Barratt's Sedge	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Carex barrattii	Barratt's Sedge	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Carex bromoides ssp. montana	Brome-like Sedge	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Plant	Carex bromoides ssp. montana	Brome-like Sedge	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Carex buxbaumii	Buxbaum's Sedge	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Plant	Carex buxbaumii	Buxbaum's Sedge	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Carex buxbaumii	Buxbaum's Sedge	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Carex buxbaumii	Buxbaum's Sedge	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Carex buxbaumii	Buxbaum's Sedge	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Carex canescens ssp. disjuncta	Silvery Sedge	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Plant	Carex comosa	Bristly Sedge	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Plant	Carex comosa	Bristly Sedge	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Plant	Carex comosa	Bristly Sedge	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Plant	Carex comosa	Bristly Sedge	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Carex comosa	Bristly Sedge	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Carex comosa	Bristly Sedge	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Plant	Carex comosa	Bristly Sedge	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Plant	Carex comosa	Bristly Sedge	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Carex comosa	Bristly Sedge	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Plant	Carex comosa	Bristly Sedge	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Carex comosa	Bristly Sedge	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Carex davisii	Davis' Sedge	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred
Plant	Carex davisii	Davis' Sedge	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Carex echinata ssp. echinata	Little Prickly Sedge	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Plant	Carex echinata ssp. echinata	Little Prickly Sedge	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Carex echinata ssp. echinata	Little Prickly Sedge	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Carex echinata ssp. echinata	Little Prickly Sedge	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Carex folliculata	Long Sedge	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Plant	Carex fumosimontana		Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Carex fumosimontana		Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Plant	Carex hirtifolia	Pubescent Sedge	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Carex hitchcockiana	Hitchcock's Sedge	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Carex hitchcockiana	Hitchcock's Sedge	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Plant	Carex hyalina	Tissue Sedge	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Plant	Carex interior	Inland Sedge	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Carex lonchocarpa	Southern Long Sedge	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Preferred
Plant	Carex manhartii	Manhart's Sedge	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Plant	Carex misera	Wretched Sedge	Southern Appalachian Rocky Summit	Mountain Summit	Preferred
Plant	Carex muskingumensis	Muskingum Sedge	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Carex ouachitana	Ouachita Sedge	Old Field / Successional	Old Field/Successional	Marginal
Plant	Carex ouachitana	Ouachita Sedge	Pasture	Pasture	Marginal
Plant	Carex ouachitana	Ouachita Sedge	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Carex ouachitana	Ouachita Sedge	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Carex ouachitana	Ouachita Sedge	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Carex ouachitana	Ouachita Sedge	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Carex ouachitana	Ouachita Sedge	Forest Plantation	Forest Plantation	Suitable
Plant	Carex pallescens	Pale Sedge	Southern Appalachian Grass and Shrub Bald	Bald	Preferred
Plant	Carex pellita	Woolly Sedge	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Carex reniformis	Reniform Sedge	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Carex reniformis	Reniform Sedge	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Carex roanensis	Roan Mountain Sedge	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Marginal
Plant	Carex roanensis	Roan Mountain Sedge	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Preferred
Plant	Carex roanensis	Roan Mountain Sedge	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Plant	Carex roanensis	Roan Mountain Sedge	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Carex ruthii	Ruth's Sedge	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Plant	Carex ruthii	Ruth's Sedge	Southern Appalachian Seepage Wetland	Open Seep/Fen	Preferred
Plant	Carex ruthii	Ruth's Sedge	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Carex ruthii	Ruth's Sedge	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Carex woodii	Pretty Sedge	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Castanea dentata	American Chestnut	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Plant	Castanea dentata	American Chestnut	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Plant	Castanea dentata	American Chestnut	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Castanea dentata	American Chestnut	Southern Appalachian Oak Forest	Upland Deciduous Forest	Preferred
Plant	Castanea dentata	American Chestnut	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Castanea dentata	American Chestnut	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Castanea dentata	American Chestnut	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Plant	Caulophyllum giganteum	Giant Blue Cohosh	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Caulophyllum giganteum	Giant Blue Cohosh	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Cephaloziella massalongoi	a liverwort	Southern Appalachian Rocky Summit	Mountain Summit	Preferred
Plant	Cephaloziella massalongoi	a liverwort	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Plant	Cephaloziella massalongoi	a liverwort	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Plant	Cephaloziella spinicaulis	a liverwort	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Cerastium arvense var. velutinum	Field Chickweed	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Ceratophyllum echinatum	Prickly Hornwort	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Plant	Ceratophyllum echinatum	Prickly Hornwort	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Chamerion angustifolium	Fireweed	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Plant	Chamerion angustifolium	Fireweed	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Marginal
Plant	Chamerion angustifolium	Fireweed	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Marginal
Plant	Chamerion angustifolium	Fireweed	Southern Appalachian Grass and Shrub Bald	Bald	Marginal
Plant	Chamerion angustifolium	Fireweed	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Marginal
Plant	Chamerion angustifolium	Fireweed	Southern Appalachian Rocky Summit	Mountain Summit	Marginal
Plant	Chelone obliqua	Red Turtlehead	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Plant	Chelone obliqua	Red Turtlehead	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Chrysogonum virginianum	Green-and-gold	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Chrysogonum virginianum	Green-and-gold	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Plant	Chrysogonum virginianum	Green-and-gold	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Clematis fremontii	Fremont's Virgin's-bower	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Preferred
Plant	Clematis glaucophylla	Whiteleaf Leatherflower	Old Field / Successional	Old Field/Successional	Marginal
Plant	Clematis glaucophylla	Whiteleaf Leatherflower	Pasture	Pasture	Marginal
Plant	Clematis glaucophylla	Whiteleaf Leatherflower	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Clematis glaucophylla	Whiteleaf Leatherflower	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Clematis glaucophylla	Whiteleaf Leatherflower	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Clematis glaucophylla	Whiteleaf Leatherflower	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Clematis glaucophylla	Whiteleaf Leatherflower	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Clematis glaucophylla	Whiteleaf Leatherflower	Forest Plantation	Forest Plantation	Suitable
Plant	Clematis morefieldii	Morefield's Leatherflower	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Clematis vinacea		Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Clematis vinacea		Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Plant	Clethra alnifolia	Coastal Sweet-pepperbush	Pond	Forested Depression/Wet Flatwoods	Preferred
Plant	Clethra alnifolia	Coastal Sweet-pepperbush	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Coeloglossum viride var. virescens	Long-bracted Green Orchid	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Coeloglossum viride var. virescens	Long-bracted Green Orchid	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Plant	Coeloglossum viride var. virescens	Long-bracted Green Orchid	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Coelorachis rugosa	Wrinkled Jointgrass	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Collinsia verna	Spring Blue-eyed Mary	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Cololejeunea ornata	Ornate Cololejeunea	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Preferred
Plant	Cololejeunea ornata	Ornate Cololejeunea	Southern Interior Sinkhole Wall	Karst Outcrop	Preferred
Plant	Comptonia peregrina	Sweet-fern	Cumberland Riverscour	Forested Bottomland Floodplain	Suitable
Plant	Conradina verticillata	Cumberland False Rosemary	Cumberland Riverscour	Forested Bottomland Floodplain	Preferred
Plant	Conradina verticillata	Cumberland False Rosemary	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Conradina verticillata	Cumberland False Rosemary	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Conradina verticillata	Cumberland False Rosemary	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Conradina verticillata	Cumberland False Rosemary	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Conradina verticillata	Cumberland False Rosemary	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Conradina verticillata	Cumberland False Rosemary	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Conradina verticillata	Cumberland False Rosemary	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Conradina verticillata	Cumberland False Rosemary	Old Field / Successional	Old Field/Successional	Suitable
Plant	Corallorhiza maculata	Spotted Coralroot	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Plant	Corallorhiza maculata	Spotted Coralroot	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Corallorhiza maculata	Spotted Coralroot	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Coreopsis latifolia	Broadleaf Tickseed	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Plant	Coreopsis latifolia	Broadleaf Tickseed	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Plant	Coreopsis latifolia	Broadleaf Tickseed	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Cornus obliqua	Pale Dogwood	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Corydalis sempervirens	Pale Corydalis	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Marginal
Plant	Corydalis sempervirens	Pale Corydalis	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Plant	Corydalis sempervirens	Pale Corydalis	Southern Appalachian Rocky Summit	Mountain Summit	Suitable
Plant	Cotinus obovatus	American Smoketree	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Cotinus obovatus	American Smoketree	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Crataegus harbisonii	Harbison's Hawthorn	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Plant	Crataegus harbisonii	Harbison's Hawthorn	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Plant	Crocanthemum canadense	Canada Frostweed	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Preferred
Plant	Crocanthemum canadense	Canada Frostweed	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Preferred
Plant	Crocanthemum canadense	Canada Frostweed	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Crocanthemum canadense	Canada Frostweed	Old Field / Successional	Old Field/Successional	Suitable
Plant	Crocanthemum canadense	Canada Frostweed	Pasture	Pasture	Suitable
Plant	Crocanthemum propinquum	Low Frostweed	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Crocanthemum propinquum	Low Frostweed	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Plant	Cymophyllus fraserianus	Fraser's Sedge	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Cymophyllus fraserianus	Fraser's Sedge	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Cymophyllus fraserianus	Fraser's Sedge	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Plant	Cymophyllus fraserianus	Fraser's Sedge	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Cymophyllus fraserianus	Fraser's Sedge	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Cyperus dentatus	Toothed Flatsedge	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Cyperus plukenetii	Plukenet's Flatsedge	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Preferred

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Cyperus plukenetii	Plukenet's Flatsedge	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Cyperus plukenetii	Plukenet's Flatsedge	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Plant	Cyperus plukenetii	Plukenet's Flatsedge	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Suitable
Plant	Cypripedium kentuckiense	Southern Lady's-slipper	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Cypripedium kentuckiense	Southern Lady's-slipper	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Cypripedium kentuckiense	Southern Lady's-slipper	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Cypripedium kentuckiense	Southern Lady's-slipper	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Cypripedium kentuckiense	Southern Lady's-slipper	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Cypripedium reginae	Showy Lady's-slipper	Southern Interior Calcareous Cliff	Cliff/Talus	Preferred
Plant	Dalea candida	White Prairie-clover	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Dalea candida	White Prairie-clover	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Plant	Dalea candida	White Prairie-clover	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Plant	Dalea foliosa	Leafy Prairie-clover	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Dalea gattingeri	Gattinger's Prairie-clover	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Dalea purpurea	Purple Prairie-clover	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Danthonia epilis	Bog Wild Oatgrass	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Danthonia epilis	Bog Wild Oatgrass	Cumberland Riverscour	Forested Bottomland Floodplain	Preferred
Plant	Delphinium exaltatum	Tall Larkspur	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Marginal
Plant	Delphinium exaltatum	Tall Larkspur	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Preferred
Plant	Delphinium exaltatum	Tall Larkspur	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Plant	Dendrolycopodium dendroideum	Treelike Clubmoss	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Dendrolycopodium dendroideum	Treelike Clubmoss	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Plant	Dendrolycopodium dendroideum	Treelike Clubmoss	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Plant	Desmodium ochroleucum	Cream Tick-trefoil	Cropland	Cropland	Marginal
Plant	Desmodium ochroleucum	Cream Tick-trefoil	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Plant	Desmodium ochroleucum	Cream Tick-trefoil	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Preferred
Plant	Desmodium ochroleucum	Cream Tick-trefoil	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Desmodium ochroleucum	Cream Tick-trefoil	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Desmodium ochroleucum	Cream Tick-trefoil	Forest Plantation	Forest Plantation	Suitable
Plant	Diamorpha smallii	Small's Stonecrop	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Preferred
Plant	Diarrhena obovata	Beak Grass	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Diarrhena obovata	Beak Grass	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Plant	Diarrhena obovata	Beak Grass	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Plant	curtifolium	Shortleaf Witchgrass	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	curtifolium	Shortleaf Witchgrass	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Plant	Dichanthelium leucothrix	Roughish Witchgrass	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Dichanthelium leucothrix	Roughish Witchgrass	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Dichanthelium spretum	Eaton's Witchgrass	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Didiplis diandra	Water-purslane	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Didiplis diandra	Water-purslane	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Didiplis diandra	Water-purslane	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Didiplis diandra	Water-purslane	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Plant	Didiplis diandra	Water-purslane	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Plant	Didymoglossum petersii	Dwarf Filmy Fern	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Preferred
Plant	Didymoglossum petersii	Dwarf Filmy Fern	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Didymoglossum petersii	Dwarf Filmy Fern	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Plant	Diervilla lonicera	Northern Bush-honeysuckle	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Diervilla lonicera	Northern Bush-honeysuckle	Southern Appalachian Grass and Shrub Bald	Bald	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Diervilla lonicera	Northern Bush-honeysuckle	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Plant	Diervilla lonicera	Northern Bush-honeysuckle	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Plant	Diervilla lonicera	Northern Bush-honeysuckle	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Plant	Diervilla lonicera	Northern Bush-honeysuckle	Southern Appalachian Rocky Summit	Mountain Summit	Suitable
Plant	Diervilla rivularis	Mountain Bush-honeysuckle	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Preferred
Plant	Diervilla rivularis	Mountain Bush-honeysuckle	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Diervilla rivularis	Mountain Bush-honeysuckle	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Plant	Draba cuneifolia	Wedgeleaf Whitlow-grass	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Preferred
Plant	Draba ramosissima	Branched Whitlow-grass	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Plant	Draba ramosissima	Branched Whitlow-grass	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Draba ramosissima	Branched Whitlow-grass	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Plant	Draba ramosissima	Branched Whitlow-grass	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Plant	Draba ramosissima	Branched Whitlow-grass	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Plant	Drepanolejeunea appalachiana	Appalachian Threadwort	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Plant	Drepanolejeunea appalachiana	Appalachian Threadwort	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Drosera brevifolia	Dwarf Sundew	Old Field / Successional	Old Field/Successional	Marginal
Plant	Drosera brevifolia	Dwarf Sundew	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Drosera brevifolia	Dwarf Sundew	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Drosera brevifolia	Dwarf Sundew	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Drosera brevifolia	Dwarf Sundew	Pasture	Pasture	Preferred
Plant	Drosera brevifolia	Dwarf Sundew	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Drosera brevifolia	Dwarf Sundew	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Drosera brevifolia	Dwarf Sundew	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Drosera brevifolia	Dwarf Sundew	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Drosera capillaris	Pink Sundew	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Preferred
Plant	Drosera capillaris	Pink Sundew	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Drosera intermedia	Spoonleaf Sundew	Old Field / Successional	Old Field/Successional	Marginal
Plant	Drosera intermedia	Spoonleaf Sundew	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Drosera intermedia	Spoonleaf Sundew	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Drosera intermedia	Spoonleaf Sundew	Pasture	Pasture	Preferred
Plant	Drosera intermedia	Spoonleaf Sundew	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Drosera intermedia	Spoonleaf Sundew	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Drosera intermedia	Spoonleaf Sundew	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Drosera intermedia	Spoonleaf Sundew	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Drosera rotundifolia	Roundleaf Sundew	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Marginal
Plant	Drosera rotundifolia	Roundleaf Sundew	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Plant	Drosera rotundifolia	Roundleaf Sundew	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Plant	Drosera rotundifolia	Roundleaf Sundew	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Drosera rotundifolia	Roundleaf Sundew	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Dryopteris carthusiana	Spinulose Shieldfern	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Plant	Dryopteris cristata	Crested Shieldfern	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Plant	Echinacea pallida	Pale Purple Coneflower	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Plant	Echinacea pallida	Pale Purple Coneflower	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Echinacea simulata	Wavyleaf Purple Coneflower	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Echinacea tennesseensis	Tennessee Coneflower	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Echinochloa walteri	Walter's Barnyard Grass	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred
Plant	Echinodorus berteroi	Upright Burhead	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Plant	Echinodorus berteroi	Upright Burhead	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Echinodorus berteroi	Upright Burhead	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Plant	Eleocharis compressa var. compressa	Flat-stem Spikerush	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Preferred
Plant	Eleocharis compressa var. compressa	Flat-stem Spikerush	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Plant	Eleocharis elliptica	Slender Spikerush	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Eleocharis equisetoides	Horsetail Spikerush	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Eleocharis equisetoides	Horsetail Spikerush	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Plant	Eleocharis intermedia	Matted Spikerush	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Eleocharis intermedia	Matted Spikerush	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Eleocharis intermedia	Matted Spikerush	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Plant	Eleocharis intermedia	Matted Spikerush	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Plant	Eleocharis lanceolata	Lance-like Spikerush	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Eleocharis lanceolata	Lance-like Spikerush	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Eleocharis lanceolata	Lance-like Spikerush	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Eleocharis tortilis	Twisted Spikerush	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Plant	Eleocharis wolfii	Wolf's Spikerush	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Marginal
Plant	Eleocharis wolfii	Wolf's Spikerush	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Plant	Eleocharis wolfii	Wolf's Spikerush	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Eleocharis wolfii	Wolf's Spikerush	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Elodea nuttallii	Nuttall's Waterweed	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Plant	Elodea nuttallii	Nuttall's Waterweed	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Plant	Elodea nuttallii	Nuttall's Waterweed	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Plant	Elodea nuttallii	Nuttall's Waterweed	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Elodea nuttallii	Nuttall's Waterweed	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Plant	Elymus svensonii	Svenson's Wild Rye	Old Field / Successional	Old Field/Successional	Marginal
Plant	Elymus svensonii	Svenson's Wild Rye	Pasture	Pasture	Marginal
Plant	Elymus svensonii	Svenson's Wild Rye	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Elymus svensonii	Svenson's Wild Rye	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Elymus svensonii	Svenson's Wild Rye	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Elymus svensonii	Svenson's Wild Rye	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Elymus svensonii	Svenson's Wild Rye	Forest Plantation	Forest Plantation	Suitable
Plant	Entodon concinnus	Lime Silk Moss	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Marginal
Plant	Entodon concinnus	Lime Silk Moss	Southern Appalachian Spray Cliff	Cliff/Talus	Suitable
Plant	Epilobium ciliatum	Hairy Willowherb	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Marginal
Plant	Epilobium ciliatum	Hairy Willowherb	Pond	Forested Depression/Wet Flatwoods	Marginal
Plant	Epilobium ciliatum	Hairy Willowherb	Southern Appalachian Seepage Wetland	Open Seep/Fen	Preferred
Plant	Epilobium ciliatum	Hairy Willowherb	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Epilobium leptophyllum	Linear-leaf Willowherb	Southern Appalachian Seepage Wetland	Open Seep/Fen	Preferred
Plant	Epilobium leptophyllum	Linear-leaf Willowherb	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Eriocaulon decangulare	Ten-angle Pipewort	Pond	Forested Depression/Wet Flatwoods	Preferred
Plant	Eriogonum longifolium var. harperi	Harper's Umbrella-plant	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Plant	Eriogonum longifolium var. harperi	Harper's Umbrella-plant	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Plant	Eriogonum longifolium var. harperi	Harper's Umbrella-plant	Old Field / Successional	Old Field/Successional	Marginal
Plant	Eriogonum longifolium var. harperi	Harper's Umbrella-plant	Pasture	Pasture	Marginal
Plant	Eriogonum longifolium var. harperi	Harper's Umbrella-plant	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Eriogonum longifolium var. harperi	Harper's Umbrella-plant	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Plant	Eriophorum virginicum	Tawny Cotton-grass	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Plant	Eriophorum virginicum	Tawny Cotton-grass	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Plant	Eriophorum virginicum	Tawny Cotton-grass	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Eriophorum virginicum	Tawny Cotton-grass	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Eriophorum virginicum	Tawny Cotton-grass	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Eriophorum virginicum	Tawny Cotton-grass	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Eriophorum virginicum	Tawny Cotton-grass	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Eryngium integrifolium	Savanna Eryngo	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Eryngium integrifolium	Savanna Eryngo	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Plant	Eryngium integrifolium	Savanna Eryngo	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Eryngium integrifolium	Savanna Eryngo	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Plant	Eryngium integrifolium	Savanna Eryngo	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Eryngium integrifolium	Savanna Eryngo	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Eryngium integrifolium	Savanna Eryngo	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Eryngium integrifolium	Savanna Eryngo	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Erysimum capitatum	Western Wallflower	Old Field / Successional	Old Field/Successional	Marginal
Plant	Erysimum capitatum	Western Wallflower	Pasture	Pasture	Marginal
Plant	Erysimum capitatum	Western Wallflower	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Erysimum capitatum	Western Wallflower	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Erysimum capitatum	Western Wallflower	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Erysimum capitatum	Western Wallflower	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Erysimum capitatum	Western Wallflower	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Plant	Erysimum capitatum	Western Wallflower	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Plant	Erysimum capitatum	Western Wallflower	Forest Plantation	Forest Plantation	Suitable
Plant	Erythronium rostratum	Yellow Trout-lily	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Plant	Erythronium rostratum	Yellow Trout-lily	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Plant	Erythronium rostratum	Yellow Trout-lily	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Erythronium rostratum	Yellow Trout-lily	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Plant	Eupatorium godfreyanum	Godfrey's Boneset	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Eupatorium leucolepis	White-bract Thoroughwort	Pond	Forested Depression/Wet Flatwoods	Marginal
Plant	Eupatorium leucolepis	White-bract Thoroughwort	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Euphorbia ouachitana	Ouachita Spurge	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Plant	Eurybia saxicastelli	Rockcastle Wood-aster	Cumberland Riverscour	Forested Bottomland Floodplain	Preferred
Plant	Eurybia saxicastelli	Rockcastle Wood-aster	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Eurybia saxicastelli	Rockcastle Wood-aster	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Eurybia saxicastelli	Rockcastle Wood-aster	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Eurybia saxicastelli	Rockcastle Wood-aster	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Eurybia saxicastelli	Rockcastle Wood-aster	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Eurybia saxicastelli	Rockcastle Wood-aster	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Eurybia saxicastelli	Rockcastle Wood-aster	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Eurybia saxicastelli	Rockcastle Wood-aster	Old Field / Successional	Old Field/Successional	Suitable
Plant	Eurybia schreberi	Schreber's Aster	Southern Interior Calcareous Cliff	Cliff/Talus	Preferred
Plant	Eurybia schreberi	Schreber's Aster	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Plant	Euthamia gymnospermoides	Viscid Bushy Goldenrod	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Eutrochium steelei	Steele's Joe-pyeweed	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Plant	Eutrochium steelei	Steele's Joe-pyeweed	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Eutrochium steelei	Steele's Joe-pyeweed	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Eutrochium steelei	Steele's Joe-pyeweed	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Evolvulus nuttallianus	Shaggy Dwarf Morning-glory	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Fallopia cilinodis	Fringed Black-bindweed	Southern Appalachian Grass and Shrub Bald	Bald	Preferred
Plant	Fallopia cilinodis	Fringed Black-bindweed	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Fallopia cilinodis	Fringed Black-bindweed	Southern Appalachian Rocky Summit	Mountain Summit	Suitable
Plant	Festuca paradoxa	Cluster Fescue	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Plant	Festuca paradoxa	Cluster Fescue	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Festuca paradoxa	Cluster Fescue	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Festuca paradoxa	Cluster Fescue	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Fimbristylis perpusilla	Harper's Fimbry	Cropland	Cropland	Marginal
Plant	Fimbristylis perpusilla	Harper's Fimbry	Pond	Forested Depression/Wet Flatwoods	Preferred
Plant	Fimbristylis perpusilla	Harper's Fimbry	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Fimbristylis puberula	Hairy Fimbry	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Preferred
Plant	Fimbristylis puberula	Hairy Fimbry	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Plant	Fimbristylis puberula	Hairy Fimbry	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Fimbristylis puberula	Hairy Fimbry	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Plant	Fothergilla major	Mountain Witch-alder	Cumberland Riverscour	Forested Bottomland Floodplain	Preferred
Plant	Fothergilla major	Mountain Witch-alder	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Fothergilla major	Mountain Witch-alder	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Fothergilla major	Mountain Witch-alder	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Frullania caulisequa	a liverwort	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Fuirena squarrosa	Hairy Umbrella-sedge	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Plant	Fuirena squarrosa	Hairy Umbrella-sedge	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Fuirena squarrosa	Hairy Umbrella-sedge	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Plant	Fuirena squarrosa	Hairy Umbrella-sedge	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Fuirena squarrosa	Hairy Umbrella-sedge	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Plant	Funaria americana	American Cord Moss	Southern Interior Calcareous Cliff	Cliff/Talus	Preferred
Plant	Galium asprellum	Rough Bedstraw	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Galium asprellum	Rough Bedstraw	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Galium asprellum	Rough Bedstraw	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Galium palustre	Marsh Bedstraw	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Galium palustre	Marsh Bedstraw	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Galium palustre	Marsh Bedstraw	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Gaylussacia dumosa	Southern Dwarf Huckleberry	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Gaylussacia dumosa	Southern Dwarf Huckleberry	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Plant	Gentiana linearis	Narrowleaf Gentian	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Gentiana puberulenta	Downy Gentian	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Marginal
Plant	Gentiana puberulenta	Downy Gentian	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Gentiana puberulenta	Downy Gentian	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Gentiana puberulenta	Downy Gentian	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Gentiana puberulenta	Downy Gentian	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Gentiana puberulenta	Downy Gentian	Forest Plantation	Forest Plantation	Suitable
Plant	Gentiana puberulenta	Downy Gentian	Old Field / Successional	Old Field/Successional	Suitable
Plant	Gentiana puberulenta	Downy Gentian	Pasture	Pasture	Suitable
Plant	Gentiana puberulenta	Downy Gentian	Cropland	Cropland	Suitable
Plant	Geranium robertianum	Herb-Robert	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Geranium robertianum	Herb-Robert	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Geum aleppicum	Yellow Avens	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Plant	Geum geniculatum	Bent Avens	Southern Appalachian Seepage Wetland	Open Seep/Fen	Preferred
Plant	Geum geniculatum	Bent Avens	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Geum laciniatum	Rough Avens	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred
Plant	Geum radiatum	Spreading Avens	Southern Appalachian Grass and Shrub Bald	Bald	Preferred

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Geum radiatum	Spreading Avens	Southern Appalachian Rocky Summit	Mountain Summit	Preferred
Plant	Glyceria acutiflora	Sharp-scaled Mannagrass	Pond	Forested Depression/Wet Flatwoods	Preferred
Plant	Glyceria canadensis var. laxa	Limp Mannagrass	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Plant	Glyceria canadensis var. laxa	Limp Mannagrass	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Glyceria nubigena	Smoky Mountains Mannagrass	Southern Appalachian Seepage Wetland	Open Seep/Fen	Preferred
Plant	Goodyera repens	Dwarf Rattlesnake-plantain	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Plant	Goodyera repens	Dwarf Rattlesnake-plantain	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Plant	Gratiola brevifolia	Sticky Hedge-hyssop	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Gratiola floridana	Florida Hedge-hyssop	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Gratiola floridana	Florida Hedge-hyssop	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Gratiola viscidula	Short's Hedge-hyssop	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Grimmia olneyi	Olney's Dry Rock Moss	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Plant	Grimmia olneyi	Olney's Dry Rock Moss	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Plant	Grimmia olneyi	Olney's Dry Rock Moss	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Plant	Gymnomitrion laceratum	a liverwort	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Plant	Gymnomitrion laceratum	a liverwort	Southern Appalachian Rocky Summit	Mountain Summit	Suitable
Plant	Gymnopogon brevifolius	Shortleaf Beardgrass	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Gymnopogon brevifolius	Shortleaf Beardgrass	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Preferred
Plant	Hasteola suaveolens	Sweet-scented Indian-plantain	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Helenium brevifolium	Shortleaf Sneezeweed	Cumberland Riverscour	Forested Bottomland Floodplain	Suitable
Plant	Helianthus eggertii	Eggert's Sunflower	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Helianthus eggertii	Eggert's Sunflower	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Helianthus eggertii	Eggert's Sunflower	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Helianthus eggertii	Eggert's Sunflower	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Helianthus eggertii	Eggert's Sunflower	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Helianthus eggertii	Eggert's Sunflower	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Helianthus eggertii	Eggert's Sunflower	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Helianthus eggertii	Eggert's Sunflower	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Plant	Helianthus eggertii	Eggert's Sunflower	Forest Plantation	Forest Plantation	Suitable
Plant	Helianthus eggertii	Eggert's Sunflower	Old Field / Successional	Old Field/Successional	Suitable
Plant	Helianthus eggertii	Eggert's Sunflower	Pasture	Pasture	Suitable
Plant	Helianthus eggertii	Eggert's Sunflower	Cropland	Cropland	Suitable
Plant	Helianthus glaucophyllus	Whiteleaf Sunflower	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Helianthus glaucophyllus	Whiteleaf Sunflower	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Helianthus occidentalis	Mcdowell's Sunflower	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Plant	Helianthus occidentalis	Mcdowell's Sunflower	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Plant	Helianthus occidentalis	Mcdowell's Sunflower	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Plant	Helianthus occidentalis	Mcdowell's Sunflower	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Helianthus occidentalis	Mcdowell's Sunflower	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Plant	Helianthus smithiorum	Smith's Sunflower	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Helianthus verticillatus	Whorled Sunflower	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Plant	Helianthus verticillatus	Whorled Sunflower	Old Field / Successional	Old Field/Successional	Suitable
Plant	Helianthus verticillatus	Whorled Sunflower	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Plant	Heracleum maximum	Cow-parsnip	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Heracleum maximum	Cow-parsnip	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Heracleum maximum	Cow-parsnip	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Heteranthera limosa	Blue Mud-plantain	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Plant	Heteranthera limosa	Blue Mud-plantain	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred
Plant	Heteranthera missouriensis	Missouri Mud-Plantain	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Hexastylis virginica	Virginia Heartleaf	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Hieracium longipilum	Hairy Hawkweed	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Hieracium longipilum	Hairy Hawkweed	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Hieracium scabrum	Rough Hawkweed	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Hieracium scabrum	Rough Hawkweed	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Hieracium scabrum	Rough Hawkweed	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Hieracium scabrum	Rough Hawkweed	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Plant	Homaliadelphus sharpii	Sharp's Homaliadelphus Moss	Southern Interior Calcareous Cliff	Cliff/Talus	Preferred
Plant	Homaliadelphus sharpii	Sharp's Homaliadelphus Moss	Southern Interior Sinkhole Wall	Karst Outcrop	Suitable
Plant	Hottonia inflata	Featherfoil	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Plant	Hottonia inflata	Featherfoil	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Houstonia purpurea var. montana	Mountain Bluet	Southern Appalachian Rocky Summit	Mountain Summit	Preferred
Plant	Houstonia purpurea var. montana	Mountain Bluet	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Plant	Huperzia appalachiana	Appalachian Fir-clubmoss	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Plant	Huperzia appalachiana	Appalachian Fir-clubmoss	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Plant	Huperzia appalachiana	Appalachian Fir-clubmoss	Southern Appalachian Rocky Summit	Mountain Summit	Suitable
Plant	Hydrocotyle americana	American Water-pennywort	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Hydrocotyle americana	American Water-pennywort	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Hydrocotyle americana	American Water-pennywort	Southern Appalachian Spray Cliff	Cliff/Talus	Suitable
Plant	Hydrolea ovata	Ovate False Fiddleleaf	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Plant	Hydrophyllum virginianum	John's-cabbage	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Plant	Hydrophyllum virginianum	John's-cabbage	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Plant	Hydrophyllum virginianum	John's-cabbage	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Plant	Hydrophyllum virginianum	John's-cabbage	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Hymenophyllum tayloriae	Taylor's Filmy Fern	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Preferred
Plant	Hymenophyllum tayloriae	Taylor's Filmy Fern	Southern Appalachian Spray Cliff	Cliff/Talus	Suitable
Plant	Hymenophyllum tayloriae	Taylor's Filmy Fern	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Plant	Hypericum adpressum	Creeping St. John's-wort	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Plant	Hypericum adpressum	Creeping St. John's-wort	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Plant	Hypericum adpressum	Creeping St. John's-wort	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Plant	Hypericum adpressum	Creeping St. John's-wort	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Hypericum adpressum	Creeping St. John's-wort	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Hypericum adpressum	Creeping St. John's-wort	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Hypericum ellipticum	Pale St. John's-wort	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Plant	Hypericum graveolens	Mountain St. John's-wort	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Plant	Hypericum graveolens	Mountain St. John's-wort	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Hypericum graveolens	Mountain St. John's-wort	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Hypericum mitchellianum	Blue Ridge St. John's-wort	Southern Appalachian Grass and Shrub Bald	Bald	Preferred
Plant	Hypericum nudiflorum	Pretty St. John's-wort	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Preferred
Plant	Iris brevicaulis	Lamance Iris	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Plant	Iris brevicaulis	Lamance Iris	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Iris fulva	Red Iris	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Plant	Iris fulva	Red Iris	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Iris fulva	Red Iris	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Iris fulva	Red Iris	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Plant	Iris prismatica	Slender Blue Iris	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Isoetes melanopoda	Blackfoot Quillwort	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Isoetes tennesseensis	Tennessee Quillwort	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Isoetes tennesseensis	Tennessee Quillwort	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Isotria medeoloides	Small Whorled Pogonia	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Isotria medeoloides	Small Whorled Pogonia	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Isotria medeoloides	Small Whorled Pogonia	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Isotria medeoloides	Small Whorled Pogonia	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Isotria medeoloides	Small Whorled Pogonia	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Isotria medeoloides	Small Whorled Pogonia	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Juglans cinerea	Butternut	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Plant	Juglans cinerea	Butternut	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Juglans cinerea	Butternut	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Plant	Juglans cinerea	Butternut	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Juncus brachycephalus	Small-head Rush	Interior Low Plateau Seepage Fen	Open Seep/Fen	Preferred
Plant	Juncus brachycephalus	Small-head Rush	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Juncus elliottii	Bog Rush	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Krigia montana	False Dandelion	Southern Appalachian Rocky Summit	Mountain Summit	Preferred
Plant	Lachnanthes caroliana	Carolina Redroot	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Plant	Lachnanthes caroliana	Carolina Redroot	Pond	Forested Depression/Wet Flatwoods	Preferred
Plant	Lachnocaulon anceps	Whitehead Bogbutton	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Marginal
Plant	Lachnocaulon anceps	Whitehead Bogbutton	Pond	Forested Depression/Wet Flatwoods	Preferred
Plant	Lathyrus palustris	Vetchling Peavine	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Lathyrus palustris	Vetchling Peavine	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Lechea pulchella	Leggett's Pinweed	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Lejeunea blomquistii	Blomquist Leafy Liverwort	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Lejeunea blomquistii	Blomquist Leafy Liverwort	Southern Appalachian Spray Cliff	Cliff/Talus	Suitable
Plant	Lejeunea blomquistii	Blomquist Leafy Liverwort	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Lejeunea blomquistii	Blomquist Leafy Liverwort	Southern Appalachian Spray Cliff	Cliff/Talus	Suitable
Plant	Lejeunea blomquistii	Blomquist Leafy Liverwort	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Plant	Lejeunea sharpii	Sharp's Pouncewort	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Marginal
Plant	Lejeunea sharpii	Sharp's Pouncewort	Southern Interior Sinkhole Wall	Karst Outcrop	Preferred
Plant	Lejeunea sharpii	Sharp's Pouncewort	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Lejeunea sharpii	Sharp's Pouncewort	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Plant	sulphureum	Moss	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Plant	Leptohymenium sharpii	Mount Leconte Moss	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Leptohymenium sharpii	Mount Leconte Moss	Southern Appalachian Seepage Wetland	Open Seep/Fen	Preferred
Plant	Leptohymenium sharpii	Mount Leconte Moss	Southern Appalachian Spray Cliff	Cliff/Talus	Suitable
Plant	cuneifolius	Wedge Flapwort	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Plant	Lespedeza angustifolia	Narrowleaf Bushclover	Old Field / Successional	Old Field/Successional	Marginal
Plant	Lespedeza angustifolia	Narrowleaf Bushclover	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Lespedeza angustifolia	Narrowleaf Bushclover	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Lespedeza angustifolia	Narrowleaf Bushclover	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Lespedeza angustifolia	Narrowleaf Bushclover	Pasture	Pasture	Preferred
Plant	Lespedeza angustifolia	Narrowleaf Bushclover	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Lespedeza angustifolia	Narrowleaf Bushclover	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Lespedeza angustifolia	Narrowleaf Bushclover	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Leucothoe racemosa	Fetterbush	Pond	Forested Depression/Wet Flatwoods	Marginal
Plant	Leucothoe racemosa	Fetterbush	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Plant	Leucothoe racemosa	Fetterbush	Cumberland Riverscour	Forested Bottomland Floodplain	Preferred
Plant	Liatris cylindracea	Slender Blazingstar	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Marginal
Plant	Liatris cylindracea	Slender Blazingstar	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Plant	Liatris cylindracea	Slender Blazingstar	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Plant	Liatris cylindracea	Slender Blazingstar	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable

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Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Liatris cylindracea	Slender Blazingstar	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Liatris pilosa	Grass-leaf Gayfeather	Cumberland Riverscour	Forested Bottomland Floodplain	Preferred
Plant	Liatris virgata	Wand Gayfeather	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Plant	Liatris virgata	Wand Gayfeather	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Liatris virgata	Wand Gayfeather	Appalachian Shale Barrens	Upland Mixed Forest	Suitable
Plant	Liatris virgata	Wand Gayfeather	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Suitable
Plant	Lilium grayi	Gray's Lily	Southern Appalachian Grass and Shrub Bald	Bald	Preferred
Plant	Lilium grayi	Gray's Lily	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Lilium grayi	Gray's Lily	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Lilium philadelphicum	Wood Lily	Forest Plantation	Forest Plantation	Marginal
Plant	Lilium philadelphicum	Wood Lily	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Lilium philadelphicum	Wood Lily	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Preferred
Plant	Lilium philadelphicum	Wood Lily	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Lilium philadelphicum	Wood Lily	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Lilium philadelphicum	Wood Lily	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Plant	Lilium philadelphicum	Wood Lily	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Plant	Liparis loeselii	Loesel's Twayblade	Interior Low Plateau Seepage Fen	Open Seep/Fen	Preferred
Plant	Liparis loeselii	Loesel's Twayblade	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Liparis loeselii	Loesel's Twayblade	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Liparis loeselii	Loesel's Twayblade	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Liparis loeselii	Loesel's Twayblade	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Plant	Liparis loeselii	Loesel's Twayblade	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Plant	Listera australis	Southern Twayblade	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Plant	Listera australis	Southern Twayblade	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Plant	Listera australis	Southern Twayblade	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Listera australis	Southern Twayblade	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Plant	Listera australis	Southern Twayblade	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Listera australis	Southern Twayblade	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Listera australis	Southern Twayblade	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Listera australis	Southern Twayblade	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Plant	Listera australis	Southern Twayblade	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Listera australis	Southern Twayblade	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Listera smallii	Kidneyleaf Twayblade	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Listera smallii	Kidneyleaf Twayblade	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Listera smallii	Kidneyleaf Twayblade	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Listera smallii	Kidneyleaf Twayblade	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Listera smallii	Kidneyleaf Twayblade	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Lobelia amoena	Southern Lobelia	Southern Appalachian Seepage Wetland	Open Seep/Fen	Preferred
Plant	Lobelia amoena	Southern Lobelia	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Lonicera canadensis	American Fly-honeysuckle	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Plant	Lonicera canadensis	American Fly-honeysuckle	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Lonicera canadensis	American Fly-honeysuckle	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Plant	Lonicera canadensis	American Fly-honeysuckle	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Lonicera canadensis	American Fly-honeysuckle	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Lonicera canadensis	American Fly-honeysuckle	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Lonicera canadensis	American Fly-honeysuckle	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Lonicera dioica	Mountain Honeysuckle	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Lonicera dioica	Mountain Honeysuckle	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable

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Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Lonicera dioica	Mountain Honeysuckle	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Lonicera dioica	Mountain Honeysuckle	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Plant	Lonicera dioica	Mountain Honeysuckle	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Plant	Lonicera flava	Yellow Honeysuckle	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Plant	Lonicera flava	Yellow Honeysuckle	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Plant	Lonicera reticulata	Grape Honeysuckle	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Lonicera reticulata	Grape Honeysuckle	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Plant	Lophocolea appalachiana	Appalachian Crestwort	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Lophocolea appalachiana	Appalachian Crestwort	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Plant	Lophocolea appalachiana	Appalachian Crestwort	Southern Appalachian Spray Cliff	Cliff/Talus	Suitable
Plant	Lophocolea muricata	a crestwort	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Ludwigia hirtella	Hairy Ludwigia	Old Field / Successional	Old Field/Successional	Marginal
Plant	Ludwigia hirtella	Hairy Ludwigia	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Ludwigia hirtella	Hairy Ludwigia	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Ludwigia hirtella	Hairy Ludwigia	Pasture	Pasture	Preferred
Plant	Ludwigia hirtella	Hairy Ludwigia	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Ludwigia hirtella	Hairy Ludwigia	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Ludwigia hirtella	Hairy Ludwigia	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Plant	Ludwigia hirtella	Hairy Ludwigia	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Ludwigia hirtella	Hairy Ludwigia	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Ludwigia sphaerocarpa	Globe-fruit False Loosestrife	Pond	Forested Depression/Wet Flatwoods	Preferred
Plant	Lycopodiella alopecuroides	Foxtail Bog Clubmoss	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Lycopodiella alopecuroides	Foxtail Bog Clubmoss	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Plant	Lycopodiella inundata	Bog Clubmoss	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Plant	Lycopodiella inundata	Bog Clubmoss	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Lysimachia fraseri	Fraser's Loosestrife	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Lysimachia fraseri	Fraser's Loosestrife	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Lysimachia fraseri	Fraser's Loosestrife	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Lysimachia fraseri	Fraser's Loosestrife	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Lysimachia fraseri	Fraser's Loosestrife	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Lysimachia fraseri	Fraser's Loosestrife	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Lysimachia fraseri	Fraser's Loosestrife	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Lysimachia fraseri	Fraser's Loosestrife	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Lysimachia hybrida	Lanceleaf Loosestrife	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Lysimachia quadriflora	Four-flower Yellow Loosestrife	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Plant	Lysimachia quadriflora	Four-flower Yellow Loosestrife	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Lysimachia terrestris	Swamp Loosestrife	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal
Plant	Lysimachia terrestris	Swamp Loosestrife	Old Field / Successional	Old Field/Successional	Marginal
Plant	Lysimachia terrestris	Swamp Loosestrife	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Plant	Lysimachia terrestris	Swamp Loosestrife	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Lysimachia terrestris	Swamp Loosestrife	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Lysimachia terrestris	Swamp Loosestrife	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Lysimachia terrestris	Swamp Loosestrife	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Lysimachia x producta	Loosestrife	Pond	Forested Depression/Wet Flatwoods	Preferred
Plant	Lysimachia x producta	Loosestrife	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Magnolia virginiana	Sweetbay Magnolia	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Magnolia virginiana	Sweetbay Magnolia	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Magnolia virginiana	Sweetbay Magnolia	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Magnolia virginiana	Sweetbay Magnolia	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Magnolia virginiana	Sweetbay Magnolia	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Maianthemum stellatum	Starflower Solomon's-plume	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Marchantia quadrata	Narrow Mushroom-headed Liverwort	Southern Interior Calcareous Cliff	Cliff/Talus	Preferred
Plant	Marshallia grandiflora	Large-flowered Barbara's-buttons	Cumberland Riverscour	Forested Bottomland Floodplain	Preferred
Plant	Marshallia obovata	Spoon-shape Barbara's-buttons	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Plant	Marshallia obovata	Spoon-shape Barbara's-buttons	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Marshallia trinervia	Broadleaf Barbara's-buttons	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Marshallia trinervia	Broadleaf Barbara's-buttons	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Plant	Marsupella funckii	a liverwort	Southern Appalachian Rocky Summit	Mountain Summit	Preferred
Plant	Marsupella funckii	a liverwort	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Plant	Marsupella funckii	a liverwort	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Plant	Meehania cordata	Heartleaf Meehania	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Meehania cordata	Heartleaf Meehania	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Meehania cordata	Heartleaf Meehania	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Plant	Megaceros aenigmaticus	Headwaters Hornwort	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Melanthium latifolium	Broadleaf Bunchflower	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Melanthium latifolium	Broadleaf Bunchflower	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Melanthium latifolium	Broadleaf Bunchflower	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Melanthium latifolium	Broadleaf Bunchflower	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Melanthium latifolium	Broadleaf Bunchflower	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Melanthium virginicum	Virginia Bunchflower	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Marginal
Plant	Melanthium virginicum	Virginia Bunchflower	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Plant	Melanthium virginicum	Virginia Bunchflower	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Melanthium virginicum	Virginia Bunchflower	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Plant	Melanthium virginicum	Virginia Bunchflower	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Melanthium virginicum	Virginia Bunchflower	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Melanthium virginicum	Virginia Bunchflower	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Melanthium virginicum	Virginia Bunchflower	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Melanthium woodii	Ozark Bunchflower	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Plant	Melanthium woodii	Ozark Bunchflower	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Melanthium woodii	Ozark Bunchflower	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Melanthium woodii	Ozark Bunchflower	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Melanthium woodii	Ozark Bunchflower	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Menziesia pilosa	Minniebush	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Marginal
Plant	Menziesia pilosa	Minniebush	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Marginal
Plant	Menziesia pilosa	Minniebush	Southern Appalachian Grass and Shrub Bald	Bald	Preferred
Plant	Metzgeria uncigera	a liverwort	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Preferred
Plant	Metzgeria uncigera	a liverwort	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Metzgeria uncigera	a liverwort	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Micranthes caroliniana	Carolina Saxifrage	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Preferred
Plant	Micranthes caroliniana	Carolina Saxifrage	Southern Appalachian Spray Cliff	Cliff/Talus	Suitable
Plant	Micranthes pensylvanica	Swamp Saxifrage	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Plant	Microlejeunea globosa	Cardot's Pouncewort	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Preferred
Plant	Mielichhoferia elongata	Mielichhofer's Copper Moss	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Preferred
Plant	Mielichhoferia elongata	Mielichhofer's Copper Moss	Southern Appalachian Rocky Summit	Mountain Summit	Suitable
Plant	Milium effusum var. cisatlanticum	Tall Millet Grass	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Plant	Milium effusum var. cisatlanticum	Tall Millet Grass	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Minuartia cumberlandensis	Cumberland Sandwort	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Plant	Minuartia cumberlandensis	Cumberland Sandwort	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Plant	Minuartia cumberlandensis	Cumberland Sandwort	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Preferred
Plant	Minuartia cumberlandensis	Cumberland Sandwort	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Minuartia cumberlandensis	Cumberland Sandwort	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Minuartia cumberlandensis	Cumberland Sandwort	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Minuartia godfreyi	Godfrey's Stitchwort	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Minuartia godfreyi	Godfrey's Stitchwort	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Minuartia godfreyi	Godfrey's Stitchwort	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Plant	Minuartia groenlandica	Mountain Sandwort	Southern Appalachian Rocky Summit	Mountain Summit	Preferred
Plant	Minuartia groenlandica	Mountain Sandwort	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Plant	Mirabilis albida	Pale Umbrella-wort	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Monotropsis odorata	Sweet Pinesap	Forest Plantation	Forest Plantation	Marginal
Plant	Monotropsis odorata	Sweet Pinesap	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Monotropsis odorata	Sweet Pinesap	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Preferred
Plant	Monotropsis odorata	Sweet Pinesap	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Preferred
Plant	Monotropsis odorata	Sweet Pinesap	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Preferred
Plant	Monotropsis odorata	Sweet Pinesap	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Suitable
Plant	Muhlenbergia cuspidata	Plains Muhly	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Plant	Muhlenbergia glabrifloris	Inland Muhly	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Muhlenbergia glabrifloris	Inland Muhly	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Plant	Muhlenbergia glabrifloris	Inland Muhly	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Plant	Muhlenbergia torreyana	Torrey's Dropseed	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Myriophyllum pinnatum	Cutleaf Water-milfoil	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Plant	Myriophyllum pinnatum	Cutleaf Water-milfoil	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Myurella julacea	Small Mousetail Moss	Southern Interior Calcareous Cliff	Cliff/Talus	Preferred
Plant	Nemopanthus collinus	Long-stalked Holly	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Nemopanthus collinus	Long-stalked Holly	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Plant	Nemopanthus collinus	Long-stalked Holly	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Nemopanthus collinus	Long-stalked Holly	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Nestronia umbellula	Nestronia	Old Field / Successional	Old Field/Successional	Marginal
Plant	Nestronia umbellula	Nestronia	Pasture	Pasture	Marginal
Plant	Nestronia umbellula	Nestronia	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Nestronia umbellula	Nestronia	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Nestronia umbellula	Nestronia	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Nestronia umbellula	Nestronia	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Nestronia umbellula	Nestronia	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Nestronia umbellula	Nestronia	Forest Plantation	Forest Plantation	Suitable
Plant	Neviusia alabamensis	Alabama Snow-wreath	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Neviusia alabamensis	Alabama Snow-wreath	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Neviusia alabamensis	Alabama Snow-wreath	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Oenothera macrocarpa	Missouri Evening-primrose	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Oenothera parviflora	Northern Evening-primrose	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Suitable
Plant	Oligoneuron album	Prairie Goldenrod	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Plant	Oligoneuron album	Prairie Goldenrod	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Plant	Oligoneuron album	Prairie Goldenrod	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Plant	Onosmodium molle ssp. bejariense	Soft-hairy False Gromwell	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Plant	Onosmodium molle ssp. bejariense	Soft-hairy False Gromwell	Old Field / Successional	Old Field/Successional	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Onosmodium molle ssp. bejariense	Soft-hairy False Gromwell	Pasture	Pasture	Marginal
Plant	Onosmodium molle ssp. bejariense	Soft-hairy False Gromwell	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Onosmodium molle ssp. bejariense	Soft-hairy False Gromwell	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Onosmodium molle ssp. bejariense	Soft-hairy False Gromwell	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Preferred
Plant	Onosmodium molle ssp. bejariense	Soft-hairy False Gromwell	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Onosmodium molle ssp. bejariense	Soft-hairy False Gromwell	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Onosmodium molle ssp. bejariense	Soft-hairy False Gromwell	Forest Plantation	Forest Plantation	Suitable
Plant	Onosmodium molle ssp. hispidissimum	Soft-Hairy False Gromwell	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Onosmodium molle ssp. subsetosum	False Gromwell	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Onosmodium molle ssp. subsetosum	False Gromwell	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Plant	Orthodontium pellucens	Translucent Orthodontium Moss	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Preferred
Plant	Packera crawfordii	Bog Ragwort	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Packera crawfordii	Bog Ragwort	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Packera crawfordii	Bog Ragwort	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Plant	Packera plattensis	Prairie Ragwort	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Packera schweinitziana	New England Ragwort	Southern Appalachian Grass and Shrub Bald	Bald	Preferred
Plant	Palamocladium leskeoides	Palamocladium Moss	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Palamocladium leskeoides	Palamocladium Moss	Southern Interior Calcareous Cliff	Cliff/Talus	Preferred
Plant	Palamocladium leskeoides	Palamocladium Moss	Southern Interior Sinkhole Wall	Karst Outcrop	Suitable
Plant	Panax quinquefolius	American Ginseng	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Plant	Panax quinquefolius	American Ginseng	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Marginal
Plant	Panax quinquefolius	American Ginseng	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Plant	Panax quinquefolius	American Ginseng	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Plant	Panax quinquefolius	American Ginseng	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Plant	Panax quinquefolius	American Ginseng	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Plant	Panax quinquefolius	American Ginseng	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Panax quinquefolius	American Ginseng	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Plant	Panax quinquefolius	American Ginseng	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Panax quinquefolius	American Ginseng	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Panax quinquefolius	American Ginseng	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Plant	Panax quinquefolius	American Ginseng	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Plant	Panax quinquefolius	American Ginseng	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Panicum hemitomon	Maidencane	Pond	Forested Depression/Wet Flatwoods	Preferred
Plant	Parnassia grandifolia	Largeleaf Grass-of-Parnassus	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Plant	Parnassia grandifolia	Largeleaf Grass-of-Parnassus	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Parnassia grandifolia	Largeleaf Grass-of-Parnassus	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Parnassia grandifolia	Largeleaf Grass-of-Parnassus	Interior Low Plateau Seepage Fen	Open Seep/Fen	Preferred
Plant	Parnassia grandifolia	Largeleaf Grass-of-Parnassus	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Plant	Paronychia argyrocoma	Silverling	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Preferred
Plant	Paronychia argyrocoma	Silverling	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Preferred
Plant	Paronychia argyrocoma	Silverling	Southern Appalachian Rocky Summit	Mountain Summit	Preferred
Plant	Paronychia argyrocoma	Silverling	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Plant	Paronychia argyrocoma	Silverling	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Plant	Patis racemosa	mountain ricegrass	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Paxistima canbyi	Canby's Mountain-lover	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Plant	Paxistima canbyi	Canby's Mountain-lover	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Paxistima canbyi	Canby's Mountain-lover	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Paxistima canbyi	Canby's Mountain-lover	Southern Interior Calcareous Cliff	Cliff/Talus	Preferred
Plant	Paysonia densipila	Duck River Bladderpod	Pasture	Pasture	Marginal
Plant	Paysonia densipila	Duck River Bladderpod	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Paysonia densipila	Duck River Bladderpod	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Paysonia densipila	Duck River Bladderpod	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Paysonia densipila	Duck River Bladderpod	Cropland	Cropland	Suitable
Plant	Paysonia perforata	Spring Creek Bladderpod	Pasture	Pasture	Marginal
Plant	Paysonia perforata	Spring Creek Bladderpod	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Plant	Paysonia perforata	Spring Creek Bladderpod	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Paysonia perforata	Spring Creek Bladderpod	Cropland	Cropland	Suitable
Plant	Paysonia stonensis	Stones River Bladderpod	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Paysonia stonensis	Stones River Bladderpod	Pasture	Pasture	Marginal
Plant	Paysonia stonensis	Stones River Bladderpod	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Plant	Paysonia stonensis	Stones River Bladderpod	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Paysonia stonensis	Stones River Bladderpod	Cropland	Cropland	Suitable
Plant	Pedicularis lanceolata	Swamp Lousewort	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Marginal
Plant	Pedicularis lanceolata	Swamp Lousewort	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Pedicularis lanceolata	Swamp Lousewort	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Plant	Pedicularis lanceolata	Swamp Lousewort	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Pedicularis lanceolata	Swamp Lousewort	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Pellia appalachiana	Appalachian Pellia	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Pellia appalachiana	Appalachian Pellia	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Plant	Penstemon kralii	Kral's Beardtongue	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Penstemon tubiflorus	White-wand Beardtongue	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Plant	Perideridia americana	Eastern Eulophus	Old Field / Successional	Old Field/Successional	Marginal
Plant	Perideridia americana	Eastern Eulophus	Pasture	Pasture	Marginal
Plant	Perideridia americana	Eastern Eulophus	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Perideridia americana	Eastern Eulophus	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Perideridia americana	Eastern Eulophus	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Preferred
Plant	Perideridia americana	Eastern Eulophus	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Perideridia americana	Eastern Eulophus	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Perideridia americana	Eastern Eulophus	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Plant	Perideridia americana	Eastern Eulophus	Forest Plantation	Forest Plantation	Suitable
Plant	Phegopteris connectilis	Northern Beech Fern	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Marginal
Plant	Phegopteris connectilis	Northern Beech Fern	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Marginal
Plant	Phegopteris connectilis	Northern Beech Fern	Southern Appalachian Spray Cliff	Cliff/Talus	Preferred
Plant	Phegopteris connectilis	Northern Beech Fern	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Plant	Phegopteris connectilis	Northern Beech Fern	Southern Appalachian Rocky Summit	Mountain Summit	Suitable
Plant	Phemeranthus calcaricus	Limestone Fameflower	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Phemeranthus calcaricus	Limestone Fameflower	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Phemeranthus calcaricus	Limestone Fameflower	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Phemeranthus calcaricus	Limestone Fameflower	Forest Plantation	Forest Plantation	Suitable
Plant	Phemeranthus calcaricus	Limestone Fameflower	Old Field / Successional	Old Field/Successional	Suitable
Plant	Phemeranthus calcaricus	Limestone Fameflower	Pasture	Pasture	Suitable
Plant	Phemeranthus mengesii	Large-flower Rock-pink	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Preferred
Plant	Phemeranthus teretifolius	Roundleaf Fameflower	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Phemeranthus teretifolius	Roundleaf Fameflower	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Preferred
Plant	Phemeranthus teretifolius	Roundleaf Fameflower	Old Field / Successional	Old Field/Successional	Preferred
Plant	Phemeranthus teretifolius	Roundleaf Fameflower	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Phlox bifida ssp. stellaria	Cleft Phlox	Old Field / Successional	Old Field/Successional	Marginal
Plant	Phlox bifida ssp. stellaria	Cleft Phlox	Pasture	Pasture	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Phlox bifida ssp. stellaria	Cleft Phlox	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Phlox bifida ssp. stellaria	Cleft Phlox	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Phlox bifida ssp. stellaria	Cleft Phlox	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Phlox bifida ssp. stellaria	Cleft Phlox	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Phlox bifida ssp. stellaria	Cleft Phlox	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Phlox bifida ssp. stellaria	Cleft Phlox	Forest Plantation	Forest Plantation	Suitable
Plant	Phlox pilosa ssp. ozarkana	Downy Phlox	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Phlox pilosa ssp. ozarkana	Downy Phlox	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Plant	Phlox subulata	Moss Phlox	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Plant	Phlox subulata	Moss Phlox	Southern Interior Calcareous Cliff	Cliff/Talus	Preferred
Plant	Phyllanthopsis phyllanthoides	Missouri Buck-brush	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Plant	Physaria globosa	Globe Bladderpod	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Plant	Physaria globosa	Globe Bladderpod	Old Field / Successional	Old Field/Successional	Marginal
Plant	Physaria globosa	Globe Bladderpod	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Physaria globosa	Globe Bladderpod	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Pieris floribunda	Mountain Fetterbush	Southern Appalachian Grass and Shrub Bald	Bald	Preferred
Plant	Pieris floribunda	Mountain Fetterbush	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Plant	Pilularia americana	American Pillwort	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Preferred
Plant	Pilularia americana	American Pillwort	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Pilularia americana	American Pillwort	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Pityopsis ruthii	Ruth's Silk-grass	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Plagiochila exigua	a liverwort	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Plant	Plagiochila punctata	Spotty Featherwort	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Preferred
Plant	Plagiomnium carolinianum	Mountain Wavy-leaf Moss	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Marginal
Plant	Plagiomnium carolinianum	Mountain Wavy-leaf Moss	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Plagiomnium carolinianum	Mountain Wavy-leaf Moss	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Plantago cordata	Heartleaf Plantain	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Platanthera cristata	Yellow-crested Orchid	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Platanthera flava var. herbiola	Pale-green Orchid	Southern Appalachian Seepage Wetland	Open Seep/Fen	Marginal
Plant	Platanthera flava var. herbiola	Pale-green Orchid	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Platanthera grandiflora	Large Purple Fringed Orchid	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Platanthera grandiflora	Large Purple Fringed Orchid	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Platanthera integra	Yellow Fringeless Orchid	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Platanthera integra	Yellow Fringeless Orchid	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Preferred
Plant	Platanthera integrilabia	White Fringeless Orchid	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Preferred
Plant	Platanthera integrilabia	White Fringeless Orchid	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Platanthera integrilabia	White Fringeless Orchid	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Platanthera integrilabia	White Fringeless Orchid	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Platanthera integrilabia	White Fringeless Orchid	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Platanthera integrilabia	White Fringeless Orchid	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Plant	Platanthera integrilabia	White Fringeless Orchid	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Platanthera nivea	Snowy Orchid	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Platanthera psycodes	Small Purple Fringed Orchid	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Platanthera psycodes	Small Purple Fringed Orchid	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Platanthera psycodes	Small Purple Fringed Orchid	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Platanthera psycodes	Small Purple Fringed Orchid	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Platanthera psycodes	Small Purple Fringed Orchid	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Platanthera psycodes	Small Purple Fringed Orchid	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Platanthera psycodes	Small Purple Fringed Orchid	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Platanthera psycodes	Small Purple Fringed Orchid	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Poa palustris	Fowl Bluegrass	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Plant	Poa palustris	Fowl Bluegrass	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Poa palustris	Fowl Bluegrass	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Poa palustris	Fowl Bluegrass	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Poa saltuensis	Drooping Bluegrass	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Poa saltuensis	Drooping Bluegrass	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Poa saltuensis	Drooping Bluegrass	Cumberland Riverscour	Forested Bottomland Floodplain	Suitable
Plant	Poa saltuensis	Drooping Bluegrass	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Pogonia ophioglossoides	Rose Pogonia	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Plant	Pogonia ophioglossoides	Rose Pogonia	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Pogonia ophioglossoides	Rose Pogonia	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Pogonia ophioglossoides	Rose Pogonia	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Pogonia ophioglossoides	Rose Pogonia	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Pogonia ophioglossoides	Rose Pogonia	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Pogonia ophioglossoides	Rose Pogonia	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Plant	Pogonia ophioglossoides	Rose Pogonia	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Pogonia ophioglossoides	Rose Pogonia	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Polygala boykinii	Boykin's Milkwort	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Polygala mariana	Maryland Milkwort	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Polygala mariana	Maryland Milkwort	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Plant	Polygala mariana	Maryland Milkwort	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Polygala mariana	Maryland Milkwort	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Polygala mariana	Maryland Milkwort	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Polygala nana	Dwarf Milkwort	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Polygala nana	Dwarf Milkwort	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Suitable
Plant	Polygala nuttallii	Nuttall's Milkwort	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Polygonella americana	Southern Jointweed	Cumberland Riverscour	Forested Bottomland Floodplain	Preferred
Plant	Polygonum arifolium	Halberd-leaf Tearthumb	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Polygonum arifolium	Halberd-leaf Tearthumb	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Polygonum arifolium	Halberd-leaf Tearthumb	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Plant	Polymnia johnbeckii	John Beck's Leafcup	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Polytaenia nuttallii	Prairie Parsley	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Preferred
Plant	Polytaenia nuttallii	Prairie Parsley	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Plant	Ponthieva racemosa	Shadow-witch Orchid	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Porella gracillima	Hot Porella	Southern Interior Sinkhole Wall	Karst Outcrop	Preferred
Plant	Porella gracillima	Hot Porella	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Plant	Porella wataugensis	Watauga Porella	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Preferred
Plant	Porella wataugensis	Watauga Porella	Southern Appalachian Spray Cliff	Cliff/Talus	Suitable
Plant	Potamogeton amplifolius	Largeleaf Pondweed	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Potamogeton amplifolius	Largeleaf Pondweed	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Plant	Potamogeton epihydrus	Nuttall's Pondweed	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Plant	Potamogeton epihydrus	Nuttall's Pondweed	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Potamogeton tennesseensis	Tennessee Pondweed	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Plant	Potamogeton tennesseensis	Tennessee Pondweed	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Prenanthes alba	White Rattlesnake-root	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Prenanthes aspera	Rough Rattlesnake-root	Forest Plantation	Forest Plantation	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Prenanthes aspera	Rough Rattlesnake-root	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Prenanthes aspera	Rough Rattlesnake-root	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Prenanthes barbata	Barbed Rattlesnake-root	Forest Plantation	Forest Plantation	Marginal
Plant	Prenanthes barbata	Barbed Rattlesnake-root	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Prenanthes barbata	Barbed Rattlesnake-root	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Prenanthes barbata	Barbed Rattlesnake-root	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Plant	Prenanthes barbata	Barbed Rattlesnake-root	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Prunus pumila	Sand Cherry	Pond	Forested Depression/Wet Flatwoods	Preferred
Plant	Prunus pumila	Sand Cherry	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Prunus virginiana	Choke Cherry	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Plant	Prunus virginiana	Choke Cherry	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Prunus virginiana	Choke Cherry	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Prunus virginiana	Choke Cherry	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Prunus virginiana	Choke Cherry	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Plant	Pseudognaphalium helleri	Catfoot	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Pseudognaphalium helleri	Catfoot	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Pseudognaphalium helleri	Catfoot	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Plant	Pycnanthemum beadlei	Beadle's Mountainmint	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Plant	Pycnanthemum torreyi	Torrey's Mountainmint	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Pycnanthemum torreyi	Torrey's Mountainmint	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Pycnanthemum torreyi	Torrey's Mountainmint	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Plant	Pyrola americana	American Wintergreen	Southern Appalachian Oak Forest	Upland Deciduous Forest	Preferred
Plant	Quercus margarettiae	Sand Post Oak	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Marginal
Plant	Quercus margarettiae	Sand Post Oak	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Preferred
Plant	Radula voluta	a liverwort	Cumberland Riverscour	Forested Bottomland Floodplain	Suitable
Plant	Radula voluta	a liverwort	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Plant	Radula voluta	a liverwort	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Plant	Radula voluta	a liverwort	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Plant	Radula voluta	a liverwort	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Plant	Radula voluta	a liverwort	Southern Interior Sinkhole Wall	Karst Outcrop	Suitable
Plant	Ranunculus aquatilis var. diffusus	Whitewater Crowfoot	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Plant	Ranunculus aquatilis var. diffusus	Whitewater Crowfoot	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Ranunculus aquatilis var. diffusus	Whitewater Crowfoot	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Ranunculus flabellaris	Yellow Water-crowfoot	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Plant	Ranunculus flabellaris	Yellow Water-crowfoot	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Plant	Ranunculus flabellaris	Yellow Water-crowfoot	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Rhachithecium perpusillum	Budding Tortula Moss	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Rhamnus alnifolia	Alderleaf Buckthorn	Southern Interior Calcareous Cliff	Cliff/Talus	Preferred
Plant	Rhynchosia latifolia	Prairie Rhynchosia	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Plant	Rhynchosia latifolia	Prairie Rhynchosia	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Rhynchospora caduca	Falling Beakrush	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Rhynchospora caduca	Falling Beakrush	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Plant	Rhynchospora capillacea	Horned Beakrush	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Rhynchospora chalarocephala	Loose-head Beakrush	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Rhynchospora debilis	Savannah Beakrush	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Rhynchospora harveyi	Harvey's Beakrush	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Rhynchospora macrostachya	Tall Beakrush	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Rhynchospora perplexa	Pineland Beakrush	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Rhynchospora perplexa	Pineland Beakrush	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Plant	Rhynchospora perplexa	Pineland Beakrush	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Rhynchospora rariflora	Few-flowered Beakrush	Pond	Forested Depression/Wet Flatwoods	Preferred
Plant	Rhynchospora rariflora	Few-flowered Beakrush	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Rhynchospora rariflora	Few-flowered Beakrush	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Plant	Ribes aureum var. villosum	Buffalo Currant	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Ribes curvatum	Granite Gooseberry	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Preferred
Plant	Ribes missouriense	Missouri Gooseberry	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Ribes missouriense	Missouri Gooseberry	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Plant	Ribes missouriense	Missouri Gooseberry	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Plant	Rorippa aquatica	Lake-cress	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Plant	Rorippa aquatica	Lake-cress	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Rorippa aquatica	Lake-cress	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Rudbeckia subtomentosa	Sweet Coneflower	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Rugelia nudicaulis	Rugel's Ragwort	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Plant	Rugelia nudicaulis	Rugel's Ragwort	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Sabatia capitata	Appalachian Rose-gentian	Cumberland Riverscour	Forested Bottomland Floodplain	Marginal
Plant	Sabatia capitata	Appalachian Rose-gentian	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Sabatia capitata	Appalachian Rose-gentian	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Suitable
Plant	Sabatia capitata	Appalachian Rose-gentian	Old Field / Successional	Old Field/Successional	Suitable
Plant	Sacciolepis striata	Gibbous Panicgrass	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Sacciolepis striata	Gibbous Panicgrass	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Sacciolepis striata	Gibbous Panicgrass	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Sacciolepis striata	Gibbous Panicgrass	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Plant	Sagittaria brevirostra	Shortbeak Arrowhead	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred
Plant	Sagittaria graminea	Grassleaf Arrowhead	Pond	Forested Depression/Wet Flatwoods	Preferred
Plant	Sagittaria platyphylla	Ovate-leaf Arrowhead	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Plant	Sagittaria platyphylla	Ovate-leaf Arrowhead	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred
Plant	Sagittaria platyphylla	Ovate-leaf Arrowhead	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Plant	Sagittaria platyphylla	Ovate-leaf Arrowhead	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Sagittaria platyphylla	Ovate-leaf Arrowhead	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Plant	Sagittaria rigida	Sessile-fruit Arrowhead	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Salvia azurea var. grandiflora	Blue Sage	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Marginal
Plant	Salvia azurea var. grandiflora	Blue Sage	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Preferred
Plant	Sanguisorba canadensis	Canada Burnet	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Plant	Sanguisorba canadensis	Canada Burnet	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Schisandra glabra	Bay Starvine	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Preferred
Plant	Schisandra glabra	Bay Starvine	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Schisandra glabra	Bay Starvine	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Preferred
Plant	Schoenolirion croceum	Yellow Sunnybell	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Schoenoplectus subterminalis	Water Bulrush	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Scleria muehlenbergii	Muehlenberg's Nutrush	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Scleria verticillata	Low Nutrush	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Scleria verticillata	Low Nutrush	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Scopelophila cataractae	Agoyan Cataract Moss	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Preferred
Plant	Scutellaria arguta	Hairy Skullcap	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Plant	Scutellaria montana	Large-flower Skullcap	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Plant	Scutellaria montana	Large-flower Skullcap	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Scutellaria montana	Large-flower Skullcap	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Scutellaria montana	Large-flower Skullcap	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Sedum nevii	Nevius' Stonecrop	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Sedum nevii	Nevius' Stonecrop	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Plant	Sibbaldiopsis tridentata	Three-toothed Cinquefoil	Southern Appalachian Grass and Shrub Bald	Bald	Preferred
Plant	Sibbaldiopsis tridentata	Three-toothed Cinquefoil	Southern Appalachian Rocky Summit	Mountain Summit	Suitable
Plant	Silene caroliniana ssp. pensylvanica	Carolina Pink	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Marginal
Plant	Silene caroliniana ssp. pensylvanica	Carolina Pink	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Silene caroliniana ssp. pensylvanica	Carolina Pink	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Suitable
Plant	Silene caroliniana ssp. pensylvanica	Carolina Pink	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Plant	Silene ovata	Ovate Catchfly	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Silene ovata	Ovate Catchfly	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Preferred
Plant	Silene ovata	Ovate Catchfly	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Silene ovata	Ovate Catchfly	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Plant	Silene ovata	Ovate Catchfly	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Silene ovata	Ovate Catchfly	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Silene ovata	Ovate Catchfly	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Plant	Silene ovata	Ovate Catchfly	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Plant	Silene ovata	Ovate Catchfly	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Plant	Silene ovata	Ovate Catchfly	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Silene ovata	Ovate Catchfly	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Silene ovata	Ovate Catchfly	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Silene ovata	Ovate Catchfly	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Silene ovata	Ovate Catchfly	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Plant	Silphium brachiatum	Cumberland Rosinweed	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Preferred
Plant	Silphium brachiatum	Cumberland Rosinweed	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Silphium laciniatum	Compass Plant	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Silphium laciniatum	Compass Plant	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Silphium laciniatum	Compass Plant	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Plant	Silphium laciniatum	Compass Plant	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Plant	Silphium laciniatum	Compass Plant	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Plant	Silphium laciniatum	Compass Plant	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Silphium pinnatifidum	Tansy Rosinweed	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Plant	Silphium pinnatifidum	Tansy Rosinweed	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Plant	Silphium pinnatifidum	Tansy Rosinweed	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Suitable
Plant	Silphium pinnatifidum	Tansy Rosinweed	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Silphium pinnatifidum	Tansy Rosinweed	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Silphium pinnatifidum	Tansy Rosinweed	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Silphium pinnatifidum	Tansy Rosinweed	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Plant	Silphium wasiotense	Appalachian Rosinweed	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Marginal
Plant	Silphium wasiotense	Appalachian Rosinweed	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Preferred
Plant	Silphium wasiotense	Appalachian Rosinweed	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Silphium wasiotense	Appalachian Rosinweed	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Silphium wasiotense	Appalachian Rosinweed	Old Field / Successional	Old Field/Successional	Suitable
Plant	Smilax laurifolia	Laurel-leaf Greenbrier	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Plant	Smilax laurifolia	Laurel-leaf Greenbrier	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Solenostoma appalachianum	a liverwort	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Solenostoma appalachianum	a liverwort	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Solenostoma fossombronioides	a liverwort	Cumberland Riverscour	Forested Bottomland Floodplain	Marginal
Plant	Solenostoma fossombronioides	a liverwort	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Solenostoma fossombronioides	a liverwort	Southern Appalachian Spray Cliff	Cliff/Talus	Suitable
Plant	Solidago arenicola	Southern Racemose Goldenrod	Cumberland Riverscour	Forested Bottomland Floodplain	Preferred
Plant	Solidago arenicola	Southern Racemose Goldenrod	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Solidago arenicola	Southern Racemose Goldenrod	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Solidago arenicola	Southern Racemose Goldenrod	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Solidago arenicola	Southern Racemose Goldenrod	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Solidago arenicola	Southern Racemose Goldenrod	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Solidago arenicola	Southern Racemose Goldenrod	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Solidago arenicola	Southern Racemose Goldenrod	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Solidago arenicola	Southern Racemose Goldenrod	Old Field / Successional	Old Field/Successional	Suitable
Plant	Solidago austrina	Southern Bog Goldenrod	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Solidago austrina	Southern Bog Goldenrod	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Solidago austrina	Southern Bog Goldenrod	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Solidago austrina	Southern Bog Goldenrod	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Solidago austrina	Southern Bog Goldenrod	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Solidago austrina	Southern Bog Goldenrod	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Solidago austrina	Southern Bog Goldenrod	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Solidago austrina	Southern Bog Goldenrod	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Solidago austrina	Southern Bog Goldenrod	Old Field / Successional	Old Field/Successional	Suitable
Plant	Solidago faucibus	Gorge Goldenrod	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Solidago faucibus	Gorge Goldenrod	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Solidago faucibus	Gorge Goldenrod	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Solidago faucibus	Gorge Goldenrod	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Solidago gattingeri	Gattinger's Goldenrod	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Solidago lancifolia	Broadleaf Goldenrod	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Solidago lancifolia	Broadleaf Goldenrod	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Solidago rupestris	Rock Goldenrod	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Solidago spithamaea	Blue Ridge Goldenrod	Southern Appalachian Rocky Summit	Mountain Summit	Preferred
Plant	Solidago tarda	Late Goldenrod	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Plant	Solidago tarda	Late Goldenrod	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Preferred
Plant	Sparganium androcladum	Branching Bur-reed	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Plant	Sparganium androcladum	Branching Bur-reed	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Sphenolobopsis pearsonii	Horsehair Threadwort	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Plant	Sphenolobus saxicola	Curled Notchwort	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Sphenolobus saxicola	Curled Notchwort	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Plant	Spiraea alba	Narrowleaf Meadowsweet	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Spiraea virginiana	Virginia Spiraea	Cumberland Riverscour	Forested Bottomland Floodplain	Preferred
Plant	Spiraea virginiana	Virginia Spiraea	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Spiraea virginiana	Virginia Spiraea	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Spiraea virginiana	Virginia Spiraea	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Spiraea virginiana	Virginia Spiraea	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Spiraea virginiana	Virginia Spiraea	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Spiraea virginiana	Virginia Spiraea	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Spiraea virginiana	Virginia Spiraea	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Spiraea virginiana	Virginia Spiraea	Old Field / Successional	Old Field/Successional	Suitable
Plant	Spiranthes lucida	Shining Ladies'-tresses	Interior Low Plateau Seepage Fen	Open Seep/Fen	Preferred

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Spiranthes lucida	Shining Ladies'-tresses	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Spiranthes lucida	Shining Ladies'-tresses	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Spiranthes lucida	Shining Ladies'-tresses	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Spiranthes lucida	Shining Ladies'-tresses	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Spiranthes lucida	Shining Ladies'-tresses	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Spiranthes magnicamporum	Great Plains Ladies'-tresses	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Plant	Spiranthes magnicamporum	Great Plains Ladies'-tresses	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Spiranthes magnicamporum	Great Plains Ladies'-tresses	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Spiranthes magnicamporum	Great Plains Ladies'-tresses	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Plant	Spiranthes magnicamporum	Great Plains Ladies'-tresses	Forest Plantation	Forest Plantation	Suitable
Plant	Spiranthes magnicamporum	Great Plains Ladies'-tresses	Old Field / Successional	Old Field/Successional	Suitable
Plant	Spiranthes magnicamporum	Great Plains Ladies'-tresses	Pasture	Pasture	Suitable
Plant	Spiranthes ochroleuca	Yellow Nodding Ladies'-tresses	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Spiranthes odorata	Sweetscent Ladies'-tresses	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Plant	Spiranthes odorata	Sweetscent Ladies'-tresses	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Plant	Spiranthes odorata	Sweetscent Ladies'-tresses	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Plant	Spiranthes odorata	Sweetscent Ladies'-tresses	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Plant	Spiranthes odorata	Sweetscent Ladies'-tresses	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Spiranthes odorata	Sweetscent Ladies'-tresses	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Plant	Spiranthes odorata	Sweetscent Ladies'-tresses	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Spiranthes odorata	Sweetscent Ladies'-tresses	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Spiranthes odorata	Sweetscent Ladies'-tresses	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Spiranthes odorata	Sweetscent Ladies'-tresses	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Sporobolus heterolepis	Northern Dropseed	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Sporobolus junceus	Sandhill Dropseed	Cumberland Riverscour	Forested Bottomland Floodplain	Suitable
Plant	Stachys clingmanii	Clingman's Hedge-nettle	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Preferred
Plant	Stachys clingmanii	Clingman's Hedge-nettle	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Stachys clingmanii	Clingman's Hedge-nettle	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Stachys glandulosissima		Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Stachys glandulosissima		Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Stellaria alsine	Trailing Stitchwort	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Plant	Stellaria alsine	Trailing Stitchwort	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Stellaria alsine	Trailing Stitchwort	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Stellaria fontinalis	Water Stitchwort	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Stellaria fontinalis	Water Stitchwort	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Plant	Stellaria fontinalis	Water Stitchwort	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Stellaria fontinalis	Water Stitchwort	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Stellaria longifolia	Longleaf Stitchwort	Southern Appalachian Seepage Wetland	Open Seep/Fen	Marginal
Plant	Stellaria longifolia	Longleaf Stitchwort	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Plant	Stellaria longifolia	Longleaf Stitchwort	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Plant	Stenanthium diffusum	Rockhouse Featherbells	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Preferred
Plant	Stenanthium tennesseense	Tennessee Death-Camas	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Stenanthium tennesseense	Tennessee Death-Camas	Pond	Forested Depression/Wet Flatwoods	Preferred
Plant	Streptopus amplexifolius	Clasping Twisted-stalk	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Plant	Streptopus amplexifolius	Clasping Twisted-stalk	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Streptopus lanceolatus	Rosy Twisted-stalk	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Preferred
Plant	Streptopus lanceolatus	Rosy Twisted-stalk	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Streptopus lanceolatus	Rosy Twisted-stalk	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Streptopus lanceolatus	Rosy Twisted-stalk	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Plant	Streptopus lanceolatus	Rosy Twisted-stalk	Southern Appalachian Grass and Shrub Bald	Bald	Suitable
Plant	Streptopus lanceolatus	Rosy Twisted-stalk	Southern Appalachian Rocky Summit	Mountain Summit	Suitable
Plant	Stylisma humistrata	Southern Morning-glory	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Sullivantia sullivantii	Sullivantia	Southern Interior Calcareous Cliff	Cliff/Talus	Preferred
Plant	ericoides	White Heath Aster	Southern Appalachian Grass and Shrub Bald	Bald	Preferred
Plant	Symphyotrichum estesii		Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Symphyotrichum praealtum	Willow Aster	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal
Plant	Symphyotrichum praealtum	Willow Aster	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Plant	Symphyotrichum praealtum	Willow Aster	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Plant	Symphyotrichum praealtum	Willow Aster	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Symphyotrichum praealtum	Willow Aster	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Symphyotrichum praealtum	Willow Aster	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Symphyotrichum praealtum	Willow Aster	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Symphyotrichum praealtum	Willow Aster	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Symphyotrichum praealtum	Willow Aster	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Symphyotrichum praealtum	Willow Aster	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Symphyotrichum pratense	Barrens Silky Aster	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Plant	Symphyotrichum pratense	Barrens Silky Aster	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Preferred
Plant	Symphyotrichum pratense	Barrens Silky Aster	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Symphyotrichum pratense	Barrens Silky Aster	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Symphyotrichum pratense	Barrens Silky Aster	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Symphyotrichum pratense	Barrens Silky Aster	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Plant	Symphyotrichum pratense	Barrens Silky Aster	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Symphyotrichum pratense	Barrens Silky Aster	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Plant	Symphyotrichum pratense	Barrens Silky Aster	Forest Plantation	Forest Plantation	Suitable
Plant	Symphyotrichum pratense	Barrens Silky Aster	Old Field / Successional	Old Field/Successional	Suitable
Plant	Symphyotrichum pratense	Barrens Silky Aster	Pasture	Pasture	Suitable
Plant	Symplocarpus foetidus	Skunk-cabbage	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Plant	Symplocarpus foetidus	Skunk-cabbage	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Symplocarpus foetidus	Skunk-cabbage	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Symplocos tinctoria	Horsesugar	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Symplocos tinctoria	Horsesugar	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Symplocos tinctoria	Horsesugar	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Symplocos tinctoria	Horsesugar	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Syntrichia ammonsiana	Ammons' Screw Moss	Southern Appalachian Spray Cliff	Cliff/Talus	Suitable
Plant	Syntrichia ammonsiana	Ammons' Screw Moss	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Plant	Syntrichia fragilis	Fragmented Screw Moss	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Syntrichia fragilis	Fragmented Screw Moss	Southern Interior Sinkhole Wall	Karst Outcrop	Suitable
Plant	Taxus canadensis	Canadian Yew	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	brownianum	Brown's Four-toothed Moss	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Plant	brownianum	Brown's Four-toothed Moss	Southern Appalachian Spray Cliff	Cliff/Talus	Suitable
Plant	Thalictrum coriaceum	Leatherleaf Meadowrue	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Thalictrum coriaceum	Leatherleaf Meadowrue	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Thalictrum coriaceum	Leatherleaf Meadowrue	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Thalictrum coriaceum	Leatherleaf Meadowrue	Cumberland Riverscour	Forested Bottomland Floodplain	Suitable
Plant	Thalictrum coriaceum	Leatherleaf Meadowrue	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Thaspium pinnatifidum	Cutleaf Meadow-parsnip	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Plant	Thaspium pinnatifidum	Cutleaf Meadow-parsnip	Old Field / Successional	Old Field/Successional	Marginal
Plant	Thaspium pinnatifidum	Cutleaf Meadow-parsnip	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Thaspium pinnatifidum	Cutleaf Meadow-parsnip	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Thaspium pinnatifidum	Cutleaf Meadow-parsnip	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Plant	Thermopsis fraxinifolia	Ashleaf Bush-pea	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Thermopsis fraxinifolia	Ashleaf Bush-pea	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Thermopsis mollis	Allegheny Mountain Golden-banner	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Preferred
Plant	Torreyochloa pallida	Pale Manna Grass	Pond	Forested Depression/Wet Flatwoods	Preferred
Plant	Trautvetteria fonticalcarea	Leatherleaf Tassel-rue	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Triadenum fraseri	Fraser's Marsh-St. John's-wort	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Plant	Triantha glutinosa	Sticky Bog-asphodel	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Triantha racemosa	Coastal False Asphodel	Pond	Forested Depression/Wet Flatwoods	Marginal
Plant	Triantha racemosa	Coastal False Asphodel	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Plant	Trichophorum cespitosum	Tufted Clubrush	Southern Appalachian Grass and Shrub Bald	Bald	Marginal
Plant	Trichophorum cespitosum	Tufted Clubrush	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Marginal
Plant	Trichophorum cespitosum	Tufted Clubrush	Southern Appalachian Rocky Summit	Mountain Summit	Preferred
Plant	Tridens flavus var. chapmanii	Chapman's Redtop	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Preferred
Plant	Trientalis borealis	Northern Starflower	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Trientalis borealis	Northern Starflower	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Trientalis borealis	Northern Starflower	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Trientalis borealis	Northern Starflower	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Trientalis borealis	Northern Starflower	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Trientalis borealis	Northern Starflower	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Trifolium calcaricum	Running Glade Clover	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Preferred
Plant	Trifolium reflexum	Buffalo Clover	Forest Plantation	Forest Plantation	Marginal
Plant	Trifolium reflexum	Buffalo Clover	Old Field / Successional	Old Field/Successional	Marginal
Plant	Trifolium reflexum	Buffalo Clover	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Plant	Trifolium reflexum	Buffalo Clover	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Plant	Trifolium reflexum	Buffalo Clover	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Trifolium reflexum	Buffalo Clover	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Plant	Trifolium reflexum	Buffalo Clover	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Trifolium reflexum	Buffalo Clover	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Plant	Trifolium reflexum	Buffalo Clover	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Plant	Trifolium reflexum	Buffalo Clover	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Plant	Trifolium reflexum	Buffalo Clover	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Suitable
Plant	Trifolium reflexum	Buffalo Clover	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Trifolium reflexum	Buffalo Clover	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Trifolium reflexum	Buffalo Clover	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Trillium decumbens	Trailing Trillium	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Trillium decumbens	Trailing Trillium	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Trillium lancifolium	Lanceleaf Wakerobin	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Trillium lancifolium	Lanceleaf Wakerobin	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Trillium lancifolium	Lanceleaf Wakerobin	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Trillium pusillum	Least Trillium	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Trillium pusillum	Least Trillium	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Trillium pusillum	Least Trillium	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Trillium pusillum	Least Trillium	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Trillium pusillum	Least Trillium	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Trillium rugelii	Southern Nodding Trillium	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Plant	Trillium rugelii	Southern Nodding Trillium	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Trillium rugelii	Southern Nodding Trillium	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Trillium rugelii	Southern Nodding Trillium	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Trillium rugelii	Southern Nodding Trillium	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Trillium rugelii	Southern Nodding Trillium	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Trillium tennesseense	Tennessee Trillium	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Plant	Trillium tennesseense	Tennessee Trillium	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Plant	Trillium tennesseense	Tennessee Trillium	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Plant	Trillium tennesseense	Tennessee Trillium	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Trillium tennesseense	Tennessee Trillium	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Tsuga caroliniana	Carolina Hemlock	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Plant	Tsuga caroliniana	Carolina Hemlock	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Preferred
Plant	Tsuga caroliniana	Carolina Hemlock	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Turritis glabra	Tower-mustard	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Preferred
Plant	Turritis glabra	Tower-mustard	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Turritis glabra	Tower-mustard	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Plant	Turritis glabra	Tower-mustard	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Plant	Turritis glabra	Tower-mustard	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Plant	Turritis glabra	Tower-mustard	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Plant	Ulmus crassifolia	Cedar Elm	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Plant	Ulmus crassifolia	Cedar Elm	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Plant	Ulmus crassifolia	Cedar Elm	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Suitable
Plant	Ulmus crassifolia	Cedar Elm	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Ulmus crassifolia	Cedar Elm	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Plant	Ulmus crassifolia	Cedar Elm	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Plant	Utricularia cornuta	Horned Bladderwort	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Utricularia subulata	Zigzag Bladderwort	Pond	Forested Depression/Wet Flatwoods	Preferred
Plant	Utricularia subulata	Zigzag Bladderwort	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Vaccinium elliottii	Elliott's Blueberry	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Vaccinium elliottii	Elliott's Blueberry	Pond	Forested Depression/Wet Flatwoods	Suitable
Plant	Vaccinium macrocarpon	Large Cranberry	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Marginal
Plant	Vaccinium macrocarpon	Large Cranberry	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Marginal
Plant	Vaccinium macrocarpon	Large Cranberry	Pond	Forested Depression/Wet Flatwoods	Marginal
Plant	Vaccinium macrocarpon	Large Cranberry	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Plant	Vaccinium macrocarpon	Large Cranberry	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Vandenboschia boschiana	Appalachian Filmy Fern	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Plant	Vandenboschia boschiana	Appalachian Filmy Fern	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Preferred
Plant	Vandenboschia boschiana	Appalachian Filmy Fern	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Vandenboschia boschiana	Appalachian Filmy Fern	Central Interior Acidic Cliff and Talus	Cliff/Talus	Suitable
Plant	Vandenboschia boschiana	Appalachian Filmy Fern	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Plant	Veronica americana	American Speedwell	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Veronica americana	American Speedwell	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Plant	Veronica americana	American Speedwell	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Veronica catenata	Sessile Water-speedwell	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Veronica catenata	Sessile Water-speedwell	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Plant	Veronica scutellata	Marsh Speedwell	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Veronica scutellata	Marsh Speedwell	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Plant	Veronica scutellata	Marsh Speedwell	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Plant	Viburnum bracteatum	Limerock Arrow-wood	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Plant	Viburnum molle	Softleaf Arrow-wood	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Preferred
Plant	Viburnum molle	Softleaf Arrow-wood	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Plant	Viburnum molle	Softleaf Arrow-wood	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Viburnum rafinesquianum	Downy Arrow-wood	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Plant	Vitis rupestris	Rock Grape	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Plant	Vitis rupestris	Rock Grape	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Vitis rupestris	Rock Grape	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Plant	Vitis rupestris	Rock Grape	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Vitis rupestris	Rock Grape	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Vitis rupestris	Rock Grape	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Vitis rupestris	Rock Grape	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Plant	Vitis rupestris	Rock Grape	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Plant	Vitis rupestris	Rock Grape	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Plant	Vitis rupestris	Rock Grape	Old Field / Successional	Old Field/Successional	Suitable
Plant	Woodsia appalachiana	Appalachian Woodsia	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Marginal
Plant	Woodsia appalachiana	Appalachian Woodsia	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Preferred
Plant	Woodsia appalachiana	Appalachian Woodsia	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Preferred
Plant	Woodsia appalachiana	Appalachian Woodsia	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Woodsia appalachiana	Appalachian Woodsia	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Plant	Woodsia appalachiana	Appalachian Woodsia	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Plant	Xerophyllum asphodeloides	Eastern Turkeybeard	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Preferred
Plant	Xerophyllum asphodeloides	Eastern Turkeybeard	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Plant	Xerophyllum asphodeloides	Eastern Turkeybeard	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Plant	Xerophyllum asphodeloides	Eastern Turkeybeard	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Plant	Xyris ambigua	Coastal Plain Yellow-eyed-grass	Pond	Forested Depression/Wet Flatwoods	Preferred
Plant	Xyris ambigua	Coastal Plain Yellow-eyed-grass	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Suitable
Plant	Xyris fimbriata	Fringed Yellow-eyed-grass	Pond	Forested Depression/Wet Flatwoods	Preferred
Plant	Xyris laxifolia var. iridifolia	Laxleaf Yellow-eyed-grass	Pond	Forested Depression/Wet Flatwoods	Preferred
Plant	Xyris laxifolia var. iridifolia	Laxleaf Yellow-eyed-grass	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Plant	Xyris tennesseensis	Tennessee Yellow-eyed-grass	Interior Low Plateau Seepage Fen	Open Seep/Fen	Preferred
Plant	Zanthoxylum americanum	Northern Prickly-ash	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Plant	Zanthoxylum americanum	Northern Prickly-ash	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Plant	Zanthoxylum americanum	Northern Prickly-ash	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Plant	Zigadenus elegans	White Camas	Southern Interior Calcareous Cliff	Cliff/Talus	Suitable
Reptile	Clonophis kirtlandii	Kirtland's Snake	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Reptile	Clonophis kirtlandii	Kirtland's Snake	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Reptile	Clonophis kirtlandii	Kirtland's Snake	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Reptile	Clonophis kirtlandii	Kirtland's Snake	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Marginal
Reptile	Clonophis kirtlandii	Kirtland's Snake	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Marginal
Reptile	Clonophis kirtlandii	Kirtland's Snake	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Marginal
Reptile	Clonophis kirtlandii	Kirtland's Snake	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Reptile	Clonophis kirtlandii	Kirtland's Snake	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Reptile	Clonophis kirtlandii	Kirtland's Snake	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Marginal
Reptile	Clonophis kirtlandii	Kirtland's Snake	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Reptile	Clonophis kirtlandii	Kirtland's Snake	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Reptile	Clonophis kirtlandii	Kirtland's Snake	Pond	Forested Depression/Wet Flatwoods	Marginal
Reptile	Clonophis kirtlandii	Kirtland's Snake	Interior Low Plateau Seepage Fen	Open Seep/Fen	Marginal
Reptile	Clonophis kirtlandii	Kirtland's Snake	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Reptile	Clonophis kirtlandii	Kirtland's Snake	Old Field / Successional	Old Field/Successional	Marginal
Reptile	Clonophis kirtlandii	Kirtland's Snake	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Preferred
Reptile	Clonophis kirtlandii	Kirtland's Snake	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Preferred
Reptile	Clonophis kirtlandii	Kirtland's Snake	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Reptile	Clonophis kirtlandii	Kirtland's Snake	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Reptile	Clonophis kirtlandii	Kirtland's Snake	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Reptile	Clonophis kirtlandii	Kirtland's Snake	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Reptile	Clonophis kirtlandii	Kirtland's Snake	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Reptile	Clonophis kirtlandii	Kirtland's Snake	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Reptile	Clonophis kirtlandii	Kirtland's Snake	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Reptile	Clonophis kirtlandii	Kirtland's Snake	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Reptile	Coluber flagellum	Coachwhip	Forest Plantation	Forest Plantation	Marginal
Reptile	Coluber flagellum	Coachwhip	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Reptile	Coluber flagellum	Coachwhip	Pasture	Pasture	Marginal
Reptile	Coluber flagellum	Coachwhip	Cropland	Cropland	Marginal
Reptile	Coluber flagellum	Coachwhip	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Reptile	Coluber flagellum	Coachwhip	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Preferred
Reptile	Coluber flagellum	Coachwhip	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Preferred
Reptile	Coluber flagellum	Coachwhip	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Reptile	Coluber flagellum	Coachwhip	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Reptile	Coluber flagellum	Coachwhip	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Reptile	Coluber flagellum	Coachwhip	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Reptile	Coluber flagellum	Coachwhip	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Reptile	Coluber flagellum	Coachwhip	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Reptile	Coluber flagellum	Coachwhip	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Reptile	Coluber flagellum	Coachwhip	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Reptile	Coluber flagellum	Coachwhip	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Reptile	Coluber flagellum	Coachwhip	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Reptile	Coluber flagellum	Coachwhip	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Reptile	Coluber flagellum	Coachwhip	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Reptile	Coluber flagellum	Coachwhip	Old Field / Successional	Old Field/Successional	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	Appalachian Shale Barrens	Upland Mixed Forest	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	Southern Appalachian Grass and Shrub Bald	Bald	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	Pond	Forested Depression/Wet Flatwoods	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	Southern Appalachian Seepage Wetland	Open Seep/Fen	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	Forest Plantation	Forest Plantation	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	Pasture	Pasture	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	Cropland	Cropland	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Reptile	Crotalus horridus	Timber Rattlesnake	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Reptile	Crotalus horridus	Timber Rattlesnake	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Preferred
Reptile	Crotalus horridus	Timber Rattlesnake	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Preferred
Reptile	Crotalus horridus	Timber Rattlesnake	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Preferred
Reptile	Crotalus horridus	Timber Rattlesnake	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Preferred
Reptile	Crotalus horridus	Timber Rattlesnake	Southern Appalachian Oak Forest	Upland Deciduous Forest	Preferred
Reptile	Crotalus horridus	Timber Rattlesnake	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Reptile	Crotalus horridus	Timber Rattlesnake	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Reptile	Crotalus horridus	Timber Rattlesnake	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Reptile	Crotalus horridus	Timber Rattlesnake	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Reptile	Crotalus horridus	Timber Rattlesnake	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	Central Interior Acidic Cliff and Talus	Cliff/Talus	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	Central Interior Calcareous Cliff and Talus	Cliff/Talus	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	Cumberland Acidic Cliff and Rockhouse	Cliff/Talus	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Suitable
Reptile	Crotalus horridus	Timber Rattlesnake	Old Field / Successional	Old Field/Successional	Suitable
Reptile	Farancia abacura	Red-bellied Mudsnake	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Reptile	Farancia abacura	Red-bellied Mudsnake	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Marginal
Reptile	Farancia abacura	Red-bellied Mudsnake	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Marginal
Reptile	Farancia abacura	Red-bellied Mudsnake	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Marginal
Reptile	Farancia abacura	Red-bellied Mudsnake	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Reptile	Farancia abacura	Red-bellied Mudsnake	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Reptile	Farancia abacura	Red-bellied Mudsnake	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Reptile	Farancia abacura	Red-bellied Mudsnake	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Reptile	Farancia abacura	Red-bellied Mudsnake	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Reptile	Farancia abacura	Red-bellied Mudsnake	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Reptile	Farancia abacura	Red-bellied Mudsnake	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred
Reptile	Farancia abacura	Red-bellied Mudsnake	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Preferred
Reptile	Farancia abacura	Red-bellied Mudsnake	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Preferred
Reptile	Farancia abacura	Red-bellied Mudsnake	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Preferred
Reptile	Farancia abacura	Red-bellied Mudsnake	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Suitable
Reptile	Farancia abacura	Red-bellied Mudsnake	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Reptile	Glyptemys muhlenbergii	Bog Turtle	Old Field / Successional	Old Field/Successional	Marginal
Reptile	Glyptemys muhlenbergii	Bog Turtle	Pasture	Pasture	Marginal
Reptile	Glyptemys muhlenbergii	Bog Turtle	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Marginal
Reptile	Glyptemys muhlenbergii	Bog Turtle	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Preferred
Reptile	Glyptemys muhlenbergii	Bog Turtle	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Reptile	Glyptemys muhlenbergii	Bog Turtle	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Reptile	Haldea striatula	Rough Earthsnake	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Marginal
Reptile	Haldea striatula	Rough Earthsnake	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Marginal
Reptile	Haldea striatula	Rough Earthsnake	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Marginal
Reptile	Haldea striatula	Rough Earthsnake	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Reptile	Haldea striatula	Rough Earthsnake	Pasture	Pasture	Marginal
Reptile	Haldea striatula	Rough Earthsnake	Cropland	Cropland	Marginal
Reptile	Haldea striatula	Rough Earthsnake	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Reptile	Haldea striatula	Rough Earthsnake	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Reptile	Haldea striatula	Rough Earthsnake	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Reptile	Haldea striatula	Rough Earthsnake	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Reptile	Haldea striatula	Rough Earthsnake	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Reptile	Haldea striatula	Rough Earthsnake	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Reptile	Haldea striatula	Rough Earthsnake	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Reptile	Haldea striatula	Rough Earthsnake	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Reptile	Haldea striatula	Rough Earthsnake	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Reptile	Haldea striatula	Rough Earthsnake	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Reptile	Haldea striatula	Rough Earthsnake	Old Field / Successional	Old Field/Successional	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Marginal
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Marginal
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Marginal
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Marginal
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Marginal
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Marginal
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Marginal
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Southern Appalachian Seepage Wetland	Open Seep/Fen	Marginal
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Southern Appalachian Montane Cliff and Talus	Cliff/Talus	Marginal
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Forest Plantation	Forest Plantation	Marginal
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Pasture	Pasture	Marginal
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Cropland	Cropland	Marginal
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Preferred

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Pond	Forested Depression/Wet Flatwoods	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Reptile	Heterodon platirhinos	Eastern Hog-nosed Snake	Old Field / Successional	Old Field/Successional	Suitable
Reptile	Nerodia cyclopion	Mississippi Green Watersnake	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Marginal
Reptile	Nerodia cyclopion	Mississippi Green Watersnake	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Reptile	Nerodia cyclopion	Mississippi Green Watersnake	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Reptile	Nerodia cyclopion	Mississippi Green Watersnake	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Reptile	Nerodia cyclopion	Mississippi Green Watersnake	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Reptile	Nerodia cyclopion	Mississippi Green Watersnake	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Preferred
Reptile	Nerodia cyclopion	Mississippi Green Watersnake	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Reptile	Nerodia cyclopion	Mississippi Green Watersnake	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred
Reptile	Nerodia cyclopion	Mississippi Green Watersnake	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Reptile	Nerodia cyclopion	Mississippi Green Watersnake	Converted Wetland (Lacustrine)	Converted/Altered Forested Wetland	Suitable
Reptile	Nerodia cyclopion	Mississippi Green Watersnake	Converted Wetland (Riverine)	Converted/Altered Forested Wetland	Suitable
Reptile	Nerodia cyclopion	Mississippi Green Watersnake	Converted Wetland (Palustrine)	Converted/Altered Forested Wetland	Suitable
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Marginal
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Marginal
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Appalachian Shale Barrens	Upland Mixed Forest	Marginal
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Marginal
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Marginal
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Marginal
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Forest Plantation	Forest Plantation	Marginal

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Preferred
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Preferred
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Preferred
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Preferred
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Preferred
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Reptile	Ophisaurus attenuatus longicaudus	Eastern Slender Glass Lizard	Old Field / Successional	Old Field/Successional	Suitable
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Marginal
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Marginal
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Marginal
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Appalachian Shale Barrens	Upland Mixed Forest	Marginal
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Marginal
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Marginal
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Marginal
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Marginal
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Urban / Suburban Managed Forestland	Urban/Suburban Managed Forest	Marginal
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Pasture	Pasture	Marginal
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Urban / Suburban Managed Grassland	Urban/Suburban Managed Grassland	Marginal
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Excavated Land (Strip Mine / Road Cut / Rock Quarry / Gravel Pit)	Excavated Land	Marginal
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Preferred
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Suitable
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Forest Plantation	Forest Plantation	Suitable
Reptile	Pituophis melanoleucus melanoleucus	Northern Pinesnake	Old Field / Successional	Old Field/Successional	Suitable
Reptile	Plestiodon anthracinus	Coal Skink	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Reptile	Plestiodon anthracinus	Coal Skink	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Reptile	Plestiodon anthracinus	Coal Skink	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Marginal
Reptile	Plestiodon anthracinus	Coal Skink	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Marginal
Reptile	Plestiodon anthracinus	Coal Skink	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Marginal
Reptile	Plestiodon anthracinus	Coal Skink	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Marginal
Reptile	Plestiodon anthracinus	Coal Skink	Southern Appalachian Oak Forest	Upland Deciduous Forest	Marginal
Reptile	Plestiodon anthracinus	Coal Skink	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Marginal
Reptile	Plestiodon anthracinus	Coal Skink	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Marginal
Reptile	Plestiodon anthracinus	Coal Skink	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Marginal
Reptile	Plestiodon anthracinus	Coal Skink	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Preferred
Reptile	Plestiodon anthracinus	Coal Skink	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Reptile	Plestiodon anthracinus	Coal Skink	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Reptile	Plestiodon anthracinus	Coal Skink	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Reptile	Plestiodon anthracinus	Coal Skink	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Reptile	Plestiodon anthracinus	Coal Skink	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Reptile	Plestiodon anthracinus	Coal Skink	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Reptile	Plestiodon anthracinus	Coal Skink	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Reptile	Plestiodon anthracinus	Coal Skink	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Reptile	Plestiodon anthracinus	Coal Skink	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Reptile	Plestiodon anthracinus	Coal Skink	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable
Reptile	Plestiodon anthracinus	Coal Skink	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Suitable
Reptile	Plestiodon anthracinus	Coal Skink	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Suitable
Reptile	Plestiodon anthracinus	Coal Skink	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Reptile	Plestiodon anthracinus	Coal Skink	Pond	Forested Depression/Wet Flatwoods	Suitable
Reptile	Plestiodon anthracinus	Coal Skink	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable
Reptile	Plestiodon anthracinus	Coal Skink	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Reptile	Sistrurus miliarius streckeri	Western Pygmy Rattlesnake	Interior Low Plateau Seepage Fen	Open Seep/Fen	Marginal
Reptile	Sistrurus miliarius streckeri	Western Pygmy Rattlesnake	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Preferred
Reptile	Sistrurus miliarius streckeri	Western Pygmy Rattlesnake	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Reptile	Sistrurus miliarius streckeri	Western Pygmy Rattlesnake	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Preferred
Reptile	Sistrurus miliarius streckeri	Western Pygmy Rattlesnake	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Preferred
Reptile	Sistrurus miliarius streckeri	Western Pygmy Rattlesnake	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Preferred
Reptile	Sistrurus miliarius streckeri	Western Pygmy Rattlesnake	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Reptile	Sistrurus miliarius streckeri	Western Pygmy Rattlesnake	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Reptile	Sistrurus miliarius streckeri	Western Pygmy Rattlesnake	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Reptile	Sistrurus miliarius streckeri	Western Pygmy Rattlesnake	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Reptile	Sistrurus miliarius streckeri	Western Pygmy Rattlesnake	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Reptile	Sistrurus miliarius streckeri	Western Pygmy Rattlesnake	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Reptile	Sistrurus miliarius streckeri	Western Pygmy Rattlesnake	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Reptile	Sistrurus miliarius streckeri	Western Pygmy Rattlesnake	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Reptile	Sistrurus miliarius streckeri	Western Pygmy Rattlesnake	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Reptile	Sistrurus miliarius streckeri	Western Pygmy Rattlesnake	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Reptile	Sistrurus miliarius streckeri	Western Pygmy Rattlesnake	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Suitable
Reptile	Sistrurus miliarius streckeri	Western Pygmy Rattlesnake	Pond	Forested Depression/Wet Flatwoods	Suitable
Reptile	Terrapene carolina	American Box Turtle	Central Interior Highlands Dry Acidic Glade and Barrens	Upland Mixed Forest	Marginal
Reptile	Terrapene carolina	American Box Turtle	Appalachian Shale Barrens	Upland Mixed Forest	Marginal
Reptile	Terrapene carolina	American Box Turtle	Central Interior Highlands Calcareous Glade and Barrens	Glade/Barrens	Marginal
Reptile	Terrapene carolina	American Box Turtle	Nashville Basin Limestone Glade and Woodland	Glade/Barrens	Marginal
Reptile	Terrapene carolina	American Box Turtle	Cumberland Sandstone Glade and Barrens	Glade/Barrens	Marginal
Reptile	Terrapene carolina	American Box Turtle	Ridge and Valley Calcareous Valley Bottom Glade and Woodland	Glade/Barrens	Marginal
Reptile	Terrapene carolina	American Box Turtle	Central Appalachian Alkaline Glade and Woodland	Glade/Barrens	Marginal
Reptile	Terrapene carolina	American Box Turtle	Southern and Central Appalachian Mafic Glade and Barrens	Glade/Barrens	Marginal
Reptile	Terrapene carolina	American Box Turtle	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Marginal
Reptile	Terrapene carolina	American Box Turtle	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Marginal
Reptile	Terrapene carolina	American Box Turtle	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Marginal
Reptile	Terrapene carolina	American Box Turtle	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Reptile	Terrapene carolina	American Box Turtle	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Marginal
Reptile	Terrapene carolina	American Box Turtle	Cumberland Wet-Mesic Meadow and Savanna	Prairie/Barrens	Marginal
Reptile	Terrapene carolina	American Box Turtle	Southern Ridge and Valley Patch Prairie	Prairie/Barrens	Marginal
Reptile	Terrapene carolina	American Box Turtle	Southern Appalachian Grass and Shrub Bald	Bald	Marginal
Reptile	Terrapene carolina	American Box Turtle	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Reptile	Terrapene carolina	American Box Turtle	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Marginal
Reptile	Terrapene carolina	American Box Turtle	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Marginal
Reptile	Terrapene carolina	American Box Turtle	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Reptile	Terrapene carolina	American Box Turtle	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Marginal
Reptile	Terrapene carolina	American Box Turtle	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Marginal
Reptile	Terrapene carolina	American Box Turtle	Cumberland Seepage Forest	Forested Seep/Bog/Swamp	Marginal
Reptile	Terrapene carolina	American Box Turtle	Southern and Central Appalachian Bog and Fen	Forested Seep/Bog/Swamp	Marginal
Reptile	Terrapene carolina	American Box Turtle	Mississippi River Bottomland Depression	Forested Depression/Wet Flatwoods	Marginal
Reptile	Terrapene carolina	American Box Turtle	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Marginal
Reptile	Terrapene carolina	American Box Turtle	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Suitable
Reptile	Terrapene carolina	American Box Turtle	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Suitable
Reptile	Terrapene carolina	American Box Turtle	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Reptile	Terrapene carolina	American Box Turtle	Southern Ridge and Valley / Cumberland Dry Calcareous Forest	Upland Deciduous Forest	Suitable
Reptile	Terrapene carolina	American Box Turtle	Allegheny-Cumberland Dry Oak Forest and Woodland	Upland Deciduous Forest	Suitable
Reptile	Terrapene carolina	American Box Turtle	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Suitable
Reptile	Terrapene carolina	American Box Turtle	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Suitable
Reptile	Terrapene carolina	American Box Turtle	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Suitable
Reptile	Terrapene carolina	American Box Turtle	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Suitable
Reptile	Terrapene carolina	American Box Turtle	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Reptile	Terrapene carolina	American Box Turtle	Southern and Central Appalachian Cove Forest	Upland Deciduous Forest	Suitable
Reptile	Terrapene carolina	American Box Turtle	Southern Appalachian Oak Forest	Upland Deciduous Forest	Suitable
Reptile	Terrapene carolina	American Box Turtle	Southern Appalachian Northern Hardwood Forest	Upland Deciduous Forest	Suitable
Reptile	Terrapene carolina	American Box Turtle	Southern Appalachian Low-Elevation Pine Forest	Upland Coniferous Forest	Suitable
Reptile	Terrapene carolina	American Box Turtle	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable
Reptile	Terrapene carolina	American Box Turtle	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Suitable
Reptile	Terrapene carolina	American Box Turtle	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	Upland Mixed Forest	Suitable
Reptile	Terrapene carolina	American Box Turtle	Appalachian (Hemlock)-Northern Hardwood Forest	Upland Mixed Forest	Suitable
Reptile	Terrapene carolina	American Box Turtle	Pond	Forested Depression/Wet Flatwoods	Suitable
Reptile	Terrapene carolina	American Box Turtle	Interior Low Plateau Seepage Fen	Open Seep/Fen	Suitable

Table E-2
Habitat preference information for terrestrial SGCN

Taxa Group	Scientific Name	Common Name	Ecological System (Habitat Type)	Habitat Group	SGCN Preference for Habitat Type
Reptile	Terrapene carolina	American Box Turtle	Southern Appalachian Seepage Wetland	Open Seep/Fen	Suitable
Reptile	Thamnophis proximus	Western Ribbonsnake	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland	Upland Deciduous Forest	Marginal
Reptile	Thamnophis proximus	Western Ribbonsnake	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest	Upland Deciduous Forest	Marginal
Reptile	Thamnophis proximus	Western Ribbonsnake	East Gulf Coastal Plain Northern Loess Bluff Forest	Upland Deciduous Forest	Marginal
Reptile	Thamnophis proximus	Western Ribbonsnake	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest	Upland Deciduous Forest	Marginal
Reptile	Thamnophis proximus	Western Ribbonsnake	South-Central Interior / Upper Coastal Plain Flatwoods	Upland Deciduous Forest	Marginal
Reptile	Thamnophis proximus	Western Ribbonsnake	East Gulf Coastal Plain Limestone Forest	Upland Deciduous Forest	Marginal
Reptile	Thamnophis proximus	Western Ribbonsnake	East Gulf Coastal Plain Black Belt Calcareous Prairie and Woodland	Prairie/Barrens	Marginal
Reptile	Thamnophis proximus	Western Ribbonsnake	East Gulf Coastal Plain Northern Seepage Swamp	Forested Seep/Bog/Swamp	Marginal
Reptile	Thamnophis proximus	Western Ribbonsnake	South-Central Interior / Upper Coastal Plain Wet Flatwoods	Forested Depression/Wet Flatwoods	Marginal
Reptile	Thamnophis proximus	Western Ribbonsnake	Pond	Forested Depression/Wet Flatwoods	Marginal
Reptile	Thamnophis proximus	Western Ribbonsnake	Interior Low Plateau Seepage Fen	Open Seep/Fen	Marginal
Reptile	Thamnophis proximus	Western Ribbonsnake	Old Field / Successional	Old Field/Successional	Marginal
Reptile	Thamnophis proximus	Western Ribbonsnake	Mississippi River Low Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Preferred
Reptile	Thamnophis proximus	Western Ribbonsnake	Mississippi River Riparian Forest	Forested Bottomland Floodplain	Preferred
Reptile	Thamnophis proximus	Western Ribbonsnake	Southern Interior Low Plateau Dry-Mesic Oak Forest	Upland Deciduous Forest	Suitable
Reptile	Thamnophis proximus	Western Ribbonsnake	South-Central Interior Mesophytic Forest	Upland Deciduous Forest	Suitable
Reptile	Thamnophis proximus	Western Ribbonsnake	East Gulf Coastal Plain Jackson Plain Prairie and Barrens	Prairie/Barrens	Suitable
Reptile	Thamnophis proximus	Western Ribbonsnake	Pennyroyal Karst Plain Prairie and Barrens	Prairie/Barrens	Suitable
Reptile	Thamnophis proximus	Western Ribbonsnake	Western Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Reptile	Thamnophis proximus	Western Ribbonsnake	Eastern Highland Rim Prairie and Barrens	Prairie/Barrens	Suitable
Reptile	Thamnophis proximus	Western Ribbonsnake	Mississippi River High Floodplain (Bottomland) Forest	Forested Bottomland Floodplain	Suitable
Reptile	Thamnophis proximus	Western Ribbonsnake	East Gulf Coastal Plain Large River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Reptile	Thamnophis proximus	Western Ribbonsnake	East Gulf Coastal Plain Small Stream and River Floodplain Forest	Forested Bottomland Floodplain	Suitable
Reptile	Thamnophis proximus	Western Ribbonsnake	South-Central Interior Small Stream and Riparian	Upland Riparian Zone/Floodplain	Suitable
Reptile	Thamnophis proximus	Western Ribbonsnake	South-Central Interior Large Floodplain	Upland Riparian Zone/Floodplain	Suitable
Tardigrade	Calohypsibius schusteri	Schuster's Tardigrade	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Tardigrade	Hypsibius roanensis	a tardigrade	Central and Southern Appalachian Spruce-Fir Forest	Upland Coniferous Forest	Preferred
Tardigrade	Hypsibius roanensis	a tardigrade	Southern Appalachian Montane Pine Forest and Woodland	Upland Coniferous Forest	Suitable

Tennessee 2025 State Wildlife Action Plan

Appendix F

Plant Species Selection Methodology for Tennessee

Tennessee SWAP Plant Species Selection Methodology used by Tennessee Dept. of Environment and Conservation

To begin selecting plant species for the Tennessee SWAP list, TDEC used the SEAFWA guidance to assign priorities to species.

Links to the guidance document:

- https://www.fishwildlife.org/application/files/3017/0552/5687/Priority_Tier_Reference_Guide_SEAFWA_SWAP.pdf
- https://www.fishwildlife.org/download_file/view/4734/354

Box 3.3 Plant species Priority Tier reference guide that may be used to help assign SGCN to priority tiers. Source: AFWA

Priority Tier	Definition	Reference Criteria
Highest Conservation Concern	Imperiled species that may become extirpated from my state in the near future unless conservation efforts are continued or enhanced. The population(s) in my state is/are important to the global conservation of the species.	-G1-G2 -RSGCN Very High or High **and** S1-S2 -ESA E -ESA T or C **and** S1-S2 -IUCN CR or EN **and** S1-S2 PIF Red Watchlist Species
High Conservation Concern	Imperiled species that may continue to decline in my state unless conservation efforts are continued or enhanced. The population(s) in my state is/are important to the global or regional conservation of the species. * While Highest Conservation Concern was the most frequently selected category for G5S1 species in the survey, this was a relatively weak preference that represented less than half of respondents (43%). Whether or not to designate G5S1 species as SGCN in your state should take into account the regional and global significance of your state's occurrence.	-G3-G4 **and** S1-S2 -G5 **and** S1* -RSGCN Mod **and** S1-S2 -RSGCN Very High or HIGH **and** S3 -ESA T or C **and** S3 -IUCN CR or EN **and** S3 -IUCN VU **and** S1-S2 PIF Yellow Watchlist Species
Moderate Conservation Concern	Species that may be currently stable but of long-term conservation concern due to increasing or emerging threats or species that are currently stable but are representative of an ecosystem or community in need of conservation or species that are currently stable but represented by a strong population or unique genetic diversity that is worthy of conservation within my state.	G3 **and** S3 RSGCN Mod **and** S3 IUCN VU **and** S3 PIF CBSD
Data Deficient	Species that may be imperiled, but lack of information on their conservation status, taxonomy, life history, and threats precludes the identification of conservation actions.	Any G Rank **and** SU SH or SX species that may be rediscovered IUCN Data Deficient

Using these criteria, species are categorized according to global and state ranks as well as RSGCN status.

In order to thoroughly assess the plant species all plant species in the Tennessee rare species tracking database (TN Biotics) were included regardless of state status (actively tracked or not). This includes previously tracked as well as actively tracked plant species. The list of 733 species was evaluated using the SEAFWA recommended criteria with the exception of IUCN categories. Many species have yet to be assigned an IUCN status and those that have are based on comparing current abundance with historical abundance, rather than assessing extinction risk. The Tennessee plant evaluation process involved implementing the criteria in Microsoft Excel worksheets as a series of conditions of 2 orders in a hierarchy. This process made use of 2 Excel functions, IF() and Left().

IF(condition,true,false) - Evaluates a condition and returns a user specified true or false value.
LEFT(text, [num_chars]) - Strips the leftmost user specified number of characters from a text string.

The first set of conditions splits each criterion into individual elements that can be converted to a conditional function in Excel. For example, in the "Highest Conservation Concern" category the first 3 reference criteria are "G1-G2", "RSGCN Very High or High and S1-S2" and "ESA E". For clarity, these are expanded to "Global Rank = G1 or Global Rank = G2", "RSGCN = VH or RSGCN = H", "State Rank = S1 or State Rank = S2" and "Endangered Species Act status = Endangered". A conditional function then tests each species for the individual criteria. When evaluating ranks, if a range rank has been assigned to the species, the highest rank in the range is used. For example, a rank of G2G3 would be evaluated as G2.

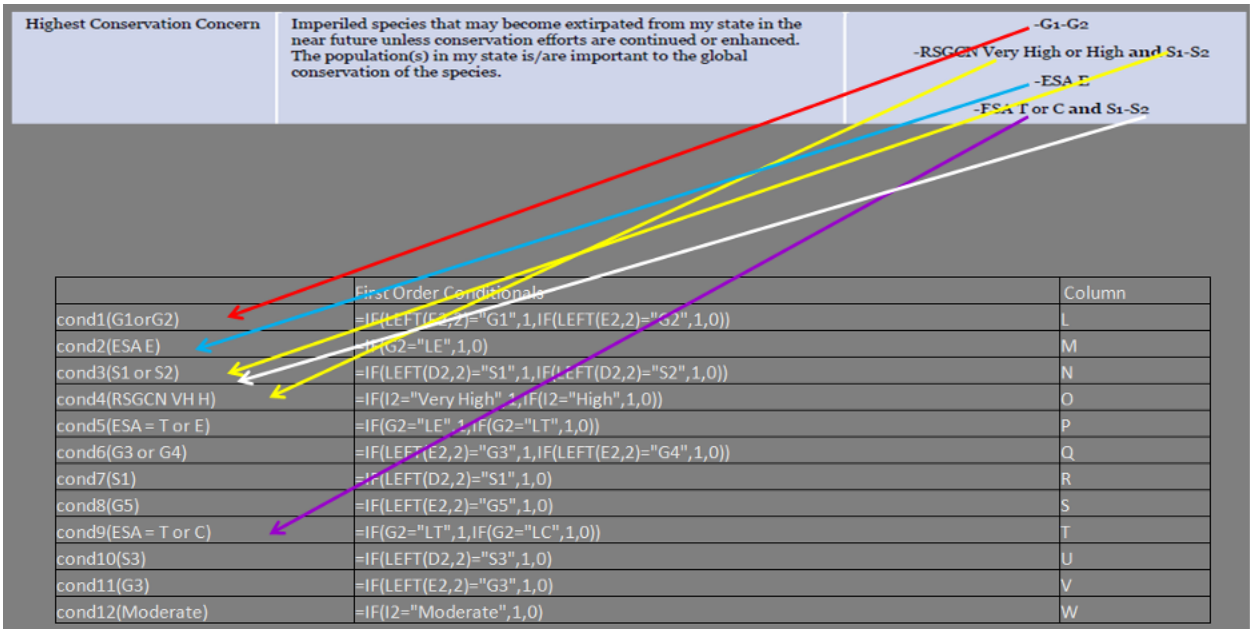
Below are the 3 resultant conditionals for the first 2 reference criteria in the example.

C1
Criterion: "G1 or G2"
Excel function: =IF(LEFT(E2,2)="G1",1,IF(LEFT(E2,2)="G2",1,0))

C2
Criterion: "ESA = E"
Excel function: =IF(G2="LE",1,0)

C3
Criterion: "S1 or S2"
Excel function: =IF(LEFT(D2,2)="S1",1,IF(LEFT(D2,2)="S2",1,0))

C4
Criterion: "RSGCN = VH or H"
Excel function: =IF(I2="Very High",1,IF(I2="High",1,0))



	First Order Conditionals	Column
cond1(G1orG2)	=IF(LEFT(E2,2)="G1",1,IF(LEFT(E2,2)="G2",1,0))	L
cond2(ESA E)	=IF(G2="LE",1,0)	M
cond3(S1 or S2)	=IF(LEFT(D2,2)="S1",1,IF(LEFT(D2,2)="S2",1,0))	N
cond4(RSGCN VH H)	=IF(I2="Very High",1,IF(I2="High",1,0))	O
cond5(ESA = T or E)	=IF(G2="LE",1,IF(G2="LT",1,0))	P
cond6(G3 or G4)	=IF(LEFT(E2,2)="G3",1,IF(LEFT(E2,2)="G4",1,0))	Q
cond7(S1)	=IF(LEFT(D2,2)="S1",1,0)	R
cond8(G5)	=IF(LEFT(E2,2)="G5",1,0)	S
cond9(ESA = T or C)	=IF(G2="LT",1,IF(G2="LC",1,0))	T
cond10(S3)	=IF(LEFT(D2,2)="S3",1,0)	U
cond11(G3)	=IF(LEFT(E2,2)="G3",1,0)	V
cond12(Moderate)	=IF(I2="Moderate",1,0)	W

Primary conditionals and their relationship to the criteria.

A secondary set of conditionals is used to assign priorities levels based on a table of binary values resulting from the primary conditionals. If a primary conditional evaluated to true then a value of 1 is present in the table. Likewise if the conditional evaluated to false then a value of 0 is present in the table. Using this method, multiple primary conditionals can be re-used in the secondary conditionals.

Self-documenting binary grid

Cond1 (G1orG2)	Cond2 (ESA E)	Cond3 (S1 or S2)	Cond4 (RSGCN VH H)	Cond5 (ESA = T or E)	Cond6 (G3 or G4)	Cond7 (S1)	Cond8 (G5)	Cond9 (ESA = T or C)	Cond10 (S3)	Cond11 (G3)	Cond12 (Moderate)
1	0	1	1	0	0	1	0	0	0	0	0
0	0	1	0	0	1	1	0	0	0	0	0
0	0	0	0	0	0	0	1	0	1	0	0
0	0	0	0	0	0	0	1	0	1	0	0
0	0	1	0	0	1	1	0	0	0	1	1
0	0	0	0	0	1	0	0	0	1	0	0
0	0	1	0	0	1	1	0	0	0	1	0
0	0	1	0	0	1	0	0	0	0	0	0

An example of a secondary conditional.

C1: "G1 or G2"
C2: "ESA = E"
Conditional: C1 or C2 = Highest
Excel function: =IF(L2+M2>0,"Highest","")

	Primary Conditionals
cond1(G1orG2)	IF(LEFT(E2,2)=“G1”,1,IF(LEFT(E2,2)="G2",1,0))
cond2(ESA E)	IF(G2="LE",1,0)
cond3(S1 or S2)	IF(LEFT(DS,2)=“S1”,1,IF(LEFT(D2,2)=“S2",1,0))
cond4(RSGCN VH H)	IF(12="Very High",1,IF(12="High",1,0))
cond5(ESA = T or E)	IF(G2="LE",1,IF(G2="LT",1,0))
cond6(G3 or G4)	IF(LEFT(E2,2)=“G3",1,IF(LEFT(E2,2)="G4",1,0))
cond7(S1)	IF(LEFT(D2,2)="S1",1,0)
cond8(G5)	IF(LEFT(E2,2)=“G5",1,0)
cond9(ESA = T or C)	IF(G2="LT",1,IF(G2="LC",1,0))
cond10(S3)	IF(LEFT(D2,2)="S3",1,0)
cond11(G3)	IF(LEFT(E2,2)="G3",1,0)
cond12(Moderate)	IF(12="Moderate",1,0)

Secondary Conditionals	
IF(L2+M2>0,"Highest","")	C1 or C2 = Highest
IF(N2+O2=2,“ Highest",IF(N2+P2=2,"Highest",""))	C3 and C4 = Highest Else C3 and C5 = Highest
IF(N2+Q2=2,"High","")	C3 and C6 = High
IF(R2+S2=2,“High","")	C7 and C8 = High***
IF(N2+W2=2,"High","")	C3 and C12 = High
IF(O2+U2=2,"High","")	C3 and C10 = High
IF(T2+U2=2,"High","")	C9 and C10 = High
IF(U2+V2=2,"Moderate",IF(W2+U2=2,"Moderate",""))	C10 and C11 = Moderate Else C11 and C12 = Moderate

Both sets of conditionals showing that secondary conditionals are dependent on primary conditionals (shaded cells in table).

There are 12 primary conditionals and 8 secondary conditionals. There is one conditional that combines them all into a priority assignment. This last conditional merely parses the results of the secondary conditional from higher to lower priority until it reaches a non-blank value. This is the highest priority assigned according to the criteria.

Parse columns from Highest through High to Moderate to find first non-blank value.

=IF(Z2>"",Z2,IF(AA2>"",AA2,IF(AB2>"",AB2,IF(AC2>"",AC2,IF(AD2>"",AD2,IF(AE2>"",AE2,IF(AF2>"",AF2,IF(AG2>"",AG2,""))))))))

All of the species that were assessed a Moderate priority met the “RSGCN Moderate and S3” criterion. Some of these did not meet the “G3 and S3” criterion.

An additional step was implemented to assess the assigned priorities. The species list was reviewed to note any species that were actively tracked by the Tennessee Natural Heritage Program but were not assigned a priority. Likewise any species that were not actively tracked but did get a priority assignment were noted. All items noted were reviewed individually to determine why they were assigned or not assigned a priority.

Exceptions

Tracked species that were not automatically assigned a priority.

A number of species that are tracked and did not get priorities assigned had ranks of G5 and S2 and a status of Threatened or Special Concern. There were also a few species with ranks of G5 and S2 with a status of Endangered that were not assigned a priority. These were manually assigned a priority of Moderate. Some species that are tracked and were not assigned a priority had non-standard ranks that did not fit the criteria. For some species there is enough information to assign a state rank but not enough to assign a global rank and these are assigned a non-numeric rank. For these tracked species a priority of Moderate was assigned manually.

Species no longer tracked that were automatically assigned a priority.

Species that are no longer tracked that were assigned a priority fall into several categories. Some are globally rare but extirpated or historic in Tennessee. Others are globally rare and their status in the state is uncertain. The remainder either involve taxonomic issues or are species with outdated ranks. Those with outdated ranks are mostly made up of species which were removed from the state list based on observations that were not used to update the state rank. Most of these automatically assigned priorities were rejected. An exception to this is Dalea gattingeri. It is one of the least conservative cedar glade endemics and as such is among the last to survive in

altered cedar glade habitat. But it also serves as an indicator of these impacted habitats that are potential restoration targets for higher priority plant and animal conservation activities.

This process identified 618 species that met criteria (automatic and manual) for assigning a priority and inclusion in the Tennessee SWAP plant list. Although including formerly tracked species in the evaluation produced almost all of the problems that required detailed review, that decision also insured a more thorough evaluation process. It also led to identifying items which need a current state rank evaluation.

Tennessee 2025 State Wildlife Action Plan

Appendix G

Problems Affecting Species and Habitats

CMP Level 1	CMP Level 2 Label	TN SWAP Level 3 Label	CMP Level 2 Descriptor	Examples, not comprehensive	Description
1. Residential & Commercial Development	1.1	A	Housing & urban areas - Primary residential development	urban areas, suburbs, villages, vacation homes, shopping areas, offices, schools, hospitals	Destruction or degradation of habitats due to construction activities associated with the building of primary residences. This category dovetails somewhat arbitrarily with 1.2 Commercial and Industrial Areas. As a general rule, however, if people live in the development, it should fall into this category.
1. Residential & Commercial Development	1.1	B	Housing & urban areas - Secondary home/resort development	urban areas, suburbs, villages, vacation homes, shopping areas, offices, schools, hospitals	Destruction or degradation of habitats due to construction activities associated with the building of secondary/vacation homes and resort developments.
1. Residential & Commercial Development	1.2	A	Commercial & industrial areas	manufacturing plants, shopping centers, office parks, military bases, power plants, train & ship yards, airports	Destruction or degradation of habitats in an area due to construction and other activities related to the development of commercial or industrial buildings. Shipyards and airports fall into this category, whereas shipping lanes and flight paths fall under 4. Transportation & Service Corridors. Dams are NOT included here, rather they are in 7.2 Dams & Water Management / Use.
1. Residential & Commercial Development	1.2	B	Commercial & industrial areas -Landfill construction/ operation (one sp)	manufacturing plants, shopping centers, office parks, military bases, power plants, train & ship yards, airports	Destruction or degradation of habitats due to construction and maintenance of county or municipal landfill operations. Also, includes habitat degradation and increased mortality caused by releases of toxins and other contaminants into the environment.
1. Residential & Commercial Development	1.2	C	Commercial & industrial areas -Military maneuvers	manufacturing plants, shopping centers, office parks, military bases, power plants, train & ship yards, airports	Increased mortality of species or destruction / degradation of habitats due to the use of heavy vehicles or explosives on the landscape during military exercises.
Residential & Commercial Development	1.3	A	Tourism & recreation areas*	ski areas, golf courses, beach resorts, cricket fields, county parks, campgrounds	There is a fine line between housing and vacation housing/resorts. Be careful not to confuse this category, which focuses on the habitat effects of recreation areas, with those in 6.1 Recreational Activities, which focuses on the disturbance effects posed by recreation.
2. Agriculture and Aquaculture	2.1	A	Annual & perennial non- timber crops - Agricultural conversion (row crop; mostly historical)	farms, household swidden plots, plantations, orchards, vineyards, mixed agroforestry systems	Removal of the natural vegetation of an area for agricultural purposes such as: pasture, row crops, feed lots, outbuildings, etc.

CMP Level 1	CMP Level 2 Label	TN SWAP Level 3 Label	CMP Level 2 Descriptor	Examples, not comprehensive	Description
2. Agriculture and Aquaculture	2.1	B	Annual & perennial non- timber crops - Incompatible row crop agricultural practices	farms, household swidden plots, plantations, orchards, vineyards, mixed agroforestry systems	Degradation of soil - water quality or habitat structure related to row crop production and maintenance not compatible with species needs. Often due to erosion from plowing/tilling or chemical applications of herbicides/ pesticides.
2. Agriculture and Aquaculture	2.2	A	Wood and pulp plantations	teak or eucalyptus plantations, silviculture, christmas tree farms	If it is one or a couple timber species that are planted on a rotation cycle, it belongs here. If it is multiple species or enrichment plantings in a quasi-natural system, it belongs in 5.3 Logging & Wood Harvesting.
Agriculture and Aquaculture	2.3	A	Livestock farming & ranching - Agricultural conversion (livestock, mostly historical)	cattle feed lots, dairy farms, cattle ranching, chicken farms, goat, camel, or yak herding	In farming, animals are kept in captivity; in ranching they are allowed to roam in wild habitats. If a few animals are mixed in a subsistence cropping system, it belongs in 2.1 Annual & Perennial Non-Timber Crops. Forage of wild resources for stall-fed animals falls under 5.2 Gathering Terrestrial Plants.
Agriculture and Aquaculture	2.3	B	Livestock farming & ranching - Incompatible animal production practices	cattle feed lots, dairy farms, cattle ranching, chicken farms, goat, camel, or yak herding	Degradation of soil & water quality via improper management of animal waste or chemical applications required during the rearing of livestock or other farm animals raised in concentrated conditions.
Agriculture and Aquaculture	2.3	C	Livestock farming & ranching - Incompatible grazing/ pasture management practices	cattle feed lots, dairy farms, cattle ranching, chicken farms, goat, camel, or yak herding	Degradation of soil & water quality and habitat structure of an area due to excessive grazing or to Inappropriate exclusion of cattle from stream and forest resources. Also, includes degradation caused by overapplication of fertilizers or other chemicals during pasture management practices.
Energy Production & Mining	3.1	A	Oil & gas drilling	oil wells, deep sea natural gas drilling	Oil and gas pipelines go into 4.2 Utility & Service Lines. Oil spills that occur at the drill site should be placed here; those that come from oil tankers or pipelines should go in 4. Transportation & Service Corridors or in 9.2 Industrial & Military Effluents, depending on your perspective.
Energy Production & Mining	3.2	A	Mining & quarrying	coal mines, alluvial gold panning, gold mines, rock quarries, coral mining, deep sea nodules, guano harvesting	It is a judgement call whether deforestation caused by strip mining should be in this category or in 5.3 Logging & Wood Harvesting - it depends on whether the primary motivation for the deforestation is access to the trees or to the minerals. Sediment or toxic chemical runoff from mining should be placed in 9.2 Industrial & Military Effluents if it is the major threat from a mining operation.
Energy Production & Mining	3.3	A	Renewable energy*	geothermal power production, solar farms, wind farms (including birds or bats flying into windmills), tidal farms	Not relating to hydropower (in 7.2)

CMP Level 1	CMP Level 2 Label	TN SWAP Level 3 Label	CMP Level 2 Descriptor	Examples, not comprehensive	Description
Transportation & Service Corridors	4.1	A	Roads & Railroads	highways, secondary roads, logging roads, bridges & causeways, road kill, fencing associated with roads, railroads	Destruction or degradation of habitats in an area due to construction of roads, railroads, or utilities. The linear makeup of these corridors often fragment terrestrial habitats.
Transportation & Service Corridors	4.2	A	Utility & service lines	electrical & phone wires, aqueducts, oil & gas pipelines, electrocution of wildlife	Cell phone and other communication towers connected by small access roads belong here. If there are small utility lines using a road right of way, they belong in 4.1 Roads & Railroads. Oil spills from pipelines should go in 9.2 Industrial & Military Effluents.
Transportation & Service Corridors	4.3	A	Shipping lanes	dredging, canals, shipping lanes, ships running into whales, wakes from cargo ships	Alteration of the natural course of a river or stream by removing rock, dirt, gravel, and other sediments from shorelines and bottoms. Such alteration is done primarily for navigation and flood control purposes.
Biological Resource Use	5.1	A	Hunting & collecting terrestrial animals	bushmeat hunting, trophy hunting, fur trapping, insect collecting, honey or bird nest hunting, predator control, pest control, persecution	This category focuses on animals that primarily live in a terrestrial environment. There are obviously some species that live on the terrestrial/ aquatic boundary. Hunting otters, beavers, amphibians, polar bears, penguins, waterfowl, and sea birds should (somewhat arbitrarily) go here. Hunting seals, whales and other marine mammals, and freshwater and marine turtles go in 5.4 Fishing & Harvesting Aquatic Resources. Yes, most people "gather" honey, eggs, insects or other slow moving targets, rather than "hunt" them. But it seems cleaner to keep all animal products as being hunted.
Biological Resource Use	5.2	A	Gathering terrestrial plants*	wild mushrooms, forage for stall fed animals, orchids, rattan, control of host plants to combat timber diseases	This category focuses on plants, mushrooms, and other non-animal terrestrial species except trees which are treated in 5.3 Logging & Wood Harvesting.
Biological Resource Use	5.3	A	Logging & wood harvesting	clear cutting of hardwoods, selective commercial logging of ironwood, pulp operations, fuel wood collection, charcoal production	Felling trees to clear agricultural land goes in the appropriate category in 2. Agriculture & Aquaculture. If it is a few timber species that are planted on a rotation cycle, it belongs in 2.2 Wood & Pulp Plantations. If it is multiple species or enrichment plantings in a quasi-natural system, it belongs here.

CMP Level 1	CMP Level 2 Label	TN SWAP Level 3 Label	CMP Level 2 Descriptor	Examples, not comprehensive	Description
Biological Resource Use	5.4	A	Fishing & harvesting aquatic resources	trawling, blast fishing, spear fishing, shellfish harvesting, whaling, seal hunting, turtle egg collection, live coral collection, seaweed collection	Increased mortality due to legal taking or killing of species for commercial purposes such as: pet trade, live bait, mussel collection for pearl industry, fur trade, smelt production, etc.
Human Intrusions & Disturbance	6.1	A	Recreational activities - non-vehicular	off-road vehicles, motorboats, jet-skis, snowmobiles, ultralight planes, dive boats, whale watching, mountain bikes, hikers, birdwatchers, skiers, pets in recreational areas, temporary campsites, caving, rock-climbing	Destruction and degradation of habitats and increased mortality of species due to excessive levels of recreational activities or inappropriate usage of habitats for recreation.
Human Intrusions & Disturbance	6.1	B	Recreational activities - vehicular	off-road vehicles, motorboats, jet-skis, snowmobiles, ultralight planes, dive boats, whale watching, mountain bikes, hikers, birdwatchers, skiers, pets in recreational areas, temporary campsites, caving, rock-climbing	Destruction and degradation of habitats and increased mortality of species due to excessive levels of recreational vehicle traffic or inappropriate usage of habitats for recreational vehicles.
Natural System Modifications	7.1	A	Fire & Fire suppression	fire suppression to protect homes, inappropriate fire management, escaped agricultural fires, arson, campfires, fires for hunting	Degradation of fire-dependent natural systems due to either human suppression of fire or the conditions needed to support combustion.

CMP Level 1	CMP Level 2 Label	TN SWAP Level 3 Label	CMP Level 2 Descriptor	Examples, not comprehensive	Description
Natural System Modifications	7.2	A	Dams & water management/use - Channelization of rivers/streams	dam construction, dam operations, sediment control, change in salt regime, wetland filling for mosquito control, levees and dikes, surface water diversion, groundwater pumping, channelization, artificial lakes	Alteration of the natural course of a river or stream by removing rock, dirt, gravel, and other sediments from shorelines and bottoms. Such alteration is done primarily for navigation and flood control purposes. This category focuses on the human activities that lead to either not enough water or too much water in the ecosystem in question. Note that homogenizing flows to a constant level may be outside the "natural range of variation." Dredging belongs in 4.3 Shipping Lanes.
Natural System Modifications	7.2	B	Dams & water management/use - Construction of dams/ impoundments	dam construction, dam operations, sediment control, change in salt regime, wetland filling for mosquito control, levees and dikes, surface water diversion, groundwater pumping, channelization, artificial lakes	Disruption and degradation of the natural flow of a river or stream due to construction of dams or impoundments. Also includes destruction of terrestrial habitats due to removal and inundation of vegetation along shorelines.
Natural System Modifications	7.2	C	Dams & water management/use - Construction of ditches/dikes/ drainage/diversion systems	dam construction, dam operations, sediment control, change in salt regime, wetland filling for mosquito control, levees and dikes, surface water diversion, groundwater pumping, channelization, artificial lakes	Disruption and degradation of the natural hydrologic patterns of wetlands, rivers, and streams due to construction of various water diversionary or containment structures.

CMP Level 1	CMP Level 2 Label	TN SWAP Level 3 Label	CMP Level 2 Descriptor	Examples, not comprehensive	Description
Natural System Modifications	7.2	D	Dams & water management/use - Excessive groundwater withdrawal	dam construction, dam operations, sediment control, change in salt regime, wetland filling for mosquito control, levees and dikes, surface water diversion, groundwater pumping, channelization, artificial lakes	Removal of groundwater resources essential to maintenance of hydrologic levels that support aquatic and subterranean species. Withdrawal is primarily from wells drilled for home water supply, irrigation, and other agricultural uses.
Natural System Modifications	7.2	E	Dams & water management/use - Excessive surface water withdrawal	dam construction, dam operations, sediment control, change in salt regime, wetland filling for mosquito control, levees and dikes, surface water diversion, groundwater pumping, channelization, artificial lakes	Removal of surfacewater resources needed to maintain hydrologic levels for aquatic and subterranean species.
Natural System Modifications	7.2	F	Dams & water management/use - Operation of dams/ reservoirs	dam construction, dam operations, sediment control, change in salt regime, wetland filling for mosquito control, levees and dikes, surface water diversion, groundwater pumping, channelization, artificial lakes	Degradation of water quality and aquatic habitat availability due to disruption of natural hydrologic regimes of rivers and streams by dams or reservoirs. Also, includes destruction / degradation of terrestrial habitats due to periodic raising or lower of water levels.

CMP Level 1	CMP Level 2 Label	TN SWAP Level 3 Label	CMP Level 2 Descriptor	Examples, not comprehensive	Description
Natural System Modifications	7.2	G	Dams & water management/use - Operation of drainage/diversion systems	dam construction, dam operations, sediment control, change in salt regime, wetland filling for mosquito control, levees and dikes, surface water diversion, groundwater pumping, channelization, artificial lakes	Degradation of water quality and habitat availability due to disruption of natural hydrologic regimes of rivers, streams, & wetlands by the operation of drainage ditches, dikes, and other water diversionary & containment structures.
Natural System Modifications	7.3	A	Other ecosystem modifications - Incompatible species management practices	land reclamation projects, rip-rap along shoreline, mowing grass, tree thinning in parks, beach construction, removal of snags from streams	Increased mortality or degradation of habitats resulting from the application of management practices that conflict with the ecological needs of a particular species.
Natural System Modifications	7.3	B	Other ecosystem modifications - Shoreline stabilization	land reclamation projects, rip-rap along shoreline, mowing grass, tree thinning in parks, beach construction, removal of snags from streams	Degradation of water quality and destruction of habitats along shorelines during stabilization activities that cover stream banks with rock or other erosion- control structures (e.g. rip rap).
Natural System Modifications	7.4	A	Removing/Reducing Human Maintenance	lack of mowing of meadows, reduction in controlled burns, lack of indigenous management of key ecosystems, ceasing supplimental feeding of condors	Many ecosystems and species depend on human maintenance to mimic natural conditions and maintain key attributes. This threat captures the loss of these direct maintenance regimes. Caution should be used in applying this category – it is not meant as a catch-all for a lack of conservation action at a site, but rather refers to instances where a historical action is no longer possible due to, for example, funding, institutional constraints, or actors being disempowered. This category does not include less direct maintenance actions, such as lack of outreach or lack of adequate policy.
Invasive & Problematic Species, Pathogens & Genes	8.1	A	Invasive non-native/ alien species plants & animals	feral horses, feral household pets, zebra mussels, Miconia tree, introduction of species for biocontrol	Increased mortality or habitat degradation caused by excessive competition or predation from invasive exotic species.

CMP Level 1	CMP Level 2 Label	TN SWAP Level 3 Label	CMP Level 2 Descriptor	Examples, not comprehensive	Description
Invasive & Problematic Species, Pathogens & Genes	8.2	A	Problematic native plants & animals	overabundant native deer, overabundant algae due to loss of native grazing fish, plague affecting rodents, invasive grasses	Increased mortality of animals resulting from either excessive take by predators or by the inability to compete with other species for food and resources.
Invasive & Problematic Species, Pathogens & Genes	8.4	A	Pathogens & Microbes	plague affecting rodents, Dutch elm disease or chestnut blight, Chytrid fungus affecting amphibians outside of Africa	Increased mortality of species due to high levels of parasites or disease-causing pathogens.
Pollution	9.1	A	Household sewage & urban wastewater - Municipal wastewater treatment/stormwater runoff	discharge from municipal waste treatment plants, leaking septic systems, untreated sewage, outhouses, oil or sediment from roads, fertilizers and pesticides from lawns and golf-courses, road salt	Degradation of water quality resulting from ineffective treatment of municipal wastewater released into rivers and streams. Also, includes ineffective capture and treatment of stormwater runoff which is often contaminated by various pollutants.
Pollution	9.1	B	Household sewage & urban waste water - Residential sewage/ septic systems	discharge from municipal waste treatment plants, leaking septic systems, untreated sewage, outhouses, oil or sediment from roads, fertilizers and pesticides from lawns and golf-courses, road salt	Degradation of water quality resulting from ineffective treatment of residential sewage by septic systems. Often caused by older, defective sewage systems or by poorly-sited septic tanks.

CMP Level 1	CMP Level 2 Label	TN SWAP Level 3 Label	CMP Level 2 Descriptor	Examples, not comprehensive	Description
Pollution	9.2	A	Industrial & military effluents	toxic chemicals from factories, illegal dumping of chemicals, mine tailings, arsenic from gold mining, leakage from fuel tanks, PCBs in river sediments	Increased mortality or degradation of habitats resulting from legal or illegal releases of toxins or contaminants into the environment by various industries.
Pollution	9.3	A	Agriculture & forestry effluents - Incompatible animal production practices	nutrient loading from fertilizer run-off, herbicide run-off, manure from feedlots, nutrients from aquaculture, soil erosion	Degradation of soil & water quality via improper management of animal waste or chemical applications required during the rearing of livestock or other farm animals raised in concentrated conditions. Wind erosion of agricultural sediments or smoke from forest fires goes in 9.5 Air-Borne Pollutants.
Pollution	9.3	B	Agriculture & forestry effluents - Incompatible Forestry Practices	nutrient loading from fertilizer run-off, herbicide run-off, manure from feedlots, nutrients from aquaculture, soil erosion	Modification of the forest composition or type of an area related to silvicultural (in)activities not compatible with species or habitat.
Pollution	9.3	C	Agriculture & forestry effluents - Incompatible grazing/ pasture management practices	nutrient loading from fertilizer run-off, herbicide run-off, manure from feedlots, nutrients from aquaculture, soil erosion	Degradation of soil & water quality and habitat structure of an area due to excessive grazing or to Inappropriate exclusion of cattle from stream and forest resources. Also, includes degradation caused by overapplication of fertilizers or other chemicals during pasture management practices.
Pollution	9.3	D	Agriculture & forestry effluents -Incompatible row crop agricultural practices	nutrient loading from fertilizer run-off, herbicide run-off, manure from feedlots, nutrients from aquaculture, soil erosion	Degradation of soil - water quality or habitat structure related to row crop production and maintenance not compatible with species needs. Often due to erosion from plowing/tilling or chemical applications of herbicides/ pesticides.
Pollution	9.4	A	Garbage & solid waste	municipal waste, litter from cars, flotsam & jetsam from recreational boats, waste that entangles wildlife, construction debris	Increased mortality or degradation of habitats due to illegal disposal of waste products containing pollutants harmful to animals. This category generally is for solid waste outside of designated landfills - landfills themselves should go in 1.2 Commercial & Industrial Areas. Likewise, toxins leaching from solid waste - for example, mercury leaking out of a landfill into groundwater - should go in 9.2 Industrial & Military Effluents.

CMP Level 1	CMP Level 2 Label	TN SWAP Level 3 Label	CMP Level 2 Descriptor	Examples, not comprehensive	Description
Pollution	9.5	A	Air-borne pollutants - Acid rain	acid rain, smog from vehicle emissions, excess nitrogen deposition, radioactive fallout, wind dispersion of pollutants or sediments from farm fields, smoke from forest fires or wood stoves	Destruction or degradation of terrestrial & aquatic habitat from precipitation in the low pH range (acid). Acid rain results from emissions of various pollutants by powerplants, factories, automobiles, and other sources. It may be difficult to determine the sources of many atmospheric pollutants – and thus hard to take action to counter them.
Pollution	9.5	B	Air-borne pollutants - Low-level ozone air pollution	acid rain, smog from vehicle emissions, excess nitrogen deposition, radioactive fallout, wind dispersion of pollutants or sediments from farm fields, smoke from forest fires or wood stoves	These inputs of energy can have strong effects on some species or ecosystems.
11. Climate Change	11.1	A	Ecosystem Encroachment	sea level rise (inundation of shoreline ecosystems, drowning of coral reefs), desertification (sand dune encroachment)	Large-scale effects of ecosystems shifting and impinging on other species and ecosystems.
11. Climate Change	11.3	A	Changes in Temperature Regimes	heat waves, cold spells, oceanic temperature changes, melting of glaciers/sea ice	Broad-scale changes in temperature mean, variability, seasonality and extremes, including changes in temperature extremes, increased average summer temperature, and decreased minimum winter/spring temperature
11. Climate Change	11.4	A	Changes in Precipitation & Hydrological Regimes	droughts, changes in timing of rains, loss of snowcover, increased severity of floods	Broad-scale changes in precipitation mean, variability, seasonality, and extremes, including decreased or increased precipitation, changes in timing of precipitation, changes in form of precipitation (eg snow vs rain; snowcover and snowpack where applicable), changes in evapotranspiration rates and hydrological cycles, and droughts and floods
11. Climate Change	11.5	A	Severe / Extreme Weather Events	thunderstorms, tropical storms, hurricanes, cyclones, tornadoes, hailstorms, ice storms or blizzards, dust storms, erosion of beaches during storms	Changes in frequency, timing and/or intensity of storms as well as severe weather events that threaten targets that have lost resilience Category Examples: thunderstorms, tropical storms, hurricanes, cyclones, tornadoes, hailstorms, ice storms or blizzards, dust storms, erosion of beaches during storms

Tennessee 2025 State Wildlife Action Plan

Appendix H

Comprehensive Hierarchy of State Conservation Actions

2025 TN SWAP Comprehensive Hierarchy of Statewide Conservation Actions for SGCN			
Action Class (#)	**General Action (ABC)**	**Specific Action**	**Metric**
1. Habitat acquisition	**A. Fee-title Ownership**	1. Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	# of acres
		2. Coordinate land acquisition priorities among state/federal agencies and non-governmental organizations.	N/A
	B. Permanent Protective Easements	1. Use federal/state/private funding sources to acquire permanent easements within critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	# of caves protected
		2. Coordinate acquisition of permanent protective easements among state/federal agencies and non-governmental organizations.	# of acres restored
	A. Communications & Public Relations	1. Develop a multi-media public outreach campaign to promote the availability of government-funded incentive programs to private landowners.	# of acres restored
		2. Develop a multi-media public outreach campaign to promote awareness of the negative effects of invasive exotic species.	# of acres
		3. Develop a multi-media public outreach campaign to promote the need for conserving rare, threatened, or endangered species and habitats.	# of people reached or # of outreach events held
	B. Conservation Planning	1. Develop/participate in regional conservation planning initiatives sponsored by federal and state agencies (e.g., TDEC Outdoor Recreational Planning, Tennessee State Park Comprehensive System Planning and park-specific Strategic Management Planning, Tennessee State Forest planning, TWRA regional planning, USFWS Joint Venture planning, TVA Reservoir Operations Planning, USACE Water Control Manual updates and revisions, etc.)	# of initiatives participated in
		2. Develop/participate in regional planning initiatives sponsored by non-governmental organizations or public/private partnerships (e.g., TNC ecoregional planning, WWF watershed planning, Cumberland Region Tomorrow - Community Quality Growth Planning, Partners In Flight, Audubon - Important Bird Areas, Habitat Conservation Plans, etc.).	# of initiatives participated in
		3. Develop central database to combine/reconcile/maintain state & federal agency, non-governmental organization, and university sources of data for target species and habitats.	# of surveys
		1. Develop outdoor education and recreation programs that inform the public about the effects of recreational vehicles and various other recreational uses on target species and habitats.	# of research projects

2025 TN SWAP Comprehensive Hierarchy of Statewide Conservation Actions for SGCN			
2. Information collection and dispersal	**C. Formal Education, Training, Outdoor Education, & Recreation**	2. Incorporate information about protection of target species and habitats into forestry training programs such as the Cooperative Extension Master Logger Program, TN Wildlife Resources Agency Forestry Outreach, and other formal education programs.	# of programs to have incorporated info.
		3. Develop brochures, guides, posters, and other educational aids for land managers and for the public that address conservation issues affecting target species and habitats.	# of acres
		4. Develop school curricula in conjunction with the TN Department of Education to emphasize local, state, & regional conservation issues affecting target species and habitats.	# of acres restored
		5. Deliver formal presentations for classrooms, public-interest groups, academic conferences, clubs, and other groups to promote conservation issues affecting target species and habitats.	# of acres restored or # of feet or riparian area restored
	D. Monitoring	1. Develop a monitoring program to measure bioaccumulation of contaminants in target species (e.g., fish, mussels, turtles, birds, bats, etc.).	# of working groups established or maintained
		2. Expand network of trained volunteers to conduct various types of environmental monitoring for target species and habitats (e.g., "Adopt A Stream" program, PIF bird counts, etc.).	# of species or # of volunteers trained
		3. Develop GIS remote-sensing program to analyze statewide land cover changes, map habitats, evaluate land use practices, etc. at shorter intervals or in greater detail than current national-level programs.	# of acres
	E. Research	1. Conduct scientific surveys to discern the geographical distributions of lesser known target species.	# of surveys
		2. Conduct research on life history and ecological needs of target species to establish guidelines for determining population viability.	# of projects
		3. Establish guidelines for determining population viability standards for target species (i.e.,size, condition, & landscape context).	# of species
		4. Conduct research on problems (i.e.,stresses and sources of stress) affecting target species and habitats.	# of projects
		5. Conduct research to map karst systems, delineate underground watersheds, and identify above-ground linkages to subterranean habitats.	# of maps produced, delineations performed, linkages made

2025 TN SWAP Comprehensive Hierarchy of Statewide Conservation Actions for SGCN			
	A. Compatible Resource Use	1. Utilize government funded incentive programs (e.g., CRP, EQIP, CSP, WRP, and FLEP) to encourage private landowners to protect water quality for target species in critical units of aquatic, subterranean, or terrestrial habitats.	# of acres restored
		2. Utilize government funded incentive programs (e.g., FLEP, CRP, EQIP, Forest Stewardship Program, and Forest Legacy Program) to encourage private landowners to restore and/or protect native forest systems for target species in critical units of aquatic, subterranean, or terrestrial habitats.	# of acres restored
		3. Utilize government-funded incentive programs such as CRP, WRP, GRP, EQIP, CSP, FLEP, LIP, and rare species protection funding such as FWS Section 6 and other funds to manage or restore populations of target species in critical units of aquatic, subterranean, or terrestrial habitats.	# of species targeted
		4. Develop formal management agreements between private landowners, agencies, and non-governmental organizations to provide financial/technical assistance to manage target species within critical units of aquatic, subterranean, and terrestrial habitats (e.g., USFWS Safe Harbor program, TNC cooperative management agreements, etc.).	# of agreements
		5. Install exclusionary devices (e.g., gates, barriers, trespass detection equipment, etc.) to limit access to critical units of aquatic, subterranean, or terrestrial habitats for target species vulnerable to human disturbance.	# of exclusionary devices constructed
		6. Participate in environmental review procedures to prevent/mitigate construction of dams, impoundments, drainage ditches, levees, stormwater culverts, and other water diversionary structures that affect target species in critical units of aquatic, subterranean, or terrestrial habitats.	# of reviews performed
		7. Participate in environmental review procedures to prevent/mitigate coal mining and oil & natural gas drilling activities that affect target species in critical units of aquatic, subterranean, and terrestrial habitats.	# of reviews performed
		8. Encourage adoption of more stringent sustainable forestry practices on state forests and other public lands that contain critical units of aquatic, subterranean, and terrestrial habitats.	# of reviews performed
	B. Conservation Area Management	1. Participate in activities to establish/adjust state wildlife "sanctuaries" and/or federally designated critical habitat areas for target species on multi-use public/private conservation areas across the state.	# of acres
		2. Develop and implement conservation plans for all public/private conservation areas across the state based on ecosystem-level management principles.	# of conservation plans developed
		3. Develop recreation management plans that outline strict guidelines on high-impact recreational uses on public/private conservation areas across the state.	# of recreation plans developed

2025 TN SWAP Comprehensive Hierarchy of Statewide Conservation Actions for SGCN			
3. Management and restoration of species and habitats		4. Discourage conversion of native habitats to semi/non-natural land types (e.g., pine plantations, golf courses, etc.) on public and private conservation areas across the state.	# of acres
	C. Control/ Prevention of Invasive Exotic Species & Pathogens	1. Conduct rapid ecological assessments of key populations of target species and critical units of aquatic, subterranean, and terrestrial habitats most susceptible to invasive exotic species & pathogens.	# of assessments performed
		2. Implement integrated pest management practices to control or prevent invasive exotic species & pathogens from key populations of target species and critical units of aquatic, subterranean, and terrestrial habitats.	# IPMs implemented
		3. Organize a TN Exotic Pest Animal Council to coordinate activities with the TN Exotic Pest Plant Council and serve as a clearinghouse of information & decisionmaking to control or prevent outbreaks of invasive exotic species.	# of meetings
		4. Establish a central GIS database to track occurrences of severe category invasive exotic species and maintain information on control measures & current management efforts statewide.	# of species tracked
		5. Support programs that advocate usage of native or non-invasive exotic plants in ornamental horticulture, erosion control, and wildlife habitat plantings.	# of acres
	D. Habitat/Natural Processes Restoration	1. Reintroduce fire via prescribed burning into fire-dependent grassland & woodland systems within critical units of terrestrial habitats.	# of acres burned
		2. Reclaim abandoned coal mines and streams affected by acid mine drainage within critical units of aquatic, subterranean, and terrestrial habitats.	# of acres reclaimed
		3. Restore degraded/converted wetland systems within critical units of aquatic, subterranean, and terrestrial habitats.	# of acres restored
		4. Restore in-stream flows and physical structure to channelized or impounded streams within critical units of aquatic, subterranean, and terrestrial habitats.	# of acres or linear feet restored
		5. Restore degraded forests and pine plantations to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	# of acres restored
		6. Restore pastures and other agricultural lands to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	# of acres restored
		7. Remove or modify physical barriers that disrupt habitat/population connectivity for target species within critical units of aquatic, subterranean, and terrestrial habitats.	# of acres or linear feet restored

2025 TN SWAP Comprehensive Hierarchy of Statewide Conservation Actions for SGCN			
	E. Species Restoration	1. Reintroduce extirpated and historic populations of priority species to appropriate habitats across the state.	# of introductions
		2. Utilize ex-situ conservation methods (e.g., captive breeding, gene banking, etc.) to conserve populations of target species on the verge of range-wide extinction or local extinction of unique genotypes.	# of programs implemented
		3. Provide funding to permitted institutions/individuals for rehabilitation of priority target species across the state.	# of species
		4. Continue funding and staff support for a freshwater mollusk propagation facility to increase populations of mussels and aquatic snails for habitat reintroduction.	# of species
	A. Alliances & Partnerships	1. Develop strategic alliance with Farm Bureau, Natural Resource Conservation Service, Farm Service Agency, TN Division of Water Pollution Control, TN Dept. of Agriculture, Cooperative Extension, and other institutions to improve agricultural and animal production industries that affect target species and habitats.	# of partnerships
		2. Develop strategic alliance with US Army Corp of Engineers, TN Valley Authority, water utility boards, and other institutions to address water management issues that affect target species and habitats.	# of partnerships
		3. Develop strategic alliance with TN Dept. of Transportation, county mayors, municipalities, city/county planners, private developers and others to address urban and rural development practices that affect target species and habitats.	# of partnerships
		4. Develop strategic alliance with TN Division of Forestry, TN Forestry Association, US Forest Service, private timber companies, non-governmental organizations, universities, and other forest resource managers to address forestry practices that affect target species and habitats.	# of partnerships
		5. Develop strategic alliance with TN Division of Geology, Office of Surface Mining, US Geological Survey, TN Oil & Gas Association, private companies, and other institutions to address mining and drilling issues that affect target species and habitats.	# of partnerships
		6. Develop strategic alliance with the US Environmental Protection Agency, TN Dept. of Environment and Conservation, non-governmental organizations, and other related environmental regulatory agencies to address air and water quality issues affecting target species and habitats.	# of partnerships
		7. Develop faunal and/or habitat working groups or continue working groups previously established (e.g., bat working group, cave working group, Partners In Flight/TN Ornithological Society working group, etc.) composed of academics, government and non-government biologists, & others to identify research issues, conduct research, fill data gaps, and disperse scientific information.	# of working groups established or maintained

2025 TN SWAP Comprehensive Hierarchy of Statewide Conservation Actions for SGCN			
4. Capacity building		8. Partner with TN Division of Forestry, TN Wildlife Resources Agency, TN Division of Natural Heritage, TN State Parks, US Forest Service, US Fish & Wildlife Service, The Nature Conservancy, and other institutions to establish a statewide burn crew to conduct prescribed burns in fire-dependent grassland & woodland habitats.	# of acres burned
		9. Develop strategic alliances with state/federal agencies, non-governmental organizations, stakeholders, and other groups focused on improvement of regional landscapes or special natural resources that contain target species in need of conservation (e.g., Alliance for the Cumberlands, Mississippi River Corridor Critical Area Program, Cumberland Region Tomorrow, cave conservation groups, etc.).	# of acres
		10. Partner with state/federal agencies, non-governmental organizations, and various institutions in other states/countries to develop conservation strategies to manage wide-ranging target species and/or abate problems affecting species and habitats of regional/international concern (e.g., US Fish & Wildlife Service Joint Ventures, international partnerships for neo-tropical migratory birds, Southeast Aquatic Resource Partnership, etc.).	# of acres
	B. Conservation Finance	1. Establish a private capital conservation fund to finance and/or provide leverage for priority land acquisition deals across the state.	# of acres
		2. Solicit donations from private individuals and foundations for conservation work being conducted by various state/federal agencies and non-governmental organizations.	# of acres
		3. Incorporate network of trained volunteers within state agencies as "in-kind" services match for federal funds.	# of volunteers
	C. Institutional Improvement	1. Increase staffing and funding of state agencies and local offices of federal agencies responsible for managing target species/habitats or monitoring environmental quality.	# of acres or species
		2. Increase staffing and funding of non-governmental organizations that either manage or assist with the protection of target species and habitats.	# of acres or species
		3. Create opportunities for cost-shared positions among state agencies, municipal/county governments, non-governmental organizations, and/or other institutions to increase the number of biological staff working on protection of target species and habitats.	# of acres or species
5. Commercial incentives	**A. Conservation Enterprises**	1. Develop forest banking programs for forest systems at high risk of destruction or degradation within critical units of aquatic, subterranean, or terrestrial habitats.	# of acres
		2. Create ecotourism-based local economies to deter development or natural resource extraction pressures in economically depressed areas that contain critical units of aquatic, subterranean, or terrestrial habitats.	# of acres
	B. Market Forces	1. Encourage municipal & county governments to subsidize/offer additional incentives to developers that utilize "green" methods of construction, design, and land-use planning in large residential or commercial developments.	# of acres

2025 TN SWAP Comprehensive Hierarchy of Statewide Conservation Actions for SGCN			
6. Law & Policy	A. Compliance & Enforcement	1. Develop multi-agency network of professional aquatic biologists to assist TN Div. of Water Pollution Control in gathering documentation and supporting evidence to enforce existing water quality laws.	# of acres
		2. Increase compliance monitoring of aquatic resource alteration permits, storm water, & other permits within critical units of aquatic and subterranean habitats.	# of acres
		3. Work with TN Wildlife Resources Agency and US Fish & Wildlife Service to enforce compliance with rules and other stipulations for scientific collection permits and commercial licenses.	# of species
		4. Provide TWRA wildlife officers with non-game funding to assist with compliance and enforcement of state laws protecting target species and habitats.	# of species or # of acres
	B. Land-use Planning & Zoning	1. Participate in the review and/or revision of county urban growth management plans.	# of plans
		2. Encourage municipal and county governments to adopt zoning ordinances that limit or regulate development within critical units of aquatic, subterranean, and terrestrial habitats.	# of acres
		3. Provide funding/resources for the completion of the state's property owner base mapping project for counties that contain critical units of aquatic, subterranean, and terrestrial habitats.	# of acres
	C. Legislation	1. Propose/support state legislation to remove or prevent passage of private legislative acts that negatively affect target species and habitats.	# of species or # of acres
		2. Propose/support state and federal legislation to create dedicated funding sources for conservation programs, acquisition, and/or restoration of critical units of aquatic, subterranean, and terrestrial habitats.	# of species or # of acres
		3. Propose/support state legislation to restrict importation or usage of severe category invasive exotic animal and plant species in the state.	# of species or # of acres
		4. Propose/support state legislation to strengthen penalties for laws regarding poaching, illegal collection, or killing of target species and for violation of current environmental quality or habitat destruction laws.	# of species or # of acres
		5. Propose/support federal legislation to support CITES and to increase penalties for illegal trade in wildlife.	# of species
		6. Propose/support state & federal legislation to modify current "greenbelt" laws to include tax breaks to landowners for protection of target species and habitats or vital ecosystem services such as forest/ watershed protection.	# of species or # of acres
		7. Propose/support federal legislation to fund a national or regional conservation initiative regarding aquatic resource protection (e.g., National/Southeast Aquatic Resources Partnership).	# of species or # of acres
		8. Propose/support state legislation urging the federal Office of Surface Mining to designate critical units of aquatic, subterranean, and terrestrial habitats as "lands unsuitable for mining".	# of species or # of acres

2025 TN SWAP Comprehensive Hierarchy of Statewide Conservation Actions for SGCN			
		9. Propose/support federal legislation to encourage greater public participation in federal incentive programs (e.g., CRP, EQIP, WHIP, WRP, etc.) by revamping current spending limits and cost-share matches for private landowners.	# of species or # of acres
	D. Policies & Regulations	1. Enact more stringent policies & regulations regarding issuance of scientific collection permits and commercial licenses for target species within critical units of aquatic, subterranean, and terrestrial habitats.	# of species or # of acres
		2. Review current policies & regulations regarding commercial usage of non-game species.	# of species
		3. Encourage TN Valley Authority and US Army Corps of Engineers to review policies & regulations regarding operation of dams/ impoundments or other water diversionary structures that affect target species and habitats.	# of acres
		4. Encourage the federal Office of Surface Mining to designate critical units of aquatic, subterranean, and terrestrial habitats as "lands unsuitable for mining" under current federal policy guidelines.	# of acres
	E. Standards	1. Develop standards for instream-flow regimes that establish minimum water levels required for target species during critical periods and for maintenance of habitat quality.	# of acres
		2. Develop more stringent standards for forestry "best management practices" based on regional differences in landform and habitats.	# of acres
		3. Evaluate agency standards for conducting environmental reviews of projects that potentially affect target species and habitats.	# of species or # of acres
		4. Develop more stringent standards regarding permits for construction projects that potentially affect water quality and/or alter habitat.	# of species or # of acres
		5. Evaluate agency standards for reviewing status of state endangered, threatened, proposed endangered, proposed threatened, and "deemed in need of management" species.	# of species
	A. Research	1. Identify species with specialized habitat, resource, or connectivity needs across their life stages (i.e., those that are area-limited, resource-limited, dispersal-limited, or process-limited).	# of species
		2. Map the distribution of species that are being displaced by changes in climate, and model future suitable habitat under different climate and land-use scenarios and over different periods of time (e.g., 2050, 2100).	# of species
		3. Assess threats to species (or vulnerabilities of species) using a suite of plausible future climate and land-use change scenarios.	# of threats
	B. Adaptation Planning	1. Identify areas in locations within the existing geographic range of species for restoration or protection that are unoccupied due to geographic barriers or past catastrophes but are climatically suitable for persistence into the future.	# of acres
		2. Assess risks and vulnerability of conservation targets to inform monitoring and adaptation priorities.	# of species

2025 TN SWAP Comprehensive Hierarchy of Statewide Conservation Actions for SGCN			
		3. Monitor the status of pre-defined indicators of ecosystem integrity and function and adjust management approaches if needed in response to indicator status.	# of acres
		4. Proactively monitor range-shifting species and pathogens to minimize introductions or outbreaks that may have undesirable or negative impacts.	# of species
	C. Habitat Acquisition	1. Protect land and water across environmental gradients to support viable SGCN populations, allow for migration, and maximize opportunities for unassisted evolutionary adaptation to future	# of acres
		2. Identify and protect areas important to maintain biodiversity and ecosystem functions, such as climate refugia, current biodiversity hotspots, large intact habitats, aquatic and riparian systems, and corridors for connectivity.	# of acres
		3. Identify and protect areas with high evolutionary potential (i.e., evolutionary or biodiversity hotspots) that allow for the persistence of locally adapted populations and adaptive genetic diversity.	# of acres
		4. Conserve areas that provide high quality habitats under current climate conditions and are likely to be resilient to climate change or support a broad array of species in the future.	# of acres
		5. Implement market-based incentives (such as carbon markets) where appropriate that encourage conservation and restoration of ecosystems for the full range of ecosystem services including carbon storage.	# of acres
	D. Conservation Area Management	1. Identify and pursue opportunities to increase conservation of priority lands and waters by working with managers of existing public lands managed for purposes other than conservation, such as military installations or state lands.	# of acres
		2. Make available diverse conditions, resources, or habitat types that allow for individuals or populations to utilize a range of resources more effectively.	# of acres
7. Climate Adaptation	**E. Habitat/Natural Processes Restoration**	1. Develop and implement restoration protocols and techniques that promote ecosystem resilience and facilitate adaptation under a range of plausible future conditions.	# of acres
		2. Restore degraded habitats, as appropriate, to support a diversity of species assemblages and ecosystem structure and function.	# of acres
		3. Restore or enhance areas that will provide essential habitat and ecosystem services during ecosystem transformation under a changing climate.	# of acres
		4. Redesign and remove existing structures or barriers where there is the greatest potential to restore natural processes.	# of acres
		5. Enhance design and siting criteria for water resources infrastructure to reduce impacts and restore connectivity in floodplains and aquatic habitats, in partnership with water resource managers.	# of acres

2025 TN SWAP Comprehensive Hierarchy of Statewide Conservation Actions for SGCN			
		6. Restore and enhance riparian zones and buffers in agricultural and urban areas to minimize non-point source pollution.	# of acres restored or # of feet or riparian area restored
		7. Use native plants for restoration where possible, and here native plant sourcing is not possible, use resilient and non-invasive species and seed mixes.	# of acres
		8. Reduce existing sources of pollution and contaminants and increase monitoring of air and water pollution as necessary.	# of acres
		9. Reduce ground and surface water withdrawals in areas experiencing drought.	# of gallons reduced
	F. Climate Adaptation Management	1. Protect and restore riparian buffers to reduce temperature and moderate flows in riparian systems.	# of acres restored or # of feet or riparian area restored
		2. Protect wetland systems to buffer storm and flood impacts.	# of acres
		3. Re-establish fire regimes with prescribed burning to reduce the risk of catastrophic wildfire.	# of acres
		Increase the number of viable populations (redundancy) for species most at risk of extinction due to stochastic events (especially those with extremely limited ranges).	# of populations
		4. Maintain size, age structure, and genetic diversity of managed populations and aim for large and viable population sizes	# of population
		5. Provide alternative resources (e.g., multiple milkweed species for monarchs) for species with fixed reproductive timing or cues and minimize phenological mismatches.	# of acres
		6. Reduce risks of facilitating movement of undesirable invasive species, pests, and pathogens, while allowing for connectivity for the movement of desired species.	# of species
		7. Reduce harmful invasive species to the greatest extent possible, by applying integrated management practices, sharing innovative control methodologies, and taking corrective actions when necessary.	# of species
	G. Facilitation	1. Restore connectivity pathways to areas beyond species' current distribution, such as at the leading edge of the species' range, that will likely be climatically suitable in the future, to facilitate movement and tracking of suitable climatic conditions.	# of acres
		2. Conduct strategic translocations (aka: assisted migration, managed relocation, conservation translocation) to sites that span a range of potentially suitable climatic or hydrological conditions either within or beyond current distributions, after evaluating risks, weighing ethical considerations, and managing for unintended consequences.	# of translocations
		3. Manage species to preserve genetic diversity, especially at the leading and trailing edges of their ranges.	# of species

Tennessee 2025 State Wildlife Action Plan

Appendix I

2025 Conservation Opportunity Area Factsheets

(36 factsheets)

2025 Conservation Opportunity Area Factsheets

Region 1 (8 COAs)

Middle Fork of the Forked Deer River

Conservation Opportunity Area



The Middle Fork of the Forked Deer River in Dyer, Crockett, and Gibson Counties is encompassed within this Conservation Opportunity Area (COA). This Middle Fork has been extensively channelized, and approximately 20% of the original bottomland hardwood forests remain. Nevertheless, the river and its associated terrestrial habitats remain important for a variety of wildlife species. This ecosystem is important for waterfowl, wading birds, mammals, reptiles, and amphibians. Tigrett Wildlife Management Area, which encompasses 7,000 acres within this COA, provides habitat for Alligator Gar, Alligator Snapping Turtles, and Bald Eagles.

The potential to restore the river and its associated floodplain make this a high priority zone. Created habitats would benefit all species including reptiles, amphibians, and fishes as well as waterfowl, wading birds, and shorebirds. Additionally, it would improve wetland functions, which could enhance groundwater recharge, reduce sediment transfer, and help minimize downstream flooding.

TWRA will consider future land acquisitions in this COA for watershed protection, critical habitat protection, habitat restoration, streambank stabilization, planting of bottomland hardwoods and warm season grasses, and buffer strip plantings along the river. TWRA will also seek partnerships with other agencies and landowners to implement many of the management strategies on private lands within this COA.



The river and its associated habitats remain important for a variety of wildlife, including waterfowl, wading birds, mammals, reptiles, and amphibians.



Top to bottom: Snowy Egret/Paul VanDerWerf; Box Turtle eating a shrew/Rob Colviin, TWRA. P2: Least Sandpipers in winter plumage/Andy Regal & Chrissy McClaren. P4: Juvenile Alligator Gar/Rob Colvin, TWRA

Middle Fork of the Forked Deer River Conservation Opportunity Area

Partnerships

TWRA will develop and foster partnerships with the US Fish and Wildlife Service, Tennessee Department of Environment and Conservation, USDA Natural Resources Conservation Service/ Mississippi River Basin Initiative, Farm Bureau, TN Dept. of Forestry, The Nature Conservancy, Ducks Unlimited, TN Aquarium and Conservation Institute, Wetland Acquisition Fund, National Wild Turkey Federation, TennGreen Land Conservancy, UT Extension, Southeast Missouri State, Cooperative Extensions, universities, various other institutions/local governments.



CMP Stressor Level	Stressor Categories	Threats specific to Middle Fork of the Forked Deer River
7.2 A	Dams and water management/use; Channelization of rivers/streams	Alteration of the natural course of a river or stream by removing rock, dirt, gravel, and other sediments from shorelines and bottoms (primarily for navigation and flood control purposes). This COA's channelized waterways require constant maintenance to function for the original intention. Many problems have risen as a direct response to the channelization.
7.2 C	Dams and water management/use; Construction of ditches/dikes/drainage/ diversion systems	Disruption and degradation of the natural hydrologic patterns of wetlands, rivers, and streams due to construction of various water diversion or containment structures. Unnatural drainage ditches designed to remove water from naturally flooded areas occur on private and agency-owned property.
7.2 D	Dams and water management/use; Excessive groundwater withdrawal	Removal of groundwater resources essential to maintenance of hydrologic levels that support aquatic and subterranean species. Withdrawal is mostly from wells drilled for home water supply (expanding populations, preference for well water), irrigation (center pivots), and other agricultural uses.
7.2 G	Dams and water management/use; Operation of drainage/ diversion systems	Degradation of water quality and habitat availability due to disruption of natural hydrologic regimes of rivers, streams, and wetlands by the operation of drainage ditches, dikes, and other water diversion/containment structures. The channelized waterways require constant maintenance.
2.1 A	Annual and perennial non-timber crops; Agricultural conversion	Removal (mostly historical) of the natural vegetation of an area for agricultural purposes such as beef cattle, row crops, and hay farms.
2.1 B	Annual and perennial non- timber crops; Incompatible row crop agricultural practices	Degradation of soil/water quality or habitat structure related to row crop production (especially (corn, soybeans, and cotton in this COA) and maintenance not compatible with species needs. Row crop farming occurs on WMAs, which can be directly addressed by state agency personnel, as it is not a BMP for any species.
9.3 D	Agriculture and forestry effluents; Incompatible row crop agricultural practices	Degradation of soil/water quality or habitat structure related to row crop production and maintenance not compatible with species needs. Often due to erosion from plowing/tilling or chemical applications. Row crops in this COA (corn, soybeans, cotton) tend to receive fertilizer and herbicide chemicals in extreme excess. Row crop farming also occurs on WMAs.

Middle Fork of the Forked Deer River Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes and/or species with large home ranges.	acres
Compatible Resource Use	Use government funded incentive programs (e.g., CRP, EQIP, CSP, WRP, and FLEP) to encourage private landowners to protect water quality and target species in critical units of aquatic, subterranean, or terrestrial habitats, particularly those degraded by agriculture and forestry.	acres
Habitat/Natural Processes Restoration	Restore degraded/converted wetland systems within critical units of aquatic, subterranean, and terrestrial habitats.	acres / feet of riparian
Habitat/Natural Processes Restoration	Restore in-stream flows and physical structure to channelized or impounded streams within critical units of aquatic, subterranean, and terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats (state-owned lands and private land BMPs).	acres
Habitat/Natural Processes Restoration	Restore and enhance riparian zones and buffers in agricultural and urban areas to minimize non-point source pollution and address channelization.	acres / feet of riparian
Habitat/Natural Processes Restoration	Reduce ground and surface water withdrawals in areas with drought to alleviate impacts of channelization, diversions, dikes.	acre-feet
Species Restoration	Reintroduce extirpated and historic populations of priority species (such as Alligator Snapping Turtle) to appropriate habitats across the state as “head start” programs to increase populations and mitigate declines caused by stressors.	caves, sensitive sites protected
Institutional Improvement	Increase staffing and funding of state and federal agencies responsible for managing target species/habitats or monitoring environmental quality.	acres
Climate Adaptation Management	Protect wetland systems to buffer storm and flood impacts and alleviate impacts of channelization, diversions, dikes.	acres

To learn more about the Middle Fork of the Forked Deer River Conservation Opportunity Area, please contact: Rob Colvin, Biodiversity Coordinator, Region 1 (731) 423-5725

Middle Fork of the Forked Deer River Conservation Opportunity Area

Conservation Projects

Some completed and ongoing projects focused on achieving a better understanding of the abundance and distribution of SGCN such as fish and Alligator Snapping Turtles.

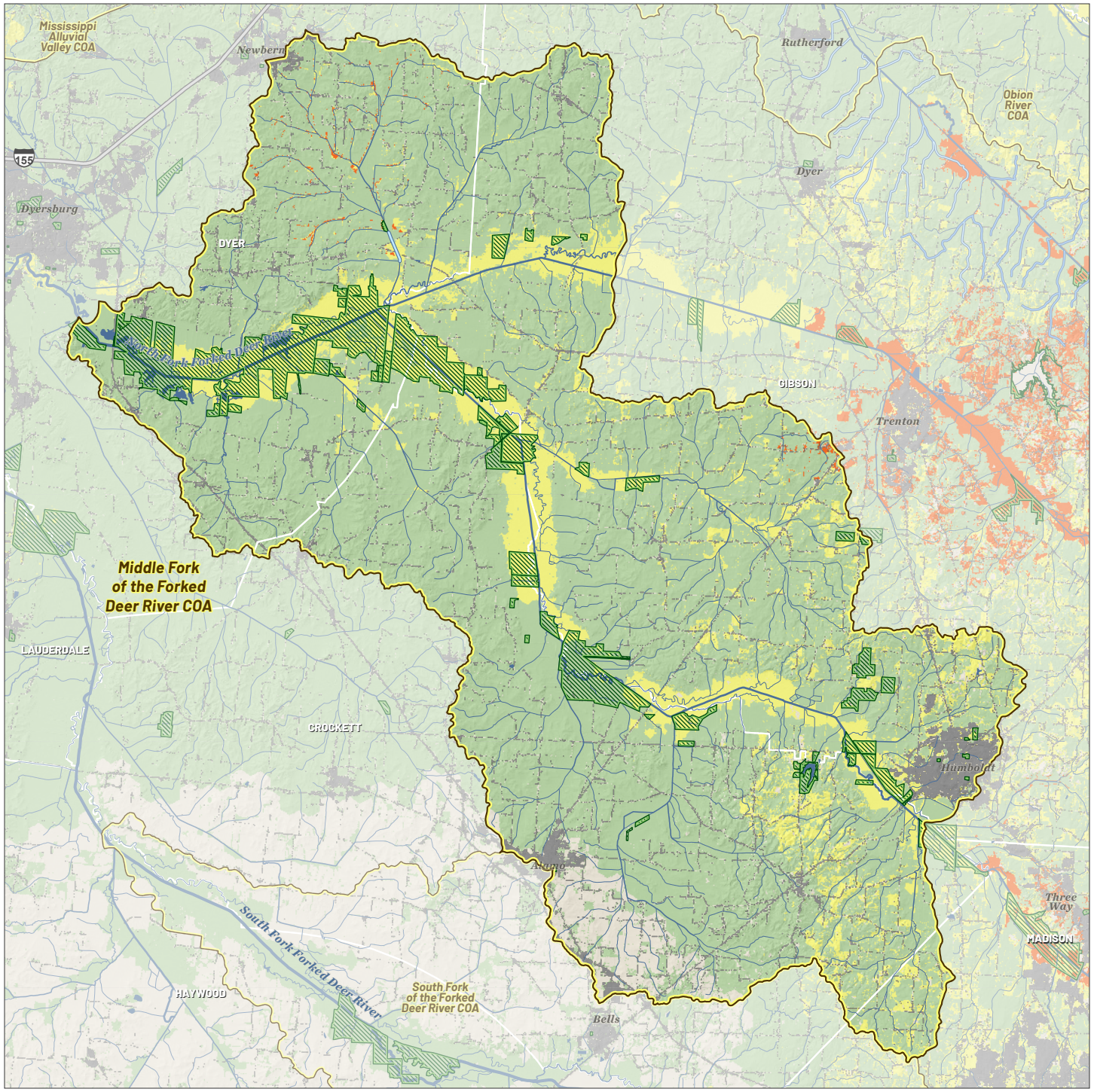
In addition, amphibian surveys were conducted to detect the presence of Bsal (*Batrachochytrium salamandrivorans*), a dreaded pathogenic chytrid fungus known for infecting various amphibian species. Bsal likely originated in Asia and surveys in the US are conducted as surveillance for early detection to prevent the spread of this wildlife pathogen. Based on lab studies, biodiversity loss from Bsal would be expected to be greatest in the Appalachian region and along the west coast of the United States. Monitoring of snake fungal disease also continues.



To learn more about the Middle Fork of the Forked Deer River Conservation Opportunity Area, please contact: Rob Colvin, Biodiversity Coordinator, Region 1 (731) 423-5725

Middle Fork of the Forked Deer River Conservation Opportunity Area

Middle Fork of the Forked Deer COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Horns Bluff Conservation Easement	Private	24	100%
Horns Bluff Refuge	TWRA	1,926	100%
Tigrett WMA	TWRA	9,109	100%



Combined Habitat Priorities

Middle Fork of the Forked Deer River Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

- Conservation Opportunity Area (COA)
- Public/Protected Land
- Conservation Easement

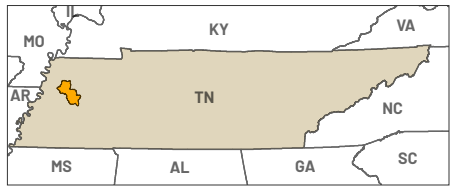
Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Middle Fork of the Forked Deer River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Small-Mouthed Salamander	Ambystoma texanum	2013
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	1968
Bat	Tricolored Bat	Perimyotis subflavus	2017
Bird	American Barn Owl	Tyto furcata	2023
Bird	American Bittern	Botaurus lentiginosus	2019
Bird	American Black Duck	Anas rubripes	2015
Bird	American Golden-Plover	Pluvialis dominica	2016
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2021
Bird	Bank Swallow	Riparia riparia	2022
Bird	Bell's Vireo	Vireo bellii	2021
Bird	Belted Kingfisher	Megaceryle alcyon	2001
Bird	Bewick's Wren	Thryomanes bewickii	1982
Bird	Black-bellied Plover	Pluvialis squatarola	2010
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2017
Bird	Bobolink	Dolichonyx oryzivorus	2023
Bird	Brown Creeper	Certhia americana	2023
Bird	Buff-breasted Sandpiper	Calidris subruficollis	2010
Bird	Cerulean Warbler	Setophaga cerulea	2014
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2022
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Dunlin	Calidris alpina	2008
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2003
Bird	Evening Grosbeak	Coccothraustes vespertinus	1986
Bird	Golden-winged Warbler	Vermivora chrysoptera	2022
Bird	Grasshopper Sparrow	Ammodramus savannarum	2020
Bird	Great Egret	Ardea alba	2023
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	King Rail	Rallus elegans	1995
Bird	Least Bittern	Botaurus exilis	2017
Bird	Least Flycatcher	Empidonax minimus	2021
Bird	LeConte's Sparrow	Ammospiza leconteii	2020
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2023
Bird	Long-eared Owl	Asio otus	2012
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2023
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Olive-sided Flycatcher	Contopus cooperi	2023

Middle Fork of the Forked Deer River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2023
Bird	Peregrine Falcon	Falco peregrinus	2019
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2010
Bird	Sharp-shinned Hawk	Accipiter striatus	1997
Bird	Short-billed Dowitcher	Limnodromus griseus	2010
Bird	Short-eared Owl	Asio flammeus	2023
Bird	Snowy Egret	Egretta thula	2023
Bird	Stilt Sandpiper	Calidris himantopus	2010
Bird	Swainson's Warbler	Limnothlypis swainsonii	2023
Bird	Veery	Catharus fuscescens	2022
Bird	Vesper Sparrow	Pooecetes gramineus	2019
Bird	Western Sandpiper	Calidris mauri	2017
Bird	Willet	Tringa semipalmata	2010
Bird	Willow Flycatcher	Empidonax traillii	2023
Bird	Winter Wren	Troglodytes hiemalis	2022
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2009
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Plant	Red Iris	Iris fulva	1884
Plant	Reniform Sedge	Carex reniformis	1949
Plant	Water-purslane	Didiplis diandra	1998
Reptile	Red-bellied Mudsnake	Farancia abacura	2002

Middle Fork of the Forked Deer River COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Crustacean	Hatchie Burrowing Crayfish	Creaserinus hortoni	1985

Middle Fork of the Forked Deer River COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
No documented subterranean SGCN in this COA			

Mississippi Alluvial Valley

Conservation Opportunity Area



The corridor along the Mississippi River is recognized as one of the most significant migratory bird corridors in the world (the Mississippi Flyway). Annually, up to 50 million ducks, geese, shorebirds, wading birds, neotropical birds, and raptors migrate through this area. The MAV is an extensive area along the Mississippi River that lies mostly within the Mississippi Alluvial Plain Ecoregion, which encompasses about 2% of the total land area in Tennessee.



The landscape consists mostly of forested wetland habitats interspersed with agricultural lands and uplands. An estimated 80% of the original bottomland hardwood forest has been removed, along with the large river cane (a type of native bamboo) corridors that once existed. TWRA personnel are reforesting areas on state-owned lands to restore bottomland hardwood habitat. As of 2025, TWRA has restored over 9,900 acres of former agricultural lands to forest. The agency attempted to restore river cane along the Mississippi River, but had very little success.

The corridor along the Mississippi River is recognized as one of the most significant migratory bird corridors in the world.

Its diverse habitats, species richness, proximity to Memphis, and location along the Great River Road leading to Reelfoot make the MAV an attractive destination for hunters, anglers, and wildlife viewers. TWRA will consider future land acquisitions in this COA for watershed protection, critical habitat protection, habitat restoration, streambank stabilization, restoration of row crop lands to bottomland hardwoods, and the planting of buffer strips along the river. TWRA will also seek partnerships with other agencies and landowners to implement many of the management strategies on private lands within the COA.



Partnerships

TWRA will develop and foster partnerships with the US Fish and Wildlife Service, TN Dept. of Environment and Conservation, Army Corps of Engineers, The Nature Conservancy, Tennessee Ornithological Society, TN Wildlife Resources Foundation, National Wild Turkey Federation, USDA Natural Resources Conservation

Top to bottom: Dunlin flock/Laura Wolf; Channelized stream in w. TN/ WTRBA. P2: Alligator Snapping Turtle nesting and P4: Alligator Gar Release / Rob Colvin, TWRA and Swallow-tailed Kite / Andy Reago & Chrissy McClaren

Mississippi Alluvial Valley
Conservation Opportunity Area

Service, TN Dept. of Forestry, TN Valley Authority, Ducks Unlimited, Lower Mississippi Valley Joint Venture (LMVJV), Cooperative Extensions, University of Memphis, UT Martin, Southeast Missouri State, TN Aquarium and Conservation Institute and other institutions, and local governments.



CMP Stressor Level	Stressors	Threats specific to Mississippi Alluvial Valley
2.1.A.	Annual and perennial non-timber crops; Agricultural conversion (row crop, mostly historical)	Removal of the natural vegetation of an area for agricultural purposes, particularly cotton, soybean, and corn row crops, but also including pasture, feed lots, outbuildings, etc.
2.1.B.	Annual and perennial non-timber crops; Incompatible row crop agricultural practices	Degradation of soil/water quality or habitat structure related to row crop production and maintenance not compatible with species needs. Often due to erosion from plowing/tilling or chemical applications of herbicides/pesticides. Also occurs on WMAs.
4.1.A.	Roads and railroads	Destruction or degradation of habitats in an area due to construction of roads, railroads, or utilities. The linear makeup of these corridors often fragments terrestrial habitats.
4.3.A.	Shipping lanes	Alteration of the natural course of a river or stream by removing rock, dirt, gravel, and other sediments from shorelines and bottoms. Such alteration is done primarily for navigation and flood control purposes. The Mississippi River is occasionally dredged during low water events to assist barge navigation.
7.2.C.	Dams and water management/use; Construction of ditches/ dikes/drainage/diversion systems	Disruption and degradation of the natural hydrologic patterns of wetlands, rivers, and streams due to construction of various water diversion or containment structures. Many private and agency-owned properties have unnatural drainage ditches constructed to remove water from naturally flooded areas.
9.3.D.	Agriculture and forestry effluents; Incompatible row crop agricultural practices	Degradation of soil/water quality or habitat structure related to row crop production and maintenance not compatible with species needs. Often due to erosion from plowing/tilling or chemical applications of herbicides/pesticides.

Mississippi Alluvial Valley
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats that provide species protection, buffering, connectivity, and/or perpetuation of natural processes, as well as accommodating species with large home ranges, and/or increasing the potential for population increases.	acres
Permanent Protective Easements	Use federal/state/private funding sources to acquire permanent easements within critical units of aquatic, subterranean, and terrestrial habitats that provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Compatible Resource Use	Use government funded incentive programs (e.g., CRP, EQIP, CSP, WRP, and FLEP) to encourage private landowners to protect water quality and target species in critical units of aquatic, subterranean, or terrestrial habitats, particularly those degraded by agriculture and forestry.	acres
Compatible Resource Use	Use government-funded incentive programs such as CRP, WRP, GRP, EQIP, CSP, FLEP, LIP, and rare species protection funding such as FWS Section 6 and other funds to manage or restore populations of target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Species Restoration	Reintroduce extirpated and historic populations of priority species to appropriate habitats across the state to increase populations and mitigate declines caused by stressors (state-owned lands and private land BMPs).	number of intro-ductions
Habitat/Natural Processes Restoration	Restore degraded/converted wetland systems within critical units of aquatic, subterranean, and terrestrial habitats to address the effects of channelization, dikes, and drainage systems.	acres
Habitat/Natural Processes Restoration	Restore in-stream flows and physical structure to channelized or impounded streams within critical units of aquatic, subterranean, and terrestrial habitats.	acres / feet of riparian
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats (state-owned lands and private land BMPs).	acres
Habitat/Natural Processes Restoration	Restore degraded habitats, as appropriate, to support a diversity of species assemblages and ecosystem structure and function.	acres
Habitat/Natural Processes Restoration	Restore and enhance riparian zones and buffers in agricultural and urban areas to minimize non-point source pollution and address channelization.	acres / feet of riparian
Habitat/Natural Processes Restoration	Reduce ground and surface water withdrawals in areas with drought.	acres
Institutional Improvement	Increase staffing and funding of state and federal agencies responsible for managing target species/habitats or monitoring environmental quality.	FTEs
Policies & Regulations	Encourage TN Valley Authority and US Army Corps of Engineers to review policies/regulations regarding operation of dams/impoundments or other water diversion structures that affect target species and habitats.	acres

Mississippi Alluvial Valley
Conservation Opportunity Area

Conservation Projects

Some completed and ongoing projects focused on achieving a better understanding of the abundance and distribution of SGCN such as fish, Alligator Snapping Turtles, bats, small mammals, and Eastern Spotted Skunks. Monitoring of snake fungal disease also continues. In addition, Cold Creek was stocked with Alligator Gar, and a bat gate was placed on a Civil War Magazine site.

For future projects, the LMVJV partnership developed a Forest Breeding Bird Decision Support Model (https://www.lmvjv.org/mav-breedingbird) which is intended as a guide for bottomland hardwood forest reforestation to benefit landbirds.

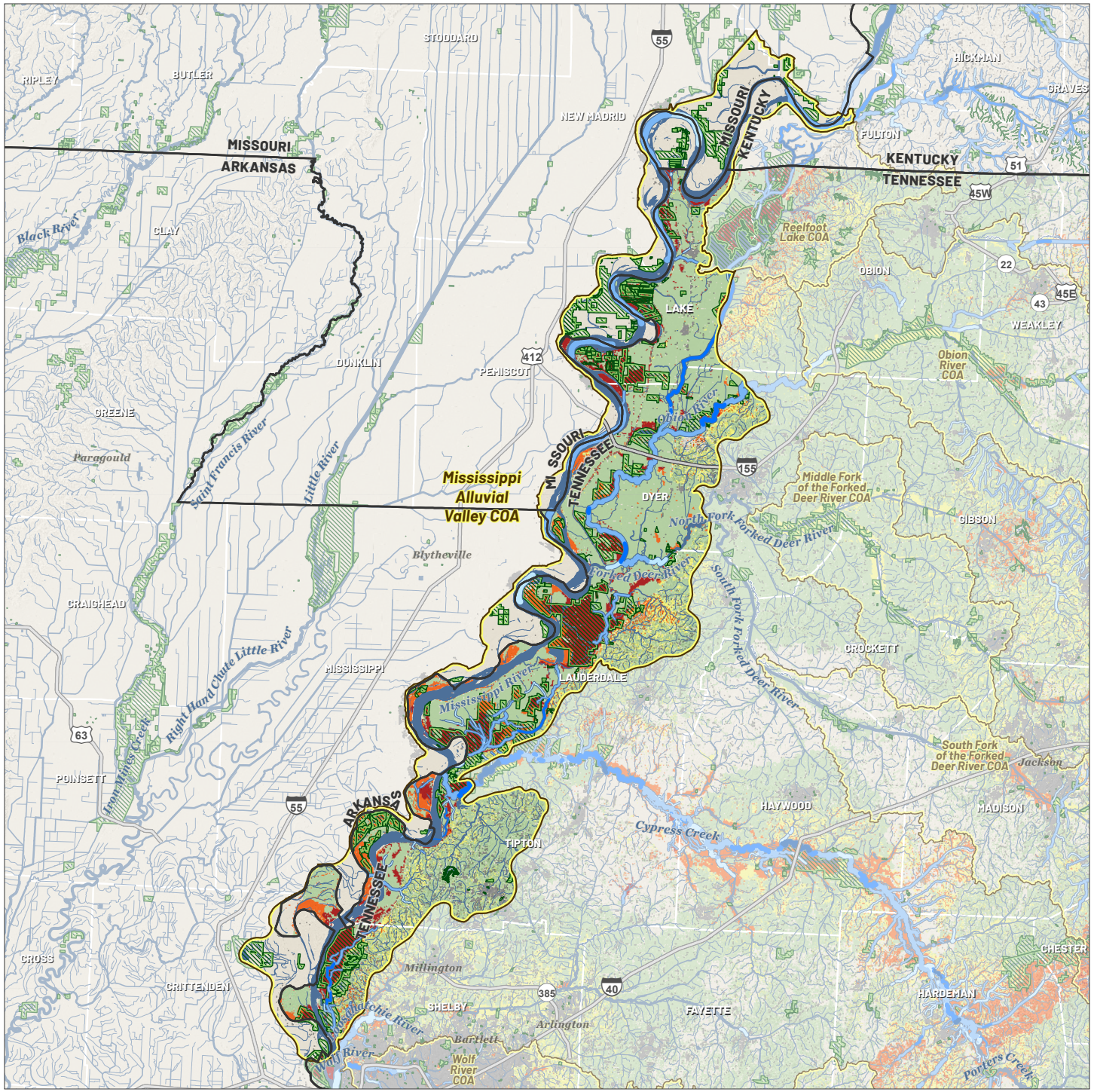




To learn more about the Mississippi Alluvial Valley Conservation Opportunity Area, please contact: Rob Colvin, Wildlife Diversity Coordinator, Region 1 (731) 423-5725

Mississippi Alluvial Valley
Conservation Opportunity Area

Mississippi Alluvial Valley COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Sunk Lake SNA	TDEC - DNA	1,875	100%
Fort Pillow State Historic Park	TDEC - SP	1,726	100%
Meeman-Shelby Forest SP	TDEC - SP	12,004	100%
John Tully SF	TDF	2,134	100%
Bogota WMA	TWRA	2,685	100%
Eagle Lake Refuge	TWRA	3,538	100%
Ernest Rice WMA	TWRA	2,905	100%
Glen Springs Lake	TWRA	358	100%
John Tully WMA	TWRA	13,402	100%
Moss Island WMA	TWRA	5,323	100%
Thorny Cypress WMA	TWRA	3,290	100%
Tumbleweed WMA	TWRA	5,785	100%
White Lake Refuge	TWRA	1,192	100%
Chickasaw NWR	USFWS	26,374	100%
Lake Isom NWR	USFWS	1,814	65%
Lower Hatchie NWR	USFWS	10,070	42%



Combined Habitat Priorities

Mississippi Alluvial Valley Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

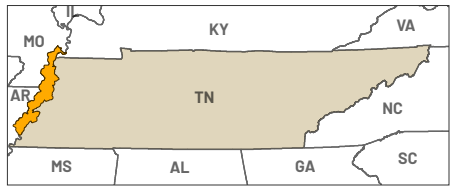
- Conservation Opportunity Area (COA)
- Public/Protected Land
- Conservation Easement

Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles
0 5 Kilometers



Mississippi Alluvial Valley COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Barking Treefrog	Dryophytes gratiosus	1993
Amphibian	Gray Treefrog	Dryophytes versicolor	1980
Amphibian	Small-Mouthed Salamander	Ambystoma texanum	1978
Amphibian	Southern Cricket Frog	Acris gryllus	1972
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2014
Bat	Southeastern Bat	Myotis austroriparius	2007
Bat	Tricolored Bat	Perimyotis subflavus	2020
Bird	American Barn Owl	Tyto furcata	2023
Bird	American Bittern	Botaurus lentiginosus	2023
Bird	American Black Duck	Anas rubripes	2023
Bird	American Golden-Plover	Pluvialis dominica	2023
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bachman's Sparrow	Peucaea aestivalis	1925
Bird	Baltimore Oriole	Icterus galbula	2007
Bird	Bank Swallow	Riparia riparia	2023
Bird	Bell's Vireo	Vireo bellii	2023
Bird	Belted Kingfisher	Megaceryle alcyon	2002
Bird	Bewick's Wren	Thryomanes bewickii	2002
Bird	Black-bellied Plover	Pluvialis squatarola	2023
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2023
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2020
Bird	Bobolink	Dolichonyx oryzivorus	2023
Bird	Brown Creeper	Certhia americana	2023
Bird	Buff-breasted Sandpiper	Calidris subruficollis	2023
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Connecticut Warbler	Oporornis agilis	2019
Bird	Dunlin	Calidris alpina	2023
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2021
Bird	Evening Grosbeak	Coccothraustes vespertinus	1996
Bird	Golden Eagle	Aquila chrysaetos	2023
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023
Bird	Great Egret	Ardea alba	2023
Bird	Henslow's Sparrow	Centronyx henslowii	2023
Bird	Hudsonian Godwit	Limosa haemastica	2023
Bird	Interior Least Tern	Sternula antillarum athalassos	2020
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	King Rail	Rallus elegans	2022

Mississippi Alluvial Valley COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Least Bittern	Botaurus exilis	2022
Bird	Least Flycatcher	Empidonax minimus	2023
Bird	LeConte's Sparrow	Ammospiza leconteii	2023
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2023
Bird	Long-eared Owl	Asio otus	2022
Bird	Long-tailed Duck	Clangula hyemalis	2002
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2023
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Olive-sided Flycatcher	Contopus cooperi	2023
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2023
Bird	Peregrine Falcon	Falco peregrinus	2023
Bird	Piping Plover (Atlantic subspecies)	Charadrius melodus melodus	2023
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruddy Turnstone	Arenaria interpres	2023
Bird	Rufa Red Knot	Calidris canutus rufa	2002
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2023
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-billed Dowitcher	Limnodromus griseus	2023
Bird	Short-eared Owl	Asio flammeus	2023
Bird	Snowy Egret	Egretta thula	2023
Bird	Stilt Sandpiper	Calidris himantopus	2023
Bird	Swainson's Warbler	Limnothlypis swainsonii	2023
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	Western Sandpiper	Calidris mauri	2023
Bird	White-rumped Sandpiper	Calidris fuscicollis	2023
Bird	Willet	Tringa semipalmata	2023
Bird	Willow Flycatcher	Empidonax traillii	2023
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Gastropod	Striped Whitelip	Webbhelix multilineata	1995
Mammal	Eastern Woodrat	Neotoma floridana illinoensis	2019

Mississippi Alluvial Valley COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Mammal	Golden Mouse	Ochrotomys nuttalli	2012
Mammal	Southeastern Shrew	Sorex longirostris	2006
Plant	American Ginseng	Panax quinquefolius	2014
Plant	Bay Starvine	Schisandra glabra	2024
Plant	Blue Mud-plantain	Heteranthera limosa	2019
Plant	Butternut	Juglans cinerea	2024
Plant	Cedar Elm	Ulmus crassifolia	2009
Plant	Featherfoil	Hottonia inflata	2013
Plant	Lake-cress	Rorippa aquatica	1988
Plant	Missouri Mud-Plantain	Heteranthera missouriensis	1978
Plant	Northern Prickly-ash	Zanthoxylum americanum	2022
Plant	Ovate-leaf Arrowhead	Sagittaria platyphylla	2010
Plant	Red Iris	Iris fulva	2024
Plant	Tissue Sedge	Carex hyalina	1995
Reptile	Eastern Box Turtle	Terrapene carolina	2012
Reptile	Eastern Hog-nosed Snake	Heterodon platirhinos	1968
Reptile	Mississippi Green Watersnake	Nerodia cyclopion	1980
Reptile	Timber Rattlesnake	Crotalus horridus	2013
Reptile	Western Ribbonsnake	Thamnophis proximus	2018

Mississippi Alluvial Valley COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bivalve	Hickorynut	Obovaria olivaria	1991
Fish	Alligator Gar	Atractosteus spatula	2023
Fish	Bigmouth Shiner	Ericymba dorsalis	2007
Fish	Blue Sucker	Cycleptus elongatus	1998
Fish	Golden Topminnow	Fundulus chrysotus	2000
Fish	Highfin Carpsucker	Carpiodes velifer	2009
Fish	Paddlefish	Polyodon spathula	2008
Fish	Pallid Sturgeon	Scaphirhynchus albus	2001
Fish	Piebald Madtom	Noturus gladiator	1976
Fish	Plains Minnow	Hybognathus placitus	1968
Fish	Sicklefin Chub	Macrhybopsis meeki	1993
Fish	Sturgeon Chub	Macrhybopsis gelida	1981
Reptile	Alligator Snapping Turtle	Macrochelys temminckii	2022
Reptile	Smooth Softshell Turtle	Apalone mutica	1972

Mississippi Alluvial Valley COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
No documented subterranean SGCN in this COA			

Obion River

Conservation Opportunity Area



The Obion River Conservation Opportunity Area (COA) already contains several state lands that provide habitat for numerous priority species including the crawfish frog, bald eagle, cerulean warbler, and sandhill crane. The Obion River is one of the past stocking sites that TWRA used for Alligator Gar restoration. Adult Alligator Gar occurrences have been documented within the last five years in this COA. It is also an important area for potential future Alligator Snapping Turtle restoration work. This area consists of bottomland hardwood forests, swamps, oxbows, sloughs, and agricultural fields. Much of the land surrounding the Obion River has been cleared and drained for agricultural use. Gooch Wildlife Management Area is one of the few areas where the bottomland timber remains. In the mid 1900s, the Obion system was largely channelized for agricultural purposes.

TWRA will consider future land acquisitions in this COA for watershed protection, critical habitat protection, habitat restoration, streambank stabilization, and planting of bottomland hardwoods and buffer strip along the river. TWRA will also seek partnerships with other agencies and interested landowners to implement many of the management strategies on private lands within the COA.



This area consists of bottomland hardwood forests, swamps, oxbows, sloughs, and agricultural fields.



Top to bottom: Little Blue Heron/Bob Peterson; Channelized stream/ Rob Colvin, TWRA. P2: Southern Cricket Frog/Judy Gallagher. P4: Lower Obion River aerial/Damon Hollis, TWRA.

Obion River
Conservation Opportunity Area

Partnerships

TWRA will develop and foster partnerships with the US Fish & Wildlife Service, TN Dept. of Environment and Conservation, The Nature Conservancy, Tennessee Ornithological Society, USDA Natural Resources Conservation Service/National Water Quality Initiative/Mississippi River Basin Initiative, Farm Bureau, TN Dept. of Forestry, Ducks Unlimited, Southeast Missouri State, Tennessee Aquarium and Conservation Institute, Cooperative Extensions, universities, various other institutions, and local governments.



CMP Stressor Level	Stressor Categories	Threats specific to Obion River
2.1 A	Annual and perennial non-timber crops; Agricultural conversion (row crop, mostly historical)	Removal of the natural vegetation of an area for agricultural purposes such as beef cattle, row crops, and hay farms.
2.1 B	Annual and perennial non- timber crops; Incompatible row crop agricultural practices	Degradation of soil/water quality or habitat structure related to row crop production (especially (corn, soybeans, and cotton in this COA) and maintenance not compatible with species needs. Row crop farming occurs on WMAs, which can be directly addressed by state agency personnel, as it is not a BMP for any species.
7.2 A	Dams and water management/use; Channelization of rivers/streams	Alteration of the natural course of a river or stream by removing rock, dirt, gravel, and other sediments from shorelines and bottoms. Such alteration is done primarily for navigation and flood control purposes and leads to either not enough water or too much water in the ecosystem in question.
7.2 B	Dams & water management/use - Construction of dams/ impoundments	Disruption and degradation of the natural flow of a river or stream due to construction of dams or impoundments. Also includes habitat destruction due to removal and inundation of vegetation along shorelines. Dams on The Obion River and its tributaries disrupt the historic natural flow of the river, restricting movements of native species.
7.2 C	Dams and water management/use; Construction of ditches/dikes/ drainage/diversion systems	Disruption and degradation of the natural hydrologic patterns of wetlands, rivers, and streams due to construction of various water diversion or containment structures. Unnatural drainage ditches designed to remove water from naturally flooded areas occur on both private and agency-owned property.
7.2 G	Dams and water management/use; Operation of drainage/ diversion systems	Degradation of water quality and habitat availability due to disruption of natural hydrologic regimes of rivers, streams, and wetlands by the operation of drainage ditches, dikes, and other water diversion/ containment structures. The channelized waterways require constant maintenance to function for the original intention. Many problems have risen as a direct response to the channelization.

Obion River
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Fee-title Ownership	Coordinate land acquisition priorities among state/federal agencies and non-governmental organizations to acquire critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Compatible Resource Use	Use government-funded incentive programs (e.g., Forest Land Enhancement Program or FLEP, CRP, EQIP, Forest Stewardship Program, and Forest Legacy Program) to encourage private landowners to restore and/or protect native forest systems from forest type conversion and/or incompatible forestry practices to benefit target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Compatible Resource Use	Use government funded incentive programs (e.g., CRP, EQIP, CSP, WRP, and FLEP) to encourage private landowners to protect water quality and target species in critical units of aquatic, subterranean, or terrestrial habitats, particularly those degraded by agriculture and forestry.	acres
Habitat/Natural Processes Restoration	Restore in-stream flows and physical structure to channelized or impounded streams within critical units of aquatic, subterranean, and terrestrial habitats.	acres / feet of riparian
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore and enhance riparian zones and buffers in agricultural and urban areas to minimize non-point source pollution and address channelization.	acres / feet of riparian
Habitat/Natural Processes Restoration	Reduce ground and surface water withdrawals in areas with drought.	acre-feet water
Species Restoration	Reintroduce extirpated and historic populations of priority species (e.g., Alligator Snapping Turtle) to appropriate habitats across the state as “head start” programs to increase populations and mitigate declines caused by stressors.	number of intro-ductions
Institutional Improvement	Increase staffing and funding of state and federal agencies responsible for managing target species/habitats or monitoring environmental quality.	acres
Institutional Improvement	Increase staffing and funding of non-governmental organizations that either manage or assist with the protection of target species and habitats.	FTEs
Climate Adaptation Management	Protect wetland systems to buffer storm and flood impacts.	acres

To learn more about the Obion River Conservation Opportunity Area, please contact: Rob Colvin, Biodiversity Coordinator, Region 1 (731) 423-5725

Obion River
Conservation Opportunity Area

Conservation Projects

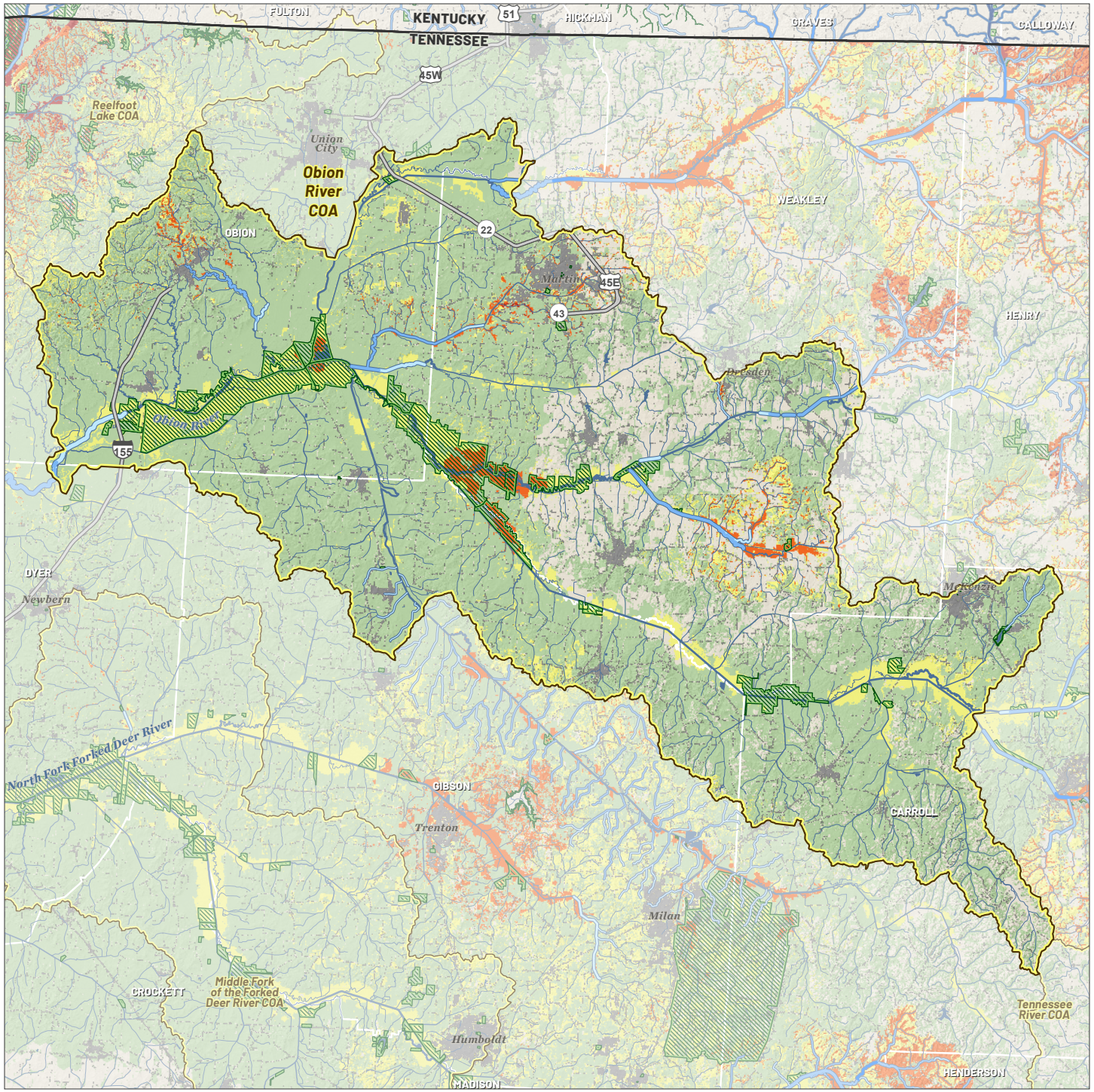
Many completed and ongoing projects focused on achieving a better understanding of the abundance and distribution of SGCN, including fish, Alligator Snapping Turtle, bats, and reptiles and amphibians, and Spotted Skunks to determine species distribution, abundance, and other demographic factors. In addition, TWRA and the USFWS conducted Alligator Gar Stocking.



To learn more about the Obion River Conservation Opportunity Area, please contact: Rob Colvin, Biodiversity Coordinator, Region 1 (731) 423-5725

Obion River
Conservation Opportunity Area

Obion River COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Big Cypress Tree SP	TDEC - SP	327	100%
Bean Switch Refuge	TWRA	732	100%
Carroll Lake	TWRA	98	100%
Gooch WMA	TWRA	9,230	100%
Harts Mill	TWRA	1,772	100%
Harts Mill Conservation Easement	TWRA	1	100%
Hop-in Refuge	TWRA	653	100%
Jarrell Switch Refuge	TWRA	275	100%
Maness Swamp Refuge	TWRA	1,219	100%
Obion River WMA	TWRA	9,322	100%
Three Rivers WMA	TWRA	1,595	100%



Combined Habitat Priorities

Obion River Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

Conservation Opportunity Area (COA)

Public/Protected Land

Conservation Easement

Karst Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:

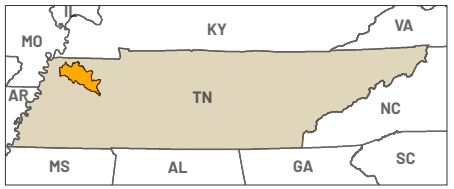
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Obion River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Crawfish Frog	Lithobates areolatus	1992
Amphibian	Gray Treefrog	Dryophytes versicolor	2005
Amphibian	Small-Mouthed Salamander	Ambystoma texanum	2022
Bat	Little Brown Myotis	Myotis lucifugus	2018
Bat	Northern Long-eared Bat	Myotis septentrionalis	2007
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2018
Bat	Southeastern Bat	Myotis austroriparius	2018
Bat	Tricolored Bat	Perimyotis subflavus	2018
Bird	American Barn Owl	Tyto furcata	2023
Bird	American Black Duck	Anas rubripes	2019
Bird	American Golden-Plover	Pluvialis dominica	2022
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bank Swallow	Riparia riparia	2009
Bird	Bell's Vireo	Vireo bellii	1976
Bird	Bewick's Wren	Thryomanes bewickii	1962
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2014
Bird	Bobolink	Dolichonyx oryzivorus	2019
Bird	Brown Creeper	Certhia americana	2023
Bird	Buff-breasted Sandpiper	Calidris subruficollis	2018
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2014
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	1994
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Dunlin	Calidris alpina	2018
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2020
Bird	Evening Grosbeak	Coccothraustes vespertinus	2009
Bird	Golden Eagle	Aquila chrysaetos	2022
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2021
Bird	Great Egret	Ardea alba	2023
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	King Rail	Rallus elegans	2007
Bird	Least Bittern	Botaurus exilis	2007
Bird	Least Flycatcher	Empidonax minimus	2020
Bird	LeConte's Sparrow	Ammospiza leconteii	2017
Bird	Lesser Yellowlegs	Tringa flavipes	2022
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2023
Bird	Long-eared Owl	Asio otus	2019
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2023

Obion River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Olive-sided Flycatcher	Contopus cooperi	2011
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2022
Bird	Peregrine Falcon	Falco peregrinus	2023
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2009
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-billed Dowitcher	Limnodromus griseus	2015
Bird	Short-eared Owl	Asio flammeus	2019
Bird	Snowy Egret	Egretta thula	2021
Bird	Swainson's Warbler	Limnothlypis swainsonii	2020
Bird	Veery	Catharus fuscescens	2018
Bird	Vesper Sparrow	Pooecetes gramineus	2022
Bird	Whooping Crane	Grus americana	2019
Bird	Willet	Tringa semipalmata	2018
Bird	Willow Flycatcher	Empidonax traillii	2010
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2021
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Mammal	Golden Mouse	Ochrotomys nuttalli	2007
Mammal	Meadow Jumping Mouse	Zapus hudsonius	2007
Mammal	Southeastern Shrew	Sorex longirostris	2007
Mammal	Southern Bog Lemming	Synaptomys cooperi	1970
Plant	Halberd-leaf Tearthumb	Polygonum arifolium	2019
Plant	Harbison's Hawthorn	Crataegus harbisonii	1948
Plant	Mcdowell's Sunflower	Helianthus occidentalis	1959
Plant	Prickly Hornwort	Ceratophyllum echinatum	1977
Plant	Red Turtlehead	Chelone obliqua	2018
Plant	Sweetscent Ladies'-tresses	Spiranthes odorata	2008
Reptile	Eastern Box Turtle	Terrapene carolina	2013
Reptile	Eastern Pinesnake	Pituophis melanoleucus	2014
Reptile	Red-bellied Mudsnake	Farancia abacura	1962

Obion River COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Western Siren	Siren nettingi	1969
Crustacean	Hatchie Burrowing Crayfish	Creaserinus hortoni	1984
Fish	Alligator Gar	Atractosteus spatula	1955
Fish	Firebelly Darter	Etheostoma pyrrhogaster	2018
Fish	Piebald Madtom	Noturus gladiator	2006

Obion River COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
No documented subterranean SGCN in this COA			

South Fork of the Forked Deer River

Conservation Opportunity Area



The South Fork of the Forked Deer River is comprised of the typical bottomland hardwood/wetland habitat found in West Tennessee, with some agricultural lands found near the river. This river system is the main drainage of the central portion of West Tennessee. Historically, much of the Forked Deer basin contained wetlands that were used by Native Americans and early settlers as hunting and fishing grounds. However, much of this area has been drained, and most of the tributaries of the Forked Deer have been channelized, impacting aquatic habitat structure, riparian vegetation, and water quality.

The bottomland hardwood/wetland areas found along the South Fork of the Forked Deer River are some of Tennessee's richest in biological diversity, with over 160 species. This area supports populations of nongame species such as Alligator Gar, Chickasaw Darter, Mississippi Kite, Barking Treefrog, and plant species such as the whorled sunflower. The Forked Deer River was also the site for three past species restoration projects (Alligator Gar, Mississippi Kite, and Alligator Snapping Turtle).

TWRA will consider future land acquisitions in this COA for watershed protection, critical habitat protection, habitat restoration, streambank stabilization, planting of bottomland hardwoods and warm season grasses, and planting buffer strips along the river to improve water quality. TWRA will also seek partnerships with other agencies and landowners to implement many of the management strategies on private lands within the COA.



The South Fork of the Forked Deer River system is the main drainage of the central portion of West Tennessee.



Top to bottom: Rafinesque's Big-eared Bat/Scott Dykes, TWRA; Chuck Will's Widow/Ryan Mandelbaum. P2: Mississippi Kite/Andy Reago & Chrissy McClarren. P4: Alligator Gar/Lynn Chan

South Fork of the Forked Deer River Conservation Opportunity Area

Partnerships

TWRA will develop and foster partnerships with the US Fish & Wildlife Service, Tennessee Department of Environment and Conservation, Natural Resources Conservation Service, Farm Bureau, TN Dept. of Forestry, The Nature Conservancy, National Wild Turkey Federation, TN Aquarium and Conservation Institute, Ducks Unlimited, UT Agricultural Extension, Southeast Missouri State, TN State University, Cooperative Extensions, and various other universities, institutions, and local governments.



CMP Stressor Level	Stressor Categories	Threats specific to South Fork of the Forked Deer River
2.1.A.	Annual and perennial non-timber crops; Agricultural conversion (row crop, mostly historical)	Removal of the natural vegetation of an area for agricultural purposes such as beef cattle, row crops, and hay farms.
2.1 B	Annual and perennial non-timber crops; Incompatible row crop agricultural practices	Degradation of soil/water quality or habitat structure related to row crop production (especially (corn, soybeans, and cotton in this COA) and maintenance not compatible with species needs. Row crop farming occurs on WMAs, which can be directly addressed by state agency personnel, as it is not a BMP for any species.
7.2 A	Dams and water management/use; Channelization of rivers/ streams	Alteration of the natural course of a river or stream by removing rock, dirt, gravel, and other sediments from shorelines and bottoms. Such alteration is done primarily for navigation and flood control purposes and leads to either not enough water or too much water in the ecosystem in question.
7.2 C	Dams and water management/use; Construction of ditches/dikes/ drainage/diversion systems	Disruption and degradation of the natural hydrologic patterns of wetlands, rivers, and streams due to construction of various water diversion or containment structures.
7.2 G	Dams and water management/use; Operation of drainage/ diversion systems	Degradation of water quality and habitat availability due to disruption of natural hydrologic regimes of rivers, streams, and wetlands by the operation of drainage ditches, dikes, and other water diversion/containment structures.
9.3 D	Agriculture and forestry effluents; Incompatible row crop agricultural practices	Degradation of soil/water quality or habitat structure related to row crop production and maintenance not compatible with species needs. Often due to erosion from plowing/tilling or chemical applications of herbicides/pesticides.

To learn more about the South Fork of the Forked Deer River Conservation Opportunity Area, please contact: Rob Colvin, Biodiversity Coordinator, Region 1 (731) 423-5725

South Fork of the Forked Deer River Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Fee-title Ownership	Coordinate land acquisition priorities among state/federal agencies and non-governmental organizations to acquire critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	N/A
Permanent Protective Easements	Use federal/state/private funding sources to acquire permanent easements within critical units of aquatic, subterranean, and terrestrial habitats that provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Habitat/Natural Processes Restoration	Restore degraded/converted wetland systems (e.g., mudflat, moist soil) within critical units of aquatic, subterranean, and terrestrial habitats to address the effects of channelization, dikes, and drainage systems.	acres
Habitat/Natural Processes Restoration	Restore in-stream flows and physical structure to channelized or impounded streams within critical units of aquatic, subterranean, and terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems (e.g., mud flats, moist soil) in or near critical units of aquatic, subterranean, and terrestrial habitats (state-owned lands and private land BMPs).	acres
Habitat/Natural Processes Restoration	Restore and enhance riparian zones and buffers in agricultural and urban areas to minimize non-point source pollution and address channelization.	acres or feet of riparian
Habitat/Natural Processes Restoration	Reduce ground and surface water withdrawals in areas with drought, specifically through use of channelization,	acre-feet
Species Restoration	Reintroduce extirpated and historic populations of priority species to appropriate habitats across the state to help increase species population numbers and mitigate population declines native species have suffered due to stressors on the landscape.	number of introductions
Institutional Improvement	Increase staffing and funding of state and federal agencies responsible for managing target species/habitats or monitoring environmental quality.	FTEs
Climate Adaptation Management	Protect wetland systems (specifically, from channelization, drainage and diversions) to buffer storm and flood impacts.	acres

South Fork of the Forked Deer River Conservation Opportunity Area

Conservation Projects

Some completed and ongoing projects focused on achieving a better understanding of the abundance and distribution of SGCN such as fish, Alligator Snapping Turtles, Pine Snakes, Pygmy Rattlesnakes, and Bald Eagles.

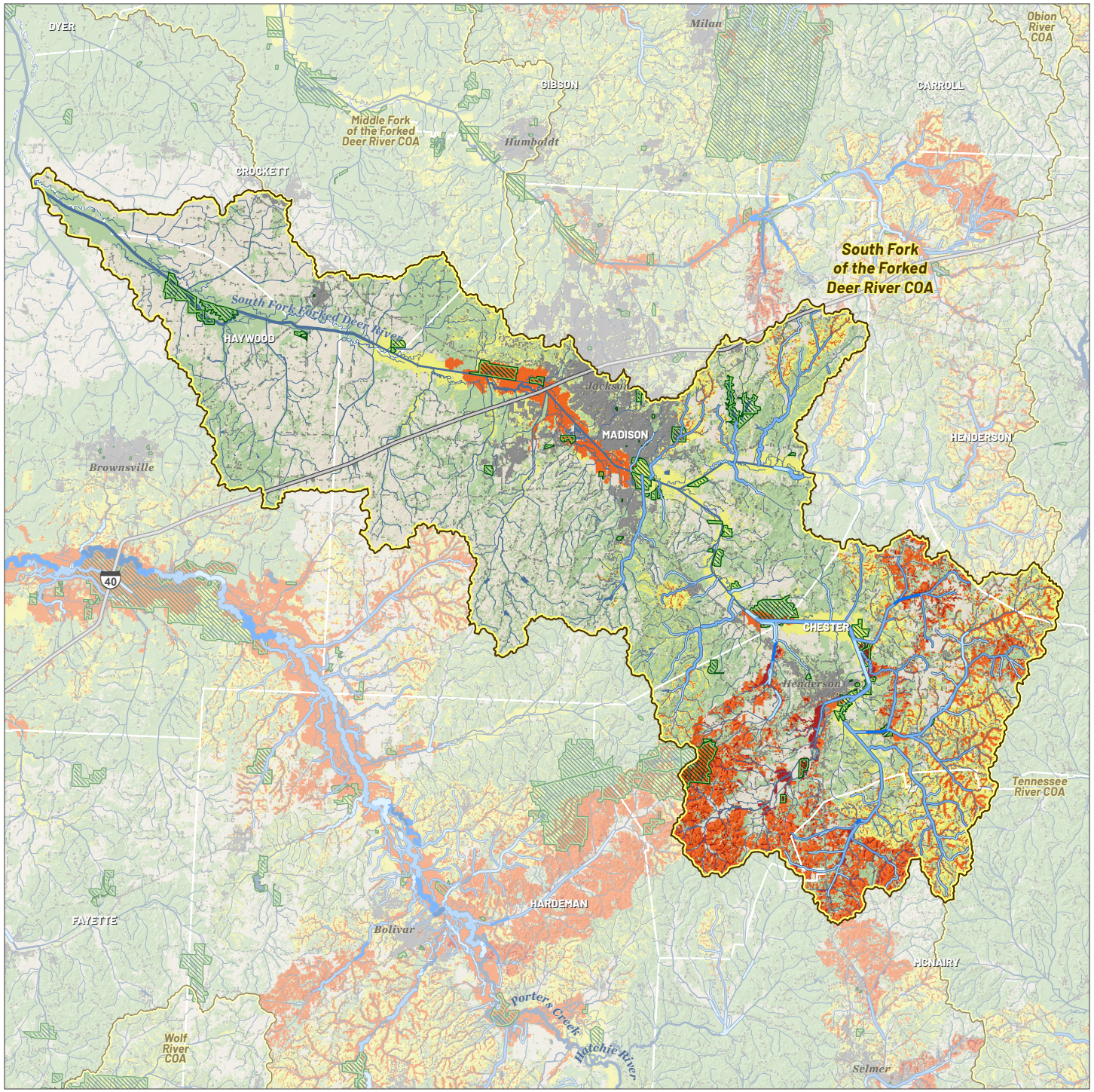
In addition, amphibian surveys were conducted to detect the presence of Bsal (Batrachochytrium salamandrivorans), a dreaded pathogenic chytrid fungus known for infecting various amphibian species. Bsal likely originated in Asia and surveys in the US are conducted as surveillance for early detection to prevent the spread of this wildlife pathogen. Based on lab studies, biodiversity loss from Bsal would be expected to be greatest in the Appalachian region and along the west coast of the United States. Monitoring of snake fungal disease also continues.

Monitoring of snake fungal disease continues, and in this COA it was combined with snake epidermis microbiome sampling and herpetofauna gut microbiome sampling as part of a study in collaboration with MTSU to better understand the effects of this disease in snakes.



South Fork of the Forked Deer River Conservation Opportunity Area

South Fork of the Forked Deer Plateau COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Cypress Grove Park	Local	140	100%
Kate Campbell Robertson Park	Local	313	100%
Muse Park	Local	100	100%
Pinson Mounds State Archaeological Park	TDEC - SP	1,524	100%
Chickasaw SF & WMA	TDF	12,746	13%
South Fork Waterfowl Refuge	TDOT	828	100%
Col. Forrest V. Durand WMA	TWRA	389	100%
Fort Ridge WMA	TWRA	1,579	100%
Lake Graham SFA	TWRA	867	100%
Perry Switch WMA	TWRA	207	100%
South Fork Waterfowl Refuge	TWRA	149	100%
Tull Bottom WMA	TWRA	1,485	100%



Combined Habitat Priorities

South Fork of the Forked Deer River Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

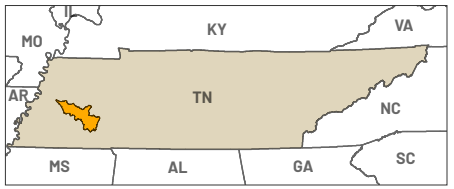
- Conservation Opportunity Area (COA)
- Public/Protected Land
- Conservation Easement

Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles
0 5 Kilometers



South Fork of the Forked Deer River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Barking Treefrog	Dryophytes gratiosus	1998
Amphibian	Small-Mouthed Salamander	Ambystoma texanum	2010
Amphibian	Southern Cricket Frog	Acris gryllus	2019
Bat	Eastern Small-footed Bat	Myotis leibii	2016
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2016
Bat	Southeastern Bat	Myotis austroriparius	2011
Bat	Tricolored Bat	Perimyotis subflavus	2011
Bird	American Bittern	Botaurus lentiginosus	2022
Bird	American Black Duck	Anas rubripes	2010
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bachman's Sparrow	Peucaea aestivalis	1995
Bird	Bewick's Wren	Thryomanes bewickii	1979
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2013
Bird	Black-throated Blue Warbler	Setophaga caerulescens	1995
Bird	Bobolink	Dolichonyx oryzivorus	2019
Bird	Brown Creeper	Certhia americana	2023
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2022
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2022
Bird	Evening Grosbeak	Coccothraustes vespertinus	1975
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2019
Bird	Great Egret	Ardea alba	2023
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	King Rail	Rallus elegans	1941
Bird	Least Flycatcher	Empidonax minimus	2023
Bird	LeConte's Sparrow	Ammospiza leconteii	1955
Bird	Lesser Yellowlegs	Tringa flavipes	2021
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2021
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2023
Bird	Northern Bobwhite	Colinus virginianus	2022
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Olive-sided Flycatcher	Contopus cooperi	2009
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Peregrine Falcon	Falco peregrinus	2014
Bird	Prairie Warbler	Setophaga discolor	2023

South Fork of the Forked Deer River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-eared Owl	Asio flammeus	1957
Bird	Snowy Egret	Egretta thula	2012
Bird	Swainson's Warbler	Limnothlypis swainsonii	2022
Bird	Veery	Catharus fuscescens	2020
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	Willow Flycatcher	Empidonax traillii	2021
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Plant	Barbed Rattlesnake-root	Nabalus barbatus	2015
Plant	Bay Starvine	Schisandra glabra	1971
Plant	Catfoot	Pseudognaphalium helleri	2015
Plant	Lamance Iris	Iris brevicaulis	1970
Plant	Prairie Rhynchosia	Rhynchosia latifolia	2023
Plant	Southern Twayblade	Neottia bifolia	2023
Plant	Whorled Sunflower	Helianthus verticillatus	2024
Reptile	Eastern Box Turtle	Terrapene carolina	2011
Reptile	Red-bellied Mudsnake	Farancia abacura	1979

South Fork of the Forked Deer River COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Western Siren	Siren nettingi	2007
Crustacean	Hatchie Burrowing Crayfish	Creaserinus hortoni	2014
Fish	Chickasaw Darter	Etheostoma cervus	2021
Fish	Firebelly Darter	Etheostoma pyrrhogaster	1995

South Fork of the Forked Deer River COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
No documented subterranean SGCN in this COA			

Hatchie River

Regional Conservation Opportunity Area



The Hatchie River was designated a State Scenic River in 1970 and is an important aquatic and terrestrial area. Originating in northern MS, it is the longest unchannelized tributary of the lower Mississippi River as well as the largest forested floodplain remaining in Tennessee. Because it has remained unimpounded and unchannelized, the natural flood processes that drive the ecosystem are intact.

The Hatchie River is a complex ecosystem encompassing bottomland hardwood forests, canebrakes, swamps, sloughs, rivers, and lakes. These habitats support one of the most diverse systems in Tennessee with more than 100 species of fish, 35 species of mussels, over 250 bird species, and more than 70 species of reptiles and amphibians. With 11 species of catfish, the Hatchie may support more species of catfish than any other river in North America. Currently, the Hatchie River is the main site in Tennessee for Alligator Gar restoration efforts. Excessive sedimentation, contaminants, and habitat fragmentation are all threatening the Hatchie River. Additionally, expansion of industry and population near the Hatchie River could negatively affect it in the future.

TWRA will consider future land acquisitions in this COA for watershed protection, critical habitat protection, habitat restoration, streambank stabilization, and planting of bottomland hardwoods and buffer strips along the river. TWRA will also seek partnerships with other agencies and landowners to implement many of these management strategies on private lands within the COA to reduce soil erosion.



The Hatchie River is the longest free-flowing tributary of the lower Mississippi River and is the largest forested floodplain remaining in Tennessee.



Top to bottom: Rob Colvin, TWRA Biodiversity biologist handling a large Alligator Snapping Turtle; Mud Snake along the Hatchie River/Rob Colvin, TWRA P2: Prothonotary Warbler/Allen Sparks. P4: Oxbow off the Hatchie River, Hatchie NWR/Rob Colvin, TWRA

Hatchie River
Conservation Opportunity Area

Partnerships



TWRA will develop and foster partnerships with the US Fish and Wildlife Service, TN Department of Environment and Conservation, The Nature Conservancy, USDA Natural Resources Conservation Service, The Hatchie River Conservancy, TN Dept. of Forestry, Tennessee Valley Authority, West TN River Basin Authority, Ducks Unlimited, Tennessee Ornithological Society, Tennessee Aquarium and Conservation Institute, Lower Hatchie National Wildlife Refuge volunteers, the Tennessee Bat Working Group, UT Agricultural Extension, Cooperative Extensions, Austin Peay State Univ., Middle Tennessee State Univ., Southeast Missouri State, and various other universities as well as local governments (Haywood, Tipton, Hardeman, McNairy, Madison and Lauderdale counties).

CMP Stressor Level	Stressor Category	Threats specific to Hatchie River
2.1.A	Annual and perennial non- timber crops; Agricultural conversion (row crop, mostly historical)	Removal of the natural vegetation of an area for agricultural purposes such as beef cattle, row crops, and hay farms, etc.
2.1.B	Annual and perennial non- timber crops; Incompatible row crop agricultural practices	Degradation of soil/water quality or habitat structure related to row crop production and maintenance not compatible with species needs. Often due to erosion from plowing/tilling or chemical applications of herbicides/ pesticides. Also occurs on WMAs.
4.1.A	Roads and railroads	Recent industrial land commercial development infrastructure
7.2.C	Dams and water management/use; Construction of ditches/dikes/ drainage/diversion systems	Disruption and degradation of the natural hydrologic patterns of wetlands, rivers, and streams due to unnatural drainage ditch construction that removes water from naturally flooded areas
7.2.D	Dams & water management/use; Excessive groundwater withdrawal	Removal of groundwater resources essential to maintenance of hydrologic levels that support aquatic and subterranean species. Withdrawal is primarily from wells drilled for irrigation, particularly new center pivot irrigation
7.2.G	Dams & water management/use; Operation of drainage/diversion systems	Disruption and degradation of the natural hydrologic patterns of wetlands, rivers, and streams due to channelization of waterways
9.3.D	Agriculture & forestry effluents; Incompatible row crop agricultural practices	Degradation of soil and water quality or habitat structure related to row crop production, including production on WMAs

Hatchie River
Conservation Opportunity Area

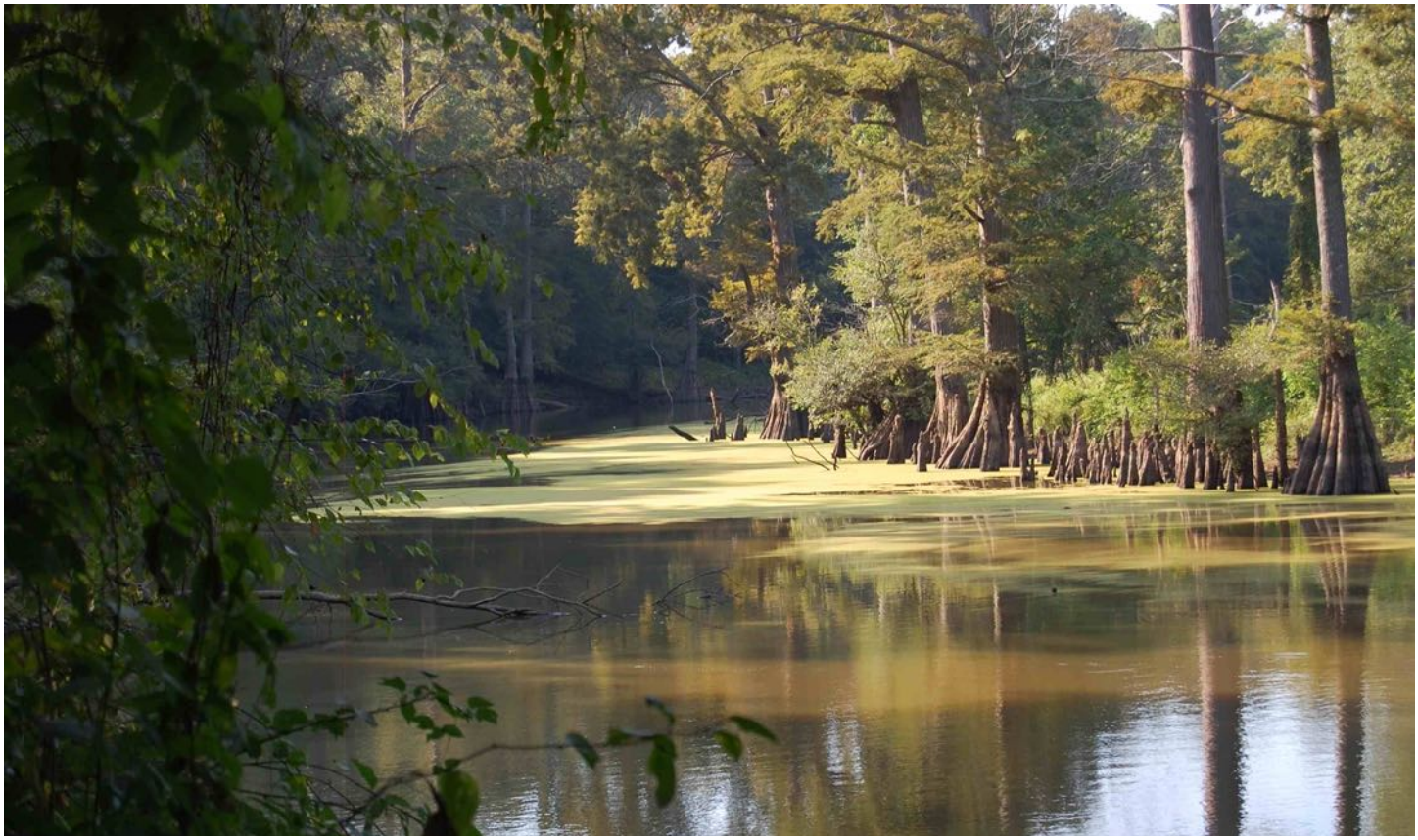
Conservation Actions	Desired Change	Units of Measure
Fee-title Acquisition	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Habitat/Natural Processes Restoration	Restore degraded/converted wetland systems (e.g., channelization) within critical units of aquatic, subterranean, and terrestrial habitats.	acres
Species Restoration	Reintroduce extirpated and historic populations of priority species, in particular the Alligator Snapping Turtle, to appropriate habitats across the state.	number of introductions
Institutional Improvement	Increase staffing and funding of state agencies and local offices of federal agencies responsible for managing target species/habitats or monitoring environmental quality.	FTEs
Compatible Resource Use	Use government-funded incentive programs (e.g., CRP, EQIP, CSP, WRP, and FLEP) to encourage private landowners to protect water quality for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Compatible Resource Use	Use government-funded incentive programs (e.g., FLEP, CRP, EQIP, Forest Stewardship Program, and Forest Legacy Program) to encourage private landowners to restore and/or protect native forest systems for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore degraded habitats, as appropriate, to support a diversity of species assemblages and ecosystem structure and function, especially on state-owned lands.	acres
Habitat/Natural Processes Restoration	Restore and enhance riparian zones and buffers in agricultural and urban areas to minimize non-point source pollution.	acres or length (feet) of riparian area restored
Habitat/Natural Processes Restoration	Reduce ground and surface water withdrawals (in particular, through drainage/diversion systems) in areas experiencing drought.	gallons reduced
Climate Adaptation Management	Protect and restore riparian buffers to reduce temperature and moderate flows in riparian systems (on state-owned lands).	acres or length (feet) of riparian area restored

To learn more about the Hatchie River Conservation Opportunity Area, please contact:
Rob Colvin, Biodiversity Coordinator, Region 1 (731) 423-5725

Hatchie River
Conservation Opportunity Area

Conservation Projects

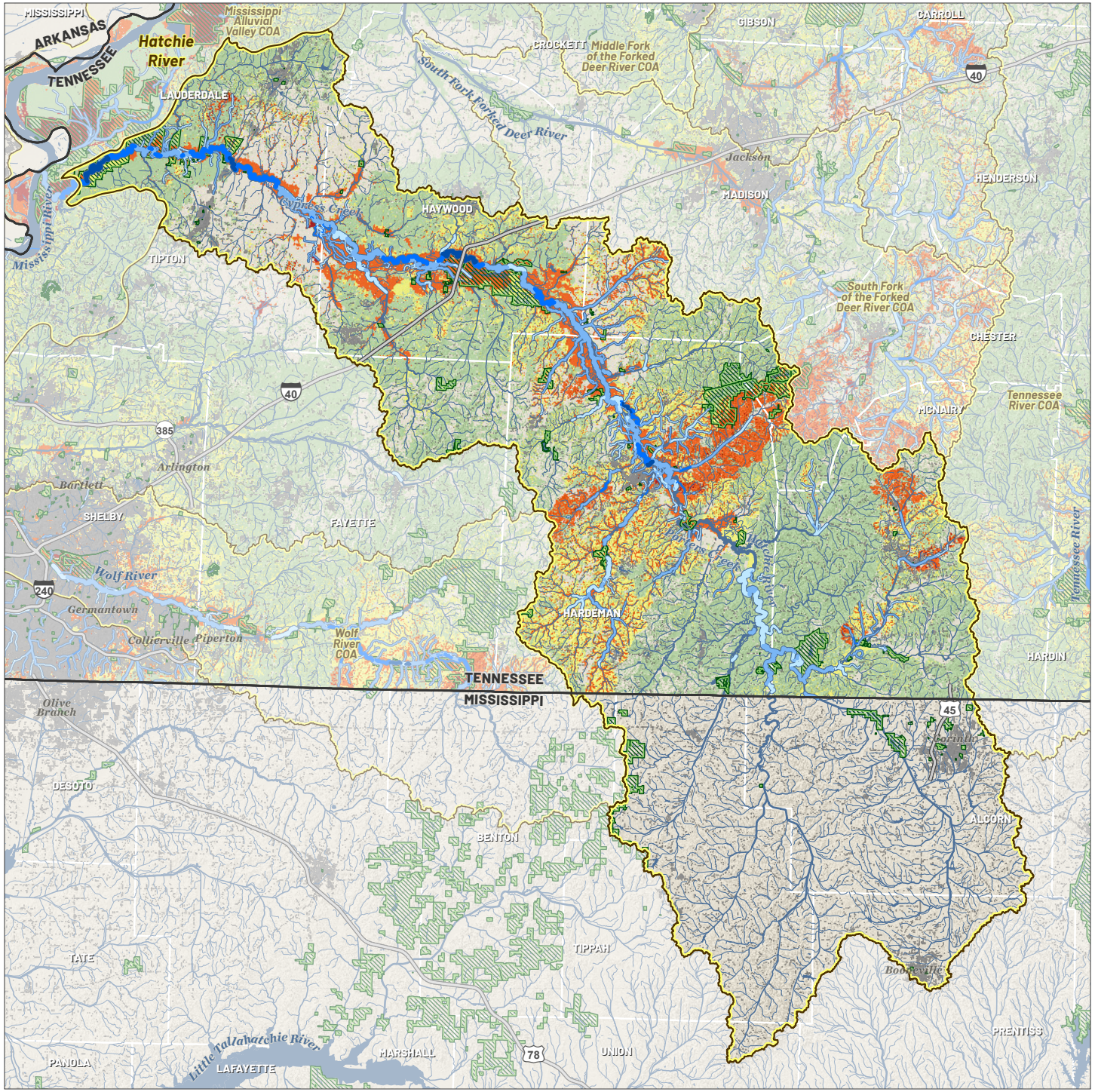
Many completed and ongoing projects focused on achieving a better understanding of the abundance and distribution of SGCN, including fish, mussels, Alligator Snapping Turtle, bats, Bald eagles, marsh birds, and reptiles and amphibians to determine species distribution, abundance, and other demographic factors. In addition, sampling for snake fungal disease was conducted as part of ongoing research to understand the reach and impacts of this wildlife disease.



To learn more about the Hatchie River Conservation Opportunity Area, please contact:
Rob Colvin, Biodiversity Coordinator, Region 1 (731) 423-5725

Hatchie River
Conservation Opportunity Area

Hatchie River COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Big Hill Pond SP	TDEC - SP	4,055	100%
Chickasaw SP	TDEC - SP	1,356	100%
Chickasaw SF & WMA	TDF	12,746	87%
Grays Creek WMA	TWRA	288	100%
Oak Dane Public Hunting Area	TWRA	164	100%
Whiteville Lake WMA	TWRA	334	100%
Hatchie NWR	USFWS	11,457	100%
Lower Hatchie NWR	USFWS	10,070	58%
Big Hill Pond SP	TDEC - SP	4,055	100%
Chickasaw SP	TDEC - SP	1,356	100%



Combined Habitat Priorities

Hatchie River Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

Conservation Opportunity Area (COA)

Public/Protected Land

Conservation Easement

Karst Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:

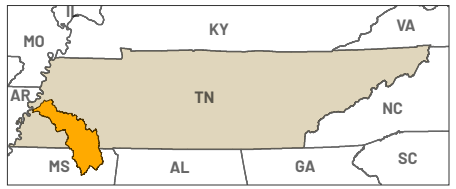
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Hatchie River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Barking Treefrog	Dryophytes gratiosus	1969
Amphibian	Four-toed Salamander	Hemidactylium scutatum	2008
Amphibian	Small-Mouthed Salamander	Ambystoma texanum	1970
Amphibian	Southern Cricket Frog	Acris gryllus	2008
Bat	Gray Bat	Myotis grisescens	1968
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2013
Bat	Southeastern Bat	Myotis austroriparius	2012
Bat	Tricolored Bat	Perimyotis subflavus	2014
Bird	American Barn Owl	Tyto furcata	2020
Bird	American Bittern	Botaurus lentiginosus	2023
Bird	American Black Duck	Anas rubripes	2023
Bird	American Golden-Plover	Pluvialis dominica	2020
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bachman's Sparrow	Peucaea aestivalis	2003
Bird	Bank Swallow	Riparia riparia	2023
Bird	Bell's Vireo	Vireo bellii	2015
Bird	Belted Kingfisher	Megaceryle alcyon	1999
Bird	Bewick's Wren	Thryomanes bewickii	1982
Bird	Black-bellied Plover	Pluvialis squatarola	2004
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2013
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2023
Bird	Bobolink	Dolichonyx oryzivorus	2023
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2018
Bird	Buff-breasted Sandpiper	Calidris subruficollis	2023
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2019
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2022
Bird	Connecticut Warbler	Oporornis agilis	1958
Bird	Dunlin	Calidris alpina	2018
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Golden Eagle	Aquila chrysaetos	2022
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2020
Bird	Great Egret	Ardea alba	2023
Bird	Henslow's Sparrow	Centronyx henslowii	2016
Bird	Hudsonian Godwit	Limosa haemastica	2004
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	King Rail	Rallus elegans	1939
Bird	Least Bittern	Botaurus exilis	2018

Hatchie River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Least Flycatcher	Empidonax minimus	2023
Bird	LeConte's Sparrow	Ammospiza leconteii	2023
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2021
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2023
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Olive-sided Flycatcher	Contopus cooperi	2021
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2023
Bird	Peregrine Falcon	Falco peregrinus	2021
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruddy Turnstone	Arenaria interpres	2003
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2023
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-billed Dowitcher	Limnodromus griseus	2023
Bird	Short-eared Owl	Asio flammeus	2012
Bird	Snowy Egret	Egretta thula	2023
Bird	Stilt Sandpiper	Calidris himantopus	2018
Bird	Swainson's Warbler	Limnothlypis swainsonii	2023
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	Western Sandpiper	Calidris mauri	2023
Bird	White-rumped Sandpiper	Calidris fuscicollis	2023
Bird	Whooping Crane	Grus americana	2007
Bird	Willet	Tringa semipalmata	2022
Bird	Willow Flycatcher	Empidonax traillii	2018
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Mammal	Appalachian Cottontail	Sylvilagus obscurus	2007
Mammal	Eastern Woodrat	Neotoma floridana illinoensis	1980
Mammal	Golden Mouse	Ochrotomys nuttalli	2017
Mammal	Southeastern Shrew	Sorex longirostris	2008
Mammal	Southern Bog Lemming	Synaptomys cooperi	1985
Plant	Bay Starvine	Schisandra glabra	1997

Hatchie River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Catfoot	Pseudognaphalium helleri	2023
Plant	Cedar Elm	Ulmus crassifolia	1986
Plant	Chapman's Redtop	Tridens flavus var. chapmanii	1949
Plant	Earleaf False Foxglove	Agalinis auriculata	1991
Plant	Gibbous Panicgrass	Sacciolepis striata	2003
Plant	Hairy Umbrella-sedge	Fuirena squarrosa	2019
Plant	Halberd-leaf Tearthumb	Polygonum arifolium	2024
Plant	Heartleaf Plantain	Plantago cordata	2023
Plant	Horsesugar	Symplocos tinctoria	1978
Plant	Ovate Catchfly	Silene ovata	1982
Plant	Pink Sundew	Drosera capillaris	1951
Plant	Plukenet's Flatsedge	Cyperus plukenetii	1949
Plant	Prairie False Foxglove	Agalinis heterophylla	1983
Plant	Prairie Parsley	Polytaenia nuttallii	1990
Plant	Prickly Hornwort	Ceratophyllum echinatum	1982
Plant	Reniform Sedge	Carex reniformis	1996
Plant	Savannah Beakrush	Rhynchospora debilis	2024
Plant	Southern Morning-glory	Stylisma humistrata	1988
Plant	Sweetbay Magnolia	Magnolia virginiana	2019
Plant	Twisted Spikerush	Eleocharis tortilis	2019
Plant	White Heath Aster	Symphyotrichum ericoides var. ericoides	2023
Plant	Whorled Sunflower	Helianthus verticillatus	2022
Plant	Yellow-crested Orchid	Platanthera cristata	2019
Reptile	Common Coachwhip	Coluber flagellum	1970
Reptile	Eastern Box Turtle	Terrapene carolina	2007
Reptile	Eastern Hog-nosed Snake	Heterodon platirhinos	1970
Reptile	Eastern Slender Glass Lizard	Ophisaurus attenuatus longicaudus	2003
Reptile	Red-bellied Mudsnake	Farancia abacura	2009
Reptile	Rough Earthsnake	Virginia striatula	1967
Reptile	Timber Rattlesnake	Crotalus horridus	2013
Reptile	Western Pygmy Rattlesnake	Sistrurus miliarius streckeri	1982

Hatchie River COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Western Siren	Siren nettingi	1953
Bivalve	Fatmucket	Lampsilis siliquoidea	2005
Bivalve	Little Spectaclecase	Leaunio lienosus	2005
Bivalve	Ohio Pigtoe	Pleurobema cordatum	2005
Bivalve	Southern Hickorynut	Obovaria arkansasensis	1983
Bivalve	Southern Rainbow	Villosa vibex	2005
Bivalve	Tapered Pondhorn	Uniomerus declivis	1983
Bivalve	White Heelsplitter	Lasmigona complanata	2005
Crustacean	Hatchie Burrowing Crayfish	Creaserinus hortoni	2013
Fish	Alligator Gar	Atractosteus spatula	2023

Hatchie River COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Fish	Blue Sucker	Cycleptus elongatus	2016
Fish	Naked Sand Darter	Ammocrypta beanii	2009
Fish	Paddlefish	Polyodon spathula	2000
Fish	Piebald Madtom	Noturus gladiator	2008
Fish	Scaly Sand Darter	Ammocrypta vivax	2020
Insect	Pygmy Snaketail	Ophiogomphus howei	1997
Reptile	Alligator Snapping Turtle	Macrochelys temminckii	1975
Reptile	Smooth Softshell Turtle	Apalone mutica	2016

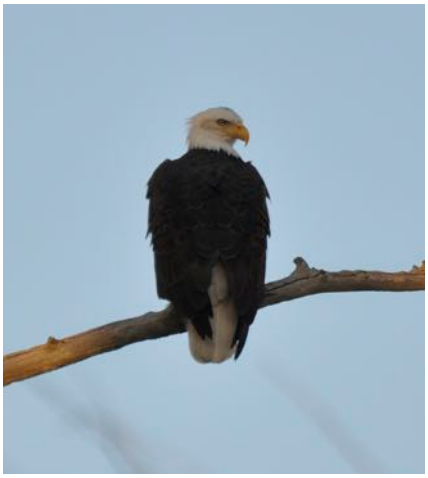
Hatchie River COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
No documented subterranean SGCN in this COA			

Reelfoot Lake

Regional Conservation Opportunity Area



Reelfoot Lake is located in Lake and Obion Counties in northwest Tennessee, with a small portion of the lake extending into southwestern Kentucky. It was formed in 1811-1812 following a series of earthquakes and is the largest natural lake in Tennessee, encompassing more than 10,000 acres of water and another 5,000 acres of marshes and wetlands. Approximately 30,000 acres of the lake and surrounding marshes and wetlands are protected, with approximately 18,000 acres designated as a State Natural Area. Management of the lake and its surrounding lands is primarily vested with three agencies (TWRA – 17,500 acres; USFWS – 12,300 acres; TDEC – 300 acres).



Reelfoot Lake and its associated habitats are internationally recognized, and this COA receives a tremendous amount of tourism due to the world class fishing, hunting, wildlife viewing, and recreational opportunities. The diversity includes over 50 species of mammals and over 70 species of reptiles and amphibians that inhabit the Reelfoot area, including over 60 plant and animal Species of Greatest Conservation Need (SGCN). Additionally, Reelfoot is one of the premier eagle viewing areas in eastern North America and is an important migration area for large populations of shorebirds, wading birds, and waterfowl.

Reelfoot Lake and its associated habitats are internationally recognized for their wildlife diversity, scenery, and recreational opportunities

Despite its abundant populations and the habitats that support them the lake is being subjected to severe actions that are degrading and destroying the area. It is estimated that 1.4 million tons of silt are deposited in the lake each year, depending on the severity of rainfall events. Originally, the lake was surrounded by extensive bottomland hardwood forests, but only small fragments remain today due to agricultural encroachment. The primary goals of this COA are to protect and restore the functional integrity of the Reelfoot Lake ecosystem and to enhance the capability of this ecosystem to provide habitat for migratory birds and other fish and wildlife.



Top to bottom: Bald Eagle/Greg Wathen; Reelfoot Lake Cypress/Rob Colvin, TWRA. P2: Habitat loss from farming/Rob Colvin, TWRA

Reelfoot Lake
Conservation Opportunity Area

Partnerships



TWRA will develop and foster partnerships with the US Fish and Wildlife Service, Tennessee Department of Environment and Conservation, The Nature Conservancy, National Wild Turkey Federation, Tennessee Parks & Greenways Foundation, The Conservation Fund, Tennessee Aquarium and Conservation Institute, USDA Natural Resources Conservation Service, Farm Bureau, TN Dept. of Forestry, Southeast Missouri State, Ducks Unlimited, Cooperative Extensions, universities, various other institutions, businesses, and local governments.

CMP Stressor Level	Stressors Categories	Threats specific to Reelfoot Lake
5.4 A	Fishing and harvesting aquatic resources	Increased mortality due to legal taking or killing of species for commercial purposes, such as pet trade, live bait, mussel collection for pearl industry, fur trade, smelt production, etc. Commercial turtle collection is still allowed around Reelfoot Lake.
7.2 A	Dams and water management/use; Channelization of rivers/streams	Alteration of the natural course of a river or stream by removing rock, dirt, gravel, and other sediments from shorelines and bottoms. Such alteration is done primarily for navigation and flood control purposes. This category focuses on the human activities that lead to either not enough water or too much water in the ecosystem in question. Most waterways in this COA have been channelized to some degree. The channelized waterways require constant maintenance to function for the original intention. The spillway has been controversial, and dredging is required on the lake to combat sedimentation.
7.2 C	Dams and water management/use; Construction of ditches/dikes/ drainage/diversion systems	Disruption and degradation of the natural hydrologic patterns of wetlands, rivers, and streams due to construction of various water diversion or containment structures. The spillway has been controversial at Reelfoot and disrupts the natural flow of Running Reelfoot Bayou.
7.2 G	Dams and water management/use; Operation of drainage/diversion systems	Degradation of water quality and habitat availability due to disruption of natural hydrologic regimes of rivers, streams, and wetlands by the operation of drainage ditches, dikes, and other water diversion/containment structures. There are many examples of private as well as agency-owned property that have unnatural drainage ditches constructed to remove water from naturally flooded areas.These ditches are primarily for agriculture and flooding/draining fields for waterfowl.

CMP Stressor Level	Stressors Categories	Threats specific to Reelfoot Lake, continued
8.1 A	Invasive non-native/alien species plants and animals	Increased mortality or habitat degradation caused by excessive competition or predation from invasive exotic species. Invasive carp are a problem around Reelfoot Lake as well as many other waterways in west Tennessee.
9.3 D	Agriculture and forestry effluents -Incompatible row crop agricultural practices	Degradation of soil/water quality or habitat structure related to row crop production and maintenance not compatible with species needs. Often due to erosion from plowing/tilling or chemical applications of herbicides/ pesticides. There is extensive row crop farming in this COA (corn, soybeans, and cotton). Most row crop farming in this COA uses fertilizer and herbicide chemicals in extreme excess. Furthermore, row crop farming occurs on WMAs, which can be directly addressed by state agency personnel.

Conservation Projects

Many completed and ongoing projects focused on achieving a better understanding of the abundance and distribution of SGCN, including fish, turtles (including Alligator Snapping Turtle), Bald Eagles, colonial waterbirds, and bats. In addition, bat telemetry is helping to identify important habitats for bat species, and tagging of invasive carp is helping to monitor the spread of these detrimental species. Finally, monitoring combined with studies of snake microbiomes will advance the understanding of snake fungal disease and its effects.



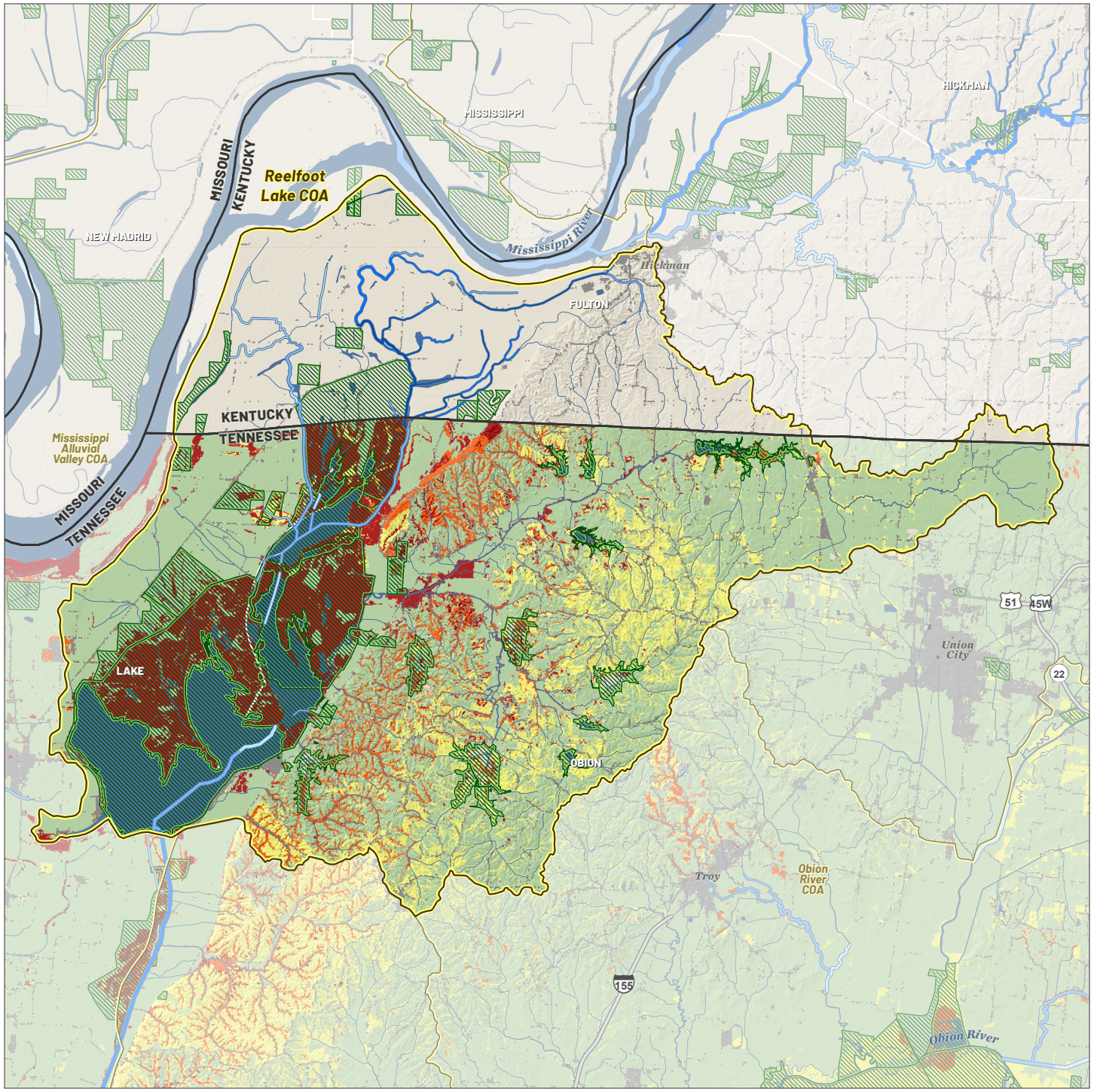
To learn more about the Reelfoot Lake Conservation Opportunity Area, please contact:
Rob Colvin, Biodiversity Coordinator, Region 1 (731) 423-5725

Reelfoot Lake
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Compatible Resource Use	Utilize government funded incentive programs (e.g., CRP, EQIP, CSP, WRP, and FLEP) to encourage private landowners to protect water quality for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore in-stream flows and physical structure to channelized or impounded streams within critical units of aquatic, subterranean, and terrestrial habitats.	acres of feet of riparian corridor
Habitat/Natural Processes Restoration	Restore degraded/converted wetland systems within critical units of aquatic, subterranean, and terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore and enhance riparian zones and buffers in agricultural and urban areas to minimize non-point source pollution.	acres or feet or riparian corridor
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres
Species Restoration	Reintroduce extirpated and historic populations of priority species to appropriate habitats across the state.	introductions
Institutional Improvement	Increase staffing and funding of state agencies and local offices of federal agencies responsible for managing target species/habitats or monitoring environmental quality.	acres or species
Policies & Regulations	Review current policies & regulations regarding commercial usage of non-game species.	species
Legislation	Propose/support state legislation to remove or prevent passage of local laws or regulations that negatively impact target species and/or habitats.	species or acres

Reelfoot Lake
Conservation Opportunity Area

Reelfoot Lake COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Reelfoot Lake SP	TDEC - SP	12,888	100%
Black Bayou Refuge	TWRA	1,374	100%
Reelfoot WMA	TWRA	1,665	90%
Reelfoot NWR	USFWS	7,069	100%



Combined Habitat Priorities

Reelfoot Lake Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

- Conservation Opportunity Area (COA)
- Public/Protected Land
- Conservation Easement

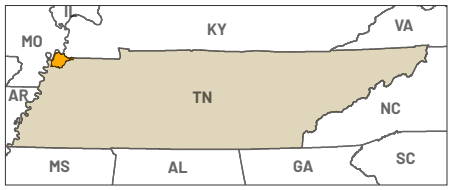
Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Reelfoot Lake COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Small-Mouthed Salamander	Ambystoma texanum	2013
Amphibian	Southern Cricket Frog	Acris gryllus	1966
Bat	Gray Bat	Myotis grisescens	2016
Bat	Indiana Bat	Myotis sodalis	2016
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2016
Bat	Southeastern Bat	Myotis austroriparius	2016
Bat	Tricolored Bat	Perimyotis subflavus	2016
Bird	American Barn Owl	Tyto furcata	2023
Bird	American Bittern	Botaurus lentiginosus	2022
Bird	American Black Duck	Anas rubripes	2022
Bird	American Golden-Plover	Pluvialis dominica	2023
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bachman's Sparrow	Peucaea aestivalis	1949
Bird	Baltimore Oriole	Icterus galbula	1999
Bird	Bank Swallow	Riparia riparia	2023
Bird	Bell's Vireo	Vireo bellii	2021
Bird	Belted Kingfisher	Megaceryle alcyon	2001
Bird	Bewick's Wren	Thryomanes bewickii	2013
Bird	Black-bellied Plover	Pluvialis squatarola	2022
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2022
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2016
Bird	Bobolink	Dolichonyx oryzivorus	2023
Bird	Brown Creeper	Certhia americana	2023
Bird	Buff-breasted Sandpiper	Calidris subruficollis	2005
Bird	Canada Warbler	Cardellina canadensis	2021
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2013
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Connecticut Warbler	Oporornis agilis	2006
Bird	Dunlin	Calidris alpina	2023
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	1979
Bird	Evening Grosbeak	Coccothraustes vespertinus	1996
Bird	Golden Eagle	Aquila chrysaetos	2018
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2022
Bird	Great Egret	Ardea alba	2023
Bird	Henslow's Sparrow	Centronyx henslowii	2019
Bird	Hudsonian Godwit	Limosa haemastica	2016
Bird	Interior Least Tern	Sternula antillarum athalassos	2008
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	King Rail	Rallus elegans	2020

Reelfoot Lake COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Least Bittern	Botaurus exilis	2023
Bird	Least Flycatcher	Empidonax minimus	2023
Bird	LeConte's Sparrow	Ammospiza leconteii	2023
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2023
Bird	Long-eared Owl	Asio otus	1999
Bird	Long-tailed Duck	Clangula hyemalis	2022
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2023
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Northern Saw-whet Owl	Aegolius acadicus	2023
Bird	Olive-sided Flycatcher	Contopus cooperi	2023
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2023
Bird	Peregrine Falcon	Falco peregrinus	2021
Bird	Piping Plover (Atlantic subspecies)	Charadrius melodus melodus	2001
Bird	Prairie Warbler	Setophaga discolor	2022
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruddy Turnstone	Arenaria interpres	2018
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2023
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-billed Dowitcher	Limnodromus griseus	2023
Bird	Short-eared Owl	Asio flammeus	2023
Bird	Snowy Egret	Egretta thula	2023
Bird	Stilt Sandpiper	Calidris himantopus	2023
Bird	Swainson's Warbler	Limnothlypis swainsonii	2023
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	Western Sandpiper	Calidris mauri	2020
Bird	White-rumped Sandpiper	Calidris fuscicollis	2023
Bird	Willet	Tringa semipalmata	2023
Bird	Willow Flycatcher	Empidonax traillii	2022
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2021
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Gastropod	Striped Whitelip	Webbhelix multilineata	1999
Mammal	Eastern Woodrat	Neotoma floridana illinoensis	1951

Reelfoot Lake COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Mammal	Southeastern Shrew	Sorex longirostris	1995
Plant	Blue Mud-plantain	Heteranthera limosa	2021
Plant	Blue Scorpionweed	Phacelia ranunculacea	2000
Plant	Bristly Sedge	Carex comosa	1986
Plant	Featherfoil	Hottonia inflata	2024
Plant	Grassleaf Arrowhead	Sagittaria graminea	2021
Plant	Lake-cress	Rorippa aquatica	2007
Plant	Nuttall's Waterweed	Elodea nuttallii	1997
Plant	Ovate-leaf Arrowhead	Sagittaria platyphylla	2010
Plant	Red Iris	Iris fulva	2021
Plant	River Bulrush	Bolboschoenus fluviatilis	1999
Plant	Tennessee Leafcup	Polymnia laevigata	1986
Plant	Upright Burhead	Echinodorus berteroi	2013
Plant	Yellow Water-crowfoot	Ranunculus flabellaris	2010
Reptile	Eastern Box Turtle	Terrapene carolina	1983
Reptile	Eastern Hog-nosed Snake	Heterodon platirhinos	1959
Reptile	Mississippi Green Watersnake	Nerodia cyclopion	2008
Reptile	Red-bellied Mudsnake	Farancia abacura	2020
Reptile	Timber Rattlesnake	Crotalus horridus	2011
Reptile	Western Ribbonsnake	Thamnophis proximus	2020

Reelfoot Lake COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Western Siren	Siren nettingi	1936
Bivalve	Fatmucket	Lampsilis siliquoidea	1985
Fish	Alligator Gar	Atractosteus spatula	1937
Fish	Golden Topminnow	Fundulus chrysotus	2018

Reelfoot Lake COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
No documented subterranean SGCN in this COA			

Tennessee River

Regional Conservation Opportunity Area



The Tennessee River Conservation Opportunity Area encompasses portions of the Tennessee River, Buffalo River, and Duck River, which provide important aquatic and terrestrial habitat in the river channels, floodplains, and surrounding uplands. In this COA, the Tennessee River is impounded by Kentucky Dam and is an important recreation area for boating, wildlife viewing, recreational fishing, commercial fishing, and hunting. The section of the Tennessee River in this COA downstream of Pickwick Dam is perhaps the best example of "big river" habitat remaining in Tennessee and is home to rare species of mussels, fishes, and reptiles that are state or federally listed as threatened or endangered. Other important species such as the Pygmy Rattlesnake and Eastern Pine Snake can be found in terrestrial habitats along the river. The primary land uses in the adjacent floodplains are agriculture and forestry.



Photo: Indian Creek, Hardin Co, a tributary to the Tennessee River/Rob Colvin, TWRA. P.5: Land Between the Lakes/Drew Train

The Tennessee River COA also includes extensive upland hardwood forests and pockets of limestone glade and barrens habitats. Public lands, including Land Between the Lakes, are distributed throughout the river corridor, providing important habitat conservation, recreation, and public education benefits.

TWRA will consider future land acquisitions in this COA for watershed protection, critical habitat protection, habitat restoration, streambank stabilization, planting of bottomland hardwoods, and buffer strip plantings along the river. The goal of land management projects is to establish or protect wide forested buffer zones along the rivers and promote the use of best management practices (BMPs) for farming, forestry, and construction projects.

The section of the Tennessee River in this COA below Pickwick Dam is perhaps the best example of "big river" habitat remaining in Tennessee

Tennessee River
Conservation Opportunity Area

Partnerships

TWRA will seek partnerships with other agencies and landowners to implement many of these management strategies on private lands within the COA. TWRA will develop and foster partnerships with the Tennessee Department of Environment and Conservation, Tennessee Department of Forestry, the Tennessee Valley Authority, the US Fish & Wildlife Service, US Army Corps of Engineers, The Nature Conservancy, Wolf River Conservancy, Tennessee Ornithological Society, USDA Natural Resources Conservation Service, Farm Bureau, Tennessee Department of Agriculture Forestry Division, Ducks Unlimited, Cooperative Extensions, University of Tennessee, Tennessee State University, citizen scientists, and other universities, businesses, and local governments. Collaborations with states bordering this COA include work with the fish and wildlife agencies of Mississippi, Alabama, and Kentucky.

CMP Stressor Level	Stressors Categories	Threats specific to Tennessee River
2.1 A	Annual and perennial non-timber crops; Agricultural conversion (row crop; mostly historical)	Removal of the natural vegetation of an area for agricultural purposes, such as pasture, row crops, feed lots, outbuildings, etc. There are many agriculture farms in this COA including beef cattle, row crop, and hay farms.
2.1 B	Annual and perennial non-timber crops; Incompatible row crop agricultural practices	Degradation of soil/water quality or habitat structure related to row crop production and maintenance not compatible with species needs. Often due to erosion from plowing/tilling or chemical applications of herbicides/pesticides. There is extensive row crop farming in this COA (corn, soybeans, and cotton). Furthermore, row crop farming occurs on WMAs, which can be directly addressed by state agency personnel. There should not be any row crop management practices on state-owned property, as it is not a BMP for any species.
2.2 A	Wood and pulp plantations	Large tracts of loblolly pine plantations are in regular rotation for paper production. There are areas of state-owned land that have dense loblolly forests that could be converted to mixed hardwood forest.
5.3 A	Logging and wood harvesting	A core issue in this COA is when forestry BMPs are not followed, such as high-grading. Several state-owned land areas (usually multi-agency) do not follow forestry BMPs for native species.
6.1 B	Recreational activities - vehicular	Destruction and degradation of habitats and increased mortality of species due to excessive levels of recreational vehicle traffic or inappropriate usage of habitats for recreational vehicles. In this COA, OHVs can cause loss of vegetation, SGCN habitat destruction, erosion, and increased runoff. Degraded aquatic habitat occurs due to petroleum pollution from outboard motors.

To learn more about the Tennessee River Conservation Opportunity Area, please contact:
Rob Colvin, Biodiversity Coordinator, Region 1 (731) 423-5725

CMP Stressor Level	Stressors Categories	Threats specific to Tennessee River, continued
7.2 A	Dams and water management/use; Channelization of rivers/streams	Alteration of the natural course of a river or stream by removing rock, dirt, gravel, and other sediments from shorelines and bottoms. Such alteration is done primarily for navigation and flood control purposes. This category focuses on the human activities that lead to either not enough water or too much water in the ecosystem in question. Most waterways in this COA have been channelized to some degree. The channelized waterways require constant maintenance to function for the original intention. Many problems have risen as a direct response to the channelization.
7.2 B	Dams and water management/use; Construction of dams/impoundments	Disruption and degradation of the natural flow of a river or stream due to construction of dams or impoundments. Also includes destruction of terrestrial habitats due to removal and inundation of vegetation along shorelines. High profile dams on the Tennessee River disrupt the historic natural flow of the river, restricting movements of native species.
7.2 C	Dams and water management/use; Construction of ditches/dikes/ drainage/diversion systems	Disruption and degradation of the natural hydrologic patterns of wetlands, rivers, and streams due to construction of various water diversion or containment structures. There are many examples of private as well as agency-owned property that have unnatural drainage ditches constructed to remove water from naturally flooded areas.
7.2 F	Dams and water management/use; Operation of dams/reservoirs	Degradation of water quality and aquatic habitat availability due to disruption of natural hydrologic regimes of rivers and streams by dams or reservoirs. Also includes destruction/ degradation of terrestrial habitats due to periodic raising or lowering of water levels. High profile dams on the Tennessee River disrupt the historic natural flow of the river, restricting movements of native species.
7.2 G	Dams and water management/use; Operation of drainage/diversion systems	Degradation of water quality and habitat availability due to disruption of natural hydrologic regimes of rivers, streams, and wetlands by the operation of drainage ditches, dikes, and other water diversion/containment structures. Most waterways in this COA have been channelized to some degree. The channelized waterways require constant maintenance to function for the original intention. Many problems have risen as a direct response to the channelization.
7.3 A	Other ecosystem modifications; Incompatible species management practices	Increased mortality or degradation of habitats resulting from the application of management practices that conflict with the ecological needs of a particular species, which include land reclamation projects, rip-rap along shoreline, mowing grass, tree thinning in parks, beach construction, and removal of snags from streams. All of the above are problems in this COA.
9.3 D	Agriculture and forestry effluents; Incompatible row crop agricultural practices	Degradation of soil/water quality or habitat structure related to row crop production and maintenance not compatible with species needs. Often due to erosion from plowing/tilling or chemical applications of herbicides/pesticides. There is extensive row crop farming in this COA (corn, soybeans, and cotton). Most row crop farming in this COA uses fertilizer and herbicide chemicals in extreme excess. Furthermore, row crop farming occurs on WMAs, which can be directly addressed by state agency personnel.

Tennessee River
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats that provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Conservation Planning	Develop/participate in regional conservation planning initiatives sponsored by federal and state agencies (e.g., TDEC Outdoor Recreational Planning, Tennessee State Park Comprehensive System Planning and park-specific Strategic Management Planning, Tennessee State Forest planning, TWRA regional planning, USFWS Joint Venture planning, TVA Reservoir Operations Planning, USACE Water Control Manual updates and revisions, etc.)	planning initiatives
Monitoring	Develop GIS remote-sensing program to analyze statewide land cover changes, map habitats, evaluate land use practices, etc. at shorter intervals or in greater detail than current national-level programs.	acres
Research	Conduct research on life history and ecological needs of target species to establish guidelines for determining population viability.	projects
Research	Conduct scientific surveys to discern the geographical distributions of lesser known target species.	surveys
Compatible Resource Use	Use government-funded incentive programs (e.g., CRP, EQIP, CSP, WRP, and FLEP) to encourage private landowners to protect water quality for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Compatible Resource Use	Use government funded incentive programs (e.g., FLEP, CRP, EQIP, Forest Stewardship Program, and Forest Legacy Program) to encourage private landowners to restore and/or protect native forest systems for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Compatible Resource Use	Encourage adoption of more stringent sustainable forestry practices on state forests and other public lands that contain critical units of aquatic, subterranean, and terrestrial habitats.	reviews performed
Conservation Area Management	Discourage conversion of native habitats to semi/non-natural land types (e.g., pine plantations, golf courses, etc.) on public and private conservation areas across the state.	acres
Habitat/Natural Processes Restoration	Restore degraded/converted wetland systems within critical units of aquatic, subterranean, and terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore in-stream flows and physical structure to channelized or impounded streams within critical units of aquatic, subterranean, and terrestrial habitats.	acres and/or feet or riparian corridor

Tennessee River
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Habitat/Natural Processes Restoration	Restore degraded forests and pine plantations to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Reintroduce fire via prescribed burning into fire-dependent grassland and woodland systems within critical units of terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Use native plants for restoration where possible, and where native plant sourcing is not possible, use resilient and non-invasive species and seed mixes.	acres
Habitat/Natural Processes Restoration	Restore degraded habitats, as appropriate, to support a diversity of species assemblages and ecosystem structure and function.	acres
Institutional Improvement	Increase staffing and funding of state agencies and local offices of federal agencies responsible for managing target species/habitats or monitoring environmental quality.	acres or species
Alliances & Partnerships	Develop strategic alliance with TN Division of Forestry, TN Forestry Association, US Forest Service, private timber companies, non-governmental organizations, universities, and other forest resource managers to address forestry practices that affect target species and habitats.	partnerships
Standards	Develop more stringent standards regarding permits for construction projects that potentially affect water quality and/or alter habitat.	acres or species

Conservation Projects

Many completed and ongoing projects focused on achieving a better understanding of the abundance and distribution of SGCN, including mussels, crayfish, fish, turtles, snakes, Bald Eagles, colonial waterbirds, Eastern Spotted Skunk, and numerous bat species. Monitoring and sampling for surveillance of snake fungal disease and Bsal occurred. Finally, habitat management and improvement projects focused on improving or restoring Loblolly pine forest and aquatic habitat at numerous locations.

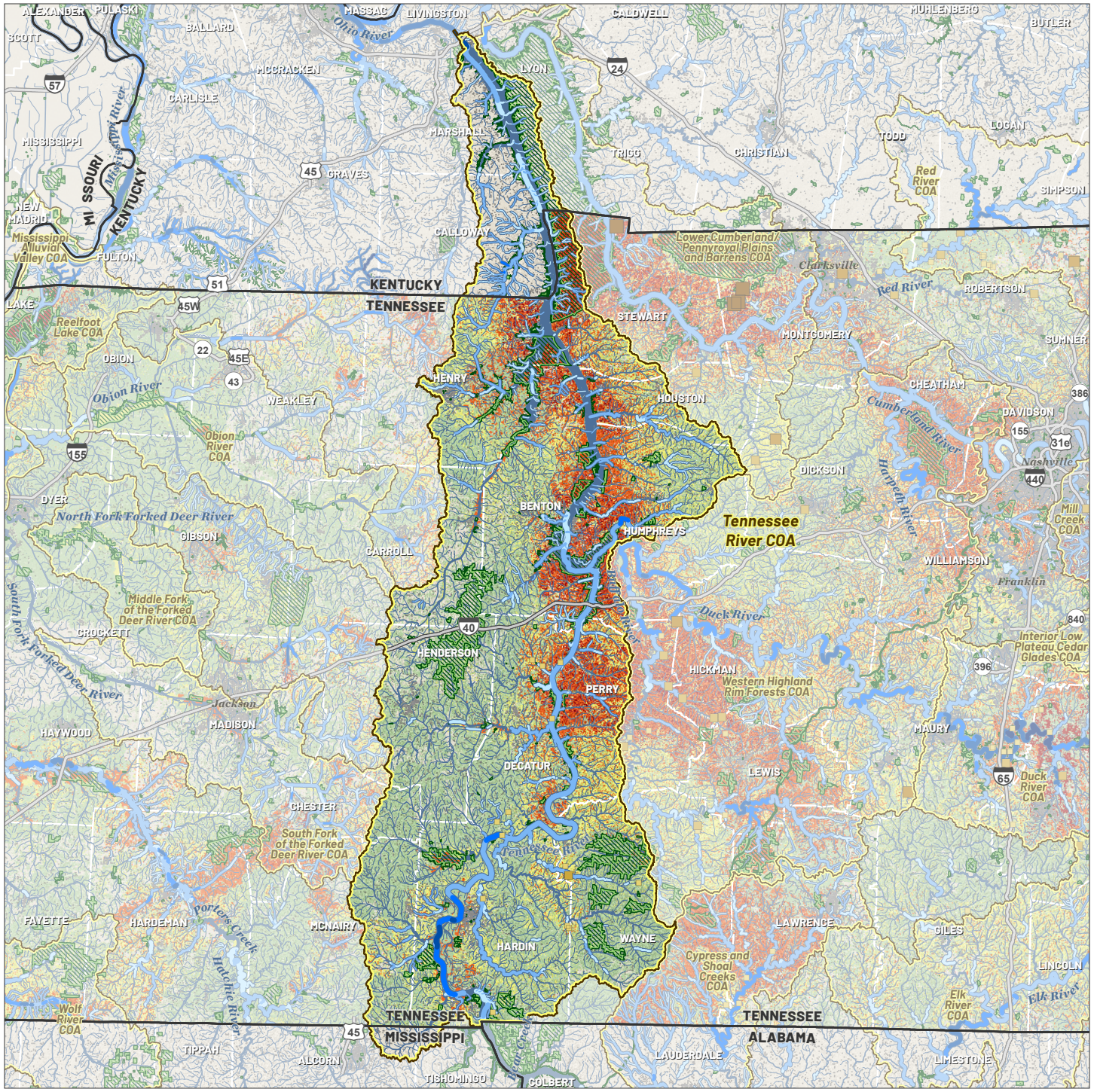


Tennessee River
Conservation Opportunity Area

Tennessee River COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
McEwen City Park	Local	174	100%
New Johnsonville Community Park	Local	47	100%
Turkey Creek Resort	Local	135	100%
Arnold Hollow WMA	Private	7,018	100%
Beech River WMA	Private	2	100%
Browntown WMA	Private	6,770	100%
Dry Creek WMA	Private	4,053	100%
Eagle Creek WMA	Private	22,886	95%
Carroll Cabin Barrens SNA	TDEC - DNA	249	100%
Johnsonville State Historic Park	TDEC - SP	1,291	58%
Mousetail Landing SP	TDEC - SP	1,305	100%
Natchez Trace SP	TDEC - SP	8,265	100%
Nathan Bedford Forrest SP	TDEC - SP	2,868	100%
Paris Landing SP	TDEC - SP	468	100%
Pickwick Landing SP	TDEC - SP	1,597	100%
Parkers Crossroads SHS	TDEC - THC	340	100%
Natchez Trace SF & WMA	TDF	36,644	100%
Alley Bluff Habitat Protection Area	TVA	71	100%
Big Sandy WMA	TVA	3,023	100%
Camden WMA	TVA	3,759	100%
Clendenin Creek Habitat Protection Area	TVA	23	100%
Crooked Creek Cemetery Habitat Protection Area	TVA	50	100%
Harmon Creek WMA	TVA	425	100%
Highway 79 Henson Branch Rare Histosol Habitat Protection Area	TVA	90	100%
Lady's Bluff SWA	TVA	45	100%
New Hope WMA	TVA	100	100%

Tennessee River
Conservation Opportunity Area

Tennessee River COA Protected Lands (continued)			
Name	Management Agency	Total Acreage	% of Acreage within COA
Paint Rock Bluff SWA	TVA	70	100%
Tribble Woods Habitat Protection Area	TVA	34	100%
TVA Land Use Zone 4 Multiple Allocations	TVA	1,572	6%
TVA Land Use Zone 4 Natural Resource Conservation	TVA	13,250	12%
TVA Land Use Zone 4 Open Space	TVA	3	100%
TVA Land Use Zone 4 Forest Management	TVA	744	100%
TVA Land Use Zone 4 Multiple Allocations	TVA	15,119	82%
West Sandy WMA	TVA	5,101	100%
Bailey Fork Public Hunting Area	TWRA	158	100%
Beason Creek WMA	TWRA	452	100%
Beech River WMA	TWRA	452	100%
Chambers Creek WMA	TWRA	487	100%
Cypress Pond Refuge	TWRA	585	100%
Hog Creek Refuge	TWRA	125	100%
Natchez Trace WMA	TWRA	419	100%
Walker Branch Dragonfly And Damselfly Preserve SNA	TWRA	524	100%
White Oak WMA	TWRA	7,184	100%
Land Between The Lakes National Recreation Area	USFS	64,158	51%
Tennessee NWR	USFWS	50,201	100%



Combined Habitat Priorities

Tennessee River Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

- Conservation Opportunity Area (COA)
- Public/Protected Land
- Conservation Easement

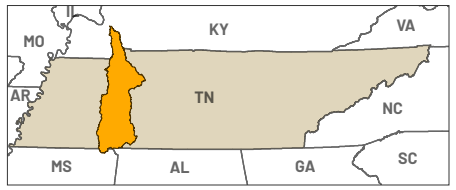
Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Tennessee River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Barking Treefrog	Dryophytes gratiosus	2005
Amphibian	Crawfish Frog	Lithobates areolatus	1970
Amphibian	Four-toed Salamander	Hemidactylium scutatum	2014
Amphibian	Gray Treefrog	Dryophytes versicolor	2005
Amphibian	Small-Mouthed Salamander	Ambystoma texanum	1926
Amphibian	Southern Cricket Frog	Acris gryllus	2005
Bat	Gray Bat	Myotis grisescens	2021
Bat	Indiana Bat	Myotis sodalis	2014
Bat	Little Brown Myotis	Myotis lucifugus	2018
Bat	Northern Long-eared Bat	Myotis septentrionalis	2014
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2012
Bat	Southeastern Bat	Myotis austroriparius	2018
Bat	Tricolored Bat	Perimyotis subflavus	2020
Bird	American Barn Owl	Tyto furcata	2023
Bird	American Bittern	Botaurus lentiginosus	2023
Bird	American Black Duck	Anas rubripes	2023
Bird	American Golden-Plover	Pluvialis dominica	2023
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bachman's Sparrow	Peucaea aestivalis	1997
Bird	Baltimore Oriole	Icterus galbula	2006
Bird	Bank Swallow	Riparia riparia	2023
Bird	Bell's Vireo	Vireo bellii	2022
Bird	Belted Kingfisher	Megaceryle alcyon	2006
Bird	Bewick's Wren	Thryomanes bewickii	1996
Bird	Black-bellied Plover	Pluvialis squatarola	2023
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2023
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2021
Bird	Blue-headed Vireo	Vireo solitarius	2001
Bird	Bobolink	Dolichonyx oryzivorus	2023
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2023
Bird	Buff-breasted Sandpiper	Calidris subruficollis	2023
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Connecticut Warbler	Oporornis agilis	2022
Bird	Dunlin	Calidris alpina	2023
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Evening Grosbeak	Coccothraustes vespertinus	2021
Bird	Golden Eagle	Aquila chrysaetos	2023

Tennessee River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023
Bird	Great Egret	Ardea alba	2023
Bird	Henslow's Sparrow	Centronyx henslowii	2023
Bird	Hudsonian Godwit	Limosa haemastica	2011
Bird	Interior Least Tern	Sternula antillarum athalassos	2005
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	King Rail	Rallus elegans	2022
Bird	Least Bittern	Botaurus exilis	2023
Bird	Least Flycatcher	Empidonax minimus	2023
Bird	LeConte's Sparrow	Ammospiza leconteii	2023
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2023
Bird	Long-eared Owl	Asio otus	2010
Bird	Long-tailed Duck	Clangula hyemalis	2023
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2023
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Northern Saw-whet Owl	Aegolius acadicus	2023
Bird	Olive-sided Flycatcher	Contopus cooperi	2023
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2023
Bird	Peregrine Falcon	Falco peregrinus	2023
Bird	Piping Plover (Atlantic subspecies)	Charadrius melodus melodus	2014
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruddy Turnstone	Arenaria interpres	2022
Bird	Rufa Red Knot	Calidris canutus rufa	1984
Bird	Ruffed Grouse	Bonasa umbellus	1996
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2023
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-billed Dowitcher	Limnodromus griseus	2023
Bird	Short-eared Owl	Asio flammeus	2023
Bird	Snowy Egret	Egretta thula	2023
Bird	Stilt Sandpiper	Calidris himantopus	2023
Bird	Swainson's Warbler	Limnothlypis swainsonii	2023
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	Western Sandpiper	Calidris mauri	2023
Bird	White-rumped Sandpiper	Calidris fuscicollis	2023
Bird	Whooping Crane	Grus americana	2017

Tennessee River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Willet	Tringa semipalmata	2023
Bird	Willow Flycatcher	Empidonax traillii	2023
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Gastropod	Swamp Vertigo	Vertigo teskeyae	2000
Mammal	Allegheny Woodrat	Neotoma magister	1997
Mammal	Eastern Pygmy Shrew	Sorex hoyi	1990
Mammal	Golden Mouse	Ochrotomys nuttalli	2005
Mammal	Meadow Jumping Mouse	Zapus hudsonius	2004
Mammal	Southeastern Shrew	Sorex longirostris	2005
Plant	American Ginseng	Panax quinquefolius	2013
Plant	American Pillwort	Pilularia americana	1981
Plant	Barbed Rattlesnake-root	Nabalus barbatus	2023
Plant	Barrens Silky Aster	Symphyotrichum pratense	2023
Plant	Blackfoot Quillwort	Isoetes melanopoda	1981
Plant	Blue Mud-plantain	Heteranthera limosa	2010
Plant	Blue Sage	Salvia azurea var. grandiflora	2023
Plant	Branched Three-awn Grass	Aristida ramosissima	1897
Plant	Butternut	Juglans cinerea	2012
Plant	Cream Tick-trefoil	Desmodium ochroleucum	2013
Plant	Cream Wild Indigo	Baptisia leucophaea var. leucophaea	2019
Plant	Cream-flower Rockcress	Arabis pycnocarpa	2003
Plant	Deam's Copperleaf	Acalypha deamii	1949
Plant	Featherfoil	Hottonia inflata	2015
Plant	Flat-stem Spikerush	Eleocharis compressa var. compressa	2019
Plant	Fraser's Loosestrife	Lysimachia fraseri	2024
Plant	Godfrey's Stitchwort	Minuartia godfreyi	2021
Plant	Great Plains Ladies'-tresses	Spiranthes magnicamporum	2012
Plant	Hairy Fimbry	Fimbristylis puberula	2019
Plant	Hairy Hawkweed	Hieracium longipilum	1995
Plant	Hairy Umbrella-sedge	Fuirena squarrosa	2015
Plant	Halberd-leaf Tearthumb	Polygonum arifolium	2019
Plant	Harper's Fimbry	Fimbristylis perpusilla	2010
Plant	Horsesugar	Symplocos tinctoria	2023
Plant	Lake-cress	Rorippa aquatica	1988
Plant	Lamance Iris	Iris brevicaulis	2020
Plant	Loesel's Twayblade	Liparis loeselii	2002
Plant	Longleaf Stitchwort	Stellaria longifolia	1990
Plant	Maryland Milkwort	Senega mariana	2002
Plant	Mcdowell's Sunflower	Helianthus occidentalis	2023
Plant	Ovate Catchfly	Silene ovata	1988

Tennessee River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Price's Potato-bean	Apios priceana	2021
Plant	Purple Milkweed	Asclepias purpurascens	2024
Plant	Red Turtlehead	Chelone obliqua	2012
Plant	Reniform Sedge	Carex reniformis	1989
Plant	River Bulrush	Bolboschoenus fluviatilis	2001
Plant	Rough Rattlesnake-root	Prenanthes aspera	2004
Plant	Savanna Eryngo	Eryngium integrifolium	2006
Plant	Shortbeak Arrowhead	Sagittaria brevirostra	2002
Plant	Short's Rockcress	Borodinia dentata	1972
Plant	Slender Blazingstar	Liatris cylindracea	2019
Plant	Soft-hairy False Gromwell	Lithospermum bejariense	2022
Plant	Southern Lady's-slipper	Cypripedium kentuckiense	2014
Plant	Southern Morning-glory	Stylisma humistrata	1990
Plant	Southern Twayblade	Neottia bifolia	2018
Plant	Sweetbay Magnolia	Magnolia virginiana	1981
Plant	Sweetscent Ladies'-tresses	Spiranthes odorata	2002
Plant	Sweet-scented Indian-plantain	Hasteola suaveolens	2021
Plant	Tansy Rosinweed	Silphium pinnatifidum	2009
Plant	Tower-mustard	Turritis glabra	1993
Plant	Virginia Bunchflower	Melanthium virginicum	2018
Plant	Walter's Barnyard Grass	Echinochloa walteri	2002
Plant	Water-purslane	Didiplis diandra	1976
Plant	Wedgeleaf Whitlow-grass	Draba cuneifolia	2015
Plant	Yellow Trout-lily	Erythronium rostratum	2019
Plant	Yellow-crested Orchid	Platanthera cristata	2023
Reptile	Coal Skink	Plestiodon anthracinus	2020
Reptile	Eastern Box Turtle	Terrapene carolina	2013
Reptile	Eastern Hog-nosed Snake	Heterodon platirhinos	2023
Reptile	Eastern Pinesnake	Pituophis melanoleucus	2021
Reptile	Eastern Slender Glass Lizard	Ophisaurus attenuatus longicaudus	1998
Reptile	Red-bellied Mudsnake	Farancia abacura	2011
Reptile	Rough Earthsnake	Virginia striatula	1968
Reptile	Timber Rattlesnake	Crotalus horridus	2023
Reptile	Western Pygmy Rattlesnake	Sistrurus miliarius streckeri	2021

Tennessee River COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Hellbender	Cryptobranchus alleganiensis	2013
Amphibian	Mudpuppy	Necturus maculosus	2013
Amphibian	Western Siren	Siren nettingi	1946
Bivalve	Black Sandshell	Ligumia recta	2022
Bivalve	Clubshell	Pleurobema clava	1987
Bivalve	Cracking Pearlymussel	Hemistena lata	1980
Bivalve	Fanshell	Cyprogenia stegaria	1998

Tennessee River COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bivalve	Hickorynut	Obovaria olivaria	1990
Bivalve	Longsolid	Fusconaia subrotunda	1993
Bivalve	Ohio Pigtoe	Pleurobema cordatum	2020
Bivalve	Orangefoot Pimpleback	Plethobasus cooperianus	2022
Bivalve	Pale Lilliput	Toxolasma cylindrellum	2015
Bivalve	Pink Mucket	Lampsilis abrupta	2022
Bivalve	Ring Pink	Obovaria retusa	1999
Bivalve	Rough Pigtoe	Pleurobema plenum	1998
Bivalve	Round Hickorynut	Obovaria subrotunda	2019
Bivalve	Round Pigtoe	Pleurobema sintoxia	2022
Bivalve	Sheepnose	Plethobasus cyphyus	1998
Bivalve	Slabside Pearlymussel	Pleuronaia dolabelloides	1978
Bivalve	Slippershell Mussel	Alasmidonta viridis	2015
Bivalve	Spectaclecase	Cumberlandia monodonta	1999
Bivalve	White Heelsplitter	Lasmigona complanata	1990
Bivalve	White Wartyback	Plethobasus cicatricosus	1987
Crustacean	Alabama Crayfish	Faxonius alabamensis	2019
Crustacean	Blood River Crayfish	Faxonius burri	2009
Crustacean	Hairy Crayfish	Cambarus friaufi	1998
Crustacean	Hardin Crayfish	Faxonius wrighti	2022
Crustacean	Hillbilly Hairy Crayfish	Cambarus polypilosus	2018
Crustacean	Slender Crayfish	Faxonius compressus	2019
Fish	Alligator Gar	Atractosteus spatula	1998
Fish	American Eel	Anguilla rostrata	2021
Fish	Ashy Darter	Allohistium cinereum	2014
Fish	Blotchside Logperch	Percina burtoni	2014
Fish	Blue Sucker	Cycleptus elongatus	1978
Fish	Coppercheek Darter	Nothonotus aquali	2007
Fish	Flame Chub	Hemitremia flammea	1997
Fish	Golden Darter	Nothonotus denoncourti	2017
Fish	Highfin Carpsucker	Carpiodes velifer	2009
Fish	Lake Sturgeon	Acipenser fulvescens	2024
Fish	Paddlefish	Polyodon spathula	2023
Fish	Saddled Madtom	Noturus fasciatus	2020
Fish	Silver Lamprey	Ichthyomyzon unicuspis	1978
Fish	Slenderhead Darter	Percina phoxocephala	1983
Fish	Southern Brook Lamprey	Ichthyomyzon gagei	2023
Fish	Tennessee Logperch	Percina apina	2009
Fish	Tuscumbia Darter	Etheostoma tuscumbia	1937
Gastropod	Muddy Rocksnail	Lithasia salebrosa	1979
Insect	Acuminate Snaketail	Ophiogomphus acuminatus	1995
Reptile	Alligator Snapping Turtle	Macrochelys temminckii	2022
Reptile	Smooth Softshell Turtle	Apalone mutica	1999

Tennessee River COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Arachnid	Southeastern Cave Pseudoscorpion	Hesperochernes mirabilis	1895
Bat	Gray Bat	Myotis grisescens	2002
Crustacean	a cave obligate isopod	Caecidotea bicrenata bicrenata	1972
Crustacean	Appalachian Valley Crangonyctid	Crangonyx antennatus	2003
Fish	Southern Cavefish	Typhlichthys subterraneus	2008
Insect	a cave obligate beetle	Batriasymmodes quisnamus	1951
Insect	a cave obligate ground beetle	Pseudanophthalmus hesperus	1981
Insect	a cave obligate springtail	Pseudosinella hirsuta	1949
Insect	a cave obligate springtail	Sinella cavernarum	1881
Millipede	a cave obligate millipede	Chaetaspis debilis	1959
Millipede	a cave obligate millipede	Scoterpes hesperus	2010

Wolf River

Regional Conservation Opportunity Area



The Wolf River covers over 90 miles from its source (a spring-fed pond in northeastern Benton County, MS), and it passes through Hardeman, Fayette, and Shelby Counties in TN before emptying into the Mississippi River at Memphis. Meanders, sloughs, wetlands, and bottomland hardwood forests are characteristic of this river. The Wolf River is a significant component of the Mississippi River Alluvial Plain Ecoregion, which covers seven states in the lower Mississippi River Valley.

The river and its sloughs provide excellent habitat for approximately 25 species of mussels, over 100 species of fish, and numerous birds, reptiles, and amphibians, including the Alligator Snapping Turtle. The riparian Bald Cypress-Water Tupelo forests are quickly disappearing, and examples of unchannelized rivers and functional bottomland forests are becoming increasingly rare in West Tennessee. This COA also contains the quail focus area for TWRA's Region 1, located on the Wolf River Wildlife Management Area.

TWRA will consider future land acquisitions in this COA for watershed protection, critical habitat protection, habitat restoration, streambank stabilization, planting of bottomland hardwoods, planting of native warm season grasses, and planting of buffer strips along the river. TWRA will also seek partnerships with other agencies and landowners to implement many of the management strategies on private lands within the COA to reduce soil erosion.



The unchannelized Wolf River and its bottomlands support bald cypress-water tupelo forests and hundreds of fish and other species.





Top to bottom: Lost Swamp trail of the Wolf River/Gregg Elliott, K Gregg Consulting; Spotted Salamander/Rob Colvin, TWRA; Wolf River in summer/ John Henry Photography; Next page - Cypress reflections/Gregg Elliott, K Gregg Consulting

Wolf River
Conservation Opportunity Area

Partnerships

TWRA will develop and foster partnerships with the Wolf River Conservancy, TN Dept. of Environment and Conservation, The Nature Conservancy, USDA Natural Resources Conservation Service, Farm Bureau, TN Dept. of Agriculture, TN Valley Authority, Ducks Unlimited, Cooperative Extensions, universities, Fayette County Government, Shelby County Government, UT Agricultural Extension, TN State Univ., local schools, and other institutions.



CMP Stressor Level	Stressors Categories	Threats specific to Wolf River
1.1 A	Housing and urban areas; Primary residential development	Destruction or degradation of habitats due to construction activities associated with the building of primary residences. Shelby County has extensive urban sprawl that serves as a major stressor in this COA.
2.1 A	Annual and perennial non-timber crops; Agricultural conversion (row crop; mostly historical)	Removal of the natural vegetation of an area for agricultural purposes such as pasture, row crops, feed lots, outbuildings, etc. There are many agriculture farms in this COA including beef cattle, row crop, and hay farms.
2.1 B	Annual and perennial non-timber crops; Incompatible row crop agricultural practices	Degradation of soil/water quality or habitat structure related to row crop production and maintenance not compatible with species needs. Often due to erosion from plowing/tilling or chemical applications of herbicides/ pesticides. There is extensive row crop farming in this COA (corn, soybeans, and cotton). Furthermore, row crop farming occurs on WMAs, which can be directly addressed by state agency personnel. There should not be any row crop management practices on state owned property, as it is not a BMP for any species.
7.2 A	Dams and water management/use; Channelization of rivers/streams	Alteration of the natural course of a river or stream by removing rock, dirt, gravel, and other sediments from shorelines and bottoms. Such alteration is done primarily for navigation and flood control purposes. This category focuses on the human activities that lead to either not enough water or too much water in the ecosystem in question. Most waterways in this COA have been channelized to some degree. The channelized waterways require constant maintenance to function for the original intention. Many problems have risen as a direct response to the channelization.

To learn more about the Wolf River Conservation Opportunity Area, please contact:
Rob Colvin, Biodiversity Coordinator, Region 1 (731) 423-5725

CMP Stressor Level	Stressors Categories	Threats specific to Wolf River, continued
7.2 B	Dams and water management/use; Construction of dams/ impoundments	Disruption and degradation of the natural flow of a river or stream due to construction of dams or impoundments. Also includes destruction of terrestrial habitats due to removal and inundation of vegetation along shorelines. There are 61 dams inventoried by TDEC Division of Water Supply in the Tennessee Portion of the Wolf River Watershed. Dams on the Wolf River and its tributaries disrupt the historic natural flow of the river, restricting movements of native species.
7.2 C	Dams and water management/use; - Construction of ditches/dikes/ drainage/diversion systems	Disruption and degradation of the natural hydrologic patterns of wetlands, rivers, and streams due to construction of various water diversion or containment structures. There are many examples of private as well as agency-owned property that have unnatural drainage ditches constructed to remove water from naturally flooded areas.
4.1 A	Roads and railroads	Destruction or degradation of habitats in an area due to construction of roads, railroads, or utilities. The linear makeup of these corridors often fragments terrestrial habitats. Shelby County has extensive urban sprawl that serves as a major stressor in this COA.
7.2 G	Dams and water management/use; - Operation of drainage/diversion systems	Degradation of water quality and habitat availability due to disruption of natural hydrologic regimes of rivers, streams, and wetlands by the operation of drainage ditches, dikes, and other water diversion/containment structures. Many waterways in this COA have been channelized to some degree. The channelized waterways require constant maintenance to function for the original intention. Many problems have risen as a direct response to the channelization.
7.3 A	Other ecosystem modifications; Incompatible species management practices	Increased mortality or degradation of habitats resulting from the application of management practices that conflict with the ecological needs of a particular species. Land reclamation projects, rip-rap along shorelines, mowing grass, tree thinning in parks, beach construction, removal of snags from streams: All of these are problems in this COA.
9.1 A	Household sewage and urban wastewater; Municipal wastewater treatment/stormwater runoff	Degradation of water quality resulting from ineffective treatment of municipal wastewater released into rivers and streams. Also includes ineffective capture and treatment of stormwater runoff, which is often contaminated by various pollutants. Shelby County has extensive urban sprawl that serves as a major stressor in this COA.
9.3 D	Agriculture and forestry effluents; Incompatible row crop agricultural practices	Degradation of soil/water quality or habitat structure related to row crop production. There is extensive row crop farming in this COA (corn, soybeans, and cotton). Most row crop farming in this COA uses fertilizer and herbicide chemicals in extreme excess. Furthermore, row crop farming occurs on WMAs, which can be directly addressed by state agency personnel.
9.4 A	Garbage and solid waste	Includes litter from cars, flotsam & jetsam from recreational boats, waste that entangles wildlife. Illegal dumping impacts the watershed along its entire length.

Wolf River
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats that provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Conservation Area Management	Discourage conversion of native habitats to semi/non-natural land types (e.g., pine plantations, golf courses, etc.) on public and private conservation areas across the state.	acres
Conservation Planning	Develop/participate in regional conservation planning initiatives sponsored by federal and state agencies (e.g., TDEC Outdoor Recreational Planning, Tennessee State Park Comprehensive System Planning and park-specific Strategic Management Planning, Tennessee State Forest planning, TWRA regional planning, USFWS Joint Venture planning, TVA Reservoir Operations Planning, USACE Water Control Manual updates and revisions, etc.)	planning initiatives
Habitat/Natural Processes Restoration	Restore degraded/converted wetland systems within critical units of aquatic, subterranean, and terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore in-stream flows and physical structure to channelized or impounded streams within critical units of aquatic, subterranean, and terrestrial habitats.	acres and/or feet of riparian corridor
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Increase management in and around Sand Post Oak communities to preserve this rare habitat type.	acres
Monitoring	Develop GIS remote-sensing program to analyze statewide land cover changes, map habitats, evaluate land use practices, etc. at shorter intervals or in greater detail than current national-level programs.	acres
Research	Conduct research on life history and ecological needs of target species to establish guidelines for determining population viability.	projects
Research	Conduct scientific surveys to discern the geographical distributions of lesser known target species.	surveys
Compatible Resource Use	Use government funded incentive programs (e.g., CRP, EQIP, CSP, WRP, and FLEP) to encourage private landowners to protect water quality for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Compatible Resource Use	Use government funded incentive programs (e.g., FLEP, CRP, EQIP, Forest Stewardship Program, and Forest Legacy Program) to encourage private landowners to restore and/or protect native forest systems for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres

Wolf River
Conservation Opportunity Area

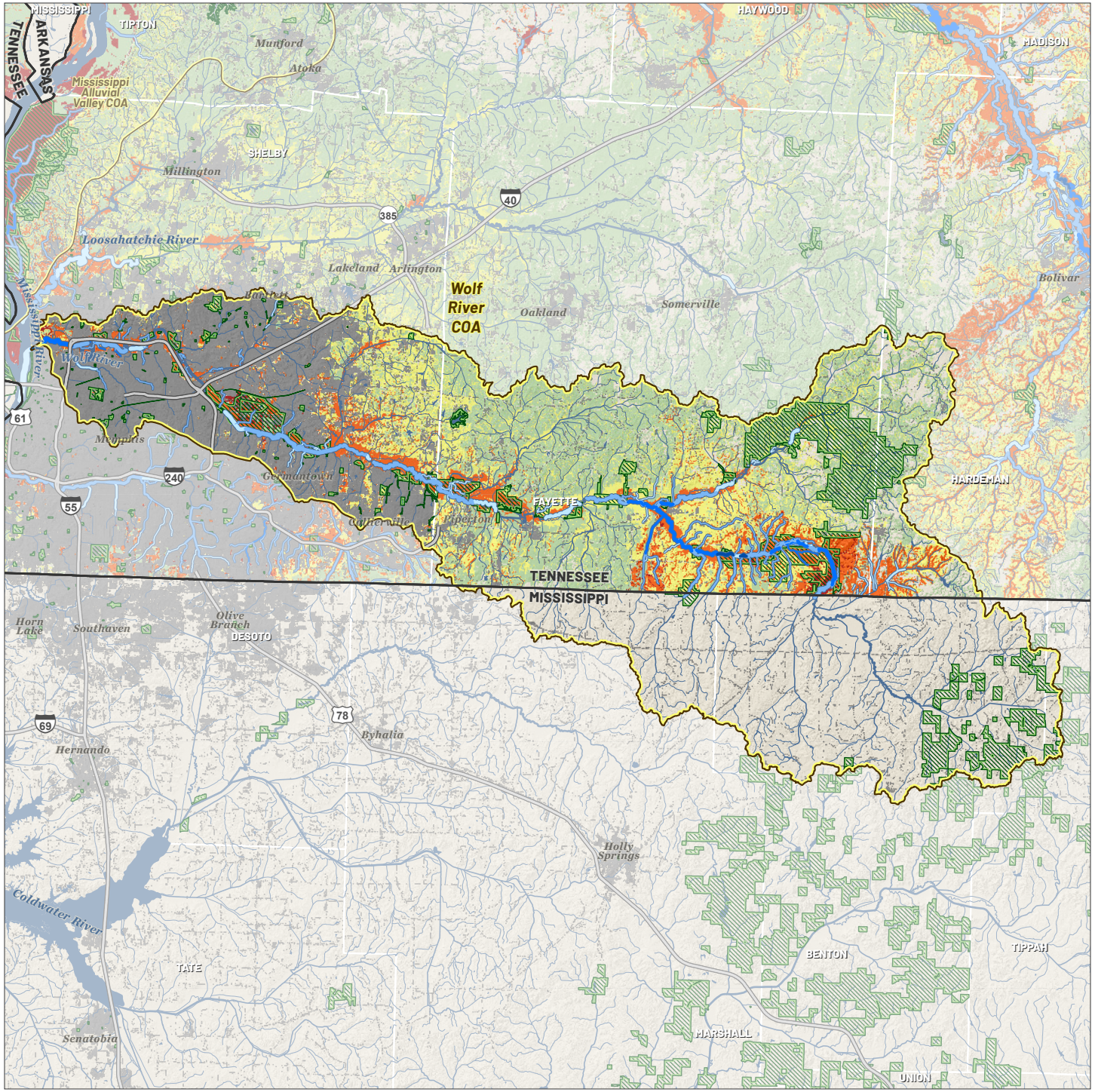
Conservation Actions	Desired Change	Units
Compatible Resource Use	Encourage adoption of more stringent sustainable forestry practices on state forests and other public lands that contain critical units of aquatic, subterranean, and terrestrial habitats.	reviews performed
Habitat/Natural Processes Restoration	Use native plants for restoration where possible, and where native plant sourcing is not possible, use resilient and non-invasive species and seed mixes.	acres
Habitat/Natural Processes Restoration	Restore degraded habitats, as appropriate, to support a diversity of species assemblages and ecosystem structure and function.	acres
Habitat/Natural Processes Restoration	Reintroduce fire via prescribed burning into fire-dependent grassland and woodland systems within critical units of terrestrial habitats.	acres
Institutional Improvement	Increase staffing and funding of state agencies and local offices of federal agencies responsible for managing target species/habitats or monitoring environmental quality.	acres or species
Alliances & Partnerships	Develop strategic alliance with TN Division of Forestry, TN Forestry Association, US Forest Service, private timber companies, non-governmental organizations, universities, and other forest resource managers to address forestry practices that affect target species and habitats.	partnerships
Standards	Develop more stringent standards regarding permits for construction projects that potentially affect water quality and/or alter habitat.	acres or species
Market Forces	Encourage municipal and county governments to subsidize/offer additional incentives to developers that utilize "green" methods of construction, design, and land-use planning in large residential or commercial developments.	acres
Land-use Planning and Zoning	Participate in the review and/or revision of county urban growth management plans.	plans
Land-use Planning and Zoning	Encourage municipal and county governments to adopt zoning ordinances that limit or regulate development within critical units of aquatic, subterranean, and terrestrial habitats.	acres

Conservation Projects

Many completed and ongoing projects focused on achieving a better understanding of the abundance and distribution of SGCN, including fish, Pine Snake, Pygmy Rattlesnake, Alligator Snapping Turtles, and bats. Monitoring and sampling for surveillance of snake fungal disease, Bsal, and White-nose Syndrome (which occur in snakes, amphibians, and bats, respectively) occurred.

Wolf River
Conservation Opportunity Area

Wolf River COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Kennedy Park	Local	281	100%
Overton Park	Local	461	100%
Shelby Park	Local	807	100%
Lagrange Historic District	Private	695	100%
Neely Tracts	Private	345	100%
Ghost River SNA	TDEC - DNA	2,107	100%
Riverwoods SNA	TDEC - DNA	21	100%
William B Clark Conservation Area	TNC	428	100%
Waterbury Refuge	TWRA	12	100%
Wolf River WMA	TWRA	9,113	100%



Combined Habitat Priorities

Wolf River Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

- Conservation Opportunity Area (COA)
- Public/Protected Land
- Conservation Easement

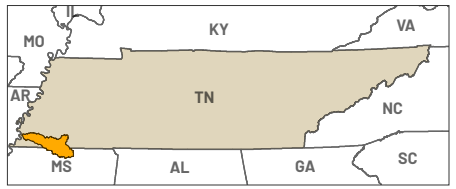
Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Wolf River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Barking Treefrog	Dryophytes gratiosus	1983
Amphibian	Gray Treefrog	Dryophytes versicolor	1972
Amphibian	Small-Mouthed Salamander	Ambystoma texanum	1972
Amphibian	Southern Cricket Frog	Acris gryllus	2005
Bat	Little Brown Myotis	Myotis lucifugus	2018
Bat	Southeastern Bat	Myotis austroriparius	2018
Bat	Tricolored Bat	Perimyotis subflavus	2018
Bird	American Barn Owl	Tyto furcata	2023
Bird	American Bittern	Botaurus lentiginosus	2023
Bird	American Black Duck	Anas rubripes	2020
Bird	American Golden-Plover	Pluvialis dominica	2023
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bachman's Sparrow	Peucaea aestivalis	1995
Bird	Baltimore Oriole	Icterus galbula	1999
Bird	Bank Swallow	Riparia riparia	2023
Bird	Bell's Vireo	Vireo bellii	2023
Bird	Belted Kingfisher	Megaceryle alcyon	2000
Bird	Bewick's Wren	Thryomanes bewickii	2006
Bird	Black-bellied Plover	Pluvialis squatarola	2023
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2023
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2022
Bird	Bobolink	Dolichonyx oryzivorus	2023
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2021
Bird	Buff-breasted Sandpiper	Calidris subruficollis	2022
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Connecticut Warbler	Oporornis agilis	2021
Bird	Dunlin	Calidris alpina	2023
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Evening Grosbeak	Coccothraustes vespertinus	1990
Bird	Golden Eagle	Aquila chrysaetos	2015
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023
Bird	Great Egret	Ardea alba	2023
Bird	Henslow's Sparrow	Centronyx henslowii	2023
Bird	Hudsonian Godwit	Limosa haemastica	1997
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	King Rail	Rallus elegans	2023

Wolf River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Least Bittern	Botaurus exilis	2020
Bird	Least Flycatcher	Empidonax minimus	2023
Bird	LeConte's Sparrow	Ammospiza leconteii	2023
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2023
Bird	Long-eared Owl	Asio otus	2014
Bird	Long-tailed Duck	Clangula hyemalis	2023
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2023
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Northern Saw-whet Owl	Aegolius acadicus	1936
Bird	Olive-sided Flycatcher	Contopus cooperi	2023
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2023
Bird	Peregrine Falcon	Falco peregrinus	2023
Bird	Piping Plover (Atlantic subspecies)	Charadrius melodus melodus	2000
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruddy Turnstone	Arenaria interpres	1998
Bird	Rufa Red Knot	Calidris canutus rufa	1992
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2023
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-billed Dowitcher	Limnodromus griseus	2023
Bird	Short-eared Owl	Asio flammeus	2023
Bird	Snowy Egret	Egretta thula	2023
Bird	Stilt Sandpiper	Calidris himantopus	2023
Bird	Swainson's Warbler	Limnothlypis swainsonii	2023
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	Western Sandpiper	Calidris mauri	2023
Bird	White-rumped Sandpiper	Calidris fuscicollis	2023
Bird	Willet	Tringa semipalmata	2023
Bird	Willow Flycatcher	Empidonax traillii	2023
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Mammal	Eastern Woodrat	Neotoma floridana illinoensis	2020

Wolf River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Mammal	Golden Mouse	Ochrotomys nuttalli	2005
Mammal	Meadow Jumping Mouse	Zapus hudsonius	2004
Mammal	Southeastern Shrew	Sorex longirostris	2005
Mammal	Southern Bog Lemming	Synaptomys cooperi	2005
Plant	Blue Mud-plantain	Heteranthera limosa	2010
Plant	Capillary Hairsedge	Bulbostylis ciliatifolia var. coarctata	2023
Plant	Chapman's Redtop	Tridens flavus var. chapmanii	2024
Plant	Cluster Fescue	Festuca paradoxa	1965
Plant	Missouri Mud-Plantain	Heteranthera missouriensis	2018
Plant	Ovate Catchfly	Silene ovata	1977
Plant	Plukenet's Flatsedge	Cyperus plukenetii	2023
Plant	Prickly Hornwort	Ceratophyllum echinatum	2015
Plant	Red Iris	Iris fulva	2024
Plant	Sand Post Oak	Quercus margaretiae	2017
Plant	Southern Twayblade	Neottia bifolia	2012
Plant	Sweetbay Magnolia	Magnolia virginiana	2008
Plant	White-wand Beardtongue	Penstemon tubiflorus	2021
Plant	Willow Aster	Symphyotrichum praealtum	2015
Reptile	Eastern Box Turtle	Terrapene carolina	2005
Reptile	Eastern Hog-nosed Snake	Heterodon platirhinos	1963
Reptile	Rough Earthsnake	Virginia striatula	1980

Wolf River COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Western Siren	Siren nettingi	1974
Bivalve	Creeper	Strophitus undulatus	1996
Bivalve	Fatmucket	Lampsilis siliquoidea	2016
Bivalve	Little Spectaclecase	Leaunio lienosus	1996
Bivalve	Southern Hickorynut	Obovaria arkansasensis	2000
Bivalve	Southern Rainbow	Villosa vibex	2016
Fish	Blue Sucker	Cycleptus elongatus	1979
Fish	Naked Sand Darter	Ammocrypta beanii	2006
Fish	Piebald Madtom	Noturus gladiator	2006
Reptile	Alligator Snapping Turtle	Macrochelys temminckii	2021

Wolf River COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
No documented subterranean SGCN in this COA			

2025 Conservation Opportunity Area Factsheets

Region 2 (12 COAs)

Cypress and Shoal Creeks

Conservation Opportunity Area



Shoal Creek is located in Lawrence Co. in the southwestern corner of the Interior Plateau physiographic region of Tennessee. The river flows approximately 65 miles trending southwest from its headwaters around Lawrenceburg, TN to the Tennessee River in Lauderdale County, AL. Cypress and Little Cypress Creek begin in southern Wayne County, TN Transition Hills sub-region of the Southeastern Plains ecoregion. The creeks trend south into Lauderdale County, AL and flow into the Tennessee River near Florence, AL.

The COA encompasses the watersheds of Cypress and Shoal Creeks and contains numerous tributaries of the two creeks. The terrestrial landscape consists of rolling hills topped with deciduous forest interspersed with pine plantations. Agriculture (hay production, cattle, and row crops) dominates the landscape along floodplains and in streamside riparian areas. Shoal Creek provides water to approximately 7,500 households and businesses in and around Lawrenceburg. Municipal utility waste is dumped into Shoal Creek.

Slackwater Darters are listed as federally threatened by USFWS under the Endangered Species Act (ESA). The species is only known from five tributaries of the southern bend of the Tennessee River, and it occurs in Cypress and Shoal Creeks. Cypress Creek was also one of the last places the extinct Harelipped Sucker was collected. Major threats to the species include agriculture—primarily cattle destroying stream banks—deforestation of riparian areas, and channel modification. Several other SGCN fishes occur in the area including Crown Darter, Lollypop Darter, and Flame Chub.



The Cypress and Shoal Creek watersheds are associated with the highest degree of aquatic species richness, endemism, and imperilment in the southeastern United States.

Top to bottom: Slackwater Darter spawning habitat Middle Cypress Creek/Alex Bybel, TWRA. Next page: The Slackwater Darter/Alex Babel, TWRA

The Cypress and Shoal Creek watersheds are associated with the highest degree of aquatic species richness, endemism, and imperilment in the southeastern US. These drainages were recognized as the top priorities for conservation action/protection for fish, mussels, and crayfish. The state endangered Tennessee Bottlebrush Crayfish is endemic to the Shoal Creek Watershed. This is the largest crayfish species in North America and is endemic to one of the smallest ranges of any known crayfish species. Other at-risk crayfish species are the Florence Crayfish, Alabama Crayfish, and Slender Crayfish.

Cypress and Shoal Creeks Conservation Opportunity Area



CMP Stressor Level	Stressor Categories	Threats specific to Cypress and Shoal Creeks
1.1 A	Housing and urban areas; Primary residential development	Destruction or degradation of habitats due to construction activities associated with the building of primary residences. Growth has been about 1% per year for the past decade at least. According to the US census the population growth was 4.4% from 2020 to 2023.
2.1 A	Annual and perennial non-timber crops; Agricultural conversion (row crop, mostly historical)	Removal of the natural vegetation of an area for agricultural purposes, such as pasture, row crops, feed lots, outbuildings, etc. Historical conversion of land from natural vegetation to agriculture is the primary threat in TN and the COA.
2.1 B	Annual and perennial non-timber crops; Incompatible row crop agricultural practices	Degradation of soil/water quality or habitat structure related to row crop production and maintenance not compatible with species needs. Often due to erosion from plowing/tilling or chemical applications of herbicides/pesticides. Row crops along streams are a problem in this COA.
2.3 C	Livestock farming and ranching; Incompatible grazing/pasture management practices	Degradation of soil/water quality and habitat structure of an area due to excessive grazing or to inadequate exclusion of cattle from stream and forest resources. Also includes degradation caused by overapplication of fertilizers or other chemicals during pasture management practices. Cattle, especially along steams, is a threat to water quality in the COA.
5.3 A	Logging and wood harvesting	Degradation of water quality resulting from ineffective treatment of municipal wastewater released into rivers and streams. Also includes ineffective capture and treatment of stormwater runoff, which is often contaminated by various pollutants. Pine plantations are scattered across the COA, and these cause problems with sedimentation and are virtual ecological deserts during much of the growing cycle. Additionally, clear cutting and high grading is presumably a problem, especially on high gradient slopes.
9.1 A	Household sewage and urban wastewater; Municipal wastewater treatment/stormwater runoff	Lawrenceburg Utility Systems has been sued by a non-profit for discharge of untreated waste into Shoal Creek. A federal judge determined there was not evidence of a Clean Water Act violation. However, there was a consent decree between the utility and the plaintiff. The bottom line is that untreated wastewater is a threat to water quality and the aquatic organisms in the system.

Cypress and Shoal Creek Conservation Opportunity Area

Partnerships

TWRA will continue working with the US Fish and Wildlife Service, Southeast Aquatic Resource Partnership, USDA Natural Resources Conservation Service, conservation NGOs, universities, and private landowners/businesses to achieve aquatic conservation and water quality goals.

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats that provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Compatible Resource Use	Use government-funded incentive programs (e.g., CRP, EQIP, CSP, WRP, and FLEP) to encourage private landowners to protect water quality for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Compatible Resource Use	Use government-funded incentive programs (e.g., FLEP, CRP, EQIP, Forest Stewardship Program, and Forest Legacy Program) to encourage private landowners to restore and/or protect native forest systems for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres
Standards	Develop standards for instream-flow regimes that establish minimum water levels required for target species during critical periods and for maintenance of habitat quality.	flow standards

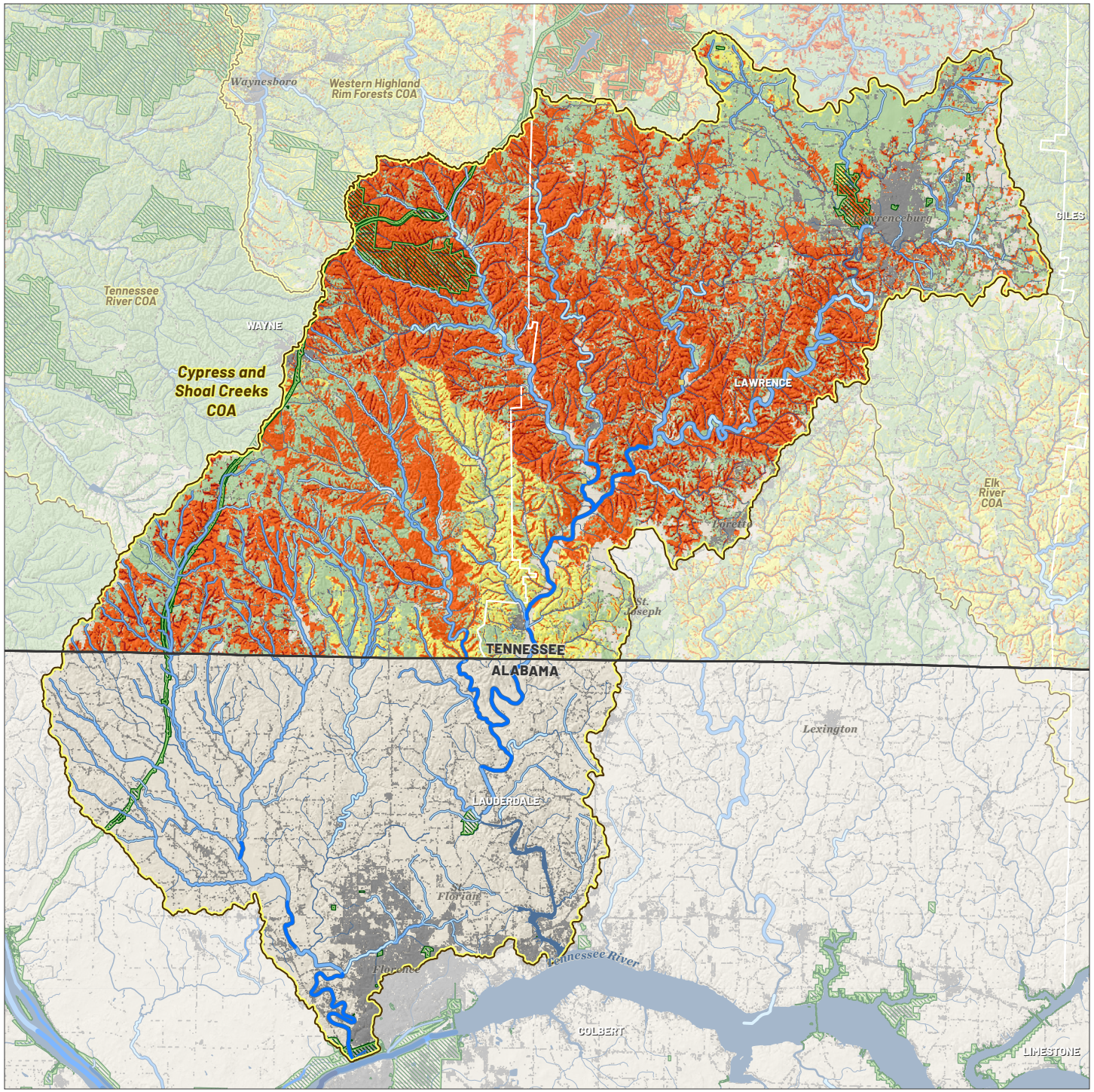
Conservation Projects

Completed and ongoing projects in this COA focus on assessing abundance and distribution of fish and other aquatic organisms, as well as assessing barriers to fish movement (e.g., the Slackwater Darter).

To learn more about the Cypress & Shoal Creek Conservation Opportunity Area, please contact: Dustin Thames, Biodiversity Coordinator, Region 2 (615) 781-6626

Cypress and Shoal Creek Conservation Opportunity Area

Cypress and Shoal Creeks COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Natchez Trace Parkway and National Scenic Trail	NPS	10,663	20%
Tie Camp WMA	Private	7,677	65%
David Crockett SP	TDEC - SP	1,297	100%



Combined Habitat Priorities

Cypress and Shoal Creeks Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

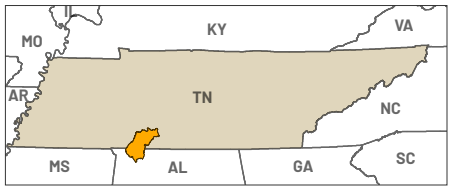
- Conservation Opportunity Area (COA)
- Public/Protected Land
- Conservation Easement

Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles
0 5 Kilometers



Cypress & Shoal Creeks COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bat	Gray Bat	Myotis grisescens	2016
Bat	Tricolored Bat	Perimyotis subflavus	2020
Bird	American Barn Owl	Tyto furcata	2022
Bird	American Black Duck	Anas rubripes	1988
Bird	American Golden-Plover	Pluvialis dominica	1988
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bachman's Sparrow	Peucaea aestivalis	2016
Bird	Bank Swallow	Riparia riparia	2021
Bird	Bewick's Wren	Thryomanes bewickii	1991
Bird	Blackburnian Warbler	Setophaga fusca	2013
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2005
Bird	Bobolink	Dolichonyx oryzivorus	1987
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2015
Bird	Buff-breasted Sandpiper	Calidris subruficollis	1986
Bird	Canada Warbler	Cardellina canadensis	1986
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Dunlin	Calidris alpina	1986
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2022
Bird	Evening Grosbeak	Coccothraustes vespertinus	1987
Bird	Golden Eagle	Aquila chrysaetos	2017
Bird	Golden-winged Warbler	Vermivora chrysoptera	2018
Bird	Grasshopper Sparrow	Ammodramus savannarum	2021
Bird	Great Egret	Ardea alba	2023
Bird	Henslow's Sparrow	Centronyx henslowii	2010
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	Least Flycatcher	Empidonax minimus	2010
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2023
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2023
Bird	Northern Bobwhite	Colinus virginianus	2022
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2016
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2005
Bird	Peregrine Falcon	Falco peregrinus	2021
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023

Cypress & Shoal Creeks COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	1988
Bird	Sharp-shinned Hawk	Accipiter striatus	2004
Bird	Short-billed Dowitcher	Limnodromus griseus	2005
Bird	Snowy Egret	Egretta thula	1987
Bird	Swainson's Warbler	Limnothlypis swainsonii	1984
Bird	Veery	Catharus fuscescens	2022
Bird	Vesper Sparrow	Pooecetes gramineus	2020
Bird	Western Sandpiper	Calidris mauri	1988
Bird	White-rumped Sandpiper	Calidris fuscicollis	1988
Bird	Willow Flycatcher	Empidonax traillii	2010
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2005
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Plant	Branched Three-awn Grass	Aristida ramosissima	1930
Plant	Broadleaf Barbara's-buttons	Marshallia trinervia	2006
Plant	Eggert's Sunflower	Helianthus eggertii	2009
Plant	Fetterbush	Leucothoe racemosa	2016
Plant	Pubescent Sedge	Carex hirtifolia	1990
Plant	Yellow Trout-lily	Erythronium rostratum	1993
Reptile	Eastern Pinesnake	Pituophis melanoleucus	2017
Reptile	Western Pygmy Rattlesnake	Sistrurus miliarius streckeri	1940

Cypress & Shoal Creeks COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Hellbender	Cryptobranchus alleganiensis	2015
Bivalve	Mountain Creekshell	Leaunio vanuxemensis	2019
Bivalve	Painted Creekshell	Cambarunio taeniatus	2019
Bivalve	Purple Lilliput	Toxolasma lividum	2019
Bivalve	Rabbitsfoot	Theliderma cylindrica cylindrica	1995
Bivalve	Rainbow	Cambarunio iris	2019
Bivalve	Shiny Pigtoe	Fusconaia cor	1924
Bivalve	Slabside Pearlymussel	Pleuronaia dolabelloides	1992
Bivalve	Tennessee Clubshell	Pleurobema oviforme	1991
Bivalve	Tennessee Pigtoe	Pleuronaia barnesiana	2019
Crustacean	Alabama Crayfish	Faxonius alabamensis	1997
Crustacean	Florence Crayfish	Cambarus andersoni	2015
Crustacean	Tennessee Bottlebrush Crayfish	Barbicambarus simmonsi	2017
Fish	Blotched Chub	Erimystax insignis	2022

Cypress & Shoal Creeks COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Fish	Blotchside Logperch	Percina burtoni	2022
Fish	Boulder Darter	Nothonotus wapiti	2018
Fish	Chucky Madtom	Noturus crypticus	2018
Fish	Crown Darter	Etheostoma corona	2021
Fish	Flame Chub	Hemitremia flammea	2021
Fish	Lollypop Darter	Etheostoma neopterum	2021
Fish	Riffle Minnow	Phenacobius catostomus	2022
Fish	Rock Darter	Etheostoma rupestre	1972
Fish	Rosyface Shiner	Notropis rubellus	2005
Fish	Slackwater Darter	Etheostoma boschungi	2010
Fish	Southern Brook Lamprey	Ichthyomyzon gagei	2010
Fish	Spotfin Chub	Erimonax monachus	2022
Fish	Streamline Chub	Erimystax dissimilis	2021
Fish	Tuscumbia Darter	Etheostoma tuscumbia	2011
Gastropod	Anthony's Riversnail	Athearnia anthonyi	1998
Gastropod	Telescope Hornsnail	Pleurocera walkeri	2019
Gastropod	Warty Rocksnail	Lithasia lima	2018
Insect	Acuminate Snaketail	Ophiogomphus acuminatus	1995

Cypress & Shoal Creeks COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bat	Gray Bat	Myotis grisescens	2016
Bat	Tricolored Bat	Perimyotis subflavus	2016
Crustacean	a cave obligate isopod	Caecidotea bicrenata bicrenata	1972
Fish	Southern Cavefish	Typhlichthys subterraneus	1982
Insect	a cave obligate beetle	Batriasymmodes quisnamus	1951

Duck River

Conservation Opportunity Area



The Duck River flows 284 miles from its headwaters in the Eastern Highland Rim, draining much of middle Tennessee, before entering the Tennessee River. The Duck River has a high diversity of freshwater animals, with 151 species of fish, 60 species of freshwater mussels, and 22 species of aquatic snails. Several of these species are considered rare and endangered.

The Tennessee Chapter of The Nature Conservancy has developed and implemented numerous habitat improvement projects along the Duck River in collaboration with TWRA and many other partners. These projects include stabilizing stream banks through the planting of trees and shrubs; providing landowner incentive funds to construct cattle fencing, water stations, and creek crossings; and assisting state and federal agencies with freshwater mussel recovery efforts.

The highlands surrounding the headwaters of the Duck River, as well as the forested areas remaining along the river, are important for maintaining water quality and temperature. Stream bank erosion can impact water quality and degrade habitat. The Duck River provides up to 73 million gallons of drinking water each day, and parts of the watershed are experiencing urbanization pressures. Collaborative land and water use planning will be critical to protecting the Duck River in coming years. In early 2025, the Southern Environmental Law Center, the Tennessee Wildlife Federation and the Columbia Power and Water Systems signed an agreement to modify newly permitted water withdrawals to increase protections for the river's in-stream flows and wildlife during drought.

In addition, large areas of cedar glades and limestone barren habitats occur throughout this COA. These glades and barrens are susceptible to loss due to natural succession from lack of natural fire and management. Many of these glades are home to rare plant species and also associated with caves and sinkholes. These habitats are all susceptible to illegal dumping and incompatible recreational activities.



Draining much of middle Tennessee, the Duck River is considered to be one of the most biologically diverse rivers in North America.



Top to bottom: The Nashville Breadroot only found in Cedar Glades habitats/Jason Ferrell; Big Falls, Duck River/Brian Stansberry. P2: Ashy Darter/Alex Babel, TWRA

Duck River
Conservation Opportunity Area

Partnerships



TWRA will continue its collaborations with The Nature Conservancy and others to conserve the natural resources of the Duck River. TWRA will develop and foster partnerships with the US Fish and Wildlife Service, USDA Natural Resources Conservation Service, US Army Corps of Engineers, Tennessee Valley Authority, Tennessee Department of Environment and Conservation, universities, and private landowners.

CMP Stressor Level	Stressor Categories	Threats specific to Duck River
1.1 A	Housing and urban areas; Primary residential development	Destruction or degradation of habitats due to construction activities associated with the building of primary residences. Lots of residential development within this COA.
7.2 E	Dams and water management/use; Excessive surface water withdrawal	Removal of surfacewater resources needed to maintain hydrologic levels for aquatic and subterranean species. Water withdrawals for cities.
11.4 A	Changes in precipitation and hydrological regimes	Broad-scale changes in precipitation mean, variability, seasonality, and extremes. This includes decreased or increased precipitation, changes in timing of precipitation, changes in form of precipitation (e.g., snow vs rain; snow cover and snowpack, where applicable), changes in evapotranspiration rates and hydrological cycles, and droughts and floods. Increasing time periods of river drought stages, with entire stretches of streams going completely dry results in fish and mussel die-offs.
2.1 A	Annual and perennial non-timber crops; Agricultural conversion (row crop; mostly historical)	Removal of the natural vegetation of an area for agricultural purposes such as, pasture, row crops, feed lots, outbuildings, etc. Historically one of the stressors with the greatest scope and severity.
2.3 A	Livestock farming and ranching; Agricultural conversion (livestock, mostly historical)	Chicken and cattle farming, with cows being a common occurrence in streams. (In farming, animals are kept in captivity; in ranching they are allowed to roam in wild habitats.)
7.2 F	Dams and water management/use; Operation of dams/reservoirs	Degradation of water quality and aquatic habitat availability due to disruption of natural hydrologic regimes of rivers and streams by dams or reservoirs. Also, includes destruction/degradation of terrestrial habitats due to periodic raising or lowering of water levels. Altered temperature regimes, barriers to fish passage, etc.
8.2 A	Problematic native plants and animals	Increased mortality of animals resulting from either excessive take by predators or by the inability to compete with other species for food and resources. Eastern red cedar is taking over in unnatural abundance due to removal of fire from landscape.

CMP Stressor Level	Stressors Categories	Threats specific to Duck River, continued
9.1 A	Household sewage and urban wastewater; Municipal wastewater treatment/stormwater runoff	Degradation of water quality resulting from ineffective treatment of municipal wastewater released into rivers and streams. Also includes ineffective capture and treatment of stormwater runoff which is often contaminated by various pollutants.
9.1 B	Household sewage and urban waste water; Residential sewage/septic systems	Degradation of water quality resulting from ineffective treatment of residential sewage by septic systems. Often caused by older, defective sewage systems or by poorly-sited septic tanks.
9.3 C	Agriculture and forestry effluents; Incompatible grazing/pasture management practices	Degradation of soil and water quality and habitat structure of an area due to excessive grazing or to inadequate exclusion of cattle from stream and forest resources. Also, includes degradation caused by over-application of fertilizers or other chemicals during pasture management practices. Runoff from farms, golf courses etc.
9.3 D	Agriculture and forestry effluents; Incompatible row crop agricultural practices	Degradation of soil/water quality or habitat structure related to row crop production and maintenance not compatible with species needs. Often due to erosion from plowing/tilling or chemical applications of herbicides/pesticides. Row crops in floodplains of Duck River and tributaries, with little to no buffer between crops and streams are creating run-off and sedimentation issues.
11.3 A	Changes in temperature regimes	Broad-scale changes in temperature mean, variability, seasonality, and extremes. This includes changes in temperature extremes, increased average summer temperature, and decreased minimum winter/spring temperature
2.3 A	Livestock farming and ranching; Agricultural conversion (livestock, mostly historical)	Chicken and cattle farming, with cows being a common occurrence in streams. (In farming, animals are kept in captivity; in ranching they are allowed to roam in wild habitats.)



To learn more about the Duck River Watershed Conservation Opportunity Area, please contact: Dustin Thames, Biodiversity Coordinator, Region 2 (615) 781-6626

Duck River Highlands and Headwaters Conservation Opportunity Area

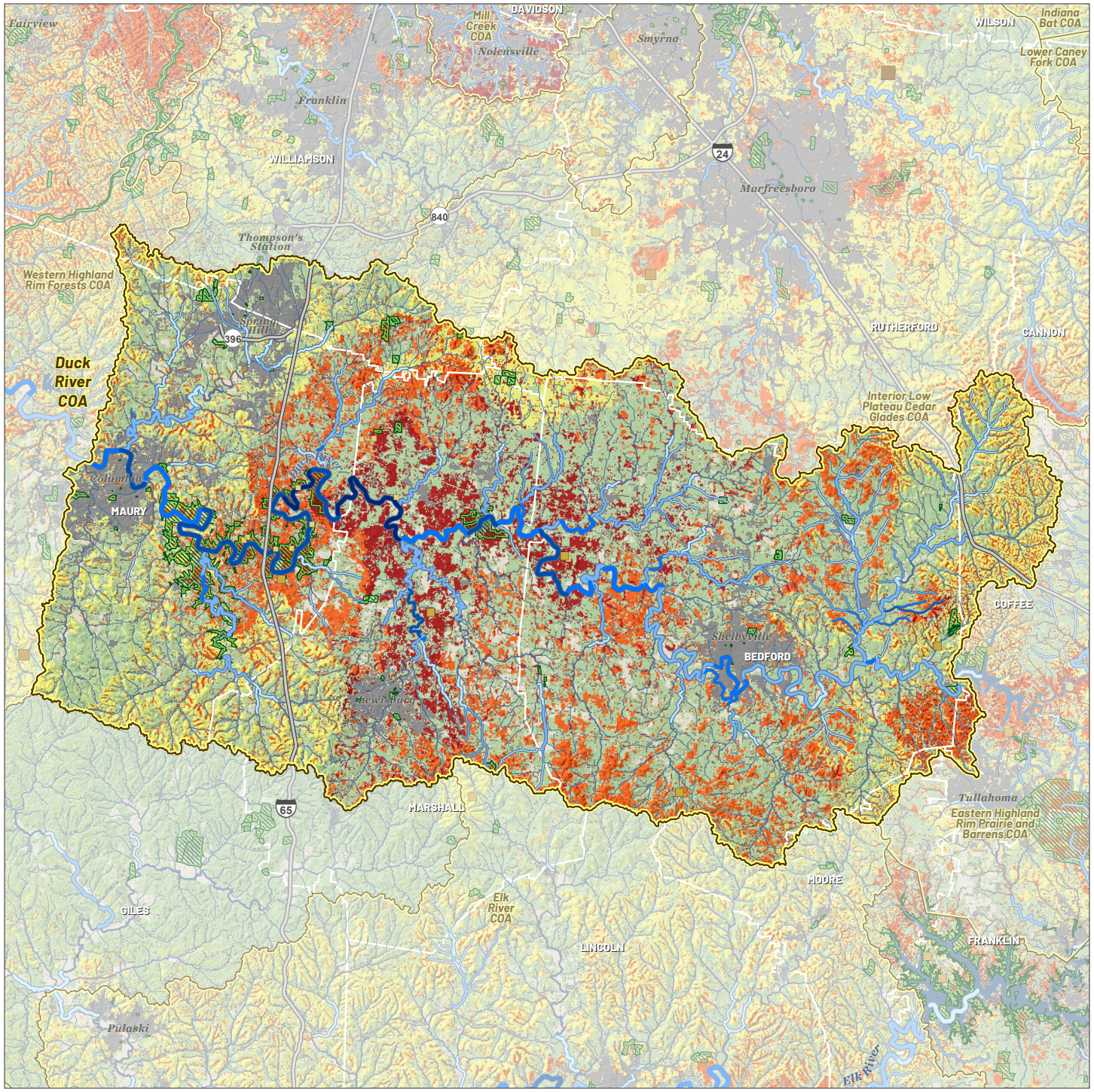
Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats that provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Compatible Resource Use	Use government funded incentive programs (e.g., CRP, EQIP, CSP, WRP, and FLEP) to encourage private landowners to protect water quality for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres
Restoration	Continue funding and staff support for a freshwater mollusk propagation facility to increase populations of mussels and aquatic snails for habitat reintroduction.	species
Standards	Develop standards for instream-flow regimes that establish minimum water levels required for target species during critical periods and for maintenance of habitat quality.	acres

Conservation Projects

In Tennessee's most biodiverse river, most completed and ongoing projects focused on a) achieving a better understanding of the abundance and distribution of SGCN such as fish, mussels, amphibians and bats or b) in-depth assessments of the status of rare and/or listed species, including the Longhead Darter, the Ashy Darter, the Striated Darter, and the Pale Lilliput mussel. In addition, TWRA and the USFWS collaborated to develop a research station for endangered mussel propagation and conservation.

Duck River
Conservation Opportunity Area

Duck River COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Maury Park	Local	166	93%
Duck - Allen	Private	164	100%
Duck - Kennedy	Private	162	100%
Wilson School Road Forest and Cedar Glades SNA	TDEC - DNA	58	100%
Henry Horton SP	TDEC - SP	1,523	100%
James K. Polk Home SHS	TDEC - THC	1	100%
Bedford Lake	TWRA	308	100%
Columbia Greenway	TWRA	7	100%
Yanahli WMA	TWRA	15,355	100%



Combined Habitat Priorities

Duck River Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

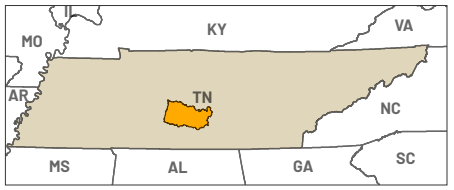
- Conservation Opportunity Area (COA)
- Public/Protected Land
- Conservation Easement

Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles
0 5 Kilometers



Duck River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Gray Treefrog	Dryophytes versicolor	1978
Amphibian	Streamside Salamander	Ambystoma barbouri	2023
Bat	Gray Bat	Myotis grisescens	2018
Bat	Indiana Bat	Myotis sodalis	2013
Bat	Little Brown Myotis	Myotis lucifugus	2018
Bat	Northern Long-eared Bat	Myotis septentrionalis	2017
Bat	Tricolored Bat	Perimyotis subflavus	2020
Bird	American Barn Owl	Tyto furcata	2023
Bird	American Bittern	Botaurus lentiginosus	2014
Bird	American Black Duck	Anas rubripes	2023
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bank Swallow	Riparia riparia	2023
Bird	Belted Kingfisher	Megaceryle alcyon	2002
Bird	Bewick's Wren	Thryomanes bewickii	1976
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2023
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2020
Bird	Bobolink	Dolichonyx oryzivorus	2020
Bird	Brown Creeper	Certhia americana	2023
Bird	Canada Warbler	Cardellina canadensis	2022
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Connecticut Warbler	Oporornis agilis	2016
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Evening Grosbeak	Coccothraustes vespertinus	1995
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023
Bird	Great Egret	Ardea alba	2023
Bird	Henslow's Sparrow	Centronyx henslowii	2012
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	Least Bittern	Botaurus exilis	2011
Bird	Least Flycatcher	Empidonax minimus	2022
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2016
Bird	Loggerhead Shrike	Lanius ludovicianus	2023
Bird	Long-eared Owl	Asio otus	1982
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2023
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023

Duck River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Northern Saw-whet Owl	Aegolius acadicus	2011
Bird	Olive-sided Flycatcher	Contopus cooperi	2022
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2023
Bird	Peregrine Falcon	Falco peregrinus	2023
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2007
Bird	Sharp-shinned Hawk	Accipiter striatus	2009
Bird	Short-eared Owl	Asio flammeus	1990
Bird	Snowy Egret	Egretta thula	2010
Bird	Swainson's Warbler	Limnothlypis swainsonii	2020
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	Western Sandpiper	Calidris mauri	2003
Bird	White-rumped Sandpiper	Calidris fuscicollis	1984
Bird	Willow Flycatcher	Empidonax traillii	2023
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Mammal	Allegheny Woodrat	Neotoma magister	2016
Mammal	Smoky Shrew	Sorex fumeus	1979
Plant	Boykin's Milkwort	Polygala boykinii	2014
Plant	Butternut	Juglans cinerea	2006
Plant	Carolina Anemone	Anemone caroliniana	2001
Plant	Davis' Sedge	Carex davisii	2024
Plant	Duck River Bladderpod	Paysonia densipila	2010
Plant	Field Chickweed	Cerastium velutinum var. velutinum	1987
Plant	Gattinger's Bluestar	Amsonia tabernaemontana var. gattingeri	2019
Plant	Groove-stem Indian-plantain	Arnoglossum plantagineum	2002
Plant	Inland Muhly	Muhlenbergia glabrifloris	1971
Plant	Leafy Prairie-clover	Dalea foliosa	2024
Plant	Limestone Fameflower	Phemeranthus calcaricus	2024
Plant	Missouri Evening-primrose	Oenothera macrocarpa	1990
Plant	Northern Prickly-ash	Zanthoxylum americanum	2010
Plant	Pale Umbrella-wort	Mirabilis albida	1966
Plant	Pope's Sand-parsley	Ammoselinum popei	2014
Plant	Porter's Reedgrass	Calamagrostis porteri	2018
Plant	Rock Grape	Vitis rupestris	1980
Plant	Running Glade Clover	Trifolium calcaricum	2022
Plant	Spreading Sandwort	Arenaria lanuginosa	2018

Duck River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Tennessee Coneflower	Echinacea tennesseensis	2005
Plant	Tennessee Death-Camas	Stenanthium tennesseense	1936
Plant	Tennessee Milkvetch	Astragalus tennesseensis	2023
Plant	Tower-mustard	Turritis glabra	1992
Plant	Water Stitchwort	Stellaria fontinalis	2023
Plant	Wolf's Spikerush	Eleocharis wolfii	1988
Plant	Yellow Sunnybell	Schoenolirion croceum	2023
Reptile	Eastern Box Turtle	Terrapene carolina	2007

Duck River COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Hellbender	Cryptobranchus alleganiensis	1981
Bivalve	Birdwing Pearlymussel	Lemiox rimosus	2022
Bivalve	Cracking Pearlymussel	Hemistena lata	1979
Bivalve	Creeper	Strophitus undulatus	2022
Bivalve	Cumberland Moccasinshell	Medionidus conradicus	2022
Bivalve	Cumberland Rockshell	Theliderma intermedia	2018
Bivalve	Cumberlandian Combshell	Epioblasma brevidens	1991
Bivalve	Duck River Dartersnapper	Epioblasma ahlstedti	2005
Bivalve	Elktoe	Alasmidonta marginata	1973
Bivalve	Fanshell	Cyprogenia stegaria	2014
Bivalve	Fluted Kidneyshell	Ptychobranchus subtentus	2020
Bivalve	Longsolid	Fusconaia subrotunda	1985
Bivalve	Mountain Creekshell	Leaunio vanuxemensis	2020
Bivalve	Orangefoot Pimpleback	Plethobasus cooperianus	1970
Bivalve	Oyster Mussel	Epioblasma capsaeformis	2005
Bivalve	Painted Creekshell	Cambarunio taeniatus	2022
Bivalve	Pale Lilliput	Toxolasma cylindrellum	2022
Bivalve	Pheasantshell	Actinonaias pectorosa	2022
Bivalve	Pink Mucket	Lampsilis abrupta	2020
Bivalve	Purple Lilliput	Toxolasma lividum	2022
Bivalve	Rainbow	Cambarunio iris	2022
Bivalve	Rayed Bean	Paetulunio fabalis	1965
Bivalve	Round Hickorynut	Obovaria subrotunda	2022
Bivalve	Round Pigtoe	Pleurobema sintoxia	2022
Bivalve	Sheepnose	Plethobasus cyphyus	2003
Bivalve	Slabside Pearlymussel	Pleuronaia dolabelloides	2022
Bivalve	Snuffbox	Epioblasma triquetra	1995
Bivalve	Spectaclecase	Cumberlandia monodonta	2004
Bivalve	Tan Riffleshell	Epioblasma walkeri	1988
Bivalve	Tennessee Clubshell	Pleurobema oviforme	2022
Bivalve	Tennessee Heelsplitter	Lasmigona holstonia	2001
Bivalve	Tennessee Pigtoe	Pleuronaia barnesiana	2022
Crustacean	Depression Crayfish	Cambarus rusticiformis	2004

Duck River COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Crustacean	Slender Crayfish	Faxonius compressus	2017
Fish	American Eel	Anguilla rostrata	2019
Fish	Ashy Darter	Allohistium cinereum	2009
Fish	Barrens Topminnow	Fundulus julisia	2001
Fish	Bedrock Shiner	Notropis rupestris	1981
Fish	Blotched Chub	Erimystax insignis	2022
Fish	Coppercheek Darter	Nothonotus aquali	2022
Fish	Flame Chub	Hemitremia flammea	2018
Fish	Golden Darter	Nothonotus denoncourti	2019
Fish	Highfin Carpsucker	Carpiodes velifer	2008
Fish	Longhead Darter	Percina macrocephala	1972
Fish	Redband Darter	Etheostoma luteovinctum	2023
Fish	Saddled Madtom	Noturus fasciatus	1992
Fish	Slenderhead Darter	Percina phoxocephala	2020
Fish	Spotfin Chub	Erimonax monachus	2018
Fish	Streamline Chub	Erimystax dissimilis	2009
Fish	Striated Darter	Etheostoma striatulum	2021
Fish	Tennessee Logperch	Percina apina	2018
Gastropod	Armored Rocksnail	Lithasia armigera	2009
Gastropod	Geniculate River Snail	Lithasia fuliginosa	2009
Gastropod	Helmet Rocksnail	Lithasia duttoniana	2009
Gastropod	Muddy Rocksnail	Lithasia salebrosa	1975
Insect	Tennessee Clubtail	Phanogomphus sandrius	2010

Duck River COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Big Mouth Cave Salamander	Gyrinophilus palleucus necturoides	2008
Amphibian	Tennessee Cave Salamander	Gyrinophilus palleucus	2016
Arachnid	Southeastern Cave Pseudoscorpion	Hesperochernes mirabilis	2016
Bat	Gray Bat	Myotis grisescens	2012
Bat	Indiana Bat	Myotis sodalis	1937
Bat	Little Brown Myotis	Myotis lucifugus	2016
Bat	Northern Long-eared Bat	Myotis septentrionalis	2017
Bat	Tricolored Bat	Perimyotis subflavus	2017
Crustacean	a cave obligate isopod	Caecidotea bicrenata	1965
Crustacean	a cave obligate isopod	Caecidotea bicrenata bicrenata	1982
Crustacean	Central Kentucky Cave Amphipod	Stygobromus exilis	1943
Crustacean	Nickajack Cave Isopod	Caecidotea nickajackensis	1901
Fish	Southern Cavefish	Typhlichthys subterraneus	2005
Gastropod	Hollow Glyph	Glyphyalinia specus	1965
Insect	a bristletail	Litocampa cherokeensis	1981
Insect	a bristletail	Litocampa davisi	1981
Insect	a cave obligate springtail	Pseudosinella hirsuta	2000
Insect	Cooke's Cave Dipluran	Litocampa cookei	2005

Duck River COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Mammal	Allegheny Woodrat	Neotoma magister	2007
Millipede	a cave obligate millipede	Scoterpes jackdanieli	2010
Millipede	a cave obligate millipede	Scoterpes musicarustica	2010
Millipede	a cave obligate millipede	Scoterpes tricorner	2010

Eastern Highland Rim Prairie and Barrens

Conservation Opportunity Area



The Eastern Highland Rim Conservation Opportunity Area (COA) is a patchwork of remnant prairies, barrens, and croplands. The flora of the prairie and barrens is highly diverse, with many relict species of the Atlantic Coastal Plain that once extended into this area. These remnant habitats are home to a diverse number of breeding grassland birds, such as Henslow's Sparrows, many of which are Species of Greatest Conservation Need (SGCN). Habitat conversion and fragmentation from agricultural development and succession of grasslands into forest have reduced the available habitat for this species to only a few patches suitable for breeding. Many of the remaining patches are too small to support breeding pairs.

Native American use of fire once played an important role in the natural maintenance of the prairies and barrens, reducing the amount of woody vegetation that otherwise encroaches into these systems. Likewise, hydrology has a large influence on woody succession; the extremely flat topography is underlain with a hard pan, which causes surface ponding of water that in turn controls the woody vegetation.

Small patches of forest once occurred only sporadically across the landscape in areas of higher elevation (steeper slopes) and better soils. However, lack of fire combined with altered hydrology (ditching and culverts) has allowed forests to expand beyond their former extent.

The largest threats to the prairies and barrens of this COA are habitat conversion for agricultural purposes and urban sprawl - both of which contribute to increased habitat fragmentation - as well as the elimination of fire from the ecosystem. This COA also encompasses several headwaters springs and tributaries that harbor many SGCN fish, including the Barrens Topminnow and the Barrens Darter. Invasive exotic fish species, stream habitat alteration, and overuse of water resources are a management challenge in these streams.



The flora of the Eastern Highland Rim is highly diverse, and its grasslands support a diversity of rare birds. The topography and hydrology of the barrens support characteristic herbaceous and forested wetland habitats.



Top to bottom: Northern Pine Snake/ Jesse Eaker, TWRA; Loggerhead Shrike/Alan Shmierer. P2: Prescribed burn/Clarence Coffey, TWRA (retired);

Eastern Highland Rim Prairie and Barrens Conservation Opportunity Area

Partnerships

TWRA will increase connectivity between existing grasslands and wetlands by restoring and managing grassland habitats on public lands, as well as assessing the likelihood of increasing connectivity between public lands within the COA and improving stream habitats. Management strategies and restoration projects will be implemented on private lands within the COA through partnerships with US Fish and Wildlife Service, the USDA Natural Resources Conservation Service/ National Water Quality Initiative, Arnold Air Force Base, Tennessee Valley Authority, TN Dept. of Education and Conservation, the Tennessee Aquarium, University of Tennessee, Copperhead Consulting, the North American Bat Monitoring Program, The Nature Conservancy, other agencies and willing private landowners.



CMP Stressor Level	Stressors	Threats specific to Highland Rim Prairie & Barrens
1.1 A	Housing and urban areas; Primary residential development	Destruction or degradation of habitats due to construction activities associated with the building of primary residences. Suburban housing development is causing the loss of natural landcovers.
1.2 A	Commercial and industrial areas	Destruction or degradation of habitats in an area due to construction and other activities related to the development of commercial or industrial buildings. Commercial development around urban areas, such as Tullahoma, Manchester, and McMinnville, are causing the loss of natural ecosystems. Specifically, the development of nurseries in the northern portions of the COA are causing destruction of natural ecosystems and degradation of water quality due to loss of natural riparian vegetation and nutrient loads from fertilizers.
2.1 A	Annual and perennial non timber crops; Agricultural conversion (row crop; mostly historical)	Removal of the natural vegetation of an area for agricultural purposes such as pasture, row crops, feed lots, outbuildings, etc. Much of the land within the COA has been converted to agriculture. Only small remnant prairies still exist.
2.1 B	Annual and perennial non-timber crops; Incompatible row crop agricultural practices	Degradation of soil/water quality or habitat structure related to row crop production and maintenance not compatible with species needs. Often due to erosion from plowing/tilling or chemical applications of herbicides/ pesticides. Especially around Warren County horticultural nurseries.

CMP Stressor Level	Stressor Categories	Threats specific to Highland Rim Prairie & Barrens, continued
2.3 A	Livestock farming and ranching; Agricultural conversion (livestock, mostly historical)	In farming, animals are kept in captivity; in ranching they are allowed to roam in wild habitats. Agricultural conversion for livestock altered much of the grasslands in this COA. As a result, fescue was introduced and much of the historically biodiverse plant communities are now a virtual monoculture of fescue.
2.3 C	Livestock farming and ranching; Incompatible grazing/pasture management practices	Degradation of soil/water quality and habitat structure of an area due to excessive grazing or to inappropriate exclusion of cattle from stream and forest resources. Also, includes degradation caused by over-application of fertilizers or other chemicals during pasture management practices. Agricultural practices in riparian areas of streams and wetlands are degrading water quality.
7.1 A	Fire and fire suppression	Degradation of fire-dependent natural systems due to either human suppression of fire or the conditions needed to support combustion. Fire suppression is a major component in the loss of natural grasslands.
7.2.F.	Dams and water management/use; Operation of dams/ reservoirs	Dam construction, dam operations, sediment control, change in salt regime, wetland filling for mosquito control, levees and dikes, surface water diversion, groundwater pumping, channelization, and artificial lakes can all degrade water quality and aquatic habitat availability due to disruption of natural hydrologic regimes of rivers and streams.
7.2 G	Dams and water management/use; Operation of drainage/ diversion systems	Degradation of water quality and habitat availability due to disruption of natural hydrologic regimes of rivers, streams, and wetlands by the operation of drainage ditches, dikes, and other water diversion and containment structures. Much of the COA contains a fragipan in the soil layers. The fragipan's dense clay resists soil drainage and causes standing water during much of the cool season. Drainage ditches have been installed in many areas to remove the surface water for agriculture and development. This has degraded the function of many of the wetlands and associated plant communities.

Conservation Projects

Various types of bat research and monitoring were conducted, including bat presence/absence surveys, colony counts, and acoustic monitoring to learn more about the life history and demographics of various important bat species, such as Little Brown Bats and Gray Bats. Many completed and ongoing surveys focused on the abundance and distribution of SGCN, including fish, plants, and bats. A Barrens Topminnow propagation and reintroduction project was completed. In addition, numerous habitat restoration projects address the loss of grasslands, prairies, and streams in this COA.

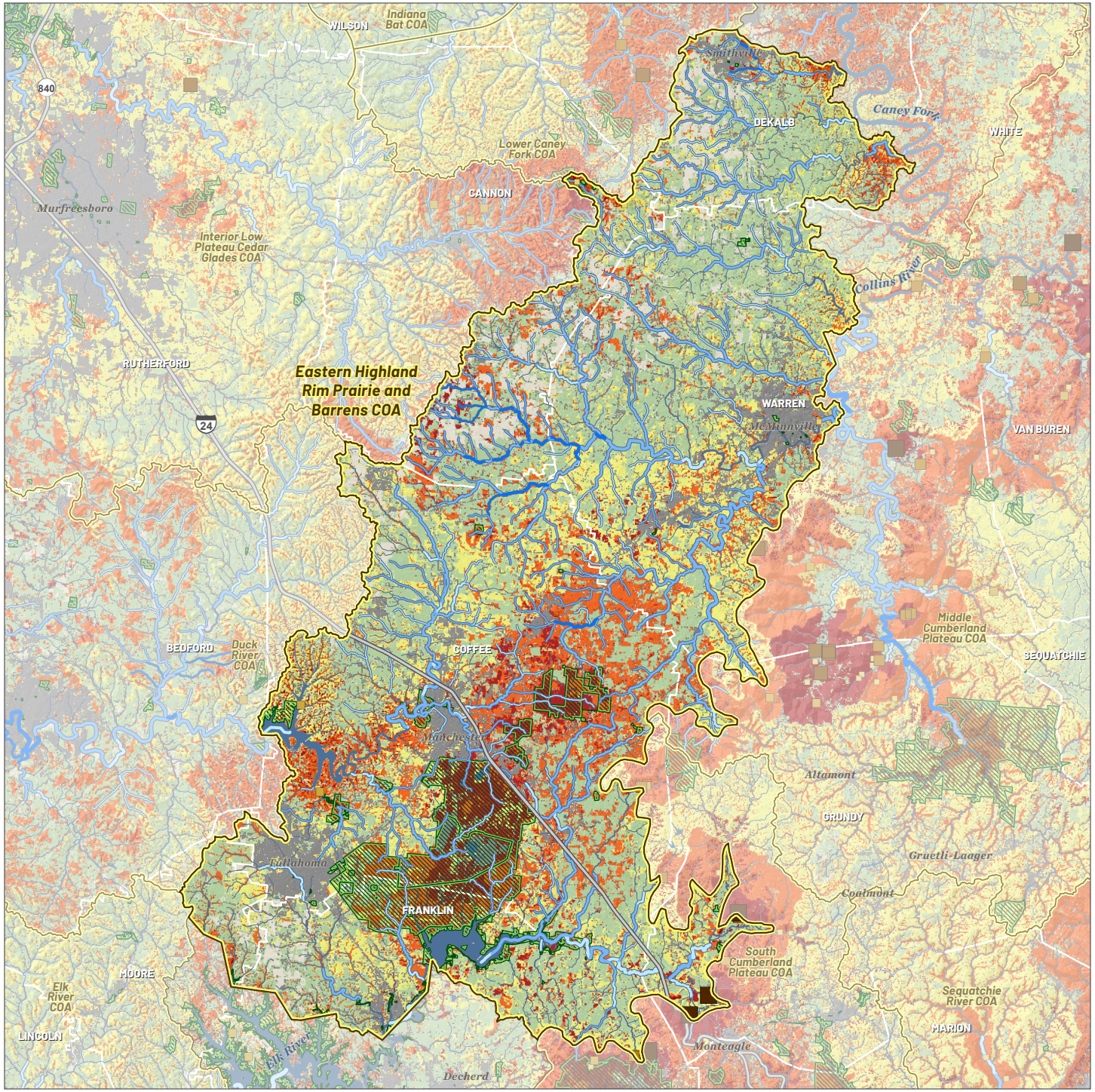
To learn more about the E. Highland Rim Prairie & Barrens Conservation Opportunity Area, please contact: Dustin Thames, Biodiversity Coordinator, Region 2 (615) 781-6626

Eastern Highland Rim Prairie and Barrens Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats which allows restoration of natural grasslands and wetlands in perpetuity, as well as providing species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Compatible Resource Use	Use government-funded incentive programs (e.g., CRP, EQIP, CSP, WRP, and FLEP) to encourage/incentivize private landowners to (a) restore riparian areas to natural vegetation to improve water quality and reduce sedimentation and/or (b) restore grasslands to benefit SGCNs.	acres
Habitat/Natural Processes Restoration	Reintroduce fire via prescribed burning into fire-dependent grassland and woodland systems within critical units of terrestrial habitats. Fire can be used to restore agricultural lands to native grasslands. Prescribed fires should be used to maintain early successional plant communities.	acres
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems (natural grasslands) in or near critical units of aquatic, subterranean, and terrestrial habitats to benefit SGCNs.	acres
Habitat/Natural Processes Restoration	Restore and enhance riparian zones and buffers in agricultural and urban areas to minimize non-point source pollution and protect water quality.	acres or feet of riparian
Formal Education, Training, Outdoor Education, and Recreation	Develop brochures, land managers guides, posters, and other educational aids for the public that address conservation issues, specifically the former extent of natural grasslands in this COA, their importance, and opportunities for restoration.	programs/ products

Eastern Highland Rim Prairie and Barrens Conservation Opportunity Area

Eastern Highland Rim Prairie & Barrens COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Bark Camp Barrens Conservation Easement	Private	2	100%
Pond Springs	Private	3	100%
Short Mountain-Jim Cummings SNA	Private	453	19%
Morrison Meadow SNA	TDEC - DNA	19	100%
Short Springs SNA	TDEC - DNA	401	100%
Old Stone Fort State Archaeological Park	TDEC - SP	835	100%
Normandy WMA	TVA	747	100%
Short Springs SWA	TVA	71	100%
Bark Camp Barrens	TWRA	3,453	100%
Headwaters WMA	TWRA	554	40%
Hickory Flat WMA	TWRA	625	100%
Maple Springs	TWRA	122	100%
May Prairie SNA	TWRA	498	100%
Arnold Engineering Development Center	USAF	35,949	100%



Combined Habitat Priorities

Eastern Highland Rim Prairie and Barrens Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

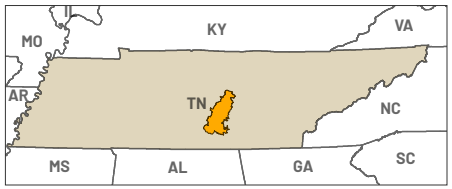
- Conservation Opportunity Area (COA)
- Public/Protected Land
- Conservation Easement

Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles
0 5 Kilometers



Eastern Highland Rim Prairie and Barrens COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Barking Treefrog	Dryophytes gratiosus	1991
Amphibian	Cumberland Dusky Salamander	Desmognathus abditus	1998
Amphibian	Four-toed Salamander	Hemidactylium scutatum	2019
Amphibian	Gopher Frog	Lithobates capito	1997
Amphibian	Gray Treefrog	Dryophytes versicolor	2007
Amphibian	Green Salamander	Aneides aeneus	2004
Amphibian	Mud Salamander	Pseudotriton montanus	1971
Amphibian	Small-Mouthed Salamander	Ambystoma texanum	2019
Bat	Gray Bat	Myotis grisescens	2021
Bat	Indiana Bat	Myotis sodalis	2019
Bat	Little Brown Myotis	Myotis lucifugus	2021
Bat	Northern Hoary Bat	Lasiurus cinereus	2018
Bat	Northern Long-eared Bat	Myotis septentrionalis	2017
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2004
Bat	Tricolored Bat	Perimyotis subflavus	2022
Bird	American Barn Owl	Tyto furcata	2023
Bird	American Bittern	Botaurus lentiginosus	2023
Bird	American Black Duck	Anas rubripes	2023
Bird	American Golden-Plover	Pluvialis dominica	2023
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2022
Bird	Bachman's Sparrow	Peucaea aestivalis	2008
Bird	Bank Swallow	Riparia riparia	2023
Bird	Belted Kingfisher	Megaceryle alcyon	1997
Bird	Bewick's Wren	Thryomanes bewickii	2017
Bird	Black-bellied Plover	Pluvialis squatarola	2023
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2023
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2018
Bird	Bobolink	Dolichonyx oryzivorus	2023
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2023
Bird	Buff-breasted Sandpiper	Calidris subruficollis	2023
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2022
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Connecticut Warbler	Oporornis agilis	2008
Bird	Dunlin	Calidris alpina	2023
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2022
Bird	Golden Eagle	Aquila chrysaetos	2021
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023

Eastern Highland Rim Prairie and Barrens COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Great Egret	Ardea alba	2023
Bird	Henslow's Sparrow	Centronyx henslowii	2022
Bird	Hudsonian Godwit	Limosa haemastica	2015
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	King Rail	Rallus elegans	1988
Bird	Least Bittern	Botaurus exilis	1985
Bird	Least Flycatcher	Empidonax minimus	2023
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2023
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2022
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Olive-sided Flycatcher	Contopus cooperi	2023
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2023
Bird	Peregrine Falcon	Falco peregrinus	2023
Bird	Piping Plover (Atlantic subspecies)	Charadrius melodus melodus	2021
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruddy Turnstone	Arenaria interpres	2023
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2023
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-billed Dowitcher	Limnodromus griseus	2023
Bird	Short-eared Owl	Asio flammeus	2022
Bird	Snowy Egret	Egretta thula	2023
Bird	Stilt Sandpiper	Calidris himantopus	2023
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	Western Sandpiper	Calidris mauri	2022
Bird	White-rumped Sandpiper	Calidris fuscicollis	2022
Bird	Whooping Crane	Grus americana	2016
Bird	Willet	Tringa semipalmata	2022
Bird	Willow Flycatcher	Empidonax traillii	2018
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2012
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Gastropod	Alabama Tigersnail	Anguispira alabama	2002

Eastern Highland Rim Prairie and Barrens COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Gastropod	Rockpile Liptooth	Daedalochila auriformis	2001
Mammal	Allegheny Woodrat	Neotoma magister	2004
Mammal	Cinereus Shrew	Sorex cinereus	2007
Mammal	Eastern Pygmy Shrew	Sorex hoyi	1994
Mammal	Eastern Woodrat	Neotoma floridana illinoensis	2022
Mammal	Golden Mouse	Ochrotomys nuttalli	2005
Mammal	Meadow Jumping Mouse	Zapus hudsonius	2006
Mammal	Smoky Shrew	Sorex fumeus	1979
Mammal	Southeastern Shrew	Sorex longirostris	2007
Plant	a liverwort	Frullania caulisequa	1998
Plant	a liverwort	Radula voluta	1998
Plant	Appalachian Filmy Fern	Vandenboschia boschiana	2002
Plant	Appalachian Pellia	Pellia appalachiana	1998
Plant	Barbed Rattlesnake-root	Nabalus barbatus	2019
Plant	Barratt's Sedge	Carex barrattii	2004
Plant	Barrens Silky Aster	Symphyotrichum pratense	1955
Plant	Blackfoot Quillwort	Isoetes melanopoda	2021
Plant	Blue Ridge False Foxglove	Agalinis decemloba	2020
Plant	Bog Rush	Juncus elliottii	2004
Plant	Branching Bur-reed	Sparganium androcladum	1999
Plant	Broadleaf Barbara's-buttons	Marshallia trinervia	2020
Plant	Broadleaf Bunchflower	Melanthium latifolium	1990
Plant	Butternut	Juglans cinerea	2000
Plant	Buxbaum's Sedge	Carex buxbaumii	1987
Plant	Carolina Redroot	Lachnanthes caroliana	2011
Plant	Cluster Fescue	Festuca paradoxa	1993
Plant	Coastal False Asphodel	Triantha racemosa	2011
Plant	Coastal Sweet-pepperbush	Clethra alnifolia	1995
Plant	Creeping St. John's-wort	Hypericum adpressum	1973
Plant	Cutleaf Water-milfoil	Myriophyllum pinnatum	1979
Plant	Downy Gentian	Gentiana puberulenta	1997
Plant	Dwarf Milkwort	Polygala nana	2023
Plant	Dwarf Sundew	Drosera brevifolia	2023
Plant	Eaton's Witchgrass	Dichanthelium spretum	1994
Plant	Eggert's Sunflower	Helianthus eggertii	2010
Plant	Elliott's Blueberry	Vaccinium elliottii	1993
Plant	Falling Beakrush	Rhynchospora caduca	2019
Plant	Few-flowered Beakrush	Rhynchospora rariflora	2011
Plant	Foxtail Bog Clubmoss	Lycopodiella alopecuroides	2022
Plant	Fringed Yellow-eyed-grass	Xyris fimbriata	1992
Plant	Globe-fruit False Loosestrife	Ludwigia sphaerocarpa	1995
Plant	Grassleaf Arrowhead	Sagittaria graminea	2007
Plant	Hairy Fimbry	Fimbristylis puberula	2022
Plant	Harvey's Beakrush	Rhynchospora harveyi	1960
Plant	Horned Bladderwort	Utricularia cornuta	2004
Plant	Lake-cress	Rorippa aquatica	1950

Eastern Highland Rim Prairie and Barrens COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Lanceleaf Loosestrife	Steironema hybridum	2020
Plant	Lance-like Spikerush	Eleocharis lanceolata	1995
Plant	Large Cranberry	Vaccinium macrocarpon	2010
Plant	Largeleaf Grass-of-Parnassus	Parnassia grandifolia	1994
Plant	Laxleaf Yellow-eyed-grass	Xyris laxifolia var. iridifolia	2022
Plant	Least Trillium	Trillium pusillum	2020
Plant	Leggett's Pinweed	Lechea pulchella	1998
Plant	Loesel's Twayblade	Liparis loeselii	2012
Plant	Loose-head Beakrush	Rhynchospora chalarocephala	2004
Plant	Loosestrife	Lysimachia x producta	2004
Plant	Low Frostweed	Crocanthemum propinquum	2012
Plant	Low Nutrush	Scleria verticillata	1995
Plant	Maidencane	Hymenachne hemitoma	2018
Plant	Marsh Bellflower	Campanula aparinoides	1985
Plant	Maryland Milkwort	Senega mariana	2019
Plant	May Prairie Aster	Symphyotrichum estesii	2019
Plant	Narrowleaf Bushclover	Lespedeza angustifolia	1997
Plant	Nestronia	Nestronia umbellula	1984
Plant	Nuttall's Milkwort	Polygala nuttallii	1994
Plant	Ovate Catchfly	Silene ovata	1980
Plant	Pale False Foxglove	Agalinis skinneriana	2021
Plant	Pale Purple Coneflower	Echinacea pallida	2012
Plant	Pale-green Orchid	Platanthera flava var. herbiola	2007
Plant	Pineland Beakrush	Rhynchospora perplexa	1994
Plant	Pink Sundew	Drosera capillaris	1947
Plant	Pubescent Sedge	Carex hirtifolia	1987
Plant	Ridge-stem False Foxglove	Agalinis oligophylla	2021
Plant	Rose Pogonia	Pogonia ophioglossoides	2014
Plant	Rough Rattlesnake-root	Prenanthes aspera	1998
Plant	Roughish Witchgrass	Dichanthelium leucothrix	1992
Plant	Sand Cherry	Prunus pumila	2022
Plant	Savanna Eryngo	Eryngium integrifolium	2021
Plant	Sharp's Pouncewort	Lejeunea sharpii	1998
Plant	Sharp-scaled Mannagrass	Glyceria acutiflora	2018
Plant	Shortleaf Beardgrass	Gymnopogon brevifolius	2021
Plant	Shortleaf Witchgrass	Dichanthelium ensifolium ssp. curtifolium	1989
Plant	Slender Blue Iris	Iris prismatica	2022
Plant	Snowy Orchid	Platanthera nivea	2022
Plant	Southern Bog Goldenrod	Solidago austrina	2020
Plant	Southern Dwarf Huckleberry	Gaylussacia dumosa	2022
Plant	Southern Lady's-slipper	Cypripedium kentuckiense	2024
Plant	Southern Twayblade	Neottia bifolia	2017
Plant	Spoonleaf Sundew	Drosera intermedia	2010
Plant	Spreading Yellow False Foxglove	Aureolaria patula	1998
Plant	Sticky Hedge-hyssop	Gratiola brevifolia	1994
Plant	Swamp Loosestrife	Lysimachia terrestris	1995

Eastern Highland Rim Prairie and Barrens COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Swamp Lousewort	Pedicularis lanceolata	2021
Plant	Tall Beakrush	Rhynchospora macrostachya	2019
Plant	Tansy Rosinweed	Silphium pinnatifidum	2004
Plant	Tennessee Death-Camas	Stenanthium tennesseense	2021
Plant	Torrey's Dropseed	Muhlenbergia torreyana	2007
Plant	Vetchling Peavine	Lathyrus palustris	2011
Plant	Virginia Chainfern	Anchistea virginica	2004
Plant	Viscid Bushy Goldenrod	Euthamia gymnospermoides	2010
Plant	White-bract Thoroughwort	Eupatorium leucolepis	2011
Plant	Whiteleaf Leatherflower	Clematis glaucophylla	2009
Plant	Wolf's Spikerush	Eleocharis wolfii	1975
Plant	Woolly Sedge	Carex pellita	2003
Plant	Wrinkled Jointgrass	Coelorachis rugosa	2012
Plant	Yellow Fringeless Orchid	Platanthera integra	1998
Plant	Yellow Water-crowfoot	Ranunculus flabellaris	1997
Plant	Yellow-crested Orchid	Platanthera cristata	2020
Plant	Zigzag Bladderwort	Utricularia subulata	2004
Reptile	Eastern Box Turtle	Terrapene carolina	2006
Reptile	Eastern Pinesnake	Pituophis melanoleucus	2002
Reptile	Eastern Slender Glass Lizard	Ophisaurus attenuatus longicaudus	1993

Eastern Highland Rim Prairie and Barrens COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Hellbender	Cryptobranchus alleganiensis	1990
Bivalve	Cumberland Moccasinshell	Medionidus conradicus	1980
Bivalve	Cumberland Pigtoe	Pleuronaia gibber	2004
Bivalve	Mountain Creekshell	Leaunio vanuxemensis	1997
Bivalve	Painted Creekshell	Cambarunio taeniatus	1992
Bivalve	Pale Lilliput	Toxolasma cylindrellum	1970
Bivalve	Purple Lilliput	Toxolasma lividum	1980
Bivalve	Rainbow	Cambarunio iris	2005
Bivalve	Salamander Mussel	Simpsonaias ambigua	2004
Bivalve	Slabside Pearlymussel	Pleuronaia dolabelloides	1980
Bivalve	Snuffbox	Epioblasma triquetra	1973
Bivalve	Tennessee Clubshell	Pleurobema oviforme	1980
Bivalve	Tennessee Heelsplitter	Lasmigona holstonia	2001
Bivalve	Tennessee Pigtoe	Pleuronaia barnesiana	1999
Crustacean	Brawleys Fork Crayfish	Cambarus williami	2021
Crustacean	Depression Crayfish	Cambarus rusticiformis	2021
Crustacean	Hairy Crayfish	Cambarus friaufi	2010
Crustacean	Short Mountain Crayfish	Cambarus clivosus	2018
Crustacean	Slender Crayfish	Faxonius compressus	2020
Fish	Ashy Darter	Allohistium cinereum	1971
Fish	Barrens Darter	Etheostoma forbesi	2022

Eastern Highland Rim Prairie and Barrens COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Fish	Barrens Topminnow	Fundulus julisia	2019
Fish	Coppercheek Darter	Nothonotus aquali	1978
Fish	Flame Chub	Hemitremia flammea	2022
Fish	Longhead Darter	Percina macrocephala	1978
Fish	Redband Darter	Etheostoma luteovinctum	2022
Fish	Sooty Darter	Etheostoma olivaceum	2022
Fish	Streamline Chub	Erimystax dissimilis	1999
Fish	Tennessee Logperch	Percina apina	1977
Gastropod	Geniculate River Snail	Lithasia fuliginosa	1973
Gastropod	Helmet Rocksnail	Lithasia duttoniana	1973
Gastropod	Umbilicate Rocksnail	Leptoxis umbilicata	1963
Gastropod	Warty Rocksnail	Lithasia lima	1984
Reptile	Alligator Snapping Turtle	Macrochelys temminckii	2017

Eastern Highland Rim Prairie and Barrens COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Big Mouth Cave Salamander	Gyrinophilus palleucus necturoides	2006
Amphibian	Tennessee Cave Salamander	Gyrinophilus palleucus	2005
Arachnid	a cave obligate harvestman	Phalangodes appalachius	1989
Arachnid	a cave obligate pseudoscorpion	Chitrella archeri	2004
Arachnid	Archer's Two-clawed Spider	Liocranoides archeri	2004
Arachnid	Big-eyed Meshweaver	Cicurina placida	2004
Arachnid	Cave Funnel-web Spider	Calymmaria persica	2005
Arachnid	cave harvestmen	Phalangodes sp.	2004
Arachnid	funnel-web spider	Cicurina breviaria	2004
Arachnid	harvestmen	Erebomaster sp.	2004
Arachnid	Mammoth Cave Spider	Anthrobia mammouthia	2011
Arachnid	Southeastern Cave Pseudoscorpion	Hesperochernes mirabilis	2011
Arachnid	Subterranean Sheetweb Spider	Phanetta subterranea	2004
Arachnid	Trussell Cave Sheet-web Spider	Agyneta sp.	2004
Arachnid	Two-clawed spider	Liocranoides sp.	2004
Bat	Gray Bat	Myotis grisescens	2017
Bat	Indiana Bat	Myotis sodalis	2017
Bat	Little Brown Myotis	Myotis lucifugus	2017
Bat	Northern Long-eared Bat	Myotis septentrionalis	2017
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2004
Bat	Tricolored Bat	Perimyotis subflavus	2017
Crustacean	a cave obligate isopod	Caecidotea bicrenata bicrenata	2011
Crustacean	a cave obligate isopod	Ligidium elrodii hancockensis	2004
Crustacean	a sideswimmer	Gammarus minus	2004
Crustacean	Southern Cave Crayfish	Orconectes australis	2005
Crustacean	Swamp River Cave Amphipod	Stygobromus sp. 22	2004
Fish	Goldline Darter	Percina aurolineata	2005
Fish	Southern Cavefish	Typhlichthys subterraneus	2006

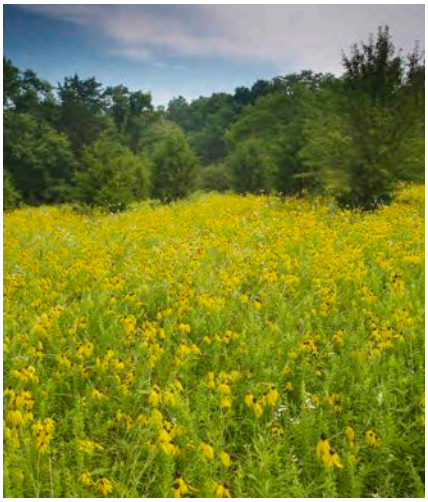
Eastern Highland Rim Prairie and Barrens COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Gastropod	Cave Thorn	Carychium stygium	2004
Gastropod	Hollow Coil	Helicodiscus notius specus	2004
Gastropod	Hollow Glyph	Glyphyalinia specus	1957
Gastropod	Raccoon Coil	Helicodiscus barri	2004
Insect	a carabid beetle	Rhadine caudata	2004
Insect	a cave barklice	Psyllipsocus ramburi	2004
Insect	a cave obligate beetle	Anillinus longiceps	2004
Insect	a cave obligate beetle	Batrisodes valentinei	1951
Insect	a cave obligate beetle	Ptomaphagus hatchi	2011
Insect	a cave obligate beetle	Subterrochus ferus	2004
Insect	a cave obligate bristletail	Litocampa valentinei	2011
Insect	a cave obligate ground beetle	Pseudanophthalmus humeralis	2004
Insect	a cave obligate springtail	Pseudosinella aera	2004
Insect	a cave obligate springtail	Pseudosinella christianseni	1964
Insect	a cave obligate springtail	Pseudosinella hirsuta	2011
Insect	a cave obligate springtail	Pseudosinella spinosa	1949
Insect	a cave springtail	Pygmarrhopalites pavo	2004
Insect	a fly	Megaselia cavernicola	2005
Insect	a rove beetle	Aleochara lucifuga	1986
Insect	a rove beetle	Aleochara sp.	2004
Insect	a rove beetle	Atheta sp.	2004
Insect	a rove beetle	Atheta troglophila	1986
Insect	Barr's cave cricket	Hadenoecus barri	2004
Insect	cave crickets	Ceuthophilus sp.	2004
Insect	Cave Dung Fly	Spelobia tenebrarum	2011
Insect	Cooke's Cave Dipluran	Litocampa cookei	2004
Insect	Duck River Cave Beetle	Pseudanophthalmus tullahoma	1981
Insect	Intermediate Cave Beetle	Pseudanophthalmus intermedius	2011
Insect	Two-toothed Springtail	Pogonognathellus bidentatus	2004
Mammal	Allegheny Woodrat	Neotoma magister	2004
Millipede	a cave obligate millipede	Scoterpes jackdanieli	2010
Millipede	a cave obligate millipede	Scoterpes ventus	2010
Millipede	a cave obligate millipede	Tetracion tennesseensis	2004
Millipede	Barr's cave milliped	Pseudotremia sp. 7	2011
Millipede	cave millipeds	Chaetaspis sp.	2004
Roundworm	a cave obligate worm	Cambarincola alienus	1964

Interior Low Plateau Cedar Glades

Conservation Opportunity Area



Cedar glade habitats are characterized by their limestone outcrops and shallow soils. Middle Tennessee is highly recognized for its high concentration of these habitats, which are considered one of the rarest habitats in the southeastern United States. Other notable features of cedar glades are their association with dense thickets of cedar trees, upland forests, and grass dominated barrens in a matrix of different habitat types. These components of the cedar glade ecosystem create habitats for a diverse flora and fauna.



Pyne's Ground-plum (*Astragalus bibullatus*), a federally listed plant, was once thought to be extirpated until recently rediscovered in cedar glades of Tennessee. The first- and second-order streams within the upland forests associated with cedar glades in middle Tennessee provide terrestrial and breeding habitat for the Streamside Salamander, a Species of Greatest Conservation Need (SGCN). This salamander requires both upland forests and streams to complete its life cycle.

Middle Tennessee is highly recognized for its cedar glades, considered one of the rarest habitats in the southeastern United States.

Population growth is expected to continue in this region at one of the highest rates for the state overall during the coming decades. Urban sprawl threatens to further reduce, degrade and fragment glade habitats. Many of the cedar glades' rare species of flora and fauna have evolved life history characteristics that reduce their ability to move across the environment, making connectivity among these habitats crucial for maintaining genetic diversity. Furthermore, many cedar glade and barren species evolved with fire (from lightning strikes and Native American management), and some require fire either for propagation or for maintenance of open habitat structure. Without active management using prescribed fire, the grass-dominated barrens within cedar glades will be lost.

Top to bottom: Couchville Cedar State Natural Area/Byron Jorjorian; next page - Pyne's Ground-plum ((*Astragalus bibullatus*)/Ryan Kaldari. P4: Green Salamander/Dustin Thames

Interior Low Plateau Cedar Glades Conservation Opportunity Area

Partnerships



TWRA will implement strategies to improve protection and management of cedar glades, their associated matrix habitats, and many SGCN plants and animals. TWRA will develop and foster partnerships with the US Fish and Wildlife Service, Natural Resources Conservation Service, US Army Corps of Engineers, TN Dept. of Environment and Conservation, TN Valley Authority, The Nature Conservancy, TennGreen Land Conservancy, TN Bat Working Group, Middle TN State Univ., other universities, local governments, and private landowners as well as companies.

CMP Stressor Level	Stressor Categories	Threats specific to Interior Low Plateau Cedar Glades
1.1 A	Housing and urban areas; Primary residential development	Destruction or degradation of habitats due to construction activities associated with the building of primary residences.
1.2 A	Commercial and industrial areas	Destruction or degradation of habitats in an area due to construction and other activities related to the development of commercial or industrial buildings.
1.2 B	Commercial and industrial areas; Landfill construction/operation (a threat to one species)	Destruction or degradation of habitats due to construction and maintenance of county or municipal landfill operations. Also includes habitat degradation and increased mortality caused by releases of toxins and other contaminants into the environment.
2.3 C	Livestock farming and ranching; Incompatible grazing/pasture management practices	Degradation of soil/water quality and habitat structure of an area due to excessive grazing or to inadequate exclusion of cattle from stream and forest resources. Also includes degradation caused by over-application of fertilizers or other chemicals during pasture management practices. This stress is directly related to the impacts of animals on soil and water quality.
7.1 A	Fire and fire suppression	Degradation of fire-dependent natural systems due to either human suppression of fire or the conditions needed to support combustion. This category focuses on the human activities that lead to either not enough fire or too much fire in the ecosystem in question. It also includes damaging "natural" fires in systems that have lost their natural resilience.

CMP Stressor Level	Stressor Categories	Threats specific to Interior Low Plateau Cedar Glades, continued
7.2 F	Dams and water management/use; Operation of dams/reservoirs	Degradation of water quality and aquatic habitat availability due to disruption of natural hydrologic regimes of rivers and streams by dams or reservoirs. Also includes destruction/degradation of terrestrial habitats due to periodic raising or lowering of water levels.
8.2 A	Problematic native plants and animals	Increased mortality of animals resulting from either excessive take by predators or by the inability to compete with other species for food and resources.
9.3 C	Agriculture and forestry effluents; Incompatible grazing/pasture management practices	Degradation of soil/water quality and habitat structure of an area due to excessive grazing or to inadequate exclusion of cattle from stream and forest resources. Also includes degradation caused by over-application of fertilizers or other chemicals during pasture management practices.
11.4 A	Changes in precipitation an d hydrological Regimes	Broad-scale changes in precipitation mean, variability, seasonality, and extremes. Includes decreased or increased precipitation; changes in timing of precipitation; changes in form of precipitation (e.g., snow vs rain; snow cover and snowpack where applicable); changes in evapotranspiration rates and hydrological cycles; and droughts and floods

Conservation Projects

Some completed and ongoing projects focused on achieving a better understanding of the abundance, distribution, and genetics of SGCN such as fish, Streamside Salamander, Green Salamander, and bats (including a Bat Blitz conducted in collaboration with the TN Bat Working Group). Conservation easements and rare plant/community restorations were conducted to benefit Pyne's Ground-plum (*Astragalus bibullatus),* Leafy Prairie Clover (*Dalea foliosa),* glades, cedar forest, and Brawley's Fork Crayfish. TWRA and TDEC also conducted surveillance for snake fungal disease in this COA.



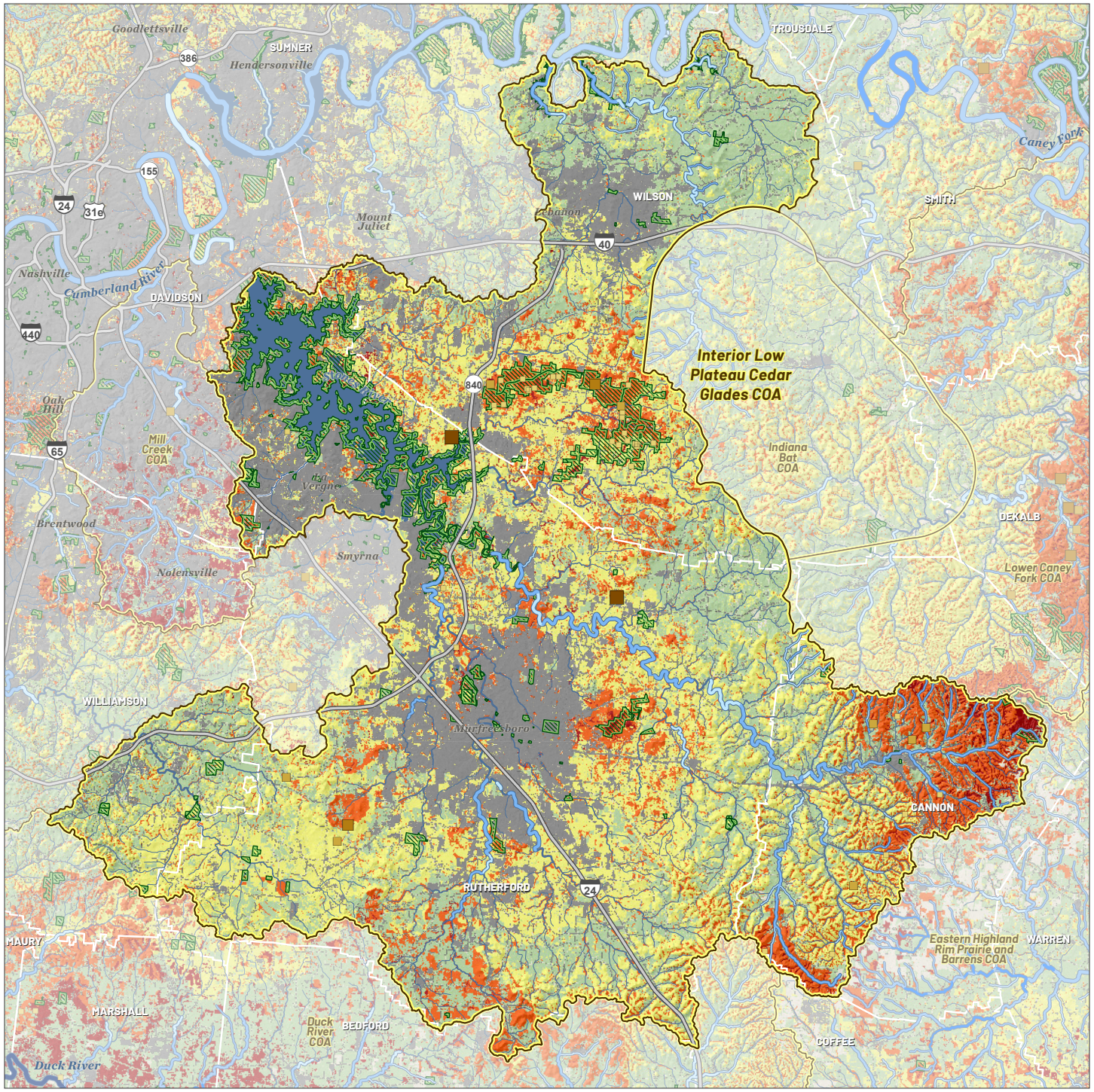
To learn more about the ILP Cedar Glades Conservation Opportunity Area, please contact: Dustin Thames, Biodiversity Coordinator, Region 2 (615) 781-6626

Interior Low Plateau Cedar Glade Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats that provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Fee-title Ownership	Coordinate land acquisition priorities among state/federal agencies and non-governmental organizations.	N/A
Permanent Protective Easements	Use federal/state/private funding sources to acquire permanent easements within critical units of aquatic, subterranean, and terrestrial habitats that provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	caves protected
Research	Conduct research on life history and ecological needs of target species to establish guidelines for determining population viability.	projects
Compatible Resource Use	Use government funded incentive programs (e.g., CRP, EQIP, CSP, WRP, and FLEP) to encourage private landowners to protect water quality for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Conservation Area Management	Develop and implement conservation plans for all public/private conservation areas across the state based on ecosystem-level management principles.	conservation plans developed
Habitat/Natural Processes Restoration	Reintroduce fire via prescribed burning into fire-dependent grassland and woodland systems within critical units of terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Remove or modify physical barriers that disrupt habitat/population connectivity for target species within critical units of aquatic, subterranean, and terrestrial habitats.	acres/feet of riparian corridor

Interior Low Plateau Cedar Glade Conservation Opportunity Area

Interior Low Plateau Cedar Glades COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Cane Ridge Park	Local	294	99%
James E. Ward Ag. & Comm. Ctr.	Local	164	100%
Stones River National Battlefield	NPS	898	100%
Gattinger's Cedar Glade and Barrens SNA	Private	57	100%
Short Mountain-Jim Cummings SNA	Private	453	27%
Flat Rock Cedar Glades and Barrens SNA	TDEC - DNA	849	100%
John and Hester Lane Cedar Glades SNA	TDEC - DNA	46	100%
Manus Road Cedar Glade SNA	TDEC - DNA	18	100%
Mount View Glade SNA	TDEC - DNA	9	100%
Overbridge SNA	TDEC - DNA	72	100%
Walterhill Floodplain SNA	TDEC - DNA	34	100%
Cedars Of Lebanon SP & SF	TDEC - SP	1,339	100%
Long Hunter SP	TDEC - SP	2,919	98%
Cedars of Lebanon SF	TDF	8,048	100%
Sunnybell Cedar Glade	TNC	35	100%
Haley-Jaqueth WMA	TWRA	246	100%
Headwaters WMA	TWRA	554	45%
Lytle Creek Refuge	TWRA	49	100%
Murfree Springs Refuge	TWRA	12	100%
Old Hickory Lock 5 Refuge	USACE	972	35%
Old Hickory WMA	USACE	5,704	11%
Percy Priest - Safety Zone	USACE	4,063	96%
Percy Priest WMA	USACE	12,638	100%



Combined Habitat Priorities

Interior Low Plateau Cedar Glades Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

Conservation Opportunity Area (COA)

Public/Protected Land

Conservation Easement

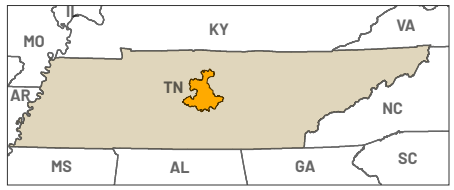
Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Interior Low Plateau Cedar Glades COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Green Salamander	Aneides aeneus	2018
Amphibian	Mud Salamander	Pseudotriton montanus	1991
Amphibian	Small-Mouthed Salamander	Ambystoma texanum	1929
Amphibian	Streamside Salamander	Ambystoma barbouri	2024
Bat	Eastern Small-footed Bat	Myotis leibii	2019
Bat	Gray Bat	Myotis grisescens	2023
Bat	Indiana Bat	Myotis sodalis	2019
Bat	Little Brown Myotis	Myotis lucifugus	2021
Bat	Northern Hoary Bat	Lasiurus cinereus	2023
Bat	Northern Long-eared Bat	Myotis septentrionalis	2019
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2019
Bat	Southeastern Bat	Myotis austroriparius	2019
Bat	Tricolored Bat	Perimyotis subflavus	2022
Bird	American Barn Owl	Tyto furcata	2023
Bird	American Bittern	Botaurus lentiginosus	2020
Bird	American Black Duck	Anas rubripes	2023
Bird	American Golden-Plover	Pluvialis dominica	2023
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bank Swallow	Riparia riparia	2023
Bird	Bewick's Wren	Thryomanes bewickii	2015
Bird	Black-bellied Plover	Pluvialis squatarola	2022
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2023
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2020
Bird	Bobolink	Dolichonyx oryzivorus	2023
Bird	Brown Creeper	Certhia americana	2023
Bird	Buff-breasted Sandpiper	Calidris subruficollis	2021
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Connecticut Warbler	Oporornis agilis	2014
Bird	Dunlin	Calidris alpina	2023
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Evening Grosbeak	Coccothraustes vespertinus	1974
Bird	Golden Eagle	Aquila chrysaetos	1994
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023
Bird	Great Egret	Ardea alba	2023
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	Least Flycatcher	Empidonax minimus	2023
Bird	LeConte's Sparrow	Ammospiza leconteii	2023

Interior Low Plateau Cedar Glades COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2023
Bird	Long-eared Owl	Asio otus	2010
Bird	Long-tailed Duck	Clangula hyemalis	2022
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2023
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Olive-sided Flycatcher	Contopus cooperi	2023
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2023
Bird	Peregrine Falcon	Falco peregrinus	2023
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruddy Turnstone	Arenaria interpres	2018
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2023
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-billed Dowitcher	Limnodromus griseus	2023
Bird	Short-eared Owl	Asio flammeus	2023
Bird	Snowy Egret	Egretta thula	2023
Bird	Stilt Sandpiper	Calidris himantopus	2022
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	Western Sandpiper	Calidris mauri	2022
Bird	White-rumped Sandpiper	Calidris fuscicollis	2023
Bird	Willet	Tringa semipalmata	2022
Bird	Willow Flycatcher	Empidonax traillii	2023
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Gastropod	Tongued Glyph	Glyphyalinia rimula	1972
Mammal	Allegheny Woodrat	Neotoma magister	2008
Plant	Alabama Grapefern	Botrychium jenmanii	2018
Plant	Alabama Snow-wreath	Neviusia alabamensis	2011
Plant	Beak Grass	Diarrhena obovata	2017
Plant	Blackfoot Quillwort	Isoetes melanopoda	2003
Plant	Boykin's Milkwort	Polygala boykinii	2019
Plant	Braun's Rockcress	Borodinia perstellata	2021

Interior Low Plateau Cedar Glades COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Butternut	Juglans cinerea	2010
Plant	Carolina Anemone	Anemone caroliniana	2023
Plant	Cleft Phlox	Phlox bifida ssp. stellaria	2021
Plant	Cream-flower Rockcress	Arabis pycnocarpa	2015
Plant	Davis' Sedge	Carex davisii	2003
Plant	Downy Gentian	Gentiana puberulenta	2009
Plant	Duck River Bladderpod	Paysonia densipila	2010
Plant	Earleaf False Foxglove	Agalinis auriculata	2023
Plant	Eastern Eulophus	Perideridia americana	2011
Plant	False Gromwell	Lithospermum subsetosum	2015
Plant	Flat-stem Spikerush	Eleocharis compressa var. compressa	1958
Plant	Gattinger's Bluestar	Amsonia tabernaemontana var. gattingeri	2023
Plant	Gattinger's Goldenrod	Solidago gattingeri	2010
Plant	Groove-stem Indian-plantain	Arnoglossum plantagineum	2024
Plant	Hairy Fimbry	Fimbristylis puberula	2021
Plant	Horsetail Spikerush	Eleocharis equisetoides	1987
Plant	Leafy Prairie-clover	Dalea foliosa	2024
Plant	Limestone Fameflower	Phemeranthus calcaricus	2024
Plant	Low Nutrush	Scleria verticillata	2022
Plant	Mcdowell's Sunflower	Helianthus occidentalis	2012
Plant	Missouri Evening-primrose	Oenothera macrocarpa	2021
Plant	Missouri Gooseberry	Ribes missouriense	2008
Plant	Northern Dropseed	Sporobolus heterolepis	2020
Plant	Northern Prickly-ash	Zanthoxylum americanum	2011
Plant	Ornate Cololejeunea	Cololejeunea ornata	1997
Plant	Ovate-leaf Arrowhead	Sagittaria platyphylla	1990
Plant	Pale Purple Coneflower	Echinacea pallida	1958
Plant	Pale Umbrella-wort	Mirabilis albida	2010
Plant	Pope's Sand-parsley	Ammoselinum popei	2020
Plant	Prairie Goldenrod	Oligoneuron album	2011
Plant	Purple Prairie-clover	Dalea purpurea	2010
Plant	Pyne's Ground-plum	Astragalus bibullatus	2023
Plant	Rock Grape	Vitis rupestris	1978
Plant	Rough Rattlesnake-root	Prenanthes aspera	2021
Plant	Running Glade Clover	Trifolium calcaricum	2018
Plant	Sessile Water-speedwell	Veronica catenata	2014
Plant	Shaggy Dwarf Morning-glory	Evolvulus nuttallianus	2022
Plant	Sharp's Pouncewort	Lejeunea sharpii	1997
Plant	Slender Blazingstar	Liatris cylindracea	2011
Plant	Spring Creek Bladderpod	Paysonia perforata	2024
Plant	Stones River Bladderpod	Paysonia stonensis	2024
Plant	Sweetscent Ladies'-tresses	Spiranthes odorata	2020
Plant	Tansy Rosinweed	Silphium pinnatifidum	2010
Plant	Tennessee Coneflower	Echinacea tennesseensis	2024
Plant	Tennessee Milkvetch	Astragalus tennesseensis	2024
Plant	Tower-mustard	Turritis glabra	1994

Interior Low Plateau Cedar Glades COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Water Stitchwort	Stellaria fontinalis	2019
Plant	Wavyleaf Purple Coneflower	Echinacea simulata	2021
Plant	Western Wallflower	Erysimum capitatum	2020
Plant	White Prairie-clover	Dalea candida	2011
Plant	Whitewater Crowfoot	Ranunculus aquatilis var. diffusus	2010
Plant	Wolf's Spikerush	Eleocharis wolfii	2003
Plant	Yellow Sunnybell	Schoenolirion croceum	2024
Reptile	Eastern Box Turtle	Terrapene carolina	2021
Reptile	Timber Rattlesnake	Crotalus horridus	2015

Interior Low Plateau Cedar Glades COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bivalve	Cumberland Moccasinshell	Medionidus conradicus	1980
Bivalve	Cumberland Pigtoe	Pleuronaia gibber	2001
Bivalve	Littlewing Pearlymussel	Pegias fabula	1966
Bivalve	Painted Creekshell	Cambarunio taeniatus	2002
Bivalve	Purple Lilliput	Toxolasma lividum	1976
Bivalve	Salamander Mussel	Simpsonaias ambigua	1965
Bivalve	Slippershell Mussel	Alasmidonta viridis	2002
Bivalve	Tan Riffleshell	Epioblasma walkeri	1966
Crustacean	Brawleys Fork Crayfish	Cambarus williami	2021
Crustacean	Depression Crayfish	Cambarus rusticiformis	2019
Crustacean	Hairy Crayfish	Cambarus friaufi	2006
Crustacean	Short Mountain Crayfish	Cambarus clivosus	2017
Crustacean	Slender Crayfish	Faxonius compressus	2021
Fish	Bedrock Shiner	Notropis rupestris	2009
Fish	Blotched Chub	Erimystax insignis	2022
Fish	Redband Darter	Etheostoma luteovinctum	2022
Fish	Redlips Darter	Allohistium maydeni	1961
Fish	Slenderhead Darter	Percina phoxocephala	1980
Fish	Smallscale Darter	Nothonotus microlepidus	2009
Fish	Streamline Chub	Erimystax dissimilis	1967
Fish	Tippecanoe Darter	Nothonotus tippecanoe	1968
Gastropod	Umbilicate Rocksnail	Leptoxis umbilicata	1964
Insect	Tennessee Clubtail	Phanogomphus sandrius	2010

Interior Low Plateau Cedar Glades COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Big Mouth Cave Salamander	Gyrinophilus palleucus necturoides	2008
Amphibian	Mud Salamander	Pseudotriton montanus	1972
Amphibian	Pale Salamander	Gyrinophilus palleucus palleucus	2007
Amphibian	Tennessee Cave Salamander	Gyrinophilus palleucus	2008
Arachnid	Coyle’s tengellid spider	Liocranoides coylei	2006

Interior Low Plateau Cedar Glades COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Arachnid	mite	Macrocheles sp. 1	2006
Arachnid	Pale Nest Spider	Eidmannella pallida	2006
Arachnid	Southeastern Cave Pseudoscorpion	Hesperochernes mirabilis	2006
Arachnid	Subterranean Sheetweb Spider	Phanetta subterranea	2006
Bat	Gray Bat	Myotis grisescens	2017
Bat	Little Brown Myotis	Myotis lucifugus	2016
Bat	Northern Long-eared Bat	Myotis septentrionalis	2013
Bat	Tricolored Bat	Perimyotis subflavus	2017
Crustacean	a cave obligate isopod	Caecidotea bicrenata	2006
Crustacean	a cave obligate isopod	Caecidotea bicrenata bicrenata	2010
Crustacean	Cavespring Crayfish	Cambarus tenebrosus	2006
Crustacean	Central Kentucky Cave Amphipod	Stygobromus exilis	2006
Crustacean	groundwater amphipod	Bactrurus undescribed sp.	2006
Crustacean	terrestrial isopod	Triconiscus pusillus	2006
Fish	Southern Cavefish	Typhlichthys subterraneus	2010
Flatworm	a cave obligate planarian	Sphalloplana percoeca	1959
Gastropod	Cricket Coil	Helicodiscus hadenoecus	1973
Gastropod	Hollow Glyph	Glyphyalinia specus	1967
Gastropod	Tongued Glyph	Glyphyalinia rimula	1972
Insect	a cave ant beetle	Arianops pecki	1974
Insect	a cave obligate beetle	Batriasymmodes quisnamus	2006
Insect	a cave obligate beetle	Ptomaphagus barri	1974
Insect	a cave obligate beetle	Ptomaphagus hubrichti	1959
Insect	a cave obligate springtail	Pseudosinella hirsuta	2006
Insect	a fly	Megaselia cavernicola	2006
Insect	a rove beetle	Atheta troglophila	2006
Insect	Annexed Minute Rove Beetle	Atheta annexa	2006
Insect	cave crickets	Ceuthophilus sp.	2006
Insect	Cave Dung Fly	Spelobia tenebrarum	2006
Insect	Cooke's Cave Dipluran	Litocampa cookei	2006
Insect	Echo Cave Beetle	Pseudanophthalmus acherontis	2010
Insect	Slender Ground Beetle	Platynus tenuicollis	2006
Insect	small carrion beetle	Nemadus horni	2006
Insect	springtail	Ceratophysella undescribed sp., denticulata group	2006
Insect	White Springtail	Folsomia candida	2006
Mammal	Allegheny Woodrat	Neotoma magister	2007
Millipede	a cave obligate millipede	Scoterpes musicarustica	2010
Millipede	a cave obligate millipede	Scoterpes tricorner	2010
Millipede	a cave obligate millipede	Scoterpes ventus	2010

Indiana Bat

Conservation Opportunity Area



The Indiana Bat COA is primarily located in southeast Wilson County and the edges of Dekalb and Cannon Counties. The COA ranges in elevation from approximately 700 to 1,350 ft (411–2,013 m) and is on the intersection of the Eastern Highland Rim and Central Basin physiographic subregions. The landscape in the area is primarily a patchwork of forest, agriculture, and residential development. Relatively large tracts of mature forest occur on and around steep gradient hills with smaller patches of forest spread throughout. Agriculture in the area consists primarily of cattle and hay production with some limited row crops. The COA forms the headwaters of multiple small streams that flow into the Cumberland River, including Fall Creek, Smith Fork Creek, Sulphur Branch, and Spring Creek.



The Indiana Bat is a federally listed species that is exceedingly rare in Tennessee during the summer maternity period. A maternity population occurs in the Indiana Bat COA and is the most populous and only monitored population in Tennessee. Female Indiana bats from at least four winter hibernacula in Tennessee and one hibernaculum in Kentucky migrate to the COA each spring to have their pups. TWRA has worked collaboratively with a variety of partners to lease approximately 1,200 acres for Indiana Bat conservation. Twenty-four artificial roosts have been constructed on the leased property and have harbored a maternity colony of Indiana Bats since the project was implemented in 2020.

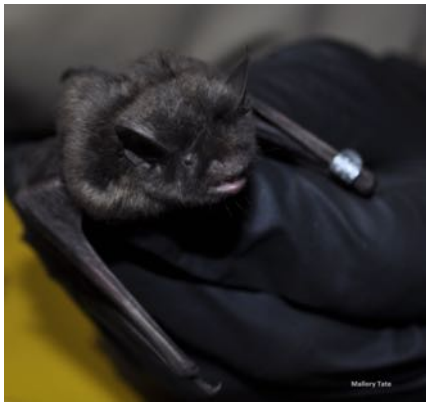
The Indiana Bat is a federally listed species that is exceedingly rare in Tennessee during the summer, but a maternity population occurs in this COA.

Top to bottom: Artificial roost construction. P2: Indiana Bat in the hand. P3: Two views of the Indiana Bat landscape. All photos by Dustin Thames, TWRA

Threats to Indiana bats and other SGCN in the COA primarily stem from development. Wilson County is one of the fastest growing counties in TN, and the human population of the county grew by 3.2% in 2024. With the rapid increase in population, housing developments are also expanding into historically rural areas. Deforestation is another threat to SGCN. Foraging and roosting areas for Indiana bats are often in open hardwood forests and forest edges/corridors. Additionally, forest cover protects water quality of the headwater streams that are inhabitated by SGCN fishes, such as the Slabrock Darter. There are very few tracts of protected land in the COA, and with rapidly increasing property values, it's critical that land be protected and managed in perpetuity for SGCN, especially Indiana Bats.

Indiana Bat
Conservation Opportunity Area

Partnerships



TWRA will continue working with the US Fish and Wildlife Service, Tennessee Valley Authority, TennGreen Land Conservancy, The Nature Conservancy, the Tennessee Bat Working Group, the Imperiled Bat Conservation Fund, University of Tennessee, and other universities, local governments and private landowners and businesses to implement strategies to assist in managing and improving private lands and bat roosting habitat within the Indiana Bat COA.





Indiana Bat
Conservation Opportunity Area

CMP Stressor Level	Stressor Categories	Threats specific to Indiana Bat COA
1.1 A	Housing and urban areas; Primary residential development	Destruction or degradation of habitats due to construction activities associated with the building of primary residences. Intense level of development throughout COA, specifically in areas surrounding maternity colonies.
2.3 C	Livestock farming and ranching; Incompatible grazing/pasture management practices	Degradation of soil/water quality and habitat structure of an area due to excessive grazing or to inadequate exclusion of cattle from stream and forest resources. Also, includes degradation caused by overapplication of fertilizers or other chemicals during pasture management practices. There are cattle in every stream in this COA.
7.3 A	Other ecosystem modifications; Incompatible species management practices	Increased mortality or degradation of habitats resulting from the application of management practices that conflict with the ecological needs of a particular species. With development, almost all private land is being converted to 5-10 acre tracts of mowed land. Large tracts that used to be grazed, providing early succession vegetative communities (though not thriving) are now scalped biological deserts.
8.2 A	Problematic native plants and animals	Increased mortality of animals resulting from either excessive take by predators or by the inability to compete with other species for food and resources. Area has intermittent cedar glades with native plants, some listed. Fescue and eastern red cedars are shading out native and endemic species.
8.4 A	Pathogens and microbes	Increased mortality of species due to high levels of parasites or disease-causing pathogens. This COA was created to protect the only Indiana bat colony in the state. This species has been severly impacted by white-nose syndrome.

To learn more about the Indiana Bat Conservation Opportunity Area, please contact:
Dustin Thames, Biodiversity Coordinator, Region 2 (615) 781-6626

Indiana Bat
Conservation Opportunity Area

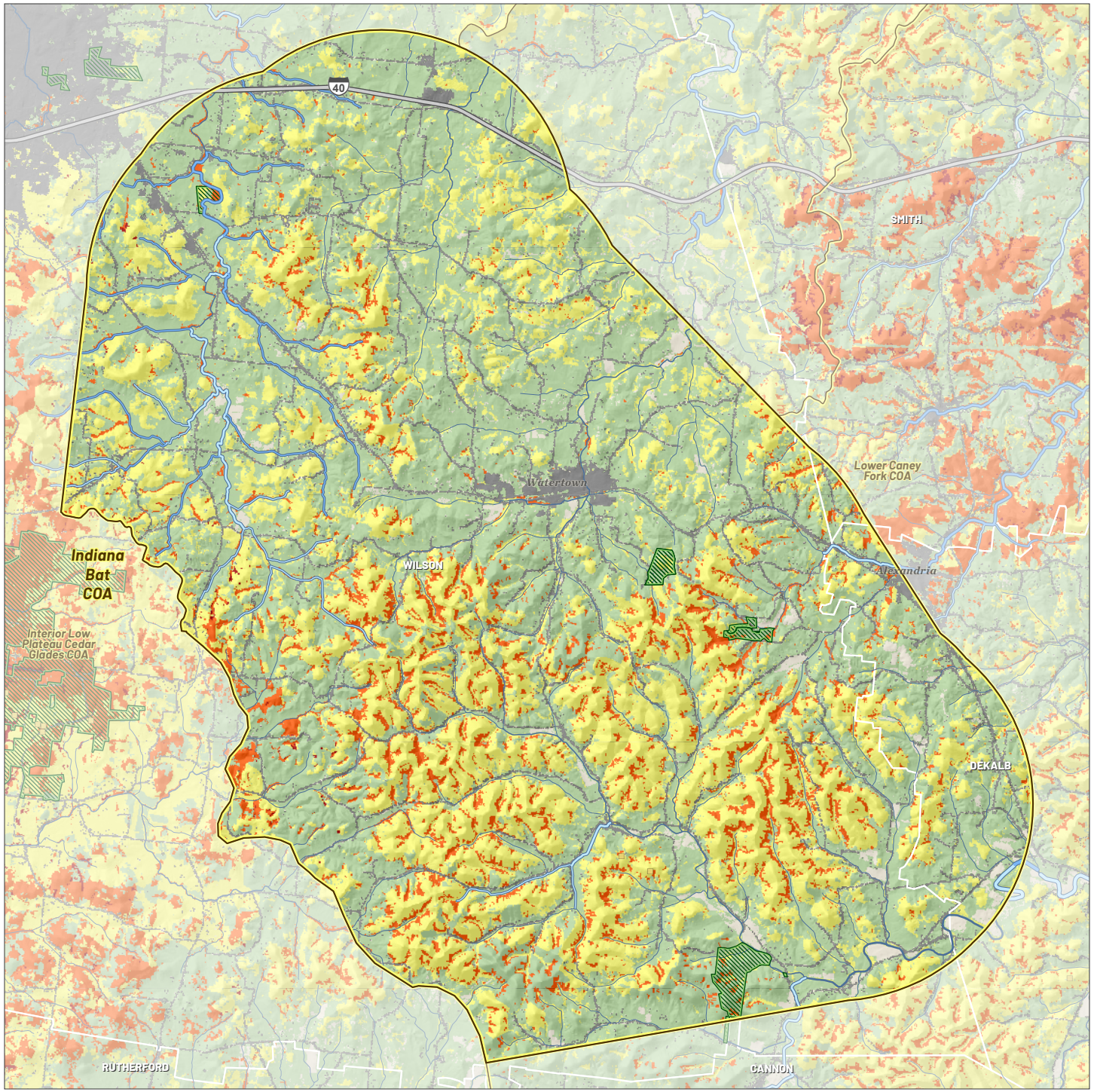
Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Fee-title Ownership	Coordinate land acquisition priorities among state/federal agencies and non-governmental organizations.	acres
Permanent Protective Easements	Use federal/state/private funding sources to acquire permanent easements within critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Permanent Protective Easements	Coordinate acquisition of permanent protective easements among state/federal agencies and non-governmental organizations.	acres
Conservation Area Management	Participate in activities to establish/adjust state wildlife "sanctuaries" and/or federally designated critical habitat areas for target species on multi-use public/private conservation areas across the state.	acres and/or feet of riparian corridor
Habitat/Natural Processes Restoration	Reintroduce fire via prescribed burning into fire-dependent grassland & woodland systems within critical units of terrestrial habitats.	acres
Species Restoration	Provide funding to permitted institutions/individuals for rehabilitation of priority target species across the state.	acres or species
Institutional Improvement	Increase staffing and funding of state agencies and local offices of federal agencies responsible for managing target species/habitats or monitoring environmental quality.	FTEs

Conservation Projects

Completed and ongoing projects in this COA focus on the Indiana Bat maternity colony. Projects include population and biodiversity assessments as well as colony counts at different times of year, protection of habitat through conservation easements, and species restoration through the provision of artificial roosts to support the reproductive population.

Indiana Bat
Conservation Opportunity Area

Indiana Bat COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Long Hunter SP	TDEC - SP	2,919	2%



Combined Habitat Priorities

Indiana Bat Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

Conservation Opportunity Area (COA)

Public/Protected Land

Conservation Easement

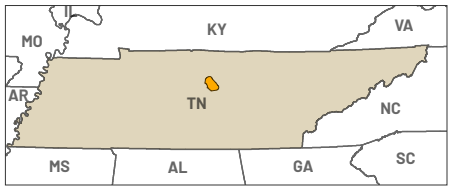
Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Indiana Bat COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Green Salamander	Aneides aeneus	2006
Amphibian	Streamside Salamander	Ambystoma barbouri	2021
Bat	Gray Bat	Myotis grisescens	2023
Bat	Indiana Bat	Myotis sodalis	2021
Bat	Northern Hoary Bat	Lasiurus cinereus	2023
Bat	Northern Long-eared Bat	Myotis septentrionalis	2013
Bat	Tricolored Bat	Perimyotis subflavus	2023
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Blackburnian Warbler	Setophaga fusca	2015
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2015
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2021
Bird	Great Egret	Ardea alba	2023
Bird	Kentucky Warbler	Geothlypis formosa	2018
Bird	Loggerhead Shrike	Lanius ludovicianus	2023
Bird	Louisiana Waterthrush	Parkesia motacilla	2022
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Prairie Warbler	Setophaga discolor	2021
Bird	Prothonotary Warbler	Protonotaria citrea	2015
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Rusty Blackbird	Euphagus carolinus	2021
Bird	Willet	Tringa semipalmata	2018
Bird	Winter Wren	Troglodytes hiemalis	2020
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2017
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2008
Bird	Yellow-throated Warbler	Setophaga dominica	2019
Plant	Beak Grass	Diarrhena obovata	2018
Plant	Water Stitchwort	Stellaria fontinalis	2014

Indiana Bat COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Fish	Bedrock Shiner	Notropis rupestris	1991
Fish	Lake Sturgeon	Acipenser fulvescens	2019
Fish	Redband Darter	Etheostoma luteovinctum	1964

Indiana Bat COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Fish	Sooty Darter	Etheostoma olivaceum	1991
Insect	Tennessee Clubtail	Phanogomphus sandrius	2010

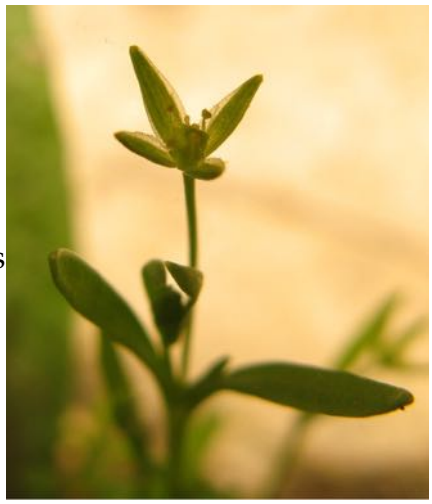
Indiana Bat COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Arachnid	Mammoth Cave Spider	Anthrobia mammouthia	2005
Arachnid	Southeastern Cave Pseudoscorpion	Hesperochernes mirabilis	1895
Bat	Tricolored Bat	Perimyotis subflavus	2017
Crustacean	a cave obligate isopod	Caecidotea bicrenata	1965
Crustacean	a cave obligate isopod	Caecidotea bicrenata bicrenata	1972
Crustacean	Central Kentucky Cave Amphipod	Stygobromus exilis	1943
Insect	a cave obligate beetle	Ptomaphagus hubrichti	1959

Lower Caney Fork

Conservation Opportunity Area



The Caney Fork River is a large tributary of the Cumberland River in Tennessee, and the lower Caney Fork COA encompasses the lower section of Center Hill Reservoir downstream to the Cumberland River. The COA also contains Smith Fork and Hickman Creek watersheds to the southwest and Indian Creek watershed to the northeast. Terrestrially, the COA consists of steep, rolling hills. Much of the COA is forested with agriculture primarily confined to riparian zones along rivers and streams as well as ridgetops.



Along the Caney Fork River and Center Hill Reservoir are limestone outcrops that form bluffs and shelves above the river and reservoir. These small, calcareous glades contain unique rare plant communities. Water Stitchwort (*Stellaria fontinalis*) is a state threatened winter annual forb that occurs in seasonally wet, calcareous areas along the Caney Fork River alongside the state listed species of special concern Largeleaf Grass of Parnassus (*Parnassia grandifolia*). Additionally, federally threatened Traveler's Delight (*Apios priceana*) and state endangered Svenson's Wild Rye (*Elymus svensonii*) occur on drier areas of the limestone bluffs and shelves. These plants are threatened by succession, and management is needed to protect and preserve their populations. Wofford's Woodmint (*Blephilia woffordii*) is another unique species endemic to a small area along the Caney Fork River and Centerhill Reservoir. The species was described in 2020. Only a handful of populations are known, and all are located within the Lower Caney Fork COA.

Small, calcareous glades that form bluffs and shelves above the Caney Fork River contain unique rare plant communities, harboring species such as the state-threatened Water Stitchwort and federally threatened Traveler's Delight.

Top to bottom: Water Stitchwort. P2: Largeleaf Grass of Parnassus/all photos by Dustin Thames, TWRA

Numerous aquatic SGCNs occur within the COA boundaries, such as the SGCN Sooty Darter and state endangered Lake Sturgeon. The tailwater of Center Hill Dam in the Caney Fork River is amongst the most popular fishing destinations in Tennessee and has a substantial economic impact on the local communities.

Lower Caney Fork
Conservation Opportunity Area

Partnerships

Partnerships are needed between TWRA, TDEC, USFWS, SGI, and USACE to manage rare plant populations. TWRA will also continue to work with partners to implement species conservation strategies focused on fish resources in the Lower Caney Fork.



CMP Stressor Level	Stressor Categories	Threats specific to Lower Caney Fork
1.2 A	Commercial and industrial areas	Destruction or degradation of habitats in an area due to construction and other activities related to the development of commercial or industrial buildings. Road construction near Center Hill Dam and related stabilization of bluffs threatens populations of imperiled plants.
2.1 A	Annual and perennial non- timber crops; Agricultural conversion (row crop, mostly historical)	Removal of the natural vegetation of an area for agricultural purposes such as pasture, row crops, feed lots, outbuildings, etc. Much agriculture is found in riparian areas; steep terrain makes agriculture unsuitable in other areas away from streams. Additionally, riparian buffers throughout much of the COA are inadequate to protect water quality.
2.3 A	Livestock farming and ranching; Agricultural conversion (livestock, mostly historical)	Most of the agriculture in this COA is in riparian areas; steep terrain makes agriculture unsuitable in other areas away from streams. (In farming, animals are kept in captivity; in ranching they are allowed to roam in wild habitats.)
5.3 A	Logging and wood harvesting	BMPs are sometimes not followed on high gradient stands. High-grading is likely an issue on small tracts of land.
6.1 A	Recreational activities - non-vehicular	Destruction and degradation of habitats and increased mortality of species due to excessive levels of recreational activities or inappropriate usage of habitats for recreation. Kayaking on the Caney Fork along with trampling of shoreline and bluff plants may be an issue.
7.1 A	Fire and fire suppression	Degradation of fire-dependent natural systems due to either human suppression of fire or the conditions needed to support combustion.
7.2 A	Dams and water management/use; Channelization of rivers/streams	Alteration of the natural course of a river or stream by removing rock, dirt, gravel, and other sediments from shorelines and bottoms. Such alteration is done primarily for navigation and flood control purposes. This category focuses on the human activities that lead to either not enough water or too much water in the ecosystem in question. Construction of Center Hill Dam likely destroyed many populations of Woffords Woodmint.
7.4 A	Removing/reducing human maintenance	Many ecosystems and species depend on human maintenance to mimic natural conditions and maintain key attributes. This threat captures the loss of these direct maintenance regimes. Management of tree canopy cover is needed on many of the calcarous plant community sites.

Lower Caney Fork
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats that provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Research	Conduct scientific surveys to discern the geographical distributions of lesser known target species.	surveys
Compatible Resource Use	Use government-funded incentive programs (e.g., CRP, EQIP, CSP, WRP, and FLEP) to encourage private landowners to protect water quality for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Compatible Resource Use	Use government-funded incentive programs (e.g., FLEP, CRP, EQIP, Forest Stewardship Program, and Forest Legacy Program) to encourage private landowners to restore and/or protect native forest systems for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Compatible Resource Use	Use government-funded incentive programs such as CRP, WRP, GRP, EQIP, CSP, FLEP, LIP, and rare species protection funding such as USFWS Section 6 and other funds to manage or restore populations of target species in critical units of aquatic, subterranean, or terrestrial habitats.	species
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres
Alliances & Partnerships	Develop strategic alliances with US Army Corp of Engineers, Tennessee Valley Authority, water utility boards, and other institutions to address water management issues that affect target species and habitats.	partnerships

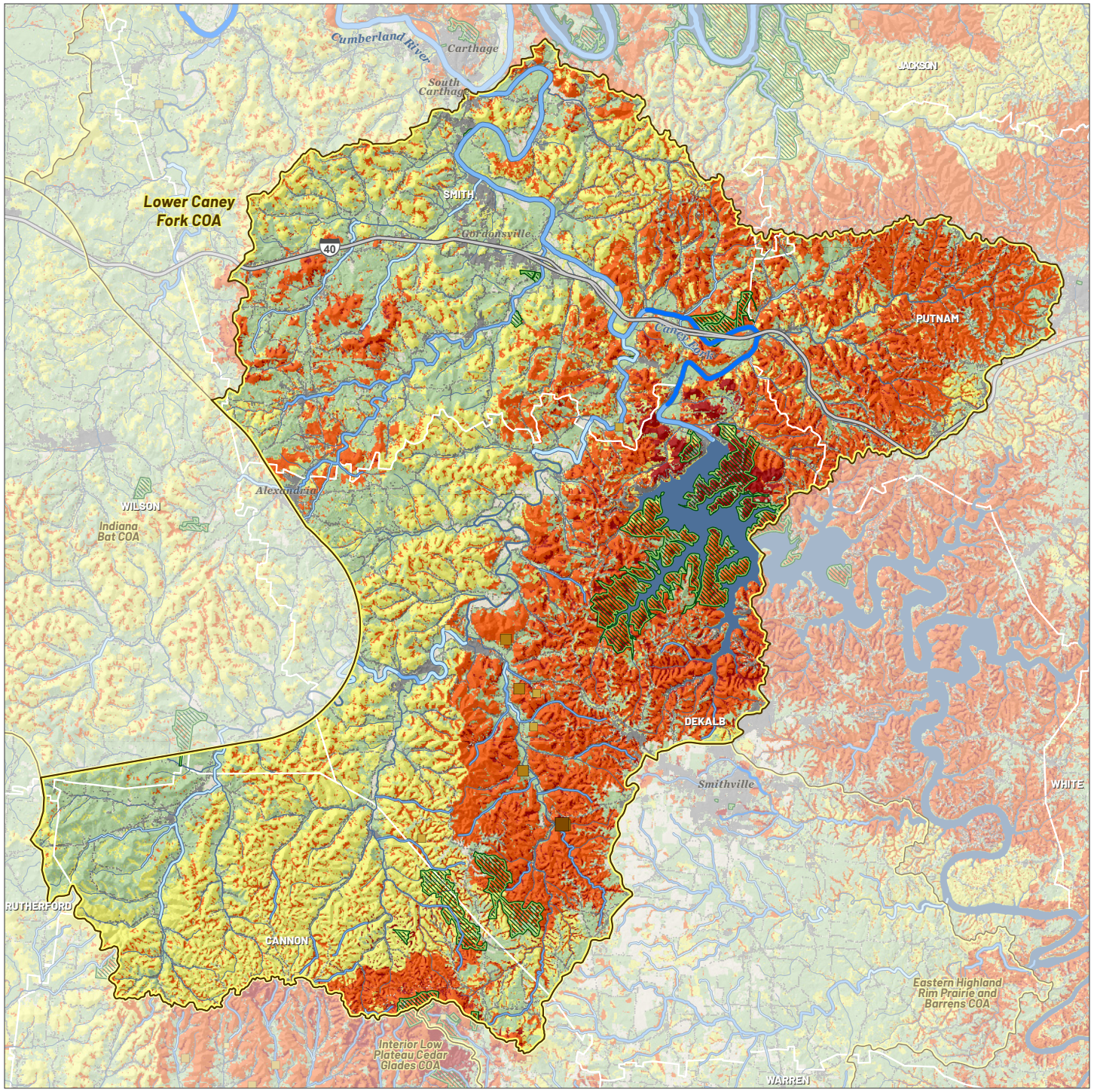
Conservation Projects

Completed and ongoing projects have focused on fish, including species surveys and studies in support of an ongoing project to bring back self-sustaining Lake Sturgeon populations to Tennessee. To capitalize on opportunities to benefit cool-water species (e.g., Lake Sturgeon, Striped Bass, and trout), the potential for collaboration with partners such as the Corps of Engineers to preserve the local genetics of a rich mussel fauna is great. Multiple partners are currently beginning to collaborate in addressing mussel needs in the area, noting the importance of updating knowledge of the status of mainstem mussels in the vicinity of Hartsville and initiating efforts to restore the Smith Fork mussel community.

To learn more about the Lower Caney Fork Conservation Opportunity Area, please contact: Dustin Thames, Biodiversity Coordinator, Region 2 (615) 781-6626

Lower Caney Fork
Conservation Opportunity Area

Lower Caney Fork COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Short Mountain-Jim Cummings SNA	Private	453	54%
Edgar Evins SP	TDEC - SP	6,308	96%
Headwaters WMA	TWRA	554	15%
Pea Ridge WMA	TWRA	1,997	100%
Long Branch Public Hunting Area	USACE	183	100%



Combined Habitat Priorities

Lower Caney Fork Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

Conservation Opportunity Area (COA)

Public/Protected Land

Conservation Easement

Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Lower Caney Fork COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Green Salamander	Aneides aeneus	1980
Bat	Gray Bat	Myotis grisescens	2021
Bat	Indiana Bat	Myotis sodalis	2021
Bat	Little Brown Myotis	Myotis lucifugus	2019
Bat	Northern Long-eared Bat	Myotis septentrionalis	2014
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2013
Bat	Tricolored Bat	Perimyotis subflavus	2021
Bird	American Barn Owl	Tyto furcata	2023
Bird	American Black Duck	Anas rubripes	2023
Bird	American Golden-Plover	Pluvialis dominica	2006
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bank Swallow	Riparia riparia	2012
Bird	Bewick's Wren	Thryomanes bewickii	1970
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2022
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2023
Bird	Bobolink	Dolichonyx oryzivorus	2022
Bird	Brown Creeper	Certhia americana	2023
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2022
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Connecticut Warbler	Oporornis agilis	2023
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2020
Bird	Golden Eagle	Aquila chrysaetos	1976
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023
Bird	Great Egret	Ardea alba	2023
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	Least Flycatcher	Empidonax minimus	2023
Bird	Lesser Yellowlegs	Tringa flavipes	2022
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2016
Bird	Long-tailed Duck	Clangula hyemalis	2000
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2023
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2021
Bird	Olive-sided Flycatcher	Contopus cooperi	2018
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2020

Lower Caney Fork COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Peregrine Falcon	Falco peregrinus	2022
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2012
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	Whooping Crane	Grus americana	2017
Bird	Willet	Tringa semipalmata	2013
Bird	Willow Flycatcher	Empidonax traillii	2016
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2018
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Mammal	Allegheny Woodrat	Neotoma magister	2014
Mammal	Eastern Pygmy Shrew	Sorex hoyi	1979
Mammal	Southeastern Shrew	Sorex longirostris	1979
Plant	American Chestnut	Castanea dentata	2011
Plant	Branched Whitlow-grass	Draba ramosissima	2003
Plant	Butternut	Juglans cinerea	2015
Plant	Deam's Copperleaf	Acalypha deamii	2002
Plant	Fragmented Screw Moss	Syntrichia fragilis	1976
Plant	Gattinger's Bluestar	Amsonia tabernaemontana var. gattingeri	2003
Plant	Giant Blue Cohosh	Caulophyllum giganteum	2015
Plant	Harper's Umbrella-plant	Eriogonum longifolium var. harperi	2020
Plant	Herb-Robert	Geranium robertianum	2008
Plant	Largeleaf Grass-of-Parnassus	Parnassia grandifolia	2007
Plant	Least Trillium	Trillium pusillum	1992
Plant	Loesel's Twayblade	Liparis loeselii	1997
Plant	Prairie Ragwort	Packera plattensis	2008
Plant	Price's Potato-bean	Apios priceana	2018
Plant	Svenson's Wild Rye	Elymus svensonii	2018
Plant	Water Stitchwort	Stellaria fontinalis	2016
Plant	Western Wallflower	Erysimum capitatum	2017
Plant	Whiteleaf Leatherflower	Clematis glaucophylla	2023
Plant	Wofford's Woodmint	Blephilia woffordii	2020
Reptile	Eastern Box Turtle	Terrapene carolina	2012
Reptile	Timber Rattlesnake	Crotalus horridus	2018

Lower Caney Fork COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Mudpuppy	Necturus maculosus	1972
Bivalve	Catspaw	Epioblasma obliquata	1988
Bivalve	Clubshell	Pleurobema clava	1988
Bivalve	Cumberland Bean	Venustaconcha troostensis	1988
Bivalve	Cumberlandian Combshell	Epioblasma brevidens	1988
Bivalve	Dromedary Pearlymussel	Dromus dromas	1988
Bivalve	Fanshell	Cyprogenia stegaria	1988
Bivalve	Oyster Mussel	Epioblasma capsaeformis	1988
Bivalve	Painted Creekshell	Cambarunio taeniatus	2002
Bivalve	Pheasantshell	Actinonaias pectorosa	2002
Bivalve	Pink Mucket	Lampsilis abrupta	1988
Bivalve	Round Hickorynut	Obovaria subrotunda	1988
Bivalve	Sheepnose	Plethobasus cyphyus	1988
Bivalve	Slabside Pearlymussel	Pleuronaia dolabelloides	2002
Bivalve	Snuffbox	Epioblasma triquetra	1988
Bivalve	Spectaclecase	Cumberlandia monodonta	1988
Bivalve	Tennessee Bean	Venustaconcha trabalis	1988
Bivalve	White Wartyback	Plethobasus cicatricosus	1961
Crustacean	Hairy Crayfish	Cambarus friaufi	2019
Crustacean	Short Mountain Crayfish	Cambarus clivosus	2015
Crustacean	Surgeon Crayfish	Faxonius forceps	2000
Fish	Bedrock Shiner	Notropis rupestris	2019
Fish	Blotched Chub	Erimystax insignis	2005
Fish	Bluemask Darter	Etheostoma akatulo	2011
Fish	Lake Sturgeon	Acipenser fulvescens	2023
Fish	Sooty Darter	Etheostoma olivaceum	2019
Gastropod	Armored Rocksnail	Lithasia armigera	2002

Lower Caney Fork COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Arachnid	a cave obligate pseudoscorpion	Kleptochthonius myopius	1962
Arachnid	a cave obligate spider	Liocranoides unicolor	1999
Arachnid	Southeastern Cave Pseudoscorpion	Hesperochernes mirabilis	1895
Bat	Gray Bat	Myotis grisescens	1999
Bat	Indiana Bat	Myotis sodalis	2017
Bat	Little Brown Myotis	Myotis lucifugus	2017
Bat	Northern Long-eared Bat	Myotis septentrionalis	2014
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2013
Bat	Tricolored Bat	Perimyotis subflavus	2017
Crustacean	a cave obligate isopod	Caecidotea bicrenata bicrenata	1972
Crustacean	Central Kentucky Cave Amphipod	Stygobromus exilis	1943
Fish	Southern Cavefish	Typhlichthys subterraneus	2002

Insect	a cave ant beetle	Arianops pecki	1974
Insect	a cave obligate beetle	Batriasymmodes quisnamus	1951
Lower Caney Fork COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Insect	a cave obligate beetle	Ptomaphagus hubrichti	1959
Insect	a cave obligate ground beetle	Pseudanophthalmus farrelli	1962
Insect	a cave obligate ground beetle	Pseudanophthalmus productus	1980
Insect	a cave obligate springtail	Pseudosinella hirsuta	1949
Insect	a cave obligate springtail	Pseudosinella spinosa	1949
Insect	Cave Dung Fly	Spelobia tenebrarum	1984
Insect	Cooke's Cave Dipluran	Litocampa cookei	1981
Insect	Indian Cave Point Cave Beetle	Pseudanophthalmus tiresias	1980
Mammal	Allegheny Woodrat	Neotoma magister	2001
Millipede	a cave obligate millipede	Pseudotremia cercops	1973
Millipede	a cave obligate millipede	Pseudotremia lictor	1973
Millipede	a cave obligate millipede	Scoterpes ventus	2010

Mill Creek Watershed

Conservation Opportunity Area



Mill Creek is a tributary of the Cumberland River and flows approximately 27 miles through Williamson and Davidson Counties. Much of the watershed of Mill Creek is within urbanized Metro-Davidson County (Nashville) and is negatively impacted by the land use. The majority of the range of the Nashville Crayfish (*Faxonius shoupi*) is located with the Mill Creek watershed. The entire geographic range of the species was once thought to only occur in the Mill Creek watershed, however, a disjunct population was recently discovered in the Pickwick Dam tailwaters. The species is currently listed as federally endangered under the Endangered Species Act. However, in 2020 the USFWS proposed to delist the Nashville Crayfish due to positive population growth of the species and improved habitat conditions.

Since the occurrence of this species is in a highly developed metropolitan area, threats to this crayfish and other species in the watershed include pollutants contained in storm water runoff, sedimentation from construction located along the streams and within the watershed, and stream modifications such as dry bed retention dams. This species is typically not found in turbid waters within the creek, therefore erosion associated with development in the watershed poses a major threat. Additionally, post-delisting monitoring is critical to ensure that the populations continue to increase after the removal of federal protections.

Given the amount of development that has previously occurred within the watershed, it is imperative to implement habitat protection measures to ensure the remaining aquatic habitat is not destroyed or lost. Bioaccumulation of contaminants is a concern for the crayfish and other aquatic species in the watershed.



Mill Creek and its tributaries are the only known localities in the world that harbor the Nashville Crayfish (*Orconectes shoupi*).



Top to bottom: Nashville Crayfish/ Carl Williams, TWRA; Crayfish education/Nashville Zoo. P2: Yellow-crowned Night Heron/Andy Reago & Chrissy McClarren. P3: Radnor Lake State Park/Mark B.

Mill Creek Watershed
Conservation Opportunity Area

Partnerships



To address these threats to Mill Creek and the Nashville Crayfish, TWRA will develop and expand new programs and foster partnerships with the US Fish and Wildlife Service (USFWS), US Army Corps of Engineers, Tennessee Dept. of Environment and Conservation, Tennessee Valley Authority, Williamson County and Nolensville MS4s, watershed associations, and Metro Davidson County government. The Agency will partner with zoning and planning committees to help minimize the impact of planned developments through improved zoning ordinances. Additionally, TWRA will participate in post delisting monitoring in collaboration with the USFWS and others.

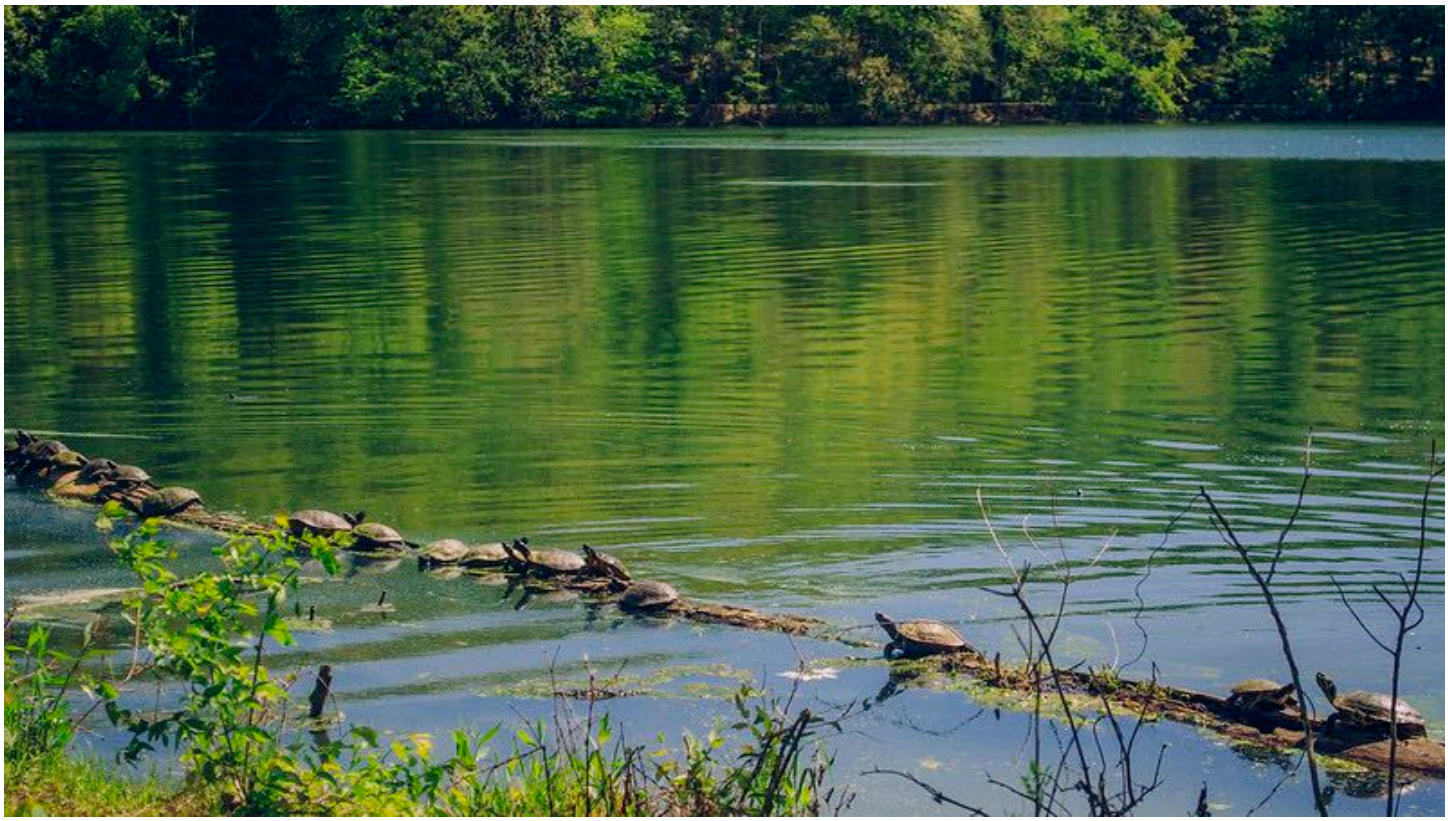
CMP Stressor Level	Stressor Categories	Threats specific to Mill Creek Watershed
1.1 A	Housing and urban areas; Primary residential development	Destruction or degradation of habitats due to construction activities associated with the building of primary residences. The COA is located in metro Nashville. Development, both historical and current, is a big stressor.
1.2 A	Commercial and industrial areas	Destruction or degradation of habitats in an area due to construction and other activities related to the development of commercial or industrial buildings. The COA is located in metro Nashville. Development, both historical and current, is a big stressor.
7.2 C	Dams and water management/use; Construction of ditches/dikes/ drainage/diversion systems	Disruption and degradation of the natural hydrologic patterns of wetlands, rivers, and streams due to construction of various water diversion or containment structures. A major disruption to hydrology is impervious surfaces across the COA.
9.1 A	Household sewage and urban wastewater; Municipal wastewater treatment/stormwater runoff	Degradation of water quality resulting from ineffective treatment of municipal wastewater released into rivers and streams. Also includes ineffective capture and treatment of stormwater runoff. The big threat here is stormwater runoff and various contaminants entering the system.

To learn more about the Mill Creek Watershed Conservation Opportunity Area, please contact: Dustin Thames, Biodiversity Coordinator, Region 2 (615) 781-6626

CMP Stressor Level	Stressor Categories	Threats specific to Mill Creek Watershed, continued
9.1 B	Household sewage & urban waste water - Residential sewage/septic systems	Degradation of water quality resulting from ineffective treatment of residential sewage by septic systems. Often caused by older, defective sewage systems or by poorly-sited septic tanks. Includes runoff from pesticides and fertilizers from the residential and commercial areas in the COA.
11.4 A	Changes in Precipitation & Hydrological Regimes	Broad-scale changes in precipitation mean, variability, seasonality, and extremes. This includes decreased or increased precipitation; changes in timing of precipitation; changes in form of precipitation (e.g., snow vs rain; snow cover and snowpack where applicable); changes in evapotranspiration rates and hydrological cycles; and droughts and floods—as well as increased frequency and severity of floods and droughts.

Conservation Projects

Projects in this COA concentrate on the Nashville Crayfish (*Faxonius shoupi*), which includes presence/absence surveys and post-delisting monitoring, as well as a genetics study of this species.



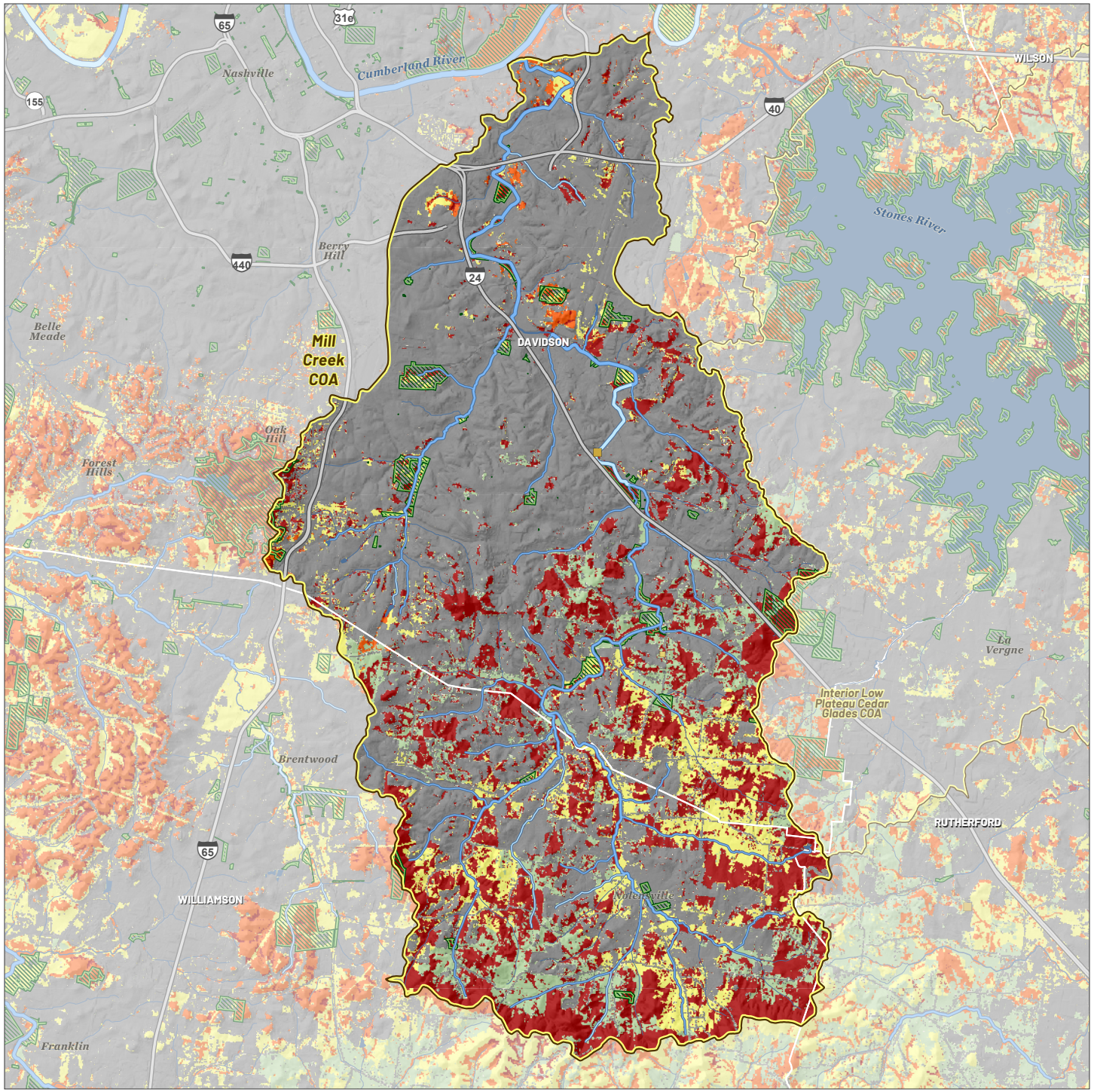
Mill Creek Watershed
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Research	Conduct scientific surveys to discern the geographical distributions of lesser known target species.	surveys
Compliance & Enforcement	Increase compliance monitoring of aquatic resource alteration permits, storm water, & other permits within critical units of aquatic and subterranean habitats.	acres
Land-use Planning & Zoning	Encourage municipal and county governments to adopt zoning ordinances that limit or regulate development within critical units of aquatic, subterranean, and terrestrial habitats.	acres
Standards	Develop more stringent standards regarding permits for construction projects that potentially affect water quality and/or alter habitat.	species or acres
Communications & Public Relations	Develop a multi-media public outreach campaign to promote the need for conserving rare, threatened, or endangered species and habitats.	people reached or events held
Habitat/Natural Processes Restoration	Restore and enhance riparian zones and buffers in agricultural and urban areas to minimize non-point source pollution.	acres or feet of riparian corridor

To learn more about the Mill Creek Watershed Conservation Opportunity Area, please contact: Dustin Thames, Biodiversity Coordinator, Region 2 (615) 781-6626

Mill Creek Watershed
Conservation Opportunity Area

Mill Creek COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Mill Creek Black-Crowned Night Heronry	Private	10	100%
Radnor Lake SP	TDEC - SP	1,359	7%
Mill Creek Bottoms Greenway	TWRA	48	100%



Combined Habitat Priorities

Mill Creek Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

Conservation Opportunity Area (COA)

Public/Protected Land

Conservation Easement

Karst Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:

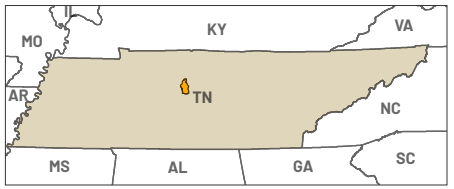
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Mill Creek Watershed COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Streamside Salamander	Ambystoma barbouri	2021
Bat	Gray Bat	Myotis grisescens	2012
Bird	American Black Duck	Anas rubripes	2023
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bank Swallow	Riparia riparia	2019
Bird	Bewick's Wren	Thryomanes bewickii	1927
Bird	Black-bellied Plover	Pluvialis squatarola	2022
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2022
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2020
Bird	Bobolink	Dolichonyx oryzivorus	2020
Bird	Brown Creeper	Certhia americana	2023
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2022
Bird	Evening Grosbeak	Coccothraustes vespertinus	1996
Bird	Golden-winged Warbler	Vermivora chrysoptera	2020
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023
Bird	Great Egret	Ardea alba	2023
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	Least Flycatcher	Empidonax minimus	2023
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2013
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2022
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2022
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2022
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	White-rumped Sandpiper	Calidris fuscicollis	2023
Bird	Willow Flycatcher	Empidonax traillii	2020
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023

Mill Creek Watershed COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Worm-eating Warbler	Helmitheros vermivorum	2022
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Plant	Duck River Bladderpod	Paysonia densipila	2003
Plant	Limestone Fameflower	Phemeranthus calcaricus	2000
Plant	Water Stitchwort	Stellaria fontinalis	2020
Reptile	Eastern Box Turtle	Terrapene carolina	2023

Mill Creek Watershed COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Crustacean	Nashville Crayfish	Faxonius shoupi	2023
Fish	Redband Darter	Etheostoma luteovinctum	2022

Mill Creek Watershed COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Crustacean	a cave obligate isopod	Caecidotea bicrenata bicrenata	1963
Flatworm	a cave obligate planarian	Sphalloplana buchanani	1960
Flatworm	a cave obligate planarian	Sphalloplana percoeca	1959
Insect	a cave obligate springtail	Pseudosinella hirsuta	1949
Millipede	a cave obligate millipede	Scoterpes musicarustica	2010

Western Highland Rim Forests

Conservation Opportunity Area



Much of the Western Highland Rim of middle Tennessee is dominated by Southern Dry Oak and mixed mesophytic forests, representing the largest remaining contiguous forest habitat region in not only middle Tennessee, but also the larger Central Hardwoods forest region extending north through Kentucky and into southern Illinois, Indiana, and Ohio. Much of the land is held in private ownership, and in the past decades large acreages of hardwoods have been converted to industrial pine plantations. Other habitats, including remnant barrens and prairies, headwaters springs, and streams and rivers, are also important components of Western Highland Rim ecosystems.

Major threats to the contiguous forests and other habitats of the Western Highland Rim are reduction of these habitats due to timber harvests and habitat alteration due to incompatible forestry practices. These forests support a large diversity of breeding birds that include Cerulean Warbler, Red-headed Woodpecker, Acadian Flycatcher, and Yellow-billed Cuckoo.

Intact forests also help to maintain water quality, protecting diverse habitats for freshwater animals, including the Hellbender, Birdwing Pearlymussel, Coppercheek Darter and Slackwater Darter. The largest and possibly last remaining reproductive population of Eastern Hellbenders in middle Tennessee is located in the Buffalo River system, primarily the Little Buffalo River. Future work will determine what the key limiting factors are for this species and if populations can be restored through propagation and reintroduction.



Southern dry oak and mesic forests predominate on the Western Highland Rim, which has the largest remaining contiguous forest in middle Tennessee.

Photos: Yellow-/billed Cuckoo/Melissa McMasters. P2: TWRA Biologist Stevenson holding Golden Eagle/ Dustin Thames

Western Highland Rim Forests
Conservation Opportunity Area

Partnerships



TWRA management strategies will focus on protecting or improving forest health, the quality and quantity of forested habitat, and the freshwater resources within this COA. TWRA will develop and expand partnerships with the US Fish and Wildlife Service, Natural Resources Conservation Service, US Army Corps of Engineers, TN Division of Forestry, TN Dept. of Environment and Conservation, TN Valley Authority, The Nature Conservancy, Partners in Flight, the Central Hardwoods Joint Venture, Nashville Zoo, Tennessee Bat Working Group, University of Tennessee and other Tennessee universities, and private landowners.

Conservation Projects

Many completed and ongoing projects focused on achieving a better understanding of the abundance and distribution of SGCN, including fish, mussels, Eastern Hellbenders, the Slackwater Darter, Streamside Salamander, Pine Snakes, Pygmy Rattlesnakes, and bats. Projects also include a reassessment of the status of Pale Lilliput (*Toxolasma cylindrellus*) to assess the potential for downgrading its endangered status, and restoration of Tennessee's Lake Sturgeon.

CMP Stressor Level	Stressor Categories	Threats specific to Western Highland Rim Forests
1.1 A	Housing and urban areas; Primary residential development	Destruction or degradation of habitats due to construction activities associated with the building of primary residences. Areas of this COA, such as Ashland City, White Bluff, Dickson, and Fairview face intense development.
1.2 A	Commercial and industrial areas	Destruction or degradation of habitats in an area due to construction and other activities related to the development of commercial or industrial buildings. There are large commercial developments in Ashland City and Dickson.
1.3 A	Tourism and recreation areas	The habitat effects of recreation areas, which focuses on the disturbance effects posed by recreation. The Buffalo River has become a large tourist attraction and draws many paddlers, boaters, and horse-back riders. This comes with a massive amount of trash, erosion, and removal of riparian buffers (for campsites and other mowed areas).
2.2 A	Wood and pulp plantations	Loblolly pine plantations are the main threat.
2.3 A	Livestock farming and ranching; Agricultural conversion (livestock, mostly historical)	Cattle farms along the Buffalo River, with many allowing cattle in-stream. (In farming, animals are kept in captivity; in ranching they are allowed to roam in wild habitats.)

To learn more about the Western Highland Rim Conservation Opportunity Area, please contact: Dustin Thames, Biodiversity Coordinator, Region 2 (615) 781-6626

Western Highland Rim Forests
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Fee-title Ownership	Coordinate land acquisition priorities among state/federal agencies and non-governmental organizations.	N/A
Permanent Protective Easements	Use federal/state/private funding sources to acquire permanent easements within critical units of aquatic, subterranean, and terrestrial habitats that provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	caves protected
Permanent Protective Easements	Coordinate acquisition of permanent protective easements among state/federal agencies and non-governmental organizations.	acres
Monitoring	Develop a monitoring program to measure bioaccumulation of contaminants in target species (e.g., fish, mussels, turtles, birds, bats, etc.).	working groups established or maintained
Monitoring	Develop GIS remote-sensing program to analyze statewide land cover changes, map habitats, evaluate land use practices, etc. at shorter intervals or in greater detail than current national-level programs.	acres
Research	Conduct scientific surveys to discern the geographical distributions of lesser known target species.	surveys
Research	Conduct research on life history and ecological needs of target species to establish guidelines for determining population viability.	projects
Research	Establish guidelines for determining population viability standards for target species (i.e., size, condition, & landscape context).	species
Research	Conduct research on problems (i.e., stresses and sources of stress) affecting target species and habitats.	projects
Research	Conduct research to map karst systems, delineate underground watersheds, and identify above-ground linkages to subterranean habitats.	maps produced, delineations performed, linkages made
Compatible Resource Use	Use government funded incentive programs (e.g., CRP, EQIP, CSP, WRP, and FLEP) to encourage private landowners to protect water quality for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Remove or modify physical barriers that disrupt habitat/population connectivity for target species within critical units of aquatic, subterranean, and terrestrial habitats.	acres or feet of riparian corridor

Western Highland Rim Forests
Conservation Opportunity Area

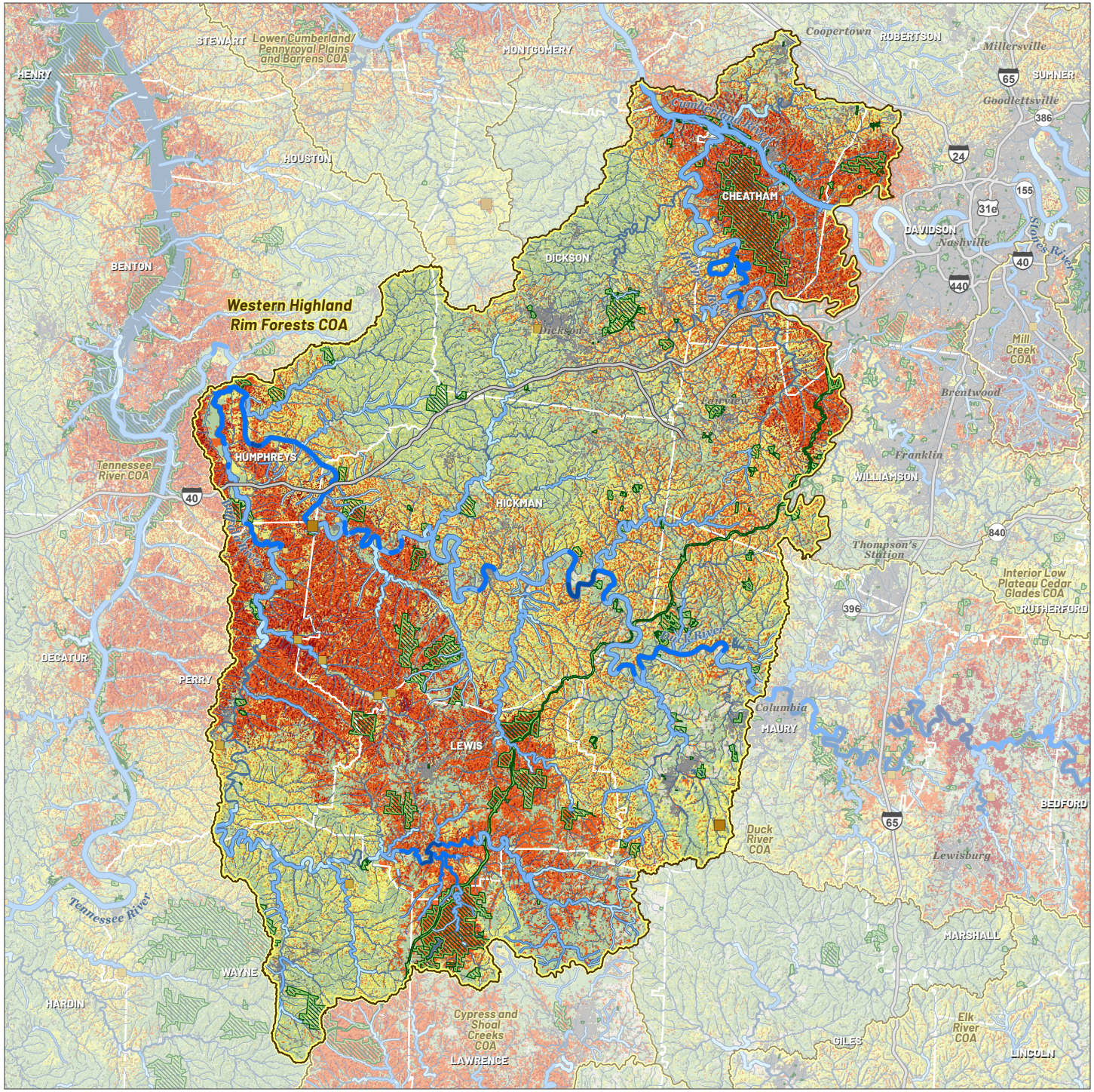
Conservation Actions	Desired Change	Units
Compatible Resource Use	Use government funded incentive programs (e.g., FLEP, CRP, EQIP, Forest Stewardship Program, and Forest Legacy Program) to encourage private landowners to restore and/or protect native forest systems for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Compatible Resource Use	Use government-funded incentive programs such as CRP, WRP, GRP, EQIP, CSP, FLEP, LIP, and rare species protection funding such as FWS Section 6 and other funds to manage or restore populations of target species in critical units of aquatic, subterranean, or terrestrial habitats.	species
Compatible Resource Use	Develop formal management agreements between private landowners, agencies, and non-governmental organizations to provide financial/technical assistance to manage target species within critical units of aquatic, subterranean, and terrestrial habitats (e.g., USFWS Safe Harbor program, TNC cooperative management agreements, etc.).	agreements
Compatible Resource Use	Install exclusionary devices (e.g., gates, barriers, trespass detection equipment, etc.) to limit access to critical units of aquatic, subterranean, or terrestrial habitats for target species vulnerable to human disturbance.	exclusionary devices
Compatible Resource Use	Participate in environmental review procedures to prevent/mitigate construction of dams, impoundments, drainage ditches, levees, stormwater culverts, and other water diversionary structures that affect target species in critical units of aquatic, subterranean, or terrestrial habitats.	reviews
Conservation Area Management	Develop and implement conservation plans for all public/private conservation areas across the state based on ecosystem-level management principles.	conservation plans
Conservation Area Management	Develop recreation management plans that outline strict guidelines on high-impact recreational uses on public/private conservation areas across the state.	recreation plans
Control/Prevention of Invasive Exotic Species & Pathogens	Conduct rapid ecological assessments of key populations of target species and critical units of aquatic, subterranean, and terrestrial habitats most susceptible to invasive exotic species & pathogens.	assessments
Habitat/Natural Processes Restoration	Reintroduce fire via prescribed burning into fire-dependent grassland and woodland systems within critical units of terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore in-stream flows and physical structure to channelized or impounded streams within critical units of aquatic, subterranean, and terrestrial habitats.	acres/feet of riparian corridor
Habitat/Natural Processes Restoration	Restore degraded forests and pine plantations to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres

Western Highland Rim Forests Conservation Opportunity Area

Western Highland Rim Forests COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Beaman Park & SNA	Local	1,527	100%
Fairview Nature Park	Local	403	100%
Lakeview Park	Local	108	100%
Lonesome Pioneer Park	Local	9	100%
Maury Park	Local	166	7%
Santa Fe/TVA Park	Local	341	100%
Upper Lake Park	Local	93	100%
Natchez Trace Parkway and National Scenic Trail	NPS	10,663	76%
Auntney Hollow SNA	Private	26	100%
Beaver Dam Creek WMA	Private	6,610	100%
Hick Hill WMA	Private	3,004	100%
Kelley Creek Seeps	Private	164	100%
Langford Branch SNA	Private	23	100%
Tie Camp WMA	Private	7,677	35%
Devil's Backbone SNA	TDEC - DNA	1,460	100%
Dry Branch SNA	TDEC - DNA	2,173	100%
John Noel at Bon Aqua SNA	TDEC - DNA	35	100%
Stillhouse Hollow Falls SNA	TDEC - DNA	197	100%
Harpeth River SP	TDEC - SP	517	81%
Johnsonville State Historic Park	TDEC - SP	1,291	42%
Montgomery Bell SP	TDEC - SP	3,772	100%
Lewis SF	TDF	1,300	100%
Alexander Cave	TNC	205	100%
Buffalo Ridge Refuge	TWRA	1,817	98%
Cheatham WMA	TWRA	19,821	100%
Happy Hollow WMA	TWRA	1,813	100%
Laurel Hill WMA	TWRA	14,336	100%
Marrowbone Lake	TWRA	62	100%
MTSU WMA	TWRA	794	100%

Western Highland Rim Forests Conservation Opportunity Area

Western Highland Rim Forests COA Protected Lands (continued)			
Name	Management Agency	Total Acreage	% of Acreage within COA
Williamsport WMA	TWRA	1,527	100%
Cheatham Lake WMA	USACE	2,232	100%
Dyson Ditch Refuge	USACE	304	100%
Pardue Pond Refuge	USACE	432	100%



Combined Habitat Priorities

Western Highland Rim Forests Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

Conservation Opportunity Area (COA)

Public/Protected Land

Conservation Easement

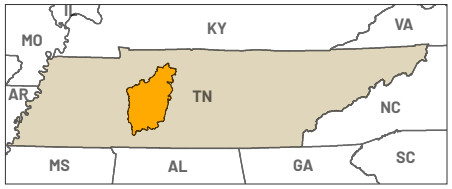
Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Western Highland Rim Forests COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Four-toed Salamander	Hemidactylium scutatum	1982
Amphibian	Green Salamander	Aneides aeneus	2015
Amphibian	Small-Mouthed Salamander	Ambystoma texanum	1979
Amphibian	Streamside Salamander	Ambystoma barbouri	2023
Bat	Eastern Small-footed Bat	Myotis leibii	2020
Bat	Gray Bat	Myotis grisescens	2022
Bat	Indiana Bat	Myotis sodalis	2022
Bat	Little Brown Myotis	Myotis lucifugus	2020
Bat	Northern Hoary Bat	Lasiurus cinereus	2020
Bat	Northern Long-eared Bat	Myotis septentrionalis	2020
Bat	Tricolored Bat	Perimyotis subflavus	2022
Bird	American Barn Owl	Tyto furcata	2023
Bird	American Bittern	Botaurus lentiginosus	2023
Bird	American Black Duck	Anas rubripes	2022
Bird	American Golden-Plover	Pluvialis dominica	2021
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bachman's Sparrow	Peucaea aestivalis	2016
Bird	Baltimore Oriole	Icterus galbula	2006
Bird	Bank Swallow	Riparia riparia	2023
Bird	Bell's Vireo	Vireo bellii	2020
Bird	Belted Kingfisher	Megaceryle alcyon	2007
Bird	Bewick's Wren	Thryomanes bewickii	1989
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2022
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2022
Bird	Blue-headed Vireo	Vireo solitarius	2003
Bird	Bobolink	Dolichonyx oryzivorus	2023
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2004
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Connecticut Warbler	Oporornis agilis	2023
Bird	Dunlin	Calidris alpina	2023
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Evening Grosbeak	Coccothraustes vespertinus	2021
Bird	Golden Eagle	Aquila chrysaetos	2022
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023
Bird	Great Egret	Ardea alba	2023
Bird	Henslow's Sparrow	Centronyx henslowii	2020

Western Highland Rim Forests COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	Least Bittern	Botaurus exilis	2022
Bird	Least Flycatcher	Empidonax minimus	2023
Bird	LeConte's Sparrow	Ammospiza leconteii	2023
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2023
Bird	Long-eared Owl	Asio otus	2019
Bird	Long-tailed Duck	Clangula hyemalis	2014
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2023
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Northern Saw-whet Owl	Aegolius acadicus	2023
Bird	Olive-sided Flycatcher	Contopus cooperi	2023
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2022
Bird	Peregrine Falcon	Falco peregrinus	2023
Bird	Piping Plover (Atlantic subspecies)	Charadrius melodus melodus	2014
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2023
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-billed Dowitcher	Limnodromus griseus	2011
Bird	Short-eared Owl	Asio flammeus	2017
Bird	Snowy Egret	Egretta thula	2023
Bird	Stilt Sandpiper	Calidris himantopus	2023
Bird	Swainson's Warbler	Limnothlypis swainsonii	2020
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	Western Sandpiper	Calidris mauri	2006
Bird	White-rumped Sandpiper	Calidris fuscicollis	2012
Bird	Whooping Crane	Grus americana	2011
Bird	Willet	Tringa semipalmata	2022
Bird	Willow Flycatcher	Empidonax traillii	2022
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2021
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Mammal	Allegheny Woodrat	Neotoma magister	1975

Western Highland Rim Forests COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Mammal	Eastern Spotted Skunk	Spilogale putorius	2013
Mammal	Southeastern Shrew	Sorex longirostris	1979
Plant	American Chestnut	Castanea dentata	2003
Plant	Barbed Rattlesnake-root	Nabalus barbatus	2009
Plant	Beak Grass	Diarrhena obovata	2015
Plant	Bristly Sedge	Carex comosa	1970
Plant	Broadleaf Barbara's-buttons	Marshallia trinervia	2015
Plant	Broadleaf Bunchflower	Melanthium latifolium	2013
Plant	Buffalo Clover	Trifolium reflexum	2023
Plant	Butternut	Juglans cinerea	2022
Plant	Catfoot	Pseudognaphalium helleri	1972
Plant	Cream Tick-trefoil	Desmodium ochroleucum	2016
Plant	Davis' Sedge	Carex davisii	1990
Plant	Deam's Copperleaf	Acalypha deamii	2015
Plant	Duck River Bladderpod	Paysonia densipila	2022
Plant	Dwarf Sundew	Drosera brevifolia	2022
Plant	Eggert's Sunflower	Helianthus eggertii	2016
Plant	Field Chickweed	Cerastium velutinum var. velutinum	2003
Plant	Gattinger's Bluestar	Amsonia tabernaemontana var. gattingeri	2008
Plant	Globe Bladderpod	Physaria globosa	2024
Plant	Grape Honeysuckle	Lonicera reticulata	2014
Plant	Hairy Umbrella-sedge	Fuirena squarrosa	2016
Plant	Lance-like Spikerush	Eleocharis lanceolata	2015
Plant	Largeleaf Grass-of-Parnassus	Parnassia grandifolia	2016
Plant	Loesel's Twayblade	Liparis loeselii	2019
Plant	Low Nutrush	Scleria verticillata	2016
Plant	Maryland Milkwort	Senega mariana	2013
Plant	Northern Bush-honeysuckle	Diervilla lonicera	1976
Plant	Northern Prickly-ash	Zanthoxylum americanum	1947
Plant	Ozark Bunchflower	Melanthium woodii	2015
Plant	Pale Dogwood	Cornus obliqua	2011
Plant	Prairie Parsley	Polytaenia nuttallii	1991
Plant	Price's Potato-bean	Apios priceana	2021
Plant	Pubescent Sedge	Carex hirtifolia	2008
Plant	Purple Milkweed	Asclepias purpurascens	2020
Plant	Ridge-stem False Foxglove	Agalinis oligophylla	1979
Plant	Rock Grape	Vitis rupestris	1982
Plant	Roughish Witchgrass	Dichanthelium leucothrix	1983
Plant	Savannah Beakrush	Rhynchospora debilis	2005
Plant	Shining Ladies'-tresses	Spiranthes lucida	2020
Plant	Showy Lady's-slipper	Cypripedium reginae	2024
Plant	Small-head Rush	Juncus brachycephalus	2015
Plant	Spring Blue-eyed Mary	Collinsia verna	2022
Plant	Svenson's Wild Rye	Elymus svensonii	2011
Plant	Sweet-scented Indian-plantain	Hasteola suaveolens	2020
Plant	Tennessee Yellow-eyed-grass	Xyris tennesseensis	2024

Western Highland Rim Forests COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Twisted Spikerush	Eleocharis tortilis	2015
Plant	Viscid Bushy Goldenrod	Euthamia gymnospermoides	1960
Plant	Water Stitchwort	Stellaria fontinalis	2024
Plant	White Prairie-clover	Dalea candida	1936
Plant	Yellow Honeysuckle	Lonicera flava	2003
Plant	Yellow Nodding Ladies'-tresses	Spiranthes ochroleuca	1949
Plant	Yellow Trout-lily	Erythronium rostratum	2002
Reptile	Eastern Box Turtle	Terrapene carolina	2010
Reptile	Eastern Hog-nosed Snake	Heterodon platirhinos	2021
Reptile	Eastern Pinesnake	Pituophis melanoleucus	2020
Reptile	Rough Earthsnake	Virginia striatula	2002
Reptile	Timber Rattlesnake	Crotalus horridus	2021
Reptile	Western Pygmy Rattlesnake	Sistrurus miliarius streckeri	1985

Western Highland Rim Forests COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Hellbender	Cryptobranchus alleganiensis	2019
Amphibian	Mudpuppy	Necturus maculosus	2019
Amphibian	Western Siren	Siren nettingi	1999
Bivalve	Birdwing Pearlymussel	Lemiox rimosus	1982
Bivalve	Black Sandshell	Ligumia recta	2022
Bivalve	Clubshell	Pleurobema clava	2000
Bivalve	Cracking Pearlymussel	Hemistena lata	1965
Bivalve	Mountain Creekshell	Leaunio vanuxemensis	2019
Bivalve	Mucket	Actinonaias ligamentina	2021
Bivalve	Ohio Pigtoe	Pleurobema cordatum	2000
Bivalve	Painted Creekshell	Cambarunio taeniatus	2019
Bivalve	Pale Lilliput	Toxolasma cylindrellum	2022
Bivalve	Pheasantshell	Actinonaias pectorosa	1976
Bivalve	Pink Mucket	Lampsilis abrupta	2015
Bivalve	Purple Lilliput	Toxolasma lividum	2011
Bivalve	Ring Pink	Obovaria retusa	1983
Bivalve	Round Hickorynut	Obovaria subrotunda	2002
Bivalve	Salamander Mussel	Simpsonaias ambigua	2005
Bivalve	Slabside Pearlymussel	Pleuronaia dolabelloides	2021
Bivalve	Spectaclecase	Cumberlandia monodonta	2011
Bivalve	Tennessee Pigtoe	Pleuronaia barnesiana	2012
Bivalve	White Heelsplitter	Lasmigona complanata	2002
Bivalve	Winged Mapleleaf	Quadrula fragosa	2013
Crustacean	Alabama Crayfish	Faxonius alabamensis	2013
Crustacean	Depression Crayfish	Cambarus rusticiformis	1995
Crustacean	Hairy Crayfish	Cambarus friaufi	2013
Crustacean	Hillbilly Hairy Crayfish	Cambarus polypilosus	2017
Crustacean	Shortfinger Crayfish	Cambarus brachydactylus	2013

Western Highland Rim Forests COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Crustacean	Slender Crayfish	Faxonius compressus	2019
Crustacean	Surgeon Crayfish	Faxonius forceps	1977
Fish	American Eel	Anguilla rostrata	2016
Fish	Ashy Darter	Allohistium cinereum	2008
Fish	Blotched Chub	Erimystax insignis	2022
Fish	Blotchside Logperch	Percina burtoni	2020
Fish	Blue Sucker	Cycleptus elongatus	2012
Fish	Coppercheek Darter	Nothonotus aquali	2022
Fish	Egg-mimic Darter	Etheostoma pseudovulatum	2018
Fish	Flame Chub	Hemitremia flammea	2015
Fish	Golden Darter	Nothonotus denoncourti	2009
Fish	Highfin Carpsucker	Carpiodes velifer	2006
Fish	Lake Sturgeon	Acipenser fulvescens	2024
Fish	Lollypop Darter	Etheostoma neopterum	1993
Fish	Longhead Darter	Percina macrocephala	1978
Fish	Paddlefish	Polyodon spathula	2023
Fish	Pygmy Madtom	Noturus stanauli	2008
Fish	Redband Darter	Etheostoma luteovinctum	2020
Fish	Saddled Madtom	Noturus fasciatus	2022
Fish	Scaly Sand Darter	Ammocrypta vivax	1976
Fish	Slackwater Darter	Etheostoma boschungi	2009
Fish	Slenderhead Darter	Percina phoxocephala	2008
Fish	Smallscale Darter	Nothonotus microlepidus	2009
Fish	Southern Brook Lamprey	Ichthyomyzon gagei	1989
Fish	Splendid Darter	Etheostoma barrenense	1956
Fish	Spotfin Chub	Erimonax monachus	2022
Fish	Streamline Chub	Erimystax dissimilis	2009
Fish	Striated Darter	Etheostoma striatulum	2021
Fish	Tennessee Logperch	Percina apina	2022
Fish	Tippecanoe Darter	Nothonotus tippecanoe	2009
Gastropod	Geniculate River Snail	Lithasia fuliginosa	1973
Gastropod	Helmet Rocksnail	Lithasia duttoniana	1977
Insect	Acuminate Snaketail	Ophiogomphus acuminatus	1997
Reptile	Alligator Snapping Turtle	Macrochelys temminckii	2017
Reptile	Smooth Softshell Turtle	Apalone mutica	1977

Western Highland Rim Forests COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Arachnid	mite	Macrocheles sp. 3	2006
Arachnid	Southeastern Cave Pseudoscorpion	Hesperochernes mirabilis	2006
Arachnid	Subterranean Sheetweb Spider	Phanetta subterranea	2006
Bat	Gray Bat	Myotis grisescens	2015
Bat	Indiana Bat	Myotis sodalis	2017
Bat	Little Brown Myotis	Myotis lucifugus	2017

Western Highland Rim Forests COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bat	Northern Long-eared Bat	Myotis septentrionalis	2015
Bat	Tricolored Bat	Perimyotis subflavus	2017
Crustacean	a cave obligate isopod	Caecidotea bicrenata	2006
Crustacean	a cave obligate isopod	Caecidotea bicrenata bicrenata	2010
Crustacean	a sideswimmer	Gammarus minus	2006
Crustacean	Cavespring Crayfish	Cambarus tenebrosus	2006
Crustacean	Central Kentucky Cave Amphipod	Stygobromus exilis	2006
Fish	Southern Cavefish	Typhlichthys subterraneus	2006
Gastropod	Raccoon Coil	Helicodiscus barri	1964
Insect	a cave barklice	Psyllipsocus ramburi	2006
Insect	a cave obligate beetle	Batrisodes barri	1959
Insect	a cave obligate beetle	Batrisodes ferulifer	1952
Insect	a cave obligate ground beetle	Pseudanophthalmus hesperus	1981
Insect	a cave obligate springtail	Pseudosinella hirsuta	1949
Insect	a cave obligate springtail	Sinella cavernarum	2006
Insect	Benderman's Cave Beetle	Pseudanophthalmus bendermani	1959
Insect	Christiansen’s Cave Springtail	Typhlogastrura christianseni	2006
Insect	Cooke's Cave Dipluran	Litocampa cookei	2010
Insect	sepsid Black scavenger fly	Undetermined species	2006
Insect	Slender Ground Beetle	Platynus tenuicollis	2006
Insect	Two-toothed Springtail	Pogonognathellus bidentatus	2006
Insect	Western Cave Beetle	Pseudanophthalmus occidentalis	1997
Insect	White Springtail	Folsomia candida	2006
Mammal	Allegheny Woodrat	Neotoma magister	1975
Millipede	a cave obligate millipede	Scoterpes hesperus	2010
Millipede	a cave obligate millipede	Scoterpes musicarustica	2010
Reptile	Rough Earthsnake	Virginia striatula	1967
Roundworm	a cave obligate worm	Cambarincola leptadenus	1974

Elk River

Regional Conservation Opportunity Area



The Elk River flows south and west from Tennessee into Alabama and has two major dams creating two lakes: Woods Reservoir and Tims Ford Lake. Slack water provided by the Woods Reservoir is used as a cooling source for scientific testing conducted by Arnold Engineering Development Center, and both dams provide numerous recreational opportunities for the public. The cold water released by Tims Ford Dam provides suitable habitat for a regionally important trout fishery. The Elk River is also a biologically diverse river system, home to numerous species of fish, mussels, and aquatic snails.



In the latter 20th century, the Boulder Darter fish species was almost eliminated from the Elk River system, likely due to impoundments on both the Elk River and Shoal Creek, cold water release from the dams, siltation, and pollution. A propagation and reintroduction program began in the early 1990s. Even though the Boulder Darter still occurs in small numbers, biologists consider this population restoration program successful because multiple age classes and young of the year have been found in the river itself as well as additional Elk River tributary streams since reintroduction efforts began.

To address threats to the Elk River's aquatic species, government agencies and others have developed incentive programs to restore riparian habitat.

To address threats to the Elk's numerous species of rare, threatened, and endangered fish and mussels, numerous government agencies and non-governmental organizations have developed incentive programs to restore habitat along the Elk River and improve river quality. These programs include streamside plantings for stream bank stabilization, facilities to keep cattle out of streams, and the planting of grass filter strips to minimize sediment runoff from agricultural areas. Improved temperature and dissolved oxygen levels from water releases out of Tims Ford Dam are also helping restore downstream habitat conditions on the Elk.



Top to bottom: The Pale Lilliput mussel/Dan Hua, TWRA; Tims Ford Lake/Kathy. P2: Part of the AABC propagation facilities in Alabama/ AABC. P4: Northern Pintail/Alan Schmierer

Elk River Watershed
Conservation Opportunity Area

Partnerships

TWRA will implement strategies to reduce or eliminate threats to aquatic habitat through public outreach efforts designed to educate landowners about the Elk River's importance and incentive programs for improved streamside management. In addition to ongoing ongoing partnerships with TVA on dam releases, opportunities to assist the TN Dam Removal Partnership on projects in the watershed may exist in the future. TWRA will develop and foster partnerships with the US Fish and Wildlife Service, USDA Natural Resources Conservation Service/National Water Quality Initiative, TN Valley Authority, TN Dept. of Environment and Conservation, The Nature Conservancy, Conservation Fisheries Inc., universities, and private landowners. Collaborations with states bordering this COA include work with the Alabama Aquatic Biodiversity Center.



CMP Stressor Level	Stressors Categories	Threats specific to Elk River Watershed
2.1 A	Annual and perennial non-timber crops; Agricultural conversion (row crop; mostly historical)	Removal of the natural vegetation of an area for agricultural purposes, such as pasture, row crops, feed lots, outbuildings, etc. Much of the land in the Elk River watershed is agriculture, including riparian areas.
2.1 B	Annual and perennial non-timber crops; Incompatible row crop agricultural practices	Degradation of soil/water quality or habitat structure related to row crop production and maintenance not compatible with species needs. Often due to erosion from plowing/tilling or chemical applications of herbicides/pesticides. Agriculture along the Elk River is widespread.
2.3 A	Livestock farming and ranching; Agricultural conversion (livestock, mostly historical)	Much of the land in the Elk River watershed is agriculture, including riparian areas. (In farming, animals are kept in captivity; in ranching they are allowed to roam in wild habitats.)
7.2 B	Dams and water management/use; Construction of dams/impoundments	Disruption and degradation of the natural flow of a river or stream due to construction of dams or impoundments. Also includes destruction of terrestrial habitats due to removal and inundation of vegetation along shorelines. Tims Ford dam disrupts natural water temperatures and limits occupancy by SGCN.
7.2 C	Dams and water management/use; Construction of ditches/dikes/drainage/ diversion systems	Disruption and degradation of the natural hydrologic patterns of wetlands, rivers, and streams due to construction of various water diversion or containment structures. Along the Elk River, water cress farms and Harms Mill Dam contribute to this pattern.
7.2 F	Dams and water management/use - Operation of dams/reservoirs	Degradation of water quality and aquatic habitat availability due to disruption of natural hydrologic regimes of rivers and streams by dams or reservoirs. Also includes destruction/degradation of terrestrial habitats due to periodic raising or lower of water levels. Tims Ford dam disrupts natural water temperatures and limits occupancy by SGCN.

CMP Stressor Level	Stressors Categories	Threats specific to Elk River Watershed, continued
2.3 C	Livestock farming and ranching; Incompatible grazing/pasture management practices	Degradation of soil/water quality and habitat structure of an area due to excessive grazing or to inadequate exclusion of cattle from stream and forest resources. Also, includes degradation caused by over-application of fertilizers or other chemicals during pasture management practices. Cattle grazing along the Elk River is widespread, including some cattle in the river and along the banks, which leads to sedimentation.
9.3 A	Agriculture and forestry effluents; Incompatible animal production practices	Degradation of soil/water quality via improper management of animal waste or chemical applications required during the rearing of livestock or other farm animals raised in concentrated conditions.
9.3 C	Agriculture and forestry effluents; Incompatible grazing/pasture management practices	Degradation of soil/water quality and habitat structure of an area due to excessive grazing or to inadequate exclusion of cattle from stream and forest resources. Also, includes degradation caused by over-application of fertilizers or other chemicals during pasture management practices. Excessive nutrients enter the river and tributaries from agriculture in riparian areas.
9.3 D	Agriculture and forestry effluents; Incompatible row crop agricultural practices	Degradation of soil/water quality or habitat structure related to row crop production and maintenance not compatible with species needs. Often due to erosion from plowing/tilling or chemical applications of herbicides/pesticides.
11.5 A	Severe/extreme weather events	Changes in frequency, timing and/or intensity of storms as well as severe weather events that threaten targets that have lost resilience. Category Examples: thunderstorms, tropical storms, hurricanes, tornadoes, hailstorms, ice storms or blizzards, and dust storms. Increased intensity of floods and droughts will impact water quality conditions for SGCN.

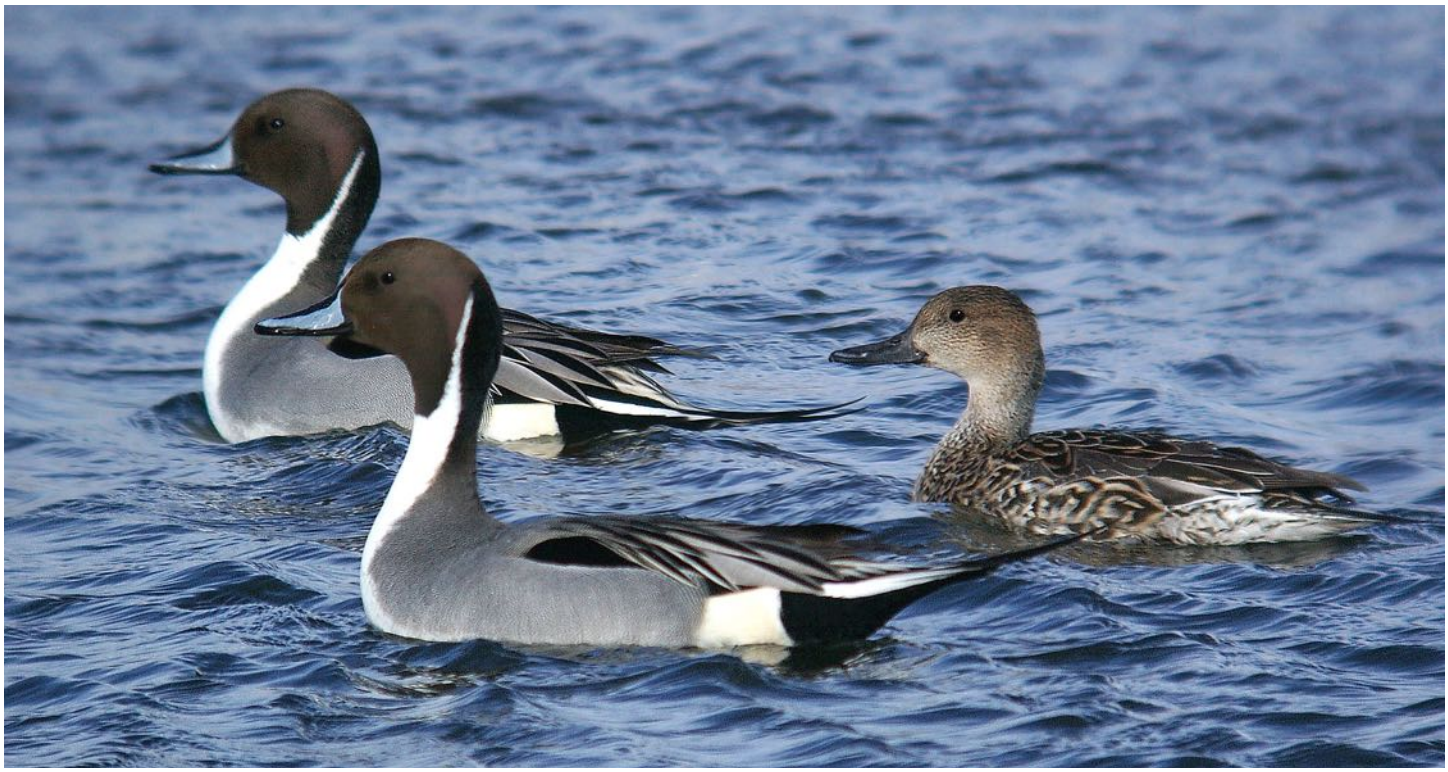
Conservation Projects

Some completed and ongoing projects focused on achieving a better understanding of the distribution and abundance of SGCN, including mussels, fish, Eastern Hellbenders, and bats. Several projects focused on propagation of rare species by assessing habitats and/or species status. These included projects to benefit the Cracking Pearlymussel, Elk River Mussel, Pale Lilliput (a mussel), and Boulder Darter (a fish). A major project to remove Harms Mill Dam was underway in 2025.

To learn more about the Elk River Conservation Opportunity Area, please contact: Dustin Thames, Biodiversity Coordinator, Region 2 (615) 781-6626

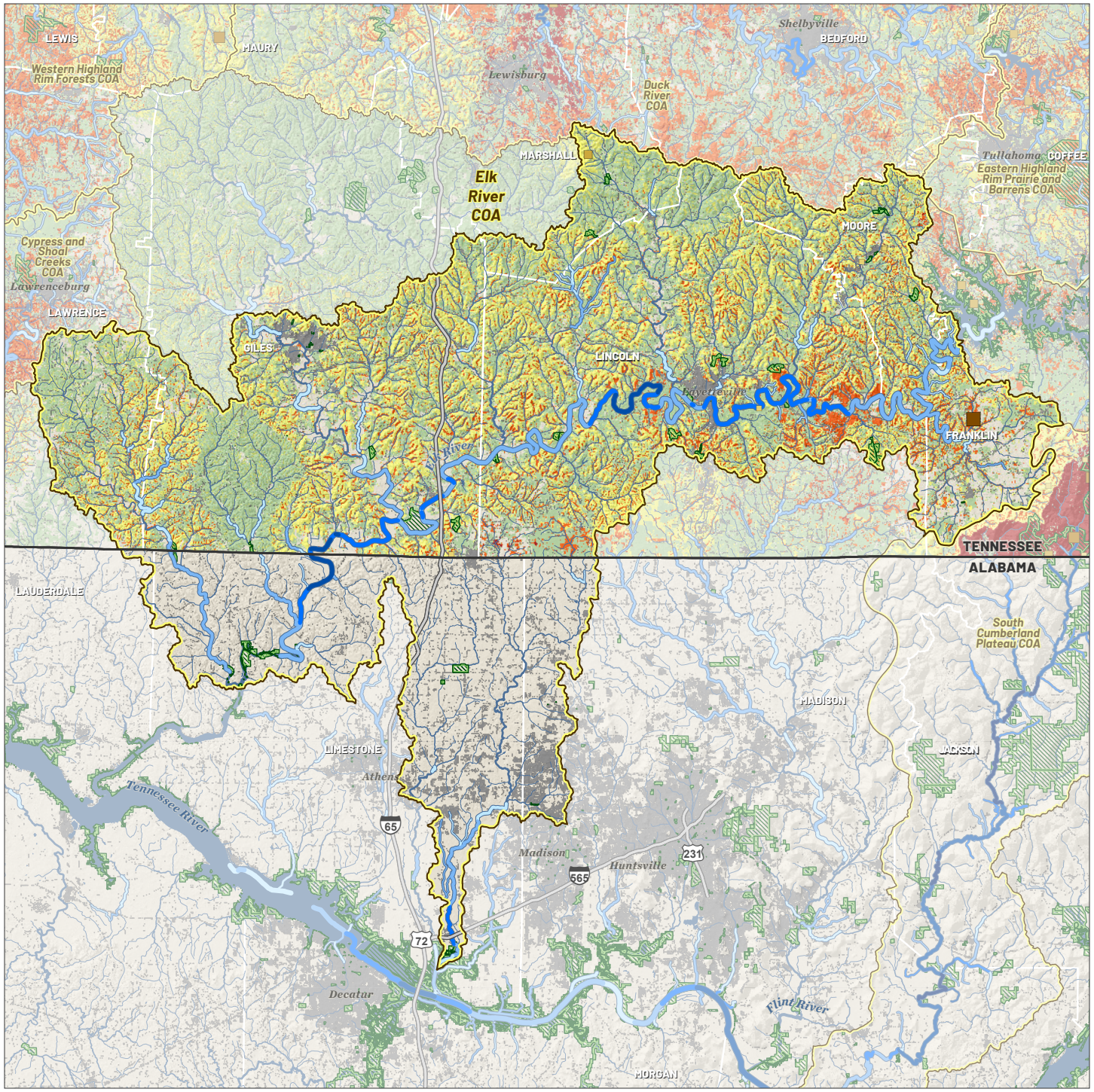
Elk River Watershed
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats that provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Compatible Resource Use	Use government funded incentive programs (e.g., FLEP, CRP, EQIP, Forest Stewardship Program, and Forest Legacy Program) to encourage private landowners to restore and/or protect native forest systems for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Remove or modify physical barriers that disrupt habitat/population connectivity for target species within critical units of aquatic, subterranean, and terrestrial habitats.	acres and/or feet of riparian corridor
Species Restoration	Continue funding and staff support for a freshwater mollusk propagation facility to increase populations of mussels and aquatic snails for habitat reintroduction.	species



Elk River Watershed
Conservation Opportunity Area

Elk River COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Lions Club Complex	Local	201	100%
Wells Hill Park	Local	128	100%
Flintville WMA	TWRA	691	100%



Combined Habitat Priorities

Elk River Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

- Conservation Opportunity Area (COA)
- Public/Protected Land
- Conservation Easement

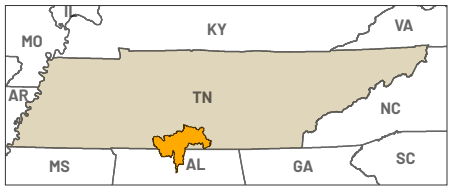
Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Elk River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bat	Gray Bat	Myotis grisescens	2018
Bat	Indiana Bat	Myotis sodalis	2013
Bat	Tricolored Bat	Perimyotis subflavus	2020
Bird	American Barn Owl	Tyto furcata	2023
Bird	American Black Duck	Anas rubripes	2023
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2022
Bird	Bachman's Sparrow	Peucaea aestivalis	1987
Bird	Bank Swallow	Riparia riparia	2022
Bird	Bewick's Wren	Thryomanes bewickii	1975
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2023
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2022
Bird	Bobolink	Dolichonyx oryzivorus	2016
Bird	Brown Creeper	Certhia americana	2023
Bird	Canada Warbler	Cardellina canadensis	2021
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Dunlin	Calidris alpina	2015
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2010
Bird	Evening Grosbeak	Coccothraustes vespertinus	1986
Bird	Golden Eagle	Aquila chrysaetos	2014
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023
Bird	Great Egret	Ardea alba	2023
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	Least Flycatcher	Empidonax minimus	2023
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2023
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2022
Bird	Peregrine Falcon	Falco peregrinus	2023
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2017

Elk River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Snowy Egret	Egretta thula	2022
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	White-rumped Sandpiper	Calidris fuscicollis	2017
Bird	Willow Flycatcher	Empidonax traillii	2023
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Mammal	Allegheny Woodrat	Neotoma magister	2018
Mammal	Southeastern Shrew	Sorex longirostris	1979
Plant	Alabama Snow-wreath	Neviusia alabamensis	1997
Plant	Butternut	Juglans cinerea	2003
Plant	Duck River Bladderpod	Paysonia densipila	2001
Plant	Eastern Eulophus	Perideridia americana	2001
Plant	Eggert's Sunflower	Helianthus eggertii	2001
Plant	Florida Hedge-hyssop	Gratiola floridana	1941
Plant	Harbison's Hawthorn	Crataegus harbisonii	1948
Plant	Limestone Fameflower	Phemeranthus calcaricus	2002
Plant	Maryland Milkwort	Senega mariana	1939
Plant	Spreading Sandwort	Arenaria lanuginosa	2001
Plant	Water Stitchwort	Stellaria fontinalis	2014
Plant	Wolf's Spikerush	Eleocharis wolfii	1939
Plant	Yellow Sunnybell	Schoenolirion croceum	1955
Plant	Yellow Trout-lily	Erythronium rostratum	1993
Reptile	Eastern Box Turtle	Terrapene carolina	1962
Reptile	Timber Rattlesnake	Crotalus horridus	2010

Elk River COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Hellbender	Cryptobranchus alleganiensis	2011
Amphibian	Mudpuppy	Necturus maculosus	2008
Bivalve	Alabama Lampmussel	Lampsilis virescens	2012
Bivalve	Birdwing Pearlymussel	Lemiox rimosus	1980
Bivalve	Cracking Pearlymussel	Hemistena lata	2007
Bivalve	Cumberland Rockshell	Theliderma intermedia	2011
Bivalve	Cumberlandian Combshell	Epioblasma brevidens	2001
Bivalve	Dromedary Pearlymussel	Dromus dromas	1926
Bivalve	Fanshell	Cyprogenia stegaria	2001
Bivalve	Finerayed Pigtoe	Fusconaia cuneolus	1983
Bivalve	Fluted Kidneyshell	Ptychobranchus subtentus	1967

Elk River COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bivalve	Pink Mucket	Lampsilis abrupta	2013
Bivalve	Purple Lilliput	Toxolasma lividum	1967
Bivalve	Rainbow	Cambarunio iris	1996
Bivalve	Rayed Bean	Paetulunio fabalis	1965
Bivalve	Round Hickorynut	Obovaria subrotunda	2001
Bivalve	Shiny Pigtoe	Fusconaia cor	2021
Bivalve	Slabside Pearlymussel	Pleuronaia dolabelloides	2011
Bivalve	Slippershell Mussel	Alasmidonta viridis	2015
Bivalve	Snuffbox	Epioblasma triquetra	2011
Bivalve	Tan Riffleshell	Epioblasma walkeri	1967
Bivalve	Tennessee Clubshell	Pleurobema oviforme	2001
Bivalve	Tennessee Pigtoe	Pleuronaia barnesiana	1980
Bivalve	White Heelsplitter	Lasmigona complanata	2011
Crustacean	Surgeon Crayfish	Faxonius forceps	2007
Fish	Ashy Darter	Allohistium cinereum	2009
Fish	Barrens Topminnow	Fundulus julisia	1996
Fish	Blotched Chub	Erimystax insignis	2022
Fish	Boulder Darter	Nothonotus wapiti	2008
Fish	Flame Chub	Hemitremia flammea	2019
Fish	Highfin Carpsucker	Carpiodes velifer	2009
Fish	Lake Sturgeon	Acipenser fulvescens	2001
Fish	Snail Darter	Percina tanasi	1981
Fish	Streamline Chub	Erimystax dissimilis	2009
Gastropod	Geniculate River Snail	Lithasia fuliginosa	1973
Gastropod	Umbilicate Rocksnail	Leptoxis umbilicata	1900
Gastropod	Warty Rocksnail	Lithasia lima	1984

Elk River COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Arachnid	Appalachian Cave Spider	Porrhomma cavernicola	2004
Arachnid	harvestman	Bishopella sp. Probably laciniosa	2004
Arachnid	Southeastern Cave Pseudoscorpion	Hesperochernes mirabilis	2016
Arachnid	Subterranean Sheetweb Spider	Phanetta subterranea	2004
Bat	Gray Bat	Myotis grisescens	2011
Bat	Indiana Bat	Myotis sodalis	1976
Bat	Tricolored Bat	Perimyotis subflavus	2017
Crustacean	a cave obligate isopod	Caecidotea bicrenata bicrenata	2004
Crustacean	Central Kentucky Cave Amphipod	Stygobromus exilis	2004
Crustacean	Southern Cave Crayfish	Orconectes australis	1972
Fish	Southern Cavefish	Typhlichthys subterraneus	2007
Insect	a cave barklice	Psyllipsocus ramburi	2004
Insect	a cave obligate beetle	Ptomaphagus fecundus	2004
Insect	a cave obligate bristletail	Litocampa valentinei	2004
Insect	a cave obligate springtail	Pseudosinella aera	2004

Elk River COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Insect	a cave obligate springtail	Pseudosinella christianseni	2004
Insect	a cave obligate springtail	Pseudosinella hirsuta	2004
Insect	a cave obligate springtail	Pseudosinella spinosa	1949
Insect	a fly	Megaselia cavernicola	2004
Insect	a rove beetle	Aleochara sp.	2004
Insect	a springtail	Pseudosinella sp.	2004
Insect	Caney Hollow cave ground beetle	Pseudanophthalmus sp.	2004
Insect	Catherine's Cave Beetle	Pseudanophthalmus catherinae	1959
Insect	cave crickets	Ceuthophilus sp.	2004
Insect	Cave Dung Fly	Spelobia tenebrarum	2004
Insect	Pale-footed Ocellate Rove Beetle	Lesteva pallipes	2004
Insect	Slender Ground Beetle	Platynus tenuicollis	2004
Insect	Troglophilic Fly	Macrocera nobilis	2004
Insect	Two-toothed Springtail	Pogonognathellus bidentatus	2004
Mammal	Allegheny Woodrat	Neotoma magister	2004
Millipede	a cave milliped	Scoterpes sp.	2004
Millipede	a cave obligate millipede	Scoterpes jackdanieli	2010
Millipede	a cave obligate millipede	Scoterpes ventus	2010
Millipede	millipeds	Cambala sp.	2004

Pennyroyal Plains and Barrens

Regional Conservation Opportunity Area



Barrens and grasslands were once the dominant ecosystem in the Pennyroyal Plains (of TN and KY) before European settlement. There are numerous accounts of settlers describing these areas dominated by grasses and wildflowers with short, stunted trees scattered across the landscape. Post-settlement, much of this ecosystem was converted to agricultural production with the natural, intermittent fire regime being all but eliminated due to fire suppression.

Natural or prescribed fires reduce encroachment by woody vegetation and slow or stop succession of this habitat into forests. The largest remnant of barrens within the Pennyroyal Plains lies on Fort Campbell Military Reservation, where the Department of Defense regularly manages the barrens with fire supporting training and readiness as well as habitat enhancement.

The diversity of plants within this Conservation Opportunity Area (COA) is extremely high, as researchers have documented over 340 species across multiple barrens. Dominated by little bluestem, this habitat type supports numerous rare plant species, many of which are also fire-dependent. Numerous Species of Greatest Conservation Need (SGCN) occur within this COA, including Henslow's Sparrow, Grasshopper Sparrow, Prairie Warbler, Hognose Snake, and Timber Rattlesnake.



Researchers have documented over 340 plant species across multiple barren habitats in the Pennyroyal Plain ecosystem, many of which are fire-dependent.



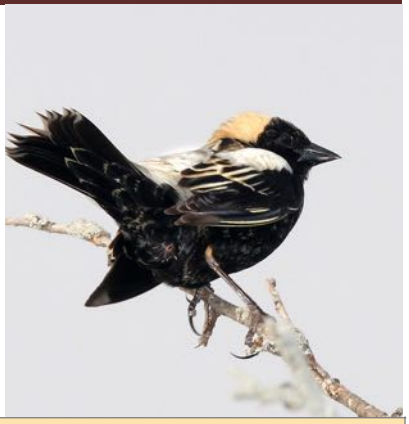


Top to bottom: Timber Rattlesnake/ Daniel Istvanko, TWRA; Prescribed burn/ Clarence Coffey, TWRA (retired); Purple Milkweed/Pam Morgan. P.2: Bobolink/Alan Schmierer. P.3: The Pennyroyal Plain in TN/Duane Estes

Pennyroyal Plains and Barrens Conservation Opportunity Area

Partnerships

TWRA will develop and expand partnerships with the US Fish and Wildlife Service, US Army Dept. of Defense (Ft. Campbell), Tennessee Dept. of Environment and Conservation, Tennessee Valley Authority, The Nature Conservancy, Southeastern Grasslands Institute/Austin Peay, Tennessee Tech, other universities, and the planning departments of local city and county governments.



CMP Stressor Level	Stressors Categories	Threats specific to Pennyroyal Plains & Barrens
1.1 A	Housing and urban areas; Primary residential development	Destruction or degradation of habitats due to construction activities associated with the building of primary residences. From 2020-2022, Montgomery Co. grew by 6.9%. Clarksville is the 5th largest city in Tennessee and growing at a rate of almost 3% annually.
1.2 C	Commercial and industrial areas; Military maneuvers	Increased mortality of species or destruction/degradation of habitats due to the use of heavy vehicles or explosives on the landscape during military exercises. Military maneuvers have both a positive and negative impact on imperiled ecosystems and SGCN. The maneuvers cause sporadic fires that serve to maintain open grasslands. However, these maneuvers undoubtly lead to take of SGCN species.
2.3 A	Livestock farming and ranching; Agricultural conversion (livestock, mostly historical)	Much of the grasslands in the COA were converted to agriculture during colonization. (In farming, animals are kept in captivity; in ranching they are allowed to roam in wild habitats.)
4.3A	Shipping lanes	Alteration of the natural course of a river or stream by removing rock, dirt, gravel, and other sediments from shorelines and bottoms. Such alteration is done primarily for navigation and flood control purposes. Dredging takes place in the Cumberalnd River within the COA, likely causing take of freshwater mussels.
7.1 A	Fire and fire suppression	Degradation of fire-dependent natural systems due to either human suppression of fire or the conditions needed to support combustion. Fire supression has led to the encroachment of fast-growing fire intolerant trees into what was historically grasslands and open post oak savannas.
7.2 B	Dams and water management/use; Construction of dams/ impoundments	Disruption and degradation of the natural flow of a river or stream due to construction of dams or impoundments. Also includes destruction of terrestrial habitats due to removal and inundation of vegetation along shorelines, as is the case with the Kentucky Dam.

CMP Stressor Level	Stressors Categories	Threats specific to Pennyroyal Plains & Barrens, continued
7.2 F	Dams and water management/use; Operation of dams/reservoirs	Degradation of water quality and aquatic habitat availability due to disruption of natural hydrologic regimes of rivers and streams by dams or reservoirs. Also, includes destruction / degradation of terrestrial habitats due to periodic raising or lower of water levels. A prime example in this COA is Kentucky Dam.
8.1 A	Invasive non-native/alien species plants and animals	Increased mortality or habitat degradation caused by excessive competition or predation from invasive exotic species. fescue, and other introduced cool season grasses.
7.3 A	Other ecosystem modifications; Incompatible species management practices	Increased mortality or degradation of habitats resulting from the application of management practices that conflict with the ecological needs of a particular species. Loss of Post Oak savannas due to fire supression and conversion to agriculture.
9.2 A	Industrial and military effluents	Increased mortality or degradation of habitats resulting from legal or illegal releases of toxins or contaminants into the environment by various industries. PFAS in water effluent of Fort Campbell and other potentially harmful chemicals.

Conservation Projects

Some projects focused on achieving a better understanding of the distribution and abundance of SGCN, including fish, mussels, and bats. In addition, a Gray Bat MOTUS project is using technology to determine sites of importance for breeding and overwintering Gray Bats. Direct protection of bat populations was achieved by the installation of the Tobaccoport Saltpeter Cave Gate in 2019. In addition, this COA includes an ongoing program to restore Lake Sturgeon populations in the state.



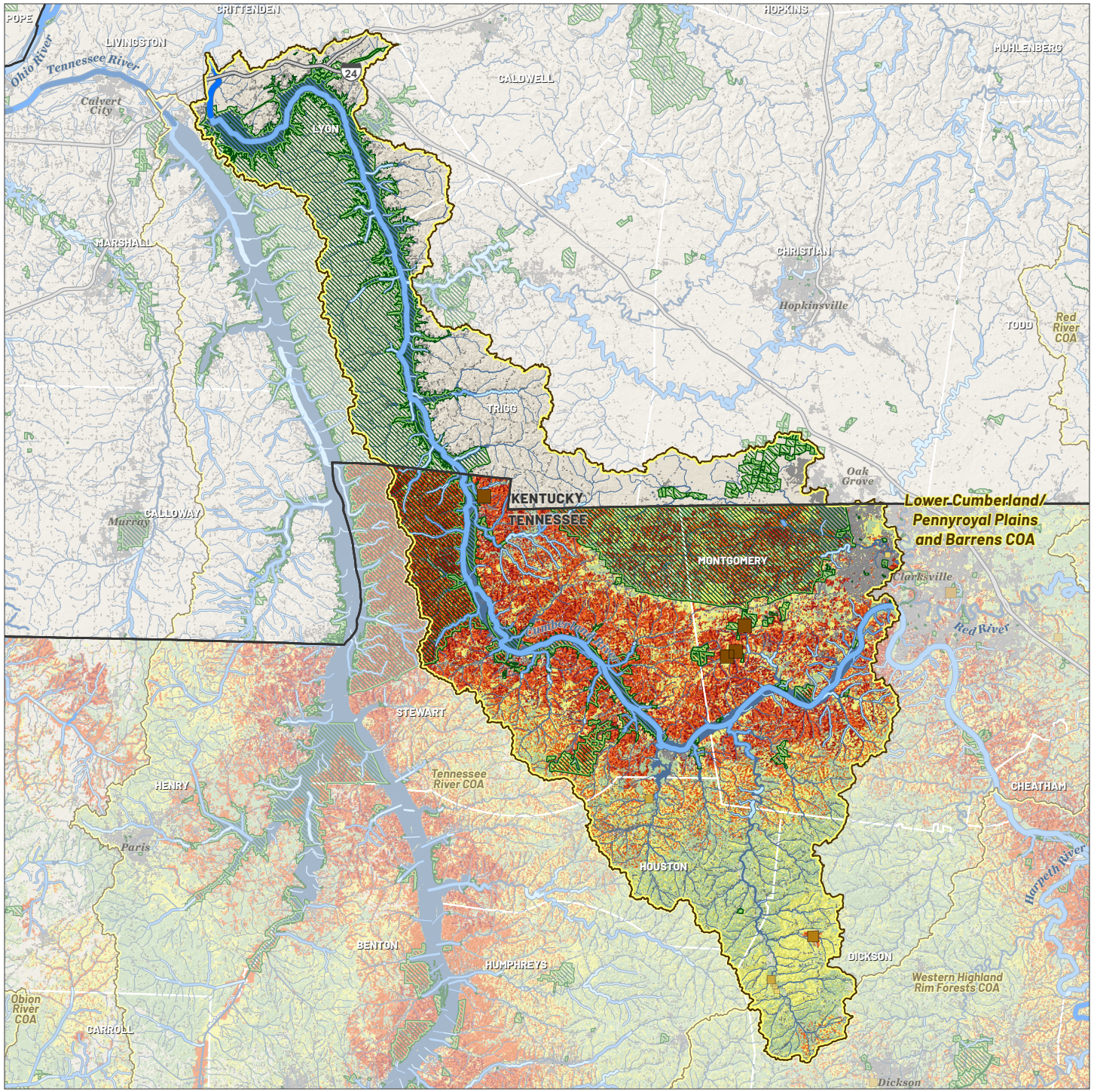
To learn more about the Pennyroyal Plains & Barrens Conservation Opportunity Area, please contact: Dustin Thames, Biodiversity Coordinator, Region 2 (615) 781-6626

Pennyroyal Plains and Barrens Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Compatible Resource Use	Use government funded incentive programs (e.g., CRP, EQIP, CSP, WRP, and FLEP) to encourage private landowners to protect water quality for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Reintroduce fire via prescribed burning into fire-dependent grassland and woodland systems within critical units of terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore and enhance riparian zones and buffers in agricultural and urban areas to minimize nonpoint source pollution.	acres and/or feet of riparian corridor
Alliances and Partnerships	Partner with TN Division of Forestry, TN Wildlife Resources Agency, TDEC, TN State Parks, US Forest Service, US Fish & Wildlife Service, The Nature Conservancy, and other institutions to establish a statewide burn crew to conduct prescribed burns in fire-dependent grassland and woodland habitats. The Division of Natural Areas, Tennessee State Parks, and Heritage Program can serve as a unified burn crew.	acres
Alliances and Partnerships	Develop strategic alliances with state/federal agencies, non-governmental organizations, stakeholders, and other groups focused on improvement of regional landscapes or special natural resources that contain target species in need of conservation (e.g., Alliance for the Cumberlands, Mississippi River Corridor Critical Area Program, Cumberland Region Tomorrow, cave conservation groups, etc.).	acres

Pennyroyal Plains and Barrens Conservation Opportunity Area

Pennyroyal Plains & Barrens COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Fort Donelson National Battlefield	NPS	547	100%
Barnett's Woods SNA	TDEC - DNA	40	100%
Stewart SF	TDF	4,241	100%
Bellamy Cave Refuge	TWRA	34	100%
Haynes Bottom WMA	TWRA	972	100%
Long Pond Refuge	TWRA	104	100%
Fort Campbell Military Reservation	US ARMY	67,721	100%
Bards Creek Refuge	USACE	282	100%
Barkley WMA	USACE	6,804	100%
Brandon Spring Group Camp	USFS	679	100%
Land Between The Lakes National Recreation Area	USFS	64,158	49%
Cross Creeks NWR	USFWS	9,787	100%



Combined Habitat Priorities

Lower Cumberland/Pennyroyal Plains and Barrens Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

- Conservation Opportunity Area (COA)
- Public/Protected Land
- Conservation Easement

Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles
0 5 Kilometers



Lower Cumberland/Pennyroyal Plains and Barrens COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Barking Treefrog	Dryophytes gratiosus	1997
Amphibian	Small-Mouthed Salamander	Ambystoma texanum	1993
Bat	Eastern Small-footed Bat	Myotis leibii	2018
Bat	Gray Bat	Myotis grisescens	2022
Bat	Indiana Bat	Myotis sodalis	2022
Bat	Little Brown Myotis	Myotis lucifugus	2021
Bat	Northern Long-eared Bat	Myotis septentrionalis	2019
Bat	Southeastern Bat	Myotis austroriparius	2016
Bat	Tricolored Bat	Perimyotis subflavus	2022
Bird	American Barn Owl	Tyto furcata	2023
Bird	American Bittern	Botaurus lentiginosus	2021
Bird	American Black Duck	Anas rubripes	2023
Bird	American Golden-Plover	Pluvialis dominica	2023
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bachman's Sparrow	Peucaea aestivalis	2020
Bird	Baltimore Oriole	Icterus galbula	1998
Bird	Bank Swallow	Riparia riparia	2023
Bird	Bell's Vireo	Vireo bellii	2022
Bird	Belted Kingfisher	Megaceryle alcyon	1998
Bird	Bewick's Wren	Thryomanes bewickii	1998
Bird	Black-bellied Plover	Pluvialis squatarola	2023
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2023
Bird	Bobolink	Dolichonyx oryzivorus	2023
Bird	Brown Creeper	Certhia americana	2023
Bird	Buff-breasted Sandpiper	Calidris subruficollis	2020
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2022
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Connecticut Warbler	Oporornis agilis	2016
Bird	Dunlin	Calidris alpina	2023
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Evening Grosbeak	Coccothraustes vespertinus	2022
Bird	Golden Eagle	Aquila chrysaetos	2023
Bird	Golden-winged Warbler	Vermivora chrysoptera	2021
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023
Bird	Great Egret	Ardea alba	2023
Bird	Henslow's Sparrow	Centronyx henslowii	2022
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	Least Bittern	Botaurus exilis	2009
Bird	Least Flycatcher	Empidonax minimus	2023

Lower Cumberland/Pennyroyal Plains and Barrens COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	LeConte's Sparrow	Ammospiza leconteii	2022
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2022
Bird	Long-eared Owl	Asio otus	2020
Bird	Long-tailed Duck	Clangula hyemalis	2014
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2023
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Northern Saw-whet Owl	Aegolius acadicus	2018
Bird	Olive-sided Flycatcher	Contopus cooperi	2023
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2023
Bird	Peregrine Falcon	Falco peregrinus	2023
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruddy Turnstone	Arenaria interpres	2023
Bird	Rufa Red Knot	Calidris canutus rufa	1981
Bird	Ruffed Grouse	Bonasa umbellus	1996
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2023
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-billed Dowitcher	Limnodromus griseus	2023
Bird	Short-eared Owl	Asio flammeus	2023
Bird	Snowy Egret	Egretta thula	2023
Bird	Stilt Sandpiper	Calidris himantopus	2023
Bird	Swainson's Warbler	Limnothlypis swainsonii	2017
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	Western Sandpiper	Calidris mauri	2020
Bird	White-rumped Sandpiper	Calidris fuscicollis	2022
Bird	Whooping Crane	Grus americana	2023
Bird	Willet	Tringa semipalmata	2022
Bird	Willow Flycatcher	Empidonax traillii	2023
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2021
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Insect	American Burying Beetle	Nicrophorus americanus	1974
Mammal	Cinereus Shrew	Sorex cinereus	1994

Lower Cumberland/Pennyroyal Plains and Barrens COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Mammal	Eastern Harvest Mouse	Reithrodontomys humulis	2013
Mammal	Eastern Pygmy Shrew	Sorex hoyi	2011
Mammal	Golden Mouse	Ochrotomys nuttalli	2013
Mammal	Meadow Jumping Mouse	Zapus hudsonius	2013
Mammal	North American Least Shrew	Cryptotis parva	2013
Mammal	Southeastern Shrew	Sorex longirostris	2016
Mammal	Southern Bog Lemming	Synaptomys cooperi	1994
Plant	American Ginseng	Panax quinquefolius	2014
Plant	Appalachian Bugbane	Actaea rubifolia	2012
Plant	Barbed Rattlesnake-root	Nabalus barbatus	2022
Plant	Beak Grass	Diarrhena obovata	1984
Plant	Blue Mud-plantain	Heteranthera limosa	1986
Plant	Blue Sage	Salvia azurea var. grandiflora	1981
Plant	Branched Three-awn Grass	Aristida ramosissima	1980
Plant	Bristly Sedge	Carex comosa	1988
Plant	Buffalo Clover	Trifolium reflexum	2020
Plant	Buffalo Currant	Ribes aureum var. villosum	2008
Plant	Butternut	Juglans cinerea	2012
Plant	Compass Plant	Silphium laciniatum	2002
Plant	Cow-parsnip	Heracleum maximum	2008
Plant	Cream Wild Indigo	Baptisia leucophaea var. leucophaea	2022
Plant	Earleaf False Foxglove	Agalinis auriculata	2007
Plant	Featherfoil	Hottonia inflata	2008
Plant	Gattinger's Bluestar	Amsonia tabernaemontana var. gattingeri	1948
Plant	Grassleaf Arrowhead	Sagittaria graminea	2005
Plant	Hairy Hawkweed	Hieracium longipilum	1994
Plant	Harper's Fimbry	Fimbristylis perpusilla	2007
Plant	Inland Muhly	Muhlenbergia glabrifloris	2000
Plant	Lake-cress	Rorippa aquatica	1983
Plant	Lance-like Spikerush	Eleocharis lanceolata	1950
Plant	Matted Spikerush	Eleocharis intermedia	1966
Plant	Mcdowell's Sunflower	Helianthus occidentalis	1972
Plant	Muskingum Sedge	Carex muskingumensis	1949
Plant	Pale False Foxglove	Agalinis skinneriana	2013
Plant	Prairie Ragwort	Packera plattensis	2008
Plant	Price's Potato-bean	Apios priceana	2024
Plant	Purple Milkweed	Asclepias purpurascens	2009
Plant	Rock Goldenrod	Solidago rupestris	2008
Plant	Rock Grape	Vitis rupestris	1967
Plant	Rough Rattlesnake-root	Prenanthes aspera	2020
Plant	Shortbeak Arrowhead	Sagittaria brevirostra	1999
Plant	Short's Rockcress	Borodinia dentata	2008
Plant	Swamp Lousewort	Pedicularis lanceolata	1991
Plant	Sweet Coneflower	Rudbeckia subtomentosa	1994
Plant	Sweet-scented Indian-plantain	Hasteola suaveolens	2021
Plant	Tansy Rosinweed	Silphium pinnatifidum	2019

Lower Cumberland/Pennyroyal Plains and Barrens COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Yellow Water-crowfoot	Ranunculus flabellaris	1997
Reptile	Eastern Box Turtle	Terrapene carolina	1998
Reptile	Eastern Hog-nosed Snake	Heterodon platirhinos	1997
Reptile	Eastern Pinesnake	Pituophis melanoleucus	2018
Reptile	Eastern Slender Glass Lizard	Ophisaurus attenuatus longicaudus	1996
Reptile	Timber Rattlesnake	Crotalus horridus	2021
Reptile	Western Pygmy Rattlesnake	Sistrurus miliarius streckeri	1995
Reptile	Western Ribbonsnake	Thamnophis proximus	2020

Lower Cumberland/Pennyroyal Plains and Barrens COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Hellbender	Cryptobranchus alleganiensis	1982
Amphibian	Mudpuppy	Necturus maculosus	1993
Amphibian	Western Siren	Siren nettingi	1998
Bivalve	Clubshell	Pleurobema clava	1981
Bivalve	Mountain Creekshell	Leaunio vanuxemensis	2007
Bivalve	Ohio Pigtoe	Pleurobema cordatum	1992
Crustacean	Barren River Crayfsih	Faxonius barrenensis	2007
Crustacean	Hairy Crayfish	Cambarus friaufi	2019
Crustacean	Shortfinger Crayfish	Cambarus brachydactylus	2013
Fish	American Eel	Anguilla rostrata	2016
Fish	Blotched Chub	Erimystax insignis	2003
Fish	Blue Sucker	Cycleptus elongatus	2019
Fish	Lake Sturgeon	Acipenser fulvescens	2024
Fish	Orangefin Darter	Nothonotus bellus	1997
Fish	Paddlefish	Polyodon spathula	2023
Fish	Splendid Darter	Etheostoma barrenense	1997
Fish	Streamline Chub	Erimystax dissimilis	1999
Insect	Acuminate Snaketail	Ophiogomphus acuminatus	1995
Reptile	Alligator Snapping Turtle	Macrochelys temminckii	2017

Lower Cumberland/Pennyroyal Plains and Barrens COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Arachnid	a pseudoscorpion	Kleptochthonius sp.	2006
Arachnid	a spider	Liocranoides gertschi	2006
Arachnid	Cave Funnel-web Spider	Calymmaria persica	2006
Arachnid	Southeastern Cave Pseudoscorpion	Hesperochernes mirabilis	2006
Arachnid	Subterranean Sheetweb Spider	Phanetta subterranea	2006
Bat	Eastern Small-footed Bat	Myotis leibii	1897
Bat	Gray Bat	Myotis grisescens	2017
Bat	Indiana Bat	Myotis sodalis	2017
Bat	Little Brown Myotis	Myotis lucifugus	2017
Bat	Northern Long-eared Bat	Myotis septentrionalis	2013

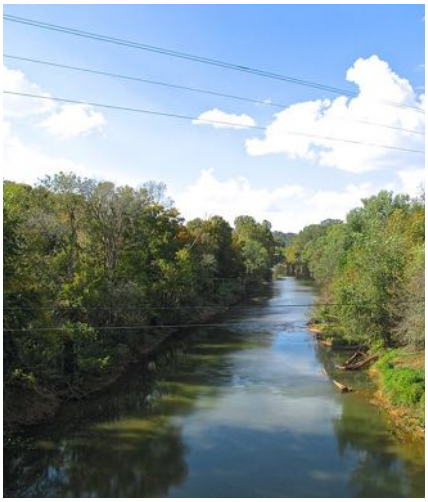
Lower Cumberland/Pennyroyal Plains and Barrens COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bat	Tricolored Bat	Perimyotis subflavus	2017
Crustacean	a cave obligate isopod	Amerigoniscus nicholasi	1965
Crustacean	a cave obligate isopod	Caecidotea bicrenata	2006
Crustacean	a cave obligate isopod	Caecidotea bicrenata bicrenata	2010
Crustacean	Cavespring Crayfish	Cambarus tenebrosus	2006
Crustacean	Central Kentucky Cave Amphipod	Stygobromus exilis	2007
Crustacean	Jeannel's Cave Ostracod	Pseudocandona jeanneli	2006
Crustacean	Mammoth Cave Crayfish	Orconectes pellucidus	2006
Crustacean	Terrestrial Cave Isopod	Haplophthalmus danicus	2006
Fish	Southern Cavefish	Typhlichthys subterraneus	2007
Gastropod	Cave Thorn	Carychium stygium	2006
Gastropod	Raccoon Coil	Helicodiscus barri	1957
Insect	a cave obligate beetle	Batrisodes barri	1959
Insect	a cave obligate beetle	Batrisodes gemmoides	1961
Insect	a cave obligate beetle	Batrisodes gemmus	1957
Insect	a cave obligate springtail	Onychiurus reluctus	2006
Insect	a cave obligate springtail	Pseudosinella aera	2006
Insect	a cave obligate springtail	Pseudosinella hirsuta	2006
Insect	a cave obligate springtail	Sinella cavernarum	2006
Insect	a fly	Megaselia cavernicola	2006
Insect	a rove beetle	Aleochara lucifuga	2006
Insect	a rove beetle	Atheta troglophila	2006
Insect	a springtail	Desoria trispinata	2006
Insect	an ant beetle	Batrisodes sp.	2010
Insect	Annexed Minute Rove Beetle	Atheta annexa	2006
Insect	Barber's Springtail	Sensillanura barberi	2006
Insect	cave crickets	Ceuthophilus sp.	2006
Insect	Cave Dung Fly	Spelobia tenebrarum	2006
Insect	cave ground beetles	Pseudanophthalmus sp.	2006
Insect	Coleman Cave Beetle	Pseudanophthalmus colemanensis	2006
Insect	fungus gnats	Sciara sp.	2006
Insect	Mushroom Springtail	Ceratophysella denticulata	2006
Insect	Opaque Round Fungus Beetle	Prionochaeta opaca	2006
Insect	Slender Ground Beetle	Platynus tenuicollis	2006
Insect	Stellate springtail	Folsomia stella	2006
Insect	Troglophilic Fly	Macrocera nobilis	2006
Insect	Truncated Springtail	Desoria truncata	2006
Insect	Two-toothed Springtail	Pogonognathellus bidentatus	2006
Millipede	a cave milliped	Scoterpes undescribed sp.	2006
Millipede	a cave obligate millipede	Scoterpes musicarustica	2010
Millipede	millipeds	Cambala sp.	2006
Millipede	Shear's cave milliped	Pseudotremia undescribed sp.	2006

Red River

Regional Conservation Opportunity Area



The Red River is a large tributary, approximately 98 miles in length, of the Cumberland River. The headwaters of the Red River begin in Robertson and Sumner Counties and flow northwest into Kentucky before flowing back into Tennessee and entering the Cumberland River in Clarksville, Montgomery Co. The headwaters of the Red River in Tennessee contain numerous smaller streams such as South Fork, Sulphur Fork, Buzzard Creek, and Spring Creek. The Red River is named for the typical color of the water, which is caused by clay and silt runoff into the river, which contain iron oxide. The Red River watershed is 1,453 square miles in north-central Tennessee and south-central Kentucky. The Red River watershed is one of the most negatively impacted in the Cumberland River Basin. The watershed is primarily agriculture with both row crops and cattle production. A very small proportion of the watershed is grasslands and forests.



The Red River watershed is one of the most negatively impacted in the Cumberland River Basin, and many species have been extirpated from the system

Top to bottom: Red River in Adams Co./Brian Stansberry (own work, CC BY 4.0). P2: Southern Cavefish/Daniel Istvanko, TWRA; American Woodcock/Carlos Guindon/USFWS Contractor

The Red River was once inhabited by a diverse assemblage of freshwater mussels and fishes. However, surrounding land use has degraded water quality, and many species have been extirpated from the system. In 2022 a mussel survey was conducted and discovered one live Pheasantshell Mussel and relic shells of Spectaclecase, and Snuffbox Mussels. There are numerous records of other mussel SGCN that are decades old and likely not representative of the current species composition due to poor water quality. Records of SGCN fish in the COA include Ashy Darter and Smallscale Darter. However, these and most other SGCN fish records are historic, and many have not been observed in the COA in decades. Surveys are needed and extensive work is needed to improve water quality for aquatic species.

The Red River COA is rich in cave and karst features due to bedrock consisting primarily of limestone. Caves in the COA are inhabited by numerous species of cave obligate invertebrates that have a high degree of endemism. The Southern Cavefish occurs in caves systems in the COA along with numerous imperiled bats such as Gray Bats and Tricolored Bats. Protection of sinkholes is a critical action needed to improve water quality in subterranean environments and on the surface.

Red River
Conservation Opportunity Area

Partnerships



TWRA will implement strategies to assist in managing and improving private lands and water quality within the Red River watershed to benefit many SGCN plants and animals. Continue to foster partnerships with the US Fish and Wildlife Service, USDA Natural Resources Conservation Service, TN Dept. of Environment and Conservation, universities, local governments, and private landowners as well as companies.



Red River
Conservation Opportunity Area

CMP Stressor Level	Stressor Categories	Threats specific to Red River
2.1 A	Annual and perennial non- timber crops; Agricultural conversion (row crop, mostly historical)	Removal of the natural vegetation of an area for agricultural purposes such as pasture, row crops, feed lots, outbuildings, etc. Agriculture is the primary landcover in the Red River COA. Forest riparian buffer are present along much of the the Red River. However, these buffer are mostly inadequate to protect water quality and many of the tributaries and intermittent headwater streams have no forested buffers.
2.1 B	Annual and perennial non-timber crops; Incompatible row crop agricultural practices	Degradation of soil/water quality or habitat structure related to row crop production and maintenance not compatible with species needs. Often due to erosion from plowing/tilling or chemical applications of herbicides/pesticides. Erosion and sedimentation is the primary threat to aquatic organisms in the COA. The major source of sedimentation is agriculture, primarily row crops.
2.3 C	Livestock farming and ranching; Incompatible grazing/pasture management practices	Degradation of soil/water quality and habitat structure of an area due to excessive grazing or to inadequate exclusion of cattle from stream and forest resources. Also, includes degradation caused by overapplication of fertilizers or other chemicals during pasture management practices. While row cropping is the primary threat in this COA, cattle crazing in streams is another source of stream bank erosion and degradation of water quality.
9.3 C	Agriculture and forestry effluents; Incompatible grazing/pasture management practices	Degradation of soil/water quality and habitat structure of an area due to excessive grazing or to inadequate exclusion of cattle from stream and forest resources. Also, includes degradation caused by over-application of fertilizers or other chemicals during pasture management practices. While row cropping is the primary threat in this COA, cattle grazing in streams is another source of stream bank erosion and degradation of water quality.
9.3 D	Agriculture and forestry effluents; Incompatible row crop agricultural practices	Degradation of soil/water quality or habitat structure related to row crop production and maintenance not compatible with species needs. Often due to erosion from plowing/tilling or chemical applications of herbicides/pesticides. Nutrient loading is caused by both runoff of manure and fertilizers in streams within the COA. This process degrades water quality through anthropogenic eutrophication and leads to decreased oxygen levels in waterbodies.

To learn more about the Red River Conservation Opportunity Area, please contact: Dustin Thames, Biodiversity Coordinator, Region 2 (615) 781-6626

Red River
Conservation Opportunity Area

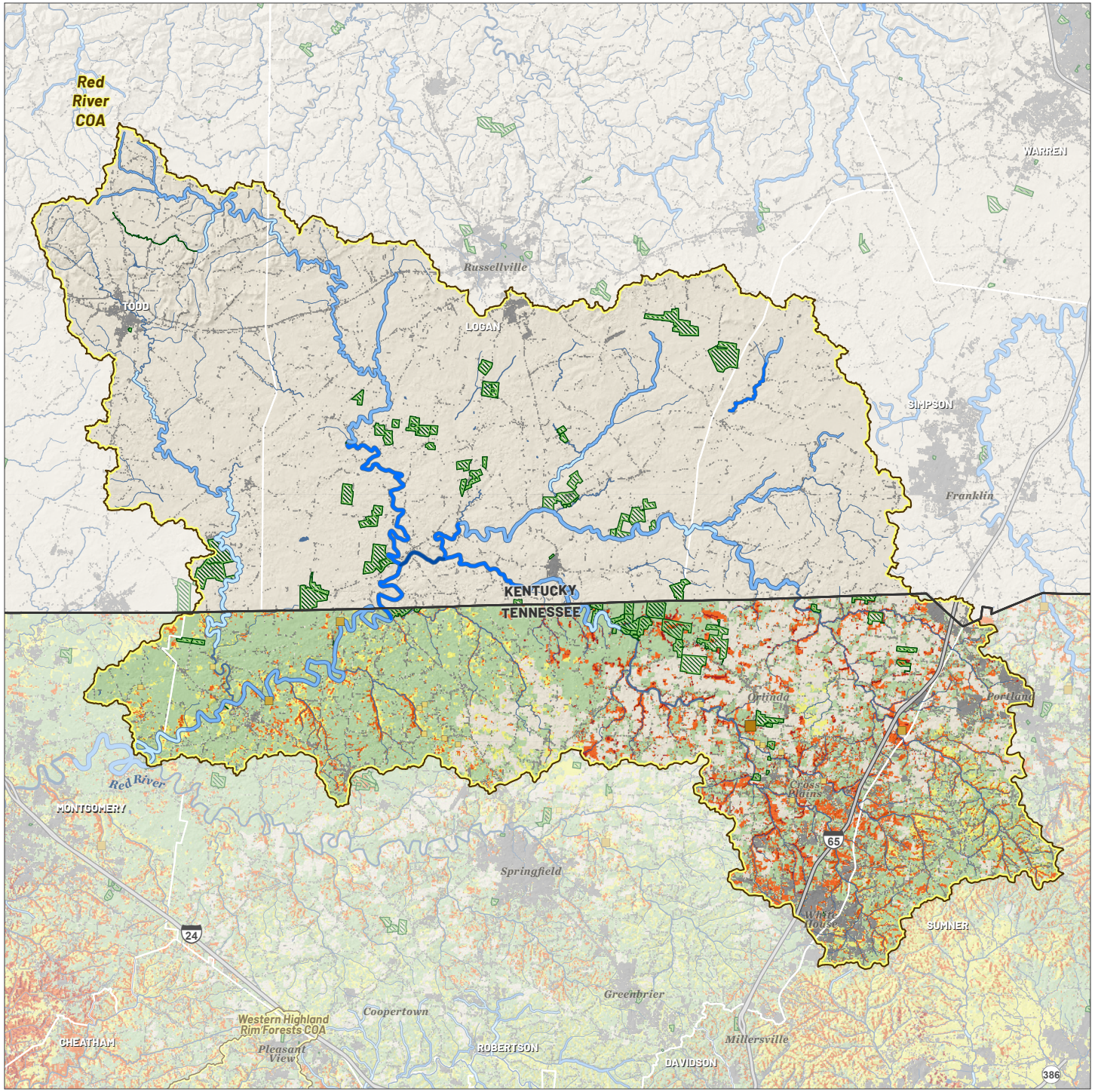
Conservation Actions	Desired Change	Units
Compatible Resource Use	Use government-funded incentive programs (e.g., CRP, EQIP, CSP, WRP, and FLEP) to encourage private landowners to protect water quality for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Compatible Resource Use	Use government-funded incentive programs (e.g., FLEP, CRP, EQIP, Forest Stewardship Program, and Forest Legacy Program) to encourage private landowners to restore and/or protect native forest systems for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres
Alliances & Partnerships	Develop strategic alliances with the Farm Bureau, Natural Resource Conservation Service, Farm Service Agency, TN Division of Water Pollution Control, TN Dept. of Agriculture, Cooperative Extension, and other institutions to improve agricultural and animal production industries that affect target species and habitats.	partnerships
Habitat/Natural Processes Restoration	Restore and enhance riparian zones and buffers in agricultural and urban areas to minimize non-point source pollution.	acres and/or feet of riparian corridor

Conservation Projects

Completed and ongoing projects focused on achieving a better understanding of the abundance, and distribution of SGCN such as fish, freshwater mussels, and bats.

Red River
Conservation Opportunity Area

Red River COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Shady Park Public Hunting Area	TWRA	69	100%



Combined Habitat Priorities

Red River Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

Conservation Opportunity Area (COA)

Public/Protected Land

Conservation Easement

Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Red River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Barking Treefrog	Dryophytes gratiosus	2013
Amphibian	Streamside Salamander	Ambystoma barbouri	2022
Bat	Gray Bat	Myotis grisescens	2014
Bat	Indiana Bat	Myotis sodalis	1963
Bat	Little Brown Myotis	Myotis lucifugus	1963
Bat	Tricolored Bat	Perimyotis subflavus	2014
Bird	American Barn Owl	Tyto furcata	2022
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bell's Vireo	Vireo bellii	2013
Bird	Bewick's Wren	Thryomanes bewickii	1905
Bird	Black-bellied Plover	Pluvialis squatarola	2008
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2021
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2022
Bird	Brown Creeper	Certhia americana	2023
Bird	Cerulean Warbler	Setophaga cerulea	2016
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	1996
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Dunlin	Calidris alpina	2008
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2001
Bird	Grasshopper Sparrow	Ammodramus savannarum	2022
Bird	Great Egret	Ardea alba	2023
Bird	Henslow's Sparrow	Centronyx henslowii	2008
Bird	Kentucky Warbler	Geothlypis formosa	2001
Bird	Lesser Yellowlegs	Tringa flavipes	2022
Bird	Loggerhead Shrike	Lanius ludovicianus	2022
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2013
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2023
Bird	Peregrine Falcon	Falco peregrinus	2019
Bird	Prairie Warbler	Setophaga discolor	2012
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Rusty Blackbird	Euphagus carolinus	2021
Bird	Semipalmated Sandpiper	Calidris pusilla	2017
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-billed Dowitcher	Limnodromus griseus	2008
Bird	Short-eared Owl	Asio flammeus	2005
Bird	Vesper Sparrow	Pooecetes gramineus	2021
Bird	Winter Wren	Troglodytes hiemalis	2023

Red River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Plant	American Ginseng	Panax quinquefolius	2021
Plant	Cream Tick-trefoil	Desmodium ochroleucum	2020
Plant	Cypress-knee Sedge	Carex decomposita	2021
Plant	Downy Gentian	Gentiana puberulenta	1978
Plant	Eastern Eulophus	Perideridia americana	2020
Plant	Plains Muhly	Muhlenbergia cuspidata	1995
Plant	Sharp-scaled Mannagrass	Glyceria acutiflora	2016
Plant	Spreading Yellow False Foxglove	Aureolaria patula	1995
Plant	Tansy Rosinweed	Silphium pinnatifidum	2005
Plant	Torrey's Mountainmint	Pycnanthemum torreyi	2017
Reptile	Eastern Box Turtle	Terrapene carolina	1982
Reptile	Eastern Slender Glass Lizard	Ophisaurus attenuatus longicaudus	1989
Reptile	Timber Rattlesnake	Crotalus horridus	1991

Red River COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bivalve	Cumberland Moccasinshell	Medionidus conradicus	1974
Bivalve	Mountain Creekshell	Leaunio vanuxemensis	1976
Bivalve	Painted Creekshell	Cambarunio taeniatus	1977
Bivalve	Pheasantshell	Actinonaias pectorosa	1974
Bivalve	Pink Mucket	Lampsilis abrupta	1977
Bivalve	Rainbow	Cambarunio iris	1976
Bivalve	Round Hickorynut	Obovaria subrotunda	1977
Bivalve	Slabside Pearlymussel	Pleuronaia dolabelloides	1976
Bivalve	Tan Riffleshell	Epioblasma walkeri	1966
Bivalve	Tennessee Clubshell	Pleurobema oviforme	1974
Crustacean	Depression Crayfish	Cambarus rusticiformis	1998
Fish	American Eel	Anguilla rostrata	1993
Fish	Redlips Darter	Allohistium maydeni	1957
Fish	Slenderhead Darter	Percina phoxocephala	1991
Fish	Smallscale Darter	Nothonotus microlepidus	2007
Fish	Streamline Chub	Erimystax dissimilis	2007
Fish	Tippecanoe Darter	Nothonotus tippecanoe	1999

Red River COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bat	Gray Bat	Myotis grisescens	2013
Bat	Tricolored Bat	Perimyotis subflavus	2014
Crustacean	Central Kentucky Cave Amphipod	Stygobromus exilis	1943

Red River COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Crustacean	Mammoth Cave Crayfish	Orconectes pellucidus	2008
Fish	Southern Cavefish	Typhlichthys subterraneus	2010
Insect	a cave obligate ground beetle	Pseudanophthalmus ciliaris orlindae	1959
Insect	a cave obligate ground beetle	Pseudanophthalmus loganensis	1960
Millipede	a cave milliped	Scoterpes undescribed sp.	2010

South Cumberland Plateau

Regional Conservation Opportunity Area



The South Cumberland Plateau is a mostly forested region whose elevation averages approximately 1,804 feet (550m). The plateau escarpment is extremely dissected along the margins of the plateau, which are characterized by nearly vertical rock faces, rock outcrops, and boulder fields. These areas, which extend into AL, support a large number of caves and karst habitats due to the exposure of limestone bedrock. Karst habitats are extremely diverse -- with springs, seeps, and sinkholes -- and they support high numbers of unique species found nowhere else in the world.



Numerous Species of Greatest Conservation Need (SGCN) can be found throughout this Conservation Opportunity Area (COA). Wetlands support breeding populations of Mountain Chorus Frog and Four-toed Salamander, as well as wintering habitat for Golden Eagles. Populations of Eastern Woodrat and roosting sites for Eastern Small-footed Bats can be found along the Plateau escarpment, along with a species of land snail known from only five sites in the world. Caves support wintering populations of endangered Indiana and Gray Bats, and wet caves harbor the Tennessee Cave Salamander, Tennessee's state amphibian.

The South Cumberland Plateau's diverse forest and karst habitats support numerous sensitive and unique species.

Varied threats affect these diverse habitats: headwater streams are susceptible to siltation and non-point source pollution; incompatible forestry practices can alter both terrestrial and aquatic habitats; and poorly planned housing developments can decrease, degrade, and fragment habitat.



Top to bottom: Walls of Jericho/ Josh Campbell, TWRA; Cave Salamander/Daniel Istvanko, TWRA. P2: Eastern Woodrat/Daniel Istvanko, TWRA. P4: Gray Treefrog/ Jesse Eaker, TWRA

South Cumberland Plateau
Conservation Opportunity Area

Partnerships



TWRA will implement management strategies in areas on public lands that maintain or preserve current terrestrial and aquatic habitats and connectivity between habitats. TWRA will develop and expand partnerships with the US Fish and Wildlife Service, the Office of Surface Mining, US Army Corps of Engineers, Natural Resources Conservation Service/National Water Quality Initiative, the National Fish and Wildlife Foundation, Tennessee Valley Authority, Tennessee Dept. of Environment and Conservation, Tennessee Division of Forestry, The Nature Conservancy, TennGreen Land Conservancy, The Land Trust for Tennessee, Univ. of the South, Univ. of Tennessee, and private landowners.

CMP Stressor Level	Stressors Categories	Threats specific to South Cumberland Plateau
1.1 A	Housing and urban areas; Primary residential development	Destruction or degradation of habitats due to construction activities associated with the building of primary residences. Development along the escarpment is a problem due to removal of forest cover on cliff lines and destruction of viewsheds.
2.2 A	Wood and pulp plantations	Pine plantations operate on sections of the northern part of the COA, reducing biodiversity.
2.3 C	Livestock farming and ranching; Incompatible grazing/pasture management practices	Degradation of soil/water quality and habitat structure of an area due to excessive grazing or to inadequate exclusion of cattle from stream and forest resources. Also includes degradation caused by over-application of fertilizers or other chemicals during pasture management practices. Cattle in headwater streams is an issue.
5.3 A	Logging and wood harvesting	Disregard for forestry BMPs in this COA includes high grading as well as timber harvest on steep slopes leading to sedimentation.

Conservation Projects

Many completed and ongoing projects focused on achieving a better understanding of the abundance and distribution of SGCN, for example Golden Eagle, Eastern Spotted Skunk, Woodrat species, Green Salamander, Tennessee Cave Salamander, and Long-tailed Weasels.

To learn more about the South Cumberland Plateau Conservation Opportunity Area, please contact: Dustin Thames, Biodiversity Coordinator, Region 2 (931) 484-9571

CMP Stressor Level	Stressors Categories	Threats specific to South Cumberland Plateau, continued
6.1 A	Recreational activities - non-vehicular	Destruction and degradation of habitats and increased mortality of species due to excessive levels of recreational activities or inappropriate usage of habitats for recreation. This is primarily related to caving activities. Numerous caves with SGCN occur in the COA. Caves are sensitive ecosystems often with high levels of endimism, and recreational caving has a negative impact on the resource. Disturbance of bats during hibernation may compound the impacts of the white-nose syndrome epidemic, and disturbance during summer can cause direct mortality to maternity colonies.
6.1 B	Recreational activities - vehicular	Destruction and degradation of habitats and increased mortality of species due to excessive levels of recreational vehicle traffic or inappropriate usage of habitats for recreational vehicles. Development of areas for OHV use is widespread in this COA.
7.1 A	Fire and fire suppression	Degradation of fire-dependent natural systems due to either human suppression of fire or the conditions needed to support combustion. Mesophication is a concern on Cumberland Plateau and escarpment (mesophication is the process where an ecosystem shifts to species that normally prefer wetter conditions. It is occurring in many eastern forests, as shade-tolerant species such as red maple and tulip poplar become dominant, rather than drought-tolerant and fire-adapted oaks and hickories).
8.1 A	Invasive non-native/alien species plants and animals	Increased mortality or habitat degradation caused by excessive competition or predation from invasive exotic species. Forest pests such as Emerald Ash Borer, Dutch Elm Disease, and Hemlock Woolly Adelgid are a problem along with the Bd fungus, white-nose syndrome, snake fungal disease, and others.

Three cave gates were constructed to protect SGCN bat populations from human disturbance. A project examining the summer daytime roost selection and foraging range of Tricolored Bats was completed. WNS surveys monitored the condition of important cave sites, as well as the health of specific bat populations. Summer mist net surveys were completed to track changes in bat relative abundance and distribution. Additionally, Motus tags were deployed on bats to examine species movement across the landscape.

The USFWS also acquired 87 acres in 2023 to develop the **Paint Rock River National Wildlife Refuge**. The purpose of the refuge is to protect the Paint Rock River watershed. The Paint Rock River is a biologically diverse river with numerous federally listed fishes and freshwater mussels.

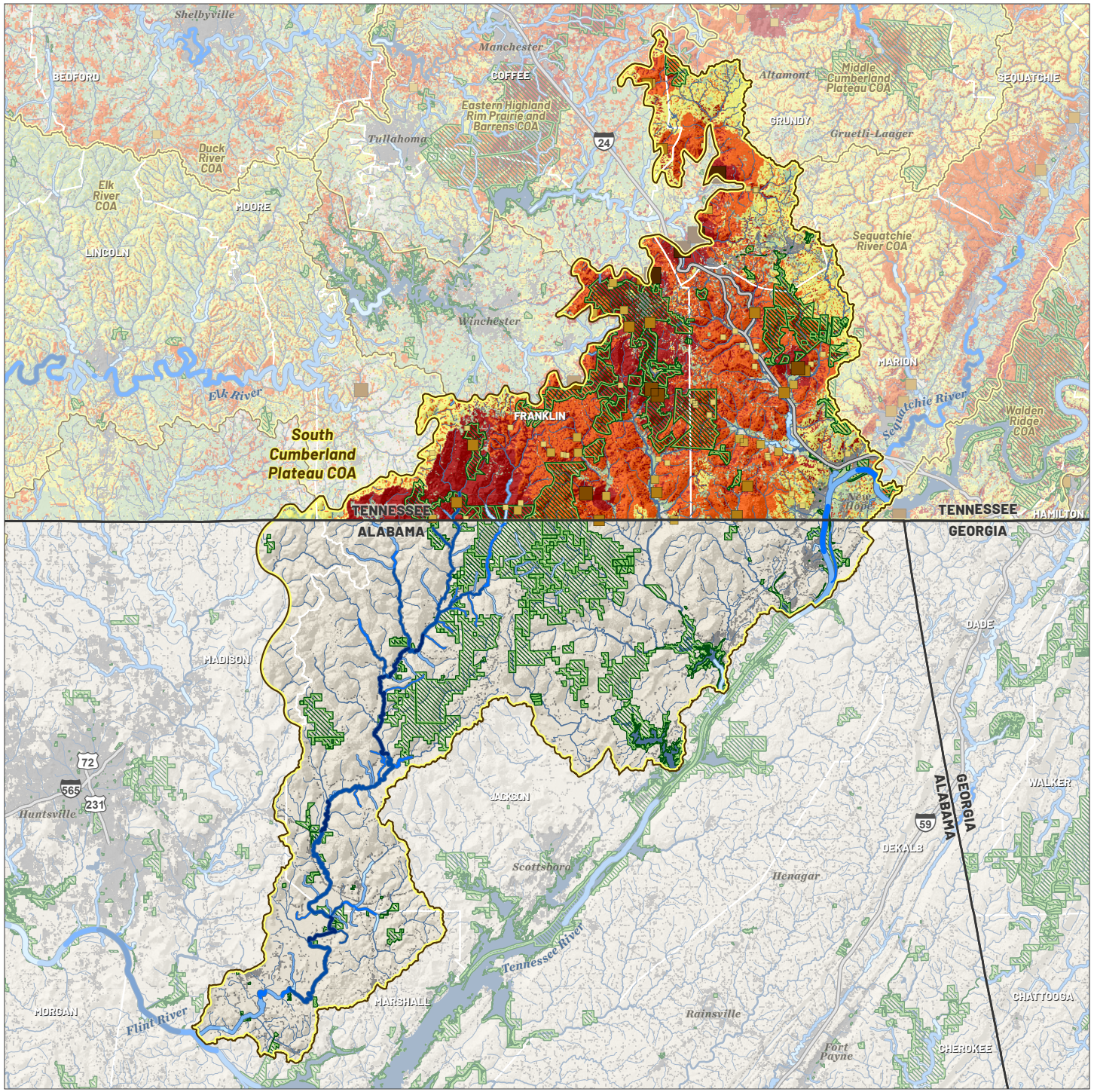
South Cumberland Plateau
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats that provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	Acres
Formal Education, Training, Outdoor Education, & Recreation	Develop outdoor education and recreation programs that inform the public about the effects of recreational vehicles and various other recreational uses on target species and habitats.	research projects
Research	Conduct scientific surveys to discern the geographical distributions of lesser known target species.	surveys
Compatible Resource Use	Use government funded incentive programs (e.g., FLEP, CRP, EQIP, Forest Stewardship Program, and Forest Legacy Program) to encourage private landowners to restore and/or protect native forest systems for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Reintroduce fire via prescribed burning into fire-dependent grassland and woodland systems within critical units of terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore degraded forests and pine plantations to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres



South Cumberland Plateau
Conservation Opportunity Area

South Cumberland Plateau COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Dick Cove National Natural Landmark	Private	215	100%
University of the South Domain	Private	12,950	100%
South Cumberland SP	TDEC - SP	30,317	39%
Franklin SF	TDF	6,797	100%
Foster Falls SWA	TVA	144	100%
Little Gizzard Creek SWA	TVA	547	100%
Nickajack Oak Wetland Habitat Protection Area	TVA	48	100%
Battle Creek Public Hunting Area	TWRA	79	100%
Bear Hollow Mountain WMA	TWRA	23,178	100%
Paint Rock NWR	USFWS	87	100%



Combined Habitat Priorities

South Cumberland Plateau Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

Conservation Opportunity Area (COA)

Public/Protected Land

Conservation Easement

Karst Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



South Cumberland Plateau COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Barking Treefrog	Dryophytes gratiosus	2008
Amphibian	Cumberland Dusky Salamander	Desmognathus abditus	2018
Amphibian	Four-toed Salamander	Hemidactylium scutatum	2018
Amphibian	Gray Treefrog	Dryophytes versicolor	2010
Amphibian	Green Salamander	Aneides aeneus	2022
Amphibian	Mountain Chorus Frog	Pseudacris brachyphona	2010
Amphibian	Mud Salamander	Pseudotriton montanus	1960
Amphibian	Southern Cricket Frog	Acris gryllus	2008
Amphibian	Southern Ravine Salamander	Plethodon richmondi	1980
Bat	Eastern Small-footed Bat	Myotis leibii	2021
Bat	Gray Bat	Myotis grisescens	2020
Bat	Indiana Bat	Myotis sodalis	2018
Bat	Little Brown Myotis	Myotis lucifugus	2019
Bat	Northern Hoary Bat	Lasiurus cinereus	2021
Bat	Northern Long-eared Bat	Myotis septentrionalis	2018
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2020
Bat	Southeastern Bat	Myotis austroriparius	2018
Bat	Tricolored Bat	Perimyotis subflavus	2022
Bird	American Barn Owl	Tyto furcata	2023
Bird	American Black Duck	Anas rubripes	2019
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bank Swallow	Riparia riparia	2021
Bird	Bewick's Wren	Thryomanes bewickii	1970
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2023
Bird	Bobolink	Dolichonyx oryzivorus	2023
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2023
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Connecticut Warbler	Oporornis agilis	2011
Bird	Dunlin	Calidris alpina	2021
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Evening Grosbeak	Coccothraustes vespertinus	2021
Bird	Golden Eagle	Aquila chrysaetos	2023
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2018
Bird	Great Egret	Ardea alba	2023
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	Lesser Yellowlegs	Tringa flavipes	2023

South Cumberland Plateau COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2023
Bird	Long-eared Owl	Asio otus	1979
Bird	Long-tailed Duck	Clangula hyemalis	2010
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2022
Bird	Northern Bobwhite	Colinus virginianus	2021
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2022
Bird	Northern Saw-whet Owl	Aegolius acadicus	2009
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2020
Bird	Peregrine Falcon	Falco peregrinus	2021
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruffed Grouse	Bonasa umbellus	2022
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2009
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Snowy Egret	Egretta thula	2022
Bird	Swainson's Warbler	Limnothlypis swainsonii	2023
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2022
Bird	Willet	Tringa semipalmata	2023
Bird	Willow Flycatcher	Empidonax traillii	2020
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Gastropod	Alabama Shagreen	Inflectarius smithi	1996
Gastropod	Alabama Tigersnail	Anguispira alabama	2011
Gastropod	Channelled Disc	Discus clappi	1960
Gastropod	Painted Snake Coiled Forest Snail	Anguispira picta	2009
Gastropod	Squat Globelet	Mesodon sanus	2001
Gastropod	Striate Gloss	Zonitoides lateumbilicatus	2001
Gastropod	Teasing Supercoil	Paravitrea tantilla	1957
Mammal	Allegheny Woodrat	Neotoma magister	2022
Mammal	Cinereus Shrew	Sorex cinereus	2006
Mammal	Eastern Harvest Mouse	Reithrodontomys humulis	2021
Mammal	Eastern Pygmy Shrew	Sorex hoyi	2010
Mammal	Eastern Spotted Skunk	Spilogale putorius	2018
Mammal	Eastern Woodrat	Neotoma floridana illinoensis	2019

South Cumberland Plateau COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Mammal	Golden Mouse	Ochrotomys nuttalli	2010
Mammal	Smoky Shrew	Sorex fumeus	1979
Mammal	Southeastern Shrew	Sorex longirostris	2010
Plant	a liverwort	Radula voluta	2001
Plant	Alabama Grapefern	Botrychium jenmanii	2010
Plant	Alabama Snow-wreath	Neviusia alabamensis	2009
Plant	Allegheny Mountain Golden-banner	Thermopsis mollis	2020
Plant	American Barberry	Berberis canadensis	2015
Plant	American Chestnut	Castanea dentata	2000
Plant	American Ginseng	Panax quinquefolius	2005
Plant	American Hart's-tongue Fern	Asplenium scolopendrium var. americanum	2016
Plant	American Smoketree	Cotinus obovatus	2020
Plant	Appalachian Filmy Fern	Vandenboschia boschiana	2022
Plant	Barrens Silky Aster	Symphyotrichum pratense	2007
Plant	Blomquist Leafy Liverwort	Lejeunea blomquistii	2001
Plant	Bog Wild Oatgrass	Danthonia epilis	2007
Plant	Butternut	Juglans cinerea	2022
Plant	Cardot's Pouncewort	Microlejeunea globosa	2001
Plant	Cream Tick-trefoil	Desmodium ochroleucum	2008
Plant	Crested Shieldfern	Dryopteris cristata	1962
Plant	Cumberland Rosinweed	Silphium brachiatum	2023
Plant	Cutleaf Water-milfoil	Myriophyllum pinnatum	1987
Plant	Dwarf Filmy Fern	Didymoglossum petersii	2015
Plant	Eggert's Sunflower	Helianthus eggertii	2021
Plant	False Gromwell	Lithospermum subsetosum	1996
Plant	Featherfoil	Hottonia inflata	1998
Plant	Foxtail Bog Clubmoss	Lycopodiella alopecuroides	2009
Plant	Gattinger's Bluestar	Amsonia tabernaemontana var. gattingeri	1972
Plant	Great Plains Ladies'-tresses	Spiranthes magnicamporum	2009
Plant	Harper's Fimbry	Fimbristylis perpusilla	1993
Plant	Heartleaf Plantain	Plantago cordata	2008
Plant	Horsetail Spikerush	Eleocharis equisetoides	1996
Plant	Kral's Beardtongue	Penstemon kralii	2011
Plant	Lanceleaf Wakerobin	Trillium lancifolium	1980
Plant	Large-flower Rock-pink	Phemeranthus mengesii	2008
Plant	Late Goldenrod	Solidago tarda	1971
Plant	Least Trillium	Trillium pusillum	1991
Plant	Limerock Arrow-wood	Viburnum bracteatum	2021
Plant	Loesel's Twayblade	Liparis loeselii	2023
Plant	Mcdowell's Sunflower	Helianthus occidentalis	2010
Plant	Morefield's Leatherflower	Clematis morefieldii	2024
Plant	Moss Phlox	Phlox subulata	2012
Plant	Mountain Honeysuckle	Lonicera dioica	2021
Plant	Narrowleaf Wild Leek	Allium burdickii	2006
Plant	Nestronia	Nestronia umbellula	2018
Plant	Ornate Cololejeunea	Cololejeunea ornata	2001

South Cumberland Plateau COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Ovate Catchfly	Silene ovata	1946
Plant	Ovate False Fiddleleaf	Hydrolea ovata	1987
Plant	Ozark Bunchflower	Melanthium woodii	2015
Plant	Palamocladium Moss	Palamocladium leskeoides	1960
Plant	Pineland Beakrush	Rhynchospora perplexa	1942
Plant	Prairie Goldenrod	Oligoneuron album	2010
Plant	Pretty St. John's-wort	Hypericum nudiflorum	1948
Plant	Price's Potato-bean	Apios priceana	2024
Plant	Roundleaf Fameflower	Phemeranthus teretifolius	2010
Plant	Shadow-witch Orchid	Ponthieva racemosa	1986
Plant	Sharp's Pouncewort	Lejeunea sharpii	2001
Plant	Sharp-scaled Mannagrass	Glyceria acutiflora	1993
Plant	Shining Ladies'-tresses	Spiranthes lucida	2016
Plant	Silverling	Paronychia argyrocoma	2000
Plant	Slender Blazingstar	Liatris cylindracea	2010
Plant	Small Whorled Pogonia	Isotria medeoloides	2016
Plant	Small's Stonecrop	Diamorpha smallii	2009
Plant	Smooth Woodmint	Blephilia subnuda	2019
Plant	Tansy Rosinweed	Silphium pinnatifidum	2014
Plant	Tawny Cotton-grass	Eriophorum virginicum	1938
Plant	Tennessee Death-Camas	Stenanthium tennesseense	1987
Plant	Virginia Chainfern	Anchistea virginica	2020
Plant	White Fringeless Orchid	Platanthera integrilabia	2024
Plant	White Prairie-clover	Dalea candida	2021
Plant	Whiteleaf Leatherflower	Clematis glaucophylla	2018
Plant	Wood Lily	Lilium philadelphicum	2020
Plant	Yellow Honeysuckle	Lonicera flava	2009
Plant	Yellow-crested Orchid	Platanthera cristata	2024
Reptile	Eastern Box Turtle	Terrapene carolina	2018
Reptile	Eastern Hog-nosed Snake	Heterodon platirhinos	2018
Reptile	Eastern Pinesnake	Pituophis melanoleucus	1984
Reptile	Timber Rattlesnake	Crotalus horridus	2008

South Cumberland Plateau COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bivalve	Alabama Lampmussel	Lampsilis virescens	1995
Bivalve	Black Sandshell	Ligumia recta	2008
Bivalve	Cumberland Moccasinshell	Medionidus conradicus	1995
Bivalve	Fanshell	Cyprogenia stegaria	1965
Bivalve	Mountain Creekshell	Leaunio vanuxemensis	1995
Bivalve	Painted Creekshell	Cambarunio taeniatus	1995
Bivalve	Pale Lilliput	Toxolasma cylindrellum	1995
Bivalve	Pink Mucket	Lampsilis abrupta	2008
Bivalve	Rainbow	Cambarunio iris	1995

South Cumberland Plateau COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bivalve	Slabside Pearlymussel	Pleuronaia dolabelloides	1995
Bivalve	Tennessee Clubshell	Pleurobema oviforme	1995
Bivalve	Tennessee Pigtoe	Pleuronaia barnesiana	1995
Fish	Lake Sturgeon	Acipenser fulvescens	2023
Fish	Snail Darter	Percina tanasi	2020
Gastropod	Anthony's Riversnail	Athearnia anthonyi	1998
Gastropod	Armored Rocksnail	Lithasia armigera	2015
Gastropod	Corpulent Hornsnail	Pleurocera corpulenta	2015
Gastropod	Golden Pebblesnail	Somatogyrus aureus	1997
Gastropod	Smooth Mudalia	Leptoxis virgata	2015
Gastropod	Spiny Riversnail	Io fluvialis	2004
Gastropod	Warty Rocksnail	Lithasia lima	2007
Reptile	Alligator Snapping Turtle	Macrochelys temminckii	2019

South Cumberland Plateau COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Big Mouth Cave Salamander	Gyrinophilus palleucus necturoides	2005
Amphibian	Gray Treefrog	Dryophytes versicolor	2005
Amphibian	Pale Salamander	Gyrinophilus palleucus palleucus	2007
Amphibian	Tennessee Cave Salamander	Gyrinophilus palleucus	2016
Arachnid	a cave obligate harvestman	Phalangodes appalachius	2011
Arachnid	a cave obligate pseudoscorpion	Kleptochthonius magnus	2004
Arachnid	a cave obligate pseudoscorpion	Kleptochthonius tantalus	1967
Arachnid	a cave obligate pseudoscorpion	Tyrannochthonius fiskei	1997
Arachnid	a cave obligate pseudoscorpion	Tyrannochthonius halopotamus	1996
Arachnid	a cave obligate spider	Nesticus barri	2012
Arachnid	a pseudoscorpion	Apochthonius sp.	2005
Arachnid	Archer's Two-clawed Spider	Liocranoides archeri	2012
Arachnid	cave harvestmen	Phalangodes sp.	2004
Arachnid	cave sheet-web spiders	Oreonetides sp.	2004
Arachnid	Eastern Cave Long-jawed Spider	Meta ovalis	2005
Arachnid	funnel-web spider	Cicurina breviaria	2005
Arachnid	harvestman	Bishopella sp. Probably laciniosa	2010
Arachnid	Monteagle Cave Spider	Nesticus pecki	2005
Arachnid	Pale Sheetweb Weaver	Bathyphantes pallidus	2005
Arachnid	Round Cove cave pseudoscorpion	Kleptochthonius sp.	2005
Arachnid	Southeastern Cave Pseudoscorpion	Hesperochernes mirabilis	2016
Arachnid	Subterranean Sheetweb Spider	Phanetta subterranea	2012
Arachnid	Two-clawed spider	Liocranoides sp.	2005
Arachnid	Valentine's Cave Spider	Nesticus valentinei	1985
Bat	Indiana Bat	Myotis sodalis	2012
Bat	Little Brown Myotis	Myotis lucifugus	2014
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2012
Bat	Southeastern Bat	Myotis austroriparius	2012

South Cumberland Plateau COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bat	Tricolored Bat	Perimyotis subflavus	2016
Crustacean	a cave obligate amphipod	Stygobromus dicksoni	2005
Crustacean	a cave obligate amphipod	Stygobromus sp. 34	2012
Crustacean	a cave obligate isopod	Caecidotea bicrenata	1965
Crustacean	a cave obligate isopod	Caecidotea bicrenata bicrenata	2012
Crustacean	a cave obligate isopod	Ligidium elrodii hancockensis	2005
Crustacean	a cave obligate shrimp	Dactylocythere steevesi	2001
Crustacean	a cyclopoid copepod	Acanthocyclops parasensitivus	2004
Crustacean	Barr's Terrestrial Isopod	Miktoniscus barri	2005
Crustacean	Cavespring Crayfish	Cambarus tenebrosus	2004
Crustacean	Central Kentucky Cave Amphipod	Stygobromus exilis	2004
Crustacean	groundwater ostracods	Pseudocandona sp.	2004
Crustacean	Indiana Groundwater Copepod	Diacyclops sp.	2005
Crustacean	Jeannel's Cave Ostracod	Pseudocandona jeanneli	2005
Crustacean	Mammoth Cave Stygobromid	Stygobromus vitreus	2005
Crustacean	Prickly Cave Crayfish	Cambarus hamulatus	2007
Crustacean	Small Alabama Sowbug	Miktoniscus medcofi	2004
Crustacean	Southern cave amphipod	Stygobromus sp. 4	2005
Crustacean	Southern Cave Crayfish	Orconectes australis	2008
Crustacean	Swamp River Cave Amphipod	Stygobromus sp. 22	2004
Crustacean	Terrestrial Cave Isopod	Haplophthalmus danicus	2004
Crustacean	Yeatman's Groundwater Copepod	Diacyclops yeatmani	2004
Fish	Southern Cavefish	Typhlichthys subterraneus	2012
Flatworm	a cave obligate planarian	Sphalloplana percoeca	2012
Gastropod	a terrestrial snail	Glyphyalinia sp.	2005
Gastropod	Cave Thorn	Carychium stygium	2005
Gastropod	Cricket Coil	Helicodiscus hadenoecus	2004
Gastropod	Raccoon Coil	Helicodiscus barri	2004
Gastropod	Teasing Supercoil	Paravitrea tantilla	1957
Insect	a bristletail	Litocampa sp.	1981
Insect	a carabid beetle	Rhadine caudata	2004
Insect	a cave barklice	Psyllipsocus ramburi	2005
Insect	a cave obligate beetle	Pseudanophthalmus sp.	2012
Insect	a cave obligate beetle	Ptomaphagus chromolithus	1984
Insect	a cave obligate beetle	Ptomaphagus hatchi	2012
Insect	a cave obligate beetle	Speleochus steevesi	2011
Insect	a cave obligate beetle	Subterrochus ferus	2004
Insect	a cave obligate bristletail	Litocampa valentinei	2012
Insect	a cave obligate ground beetle	Pseudanophthalmus humeralis	2004
Insect	a cave obligate springtail	Pseudosinella christianseni	2004
Insect	a cave obligate springtail	Pseudosinella hirsuta	2012
Insect	a cave obligate springtail	Pseudosinella spinosa	2012
Insect	a cave springtail	Pseudosinella cf. nata	2004
Insect	a fly	Megaselia cavernicola	2005
Insect	a ground beetle	Anillinus sp.	2004
Insect	a rove beetle	Aloconota insecta	1986

South Cumberland Plateau COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Insect	a rove beetle	Atheta sp.	2004
Insect	a rove beetle	Atheta troglophila	1986
Insect	Annexed Minute Rove Beetle	Atheta annexa	1986
Insect	Barr's cave cricket	Hadenoecus barri	1978
Insect	cave cricket	Euhadenoecus puteaus	1978
Insect	Cave Dung Fly	Spelobia tenebrarum	2012
Insect	Cumberland Ground Beetle	Trechus cumberlandus	2005
Insect	Greenbrier Riverbank Ground Beetle	Bembidion lacunarium	2004
Insect	Intermediate Cave Beetle	Pseudanophthalmus intermedius	2004
Insect	Jone's Cave Cricket	Hadenoecus jonesi	2005
Insect	Missus Cave Springtail	Lethemurus missus	2004
Insect	Pale-footed Ocellate Rove Beetle	Lesteva pallipes	2004
Insect	Peck's Cave Springtail	Pseudosinella pecki	2004
Insect	Rumbling Falls Cave Dipluran	Litocampa sp. 5	2005
Insect	Troglophilic Fly	Macrocera nobilis	2005
Insect	Two-toothed Springtail	Pogonognathellus bidentatus	2004
Mammal	Allegheny Woodrat	Neotoma magister	2006
Millipede	a cave milliped	Scoterpes sp.	2012
Millipede	a cave obligate millipede	Pseudotremia minos	2012
Millipede	a cave obligate millipede	Pseudotremia rhadamanthus	1972
Millipede	a cave obligate millipede	Scoterpes ventus	2004
Millipede	a cave obligate millipede	Tetracion jonesi	2012
Millipede	a cave obligate millipede	Tetracion tennesseensis	2004
Millipede	Barr's cave milliped	Pseudotremia sp. 7	2011
Millipede	cave millipeds	Pseudotremia sp.	2004
Millipede	Skylight cave milliped	Pseudotremia sp. 8	2004
Reptile	Timber Rattlesnake	Crotalus horridus	2004
Roundworm	a cave obligate worm	Eremidrilus allegheniensis	1967

2025 Conservation Opportunity Area Factsheets

Region 3 (10 COAs)

Berry Cave Salamander

Conservation Opportunity Area



The area surrounding the Berry Cave Salamander COA in eastern Tennessee, particularly near the city of Knoxville, is part of a unique ecoregion known for its karst topography, limestone caves, and underground water systems. This region is ecologically significant for its high biodiversity, particularly among cave-dwelling species and other specialized organisms that thrive in its subterranean habitats. The Berry Cave Salamander (*Gyrinophilus gulolineatus*), a federally listed species, is one of the most notable inhabitants. This cave-dwelling salamander is dependent on groundwater systems and very specific conditions within the cave environment, including cool, clean water and minimal human disturbance. The surrounding landscape includes forests, wetlands, and natural karst features that support a diverse array of species, including fishes, amphibians, and invertebrates, many of which are uniquely adapted to the region.



This region is ecologically significant for its high biodiversity, particularly among cave-dwelling species and other specialized organisms that thrive in subterranean habitats.

Top to bottom: Berry Cave Salamander/Matthew L. Niemiller, Gladstone NS, Carter ET, Niemiller KDK, Hayter LE, Niemiller ML (2018)

However, the habitat of the Berry Cave Salamander faces several ecological threats, primarily driven by human activity, especially in and around urban areas like Knoxville. Urban sprawl, industrial development, and agricultural runoff contribute to water pollution, sedimentation, and habitat fragmentation, all of which can degrade the delicate karst systems and the species that rely on them. Groundwater contamination and habitat disruption caused by construction, road development, and waste disposal pose significant risks to cave ecosystems. Additionally, invasive species and the alteration of natural flow patterns are concerns for both the salamander and surrounding biodiversity. To conserve these species, it is essential to focus on protecting and restoring water quality, protecting cave habitats from human encroachment, and addressing the broader environmental challenges posed by urbanization.

Partnerships

US Fish and Wildlife Service, USDA Natural Resource Conservation Service, Tennessee Department of Environment and Conservation, Oak Ridge National Laboratory, Non-governmental Organizations, university researchers and institutions, and private landowners.

Berry Cave Salamander
Conservation Opportunity Area

CMP Stressor Level	Stressor Categories	Threats specific to Berry Cave Salamander
1.1 B	Housing and urban areas; Secondary home/resort development	Destruction or degradation of habitats due to construction activities associated with the building of secondary/vacation homes and resort developments. Urbanization is increasing along the Tennessee River corridor and in Knox Co.
1.2 A	Commercial and industrial areas	Destruction or degradation of habitats in an area due to construction and other activities related to the development of commercial or industrial buildings. Urbanization is increasing along the Tennessee River corridor and in Knox Co.
1.2 B	Commercial and industrial areas; Landfill construction/ operation (one species)	Destruction or degradation of habitats due to construction and maintenance of county or municipal landfill operations. Also includes habitat degradation and increased mortality caused by releases of toxins and other contaminants into the environment. Urbanization is increasing along the Tennessee River corridor and in Knox Co.
1.3 A	Tourism and recreation areas	Habitat effects of recreation areas. Urbanization is increasing along the Tennessee River corridor and in Knox Co.
2.3 C	Livestock farming and ranching: Incompatible grazing/pasture management practices	Degradation of soil/water quality and habitat structure of an area due to excessive grazing or to inadequate exclusion of cattle from stream and forest resources. Also, includes degradation caused by overapplication of fertilizers or other chemicals during pasture management practices. Animals not excluded from streams and rivers. Shoreline not protected.
4.1 A	Roads and railroads	Destruction or degradation of habitats in an area due to construction of roads, railroads, or utilities. The linear makeup of these corridors often fragments terrestrial habitats. Urbanization is increasing along the Tennessee River corridor and in Knox Co.
4.2 A	Utility and service lines	Utility, cell phone, and other communication towers connected by small access roads. Urbanization is increasing along the Tennessee River corridor and in Knox Co.
7.3 B	Other ecosystem modifications; Shoreline stabilization	Degradation of water quality and destruction of habitats along shorelines during stabilization activities that cover stream banks with rock or other erosion control structures (e.g., rip rap). Development along riverine systems and degradation of shoreline influences species.
9.1 A	Household sewage and urban wastewater; Municipal wastewater treatment/ stormwater runoff	Degradation of water quality resulting from ineffective treatment of municipal wastewater released into rivers and streams. Also includes ineffective capture and treatment of stormwater runoff which is often contaminated by various pollutants. Urbanization of Knoxville Metropolitan area will degrade habitat for this COA.
9.1 B	Household sewage an d urban waste water; Residential sewage/septic systems	Degradation of water quality resulting from ineffective treatment of residential sewage by septic systems. Often caused by older, defective sewage systems or by poorly-sited septic tanks. Urbanization of Knoxville Metropolitan area will degrade habitat for this COA.
9.3 C	Agriculture and forestry effluents; Incompatible grazing/ pasture management practices	Degradation of soil/water quality and habitat structure of an area due to excessive grazing or to inadequate exclusion of cattle from stream and forest resources. Also, includes degradation caused by overapplication of fertilizers or other chemicals during pasture management practices. Urbanization of Knoxville Metropolitan area will degrade habitat for this COA.

Berry Cave Salamander Conservation Opportunity Area		
Conservation Actions	**Desired Change**	**Units**
Research	Conduct scientific surveys to discern the geographical distributions of lesser known target species.	surveys
Research	Conduct research to map karst systems, delineate underground watersheds, and identify above-ground linkages to subterranean habitats.	delineations/ linkages
Conservation Area Management	Discourage conversion of native habitats to semi/non-natural land types (e.g., pine plantations, golf courses, etc.) on public and private conservation areas across the state.	acres
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres and/or feet riparian corridor
Alliances and Partnerships	Develop strategic alliances with TN Dept. of Transportation, county mayors, municipalities, city/county planners, private developers and others to address urban and rural development practices that affect target species and habitats.	partnerships
Compliance and Enforcement	Increase compliance monitoring of aquatic resource alteration permits, storm water, and other permits within critical units of aquatic and subterranean habitats.	acres
Habitat Acquisition	Identify and protect areas with high evolutionary potential (i.e., evolutionary or biodiversity hotspots) that allow for the persistence of locally adapted populations and adaptive genetic diversity.	acres
Habitat/Natural Processes Restoration	Restore and enhance riparian zones and buffers in agricultural and urban areas to minimize non-point source pollution.	acres and/or feet riparian corridor
Climate Adaptation Management	Protect wetland systems to buffer storm and flood impacts.	acres
Climate Adaptation Management	Reduce risks of facilitating movement of undesirable invasive species, pests, and pathogens, while allowing for connectivity for the movement of desired species.	species
Facilitation	Manage species to preserve genetic diversity, especially at the leading and trailing edges of their ranges.	species

Conservation Projects

The 2019 Berry Cave Salamander Species Status Assessment indicated that the species was known to occupy six cave systems and considered extant at three more at that time (for a total of 9 cave systems). However, where conservation biologists continue to survey the species' known range, the salamander is currently known to occur only in four cave locations in East Tennessee.

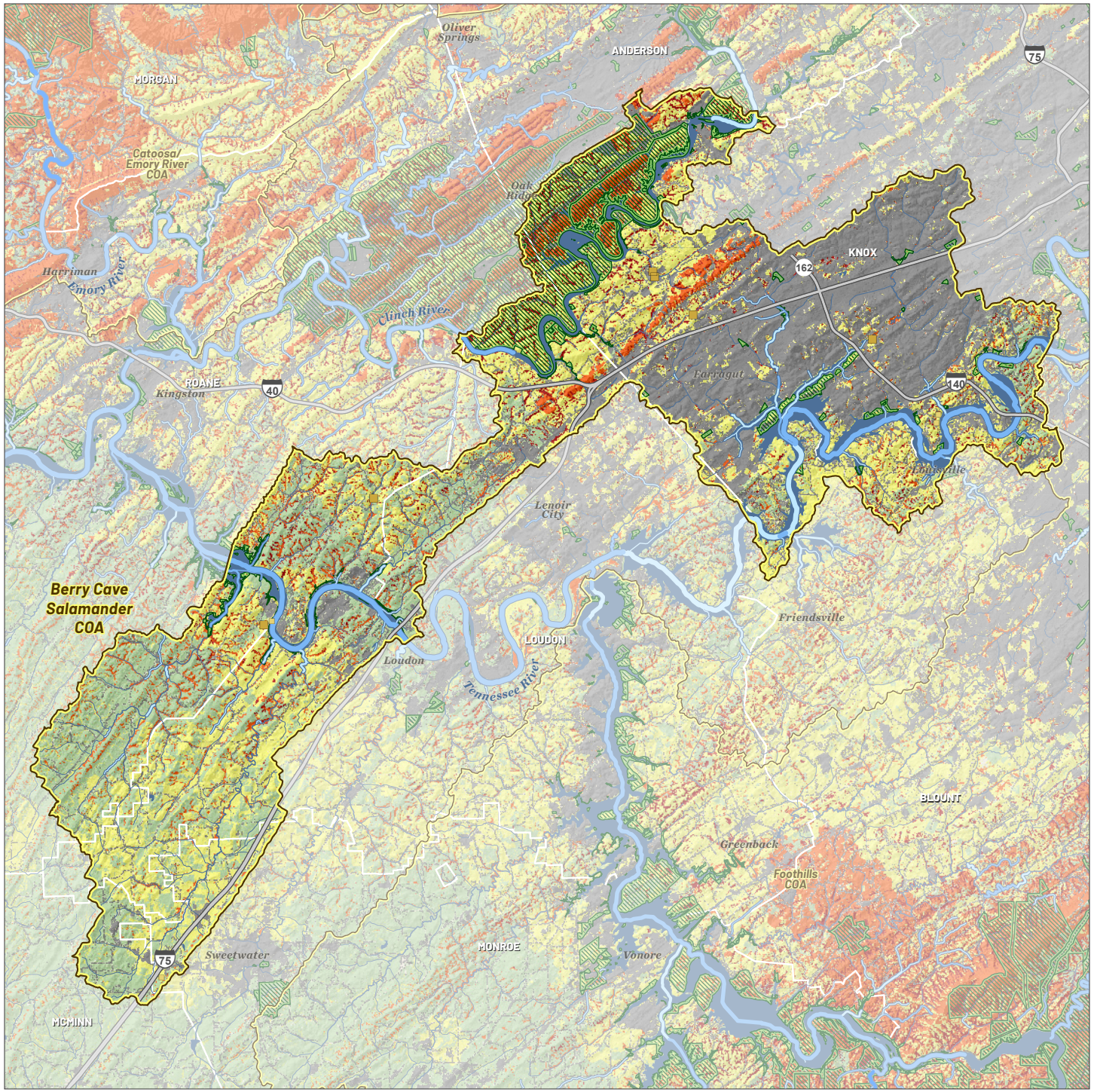
To learn more about the Berry Cave Salamander Conservation Opportunity Area, please contact Daniel Istvanko, Biodiversity Coordinator, Region 3 (931) 484-9571

Berry Cave Salamander Conservation Opportunity Area

Future efforts should focus on reducing harmful runoff into caves and groundwater recharge areas that impact this species' subterranean habitat (and also municipal water supplies). More than half of the Berry Cave Salamander's caves have been found in Knox County, the second-fastest growing county in the state.

Berry Cave Salamander Conservation Opportunity Area

Berry Cave Salamander COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Oak Ridge National Laboratory	DOE	31,471	31%
Three Bend Scenic & Wildlife Refuge	DOE	3,207	100%
Blount County Park	Local	73	100%
Carl Cowan Park	Local	44	100%
Haw Ridge Park	Local	860	61%
Louisville Point Park	Local	56	8%
Melton Hill Park	Local	148	100%
Small Lake Admiral Farragut Park	Local	4	100%
Louisville Historic District	Private	10	72%
Hewitt Bluff Habitat Protection Area	TVA	29	100%
Hickory Creek Bluffs Habitat Protection Area	TVA	28	100%
Hope Creek Colony Bluffs Habitat Protection Area	TVA	2	100%
Marble Bluff Habitat Protection Area	TVA	11	100%
Paint Rock Refuge	TVA	685	54%
Pine Top Habitat Protection Area	TVA	9	100%
Polecat Creek Slopes Habitat Protection Area	TVA	8	100%
Pumping Station Embayment Slope Habitat Protection Area	TVA	4	100%
Pumping Station Outcrops Habitat Protection Area	TVA	1	100%
Railroad Slope Habitat Protection Area	TVA	2	100%
Stubbs Bluff Habitat Protection Area	TVA	18	100%



Combined Habitat Priorities

Berry Cave Salamander Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

Conservation Opportunity Area (COA)

Public/Protected Land

Conservation Easement

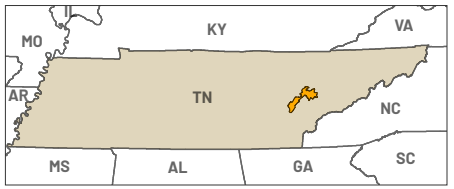
Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Berry Cave Salamander COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Green Salamander	Aneides aeneus	1985
Bat	Gray Bat	Myotis grisescens	2022
Bat	Indiana Bat	Myotis sodalis	2013
Bat	Little Brown Myotis	Myotis lucifugus	2018
Bat	Northern Long-eared Bat	Myotis septentrionalis	2014
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2018
Bat	Tricolored Bat	Perimyotis subflavus	2022
Bird	American Barn Owl	Tyto furcata	2022
Bird	American Bittern	Botaurus lentiginosus	2017
Bird	American Black Duck	Anas rubripes	2023
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2022
Bird	Bachman's Sparrow	Peucaea aestivalis	1954
Bird	Baltimore Oriole	Icterus galbula	2012
Bird	Bank Swallow	Riparia riparia	2023
Bird	Belted Kingfisher	Megaceryle alcyon	2012
Bird	Bewick's Wren	Thryomanes bewickii	1962
Bird	Black-bellied Plover	Pluvialis squatarola	2020
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-capped Chickadee	Poecile atricapillus	2009
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2023
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2023
Bird	Blue-headed Vireo	Vireo solitarius	2008
Bird	Bobolink	Dolichonyx oryzivorus	2023
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2023
Bird	Buff-breasted Sandpiper	Calidris subruficollis	2021
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2022
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Connecticut Warbler	Oporornis agilis	2021
Bird	Dunlin	Calidris alpina	2023
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Evening Grosbeak	Coccothraustes vespertinus	1995
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023
Bird	Great Egret	Ardea alba	2023
Bird	Henslow's Sparrow	Centronyx henslowii	2010
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	King Rail	Rallus elegans	1951
Bird	Least Bittern	Botaurus exilis	1987
Bird	Least Flycatcher	Empidonax minimus	2023

Berry Cave Salamander COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	LeConte's Sparrow	Ammospiza leconteii	1955
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2022
Bird	Loggerhead Shrike	Lanius ludovicianus	2023
Bird	Long-tailed Duck	Clangula hyemalis	2018
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2022
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Olive-sided Flycatcher	Contopus cooperi	2022
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2023
Bird	Peregrine Falcon	Falco peregrinus	2023
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruffed Grouse	Bonasa umbellus	2013
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2021
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-billed Dowitcher	Limnodromus griseus	2022
Bird	Snowy Egret	Egretta thula	2004
Bird	Stilt Sandpiper	Calidris himantopus	2021
Bird	Swainson's Warbler	Limnothlypis swainsonii	2020
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	Western Sandpiper	Calidris mauri	2021
Bird	Willet	Tringa semipalmata	2022
Bird	Willow Flycatcher	Empidonax traillii	2023
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Crustacean	Upland Burrowing Crayfish	Cambarus dubius	1995
Mammal	Eastern Harvest Mouse	Reithrodontomys humulis	2019
Mammal	Eastern Woodrat	Neotoma floridana illinoensis	2022
Mammal	Golden Mouse	Ochrotomys nuttalli	2017
Mammal	Long-tailed Shrew	Sorex dispar	1995
Mammal	Southeastern Shrew	Sorex longirostris	2016
Mammal	Southern Bog Lemming	Synaptomys cooperi	2019
Plant	Bristly Sedge	Carex comosa	1999
Plant	Butternut	Juglans cinerea	1997
Plant	John's-cabbage	Hydrophyllum virginianum	1958

Berry Cave Salamander COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Mountain Honeysuckle	Lonicera dioica	1997
Plant	Mountain Witch-alder	Fothergilla major	1993
Plant	Northern Bush-honeysuckle	Diervilla lonicera	1994
Plant	Schreber's Aster	Eurybia schreberi	1961
Plant	Small-head Rush	Juncus brachycephalus	1994
Plant	Spreading Yellow False Foxglove	Aureolaria patula	2000
Plant	Sweet Pinesap	Monotropsis odorata	1979
Plant	Sweetscent Ladies'-tresses	Spiranthes odorata	2008
Plant	Tall Larkspur	Delphinium exaltatum	2004
Plant	Vetchling Peavine	Lathyrus palustris	1996
Reptile	Eastern Box Turtle	Terrapene carolina	2019
Reptile	Eastern Pinesnake	Pituophis melanoleucus	1995
Reptile	Eastern Slender Glass Lizard	Ophisaurus attenuatus longicaudus	1995

Berry Cave Salamander COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Hellbender	Cryptobranchus alleganiensis	1979
Bivalve	Dromedary Pearlymussel	Dromus dromas	1914
Bivalve	Fanshell	Cyprogenia stegaria	1994
Bivalve	Finerayed Pigtoe	Fusconaia cuneolus	1919
Bivalve	Mountain Creekshell	Leaunio vanuxemensis	2000
Bivalve	Pink Mucket	Lampsilis abrupta	1920
Bivalve	Ring Pink	Obovaria retusa	1994
Bivalve	Round Pigtoe	Pleurobema sintoxia	1982
Bivalve	Sheepnose	Plethobasus cyphyus	1994
Bivalve	Spectaclecase	Cumberlandia monodonta	1983
Fish	American Eel	Anguilla rostrata	1956
Fish	Blue Sucker	Cycleptus elongatus	1963
Fish	Flame Chub	Hemitremia flammea	2009
Fish	Highfin Carpsucker	Carpiodes velifer	1976
Fish	Lake Sturgeon	Acipenser fulvescens	2023
Gastropod	Anthony's Riversnail	Athearnia anthonyi	1943
Gastropod	Spiny Riversnail	Io fluvialis	1985

Berry Cave Salamander COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Berry Cave Salamander	Gyrinophilus gulolineatus	2005
Amphibian	Tennessee Cave Salamander	Gyrinophilus palleucus	1992
Bat	Gray Bat	Myotis grisescens	1999
Bat	Northern Long-eared Bat	Myotis septentrionalis	2014
Bat	Tricolored Bat	Perimyotis subflavus	2014
Crustacean	Appalachian Valley Crangonyctid	Crangonyx antennatus	2003
Crustacean	Incurved Cave Isopod	Pseudobaicalasellus incurvus	1968

Berry Cave Salamander COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Crustacean	Southwestern Virginia Cave Amphipod	Stygobromus mackini	1943
Insect	Nobletts Cave Beetle	Pseudanophthalmus paulus	1982

Catoosa / Emory River

Conservation Opportunity Area



The Catoosa/Emory River Conservation Opportunity Area (COA) lies within the Cumberland Plateau and Mountains of Tennessee, boasting a variety of habitats, mostly forested, with some of the largest tracts of contiguous forest in Tennessee. Vertical exposed sandstone outcroppings support a unique flora and fauna. This COA is a part of over 300,000 publicly-owned acres that provide outdoor recreation opportunities to an array of user groups. Species of Greatest Conservation Need (SGCN) in this area include the Green Salamander, Cumberland Dusky Salamander, and Mud Salamander. Three species of endangered bats, the Indiana Bat, and Gray Bat, and Northern Long-eared Bat, find both winter and summer habitat in this region.

Streams of the Cumberland Plateau were heavily impacted by mining and forestry activities in the early 1900s, but many are recovering. The more pristine among them support a variety of aquatic SGCN, such as the Spot Fin Chub, Ashy Darter, Purple Bean Mussel, and Alabama Lamp Mussel.



The Catoosa/Emory River COA boasts some of the largest tracts of contiguous forest in Tennessee, with streams supporting a diversity of aquatic species.





Top to bottom: Emory River/Chris M. Morris; Great Egret/bgwashburn Male River Chub carrying stone to its nest/ Jeremy Monroe, Freshwaters Illustrated. P2: Mountain Chorus Frog/ Chris Simpson, TWRA. P. 3: Eastern Spotted Skunk (monitoring)/ Lindsay Shaw, TWRA

Catoosa / Emory River
Conservation Opportunity Area

Partnerships



TWRA will develop and expand partnerships with the US Army Corps of Engineers, Natural Resources Conservation Service, Tennessee Valley Authority, Tennessee Dept. of Environment and Conservation, The Nature Conservancy, TennGreen Land Conservancy, Tennessee Clean Water Network, Tennessee Technological University, University of Tennessee , University of Alabama in Huntsville, and other universities both in- and out-of-state, as well as private land owners.

CMP Stressor Level	Stressors Categories	Threats specific to Catoosa/Emory River
1.1 A	Housing and urban areas; Primary residential development	Destruction or degradation of habitats due to construction activities associated with the building of primary residences. Retirement communities are expanding in this COA.
1.1 B	Housing and urban areas;Secondary home/resort development	Destruction or degradation of habitats due to construction activities associated with the building of secondary/vacation homes and resort developments. Retirement homes and urban sprawl displace wildlife.
2.3 C	Livestock farming and ranching; Incompatible grazing/pasture management practices	Degradation of soil/water quality and habitat structure of an area due to excessive grazing or to inadequate exclusion of cattle from stream and forest resources. Also, includes degradation caused by overapplication of fertilizers or other chemicals during pasture management practices. This stress is directly related to the impacts of animals on soil and water quality.
3.3 A	Renewable energy*	(Not relating to hydropower) Historic mining in area degrades water quality.
5.3 A	Logging and wood harvesting	The specific threat in this COA is that some harvests do not follow BMPs, such as when high-grading occurs (this means removing the largest, most valuable trees and leaving behind lower-value or poor-quality trees without considering the impact on the future forest's health or composition).
6.1 A	Recreational activities - non-vehicular	Destruction and degradation of habitats and increased mortality of SGCN due to excessive levels of recreational activities or inappropriate usage of habitats for recreation.
6.1 B	Recreational activities - vehicular	Destruction and degradation of habitats and increased mortality of species due to excessive levels of recreational vehicle traffic or inappropriate usage of habitats for recreational vehicles. OHV-caused loss of vegetation, SGCN habitat destruction, erosion, and increased runoff occur.

CMP Stressor Level	Stressors Categories	Threats specific to Catoosa/Emory River, continued
7.1 A	Fire and fire suppression	Degradation of fire-dependent natural systems due to either human suppression of fire or the conditions needed to support combustion. This category focuses on the human activities that lead to either not enough fire or too much fire in the ecosystem in question. It also includes damaging "natural" fires in systems that have lost their natural resilience.
7.2 D	Dams and water management/use; Excessive groundwater withdrawal	Removal of groundwater resources essential to maintenance of hydrologic levels that support aquatic and subterranean species. Withdrawal is primarily from wells drilled for home water supply, irrigation, and other agricultural uses. Depletion of the water table leads to drought.
9.3 B	Agriculture and forestry effluents; Incompatible Forestry Practices	Modification of the forest composition or type of an area related to silvicultural (in)activities not compatible with species or habitat. Reduces air and water quality for all.
9.3 C	Agriculture and forestry effluents; Incompatible grazing/pasture management practices	Degradation of soil/water quality and habitat structure of an area due to excessive grazing or to inadequate exclusion of cattle from stream and forest resources. Also includes degradation caused by overapplication of fertilizers or other chemicals during pasture management practices. Reduces air and water quality for all.

Conservation Projects

Many projects focus on achieving a better understanding of the distribution, abundance, and/or genetics of SGCN, including White Fringeless Orchid, fish (e.g., Spotting Chub), Green Salamanders, Eastern Woodrat, Golden Eagles, Eastern Spotted Skunk, and bats. Species conservation includes treatment and monitoring of Hemlock Woolly Adelgid. Habitat conservation and management include expansion of the oak savannah on Catoosa WMA and abandoned mine reclamation. Additionally, several large tracts of land in this COA that rank as high terrestrial priorities (e.g., Luper Mountain Lodestar unit) have been placed under public ownership since 2015.



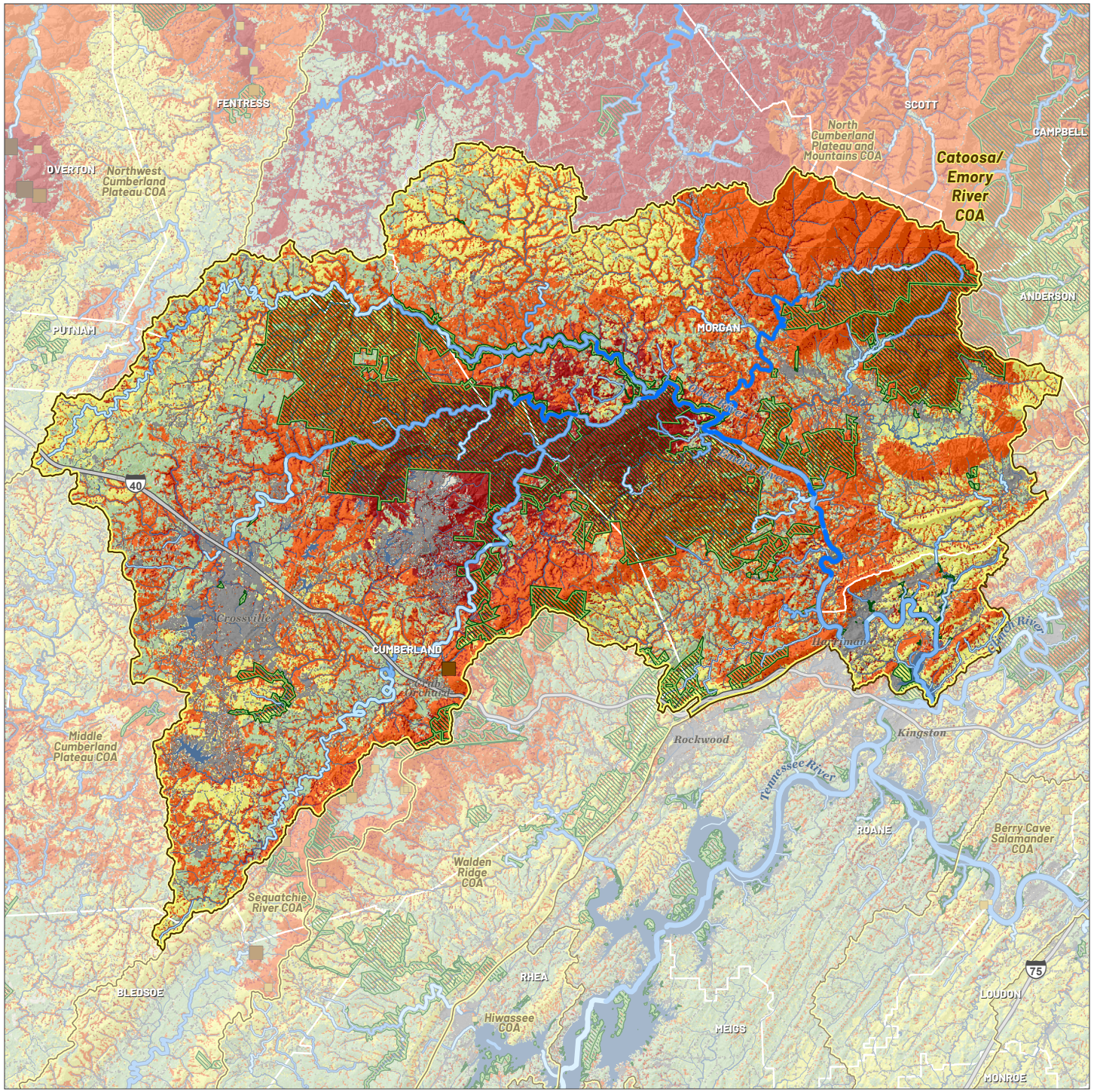
To learn more about the Catoosa Emory River Conservation Opportunity Area, please contact: Daniel Istvanko, Biodiversity Coordinator, Region 3 (931) 484-9571

Catoosa / Emory River
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats that provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Research	Conduct research on life history and ecological needs of target species to establish guidelines for determining population viability.	projects
Compatible Resource Use	Use government-funded incentive programs (e.g., CRP, EQIP, CSP, WRP, and FLEP) to encourage private landowners to protect water quality for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Compatible Resource Use	Use government-funded incentive programs (e.g., FLEP, CRP, EQIP, Forest Stewardship Program, and Forest Legacy Program) to encourage private landowners to restore and/or protect native forest systems for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Compatible Resource Use	Use government-funded incentive programs such as CRP, WRP, GRP, EQIP, CSP, FLEP, LIP, and rare species protection funding such as FWS Section 6 and other funds to manage or restorepopulations of target species in critical units of aquatic, subterranean, or terrestrial habitats.	species
Conservation Area Management	Develop recreation management plans that outline strict guidelines on high-impact recreational uses on public/private conservation areas across the state.	recreation plans
Habitat/Natural Processes Restoration	Reintroduce fire via prescribed burning into fire-dependent grassland and woodland systems within critical units of terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Reclaim abandoned coal mines and streams affected by acid mine drainage within critical units of aquatic, subterranean, and terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres

Catoosa / Emory River Conservation Opportunity Area

Catoosa/Emory River COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Obed Wild and Scenic River	NPS	5,158	100%
Emory River Tracts	Private	18,793	92%
Cumberland Mountain SP	TDEC - SP	1,553	97%
Frozen Head SP	TDEC - SP	22,965	90%
Lone Mountain SF	TDF	3,593	100%
Clifty Creek Gorge Preserve	TNC	89	100%
Liane Russell Overlook Tract	TNC	61	100%
Obed - Russell 1 Preserve	TNC	78	100%
Obed - Russell 2 Preserve	TNC	79	100%
Obed - Stone Preserve	TNC	60	100%
Kingston Refuge WMA	TVA	556	42%
Kingston Steam Plant WOA	TVA	279	100%
Sugar Grove Habitat Protection Area	TVA	6	99%
Catoosa WMA	TWRA	79,376	100%
Keyes-Harrison WMA	TWRA	1,740	100%
Luper Mountain WMA	TWRA	6,088	37%
Mt. Roosevelt WMA	TWRA	9,762	36%



Combined Habitat Priorities

Catoosa/Emory River Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

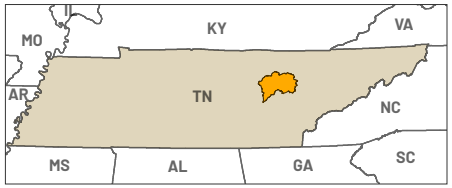
- Conservation Opportunity Area (COA)
- Public/Protected Land
- Conservation Easement

Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles
0 5 Kilometers



Catoosa/Emory River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Cumberland Dusky Salamander	Desmognathus abditus	2016
Amphibian	Four-toed Salamander	Hemidactylium scutatum	2013
Amphibian	Gray Treefrog	Dryophytes versicolor	2006
Amphibian	Green Salamander	Aneides aeneus	2021
Amphibian	Mountain Chorus Frog	Pseudacris brachyphona	2007
Amphibian	Mud Salamander	Pseudotriton montanus	2020
Bat	Eastern Small-footed Bat	Myotis leibii	2009
Bat	Gray Bat	Myotis grisescens	2020
Bat	Little Brown Myotis	Myotis lucifugus	2011
Bat	Northern Hoary Bat	Lasiurus cinereus	2021
Bat	Northern Long-eared Bat	Myotis septentrionalis	2018
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2012
Bat	Tricolored Bat	Perimyotis subflavus	2014
Bird	American Barn Owl	Tyto furcata	2022
Bird	American Bittern	Botaurus lentiginosus	2023
Bird	American Black Duck	Anas rubripes	2023
Bird	American Golden-Plover	Pluvialis dominica	2022
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bachman's Sparrow	Peucaea aestivalis	1975
Bird	Bank Swallow	Riparia riparia	2023
Bird	Belted Kingfisher	Megaceryle alcyon	2006
Bird	Bewick's Wren	Thryomanes bewickii	1950
Bird	Black-bellied Plover	Pluvialis squatarola	2006
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2023
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2023
Bird	Blue-headed Vireo	Vireo solitarius	2007
Bird	Bobolink	Dolichonyx oryzivorus	2023
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2023
Bird	Buff-breasted Sandpiper	Calidris subruficollis	2006
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Connecticut Warbler	Oporornis agilis	2021
Bird	Dunlin	Calidris alpina	2023
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Evening Grosbeak	Coccothraustes vespertinus	2021
Bird	Golden Eagle	Aquila chrysaetos	2013
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023

Catoosa/Emory River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Great Egret	Ardea alba	2023
Bird	Henslow's Sparrow	Centronyx henslowii	2011
Bird	Hudsonian Godwit	Limosa haemastica	1982
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	Least Bittern	Botaurus exilis	2020
Bird	Least Flycatcher	Empidonax minimus	2023
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2019
Bird	Long-tailed Duck	Clangula hyemalis	2018
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2021
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Olive-sided Flycatcher	Contopus cooperi	2023
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2023
Bird	Peregrine Falcon	Falco peregrinus	2023
Bird	Piping Plover (Atlantic subspecies)	Charadrius melodus melodus	2003
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruddy Turnstone	Arenaria interpres	2006
Bird	Ruffed Grouse	Bonasa umbellus	2023
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2023
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-billed Dowitcher	Limnodromus griseus	2016
Bird	Short-eared Owl	Asio flammeus	2009
Bird	Snowy Egret	Egretta thula	2018
Bird	Stilt Sandpiper	Calidris himantopus	2022
Bird	Swainson's Warbler	Limnothlypis swainsonii	2023
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	Western Sandpiper	Calidris mauri	2011
Bird	White-rumped Sandpiper	Calidris fuscicollis	2008
Bird	Willet	Tringa semipalmata	2020
Bird	Willow Flycatcher	Empidonax traillii	2023
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023

Catoosa/Emory River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Crustacean	Upland Burrowing Crayfish	Cambarus dubius	2010
Gastropod	Sequatchie Slitmouth	Stenotrema edgarianum	2001
Insect	Frosted Elfin	Callophrys irus	2019
Mammal	Allegheny Woodrat	Neotoma magister	2010
Mammal	Cinereus Shrew	Sorex cinereus	2006
Mammal	Eastern Spotted Skunk	Spilogale putorius	2023
Mammal	Eastern Woodrat	Neotoma floridana illinoensis	2020
Mammal	Golden Mouse	Ochrotomys nuttalli	2006
Mammal	Hairy-tailed Mole	Parascalops breweri	2006
Mammal	Least Weasel	Mustela nivalis	2005
Mammal	Long-tailed Weasel	Neogale frenata	2010
Mammal	Smoky Shrew	Sorex fumeus	2006
Mammal	Southeastern Shrew	Sorex longirostris	2006
Plant	American Barberry	Berberis canadensis	2008
Plant	Barrens Silky Aster	Symphyotrichum pratense	1989
Plant	Blue Ridge False Foxglove	Agalinis decemloba	2022
Plant	Bog Wild Oatgrass	Danthonia epilis	2015
Plant	Butternut	Juglans cinerea	2009
Plant	Buxbaum's Sedge	Carex buxbaumii	1990
Plant	Chapman's Redtop	Tridens flavus var. chapmanii	2019
Plant	Climbing Fumitory	Adlumia fungosa	2019
Plant	Cumberland False Rosemary	Conradina verticillata	2023
Plant	Drooping Bluegrass	Poa saltuensis	2014
Plant	Eggert's Sunflower	Helianthus eggertii	2020
Plant	Fetterbush	Leucothoe racemosa	2022
Plant	Foxtail Bog Clubmoss	Lycopodiella alopecuroides	1949
Plant	Godfrey's Boneset	Eupatorium godfreyanum	2006
Plant	Grass-leaf Gayfeather	Liatris pilosa	2006
Plant	Large-flower Rock-pink	Phemeranthus mengesii	2019
Plant	Largeleaf Pondweed	Potamogeton amplifolius	2015
Plant	Loose-head Beakrush	Rhynchospora chalarocephala	2015
Plant	Marsh Bellflower	Campanula aparinoides	1987
Plant	Missouri Gooseberry	Ribes missouriense	1959
Plant	Mountain Honeysuckle	Lonicera dioica	1984
Plant	Muehlenberg's Nutrush	Scleria muehlenbergii	1997
Plant	Narrow Mushroom-headed Liverwort	Marchantia quadrata	1990
Plant	Northern Evening-primrose	Oenothera parviflora	2015
Plant	Northern Starflower	Trientalis borealis	2017
Plant	Nuttall's Pondweed	Potamogeton epihydrus	1980
Plant	Ozark Bunchflower	Melanthium woodii	2019
Plant	Pretty St. John's-wort	Hypericum nudiflorum	2021
Plant	Rivergrass	Calamovilfa arcuata	2020
Plant	Rose Pogonia	Pogonia ophioglossoides	1976
Plant	Roundleaf Serviceberry	Amelanchier sanguinea	2002
Plant	Sandhill Dropseed	Sporobolus junceus	1980
Plant	Schreber's Aster	Eurybia schreberi	2005

Catoosa/Emory River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Shortleaf Sneezeweed	Helenium brevifolium	2015
Plant	Shortleaf Witchgrass	Dichanthelium ensifolium ssp. curtifolium	1947
Plant	Short's Hedge-hyssop	Gratiola viscidula	1977
Plant	Small Mousetail Moss	Myurella julacea	1934
Plant	Small's Stonecrop	Diamorpha smallii	2024
Plant	Southern Jointweed	Polygonella americana	2008
Plant	Spoonleaf Sundew	Drosera intermedia	2021
Plant	Spreading Yellow False Foxglove	Aureolaria patula	2004
Plant	Sticky Hedge-hyssop	Gratiola brevifolia	2015
Plant	Swamp Lousewort	Pedicularis lanceolata	1987
Plant	Sweet Pinesap	Monotropsis odorata	2019
Plant	Tawny Cotton-grass	Eriophorum virginicum	1948
Plant	Tennessee Pondweed	Potamogeton tennesseensis	2019
Plant	Virginia Spiraea	Spiraea virginiana	2024
Plant	Western Wallflower	Erysimum capitatum	1994
Plant	White Fringeless Orchid	Platanthera integrilabia	2024
Plant	Whitehead Bogbutton	Lachnocaulon anceps	1973
Plant	Wood Lily	Lilium philadelphicum	1993
Plant	Yellow-crested Orchid	Platanthera cristata	1951
Plant	Zigzag Bladderwort	Utricularia subulata	1975
Reptile	Eastern Box Turtle	Terrapene carolina	2016
Reptile	Eastern Hog-nosed Snake	Heterodon platirhinos	2020
Reptile	Eastern Pinesnake	Pituophis melanoleucus	2005
Reptile	Eastern Slender Glass Lizard	Ophisaurus attenuatus longicaudus	2007
Reptile	Timber Rattlesnake	Crotalus horridus	2020

Catoosa/Emory River COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Black Mountain Salamander	Desmognathus welteri	2016
Amphibian	Hellbender	Cryptobranchus alleganiensis	1996
Bivalve	Alabama Lampmussel	Lampsilis virescens	2012
Bivalve	Cumberland Moccasinshell	Medionidus conradicus	2001
Bivalve	Finerayed Pigtoe	Fusconaia cuneolus	1915
Bivalve	Oyster Mussel	Epioblasma capsaeformis	2012
Bivalve	Rainbow	Cambarunio iris	2021
Bivalve	Slippershell Mussel	Alasmidonta viridis	2021
Bivalve	Tennessee Bean	Venustaconcha trabalis	2016
Bivalve	Tennessee Clubshell	Pleurobema oviforme	2011
Bivalve	Tennessee Pigtoe	Pleuronaia barnesiana	2011
Crustacean	Emory River Crayfish	Cambarus sp. 1	2008
Crustacean	Hairyfoot Crayfish	Cambarus crinipes	2012
Crustacean	Obed Crayfish	Cambarus sp?	2006
Crustacean	Obey Crayfish	Cambarus obeyensis	2008
Crustacean	Valley Flame Crayfish	Cambarus deweesae	2016

Catoosa/Emory River COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Fish	Ashy Darter	Allohistium cinereum	2005
Fish	Clinch Dace	Chrosomus sp. cf. saylori	2020
Fish	Lake Sturgeon	Acipenser fulvescens	2024
Fish	Laurel Dace	Chrosomus saylori	1998
Fish	Olive Darter	Percina squamata	2006
Fish	Sickle Darter	Percina williamsi	2017
Fish	Spotfin Chub	Erimonax monachus	2019
Fish	Tangerine Darter	Percina aurantiaca	2019
Fish	Tennessee Dace	Chrosomus tennesseensis	2014
Fish	Wounded Darter	Nothonotus vulneratus	2008

Catoosa/Emory River COA SGCN LIST - KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Gastropod	Raccoon Coil	Helicodiscus barri	2004
Insect	a fly	Megaselia cavernicola	2004
Insect	an undescribed cave springtail	Arrhopalites sp. 2 near bimus	2005
Insect	Baker cave beetle	Pseudanophthalmus sp.	2004
Insect	cave crickets	Hadenoecini sp.	2004
Insect	Cave Dung Fly	Spelobia tenebrarum	2004
Insect	Cooke's Cave Dipluran	Litocampa cookei	2004
Insect	Pale-footed Ocellate Rove Beetle	Lesteva pallipes	2004
Insect	Peck's Cave Springtail	Pseudosinella pecki	2004
Insect	Two-toothed Springtail	Pogonognathellus bidentatus	2004
Mammal	Allegheny Woodrat	Neotoma magister	2004
Millipede	Baker cave milliped	Pseudotremia sp. 10	2004

Middle Cumberland Plateau

Conservation Opportunity Area



The Middle Cumberland Plateau Conservation Opportunity Area (COA) is located within the middle portion of the Cumberland Plateau in Tennessee. This COA contains one of the highest concentrations of caves in North America. These karst areas support several priority sites used by Gray Bats and Indiana Bats for hibernation over the winter, as well as a large diversity of species unique to this region that require caves for all or part of their life cycles.



Surface rock strata in the plateau have produced varied soils and a wide variety of forest types that support a high diversity of priority species. TWRA's Region 3 quail focal area is also located within this COA. Several hundred acres of pine plantation have been converted to open pine savannah and grasslands through the use of prescribed fire.

Typical of the Cumberland Plateau, streams and rivers form deep gorges as they drop in elevation to reach Tennessee's Highland Rim region to the west and the Ridge and Valley region to the east. The Caney Fork River forms Scott's Gulf, a gorge with some of the best overlooks in Tennessee, en route to the Highland Rim, and is home to the federally endangered Blue Mask Darter. These area rivers are threatened by development, incompatible agricultural activities, and unregulated water withdrawal.

The Middle Cumberland Plateau contains one of the highest concentrations of caves in North America.

Partnerships

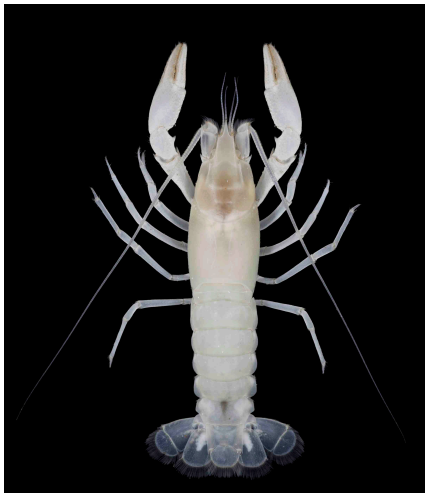
TWRA will implement management and partnership strategies to protect and manage high quality forests and cave systems, restore early successional and open woodland habitats, eliminate wild hogs, and protect priority streams. TWRA will develop and expand partnerships with the US Fish and Wildlife Service, the Natural Resources Conservation Service, National Fish and Wildlife Foundation, TN Dept. of Environment and Conservation, TN Valley Authority, TN Division of Forestry, Tennessee Aquarium,



Top to bottom: Gray Bats/John Lamb, TWRA; Indiana Bats/Dustin Thames. P2: Southern Cave Crayfish/Carl Williams, TWRA; Rock Island State Park/David Fant

Middle Cumberland Plateau
Conservation Opportunity Area

The Nature Conservancy, The Land Trust for Tennessee, TennGreen Land Conservancy, University of Tennessee, Tennessee Tech University, Middle Tennessee State University, Friends of Fall Creek Falls, and other universities and private landowners.



CMP Stressor Level	Stressor Categories	Threats specific to Middle Cumberland Plateau
3.2 A	Mining and quarrying	Commercial rock harvesting from streambeds and abandoned mines
5.3 A	Logging and wood harvesting	Incompatible forestry practices, particularly not following Best Management Practices (for example, high grading)
6.1 A	Recreational activities, non-vehicular	Destruction and degradation of habitats and increased mortality of species due to excessive levels of recreational activities or inappropriate usage of habitats for recreation. Offroad vehicle use is degrading habitat.
7.1 A	Fire and fire suppression	Degradation of fire-dependent natural systems due to either human suppression of fire or the conditions needed to support combustion. Increased chance of wildfire and loss of fire adapted species.

Conservation Projects

Many completed and ongoing projects focused on achieving a better understanding of the abundance and distribution of SGCN, for example Golden Eagle, Eastern Spotted Skunk, Woodrat species, Hellbenders, Dusky and Cave Salamanders, and Cumberland Plateau mussels. A future identified need is to model Golden Eagle migration patterns to assess and mitigate the impacts of alternative energy development.

Bat surveys and targeted bat research helped to identify and protect important new maternity sites for Indiana Bats on private lands. WNS surveys monitored the condition of important cave sites, as

To learn more about the Middle Cumberland Plateau Conservation Opportunity Area, please contact: Daniel Istvanko, Biodiversity Coordinator, Region 3 (931) 484-9571

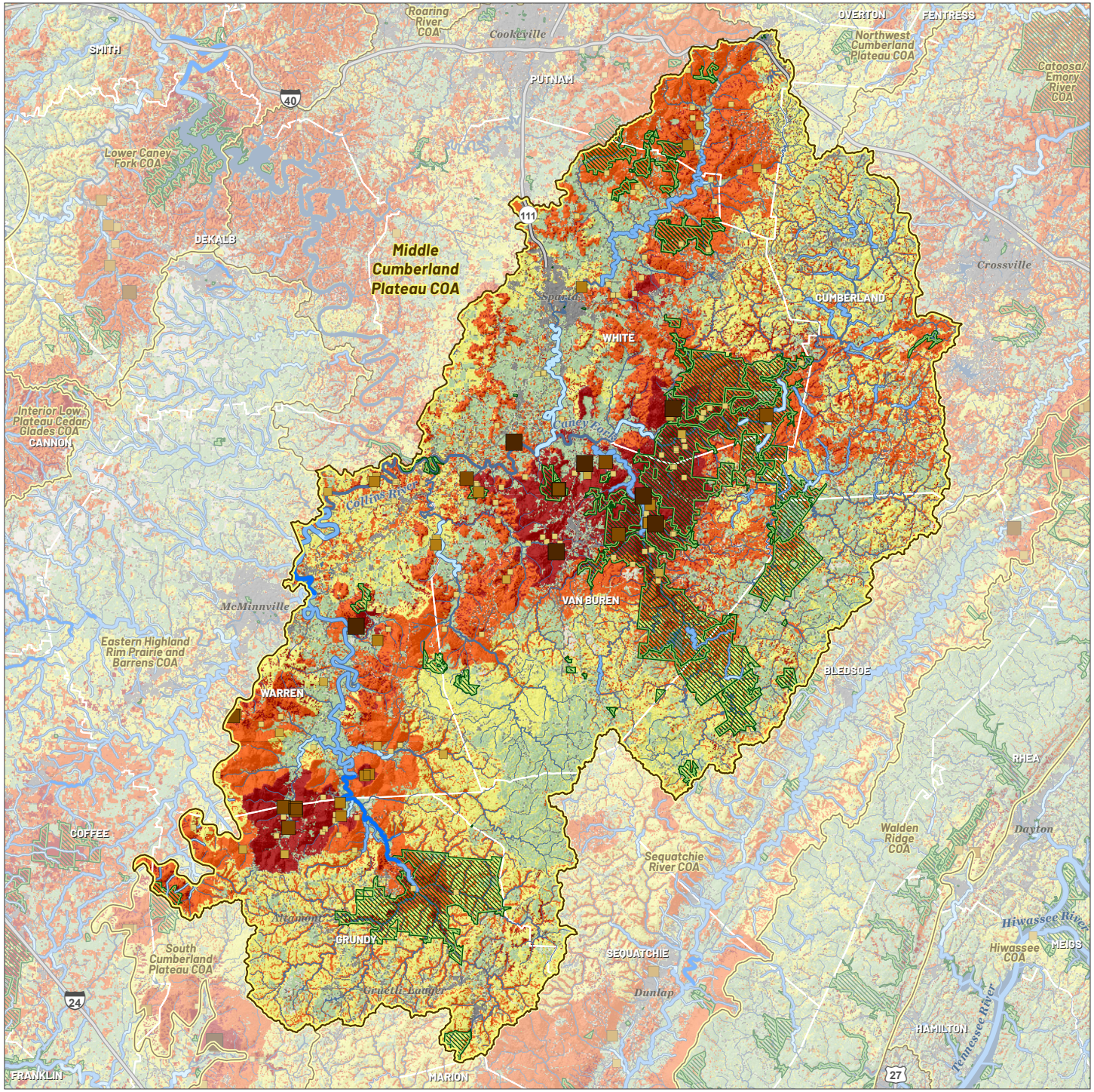
well as the health of specific bat populations, while cave gate projects are reducing human disturbance and the spread of WNS by visitors. An abandoned mine reclamation project was completed to protect water quality by reducing polluted runoff into streams.

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Information collection and dispersal	Develop outdoor education and recreation programs that inform the public about the effects of recreational vehicles and various other recreational uses on target species and habitats.	programs
Management and restoration of species and habitats	Install exclusionary devices (e.g., gates, barriers, trespass detection equipment, etc.) to limit access to critical units of aquatic, subterranean, or terrestrial habitats for target species vulnerable to human disturbance.	caves, sensitive sites protected
Management and restoration of species and habitats	Reintroduce fire via prescribed burning into fire-dependent grassland & woodland systems within critical units of terrestrial habitats.	acres
Management and restoration of species and habitats	Restore degraded forests and pine plantations to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres



Middle Cumberland Plateau Conservation Opportunity Area

Middle Cumberland Plateau COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Meadow Park Lake	Local	399	100%
Hawkins Tract	Private	487	100%
Plantation Pond	Private	4	100%
Putnam Property	Private	269	100%
Sapp/Alvarez Conservation Easement	Private	133	100%
Tuuk Timberland	Private	3,116	100%
White County Lumber Company- Fall Creek Falls	Private	2,476	100%
Scott's Gulf Wilderness SP	TDEC	8,548	100%
Big Bone Cave SNA	TDEC - DNA	372	100%
Collins State Scenic River	TDEC - SP	4	100%
Fall Creek Falls SP	TDEC - SP	14,614	100%
Fall Creek Falls SP & WMA	TDEC - SP	7,268	100%
Rock Island SP	TDEC - SP	911	22%
Scott's Gulf Wilderness SP	TDEC - SP	759	100%
South Cumberland SP	TDEC - SP	30,317	61%
Sparta Rock House SHS	TDEC - THC	1	100%
Bledsoe SF	TDF	8,413	100%
Hubbard's Cave	TNC	51	100%
The Bridgestone Nature Reserve at Chestnut Mountain	TNC	5,895	100%
Bridgestone/Firestone Centennial Wilderness WMA	TWRA	17,153	100%



Combined Habitat Priorities

Middle Cumberland Plateau Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

Conservation Opportunity Area (COA)

Public/Protected Land

Conservation Easement

Karst Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:

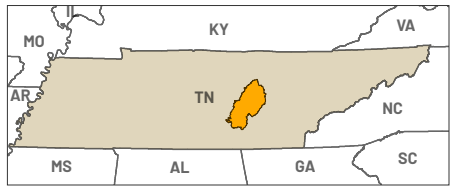
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Middle Cumberland Plateau COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Barking Treefrog	Dryophytes gratiosus	1992
Amphibian	Cumberland Dusky Salamander	Desmognathus abditus	2019
Amphibian	Four-toed Salamander	Hemidactylium scutatum	2022
Amphibian	Green Salamander	Aneides aeneus	2021
Amphibian	Mud Salamander	Pseudotriton montanus	2021
Bat	Eastern Small-footed Bat	Myotis leibii	2021
Bat	Gray Bat	Myotis grisescens	2022
Bat	Indiana Bat	Myotis sodalis	2022
Bat	Little Brown Myotis	Myotis lucifugus	2019
Bat	Northern Hoary Bat	Lasiurus cinereus	2021
Bat	Northern Long-eared Bat	Myotis septentrionalis	2018
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2022
Bat	Tricolored Bat	Perimyotis subflavus	2022
Bird	American Barn Owl	Tyto furcata	2023
Bird	American Bittern	Botaurus lentiginosus	2020
Bird	American Black Duck	Anas rubripes	2023
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bachman's Sparrow	Peucaea aestivalis	2004
Bird	Bank Swallow	Riparia riparia	2021
Bird	Bewick's Wren	Thryomanes bewickii	2008
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2023
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2020
Bird	Blue-headed Vireo	Vireo solitarius	2013
Bird	Bobolink	Dolichonyx oryzivorus	2020
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2023
Bird	Buff-breasted Sandpiper	Calidris subruficollis	2006
Bird	Canada Warbler	Cardellina canadensis	2020
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Connecticut Warbler	Oporornis agilis	2020
Bird	Dunlin	Calidris alpina	2004
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Evening Grosbeak	Coccothraustes vespertinus	1995
Bird	Golden Eagle	Aquila chrysaetos	2019
Bird	Golden-winged Warbler	Vermivora chrysoptera	2020
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023
Bird	Great Egret	Ardea alba	2023
Bird	Henslow's Sparrow	Centronyx henslowii	2023
Bird	Kentucky Warbler	Geothlypis formosa	2023

Middle Cumberland Plateau COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Least Bittern	Botaurus exilis	1976
Bird	Least Flycatcher	Empidonax minimus	2021
Bird	LeConte's Sparrow	Ammospiza leconteii	2011
Bird	Lesser Yellowlegs	Tringa flavipes	2022
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2023
Bird	Long-tailed Duck	Clangula hyemalis	2014
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2011
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2018
Bird	Olive-sided Flycatcher	Contopus cooperi	2023
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2023
Bird	Peregrine Falcon	Falco peregrinus	2023
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruffed Grouse	Bonasa umbellus	2023
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2023
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-billed Dowitcher	Limnodromus griseus	2004
Bird	Short-eared Owl	Asio flammeus	2010
Bird	Snowy Egret	Egretta thula	2022
Bird	Stilt Sandpiper	Calidris himantopus	2005
Bird	Swainson's Warbler	Limnothlypis swainsonii	2022
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	Western Sandpiper	Calidris mauri	2005
Bird	Whooping Crane	Grus americana	2008
Bird	Willet	Tringa semipalmata	2005
Bird	Willow Flycatcher	Empidonax traillii	2023
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2013
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Crustacean	Upland Burrowing Crayfish	Cambarus dubius	1982
Gastropod	Variabile Supercoil	Paravitrea variabilis	2000
Insect	Diana Fritillary	Argynnis diana	2007
Mammal	Allegheny Woodrat	Neotoma magister	2022
Mammal	Eastern Pygmy Shrew	Sorex hoyi	2011

Middle Cumberland Plateau COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Mammal	Eastern Spotted Skunk	Spilogale putorius	2021
Mammal	Eastern Woodrat	Neotoma floridana illinoensis	2021
Mammal	Golden Mouse	Ochrotomys nuttalli	2013
Mammal	Least Weasel	Mustela nivalis	1986
Mammal	Long-tailed Shrew	Sorex dispar	1967
Mammal	Meadow Jumping Mouse	Zapus hudsonius	2008
Mammal	Smoky Shrew	Sorex fumeus	1979
Mammal	Southeastern Shrew	Sorex longirostris	1979
Plant	a liverwort	Metzgeria uncigera	2001
Plant	a liverwort	Radula voluta	2002
Plant	American Barberry	Berberis canadensis	2002
Plant	American Chestnut	Castanea dentata	1997
Plant	American Pillwort	Pilularia americana	2002
Plant	American Smoketree	Cotinus obovatus	2003
Plant	American Water-pennywort	Hydrocotyle americana	1935
Plant	Blomquist Leafy Liverwort	Lejeunea blomquistii	2002
Plant	Bog Wild Oatgrass	Danthonia epilis	1980
Plant	Broadleaf Barbara's-buttons	Marshallia trinervia	1984
Plant	Butternut	Juglans cinerea	2022
Plant	Buxbaum's Sedge	Carex buxbaumii	2013
Plant	Catfoot	Pseudognaphalium helleri	1977
Plant	Coastal Plain Yellow-eyed-grass	Xyris ambigua	2004
Plant	Cumberland False Rosemary	Conradina verticillata	2023
Plant	Deam's Copperleaf	Acalypha deamii	2000
Plant	Drooping Bluegrass	Poa saltuensis	1977
Plant	Dwarf Filmy Fern	Didymoglossum petersii	2020
Plant	Dwarf Sundew	Drosera brevifolia	2014
Plant	Eggert's Sunflower	Helianthus eggertii	2003
Plant	Few-flowered Beakrush	Rhynchospora rariflora	1994
Plant	Granite Gooseberry	Ribes curvatum	2018
Plant	Hairy Fimbry	Fimbristylis puberula	1947
Plant	Hairy Willowherb	Epilobium ciliatum	1976
Plant	Hitchcock's Sedge	Carex hitchcockiana	1977
Plant	Horsetail Spikerush	Eleocharis equisetoides	1991
Plant	Large Cranberry	Vaccinium macrocarpon	1990
Plant	Largeleaf Pondweed	Potamogeton amplifolius	2000
Plant	Late Goldenrod	Solidago tarda	2005
Plant	Laxleaf Yellow-eyed-grass	Xyris laxifolia var. iridifolia	2003
Plant	Little Prickly Sedge	Carex echinata ssp. echinata	1947
Plant	Loesel's Twayblade	Liparis loeselii	1995
Plant	Low Frostweed	Crocanthemum propinquum	1994
Plant	Lucy Braun's White Snakeroot	Ageratina luciae-brauniae	1989
Plant	Mcdowell's Sunflower	Helianthus occidentalis	2012
Plant	Morefield's Leatherflower	Clematis morefieldii	2023
Plant	Muehlenberg's Nutrush	Scleria muehlenbergii	2000
Plant	Nestronia	Nestronia umbellula	2018

Middle Cumberland Plateau COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Nuttall's Pondweed	Potamogeton epihydrus	2001
Plant	Ornate Cololejeunea	Cololejeunea ornata	2001
Plant	Ozark Bunchflower	Melanthium woodii	1977
Plant	Pink Sundew	Drosera capillaris	2000
Plant	Pretty St. John's-wort	Hypericum nudiflorum	2024
Plant	Rivergrass	Calamovilfa arcuata	2000
Plant	Rose Pogonia	Pogonia ophioglossoides	1994
Plant	Shadow-witch Orchid	Ponthieva racemosa	1999
Plant	Sharp's Pouncewort	Lejeunea sharpii	2002
Plant	Sharp-scaled Mannagrass	Glyceria acutiflora	1935
Plant	Shortleaf Sneezeweed	Helenium brevifolium	2001
Plant	Shortleaf Witchgrass	Dichanthelium ensifolium ssp. curtifolium	1987
Plant	Short's Hedge-hyssop	Gratiola viscidula	1987
Plant	Silverling	Paronychia argyrocoma	2003
Plant	Southern Dwarf Huckleberry	Gaylussacia dumosa	2008
Plant	Southern Long Sedge	Carex lonchocarpa	2018
Plant	Southern Twayblade	Neottia bifolia	2016
Plant	Spinulose Shieldfern	Dryopteris carthusiana	1971
Plant	Spoonleaf Sundew	Drosera intermedia	2008
Plant	Spotty Featherwort	Plagiochila punctata	2004
Plant	Spreading Yellow False Foxglove	Aureolaria patula	1983
Plant	Sticky Hedge-hyssop	Gratiola brevifolia	1938
Plant	Swamp Lousewort	Pedicularis lanceolata	1985
Plant	Sweet Pinesap	Monotropsis odorata	1977
Plant	Tennessee Death-Camas	Stenanthium tennesseense	2021
Plant	Tennessee Pondweed	Potamogeton tennesseensis	2019
Plant	Virginia Chainfern	Anchistea virginica	2011
Plant	Virginia Spiraea	Spiraea virginiana	2024
Plant	Water Bulrush	Schoenoplectus subterminalis	1985
Plant	White Fringeless Orchid	Platanthera integrilabia	2024
Plant	Wood Lily	Lilium philadelphicum	2020
Plant	Yellow Fringeless Orchid	Platanthera integra	2017
Plant	Yellow-crested Orchid	Platanthera cristata	2024
Plant	Zigzag Bladderwort	Utricularia subulata	1997
Reptile	Eastern Box Turtle	Terrapene carolina	2019
Reptile	Eastern Hog-nosed Snake	Heterodon platirhinos	2019
Reptile	Eastern Pinesnake	Pituophis melanoleucus	2006
Reptile	Eastern Slender Glass Lizard	Ophisaurus attenuatus longicaudus	1974
Reptile	Timber Rattlesnake	Crotalus horridus	2021

Middle Cumberland Plateau COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Hellbender	Cryptobranchus alleganiensis	2019
Bivalve	Cumberland Elktoe	Alasmidonta atropurpurea	1978

Middle Cumberland Plateau COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bivalve	Cumberland Pigtoe	Pleuronaia gibber	2020
Bivalve	Littlewing Pearlymussel	Pegias fabula	2004
Bivalve	Rainbow	Cambarunio iris	2001
Crustacean	Depression Crayfish	Cambarus rusticiformis	2000
Crustacean	Hairyfoot Crayfish	Cambarus crinipes	2006
Crustacean	Pristine Crayfish	Cambarus pristinus	2022
Fish	Barrens Darter	Etheostoma forbesi	2022
Fish	Barrens Topminnow	Fundulus julisia	2022
Fish	Bedrock Shiner	Notropis rupestris	1972
Fish	Bluemask Darter	Etheostoma akatulo	2022
Fish	Flame Chub	Hemitremia flammea	2022
Fish	Redband Darter	Etheostoma luteovinctum	1972
Fish	Spotted Darter	Nothonotus maculatus	1979
Gastropod	Geniculate River Snail	Lithasia fuliginosa	1973
Gastropod	Umbilicate Rocksnail	Leptoxis umbilicata	1968
Insect	Allegheny Snaketail	Ophiogomphus incurvatus alleghaniensis	1976

Middle Cumberland Plateau COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Big Mouth Cave Salamander	Gyrinophilus palleucus necturoides	2008
Amphibian	Tennessee Cave Salamander	Gyrinophilus palleucus	2005
Arachnid	a cave leptonetid spider	Appaleptoneta sp. 1	2004
Arachnid	a cave mite	Poecilophysis weyerensis	1888
Arachnid	a cave obligate harvestman	Phalangodes appalachius	2004
Arachnid	a cave obligate harvestman	Theromaster sp. 1	2002
Arachnid	a cave obligate pseudoscorpion	Apochthonius minor	2002
Arachnid	a cave obligate pseudoscorpion	Kleptochthonius barri	2004
Arachnid	a cave obligate pseudoscorpion	Kleptochthonius daemonius	2004
Arachnid	a foldingdoor trap-door spider	Antrodiaetus sp.	2004
Arachnid	a mite	Rhagidia species s. latu	2001
Arachnid	a pseudoscorpion	Kleptochthonius sp.	2005
Arachnid	Appalachian Cave Spider	Porrhomma cavernicola	2004
Arachnid	Archer's Two-clawed Spider	Liocranoides archeri	2004
Arachnid	Cave Funnel-web Spider	Calymmaria persica	2005
Arachnid	cave harvestmen	Phalangodes sp.	2004
Arachnid	Eastern Cave Long-jawed Spider	Meta ovalis	2002
Arachnid	funnel-web spider	Coras taugynus	2004
Arachnid	harvestmen	Hesperonemastoma sp.	2004
Arachnid	harvestmen	Nemasatosoma sp.	2002
Arachnid	Mammoth Cave Spider	Anthrobia mammouthia	2004
Arachnid	Notch-tipped Shield Sheetweaver	Bathyphantes alboventris	2004
Arachnid	Pale Sheetweb Weaver	Bathyphantes pallidus	2005
Arachnid	Southeastern Cave Pseudoscorpion	Hesperochernes mirabilis	2004
Arachnid	Subterranean Sheetweb Spider	Phanetta subterranea	2004

Middle Cumberland Plateau COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Arachnid	Tennessee Cave Spider	Nesticus tennesseensis	2001
Arachnid	Tennessee Two-clawed Spider	Liocranoides tennesseensis	1999
Arachnid	Two-clawed spider	Liocranoides sp.	2005
Bat	Eastern Small-footed Bat	Myotis leibii	2016
Bat	Gray Bat	Myotis grisescens	2017
Bat	Indiana Bat	Myotis sodalis	2017
Bat	Little Brown Myotis	Myotis lucifugus	2017
Bat	Northern Long-eared Bat	Myotis septentrionalis	2014
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2017
Bat	Tricolored Bat	Perimyotis subflavus	2017
Crustacean	a cave obligate isopod	Caecidotea bicrenata	1965
Crustacean	a cave obligate isopod	Caecidotea bicrenata bicrenata	2004
Crustacean	a cave obligate isopod	Ligidium elrodii hancockensis	2004
Crustacean	a cave obligate shrimp	Dactylocythere steevesi	1961
Crustacean	a cave obligate shrimp	Donnaldsoncythere tuberosa	1961
Crustacean	a sideswimmer	Gammarus minus	2002
Crustacean	Barr's Terrestrial Isopod	Miktoniscus barri	2004
Crustacean	Bosnak’s cave amphipod	Stygobromus sp. 3	2004
Crustacean	Cavespring Crayfish	Cambarus tenebrosus	2004
Crustacean	Donaldson's Cave Copepod	Megacyclops donnaldsoni	2004
Crustacean	Ectocommensal Ostracod	Sagittocythere barri	2001
Crustacean	Indiana Groundwater Copepod	Diacyclops sp.	2004
Crustacean	Jeannel's Cave Ostracod	Pseudocandona jeanneli	2004
Crustacean	Nearctic copepod	Diacyclops nearticus	2002
Crustacean	Southern Cave Crayfish	Orconectes australis	2008
Crustacean	Swamp River Cave Amphipod	Stygobromus sp. 22	2004
Crustacean	Terrestrial Cave Isopod	Haplophthalmus danicus	2005
Crustacean	Yeatman's Groundwater Copepod	Diacyclops yeatmani	2002
Fish	Barrens Topminnow	Fundulus julisia	2005
Fish	Southern Cavefish	Typhlichthys subterraneus	2010
Flatworm	a cave obligate planarian	Sphalloplana percoeca	2004
Flatworm	Rumbling Falls Cave Flatworm	Sphalloplana sp. 2	2001
Gastropod	a terrestrial snail	Glyphyalinia sp.	2004
Gastropod	Cave Thorn	Carychium stygium	2004
Gastropod	Cricket Coil	Helicodiscus hadenoecus	1999
Gastropod	Hollow Glyph	Glyphyalinia specus	1957
Gastropod	Raccoon Coil	Helicodiscus barri	2004
Gastropod	terrestrial snails	Helicodiscus sp.	2001
Insect	a bristletail	Litocampa davisi	2005
Insect	a carabid beetle	Rhadine caudata	2004
Insect	a cave ant beetle	Arianops sp.	2004
Insect	a cave barklice	Psyllipsocus ramburi	2004
Insect	a cave cricket	Hadenoecus opilionides	2004
Insect	a cave obligate beetle	Batriasymmodes spelaeus	1951
Insect	a cave obligate beetle	Nelsonites walteri	2005
Insect	a cave obligate beetle	Tychobythinus strinatii	1983

Middle Cumberland Plateau COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Insect	a cave obligate bristletail	Litocampa valentinei	2004
Insect	a cave obligate ground beetle	Pseudanophthalmus macradyi	2004
Insect	a cave obligate ground beetle	Pseudanophthalmus robustus	2004
Insect	a cave obligate ground beetle	Pseudanophthalmus templetoni	2004
Insect	a cave obligate ground beetle	Pseudanophthalmus valentinei	1962
Insect	a cave obligate ground beetle	Pseudanophthalmus vanburenensis	2005
Insect	a cave obligate springtail	Arrhopalites sp.	2002
Insect	a cave obligate springtail	Folsomia sp. 2 nr. macrochaeta	2002
Insect	a cave obligate springtail	Pseudosinella aera	2004
Insect	a cave obligate springtail	Pseudosinella christianseni	2004
Insect	a cave obligate springtail	Pseudosinella hirsuta	2004
Insect	a cave obligate springtail	Pseudosinella sp. 6	2002
Insect	a cave obligate springtail	Pseudosinella sp. 7 nr. Nata	2002
Insect	a cave obligate springtail	Pseudosinella spinosa	2004
Insect	a cave obligate springtail	Sinella cavernarum	2002
Insect	a cave springtail	Pseudosinella cf. christianseni	2004
Insect	a cave springtail	Pygmarrhopalites pavo	2004
Insect	a fly	Megaselia cavernicola	2005
Insect	a ground beetle	Anillinus sp.	2004
Insect	a rove beetle	Aleochara lucifuga	2002
Insect	a rove beetle	Aloconota diversiseta	2002
Insect	a rove beetle	Aloconota insecta	1986
Insect	a rove beetle	Aloconota laurentiana	2002
Insect	a rove beetle	Atheta sp.	2004
Insect	a rove beetle	Atheta troglophila	2002
Insect	a springtail	Arrhopalites pygmaeus	2004
Insect	a springtail	Pseudosinella sp.	2004
Insect	a viatica group springtail	Hypogastrura sp. 1	2002
Insect	an ant beetle	Batrisodes sp.	2005
Insect	an undescribed cave springtail	Arrhopalites sp. 4	2005
Insect	an undescribed cave springtail	Arrhopalites sp. 4 near lacuna	2005
Insect	an undescribed ground beetle	Anillinus sp.	2004
Insect	Annexed Minute Rove Beetle	Atheta annexa	2002
Insect	Barber's Springtail	Sensillanura barberi	2002
Insect	Barr’s cave cricket	Hadenoecus barri	2005
Insect	Cave Ant Beetle	Arianops stygica	1960
Insect	cave ant beetles	Subterrochus sp.	2004
Insect	cave cricket	Ceuthophilus ensifer	2002
Insect	cave cricket	Ceuthophilus gracilipes vs. stygius	2002
Insect	cave cricket	Euhadenoecus puteaus	2002
Insect	cave crickets	Ceuthophilus sp.	2004
Insect	Cave Dung Fly	Spelobia tenebrarum	2005
Insect	Copeland's Springtail	Triacanthella copelandi	2002
Insect	Cumberland Ground Beetle	Trechus cumberlandus	2002
Insect	Forgotten Round Fungus Beetle	Dissochaetus oblitus	2002
Insect	Golden springtail	Tomocerus flavescens	2004

Middle Cumberland Plateau COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Insect	Hairy Harp Ground Beetle	Atranus pubescens	2005
Insect	Hilly Springtail	Pseudosinella collina	2002
Insect	Light Shunning Rove Beetle	Atheta lucifuga	2002
Insect	Marshall's Cave Springtail	Arrhopalites marshalli	2004
Insect	Pale-footed Ocellate Rove Beetle	Lesteva pallipes	2004
Insect	Round Fungus Beetle	Catops gratiosus	2001
Insect	Rumbling Falls Cave Beetle	Pseudanophthalmus sp. 27	2004
Insect	Rumbling Falls Cave Dipluran	Litocampa sp. 5	2005
Insect	Slender Ground Beetle	Platynus tenuicollis	2002
Insect	springtail	Tomocerus dubius	2004
Insect	springtails	Ceratophysella sp.	2004
Insect	springtails	Onychiurus sp.	2002
Insect	Stellate springtail	Folsomia stella	2002
Insect	Swamp River Cave Neanura	Neanura sp. 1	2001
Insect	Swamp River Cave Onychiurus	Onychiurus sp. 2	2001
Insect	Swamp River Cave Pseudosinella	Pseudosinella sp. 5	2004
Insect	Troglophilic Fly	Macrocera nobilis	2004
Insect	Two-toothed Springtail	Pogonognathellus bidentatus	2004
Mammal	Allegheny Woodrat	Neotoma magister	2004
Millipede	a cave millipede	Chaetaspis mollis	2004
Millipede	a cave obligate millipede	Ameractis satis	2004
Millipede	a cave obligate millipede	Pseudotremia acheron	2005
Millipede	a cave obligate millipede	Scoterpes ventus	2010
Millipede	a cave obligate millipede	Tetracion tennesseensis	2005
Millipede	a millipede	Ophyiulus pilosus	2002
Millipede	Barr's cave milliped	Pseudotremia sp. 7	2004
Millipede	cave millipeds	Pseudotremia sp.	2004
Millipede	millipeds	Cambala sp.	2004
Millipede	Thunder Run Cave Millipede	Chaetaspis sp. 1	2001

Ocoee River

Conservation Opportunity Area



The Ocoee River in southeastern Tennessee, a continuation of what is called the Toccoa River in GA, flows through the Cherokee National Forest and is a vital waterway that supports a diverse array of wildlife. It is essential to conservation efforts in the region. The river and its surrounding landscape feature a rich tapestry of habitats, including forested slopes, freshwater wetlands, and rocky riverbanks, all of which contribute to the area's high biodiversity. The Ocoee River's waters provide habitat for numerous species of fish, amphibians, and invertebrates, some of which are endemic or threatened. The surrounding forests, which are home to a variety of plant and animal species, also play a crucial role in maintaining the ecological balance of the region. The river itself is a key component of the larger Tennessee River watershed, contributing to the overall health of the ecosystem and providing essential services such as water purification, flood control, and carbon storage.



The Ocoee River and its surrounding landscape feature a rich tapestry of habitats, including forested slopes, freshwater wetlands, and rocky riverbanks, which support high biodiversity.

Top to bottom: Hellbender - Dave Herasimtschuk, Freshwaters Illustrated

Among the species of concern found in the Ocoee River basin is the federally listed Appalachian Elktoe, a freshwater mussel that is threatened by habitat loss and water quality degradation. Another listed species is the Ocoee Darter, a small fish endemic to the Ocoee River and its tributaries, which is listed as endangered due to its limited distribution and sensitivity to water quality changes. These species are important not only because of their rarity but also because they serve as indicators of the health of freshwater ecosystems. Unfortunately, the Ocoee River and its surrounding landscapes face significant ecological challenges. Human activities, such as dam construction and water diversion, have altered the river's natural flow and sedimentation patterns, negatively impacting aquatic habitats. Additionally, pollution from runoff, invasive species, and habitat fragmentation continue to threaten local wildlife. Conservation efforts aimed at addressing these issues—such as improving water quality, restoring natural river flows, and protecting critical habitats—are essential for the preservation of the river's biodiversity and the overall health of the ecosystem.

Ocoee River
Conservation Opportunity Area

Partnerships

US Forest Service, US Fish and Wildlife Service, Chattanooga Zoo, Nashville Zoo, Knoxville Zoo, Lee University, Tennessee State University and other academic institutions.

CMP Stressor Level	Stressor Categories	Threats specific to Ocoee River
1.1 A	Housing and urban areas; Primary residential development	Destruction or degradation of habitats due to construction activities associated with the building of primary residences. Development of housing and tourist attractions within the Ocoee watershed results in habitat loss and increased pollution.
5.3 A	Logging and wood harvesting	Incompatible timber harvest within the watershed leads to sedimentation and changes to ecological regimes.
6.1 A	Recreational activities - non-vehicular	Destruction and degradation of habitats and increased mortality of species due to excessive levels of recreational activities or inappropriate usage of habitats for recreation.
6.1 B	Recreational activities - vehicular	Destruction and degradation of habitats and increased mortality of species due to excessive levels of recreational vehicle traffic or inappropriate usage of habitats for recreational vehicles. This area receives high use of offroad vehicles and watercraft.
7.2 A	Dams and water management/use; Channelization of rivers/streams	Alteration of the natural course of a river or stream by removing rock, dirt, gravel, and other sediments from shorelines and bottoms. Such alteration is done primarily for navigation and flood control purposes. This category focuses on the human activities that lead to either not enough water or too much water in the ecosystem in question. Changes in hydrology have negatively affected hellbenders and other aquatic species.
7.2 B	Dams and water management/use; Construction of dams/impoundments	Disruption and degradation of the natural flow of a river or stream due to construction of dams or impoundments. Also includes destruction of terrestrial habitats due to removal and inundation of vegetation along shorelines. Changes in hydrology have negatively affected hellbenders and other aquatic species.
7.2 D	Dams and water management/use; Excessive groundwater withdrawal	Removal of groundwater resources essential to maintenance of hydrologic levels that support aquatic and subterranean species. Withdrawal is primarily from wells drilled for home water supply, irrigation, and other agricultural uses. Changes in hydrology have negatively affected hellbenders and other aquatic species.
7.2 F	Dams and water management/use - Operation of dams/reservoirs	Degradation of water quality and aquatic habitat availability due to disruption of natural hydrologic regimes of rivers and streams by dams or reservoirs. Also, includes destruction / degradation of terrestrial habitats due to periodic raising or lower of water levels. Changes in hydrology have negatively affected hellbenders and other aquatic species.
11.4 A	Changes in precipitation and hydrological regimes	Broad-scale changes in precipitation mean, variability, seasonality, and extremes, including decreased or increased precipitation, changes in timing of precipitation, changes in form of precipitation (e.g., snow vs rain; snow cover and snowpack where applicable), changes in evapotranspiration rates and hydrological cycles, and droughts and floods. Changes in hydrology have negatively affected hellbenders and other aquatic species.

Ocoee River
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Species Restoration	Reintroduce extirpated and historic populations of priority species to appropriate habitats across the state.	introductions
Alliances and Partnerships	Develop strategic alliances with US Army Corp of Engineers, TN Valley Authority, water utility boards, and other institutions to address water management issues that affect target species and habitats.	partnerships
Standards	Develop standards for instream-flow regimes that establish minimum water levels required for target species during critical periods and for maintenance of habitat quality.	instream flow standards
Research	Identify species with specialized habitat, resource, or connectivity needs across their life stages (i.e., those that are area-limited, resource-limited, dispersal-limited, or process-limited).	species
Conservation Area Management	Identify and pursue opportunities to increase conservation of priority lands and waters by working with managers of existing public lands managed for purposes other than conservation, such as military installations or state lands.	acres
Habitat/Natural Processes Restoration	Redesign and remove existing structures or barriers where there is the greatest potential to restore natural processes.	barriers
Facilitation	Conduct strategic translocations (aka: assisted migration, managed relocation, conservation translocation) to sites that span a range of potentially suitable climatic or hydrological conditions either within or beyond current distributions, after evaluating risks, weighing ethical considerations, and managing for unintended consequences.	species translocations

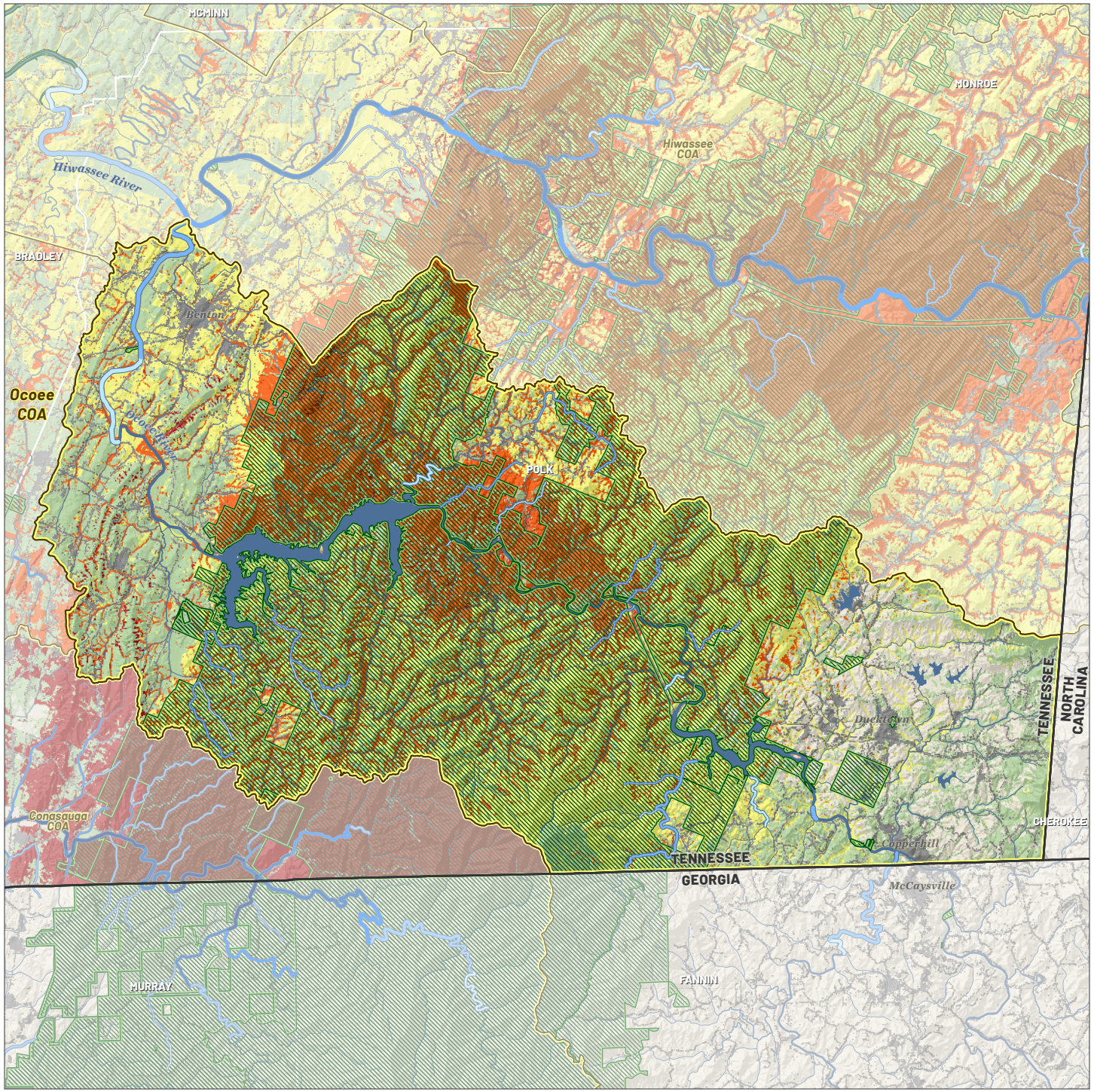
Conservation Projects

Partners continue efforts in this COA to survey for Hellbender in the headwater streams of the Ocoee River Watershed. One unique project is taking place to collect Hellbender eggs from these streams and take them to the Chattanooga Zoo to raise them in a headstart program for approximately 2 years, then return them to the wild. Hellbender headstrart programs aim to increase recruitment of individuals into adulthood. Despite these efforts, Hellbender populations continue to decline across their range. Other projects include surveys to assess abundance and distribution of fishes.

To learn more about the Ocoee River Conservation Opportunity Area, please contact Daniel Istvanko, Biodiversity Coordinator, Region 3 (931) 484-9571

Ocoee River
Conservation Opportunity Area

Ocoee COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Fourth Fractional Township	Private	654	100%
Hiwasee/Ocoee SP	TDEC - SP	107	18%
Ducktown Basin Museum SHS	TDEC - THC	20	100%
William L. Davenport Refuge	TWRA	106	100%
South Cherokee NF	USFS	305,801	23%



Combined Habitat Priorities

Ocoee Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

Conservation Opportunity Area (COA)

Public/Protected Land

Conservation Easement

Karst Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:

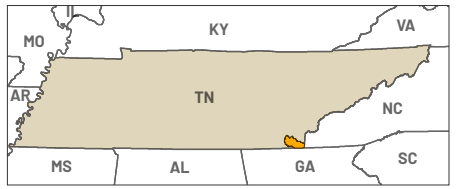
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Ocoee COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Seepage Salamander	Desmognathus aeneus	2018
Bat	Eastern Small-footed Bat	Myotis leibii	2015
Bat	Little Brown Myotis	Myotis lucifugus	2005
Bat	Northern Hoary Bat	Lasiurus cinereus	2018
Bat	Northern Long-eared Bat	Myotis septentrionalis	2012
Bat	Tricolored Bat	Perimyotis subflavus	2012
Bird	American Barn Owl	Tyto furcata	2023
Bird	American Black Duck	Anas rubripes	2013
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2019
Bird	Bank Swallow	Riparia riparia	2022
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2020
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2023
Bird	Bobolink	Dolichonyx oryzivorus	2016
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2023
Bird	Canada Warbler	Cardellina canadensis	2021
Bird	Cerulean Warbler	Setophaga cerulea	2021
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2020
Bird	Dunlin	Calidris alpina	2018
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Evening Grosbeak	Coccothraustes vespertinus	1987
Bird	Grasshopper Sparrow	Ammodramus savannarum	2018
Bird	Great Egret	Ardea alba	2021
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	Least Flycatcher	Empidonax minimus	2016
Bird	Lesser Yellowlegs	Tringa flavipes	2020
Bird	Little Blue Heron	Egretta caerulea	2022
Bird	Loggerhead Shrike	Lanius ludovicianus	2018
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Northern Bobwhite	Colinus virginianus	2022
Bird	Northern Harrier	Circus hudsonius	2020
Bird	Northern Pintail	Anas acuta	2017
Bird	Northern Saw-whet Owl	Aegolius acadicus	2023
Bird	Olive-sided Flycatcher	Contopus cooperi	2008
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2020
Bird	Peregrine Falcon	Falco peregrinus	2017
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2022
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023

Ocoee COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Ruffed Grouse	Bonasa umbellus	2021
Bird	Rusty Blackbird	Euphagus carolinus	2022
Bird	Semipalmated Sandpiper	Calidris pusilla	2020
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Swainson's Warbler	Limnothlypis swainsonii	2023
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2019
Bird	White-rumped Sandpiper	Calidris fuscicollis	2020
Bird	Willet	Tringa semipalmata	2020
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	1987
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Gastropod	Blue-gray Glyph	Glyphyalinia ocoae	2013
Gastropod	Cohutta Slitmouth	Stenotrema cohuttense	2009
Gastropod	Crossed Dome	Ventridens decussatus	2009
Gastropod	Ocoee Covert	Fumonelix archeri	2006
Gastropod	Open Supercoil	Paravitrea umbilicaris	2009
Gastropod	Pink Glyph	Glyphyalinia pentadelphia	2009
Insect	Diana Fritillary	Argynnis diana	2003
Mammal	Cinereus Shrew	Sorex cinereus	1990
Mammal	Eastern Spotted Skunk	Spilogale putorius	2023
Mammal	Eastern Woodrat	Neotoma floridana illinoensis	2011
Mammal	Smoky Shrew	Sorex fumeus	1990
Mammal	Southeastern Shrew	Sorex longirostris	1990
Mammal	Southern Appalachian Woodrat	Neotoma floridana haematoreia	1990
Mammal	Woodland Jumping Mouse	Napaeozapus insignis	1990
Plant	American Pillwort	Pilularia americana	2021
Plant	Ashleaf Bush-pea	Thermopsis fraxinifolia	2011
Plant	Broadleaf Tickseed	Coreopsis latifolia	1997
Plant	Catfoot	Pseudognaphalium helleri	1978
Plant	Choke Cherry	Prunus virginiana	2008
Plant	Cow-parsnip	Heracleum maximum	1983
Plant	Eastern Turkeybeard	Xerophyllum asphodeloides	1987
Plant	Fraser's Loosestrife	Lysimachia fraseri	2008
Plant	Green-and-gold	Chrysogonum virginianum	2007
Plant	Headwaters Hornwort	Nothoceros aenigmaticus	2013
Plant	Horsesugar	Symplocos tinctoria	2002
Plant	Large Cranberry	Vaccinium macrocarpon	2024
Plant	Mountain Bush-honeysuckle	Diervilla rivularis	1997
Plant	Mountain Honeysuckle	Lonicera dioica	1983
Plant	Mountain Witch-alder	Fothergilla major	2005
Plant	Nevius' Stonecrop	Sedum nevii	2000

Ocoee COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Northern Bush-honeysuckle	Diervilla lonicera	1983
Plant	Pale-green Orchid	Platanthera flava var. herbiola	2012
Plant	Purple Gerardia	Agalinis plukenetii	2015
Plant	Purple Giant-hyssop	Agastache scrophulariifolia	1983
Plant	Roughish Witchgrass	Dichanthelium leucothrix	1969
Plant	Ruth's Silk-grass	Pityopsis ruthii	2001
Plant	Southern Lobelia	Lobelia amoena	1991
Plant	Southern Nodding Trillium	Trillium rugelii	1980
Plant	Sweet Pinesap	Monotropsis odorata	2013
Plant	Tawny Cotton-grass	Eriophorum virginicum	2024
Plant	Trailing Trillium	Trillium decumbens	2016
Reptile	Coal Skink	Plestiodon anthracinus	2011
Reptile	Eastern Box Turtle	Terrapene carolina	2011
Reptile	Eastern Hog-nosed Snake	Heterodon platirhinos	1955
Reptile	Eastern Pinesnake	Pituophis melanoleucus	1983

Ocoee River COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Hellbender	Cryptobranchus alleganiensis	2020
Crustacean	Mountain Crayfish	Cambarus conasaugaensis	2014
Fish	Lined Chub	Hybopsis lineapunctata	1978
Fish	Snail Darter	Percina tanasi	2019
Fish	Tennessee Dace	Chrosomus tennesseensis	2022

Ocoee River COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
No documented subterranean SGCN in this COA			

Roaring River

Conservation Opportunity Area



The Roaring River Conservation Opportunity Area (COA) contains three of the thirteen State Scenic Rivers in Tennessee: Blackburn Fork State Scenic River, Roaring River State Scenic River, and Spring Creek State Scenic River. These scenic rivers all flow from headwater streams on the Highland Rim before dropping into the Nashville basin to the west and converging with the Cumberland River. This high gradient drop in elevation renders these rivers prone to flood events. Several Species of Greatest Conservation Need (SGCN) and federally endangered mussels occur within this COA. Many of the riparian areas along tributary streams within the COA are used for agriculture -- both row crops and pasture.

Hellbenders have been documented in this conservation opportunity area, but populations of this species are almost certainly in decline. Multiple species of mussels and SGCN fish are located within the numerous streams and rivers; these include the Redlips Darter, Rosyface Shiner, Cumberland Moccasinshell, and Painted Creekshell Mussels.

Opportunities to improve riparian buffers exist on the State Scenic Rivers, at the confluence with the Cumberland River, and other smaller tributaries. Improving water quality, and specifically reducing sedimentation, is essential for the persistence of several sensitive aquatic species and is the primary objective of this COA. The occurrence of small dams within the COA decreases connectivity of the river and eliminates movement of animals both upstream and downstream.



Three of Tennessee's 13 State Scenic Rivers flow from headwater streams on the Highland Rim before dropping into the Nashville basin.



Top to bottom: Fishes of Blackburn Fork/Daniel Istvanko, TWRA; Cummins Falls on the Blackburn Fork (a tributary of Roaring river and a state scenic river)/Brenton Rogers. P2: Researchers surveying for Hellbenders in the Roaring River/Chris Simspon, TWRA. P3: Cummins Falls SP/Brenton Rogers

Roaring River
Conservation Opportunity Area

Partnerships

TWRA will partner with the US Army Corps of Engineers, Tennessee Dept. of Environment and Conservation, The Nature Conservancy, and watershed groups to remove low head dams and other artificial barriers from Cumberland River tributaries. Dam removal from State Scenic Rivers will help fulfill the intent of the Tennessee Scenic Rivers Act of 1968 to reclaim Tennessee's diminishing resource of free-flowing rivers. Partnerships will also be developed with willing private land owners to restore and improve riparian buffers and water quality.



CMP Stressor Level	Stressor Categories	Threats specific to Roaring River
1.1 A	Housing and urban areas; Primary residential development	Destruction or degradation of habitats due to construction activities associated with the building of primary residences. There is widespread residential development and associated infrastructure in this COA. It has been highlighted on national media as an excellent place to live and population has surged.
2.3 A	Livestock farming and ranching; Agricultural conversion (livestock, mostly historical)	Vegetation management along riparian zones in areas farmed with livestock exacerbates erosion, sedimentation, and flooding risks. Use of land for grazing is broad and indiscriminate. (In farming, animals are kept in captivity; in ranching they are allowed to roam in wild habitats.)
6.1 B	Recreational activities - vehicular	Destruction and degradation of habitats and increased mortality of species due to excessive levels of recreational vehicle traffic or inappropriate usage of habitats for recreational vehicles. OHV-caused loss of vegetation, SGCN habitat destruction, erosion, and increased runoff occurs.



To learn more about the Roaring River Conservation Opportunity Area, please contact:
Daniel Istvanko, Biodiversity Coordinator, Region 3 (931) 484-9571

CMP Stressor Level	Stressor Categories	Threats specific to Roaring River
7.1 A	Fire and fire suppression	Degradation of fire-dependent natural systems due to either human suppression of fire or the conditions needed to support combustion. Increases risk of wildfire.
8.2 A	Problematic native plants and animals	Increased mortality of animals resulting from either excessive take by predators or by the inability to compete with other species for food and resources. Residential ~~pollution~~ species introductions also degrade habitat.
9.1 B	Household sewage and urban waste water; Residential sewage/septic systems	Degradation of water quality resulting from ineffective treatment of residential sewage by septic systems. Often caused by older, defective sewage systems or by poorly-sited septic tanks. Pollution degrades habitat.

Conservation Actions	Desired Change	Units
Permanent Protective Easements	Use federal/state/private funding sources to acquire permanent easements within critical units of aquatic, subterranean, and terrestrial habitats that provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	caves protected
Compatible Resource Use	Use government-funded incentive programs (e.g., CRP, EQIP, CSP, WRP, and FLEP) to encourage private landowners to protect water quality for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres
Climate Adaptation Management	Protect and restore riparian buffers to reduce temperature and moderate flows in riparian systems.	acres and/or feet of riparian corridor
Facilitation	Manage species to preserve genetic diversity, especially at the leading and trailing edges of their ranges.	species

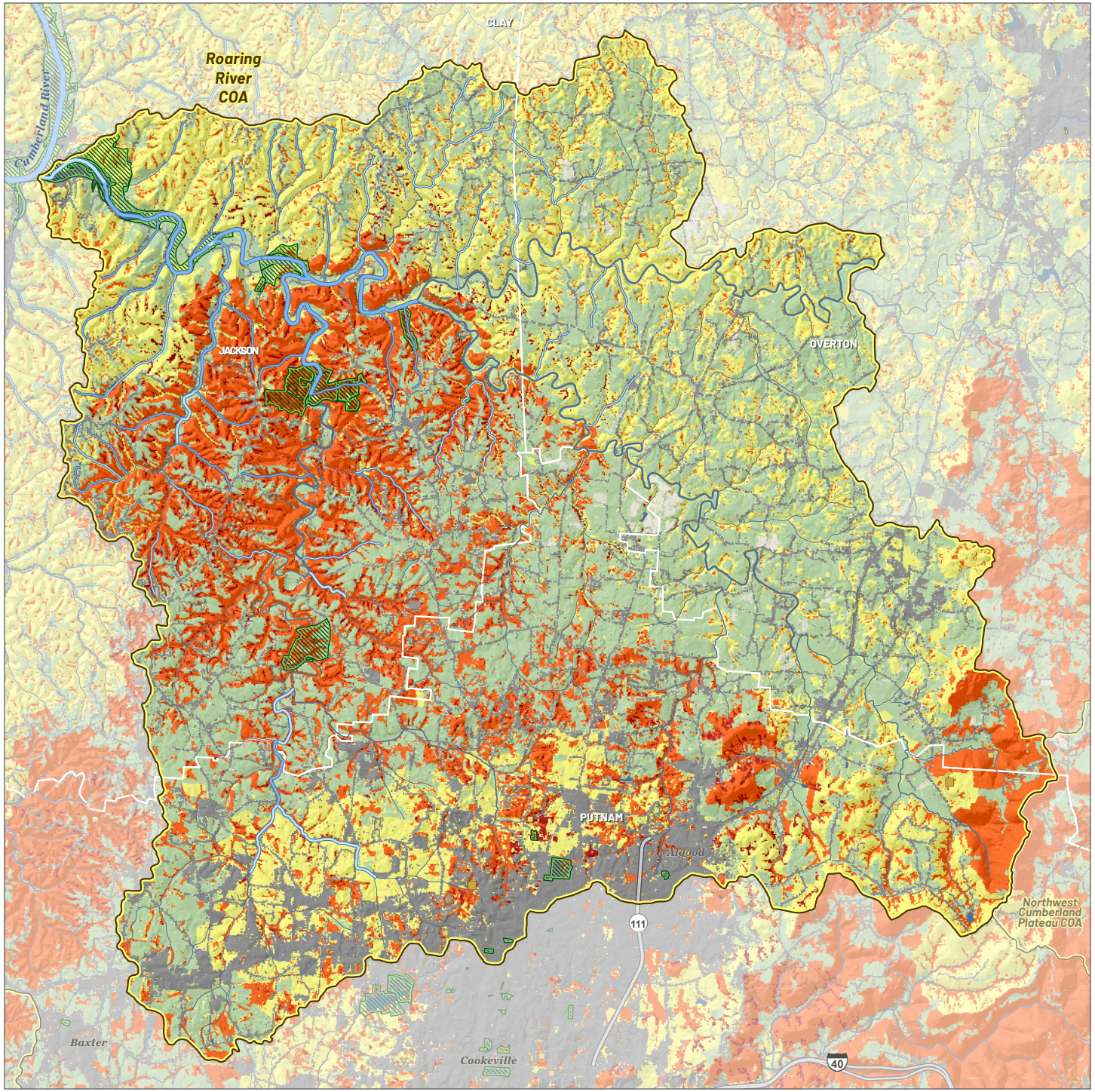
Conservation Projects

Some projects focus on achieving a better understanding of the distribution, abundance, and/or genetics of SGCN, including fish, Hellbenders, and Eastern Woodrats. A project to bring back Lake Sturgeon populations is ongoing, and property acquisitions are increasing land under conservation. Since 2015, the Roaring River Dam was successfully removed, and subsequently numerous fish surveys conducted above the dam site have documented increasing fish movement throughout the watershed. Newly restored fish passage will allow host fish and freshwater mussels that depend on them to recolonize mussel beds closer to the headwaters of the three scenic rivers mentioned above under *Public Lands*.

Bank stabilization projects are in process along the mainstem of the Roaring River. Several tracts of land along the river also have been put into public ownership, allowing for habitat restoration and increased recreation opportunities for the public.

Roaring River
Conservation Opportunity Area

Roaring River COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Cummins Falls SP	TDEC - SP	282	100%
Washmorgan Hollow	TNC	72	100%
Blackburn Fork WMA	TWRA	561	100%
The Boils WMA	TWRA	259	100%
Cordell Hull WMA	USACE	14,515	5%



Combined Habitat Priorities

Roaring River Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

Conservation Opportunity Area (COA)

Public/Protected Land

Conservation Easement

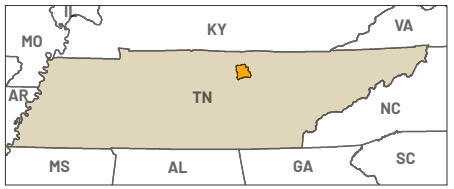
Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Roaring River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bat	Gray Bat	Myotis grisescens	2018
Bat	Little Brown Myotis	Myotis lucifugus	2014
Bat	Northern Hoary Bat	Lasiurus cinereus	2014
Bat	Northern Long-eared Bat	Myotis septentrionalis	2020
Bat	Tricolored Bat	Perimyotis subflavus	2018
Bird	American Barn Owl	Tyto furcata	2023
Bird	American Bittern	Botaurus lentiginosus	2023
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2022
Bird	Bewick's Wren	Thryomanes bewickii	1965
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2012
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Dunlin	Calidris alpina	2015
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Golden-winged Warbler	Vermivora chrysoptera	2022
Bird	Grasshopper Sparrow	Ammodramus savannarum	2014
Bird	Great Egret	Ardea alba	2023
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	Least Flycatcher	Empidonax minimus	2023
Bird	LeConte's Sparrow	Ammospiza leconteii	2015
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2021
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Northern Bobwhite	Colinus virginianus	2020
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Olive-sided Flycatcher	Contopus cooperi	2017
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2022
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Stilt Sandpiper	Calidris himantopus	2021
Bird	Veery	Catharus fuscescens	2023
Bird	Willow Flycatcher	Empidonax traillii	2005
Bird	Winter Wren	Troglodytes hiemalis	2023

Roaring River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2008
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Mammal	Allegheny Woodrat	Neotoma magister	1979
Mammal	Cinereus Shrew	Sorex cinereus	1965
Mammal	Smoky Shrew	Sorex fumeus	1979
Mammal	Southeastern Shrew	Sorex longirostris	1963
Plant	Butternut	Juglans cinerea	2012
Plant	Torrey's Mountainmint	Pycnanthemum torreyi	1968
Reptile	Eastern Box Turtle	Terrapene carolina	2020
Reptile	Eastern Hog-nosed Snake	Heterodon platirhinos	2018

Roaring River COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Hellbender	Cryptobranchus alleganiensis	2015
Crustacean	Depression Crayfish	Cambarus rusticiformis	1999
Crustacean	Hairy Crayfish	Cambarus friaufi	1999
Fish	Diamond Darter	Crystallaria cincotta	1939
Fish	Lake Sturgeon	Acipenser fulvescens	2021
Fish	Redlips Darter	Allohistium maydeni	1968

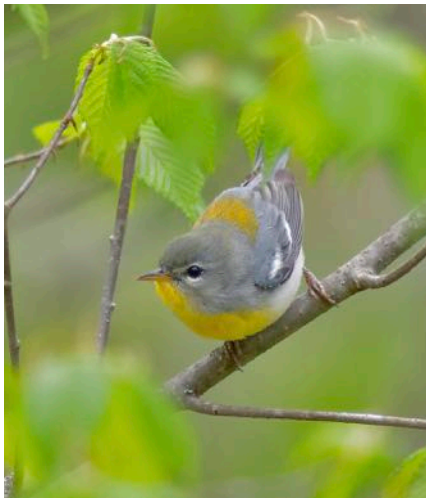
Roaring River COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Tennessee Cave Salamander	Gyrinophilus palleucus	2006
Arachnid	a cave cobweb spider	Nesticus stygius	1984
Arachnid	Tennessee Two-clawed Spider	Liocranoides tennesseensis	1999
Bat	Gray Bat	Myotis grisescens	2000
Crustacean	a cave obligate isopod	Caecidotea bicrenata bicrenata	1963
Crustacean	Central Kentucky Cave Amphipod	Stygobromus exilis	1943
Crustacean	Southern Cave Crayfish	Orconectes australis	2007
Fish	Southern Cavefish	Typhlichthys subterraneus	2007
Insect	a cave cricket	Hadenoecus opilionides	1978
Insect	a cave obligate beetle	Batrisodes pannosus	1961
Insect	a cave obligate ground beetle	Pseudanophthalmus robustus	1962
Insect	a cave obligate ground beetle	Pseudanophthalmus valentinei	1962
Millipede	a cave obligate millipede	Scoterpes ventus	2010

Sequatchie River

Conservation Opportunity Area



The Sequatchie River, which flows through the Sequatchie Valley in southeastern Tennessee, is an important waterway for both biodiversity and conservation. The river runs through a diverse landscape of limestone bluffs, rich forests, and riparian habitats that support a wide range of plant and animal species. The surrounding valley, known for its karst topography and unique geological features, provides critical habitats for various species, making it an area of significant ecological value. The river's water and floodplains are crucial for maintaining biodiversity, as they support fish, amphibians, and invertebrates, some of which are rare or endemic to the region. The Sequatchie River is also an essential tributary to the Tennessee River, contributing to the overall health of the larger watershed.



The Sequatchie River and its floodplains are are crucial for maintaining fish, amphibians, and invertebrates, some of which are rare or endemic to the region.

Top to bottom: Northern Parula/Daniel Istvanko, TWRA. P.4: Sequatchie River in Pikeville, TN/Brian Stansberry - own work, CC BY 3.0

Among the species of concern in the Sequatchie River basin is the federally listed Tennessee Clubtail Dragonfly, which is found in the river and is particularly sensitive to water quality changes. Additionally, the river is home to several species of freshwater mussels, including the federally listed Purple Lilliput and the endangered Snuffbox Mussel, both of which are highly vulnerable to habitat degradation. These species play important ecological roles, such as filtering water and contributing to the health of the aquatic ecosystem. However, the Sequatchie River and its surrounding landscape face several ecological challenges. Agricultural runoff, pollution from development, and sedimentation have led to declining water quality, which negatively impacts the delicate balance of aquatic life. Habitat fragmentation, caused by urbanization and land-use changes, further threatens wildlife populations by disrupting migration corridors and reducing available habitats. To preserve the biodiversity of the Sequatchie River, conservation efforts must focus on reducing pollution, protecting riparian zones, and restoring natural river dynamics. These actions will help ensure the survival of the Sequatchie River ecosystem and its unique species.

Sequatchie River
Conservation Opportunity Area

CMP Stressor Level	Stressor Categories	Threats specific to Sequatchie River
1.1 A	Housing and urban areas; Primary residential development	Destruction or degradation of habitats due to construction activities associated with the building of primary residences. Located near Chattanooga, this area is experiencing exponential growth and resources such as the Sequatchie River are being stressed.
2.1 B	Annual and perennial non- timber crops; Incompatible row crop agricultural practices	Destruction or degradation of habitats due to construction activities associated with the building of secondary/vacation homes and resort developments. BMPs and protective measures are needed to buffer streams, reduce erosion and sedimentation issues.
5.3 A	Logging and wood harvesting	Failure to follow Best Management Practices (BMPs) sometimes occurs during timber harvests, in particular high-grading ((this means removing the largest, most valuable trees and leaving behind lower-value or poor-quality trees without considering the impact on the future forest's health or composition). Core Comments: call out not following BMPs, such as high-grading
6.1 A	Recreational activities - non-vehicular	Destruction and degradation of habitats and increased mortality of SGCN or their habitats due to excessive levels of recreational activities or inappropriate usage of habitats for recreation.
6.1 B	Recreational activities - vehicular	Destruction and degradation of habitats and increased mortality of species due to excessive levels of recreational vehicle traffic or inappropriate usage of habitats for recreational vehicles. OHVs are causing loss of vegetation, SGCN habitat destruction, erosion, and increased runoff.
7.2 A	Dams and water management/use - Channelization of rivers/streams	Alteration of the natural course of a river or stream by removing rock, dirt, gravel, and other sediments from shorelines and bottoms. Such alteration is done primarily for navigation and flood control purposes. This category focuses on the human activities that lead to either not enough water or too much water in the ecosystem in question. Channelization and lowhead dams in this COA impede natural flow regimes. Altered hydrology has a negative impact on native species.
7.2 B	Dams and water management/use - Construction of dams/impoundments	Disruption and degradation of the natural flow of a river or stream due to construction of dams or impoundments. Also includes destruction of terrestrial habitats due to removal and inundation of vegetation along shorelines. Channelization and lowhead dams impede natural flow regimes. Altered hydrology has a negative impact on native species.
7.2 D	Dams and water management/use - Excessive groundwater withdrawal	Removal of groundwater resources essential to maintenance of hydrologic levels that support aquatic and subterranean species. Withdrawal is primarily from wells drilled for home water supply, irrigation, and other agricultural uses. Increase in development results in more water withdrawals.
7.2 F	Dams and water management/use - Operation of dams/reservoirs	Degradation of water quality and aquatic habitat availability due to disruption of natural hydrologic regimes of rivers and streams by dams or reservoirs. Also includes destruction / degradation of terrestrial habitats due to periodic raising or lower of water levels. Lowhead dams are disrupting natural systems.

Sequatchie River
Conservation Opportunity Area

Partnerships

The USDA Natural Resource Conservation Service, Tennessee Valley Authority, US Fish and Wildlife Service, TN Dept. of Environment and Conservation, Tennessee Wildlife Federation, The Nature Conservancy, McClung Museum, Tennessee Aquarium Conservation Institute, University of Tennessee and various other universities will continue to work toward shared conservation goals for the Sequatchie.

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Species Restoration	Reintroduce extirpated and historic populations of priority species to appropriate habitats across the state.	acres/species
Alliances & Partnerships	Develop strategic alliances with US Army Corp of Engineers, TN Valley Authority, water utility boards, and other institutions to address water management issues that affect target species and habitats.	alliances
Standards	Develop standards for instream-flow regimes that establish minimum water levels required for target species during critical periods and for maintenance of habitat quality.	instream flow standards
Research	Identify species with specialized habitat, resource, or connectivity needs across their life stages (i.e., those that are area-limited, resource-limited, dispersal-limited, or process-limited).	species
Research	Map the distribution of species that are being displaced by changes in climate, and model future suitable habitat under different climate and land-use scenarios and over different periods of time (e.g., 2050, 2100).	acres
Habitat/Natural Processes Restoration	Restore and enhance riparian zones and buffers in agricultural and urban areas to minimize non-point source pollution.	acres
Habitat/Natural Processes Restoration	Reduce ground and surface water withdrawals in areas experiencing drought.	acre-feet
Facilitation	Conduct strategic translocations (aka: assisted migration, managed relocation, conservation translocation) to sites that span a range of potentially suitable climatic or hydrological conditions either within or beyond current distributions, after evaluating risks, weighing ethical considerations, and managing for unintended consequences.	species translocations

To learn more about the Sequatchie River Conservation Opportunity Area, please contact Daniel Istvanko, Biodiversity Coordinator, Region 3 (931) 484-9571

Sequatchie River
Conservation Opportunity Area

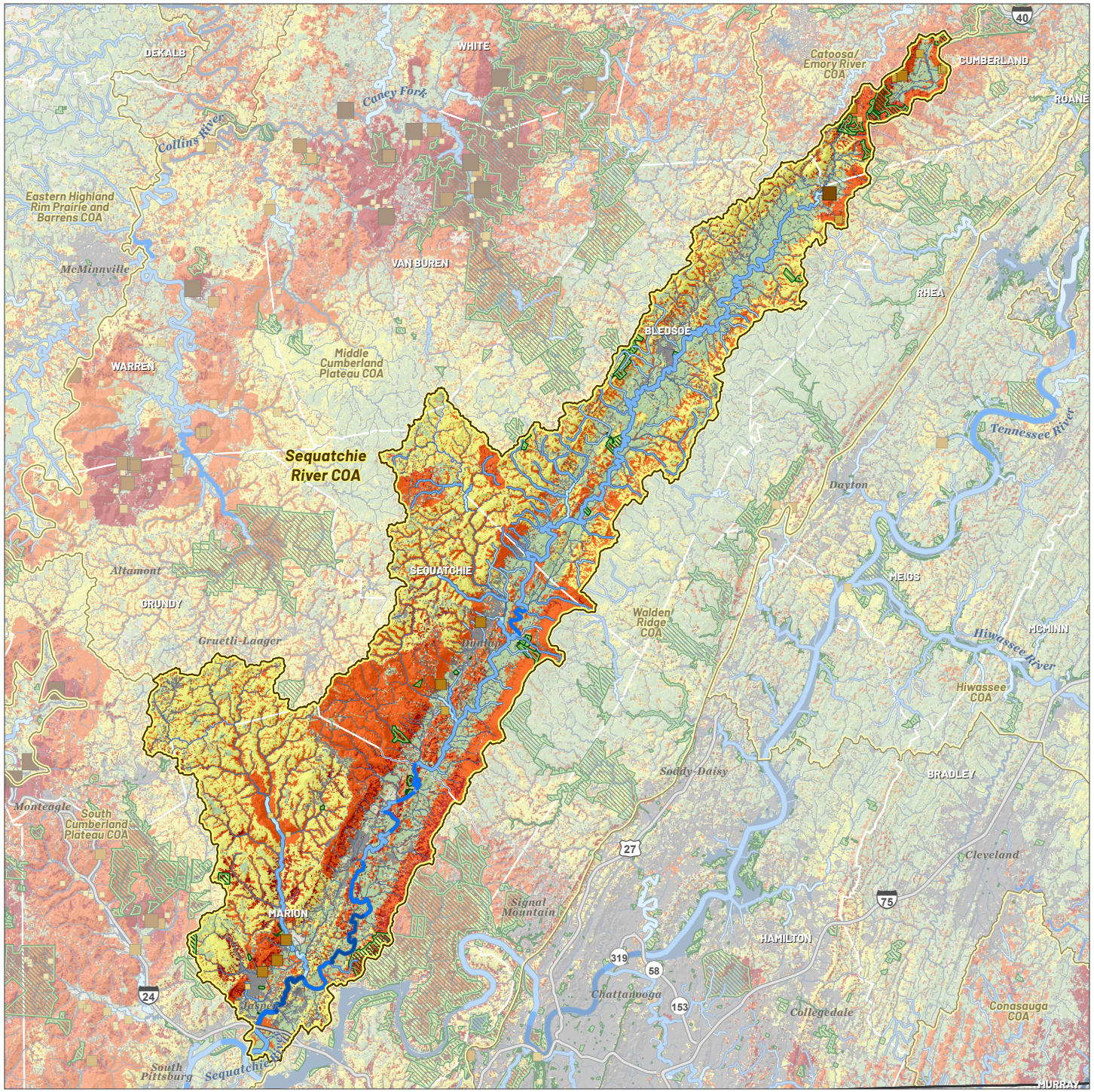
Conservation Projects

Tennessee is home to incredible stream biodiversity and the Sequatchie River is no exception. Partners are working together in ongoing watershed surveys to document and update freshwater mussel distribution. Recently, biologists documented the Slabside Pearlymussel, a species that was thought to be extirpated. In addition, species surveys are documenting fish and bat abundance and distribution. The Grassy Cove Saltpeter Cave Gate has been installed to protect sensitive bat populations.



Sequatchie River
Conservation Opportunity Area

Sequatchie River COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Chimneys SNA	TDEC - DNA	33	100%
Sequatchie Cave SNA	TDEC - DNA	134	100%
Cumberland Trail SP	TDEC - SP	32,654	8%
Prentice Cooper SF	TDF	27,492	7%
Harp WMA	TWRA	269	96%



Combined Habitat Priorities

Sequatchie River Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

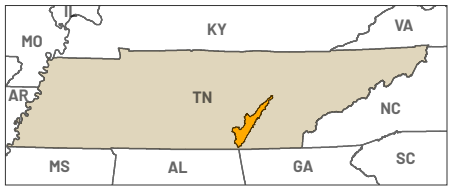
- Conservation Opportunity Area (COA)
- Public/Protected Land
- Conservation Easement

Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles
0 5 Kilometers



Sequatchie River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Cumberland Dusky Salamander	Desmognathus abditus	2018
Amphibian	Four-toed Salamander	Hemidactylium scutatum	1980
Bat	Eastern Small-footed Bat	Myotis leibii	2021
Bat	Gray Bat	Myotis grisescens	2021
Bat	Indiana Bat	Myotis sodalis	2021
Bat	Little Brown Myotis	Myotis lucifugus	2021
Bat	Northern Hoary Bat	Lasiurus cinereus	2018
Bat	Northern Long-eared Bat	Myotis septentrionalis	2015
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2001
Bat	Tricolored Bat	Perimyotis subflavus	2021
Bird	American Barn Owl	Tyto furcata	2021
Bird	American Bittern	Botaurus lentiginosus	2019
Bird	American Black Duck	Anas rubripes	2022
Bird	American Golden-Plover	Pluvialis dominica	2023
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2018
Bird	Bachman's Sparrow	Peucaea aestivalis	2000
Bird	Bank Swallow	Riparia riparia	2017
Bird	Bewick's Wren	Thryomanes bewickii	1967
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2016
Bird	Bobolink	Dolichonyx oryzivorus	2023
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2023
Bird	Canada Warbler	Cardellina canadensis	2014
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2022
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Dunlin	Calidris alpina	2023
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Evening Grosbeak	Coccothraustes vespertinus	2021
Bird	Golden-winged Warbler	Vermivora chrysoptera	2017
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023
Bird	Great Egret	Ardea alba	2023
Bird	Henslow's Sparrow	Centronyx henslowii	2012
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	Least Flycatcher	Empidonax minimus	2000
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2022
Bird	Long-eared Owl	Asio otus	1999
Bird	Long-tailed Duck	Clangula hyemalis	2021
Bird	Louisiana Waterthrush	Parkesia motacilla	2023

Sequatchie River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Mississippi Kite	Ictinia mississippiensis	2023
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2022
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2023
Bird	Peregrine Falcon	Falco peregrinus	2023
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruffed Grouse	Bonasa umbellus	2018
Bird	Rusty Blackbird	Euphagus carolinus	2022
Bird	Semipalmated Sandpiper	Calidris pusilla	2022
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-eared Owl	Asio flammeus	2006
Bird	Snowy Egret	Egretta thula	2023
Bird	Stilt Sandpiper	Calidris himantopus	2022
Bird	Swainson's Warbler	Limnothlypis swainsonii	2023
Bird	Veery	Catharus fuscescens	2021
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	Western Sandpiper	Calidris mauri	2022
Bird	Whooping Crane	Grus americana	2008
Bird	Willet	Tringa semipalmata	2022
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Gastropod	Toothy Coil	Helicodiscus hexodon	1975
Mammal	Allegheny Woodrat	Neotoma magister	2021
Mammal	Cinereus Shrew	Sorex cinereus	2006
Mammal	Southeastern Shrew	Sorex longirostris	2006
Plant	Allegheny Mountain Golden-banner	Thermopsis mollis	1934
Plant	American Barberry	Berberis canadensis	2014
Plant	Appalachian Pellia	Pellia appalachiana	2001
Plant	Blomquist Leafy Liverwort	Lejeunea blomquistii	2001
Plant	Earleaf False Foxglove	Agalinis auriculata	1989
Plant	Granite Gooseberry	Ribes curvatum	2016
Plant	Least Trillium	Trillium pusillum	2008
Plant	Mcdowell's Sunflower	Helianthus occidentalis	1980
Plant	Plukenet's Flatsedge	Cyperus plukenetii	1943
Plant	Pretty St. John's-wort	Hypericum nudiflorum	1948
Plant	Price's Potato-bean	Apios priceana	1978
Plant	Rose Pogonia	Pogonia ophioglossoides	2003
Plant	Roundleaf Serviceberry	Amelanchier sanguinea	1998

Sequatchie River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Silverling	Paronychia argyrocoma	2012
Plant	Small's Stonecrop	Diamorpha smallii	1997
Plant	Soft-Hairy False Gromwell	Lithospermum parviflorum	2009
Plant	Virginia Chainfern	Anchistea virginica	1935
Plant	White Fringeless Orchid	Platanthera integrilabia	2024
Plant	Yellow-crested Orchid	Platanthera cristata	2024

Sequatchie River COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Hellbender	Cryptobranchus alleganiensis	1991
Amphibian	Mudpuppy	Necturus maculosus	1981
Bivalve	Alabama Lampmussel	Lampsilis virescens	2014
Bivalve	Finerayed Pigtoe	Fusconaia cuneolus	1980
Bivalve	Mountain Creekshell	Leaunio vanuxemensis	2016
Bivalve	Oyster Mussel	Epioblasma capsaeformis	1980
Bivalve	Pale Lilliput	Toxolasma cylindrellum	1955
Bivalve	Rainbow	Cambarunio iris	2016
Bivalve	Round Hickorynut	Obovaria subrotunda	1973
Bivalve	Slabside Pearlymussel	Pleuronaia dolabelloides	1980
Bivalve	Spectaclecase	Cumberlandia monodonta	1992
Bivalve	Tennessee Clubshell	Pleurobema oviforme	1991
Bivalve	Tennessee Pigtoe	Pleuronaia barnesiana	1992
Crustacean	Pristine Crayfish	Cambarus pristinus	2021
Crustacean	Surgeon Crayfish	Faxonius forceps	2021
Fish	Blotched Chub	Erimystax insignis	2022
Fish	Flame Chub	Hemitremia flammea	2019
Fish	Golden Darter	Nothonotus denoncourti	2022
Fish	Highfin Carpsucker	Carpiodes velifer	1992
Fish	Lake Sturgeon	Acipenser fulvescens	2023
Fish	Laurel Dace	Chrosomus saylori	1954
Fish	Sequatchie Darter	Etheostoma blennius sequatchiense	1964
Fish	Snail Darter	Percina tanasi	2022
Gastropod	Anthony's Riversnail	Athearnia anthonyi	2007
Gastropod	Royal Springsnail	Marstonia ogmorhaphe	2009

Sequatchie River COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Tennessee Cave Salamander	Gyrinophilus palleucus	2005
Arachnid	a cave obligate pseudoscorpion	Kleptochthonius charon	2004
Arachnid	a cave obligate pseudoscorpion	Kleptochthonius infernalis	1962
Arachnid	harvestman	Bishopella sp. Probably laciniosa	2004
Arachnid	Mammoth Cave Spider	Anthrobia mammouthia	2004
Arachnid	Minute Cave Spider	Maymena ambita	2004

Sequatchie River COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Arachnid	Southeastern Cave Pseudoscorpion	Hesperochernes mirabilis	2004
Arachnid	Subterranean Sheetweb Spider	Phanetta subterranea	2004
Arachnid	Two-clawed spider	Liocranoides sp.	2004
Bat	Gray Bat	Myotis grisescens	2000
Bat	Indiana Bat	Myotis sodalis	2017
Bat	Little Brown Myotis	Myotis lucifugus	2017
Bat	Northern Long-eared Bat	Myotis septentrionalis	2015
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	1995
Bat	Tricolored Bat	Perimyotis subflavus	2017
Crustacean	a cave obligate isopod	Caecidotea circulus	1972
Crustacean	a cave obligate isopod	Caecidotea scypha	1968
Crustacean	a cave obligate isopod	Ligidium elrodii hancockensis	2004
Crustacean	Appalachian Valley Crangonyctid	Crangonyx antennatus	2003
Crustacean	cave amphipods	Stygobromus sp.	2004
Crustacean	Cavespring Crayfish	Cambarus tenebrosus	2004
Crustacean	Central Kentucky Cave Amphipod	Stygobromus exilis	2004
Crustacean	Nickajack Cave Isopod	Caecidotea nickajackensis	1963
Crustacean	Prickly Cave Crayfish	Cambarus hamulatus	2008
Crustacean	Terrestrial Cave Isopod	Haplophthalmus danicus	2004
Fish	Southern Cavefish	Typhlichthys subterraneus	2012
Flatworm	a cave obligate planarian	Sphalloplana percoeca	2004
Gastropod	a terrestrial snail	Glyphyalinia sp.	2004
Gastropod	Royal Springsnail	Marstonia ogmorhaphe	2009
Insect	a carabid beetle	Rhadine caudata	2004
Insect	a cave barklice	Psyllipsocus ramburi	2004
Insect	a cave obligate beetle	Batriasymmodes spelaeus	2004
Insect	a cave obligate beetle	Ptomaphagus hatchi	2004
Insect	a cave obligate bristletail	Litocampa valentinei	2004
Insect	a cave obligate springtail	Pseudosinella aera	2004
Insect	a cave obligate springtail	Pseudosinella christianseni	2004
Insect	a cave obligate springtail	Pseudosinella hirsuta	2004
Insect	a cave springtail	Pseudosinella cf. gisini	2005
Insect	a fly	Megaselia cavernicola	2004
Insect	a rove beetle	Atheta sp.	2004
Insect	a springtail	Arrhopalites pygmaeus	2004
Insect	Aaron Tolletts cave beetle	Pseudanophthalmus sp.	2004
Insect	an undescribed cave springtail	Arrhopalites sp. 3 near benitus	2005
Insect	Blowing Cave Beetle	Pseudanophthalmus ventus	2004
Insect	cave cricket	Euhadenoecus puteaus	1978
Insect	cave crickets	Ceuthophilus sp.	2004
Insect	cave crickets	Hadenoecini sp.	2004
Insect	Cave Dung Fly	Spelobia tenebrarum	2005
Insect	Cooke's Cave Dipluran	Litocampa cookei	2005
Insect	Golden springtail	Tomocerus flavescens	2004
Insect	Grassy Cove Cave Beetle	Pseudanophthalmus jonesi	2004
Insect	Hilly Springtail	Pseudosinella collina	2004

Sequatchie River COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Insect	Keyhole cave beetle	Pseudanophthalmus sp.	2004
Insect	Pale-footed Ocellate Rove Beetle	Lesteva pallipes	2004
Insect	Peck's Cave Springtail	Pseudosinella pecki	2005
Insect	Rumbling Falls Cave Dipluran	Litocampa sp. 5	2004
Insect	Sequatchie Caddisfly	Glyphopsyche sequatchie	2015
Insect	springtail	Tomocerus dubius	2004
Insect	springtails	Ceratophysella sp.	2004
Insect	Two-toothed Springtail	Pogonognathellus bidentatus	2004
Insect	Wilmoth cave beetle	Pseudanophthalmus sp.	2004
Mammal	Allegheny Woodrat	Neotoma magister	2004
Millipede	a cave milliped	Scoterpes sp.	2005
Millipede	a cave obligate millipede	Ameractis satis	2004
Millipede	a cave obligate millipede	Scoterpes ventus	2004
Millipede	a millipede	Ophyiulus pilosus	2004
Millipede	cave millipeds	Pseudotremia sp.	2004
Millipede	Holliday's cave milliped	Pseudotremia sp. 9	2004
Millipede	millipeds	Cambala sp.	2004

Walden Ridge

Conservation Opportunity Area



Walden Ridge, located in southeastern Tennessee, is a geologically significant and ecologically rich area that plays a crucial role in the state's biodiversity and conservation efforts. The ridge is part of the Cumberland Plateau, characterized by its steep cliffs, forested slopes, and diverse habitats, which provide a home to numerous plant and animal species, some of which are rare or endemic to the region. The area's karst topography, with its network of caves, springs, and sinkholes, supports unique ecosystems and contributes to the rich biological diversity found in the region. Walden Ridge is also a key component of the broader Appalachian ecosystem, which is recognized for its high levels of species endemism and ecological importance. Protecting this area is essential for maintaining the integrity of the larger landscape and conserving the species that depend on it.



Walden Ridge's karst topography, with its network of caves, springs, and sinkholes, supports unique ecosystems and rich biological diversity.

Among the notable species that inhabit the Walden Ridge area is the federally listed endangered Laurel Dace and imperiled bat species, such as the Tricolored Bat, which rely on the caves and forests in the area for roosting. These species are critical not only because of their rarity but also because they represent the unique ecological characteristics of the Cumberland Plateau.

However, the region faces several ecological threats, many of which are human-caused. Habitat fragmentation due to development, logging, and road construction has led to the loss of important wildlife corridors. Additionally, the spread of invasive species and pollution from agricultural runoff and urban development pose further threats to the delicate ecosystems of Walden Ridge. To protect the biodiversity of this unique area, it is vital to implement conservation strategies that focus on habitat restoration, invasive species management, and reducing human impacts on the landscape and improving water quality.

Top to bottom: Tri-colored Bat/Daniel Istvanko, TWRA. P2: Laurel Dace/Doug Strickland, Tennessee Aquarium. P.4: Walden Ridge/Brian Stansberry - own work, CC BY 3.0

Walden Ridge
Conservation Opportunity Area

Partnerships

USDA Natural Resource Conservation Service, Tennessee Valley Authority, US Fish and Wildlife Service, Tennessee Department of Environment and Conservation, Tennessee Aquarium Conservation Institute, and universities/researchers and private landowners.



CMP Stressor Level	Stressor Categories	Threats specific to Walden Ridge
1.1 A	Housing and urban areas; Primary residential development	Destruction or degradation of habitats due to construction activities associated with the building of primary residences. Increased development of commercial and residential areas due to urban sprawl surrounding Chattanooga and Soddy Daisy.
1.1 B	Housing and urban areas; Secondary home/resort development	Destruction or degradation of habitats due to construction activities associated with the building of secondary/vacation homes and resort developments. Increased development of commercial and residential areas due to urban sprawl surrounding Chattanooga and Soddy Daisy.
1.2 A	Commercial and industrial areas	Destruction or degradation of habitats in an area due to construction and other activities related to the development of commercial or industrial buildings.
5.3 A	Logging and wood harvesting	Failure to follow Best Management Practices (BMPs) sometimes occurs during timber harvests, in particular high-grading ((this means removing the largest, most valuable trees and leaving behind lower-value or poor-quality trees without considering the impact on the future forest's health or composition).
11.4 A	Changes in precipitation and hydrological regimes	Broad-scale changes in precipitation mean, variability, seasonality, and extremes, including decreased or increased precipitation, changes in timing of precipitation, changes in form of precipitation (e.g., snow vs rain; snow cover and snowpack where applicable), changes in evapotranspiration rates and hydrological cycles, and droughts and floods. Changes in forest cover could lead to increased runoff of extreme precipitation events.
11.5 A	Severe / extreme weather events	Changes in frequency, timing, and/or intensity of storms as well as severe weather events that threaten targets that have lost resilience. Category examples include thunderstorms, tropical storms, hurricanes, cyclones, tornadoes, hailstorms, ice storms or blizzards, dust storms, and erosion during storms. Changes in forest cover could lead to increased runoff of extreme precipitation events.

Walden Ridge
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Fee-title Ownership	Coordinate land acquisition priorities among state/federal agencies and non-governmental organizations.	acres
Permanent Protective Easements	Use federal/state/private funding sources to acquire permanent easements within critical units of aquatic, subterranean, and terrestrial habitats that provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Compatible Resource Use	Use government-funded incentive programs (e.g., FLEP, CRP, EQIP, Forest Stewardship Program, and Forest Legacy Program) to encourage private landowners to restore and/or protect native forest systems for target species in critical units of aquatic, subterranean, or terrestrial habitats.	acres and/or feet of riparian corridor
Compatible Resource Use	Use government-funded incentive programs (e.g., CRP, WRP, GRP, EQIP, CSP, FLEP, LIP), and rare species protection funding, such as FWS Section 6 and other funds, to manage or restore populations of target species in critical units of aquatic, subterranean, or terrestrial habitats.	species/acres
Conservation Area Management	Develop recreation management plans that outline strict guidelines for high-impact recreational uses on public/private conservation areas across the state.	plans/acres
Conservation Area Management	Discourage conversion of native habitats to semi/non-natural land types (e.g., pine plantations, golf courses, etc.) on public and private conservation areas across the state.	acres
Habitat/Natural Processes Restoration	Restore degraded forests and pine plantations to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres and/or feet of riparian corridor
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres and/or feet of riparian corridor
Habitat/Natural Processes Restoration	Restore degraded habitats, as appropriate, to support a diversity of species assemblages and ecosystem structure and function.	acres and/or feet of riparian corridor
Research	Conduct research on problems (i.e. stresses and sources of stress) affecting target species and habitats.	Species/ habitats

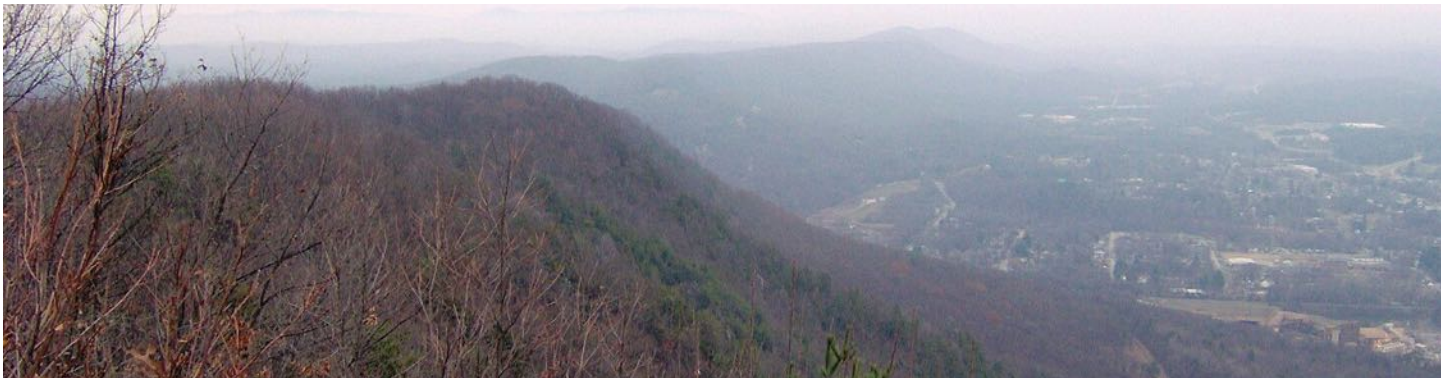
To learn more about the Walden Ridge Conservation Opportunity Area, please contact Daniel Istvanko, Biodiversity Coordinator, Region 3 (931) 484-9571

Walden Ridge
Conservation Opportunity Area

Conservation Actions	Desired Change continued	Units
Research	Identify species with specialized habitat, resource, or connectivity needs across their life stages (i.e., those that are area-limited, resource-limited, dispersal-limited, or process-limited).	species
Alliances & Partnerships	Develop strategic alliances with TN Division of Forestry, TN Forestry Association, US Forest Service, private timber companies, non-governmental organizations, universities, and other forest resource managers to address forestry practices that affect target species and habitats.	alliances
Conservation Enterprises	Develop forest banking programs for forest systems at high risk of destruction or degradation within critical units of aquatic, subterranean, or terrestrial habitats.	acres

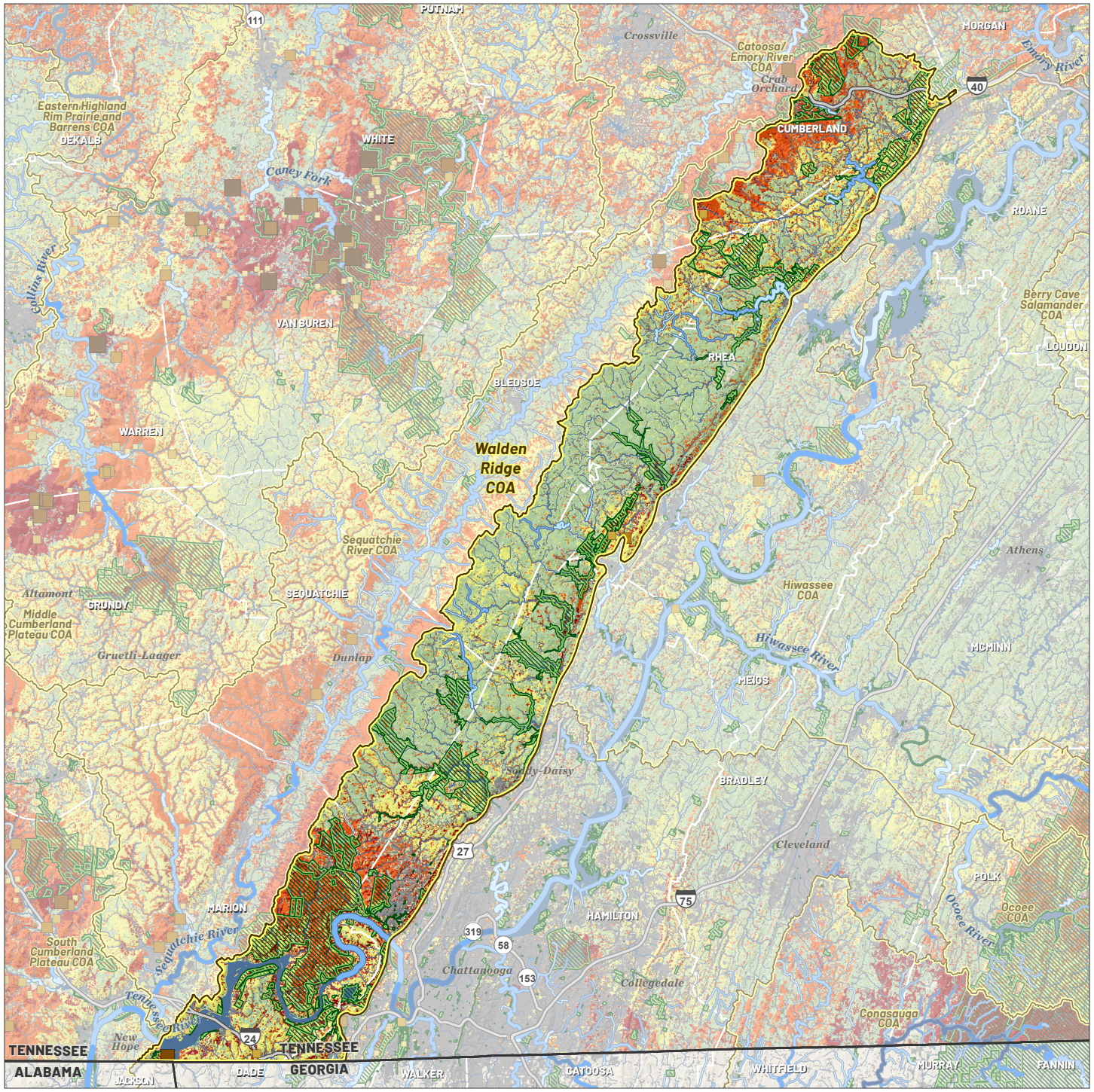
Conservation Projects

One focal SGCN that occurs in this COA is the Laurel Dace (*Chrosomus saylori*), a federally endangered fish species that is endemic to small cobble and boulder streams, which is experiencing risk of extinction due to habitat loss, disease, and drought. USFWS Partners for Fish and Wildlife Program biologists work with landowners in this COA to balance the landowners' agricultural objectives with conservation actions. Cost share programs available support such actions as field buffers, riparian zone enhancement, and cover crops. In 2024, streams in this COA experienced severe drought. In response, the Tennessee Aquarium Conservation Institute, USFWS, and TWRA organized several other partners that worked together for an emergency rescue of several stranded populations of Laurel Dace. The fish were moved to secure facilities and held until stream conditions were suitable for their return. Partners continue to work together throughout this COA to preserve, conserve, and protect this fish species with immediate work including additional distribution surveys, genetic diversity/eDNA sampling, and determining threats from disease (including parasites). In addition, other projects focus land acquisition to protect habitats critical to SGCN as well as conducting surveys to assess the abundance and distribution of SGCN, including fish, Green Salamanders, Woodrats, and Tricolored Bats.



Walden Ridge
Conservation Opportunity Area

Walden Ridge COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Tennessee River Gorge Aetna Slopes Tracts	Private	1,046	100%
Cumberland Trail SP	TDEC - SP	32,654	79%
Prentice Cooper SF	TDF	27,492	93%
Huff Branch Habitat Protection Area	TVA	21	100%
Little Cedar Mountain SWA	TVA	319	100%
Marion Bridge Habitat Protection Area	TVA	111	100%
Nickajack Cave WOA	TVA	402	99%
Raccoon Mountain Pumped Storage WOA	TVA	647	100%
Shellmound Road Bluff Habitat Protection Area	TVA	99	100%
Burhans Cave	TWRA	12	100%
Cummings Cove WMA	TWRA	1,113	100%
Luper Mountain WMA	TWRA	6,088	63%
Mt. Roosevelt WMA	TWRA	9,762	63%
North Chickamauga Creek WMA	TWRA	3,121	62%



Combined Habitat Priorities

Walden Ridge Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

Conservation Opportunity Area (COA)

Public/Protected Land

Conservation Easement

Karst Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:

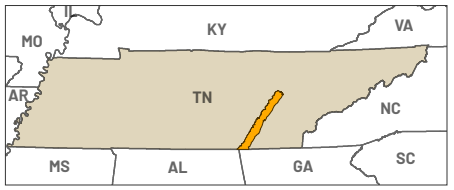
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Walden Ridge COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Cumberland Dusky Salamander	Desmognathus abditus	2019
Amphibian	Four-toed Salamander	Hemidactylium scutatum	1997
Amphibian	Green Salamander	Aneides aeneus	2019
Amphibian	Mud Salamander	Pseudotriton montanus	1997
Bat	Eastern Small-footed Bat	Myotis leibii	1960
Bat	Gray Bat	Myotis grisescens	2019
Bat	Indiana Bat	Myotis sodalis	1999
Bat	Little Brown Myotis	Myotis lucifugus	2012
Bat	Northern Long-eared Bat	Myotis septentrionalis	2008
Bat	Tricolored Bat	Perimyotis subflavus	2019
Bird	American Barn Owl	Tyto furcata	2021
Bird	American Bittern	Botaurus lentiginosus	2020
Bird	American Black Duck	Anas rubripes	2018
Bird	American Golden-Plover	Pluvialis dominica	2017
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bachman's Sparrow	Peucaea aestivalis	2002
Bird	Bank Swallow	Riparia riparia	2017
Bird	Belted Kingfisher	Megaceryle alcyon	1994
Bird	Bewick's Wren	Thryomanes bewickii	1928
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2019
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2022
Bird	Bobolink	Dolichonyx oryzivorus	2023
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2023
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Connecticut Warbler	Oporornis agilis	2015
Bird	Dunlin	Calidris alpina	1981
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Evening Grosbeak	Coccothraustes vespertinus	2021
Bird	Golden Eagle	Aquila chrysaetos	2021
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2021
Bird	Great Egret	Ardea alba	2023
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	Least Flycatcher	Empidonax minimus	2023
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2017

Walden Ridge COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Long-eared Owl	Asio otus	1999
Bird	Long-tailed Duck	Clangula hyemalis	2019
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2014
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Northern Saw-whet Owl	Aegolius acadicus	2009
Bird	Olive-sided Flycatcher	Contopus cooperi	2023
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2023
Bird	Peregrine Falcon	Falco peregrinus	2023
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2021
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruffed Grouse	Bonasa umbellus	1999
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2009
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Swainson's Warbler	Limnothlypis swainsonii	2023
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2021
Bird	Whooping Crane	Grus americana	2021
Bird	Willet	Tringa semipalmata	2017
Bird	Willow Flycatcher	Empidonax traillii	2022
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2021
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Mammal	Allegheny Woodrat	Neotoma magister	2021
Mammal	Cinereus Shrew	Sorex cinereus	1983
Mammal	Eastern Spotted Skunk	Spilogale putorius	2016
Mammal	Eastern Woodrat	Neotoma floridana illinoensis	2021
Mammal	Golden Mouse	Ochrotomys nuttalli	2018
Mammal	Southeastern Shrew	Sorex longirostris	2021
Mammal	Southern Bog Lemming	Synaptomys cooperi	1974
Plant	a liverwort	Metzgeria uncigera	2001
Plant	Allegheny Mountain Golden-banner	Thermopsis mollis	2019
Plant	American Chestnut	Castanea dentata	2006
Plant	American Smoketree	Cotinus obovatus	2009
Plant	Appalachian Rose-gentian	Sabatia capitata	2021
Plant	Barrens Silky Aster	Symphyotrichum pratense	1949
Plant	Blomquist Leafy Liverwort	Lejeunea blomquistii	2001

Walden Ridge COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Blue Ridge Bittercress	Cardamine flagellifera	1998
Plant	Bog Wild Oatgrass	Danthonia epilis	1998
Plant	Butternut	Juglans cinerea	1999
Plant	Cardot's Pouncewort	Microlejeunea globosa	2001
Plant	Creeping St. John's-wort	Hypericum adpressum	1996
Plant	Dwarf Milkwort	Polygala nana	1957
Plant	Fraser's Loosestrife	Lysimachia fraseri	1999
Plant	Granite Gooseberry	Ribes curvatum	2022
Plant	Great Plains Ladies'-tresses	Spiranthes magnicamporum	2005
Plant	John Beck's Leafcup	Polymnia johnbeckii	2009
Plant	Large-flower Rock-pink	Phemeranthus mengesii	2019
Plant	Large-flower Skullcap	Scutellaria montana	2024
Plant	Late Goldenrod	Solidago tarda	2015
Plant	Least Trillium	Trillium pusillum	1992
Plant	Mountain Bush-honeysuckle	Diervilla rivularis	2001
Plant	Mountain Honeysuckle	Lonicera dioica	2004
Plant	Mountain Witch-alder	Fothergilla major	1983
Plant	Nevius' Stonecrop	Sedum nevii	2004
Plant	Northern Bush-honeysuckle	Diervilla lonicera	2002
Plant	Pretty St. John's-wort	Hypericum nudiflorum	2001
Plant	Roundleaf Fameflower	Phemeranthus teretifolius	2021
Plant	Roundleaf Serviceberry	Amelanchier sanguinea	1978
Plant	Sharp's Pouncewort	Lejeunea sharpii	2001
Plant	Sharp-scaled Mannagrass	Glyceria acutiflora	2022
Plant	Slender Blazingstar	Liatris cylindracea	2004
Plant	Small Whorled Pogonia	Isotria medeoloides	2021
Plant	Small's Stonecrop	Diamorpha smallii	2015
Plant	Soft-Hairy False Gromwell	Lithospermum parviflorum	2009
Plant	Southern Twayblade	Neottia bifolia	1997
Plant	Spreading Rockcress	Arabis patens	1988
Plant	Spreading Yellow False Foxglove	Aureolaria patula	1998
Plant	Sweet Pinesap	Monotropsis odorata	2010
Plant	Vetchling Peavine	Lathyrus palustris	1949
Plant	Virginia Chainfern	Anchistea virginica	2022
Plant	Virginia Spiraea	Spiraea virginiana	2024
Plant	White Fringeless Orchid	Platanthera integrilabia	2024
Plant	Yellow Honeysuckle	Lonicera flava	1994
Plant	Yellow Nodding Ladies'-tresses	Spiranthes ochroleuca	1949
Plant	Yellow-crested Orchid	Platanthera cristata	2021
Plant	Zigzag Bladderwort	Utricularia subulata	2022
Reptile	Eastern Box Turtle	Terrapene carolina	2008
Reptile	Eastern Hog-nosed Snake	Heterodon platirhinos	2019
Reptile	Eastern Pinesnake	Pituophis melanoleucus	1987
Reptile	Eastern Slender Glass Lizard	Ophisaurus attenuatus longicaudus	2008

Walden Ridge COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Black Mountain Salamander	Desmognathus welteri	1998
Amphibian	Mudpuppy	Necturus maculosus	1979
Bivalve	Dromedary Pearlymussel	Dromus dromas	1955
Fish	Flame Chub	Hemitremia flammea	1934
Fish	Laurel Dace	Chrosomus saylori	2022
Fish	Olive Darter	Percina squamata	2009
Fish	Sickle Darter	Percina williamsi	2009
Fish	Tangerine Darter	Percina aurantiaca	2009
Fish	Tennessee Dace	Chrosomus tennesseensis	2020
Fish	Wounded Darter	Nothonotus vulneratus	1996
Gastropod	Spiny Riversnail	Io fluvialis	1962

Walden Ridge COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Green Salamander	Aneides aeneus	1985
Amphibian	Pale Salamander	Gyrinophilus palleucus palleucus	1967
Amphibian	Tennessee Cave Salamander	Gyrinophilus palleucus	1967
Arachnid	a cave obligate pseudoscorpion	Microcreagris nickajackensis	1966
Arachnid	a cave obligate spider	Nesticus barri	1984
Arachnid	harvestman	Bishopella sp. Probably laciniosa	2004
Arachnid	Southeastern Cave Pseudoscorpion	Hesperochernes mirabilis	1895
Arachnid	Subterranean Sheetweb Spider	Phanetta subterranea	2004
Bat	Eastern Small-footed Bat	Myotis leibii	1950
Bat	Gray Bat	Myotis grisescens	2002
Bat	Indiana Bat	Myotis sodalis	1999
Bat	Little Brown Myotis	Myotis lucifugus	2012
Bat	Tricolored Bat	Perimyotis subflavus	2017
Crustacean	a cave obligate amphipod	Stygobromus sp. 34	2004
Crustacean	a cave obligate isopod	Caecidotea circulus	1968
Crustacean	Appalachian Valley Crangonyctid	Crangonyx antennatus	2003
Crustacean	cave isopods	Caecidotea sp.	2004
Crustacean	Nickajack Cave Isopod	Caecidotea nickajackensis	1901
Crustacean	Prickly Cave Crayfish	Cambarus hamulatus	2008
Gastropod	a terrestrial snail	Glyphyalinia sp.	2004
Gastropod	terrestrial snails	Helicodiscus sp.	2004
Insect	a fly	Megaselia cavernicola	2004
Insect	a rove beetle	Atheta sp.	2004
Insect	a rove beetle	Atheta troglophila	1986
Insect	cave cricket	Euhadenoecus puteaus	1978
Insect	Cave Dung Fly	Spelobia tenebrarum	2004
Insect	Cooke's Cave Dipluran	Litocampa cookei	2005
Insect	Hilly Springtail	Pseudosinella collina	2004
Insect	Nickajack Cave Beetle	Pseudanophthalmus nickajackensis	2004
Insect	Pale-footed Ocellate Rove Beetle	Lesteva pallipes	2004

Walden Ridge COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Insect	springtail	Tomocerus dubius	2004
Insect	Two-toothed Springtail	Pogonognathellus bidentatus	2004
Mammal	Allegheny Woodrat	Neotoma magister	2004
Millipede	a cave milliped	Scoterpes sp.	2004
Millipede	a cave obligate millipede	Ameractis satis	2004
Millipede	a cave obligate millipede	Pseudotremia eburnea	1972

Conasauga

Regional Conservation Opportunity Area



The Conasauga River originates in the Blue Ridge Mountains of Georgia, and almost all of the headwaters are protected within national forests. The river flows through Tennessee for eight miles before it turns south back into Georgia; it is the only river that flows through Tennessee that does not drain into the Mississippi River. Water quality is excellent within the national forests, providing a home to more than 90 species of fish. Some pools within the river have inventory lists of greater than 40 fish species.



As the river leaves the forest and enters the Ridge and Valley region, the water quality quickly declines due to less than favorable land use practices, for example, allowing livestock unlimited access to streams. Conservation opportunities within this river system include the establishment of forested riparian zones and widening existing ones to 50 feet or greater.

The Conasauga is the only river flowing through Tennessee that does not drain into the Mississippi River, with excellent water quality within the South Cherokee National Forest.

To improve water quality outside the National Forests, opportunities exist to aid with reduction or elimination of threats. Stream bank stabilization will greatly aid in reducing siltation in the river. Working with farmers to reduce sources of nonpoint pollution will also help to increase water quality of the Conasauga River. Also, working with partners to replace poorly designed culverts and storm water drains will greatly increase river connectivity for aquatic species.





Top to bottom: Crayfish in the Conasauga River and Conasauga Blue Fish/Jeremy Monroe, Freshwaters Illustrated; Conasauga Logperch/?? P2: Perched culvert prevents small fish passage/Sam Beebe. P3: Wide view of Conasauga River/USFWS

Conasauga
Conservation Opportunity Area

Partnerships

TWRA will develop and expand partnerships with the US Fish and Wildlife Service, the Office of Surface Mining, Natural Resources Conservation Service, USDA Forest Service, National Fish and Wildlife Foundation, Tennessee Valley Authority, Tennessee Dept. of Environment and Conservation, Tennessee Division of Forestry, The Nature Conservancy, the Tennessee Aquarium, TennGreen Land Conservancy, The Land Trust for Tennessee, Chattanooga Aquarium, University of Tennessee, the Alabama Aquatic Biodiversity Center, and private landowners.



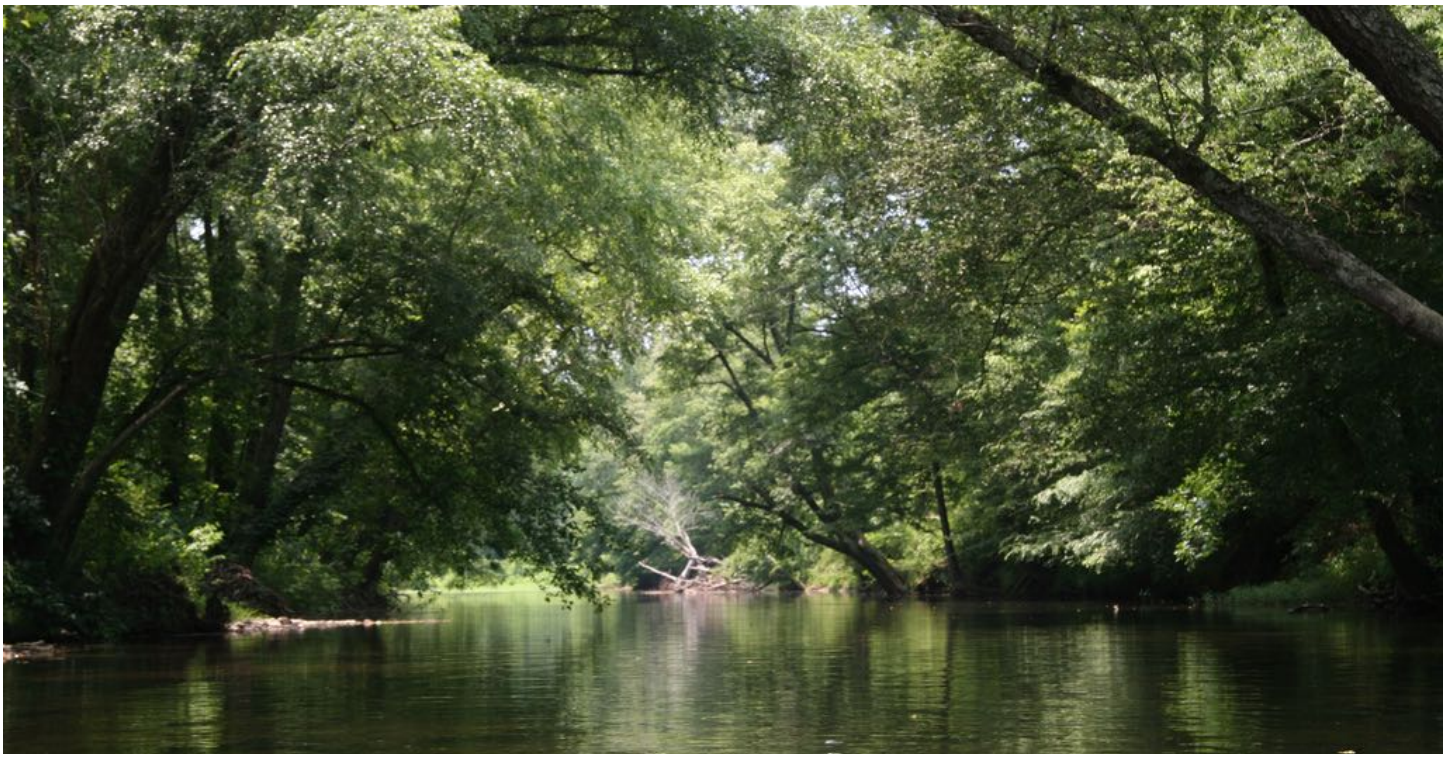
CMP Stressor Level	Stressors Categories	Threats specific to Conasauga
1.1 A	Housing and urban areas; Primary residential development	Destruction or degradation of habitats due to construction activities associated with the building of primary residences.
1.1 B	Housing and urban areas; Secondary home/resort development	Destruction or degradation of habitats due to construction activities associated with the building of secondary/vacation homes and resort developments.
5.3 A	Logging and wood harvesting	The specific threat in this COA is that some harvests do not follow BMPs, such as when high-grading occurs (this means removing the largest, most valuable trees and leaving behind lower-value or poor-quality trees without considering the impact on the future forest's health or composition).
6.1 B	Recreational activities - vehicular	Destruction and degradation of habitats and increased mortality of species due to excessive levels of recreational vehicle traffic or inappropriate usage of habitats for recreational vehicles. OHV-caused loss of vegetation, SGCN habitat destruction, erosion, and increased runoff occur.

To learn more about the Conasauga Conservation Opportunity Area, please contact:
Daniel Istvanko, Biodiversity Coordinator, Region 3 (931) 484-9571

CMP Stressor Level	Stressors Categories	Threats specific to Conasauga, continued
9.3 C	Agriculture and forestry effluents; Incompatible grazing/pasture management practices	Degradation of soil/water quality and habitat structure of an area due to excessive grazing or to inadequate exclusion of cattle from stream and forest resources. Also includes degradation caused by overapplication of fertilizers or other chemicals during pasture management practices, which can lead to nutrient loading. Erosion from runoff is also an issue.
11.4 A	Changes in precipitation and hydrological regimes	Broad-scale changes in precipitation mean, variability, seasonality, and extremes. This can include decreased or increased precipitation, changes in timing of precipitation, changes in form of precipitation (e.g., snow vs rain; snowcover and snowpack where applicable), changes in evapotranspiration rates and hydrological cycles, and droughts and floods, and changes in flood severity that alter historic regimes.

Conservation Projects

Conasauga River is teeming with SGCN species, including more than a dozen freshwater mussel species in the Tennessee portion of the river alone. Recent mussel surveys were conducted to update distribution and occurrence records. Three critically imperiled mussel species can only be found in the Conasauga River. Two notable federally listed fish species include the endangered Conasauga Logperch and the threatened Blue Shiner.

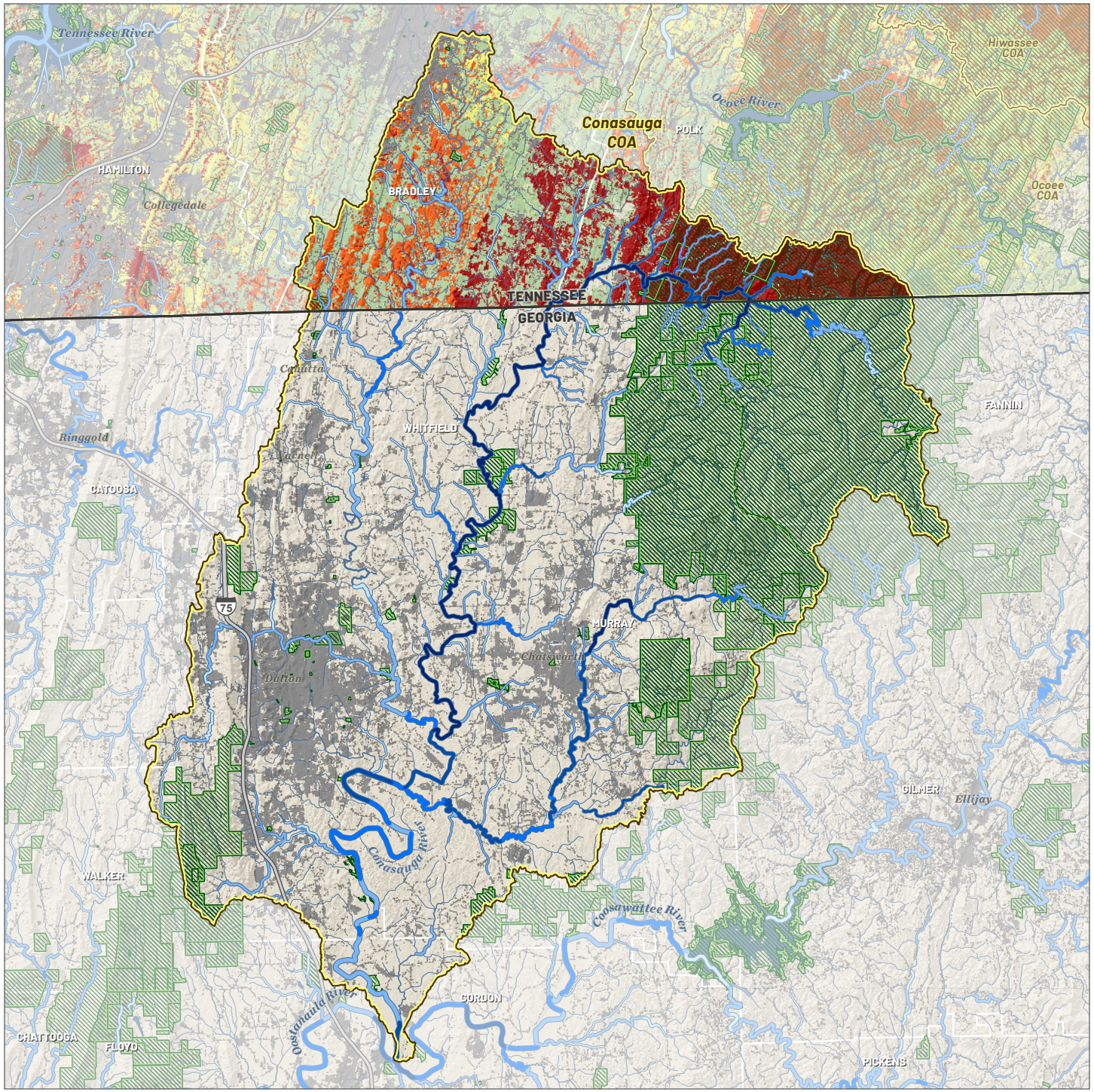


Conasauga
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	Acres
Research	Conduct scientific surveys to discern the geographical distributions of lesser known target species.	surveys
Research	Conduct research on life history and ecological needs of target species to establish guidelines for determining population viability.	projects
Habitat/Natural Processes Restoration	Restore in-stream flows and physical structure to channelized or impounded streams within critical units of aquatic, subterranean, and terrestrial habitats.	acres restored or feet or riparian area restored
Species Restoration	Reintroduce extirpated and historic populations of priority species to appropriate habitats across the state.	introductions
Research	Assess threats to species (or vulnerabilities of species) using a suite of plausible future climate and land-use change scenarios.	threats
Adaptation Planning	Identify areas in locations within the existing geographic range of species for restoration or protection that are unoccupied due to geographic barriers or past catastrophes but are climatically suitable for persistence into the future.	acres
Habitat/Natural Processes Restoration	Restore and enhance riparian zones and buffers in agricultural and urban areas to minimize non-point source pollution.	acres restored or feet or riparian area restored

Conasauga
Conservation Opportunity Area

Conasauga COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Hiwasee/Ocoee SP	TDEC - SP	107	1%
Red Clay State Historic Park	TDEC - SP	256	100%
South Cherokee NF	USFS	305,801	4%



Combined Habitat Priorities

Conasauga Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

Conservation Opportunity Area (COA)

Public/Protected Land

Conservation Easement

Karst Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:

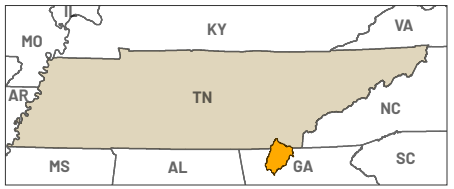
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Conasauga COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Mountain Chorus Frog	Pseudacris brachyphona	1956
Bat	Eastern Small-footed Bat	Myotis leibii	2003
Bat	Northern Long-eared Bat	Myotis septentrionalis	2005
Bat	Tricolored Bat	Perimyotis subflavus	2005
Bird	American Barn Owl	Tyto furcata	2022
Bird	American Black Duck	Anas rubripes	2017
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2022
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2016
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2023
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2020
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2022
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Evening Grosbeak	Coccothraustes vespertinus	2021
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023
Bird	Great Egret	Ardea alba	2023
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	Little Blue Heron	Egretta caerulea	2022
Bird	Loggerhead Shrike	Lanius ludovicianus	2023
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Northern Bobwhite	Colinus virginianus	2022
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Peregrine Falcon	Falco peregrinus	2018
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Rusty Blackbird	Euphagus carolinus	2022
Bird	Snowy Egret	Egretta thula	2022
Bird	Swainson's Warbler	Limnothlypis swainsonii	2022
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2022
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2022
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023

Conasauga COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Mammal	Smoky Shrew	Sorex fumeus	1990
Mammal	Southeastern Shrew	Sorex longirostris	1990
Plant	Ashleaf Bush-pea	Thermopsis fraxinifolia	1983
Plant	Broadleaf Bunchflower	Melanthium latifolium	1985
Plant	Eastern Turkeybeard	Xerophyllum asphodeloides	1992
Plant	Falling Beakrush	Rhynchospora caduca	2020
Plant	Four-flower Yellow Loosestrife	Lysimachia quadriflora	1997
Plant	Laurel-leaf Greenbrier	Smilax laurifolia	2018
Plant	Mountain Bush-honeysuckle	Diervilla rivularis	1999
Plant	Mountain Honeysuckle	Lonicera dioica	1982
Plant	Nestronia	Nestronia umbellula	1996
Plant	Ovate Catchfly	Silene ovata	1983
Plant	Savanna Eryngo	Eryngium integrifolium	1986
Plant	Swamp Lousewort	Pedicularis lanceolata	1989
Plant	Tansy Rosinweed	Silphium pinnatifidum	1983
Plant	Trailing Trillium	Trillium decumbens	2017
Plant	White Fringeless Orchid	Platanthera integrilabia	2022
Plant	Yellow-crested Orchid	Platanthera cristata	2022
Reptile	Coal Skink	Plestiodon anthracinus	1980

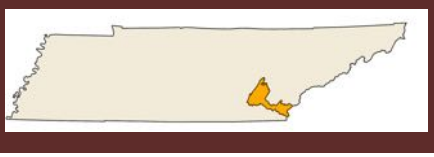
Conasauga COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Mudpuppy	Necturus maculosus	2021
Bivalve	Alabama Clubshell	Pleurobema troschelianum	1987
Bivalve	Alabama Creekmussel	Pseudodontoideus connasaugaensis	2007
Bivalve	Alabama Moccasinshell	Medionidus acutissimus	2015
Bivalve	Alabama Rainbow	Cambarunio nebulosus	2021
Bivalve	Alabama Spike	Elliptio arca	1984
Bivalve	Coosa Creekshell	Leaunio umbrans	2021
Bivalve	Coosa Moccasinshell	Medionidus parvulus	2021
Bivalve	Delicate Spike	Elliptio arctata	2001
Bivalve	Finelined Pocketbook	Hamiota altilis	2022
Bivalve	Georgia Pigtoe	Pleurobema hanleyianum	2021
Bivalve	Mountain Creekshell	Leaunio vanuxemensis	1999
Bivalve	Ovate Clubshell	Pleurobema perovatum	1994
Bivalve	Painted Clubshell	Pleurobema chattanoogaense	1999
Bivalve	Rayed Kidneyshell	Ptychobranchus foremanianus	2021
Bivalve	Southern Acornshell	Epioblasma othcaloogensis	1978
Bivalve	Southern Clubshell	Pleurobema decisum	1999
Bivalve	Southern Pigtoe	Pleurobema georgianum	2021
Bivalve	Southern Rainbow	Villosa vibex	2007
Bivalve	Tennessee Heelsplitter	Lasmigona holstonia	1981
Bivalve	Tennessee Pigtoe	Pleuronaia barnesiana	1988
Bivalve	Upland Combshell	Epioblasma metastriata	1974

Conasauga COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Crustacean	Cocoa Crayfish	Cambarus stockeri	2013
Crustacean	Conasauga Blue Burrower	Cambarus cymatilis	2016
Fish	Amber Darter	Percina antesella	1996
Fish	Blue Shiner	Cyprinella caerulea	2023
Fish	Bridled Darter	Percina kusha	2022
Fish	Burrhead Shiner	Alburnops asperifrons	2022
Fish	Coldwater Darter	Etheostoma ditrema	1981
Fish	Conasauga Logperch	Percina jenkinsi	2023
Fish	Coosa Chub	Macrhybopsis etnieri	2020
Fish	Frecklebelly Madtom	Noturus munitus	1970
Fish	Holiday Darter	Etheostoma brevirostrum	2022
Fish	Lake Sturgeon	Acipenser fulvescens	2005
Fish	Lined Chub	Hybopsis lineapunctata	2008
Fish	Rainbow Shiner	Hydrophlox chrosomus	2022
Fish	Riffle Minnow	Phenacobius catostomus	2022
Fish	Rock Darter	Etheostoma rupestre	2022
Fish	Southern Brook Lamprey	Ichthyomyzon gagei	1995
Fish	Trispot Darter	Etheostoma trisella	2022
Insect	Allegheny Snaketail	Ophiogomphus incurvatus alleghaniensis	1976
Insect	Cherokee Clubtail	Stenogomphurus consanguis	1970
Insect	Edmund's Snaketail	Ophiogomphus edmundo	1995

Conasauga COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
No documented subterranean SGCN in this COA.			

Hiwassee

Regional Conservation Opportunity Area



A 23-mile stretch of the Hiwassee River in Tennessee is designated a State Scenic River. Its headwaters begin in north Georgia before flowing north into North Carolina and then west into Tennessee. The river is renowned as an excellent trout fishery and a quality rafting destination. The portion of the river located downstream of the Appalachia Powerhouse is characterized as a cold water tailwater. As it flows westward, the river warms and slows down, creating habitat for a variety of fish and mussels.

One of the most robust breeding populations of Eastern Hellbenders in the entire country occurs in the upper Hiwassee River tailwater. It is one of the few places in Tennessee where adults of various year classes and juveniles can be found. At the confluence of the Hiwassee and Tennessee Rivers is Hiwassee Refuge, which attracts a variety of migrating waterfowl throughout the winter and is a stopping point for several Whooping Cranes as well as Sandhill Cranes.

Major threats to the river include water quality issues arising from shoreline development, lack or loss of riparian buffers, and incompatible agricultural practices. The Eastern Hellbenders found in the upper portion of the tailwater are extremely sensitive to changes in water quality.

The Piney River can also be found in this COA, and it harbors one of the most imperiled fish in the state, the Laurel Dace.



One of the most robust breeding populations of Eastern Hellbenders in the entire country occurs in the upper Hiwassee River.

Top to bottom: Biologist Chris Ogle with a Hellbender/Scott Dykes; Laurel Dace/Conservation Fisheries Inc.. Next page: Sandhill Crane/Alan Schmierer



Hiwassee River
Conservation Opportunity Area

Partnerships



TWRA will foster partnerships to enhance, buffer, and protect aquatic habitat, including a water release plan with the TN Valley Authority to balance water temperature within the tailwater and downstream. TWRA will develop and expand partnerships with the US Fish and Wildlife Service, USDA Forest Service, USDA Natural Resources Conservation Service, TN Division of Forestry, Oak Ridge National Laboratory, The Nature Conservancy, the Tennessee Aquarium, TennGreen Land Conservancy, The Land Trust for Tennessee, University of Tennessee, Middle Tennessee State University, private landowners and businesses.

CMP Stressor Level	Stressors Categories	Threats specific to Hiwassee River
1.1 A	Housing and urban areas; Primary residential development	Destruction or degradation of habitats due to construction activities associated with the building of primary residences. Tourist housing and other residential development are increasing in this COA.
5.3 A	Logging and wood harvesting	The specific threat in this COA is that some harvests do not follow BMPs, such as when high-grading occurs (this means removing the largest, most valuable trees and leaving behind lower-value or poor-quality trees without considering the impact on the future forest's health or composition).
6.1 A	Recreational activities - non-vehicular	Destruction and degradation of habitats and increased mortality of species due to excessive levels of recreational activities or inappropriate usage of habitats for recreation. Recreational use of natural resources in this COA can negatively impact SGCN and/or their habitats.
6.1 B	Recreational activities - vehicular	Destruction and degradation of habitats and increased mortality of species due to excessive levels of recreational vehicle traffic or inappropriate usage of habitats for recreational vehicles. OHVs can cause loss of vegetation, SGCN habitat destruction, erosion, and increased runoff.
8.1 A	Invasive non-native/alien species plants and animals	Increased mortality or habitat degradation caused by excessive competition or predation from invasive exotic species.

CMP Stressor Level	Stressors Categories	Threats specific to Hiwassee River, continued
7.2 B	Dams and water management/use; Construction of dams/ impoundments	Disruption and degradation of the natural flow of a river or stream due to construction of dams or impoundments. Also includes destruction of terrestrial habitats due to removal and inundation of vegetation along shorelines. Results in species declines (e.g., Hellbenders).
7.2 D	Dams and water management/use; Excessive groundwater withdrawal	Removal of groundwater resources essential to maintenance of hydrologic levels that support aquatic and subterranean species. Withdrawal is primarily from wells drilled for home water supply, irrigation, and other agricultural uses. Results in species declines (e.g., Hellbenders).
7.2 F	Dams and water management/use; Operation of dams/reservoirs	Degradation of water quality and aquatic habitat availability due to disruption of natural hydrologic regimes of rivers and streams by dams or reservoirs. Also, includes destruction / degradation of terrestrial habitats due to periodic raising or lowering of water levels. Results in species declines (e.g., Hellbenders).
7.2 A	Dams and water management/use; Channelization of rivers/streams	Alteration of the natural course of a river or stream by removing rock, dirt, gravel, and other sediments from shorelines and bottoms. Such alteration is done primarily for navigation and flood control purposes. This category focuses on the human activities that lead to either not enough water or too much water in the ecosystem in question. Dams lead to degradation of natural systems and result in species loss, for example a decline in Hellbenders.
11.5 A	Severe/extreme weather events	Changes in frequency, timing and/or intensity of storms as well as severe weather events that threaten targets that have lost resilience. Category examples: thunderstorms, tropical storms, hurricanes, cyclones, tornadoes, hailstorms, ice storms or blizzards, dust storms. These can all contribute to species declines.

Conservation Projects

TWRA and numerous state and federal partners have been working several years to monitor and track Lake Sturgeon augmentation efforts throughout the Tennessee River watershed. This past year, biologists from TWRA, TVA, the US Forest Service, and private entities teamed together to conduct freshwater mussel surveys, including eDNA surveys, on the under-surveyed and remote areas of the river above the Appalachia Powerhouse. The eDNA (Environmental DNA) surveys collect water samples that contain genetic material from organisms living in the stream; the eDNA can be used to identify those organisms to species.

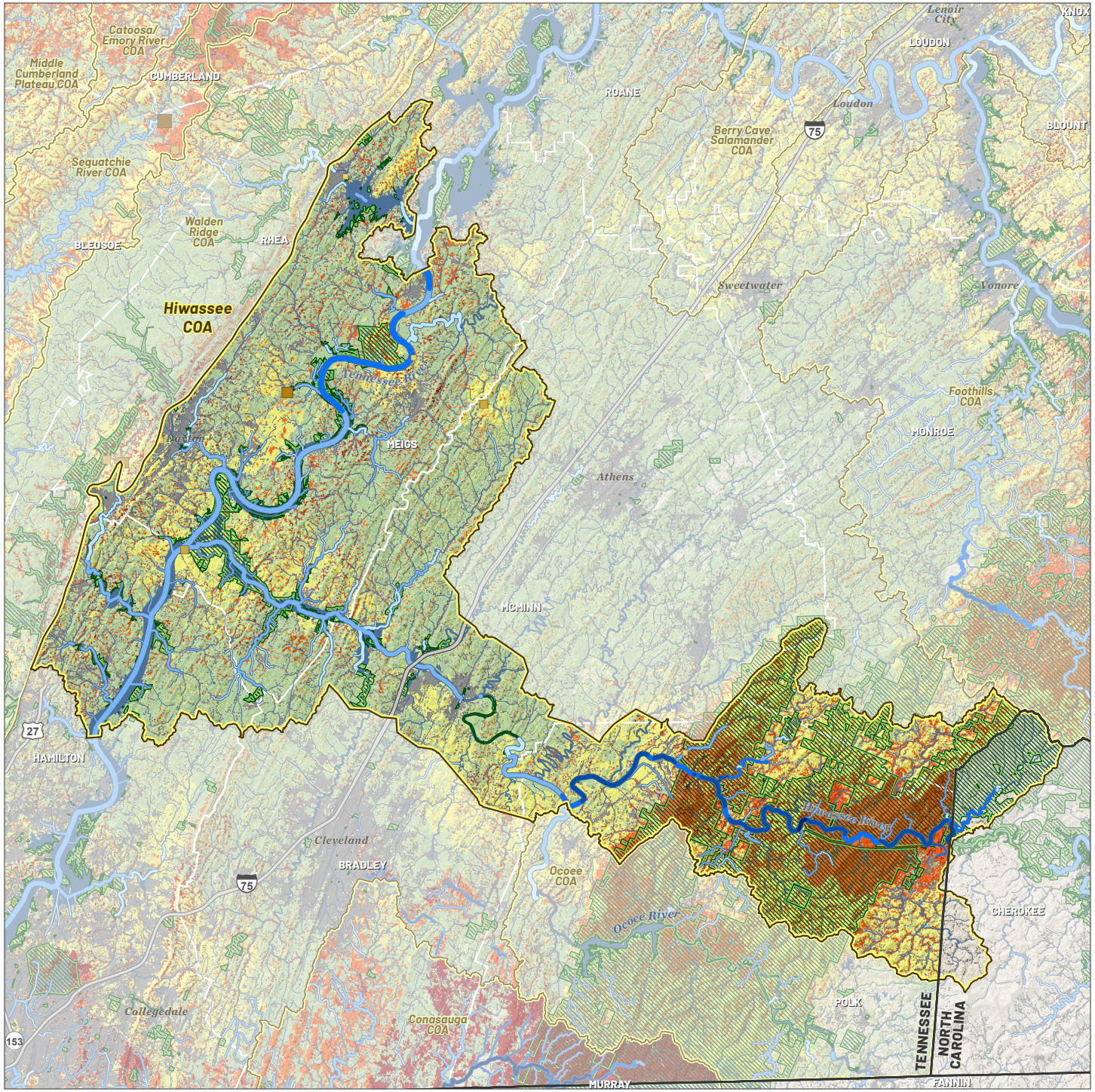
To learn more about the Hiwassee River Conservation Opportunity Area, please contact: Daniel Istvanko, Biodiversity Coordinator, Region 3 (931) 484-9571

Hiwassee River
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats that provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Fee-title Ownership	Coordinate land acquisition priorities among state/federal agencies and non-governmental organizations.	N/A
Habitat/Natural Processes Restoration	Remove or modify physical barriers that disrupt habitat/population connectivity for target species within critical units of aquatic, subterranean, and terrestrial habitats.	acres and/or feet of riparian corridor
Habitat/Natural Processes Restoration	Develop and implement restoration protocols and techniques that promote ecosystem resilience and facilitate adaptation under a range of plausible future conditions.	acres
Habitat/Natural Processes Restoration	Restore and enhance riparian zones and buffers in agricultural and urban areas to minimize non-point source pollution.	acres and/or feet of riparian corridor
Species Restoration	Reintroduce extirpated and historic populations of priority species to appropriate habitats across the state.	introductions
Alliances and Partnerships	Develop strategic alliance with US Army Corp of Engineers, TN Valley Authority, water utility boards, and other institutions to address water management issues that affect target species and habitats.	partnerships
Standards	Develop standards for instream-flow regimes that establish minimum water levels required for target species during critical periods and for maintenance of habitat quality.	acres
Research	Identify species with specialized habitat, resource, or connectivity needs across their life stages (i.e., those that are area-limited, resource-limited, dispersal-limited, or process-limited).	species
Facilitation	Conduct strategic translocations (also known as assisted migration, managed relocation, conservation translocation) to sites that span a range of potentially suitable climatic or hydrological conditions either within or beyond current distributions, after evaluating risks, weighing ethical considerations, and managing for unintended consequences.	translocations

Hiwassee River
Conservation Opportunity Area

Hiwassee COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Hiwasee/Ocoee SP	TDEC - SP	107	81%
Blythe Ferry Habitat Protection Area	TVA	9	100%
Butcher Bluff Habitat Protection Area	TVA	15	100%
Chickamauga Shoreline Habitat Protection Area	TVA	55	100%
Chickamauga WMA	TVA	3,006	99%
Eagle Roost Habitat Protection Area	TVA	10	100%
Eaves Bluff Habitat Protection Area	TVA	4	100%
Grasshopper Creek Habitat Protection Area	TVA	202	100%
Hiwassee Refuge	TVA	8,187	100%
Johnson Bottoms Habitat Protection Area	TVA	40	100%
McKinley Branch	TVA	393	100%
Murphy Hill Habitat Protection Area	TVA	196	100%
Possum Creek Habitat Protection Area	TVA	78	100%
TVA Land Use Zone 4 Multiple Allocations	TVA	1,572	74%
TVA Land Use Zone 4 Multiple Allocations	TVA	15,119	16%
Ware Branch Bend Habitat Protection Area	TVA	50	89%
Hiwassee Refuge	TWRA	137	100%
South Cherokee NF & WMA	TWRA	655	100%
Yuchi Refuge	TWRA	2,411	100%
South Cherokee NF	USFS	305,801	26%



Combined Habitat Priorities

Hiwassee Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

Conservation Opportunity Area (COA)

Public/Protected Land

Conservation Easement

Karst Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:

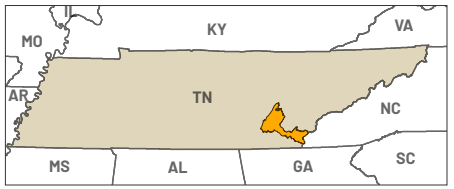
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Hiwasee COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Four-toed Salamander	Hemidactylium scutatum	2003
Amphibian	Red-cheeked Salamander	Plethodon jordani	
Amphibian	Seepage Salamander	Desmognathus aeneus	1998
Amphibian	Tellico Salamander	Plethodon aureolus	2022
Bat	Gray Bat	Myotis grisescens	2019
Bat	Indiana Bat	Myotis sodalis	2014
Bat	Little Brown Myotis	Myotis lucifugus	2019
Bat	Northern Long-eared Bat	Myotis septentrionalis	2021
Bat	Tricolored Bat	Perimyotis subflavus	2020
Bird	American Barn Owl	Tyto furcata	2022
Bird	American Bittern	Botaurus lentiginosus	2019
Bird	American Black Duck	Anas rubripes	2023
Bird	American Golden-Plover	Pluvialis dominica	2017
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bank Swallow	Riparia riparia	2023
Bird	Belted Kingfisher	Megaceryle alcyon	2007
Bird	Bewick's Wren	Thryomanes bewickii	1953
Bird	Black-bellied Plover	Pluvialis squatarola	2022
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2023
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2022
Bird	Blue-headed Vireo	Vireo solitarius	2013
Bird	Bobolink	Dolichonyx oryzivorus	2022
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2023
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Connecticut Warbler	Oporornis agilis	2020
Bird	Dunlin	Calidris alpina	2023
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Evening Grosbeak	Coccothraustes vespertinus	2021
Bird	Golden Eagle	Aquila chrysaetos	2023
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023
Bird	Great Egret	Ardea alba	2023
Bird	Hudsonian Godwit	Limosa haemastica	1983
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	King Rail	Rallus elegans	1973
Bird	Least Bittern	Botaurus exilis	2023
Bird	Least Flycatcher	Empidonax minimus	2023

Hiwasee COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	LeConte's Sparrow	Ammospiza leconteii	2020
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2023
Bird	Long-tailed Duck	Clangula hyemalis	2022
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2022
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Northern Saw-whet Owl	Aegolius acadicus	1997
Bird	Olive-sided Flycatcher	Contopus cooperi	2023
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2023
Bird	Peregrine Falcon	Falco peregrinus	2023
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruddy Turnstone	Arenaria interpres	2018
Bird	Ruffed Grouse	Bonasa umbellus	2021
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2023
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-billed Dowitcher	Limnodromus griseus	2022
Bird	Short-eared Owl	Asio flammeus	2023
Bird	Snowy Egret	Egretta thula	2023
Bird	Stilt Sandpiper	Calidris himantopus	2022
Bird	Swainson's Warbler	Limnothlypis swainsonii	2023
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2022
Bird	Western Sandpiper	Calidris mauri	2022
Bird	White-rumped Sandpiper	Calidris fuscicollis	2023
Bird	Whooping Crane	Grus americana	2023
Bird	Willet	Tringa semipalmata	2022
Bird	Willow Flycatcher	Empidonax traillii	2016
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2022
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Gastropod	Blue-gray Glyph	Glyphyalinia ocoae	2013
Gastropod	Cohutta Slitmouth	Stenotrema cohuttense	2013
Gastropod	Crossed Dome	Ventridens decussatus	2004
Gastropod	Lamellate Supercoil	Paravitrea lamellidens	2014

Hiwasee COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Gastropod	Open Supercoil	Paravitrea umbilicaris	2014
Gastropod	Pink Glyph	Glyphyalinia pentadelphia	2014
Insect	Frosted Elfin	Callophrys irus	2024
Mammal	Eastern Spotted Skunk	Spilogale putorius	2023
Mammal	Golden Mouse	Ochrotomys nuttalli	2010
Mammal	Meadow Jumping Mouse	Zapus hudsonius	2005
Mammal	North American Least Shrew	Cryptotis parva	2019
Mammal	Smoky Shrew	Sorex fumeus	1991
Mammal	Southeastern Shrew	Sorex longirostris	1991
Mammal	Southern Appalachian Woodrat	Neotoma floridana haematoreia	1991
Mammal	Southern Bog Lemming	Synaptomys cooperi	1991
Plant	Alabama Snow-wreath	Neviusia alabamensis	2007
Plant	Allegheny Mountain Golden-banner	Thermopsis mollis	2020
Plant	Ashleaf Bush-pea	Thermopsis fraxinifolia	2017
Plant	Blue Ridge Bittercress	Cardamine flagellifera	2005
Plant	Branched Whitlow-grass	Draba ramosissima	1987
Plant	Bristly Sedge	Carex comosa	1992
Plant	Broadleaf Bunchflower	Melanthium latifolium	2006
Plant	Brome-like Sedge	Carex bromoides ssp. montana	2020
Plant	Butternut	Juglans cinerea	2003
Plant	Clingman's Hedge-nettle	Stachys clingmanii	2003
Plant	Cow-parsnip	Heracleum maximum	2003
Plant	Dwarf Filmy Fern	Didymoglossum petersii	2021
Plant	Eastern Turkeybeard	Xerophyllum asphodeloides	2020
Plant	Gibbous Panicgrass	Sacciolepis striata	2004
Plant	Green-and-gold	Chrysogonum virginianum	2001
Plant	Hairy Umbrella-sedge	Fuirena squarrosa	1979
Plant	Headwaters Hornwort	Nothoceros aenigmaticus	2018
Plant	Hiwassee Hedge Nettle	Stachys glandulosissima	2012
Plant	Horsesugar	Symplocos tinctoria	2020
Plant	Large-flower Skullcap	Scutellaria montana	2021
Plant	Maryland Milkwort	Senega mariana	1979
Plant	Mcdowell's Sunflower	Helianthus occidentalis	1974
Plant	Minniebush	Rhododendron pilosum	2018
Plant	Mountain Witch-alder	Fothergilla major	2005
Plant	Northern Bush-honeysuckle	Diervilla lonicera	1991
Plant	Nuttall's Pondweed	Potamogeton epihydrus	1970
Plant	Pale-green Orchid	Platanthera flava var. herbiola	2023
Plant	Prairie Goldenrod	Oligoneuron album	2004
Plant	Roan Mountain Sedge	Carex roanensis	2005
Plant	Roundleaf Serviceberry	Amelanchier sanguinea	1991
Plant	Ruth's Sedge	Carex ruthii	2005
Plant	Ruth's Silk-grass	Pityopsis ruthii	2001
Plant	Small Mountain Bittercress	Cardamine clematitis	1977
Plant	Small Purple Fringed Orchid	Platanthera psycodes	1996
Plant	Soft-hairy False Gromwell	Lithospermum bejariense	1981

Hiwasee COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Southern Lobelia	Lobelia amoena	1979
Plant	Spoon-shape Barbara's-buttons	Marshallia obovata	2024
Plant	Spreading Rockcress	Arabis patens	2010
Plant	Spreading Yellow False Foxglove	Aureolaria patula	1986
Plant	Sweet Pinesap	Monotropsis odorata	2017
Plant	Sweetbay Magnolia	Magnolia virginiana	1993
Plant	Tansy Rosinweed	Silphium pinnatifidum	2014
Plant	Tawny Cotton-grass	Eriophorum virginicum	1976
Plant	Tennessee Pondweed	Potamogeton tennesseensis	1990
Plant	Tennessee Quillwort	Isoetes tennesseensis	2023
Plant	Toothed Flatsedge	Cyperus dentatus	1988
Plant	White Fringeless Orchid	Platanthera integrilabia	2024
Plant	White Prairie-clover	Dalea candida	2013
Plant	Yellow-crested Orchid	Platanthera cristata	2014
Reptile	Eastern Box Turtle	Terrapene carolina	2006
Reptile	Eastern Pinesnake	Pituophis melanoleucus	1944
Reptile	Eastern Slender Glass Lizard	Ophisaurus attenuatus longicaudus	2003
Reptile	Timber Rattlesnake	Crotalus horridus	1955

Hiwassee COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Hellbender	Cryptobranchus alleganiensis	2022
Amphibian	Junaluska Salamander	Eurycea junaluska	2021
Amphibian	Mudpuppy	Necturus maculosus	2017
Bivalve	Black Sandshell	Ligumia recta	1973
Bivalve	Dromedary Pearlymussel	Dromus dromas	1983
Bivalve	Elktoe	Alasmidonta marginata	1992
Bivalve	Fanshell	Cyprogenia stegaria	1994
Bivalve	Longsolid	Fusconaia subrotunda	2010
Bivalve	Mountain Creekshell	Leaunio vanuxemensis	1997
Bivalve	Ohio Pigtoe	Pleurobema cordatum	2010
Bivalve	Orangefoot Pimpleback	Plethobasus cooperianus	1978
Bivalve	Oyster Mussel	Epioblasma capsaeformis	2012
Bivalve	Pink Mucket	Lampsilis abrupta	2010
Bivalve	Rainbow	Cambarunio iris	2007
Bivalve	Rough Pigtoe	Pleurobema plenum	1985
Bivalve	Round Pigtoe	Pleurobema sintoxia	2005
Bivalve	Sheepnose	Plethobasus cyphyus	2010
Bivalve	Shiny Pigtoe	Fusconaia cor	1980
Bivalve	Slabside Pearlymussel	Pleuronaia dolabelloides	2002
Bivalve	Tan Riffleshell	Epioblasma walkeri	2000
Bivalve	Tennessee Bean	Venustaconcha trabalis	2007
Bivalve	Tennessee Clubshell	Pleurobema oviforme	2007
Bivalve	Tennessee Heelsplitter	Lasmigona holstonia	1998

Hiwassee COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bivalve	Tennessee Pigtoe	Pleuronaia barnesiana	1997
Bivalve	White Heelsplitter	Lasmigona complanata	1978
Crustacean	Hiwassee Crayfish	Cambarus hiwasseensis	2007
Crustacean	Surgeon Crayfish	Faxonius forceps	2005
Fish	Blotchside Logperch	Percina burtoni	2010
Fish	Brook Trout	Salvelinus fontinalis	2018
Fish	Flame Chub	Hemitremia flammea	1941
Fish	Highfin Carpsucker	Carpiodes velifer	1994
Fish	Lake Sturgeon	Acipenser fulvescens	2023
Fish	Olive Darter	Percina squamata	2001
Fish	Snail Darter	Percina tanasi	2019
Fish	Tangerine Darter	Percina aurantiaca	2020
Fish	Tennessee Dace	Chrosomus tennesseensis	2009
Fish	Wounded Darter	Nothonotus vulneratus	2005
Gastropod	Christy's Elimia	Elimia christyi	1997
Gastropod	Hiwassee Pebblesnail	Somatogyrus sp. 2	1997
Gastropod	Smooth Mudalia	Leptoxis virgata	1997
Insect	Cherokee Clubtail	Stenogomphurus consanguis	2005
Insect	Helma's Net-spinning Caddisfly	Cheumatopsyche helma	1981

Hiwassee COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Berry Cave Salamander	Gyrinophilus gulolineatus	2014
Amphibian	Tennessee Cave Salamander	Gyrinophilus palleucus	1975
Arachnid	Grassy Creek Cave Spider	Nesticus dilutus	2005
Arachnid	Southeastern Cave Pseudoscorpion	Hesperochernes mirabilis	2016
Bat	Gray Bat	Myotis grisescens	2002
Bat	Tricolored Bat	Perimyotis subflavus	2012
Crustacean	Appalachian Valley Crangonyctid	Crangonyx antennatus	2003
Insect	Norton's Cave Beetle	Pseudanophthalmus nortoni	1982

Northwest Cumberland Plateau

Regional Conservation Opportunity Area



The Northwest Cumberland Plateau Conservation Opportunity Area (COA) incorporates a region of diverse topography, elevation, and geology. Plateau surface elevations average 1,800 feet (550m) and are relatively flat. The plateau escarpment is extremely dissected along the margins of the plateau, with nearly vertical rock faces, rock outcrops, and boulder fields. This area supports a large number of caves and karst areas due to the limestone bedrock. Karst habitats are extremely diverse with springs, seeps and sinkholes.

Numerous Species of Greatest Conservation Need (SGCN) can be found throughout this COA. Wetlands support breeding populations of Mountain Chorus Frog and Four-toed Salamander, and migratory habitat for Golden Eagles. Populations of Eastern Woodrat and roosting sites for Eastern Small-footed Bats can be found along the plateau escarpment. Caves located throughout the conservation opportunity area support wintering populations of endangered Indiana and Gray bats, and wet caves support the Southern Cave Crayfish. Streams provide habitat for the Obey Crayfish, Hairyfoot Crayfish, and mussels such as Cumberland Moccasinshell and Fluted Kidney Shell.

The major threat to aquatic habitats is acid water runoff from historic coal mines throughout the COA. Iron pyrite exposed during these operations oxidizes with rain water, creating toxic runoff that at one time had deadened the river. Incompatible forestry practices can degrade and fragment terrestrial habitats, threatening the associated fauna.



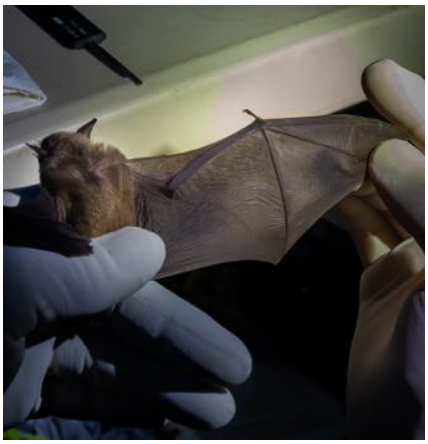
Numerous rare or sensitive species find a home in the karst, wetland, and riverine habitats of the this region, which is still recovering from historic mining practices.



Top to bottom: Four-toed Salamander/Jesse Eaker, TWRA; Southern Cave Crayfish/Carl Williams, TWRA. P2: Gray Bat wing/Cori Holliday, TNC. P3: Pogue Creek Canyon/Byron Jorjorian

Northwest Cumberland Plateau Conservation Opportunity Area

Partnerships



TWRA will develop partnerships aimed at restoring surface water pH levels that have been acidified by runoff from historic coal mines; fostering best management practices associated with timber harvests; and protecting fragile caves and other subterranean habitats. TWRA will develop and expand partnerships with the US Fish and Wildlife Service, USDA Natural Resources Conservation Service, TN Dept. of Environment and Conservation, TN Division of Forestry,The Nature Conservancy, The Conservation Fund, and private land owners.

CMP Stressor Level	Stressors Categories	Threats specific to Northwest Cumberland Plateau
1.1 A	Housing and urban areas; Primary residential development	Destruction or degradation of habitats due to construction activities associated with the building of primary residences. Large neighborhoods and other residential housing are increasing in this COA.
3.2 A	Mining and quarrying	Mineral deposits owned by third parties. Mineral rights could lead to further habitat loss if mining were to be implemented.
5.2 A	Gathering terrestrial plants*	This category focuses on plants, mushrooms, and other non-animal terrestrial species except trees. Increased harvest of rare plants such as Ginseng is occurring.
5.3 A	Logging and wood harvesting	Market-based forestry causes problems when high-grading and other short-term practices management practices occur and when forestry BMPs are not implemented.
6.1 A	Recreational activities - non-vehicular	Destruction and degradation of habitats and increased mortality of species due to excessive levels of recreational activities or inappropriate usage of habitats for recreation.
6.1 B	Recreational activities - vehicular	Destruction and degradation of habitats and increased mortality of species due to excessive levels of recreational vehicle traffic or inappropriate usage of habitats for recreational vehicles. Recreational OHV facilities are widespread and increasing in number throughout COA. Increased off-road vehicle use is resulting in damage to forests and streams.

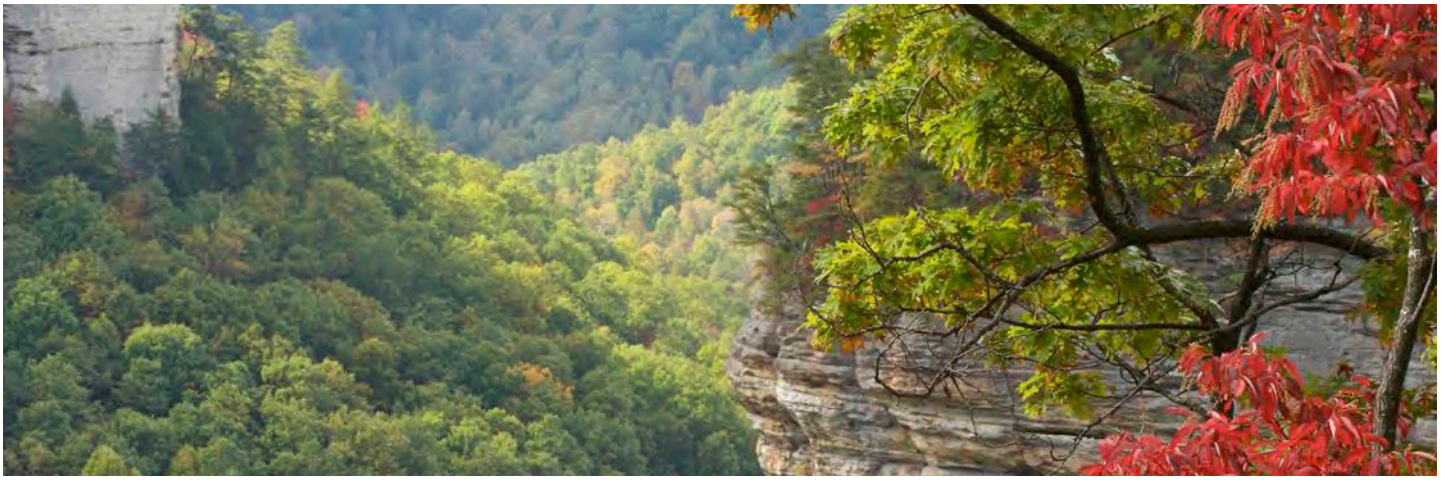
Conservation Projects

Many projects focused on achieving a better understanding of the distribution, abundance, and/or genetics of SGCN, including fish (e.g., Bluemask Darter), Tennessee Cave Salamanders, Golden Eagles, Eastern Spotted Skunks, Woodrats, and bats (includes Indiana Bat)—the latter includes monitoring white-nose syndrome as well. Direct conservation included placement of cave gates to protect bat colonies at Grassy Cave as well as land acquisition at Skinner Mountain WMA and Shortleaf Pine restoration.

To learn more about the Northwest Cumberland Plateau Conservation Opportunity Area, please contact: Daniel Istvanko, Biodiversity Coordinator, Region 3 (931) 484-9571

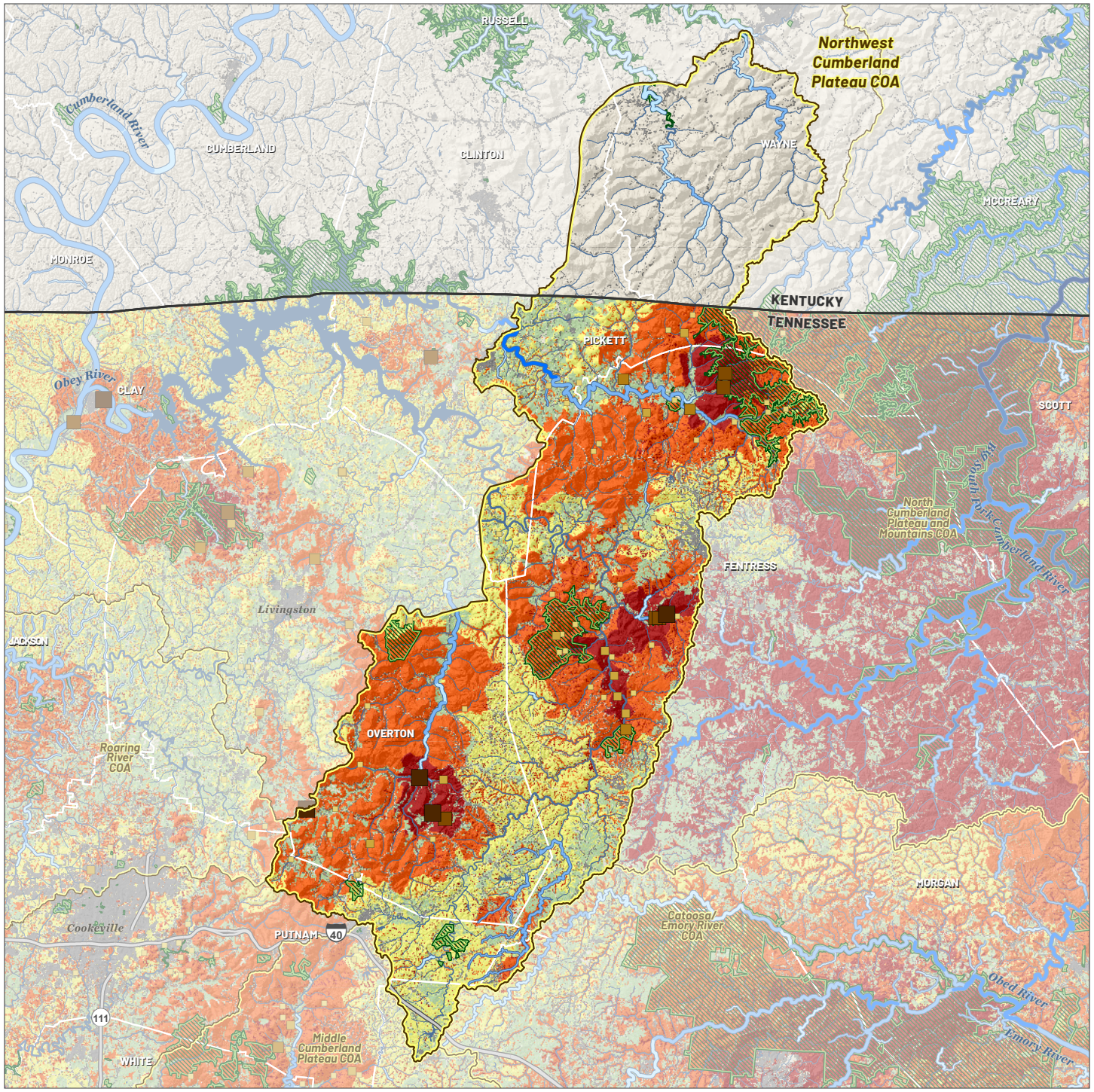
Northwest Cumberland Plateau Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Monitoring	Develop GIS remote-sensing program to analyze statewide land cover changes, map habitats, evaluate land use practices, etc. at shorter intervals or in greater detail than current national-level programs.	acres
Research	Conduct research on problems (i.e. stresses and sources of stress) affecting target species and habitats.	projects
Compatible Resource Use	Use government-funded incentive programs such as CRP, WRP, GRP, EQIP, CSP, FLEP, LIP, and rare species protection funding such as FWS Section 6 and other funds to manage or restore populations of target species in critical units of aquatic, subterranean, or terrestrial habitats.	species
Alliances and Partnerships	Develop strategic alliances with the US. Environmental Protection Agency, TN Dept. of Environment and Conservation, non-governmental organizations, and other related environmental regulatory agencies to address air and water quality issues affecting target species and habitats.	partnerships
Conservation Enterprises	Develop forest banking programs for forest systems at high risk of destruction or degradation within critical units of aquatic, subterranean, or terrestrial habitats.	acres
Research	Identify species with specialized habitat, resource, or connectivity needs across their life stages (i.e., those that are area-limited, resource-limited, dispersal-limited, or process-limited).	species
Adaptation Planning	Monitor the status of pre-defined indicators of ecosystem integrity and function and adjust management approaches if needed in response to indicator status.	acres
Climate Adaptation Management	Re-establish fire regimes with prescribed burning to reduce the risk of catastrophic wildfire.	acres



Northwest Cumberland Plateau Conservation Opportunity Area

Northwest Cumberland Plateau COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Alpine Mountain	Private	1,708	100%
Skinner Mountain - Big Laurel Conservation Easement	Private	3,080	100%
Skinner Mountain - Big Piney Conservation Easement	Private	8,605	100%
Pickett CCC Memorial SP	TDEC - SP	4,089	77%
Sgt. Alvin C. York State Historic Park	TDEC - SP	346	100%
Pickett SF & WMA	TDF	20,814	36%
Skinner Mountain WMA	TWRA	6,989	100%



Combined Habitat Priorities

Northwest Cumberland Plateau Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

Conservation Opportunity Area (COA)

Public/Protected Land

Conservation Easement

Karst Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Northwest Cumberland Plateau COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Four-toed Salamander	Hemidactylium scutatum	1979
Amphibian	Green Salamander	Aneides aeneus	2021
Bat	Eastern Small-footed Bat	Myotis leibii	2022
Bat	Gray Bat	Myotis grisescens	2022
Bat	Indiana Bat	Myotis sodalis	2022
Bat	Little Brown Myotis	Myotis lucifugus	2021
Bat	Northern Hoary Bat	Lasiurus cinereus	2017
Bat	Northern Long-eared Bat	Myotis septentrionalis	2020
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2022
Bat	Tricolored Bat	Perimyotis subflavus	2022
Bird	American Barn Owl	Tyto furcata	2021
Bird	American Black Duck	Anas rubripes	2009
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Blackburnian Warbler	Setophaga fusca	2021
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2011
Bird	Bobolink	Dolichonyx oryzivorus	2022
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2022
Bird	Canada Warbler	Cardellina canadensis	2022
Bird	Cerulean Warbler	Setophaga cerulea	2022
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2022
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Golden Eagle	Aquila chrysaetos	1930
Bird	Grasshopper Sparrow	Ammodramus savannarum	2022
Bird	Great Egret	Ardea alba	2023
Bird	Henslow's Sparrow	Centronyx henslowii	2016
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	Least Flycatcher	Empidonax minimus	2022
Bird	Loggerhead Shrike	Lanius ludovicianus	2017
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Northern Bobwhite	Colinus virginianus	2022
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Olive-sided Flycatcher	Contopus cooperi	2017
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Peregrine Falcon	Falco peregrinus	2022
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2021
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruffed Grouse	Bonasa umbellus	2012
Bird	Rusty Blackbird	Euphagus carolinus	2017
Bird	Semipalmated Sandpiper	Calidris pusilla	2011

Northwest Cumberland Plateau COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Sharp-shinned Hawk	Accipiter striatus	2012
Bird	Short-eared Owl	Asio flammeus	2015
Bird	Swainson's Warbler	Limnothlypis swainsonii	2021
Bird	Veery	Catharus fuscescens	2022
Bird	Willow Flycatcher	Empidonax traillii	2021
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Gastropod	Clifty Covert	Fumonelix wetherbyi	2003
Gastropod	Gem Supercoil	Paravitrea lapilla	2020
Mammal	Allegheny Woodrat	Neotoma magister	2017
Mammal	Eastern Spotted Skunk	Spilogale putorius	2021
Mammal	Eastern Woodrat	Neotoma floridana illinoensis	2020
Mammal	Smoky Shrew	Sorex fumeus	1979
Plant	Agoyan Cataract Moss	Merceyopsis cataractae	2008
Plant	American Chestnut	Castanea dentata	2011
Plant	Appalachian Crestwort	Lophocolea appalachiana	2008
Plant	Appalachian Filmy Fern	Vandenboschia boschiana	1951
Plant	Brown's Four-toothed Moss	Tetrodontium brownianum	2007
Plant	Butternut	Juglans cinerea	2008
Plant	Cardot's Pouncewort	Microlejeunea globosa	2007
Plant	Cumberland Sandwort	Minuartia cumberlandensis	2024
Plant	Giant Blue Cohosh	Caulophyllum giganteum	1987
Plant	Grassleaf Arrowhead	Sagittaria graminea	1977
Plant	Horsetail Spikerush	Eleocharis equisetoides	1977
Plant	Largeleaf Grass-of-Parnassus	Parnassia grandifolia	1986
Plant	Lucy Braun's White Snakeroot	Ageratina luciae-brauniae	2023
Plant	Narrowleaf Meadowsweet	Spiraea alba	1997
Plant	Ovate-leaf Arrowhead	Sagittaria platyphylla	1930
Plant	Pineland Beakrush	Rhynchospora perplexa	1987
Plant	Pretty St. John's-wort	Hypericum nudiflorum	1993
Plant	Pubescent Sedge	Carex hirtifolia	1995
Plant	Rockhouse Featherbells	Stenanthium diffusum	2016
Plant	Schreber's Aster	Eurybia schreberi	1986
Plant	Shining Ladies'-tresses	Spiranthes lucida	1997
Plant	Small's Stonecrop	Diamorpha smallii	2006
Plant	Spreading Yellow False Foxglove	Aureolaria patula	1986
Plant	Starflower Solomon's-plume	Maianthemum stellatum	1984
Plant	Sword Moss	Bryoxiphium norvegicum	2008
Plant	Taylor's Filmy Fern	Hymenophyllum tayloriae	2008
Plant	White Prairie-clover	Dalea candida	1993
Plant	Whiteleaf Leatherflower	Clematis glaucophylla	2021
Plant	Yellow-crested Orchid	Platanthera cristata	2020

Northwest Cumberland Plateau COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Reptile	Eastern Box Turtle	Terrapene carolina	2020
Reptile	Eastern Pinesnake	Pituophis melanoleucus	1971
Reptile	Timber Rattlesnake	Crotalus horridus	1989

Northwest Cumberland Plateau COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Black Mountain Salamander	Desmognathus welteri	1978
Bivalve	Creeper	Strophitus undulatus	1980
Bivalve	Cumberland Moccasinshell	Medionidus conradicus	2022
Bivalve	Fluted Kidneyshell	Ptychobranchus subtentus	1988
Bivalve	Painted Creekshell	Cambarunio taeniatus	2022
Bivalve	Rainbow	Cambarunio iris	2022
Bivalve	Slippershell Mussel	Alasmidonta viridis	1980
Bivalve	Tennessee Clubshell	Pleurobema oviforme	2022
Crustacean	Depression Crayfish	Cambarus rusticiformis	2004
Crustacean	Hairyfoot Crayfish	Cambarus crinipes	2017
Crustacean	Obey Crayfish	Cambarus obeyensis	2018
Fish	Barcheek Darter	Etheostoma obeyense	1994
Fish	Blotchside Logperch	Percina burtoni	1947
Fish	Slenderhead Darter	Percina phoxocephala	1939
Gastropod	Armored Rocksnail	Lithasia armigera	1941
Gastropod	Helmet Rocksnail	Lithasia duttoniana	1964

Northwest Cumberland Plateau COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Arachnid	a cave cobweb spider	Nesticus stygius	2003
Arachnid	a cave leptonetid spider	Appaleptoneta sp. 1	2004
Arachnid	a cave mite	Poecilophysis weyerensis	1888
Arachnid	a cave obligate pseudoscorpion	Kleptochthonius pluto	2003
Arachnid	a hackledmesh weaver	Cybaeopsis pantopla	2003
Arachnid	Cave Funnel-web Spider	Calymmaria persica	2003
Arachnid	Eastern Cave Long-jawed Spider	Meta ovalis	2003
Arachnid	harvestman	Bishopella sp. Probably laciniosa	2003
Arachnid	Southeastern Cave Pseudoscorpion	Hesperochernes mirabilis	2003
Arachnid	Subterranean Sheetweb Spider	Phanetta subterranea	2004
Arachnid	Two-clawed spider	Liocranoides sp.	2004
Bat	Eastern Small-footed Bat	Myotis leibii	2017
Bat	Gray Bat	Myotis grisescens	2017
Bat	Indiana Bat	Myotis sodalis	2017
Bat	Little Brown Myotis	Myotis lucifugus	2017
Bat	Northern Long-eared Bat	Myotis septentrionalis	2017
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2017
Bat	Tricolored Bat	Perimyotis subflavus	2017

Northwest Cumberland Plateau COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Crustacean	a cave obligate amphipod	Stygobromus sp. 24	2003
Crustacean	a cave obligate isopod	Ligidium elrodii hancockensis	2003
Crustacean	amphipods	Crangonyx sp.	2003
Crustacean	Barr's Terrestrial Isopod	Miktoniscus barri	2003
Crustacean	Cavespring Crayfish	Cambarus tenebrosus	2003
Crustacean	Central Kentucky Cave Amphipod	Stygobromus exilis	2003
Crustacean	copepods	Bryocamptus (Limocamptus) sp.	2003
Crustacean	Cumberland Plateau Cave Crayfish	Orconectes barri	2005
Crustacean	Indiana Groundwater Copepod	Diacyclops sp.	2003
Crustacean	Jeannel's Cave Ostracod	Pseudocandona jeanneli	2003
Crustacean	Southern Cave Crayfish	Orconectes australis	2009
Crustacean	Stygian Cave Isopod	Caecidotea stygia	2004
Crustacean	Terrestrial Cave Isopod	Haplophthalmus danicus	2003
Fish	Barrens Topminnow	Fundulus julisia	2005
Fish	Southern Cavefish	Typhlichthys subterraneus	2007
Flatworm	a cave obligate planarian	Sphalloplana percoeca	2003
Gastropod	a terrestrial snail	Glyphyalinia sp.	2003
Gastropod	Clifty Covert	Fumonelix wetherbyi	2003
Gastropod	Cricket Coil	Helicodiscus hadenoecus	2003
Gastropod	Raccoon Coil	Helicodiscus barri	2003
Gastropod	terrestrial snails	Helicodiscus sp.	2004
Insect	a camel cricket	Ceuthophilus stygius	2003
Insect	a carabid beetle	Rhadine caudata	2003
Insect	a cave barklice	Psyllipsocus ramburi	2003
Insect	a cave cricket	Hadenoecus opilionides	2003
Insect	a cave obligate beetle	Batrisodes clypeospecus	1960
Insect	a cave obligate beetle	Nelsonites walteri	2005
Insect	a cave obligate ground beetle	Pseudanophthalmus beakleyi	2003
Insect	a cave obligate ground beetle	Pseudanophthalmus robustus	1931
Insect	a cave obligate ground beetle	Pseudanophthalmus valentinei	2004
Insect	a cave obligate springtail	Pseudosinella christianseni	2004
Insect	a cave obligate springtail	Pseudosinella hirsuta	1949
Insect	a cave obligate springtail	Pseudosinella orba	2003
Insect	a cave obligate springtail	Sinella cavernarum	2003
Insect	a cave springtail	Pygmarrhopalites pavo	2004
Insect	a fly	Megaselia cavernicola	2004
Insect	a rove beetle	Aleochara lucifuga	2003
Insect	a rove beetle	Aloconota laurentiana	2003
Insect	a rove beetle	Atheta troglophila	2003
Insect	a springtail	Arrhopalites benitus	2003
Insect	a springtail	Arrhopalites pygmaeus	2003
Insect	Ace in the Hole Cave Beetle	Pseudanophthalmus sp. 30	2003
Insect	an ant beetle	Batrisodes sp.	2003
Insect	Buffalo Cove Cave Dipluran	Litocampa sp. 6	2003
Insect	Cave Dung Fly	Spelobia tenebrarum	2004
Insect	cave ground beetles	Pseudanophthalmus sp.	2003

Northwest Cumberland Plateau COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Insect	Cooke's Cave Dipluran	Litocampa cookei	2004
Insect	Cumberland Ground Beetle	Trechus cumberlandus	2003
Insect	Falling Springs Cave Beetle	Pseudanophthalmus sp. 29	2003
Insect	Flag Trail Cave Beetle	Anillinus sp. 5	2003
Insect	flea	Stenoponia americana	2003
Insect	Golden springtail	Tomocerus flavescens	2003
Insect	Greenbrier Riverbank Ground Beetle	Bembidion lacunarium	2003
Insect	Marshall's Cave Springtail	Arrhopalites marshalli	2004
Insect	Mill Hollow Cave Dipluran	Litocampa sp. 7	2003
Insect	Mountain Eye Cave Dipluran	Litocampa sp. 8	2003
Insect	Pale-footed Ocellate Rove Beetle	Lesteva pallipes	2003
Insect	Slender Ground Beetle	Platynus tenuicollis	2003
Insect	springtail	Tomocerus dubius	2003
Insect	springtails	Ceratophysella sp.	2003
Insect	Two-toothed Springtail	Pogonognathellus bidentatus	2004
Insect	undescribed cave dipluran	Litocampa sp. 1	2003
Insect	White springtail	Pseudosinella alba	2003
Mammal	Allegheny Woodrat	Neotoma magister	2007
Millipede	a cave obligate millipede	Scoterpes copei	2010
Millipede	a cave obligate millipede	Scoterpes ventus	2003
Millipede	cave millipeds	Pseudotremia sp.	2005
Millipede	Garland's Cave Millipede	Pseudotremia garlandae	2003
Millipede	Mann's Cave Millipede	Pseudotremia manni	2005
Millipede	Roebuck's Cave Millipede	Pseudotremia roebuckorum	2003
Millipede	Three Forks cave milliped	Pseudotremia sp. 5	2004

2025 Conservation Opportunity Area Factsheets

Region 4 (6 COAs)

Lower Holston

Conservation Opportunity Area



The Lower Holston Conservation Opportunity Area (COA) is contained within the Ridge and Valley ecoregion. Agricultural activities are the dominant form of land use, commonly small farms interspersed with residential development. Federally endangered Gray Bats and other SGCN such as American Woodcock, Eastern Box Turtle, and Northern Bobwhite have been documented here, along with more common species such as the Hoary Bat.

Most of the larger streams in this area meander parallel to the ridges and contain extensive cobble and gravel shoal areas. The smaller streams in this COA are characterized by limestone rubble with bedrock riffles and silty sand pool areas. These geological features increase productivity by adding nutrients to the region's soil and waters, enhancing wildlife species diversity.

This COA encompasses approximately 290 square miles and contains the Holston River below Cherokee Reservoir. Approximately 400 acres of this COA are publicly owned and provide limited outdoor recreational opportunities, primarily along the river.

This COA provides habitat for multiple SGCN, and it is a focal area for Lake Sturgeon reintroduction efforts. An experimental population of the federally listed Snail Darter resides within this COA as well.



In this region, agriculture is the dominant form of land use, commonly small farms. This COA contains the Holston River below Cherokee Reservoir.





Top to bottom: Hoary Bat/Daniel Istvanko, TWRA; Eastern Box Turtle/ Chris Simpson, TWRA; Valley Flame Crayfish/Carl Williams. P2: Little Brown Bat with white-nose syndrome/USFWS. P3: Holston River below Cherokee Reservoir/TWRA.

Lower Holston
Conservation Opportunity Area

Partnerships



To implement priority conservation and management strategies, including species propagation and reintroduction, TWRA will continue to work with the US Fish & Wildlife Service, the USDA Natural Resources Conservation Service, the TN Dept. of Environment and Conservation, TN Division of Forestry, the TN Valley Authority, the Tennessee Aquarium, The Nature Conservancy, Middle Tennessee State University, University of Tennessee, and other universities as well as private land owners. TWRA will also seek to educate local governments and private developers about sensitive habitats and water quality issues.

CMP Stressor Level	Stressor Categories	Threats specific to Lower Holston
2.3 A	Livestock farming and ranching; Agricultural conversion (livestock, mostly historical)	There are a variety of farming activities that take place within this COA, especially keeping goat, cattle, and horses. (In farming, animals are kept in captivity; in ranching they are allowed to roam in wild habitats.)
2.3 B	Livestock farming and ranching; Incompatible animal production practices	Degradation of soil/water quality via improper management of animal waste or chemical applications required during the rearing of livestock or other farm animals raised in concentrated conditions. There are a variety of farming activities that take place within this COA, especially keeping goat, cattle, and horses.
2.3 C	Livestock farming and ranching; Incompatible grazing/pasture management practices	Degradation of soil/water quality and habitat structure of an area due to excessive grazing or to inadequate exclusion of cattle from stream and forest resources. Also includes degradation caused by overapplication of fertilizers or other chemicals during pasture management practices. Livestock are not excluded from streams and ponds in most cases.

Conservation Projects

Some completed and ongoing projects focused on achieving a better understanding of the abundance, distribution, and genetics of SGCN such as fish and the Valley Flame Crayfish. Early successional habitat was restored, and an ongoing Lake Sturgeon project is being implemented. Finally, white-nose syndrome surveys were conducted to ascertain the status of key bat colonies and roosting sites.

To learn more about the Lower Holston Conservation Opportunity Area, please contact:
Scott Dykes, Biodiversity Coordinator, Region 4 (423) 587-7037

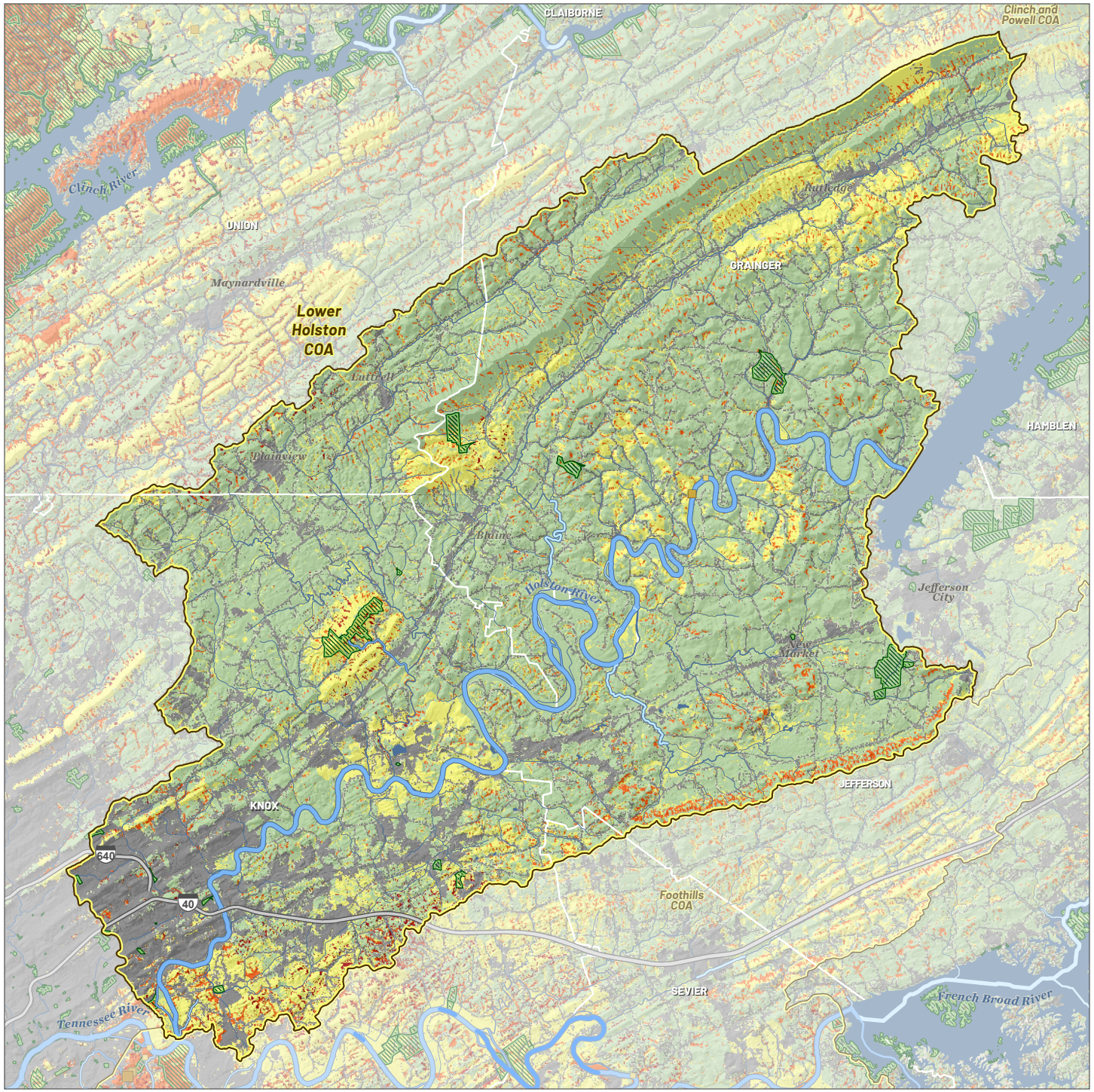
Lower Holston
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Research	Conduct scientific surveys to discern the geographical distributions of lesser known target species.	surveys
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres
Institutional Improvement	Increase staffing and funding of state agencies and local offices of federal agencies responsible for managing target species/habitats or monitoring environmental quality.	acres or species
Habitat/Natural Processes Restoration	Restore degraded habitats, as appropriate, to support a diversity of species assemblages and ecosystem structure and function.	acres



Lower Holston
Conservation Opportunity Area

Lower Holston COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
House Mountain SNA	TDEC - DNA	528	100%
Buffalo Springs WMA	TWRA	333	100%
Holston River Refuge	TWRA	1	100%



Combined Habitat Priorities

Lower Holston Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

Conservation Opportunity Area (COA)

Public/Protected Land

Conservation Easement

Karst Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:

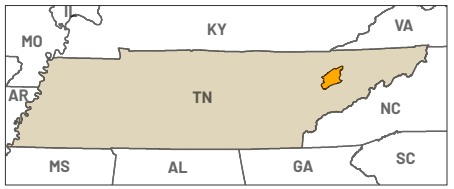
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Lower Holston River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Pygmy Salamander	Desmognathus wrighti	1976
Bat	Gray Bat	Myotis grisescens	2020
Bat	Indiana Bat	Myotis sodalis	1976
Bat	Northern Hoary Bat	Lasiurus cinereus	2014
Bat	Tricolored Bat	Perimyotis subflavus	2016
Bird	American Barn Owl	Tyto furcata	2020
Bird	American Black Duck	Anas rubripes	2023
Bird	American Golden-Plover	Pluvialis dominica	2019
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2022
Bird	Bachman's Sparrow	Peucaea aestivalis	1951
Bird	Bank Swallow	Riparia riparia	2023
Bird	Bewick's Wren	Thryomanes bewickii	1954
Bird	Black-bellied Plover	Pluvialis squatarola	2023
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2023
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2022
Bird	Bobolink	Dolichonyx oryzivorus	2023
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2023
Bird	Canada Warbler	Cardellina canadensis	2020
Bird	Cerulean Warbler	Setophaga cerulea	2021
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2022
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Dunlin	Calidris alpina	1998
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2022
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2022
Bird	Golden Eagle	Aquila chrysaetos	2015
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023
Bird	Great Egret	Ardea alba	2023
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	King Rail	Rallus elegans	1951
Bird	Least Flycatcher	Empidonax minimus	2012
Bird	LeConte's Sparrow	Ammospiza leconteii	1998
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2014
Bird	Long-tailed Duck	Clangula hyemalis	2014
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2022
Bird	Olive-sided Flycatcher	Contopus cooperi	2021

Lower Holston River COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2022
Bird	Peregrine Falcon	Falco peregrinus	2023
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2022
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-billed Dowitcher	Limnodromus griseus	2018
Bird	Snowy Egret	Egretta thula	2021
Bird	Stilt Sandpiper	Calidris himantopus	2022
Bird	Swainson's Warbler	Limnothlypis swainsonii	2006
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2022
Bird	Western Sandpiper	Calidris mauri	2021
Bird	White-rumped Sandpiper	Calidris fuscicollis	2023
Bird	Willet	Tringa semipalmata	2017
Bird	Willow Flycatcher	Empidonax traillii	2022
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Crustacean	Upland Burrowing Crayfish	Cambarus dubius	1995
Mammal	Eastern Harvest Mouse	Reithrodontomys humulis	2018
Mammal	North American Red Squirrel	Tamiasciurus hudsonicus	2009
Plant	Allegheny Mountain Golden-banner	Thermopsis mollis	1934
Plant	American Bittercress	Cardamine rotundifolia	1934
Plant	Clay Moss	Archidium alternifolium	1972
Plant	Matted Spikerush	Eleocharis intermedia	1934
Plant	Missouri Gooseberry	Ribes missouriense	2006
Plant	Moss Phlox	Phlox subulata	1934
Plant	Mountain Witch-alder	Fothergilla major	1936
Plant	Pale Corydalis	Capnoides sempervirens	1936
Plant	Schreber's Aster	Eurybia schreberi	1936
Reptile	Eastern Box Turtle	Terrapene carolina	2013

Lower Holston River COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Hellbender	Cryptobranchus alleganiensis	2002
Bivalve	Birdwing Pearlymussel	Lemiox rimosus	1915
Bivalve	Cumberland Moccasinshell	Medionidus conradicus	1980

Lower Holston River COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bivalve	Cumberland Rockshell	Theliderma intermedia	1973
Bivalve	Dromedary Pearlymussel	Dromus dromas	1963
Bivalve	Longsolid	Fusconaia subrotunda	1986
Bivalve	Mountain Creekshell	Leaunio vanuxemensis	1986
Bivalve	Mucket	Actinonaias ligamentina	1975
Bivalve	Ohio Pigtoe	Pleurobema cordatum	1986
Bivalve	Pink Mucket	Lampsilis abrupta	2002
Bivalve	Rainbow	Cambarunio iris	2005
Bivalve	Round Hickorynut	Obovaria subrotunda	1973
Bivalve	Round Pigtoe	Pleurobema sintoxia	1999
Bivalve	Sheepnose	Plethobasus cyphyus	2012
Bivalve	Shiny Pigtoe	Fusconaia cor	1963
Bivalve	Snuffbox	Epioblasma triquetra	1973
Bivalve	Spectaclecase	Cumberlandia monodonta	1963
Bivalve	Tan Riffleshell	Epioblasma walkeri	1914
Bivalve	Tennessee Pigtoe	Pleuronaia barnesiana	1999
Bivalve	White Wartyback	Plethobasus cicatricosus	1963
Crustacean	Surgeon Crayfish	Faxonius forceps	2000
Fish	American Eel	Anguilla rostrata	2000
Fish	Blue Sucker	Cycleptus elongatus	1953
Fish	Lake Sturgeon	Acipenser fulvescens	2024
Fish	Snail Darter	Percina tanasi	2003
Fish	Tennessee Dace	Chrosomus tennesseensis	2015
Gastropod	Spiny Riversnail	Io fluvialis	1971
Insect	Cherokee Clubtail	Stenogomphurus consanguis	2005

Lower Holston River COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Arachnid	Tennessee Cave Spider	Nesticus tennesseensis	1926
Bat	Gray Bat	Myotis grisescens	2014
Bat	Indiana Bat	Myotis sodalis	1976
Bat	Tricolored Bat	Perimyotis subflavus	2014
Crustacean	Southwestern Virginia Cave Amphipod	Stygobromus mackini	1943
Insect	a cave obligate beetle	Batriasymmodes spelaeus	1951
Insect	a cave obligate beetle	Batrisodes specus	1951
Insect	Cooke's Cave Dipluran	Litocampa cookei	1981

Blue Ridge

Regional Conservation Opportunity Area



The Blue Ridge Conservation Opportunity Area (COA) is located in the Southern Appalachian Mountains of east TN, southwest VA, and western NC. The Cherokee National Forest, located within this COA, comprises the largest tract of public land in the state at a total of 650,000 acres. These public lands adjoin other national forests in Virginia and North Carolina. Within this COA, there are approximately 320 square miles of aquatic habitat within four distinct watersheds that have been identified as potential conservation areas.

This COA is characterized by mid- to high-elevation streams and terrestrial habitats that vary from 1,500 (450 m) to 6,400 feet (1,950 m) in elevation. Together, the Blue Ridge and Foothills COAs contain the only known naturally-occurring and self-sustaining populations of Brook Trout in the state (others are hatchery stock). Blue Ridge is home to several populations of Hellbender, as well as the only population of Bog Turtles in the state. A significant Eastern Hemlock component is critical for numerous Species of Greatest Conservation Need (SGCN), both aquatic and terrestrial. Also of great interest in the southern portion of this COA are the state listed Blue Sucker and Olive Darter, as well as the state endangered Lake Sturgeon.

Outside of the national forest, this COA is threatened by incompatible agricultural activities, structures that interrupt stream connectivity, and development in sensitive areas. Within the national forest, there are acid deposition issues, a decline in the hemlock forest component, and invasive species that impact SGCN wildlife and their habitats.



This region and one other contain all of the Brook Trout resources in the state, plus it is home to several populations of Hellbender, as well as the only Bog Turtles in the state.



Top to bottom: Brook Trout/Dave Hersimtschuk, Freshwaters Illustrated; Hellbender in situ/USFWS. P2: Bog Turtle showing characteristic yellow neck markings/Scott Dykes, TWRA P3: Roan Mountain SP/Gregg Elliott, K Gregg Consulting

Blue Ridge
Conservation Opportunity Area

Partnerships



TWRA will continue to work with the US. Fish and Wildlife Service, US. Forest Service, National Park Service, USDA Natural Resources Conservation Service, USDA Forest Service, TN Dept. of Environment and Conservation, Tennessee Valley Authority, other state and federal agencies, the Tennessee Aquarium, Knoxville Zoo, The Nature Conservancy, the Little River Watershed Association, Quail Forever, Trout Unlimited, other NGOs, University of Tennessee, Tennessee Tech, and multiple other universities in- and out-of-state, city and county governments and private developers/businesses to implement management and planning strategies that maintain and protect quality habitats on both public and private lands and to implement strategies to eliminate Wild Hogs.

CMP Stressor Level	Stressors Categories	Threats specific to Blue Ridge
1.1 A	Housing and urban areas; Primary residential development	Destruction or degradation of habitats due to construction activities associated with the building of primary residences. There is Primary residential development throughout this COA.
7.1 A	Fire and fire suppression	Degradation of fire-dependent natural systems due to either human suppression of fire or the conditions needed to support combustion. Lack of fire as a management tool is a major problem throughout this COA.
11.5 A	Severe/extreme weather events	Changes in frequency, timing and/or intensity of storms as well as severe weather events that threaten targets that have lost resilience. Category Examples: thunderstorms, tropical storms, hurricanes, cyclones, tornadoes, hailstorms, ice storms or blizzards, dust storms, erosion of beaches during storms. The destruction left behind Hurricane Helene in 2024 is an example.

To learn more about the Blue Ridge Conservation Opportunity Area, please contact:
Scott Dykes, Biodiversity Coordinator, Region 4 (423) 587-7037

Blue Ridge
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Research	Conduct scientific surveys to discern the geographical distributions of lesser known target species.	surveys
Institutional Improvement	Increase staffing and funding of state agencies and local offices of federal agencies responsible for managing target species/habitats or monitoring environmental quality.	acres or species
Legislation	Propose/support state and federal legislation to create dedicated funding sources for conservation programs, acquisition, and/or restoration of critical units of aquatic, subterranean, and terrestrial habitats.	acres or species
Adaptation Planning	Identify areas for restoration or protection in locations within the existing geographic range of species, which are unoccupied due to geographic barriers or past catastrophes but are climatically suitable for persistence into the future.	acres

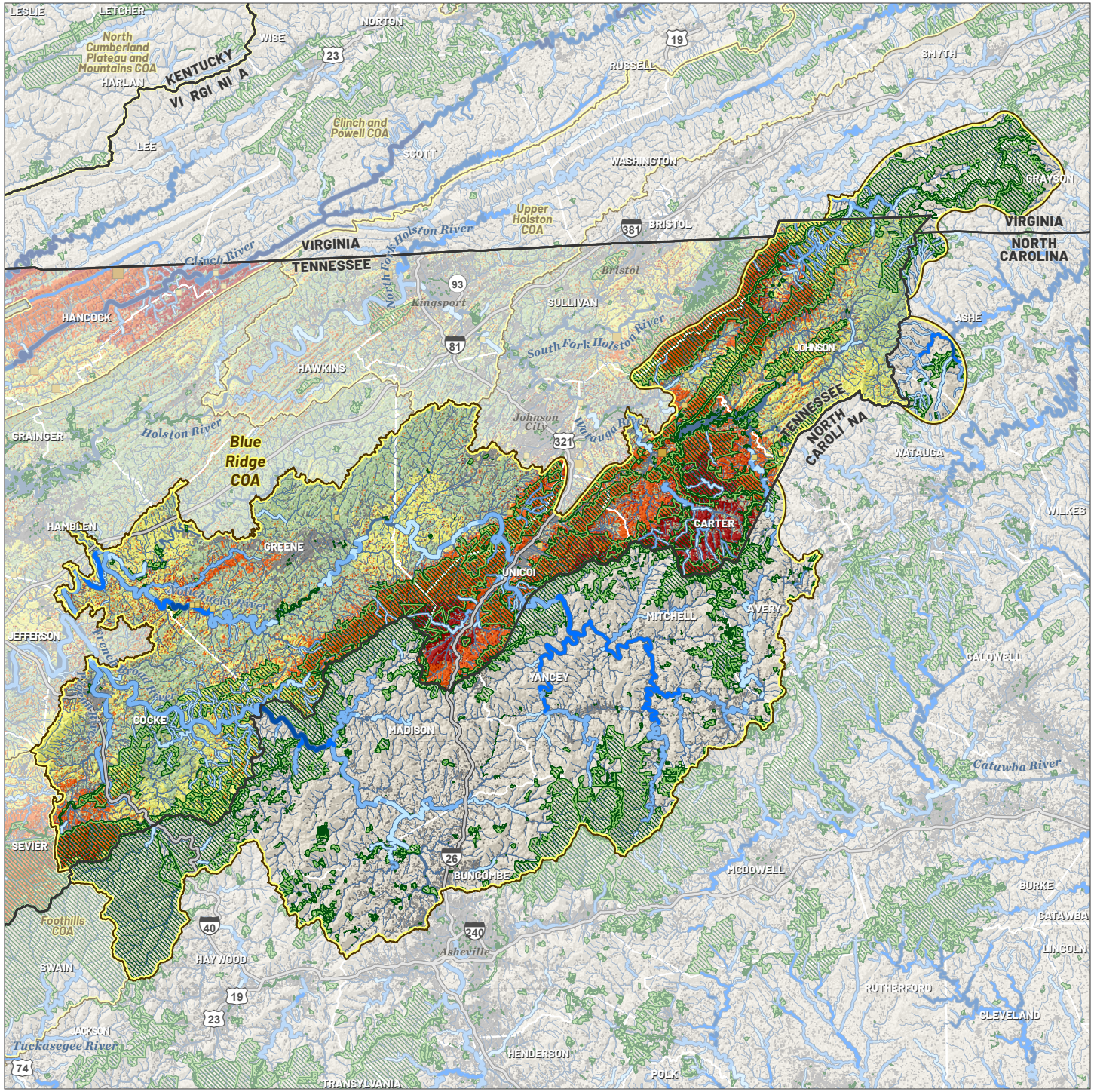
Conservation Projects

Bioblitzes catalogued overall species diversity, and individual projects focused on achieving a better understanding of the distribution, abundance, and/or genetics of SGCN, including stream macroinvertebrates, fish (including Chucky Madtom), Bog Turtles, Hellbenders, Golden Eagles, Golden-winged Warblers, Spotted Skunks, Woodrats, Carolina Northern Flying Squirrels, and bats —the latter also includes monitoring of white-nose syndrome. Habitat assessments of high elevation streams and stream wood loading also took place. Ongoing management at Lick Creek Bottoms WMA, which serves as the region's "anchor WMA" for Northern Bobwhite Quail, provides high quality, intensively managed habitat to support a self-sustaining quail population within the larger Quail Focal Area. Bobwhite Quail are a game species, but they are also SGCN.



Blue Ridge
Conservation Opportunity Area

Blue Ridge COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Andrew Johnson NHS	NPS	17	100%
Great Smoky Mountains National Park	NPS	240,304	8%
Gates Tract	Private	34	100%
Jonesboro Historic District	Private	92	100%
Shady Valley Preserves	Private	79	100%
Hampton Creek Cove SNA	TDEC - DNA	684	100%
Davy Crockett Birthplace SP	TDEC - SP	98	100%
Roane Mountain SP	TDEC - SP	2,108	100%
Rocky Fork SP	TDEC - SP	2,171	100%
Chester Inn SHS	TDEC - THC	0	100%
Martha Sundquist SF	TDF	2,006	100%
Shady Valley Preserves	TNC	742	100%
Kinser Park	TVA	291	100%
Nolichucky WMA	TVA	345	100%
Rankin Bottoms WMA	TVA	1,487	7%
Wilbur Lake WOA	TVA	101	100%
Andrew Johnson Game Refuge	TWRA	92	100%
Bumpus Cove WMA	TWRA	4,291	100%
Henderson Swamp Public Hunting Area	TWRA	29	100%
Jenkins Bog	TWRA	7	100%
Lick Creek Bottoms WMA	TWRA	1,523	100%
Mullins Island WMA	TWRA	31	100%
Orchard Bog	TWRA	18	100%
Quarry Bog	TWRA	3	100%
North Cherokee NF	USFS	345,092	94%



Combined Habitat Priorities

Blue Ridge Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

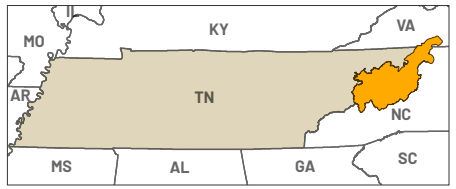
- Conservation Opportunity Area (COA)
- Public/Protected Land
- Conservation Easement

Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles
0 5 Kilometers



Blue Ridge COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Blue Ridge Dusky Salamander	Desmognathus orestes	2022
Amphibian	Cumberland Dusky Salamander	Desmognathus abditus	1940
Amphibian	Four-toed Salamander	Hemidactylium scutatum	2007
Amphibian	Imitator Salamander	Desmognathus imitator	2021
Amphibian	Mud Salamander	Pseudotriton montanus	2018
Amphibian	Northern Gray-cheeked Salamander	Plethodon montanus	2021
Amphibian	Northern Pygmy Salamander	Desmognathus organi	2004
Amphibian	Pygmy Salamander	Desmognathus wrighti	2021
Amphibian	Red-cheeked Salamander	Plethodon jordani	2021
Amphibian	Seepage Salamander	Desmognathus aeneus	2005
Amphibian	Southern Ravine Salamander	Plethodon richmondi	2021
Amphibian	Weller's Salamander	Plethodon welleri	2021
Amphibian	Yonahlossee Salamander	Plethodon yonahlossee	2022
Arachnid	Spruce-fir Moss Spider	Microhexura montivaga	1998
Bat	Eastern Small-footed Bat	Myotis leibii	2016
Bat	Gray Bat	Myotis grisescens	2022
Bat	Little Brown Myotis	Myotis lucifugus	2016
Bat	Northern Hoary Bat	Lasiurus cinereus	2017
Bat	Northern Long-eared Bat	Myotis septentrionalis	2015
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2021
Bat	Southeastern Bat	Myotis austroriparius	2008
Bat	Tricolored Bat	Perimyotis subflavus	2022
Bat	Virginia Big-eared Bat	Corynorhinus townsendii virginianus	2014
Bird	American Barn Owl	Tyto furcata	2023
Bird	American Bittern	Botaurus lentiginosus	2023
Bird	American Black Duck	Anas rubripes	2023
Bird	American Golden-Plover	Pluvialis dominica	2022
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bank Swallow	Riparia riparia	2023
Bird	Bewick's Wren	Thryomanes bewickii	1950
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-capped Chickadee	Poecile atricapillus	2022
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2023
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2023
Bird	Blue-headed Vireo	Vireo solitarius	2007
Bird	Bobolink	Dolichonyx oryzivorus	2023
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2023
Bird	Buff-breasted Sandpiper	Calidris subruficollis	2021
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2019
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Connecticut Warbler	Oporornis agilis	2018

Blue Ridge COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Dunlin	Calidris alpina	2023
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Evening Grosbeak	Coccothraustes vespertinus	2023
Bird	Golden Eagle	Aquila chrysaetos	2023
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023
Bird	Great Egret	Ardea alba	2023
Bird	Henslow's Sparrow	Centronyx henslowii	2011
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	Least Bittern	Botaurus exilis	2017
Bird	Least Flycatcher	Empidonax minimus	2023
Bird	LeConte's Sparrow	Ammospiza leconteii	2016
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2022
Bird	Loggerhead Shrike	Lanius ludovicianus	2023
Bird	Long-tailed Duck	Clangula hyemalis	2020
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2023
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Northern Saw-whet Owl	Aegolius acadicus	2023
Bird	Olive-sided Flycatcher	Contopus cooperi	2010
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2023
Bird	Peregrine Falcon	Falco peregrinus	2023
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruddy Turnstone	Arenaria interpres	2007
Bird	Ruffed Grouse	Bonasa umbellus	2023
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2023
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-billed Dowitcher	Limnodromus griseus	2017
Bird	Short-eared Owl	Asio flammeus	2013
Bird	Snowy Egret	Egretta thula	2020
Bird	Stilt Sandpiper	Calidris himantopus	2021
Bird	Swainson's Warbler	Limnothlypis swainsonii	2023
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	Western Sandpiper	Calidris mauri	2020
Bird	White-rumped Sandpiper	Calidris fuscicollis	2022
Bird	Whooping Crane	Grus americana	2000

Blue Ridge COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Willet	Tringa semipalmata	2021
Bird	Willow Flycatcher	Empidonax traillii	2023
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2022
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Crustacean	Upland Burrowing Crayfish	Cambarus dubius	2006
Gastropod	Bidentate Dome	Ventridens coelaxis	2008
Gastropod	Carter Threetooth	Triodopsis anteridon	2001
Gastropod	Crossed Dome	Ventridens decussatus	2004
Gastropod	Highland Slitmouth	Stenotrema altispira	2004
Gastropod	Honey Bud	Pilsbryna vanattai	2004
Gastropod	Lamellate Supercoil	Paravitrea lamellidens	2001
Gastropod	Ornate Bud	Pilsbryna aurea	2002
Gastropod	Ribbed Striate Snail	Pseudohyalina exigua	2001
Gastropod	Sawtooth Disc	Discus bryanti	2001
Gastropod	Smallmouth Vertigo	Vertigo parvula	2001
Gastropod	Velvet Covert	Inflectarius subpalliatus	2004
Gastropod	Whitefoot Supercoil	Paravitrea tridens	2004
Insect	Diana Fritillary	Argynnis diana	2009
Insect	Rusty-patched Bumble Bee	Bombus affinis	1984
Mammal	Allegheny Woodrat	Neotoma magister	2023
Mammal	Appalachian Cottontail	Sylvilagus obscurus	2017
Mammal	Carolina Northern Flying Squirrel	Glaucomys sabrinus coloratus	1993
Mammal	Cinereus Shrew	Sorex cinereus	2018
Mammal	Eastern Harvest Mouse	Reithrodontomys humulis	2007
Mammal	Eastern Pygmy Shrew	Sorex hoyi	2017
Mammal	Eastern Spotted Skunk	Spilogale putorius	1970
Mammal	Eastern Woodrat	Neotoma floridana illinoensis	2023
Mammal	Golden Mouse	Ochrotomys nuttalli	2018
Mammal	Hairy-tailed Mole	Parascalops breweri	2012
Mammal	Least Weasel	Mustela nivalis	2004
Mammal	Long-tailed Shrew	Sorex dispar	2005
Mammal	Meadow Jumping Mouse	Zapus hudsonius	2006
Mammal	North American Least Shrew	Cryptotis parva	2007
Mammal	North American Red Squirrel	Tamiasciurus hudsonicus	2015
Mammal	Smoky Shrew	Sorex fumeus	2013
Mammal	Southeastern Shrew	Sorex longirostris	1991
Mammal	Southern Appalachian Woodrat	Neotoma floridana haematoreia	2006
Mammal	Southern Bog Lemming	Synaptomys cooperi	1975
Mammal	Southern Red-backed Vole	Clethrionomys gapperi	2023
Mammal	Southern Rock Vole	Microtus chrotorrhinus carolinensis	1968
Mammal	Star-nosed Mole	Condylura cristata	2006

Blue Ridge COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Mammal	Woodland Jumping Mouse	Napaeozapus insignis	2020
Plant	a liverwort	Bazzania nudicaulis	1999
Plant	a liverwort	Cephaloziella spinicaulis	2014
Plant	a liverwort	Plagiochila exigua	1999
Plant	a liverwort	Solenostoma appalachianum	2014
Plant	American Barberry	Berberis canadensis	2012
Plant	American Bittercress	Cardamine rotundifolia	2020
Plant	American Chestnut	Castanea dentata	2020
Plant	American Fly-honeysuckle	Lonicera canadensis	1981
Plant	American Hart's-tongue Fern	Asplenium scolopendrium var. americanum	1933
Plant	American Speedwell	Veronica americana	2012
Plant	American Water-pennywort	Hydrocotyle americana	2014
Plant	American Wintergreen	Pyrola americana	2015
Plant	Appalachian Crestwort	Lophocolea appalachiana	2017
Plant	Appalachian Fir-clubmoss	Huperzia appalachiana	1997
Plant	Appalachian Threadwort	Drepanolejeunea appalachiana	2014
Plant	Appalachian Woodsia	Woodsia appalachiana	1994
Plant	Arctic Bentgrass	Agrostis mertensii	1966
Plant	Ashleaf Bush-pea	Thermopsis fraxinifolia	2019
Plant	Beadle's Mountainmint	Pycnanthemum beadlei	1980
Plant	Bent Avens	Geum geniculatum	2008
Plant	Blue Ridge Bittercress	Cardamine flagellifera	2012
Plant	Blue Ridge Goldenrod	Solidago spithamaea	2007
Plant	Blue Ridge St. John's-wort	Hypericum mitchellianum	2023
Plant	Blunt-lobe Grapefern	Sceptridium oneidense	1997
Plant	Bog Clubmoss	Lycopodiella inundata	2013
Plant	Branched Whitlow-grass	Draba ramosissima	2000
Plant	Branching Bur-reed	Sparganium androcladum	2003
Plant	Broadleaf Bunchflower	Melanthium latifolium	2020
Plant	Broadleaf Goldenrod	Solidago lancifolia	1999
Plant	Broadleaf Tickseed	Coreopsis latifolia	1993
Plant	Brome-like Sedge	Carex bromoides ssp. montana	2020
Plant	Butternut	Juglans cinerea	2014
Plant	Canada Burnet	Sanguisorba canadensis	1997
Plant	Carolina Hemlock	Tsuga caroliniana	2018
Plant	Carolina Saxifrage	Micranthes caroliniana	1998
Plant	Chamomile Grapefern	Botrychium matricariifolium	2007
Plant	Choke Cherry	Prunus virginiana	1986
Plant	Clasping Twisted-stalk	Streptopus amplexifolius	1978
Plant	Climbing Fumitory	Adlumia fungosa	2011
Plant	Clingman's Hedge-nettle	Stachys clingmanii	2009
Plant	Cow-parsnip	Heracleum maximum	2017
Plant	Crested Shieldfern	Dryopteris cristata	2006
Plant	Curled Notchwort	Sphenolobus saxicola	1956
Plant	Cutleaf Meadow-parsnip	Thaspium pinnatifidum	2015
Plant	Dwarf Rattlesnake-plantain	Goodyera repens	2019

Blue Ridge COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Eastern Turkeybeard	Xerophyllum asphodeloides	2024
Plant	Fetterbush	Leucothoe racemosa	1893
Plant	Fireweed	Chamerion angustifolium	1997
Plant	Fowl Bluegrass	Poa palustris	1993
Plant	Fraser Fir	Abies fraseri	2011
Plant	Fraser's Loosestrife	Lysimachia fraseri	1906
Plant	Fraser's Marsh-St. John's-wort	Triadenum fraseri	1989
Plant	Fraser's Sedge	Carex fraseriana	2019
Plant	Fringed Black-bindweed	Fallopia cilinodis	1999
Plant	Giant Blue Cohosh	Caulophyllum giganteum	1996
Plant	Godfrey's Stitchwort	Minuartia godfreyi	2005
Plant	Gray's Lily	Lilium grayi	2007
Plant	Green-and-gold	Chrysogonum virginianum	2011
Plant	Hairy Willowherb	Epilobium ciliatum	1992
Plant	Halberd-leaf Tearthumb	Polygonum arifolium	1951
Plant	Hay Sedge	Carex argyrantha	1989
Plant	Headwaters Hornwort	Nothoceros aenigmaticus	1996
Plant	Heartleaf Meehania	Meehania cordata	2013
Plant	Hitchcock's Sedge	Carex hitchcockiana	2012
Plant	Horsehair Threadwort	Sphenolobopsis pearsoni	1999
Plant	Horsesugar	Symplocos tinctoria	2014
Plant	John's-cabbage	Hydrophyllum virginianum	2019
Plant	Large Cranberry	Vaccinium macrocarpon	2014
Plant	Large Purple Fringed Orchid	Platanthera grandiflora	2023
Plant	Least Grapefern	Botrychium simplex	2007
Plant	Limp Mannagrass	Glyceria laxa	2003
Plant	Linear-leaf Willowherb	Epilobium leptophyllum	1981
Plant	Little Prickly Sedge	Carex echinata ssp. echinata	1952
Plant	Loesel's Twayblade	Liparis loeselii	2018
Plant	Long Sedge	Carex folliculata	2024
Plant	Long-bracted Green Orchid	Coeloglossum viride var. virescens	2023
Plant	Longleaf Stitchwort	Stellaria longifolia	2023
Plant	Manhart's Sedge	Carex manhartii	2004
Plant	Marsh Bedstraw	Galium palustre	2000
Plant	Marsh Bellflower	Campanula aparinoides	2023
Plant	Marsh Speedwell	Veronica scutellata	1988
Plant	Marsh-marigold	Caltha palustris	2023
Plant	Minniebush	Rhododendron pilosum	1997
Plant	Mountain Alder	Alnus alnobetula ssp. crispa	2007
Plant	Mountain Bluet	Houstonia purpurea var. montana	2010
Plant	Mountain Bush-honeysuckle	Diervilla rivularis	2001
Plant	Mountain Fetterbush	Pieris floribunda	2020
Plant	Mountain Honeysuckle	Lonicera dioica	1933
Plant	Mountain Sandwort	Minuartia groenlandica	1997
Plant	Mountain St. John's-wort	Hypericum graveolens	2004
Plant	Mountain Witch-alder	Fothergilla major	1996

Blue Ridge COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Narrowleaf Meadowsweet	Spiraea alba	2023
Plant	New England Ragwort	Packera schweinitziana	2006
Plant	Northeastern Ladyfern	Athyrium angustum	2009
Plant	Northern Beech Fern	Phegopteris connectilis	1998
Plant	Northern Bush-honeysuckle	Diervilla lonicera	1987
Plant	Northern Evening-primrose	Oenothera parviflora	2020
Plant	Northern Shorthusk	Brachyelytrum aristosum	2009
Plant	Northern Starflower	Trientalis borealis	1999
Plant	Nuttall's Pondweed	Potamogeton epihydrus	1980
Plant	Olney's Dry Rock Moss	Grimmia olneyi	1953
Plant	Ovate Catchfly	Silene ovata	1996
Plant	Pale Corydalis	Capnoides sempervirens	2024
Plant	Pale Sedge	Carex pallescens	2023
Plant	Pale St. John's-wort	Hypericum ellipticum	2018
Plant	Pale-green Orchid	Platanthera flava var. herbiola	2012
Plant	Piratebush	Buckleya distichophylla	2014
Plant	Porter's Reedgrass	Calamagrostis porteri	2014
Plant	Purple Giant-hyssop	Agastache scrophulariifolia	2004
Plant	Roan Mountain Sedge	Carex roanensis	2020
Plant	Rose Pogonia	Pogonia ophioglossoides	1952
Plant	Rosy Twisted-stalk	Streptopus lanceolatus	2010
Plant	Rough Avens	Geum laciniatum	1996
Plant	Rough Bedstraw	Galium asprellum	1973
Plant	Roundleaf Sundew	Drosera rotundifolia	2012
Plant	Rugel's Ragwort	Rugelia nudicaulis	1936
Plant	Ruth's Sedge	Carex ruthii	2020
Plant	Shining Ladies'-tresses	Spiranthes lucida	1996
Plant	Short's Hedge-hyssop	Gratiola viscidula	1976
Plant	Showy Lady's-slipper	Cypripedium reginae	2000
Plant	Silverling	Paronychia argyrocoma	1987
Plant	Silvery Sedge	Carex canescens ssp. disjuncta	2011
Plant	Skunk-cabbage	Symplocarpus foetidus	2024
Plant	Small Mountain Bittercress	Cardamine clematitis	2007
Plant	Small Purple Fringed Orchid	Platanthera psycodes	2023
Plant	Small Whorled Pogonia	Isotria medeoloides	2009
Plant	Southern Nodding Trillium	Trillium rugelii	2021
Plant	Spinulose Shieldfern	Dryopteris carthusiana	2023
Plant	Spotted Coralroot	Corallorhiza maculata	2004
Plant	Spreading Avens	Geum radiatum	2007
Plant	Spreading Rockcress	Arabis patens	2016
Plant	Swamp Loosestrife	Lysimachia terrestris	1998
Plant	Swamp Lousewort	Pedicularis lanceolata	2023
Plant	Swamp Saxifrage	Micranthes pensylvanica	1997
Plant	Sweet Pinesap	Monotropsis odorata	1993
Plant	Tawny Cotton-grass	Eriophorum virginicum	1997
Plant	Three-toothed Cinquefoil	Sibbaldiopsis tridentata	2007

Blue Ridge COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Trailing Stitchwort	Stellaria alsine	1988
Plant	Treelike Clubmoss	Dendrolycopodium dendroideum	1981
Plant	Tufted Clubrush	Trichophorum cespitosum	1994
Plant	Virginia Heartleaf	Hexastylis virginica	2013
Plant	Virginia Spiraea	Spiraea virginiana	1988
Plant	Wand Gayfeather	Liatris virgata	2013
Plant	White Camas	Zigadenus elegans ssp. glaucus	1984
Plant	White Heath Aster	Symphyotrichum ericoides var. ericoides	1976
Plant	White Monkshood	Aconitum reclinatum	1997
Plant	Whiteleaf Sunflower	Helianthus glaucophyllus	2011
Plant	Willow Aster	Symphyotrichum praealtum	1990
Plant	Wretched Sedge	Carex misera	1997
Plant	Yellow Avens	Geum aleppicum	1997
Plant	Yellow Nodding Ladies'-tresses	Spiranthes ochroleuca	2021
Reptile	Bog Turtle	Glyptemys muhlenbergii	2023
Reptile	Coal Skink	Plestiodon anthracinus	2018
Reptile	Eastern Box Turtle	Terrapene carolina	2008
Reptile	Eastern Hog-nosed Snake	Heterodon platirhinos	1949
Reptile	Timber Rattlesnake	Crotalus horridus	1937
Tardigrade	a tardigrade	Hypsibius roanensis	1988
Tardigrade	Schuster's Tardigrade	Calohypsibius schusteri	1998

Blue Ridge COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Brown-backed Salamander	Eurycea aquatica	2015
Amphibian	Hellbender	Cryptobranchus alleganiensis	2022
Amphibian	Mudpuppy	Necturus maculosus	1988
Bivalve	Appalachian Elktoe	Alasmidonta raveneliana	2002
Bivalve	Birdwing Pearlymussel	Lemiox rimosus	2012
Bivalve	Black Sandshell	Ligumia recta	1978
Bivalve	Creeper	Strophitus undulatus	2019
Bivalve	Cumberlandian Combshell	Epioblasma brevidens	2019
Bivalve	Finerayed Pigtoe	Fusconaia cuneolus	1913
Bivalve	Fluted Kidneyshell	Ptychobranchus subtentus	2012
Bivalve	Green Floater	Lasmigona subviridis	1984
Bivalve	Mountain Creekshell	Leaunio vanuxemensis	1997
Bivalve	Mucket	Actinonaias ligamentina	1977
Bivalve	Oyster Mussel	Epioblasma capsaeformis	2019
Bivalve	Pink Mucket	Lampsilis abrupta	2013
Bivalve	Rainbow	Cambarunio iris	1998
Bivalve	Rayed Bean	Paetulunio fabalis	1964
Bivalve	Slabside Pearlymussel	Pleuronaia dolabelloides	1964
Bivalve	Snuffbox	Epioblasma triquetra	1980
Bivalve	Spectaclecase	Cumberlandia monodonta	1980
Bivalve	Tennessee Bean	Venustaconcha trabalis	1997

Blue Ridge COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bivalve	Tennessee Clubshell	Pleurobema oviforme	1991
Bivalve	Tennessee Pigtoe	Pleuronaia barnesiana	1997
Crustacean	French Broad Crayfish	Cambarus reburrus	2012
Crustacean	Surgeon Crayfish	Faxonius forceps	2017
Fish	Blotched Chub	Erimystax insignis	2008
Fish	Blue Sucker	Cycleptus elongatus	2007
Fish	Brook Trout	Salvelinus fontinalis	2022
Fish	Chucky Madtom	Noturus crypticus	2009
Fish	Highfin Carpsucker	Carpiodes velifer	2000
Fish	Lake Sturgeon	Acipenser fulvescens	2022
Fish	Marbled Darter	Etheostoma marmorpinnum	2005
Fish	Olive Darter	Percina squamata	2005
Fish	Sharphead Darter	Nothonotus acuticeps	2018
Fish	Sickle Darter	Percina williamsi	1984
Fish	Snail Darter	Percina tanasi	1980
Fish	Tangerine Darter	Percina aurantiaca	2018
Fish	Tennessee Dace	Chrosomus tennesseensis	2022
Fish	Tuckasegee Darter	Etheostoma gutselli	2008
Fish	Wounded Darter	Nothonotus vulneratus	2008
Gastropod	Spiny Riversnail	Io fluvialis	1977

Blue Ridge COA SGCN LIST - KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Arachnid	a cave cobweb spider	Nesticus paynei	1985
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2012
Bat	Gray Myotis	Myotis grisescens	2016
Bat	Eastern Small-footed Myotis	Myotis leibii	2010
Bat	Little Brown Myotis	Myotis lucifugus	2016
Bat	Northern Myotis	Myotis septentrionalis	2010
Bat	Tricolored Bat	Perimyotis subflavus	2016
Crustacean	a cave obligate isopod	Caecidotea nortoni	1966
Crustacean	a cave obligate amphipod	Stygobromus barryi	1979
Insect	a bristletail	Litocampa barryi	1981
Mammal	Allegheny Woodrat	Neotoma magister	1998

Clinch and Powell

Regional Conservation Opportunity Area



The Clinch and Powell Conservation Opportunity Area (COA) is characterized by rolling ridges and valleys, and most of the land use activity within the area is agricultural in nature. Most of the larger streams in this area meander roughly parallel to the ridges, which were created by the geologic processes of folding and faulting. The streams contain extensive cobble and gravel shoal areas. The smaller streams in this COA are characterized by limestone rubble with bedrock riffles and silty sand pool areas. These geological features increase productivity by adding nutrients to the soil and waters of this region, enhancing wildlife species diversity.

The Clinch and Powell area encompasses approximately 434 square miles and two of the most biologically diverse rivers in the United States. The headwaters of these rivers begin in the state of Virginia, and cross-state collaborations such as the Clinch Powell Clean Rivers Initiative are important to ensure protection of water quality and restore species populations. Over 900 acres of this COA are publicly owned and provide outdoor recreational opportunities to an array of user groups.

This COA provides habitat for multiple Species of Greatest Conservation Need (SGCN), some of which are federally protected. For example, there are more than 20 federally listed species, a large portion of which are mollusks found primarily within the Clinch and Powell Rivers.



The Clinch and Powell Rivers are two of the most biologically diverse rivers in the United States. This region has rolling ridges, valleys, and agriculture as the primary land use.





Top to bottom: Pectoral Sandpiper/ Alan Schmierer; Wavy-rayed Lampmussel/Jeffrey Basinger, Freshwaters Illustrated; Powell River/ TWRA. P3: Yellowfin Madtom/Evan Poellinger

Clinch and Powell
Conservation Opportunity Area

Partnerships

To implement priority conservation and management strategies, TWRA will build on relationships with the US Fish & Wildlife Service; US Geological Survey; the Office of Surface Mining, Reclamation and Enforcement; the Tennessee Valley Authority; the TN Dept. of Environment and Conservation;TN Division of Forestry; The Nature Conservancy; the Clinch and Powell RC&D; the Clinch-Powell Clean Rivers; the Tennessee Clean Water Network; Tennessee Aquarium Conservation Institute; University of Tennessee, Tennessee Tech; and various universities in- and out-of-state. TWRA will also seek to educate local governments and private developers about sensitive habitats and water quality issues. Collaborations with states bordering this COA include work with the fish and wildlife agencies of Virginia and Kentucky.

Conservation Projects	Conservation Projects	Conservation Projects
3.2 A	Mining and quarrying	Strip mining occurred historically in the area. Some deep mines are still in use.
6.1 B	Recreational activities - vehicular	Destruction and degradation of habitats and increased mortality of species due to excessive levels of recreational vehicle traffic or inappropriate usage of habitats for recreational vehicles. OHV-caused loss of vegetation, SGCN habitat destruction, erosion, and increased runoff occurs.
7.1 A	Fire and fire suppression	Degradation of fire-dependent natural systems due to either human suppression of fire or the conditions needed to support combustion. This category focuses on the human activities that lead to either not enough fire or too much fire in the ecosystem in question. It also includes damaging "natural" fires in systems that have lost their natural resilience.
8.1 A	Invasive non-native/alien species plants and animals	Increased mortality or habitat degradation caused by excessive competition or predation from invasive exotic species. Chytrid fungus, Rana virus, and white-nose syndrome are potential stressors within this COA; feral hogs as well.

To learn more about the Clinch and Powell Conservation Opportunity Area, please contact: Scott Dykes, Biodiversity Coordinator, Region 4 (423) 587-7037

Clinch and Powell
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Habitat/Natural Processes Restoration	Reintroduce fire via prescribed burning into fire-dependent grassland and woodland systems within critical units of terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Reclaim abandoned coal mines and streams affected by acid mine drainage within critical units of aquatic, subterranean, and terrestrial habitats.	acres
Institutional Improvement	Increase staffing and funding of state agencies and local offices of federal agencies responsible for managing target species/habitats or monitoring environmental quality.	acres or species
Legislation	Propose/support state legislation urging the federal Office of Surface Mining to designate critical units of aquatic, subterranean, and terrestrial habitats as "lands unsuitable for mining."	acres or species

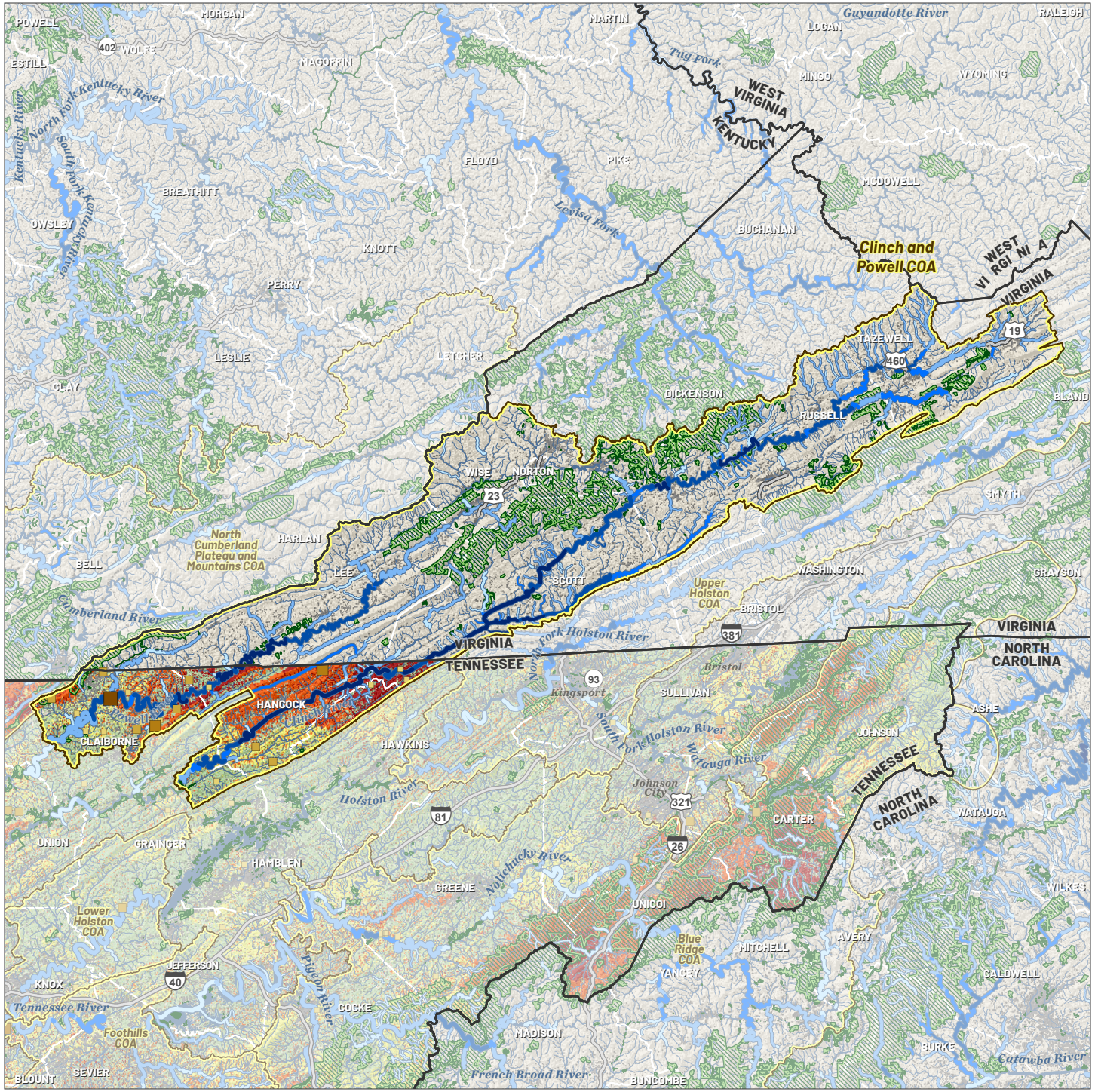
Conservation Projects

Some completed and ongoing projects focused on achieving a better understanding of the abundance, distribution, and genetics of SGCN such as Spinyscale Crayfish, fish (including Yellowfin Madtom, Pygmy Madtom, and Clinch Dace), Green Salamanders, Golden Eagles, Eastern Woodrats, and Eastern Spotted Skunks. Additional conservation work assessed pollution by characterizing algal toxins in mussels and focused on SGCN management on state Wildlife Management Areas.



Clinch and Powell
Conservation Opportunity Area

Clinch and Powell COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Cumberland Gap NHP	NPS	5,423	38%
Clinch River (Torbett)	Private	55	100%
Cumberland Forest Ataya	Private	48,339	11%
Powell River Preserve SNA	TDEC - DNA	17	100%
Trail of Lonesome Pine	TDEC - SP	10	53%
Gap Creek Bluffs Habitat Protection Area	TVA	45	100%
Kyles Ford WMA	TWRA	1,003	100%
T.N.C. Island Gift	TWRA	2	100%



Combined Habitat Priorities

Clinch and Powell Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

Conservation Opportunity Area (COA)

Public/Protected Land

Conservation Easement

Karst Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:

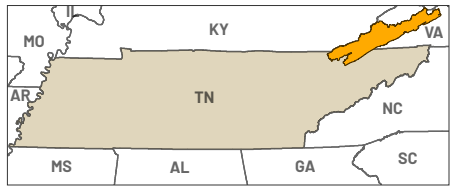
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Clinch & Powell COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Southern Ravine Salamander	Plethodon richmondi	1978
Bat	Gray Bat	Myotis grisescens	2022
Bat	Indiana Bat	Myotis sodalis	2022
Bat	Little Brown Myotis	Myotis lucifugus	2022
Bat	Northern Long-eared Bat	Myotis septentrionalis	2017
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2020
Bat	Tricolored Bat	Perimyotis subflavus	2021
Bird	American Bittern	Botaurus lentiginosus	2018
Bird	American Black Duck	Anas rubripes	2023
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2017
Bird	Bank Swallow	Riparia riparia	2021
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2021
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2022
Bird	Canada Warbler	Cardellina canadensis	2020
Bird	Cerulean Warbler	Setophaga cerulea	2016
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2022
Bird	Common Nighthawk	Chordeiles minor	2022
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2020
Bird	Evening Grosbeak	Coccothraustes vespertinus	2020
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023
Bird	Great Egret	Ardea alba	2023
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	Lesser Yellowlegs	Tringa flavipes	2017
Bird	Loggerhead Shrike	Lanius ludovicianus	2006
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2023
Bird	Peregrine Falcon	Falco peregrinus	2020
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruffed Grouse	Bonasa umbellus	2019
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Veery	Catharus fuscescens	2021
Bird	Vesper Sparrow	Pooecetes gramineus	2019
Bird	White-rumped Sandpiper	Calidris fuscicollis	2023
Bird	Willow Flycatcher	Empidonax traillii	2018
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023

Clinch & Powell COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Crustacean	Upland Burrowing Crayfish	Cambarus dubius	2007
Gastropod	Clairborne Threetooth	Triodopsis claibornensis	1997
Mammal	Allegheny Woodrat	Neotoma magister	2020
Mammal	Eastern Harvest Mouse	Reithrodontomys humulis	2017
Mammal	Eastern Pygmy Shrew	Sorex hoyi	2011
Mammal	Golden Mouse	Ochrotomys nuttalli	2009
Mammal	Hairy-tailed Mole	Parascalops breweri	1978
Mammal	North American Least Shrew	Cryptotis parva	2017
Mammal	Smoky Shrew	Sorex fumeus	2009
Mammal	Southeastern Shrew	Sorex longirostris	1988
Mammal	Southern Bog Lemming	Synaptomys cooperi	2009
Mammal	Southern Red-backed Vole	Clethrionomys gapperi	2017
Plant	Alderleaf Buckthorn	Rhamnus alnifolia	2010
Plant	American Barberry	Berberis canadensis	2003
Plant	American Bittercress	Cardamine rotundifolia	1985
Plant	Branched Whitlow-grass	Draba ramosissima	1988
Plant	Butternut	Juglans cinerea	1999
Plant	Climbing Fumitory	Adlumia fungosa	1985
Plant	Downy Arrow-wood	Viburnum rafinesqueanum	1999
Plant	Gattinger's Bluestar	Amsonia tabernaemontana var. gattingeri	1982
Plant	Green-and-gold	Chrysogonum virginianum	1967
Plant	Heartleaf Meehania	Meehania cordata	1983
Plant	Inland Sedge	Carex interior	2016
Plant	Largeleaf Grass-of-Parnassus	Parnassia grandifolia	2012
Plant	Leatherleaf Tassel-rue	Trautvetteria fonticalcarea	2010
Plant	Matted Spikerush	Eleocharis intermedia	1981
Plant	Missouri Gooseberry	Ribes missouriense	1985
Plant	Moss Phlox	Phlox subulata	1955
Plant	Mountain Honeysuckle	Lonicera dioica	1999
Plant	Ozark Bunchflower	Melanthium woodii	2017
Plant	Pale-green Orchid	Platanthera flava var. herbiola	2009
Plant	Schreber's Aster	Eurybia schreberi	2010
Plant	Sharp's Homaliadelphus Moss	Homaliadelphus sharpii	1962
Plant	Shining Ladies'-tresses	Spiranthes lucida	1994
Plant	Showy Lady's-slipper	Cypripedium reginae	2009
Plant	Silverling	Paronychia argyrocoma	2019
Plant	Small Purple Fringed Orchid	Platanthera psycodes	1991
Plant	Small-head Rush	Juncus brachycephalus	2010
Plant	Spreading Yellow False Foxglove	Aureolaria patula	1999
Reptile	Eastern Box Turtle	Terrapene carolina	2009

Clinch & Powell COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Black Mountain Salamander	Desmognathus welteri	1974
Amphibian	Hellbender	Cryptobranchus alleganiensis	2014
Amphibian	Mudpuppy	Necturus maculosus	2019
Bivalve	Appalachian Rockshell	Theliderma sparsa	2022
Bivalve	Birdwing Pearlymussel	Lemiox rimosus	2022
Bivalve	Black Sandshell	Ligumia recta	2022
Bivalve	Cracking Pearlymussel	Hemistena lata	2022
Bivalve	Creeper	Strophitus undulatus	2022
Bivalve	Cumberland Moccasinshell	Medionidus conradicus	2022
Bivalve	Cumberland Rockshell	Theliderma intermedia	2009
Bivalve	Cumberlandian Combshell	Epioblasma brevidens	2022
Bivalve	Dromedary Pearlymussel	Dromus dromas	2022
Bivalve	Elktoe	Alasmidonta marginata	2022
Bivalve	Fanshell	Cyprogenia stegaria	2022
Bivalve	Finerayed Pigtoe	Fusconaia cuneolus	2022
Bivalve	Fluted Kidneyshell	Ptychobranchus subtentus	2021
Bivalve	Longsolid	Fusconaia subrotunda	2022
Bivalve	Mountain Creekshell	Leaunio vanuxemensis	2022
Bivalve	Mucket	Actinonaias ligamentina	2022
Bivalve	Ohio Pigtoe	Pleurobema cordatum	2013
Bivalve	Orangefoot Pimpleback	Plethobasus cooperianus	1997
Bivalve	Oyster Mussel	Epioblasma capsaeformis	2022
Bivalve	Painted Creekshell	Cambarunio taeniatus	2013
Bivalve	Pheasantshell	Actinonaias pectorosa	2022
Bivalve	Pink Mucket	Lampsilis abrupta	2018
Bivalve	Purple Lilliput	Toxolasma lividum	2013
Bivalve	Rainbow	Cambarunio iris	2022
Bivalve	Rough Pigtoe	Pleurobema plenum	2022
Bivalve	Round Hickorynut	Obovaria subrotunda	2013
Bivalve	Round Pigtoe	Pleurobema sintoxia	2022
Bivalve	Sheepnose	Plethobasus cyphyus	2022
Bivalve	Shiny Pigtoe	Fusconaia cor	2022
Bivalve	Slabside Pearlymussel	Pleuronaia dolabelloides	2021
Bivalve	Snuffbox	Epioblasma triquetra	2022
Bivalve	Spectaclecase	Cumberlandia monodonta	2022
Bivalve	Tennessee Bean	Venustaconcha trabalis	1999
Bivalve	Tennessee Clubshell	Pleurobema oviforme	2013
Bivalve	Tennessee Pigtoe	Pleuronaia barnesiana	2021
Bivalve	White Heelsplitter	Lasmigona complanata	2013
Bivalve	White Wartyback	Plethobasus cicatricosus	1964
Crustacean	Angled Crayfish	Cambarus angularis	2019
Crustacean	Spiny Scale Crayfish	Cambarus jezerinaci	2006
Crustacean	Surgeon Crayfish	Faxonius forceps	2001
Fish	Ashy Darter	Allohistium cinereum	2009
Fish	Blotched Chub	Erimystax insignis	2009
Fish	Blotchside Logperch	Percina burtoni	2009

Clinch & Powell COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Fish	Blue Sucker	Cycleptus elongatus	1975
Fish	Golden Darter	Nothonotus denoncourti	2019
Fish	Highfin Carpsucker	Carpiodes velifer	1992
Fish	Lake Sturgeon	Acipenser fulvescens	2021
Fish	Pygmy Madtom	Noturus stanauli	2017
Fish	Sickle Darter	Percina williamsi	1893
Fish	Slender Chub	Erimystax cahni	2008
Fish	Spotfin Chub	Erimonax monachus	1893
Fish	Streamline Chub	Erimystax dissimilis	2009
Fish	Tangerine Darter	Percina aurantiaca	2022
Fish	Tennessee Dace	Chrosomus tennesseensis	1995
Fish	Western Sand Darter	Ammocrypta clara	2005
Fish	Wounded Darter	Nothonotus vulneratus	2009
Fish	Yellowfin Madtom	Noturus flavipinnis	2022
Gastropod	Spiny Riversnail	Io fluvialis	2009
Insect	Cherokee Clubtail	Stenogomphurus consanguis	1995

Clinch & Powell COA SGCN LIST - KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Arachnid	a cave cobweb spider	Nesticus paynei	1985
Arachnid	a cave obligate pseudoscorpion	Kleptochthonius affinis	1977
Arachnid	Appalachian Cave Spider	Porrhomma cavernicola	1886
Arachnid	cave pseudoscorpions	Kleptochthonius undescribed sp.	1988
Arachnid	Subterranean Sheetweb Spider	Phanetta subterranea	1988
Bat	Gray Bat	Myotis grisescens	2017
Bat	Indiana Bat	Myotis sodalis	1986
Bat	Little Brown Myotis	Myotis lucifugus	2013
Bat	Northern Long-eared Bat	Myotis septentrionalis	2013
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	1976
Bat	Tricolored Bat	Perimyotis subflavus	2013
Crustacean	a cave obligate isopod	Amerigoniscus nicholasi	1988
Crustacean	a cave obligate isopod	Ligidium elrodii hancockensis	1970
Crustacean	Appalachian Valley Crangonyctid	Crangonyx antennatus	2003
Crustacean	cave isopods	Caecidotea sp.	1988
Crustacean	Cumberland Gap Cave Amphipod	Bactrurus angulus	2001
Crustacean	Finley's Cave Amphipod	Stygobromus finleyi	1979
Crustacean	Nickajack Cave Isopod	Caecidotea nickajackensis	1901
Crustacean	Southwestern Virginia Cave Amphipod	Stygobromus mackini	1943
Crustacean	Southwestern Virginia Cave Isopod	Caecidotea recurvata	1963
Flatworm	a flatworm	Sphalloplana sp.	1988
Flatworm	Powell Valley Planarian	Sphalloplana consimilis	1978
Insect	a bristletail	Litocampa inexspectata	1988
Insect	Cooke's Cave Dipluran	Litocampa cookei	1988
Insect	Engelhart's Cave Beetle	Pseudanophthalmus engelhardti	1926

Clinch & Powell COA SGCN LIST - KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Insect	Long-headed Cave Beetle	Pseudanophthalmus longiceps	1981
Insect	Pale Cave Beetle	Pseudanophthalmus pallidus	1982
Insect	Rotund Cave Beetle	Pseudanophthalmus rotundatus	1933
Mammal	Allegheny Woodrat	Neotoma magister	1978
Millipede	a cave obligate millipede	Pseudotremia deprehendor	1972
Millipede	a cave obligate millipede	Pseudotremia n. sp.	1988
Millipede	a millipede	Pseudotremia nodosa	1939
Millipede	a millipede	Pseudotremia valga	1972
Millipede	cave millipeds	Pseudotremia sp.	1988

Foothills

Regional Conservation Opportunity Area



The Foothills Conservation Opportunity Area (COA) consists of a variety of habitat types at a variety of distinct elevations. The COA is primarily forested and includes the Great Smoky Mountains National Park, which has a land base of more than 500,000 acres in Tennessee and North Carolina, nearly half of which is in Tennessee. The COA also contains the southern portion of the Cherokee National Forest, and another 12,000+ acres of this COA are also publicly owned. TWRA has also established a quail showcase area, and several other habitat management showcases located at various Wildlife Management Areas.

The majority of the large river habitat in the southwest portion of this COA has been altered by hydroelectric projects operated by private and federal agencies. There are opportunities to protect and enhance populations of Tennessee Dace in the small, headwater tributaries to the Little Tennessee River. Also, the Foothills and Blue Ridge COAs contain the only known naturally occurring populations of Brook Trout in the state (others are hatchery stock).

Home to several aquatic animals of state and federal concern, the Little River contains, for its size, one of the most diverse fish communities in the Southeast if not the country. Restoration efforts for federally listed species such as Spotfin Chub are ongoing in the Tellico River portion of this COA. The lower French Broad River below Douglas Dam is an important tailwater resource that provides habitat for the federally endangered Snail Darter, as well as a key focal area for Lake Sturgeon and freshwater mollusk recovery efforts.



This region is home to almost half of Great Smoky Mountains National Park and the Little River, which for its size contains one of the most diverse fish communities in the country.



Top to bottom: Golden Eagle/Dustin Thames, TWRA; Lake Sturgeon below Douglas Dam/Bart Carter, TWRA. P2: Male Striped Shiners feed on eggs from a Chub nest, Little River/Dave Hersimtschuk, Freshwaters Illustrated; Great Smoky Mountains NP/Greg Wathen

Foothills
Conservation Opportunity Area

Partnerships



TWRA will continue to work with the US Forest Service, National Park Service, USDA Forest Service, Tennessee Valley Authority, the Tennessee Aquarium, other state and federal agencies, TN Dept. of Environment and Conservation, The Nature Conservancy, Trout Unlimited, Tennessee Clean Water Network, The Tallahassee Fund, and other NGOs, Brookfield Renewable Energy Partners, private landowners, Tennessee Tech, University of Tennessee, Middle Tennessee State Univ., and other universities both in- and out-of-state to implement strategies to protect and manage stream and forest habitats and eliminate Wild Hogs to benefit SGCN.

CMP Stressor Level	Stressors Categories	Threats specific to Foothills
1.1 A	Housing and urban areas; Primary residential development	Destruction or degradation of habitats due to construction activities associated with the building of primary residences. There is a high level of primary residential development throughout much of this COA.
1.2 A	Commercial and industrial areas	Destruction or degradation of habitats in an area due to construction and other activities related to the development of commercial or industrial buildings. With the influx of residents to the area comes more commercilized development.
1.3 A	Tourism and recreation areas	The habitat effects of recreation areas. This COA includes the most visited National park in the country; with that comes a tremendous amount of tourism.
6.1 A	Recreational activities - non-vehicular	Destruction and degradation of habitats and increased mortality of species due to excessive levels of recreational activities or inappropriate usage of habitats for recreation.



Foothills
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats which provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Research	Conduct scientific surveys to discern the geographical distributions of lesser known target species.	surveys
Habitat/Natural Processes Restoration	Reintroduce fire via prescribed burning into fire-dependent grassland & woodland systems within critical units of terrestrial habitats.	acres
Institutional Improvement	Increase staffing and funding of state agencies and local offices of federal agencies responsible for managing target species/habitats or monitoring environmental quality.	acres or species
Habitat/Natural Processes Restoration	Restore degraded habitats, as appropriate, to support a diversity of species assemblages and ecosystem structure and function.	acres

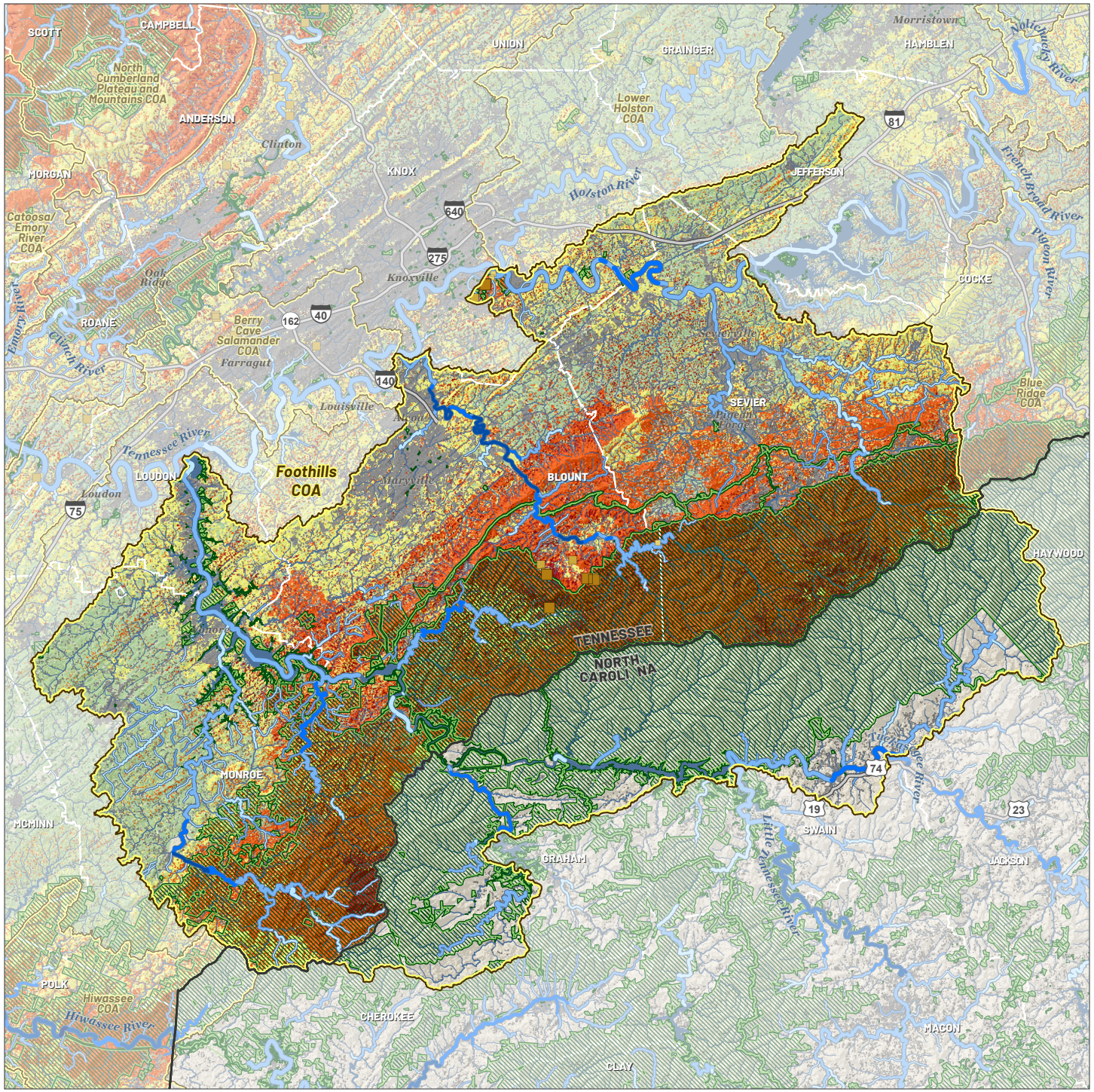
Conservation Projects

Many projects focused on achieving a better understanding of the distribution, abundance, and/or genetics of SGCN, including insects such as bumblebees, fish (including Blotchside Logperch, Ashy Darter, Sickle Darter, Snail Darter) Tennessee Cave Salamanders, Berry Cave Salamanders, Golden Eagles, Eastern Spotted Skunks, Woodrats, and bats (includes Tricolored Bats)—the latter includes monitoring white-nose syndrome as well. Species conservation included propagation and reintroduction of mussel and fish species at appropriate sites. Plant conservation projects included Eastern Hemlock, bryophyte, and lichen conservation. Habitat assessments and restoration occurred in the form of instream monitoring, riparan restoration , prescribed burns, and exotic plant removal projects. Also, ongoing management at Kyker Bottoms Refuge to benefit Northern Bobwhite Quail, has provided high quality, intensively managed habitat to support a self-sustaining quail population within the larger Quail Focal Area there. Bobwhite Quail are a game species, but they are also SGCN. Education and outreach included several films oriented toward helping the public understand conservation issues, species natural history, biodiversity, and pride of place.

To learn more about the Foothills Conservation Opportunity Area, please contact:
Scott Dykes, Biodiversity Coordinator, Region 4 (423) 587-7037

Foothills
Conservation Opportunity Area

Foothills COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Sevier County Park	Local	298	25%
Great Smoky Mountains National Park	NPS	240,304	92%
Ijams Nature Center Refuge	Private	18	100%
Tapoco Conservation Easement	Private	184	100%
Fort Loudon State Historic Park	TDEC - SP	478	100%
Fort Loudon State Historic Park	TDEC - SP	439	100%
Seven Islands SP	TDEC - SP	417	100%
Sam Houston School SHS	TDEC - THC	3	100%
Hall Bend Habitat Protection Area	TVA	59	59%
Tellico Lake WMA	TVA	5,259	100%
Trotter Bluff SWA	TVA	43	100%
TVA Land Use Zone 4 Natural Resource Conservation	TVA	13,250	30%
TVA Sensitive Resource Management	TVA	39,096	6%
Foothills WMA	TWRA	9,561	100%
Forks of the River WMA	TWRA	615	100%
Kyker Bottoms WMA	TWRA	579	100%
Whites Mill Refuge	TWRA	52	100%
Cherokee NF	USFS	815	100%
South Cherokee NF	USFS	305,801	42%



Combined Habitat Priorities

Foothills Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

Conservation Opportunity Area (COA)

Public/Protected Land

Conservation Easement

Karst Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:

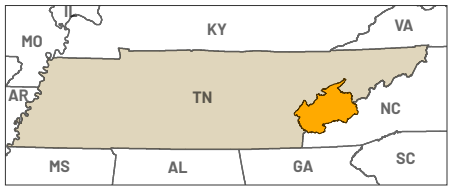
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:

- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles

0 5 Kilometers



Foothills COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Cumberland Dusky Salamander	Desmognathus abditus	1970
Amphibian	Four-toed Salamander	Hemidactylium scutatum	1997
Amphibian	Green Salamander	Aneides aeneus	2019
Amphibian	Imitator Salamander	Desmognathus imitator	2022
Amphibian	Mountain Chorus Frog	Pseudacris brachyphona	1956
Amphibian	Mud Salamander	Pseudotriton montanus	2015
Amphibian	Pygmy Salamander	Desmognathus wrighti	2022
Amphibian	Red-cheeked Salamander	Plethodon jordani	2022
Amphibian	Seepage Salamander	Desmognathus aeneus	1979
Amphibian	Tellico Salamander	Plethodon aureolus	2019
Amphibian	Yellow-spotted Woodland Salamander	Plethodon pauleyi	2019
Arachnid	Spruce-fir Moss Spider	Microhexura montivaga	1992
Bat	Eastern Small-footed Bat	Myotis leibii	2020
Bat	Gray Bat	Myotis grisescens	2022
Bat	Indiana Bat	Myotis sodalis	2020
Bat	Little Brown Myotis	Myotis lucifugus	2020
Bat	Northern Hoary Bat	Lasiurus cinereus	2016
Bat	Northern Long-eared Bat	Myotis septentrionalis	2018
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2021
Bat	Tricolored Bat	Perimyotis subflavus	2021
Bird	American Barn Owl	Tyto furcata	2023
Bird	American Bittern	Botaurus lentiginosus	2023
Bird	American Black Duck	Anas rubripes	2023
Bird	American Golden-Plover	Pluvialis dominica	1980
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bachman's Sparrow	Peucaea aestivalis	1953
Bird	Bank Swallow	Riparia riparia	2023
Bird	Bewick's Wren	Thryomanes bewickii	1961
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-capped Chickadee	Poecile atricapillus	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2023
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2023
Bird	Bobolink	Dolichonyx oryzivorus	2023
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2023
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Connecticut Warbler	Oporornis agilis	2023
Bird	Dunlin	Calidris alpina	2023
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023

Foothills COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Evening Grosbeak	Coccothraustes vespertinus	2023
Bird	Golden Eagle	Aquila chrysaetos	2017
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023
Bird	Great Egret	Ardea alba	2023
Bird	Henslow's Sparrow	Centronyx henslowii	2023
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	King Rail	Rallus elegans	2021
Bird	Least Bittern	Botaurus exilis	2023
Bird	Least Flycatcher	Empidonax minimus	2023
Bird	LeConte's Sparrow	Ammospiza leconteii	2018
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2022
Bird	Long-eared Owl	Asio otus	2017
Bird	Long-tailed Duck	Clangula hyemalis	2018
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2023
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Northern Saw-whet Owl	Aegolius acadicus	2023
Bird	Olive-sided Flycatcher	Contopus cooperi	2023
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2022
Bird	Peregrine Falcon	Falco peregrinus	2023
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruddy Turnstone	Arenaria interpres	2020
Bird	Ruffed Grouse	Bonasa umbellus	2023
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2023
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-billed Dowitcher	Limnodromus griseus	2022
Bird	Short-eared Owl	Asio flammeus	2023
Bird	Snowy Egret	Egretta thula	2022
Bird	Stilt Sandpiper	Calidris himantopus	2023
Bird	Swainson's Warbler	Limnothlypis swainsonii	2023
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	Western Sandpiper	Calidris mauri	2016
Bird	White-rumped Sandpiper	Calidris fuscicollis	2022
Bird	Whooping Crane	Grus americana	2012
Bird	Willet	Tringa semipalmata	2019
Bird	Willow Flycatcher	Empidonax traillii	2023

Foothills COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Crustacean	Upland Burrowing Crayfish	Cambarus dubius	1996
Gastropod	a terrestrial snail	Euchemotrema fraternum montanum	2000
Gastropod	Big-tooth Covert	Fumonelix jonesiana	1978
Gastropod	Crossed Dome	Ventridens decussatus	2011
Gastropod	Cupped Vertigo Snail	Vertigo clappi	2001
Gastropod	Glossy Covert	Fumonelix christyi	2001
Gastropod	Highland Slitmouth	Stenotrema altispira	2011
Gastropod	Lamellate Supercoil	Paravitrea lamellidens	2009
Gastropod	Mirey Ridge Supercoil	Paravitrea clappi	1975
Gastropod	Open Supercoil	Paravitrea umbilicaris	2009
Gastropod	Ornate Bud	Pilsbryna aurea	1992
Gastropod	Pink Glyph	Glyphyalinia pentadelphia	2011
Gastropod	Ribbed Striate Snail	Pseudohyalina exigua	2001
Gastropod	Smoky Mountain Covert	Inflectarius ferrissi	2004
Insect	Diana Fritillary	Argynnis diana	1999
Insect	Rusty-patched Bumble Bee	Bombus affinis	2001
Mammal	Carolina Northern Flying Squirrel	Glaucomys sabrinus coloratus	1989
Mammal	Cinereus Shrew	Sorex cinereus	2019
Mammal	Eastern Harvest Mouse	Reithrodontomys humulis	2008
Mammal	Eastern Spotted Skunk	Spilogale putorius	2022
Mammal	Eastern Water Shrew	Sorex albibarbis	1991
Mammal	Eastern Woodrat	Neotoma floridana illinoensis	2022
Mammal	Golden Mouse	Ochrotomys nuttalli	2005
Mammal	Hairy-tailed Mole	Parascalops breweri	1969
Mammal	Long-tailed Shrew	Sorex dispar	1969
Mammal	Meadow Jumping Mouse	Zapus hudsonius	2019
Mammal	North American Least Shrew	Cryptotis parva	2005
Mammal	North American Red Squirrel	Tamiasciurus hudsonicus	2008
Mammal	Smoky Shrew	Sorex fumeus	2019
Mammal	Southeastern Shrew	Sorex longirostris	2019
Mammal	Southern Appalachian Woodrat	Neotoma floridana haematoreia	1978
Mammal	Southern Bog Lemming	Synaptomys cooperi	2006
Mammal	Southern Red-backed Vole	Clethrionomys gapperi	2008
Mammal	Southern Rock Vole	Microtus chrotorrhinus carolinensis	1969
Mammal	Star-nosed Mole	Condylura cristata	1977
Mammal	Woodland Jumping Mouse	Napaeozapus insignis	2019
Plant	a crestwort	Lophocolea muricata	2010
Plant	a liverwort	Acrobolbus ciliatus	1974
Plant	a liverwort	Bazzania nudicaulis	1999

Foothills COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	a liverwort	Cephaloziella massalongoi	1990
Plant	a liverwort	Cephaloziella spinicaulis	1991
Plant	a liverwort	Gymnomitrion laceratum	1992
Plant	a liverwort	Marsupella funckii	1992
Plant	a liverwort	Plagiochila exigua	1999
Plant	a liverwort	Radula voluta	1957
Plant	a liverwort	Solenostoma appalachianum	1988
Plant	a liverwort	Solenostoma fossombronioides	1992
Plant	Alabama Grapefern	Botrychium jenmanii	1952
Plant	Allegheny Mountain Golden-banner	Thermopsis mollis	1994
Plant	American Bittercress	Cardamine rotundifolia	2008
Plant	American Fly-honeysuckle	Lonicera canadensis	1979
Plant	American Pillwort	Pilularia americana	1998
Plant	Ammons' Screw Moss	Syntrichia ammonsiana	1995
Plant	Appalachian Crestwort	Lophocolea appalachiana	2008
Plant	Appalachian Filmy Fern	Vandenboschia boschiana	1995
Plant	Appalachian Fir-clubmoss	Huperzia appalachiana	1957
Plant	Appalachian Pellia	Pellia appalachiana	2001
Plant	Appalachian Threadwort	Drepanolejeunea appalachiana	2012
Plant	Arctic Bentgrass	Agrostis mertensii	2005
Plant	Ashleaf Bush-pea	Thermopsis fraxinifolia	2019
Plant	Blomquist Leafy Liverwort	Lejeunea blomquistii	2001
Plant	Blue Ridge Bittercress	Cardamine flagellifera	2015
Plant	Blue Ridge St. John's-wort	Hypericum mitchellianum	1993
Plant	Branched Whitlow-grass	Draba ramosissima	1999
Plant	Branching Bur-reed	Sparganium androcladum	1949
Plant	Broadleaf Bunchflower	Melanthium latifolium	2019
Plant	Broadleaf Tickseed	Coreopsis latifolia	1993
Plant	Brome-like Sedge	Carex bromoides ssp. montana	2002
Plant	Brown's Four-toothed Moss	Tetrodontium brownianum	2000
Plant	Buffalo Clover	Trifolium reflexum	1998
Plant	Butternut	Juglans cinerea	2015
Plant	Cain's Reedgrass	Calamagrostis cainii	1978
Plant	Canada Frostweed	Crocanthemum canadense	2018
Plant	Chamomile Grapefern	Botrychium matricariifolium	2003
Plant	Choke Cherry	Prunus virginiana	2010
Plant	Clasping Twisted-stalk	Streptopus amplexifolius	1998
Plant	Climbing Fumitory	Adlumia fungosa	2001
Plant	Clingman's Hedge-nettle	Stachys clingmanii	2014
Plant	Cow-parsnip	Heracleum maximum	2001
Plant	Cream Tick-trefoil	Desmodium ochroleucum	1965
Plant	Curled Notchwort	Sphenolobus saxicola	1989
Plant	Drooping Bluegrass	Poa saltuensis	1965
Plant	Dwarf Filmy Fern	Didymoglossum petersii	2018
Plant	Dwarf Rattlesnake-plantain	Goodyera repens	1998
Plant	Eastern Turkeybeard	Xerophyllum asphodeloides	2011

Foothills COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	False Dandelion	Krigia montana	2007
Plant	Fowl Bluegrass	Poa palustris	1993
Plant	Fraser Fir	Abies fraseri	1999
Plant	Fraser's Sedge	Carex fraseriana	2015
Plant	Fringed Black-bindweed	Fallopia cilinodis	1979
Plant	Grandfather Mountain Leptodontium Moss	Leptodontium viticulosoides var. sulphureum	1999
Plant	Headwaters Hornwort	Nothoceros aenigmaticus	2015
Plant	Heartleaf Paper Birch	Betula cordifolia	1982
Plant	Horsehair Threadwort	Sphenolobopsis pearsoni	1999
Plant	Horsesugar	Symplocos tinctoria	1997
Plant	Hot Porella	Porella gracillima	1992
Plant	John's-cabbage	Hydrophyllum virginianum	1996
Plant	Largeleaf Pondweed	Potamogeton amplifolius	1980
Plant	Lime Silk Moss	Entodon concinnus	1981
Plant	Limp Mannagrass	Glyceria laxa	1993
Plant	Longleaf Stitchwort	Stellaria longifolia	1955
Plant	Manhart's Sedge	Carex manhartii	2003
Plant	Marsh Bellflower	Campanula aparinoides	1989
Plant	Mcdowell's Sunflower	Helianthus occidentalis	1984
Plant	Mielichhofer's Copper Moss	Mielichhoferia elongata	1990
Plant	Minniebush	Rhododendron pilosum	1993
Plant	Moss Phlox	Phlox subulata	1979
Plant	Mount Leconte Moss	Leptohymenium sharpii	1995
Plant	Mountain Fetterbush	Pieris floribunda	2012
Plant	Mountain St. John's-wort	Hypericum graveolens	1939
Plant	Mountain Wavy-leaf Moss	Plagiomnium carolinianum	1999
Plant	Mountain Witch-alder	Fothergilla major	1970
Plant	Narrowleaf Gentian	Gentiana linearis	2007
Plant	Northern Beech Fern	Phegopteris connectilis	1979
Plant	Northern Prickly-ash	Zanthoxylum americanum	1991
Plant	Northern Shorthusk	Brachyelytrum aristosum	1997
Plant	Nuttall's Pondweed	Potamogeton epihydrus	1980
Plant	Olney's Dry Rock Moss	Grimmia olneyi	1959
Plant	Ovate Catchfly	Silene ovata	1998
Plant	Ozark Bunchflower	Melanthium woodii	2014
Plant	Pale-green Orchid	Platanthera flava var. herbiola	1965
Plant	Peak Moss	Brachydontium trichodes	1960
Plant	Porter's Reedgrass	Calamagrostis porteri	1997
Plant	Rosy Twisted-stalk	Streptopus lanceolatus	2014
Plant	Roundleaf Serviceberry	Amelanchier sanguinea	2009
Plant	Roundleaf Sundew	Drosera rotundifolia	1937
Plant	Rugel's Ragwort	Rugelia nudicaulis	2006
Plant	Ruth's Sedge	Carex ruthii	2009
Plant	Schreber's Aster	Eurybia schreberi	2015
Plant	Sharp's Homaliadelphus Moss	Homaliadelphus sharpii	1939
Plant	Sharp's Pouncewort	Lejeunea sharpii	2001

Foothills COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Short's Hedge-hyssop	Gratiola viscidula	1956
Plant	Small Mountain Bittercress	Cardamine clematitis	2006
Plant	Small Purple Fringed Orchid	Platanthera psycodes	1984
Plant	Smoky Mountain Sedge	Carex fumosimontana	2006
Plant	Smoky Mountains Mannagrass	Glyceria nubigena	1995
Plant	Soft-hairy False Gromwell	Lithospermum bejariense	1985
Plant	Soft-Hairy False Gromwell	Lithospermum parviflorum	1998
Plant	Southern Lobelia	Lobelia amoena	2024
Plant	Southern Nodding Trillium	Trillium rugelii	1979
Plant	Spreading Avens	Geum radiatum	2008
Plant	Spreading Yellow False Foxglove	Aureolaria patula	1997
Plant	Sweet Pinesap	Monotropsis odorata	2011
Plant	Tall Millet Grass	Milium effusum var. cisatlanticum	1979
Plant	Taylor's Filmy Fern	Hymenophyllum tayloriae	2001
Plant	Tennessee Pondweed	Potamogeton tennesseensis	2008
Plant	Tennessee Quillwort	Isoetes tennesseensis	1979
Plant	Threadleaf Gerardia	Agalinis setacea	1965
Plant	Torrey's Mountainmint	Pycnanthemum torreyi	1924
Plant	Translucent Orthodontium Moss	Orthodontium pellucens	1946
Plant	Treelike Clubmoss	Dendrolycopodium dendroideum	2008
Plant	Tufted Clubrush	Trichophorum cespitosum	1990
Plant	Virginia Chainfern	Anchistea virginica	1976
Plant	Virginia Spiraea	Spiraea virginiana	2017
Plant	Watauga Porella	Porella wataugensis	2001
Plant	Wedge Flapwort	Leptoscyphus cuneifolius ssp. cuneifolius	1999
Plant	Western Wallflower	Erysimum capitatum	2013
Plant	Whiteleaf Leatherflower	Clematis glaucophylla	2013
Plant	Woolly Sedge	Carex pellita	2020
Plant	Wretched Sedge	Carex misera	1998
Plant	Yellow Nodding Ladies'-tresses	Spiranthes ochroleuca	1958
Reptile	Eastern Box Turtle	Terrapene carolina	2021
Reptile	Eastern Hog-nosed Snake	Heterodon platirhinos	1956
Reptile	Eastern Pinesnake	Pituophis melanoleucus	1968
Reptile	Eastern Slender Glass Lizard	Ophisaurus attenuatus longicaudus	2004
Reptile	Timber Rattlesnake	Crotalus horridus	1999

Foothills COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Brown-backed Salamander	Eurycea aquatica	2017
Amphibian	Hellbender	Cryptobranchus alleganiensis	2021
Amphibian	Junaluska Salamander	Eurycea junaluska	2017
Amphibian	Mudpuppy	Necturus maculosus	2021
Bivalve	Appalachian Rockshell	Theliderma sparsa	1958
Bivalve	Birdwing Pearlymussel	Lemiox rimosus	2021

Foothills COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bivalve	Creeper	Strophitus undulatus	1983
Bivalve	Cumberland Moccasinshell	Medionidus conradicus	1985
Bivalve	Cumberland Rockshell	Theliderma intermedia	1958
Bivalve	Dromedary Pearlymussel	Dromus dromas	1998
Bivalve	Fanshell	Cyprogenia stegaria	1998
Bivalve	Finerayed Pigtoe	Fusconaia cuneolus	2019
Bivalve	Longsolid	Fusconaia subrotunda	2004
Bivalve	Mountain Creekshell	Leaunio vanuxemensis	2014
Bivalve	Mucket	Actinonaias ligamentina	1975
Bivalve	Orangefoot Pimpleback	Plethobasus cooperianus	1998
Bivalve	Oyster Mussel	Epioblasma capsaeformis	1998
Bivalve	Pink Mucket	Lampsilis abrupta	2000
Bivalve	Purple Lilliput	Toxolasma lividum	1998
Bivalve	Rainbow	Cambarunio iris	2019
Bivalve	Ring Pink	Obovaria retusa	1998
Bivalve	Rough Pigtoe	Pleurobema plenum	1998
Bivalve	Sheepnose	Plethobasus cyphyus	1998
Bivalve	Slabside Pearlymussel	Pleuronaia dolabelloides	2014
Bivalve	Slippershell Mussel	Alasmidonta viridis	1986
Bivalve	Tan Riffleshell	Epioblasma walkeri	1965
Bivalve	Tennessee Clubshell	Pleurobema oviforme	2014
Bivalve	Tennessee Heelsplitter	Lasmigona holstonia	1997
Bivalve	Tennessee Pigtoe	Pleuronaia barnesiana	2019
Bivalve	White Heelsplitter	Lasmigona complanata	1997
Crustacean	Surgeon Crayfish	Faxonius forceps	2007
Fish	Ashy Darter	Allohistium cinereum	2022
Fish	Blotched Chub	Erimystax insignis	2022
Fish	Blotchside Logperch	Percina burtoni	2022
Fish	Blue Sucker	Cycleptus elongatus	2000
Fish	Brook Trout	Salvelinus fontinalis	2022
Fish	Chucky Madtom	Noturus crypticus	1940
Fish	Citico Darter	Etheostoma sitikuense	2022
Fish	Flame Chub	Hemitremia flammea	1997
Fish	Highfin Carpsucker	Carpiodes velifer	2001
Fish	Lake Sturgeon	Acipenser fulvescens	2023
Fish	Marbled Darter	Etheostoma marmorpinnum	2022
Fish	Sickle Darter	Percina williamsi	2022
Fish	Smoky Dace	Clinostomus funduloides ssp. 1	2022
Fish	Smoky Madtom	Noturus baileyi	2022
Fish	Snail Darter	Percina tanasi	2022
Fish	Spotfin Chub	Erimonax monachus	2022
Fish	Tangerine Darter	Percina aurantiaca	2022
Fish	Tennessee Dace	Chrosomus tennesseensis	2022
Fish	Tuckasegee Darter	Etheostoma gutselli	2007
Fish	Wounded Darter	Nothonotus vulneratus	2013
Fish	Yellowfin Madtom	Noturus flavipinnis	2022

Foothills COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Gastropod	Anthony's Riversnail	Athearnia anthonyi	1965
Insect	Allegheny Snaketail	Ophiogomphus incurvatus alleghaniensis	1980
Insect	Mountain River Cruiser	Macromia margarita	1990
Insect	Sevier Snowfly	Allocapnia brooksi	1999

Foothills COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Berry Cave Salamander	Gyrinophilus gulolineatus	2010
Amphibian	Mud Salamander	Pseudotriton montanus	1935
Amphibian	Tennessee Cave Salamander	Gyrinophilus palleucus	1992
Arachnid	a cave obligate spider	Nesticus barri	1984
Arachnid	a cave obligate spider	Nesticus barrowsi	2000
Arachnid	cave sheet-web spiders	Oreonetides sp.	2009
Arachnid	Subterranean Sheetweb Spider	Phanetta subterranea	2002
Bat	Indiana Bat	Myotis sodalis	2012
Bat	Little Brown Myotis	Myotis lucifugus	2012
Bat	Northern Long-eared Bat	Myotis septentrionalis	2012
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2011
Bat	Tricolored Bat	Perimyotis subflavus	2012
Bird	American Barn Owl	Tyto furcata	2000
Crustacean	a cave obligate amphipod	Stygobromus fecundus	1978
Crustacean	Appalachian Valley Crangonyctid	Crangonyx antennatus	2003
Crustacean	Gregory Cave Stygobromid	Stygobromus sparsus	2000
Crustacean	Incurved Cave Isopod	Pseudobaicalasellus incurvus	2000
Millipede	a cave obligate millipede	Scoterpes blountensis	2010

North Cumberland Plateau and Mountains

Regional Conservation Opportunity Area



The North Cumberland Plateau and Mountains Conservation Opportunity Area (COA) contains the highest elevations on the Cumberland Plateau and some of the largest tracts of contiguous forest in Tennessee. Over 300,000 acres of the area are publicly owned and provide outdoor recreation to an array of user groups, including the North Cumberland Wildlife Management Area (NCWMA).

The Cumberland Mountains contain the highest concentration of breeding Cerulean Warblers in the world. Other unique terrestrial SGCN include Green Salamanders, Allegheny Woodrats, Tricolored Bats, Yellow Spotted Woodland Salamander, and Northern Long-eared Bats. The more pristine streams in the area support a variety of aquatic SGCN, including the Emerald Darter, Blackside Dace, and the Cumberland Elktoe mussel.

The major ecological threats to the area are fossil fuel extraction activities, acid mine runoff from legacy mines, incompatible forestry practices, and invasive Wild Hogs. TWRA has determined that new contour, cross-ridge, or mountain top removal coal mining is incompatible with agency management and restoration goals for the NCWMA. Re-mining to resolve outstanding water quality and slope stability problems from previous mining and deep-mining, when properly done, are not considered incompatible with TWRA management plans for the NCWMA.



This region contains the highest elevations on the Cumberland Plateau and some of the largest tracts of contiguous forest in Tennessee, with 17 natural habitat types.



Top to bottom: Cerulean Warbler/ Bruce Beehler; Blackside Dace/ Conservation Fisheries, Inc. P2: Trail at Big South Fork/KG Elliott

North Cumberland Plateau and Mountains Conservation Opportunity Area

Partnerships

TWRA will continue to work with the US Fish and Wildlife Service, the Office of Surface Mining, Reclamation & Enforcement, National Park Service, the TN Dept. of Environment and Conservation, TN Division of Forestry, TN Valley Authority, The Nature Conservancy, the Ruffed Grouse Society, Rocky Mountain Elk Foundation, Campbell Outdoor Recreation Association, Tennessee Tech, University of Tennessee, and other universities in and out-of-state as well as private land owners.

CMP Stressor Level	Stressors Categories	Threats specific to Cumberland Plateau and Mountains
3.2 A	Mining and quarrying	Mining is a major stressor in this area including strip, surface, and deep mining. Historically, mining was the priority with tree cutting being secondary and a result of clearing the land to be mined.
5.3 A	Logging and wood harvesting	Improper forestry practices, namely disregard for BMPs, is an issue in this COA. For example, high-grading is against BMPs.
6.1 B	Recreational activities - vehicular	Destruction and degradation of habitats and increased mortality of species due to excessive levels of recreational vehicle traffic or inappropriate usage of habitats for recreational vehicles. OHV-caused loss of vegetation, SGCN habitat destruction, erosion, and increased runoff are occurring as a result.



To learn more about the Clinch and Powell Conservation Opportunity Area, please contact: Scott Dykes, Biodiversity Coordinator, Region 4 (423) 587-7037

North Cumberland Plateau and Mountains Conservation Opportunity Area

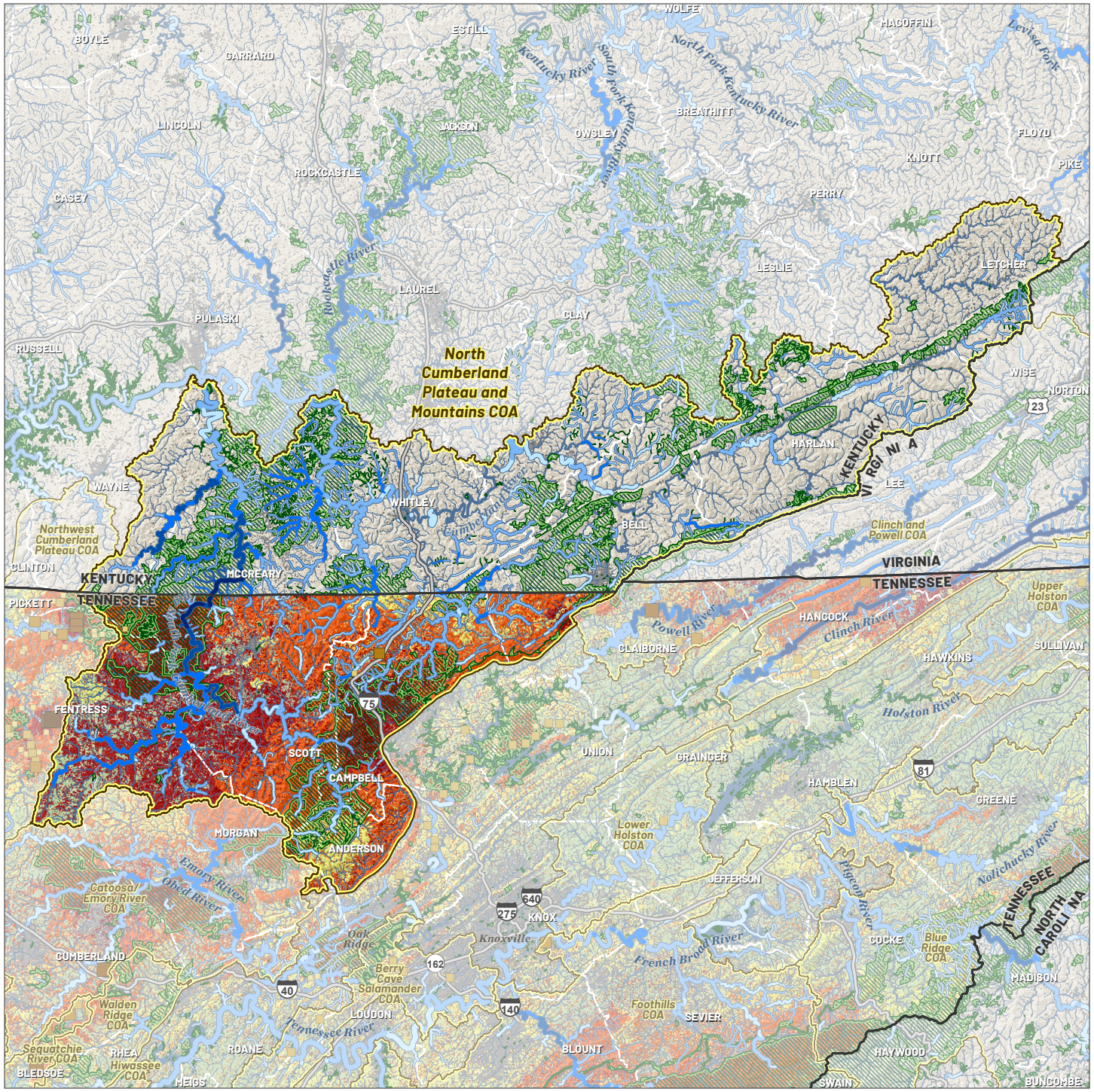
Conservation Actions	Desired Change	Units
Habitat/Natural Processes Restoration	Reclaim abandoned coal mines and streams affected by acid mine drainage within critical units of aquatic, subterranean, and terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore degraded forests and pine plantations to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres
Habitat/Natural Processes Restoration	Restore degraded habitats, as appropriate, to support a diversity of species assemblages and ecosystem structure and function.	acres
Alliances & Partnerships	Develop strategic alliances with TN Division of Geology, Office of Surface Mining, US Geological Survey, TN Oil & Gas Association, private companies, and other institutions to address mining and drilling issues that affect target species and habitats.	partnerships
Institutional Improvement	Increase staffing and funding of state agencies and local offices of federal agencies responsible for managing target species/habitats or monitoring environmental quality.	acres or species

Conservation Projects

Many projects focused on achieving a better understanding of the distribution, abundance, and/or genetics of SGCN, including fish, mussels, crayfish (Cumberland Thrust Block Crayfish), Green Salamanders, Golden Eagles, Golden-winged and Cerulean Warblers, Eastern Spotted Skunks, Woodrats, and bats (includes Indiana Bat)—the latter includes monitoring White-nose Syndrome as well. Projects also included a bioblitz to ascertain overall diversity of an area, mussel propagation, and habitat management for Ruffed Grouse.

North Cumberland Plateau and Mountains Conservation Opportunity Area

North Cumberland Plateau and Mountains COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Big South Fork NRRA	NPS	87,461	100%
Cumberland Gap NHP	NPS	5,423	62%
Cumberland Forest Ataya	Private	48,339	89%
Emory River Tracts	Private	18,793	8%
Honey Creek Conservation Easement	Private	557	100%
North Cumberland WMA	Private	23,320	100%
Rugby SNA	TDEC - DNA	761	100%
Cove Lake SP	TDEC - SP	555	11%
Cumberland Trail SP	TDEC - SP	32,654	6%
Frozen Head SP	TDEC - SP	22,965	10%
Indian Mountain SP	TDEC - SP	208	100%
Pickett CCC Memorial SP	TDEC - SP	4,089	23%
Pickett SF & WMA	TDF	20,814	64%
Scott SF	TDF	2,828	100%
Gil & Summerfield Johnston Preserve	TNC	18	100%
Tally Wilderness Preserve	TNC	1,103	100%
The Woodworth Tract Preserve	TNC	460	100%
North Cumberland WMA	TWRA	137,758	99%



Combined Habitat Priorities

North Cumberland Plateau and Mountains Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

- Conservation Opportunity Area (COA)
- Public/Protected Land
- Conservation Easement

Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles
0 5 Kilometers



North Cumberland Plateau and Mountains COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Blue Ridge Dusky Salamander	Desmognathus orestes	2013
Amphibian	Cumberland Plateau Salamander	Plethodon kentucki	2021
Amphibian	Four-toed Salamander	Hemidactylium scutatum	2011
Amphibian	Green Salamander	Aneides aeneus	2020
Amphibian	Mountain Chorus Frog	Pseudacris brachyphona	2009
Amphibian	Mud Salamander	Pseudotriton montanus	1979
Amphibian	Northern Gray-cheeked Salamander	Plethodon montanus	2013
Amphibian	Southern Ravine Salamander	Plethodon richmondi	1979
Amphibian	Yellow-spotted Woodland Salamander	Plethodon pauleyi	2022
Amphibian	Yonahlossee Salamander	Plethodon yonahlossee	2013
Bat	Eastern Small-footed Bat	Myotis leibii	2022
Bat	Gray Bat	Myotis grisescens	2021
Bat	Indiana Bat	Myotis sodalis	2022
Bat	Little Brown Myotis	Myotis lucifugus	2022
Bat	Northern Long-eared Bat	Myotis septentrionalis	2019
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	2019
Bat	Tricolored Bat	Perimyotis subflavus	2022
Bird	American Barn Owl	Tyto furcata	2022
Bird	American Black Duck	Anas rubripes	2019
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bachman's Sparrow	Peucaea aestivalis	1969
Bird	Bank Swallow	Riparia riparia	2016
Bird	Belted Kingfisher	Megaceryle alcyon	2006
Bird	Bewick's Wren	Thryomanes bewickii	1970
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-crowned Night Heron	Nycticorax nycticorax	1981
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2023
Bird	Blue-headed Vireo	Vireo solitarius	2007
Bird	Bobolink	Dolichonyx oryzivorus	2013
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2021
Bird	Buff-breasted Sandpiper	Calidris subruficollis	2013
Bird	Canada Warbler	Cardellina canadensis	2021
Bird	Cerulean Warbler	Setophaga cerulea	2023
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2023
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Connecticut Warbler	Oporornis agilis	2011
Bird	Dunlin	Calidris alpina	2023
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2023
Bird	Golden Eagle	Aquila chrysaetos	2022
Bird	Golden-winged Warbler	Vermivora chrysoptera	2023
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023

North Cumberland Plateau and Mountains COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Great Egret	Ardea alba	2023
Bird	Henslow's Sparrow	Centronyx henslowii	2023
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	Least Flycatcher	Empidonax minimus	2023
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	1996
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2022
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2022
Bird	Olive-sided Flycatcher	Contopus cooperi	2022
Bird	Orchard Oriole	Icterus spurius	2023
Bird	Pectoral Sandpiper	Calidris melanotos	2021
Bird	Peregrine Falcon	Falco peregrinus	2023
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruffed Grouse	Bonasa umbellus	2023
Bird	Rusty Blackbird	Euphagus carolinus	2022
Bird	Semipalmated Sandpiper	Calidris pusilla	2018
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Stilt Sandpiper	Calidris himantopus	2018
Bird	Swainson's Warbler	Limnothlypis swainsonii	2023
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	Western Sandpiper	Calidris mauri	2013
Bird	Willow Flycatcher	Empidonax traillii	2022
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Crustacean	Upland Burrowing Crayfish	Cambarus dubius	2010
Gastropod	Clifty Covert	Fumonelix wetherbyi	2020
Gastropod	Cupped Vertigo Snail	Vertigo clappi	1980
Gastropod	Gem Supercoil	Paravitrea lapilla	2020
Gastropod	Honey Bud	Pilsbryna vanattai	1981
Insect	Early Hairstreak	Erora laeta	2008
Insect	Frosted Elfin	Callophrys irus	1999
Insect	Tawny Crescent	Phyciodes batesii	1977
Mammal	Allegheny Woodrat	Neotoma magister	2024
Mammal	Cinereus Shrew	Sorex cinereus	2020
Mammal	Eastern Harvest Mouse	Reithrodontomys humulis	2011
Mammal	Eastern Pygmy Shrew	Sorex hoyi	2009

North Cumberland Plateau and Mountains COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Mammal	Eastern Spotted Skunk	Spilogale putorius	2023
Mammal	Eastern Woodrat	Neotoma floridana illinoensis	2011
Mammal	Golden Mouse	Ochrotomys nuttalli	2009
Mammal	Hairy-tailed Mole	Parascalops breweri	2010
Mammal	Least Weasel	Mustela nivalis	1976
Mammal	Long-tailed Weasel	Neogale frenata	2005
Mammal	Meadow Jumping Mouse	Zapus hudsonius	2010
Mammal	Smoky Shrew	Sorex fumeus	2020
Mammal	Southeastern Shrew	Sorex longirostris	2004
Mammal	Southern Bog Lemming	Synaptomys cooperi	2009
Mammal	Southern Red-backed Vole	Clethrionomys gapperi	2020
Mammal	Woodland Jumping Mouse	Napaeozapus insignis	2010
Plant	a liverwort	Metzgeria uncigera	1994
Plant	a liverwort	Solenostoma fossombronioides	1994
Plant	Agoyan Cataract Moss	Merceyopsis cataractae	1973
Plant	Alabama Grapefern	Botrychium jenmanii	1975
Plant	American Barberry	Berberis canadensis	2024
Plant	American Bittercress	Cardamine rotundifolia	1979
Plant	American Chaffseed	Schwalbea americana	1935
Plant	American Chestnut	Castanea dentata	2020
Plant	American Ginseng	Panax quinquefolius	2021
Plant	American Water-pennywort	Hydrocotyle americana	1987
Plant	Appalachian Filmy Fern	Vandenboschia boschiana	2022
Plant	Appalachian Pellia	Pellia appalachiana	2001
Plant	Appalachian Rosinweed	Silphium wasiotense	2007
Plant	Appalachian Threadwort	Drepanolejeunea appalachiana	1994
Plant	Appalachian Woodsia	Woodsia appalachiana	2011
Plant	Bay Starvine	Schisandra glabra	2006
Plant	Beak Grass	Diarrhena obovata	2005
Plant	Blomquist Leafy Liverwort	Lejeunea blomquistii	2001
Plant	Blue Ridge False Foxglove	Agalinis decemloba	2021
Plant	Blunt-lobe Grapefern	Sceptridium oneidense	1978
Plant	Bog Clubmoss	Lycopodiella inundata	2018
Plant	Butternut	Juglans cinerea	2021
Plant	Canada Burnet	Sanguisorba canadensis	2019
Plant	Canada Frostweed	Crocanthemum canadense	2021
Plant	Canadian Yew	Taxus canadensis	2023
Plant	Canby's Mountain-lover	Paxistima canbyi	2021
Plant	Cardot's Pouncewort	Microlejeunea globosa	2001
Plant	Chamomile Grapefern	Botrychium matricariifolium	2021
Plant	Chapman's Redtop	Tridens flavus var. chapmanii	2017
Plant	Climbing Fumitory	Adlumia fungosa	1985
Plant	Cow-parsnip	Heracleum maximum	1980
Plant	Cumberland False Rosemary	Conradina verticillata	2019
Plant	Cumberland Sandwort	Minuartia cumberlandensis	2024
Plant	Downy Arrow-wood	Viburnum rafinesqueanum	2002

North Cumberland Plateau and Mountains COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Dwarf Rattlesnake-plantain	Goodyera repens	2022
Plant	Fraser's Sedge	Carex fraseriana	2021
Plant	Gorge Goldenrod	Solidago faucibus	2021
Plant	Grassleaf Arrowhead	Sagittaria graminea	1955
Plant	Green-and-gold	Chrysogonum virginianum	2022
Plant	Harvey's Beakrush	Rhynchospora harveyi	1994
Plant	Horsetail Spikerush	Eleocharis equisetoides	1955
Plant	Kidneyleaf Twayblade	Neottia smallii	2021
Plant	Little Prickly Sedge	Carex echinata ssp. echinata	2004
Plant	Loesel's Twayblade	Liparis loeselii	1985
Plant	Lucy Braun's White Snakeroot	Ageratina luciae-brauniae	2024
Plant	Marsh Bellflower	Campanula aparinoides	1989
Plant	Mountain Witch-alder	Fothergilla major	2019
Plant	Northern Evening-primrose	Oenothera parviflora	1941
Plant	Ovate Catchfly	Silene ovata	1985
Plant	Ozark Bunchflower	Melanthium woodii	2008
Plant	Pale Corydalis	Capnoides sempervirens	2022
Plant	Pale-green Orchid	Platanthera flava var. herbiola	2005
Plant	Plains Muhly	Muhlenbergia cuspidata	1987
Plant	Plukenet's Flatsedge	Cyperus plukenetii	1980
Plant	Porter's Reedgrass	Calamagrostis porteri	2008
Plant	Pretty St. John's-wort	Hypericum nudiflorum	1989
Plant	Purple Milkweed	Asclepias purpurascens	2021
Plant	Red Turtlehead	Chelone obliqua	1985
Plant	Rivergrass	Calamovilfa arcuata	2019
Plant	Roan Mountain Sedge	Carex roanensis	2016
Plant	Rock Grape	Vitis rupestris	1989
Plant	Rock Skullcap	Scutellaria saxatilis	2009
Plant	Rockcastle Wood-aster	Eurybia saxicastelli	2021
Plant	Rockhouse Featherbells	Stenanthium diffusum	2024
Plant	Rose Pogonia	Pogonia ophioglossoides	2019
Plant	Rosy Twisted-stalk	Streptopus lanceolatus	2016
Plant	Roundleaf Fameflower	Phemeranthus teretifolius	2021
Plant	Roundleaf Serviceberry	Amelanchier sanguinea	2016
Plant	Roundleaf Sundew	Drosera rotundifolia	1979
Plant	Schreber's Aster	Eurybia schreberi	1996
Plant	Shining Ladies'-tresses	Spiranthes lucida	2021
Plant	Shortleaf Sneezeweed	Helenium brevifolium	1934
Plant	Silverling	Paronychia argyrocoma	2002
Plant	Small Purple Fringed Orchid	Platanthera psycodes	2015
Plant	Soft-hairy False Gromwell	Lithospermum bejariense	2003
Plant	Southern Heartleaf	Hexastylis contracta	2019
Plant	Southern Lady's-slipper	Cypripedium kentuckiense	2021
Plant	Southern Racemose Goldenrod	Solidago arenicola	2021
Plant	Spinulose Shieldfern	Dryopteris carthusiana	2021
Plant	Spotted Coralroot	Corallorhiza maculata	1992

North Cumberland Plateau and Mountains COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Spreading Yellow False Foxglove	Aureolaria patula	2019
Plant	Steele's Joe-pyeweed	Eutrochium steelei	2021
Plant	Sweet Pinesap	Monotropsis odorata	2023
Plant	Sweet-fern	Comptonia peregrina	2019
Plant	Sword Moss	Bryoxiphium norvegicum	2008
Plant	Tawny Cotton-grass	Eriophorum virginicum	2021
Plant	Taylor's Filmy Fern	Hymenophyllum tayloriae	2001
Plant	Tennessee Pondweed	Potamogeton tennesseensis	2021
Plant	Three-parted Violet	Viola tripartita	2020
Plant	Vetchling Peavine	Lathyrus palustris	2021
Plant	Virginia Heartleaf	Hexastylis virginica	1975
Plant	Virginia Spiraea	Spiraea virginiana	2019
Plant	White Fringeless Orchid	Platanthera integrilabia	2024
Plant	White Rattlesnake-root	Nabalus albus	2021
Plant	Whiteleaf Leatherflower	Clematis glaucophylla	2021
Plant	Whorled Horsebalm	Collinsonia verticillata	2022
Plant	Wood Lily	Lilium philadelphicum	2021
Plant	Yellow Nodding Ladies'-tresses	Spiranthes ochroleuca	2021
Plant	Yellow-crested Orchid	Platanthera cristata	2018
Reptile	Coal Skink	Plestiodon anthracinus	2003
Reptile	Eastern Box Turtle	Terrapene carolina	2018
Reptile	Eastern Hog-nosed Snake	Heterodon platirhinos	2013
Reptile	Eastern Pinesnake	Pituophis melanoleucus	2001
Reptile	Eastern Slender Glass Lizard	Ophisaurus attenuatus longicaudus	2018
Reptile	Timber Rattlesnake	Crotalus horridus	2021

North Cumberland Plateau and Mountains COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Black Mountain Salamander	Desmognathus welteri	2006
Amphibian	Hellbender	Cryptobranchus alleganiensis	2013
Bivalve	Black Sandshell	Ligumia recta	2022
Bivalve	Clubshell	Pleurobema clava	1998
Bivalve	Creeper	Strophitus undulatus	2021
Bivalve	Cumberland Bean	Venustaconcha troostensis	2001
Bivalve	Cumberland Elktoe	Alasmidonta atropurpurea	2022
Bivalve	Cumberland Moccasinshell	Medionidus conradicus	1998
Bivalve	Cumberland Papershell	Anodontoides denigratus	2022
Bivalve	Cumberlandian Combshell	Epioblasma brevidens	2022
Bivalve	Elktoe	Alasmidonta marginata	2001
Bivalve	Littlewing Pearlymussel	Pegias fabula	2020
Bivalve	Mountain Creekshell	Leaunio vanuxemensis	1991
Bivalve	Ohio Pigtoe	Pleurobema cordatum	2021
Bivalve	Painted Creekshell	Cambarunio taeniatus	2021
Bivalve	Pheasantshell	Actinonaias pectorosa	2022

North Cumberland Plateau and Mountains COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bivalve	Rainbow	Cambarunio iris	2021
Bivalve	Round Pigtoe	Pleurobema sintoxia	2022
Bivalve	Slippershell Mussel	Alasmidonta viridis	1998
Bivalve	Tan Riffleshell	Epioblasma walkeri	2001
Bivalve	Tennessee Bean	Venustaconcha trabalis	2001
Bivalve	Tennessee Clubshell	Pleurobema oviforme	1998
Crustacean	Big South Fork Crayfish	Cambarus bouchardi	2017
Crustacean	Hairyfoot Crayfish	Cambarus crinipes	2012
Crustacean	Valley Flame Crayfish	Cambarus deweesae	2007
Fish	Arrow Darter	Etheostoma sagitta	2022
Fish	Blackside Dace	Chrosomus cumberlandensis	2022
Fish	Clinch Dace	Chrosomus sp. cf. saylori	2012
Fish	Cumberland Darter	Etheostoma susanae	2021
Fish	Diamond Darter	Crystallaria cincotta	1905
Fish	Emerald Darter	Etheostoma baileyi	2021
Fish	Lake Sturgeon	Acipenser fulvescens	2019
Fish	Longhead Darter	Percina macrocephala	1998
Fish	Olive Darter	Percina squamata	2016
Fish	Redlips Darter	Allohistium maydeni	2020
Fish	Silverjaw Minnow	Ericymba buccata	1996
Fish	Spotted Darter	Nothonotus maculatus	1978
Fish	Streamline Chub	Erimystax dissimilis	1997
Fish	Tennessee Dace	Chrosomus tennesseensis	1950
Fish	Tippecanoe Darter	Nothonotus tippecanoe	2005
Fish	Tuxedo Darter	Etheostoma lemniscatum	2018

North Cumberland Plateau and Mountains COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Green Salamander	Aneides aeneus	1968
Bat	Eastern Small-footed Bat	Myotis leibii	2017
Bat	Gray Bat	Myotis grisescens	2015
Bat	Indiana Bat	Myotis sodalis	2017
Bat	Little Brown Myotis	Myotis lucifugus	2017
Bat	Northern Long-eared Bat	Myotis septentrionalis	2017
Bat	Rafinesque's Big-eared Bat	Corynorhinus rafinesquii	1999
Bat	Tricolored Bat	Perimyotis subflavus	2017
Crustacean	Central Kentucky Cave Amphipod	Stygobromus exilis	1943
Crustacean	Southern Cave Crayfish	Orconectes australis	2002
Insect	a cave obligate ground beetle	Pseudanophthalmus scutilus	1982
Insect	a cave obligate springtail	Pseudosinella hirsuta	1949
Mammal	Allegheny Woodrat	Neotoma magister	1999

Upper Holston

Regional Conservation Opportunity Area



The Upper Holston Conservation Opportunity Area (COA) is contained within the Ridge and Valley province in TN and VA, and the land use activity within it can be characterized as agricultural, residential, and municipal. Small farms interspersed with residential development are common within this COA. Kingsport is the major municipality and is home to one of the largest industrial complexes in the state, Eastman Chemical Company.

Most of the larger streams in this COA meander parallel to the ridges and contain extensive cobble and gravel shoal areas. Smaller streams are characterized by limestone rubble with bedrock riffles and silty sand pool areas. These geological features increase productivity by adding nutrients to the soil and waters of this region, enhancing wildlife species diversity.

This COA encompasses approximately 200 square miles and contains the Holston River headwaters, where the North and South forks of the river (each with headwaters in VA) join near Kingsport. A significant portion of this COA is publicly owned and provides outdoor recreational opportunities, particularly along the rivers. This COA harbors multiple Species of Greatest Conservation Need (SGCN; some of which are federally protected), including Spotfin Chub, Spiny River Snail, Tangerine Darter, Tennessee Dace, and Surgeon Crayfish.



This region contains the Holston River headwaters, which branch in Kingsport to form the North and South Forks of the Holston River.





Top to bottom: Northern Harrier/ Dona Hilkey; Tennessee Shiners surround a Stoneroller/Dave Hersimtschuk, Freshwaters Illustrated; Greenbelt trail along the Holston/Ken Mayer. P.2: Surgeon Crayfish/Carl Williams

Upper Holston
Conservation Opportunity Area

Partnerships

To implement priority conservation and management strategies, TWRA will continue to work with the US Fish and Wildlife Service, the Natural Resources Conservation Service, the TN Dept. of Environment and Conservation, TN Division of Forestry, the Tennessee Valley Authority, The Nature Conservancy, University of Tennessee,other university researchers in and out of state, and private land owners. TWRA will also seek to educate local governments and private developers about sensitive habitats and water quality issues.



CMP Stressor Level	Stressor Categories	Threats specific to Upper Holston
2.3 C	Livestock farming and ranching; Incompatible grazing/pasture management practices	Degradation of soil/water quality and habitat structure of an area due to excessive grazing or to inadequate exclusion of cattle from stream and forest resources. Also includes degradation caused by overapplication of fertilizers or other chemicals during pasture management practices. This stress is directly related to the impacts of animals on soil and water quality.
9.2 A	Industrial and military effluents	Increased mortality or degradation of habitats resulting from legal or illegal releases of toxins or contaminants into the environment by various industries, such as Eastman Chemical Company.
9.5 B	Air-borne pollutants; Low-level ozone air pollution	These emissions, from companies such as Eastman Chemical, can have negative effects on some species or ecosystems.

Upper Holston
Conservation Opportunity Area

Conservation Actions	Desired Change	Units
Fee-title Ownership	Use federal/state/private funding sources to acquire critical units of aquatic, subterranean, and terrestrial habitats that provide species protection, buffering, connectivity, and/or perpetuation of natural processes.	acres
Habitat/Natural Processes Restoration	Restore pastures and other agricultural lands to appropriate natural ecological systems in or near critical units of aquatic, subterranean, and terrestrial habitats.	acres
Alliances & Partnerships	Develop strategic alliance with the US Environmental Protection Agency, TN Dept. of Environment and Conservation, non-governmental organizations, and other related environmental regulatory agencies to address air and water quality issues affecting target species and habitats.	partnerships
Institutional Improvement	Increase staffing and funding of non-governmental organizations that either manage or assist with the protection of target species and habitats.	FTEs
Habitat/Natural Processes Restoration	Reduce existing sources of pollution and contaminants and increase monitoring of air and water pollution as necessary.	acres

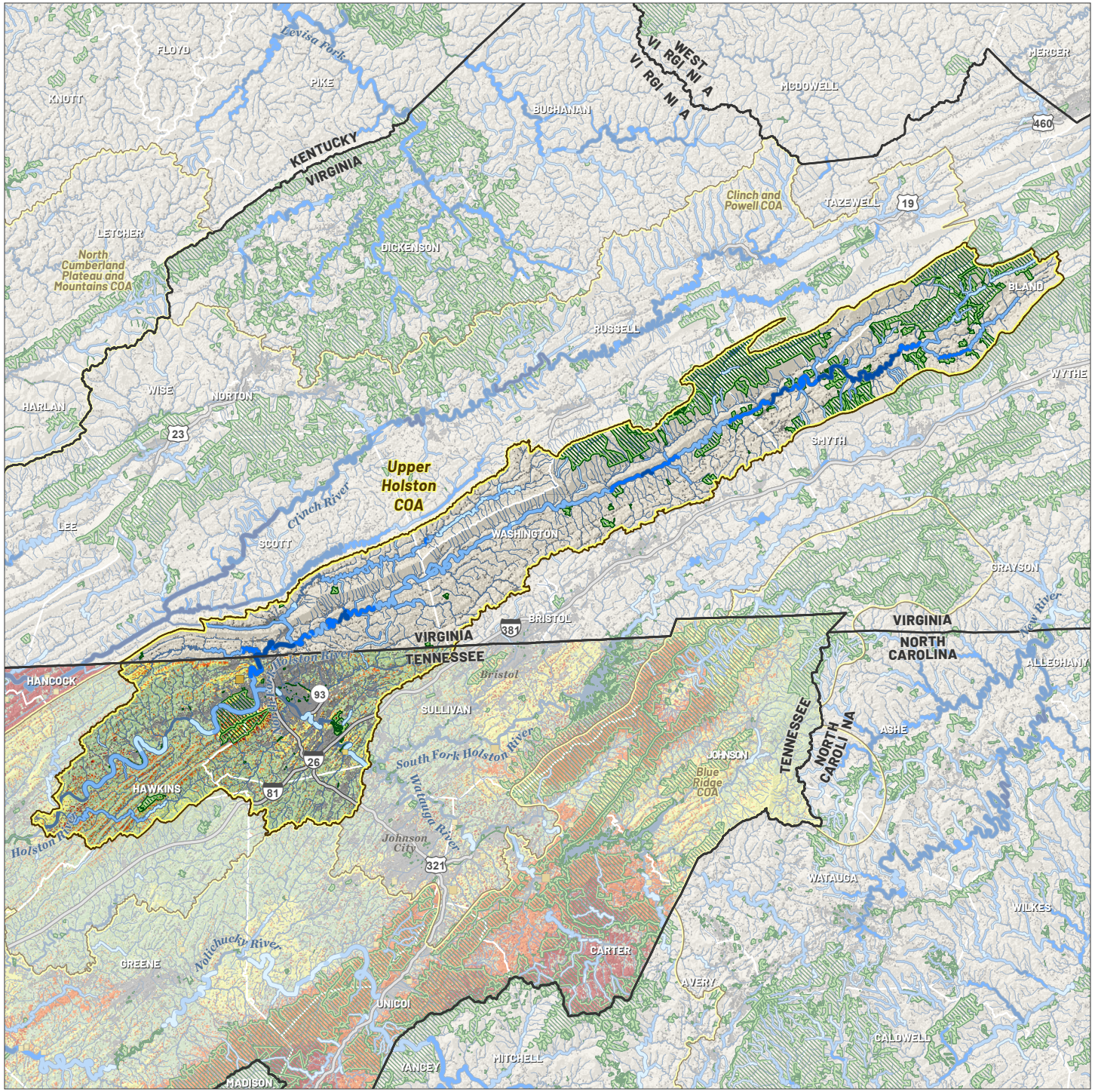
Conservation Projects

Some completed and ongoing projects focused on achieving a better understanding of the abundance, distribution, and genetics of SGCN such as fish, Green Salamanders and other amphibians, and small mammals. White-nose Syndrome surveys were conducted to ascertain the status of key bat colonies and populations.

To learn more about the Lower Holston Conservation Opportunity Area, please contact:
Scott Dykes, Biodiversity Coordinator, Region 4 (423) 587-7037

Upper Holston
Conservation Opportunity Area

Upper Holston COA Protected Lands			
Name	Management Agency	Total Acreage	% of Acreage within COA
Bays Mountain Park & SNA	Local	3,057	100%
Warriors Path SP	TDEC - SP	990	100%
Holston Ordnance Works	US ARMY	5,721	100%



Combined Habitat Priorities

Upper Holston Conservation Opportunity Area

Tennessee State Wildlife Action Plan, 2025

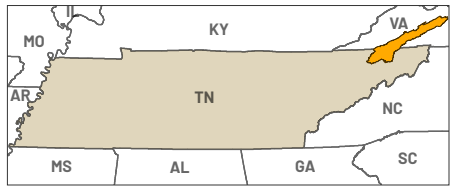
- Conservation Opportunity Area (COA)
- Public/Protected Land
- Conservation Easement

Karst Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Aquatic Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

Combined Habitat Priorities:
- Very High
- High
- Medium
- Low
- Very Low

0 5 Miles
0 5 Kilometers



Upper Holston COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Amphibian	Blue Ridge Dusky Salamander	Desmognathus orestes	1965
Amphibian	Green Salamander	Aneides aeneus	2018
Bat	Gray Bat	Myotis grisescens	2014
Bat	Northern Long-eared Bat	Myotis septentrionalis	2010
Bat	Tricolored Bat	Perimyotis subflavus	2023
Bird	American Barn Owl	Tyto furcata	2017
Bird	American Bittern	Botaurus lentiginosus	2023
Bird	American Black Duck	Anas rubripes	2023
Bird	American Golden-Plover	Pluvialis dominica	2002
Bird	American Kestrel	Falco sparverius	2023
Bird	American Woodcock	Scolopax minor	2023
Bird	Bank Swallow	Riparia riparia	2023
Bird	Black-bellied Plover	Pluvialis squatarola	2012
Bird	Blackburnian Warbler	Setophaga fusca	2023
Bird	Black-capped Chickadee	Poecile atricapillus	2012
Bird	Black-crowned Night Heron	Nycticorax nycticorax	2023
Bird	Black-throated Blue Warbler	Setophaga caerulescens	2023
Bird	Brown Creeper	Certhia americana	2023
Bird	Brown-headed Nuthatch	Sitta pusilla	2023
Bird	Canada Warbler	Cardellina canadensis	2023
Bird	Cerulean Warbler	Setophaga cerulea	2022
Bird	Chimney Swift	Chaetura pelagica	2023
Bird	Chuck-will's-widow	Antrostomus carolinensis	2021
Bird	Common Nighthawk	Chordeiles minor	2023
Bird	Dunlin	Calidris alpina	2022
Bird	Eastern Meadowlark	Sturnella magna	2023
Bird	Eastern Screech-Owl	Megascops asio	2023
Bird	Eastern Whip-poor-will	Antrostomus vociferus	2021
Bird	Golden-winged Warbler	Vermivora chrysoptera	2016
Bird	Grasshopper Sparrow	Ammodramus savannarum	2023
Bird	Great Egret	Ardea alba	2023
Bird	Kentucky Warbler	Geothlypis formosa	2023
Bird	King Rail	Rallus elegans	1993
Bird	Least Bittern	Botaurus exilis	2023
Bird	Least Flycatcher	Empidonax minimus	2023
Bird	Lesser Yellowlegs	Tringa flavipes	2023
Bird	Little Blue Heron	Egretta caerulea	2023
Bird	Loggerhead Shrike	Lanius ludovicianus	2023
Bird	Long-tailed Duck	Clangula hyemalis	2022
Bird	Louisiana Waterthrush	Parkesia motacilla	2023
Bird	Mississippi Kite	Ictinia mississippiensis	2023
Bird	Northern Bobwhite	Colinus virginianus	2023
Bird	Northern Harrier	Circus hudsonius	2023
Bird	Northern Pintail	Anas acuta	2023
Bird	Olive-sided Flycatcher	Contopus cooperi	2020
Bird	Orchard Oriole	Icterus spurius	2023

Upper Holston COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bird	Pectoral Sandpiper	Calidris melanotos	2023
Bird	Peregrine Falcon	Falco peregrinus	2022
Bird	Prairie Warbler	Setophaga discolor	2023
Bird	Prothonotary Warbler	Protonotaria citrea	2023
Bird	Red-headed Woodpecker	Melanerpes erythrocephalus	2023
Bird	Ruffed Grouse	Bonasa umbellus	2017
Bird	Rusty Blackbird	Euphagus carolinus	2023
Bird	Semipalmated Sandpiper	Calidris pusilla	2023
Bird	Sharp-shinned Hawk	Accipiter striatus	2013
Bird	Short-billed Dowitcher	Limnodromus griseus	2020
Bird	Short-eared Owl	Asio flammeus	2023
Bird	Snowy Egret	Egretta thula	2020
Bird	Stilt Sandpiper	Calidris himantopus	2018
Bird	Veery	Catharus fuscescens	2023
Bird	Vesper Sparrow	Pooecetes gramineus	2023
Bird	Western Sandpiper	Calidris mauri	2021
Bird	White-rumped Sandpiper	Calidris fuscicollis	2022
Bird	Willet	Tringa semipalmata	2017
Bird	Willow Flycatcher	Empidonax traillii	2023
Bird	Winter Wren	Troglodytes hiemalis	2023
Bird	Wood Thrush	Hylocichla mustelina	2023
Bird	Worm-eating Warbler	Helmitheros vermivorum	2023
Bird	Yellow-bellied Sapsucker	Sphyrapicus varius	2023
Bird	Yellow-billed Cuckoo	Coccyzus americanus	2023
Bird	Yellow-crowned Night Heron	Nyctanassa violacea	2023
Bird	Yellow-throated Warbler	Setophaga dominica	2023
Gastropod	a terrestrial snail	Euchemotrema fraternum montanum	1970
Gastropod	Bidentate Dome	Ventridens coelaxis	1970
Gastropod	Sawtooth Disc	Discus bryanti	1970
Gastropod	Teasing Supercoil	Paravitrea tantilla	1970
Gastropod	Whitefoot Supercoil	Paravitrea tridens	1970
Mammal	Cinereus Shrew	Sorex cinereus	1978
Mammal	Hairy-tailed Mole	Parascalops breweri	1992
Mammal	Southeastern Shrew	Sorex longirostris	1992
Mammal	Woodland Jumping Mouse	Napaeozapus insignis	1992
Plant	American Barberry	Berberis canadensis	1990
Plant	Branched Whitlow-grass	Draba ramosissima	2024
Plant	Butternut	Juglans cinerea	1992
Plant	Canby's Mountain-lover	Paxistima canbyi	1990
Plant	Downy Arrow-wood	Viburnum rafinesqueanum	1964
Plant	Fetterbush	Leucothoe racemosa	1983
Plant	Heartleaf Meehania	Meehania cordata	1997
Plant	Hitchcock's Sedge	Carex hitchcockiana	2023
Plant	John's-cabbage	Hydrophyllum virginianum	1992
Plant	Mountain Fetterbush	Pieris floribunda	1982
Plant	Mountain Honeysuckle	Lonicera dioica	1984

Upper Holston COA SGCN LIST - TERRESTRIAL			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Plant	Porter's Reedgrass	Calamagrostis porteri	2023
Plant	Soft-Hairy False Gromwell	Lithospermum parviflorum	2022
Plant	Starflower Solomon's-plume	Maianthemum stellatum	1981
Plant	Sweetbay Magnolia	Magnolia virginiana	1975
Plant	Virginia Heartleaf	Hexastylis virginica	1949

Upper Holston COA SGCN LIST - AQUATIC			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Bivalve	Birdwing Pearlymussel	Lemiox rimosus	1982
Bivalve	Black Sandshell	Ligumia recta	2005
Bivalve	Cumberland Moccasinshell	Medionidus conradicus	2005
Bivalve	CumberlandRockshell	Theliderma intermedia	1914
Bivalve	Cumberlandian Combshell	Epioblasma brevidens	2005
Bivalve	Finerayed Pigtoe	Fusconaia cuneolus	2005
Bivalve	Littlewing Pearlymussel	Pegias fabula	1914
Bivalve	Mountain Creekshell	Leaunio vanuxemensis	2005
Bivalve	Mucket	Actinonaias ligamentina	2005
Bivalve	Pheasantshell	Actinonaias pectorosa	2005
Bivalve	Rainbow	Cambarunio iris	2005
Bivalve	Shiny Pigtoe	Fusconaia cor	2005
Bivalve	Slabside Pearlymussel	Pleuronaia dolabelloides	2005
Bivalve	Tennessee Bean	Venustaconcha trabalis	2006
Bivalve	Tennessee Clubshell	Pleurobema oviforme	2005
Bivalve	Tennessee Pigtoe	Pleuronaia barnesiana	1990
Crustacean	Surgeon Crayfish	Faxonius forceps	1989
Fish	Blotchside Logperch	Percina burtoni	2020
Fish	Highfin Carpsucker	Carpiodes velifer	1941
Fish	Spotfin Chub	Erimonax monachus	2019
Fish	Streamline Chub	Erimystax dissimilis	2009
Fish	Tangerine Darter	Percina aurantiaca	2019
Fish	Tennessee Dace	Chrosomus tennesseensis	1999
Gastropod	Spiny Riversnail	Io fluvialis	2001
Insect	Cherokee Clubtail	Stenogomphurus consanguis	2009
Insect	Sevier Snowfly	Allocapnia brooksi	2001

Upper Holston COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Arachnid	Appalachian Cave Spider	Porrhomma cavernicola	1886
Arachnid	Tennessee Cave Spider	Nesticus tennesseensis	1926
Crustacean	Nickajack Cave Isopod	Caecidotea nickajackensis	1901
Crustacean	Southwestern Virginia Cave Amphipod	Stygobromus mackini	1943
Gastropod	a terrestrial snail	Euchemotrema fraternum montanum	1970
Gastropod	Bidentate Dome	Ventridens coelaxis	1970

Upper Holston COA SGCN LIST – KARST/SUBTERRANEAN			
TAXA GROUP	**COMMON NAME**	**SCIENTIFIC NAME**	**Most Recent Observation**
Gastropod	Sawtooth Disc	Discus bryanti	1970
Gastropod	Teasing Supercoil	Paravitrea tantilla	1970
Gastropod	Whitefoot Supercoil	Paravitrea tridens	1970
Insect	Ridgetop Cave Beetle	Pseudanophthalmus paradoxus	1982
Millipede	cave millipeds	Pseudotremia sp.	1988

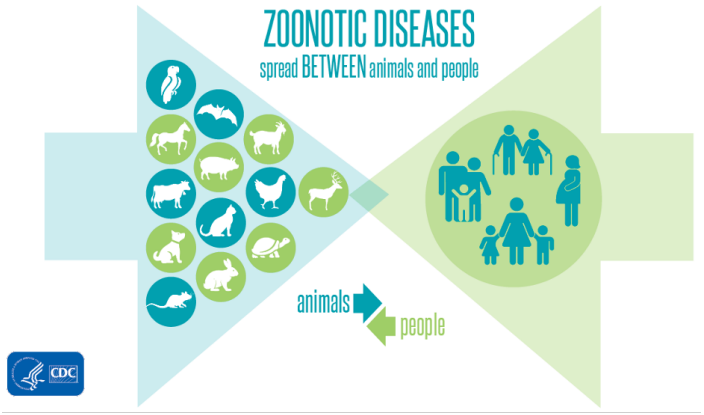
Tennessee 2025 State Wildlife Action Plan

Appendix J

One Health

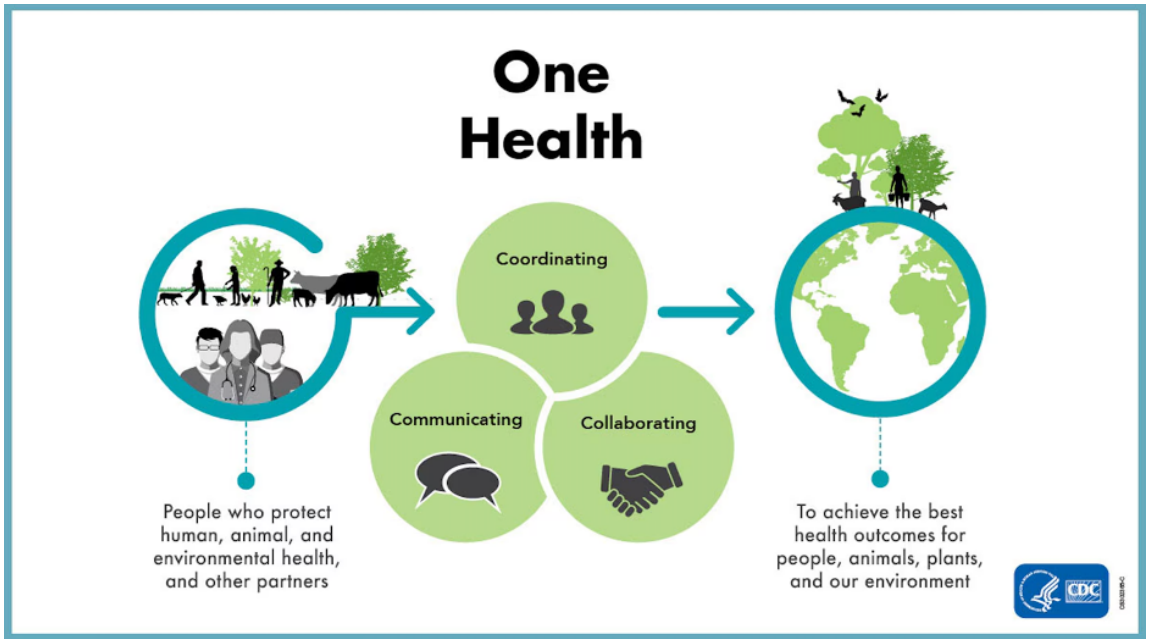
APPENDIX J - One Health

Diseases that can spread between humans and animals are called zoonotic. Approximately 70 percent of emerging infectious disease cases in humans and livestock are a consequence of spillover events from wildlife (University of Tennessee One Health Initiative [date unknown]). Consequently, the health and wildlife management communities are collaborating under a "One Health" approach as never before.



One Health recognizes that the health of people is closely connected to the health of animals (domestic and free-ranging) and our shared environment. One Health represents a collaborative, holistic, and transdisciplinary way of working at the local, regional, national, and global levels (CDC 2025b). "Humans, animals, plants, and the environment are inextricably linked, with the health of one affecting the health of all. The One Health concept recognizes that health issues must be addressed cohesively instead of independently." (UTIA [date unknown]) The overarching goal of One Health is to achieve optimal health outcomes for people and the planet.

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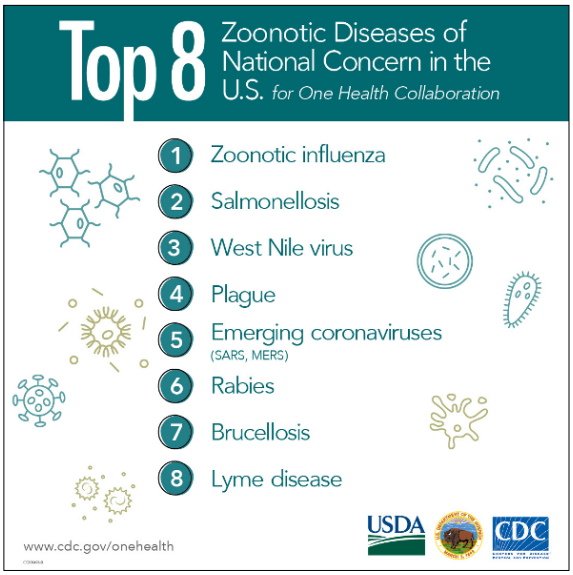


One Health in Tennessee

Prior to 2018, wildlife health was a disease-centric program that individual species managers were tasked with incorporating into their programs. Tennessee Wildlife Resources Agency (TWRA) collaborated with what is now the UTIA School of Natural Resources to hire a wildlife veterinarian to organize disease management and create a centralized wildlife health program in Tennessee.

Subsequently, TWRA created a wildlife health program coordinator position within the wildlife division. The program has since become a stand-alone program that serves to assist species managers throughout the agency in developing health plans and managing wildlife health issues across the state. The purpose of the program is to provide expertise in wildlife health management and support current and future issues with disease and health in free-ranging wildlife.

While wildlife health is usually given lower priority and less funding than human health, One Health recognizes they are inter-related, particularly in the case of zoonotic diseases, which are diseases that can spread between animals and people. Non-zoonotic diseases affecting wildlife, such as White-nose syndrome, are of One Health concern as people are indirectly affected, such as through loss of insectivores that control human (and wildlife) disease vectors such as mosquitoes. Other indirect effects of wildlife health issues that are nontransmissible to humans include:



- Impacts on ecosystem services such as pollination, plant and animal disease vector control, pest control, soil building, etc.
- Impacts on rare species and natural communities
- Impacts on agriculture (disease spread between wildlife and livestock)
- Impacts on pets and mental health

Examples of One Health Approaches to Ecosystem Health

When diseases in wildlife cause population impacts, there may be confounding factors at work rather than only the disease. Disease can sometimes be more of a symptom of other issues that are exerting or exacerbating stress on specific populations. Coordinated and collaborative work to support the broad goal of ecosystem health addresses four main categories of threats:

A. Pathogens
B. Disease Vectors
C. Toxicants
D. Environmental and community stressors (the subject of much of Ch. 4).

Tennessee One Health Committee Partners

- Tennessee Department of Health
- Tennessee Department of Agriculture
- Tennessee Wildlife Resources Agency
- Tennessee Emergency Management Agency
- Tennessee Department of Environment and Conservation
- United States Department of Agriculture
  - Wildlife Services
  - Food Safety & Inspection Service
  - Animal & Plant Health Inspection Service
- Nashville Zoo at Grassmere
- University/Academic Partners: ETSU, UTK

The following summaries provide examples of each type of threat in Tennessee but are in no way an exhaustive list.

A. Pathogens

Snake Fungal Disease

Snake Fungal Disease (SFD) is an infection that has afflicted populations of snakes, primarily venomous species, from the northeast through the Midwest and into the South, including Tennessee. This disease appears to be triggered by the fungus *Ophidiomyces ophiodiicola*. It is likely this pathogen is one of several factors that have contributed to global declines in snake populations beginning in the early 2000s. Recent research conducted by Middle Tennessee State University found that the skin microbiome of snakes is highly affected by this pathogen, resulting in dysbiosis (an imbalance in the skin microbiome). Habitat suitability was shown to have a significant effect on *O. ophiodiicola* in Tennessee counties, with higher pathogen load observed in areas predicted to be suitable. However, habitat suitability had no clear effect on dysbiosis in snakes, suggesting that dysbiosis is a multifaceted process influenced by factors beyond presence of the pathogen (Romer et al. 2025).

The implications of new wildlife diseases such as SFD depend on their role in our ecosystems. Snakes are mesopredators, meaning they provide food for some species, but they also are predators of smaller organisms. Snakes eat many species of small pests, such as slugs and rodents. The latter also have a tendency to spread diseases to humans as well. Moreover, past studies have shown that diseases caused by fungal pathogens are more likely to result in extinction or extirpation than other infectious agents. (Romer et al. 2025).

West Nile Virus

West Nile virus (*Orthoflavivirus nilense*) is primarily a disease of birds that affects the central nervous system and is transmitted by the bite of mosquitoes carrying the virus. Humans and other mammals can become infected, but they are considered dead end hosts. People cannot generally spread the disease to each other. West Nile virus has been found in more than 250 species of birds (as well as many wild mammals), but crows, jays, and ravens are most susceptible to the disease. West Nile virus is maintained in the environment between mosquitoes and birds. Birds with West Nile virus often show neurological signs including loss of coordination, head tilt, tremors, weakness, and lethargy. Most infected crows and jays will die within 3 weeks (Commonwealth of PA 2025).



Mosquito / Cristóbal Alvarado Minic via Flickr Creative Commons

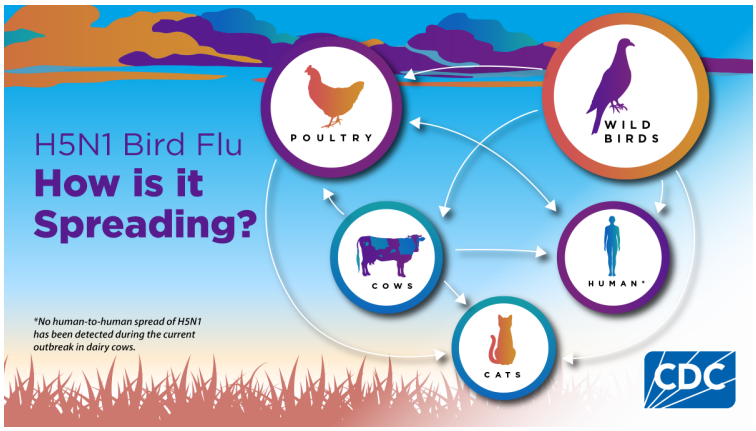
When infected, most people do not usually show symptoms. However, it can cause febrile illness or neurologic disease, including meningitis or encephalitis. There is currently no treatment for West Nile virus (CDC 2024a).

By sharing information, US and state agencies have been able to provide guidance on the disease and lessen its spread. Surveillance and sharing of West Nile virus data by doctors, public health

departments, and veterinarians helps to track both cases and spread of the disease each year. The annual number of reported West Nile cases can fluctuate widely. West Nile virus activity typically occurs during the summer months and into the fall. Surveillance helps to inform residents of and visitors to areas where virus activity has been identified that they could be at risk for infection, particularly those who work or participate in recreational activities outdoors (CDC 2024b).

Highly Pathogenic Avian Influenza

HPAI is a classic One Health issue in that the pathogen is shared among many wildlife species as well as humans, and the virus can be spread between species. Currently, there is no cure for wildlife or people infected with the virus; therefore, prevention and further research are critical.



In 2022, the first HPAI infection since 2016 was found in wild birds in the U.S (CDC 2025d). Wild birds can be infected with highly pathogenic avian influenza (HPAI) and show no signs of illness (APHIS 2025). On the other hand, HPAI can also cause significant mortality among birds—particularly waterfowl, waterbirds, and raptors (AOS 2022). This virus has infected wild birds around the globe, hitting colonially nesting seabirds and birds of prey particularly hard. In June 2022, the first large-scale outbreak in wild mammals (so called "spillover" into new taxa) occurred in Harbor and Gray Seals along the US coast of Maine (Puryear and Runstadler 2024). By the end of 2023, HPAI had been confirmed in 502 wild bird and 60 mammal species worldwide, primarily carnivores (Puryear and Runstadler 2024).

Next, in March 2024 a multi-state outbreak of HPAI in dairy cows was reported—the first time that a bird flu virus had been found in cows (CDC 2025d). In the United States, since 2022, the Animal and Plant Health Inspection Service (APHIS)—an agency of the US Dept. of Agriculture—has reported HPAI virus detections in more than 200 mammals, including dogs and cats (CDC 2023). By April 2, 2025, 168,257,258 poultry had been affected in 51 US jurisdictions along with 996 dairy herds with outbreaks among dairy cattle in 17 states (CDC 2025d). Poultry infections are deadly. In dairy cattle, they cause illness and a decline in milk production, but strict containment and decontamination protocols can help prevent spread among dairy herds (APHIS 2024b).

At least 51 US jurisdictions have recorded avian flu in wild bird populations. "High-pathogenicity avian influenza has expanded into wildlife in unprecedented numbers and species diversity, with unmatched disease severity for influenza in wildlife" (Puryear and Runstadler 2024). As of April 2, 2025, HPAI had also infected 70 people in the US, with one fatality (CDC 2025d). As of April 2025, public health risk is low. The best management of HPAI among people is to avoid exposure.

B. Vectors of Disease

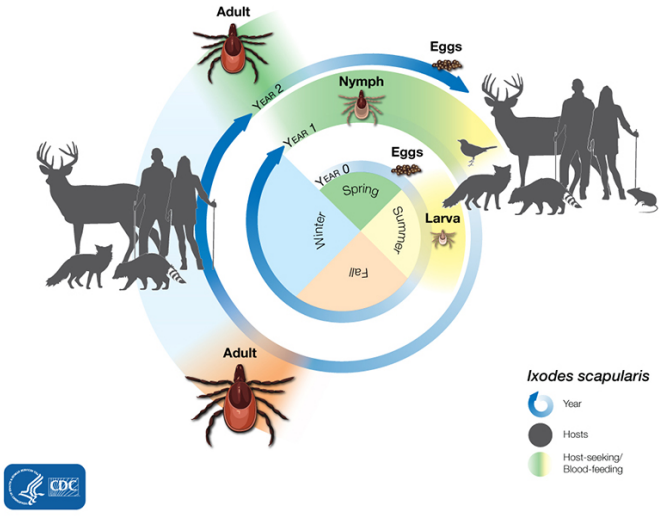
Feral Swine

Feral hogs, introduced to North America by European settlers, are hunted in the US but also have extremely destructive impacts on the habitats of native wildlife and agriculture. Feral swine can carry at least 30 diseases (including Brucellosis) and nearly 40 types of parasites that may affect people, pets, livestock, and wildlife (APHIS 2024a). Swine brucellosis is an infectious disease caused by the bacteria *Brucella suis* (*B. suis*). It was eliminated from commercially raised swine in the US in 2011, but pigs are still at risk of contracting the disease from feral hogs (USDA 2024). Feral swine can also transmit foodborne illnesses, such as E. coli, toxoplasmosis, and trichinosis. In some areas, feral swine have been the cause of elevated waterborne bacteria levels in streams and irrigation canals, which is another risk for human health (APHIS 2024c).

Feral swine are prolific reproducers and do massive damage to the land through feeding and wallowing. They are also omnivorous and will eat just about anything they can find. Feral swine depredation can cause turkeys, ground-nesting birds, amphibians, and reptiles to suffer population decreases (Cox 2014). Feral swine also root up acres of land, including native plant populations, which requires significant time and money to repair.

Nationwide, feral swine's range increased from 17 to 39 states in the US over the last 30 years (Bevins and Franklin 2014). The damage from feral swine was likewise increasing until concerted management efforts to control swine began in 2014, when APHIS established the National Feral Swine Damage Management Program to protect agricultural and natural resources, property, animal health, and human health and safety. Using a One Health approach, multiple APHIS agencies collaborate with other pertinent federal, state, territorial, tribal, and local agencies (including TWRA), as well as private organizations to achieve these goals. The program focuses on minimizing feral swine damage, eliminating emergent populations, and controlling populations in urban areas where they pose a danger to people and property (APHIS 2024c). The program has succeeded in reducing the range of feral swine in Tennessee from 89 counties in 2013 (the year TWRA closed feral swine hunting) to 40 counties in 2024.

Ticks



Ticks were the first arthropods to be established as vectors of pathogens and currently they are recognized, along with mosquitoes, as the main arthropod vectors of disease agents to humans and domestic animals globally. Tick-borne diseases are common occurrences in both medical and veterinary clinical settings (Dantas-Torres et al. 2012), and these diseases are increasing worldwide. Notorious for transmission of lyme disease in the US, there are at least 898 recognized species of tick globally, which can

transmit a wide array of diseases. Many tick-borne diseases are important zoonotic diseases, such as anaplasmosis, babesiosis, ehrlichiosis, and Lyme borreliosis.

Alpha-gal syndrome is a serious, potentially life-threatening allergy and tickborne disease that is becoming increasingly common among those who work outdoors in natural areas. The condition is an allergic reaction to the alpha-gal molecule, a sugar molecule (galactose-α-1,3-galactose) found in most mammals, but not in humans. After exposure to alpha-gal through the saliva of some ticks, the human immune system can trigger an allergic reaction to red meat (CDC 2025a).

In addition to the constraints related to their diagnosis and clinical management, the control and prevention of these diseases is often difficult, because it requires the disruption of a complex transmission chain through several life stages involving vertebrate hosts (often wildlife species) and ticks. The principle of the One Health approach for the management of tick-borne diseases is to increase the level of communication between physicians and veterinarians dealing with patients with past or present history of tick bites, particularly those with unexplained febrile illness in areas where such diseases are endemic. (Dantas-Torres et al. 2012).

Introduced tick species—such as the Asian Long-horned tick, which has been in east Tennessee since 2019—add another layer of complexity to this picture. What will be the impacts of this new species, both in terms of serving as possible vectors of disease and their effects within native ecosystems?

C. Toxicants

Neonicotinoids

Neonicotinoids (neonics), a class of relatively highly selective insecticides, have swept one-fourth of the global market since the launch of imidacloprid (IMI) in 1991 (Zhang and Lu 2022).

Neonics pose widespread problems to species and habitats for several reasons:

- They are extraordinarily toxic.
- They are extremely widespread in use.
- They contaminate the environment far beyond where they are applied (e.g., leach into water, contaminate non-target organisms).
- They are transmissible through the environment and highly persistent.

Unlike contact pesticides, which merely stay on the plant surface, neonics are systemic and can be absorbed throughout the plant (Simon-Delso et al., 2015). They can be released to the air along with pollen, diffuse into soil and water, or persistently exist in crops. Neonics have high water solubility (Zhang and Lu 2022), and one study in Arkansas, Mississippi, and Tennessee detected neonicotinoid insecticides in 23 percent of wildflower samples around recently planted fields of corn, cotton, and soybean (Stewart et al. 2014). Epidemiological studies are scarce but have linked neonics exposure to oxidative stress, neurological symptoms, metabolic changes, osteoporosis, and liver cancer in humans (Zhang and Lu, 2022).

While there is a need to further clarify the effects of neonics on human populations, the science is much clearer with respect to birds and pollinators: An increase in neonicotinoid use led to statistically significant reductions in bird biodiversity between 2008 and 2014, particularly for grassland and insectivorous birds. Specifically, on average a 100 kg increase in nicotinioid in a

county will decrease grassland bird populations in that county 2.2% (Li et al. 2020). In 2023, an EPA assessment predicted profound impacts to over 200 threatened and endangered species, many of them pollinators, from the three most commonly-used neonicotinoid insecticides. Neonics threaten about 11% of the entire US endangered species list—including pollinators like the Rusty-patched Bumblebee, Hine's Emerald Dragonfly, and Karner Blue Butterfly (EPA 2023). As the most commonly used insecticides worldwide, twenty years of research now identifies neonics not only as a leading driver of mass pollinator losses, but connects their use to similar bird declines, collapsing aquatic ecosystems, and significant risks to human health (Pisa et al. 2021).



Dead bees / Mark Helm via Flickr Creative Commons

Large-scale epidemiological studies may yet be needed to elucidate human health outcomes associated with neonics exposure; however, it is clear that indirect species and ecosystem impacts are considered significant enough to monitor, regulate, limit and/or prohibit the use of these chemicals. Since 2018, the European Union (EU) has prohibited all outdoor use of IMI, thiacloprid (THI) and clothianidin (CLO) with a few exceptions, mainly due to their risks to non-target organisms, especially pollinators. Most countries including the US have not restricted their use—yet. However, in late 2023, New York became the first US state to prohibit the use of neonicotinoids on outdoor ornamental plants and turfs, and the seeds of corn, soybeans and wheat. (NY State Senate Bill 2023-S1856A [date unknown]). Vermont and Connecticut soon followed with similar restrictions (ABC 2025).

D. Environmental and Community Stressors

Residential, commercial, and industrial development can lead to a host of impacts to habitats, wildlife, and plants. Moreover, spatial overlap between global human populations and 22,374 terrestrial vertebrate species is projected to increase across ~56.6% and decrease across only ~11.8% of the Earth's terrestrial surface by 2070. Notably, these increases are driven primarily by intensification of human population densities, not change in wildlife distributions caused by climate (Ma et al. 2024).

A direct effect of urbanization is the "humanization" of wildlife gut microbiota. A recent study of urban populations of Coyotes (*Canis latrans*), Crested Anole lizards (*Anolis cristatellus*), and White-crowned Sparrows (*Zonotrichia leucophrys*) showed these species acquire gut microbiota constituents found in humans. The study found that gut microbiota of urban populations of wildlife species were more similar to human gut microbiota than were the gut microbiota of rural wildlife populations of the same species. "These results indicate parallel effects of urbanization on human

and wildlife gut microbiota and suggest spillover of bacteria from humans into wildlife in cities" (Dillard et al. 2022).

In addition, urban sprawl exerts many different forms of pressure and impacts, both direct and indirect, to wildlife and their habitats. Urbanization consumes land and puts pressure on surface and ground water resources to provide drinking water and dilute wastewater (Thurman and Terry 2011). Other negative effects include:

- Direct loss of habitat through land conversion to other uses or stream habitat destruction, which threatens >70% of species worldwide (Hogue and Breon 2022)
- Habitat fragmentation
- Increased runoff as a result of increasing levels of impervious surface, leading to erosion, reduced groundwater recharge, and water pollution
- Increased flooding
- Expanding transportation or service corridors that can fragment habitat or block the movement of smaller, less mobile species.

Specifically with respect to forest habitats, urbanization can

- Introduce exotic pests when people travel from urban areas to rural communities for outdoor recreation
- Cause increases in mismanaged forested areas that are typically used for recreational use
- Result in a decreased probability of timber harvesting practices (TDF 2020) that can benefit people and wildlife.
- Decrease the ability to conduct prescribed fire and fight wildfires, due to the location of buildings in the wildland/urban interface.

According to the National Wildlife Federation, 60% of the rarest and most imperiled species in the US occur in metropolitan areas, especially the fastest growing large metro areas. From 2021 to 2022, Nashville was among the nation's top 10 largest gaining metro areas countrywide.

From 2001 to 2016 148,100 acres of Tennessee's agricultural land was converted to "urban and highly developed land use" (AFT 2022). Under a "business as usual" scenario, Tennessee is likely to lose 1,014,600 acres of farmland by 2040.

The pressures of urban sprawl, which can limit food, water, and shelter or subject species to increased stress, can in turn make them more subject to disease and parasites. Understanding where humans and wildlife species will co-occur in the future and the drivers of those changes can reveal key opportunities for conserving biodiversity while meeting human development and resource needs. At the local level, more targeted area-based land-use planning should be integrated into systematic conservation planning (Ma et al. 2024).

Fire Suppression

Fire suppression, lack of fuel load reduction, and the Wildland-Urban Interface all contribute to catastrophic wildfires. Since the 2015 SWAP was written, Tennessee experienced its most extreme wildfire that was vast in scale and devastating to communities and landscapes. In addition to direct destruction, wildfire can also cause enormous levels of smoke that affect human health.

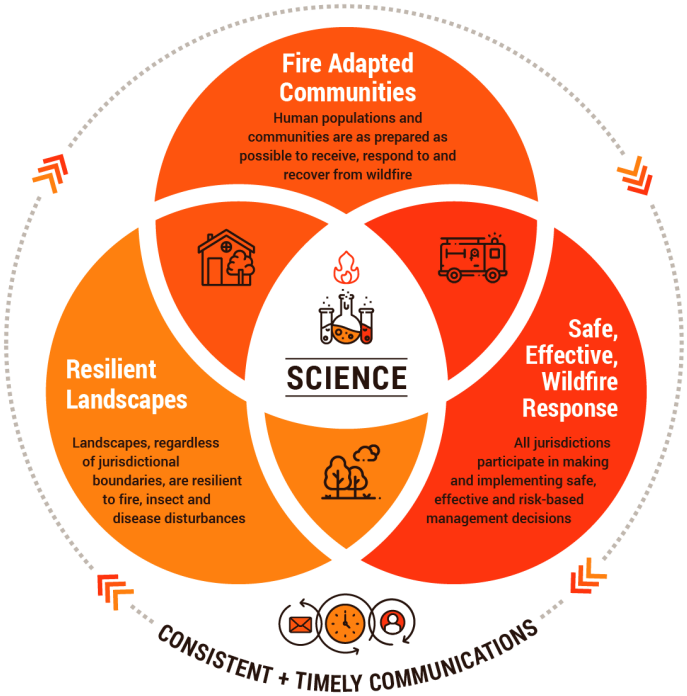
Fire suppression affects many natural habitats and can pose a significant threat to human health and safety when it contributes to wildfire. Fire is a natural process that has served an integral role in North American ecosystems for millennia. Fire has been used by Native American societies to manage habitats and food sources for millennia. Over the past 400 years, its removal from the landscape through fire suppression has become a pervasive practice. Fire suppression has contributed to the build-up of fuels, while at the same time, increasing development–particularly in the Wildland/Urban Interface –has resulted in human activity becoming the number one cause of wildland fires (FEMA 2001), while also putting people and their communities at greatest risk.



An aerial shot of the wildfires in Sevier County taken from a Tennessee National Guard helicopter on Nov. 29, 2016. The fires burned hundreds of acres and destroyed several buildings in Gatlinburg. / Photo by Staff Sgt. William Jones, TN National Guard

The Wildland/Urban Interface or WUI (pronounced woo-ee) is a concept that includes various types of interface between the built environment and natural areas, defined by housing density, structure separation distance, and typical parcel size, among others. The WUI is expanding across Tennessee as development proceeds in Nashville, Knoxville, Memphis, and Chattanooga. Additionally, the disturbance cycle of rapidly growing housing developments encroaching on wildlands, forests, and farms often leads to rapid spread of invasive species (e.g. kudzu). Increases in housing correlate with increases in invasive exotic plants (Gavier-Pizarro et al. 2010). These plants not only degrade habitat but can also make suppression during a wildfire more difficult, as some plants may burn when they're green.

In fact, in a 2023 opinion (Calkin et al. 2023), fire researchers argue that to effectively address community fire destruction, we must begin to modify our built environment to mitigate growing wildfire risk, using a framework that starts with a focus on the individual home and highlights the critical role of individual homeowners and local government. This approach requires multidisciplinary understanding of wildfire behavior, structural ignition vulnerabilities, urban resilience, and landscaping vegetation.



Prescribed fire (the controlled application of fire in selected habitat areas) is a management practice that can directly address the problem of altered fire regimes. It contributes to the "resilient landscape" shown as a core element of the US National Cohesive Wildland Fire Management Strategy (right). By using controlled fire, fuel loads found within different habitats can be safely reduced. Prescribed fire at moderate levels can also mitigate extreme wildfire risk and reduce total smoke emissions, a health hazard (Schollaert et al. 2024). Prescribed fire not only reduces the risk of wildfire, thereby reducing a threat to public health and safety, but it also costs far less than fighting a wildfire while also improving habitat for many wildlife and plant species.

Benefits of the One Health Approach

The challenge of White-nose syndrome (WNS) in bats clearly illustrates how rapid and devastating pathogens can be and how a One Health approach can make a difference. This disease was not even known in 2005 at the time of the first SWAPs, as the first introduction of the virus into New York State was identified in 2006. TWRA confirmed the first case of WNS in Tennessee in February 2010. As of 2024, seven of the sixteen bat species that occur within Tennessee have been documented as having histologically confirmed cases (see WNS Highlight).



The Tricolored Bat has been one of the species most severely affected by WNS in Tennessee / Daniel Istvanko, TWRA

The maps below show the current distribution of WNS in Tennessee as well as the progression of its spread since 2010. WNS field signs were observed in 30 percent of hibernacula surveys conducted in the winter of 2022/23 (Pers. Comm. Dustin Thames, TWRA, April 12, 2024).

WNS cannot be transmitted to humans; however, loss of our bats does translate into huge problems for people. Bats play essential roles in pest control, pollinating plants, and dispersing seeds. Recent studies estimate that bats eat enough pests to save more than $1 billion per year in crop damage and pesticide costs in the United States corn industry alone (USFWS 2021).

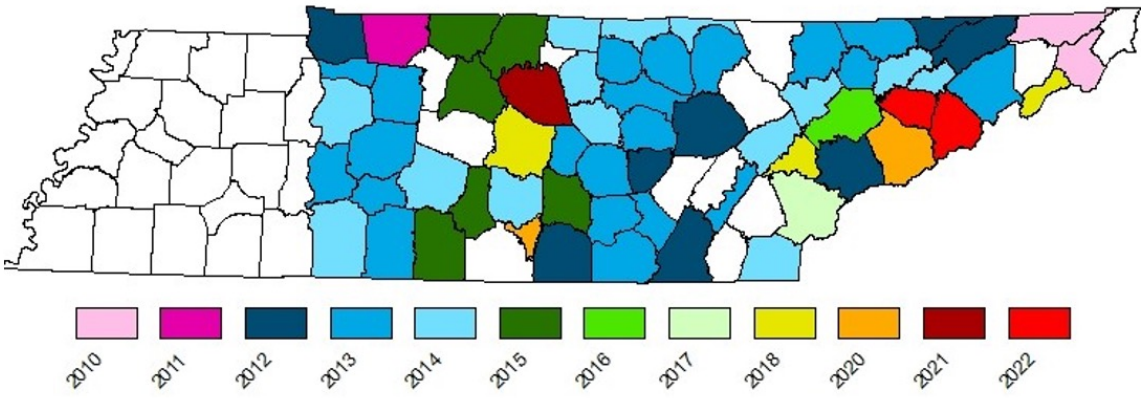
One study found that after the onset of bat die-offs (which began in 2006 and have spread to 40 states), farmers increased their insecticide use by 31.1% per county, on average. What is more astounding, infant mortality due to internal causes (i.e. not accidents or homicides) also increased by 7.1% on average in affected counties after the emergence of WNS, possibly due to the increased use of insecticides. Farms' crop revenue also decreased. This is an insightful demonstration of how biodiversity loss affects human well-being (Frank 2024).

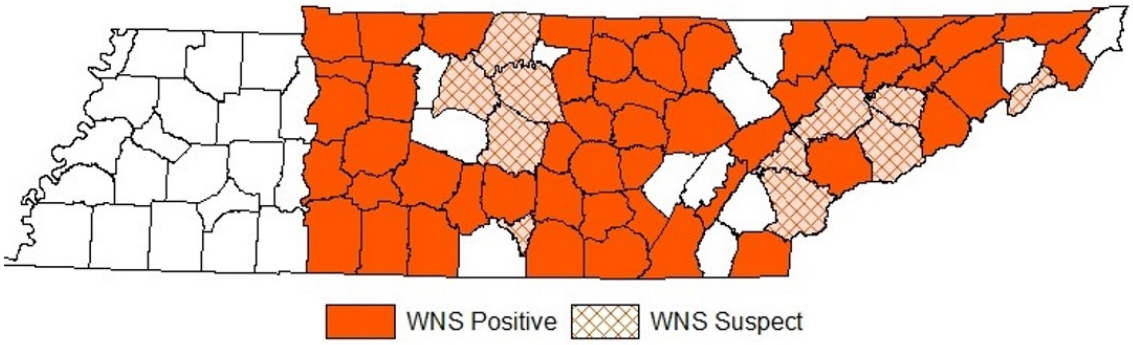
In true One Health fashion, the bat conservation community has responded to the novel threat of WNS by collaborating more than ever before to monitor, research, and apply best management practices designed to prevent the spread of the disease. Nationally, the USFWS and US Geological Survey (USGS) formed the North American Bat Monitoring Program. Collaboration by TWRA and partners has made Tennessee the number 1 contributing organization of bat winter colony count

data in the US (~1,300 bat winter colony counts at over 550 sites in 2024), matching its rank as the state with the most caves.



By 2021, data from the North American Bat Monitoring Program showed that WNS had killed over 90% of Northern Long-eared, Little Brown, and Tricolored Bats in fewer than 10 years. Researchers also noted declines in Indiana bat and Big Brown Bat populations (Cheng 2021).





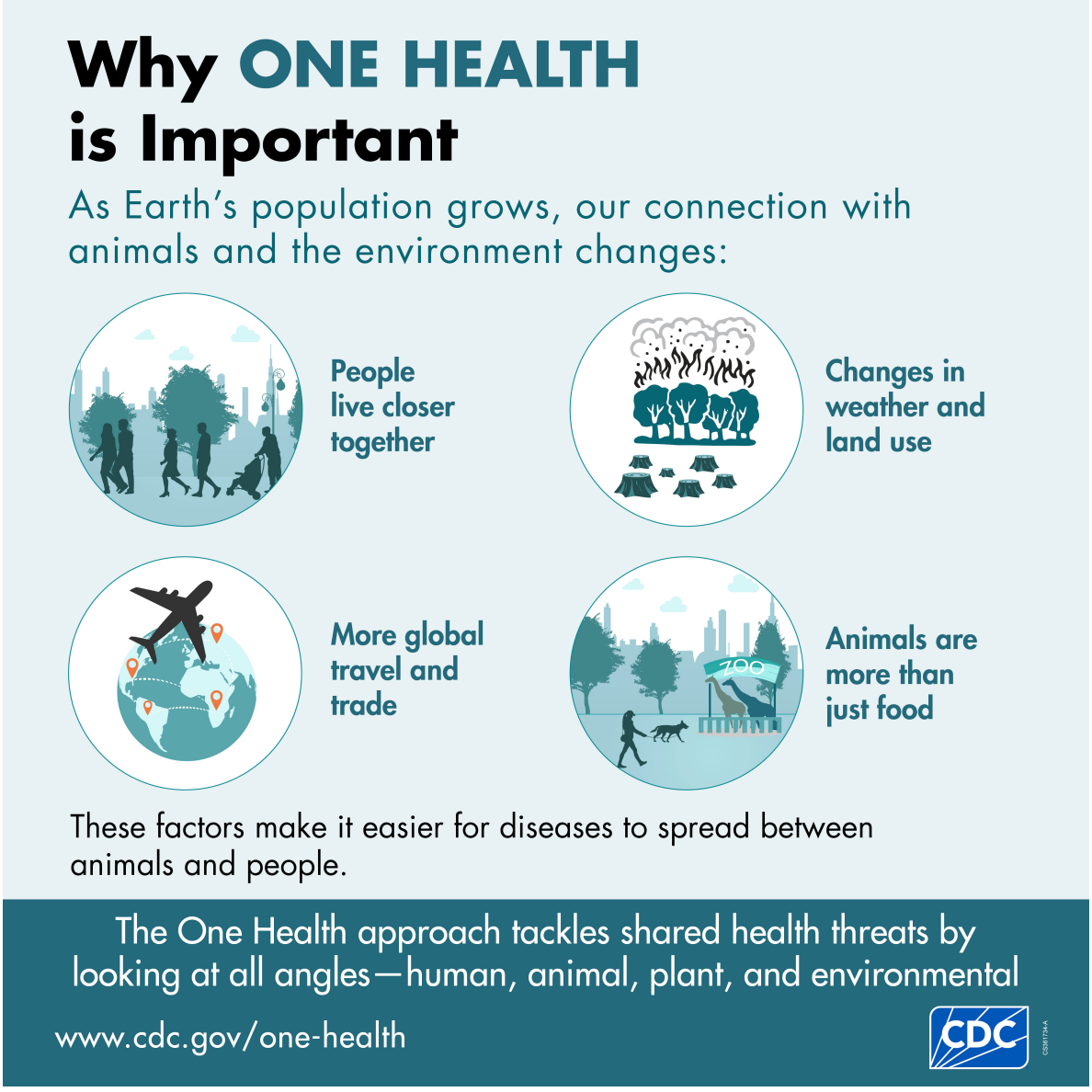
Nothing has yet been effective in completely halting its spread. Human transport of the fungus occurs, and researchers, wildlife biologists, and other cave visitors are now required to follow regularly updated decontamination protocols to prevent spread of the fungal spores from one location to another (White-nose syndrome Disease Management Working Group 2024). In Tennessee, federal and state agencies have closed access to most caves on publicly owned properties, particularly during winter to leave threatened bats undisturbed during their hibernation period (Tennessee State Parks 2025). In addition, an approach that is proving effective in reducing the compounding effect of human disturbance to bats stressed from fungal infections is to install gates on the entrances to caves. In summary, the integrative One Health approach that builds bridges across scientific disciplines helps not only explain how a disease works and how to seek a

cure, but also helps to answer the question why. Why is a disease appearing now, why is it spreading more rapidly, why are some species or populations more susceptible than others, and why should we care?

Some specific benefits that arise from One Health collaborations include:

a. Data collection/surveillance of pathogens and toxicants
b. Management action coordination
c. Long-term planning
d. Sharing and staying abreast of new technology
e. Useful long-term datasets that are comparable across states, regions, and other jurisdictions
f. Collaboration in funding, which can contribute to funding success.

By linking humans, animals, and the environment, One Health can help to address the full spectrum of disease control–from prevention to detection, preparedness, response and management–while also promoting the health and integrity of our ecosystems (WHO 2025).



Appendix J References

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