



# **INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**

## **VOLUNTEER TRAINING SITE – CATOOSA**



Tennessee Army National Guard  
Nashville, Tennessee  
August 2012





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March 2012

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Volunteer Training Site – Catoosa  
Revised Integrated Natural Resources Management Plan

Signature Page

This Integrated Natural Resources Management Plan (INRMP) meets the requirements for INRMPs listed in the Sikes Act Improvement Amendments (16 U.S.C. 670a et seq.), AR 200-3, and the "Executive Summary and Scope" within this plan. It has set appropriate and adequate guidelines for conserving and protecting the natural resources of the Volunteer Training Site at Catoosa.

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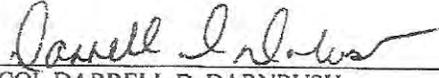
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## ACRONYMS AND ABBREVIATIONS

AR	Army Regulations
ARNG	Army National Guard
BMP	Best Management Practice
CEQ	Council for Environmental Quality
CFMO	Construction and Facilities Management Office
CPX	Command Post Exercise
DA	Department of Army
DBH	Diameter at Breast Height
DOD	Department of Defense
DoDI	Department of Defense Instruction
EA	Environmental Analysis
EMS	Environmental Management System
ENV	Environmental Office (of the TNARNG)
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPD	Georgia Environmental Protection Division
FFT2	Firefighter Type 2 (wildland fire fighter NWCG standards)
FMO	Facilities Maintenance/Engineering Office (of the TNARNG)
FONSI	Finding of No Significant Impact
FTX	Field Training Exercise
GFC	Georgia Forestry Commission
GIS	Geographic Information System
GPS	Global Positioning System
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
IPMP	Integrated Pest Management Plan
IPP	Invasive Pest Plant
ISO	International Standard Organization
ITAM	Integrated Training Area Management
LCES	Lookouts, Communications, Escape Routes, and Safety Zones
LCTA	Land Condition Trend Analysis (now RTLA)
LRAM	Land Rehabilitation and Maintenance
METL	Mission Essential Task List
MOA	Memorandum of Agreement
MOSQ	Military Occupational Skill Qualification
MP	Military Police
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NCVS	North Carolina Vegetation Survey
NEPA	National Environmental Policy Act
NFDRS	National Fire Danger Rating System

NFPA	National Fire Protection Act
NGB	National Guard Bureau
NGB-ILE	National Guard Bureau - Director of Environmental Programs
NPS	Non-Point Source Pollution
NRM	Natural Resources Manager (of the TNARNG)
NWCG	National Wildfire Coordinating Group
NWS	National Weather Service
NWSG	Native Warm Season Grasses
O&M	Operations and Maintenance
POTO	Plans, Operations, and Training Officer (of the TNARNG)
PPE	Personal Protective Equipment
PPK	Projectile Point/Knives
REC	Record of Environmental Consideration
ROA	Report of (timber) Availability
RTE	Rare, Threatened, or Endangered Species
RTLTA	Range and Training Land Assessment (previously LCTA)
RTLPL	Range and Training Land Program
SAIA	Sikes Act Improvement Act of 1997
SHPO	State Historic Preservation Office
SITE	Training Site personnel (of the TNARNG)
SJA	Staff Judge Advocate
SMZ	Streamside Management Zone
SOP	Standard Operating Procedure
SPCC	Spill Prevention, Control, and Countermeasure
SRA	Sustainable Range Awareness
SRP	Sustainable Range Program
STEP	Status Tool for Environmental Program
SWPPP	Storm Water Pollution Prevention Plan
TA	Training Area
TAG	The Adjutant General
TDEC	Tennessee Department of Environment and Conservation
TNANG	Tennessee Air National Guard
TNARNG	Tennessee Army National Guard
TNC	The Nature Conservancy
TN-EPPC	Tennessee Exotic Pest Plant Council
TRI	Training Resources Integration
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Center
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

USGS	United States Geologic Service
VFD	Volunteer Fire Department
VOC	Volatile Organic Compounds
VTTS-C	Volunteer Training Site -- Catoosa
WFMP	Wildland Fire Management Plan

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## EXECUTIVE SUMMARY

This Revised Integrated Natural Resources Management Plan (INRMP), which is required by the Sikes Act, as amended (16 U.S.C. 670a et seq.), has been developed for use by the Tennessee Army National Guard (TNARNG) to provide guidance on the protection of natural resources at the Volunteer Training Site – Catoosa (VTS-C). The original VTS-C INRMP was implemented in 2002. As the natural resources management program developed, it was determined that the original INRMP format included information no longer applicable to the INRMP and the organization of project lists and guidelines was difficult to use and to update. Therefore, a revision of formatting and information was undertaken for this second iteration. In addition, the discovery of two federally listed Threatened species, *Scutellaria montana* and *Myotis grisescens*, on VTS-C and development of a forest management program for the training site required significant additions and alterations to the management plan. This revision was initiated in 2003, after discovery of the listed plant, but prior to the publication of the 2005 National Guard Bureau (NGB) Interim Guidance on the interagency coordination of INRMPs. Therefore, the official “five year review for operation and effect” was by-passed. However, the cooperating agencies were a part of the revision process from the start and have been particularly active in the development of the rare species management plan section, and thus the spirit of the interagency cooperative effort was met.

The primary purpose of natural resources management at VTS-C is to support the military training mission. The purpose of this INRMP is to ensure that natural resource conservation measures and military activities on mission lands are integrated and consistent with responsible stewardship and environmental compliance. This INRMP was prepared in accordance with the Sikes Act, as amended; Army Regulation (AR) 200-1 – Environmental Protection and Enhancement; and Department of Defense Instruction (DoDI) 4715.3 – Environmental Conservation Program.

The National Environmental Policy Act (NEPA) of 1969 dictates that planners of public actions using federal monies, such as those on military installations, shall consider the environmental impacts and effects of “major federal actions.” Section 1508.18 in the Council for Environmental Quality (CEQ) regulations lists the adoption of a formal Integrated Natural Resource Management Plan as a major federal action. An Environmental Assessment (EA) has been prepared for this action (see Appendix A). In addition, in accordance with §670a(2) of the Sikes Act, approval of the INRMP has been noted in writing by the U.S. Fish and Wildlife Service and the Tennessee Wildlife Resources Agency (Appendix C).

The goals of this INRMP are:

- To describe the training site and its physical natural resources;
- To describe the military mission, potential effects of the mission on natural resources at the training site, and options for resolving conflicts between the military mission and natural resources management;
- To show the status of baseline inventories of natural and cultural resources and monitoring requirements for environmental compliance ;
- To present goals for the management of the site’s natural resources and tasks designed to achieve those goals;

- To recommend revegetation and erosion control techniques to maintain stable soils and ensure high-quality water resources and training opportunities; and,
- To provide management guidelines that will be effective in maintaining and improving the sustainability and biological diversity of terrestrial and aquatic ecosystems on the training site and that will support the military training mission through integrated, cooperative, and adaptive management.

Benefits to the military mission include improved maneuver lands and better distribution of military activities at VTS-C. This plan will increase training realism in the natural environment. It will also enhance long-range planning efforts at VTS-C. Benefits to the environment include reduced soil erosion and vegetation loss, improvement of water-quality in wetland and riparian ecosystems, and an increase in overall knowledge of the operation of the ecosystems on VTS-C through surveys and monitoring.

This document begins with a description of the subjects: mission and facility details are outlined in Chapter Two, while specifics of the physical environment at VTS-C are presented in Chapter Three. Chapter Four addresses the management goals for VTS-C according to the resource categories specified by the Sikes Act and the projects designed to meet those goals. Chapter Five presents guidelines intended for management and training activities as they relate to natural resources protection.

The nine Appendices of this document contain supplemental material, including NEPA documentation, additional biological data, and records of the annual review process. Five detailed management plans are included as annexes to this document: the Rare, Threatened, and Endangered Species plan, Forest Management Plan, Wildland Fire Management Plan, Invasive Pest Plant Control Plan, and the Herbicide Spray Plan for Grounds Maintenance. The Rare, Threatened, and Endangered Species Annex (Annex 1) also contains an assessment of the impacts of this plan on the federally listed species occurring in VTS-C and the U.S. Fish and Wildlife Service's concurring Biological Opinion.

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# CHAPTER 1

## GENERAL INFORMATION

### 1.1 PURPOSE

The Tennessee Army National Guard (TNARNG) maintains the federally owned Volunteer Training Site –Catoosa (VTS-C) in Catoosa County, Georgia, for the purpose of training members of the Tennessee National Guard. The TNARNG manages the land on this training site for the goal that no net loss of training land result from training or natural resources management activities. In addition, the TNARNG hopes to enhance training potential and environmental quality to the greatest extent possible through its management practices. This Integrated Natural Resources Management Plan (INRMP) for VTS-C is the principle guiding document for TNARNG land management activities taking place on the training site. It is a revision of the original VTS-C INRMP which covered the period 2002-2006 and will remain in effect until a revision is deemed necessary.

The Sikes Act, Public Law 105-85, “Sikes Act Improvement Act of 1997,” (SAIA) November 18, 1997, requires the preparation of an Integrated Natural Resources Management Plan (INRMP) for those military installations containing significant natural resources and specifies the key information to be included in the Plan. The U.S. Fish and Wildlife Service (USFWS) and the Georgia Wildlife Resources Division (GWRD) are required to be cooperators in the process of developing the INRMP.

The SAIA requires a review for operation and effect no less than every five years to keep the INRMP current. Major changes require a revision be conducted while minor changes can be incorporated with an update to the existing INRMP. A revision or update will be used based on the review for operation and effect conducted jointly with the USFWS and the GWRD. The original VTS-C INRMP was implemented in 2002. In this year, a federally listed threatened species, the large-flowered skullcap (*Scutellaria montana*) was found in large numbers on the training site. The need to develop management guidelines for this species and the unsatisfactory nature of the original INRMP drove an internal decision by TNARNG in 2003 to initiate a full revision in coordination with the cooperating agencies. In 2005, Interim Guidance was provided by NGB requiring a joint decision with the cooperating agencies to initiate a full revision. As this revision was begun prior to the publication of the Interim Guidance, the agencies were not party to the initial decision, though they were a part of the assessment of the need for a rare species management plan. They were contacted when the revision process was begun and have contributed to the development of the new INRMP. Therefore, while conducting the formal five-year review, as defined in the Interim Guidance, would not have been useful, the spirit of the interagency cooperative effort has been honored. Documentation of this cooperation is included in Appendix C.

This Revised INRMP for VTS-C will serve guide TNARNG activities on the training site until a review finds that significant revision is necessary. The overriding goals of this plan are to minimize impact on training lands, to effectively repair damage caused by training activities, to improve the mission-specific qualities of the training lands, and to protect and enhance the ecosystem value of the training site. This is a living document which will be reviewed annually and updated as needed during the five years. Barring earlier need for substantial revision, five years following the date of implementation of this document, the USFWS, GWRD, and TNARNG will coordinate a review for operation and effect to determine whether the INRMP is functioning effectively or whether another large-scale revision is necessary.

Natural resources management is an on-going, long-term process. This and subsequent INRMPs will serve to shape the direction of that process in order to support the military mission of the TNARNG,

encourage sustainable management of natural resources, and ensure compliance with all relevant federal, state, and local laws.

## **1.2 MANAGEMENT PHILOSOPHY**

As stated above, the primary goal of land management at VTS-C is to meet military training needs, now and in the future, while maintaining a healthy ecosystem. To ensure the ability to meet those future needs, there must be a healthy natural system in place across the training site. The goals of training and environmental protection should not be seen as opposing. Rather, the one – a healthy environment – supports and enhances the other – training potential.

Department of Defense (DOD) Instruction 4715.3 directs that DOD land management incorporate ecosystem management, biodiversity conservation, and multiple use management. The basic principle of ecosystem management is to focus on the health of the total environment – ecosystem composition, structure, and function – rather than individual species. It is management driven by goals and designed to be adaptable: monitoring of results should lead to changes in the process if desired outcomes are not achieved. Biodiversity is short for “biological diversity,” and it refers simply to the variety, distribution, and abundance of organisms in an ecosystem. Biodiversity is crucial to the stability and functioning of an ecosystem.

Multiple use management, a concept that originated in the forestry field, refers to the practice of integrating different purposes and end products into the management scheme for a single piece of property. Under multiple use management, the goal is to obtain such commodities as timber, wildlife, recreation, water quality, and in this case training opportunities from the same land through appropriate and integrated management.

The multiple uses for which the VTS-C is to be managed include: TNARNG training needs, maintenance of native communities and biodiversity, surface and ground water quality, conservation of soil resources, threatened and endangered species protection, and habitat quality. It is the role of this INRMP to integrate the management practices for each of these goals such that all needs can be met on a sustainable basis without compromising the health of the ecosystem or mission requirements.

## **1.3 RESPONSIBILITIES**

### **1.3.1 National Guard Bureau**

The National Guard Bureau is the federal component of DoD through which flow funds and guidance to the TNARNG. Three Directorates at NGB are involved in the management of natural resources: the Director of Environmental Programs (NGB-ILE), the Director of Engineering, and the Director of Operations, Training and Readiness. They work together to implement the Integrated Training Area Management (ITAM) Program.

The Sikes Act Coordinator at NGB-ILE is responsible for reviewing the INRMP and advising the Environmental Office before the state formally submits the plan for public review. The Environmental Directorate ensures operational readiness by sustaining environmental quality and promoting the environmental ethic and is also responsible for tracking projects, providing technical assistance, quality assurance and execution of funds.

Engineering provides policy guidance and resources to create, sustain, and operate facilities that support the Army National Guard. The Engineering Directorate coordinates proposed construction projects with Operations/Training and NGB-ILE and provides design and construction support, as well as environmental management that is directly related to property maintenance (e.g., grounds maintenance, pest control).

The Director of Operations, Training and Readiness is responsible for training and training site support to include sustainable range management. The Integrated Training Area Management (ITAM) program is run by Operations/Training, but must be coordinated with the Environmental and Engineering directorates to ensure methods and results are environmentally sound and meet military needs.

### **1.3.2 TNARNG**

The Adjutant General (TAG) of the TNARNG is directly responsible for the operation and maintenance of VTS-C, which includes implementation of this INRMP. TAG ensures that all installation land users are aware of and comply with procedures, requirements, or applicable laws and regulations that accomplish the objectives of the INRMP. TAG also ensures coordination of projects and construction among environmental, training, and engineering staffs.

TAG has an Environmental (ENV) office to provide professional expertise in the environmental arena for VTS-C and all other TNARNG properties. The conservation branch of ENV is responsible for natural and cultural resources. Natural resources, including flora, fauna, forest management, threatened and endangered species protection, riparian areas, wetlands, soils, and other features, are the focus of this plan. Cultural resources such as archaeology, historical buildings, curation, and American Indian consultation are covered by the Integrated Cultural Resources Management Plan (ICRMP). The compliance branch of ENV handles the legal requirements for managing hazardous materials and waste, drinking water quality, air quality, pollution prevention, and similar tasks. The NEPA process for TNARNG is also coordinated by a branch of the ENV office. Overall, ENV is responsible for characterizing the physical and biological features of TNARNG lands, recommending appropriate management for those features, identifying compliance needs, and advising TNARNG on the best ways to comply with federal and state environmental laws and regulations. The Environmental Office also provides technical assistance to the training site personnel including: developing projects, securing permits, conducting field studies, providing Environmental Awareness materials, locating and mapping natural and cultural resources, and developing and revising management plans, to include the INRMP.

The Plans, Operations and Training Officer (POTO) has the primary responsibility of scheduling military training and ensuring safety of all personnel while training exercises are being conducted. The POTO conducts contingency planning and preparation to provide timely and appropriate military support to meet required Federal, State, and community missions. The POTO is responsible for coordinating the ITAM program; by working with the environmental office to develop a baseline of current and projected training requirements and training lands/facilities for the training site; assisting the Environmental Office in determining carrying capacity for the training site by providing military usage and training data; planning for land use based on accomplishing training requirements while minimizing negative environmental effects; prioritizing and scheduling Land Rehabilitation and Maintenance (LRAM) projects with the Environmental Office and the Training Site Manager; and allocating funds and resources to accomplish ITAM requirements.

The Training Site Operations Staff (SITE) is made up of the Training Site Manager, Range Control, and civilian personnel, who work with the Environmental office to implement this plan and assure its success. The Training Site Operations Staff is familiar with all aspects of the training site, including training scheduling (and conflicts), locations of training facilities, impairments or problems with human-made Integrated Natural Resources Management Plan

structures or natural functions, and needs for improvement or maintenance of the training land. The Training Site Personnel and TNARNG Environmental staff will ensure that all ITAM, INRMP, and ICRMP projects are identified and executed in accordance with all laws and regulations.

The statewide Facilities Management/Engineering Office (FMO) provides a full range of financial and engineering disciplines for all facilities under the jurisdiction of the Military Department of Tennessee, including VTS-C. The FMO is responsible for master planning and ensuring that all construction projects comply with environmental regulations by consulting with the Environmental Office prior to any construction by TNARNG Engineers. The FMO also provides necessary assistance with design of erosion control projects.

The Staff Judge Advocate (SJA) advises the TAG, POTO, FMO, and ENV on laws and regulations that affect training land use and environmental compliance. The joint effort of TAG, Chief of Staff, POTO, Training Site, FMO, and Environmental Office make the INRMP a living document that is updated annually. The Conservation Branch will conduct yearly meetings with the training site manager and staff, the Training Site Commander, POTO, and FMO on proposed projects and plans for the training site. Coordination for the meeting will be the responsibility of the Conservation Branch of the Environmental Office.

#### **1.4 RELEVANT ENVIRONMENTAL REGULATIONS**

Natural resources management at VTS-C is subject to a variety of environmental regulations, as referenced in Appendix E. In addition to state and federal law, TNARNG must abide by DOD and Army policy in its handling of the training site. Copies of relevant laws and regulations are being compiled in the TNARNG Environmental library and are available for review by all personnel involved in natural resources management.

#### **1.5 ENVIRONMENTAL REVIEW (NEPA COMPLIANCE)**

The National Environmental Policy Act (NEPA) was created to identify environmental concerns with human activities and resolve them to the best degree possible at early stages of project development. The levels of NEPA are recognized:

1. If the proposed action meets a categorical exclusion as listed in 32 C.F.R. Part 651, Appendix B, a Record of Environmental Consideration (REC) document is prepared for the project, and the project may proceed as planned. These are the most commonly prepared documents.
2. An Environmental Assessment (EA) may be required when the conditions for a Categorical Exclusion are not met. This often happens when extensive new military exercises, major construction, or land acquisition is planned; when the planned action involves a large area; or when wetlands or endangered species may be involved. A Finding of No Significant Impact (FONSI) is required for the action to proceed as planned. Environmental Assessments are comprehensive documents that describe a proposed action and the alternatives to the action. A 30-day review period is provided for public comment.
3. If more study is needed or a Finding of No Significant Impact cannot be prepared, an Environmental Impact Statement (EIS) must be written. These can be lengthy documents that require significant time to prepare.

The TNARNG uses NEPA to ensure its activities are properly planned, coordinated and documented. The TNARNG provides NEPA documentation for proposed unit projects at VTS-C that are beyond the existing level of documentation developed by the TNARNG for the training site. This additional NEPA documentation can then be used for identification of potential problems or impacts on the natural resources of the VTS-C.

An Environmental Assessment (Appendix A) has been written to review the implementation of this plan. Topics addressed are related to the effects of the proposed plan on natural and cultural resources. The details are discussed in the following chapters and include but are not limited to: endangered species, wildlife, riparian zones, floodplains, wetlands, archaeological and historic sites, off-road vehicle use, sedimentation, erosion, timber harvesting and non-point source pollution.

## **1.6 IMPLEMENTATION AND REVISION**

The original VTS-C INRMP was implemented in 2002. During the first years of implementation, it became apparent that the format and content of the original INRMP were not conducive to applied management. In addition, the discovery of a federally listed threatened plant species required substantive changes in the VTS-C management plan. TNARNG decided in 2003 to initiate a full revision of the document to bring the structure and project lists more in line with actual management practices and provide for the protection of the listed species. The cooperating agencies were informed of this decision and requested to contribute to the revision process; there was no opposition to this proposal. Both the USFWS and the GDWR contributed substantially to the development of the rare species management guidelines. This occurred prior to the publication of the DoD Supplemental Guidance (2004) and NGB Interim Guidance (2005) which defined the process for a review for operation and effect. The cooperating agencies have reviewed and contributed to this new iteration (see documentation in Appendix C), thus satisfying the requirement for a joint review.

This INRMP is living document. It will be reviewed and updated annually and will remain in effect until a review finds that significant revision is necessary. It was developed in cooperation with the USFWS Athens, GA, Field Office, and the GWRD. Those agencies have approved the document, as has the Regional Office of the USFWS. It was subjected to public review to satisfy both the Sikes Act and the NEPA process. Public comments were reviewed by the cooperating agencies and incorporated into the final document where appropriate. Public comments are recorded in Appendix D. In addition, Annex 1, the Rare Species Management Plan contains a Biological Assessment of the impacts of this management plan on the federally threatened large-flowered skullcap. The determination was made that impacts were not expected to be detrimental to the protected plant. The USFWS has concurred with this determination in its Biological Opinion, also attached to Annex 1.

During the lifetime of this INRMP, it is the responsibility of the TNARNG Environmental Office to work with the cooperating agencies to review it annually and update it to stay in step with military mission requirements and to maintain compliance with all applicable laws. USFWS, GWRD, Training Site personnel, and the Environmental Office will review the accomplishments for the year and address any issues. Documentation of this review will be maintained in Appendix I. Minor changes will be incorporated when needed into the existing document with agreement of the primary cooperators. In the event of a significant change to management practices, military use, or law, a complete revision may be deemed necessary, requiring collaboration with USFWS and GWRD to produce a new, signed version of the INRMP. Otherwise, five years following the date of implementation of this revision, a full scale review for operation and effect will occur in accordance with the SAIA. A revision or update at that time will be initiated based on this review effort conducted jointly with the USFWS and the GWRD.

Implementation of the INRMP will be realized through the accomplishment of specific goals and objectives as measured by the completion of the projects identified in each section of this plan. Responsibility for implementation of goals and objectives has been identified and assigned to each project throughout this document. It should be noted that project implementation dates are estimated and are subject to change depending upon funding and staffing availability. The implementation schedule in Chapter 4, Table 4.2 will provide a basis for monitoring and evaluating accomplishments toward reaching the goals.

Projects identified in this Plan are reflected in the Status Tool for Environmental Program (STEP). Funding for these projects is programmed seven years out under this system.

### 1.6.1 Personnel

Essential to plan implementation is a balanced team of trained professionals and technical staff. Staffing sources for the natural resources program at VTS-C include:

- Permanent Staff
  - VTS-C Training Site Manager
  - VTS-C Range Control Officer
  - Two state-funded maintenance workers
  - Environmental Branch Personnel
    - TNARNG Environmental Program Manager
    - Natural Resources Manager
    - Pest Management Coordinator
    - Biologist
    - Cultural Resources Manager
- Part-time Staff
  - Training Site Detachment (8-10 people per weekend)
  - Summer Interns
- Troop Labor during Annual or Drill Training provides benefits to the training site as well as to the troops themselves. Examples of projects executed using troop labor in the past are road leveling and grading, spreading of gravel, development of a confidence course, and hardened bivouac site construction. A minimum of 100 man days per year are required to complete necessary LRAM projects and 95 man days for environmental projects using troop labor at VTS-C.

### 1.6.2 Outside Assistance

Because it is most probable that TNARNG will not be able to hire the specialized expertise needed to achieve some of the projects within this INRMP, considerable expertise from universities, agencies, and contractors will be required to accomplish the tasks. Specific needs from other organizations external to TNARNG are indicated throughout this plan.

Agencies and organizations which may provide substantial support to TNARNG in carrying out this INRMP include:

- Georgia Department of Natural Resources
  - Wildlife Resources Division
  - Historic Preservation Division
- Georgia Forestry Division
- U.S. Fish and Wildlife Service, Athens Field Office

- U.S. Forest Service
- Natural Resources Conservation Service, La Fayette (Walker County) Office

Universities are a key source of scientific expertise. TNARNG does not currently have any Memoranda of Understanding with local schools but is working to establish relationships with:

- University of Tennessee at Knoxville
- University of Tennessee at Chattanooga
- University of Georgia at Athens
- Tennessee Technological University

Many of the projects identified in this plan will require expertise and time beyond that available within the permanent TNARNG staff. Such projects will be contracted out to appropriate organizations or corporations and overseen by TNARNG Environmental Office staff.

### **1.6.3 Training**

Training received by TNARNG personnel and others participating in the management of natural resources at the training site should address practical job-oriented information, legal compliance requirements, applicable DoD/DA regulations, pertinent State and local laws, and current scientific and professional standards as related to the conservation of natural resources. The following annual workshops, professional conferences, and classes are excellent means of obtaining interdisciplinary training for natural resources managers:

- NGB National Environmental Workshop
- Sustainable Range Program Workshop
- Land Rehabilitation and Maintenance Conference
- Kansas State University GIS training
- Utah State University ARCVIEW training
- Colorado State University-Center for Ecological Management of Military Lands RTLA Training
- Pesticide Application and Licensing through Georgia Department of Agriculture
- National Military Fish and Wildlife Association Conference
- U.S. Army Corps of Engineers Wetlands Delineation Courses
- Prescribed Fire Management Course offered by The Nature Conservancy
- Locally available training through the Cooperative Extension Service, universities, professional and trade organizations, state government, and commercial businesses

### **1.6.4 Funding**

Implementation of the INRMP is subject to the availability of annual funding. The following discussion of funding options is not a complete listing of funding sources. Funding sources are continuously changing and the individual focus, restrictions, and requirements of funding sources are volatile.

In 2005, DA created the Sustainable Range/Installations Environmental Activities Matrix to realign and clarify funding responsibilities for environmental requirements on ranges and facilities to avoid redundancy and gaps. The matrix designates that Environmental is the primary funding source for cultural resources, wetlands, endangered species, and all environmental plans. Installations are the primary funding source for soils issues (erosion), pest management, and invasive species control. Prescribed burning is a shared responsibility: Environmental funds cover planning and burning for ecosystem management and endangered species protection/management. Installations are responsible for wildfire prevention, response, and control, including fire break maintenance.

### Operations and Maintenance Environmental Funds:

Environmental funds are a special category of Operations and Maintenance (O&M) funds and are controlled by the Status Tool for Environmental Program (STEP) budget process. They are special in that they are restricted by the DOD solely for environmental purposes, but they are still subject to restrictions of O&M funds. Compliance with appropriate laws and regulations is the key to securing environmental funding. The program heavily favors funding high priority projects with a goal of achieving compliance with federal or state laws, especially if non-compliances are backed by Notices of Violation or other enforcement agency action.

### Training Funds:

The VTS-C natural resources management program does not receive training funds except for projects administered through the ITAM program. ITAM funding requests are not submitted via the STEP process. Instead, a 5-year ITAM workplan is used to channel ITAM funding requests from TNARNG, through NGB, to the U.S. Army's Office of the Deputy Chief of Staff for Operations (ODCSOPS). ITAM funding is controlled by the POTO.

### Agriculture, Forestry, and Hunting Permit Funds:

The forestry program at VTS-C participates in the U.S. Army's Conservation Reimbursable and Fee Collection Program. Through this program income from the sale of forest products is used to support forestry activities on the site. At the end of each fiscal year, forestry work plan expenses are deducted from actual forestry proceeds to determine net proceeds. Forty percent of the installation's net proceeds in a given fiscal year is distributed to the county in which the sales took place in accordance with DoD Financial Management Regulation 7000.14-R, Volume 11A, Chapter 16 (August 2002). These state entitlements are to be used to build, maintain, and fund roads and schools. State entitlements are made by DFAS. Any remaining proceeds are transferred to the DoD Forestry Reserve Accounts. Funds from the account can be requested each year for projects directly related to forest management. Activities that can be funded through the forestry program include timber management, reforestation, timber stand improvement, inventories, fire protection, construction and maintenance of timber area access roads, purchase of forestry equipment, disease and insect control, planning (including compliance with laws), marking, inspections, sales preparations, personnel training, and sales.

There are no agricultural outleasements at VTS-C, so funding established for the Agricultural and Grazing Outlease program is not accessed for management at the training site. Likewise, there is no hunting program on the site and so there is no funding from hunting permit fees for wildlife management.

### Other Funding Sources:

The Legacy Resource Management Program provides assistance to DOD efforts to preserve natural and cultural resources on federal lands. Legacy projects could include regional ecosystem management initiatives, habitat preservation efforts, archaeological investigations, invasive species control, and/or flora or fauna surveys. Legacy funds are awarded on the basis of project proposals submitted to the program.

National Public Lands Day is an event that occurs once a year when volunteers come together to improve the country's largest natural resource – our public lands. These volunteers gather on a Saturday every September to help improve the public lands they use for recreation, education, and enjoyment. Consult the National Public Lands Day website for more information at <http://www.npld.com> and follow the link to the DoD contact listed on the Federal Agency Working Group page.

The Pulling Together Initiative (PTI) provides a means for federal agencies to partner with state and local agencies, private landowners, and other interested parties in developing long-term weed management Integrated Natural Resources Management Plan

projects within the scope of an integrated pest management strategy. PTI's goals are: 1) to prevent, manage, or eradicate invasive and noxious plants through a coordinated program of public/private partnerships; and 2) to increase public awareness of the adverse impacts of invasive and noxious plants. Projects that benefit multiple species, achieve a variety of resource management objectives, and/or lead to revised management practices that reduce the causes of habitat degradation are sought. A special emphasis is placed on larger projects that demonstrate a landscape-level approach and produce lasting, broad-based results on the ground. Consult the PTI website link at <http://www.denix.osd.mil/Legacy-public> for information on current grant proposal criteria.

The Federal Domestic Assistance Program 15.608 (Fish and Wildlife Management Assistance) provides technical information, advice, and assistance to Federal and State agencies and Native Americans on the conservation and management of fish and wildlife resources. Projects for grant funding must be submitted to the Regional Director of the USFWS. Cooperative programs with the State conservation agencies and military installations have included joint studies of fishery and wildlife problems of major watersheds, large reservoirs, or streams. Through the Sikes Act, the Service has established a Memorandum of Understanding with the DoD whereby fish and wildlife values are considered on military installations.

The DoD administers the grant program "Streamside Forests: Lifelines to Clean Water," a competitive grant program designed to help children and others learn about protecting resources by working with installation staff to help restore a streamside ecosystem in their own community. The DoD provides funds up to \$5,000 to military installations working in partnership with local school and/or civic organizations to purchase locally native plant material for small streamside restoration projects.

### 1.6.5 Priorities and Scheduling

The Environmental Quality Conservation Compliance Classes define funding priority with regard to O&M funds. All projects in classes 0, I, and II shall be funded consistent with timely execution to meet future deadlines (DODI 4715.3). The four project classes are:

Class 0: Recurring Natural and Cultural Resources Conservation Management Requirements – includes projects and activities needed to cover the recurring administrative, personnel, and other costs that are necessary to meet applicable compliance requirements (Federal and State laws, regulations, Presidential Executive Orders, and DOD policies) or which are in direct support of the military mission. Examples of recurring costs include:

- Manpower, training, and supplies
- Hazardous waste disposal
- Operating recycling activities
- Permits and fees
- Testing, monitoring, and/or sampling and analysis
- Reporting and record keeping
- Maintenance of environmental conservation equipment
- Compliance self-assessments

Class I: Current Compliance – includes projects and activities needed because an installation is currently or will be out of compliance if projects or activities are not implemented in the current program year.

Examples include:

- Environmental analyses, monitoring, and studies required to assess and mitigate potential effects of the military mission on conservation resources
- Planning documents

- Baseline inventories and surveys of natural and cultural resources
- Biological assessments, surveys, or habitat protection for a specific listed species
- Mitigation to meet existing regulatory permit conditions or written agreements
- Wetlands delineation
- Efforts to achieve compliance with requirements that have deadlines that have already passed
- Initial documenting and cataloging of archaeological materials

Class II: Maintenance Requirements – includes those projects and activities needed that are not currently out of compliance but shall be out of compliance if projects or activities are not implemented in time to meet an established deadline beyond the current program year. Examples include:

- Compliance with future requirements that have deadlines
- Conservation and Geographic Information System mapping to be in compliance
- Efforts undertaken in accordance with non-deadline specific compliance requirements of leadership initiatives
- Wetlands enhancement, in order to achieve the Executive Order for “no net loss” or to achieve enhancement of existing degraded wetlands
- Environmental awareness and education programs for troops and the public

Class III: Enhancement actions, beyond compliance – includes those projects and activities that enhance conservation resources or the integrity of the installation mission, or are needed to address overall environmental goals and objectives, but are not specifically required under regulation or Executive Order and are not of an immediate nature. Examples include:

- Participation in “National Public Lands Day”, an annual event where volunteers unite to improve resources on public lands
- Community outreach activities, such as “Earth Day” and “Historic Preservation Week”
- Educational and public awareness projects, such as interpretive displays, oral histories, “Watchable Wildlife” area, nature trails, wildlife checklists, and conservation teaching materials
- Restoration or enhancement of cultural or natural resources when no specific compliance requirement dictates a course or timing of action
- Management and execution of volunteer and partnership programs

## CHAPTER 2 TRAINING SITE OVERVIEW

### 2.1 LOCATION AND REGIONAL CHARACTER

#### 2.1.1 Location, size, general description

The Volunteer Training Site – Catoosa (VTS-C) is located in east-central Catoosa County in northwestern Georgia (Figure 2.1), approximately two miles east of Ringgold, the county seat, and 13 miles east of Fort Oglethorpe, Georgia. The 1,628-acre training site is approximately 90 miles northwest of Atlanta, the state capital, and approximately 20 miles southeast of Chattanooga, Tennessee. Georgia State Highway 2 borders the site on the south, and Salem Valley Road accesses the northern boundary (Figure 2.2). The site is approximately 16,000 feet at its maximum length by approximately 6,625 feet at its maximum width.

#### 2.1.2 Property Ownership

The VTS-C is owned by the U.S Army Corps of Engineers and has been licensed for use to the TNARNG since 1960. The Tennessee Military Department operates the VTS-C for the TNARNG through a license (DA Outgrant Number DACA21-3-72-0401) from the U.S. Army Corps of Engineers. The TNARNG is responsible for upkeep of the entire licensed area.

#### 2.1.3 Neighboring Land Ownership and Encroachment

The property surrounding VTS-C is primarily privately owned residential and agricultural land. The helicopter landing pad is approximately 100 feet north of the closest residence. Land to the north of the maneuver area and rifle range and west of VTS-C is composed of cultivated land, cattle pasture, and hardwood forest. A school (Tiger Creek Elementary) is located approximately 0.5 mile west of the training site on Highway 2.

#### 2.1.4 Demographics

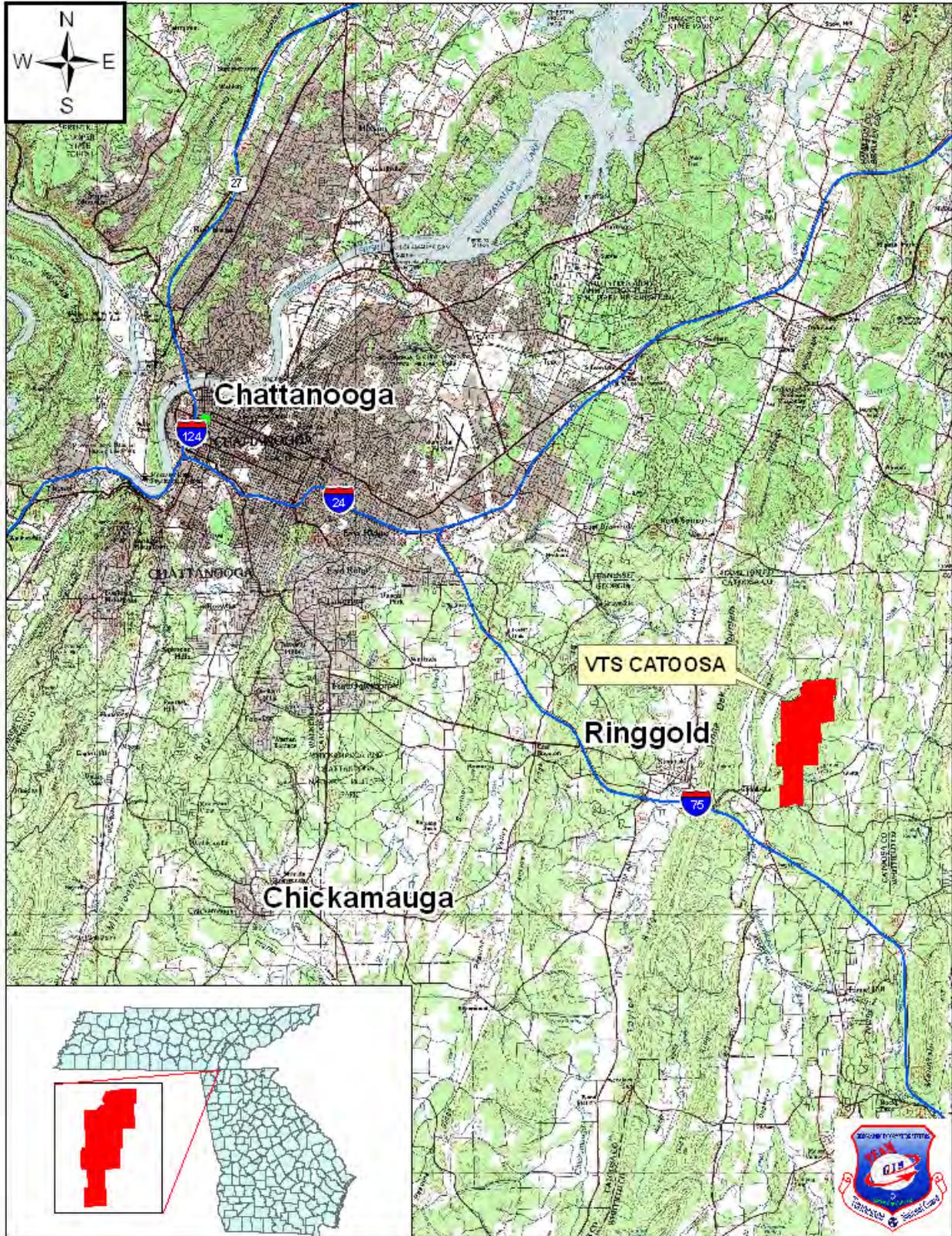
The total resident population in 2005 for Catoosa County, Georgia, was 60,813 (Table 2.1). The unemployment rate for the county is less than the state average. Median household income is also slightly less than the median income for the state.

**Table 2.1: Selected demographic data for Catoosa County, Georgia.**

	Total Resident Population, 2011 *	Median Household Income, 2006-10 *	% Persons Below the Poverty Line, 2006-10 *	Unemployment Rate (%), 2010 **
Catoosa County	64,530	\$46,544	11.2 %	8.1 %
Georgia	9,815,210	\$49,347	15.7 %	10.2 %
U.S.	311,591,917	\$51,914	13.8 %	9.6 %

\* U.S. Census Bureau (2012)

\*\* U.S.D.A. Economic Research Service (2012)



**Figure 2.1: Location of the Volunteer Training Site – Catoosa.**

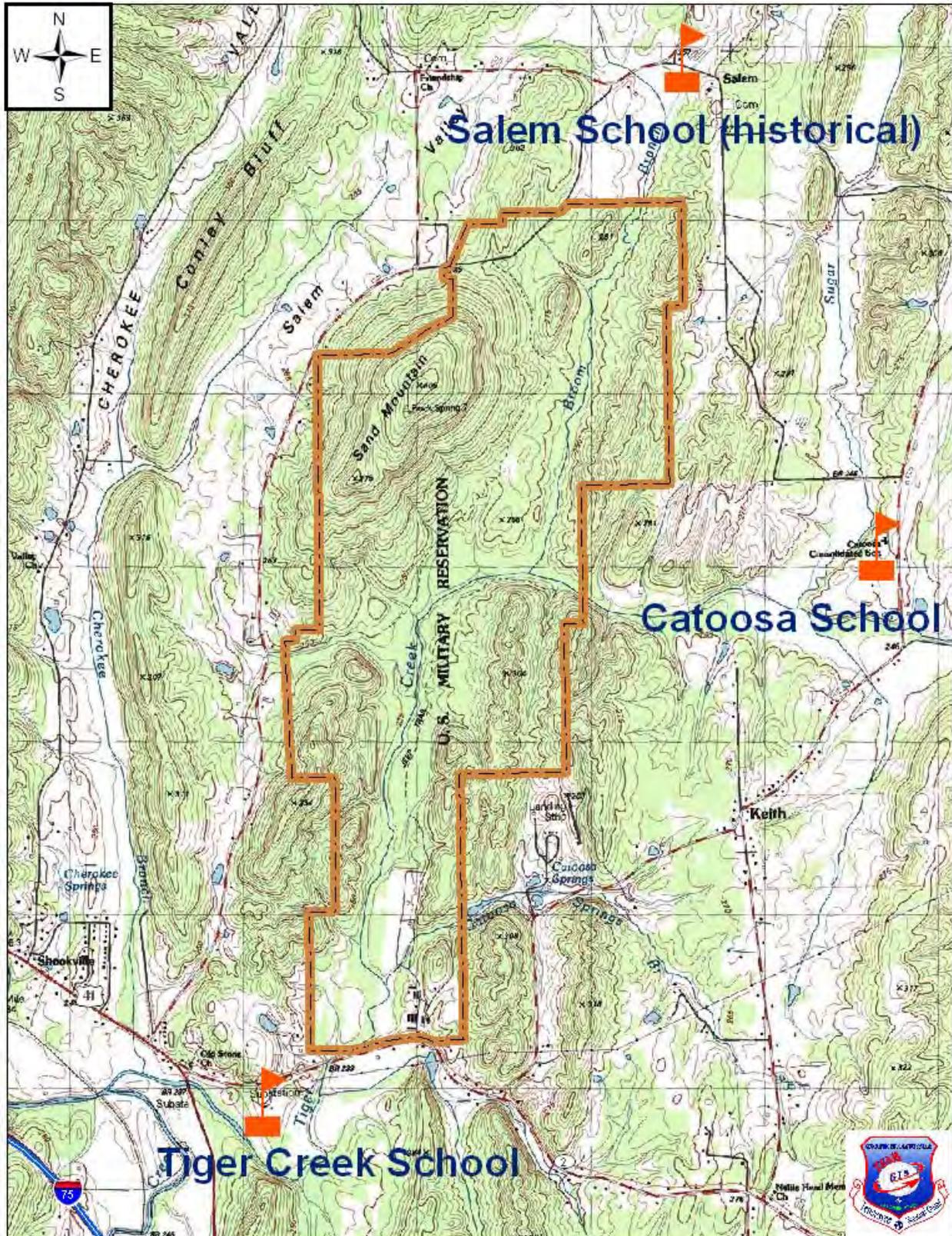


Figure 2.2: Local surroundings of VTS-Catoosa.

### 2.1.5 Nearby Natural Areas and Parks

A large portion of northwest Georgia is protected natural lands, the bulk of which falls within the Chattahoochee National Forest which covers parts of 18 counties in Georgia. The following list of natural areas within 30 miles of VTS-C was collected from multiple sources, including US Forest Service 2006, US National Park Service 2006, and Henry Chambers, GADNR, personal communication.

Chattahoochee National Forest – 750,502 acres in northwest Georgia – six acres of forest fall in Catoosa County and 11,719 acres are within Whitfield County, to the southeast of Catoosa. Both of these acreages are part of the Armuchee-Cohutta Ranger District, headquartered in Chatsworth, GA

Chickamauga and Chattanooga National Military Park – 9,059 acres south of Chattanooga in both Georgia and Tennessee

Cloudland Canyon State Park – 2300 acres in Dade and Walker Counties, straddling the deep gorge cut by Sitton Gulch Creek

Crockford-Pigeon Mountain Wildlife Management Area (WMA) – 16,400 acres in Walker County, west of Lafayette, GA

Elsie Holmes Nature Park (county park) – 66 acres in Catoosa County, approximately 5 miles from the training site, which has a protected population of large-flowered skullcap

Fort Mountain State Park – 3712 acres in Murray County within the Chattahoochee National Forest, including a 17 acre lake

JH (Sloppy) Floyd State Park – 500 acres in Chattooga County, including a 16 acre lake and a 34 acre lake

Johns Mountain WMA – 24,000 acres in Gordon and Walker Counties, located on the Chattahoochee National Forest

Otting Tract WMA – 700 acres in northwest Chattooga County.

Zahnd Tract Natural Area – 1400 acres in Dade and Walker Counties, including a 161 acre WMA.

## 2.2 INSTALLATION HISTORY

Catoosa County was established from Walker and Whitfield Counties by an act of the General Assembly of Georgia in 1853 (Lawrence 1993). The name is derived from the Cherokee word “Catoosa,” meaning “between two hills.” Cherokee Indians originally occupied Catoosa County, but a treaty signed in 1835 allowed the state to take control of lands formerly held by the Cherokee Nation. In 1838, the Cherokee people were forced from the area. In 1863, a fierce Civil War battle took place in and around Ringgold, the county seat (Lawrence 1993).

Military use of the lands that comprise VTS-C began in 1904 when the army utilized land adjacent to Catoosa Springs as a target range for training troops from Fort Oglethorpe. The land was originally leased by the Army and later purchased as two separate acquisitions in 1906-07 (876 acres) and 1910 (additional 751.41 acres).

The Catoosa property was referred to as the “Target Range” or “Rifle Range” during its years of association with Fort Oglethorpe, from 1910 until the end of World War II. The “Fighting” 6<sup>th</sup> Cavalry trained at Catoosa from 1919-1941, and members of the Woman’s Army Corps (WACs) were trained there during World War II. Soldiers were transported from the post to a 1,000 yard rifle range at the south end of the VTS-C property. Apparently the site held 13 buildings at that time, four located near Catoosa Springs Road and eight located along Tiger Creek at the base of Sand Mountain.

When Fort Oglethorpe closed in 1945, the associated property including the Catoosa Target Range was offered for public sale. In 1948, the rifle range was withdrawn from surplus and placed under the jurisdiction of the Army Corps of Engineers in an inactive status to be used by the Tennessee National Guard for training its Ground Force Unit. Since 1960, the TNARNG has had operational control through a license from the Corps of Engineers. The name of the facility was changed to the National Guard Catoosa Rifle Range in 1966, to Catoosa Area Training Center in 1976, and finally to the Volunteer Training Site – Catoosa in 2003.

### 2.3 MILITARY MISSION

The TNARNG serves both state and federal missions. Both state and federal funding are provided to ensure that the Tennessee Army National Guard is constantly ready to support any mission or need requiring military personnel and equipment. When called by the Governor, the state mission supports civil authorities in the protection of life and property and the preservation of peace, order, and public safety. When called by the President in times of war and national emergency, the federal mission provides trained and equipped personnel and units capable of rapid deployment.

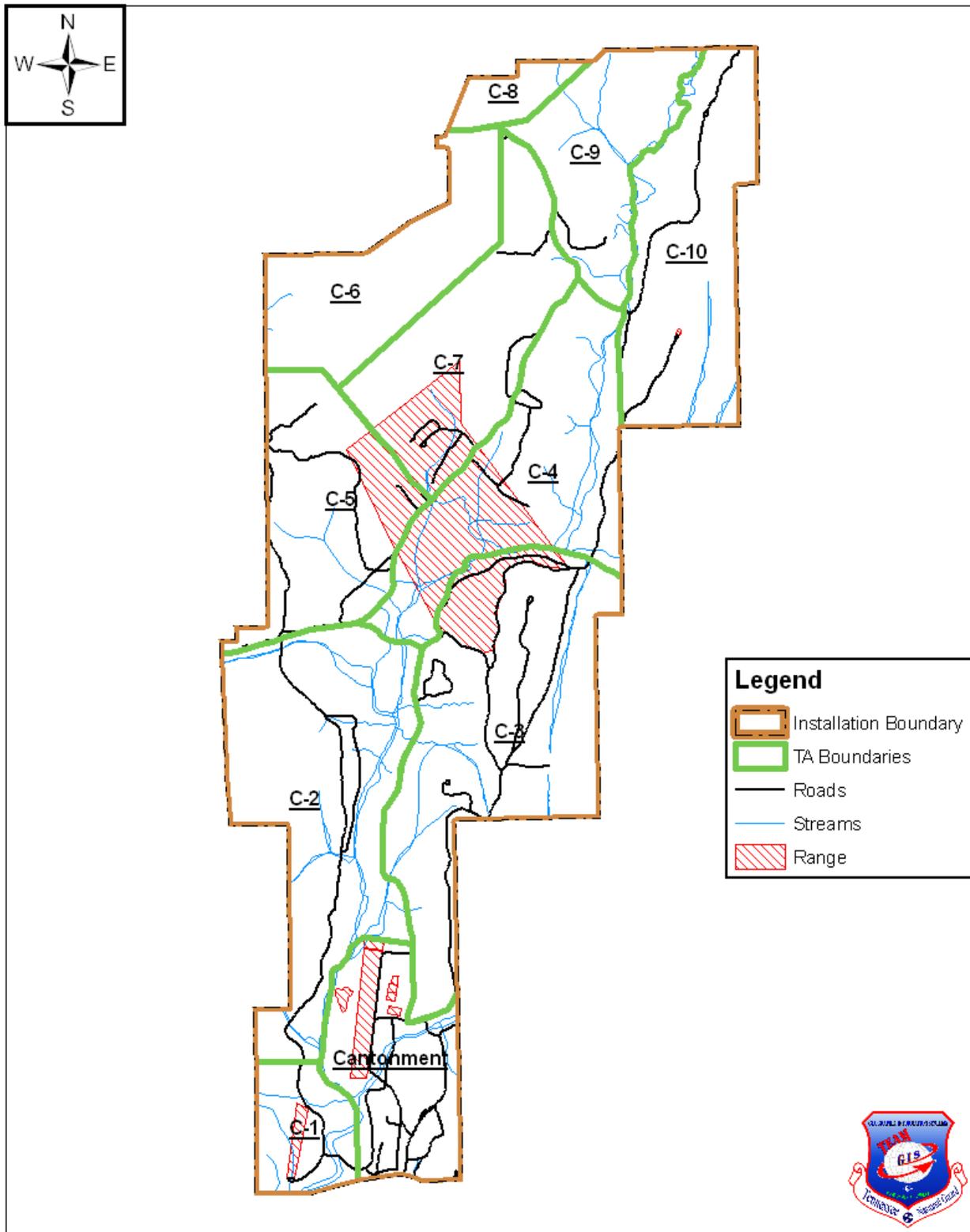
The VTS-Catoosa mission statement is to provide state of the art training facilities in support of total force training requirements to sustain operational readiness and exceed mission requirements. Training needs are subject to change in the near future as the TNARNG embraces the transformation of the military force structure.

### 2.4 FACILITIES

VTS-C has a 55.1-acre Cantonment Area, which is the improved portion of the training site. Developed facilities include an administrative building, three supply buildings, two mess halls each with kitchen shelter, seven barracks which house 400 soldiers (occupied by visiting TNARNG personnel only during training periods), a guardhouse, a 200 soldier latrine (with shower), one 50 soldier classroom, and paved parking.

The training site is divided into ten training areas and the cantonment area (Figure 2.3). Facilities in the small arms range area include two support buildings; one range tower; a weapon cleaning station; and a parking area. Available ranges on the site include:

25-meter Pistol Range	Tank Gunnery Range 1:60 scale
25-meter Rifle Range	Tank Table VII range 1:2 scale
10-meter M-60 Machine Gun range	M31 Artillery Range (inactive)
1200-meter Machine Gun Transition	M32 Mortar Range (inactive)
Known Distance Rifle Range (100-600 yards)	Demolition Range
M-203 Grenade Launcher Range	Gas Chamber
Hand Grenade Qualification Course	Urban Assault Course
MK-19 Range	



**Figure 2.3: VTS-Catoosa Training Areas and Facilities.**

Army aviation facilities include one lighted, non-controlled helipad. The nearest fuel point is the Chattanooga Metropolitan Airport. The existing facilities are considered sufficient to accommodate the current level of activities at VTS-C; however, to support the changing nature of the TNARNG mission, future plans include the addition of a Tactical Training Base (TA C-4), additional barracks and classrooms in the cantonment, and additional live fire ranges (TAs C-7, C-9, and C-4).

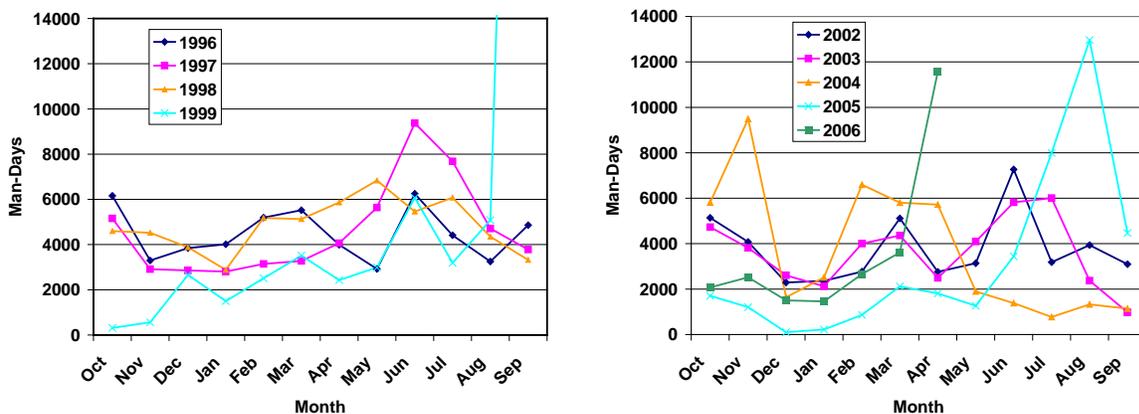
### 2.5 TRAINING SITE UTILIZATION

The VTS-C is the primary training facility for TNARNG units within 100 miles of the training site. The primary user units are:

1-181 <sup>st</sup> HIMARS BN	300 QM BN
TEC/AMS (Air Guard)	108 FA BN
489 CA BN	3397 <sup>th</sup>
4-14 <sup>th</sup> Marines (M Bttry)	212 Transportation BN
USARC History Group	844 <sup>th</sup> ENG BN
Co H, 121 INF (ABN)(LRS)	161 <sup>st</sup> ASB BN
265 <sup>th</sup> ENG BN	278 ACR
171 AVN BN	

Total training site utilization for the VTS-C for 1996-1999 and 2002-2005 is summarized in Figure 2.4 in man-days per month. The monthly data for three user groups (TNARNG/TNANG, Other Military, and Civilian) from fiscal years 1996-1999 and 2002-2005 are also presented in Table 2.2. Average training site usage over the past four years has been approximately 42,700 soldiers per year, a decrease from the average of 50,400 for the years 1996-1999 (not including the 55,000 civilians who took part in a Civil War Reenactment in September of 1999 – the off-the-chart spike on Figure 2.4).

Seasonal distribution of training activities can be seen in Figure 2.5. Training site use is generally well dispersed across the year; however, distinct peaks of National Guard usage occur in October-November, February-April, and June. The low level of use from May 2004 to May 2005 was due to unit deployments.



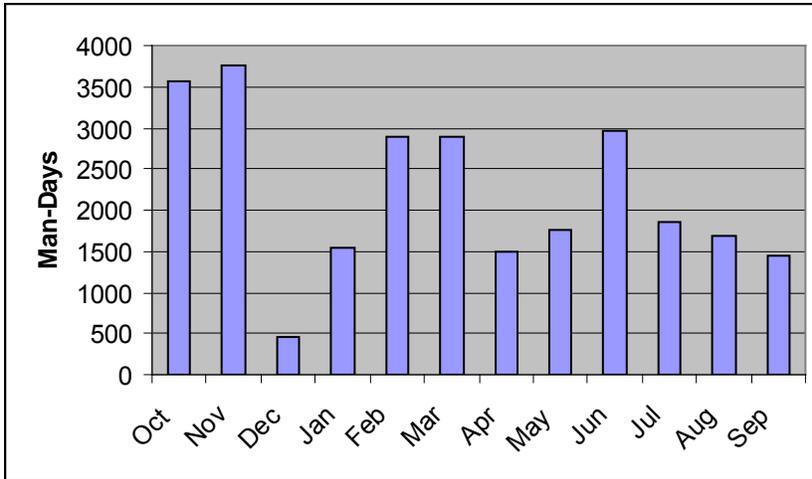
**Figure 2.4: Total training site use 1996-1999 and 2002-2006.**

**Table 2.2: Training site utilization by National Guard, other military, and civilian users, 1996-1999 and 2002-2006.**

<b>TY1996</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>TOTAL</b>
<b>TNARNG/TNANG</b>	3463	1087	1640	2036	2126	2975	2357	1354	1543	4016	2740	2826	28163
<b>Other Military</b>	2134	1857	2028	1417	2694	2113	1340	1236	770	338	196	1829	17952
<b>Civilian</b>	558	351	177	558	375	434	296	332	3934	58	316	205	7594
<b>TOTALS</b>	6155	3295	3845	4011	5195	5522	3993	2922	6247	4412	3252	4860	53709
<b>TY1997</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>TOTAL</b>
<b>TNARNG/TNANG</b>	3131	1340	606	72	2382	2155	2407	3511	8322	6260	3320	2365	38191
<b>Other Military</b>	1459	1061	1962	72	552	956	1001	1714	467	216	490	1245	11195
<b>Civilian</b>	570	512	287	343	209	166	654	412	582	1205	899	168	6007
<b>TOTALS</b>	5160	2913	2855	487	3143	3277	4062	5637	9371	7681	4709	3778	55393
<b>TY1998</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>TOTAL</b>
<b>TNARNG/TNANG</b>	1700	2693	1115	2132	3798	2684	4296	4274	2674	2086	3572	1740	32764
<b>Other Military</b>	1542	1228	1875	392	1062	1757	921	2201	800	2350	314	1140	15582
<b>Civilian</b>	1358	600	890	360	319	687	649	356	1989	1639	465	440	9752
<b>TOTALS</b>	4600	4521	3880	2884	5179	5128	5866	6831	5463	6075	4351	3320	58098
<b>TY1999</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>TOTAL</b>
<b>TNARNG/TNANG</b>	214	561	261	818	1938	2079	930	877	3883	2430	4350	3253	21594
<b>Other Military</b>	100	0	1052	679	535	1336	1274	1873	1713	708	0	378	9648
<b>Civilian</b>	0	0	1349	0	35	100	225	240	475	57	727	55288	58496
<b>TOTALS</b>	314	561	2662	1497	2508	3515	2429	2990	6071	3195	5077	58919	89738

Table 2.2, continued:

<b>TY2002</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>TOTAL</b>
<b>TNARNG/TNANG</b>	4200	2657	795	2007	1917	4023	2197	2562	5086	455	2026	2264	30189
<b>Other Military</b>	696	1220	1442	80	362	817	235	328	964	883	1281	635	8943
<b>Civilian</b>	240	203	56	275	490	270	330	250	1217	1847	629	194	6001
<b>TOTALS</b>	5136	4080	2293	2362	2769	5110	2762	3140	7267	3185	3936	3093	45133
<b>TY2003</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>TOTAL</b>
<b>TNARNG/TNANG</b>	3468	3462	800	1968	3621	2897	2044	3276	4832	2292	702	423	29785
<b>Other Military</b>	652	230	1375	0	67	1084	178	154	846	1248	980	378	7192
<b>Civilian</b>	608	123	430	158	312	380	269	664	141	2468	688	180	6421
<b>TOTALS</b>	4728	3815	2605	2126	4000	4361	2491	4094	5819	6008	2370	981	43398
<b>TY2004</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>TOTAL</b>
<b>TNARNG/TNANG</b>	5462	8670	248	2155	6474	3674	1366	360	872	315	474	793	30863
<b>Other Military</b>	0	816	1122	0	120	1829	2742	640	123	43	594	323	8352
<b>Civilian</b>	350	0	268	360	0	300	1610	900	390	416	260	27	4881
<b>TOTALS</b>	5812	9486	1638	2515	6594	5803	5718	1900	1385	774	1328	1143	44096
<b>TY2005</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>TOTAL</b>
<b>TNARNG/TNANG</b>	1401	895	60	54	348	990	1276	946	2130	4407	7205	2869	22581
<b>Other Military</b>	105	240	0	72	516	893	330	70	633	600	3124	776	7359
<b>Civilian</b>	199	70	42	98	0	238	208	251	680	2987	2630	819	8222
<b>TOTALS</b>	1705	1205	102	224	864	2121	1814	1267	3443	7994	12959	4464	38162
<b>TY2006</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>TOTAL</b>
<b>TNARNG/TNANG</b>	738	1742	378	956	1874	2876	10236						18800
<b>Other Military</b>	808	308	554	114	533	740	1324						4381
<b>Civilian</b>	530	468	570	387	254	0	10						2219
<b>TOTALS</b>	2076	2518	1502	1457	2661	3616	11570						25400



**Figure 2.5: National Guard (TNARNG/TNANG) monthly use of VTS-C (average for 2002-2005).**

Training activities on VTS-C are variable. The types of training on VTS-C in the future are expected to be similar to previous years, as shown in Table 2.3. Typical uses include small arms range firing, maneuvering, and combined arms training including field bivouac; tracked and wheeled vehicle operations on developed roads and major trails; mounted and dismounted maneuvers; and weapons firing. Off-road maneuvers are permitted within designated open terrain areas and in designated fringe areas (concealment parking sites) within 100 feet of specified roads and trails within the maneuver area. Up to one battalion-size infantry, artillery, engineer, or combat service support unit, conducting non-live fire exercises, can be accommodated at one time.

**Table 2.3. Types of training anticipated.**

Type of Training
Airborne, air assault operations
Lane Training Event using WTBD Task (Warrior Task Battle Drills)
AWQ, IWQ, and Crew served weapons on small arms ranges
Field artillery units doing collective training to include maneuver from one firing position to another
Field Training Exercise (FTX) and Command Post Exercise (CPX) operations which include setting up the Unit Headquarters in a field Tactical Operations Center
Military Police (MP) unit operations primarily route security and surveillance, company sized units
Land Navigation Course for OCS, MP, and others
Obstacle Course, company or platoon size elements
Basic to Advanced classroom instruction
Tank and Bradley qualifications
Mounted Land Navigation Course – All unit types
Artillery Training and Familiarization
Grenade Launcher Training / Qualifications
Light Infantry Training – Primarily Company/Platoon Tactics
Urban Assault Course Training - Infiltration, breaching, and clearing operations

## 2.6 EFFECTS OF TRAINING ON NATURAL RESOURCES

Military training can have both negative effects on and positive benefits to natural resources. Maneuver damage is by far the largest negative effect on the natural resources at VTS-C. Maneuvering heavy tracked and wheeled vehicles across even the best-suited landscapes can cause damage to vegetation and soils. For this reason, soils at the VTS-C require timely land rehabilitation efforts at appropriate intervals. Vegetation as well as soils can be damaged by regular use on areas such as trails, bivouac sites, and firing points. Wildlife populations can also be harmed by field equipment training, small arms firing, or by mission related wildfires.

The impact level of typical TNARNG training activities is given in Table 2.4. “Low” impact activities are those which generally will not disturb the vegetation or soil and will require no rehabilitation. “Medium” impact activities may cause some disturbance or change which may require minor rehabilitation or which may recover over time without aid. “High” impact activities typically cause significant change to the soils or vegetation of the area which will require timely attention to avoid or minimize long-term alteration of existing conditions. Some training activities may be conducted at different levels of disturbance.

**Table 2.4: Military training and land use activities that may cause soil or vegetation disturbance.**

<b>Training Activities</b>	<b>Low Impact</b>	<b>Medium Impact</b>	<b>High Impact</b>
Small unit infantry tactics	X		
Reconnaissance	X		
Terrain/map analysis	X		
Escape and evasion	X		
Infiltration	X		
Land navigation – mounted and dismounted	X		
Patrolling	X		
Nuclear, Biological, Chemical training with simulated agents	X	X	X
Engineer reconnaissance	X		
Tactical bivouac occupation/displacement		X	X
Cold weather operations	X	X	X
Cover and concealment		X	
Field fortifications		X	X
Install/clear minefields			X
Construct obstacles			X
Breaching and clearing operations			X
Construct and maintain main supply routes	X	X	
Demolition training			X
Nonstandard fixed bridges		X	
Bridging and rafting operations		X	
Fording operations		X	
Mobility and countermobility			X
Weapons qualifications/familiarization		X	
Mechanized maneuvers (tracked or wheeled)			X
Artillery training (setup and firing)			X
Direct fire			X
Aerial operations	X		

Five basic management techniques can be used to minimize military training effects to the soil and vegetation resources: (1) limit total use; (2) redistribute use; (3) modify kinds of uses; (4) alter the behavior of use; and (5) manipulate the natural resources for increased durability. These will be discussed throughout the management plan. One example of modifying the kind of use is the use of simulators and simulations at VTS-C. Various high-technology methods have been implemented at VTS-C to provide for increased safety, better use of available space, and reduced effects of noise on natural resources by eliminating the need for live-fire in certain situations. Expanded use of simulators and better equipment can reduce maneuver damage to land and soils while improving training realism.

Vehicle maneuvers, tracked and wheeled, have the potential to cause the greatest military related impact to the VTS-C ecosystem. Vehicles used by TNARNG range from Humvees to Abrams tanks. Military vehicle training may involve single vehicle maneuvers up to platoon or squadron size elements. Soil compaction and erosion are the most probable results of vehicle maneuvers. Appropriate planning (avoiding steep slopes, highly erodible soil types, and wet soils) and preparation (gravelling of tank trails, etc.) can mitigate much substrate damage. Immediate repair of any damaged areas after training maneuvers ensures no net loss of training area.

Vehicles may also be a significant factor in the introduction of non-native plant matter to the VTS-Catoosa natural areas. Invasive pest plants (IPP) are one of the most immediate threats to native ecosystems in the southeastern U.S. These exotic species can reproduce prolifically and spread rampantly throughout an ecosystem, causing significant disruption to the natural system. To minimize the threat of introducing of new invasive plant species, vehicles arriving at VTS-C from outside the county should be washed thoroughly to remove any soil, seeds, or plant parts before leaving the Cantonment to enter the training area.

Bivouacking has impacts similar to civilian campgrounds. Soil compaction and trampling of vegetation increase runoff rates and may lead to higher erosion. There may also be a change in vegetation composition to more damage- and disturbance-tolerant species. During wet conditions, vehicles may create ruts if pulled off-road. Rotation of sites and careful site choice can minimize the damage caused by bivouacking.

The greatest positive effect of the TNARNG mission on natural resources is the military presence. TNARNG land managers have tried to institute good land use practices such as reducing erosion and negative impacts on stream crossings and wetlands. Disturbances that significantly, and often permanently, change the landscape (for example, agricultural tillage, reduction of forest and wildlife habitat for development, and much recreational vehicle damage) are avoided on VTS-C, so that natural communities are relatively undisturbed and are left to return to their natural compositions. After training, the land is evaluated by training site personnel for any damage. If repair is needed, it is initiated at that time to ensure minimal erosion or loss of training land is occurring. If impacts are substantial, training is rotated to another site until the first area has recovered and can be used again.

## **2.7 NATURAL RESOURCES NEEDED TO SUPPORT MILITARY MISSION**

Due to the variety of units that utilize VTS-C, multiple environmental conditions are needed for training:

- Open woodland areas for bivouac
- Wooded maneuver areas for foot and vehicle traffic
- Road networks

- Pull-off points along roads
- Firing ranges
- Land navigation course
- Urban Assault Course

According to the Training Site Manager, the current site conditions meet most training needs. The steep topography of the site is a major limiting factor that can be minimally altered. The vegetation coverage of the site is acceptable (81% forested, 15% grassland). Sufficient large open grassland areas exist within the center of the site for most training needs. The majority of the forestland is adequate for its training uses.

There is, however, a need for additional small cleared areas for bivouac and other training within the woodlands of training areas C-4, C-5, and C-10. These open areas need to be less than 5 ac (1-2 ac typically) and situated far enough off the main roads to give a sense of seclusion. Six or eight desirable areas will be identified by training site staff for appropriate size, good location, and level ground. If the existing timber warrants, the areas will be incorporated into the timber sale schedule. If the areas do not contain merchantable timber, clearing will be conducted by the training site.

Additional clearing of trees is needed along the property boundary to create the mandated 25 ft line-of-sight buffer for security purposes. Such a buffer will also function as a perimeter firebreak, allow access to the fence for monitoring and repair, and in one section at the north end of the facility (TA C-9) will be expanded into an unimproved trail for wheeled vehicle training.

Additional range development projects are in the proposal or planning stages. Addition of a modified record fire range, relocation of the TTB, and development of a CACTF will involve the clearing of timber, leveling of ground, creation of access roads, and possible relocation of a small group of the federally listed threatened plant, large-flowered skullcap.

The boundary line-of-sight clearing has been addressed in Section 7 consultation with the USFWS for potential impacts on the large-flowered skullcap. Other projects will have to be assessed for potential impact on this plant, as well as on the endangered gray bat which is also found on the training site, and the impacts reviewed with the USFWS through informal and/or formal consultation in accordance with the Endangered Species Act.

A growing beaver population on the site has affected training lands by causing extensive flooding. Attempts to manage the pond levels mechanically have failed. The beaver population will need to be maintained at a lower level through hunting and/or trapping to minimize impact on the training mission and facilities.

To achieve the currently desired missionscape, the VTS-Catoosa needs additional small openings within heavily forested training areas, a cleared boundary fenceline, additional range features, and control of the beaver population. With these additions and modifications, the overall landscape of the VTS-Catoosa should continue to meet TNARNG training needs. Any significant change in mission will require that the missionscape be reexamined.

## 2.8 NATURAL RESOURCE CONSTRAINTS ON MISSION/MISSION PLANNING

Certain features of the natural environment represent potential limitations on training activities. The most significant at VTS-C are rare, threatened, or endangered species; topography; and surface water. The challenge is to protect these sensitive resources while still ensuring the full range of military training required by the mission. Many sensitive areas can be identified prior to any training activity and incorporated into the ambiance of the activity in the form of safety, off-limits, or contaminated areas. This allows protection of the environment in conjunction with more realistic training scenarios.

### 2.8.1 RTE species

Large-flowered skullcap (*Scutellaria montana*) is a federally- and state-listed threatened plant species that grows at VTS-C in small groups ranging in numbers from a few to hundreds per group (see Figure 3.9). This herbaceous species typically occurs in the understory of mature oak forests on the mid-range of slopes. Initial studies started in 2002, and monitoring and training have been in progress since 2004 to gather information and manage this species. Tracked or wheeled vehicles could destroy large numbers of plants, and so the locations where skullcap is known to occur are off-limits to vehicular traffic. These areas are open to foot-traffic except for during the primary growing and flowering season of the plant (March 1-June 30) when trampling might interfere with reproduction.

The gray bat (*Myotis grisescens*) is a federal endangered species. It has been captured feeding over Tiger Creek on VTS-C. To date, no caves or other hibernacula for the species have been found on the training site and so management is currently limited to protecting its foraging habitat. Stream quality and riparian habitat protection are important to maintaining the food source for this protected species, and so best management practices associated with streamside management zones must be integrated into training and land management activities.

### 2.8.2 Topography

VTS-C is located in the foothills of the Southern Appalachian Mountains. Slopes on the training site range from nearly level along the creeks to greater than 50%. The steeper areas are not suitable to some mounted training activities. In addition, the steep slopes are more prone to significant erosion problems. Roads up Sand Mountain have been closed in the past due to the erosion gullies that have formed. Care must be taken with activities that will disturb the soil or vegetation along the slopes, including such projects as building roads, locating and scheduling training, and off-road maneuvers. Immediate reclamation of disturbed areas should be incorporated into all training and site management plans.

### 2.8.3 Surface Water

Two creeks cross a large part of the VTS-C training area: Tiger Creek and its tributary Broom Branch. Water quality in these creeks is high and supports a wide variety of aquatic life. This quality must be protected from sedimentation, chemical pollutants, and damage to the streamside ecosystems. Care must be taken in all activities that could directly or indirectly impact stream conditions, such as stream crossings, vehicular maneuvers and training, fueling activities, and vegetation clearing. Current conditions in lowland parts of the training site, including large portions of the tank range along the banks of Tiger Creek, are too wet for vehicle access throughout much of the year.

## 2.9 GEOGRAPHIC INFORMATION SYSTEM (GIS) ASSETS

TNARNG supports a Geographical Information (GIS) Branch which is responsible for all GPS/GIS activities in support of the CFMO-Environmental Office mission. The TNARNG CFMO GIS Branch provides secondary support of the ITAM mission as it applies to the Environmental activities. The GIS Branch provides mapping, data mining, data storage/retrieval, statistical analysis, and data modeling. As

well as all data collection via GPS, surveying and research. In addition to required GIS/GPS functions the GIS Branch all provides first line Information Technology support, database development and web based publishing. Geospatial data must meet federal, DOD, Army, and NGB standards, including (Federal Geographic Data Committee (FGDC) and Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE). All TNARNG sponsored projects will be incorporated into the TNARNG integrated Geodatabase in support of all Training Site facilities, maintained by the GIS Branch.

The GIS database includes all facilities data, ITAM data, facilities and environmental data, including but not limited to: roads, structures, infrastructure, fencing, utilities, cultural resources, and natural resources, conservation, compliance as well as topographic maps, digital elevation models (DEM), TINs, and aerial photographic coverage of all sites. All environmental projects include gathering of GIS data for inclusion within the system. Additional needs are programmed into the STEP system as they become apparent.

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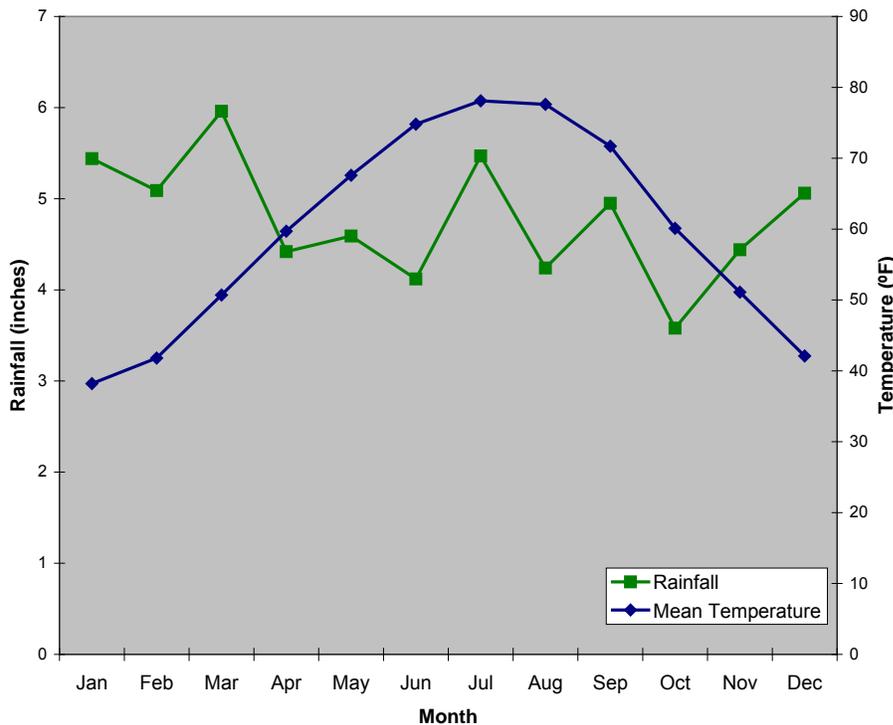
## CHAPTER 3 PHYSICAL AND BIOTIC ENVIRONMENT

### 3.1 CLIMATE

Catoosa County, Georgia, lies within the hot continental division of the humid temperate domain (Bailey 1996) and is characterized by hot summers and cool winters. Temperatures are not moderated much by the distant Atlantic Ocean or the Gulf Stream, and winter climates can be influenced by blasts of arctic air moving southward out of Canada (Georgia State Climate Center 1998). Overall, the climate is not considered a significant factor for the TNARNG. It rarely restricts or prevents training, but does account for what may be numerous state missions each year during weather related emergencies.

*Temperature:* The annual mean temperature for the 30-year period between 1961 and 1990 in Dalton, Georgia, was 59.5°F. Daily temperatures in the summer range from an average low of 65.4°F to an average high of 87.8°F. In the winter the average low is 30°F, and the average high is 51°F (UGA State Climate Office 2007).

*Precipitation:* Average annual precipitation for Dalton, Georgia, for the years 1961-1990 was 57.36 inches. Rainfall is evenly spread across the year, though slightly heavier in the winter and spring (Figure 3.1). The region sees little snow, averaging only 2.6 inches per year over the same 30 year period (UGA State Climate Office 2007).



**Figure 3.1: Mean daily temperature and mean monthly precipitation for Dalton, Georgia, 1961-1990** (data from UGA State Climate Office 2007).

*Relative Humidity:* Relative humidity is high in the region. In Chattanooga, the morning annual average humidity is approximately 86 percent, and the afternoon average is 56 percent. The highest rates for the year are 90-91 percent, occurring in the mornings in August-October. A little further south in Atlanta the relative humidity ranges from a morning average of 82 percent to an afternoon average of 56, with the highest rates of 87-89 occurring in the mornings in July-Sept (NOAA 2005).

*Wind:* The prevailing wind direction in Chattanooga is south; although during the winter months, the wind typically is from the north. The average annual wind speed is 6.4 miles per hour, and winds are strongest in the winter and spring. In Atlanta, wind speeds average 9.9 miles per hour and are also highest in the winter and spring. They tend to be northwest winds in the winter and spring and vary from west or east in the summer and fall (NOAA 1998).

*Climate and Training Exercises:* Average annual precipitation is a very important factor in determining the ability of natural resources to recover from military maneuver training effects. The seasonal distribution of rainfall at VTS-C (over 57 inches per year on average occurring evenly across the seasons) coupled with a growing season which averages 212 days (UGA State Climate Office 2007) allows vegetative cover to regenerate in a short period of time with minimal effort.

The regular rainfall also, however, results in wet soils during much of the year. Maneuver damage can be more extensive when soils are wet, and so training activity scheduling is very important in protecting the natural resources of VTS-C. Rainfall is lowest, and evaporation rates highest, in the summer months, which make those the ideal time for high impact training exercises. Damage to vegetation and soils can be decreased by scheduling high-impact training exercises during these months. Revegetation and maneuver damage repair is also most effective when performed in the winter months (November through March) or in the spring months (April and May) when temperatures begin to increase.

### **3.2 PHYSIOGRAPHY AND TOPOGRAPHY**

The VTS-C lies in eastern Catoosa County, Georgia, within the Armuchee Ridge district of the Ridge and Valley physiographic province, a part of the Appalachian Valley (Hodler and Schretter 1986). This region is described as a series of prominent, narrow, chevron-shaped ridges that run southwest to northeast and rise steeply to 600 to 700 feet above the intervening stream valleys. The ridges are capped mostly by sandstone, while valley floors are generally underlain by less resistant shales and limestones (Hodler and Schretter 1986).

The land surface of the VTS-C ranges from nearly level in the Tiger Creek floodplain and stream terrace to very steep, with Sand Mountain dominating the landscape to the northwest (Figure 3.2). The highest point of elevation on the site is approximately 1,332 feet above the National Geodetic Vertical Datum of 1929, which is approximately sea level. Elevations on the training site range from approximately 755 feet above mean sea level (msl) to 1,332 feet above msl. Elevations of 755 feet msl generally occur along creek channels, and elevations of 1,200 feet msl and higher are characteristic of Sand Mountain and another unnamed mountain to the west. Slopes on VTS-C range from 0% to 53% (U.S. Geological Survey 1983).

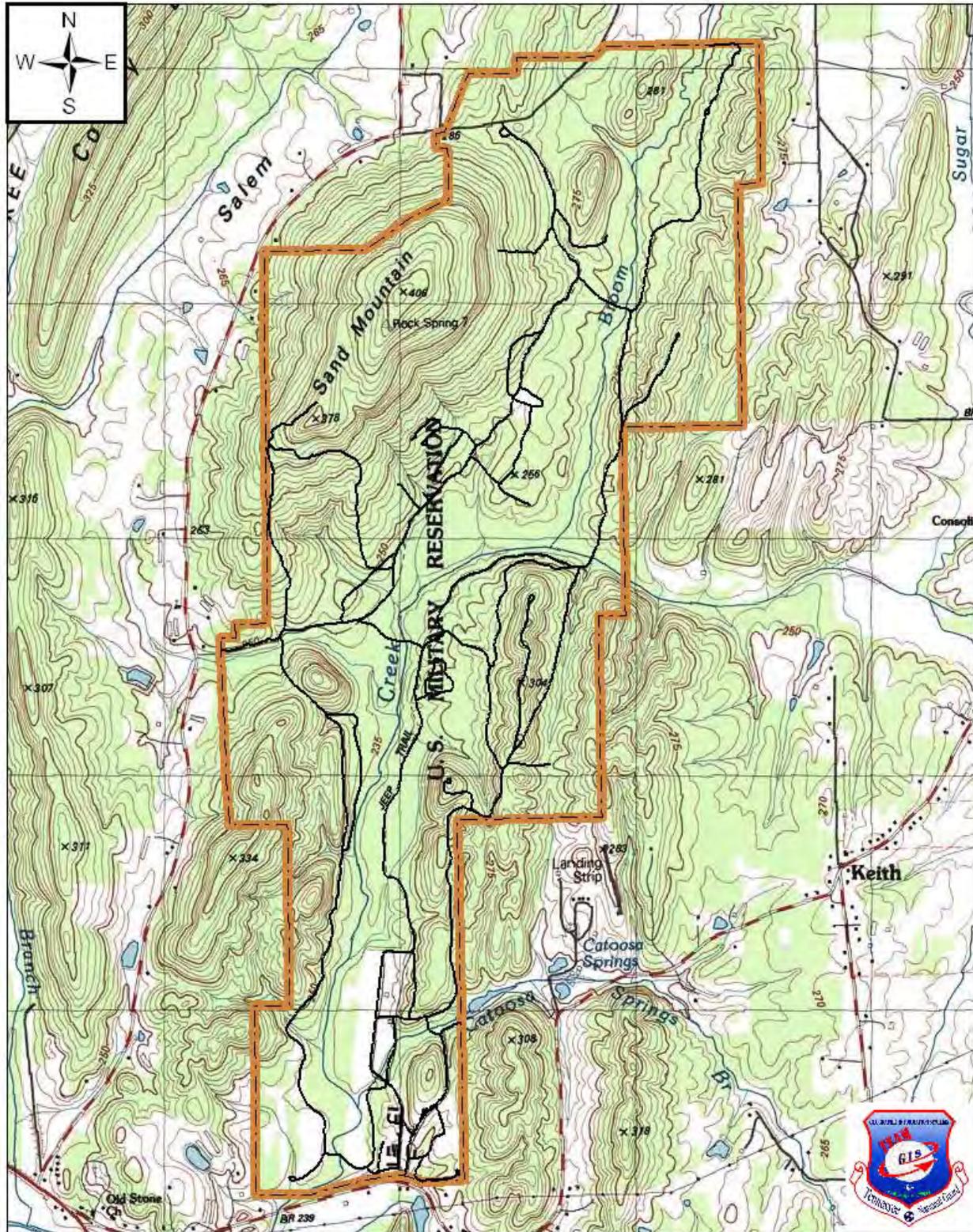


Figure 3.2: Topography of VTS-Catoosa.

### 3.3 GEOLOGY

VTS-C is underlain primarily by Paleozoic (Silurian-Devonian-Mississippian-Pennsylvanian) sedimentary rocks, including Rome and Red Mountain formations, Floyd Shale, and Pennsylvanian undifferentiated rocks (Georgia Department of Natural Resources 1976; Hodler and Schretter 1986). The hills and ridges of the region were created by compressional forces from the southeast causing giant folds. East of Sand Mountain, older rocks were thrust over and now overlie younger rocks, and other faults resulted in realignment of formations (Lawrence 1993). The Rome formation of the Early Cambrian period underlies much of the eastern part of Catoosa County. This formation consists mostly of sandstone, siltstone, and claystone. The Red Mountain Formation consists essentially of sandstone and shale but has a few beds of limestone and fossil iron ore.

### 3.4 SOILS

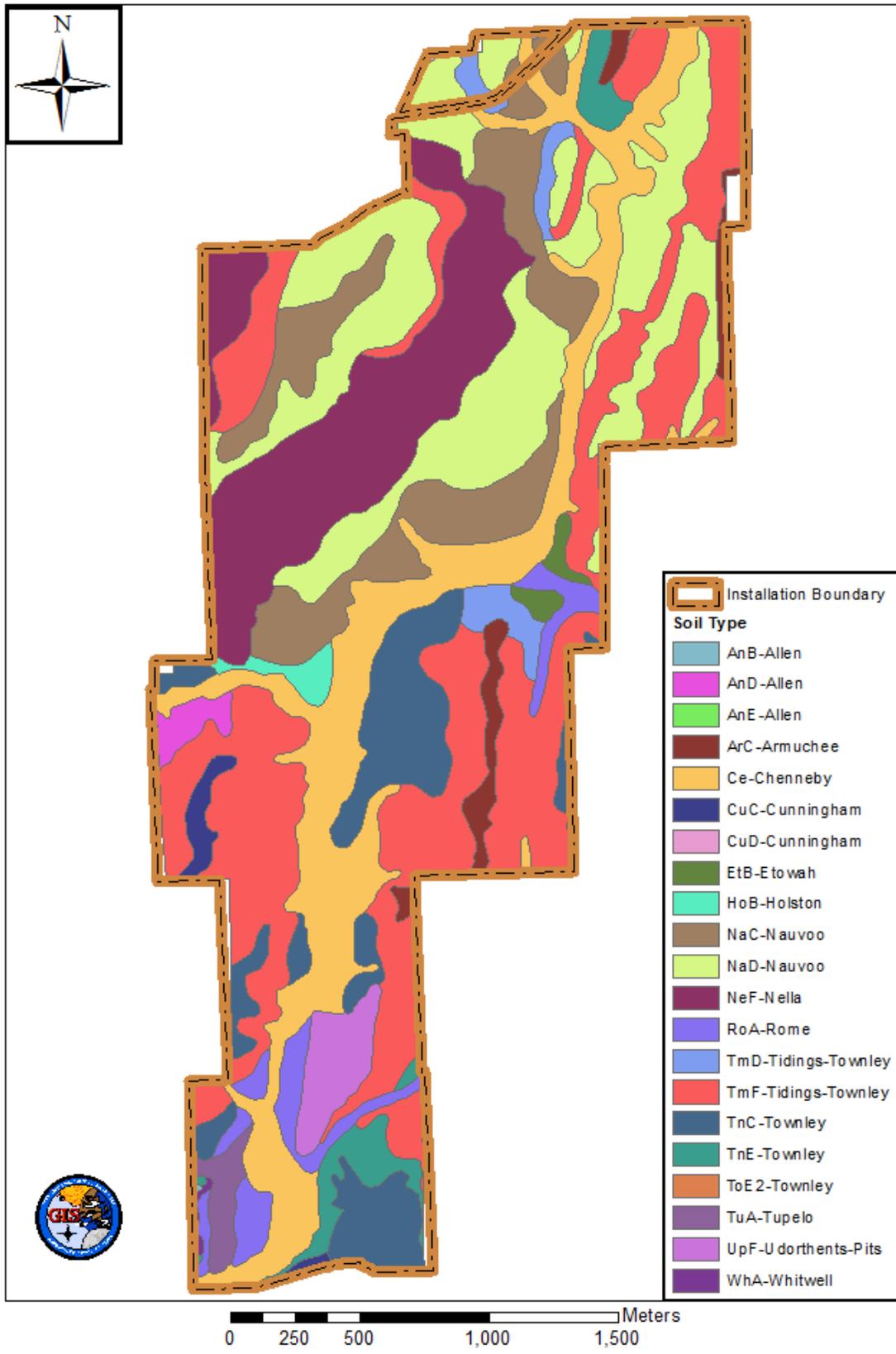
#### 3.4.1 Soil Descriptions

The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) (then named the Soil Conservation Service) completed a soil survey for Catoosa County in 1993 (Lawrence 1993). Soils on VTS-C (Table 3.1 and Figure 3.3) are mapped in three major soil associations: Chenneby-Rome, Townley-Cunningham-Conasauga, and Townley-Tidings. These soil associations are generalized categories of soil series and types that occur together in a geographical location. They are named for the dominant soils present, but several other similar soils may be part of an association. A total of thirteen soil series are found within the three associations on VTS-C. Slope further divides these thirteen series into the 19 soil types displayed in Table 3.1 and Figure 3.3.

**Table 3.1: Soil Types on VTS-C (from Lawrence 1993).**

Symbol	Soil Name	Acreage
AnB	Allen silt loam, 2 to 6 percent slopes	0.36
AnD	Allen silt loam, 6 to 10 percent slopes	8.33
AnE	Allen silt loam, 15 to 25 percent slopes	0.39
ArC	Armuchee channery silt loam, 6 to 10 percent slopes	25.69
Ce*	Chenneby silt loam, 0 to 20 percent slopes*	250.06
CuC	Cunningham silt loam, 0 to 2 percent slopes	10.59
EtB	Etowah loam, 2 to 6 percent slopes	8.32
HoB	Holston fine sandy loam, 2 to 6 percent slopes	11.17
NaC	Nauvoo fine sandy loam, 6 to 10 percent slopes	75.60
NaD	Nauvoo fine sandy loam, 10 to 15 percent slopes	335.15
NeF	Nella fine sandy loam, 25 to 45 percent slopes	204.20
RoA	Rome silt loam, 0 to 2 percent slopes	47.77
TmD	Tidings-Townley complex, 10 to 25 percent slopes	25.29
TmF	Tidings-Townley complex, 25 to 45 percent slopes	418.47
TnC	Townley silt loam, 2 to 10 percent slopes	126.72
TnE	Townley silt loam, 10 to 25 percent slopes	33.79
TuA	Tupelo silt loam, 0 to 2 percent slopes	15.10
UpF	Udorthents-Pits complex, 6 to 45 percent slopes	28.15
WhA	Whitwell loam, 1 to 2 percent slopes	1.86
		1627.01

\* Indicates hydric soils.



**Figure 3.3: Soil Types on VTS-Catoosa.**

Chenneby-Rome soils occur on nearly level, very gently sloping ground on floodplains and stream terraces. They are loamy, somewhat poorly drained to well drained soils and are 60+ inches deep over bedrock. The soils at VTS-C which make up this association cover approximately 362 acres (22% of the training site) and include: Chenneby (Ce), Etowah (EtB), Holston (HoB), Rome (RoA), Tupelo (TuA), Udorthents-Pits complex (UpF), and Whitwell (WhA).

Townley-Cunningham-Conasauga is an upland soil association, occurring on gently sloping to moderately steep locations on ridgetops, hillsides, and uplands. They are well-drained or moderately well-drained soils with a loamy surface layer and a clayey subsoil. Depth to bedrock is typically 20 to 60 inches. At VTS-C, this association covers 523 acres (32%) and is made up of the following soil series: Armuchee (ArC), Cunningham (CuC), Nauvoo (NaD), Tidings-Townley (TmD), and Townley (TnC).

Townley-Tidings is another upland association and covers 46% of the training site (741 acres). The soils are strongly sloping to steep and well drained. They either have a loamy surface layer and clayey subsoil or are gravelly and loamy throughout. The bedrock is typically shale 20-60 inches deep. The soil series in this association at VTS-C include: Allen (AnB, AnD, AnE), Nauvoo (NaC), Tidings-Townley (TmF), and Townley (TnE).

NRCS has identified five hydric soil types that occur in Catoosa County. Of these five state-listed hydric soils, the NRCS has mapped one – Chenneby silt loam, Ce – at VTS-C (see Table 3.1, starred soil type “Ce”). Hydric soils are defined by the Soil Science Society of America as “Soils that are wet long enough to periodically produce anaerobic conditions, thereby influencing the growth of plants” (Soil Science Society of America 1987).

### 3.4.2 Soil Erosion Potential

Soil erosion potential, or erosivity, is of particular importance in an area that is subject to the effects of armored vehicular training. Tracked and wheeled vehicles should be used where the least damage will be done and where the soil is most capable of recovering from the impact. Soil erosion potential is principally influenced by rainfall (R), slope steepness and length (LS), soil texture or erodibility (K), cover protecting the soil (C), and special practices (P) such as terracing or planting on the contour. Humans can control the C and P factors, while R, LS, and K are a function of the soil’s geographic location, topography, and physical properties. The Universal Soil Loss Equation (USLE) ( $A=R*LS*K*C*P$ ) uses these factors to estimate the average annual soil loss due to sheet and rill erosion for a given soil with specific management. It provides the estimate in tons per acre per year. It does not include other sources of erosion, such as gully or bank erosion.

At VTS-C, the slope steepness and length (LS) of a soil influences the amount of soil erosion more than the other factors because this factor is more variable than others. Interpretation of the data found in the soil survey reveals that soil erosion and compaction are the primary problems affecting the soil resources at the VTS-C site. The erosion index (EI) shows the soils’ potential for erosion (Table 3.2) by considering the effects of rainfall, erodibility, and slope, and adjusting for differences in soil erosion tolerance.

On the VTS-C, 78% of the soils meet the criteria of highly erodible lands (marked with red in Table 3.2). Figure 3.4 makes the extent of these soils on the training site very apparent. These soils can tolerate little disturbance. Land management activities as well as training activities which will disturb the soil or eliminate vegetation should be minimized on these highly erodible soils. Where such activities cannot be avoided or relocated, plans for immediate reclamation and revegetation should be developed prior to the activity and implemented promptly after.

An additional problem with soils at VTS-C is excess water. Chenneby soils and the other soil series located along Tiger Creek and Broom Branch floodplains, Rome, Whitwell, and Tupelo, are prone to extreme wetness and flooding. Although these areas are typically very level and so the erosion potential is low, the prevailing wetness can be a problem for training and land management. Large vehicles, including tractors and bushhogs, cannot access non-road areas near the creeks without getting stuck and/or creating large tire ruts. This limits the usefulness of these areas and makes maintenance of open areas such as the tank range difficult. Soil moisture factors must be taken into consideration when scheduling activities.

**Table 3.2: Soil Erosion Potential**

Symbol	Acreage	Slope (%)	LS Minimum	LS Maximum	T-factor	K-factor	Erosion Index (EI)	HEL Class
AnB	0.36	2 to 6	0.26	0.3	5	0.28	3.6-4.2	PHEL
AnD	8.33	10 to 15	1.31	2.29	5	0.28	18.3-32.1	HEL
AnE	0.39	15 to 25	1.31	2.93	3	0.28	30.6-68.4	HEL
ArC	25.69	6 to 10	0.74	1.08	3	0.28	17.3-25.2	HEL
Ce	250.06	0 to 2	0.05	0.05	5	0.37	0.9	NHEL
CuC	10.59	2 to 6	0.74	0.9	3	0.32	19.7-24.0	HEL
EtB	8.32	2 to 6	0.26	0.31	5	0.37	4.8-5.7	PHEL
HoB	11.17	2 to 6	0.26	0.32	5	0.28	3.6-4.5	PHEL
NaC	75.60	6 to 10	0.74	1.21	3	0.28	17.3-28.2	HEL
NaD	335.15	10 to 15	1.31	2.58	3	0.28	30.6-60.2	HEL
NeF	204.20	25 to 45	4.16	12.26	5	0.15	31.2-92.0	HEL
RoA	47.77	0 to 2	0.05	0.05	4	0.28	0.9	NHEL
TmD	25.29	10 to 25	1.31	1.92	3	0.28	30.6-44.8	HEL
TmF	418.47	25 to 45	4.16	11.65	3	0.28	97.1-271.8	HEL
TnC	126.72	2 to 10	0.26	0.35	2	0.37	12.0-16.2	HEL
TnE	33.79	10 to 25	1.31	2.93	2	0.37	60.6-135.5	HEL
TuA	15.10	0 to 2	0.05	0.05	4	0.37	1.2	NHEL
UpF	28.15	6 to 45	None	None	None	None	None	PHEL
WhA	1.86	1 to 3	0.32	0.05	5	0.32	0.8	NHEL

Note:

LS = Topographic factor (length and steepness of slope)

T = Tolerable soil loss (acres/year)

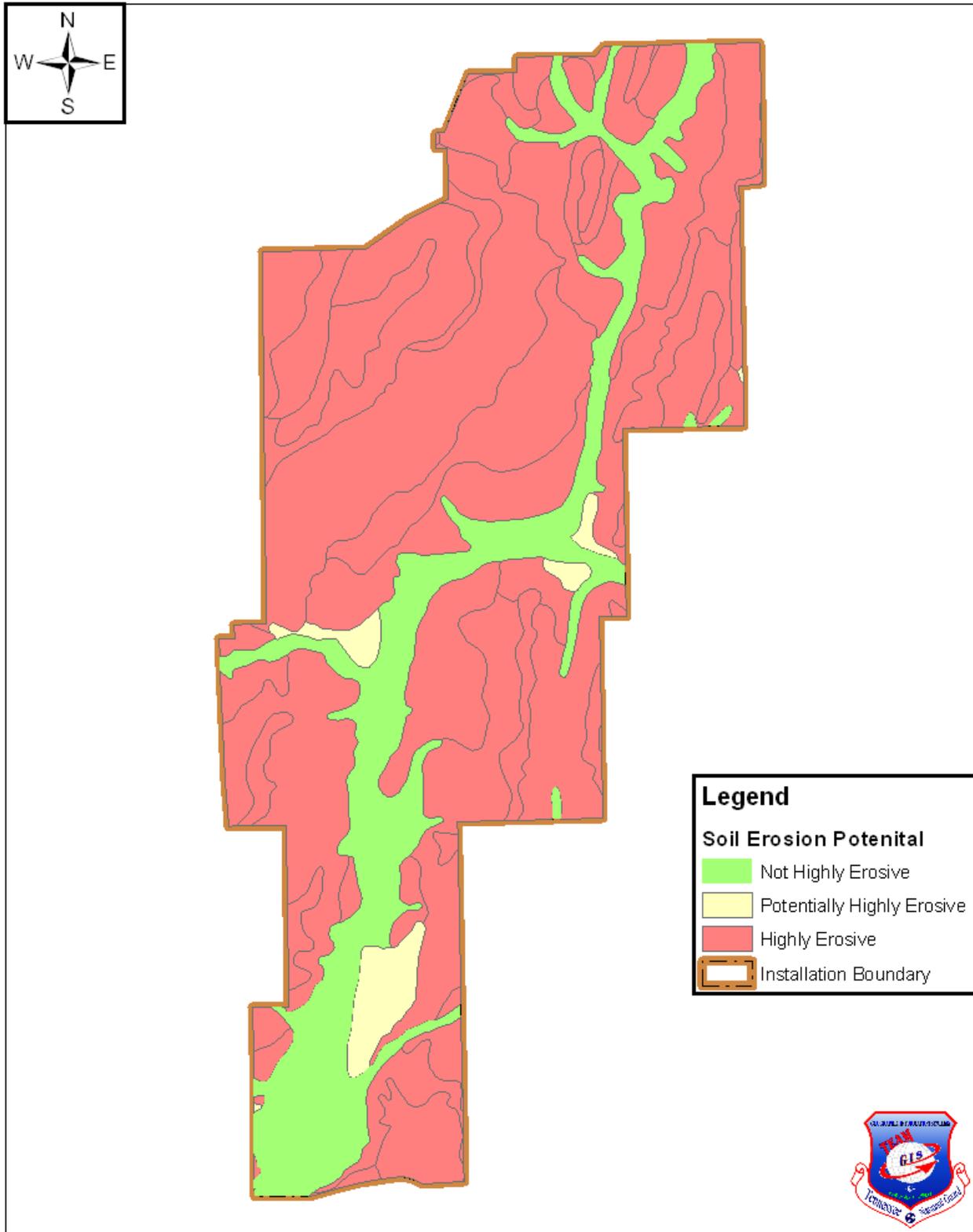
K = Soil erodibility factor

EI = Erosion Index

HEL Class: **HEL** = highly erodible land; **NHEL** = not highly erodible land; **PHEL** = potentially highly erodible land.

### 3.4.3 Prime Farmland

A prime farmland designation is given to an area if soils are present that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. According to Lawrence (1993), approximately 16,194 acres in Catoosa County, or about 16 percent of the total county acreage, meet the soil requirements for prime farmland. The acreage in most crops and pasture has been gradually decreasing as more land is used for urban development. Most of the soils on



**Figure 3.4: Soil erosion potential on VTS-Catoosa.**

VTS-C are not suitable for farmland due to soil erosion by wind and water, low soil fertility, and wetness; however, four soil types (AnB, EtB, HoB, and WhA) fall into the prime farmland category, constituting 21.7 acres of the training site. Prime farmland on the VTS-C is not managed to produce crops, nor is it leased for agricultural production.

### 3.5 WATER RESOURCES

#### 3.5.1 Surface Water

The VTS-C lies within the Chickamauga watershed (USGS Hydrologic Unit #06020001); specifically, the Little Chickamauga Creek – East Chickamauga Creek or the Tiger Creek (HUC #0602000109) watershed. The training site is drained primarily by Tiger Creek and its tributaries, including Catoosa Springs Branch and Broom Branch. A 1998 delineation of regulated waters identified 11.6 miles of intermittent or flowing streams on the site (Minkin et al. 1998).

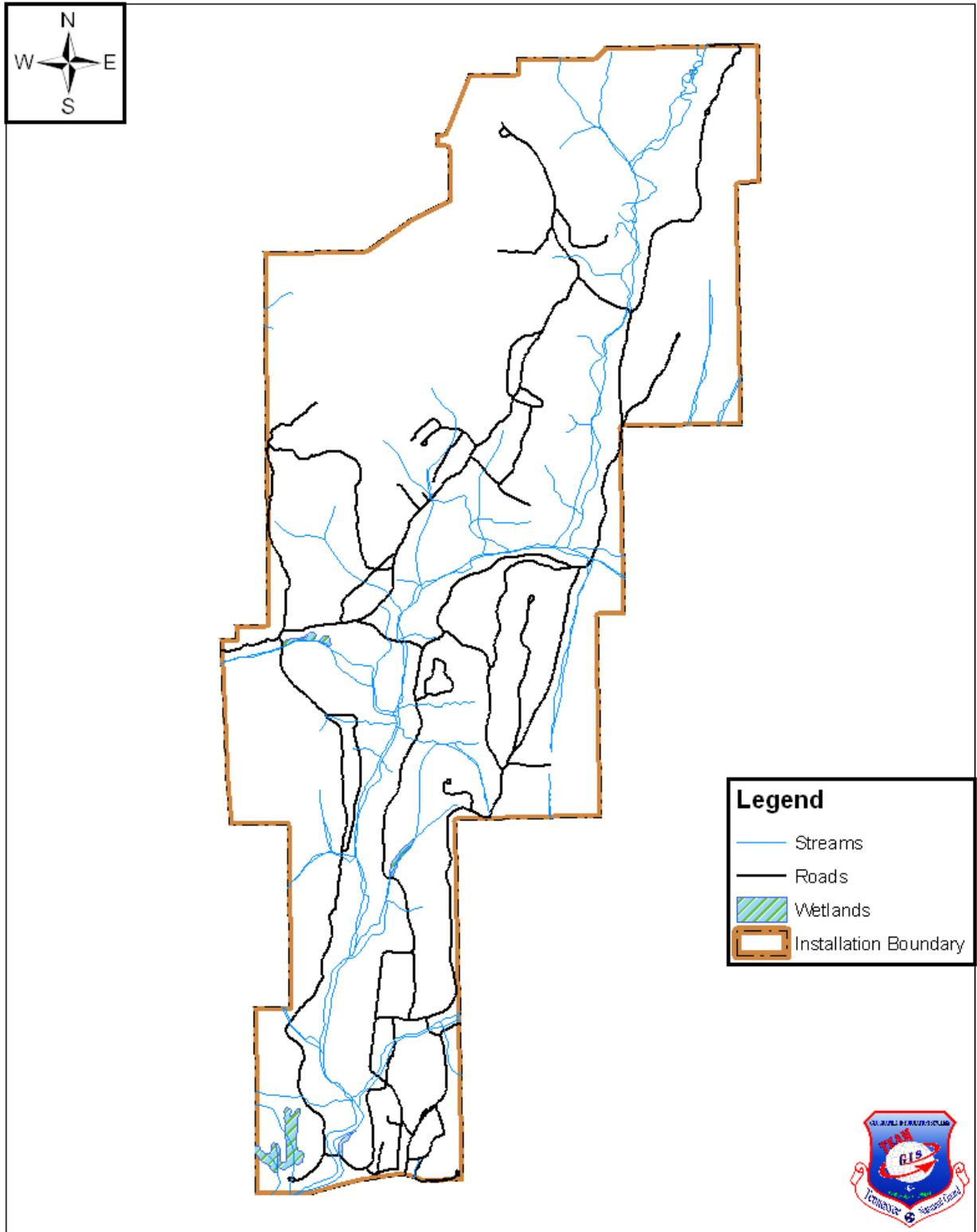
Tiger Creek originates in Whitfield County, GA, from underground springs. It flows south and southwest through heavily forested terrain into Catoosa County, GA. It proceeds west across Catoosa County, entering the VTS-C on its eastern border, approximately midway between the northern and southern boundaries. Within the training site, the creek turns south, collecting the drainage from the eastern slope of Sand Mountain, and exits the training site midway along the southern border. Tiger Creek ultimately flows into South Chickamauga Creek southeast of Ringgold, GA (Georgia 2006).

Broom Branch enters the VTS-C across the northern border near the northeast corner and flows approximately 7,500 feet south-southwest until its confluence with Tiger Creek. Catoosa Springs Branch enters the training site on the east boundary, approximately 1,100 feet north of the southern boundary. The creek flows in a westerly direction for approximately 900 feet before turning southwest and flowing another 900 feet to its confluence with Tiger Creek.

Tiger Creek and its tributaries are designated as Secondary Trout Streams by the Georgia Department of Natural Resources. A Secondary Trout Stream is one with no evidence of natural trout reproduction but that is capable of supporting trout throughout the year. Tiger Creek is stocked with trout twice per month during the stocking season of March through Labor Day (Georgia 2006). Trout streams are subject to additional controls intended to minimize sedimentation and maintain forest cover for temperature control. Current state regulation requires the maintenance of a 50 foot vegetated buffer on either side of a trout stream with permits required for any modification within that buffer area (DeMeo et al. 2005).

The upper reach of Broom Branch has been heavily impacted by beaver. In 2007, more than 20 maintained dams were counted along Broom Branch and its unnamed tributary north of the upper road, and much of the surrounding area had been flooded, leaving the defined creek channel obscured. Indications of beaver activity are present along Tiger Creek and Catoosa Springs Branch, as well. Beaver control efforts were initiated in FY07: USDA Animal Damage Control trapped three dozen beavers from the training site and broke down the known dams to restore creek flow. By mid-2008 there have been indications of some returning beaver activity.

One small pond on the site is shown on the USGS topographic map (Ringgold, GA, Quadrangle). It is a man-made pond behind a small dam on Catoosa Springs Branch from 1934 and is currently heavily clogged with silt and organic debris.



**Figure 3.5: Surface Water on VTS-Catoosa.**

### 3.5.2 Ground Water

Groundwater beneath VTS-C occurs in the Paleozoic Rock Aquifers. Soil and residuum form low-yield unconfined aquifers across most of the Valley and Ridge Providence of northwestern Georgia (Donahue 1998). For this reason, surface water is the primary source of water in the county. Chickamauga Creek provides water to the community of Ringgold. Drilled wells are widely scattered, and some areas of the county have no wells. Most drilled wells are less than 100 feet deep, but some reach to nearly 150 feet.

#### 3.5.2.3 Water Supply

VTS-C is supplied with water through the Catoosa County Utility District. There is one well located on the training site. It is not used as a potable water supply, but serves primarily to supply the vehicle wash rack.

#### 3.5.2.4 Wastewater Discharge

VTS-C wastewater discharge is to thirteen septic tanks across the facility. The washrack discharges to grade upslope of a wetland located off-site.

### 3.5.3 Water Quality

An initial water quality assessment was conducted for VTS-C during the fall (dry) and spring (wet) seasons in 1997/98 by Science Applications International Corporation (1998a). The purpose of the water quality analysis was to obtain current information on the existing conditions of the surface waters at the training site. The conclusion from this assessment was that the water quality in the surveyed creeks and ponds was “generally very good.”

Two rounds of sampling were performed in the study. The first sampling was performed on November 5-6 and December 11, 1997 (low flow), and the second sampling was conducted on April 28, 1998 (high flow). Ten stations were sampled for water quality throughout the training site including two in Tiger Creek (T-1 and T-5), two in Broom Branch (B-1 and B-3), two in Catoosa Springs Branch (C-1 and C-3), two in unnamed tributaries to Tiger Creek (U-1 and U-2), and two in ponds (P-1 and P-2).

The study found low concentrations of toxic metals, nutrients, anions, and fecal coliform. Calcium, magnesium, total hardness, sulfate, and total dissolved solids were many-fold greater at the Catoosa Springs Branch stations than any other stations during both rounds of sampling, suggesting that there is some off-site source for the elevated concentration. Complete results are available in the study report.

Although the initial assessment results for the training site indicate good water quality, the State of Georgia has developed a Total Maximum Daily Load (TMDL) Implementation Plan for the HUC #0602000109 watershed (Tiger Creek) in accordance with the GADNR Rules and Regulations for Water Quality Control, Chapter 391-3-6, Revised (November 2005). Tiger Creek’s designated use is fishing, and the creek is listed as impaired on Georgia’s 303(d) list for fecal coliform bacteria. The TMDL Implementation Plan lists the primary source of the bacteria as non-point from wildlife, agricultural livestock, and urban development.

Further water quality analysis will be conducted to identify any changes from the initial survey. In FY2008 a routine sampling program was initiated to test for fecal coliform levels on a monthly basis. In addition, water quality data will be collected in conjunction with an aquatic fauna survey initiated in FY2008.

### 3.6 WETLANDS

To meet the definition of “jurisdictional wetland” under Section 404 of the Clean Water Act, an area must exhibit three traits: (1) hydrophytic vegetation, (2) hydric soil, and (3) wetland hydrology. Areas that are periodically wet but do not meet all three criteria are not jurisdictional wetlands subject to Section 404 of the Clean Water Act. Areas that have been disturbed or that are classified as problem area wetlands, however, may not meet all three criteria due to man-induced alterations, but are still considered jurisdictional wetlands. Wetlands store water and minimize flooding. They also filter sediment, excess nutrients, and other impurities from water as it is stored. The aquatic vegetation found in wetlands protects shorelines from erosion and provides food and cover for wildlife. Wetlands provide habitat for micro- and macroinvertebrates that use or break down nutrients and contaminants.

A 1998 delineation of wetlands and other regulated waters was performed by Minkin et al. (1998) of the U.S. Army Engineer Waterways Experiment Station. To determine if an area would be considered a jurisdictional wetland under Section 404, this study applied the technical criteria for wetland delineation as described in the Corps of Engineers Wetlands Delineation Manual (U.S. Army Corps of Engineers 1987) and the Code of Federal Regulations (33 CFR 329.11(a)(1)). They found that VTS-C contained approximately 7.88 acres of wetlands and ponds, the majority located in the southwestern corner of the property (Figure 3.5).

This small area (0.5% of the installation’s total land area) constitutes a variety of wetland communities, with many situated along streams and drainageways. Six National Wetland Inventory (NWI) classes were found at VTS-C. The majority of the wetlands on VTS-C were emergent systems dominated by grasses (4.55 acres). In addition, there were approximately 2.36 acres of forested wetlands dominated by hardwood species and 0.97 acres of shrub dominated wetland.

In recent years, the beaver (*Castor canadensis*) population on the northern half of the training site has grown dramatically. A 2005 survey of Broom Branch identified over 25 individual dams in good repair. Another series of dams located on Tiger Creek in the middle of the tank range has expanded the associated “pond” substantially. These changes have significantly affected the usability of the area for training. A beaver control program has been initiated with the goal of reducing the population and associated flooding to acceptable levels.

### 3.7 VEGETATION

The VTS-C is part of a larger ecosystem that is known as the Gulf Slope Section of the Oak-Pine Forest Region (Braun 1950). Prior to widespread settlement and development, the natural landscape was composed of a mosaic of interacting communities linked by hydrologic flow, nutrient cycling, fire, animal movement, and transitions between communities. The modern landscape supports islands of somewhat natural areas (with one or more communities present) within a sea of anthropogenic features such as roads, buildings, and farms. Fire has probably been the principal historical disturbance, previously burning over small areas between natural barriers with moderate frequency and low intensity. Insect related disturbances have resulted from southern pine beetles (McNab and Avers 1994). Climatic related influences include occasional droughts and ice storms.

#### 3.7.1 Vegetation Community Classification

Climate and land use history influence the types of ecosystems found in Georgia. At the time of European settlement, most of VTS-C was probably covered by oak-hickory-pine forest and southern mixed forest. Approximately 82% of VTS-C is currently forested. The principal cover type is oak-

hickory, which includes southern red oak, white oak, post oak, red maple, winged elm, flowering dogwood, pignut hickory, and loblolly pine. In some areas, loblolly and shortleaf pines are dominant.

Ten natural communities were described in the Phase II natural resources survey by Science Applications International Corporations (SAIC 1998b) based on edaphic conditions and dominant species types. These community types were further refined by a 2006 survey (Dynamic Solutions 2007) which classified the vegetation on VTS-C according to the National Vegetation Classification Standard to the level of floristic alliance (Figure 3.6). These community classifications are described below.

### 3.7.1.1 Vegetated, Tree Dominated, Closed Tree Canopy, Evergreen

#### *Pinus taeda* Forest Alliance

Several loblolly pine plantations of varying ages occur in the southern portion of VTS-C. They were established as pure stands, but other species have invaded the understory, including red maple, sweetgum, black gum, black cherry, box elder, and eastern red cedar. If they remain free from major disturbance, these stands will likely succeed to more shade-tolerant hardwood species typical of the region. A number of the loblolly stands, however, have been impacted by southern pine bark beetle, resulting in high mortality of mature pines and leaving the future stand composition yet to be determined by competition among the surviving pines and the mixed hardwood species in the understory.

#### *Pinus (echinata, virginiana)* Forest Alliance

This alliance is characterized by natural stands of the native southern yellow pines, shortleaf pine and Virginia pine. These two species dominate the overstory, although loblolly pine and eastern redcedar may also occur naturally. These stands have a diverse canopy, including pignut hickory, basswood, black gum, yellow-poplar, black cherry, black oak, white oak, and sweetgum, as appropriate to the edaphic conditions, and an understory which includes dogwood, wild grape, and Christmas fern. This forest alliance on VTS-C is often infested with privet and honeysuckle.

### 3.7.1.2 Vegetated, Tree Dominated, Closed Tree Canopy, Deciduous

#### *Fraxinus pennsylvanica* Forest Alliance

Green ash grows along the bottoms and first terraces of Tiger Creek and Broom Branch throughout the training site. This forest alliance consists of species which are capable of withstanding frequent and, sometimes, prolonged flooding during the December to April wet season. Tree species typical of these stands include black gum, sweetgum, boxelder, black willow, black walnut, hackberry, red maple, pin oak, sycamore, basswood, redbud, and slippery elm. On the southern portion of VTS-C, this alliance has become dominated by privet up to 5-7 m in height.

#### *Quercus (alba, velutina, prinus)* Forest Alliance

Dominated by white oak, black oak, and chestnut oak, this alliance also contains mockernut hickory, black cherry, sassafras, American beech, post oak, shagbark hickory, dogwood, and sourwood. Several *Vaccinium* species are prevalent in the understory, as are wild grape, greenbriers, and Christmas fern. These stands typically occupy the upper and mid slope positions along the well-drained east- and west-facing slopes on the ridges throughout the training site.

#### *Quercus (alba, rubra, velutina) – Liriodendron tulipifera* Forest Alliance

Along the lower slopes and rolling hills in the center of the site the oaks of the previous alliance are joined by northern red oak and yellow-poplar. This alliance occupies higher quality sites with a more favorable moisture regime.

*Ulmus americana* – *Carya ovata* – *Celtis* Forest Alliance

There is one isolated stand of this type in the cantonment area. The area is mowed regularly and maintained with these three species over a crabgrass-dominated turf.

3.7.1.3 Vegetated, Tree Dominated, Closed Tree Canopy, Mixed Evergreen-Deciduous

*Juniperus virginiana* – *Quercus (prinus, velutina)* Forest Alliance

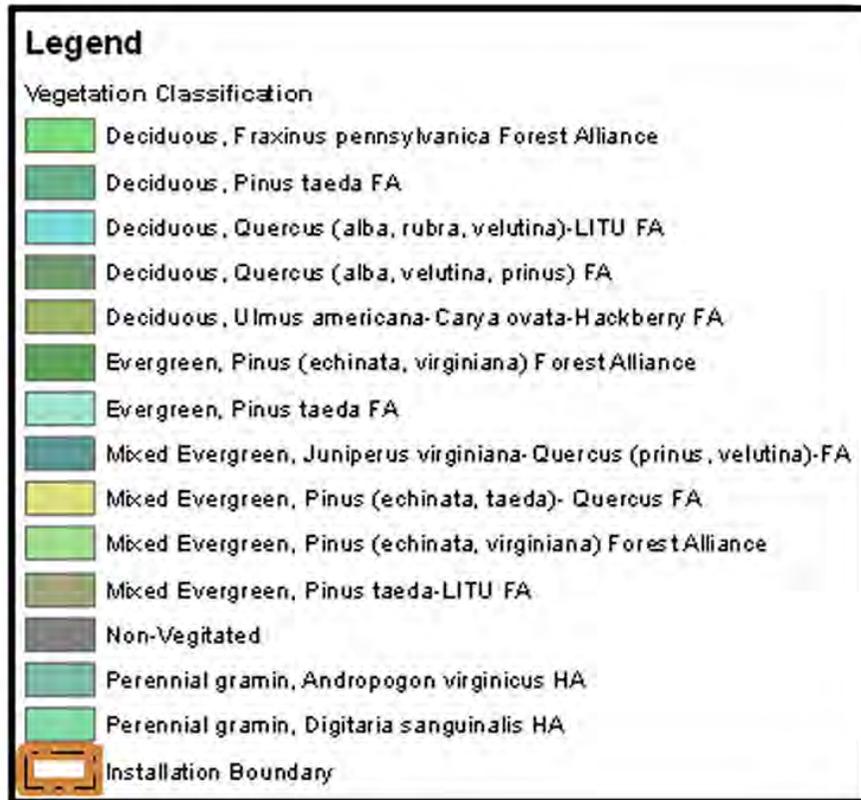
An area along the south slope of Sand Mountain has exposed limestone at the surface. This area is dominated by eastern redcedar, with hickories and dry-site oaks (chestnut oak and black oak) also common in the overstory and a variety of other species present including sourwood, redbud, and farkleberry.

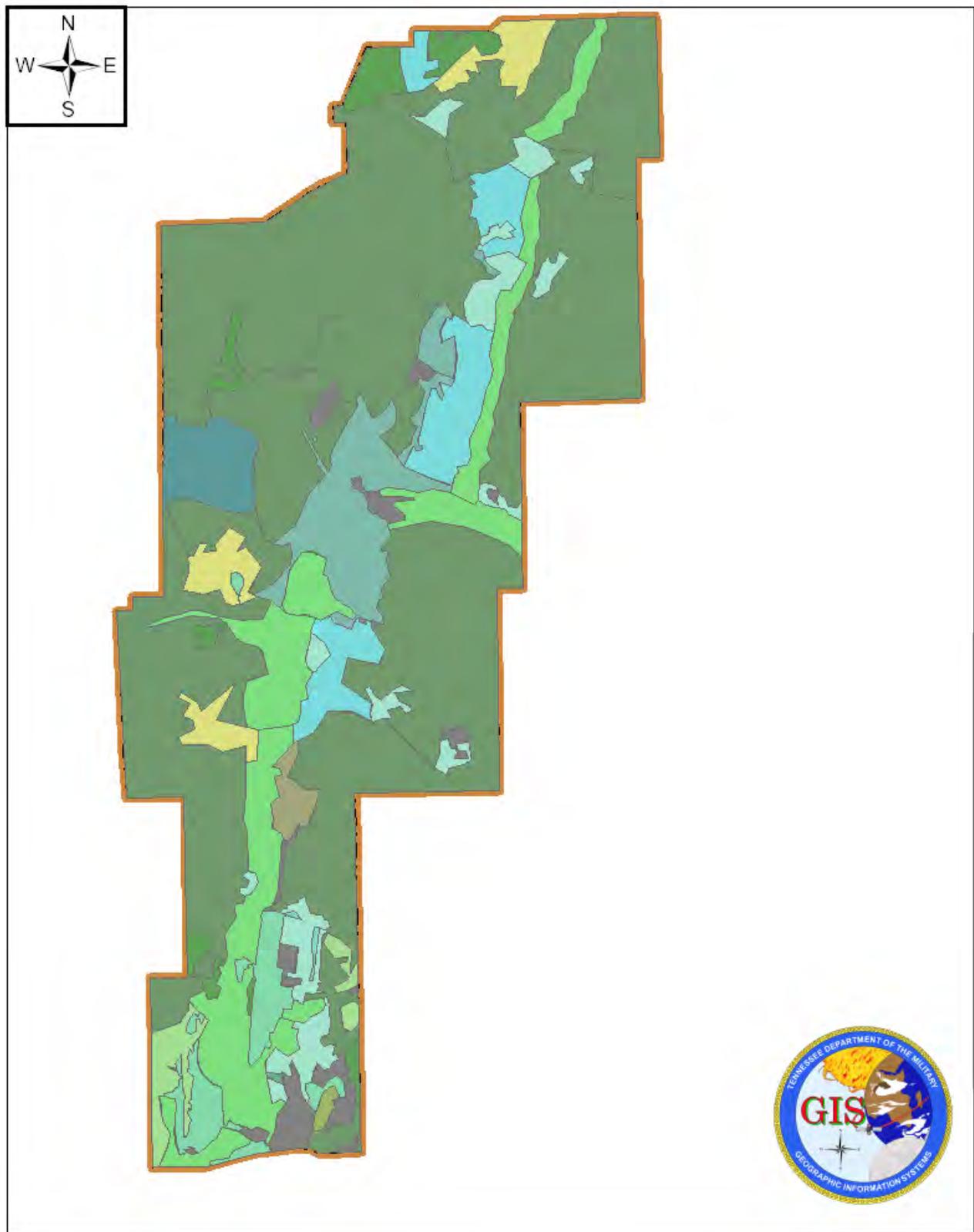
*Pinus (echinata, taeda)* – *Quercus* Forest Alliance

Areas of the training site which experienced disturbance may develop into a mixed stand in which shortleaf and loblolly pines dominate but oaks are also a significant component. Current stands of this type can be found on the northern edge of the property, as well as two areas west of Tiger Creek. The dominant hardwood canopy trees are black oak and chestnut oak. VTS-C is within the native range of loblolly pine, and so mixed stands of this type are a natural response to disturbance on dry sites in this region, not necessarily a result of human planting efforts.

*Pinus taeda* – *Liriodendron tulipifera* Forest Alliance

One area to the east of Tiger Creek is likely a response to heavy disturbance of a relatively moist site. Loblolly pine is the dominant overstory species, but it shares the stand with a significant yellow-poplar component.





**Figure 3.6: Vegetation communities on VTS-Catoosa.**

#### 3.7.1.4 Vegetated, Herb Dominated, Herbaceous Vegetation, Perennial Graminoid Vegetation

##### *Andropogon virginicus* Herbaceous Alliance

The tank range in the center of the training site represents the primary example of this alliance. The area is regularly mowed to maintain its open condition. The species composition varies across the site, but broomsedge is the dominant species throughout. Other species found in this alliance include common plantain, blackberry, thoroughwort, and honeysuckle. A number of tree species have seeded into the area, but the regularly mowing regime prevents succession to forest alliance from occurring.

##### *Digitaria sanguinalis* Herbaceous Alliance

The small arms ranges and the Cantonment areas which are mowed are dominated by crabgrass. Other species common in these areas are tall fescue, foxtail, plantain, white clover, and bermudagrass.

### 3.7.2 Forest Inventory and Management

#### 3.7.2.1 Past Forestry Operations

A forest inventory for the entire site was conducted in 1986 by the U.S Army Corps of Engineers, South Atlantic Division, Savannah District. At that time, the training site woodlands were composed primarily of a mixture of upland and lowland hardwoods with various species of oak and hickory, as well as yellow-poplar, ash, and maple, among others.

Since the mid to early 1980's, the forestry staff at the US Army Corps of Engineers, Savannah District has provided forestry management support to Catoosa. From 1982 to 1984, timber clearing was conducted in compartments 4 and 5 to create an impact area for tank firing. In addition, during the latter 1960's and the early 1970's, several road rights-of way and tank parking areas were cleared.

An emergency harvest of pine was conducted in 1988 to prevent the further spread of southern pine bark beetles and salvage the trees before they lost all value. Timber made available for harvest was located in the northeastern quadrant of the training site to the east and west of Broom Branch. Total board feet harvested was estimated at 3.5 million.

Since 1990, the Georgia Division of Forestry has provided technical expertise and professional judgment in planning for and applying various management practices related to prescribed burning. No further commercial timber harvests have been made by the TNARNG.

In 2001 another forest inventory was contracted with the U.S. Forest Service (USFS), Chattahoochee – Oconee District; however, this inventory was never completed due to personnel transfers with the USFS.

#### 3.7.2.2 Current Forest Inventory and Management

A forest inventory and a management plan were completed in 2006 by Thompson Engineering, Forest Management Group, and Aerostar Environmental Service via a contract through the U.S. Army Corps of Engineers, Mobile District. The training site was inventoried by training area, to ensure stand identification and management was compatible with other management activities on the training site. Stands were delineated through the use of aerial imagery and ground observations. Sample points were then taken in each stand (number of plots per stand was dependent on acreage of the stand) to collect the physical data needed to calculate timber volumes. The complete data for all forest stands is provided in the VTS-Catoosa Forest Management Plan (Thompson Engineering et al. 2006) and includes sawtimber and pulpwood volumes (apportioned by species/species groups), dominant and co-dominant species,

average basal area and DBH, average number of snags per acre, minimum and maximum tree ages, general health assessment, and current condition of the stand.

The forest inventory determined that a total of 1,313 acres (81%) of VTS-C were covered in forests in April 2005. The forest stands are typically dominated by red oaks and white oaks, with a substantial amount of pine in some stands. Yellow-poplar is a co-dominant in some stands, as is hickory. Timber volumes are given in Table 3.3. The average DBH for the entire installation was 11.7 inches, and the average basal area was 78.1 square feet per acre. Most stands are 20-40 years old; although some had trees approaching 70 years in age, and a few stands were dominated by young trees. The overall health of the forest stands was classified as good in April 2005, but there was evidence of a past infestation of southern pine beetles. In addition, stands in the impact area of the tank range show a significant amount of timber damage due to frequent hot fires.

**Table 3.3. Forest product volume summary for the VTS-Catoosa (from Thompson Engineering et al. 2006).**

Timber Product	Per Acre		Installation Total	
	Tons	Board feet	Tons	Board feet
<b><i>Sawtimber</i></b>				
Pine	5	640.1	6,837	875,273
Pole	0.1	6.4	137	8,751
CNS	1.9	198.8	2,598	266,370
Cedar	0	4.4	0	6,017
Red Oak	10.7	1485.4	14,631	2,031,136
Hickory	2.9	358.2	3,965	489,803
White Oak	7.2	941.7	9,845	1,287,681
Ash	1.1	148.2	1504	202,649
Poplar	4.8	650.9	6,564	890,041
Walnut	0.2	23.6	273	32,271
Misc. Hardwood	2.6	322.4	3,555	440,850
<b><i>Pulpwood</i></b>				
Pine	0.6	0.2	820	273
Hardwood	19.5	7.2	36,664	9,845

The forest inventory data was utilized to develop management prescriptions for each forest stand on VTS-C based on forest health and commercial timber production goals. Military requirements and goals were then incorporated into the final forest management plan for VTS-C presented in Annex 2. Timber harvests will be conducted on VTS-C for the purpose of opening up needed training areas and improving forest health. Forest health harvests will be thinning or small group selection cuts (creating a patchwork of 2-10 acre openings but removing no more than 30% of timber volume. Large areas (greater than 10 acres) will only be clearcut in the event that training needs demand open land.

The forest management plan identifies the priority for stand harvest for up to 17 years. The forest inventory is due to be repeated in 2015 to provide updated information which will be used to revise the management and harvest plan as needed. Thereafter, the plan will be reviewed and revised as needed in conjunction with the INRMP review process and at subsequent forest inventory periods.

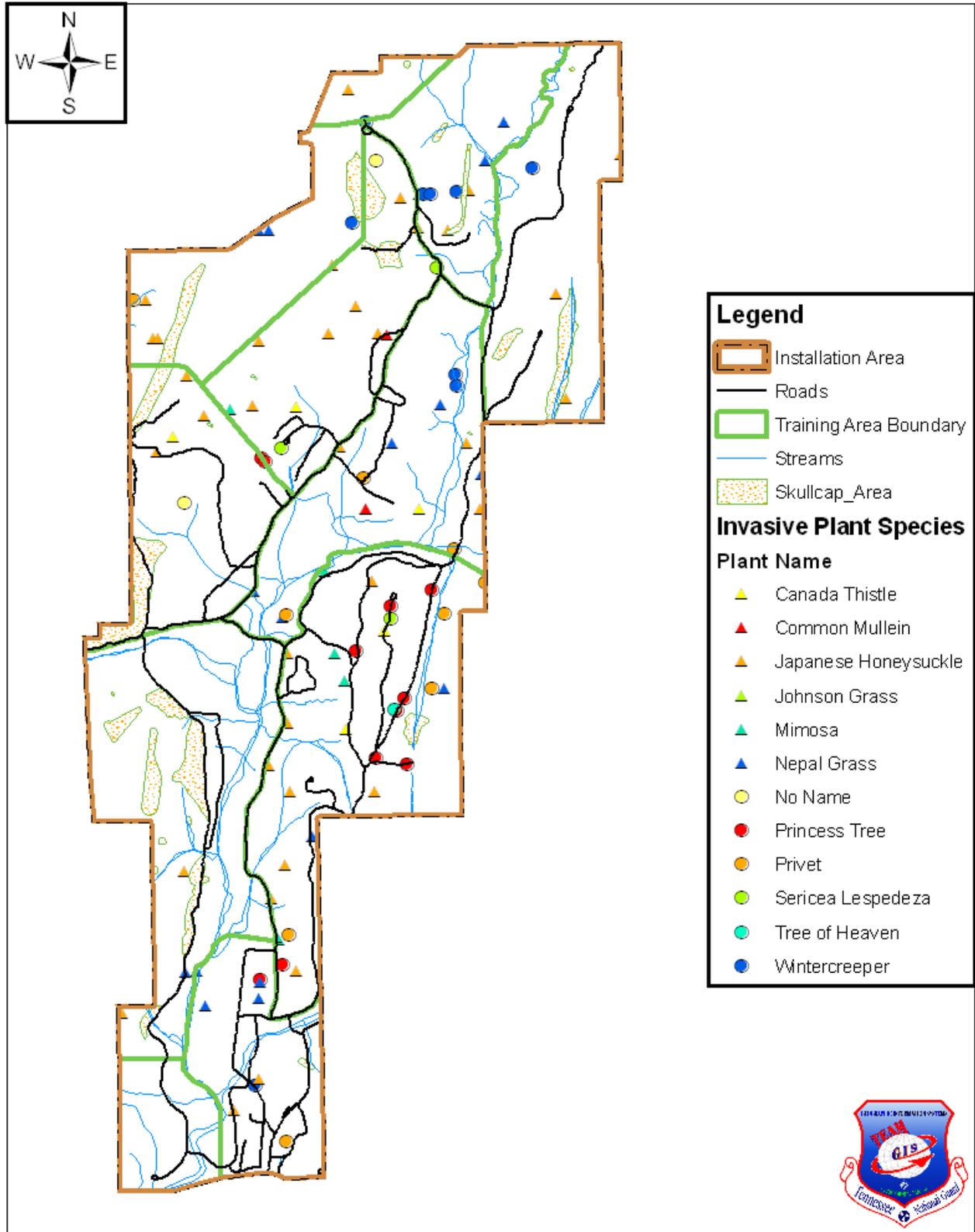
### 3.7.3 Invasive Pest Plants

Non-native plants have become a significant part of most ecosystems in this age of extensive international travel and trade. Many of the species brought into a new environment remain uncommon, requiring human intervention to reproduce and/or spread. Certain species, however, become invasive: they reproduce prolifically and spread rampantly throughout an ecosystem, causing significant disruption to the natural system. Because the predators and diseases of exotic species are rarely transplanted with them, the invasives lack natural control mechanisms. Invasive plants typically displace native species and change the species composition of a community. They can also change edaphic characteristics of the site by altering such factors as water use, shade, or flammability.

A number of invasive plant species can be found on VTS-C (Figure 3.7). A survey of the training site for invasive exotic species was completed in FY2006 (Dynamic Solutions 2006). Chief among the problem species are: privet (*Ligustrum* spp.), Japanese honeysuckle (*Lonicera japonica*), Nepal grass (*Microstegium vimineum*), sericea lespedeza (*Lespedeza cuneata*), and Canada thistle (*Cirsium arvense*). Tree-of-heaven (*Ailanthus altissima*), mimosa (*Albizia julibrissin*), wintercreeper (*Euonymus fortunei*), princess tree (*Paulownia tomentosa*), multiflora rose (*Rosa multiflora*), Johnson grass (*Sorghum halepense*), and woolly mullein (*Verbascum thapsus*) were also found on the training site. All of these species are listed as “severe threats” or “significant threats” on the Tennessee Exotic Pest Plant Council list (TNEPPC 2004). All landowners are requested to control such plants if found growing on their property. In addition to impacting native communities and threatening rare or endangered plant species, these exotic pest plants can interfere with training activities. Privet, in particular, can create dense, difficult-to-traverse stands which make an area unsuitable for mounted or dismounted maneuvers.

Complete eradication of these problem species is unlikely to be possible. In the case of small, recently established infestations – tree-of-heaven and wintercreeper at VTS-C – rapid control efforts may eliminate the species from the site. For the more prevalent species, an achievable goal is to reduce their numbers and spatial extent and to limit their impacts on native species. Control of these species is typically a combination of manual/non-chemical efforts and application of herbicides. A detailed plan of attack against these invasive pest plants is presented in Annex 4, Invasive Pest Plant Control.

At VTS-C, the use of chemical herbicides is limited by the presence of a federally listed Threatened plant species, the large-flowered skullcap (*Scutellaria montana*). To minimize the chance of accidental damage to the skullcap, herbicide use within and upslope of skullcap clusters is limited to that described in Annex 4: no herbicides will be used within a skullcap management group during the growing season for the skullcap (March through September), no foliar spray application of herbicides will be conducted within 50 feet of known skullcap locations during the skullcap growing season, and no chemicals which translocate through the soil from root systems will be utilized within 50 feet of known skullcap clusters at any time.



**Figure 3.7: Invasive pest plant species identified on VTS-Catoosa.**  
(Point occurrences – large occurrences are not represented.)



### 3.8 FISH AND WILDLIFE

Data on the wildlife utilizing the training site have been collected through several surveys. The 1998 Phase II Natural Resources survey identified some species occurring on VTS-C (SAIC 1998b). A bird survey completed in 2008 added a substantial list of new species to the site tally (see Appendix F for species lists). A mammal survey and a reptile and amphibian survey were completed in 2010. The bird survey will be repeated on a five year schedule to maintain up to date information; the second survey is underway with results expected in 2013. Other vertebrate surveys will be conducted on a longer schedule (every ten years) unless changing conditions or concerns dictate resurvey earlier. Aquatic surveys have been conducted separately from the terrestrial examinations and are discussed in section 3.2.3.

#### 3.8.1 Migratory Birds

The migratory birds group is a category made up of species which move between at least two locations, typically one for breeding and one for overwintering. Protected species are identified in C.F.R. Title 50 Section 10.13. Songbirds, shorebirds, and waterfowl may fall into this category (those with at least some populations that breed in the continental United States and spend their non-breeding months in the tropics). Attention has centered on neotropical migrants since this group is experiencing steep rates of population decline. However, decreasing populations have also been observed in resident bird species, which do not migrate, and temperate-zone migrants, which only migrate within North America. It is DoD policy to promote and support a partnership role in the protection and conservation of migratory birds and their habitat by protecting vital habitat, enhancing biodiversity, and maintaining healthy and productive natural systems on DoD lands consistent with the military mission.

The Migratory Bird Treaty Act (16 U.S.C. 703-711) provides protection for migratory birds. Under the Act, willful, knowing attempts to take, kill or remove migratory birds is unlawful unless authorized by the U.S. Fish and Wildlife Service. Feathers or other parts, nests, eggs, and products made from migratory birds are also covered by the Act. Take is defined as pursuing, hunting, shooting, poisoning, wounding, killing, capturing, trapping, or collecting. Migratory bird hunting regulations, established by the U.S. Fish and Wildlife Service, allow the taking, during designated seasons of ducks, geese, doves, rail, woodcock, and some other species. In addition, permits may be granted for various non-commercial activities involving migratory birds and some commercial activities involving captive-bred migratory birds. Misdemeanor or felony violations of the Act by individuals or organizations may result in significant fines or imprisonment.

In Georgia, which falls within the Atlantic flyway for migratory birds, over 90 species of neotropical migrants depend on the forests, thickets, and fields of the state as areas to rest and refuel during their long migrations. Fifty-four migratory species nest and raise their young in habitats around the state (Georgia Natural Heritage Program 1999). At VTS-C, 36 bird species were identified during the 1998 Phase II Natural Resources survey (SAIC 1998b). A baseline survey of birds was initiated in 2006 and identified 134 species (see Appendix F) utilizing this training site for part or all of the year (AMEC 2008). Of these, only three are not included on the 10.13 migrant list: wild turkey, northern bobwhite, and European starling. The first two are protected by state and federal gamebird regulations, and the third is a non-native invasive species which is not protected from control efforts.

Executive Order 13186 (10 January 2001), "Responsibilities of Federal Agencies to Protect Migratory Birds" requires each federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations to develop and implement a MOU with the USFWS within two years that shall promote the conservation of migratory bird populations. If any measurable negative effects on migratory bird populations at VTS-C are identified, the TNARNG will develop a MOU with the USFWS within two years.

### 3.8.2 Wildlife and Game Species

A comprehensive mammal survey conducted by AMEC Earth and Environmental, Inc., in 2008-10, identified 25 mammal species on the VTS-C. A herpetofauna survey was completed by URS in 2010 and identified 24 reptile and amphibian species on the training site.

Wildlife game species on VTS-C include white-tailed deer (*Odocoileus virginianus*), wild turkey (*Meleagris gallopavo*), northern bobwhite quail (*Colinus virginianus*), American woodcock (*Scolopax minor*), dove (*Zenaida macroura*), squirrel (*Sciurus* spp.) and other small game species, and several waterfowl species. There are currently no management activities specific to these species. Currently there is no hunting on VTS-Catoosa due to its small size, residential neighbors, and the potential for interference with training. For this reason, game management does not take precedence over general wildlife habitat management.

### 3.8.3 Aquatic Species

An aquatic survey was conducted in 1997-1998 to determine the ichthyofauna and benthic macroinvertebrate fauna of the VTS-C (SAIC 1998a). The aquatic survey was repeated in 2008 by URS. A separate mussel survey was conducted in 2007; its results are presented in the macroinvertebrate section below.

#### 3.8.3.1 Fish

The 1997-1998 survey included Tiger Creek, Broom Branch, Catoosa Springs Branch, two unnamed tributaries of Tiger Creek, and two ponds. A total of 3,387 fish, representing 33 species and three hybrids, was collected (see Appendix F for species list). The 2008 sampling collected fewer individuals due to sampling methodology differences. Fewer species were also collected in 2008 (29 species in the fall sampling), including one new species. The species that had been identified in 1997 but not 2008 were rare in the system, represented by only one or two individuals caught. Index of Biotic Integrity (IBI) metrics in 2008 indicates that VTS-Catoosa streams range from fairly poor to fair biotic quality.

No federal or state listed fish species were collected in either survey.

#### 3.8.3.2 Macroinvertebrates

The 1997/1998 aquatic survey included 15 sampling points for aquatic macroinvertebrate fauna, while the 2008 survey sampled benthic macroinvertebrates at 13 stations. The species list is contained in Appendix F. In the fall 1997, 8,798 organisms, representing 154 taxa, were collected; in spring 1998, another 13,105 organisms were collected, representing 172 taxa. The results of this survey and its associated habitat analysis indicate that aquatic habitat quality on VTS-C was generally very good and supported highly diverse benthic and fish communities, especially in Tiger Creek and Broom Branch (SAIC 1998a). The biotic index values calculated from the 2008 survey data indicated relatively unimpaired streams for all sampling stations except Catoosa Springs Branch, which was indicated to be slightly impaired. The lower quality indicators in this stream were consistent across water chemistry, fish, and macroinvertebrate indicators, and are probably a result of higher temperature and dissolved solids from the cattle pond on the creek just upstream of the training site boundary (URS 2010).

Freshwater mussels are one of the most endangered groups of aquatic species. The 1997/1998 survey identified five taxa of native mussels from live specimens and relict shells. Although none of these were federally listed species, it was determined that one – a *Villosa* sp. – might be a previously undescribed species. In addition, Asiatic clams (*Corbicula fluminea*) were common throughout the streams of the training site. In FY2007 a mussel survey was initiated to document the species diversity on the training site and further investigate the unique *Villosa* sp. The more recent survey found a significant change from

the earlier conditions: Asiatic clam was found in very high numbers, while native species were extremely rare. Only one live mountain creekshell (*Villosa vanuxemensis*) was found, in addition to several relicts of that species and of the rainbow (*Villosa iris*). There was no sign of the unknown *Villosa* in the 2007 survey. Competition from the Asiatic clam and high sediment loads provide the likely explanations of the loss of native mussels from the VTS-C. The 2008 aquatic survey again found significant numbers of *Corbicula fluminea*. However, larger numbers of a *Sphaerium* species were identified. This genus, the fingernailclams, includes several species native to Tennessee and one non-native European species that has been found in Tennessee. None of them are listed by NatureServe Explorer as found in the state of Georgia (NatureServe 2012). The lack of detail in the sampling report makes it impossible to know whether this result indicates a return of native fauna or an invasion of additional non-native species. A few individuals of a *Pisidium* species were sampled. This peaclam genus also has native and exotic species, but only native species are documented from Tennessee.

### 3.8.4 Pest Species

In the past, VTS-C has experienced problems with large numbers of feral hogs. Rooting by these animals is highly destructive of understory plant communities and is a significant threat to the federally listed large-flowered skullcap. Feral hogs were controlled previously by professional removal. If hog sighting or damage increase to unacceptable levels, a project will be initiated to reduce their numbers.

As noted previously, beaver have been active on the VTS-C in large numbers. Control activities initiated in 2006 reduced the population to zero, temporarily, and reclaimed much of the flooded training land. It is anticipated, however, that the population will rebound as young beaver move in from other areas. The beaver population is monitored by observation of dammed waterways by training site and Environmental personnel. Control efforts will be re-initiated if the acreage lost to training becomes significant again.

VTS-C is infested with the imported fire ant (*Solenopsis* spp.). This invasive pest has spread to encompass the whole of the southeastern U.S. and has been found as far west as New Mexico, Arizona, and California. The imported fire ant is a highly aggressive ant, dominating the areas it infests and generally causing a decrease in insect species diversity. It has a fierce sting which it will apply repeatedly to animals it encounters with minimal provocation. These stings are painful and can cause anaphylaxis in sensitive individuals. Humans, domestic livestock, and wildlife are all susceptible to injury by red imported fire ants (Williams et al. 2001). The imported fire ant is the subject of a USDA quarantine which restricts the transport of soil, plants with soil and roots attached, grass sod, and similar materials. Fire ants are most prevalent on the open ranges and Cantonment lawns on VTS-C. A program of broadcast bait application coupled with direct contact insecticide application to immediate threat mounds is used to minimize the impact of the fire ant on training activities.

## 3.9 RARE, THREATENED, OR ENDANGERED SPECIES

One federally listed plant species has been located on VTS-C: a rather large population of the threatened large-flowered skullcap (*Scutellaria montana*) occurs in clusters over most of the training site (see 3.9.1 and Annex 1). No other federally listed plant species are known from Catoosa County. Several state-listed plant species are documented with Catoosa County and but were not found on the site in the most recent rare, threatened, and endangered (RTE) species survey (SAIC 1998b):

- **Goldenseal** (*Hydrastis canadensis*) – listed as endangered in GA – A perennial, low-growing, rhizomatous herb with a solitary, greenish white flower. Found in rich, mesic hardwood forests with alkaline soils. Commercial exploitation puts this species at risk as it has been over-harvested

for medicinal uses. Additionally, goldenseal is sensitive to habitat alterations and encroachment of invasive species.

- **Least glade-cress** (*Leavenworthia exigua var. exigua*) – listed as a threatened by GNHP – A small winter annual with lobed basal leaves and solitary white flowers with yellow centers. Restricted to open areas in limestone cedar glades where soil is shallow and gravelly. Habitat loss is the primary threat for this species.
- **Great Plains ladies'-tresses** (*Spiranthes magnicamporum*) – listed as endangered by GNHP – A member of the orchid family, this perennial produces white flower spikes in early fall after the leaves have withered. Grows in basic soils and may be found in prairies, glades, and floodplains. Loss of habitat is the greatest threat for this species.
- **Glade meadowparsnip** (*Thaspium pinnatifidum*) – listed as endangered by GNHP – A Perennial herb in the carrot family; has white flowers and finely divided leaves. Occurs in forests and woodlands with rich, calcareous soils. There are no clear explanations for population declines. Forest succession and soil disturbances are potentially threats to this species.

The federally listed endangered gray bat (*Myotis grisescens*) has been captured over Tiger Creek on VTS-C, but no hibernacula have been identified on the training site. Further information on the gray bat is presented in section 3.9.2 and in Annex 1. Two additional federally listed animal species are documented in Catoosa County, but have not yet been found on the training site:

- **Spotfin chub** (*Erimonax monachus*) – threatened – This species occurs in clear creeks or medium-sized rivers with moderate gradient and rocky substrate. Range restricted to the Tennessee River drainage; presumed extirpated in Georgia. Species threatened by habitat loss and degradation.
- **Snail darter** (*Percina tanasi*) – threatened – The snail darter is found in shoals of creeks and small rivers, sometimes burrowing into sandy substrate. Habitat fragmentation due to stream impoundments is the main threat to this species.

In 2012 the USFWS identified the probable range of the endangered Indiana bat (*Myotis sodalis*) to include northwest Georgia. There are no recent records of this species from Catoosa County, but it must be treated as a possible species for the training site, requiring presence-absence surveys prior to any project involving the cutting of timber that might be habitat. A bat survey utilizing USFWS Indiana bat monitoring protocols was initiated in 2012 to provide baseline data on whether the species is utilizing the training site. Results are expected in late 2013.

A number of state-listed animal species are found in Catoosa County. They are all aquatic animals and have not been found on VTS-C, but habitat may be present to support them:

- **Chickamauga crayfish** (*Cambarus extraneus*) – listed as threatened by GNHP – Found in shallows and in leaf litter of high gradient streams. Has a naturally restricted range which is threatened by likelihood of stream impoundments in the area.
- **Eastern hellbender** (*Cryptobranchus alleganiensis alleganiensis*) – listed as threatened by GNHP – This entirely aquatic amphibian may be found in cool, clear streams with large rocks. The former range of these animals has been greatly diminished due primarily to habitat degradation.
- **Flame chub** (*Hemitremia flammea*) – listed as endangered by GNHP – Found in springs and spring-fed streams in areas with abundant aquatic vegetation. The primary threat to this species is habitat loss and degradation.

- **Popeye shiner** (*Notropis ariommus*) – listed as endangered by GNHP – Found in clear waters of large creeks and small to medium rivers with gravelly substrate. The main threats to these fish are habitat degradation due to siltation and other pollutants as well as stream impoundments.
- **Mountain madtom** (*Noturus eleutherus*) – listed as endangered by GNHP – Habitat consists of small to large rivers with fast-flowing, clear waters with sandy or rocky substrate. The mountain madtom is primarily threatened by habitat loss.
- **Stargazing minnow** (*Phenacobius uranops*) – listed as threatened by GNHP – Occurs in warm waters of creeks and small to medium rivers in rocky runs and riffles. The primary threat to this species is habitat loss and degradation.

A bat survey was completed in 2007: seven species were captured on the training site (see Appendix F); of these, only the gray bat is protected. Bird, mammal, herpetofauna, and fish surveys have been conducted since 2006. Species are listed in Appendix 7. The gray bat is the only federally listed species to have been identified. A new RTE survey was initiated in FY11; results are anticipated in 2013. Management plans will be developed for any species found and incorporated into Annex 1.

### 3.9.1 Large-Flowered Skullcap (*Scutellaria montana*) – Federal threatened, Georgia Natural Heritage Program threatened

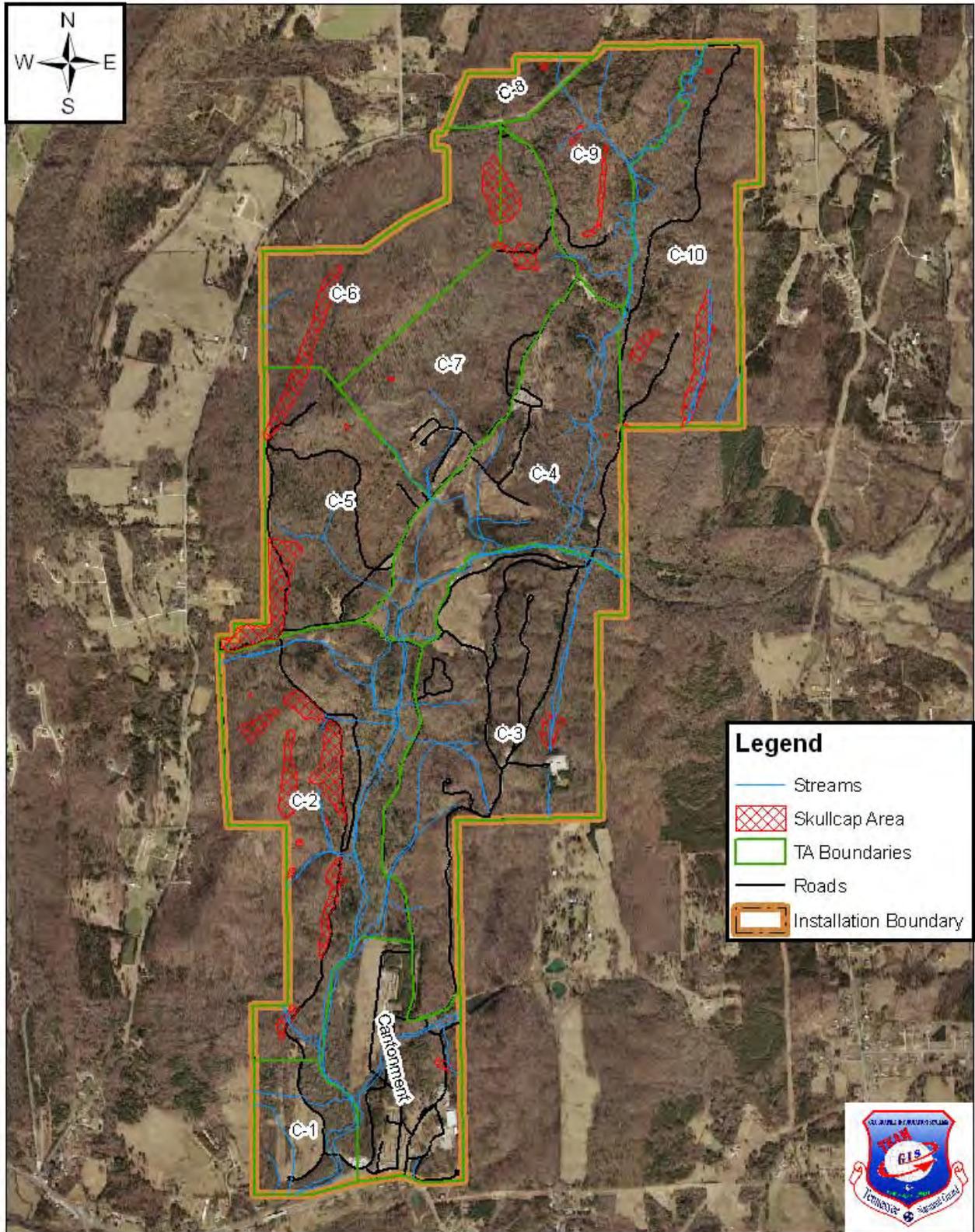
Overview: The U. S. Fish and Wildlife Service listed large-flowered skullcap (*Scutellaria montana*) as an endangered species in 1986. At that time there were seven populations known in Georgia and three in Tennessee. Over 90 % of the 7,000 plants known in 1986 occurred at only two sites (USFWS 1996). The USFWS defined a self-sustaining population as containing more than 100 plants. The species was reclassified (down-listed) to threatened in 2002, at which time 48 populations were known for a total of over 50,000 individual plants.

In 2002, TNARNG contracted SAIC to conduct a full site survey for the large-flowered skullcap. A total of 1,581 individual plants were found in sixty discrete clusters across VTS- C. These clusters were then clumped into 26 management groups based on geographic proximity and habitat similarity (Figure 3.8).

Description of species: Large-flowered skullcap is a member of the Lamiaceae or mint family. Chapman described the species in 1878 based on a location in Floyd County, Georgia. It flowers in mid-May to June. The corolla is blue and white with two-lobed calyx with a “cap” on the upper lobe. It has a solitary, erect, hairy, and square stem. Leaves are lanceolate to ovate, are serrated, and have opposite leaves.

Habitat/ecosystem: Large-flowered skullcap is endemic to northwest Georgia and southeast Tennessee. The habitat for the plant consists of rocky, slightly moist to dry, well drained and slightly acidic soils in slope, ravine, and stream bottom forests. Typically, the plant grows under mid- to late-successional oak-hickory canopies (*Quercus* spp. and *Carya* spp.). Usually, a deciduous shrub layer and moderately dense herb layer are present. Natural pine (usually shortleaf pine, *Pinus echinata*) can be present. The shrub layer often has some *Vaccinium*. This type of habitat is present at VTS-C.

Threats and competing species: Habitat alteration and destruction (as a result of logging, wildfire, grazing and development) are the principle threats to this species across its range. Conversion of oak-pine forests to pine plantations has resulted in known population losses. The large-flowered skullcap can probably tolerate some selective logging; complete canopy removal by clear-cutting likely would increase competition to an undesirable level. The large flowered skullcap is not considered to be a vigorous competitor. It is thought to be susceptible to competition by invasive, exotic, aggressive plants (especially Japanese honeysuckle) that tend to flourish after any type of disturbance. At VTS-C, invasive plant species are present near some of the skullcap management groups. Animal damage can also have an impact on large-flowered skullcap. At VTS-C indications of feral hog rooting have been noted near

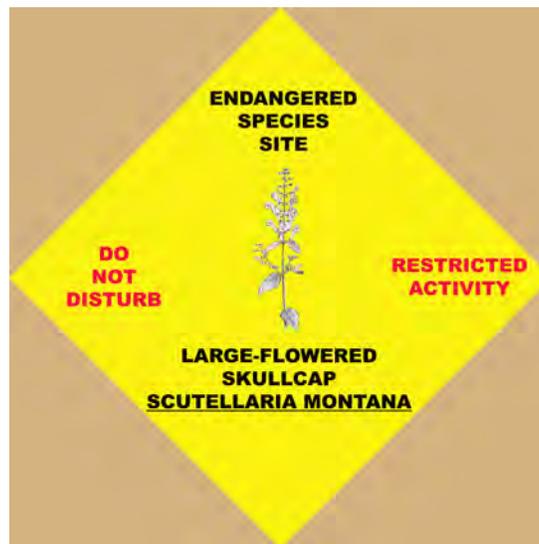


**Figure 3.8: Large-flowered skullcap occurrences on VTS-Catoosa.**

skullcap groups – as a perennial herb, damage to the rootstock could be a significant threat to the skullcap. Also, deer are believed to be eating the plants; indications of browse, especially removed floral parts, have been observed regularly during the annual monitoring of the plants.

Conservation measures: At VTS-C the large-flowered skullcap management groups are marked by signs (Figure 3.9). During the flowering season (March 1 – June 30), posted areas are closed to all access; the rest of the year posted areas are limited to foot traffic only. Maps produced for training use show the skullcap areas as limited activity sites, and training activities are designed to avoid impact to the plant or its habitat. Annual monitoring was initiated on the training site in 2004. For further information, see Annex 1.

**Figure 3.9: Large-flowered skullcap signs.**



### 3.9.2 Gray Bat (*Myotis grisescens*)

Gray bat colonies are usually restricted to caves or cave-like habitats located within a kilometer of a river or reservoir. In winter they utilize only deep, vertical caves having a temperature of 6-11 degrees centigrade. The largest member of its genus in the eastern United States, the gray bat weighs from 7 to 16 grams. Its forearm ranges from 40 to 46 millimeters in length (USFWS 1982). One feature which distinguishes this species from all other eastern bats is its uni-colored dorsal fur. The other bats have bi- or tri-colored fur on their backs. Also, the gray bat's wing membrane connects to the foot at the ankle instead of at the base of the first toe as in other species of *Myotis* (USFWS 1982). Gray bats feed on insects, of which the majority are aquatic species, particularly mayflies.

Gray bats were caught in the summer of 2006 foraging over Tiger Creek. No cave habitats have yet been located on the training site, but gray bats can travel up to 20 km from their roost site while foraging. Further surveys will be conducted as funding becomes available to more completely characterize the gray bat usage of VTS-C. A project was conducted in summer 2008 to radio-track the bats foraging on the training site to locate their roosting habitat. It was not possible to follow the gray bats to their roosts; however, it was determined that they were leaving the training site area.

More information is available in Annex 1, which will be updated with a management plan for this species when more details of the population are known and their management needs can be identified. The primary management strategy for gray bat on VTS-C at this time is to protect the riparian habitats which are known to be foraging habitat for this species.

### **3.10 CULTURAL RESOURCES**

#### **3.10.1 Paleoenvironment**

The current climate and vegetation of northern Georgia are the result of a long and complex interaction of natural and human-induced change. Prior to the arrival of humans, conditions during the last full glacial period (ca. 23,000 to 13,000 B.C.) were considerably cooler than at present. At that time, the study area was covered by a northern coniferous forest dominated by pines and spruce (Stanyard et al. 1998). When humans first arrived in what is now the Georgia region (ca. 13,000 to 8000 B.C.), the climate gradually warmed and precipitation increased. These trends occurred in conjunction with northern hardwoods replacing pine and spruce as the dominant overstory species. The Altithermal period from ca. 8000 to 3000 B.C. was a period of continued warming but decreased precipitation, with a dominant overstory vegetation of oak-hickory forest. Since ca. 3000 B.C., the climate has cooled slightly and precipitation has possibly increased, leading to the conditions that exist today. Since prior to settlement by Euro-Americans, oak-hickory stands have been decreasing and the number of pines has been increasing.

Vegetation within the Georgia Ridge and Valley has undergone extensive alteration in the past two centuries, complicating any estimation of the relative quantities of original species and their distribution across the landscape. The earliest Euro-American settlers reported large stands of yellow pine in the oak-hickory forests of the Ridge and Valley province. Whether these were the products of natural forces or the results of aboriginal hunting methods, which used fire to drive and concentrate game, is unknown. Large-scale clearing and cultivation of cotton in the nineteenth century removed large tracts of native forest and caused serious erosion. As a consequence, by the 1930s, much of the land had to be abandoned, with the result that up to 70 percent of the area now lies in secondary forest dominated by pine (Stanyard et al. 1998).

#### **3.10.2 Prehistoric Background**

Details on the prehistoric period in the southeastern United States and Georgia in particular are available in the TNARNG Integrated Cultural Resources Management Plan (ICRMP) for the Catoosa Training Center (TRC Garrow and SAIC 2002).

#### **3.10.3 Historic Overview**

##### The Contact Period

The earliest European contact with what is now Catoosa County was the de Soto expedition of 1540, which probably passed to the east of Catoosa County through the Conasauga River valley. The towns that the expedition visited reflected Mississippian Period culture, and were probably heavily impacted by the contact with these and other Spanish explorers. During the following century, European goods were incorporated into the American Indian trade, and disease and power struggles disrupted the old order.

By the time English explorers began arriving in the Tennessee River valley, the Cherokee tribe had emerged as the dominant culture and had established control of a large area that included eastern Tennessee, western North Carolina, and northern Georgia (Stanyard et al. 1998). At that time, the area around modern-day Chattanooga and northwest Georgia was essentially uninhabited, although a number

of important Indian trails passed through what would become Chattanooga. As a result of the American victory in the Revolution, in which the Cherokee sided with the British, many of the Cherokee were driven to the southern portion of their claimed territory, into what is now northwest Georgia.

During the late eighteenth and early nineteenth centuries, the Cherokee adopted many Western ways. Some Cherokee accumulated great wealth, managed large plantations, and owned slaves. Other Cherokee established farms, operated stores and taverns, and practiced trades, such as milling and blacksmithing. They settled in loosely structured towns in the fertile river valleys, where they practiced European-style farming, growing cash crops, such as corn and tobacco. One of the chiefs of the Cherokee, Captain Richard Taylor, lived near Ringgold at the northern end of the ridge that bears his name (located to the northeast of VTS-C).

Despite their acceptance of European culture, the Cherokee's right to their native homeland was never accepted by the American public, who continued to push for further concession by the Cherokee. By 1820, both legitimate and questionable treaties had reduced the Cherokee territory to the northwest corner of Georgia, north of the Chattahoochee River. Determined not to make any further concessions, the Cherokee organized the Cherokee Nation, a sovereign nation with a constitution modeled on that of the United States.

In 1835 after the discovery of gold in northern Georgia, a treaty was obtained from a small group of Cherokee, none of whom were officials in their government, agreeing to remove to lands west of the Mississippi. John Ross, then chief of the Cherokee, refused to recognize the treaty and resisted compliance, appealing to the U.S Supreme Court for support. Although the Supreme Court supported the Cherokee who refused to recognize the bogus treaty, President Andrew Jackson was generally unsympathetic to Native American causes and refused to enforce the court's decision. Despite passive resistance from the Cherokee, by 1838 federal troops had rounded up most of the remaining tribe members and forced them onto the Trail of Tears to Oklahoma. To avoid removal, numerous Cherokee fled to the mountains, while others abandoned the march en route to return to their homeland or take up residence along the trail.

#### Afro/Euroamerican Settlement

Permanent European settlement in Catoosa County probably began sometime after 1805, when construction was authorized for a Federal Road through the area to connect the southeast coast with the settlements of the upper Mississippi Valley. The road followed Georgia Highway 2 and US 41 in Catoosa County, passing within two miles of the training site. The road was used by settlers in Tennessee to drive their stock to markets in Georgia and South Carolina and to transport crops and products such as wheat, cotton, and whisky.

Catoosa County was created from Walker and Whitfield counties in 1853. In the 1830s the valleys in the area began to fill with pioneer farmers. The railroad soon followed: service from Atlanta to Dalton began in 1847, and the line to Chattanooga opened in 1850. The town of Ringgold was incorporated in December 1847.

One of the area's early attractions was its mineral springs, of which Catoosa Springs was said to be among the finest. Catoosa Springs is supposed to have been used by the Indians prior to the arrival of European settlers, and by 1849 there was an established resort centered on the springs. By 1854, the rail line had a stop, called Catoosa Platform, just southeast of Ringgold and southwest of the training site. By 1860, Ringgold was a thriving trade town in a county of 5,082, where wheat was the chief economic product. The cooler climate of the mountains did not support cotton well, and so there was little development of the plantation system, and slavery was not widely supported.

### Military History

The current area of the VTS-C was utilized for military activities as early as the 1850s when the resort at Catoosa Springs was used as a summer camp for cadets attending the Georgia Military Institute. From the fall of 1862 until September 1863, the buildings and grounds at Catoosa Springs were used as a Confederate hospital.

During the Battle of Ringgold, the Union forces pursued the retreating Confederates only as far as Stone Church before returning to Ringgold. The Union occupied the town throughout the winter of 1863-1864. Soldiers from both armies likely visited the springs during that period. At the beginning of the Atlanta Campaign, the Fourth Corps of the Army of the Cumberland marched from Cleveland, Tennessee, to Catoosa Springs. There was some fighting east of the springs during the march. The Corps remained encamped at Catoosa Springs from May 4 until May 7, when they marched on Tunnel Hill.

In 1904, land west of the Catoosa Springs recreational property was leased by the U.S. Army as a target range for soldiers stationed at Fort Oglethorpe. In 1906-07, the Army purchased 1174.5 acres; more land was acquired in 1910 through condemnation. Portions of this land were actively farmed at the time and may have supported several residences. This area was known as the "Target Range" or "Rifle Range" during its years of association with Fort Oglethorpe. A 1,000 yard rifle range was located at the south end of the property. In 1910, at least 12 structures existed, near Catoosa Springs Road and along Tiger Creek at the base of Sand Mountain. The range site was maintained and utilized by the Army through World War II.

In 1946, Fort Oglethorpe was deactivated and offered for sale to the public. The rifle range was originally included in the sale offer. The range site remained in surplus until 1948 when the U.S. Army recommended that it be placed under the jurisdiction of the Corps of Engineers for use by the Tennessee National Guard as a training site for its Ground Force Unit.

#### **3.10.4 American Indian Resources and Tribes**

The VTS-C is located on lands traditionally claimed as territory of the Cherokee. Kaskinampo/Coushatta and Yuchi and, marginally, some bands of Creek may have also ranged within the area. All archaeological sites identified during cultural resources surveys are potential American Indian sacred sites. To date, no American Indian sacred plant, animal, or mineral gathering localities are known from the VTS-C.

Currently, three groups of Cherokee are federally recognized. The Cherokee who traveled to Oklahoma are currently represented by the Cherokee Nation of Oklahoma and the United Keetoowah Band of the Cherokee of Oklahoma. The Eastern Band of Cherokee of North Carolina trace their ancestry to those Cherokee who remained in the mountains to avoid removal in 1838-1839.

Federally recognized groups of the Creek are the Alabama-Quassarte Tribal Town of the Creek Indian Nation of Oklahoma, the Kialegee Tribal Town of the Creek Indian Nation of Oklahoma, the Muskogee (Creek) Nation of Oklahoma, the Thlopthlocco Tribal Town of the Creek Nation of Oklahoma, and the Poarch Band of Creek Indians of Alabama.

Federally recognized tribes of the Coushatta are the Alabama-Quassarte Tribal Town of the Creek Nation of Oklahoma, the Coushatta Tribe of Louisiana, and the Alabama-Coushatta Tribe of Texas.

Only one group of Yuchi – those who relocated to Oklahoma with the Muskogee Creek – exists as a distinct cultural entity within a federally recognized group. These Yuchi, today represented by the Yuchi

Tribal Organization, petitioned the federal government for recognition as a separate group; the government has proposed denying the petition (<http://www.doi.gov/bia/bar/yuchidx.html>).

In 2003, TNARNG initiated tribal consultation with all federally recognized tribes which have ties to Tennessee and northwest Georgia. The list of tribes involved is presented in Appendix G. Consultations have occurred in 2003, 2004, and 2005. All interactions between the TNARNG and the tribes that have historic ties to the Catoosa region are conducted in accordance with the DoD Annotated American Indian and Alaska Native Policy (27 Oct 1999).

### **3.10.5 Cultural Resources Identified on VTS-C**

In September and October 1997, TRC Garrow Associates Inc. (Stanyard et al. 1998) conducted Phase I cultural resource investigations at the VTS-C. Archaeological and historic architectural surveys were included in the study.

Twenty archaeological sites and one isolated find were identified in the project area. Fourteen sites represent occupations, five represent historic occupations, and one site has both prehistoric and historic components. Nine prehistoric sites (9CT28, 9CT29, 9CT66, 9CT69, 9CT70, 9CT71, 9CT72, 9CT73, 9CT75) and three historic sites (9CT34, 9CT35, 9CT74) are recommended potentially eligible for the National Register of Historic Places (NRHP) under Criterion D. The other eight sites are recommended ineligible for the NRHP.

The historic architecture survey identified 17 historic architectural resources located among numerous non-historic resources near the south end of the installation. Of the 17 resources, three are recommended eligible for the NRHP; the rest are recommended ineligible due to loss of integrity. The three resources recommended NRHP-eligible are a 1934 concrete dam (with its associated pond) (HS-14)[TR-23]; a ca. 1907 target range (HS-15)[TR-27]; and a ca. 1940 concrete bridge (HS-17). HS-14 and HS-17 appear eligible under NRHP Criterion A for their roles in the military history of the local area, state, and region and under Criterion C as an intact site that continues to display its historic appearance and use. The State Historic Preservation Office (SHPO) concurred with these findings on August 5, 1998.

The inventoried buildings and structures were evaluated to determine if they comprised a potentially eligible NRHP district. Severe alterations to 14 of the 17 properties, non-historic infill construction, and changes in use had drastically altered the historic core area of the training center. In fact, an approximately equal number of historic and non-historic properties were located in the core area. Thus, it did not appear that a cohesive, eligible NRHP district existed at the facility.

## **CHAPTER FOUR MANAGEMENT GOALS: GOALS, OBJECTIVES, AND TASKS FOR NATURAL RESOURCES MANAGEMENT**

### **4.1 MILITARY MISSION GOALS AND OBJECTIVES**

VTS-Catoosa exists to provide a location and facilities for the training of Tennessee National Guardsmen. Ensuring the availability of mission-critical training land now and for the future is the primary objective of VTS-Catoosa natural resources management.

The following are military mission-related objectives that will be accomplished by or in cooperation with the natural resources management actions proposed in this VTS-C INRMP:

- Additional small cleared areas for bivouac and other training
- Improved visibility along roadways through selective tree cutting
- Meet security directives by clearing 25 ft buffer along perimeter fencing
- Augment range facilities: addition of modified record fire range and CACTF; relocation of TTB

### **4.2 NATURAL RESOURCES GOALS AND OBJECTIVES**

The ultimate goal of the TNARNG natural resources program is to maintain healthy natural ecosystems while training soldiers to meet the mission requirements. Training programs and land management are both long-term, ever-changing processes, and the goals and objectives presented here are intended to guide TNARNG activities for the foreseeable future. The projects list is scheduled five to ten years out and will be updated annually as needed.

#### **4.2.1 Ecosystem Management and Maintenance of Biodiversity**

In 1994, the Office of the Under Secretary of Defense for Environmental Security issued a memorandum to all forces in the Department of Defense (DoD) to implement Ecosystem Management on DoD lands. Ecosystem management blends multiple-use needs, provides a consistent framework to manage installations, and ensures that the integrity of the system of DoD lands remains intact. DoD Instruction 4715.3, “Environmental Conservation Program”, implements policy, assigns responsibilities, and prescribes procedures for the integrated management of natural and cultural resources on property under DoD control.

Ecosystems are “explicit units of the earth that include all of the organisms, along with all components of the non-living environment within its boundaries” (Ecological Society of America 1996). The aim of “ecosystem management” is to manage the land for the health of the whole rather than for constituent pieces, such as game species, timber, or rare species. Maintaining the system as a functioning whole ensures the continuing ability of that system to meet future needs.

Ecosystem management is not easily planned or measured. Many functions of an ecosystem take place on scales far larger and longer than most human activity, and the boundaries of an ecosystem are not easily defined. For the purposes of this INRMP, the property line of the training site will function as a permeable border around a series of interconnected systems (forest, grassland, riparian) which make up a whole, which is itself a part of a larger system. Management of the training site must focus on the training site, but must take into account the activities beyond the fenceline, as well.

VTS-C has a variety of community types, including the habitat for a federally listed threatened plant species, creating a high level of ecosystem diversity. The current patchwork of habitats has been created by the conjunction of past land use patterns, current military land use, and environmental gradients, and it may be drastically different from the environment found in the region prior to European settlement. However, it is a healthy, functioning system, as indicated by its high level of species diversity and the presence of rare species. It is the aim of this management plan that native biodiversity will be maintained at all levels within the ecosystems that make up VTS-C and that those systems will continue to function fully.

## Goals:

- Provide the ecosystem types needed for training.
- Maintain or improve ecosystem and habitat diversity.
- Maintain or improve species diversity.
- Protect unique communities.

**Objective 1-1:** Manage for mission-suitable habitats or “missionscape”.

<i>Tasks</i>	<i>Targets</i>
<i>Identify natural resources characteristics needed for training activities on VTS-C through consultation with training site manager, training site commander, units, and trainers.</i>	1a. Missionscape statement development FY11
<i>Determine appropriate acreage and locations for given mission habitats based on training needs and VTS-C characteristics.</i>	1b. Missionscape plan development FY12
<i>Develop and implement management actions to create, improve, or expand mission habitats, as needed.</i>	

**Objective 1-2:** Identify ecotypes present on the training site and maintain up to date information regarding those systems.

<i>Repeat vegetation community survey every ten years.</i>	1c. Vegetation community PLS FY16
<i>Repeat wetland survey using USACE formal delineation guidelines every ten years.</i>	1d. Wetland PLS FY10 (in progress) and FY20.
<i>Repeat surface water quality assessment every 5 years.</i>	1e. Surface water quality assessment FY 14

**Objective 1-3:** Characterize the species composition, ecosystem health, and wildlife use of the significant habitats on VTS-C.

<i>Conduct a baseline survey for potential threatened and endangered species and repeat every 5 years.</i>	1f. Rare species PLS FY12
<i>Conduct a bat survey and repeat every 5 years.</i>	1g. Bat PLS FY13
<i>Repeat bird survey every 5 years.</i>	1h. Avian PLS FY12 and FY17
<i>Conduct an insect survey.</i>	1i. Insect PLS FY14
<i>Repeat aquatic fauna survey, including macroinvertebrate and vertebrate organisms every 5 years.</i>	1j. Aquatic fauna PLS FY14
<i>Repeat mammal survey every 10 years.</i>	1k. Mammal PLS FY18
<i>Repeat herpetofauna survey every 10 years.</i>	1l. Herpetofauna PLS FY19

**Objective 1-4:** Develop management strategies to protect ecotypes/habitats of importance.

<i>Identify and prioritize ecotypes of significance at regional and local</i>	1m. Map and priority list of
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<i>scales.</i>	extant ecosystems FY13
<i>Identify training or other threats to significant habitats</i>	
<i>Determine the necessity of significant habitats to training activities, and identify alternate areas for training where feasible.</i>	1n. Threat and usage details collected FY13
<i>Develop protection plan for significant habitats.</i>	1o. Protection plan FY14
<i>Implement measures of biodiversity at multiple scales to monitor habitat health (see Section 4.2.11)</i>	
<b>Objective 1-5: Manage for ecosystem health, wildlife, and improved habitat quality.</b>	
<i>Eliminate invasive exotic species where feasible (see Section 4.2.10)</i>	
<i>Initiate conversion to native species to restore natural vegetation communities, especially in grassland areas, where there is no conflict with military training.</i>	1p. Identify locations for native species restoration FY12 1q. Develop restoration plan FY13 1r. Implement restoration plan as possible
<i>Institute prescribed fire regime for grassland and forest management where appropriate, incorporating training site needs, nesting bird protection, and the historic fire regime (see Section 4.2.8)</i>	
<i>Implement measures of biodiversity at multiple scales to monitor habitat health (see Section 4.2.11)</i>	

#### 4.2.2 Rare, Threatened, and Endangered Species (RTE) Management

VTS-C is home to relatively large numbers of the federally threatened large-flowered skullcap (*Scutellaria montana*). Initial investigations of the species on VTS-C began in 2002 with a survey to establish the extent of its occurrence on the training site. Annual monitoring for the skullcap has been carried out on the training site since 2004.

The federally listed endangered gray bat (*Myotis grisescens*) has also been found on the VTS-C. Studies are still underway to determine the level of use this species makes of the training site. Monitoring protocols and management guidance will be developed for the gray bat as more information becomes available.

A variety of other rare, threatened, or endangered species are known to occur within the northwest Georgia region in habitats that can be found on VTS-C (see section 3.9). Annex 1 contains the Rare Species Management Plan. At this time, the plan is focused on monitoring and management activities for the large-flowered skullcap. Additional information will be added if other RTE species are identified on the training site and management protocols are developed for them.

##### Goals:

- Minimize conflicts between the training mission and species protection.
- Maintain healthy population of large-flowered skullcap (*Scutellaria montana*)
- Maintain habitat currently used by gray bat (*Myotis grisescens*)
- Avoid accidental takes of *S. montana* and *M. grisescens*
- Maintain native plant communities that support state and federal rare, threatened, or endangered species

- Cooperate with the US Fish & Wildlife Service and the State of Georgia Natural Heritage Program
- Ensure that VTS-C remains in compliance with the Endangered Species Act

**Objective 2-1:** Quantify and monitor groups of large-flowered skullcap on VTS-C.

<i>Conduct annual monitoring during</i>	2a. Annual monitoring
<i>Utilize results of annual monitoring and other data to track the plant population</i>	2b. Annual report of population condition
<i>Re-evaluate monitoring protocol in 2013 to determine need for continued annual monitoring and/or changes to methodology.</i>	

**Objective 2-2:** Protect the large-flowered skullcap groups on VTS-C.

<i>Maintain a posted perimeter around the large-flowered skullcap groups.</i>	2c. GPS location every other year Adjust sign positions as needed
<i>Develop training for soldiers and training site personnel to understand the restricted activities within posted groups.</i>	2d. Poster and training materials in FY12
<i>Continue regular communication with GADNR and USFWS, including consultation on major actions,</i>	As needed
<i>Work with universities or other research institutions to further knowledge of large-flowered skullcap.</i>	
<i>Develop other protection protocols as needed.</i>	

**Objective 2-3:** Investigate management alternatives and impacts.

<i>Develop experiment to test transplanting some individuals in conjunction with mandatory clearing of training site boundary fenceline.</i>	2e. Study results/report FY12
<i>Determine effect of selective burning on large-flowered skullcap.</i>	2f. Study results/report FY12
<i>Investigate the impact of herbivory on large-flowered skullcap.</i>	2g. Study results/report FY14
<i>Develop treatment protocol and track effects of herbicide and non-chemical control of invasive plants in the vicinity of large-flowered skullcap.</i>	2h. Study results/report FY15
<i>Identify other practices that might improve skullcap habitat and develop experimental protocols in cooperation with FWS.</i>	

**Objective 2-4:** Characterize and protect gray bat population on VTS-C.

<i>Resurvey bat species on VTS-C every 5 years.</i>	See Target 1g
<i>Track bats with radio-telemetry to determine location of roosts/hibernacula if significant change in species composition.</i>	As needed
<i>Perform survey to quantify gray bat population and its activities on VTS-C if roosts/hibernacula are located.</i>	As needed
<i>Develop management plan and monitoring protocol for the bats, their foraging habitat, and their hibernacula (if located on site).</i>	As needed

**Objective 2-5:** Quantify and monitor populations of state and federal RTE species on VTS-C.

<i>Incorporate Indiana bat survey protocol into regularly scheduled bat surveys.</i>	See target 1g
<i>Perform a comprehensive survey for RTE species every 5 years.</i>	See target 1f

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*Develop management plan and monitoring protocol for any new species identified on VTS-C, as needed.*

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**Objective 2-6:** Identify and manage native communities currently supporting or potentially supporting RTE species.

*Integrate community information with RTE information and develop community-based habitat management plans and monitoring protocols for significant habitats, as needed.*

*Control invasive pest plant species where impacting RTE habitats (see Section 4.2.10).*

*Monitor health of communities of interest through long-term vegetation monitoring program and repeat surveys (see Section 4.2.11).*

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**Objective 2-7:** Manage American chestnut orchard.

<i>Coordinate with TACF annually for additional seeds/seedlings and to share data.</i>	2i. Annual correspondence
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<i>Physically maintain orchards: water and fertilize seedlings, maintain fence, and mow field.</i>	2j. As needed throughout growing season
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<i>Survey and measure seedlings annually.</i>	2k. Annual survey
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<i>Coordinate with TACF for blight resistance testing</i>	2l. Consult in FY14
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### 4.2.3 Reclamation/Mitigation

Reclamation and mitigation are a part of the everyday management of the training site, largely under the ITAM program. Major projects of reclamation and mitigation are included under the more specific environmental topic involved (e.g., erosion control, wildlife habitat, etc.). The principle project addressed in this INRMP is the Tiger Creek streambank restoration effort, which is discussed in detail in section 4.2.4 Erosion Control.

### 4.2.4 Erosion Control and Soil Conservation

VTS-C has large areas of steep slopes and highly erodible soil (see Section 3.4). Vehicle traffic is kept to the roads where possible in these fragile areas; however, erosion problems do occasionally develop from the limited use of these areas, the heavier use of less sensitive sites, and/or natural forces. Erosion issues need to be identified and repaired as quickly as possible. Documentation of recurring problems will allow adjustments to training use to avoid such problem areas. In addition, one significant reclamation project is planned at this time:

- A section of Tiger Creek which runs through the tank range has experienced significant undercutting and slumping of the banks. Restoration of this area will require resloping the banks, stabilizing the soil along the shoreline, and revegetating the area with native bottomland species.

According to the 2005 DA Sustainable Range/Installations Environmental Activities Matrix, erosion control and repair is predominantly a facilities or range responsibility. The Environmental Office will provide survey and reporting support, technical guidance, and assistance with permits as required. Repair efforts will be funded in accordance with the matrix.

Goals:

- Keep topsoil in its place.

- Minimize the development of erosion and sedimentation problems on the training land.
- Rehabilitate existing erosion problems.
- Protect shorelines from unnecessary erosion.

**Objective 4-1:** Identify and rehabilitate degraded and eroding training land.

<i>Develop a reporting form for TNARNG soldiers and training site personnel to report erosion problems identified during other daily activities.</i>	4a. Form prepared FY11
<i>Install reporting form on the Environmental webpage for easy access for all personnel.</i>	4b. Form on website FY11
<i>Establish regular surveys of training areas to identify and prioritize degraded or eroded areas requiring rehabilitation</i>	4c. Annual surveys beginning FY12
<i>Develop a system for compiling erosion reports, prioritizing projects, and tracking project progress and budget through the ENV office.</i>	4d. Tracking system FY12
<i>Repair erosion problems as identified. (Typically a Facility responsibility.</i>	
<i>Develop an “erosion guide” for VTS-C that identifies areas experiencing repeated erosion and gives guidance in appropriate repair and avoidance methodology.</i>	4e. Erosion guide FY12
<i>Develop training for soldiers, commanders, and planners in best Management Practices and their applicability to TNARNG actions.</i>	4f. BMP training module FY13

**Objective 4-2:** Restore sections of Tiger Creek streambank that are badly eroded/slumping.

<i>Determine the most appropriate natural streambank stabilization methods for this project and develop plan to reslope banks, install stabilizing structures, and revegetate.</i>	4g. Restoration plan FY12
<i>Conduct mechanical work and install stabilization structures.</i>	4h. Physical work FY13
<i>Revegetate with native, bottomland species which will provide soil-holding capabilities but remain low-growing to comply with range line-of-sight requirements.</i>	4i. Revegetation in FY13 and FY14

#### 4.2.5 Watershed Management

The riparian ecosystem – the land adjacent to the streams and wetlands – is extensive on VTS-C, surrounding Tiger Creek, Broom Branch, Catoosa Springs Branch, and the wetland areas. It consists primarily of mixed bottomland hardwood forests; although a portion of the area surrounding Tiger Creek in the tank range has been converted to managed grassland. Riparian areas serve as the interface between aquatic and terrestrial ecosystems. They serve as valuable wildlife habitat and corridors, promote streambank stabilization, trap sediments and nutrients, filter runoff water, and help to moderate flooding.

Limited military training activities occur within riparian areas at VTS-C. For much of the year, the natural water table level makes the area too wet for vehicle or troop movement. Stream fording by vehicles and troops on foot is only permitted at designated, hardened sites.

All stream systems will be surrounded by functioning riparian zones, continuous throughout a watershed and connected to other watersheds by mixed species corridors. Riparian zones and corridors will be designated as riparian buffer areas [streamside management zones (SMZ)] on maps in the VTS-C training site office.

The TNARNG will maintain riparian habitats along streams by implementing at minimum a 50 foot streamside buffer zone on either side of every creek. Vehicular traffic in the SMZ will be kept to a minimum, and authorization must be obtained before conducting maintenance and construction activities. Foot traffic through riparian areas is not regulated, but vehicles will be kept to established roads and trails. Where wetlands are present, a 50 foot riparian buffer zone will be established and marked with Seibert stakes on all sides of the wetland.

The riparian habitat is variable in size. While the restricted-activity Streamside Management Zone is 50-foot on either side of the waterway, the actual riparian area typically extends much further beyond the streambank. All areas of bottomland hardwood forest should be considered to be within the riparian zone, and care should be taken to minimize impacts on water and habitat quality.

Riparian areas are particularly susceptible to invasion by exotic plant species. The bottomland forests around Tiger Creek and Broom Branch are heavily infested with privet (*Ligustrum* spp.) and Nepalese browntop grass (*Microstegium vimineum*). These species drastically modify the habitat quality of the area and will require intensive efforts to control.

The stretch of Tiger Creek through the tank range was heavily modified in the past. It currently has areas of bank sloughing and erosion and sections with insufficient vegetative cover. Reclamation of this problem is covered in Section 4.2.4 Erosion Control and Soil Conservation.

Goals:

- Minimize nutrient and sediment inputs from watersheds.
- Minimize non-point source pollution in watersheds through use of Best Management Practices.
- Understand the ecosystem dynamics and stressors within the watersheds.
- Retain/rehabilitate vegetative buffers on waterways.
- Incorporate watershed management concerns into training and land management planning.
- Improve trout habitat quality along the full length of streams on VTS-C.

**Objective 5-1:** Improve knowledge of existing riparian areas and their conditions.

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*Vegetation community surveys and aquatic fauna surveys as noted in Section 4.2.1*

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*Survey streams as part of regular erosion surveys as noted in Section 4.2.4*

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*Develop and implement monitoring protocol for water resources to assess water quality across the training site and at in-flow and out-flow points.*

5a. Implement water monitoring FY13

**Objective 5-2:** Improve buffering quality of the riparian areas.

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*Perform riparian habitat assessments to identify degraded riparian corridors and prioritize restoration efforts.*

5b. Riparian habitat assessments FY13

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*Restore degraded buffers with appropriate native vegetation, as needed*  
*Repair erosion and sedimentation problems as identified, in accordance with Section 4.2.4*

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*Control invasive species in the riparian communities to allow native species to re-establish (see Section 4.2.10)*

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*Monitor riparian ecosystems to determine effects of management through long-term vegetation monitoring and repeat surveys (see Section 4.2.11).*

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**Objective 5-3:** Protect shoreline of Tiger Creek and all riparian areas from potential causes of erosion.

*Restrict all vehicular traffic, especially of large vehicles and machinery, along highly erodible soils at water's edge by maintaining, at minimum, a 50 foot riparian buffer zone (SMZ).*

*Post and maintain signs/Seibert stakes identifying SMZs.*

5c. Posting complete FY11 and checked biennially

*Maintain SMZs during all timber harvests and other clearing activities, retaining all trees that exist within the buffer zone.*

*Educate troops, management staff, and others on the importance of SMZs, the limitations to their use, and regulatory and permitting issues involved in riparian area activities.*

5d. SMZ training module FY13

**Objective 5-4:** Improve water quality for trout habitat.

*Measure water quality in terms of trout habitat requirements through stream system in conjunction with regular water quality assessment.*

*Develop and implement plan for improving stream habitat.*

See target 1e

**4.2.6 Wetlands Protection**

VTS-C has only a small area of jurisdictional wetlands (7.88 acres), mostly associated with the creek system on the training site. This ecotype is of importance for its chemical and sediment filtration functions as well as providing habitat for many species. A 50-foot buffer zone will be established surrounding wetland areas on VTS-C. Limitations for use of the buffer zone will be the same as those for an SMZ.

The Georgia Department of Natural Resources Environmental Protection Division, Water Protection Branch, and the Army Corps of Engineers protect wetlands by requiring state permits to alter waters of the state. These permits require that activities be undertaken in such a way that impacts to streams or wetlands are avoided or mitigated. Wetland criteria are provided within the general Water Quality Standards, and Best Management Practices identified for Forestry and Agriculture are applicable to wetland ecosystems.

## Goals:

- Minimize operational impact of the military mission on wetlands.
- Maintain functional, healthy wetlands that are resilient to minor, inadvertent encroachments and impacts.
- Manage for no net loss of wetland acreage, function, or value.

**Objective 6-1:** Improve knowledge of existing wetlands and their conditions.

*Wetland surveys as noted in Section 4.2.1*

*Conduct a floristic study of wetland habitats. Significant flora will be subject to appropriate monitoring.*

6a. Floristic study FY13

*Conduct a faunal study of wetland habitats. Significant fauna will be subject to appropriate monitoring.*

6b. Fauna study FY13

**Objective 6-2:** Implement and enforce effective buffers around wetlands areas.

*Post signs identifying 50' wetland buffers*

6c. Post buffers FY12

*Identify areas surrounding wetlands that require a vegetative buffer or filterstrip (or repair thereof) for protection*

6d. Buffer zone vegetative assessment FY13

<i>Educate troops, management staff, and others on the importance of wetland buffers, the limitations to their use, and regulatory and permitting issues involved in wetland area activities.</i>	6e. Wetland training module FY13
<i>Visually monitor wetlands annually to ensure compliance with SMZs.</i>	

#### 4.2.7 Forest Management

The Forest Ecosystem occurs on approximately 94% (1,522 acres) of the training site. The desired future condition of the forest at VTS-C is a range of forest types and ages, approximating natural habitat conditions and providing needed training opportunities. Timber production is not a primary goal of forest management on VTS-C, but timber harvest may be an appropriate method to achieve training needs, native species restoration, or forest health goals.

The Army forest management program is required to support and enhance the immediate and long-term military mission while meeting environmental stewardship requirements as mandated by Federal laws. Army Regulation 200-3 states that "...it is the Department of Army policy to maintain, restore, and manage its forest lands on an ecosystem basis. The harvesting of forest products is allowed and encouraged when conducted consistent with protecting and maintaining a viable, self-sustaining ecosystem".

Currently, many of the stands on VTS-C are overmature in terms of timber production. Areas of the training site are too dense for effective training use. In other areas, the mature forest should be protected for the threatened large-flowered skullcap. A forest inventory and a timber management plan were completed in 2006. This information and training site plans were used to develop the overall management plan for forest resources in Annex 2.

##### Goals:

- Provide optimum forestland training opportunities for TNARNG.
- Maintain mature forest habitat for *Scutellaria montana*.
- Improve forest health and wildlife habitat through appropriate forest management techniques.
- Manage for native forest species appropriate to the region.

##### **Objective 7-1:** Maintain forest inventory and other information needed for forest management planning.

<i>Repeat forest inventory every 10 years.</i>	7a. Timber inventory FY15
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<i>Conduct planning levels surveys as noted in Section 4.2.1</i>	
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##### **Objective 7-2:** Improve training areas by selected timber harvesting.

<i>Determine needs of TNARNG for forestland training operations at VTS-C and identify areas requiring alterations to the forest stands for training purposes.</i>	7b. Consult with training site staff annually.
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<i>Identify management practices to create desired training conditions, as needed.</i>	
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<i>Implement timber management to support training, as needed. Program projects through STEP or RPTS as appropriate</i>	
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##### **Objective 7-3:** Improve forest health and habitat quality across the training site.

<i>Identify stands requiring improvement through forest inventory, planning level surveys, and general observation.</i>	7c. Annual update of FMP
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<i>Perform timber stand improvement activities IAW Annex 1.</i>	7d. Annual timber ROA.
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*Conduct prescribed burning, where appropriate, to improve forest health and wildlife habitat, IAW Annex 3 (see Section 4.2.8).*

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*Control invasive exotic species within the forest ecosystem IAW Annex 3 (see Section 4.2.10).*

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*Maintain appropriate stand conditions along and around waterways with streamside management zones and best management practices.*

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*Monitor changes to biodiversity and species composition through long-term vegetation monitoring, repeat surveys, and regular timber inventory (see Section 4.2.11).*

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#### 4.2.8 Fire Management

Catastrophic wildfire is not a common threat to northwest Georgia ecosystems but must be planned for. The Wildland Fire Management Plan (WFMP) for the VTS-C is found in Annex 3. It includes background information on wildland fire and fuels on the training site, fire suppression guidelines, and the prescribed burning plan. The existing road system at VTS-C provides the basis for a functional firebreak system; additional breaks may be needed. The natural ecosystems of VTS-C are not notably fire adapted, and so prescribed fire will be a small component of forest management on the training site. It can be an important tool for maintaining grassland areas, however.

Goals:

- Minimize threat of wildfire to the training site.
- Maintain fire breaks to control wildfire or prescribed fire.
- Utilize prescribed fire as appropriate to maintain training area conditions and native ecosystems.

**Objective 8-1:** Ensure sufficient firebreaks for protection of VTS-C resources and to prevent fire escape from the training site.

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*Identify additional firebreak locations needed.*

8a. Consult with training site and TDF FY12.

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*Create firebreaks where needed, with consideration for erosion potential and 508-line. VTS staff responsibility.*

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*Develop and implement schedule of maintenance for firebreaks. VTS staff responsibility.*

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**Objective 8-2:** Perform prescribed burning as appropriate for training and ecosystem management needs, IAW Annex 3.

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*Obtain training for TNARNG personnel for prescribed burning and wildland fire fighting.*

8b. Annual refresher training. Additional training opportunities as needed.

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*Obtain equipment needed for prescribed burning, as needed.*

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*Coordinate with the GA Forestry Commission or other organizations to provide a trained prescribed fire burn boss, as needed.*

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*Implement prescribed fire program in Annex 3 for fuel reduction, training area, and ecosystem management.*

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*Conduct postburn evaluations to monitor efficacy of prescribed fire program.*

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*Review Wildland Fire Management Plan annually and update as needed.*

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8c. Annual WFMP review.

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#### 4.2.9 Fish and Wildlife Management

Currently, there are no specific fish or wildlife management activities conducted at VTS-C. Ecosystem management focuses on maintaining or improving the system as a whole; therefore, TNARNG policy is to manage animal species through manipulation of their habitat. Appropriate treatment of the forest, grassland, and riparian ecosystems should benefit the species that utilize those habitats. However, further information about the species that are utilizing the training site will allow further enhancement of this plan for the benefit of wildlife species.

There is no open hunting or fishing at VTS-C due to concerns for security and for the safety of the public and the soldiers. The white-tail deer population may exceed the site's carrying capacity without control; TNARNG will work with the GADNR to determine if this is a problem and to carry out a solution. Feral pigs and beaver are also an intermittent problem on the training site which will be addressed in cooperation with the Georgia wildlife authorities. Control of pest animals is addressed in Section 4.2.10, Pest Management.

Tiger Creek and its tributaries on VTS-C are classified as trout streams by the state of Georgia. Management of riparian areas will be conducted with maintenance of trout habitat as a primary goal.

##### Goals:

- Limit negative impacts on wildlife or wildlife management by training activities or land management.
- Improve wildlife habitat where possible through management of native communities and use of native species.
- Improve trout habitat quality in streams throughout VTS-C.
- Determine carrying capacity of the training site for white-tailed deer and maintain population at that level.
- Manage feral pigs for the protection of the ecosystems and rare species (see also Section 4.2.10).
- Manage beaver populations to minimize loss of training lands.

##### **Objective 9-1:** Gain updated and complete data on wildlife use of VTS-C.

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*Perform baseline biological surveys as noted in Section 4.2.1.*

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*Conduct population counts for deer, beaver, feral hog or other species as needed.*

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##### **Objective 9-2:** Manage habitats for all native species, not just game species.

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*Protect and maintain native species vegetative buffers around water sources, in accordance with SMZ protocols (See Section 4.2.5).*

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*Install and maintain nest boxes for appropriate bird species, as possible.*

9a. Install boxes 2012; annual maintenance thereafter.

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*Convert grassland areas to native plant species where feasible. See section 4.2.1.*

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*Educate troops, management staff, and others on protection of wildlife species and habitats.*

9b. Wildlife training module FY13

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##### **Objective 9-3:** Determine the necessity/feasibility of a hunting program for VTS-C.

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*Consult with the Training Office and training site personnel to determine if the military mission can be coordinated with limited public hunting access.*

9c. Hunting discussion FY13

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*Consult with GADNR about the potential need for additional public*

9d. Consultation FY13

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*hunting opportunities in Catoosa County and the suitability of VTS-C to fill that need.*

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*Gather information about game species populations on the training site and in the region.*

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9e. Game species population counts FY14

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*Consult with the GADNR about the carrying capacity of the training site and whether additional population control is needed for any game species.*

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#### 4.2.10 Pest Management

Pest Management at VTS-C is directed by the TNARNG Integrated Pest Management Plan (IPMP). Integrated Pest Management is “a comprehensive approach to pest control or prevention that considers various chemical, physical, and biological suppression techniques; the habitat of the pest; and the interrelationship between pest populations and the ecosystem” (Armed Forces Pest Management Board 1987).

According to DoD regulation and TNARNG policy, only DoD or State Certified Pesticide Applicators may apply any (restricted or general use) pesticide or herbicide to VTS-C property. The only exception to this rule is occasional small application of ready-made general use pesticides applied on a “self-help” basis due to an immediate need for personal safety (e.g., wasp spray in the motorpool, fire ant bait beside the walkway). Most chemical pest control on VTS-C is provided by contracted pest control company. VTS-C has one employee certified in the right-of-way category for in-house weed control. All chemical pesticide applications must be reported to the TNARNG Pest Management Coordinator (see Appendix H for forms).

VTS-C is infested with the imported fire ant (*Solenopsis* spp.). This is a highly aggressive ant, dominating the areas it infests and generally causing a decrease in insect species diversity. It has a fierce sting which it will apply repeatedly to animals it encounters with minimal provocation. These stings are painful and can cause anaphylaxis in sensitive individuals. Humans, domestic livestock, and wildlife are all susceptible to injury by red imported fire ants (Williams et al. 2001). The imported fire ant is the subject of a USDA quarantine which restricts the transport of soil, plants with soil and roots attached, grass sod, and similar materials. Fire ants are treated when the mounds pose an immediate threat to soldiers and other site users: around buildings, work stations, bivouac sites, firing points, training shelters, etc.

The primary natural resources aspect of pest management is the control of invasive species. Nonnative species have the potential to degrade training land at VTS-C and impact the usability of the land for Guard purposes. A variety of invasive pest plants are of concern at VTS-C: common privet, Japanese honeysuckle, Nepalese browntop, sericea lespedeza, and Canada thistle are the most prevalent. These plants can out-compete native plant species, change water and nutrient cycling, and drastically change the ecosystem in which they occur. An invasive pest plant management plan is included in Annex 4.

Two significant animal pests occur on the training site: feral pigs and beaver. The pigs dig up the roots of herbaceous plants for food and can have a major impact on rare species including the large-flowered skullcap, as well as disturbing the soil. Beaver are highly active in Tiger Creek and Broom Branch, creating water impoundments which kill timber, destroy bottomland ecosystems, and make the land unsuitable for training. The feral pig population has been reduced in the past by professional hunting. Trapping conducted in 2006 reduced the beaver population to near zero temporarily, but it is anticipated that new individuals will move into the vacated habitat. Hunting and trapping of these pest animals will be continued on an as-needed basis.

## Goals:

- Implement Integrated Pest Management according to the TNARNG Integrated Pest Management Plan (IPMP)
- Minimize the use of chemical pesticides and herbicides while achieving needed control.
- Ensure compliance with all legislation, regulations, and guidelines for pest management.
- Control animal and plant pests on the installation.

**Objective 10-1:** Control invasive species (IAW Executive Order 13112) to protect the natural ecosystems of the training site.

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<i>Repeat survey to identify and map invasive pest plant infestations every 5 years.</i>	10a. IPP survey FY12
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<i>Implement appropriate pest plant controls IAW Annex 4.</i>	10b. Annual implementation efforts
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<i>Monitor change in IPP infestations through long-term vegetation monitoring and repeat surveys (See 4.2.11).</i>	
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**Objective 10-2:** Control invasive species for improvement of training areas.

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<i>Identify problem plant species that may interfere with training activities and develop control plan.</i>	10c. Training-specific IPP control plan FY14
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<i>Implement appropriate controls to eliminate problem plants from training areas. VTS responsibility.</i>	
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<i>Monitor change through long-term vegetation monitoring and repeat surveys (See 4.2.11).</i>	
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**Objective 10-3:** Control pest species for safety and comfort of training site users.

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<i>Install, as feasible, and maintain bat boxes and bird nest boxes for biological control of mosquitoes around buildings and bivouac sites.</i>	10d. Annual box maintenance
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<i>Regularly monitor training site for presence of imported fire ant infestations.</i>	10e. Annual fire ant survey
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<i>Control pest animal populations as needed. VTS responsibility.</i>	
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**Objective 10-4:** Control pest animals for the protection of natural communities and RTE species and to minimize loss of training land.

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<i>Monitor feral pig impacts on vegetation in conjunction with routine vegetation monitoring (See 4.2.11).</i>	
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<i>Implement controlled hunting in cooperation with GADNR or USDA Animal Control Services to limit population of feral pigs as needed. VTS responsibility.</i>	
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<i>Map and monitor beaver populations and dams, in conjunction with annual stream erosion surveys, see Section 4.2.5.</i>	
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<i>Implement beaver trapping/hunting and dam removal as needed, complying with all state and federal regulations applying to aquatic and riparian habitat alteration. VTS responsibility.</i>	
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#### 4.2.11 Long-term Vegetation Monitoring

The goal of long-term monitoring is to track changes to the land resulting from training activities or other forces. RTLA, under the ITAM program, is one form of monitoring which should be implemented at VTS-C. Additional monitoring is needed to track impacts and changes to the ecosystems on the facility.

The Environmental office initiated a vegetation monitoring protocol in 2002. In the fall of that year, plots were established at three TNARNG training sites (Catoosa, Milan and Tullahoma) following the original Land Condition Trend Analysis (LCTA) line transect-point quadrat methodology (three control plots and five special use plots). On examination of the original LCTA (now RTLA) methodology utilized in 2002, it was determined that the design was not consistent with current scientific methods utilized in the eastern U.S. ecotypes. An initial sampling was made in 2004 on eight rectangular plots at VTS-C located at the starting end of the original LCTA transects. Further modification of this design is needed to ensure thorough coverage of the site and statistical validity, and a larger sample size is essential to fully characterize the training site.

A comprehensive, scientifically valid monitoring program should be developed for the VTS-C. Data collected through a vegetation monitoring program will be used to track impacts of various management activities on overall habitat health on the training site, especially in riparian systems, forest stands, and rare species habitat.

Goal:

- To use data collected from analyses of long-term vegetation plots to monitor effects of training activities and land management practices at VTS-C.

#### **Objective 11-1: Develop and implement a vegetation monitoring program.**

<i>Develop vegetation monitoring protocols for VTS-C.</i>	11a. Monitoring protocol FY13
<i>Establish vegetation monitoring plots.</i>	11b. VTS-C plots in place FY15
<i>Resample monitoring plots as appropriate IAW monitoring protocol.</i>	TBD

#### 4.2.12 Grounds Maintenance

Environmentally and economically beneficial landscaping practices can reduce maintenance costs while also providing wildlife habitat. Planting windbreaks around buildings, establishing forest, prairie, or wildflower areas, and reducing mowing are all ways to spend dwindling maintenance dollars more wisely, educate the public about the benefits of reduced maintenance, and become better stewards of the environment.

Goals:

- Maintain an attractive, functional landscape appropriate to TNARNG needs.
- Minimize the disconnect between “maintained” and “natural” landscapes.
- Decrease the use of chemical pesticides and herbicides.

**Objective 12-1:** Utilize regionally native plant species for all landscaping and restoration efforts if feasible.

*Use native grasses to seed exposed soils except where the native warm*

<i>season grass growth habit is incompatible with use (e.g., firing ranges).</i>	
<i>Use native shrubs, trees, and wildflowers for aesthetic plantings.</i>	
<i>Create a list of non-native plants to avoid and a list of native alternatives and their planting requirements for landscaping purposes.</i>	12a. Native planting guide FY11
<b>Objective 12-2:</b> Identify areas where the “edge” between maintained and natural can be blurred and adjust grounds maintenance activities to produce a less sharp division.	
<i>Survey the training site for appropriate boundaries between natural and maintained landscapes.</i>	
<i>Develop and implement a program to create more graduated edges. Ensure that changes to the vegetation structure will not affect training or safety.</i>	12b. Edge conversion plan FY14
<b>Objective 12-3:</b> Adjust maintenance schedules for protection of specific environmental values (e.g., breeding seasons of native birds).	
<i>Create list of values that may be impacted by grounds maintenance and determine appropriate scheduling and process for their protection.</i>	12c. List and details FY14
<i>Modify the ground maintenance calendar in the INRMP to reflect these protection efforts.</i>	12d. Calendar finalized FY14

#### 4.2.13 Recreational Use Management

At VTS-C, outdoor recreation is limited due to the primary mission of the training site and the danger it presents to public safety. Public access is restricted because of hazards related to training activities as well as on-going construction activities: small arms firing, convoy movement, training residue (e.g., fox holes and concertina wire), and training mechanisms (e.g., moving targets). All of these are potential hazards to outdoor recreationists on foot or in a vehicle. For this reason, public access to the training site is controlled by secured gates.

Any person entering the training site for any purpose prohibited by law or lawful regulation is trespassing. Criminal trespass is a misdemeanor under Georgia Code 16-7-21 and 38-2-306. It may endanger the life of the person entering the training site and the lives of Tennessee Army National Guardsmen and may interfere with training. Georgia Recreation Use Statutes (Liability of Land Owner to Person Using Land) are found in Section 12-3-116 of the Georgia Code.

##### Goals:

- Determine the viability and desirability of hunting or fishing programs at VTS-C in consultation with the GADNR.
- Identify and develop any other potential recreational use that will not interfere with training or result in hazardous situations for the public or TNARNG personnel.

#### 4.2.14 Cultural Resources Management

TNARNG has an approved Integrated Cultural Resources Management Plan (ICRMP) for the VTS-C in Georgia (separate from the ICRMP for the properties within Tennessee) and has conducted three consultations with 20 American Indian tribes with an interest in TNARNG properties. The ICRMP addresses cultural resources management in more detail and provides procedures to consider the effects that natural resources activities might have on cultural resources.

Natural resources management activities proposed in the INRMP that may require Section 106, Section 110, or tribal consultation include ground-disturbing activities associated with land rehabilitation and maintenance (erosion control and rehabilitation of eroded areas or trails). Some military training activities, e.g., engineering training and other ground-disturbing activities, are considered “undertakings” that are required to be conducted in accordance with the ICRMP. Each activity conducted in accordance with the INRMP must be coordinated through the Environmental Office’s Cultural Resources Manager and the ICRMP to ensure that they will comply with all applicable federal and state cultural resources requirements.

Goals:

- Manage cultural resources in support of the military training mission.
- Identify conflicts between cultural resources management and the training mission. Reconcile conflicts by ensuring continuance of the military mission while protecting cultural resources.
- Avoid impacts to historic, prehistoric, and archaeological resources on VTS-C in accordance with cultural resources laws and regulations.
- Maintain good relations with the American Indian tribes that have interest in TNARNG lands.

**Objective 14-1:** Adhere to guidelines presented in the TNARNG Integrated Cultural Resources Management Plan for VTS-C.

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**Objective 14-2:** Ensure that potential cultural resources sites are identified and are avoided during all natural resources management activities.

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**Objective 14-3:** Ensure that sites of prehistoric or historic significance which are encountered during natural resources management activities are properly reported, protected, and evaluated as required by state and federal regulations.

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**Objective 14-4:** Protect cemeteries on the VTS-C in accordance with the license.

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**4.2.15 Geographic Information Systems**

TNARNG Environmental has an extensive GIS database. It incorporates relatively complete training site information including all required SDS/FIE feature classes as required by National Guard Bureau. TNARNG GIS Branch meets or exceeds the CIP data calls required by NGB.

Goals:

- Continue to expand the information contained in the database and meet the ever growing demand to make data more readily available via interactive web applications.
- Utilize the data for training and management planning and for reporting purposes.

**Objective 15-1:** Maintain a constantly improving GIS.

*Identify the data layers captured and those still needed.*

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*Update older data layers and create new, as needed, or as information becomes available.*

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*Develop appropriate wording to be included in all Conservation contracts to ensure data is collected and presented in the correct format for the TNARNG GIS database.*

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15a. Review contract wording annually.

#### 4.2.16 Environmental Management Systems

The TNARNG Environmental office is in the process of developing an ISO 14001 Program. When completed, the environmental management system (EMS) and International Standard Organization (ISO) 14001 standard will:

- establish a mission-focused EMS within their purview;
- comply with Executive Order (EO) 13148, 'Greening the Government';
- conform to ISO 14001 per Department of Army (DA) and Army National Guard (ARNG) policy; and
- provide National Guard Bureau (NGB) with information regarding specific requirements for implementation.

EMS implementation will encompass the entire TNARNG installation, including VTS-C. The EMS implementation requirements apply to all installation missions, facilities, tenants, contractors, and activities. The surrounding communities, regulators, and other interested parties will be notified of the installation's EMS efforts and encouraged to become participants in and/or contributors to the process.

### 4.3 SUSTAINABLE RANGE PROGRAM (SRP)

The Sustainable Range Program (SRP) was conceived and implemented to improve the way the Army designs, manages, and uses ranges to ensure that current and future doctrinal requirements are met. As defined in AR 350-19, The Army Sustainable Range Program, the goal of the SRP is to maximize the capability, availability, and accessibility of ranges and training land to support training and testing requirements. The military mission is supported by the SRP through the integration of facilities management, environmental management, munitions management, and safety management to efficiently manage and maximize the capability, availability, and accessibility of ranges and training land to support training and testing requirements (Department of Army 2005).

The SRP gives attention to the increasing problem of encroachment on areas surrounding military installations. Encroachment has the potential to affect the accessibility and capability of the Army and the way the military trains. Because Army installations are located in regions that are increasingly urban and agricultural, the relatively natural landscapes found on these installations become islands of biodiversity.

There are eight overall objectives/core areas for the SRP that are designed to ensure the availability and accessibility of army training land (Department of Army 2005). These are:

1. Range Facilities
2. Range Operations
3. Range Maintenance
4. Encroachment
5. Environmental Responsibilities
6. Outreach
7. Integrated Management
8. Professional Development

The SRP program is the responsibility of the Training Site Commander. This program is closely tied to natural resources management and should be conducted in accordance with the standards put forward in

this INRMP. The Army's two components of the Sustainable Range Program are the Range and Training Land Program (RTLTP) and Integrated Training Area Management (ITAM).

#### **4.3.1 Range and Training Lands Program (RTLTP)**

The Range and Training Lands Program (RTLTP) provides centralized management and prioritization for planning, programming, design and construction activities for live-fire training ranges and maneuver training lands. The RTLTP process was developed to assist installations in the integration of mission support, environmental stewardship, and their economic feasibility (Department of Army 2005). In addition, the RTLTP identifies the needs for range projects and training land requirements for live-fire ranges and maneuver area. The RTLTP establishes how Army ranges are managed and maintained to support the mission requirements of each installation.

#### **4.3.2 Integrated Training Area Management (ITAM)**

The ITAM program serves as a link between the RTLTP and Natural Resources Management. ITAM provides range officers with the capabilities to manage and maintain training lands and support mission readiness and the Mission Essential Task List (METL). ITAM integrates the mission requirements derived from the RTLTP with environmental requirements and environmental management practices and establishes the policies and procedures to achieve optimum, sustainable use of training and testing lands by implementing a uniform land management program.

The ITAM program is a management and decision-making process that integrates army training and other mission requirements for land use with sound natural resource management practices. There are four components of the ITAM program: Range and Training Land Assessment<sup>1</sup> (RTLTA); Land Rehabilitation and Maintenance (LRAM); Sustainable Range Awareness (SRA); and Training Resources Integration (TRI). These areas do not fall under the control or responsibility of the Environmental Office. The goals and tasks included here are based on the SRP guidance, but may not be identical to the goals of the TNARNG SRP program.

##### **4.3.2.1 Range and Training Land Assessment**

RTLTA is a management procedure that inventories and monitors land conditions. It incorporates relational database and GIS technologies into the land use decision process. RTLTA collects physical and biological resources data from training land in order to relate land conditions to training and testing activities. These data provide the information to effectively manage land use and natural and cultural resources. It is the natural resources data collection and analysis component of the ITAM Program and is used as a standard base for inventory and monitoring on Department of Defense owned/managed properties (CEMML 1999). The intent of RTLTA is to acquire essential natural resource baseline information that is needed to effectively manage training lands. RTLTA surveys inventory plants and animals and describe the condition of the soils. The information obtained from RTLTA surveys may be integrated with standard data elements from ancillary components of ITAM (for example, cultural resources surveys, forest surveys, wetlands surveys, endangered species surveys, and water quality monitoring), satellite imagery, and aerial photography to portray a total picture of the natural and cultural resources of the training site. GIS is used to integrate all natural/cultural resources data and graphically display the relationships between individual resource components.

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<sup>1</sup> The Range and Training Land Assessment was formerly known as the Land Condition Trend Analysis (LCTA).  
Integrated Natural Resources Management Plan  
VTS-Catoosa

## Goal:

- To establish and maintain a monitoring system on VTS-C's training areas that will serve as an early warning system for the integrity of the training site's ecosystems.

## Tasks:

1. Establish special use plots as necessary on VTS-C.
2. Establish control plots as necessary on VTS-C.
3. Conduct inventories of vegetation, wildlife, and effects of training on RTLA plots.
4. Conduct short-term (every year) and long-term (every 3-5 years) monitoring of plots.
5. Utilize data to determine carrying capacity of training areas.
6. Utilize data to track changes in the training site's ecosystems.

#### 4.3.2.2 Land Rehabilitation and Maintenance

LRAM is a preventive and corrective land rehabilitation and maintenance procedure that reduces the long-term impacts of training and testing on an installation. It mitigates training and testing effects by combining preventive and corrective land rehabilitation, repair, and/or maintenance practices. It includes training area redesign and/or reconfiguration to meet training requirements. LRAM is an active component of the ITAM program that is designed to restore and maintain soil, vegetation, and water resources for long-term sustainable use and training realism. The program uses cost-effective technologies such as revegetation and erosion control techniques to reduce soil loss, control water runoff, and protect soil productivity and riparian areas (adjacent to water and wetlands). A key element in the LRAM program is the watershed or drainage basin approach to land rehabilitation. This approach ensures that land rehabilitation projects address actual land degradation problems, not just the symptoms.

## Goals:

- To ensure "no net loss" of training lands for military maneuver training.
- To protect, maintain, and improve soil, water, and air quality by providing adequate vegetative cover on all soils and maintaining appropriate drainage structures.

## Tasks:

1. Comply with all federal, state, and local laws and regulations pertaining to soil stabilization and water and air quality.
2. Provide adequate protection of natural resources by implementing best management practices.
3. Improve surface water quality by reducing sediment concentrations in streams and drainages on VTS-C.
4. Apply land rehabilitation treatment measures following troop training within the next optimum seeding period (spring or fall).
5. Reseed with native species in areas where they would be effective, productive, and cost-efficient.

#### 4.3.2.3 Sustainable Range Awareness

SRA provides a means to educate land users on their environmental stewardship responsibilities. It provides for the development and distribution of educational materials to land users. These materials relate the principles of land stewardship and the practices of reducing training and/or testing impacts. Environmental Outreach also includes information provided to environmental professionals concerning operational requirements. The purpose of SRA is to prevent unnecessary damage to the environment and in particular, training lands, by providing information to all site users.

The SRA program should focus on all land users to include soldiers, leaders, DA civilians, and the local community who may use training lands for recreational purposes. Sustainable Range Awareness is designed to improve their understanding of the effects of their mission, training, or activity on the natural resources of the VTS-C.

Goals:

- To create in those who use VTS-C a conservation ethic that will minimize damage to training lands and natural resources.
- To develop and implement a public education program to increase public awareness and acceptance of ecosystem management.

Tasks:

1. Develop the VTS-C field card that identifies environmental considerations and guidelines for military tenants utilizing the facilities and resources at VTS-C.
2. Develop other awareness materials for use on VTS-C.
3. Provide public service announcements to inform the public of events occurring on VTS-C.

#### 4.3.2.4 Training Requirements Integration

TRI is a decision making process that supports integration of all requirements for land use with natural and cultural resources management processes. TRI integrates the installation training and testing requirements for land use derived from the Range and Training Land Program (RTLTP); the range operations and training land management processes; and the installation training readiness requirements with the installation's natural resources conditions. Siting military missions (and other land uses) in areas best capable of supporting the activities is the main goal of TRI. TRI relies heavily on GIS and RTLA to determine land capabilities and includes rotation of training lands as well as scheduling lands according to their "carrying capacity" to support specific missions. TRI also includes those restrictions required to maintain quality training land, provide a safe training environment, and protect significant natural resources. When areas cannot be placed "off-limits" or signage cannot be used, the SRA program will serve to educate the training site users about site limitations.

TRI requires the involvement of and coordination between the POTO, Environmental, and Facilities staffs. The ITAM/TRI Committee, formed by the Adjutant General will serve as the mechanism to bring all the key players together. Coordination must take place for management to effectively schedule and properly allocate activities according to the land's ability to support training events with minimum environmental effects.

Goals:

- To ensure the sustainability of training lands for essential support of the military mission and environmental law compliance.
- To provide guidance to users of VTS-C regarding their conduct while on TNARNG property.

Tasks:

1. Determine the training land carrying capacity at the time a training event will occur.
2. Plan and distribute activities such as military training, rehabilitation of training damage, rare species habitat management, and natural resources management to minimize conflicts with each other.
3. Update the VTS-C Standard Operating Procedures (SOP), especially the environmental section.

## 4.4 NATURAL RESOURCES PROJECTS

### 4.4.1 Survey History

Effective management of natural resources is dependent on a solid understanding of current conditions and desired conditions. Current conditions are identified through baseline surveys which are repeated as needed as time, human use, or natural occurrence causes change in those conditions. Table 4.1 shows the planning level and other natural resources surveys which have been completed to date for VTS-C and the anticipated date of the next repetition, if required.

**Table 4.1. Surveys completed at VTS-C.**

Survey	Completed	Contractor	Next
Soil Survey for Catoosa County, GA	1993	Soil Conservation Service	NA
Phase I Natural Resources Survey	Mar 1994	Lockwood Greene Technologies	NA
Delineation of Wetlands	Sep 1998	US Army Engineers Waterways Experiment Station	2008
Natural Resources Aquatic Survey	Sep 1998	Science Applications International Corporation	2008
Phase II Natural Resources Terrestrial Survey	Nov 1998	Science Applications International Corporation	NA
Biological Survey for the Large-flowered Skullcap	Dec 2002	Science Applications International Corporation	Monitored annually
Forest Inventory	Apr 2005	Forest Management Group	2015
Biological Survey for Invasive Plant Species	Jan 2006	Dynamic Solutions LLC	2011
Vegetation Community Survey	May 2007	Dynamic Solutions LLC	2017
Biological Survey for Bats	May 2007	URS Corporation	2013
Avian Survey	Sep 2008	AMEC Earth & Environmental Inc.	2012
Aquatic Fauna Survey	Jan 2010	URS Corporation	2019
Mammal Survey	Feb 2010	AMEC Earth & Environmental Inc.	2020
Herpetofauna Survey	Mar 2010	URS Corporation	2020
Planning Level Wetland Survey	Jan 2012	URS Corporation	2021
Rare Species Survey	In process	URS Corporation	2016
Avian Survey	In process	URS Corporation	2017

### 4.4.2 Implementation of INRMP 2002-2006

One function of this Revised INRMP is to review the prior INRMP for “operation and effect” in accordance with the 2004 DoD Supplemental Guidance. As noted in Section 1.6, the format of the 2002-2006 INRMP was found to be unwieldy and difficult to apply. In addition, the project lists provided in the first INRMP were not complete, relative to the extensive lists of goals and objectives outlined in that document, and the layout made it difficult to identify the objective which a given project supported. In general, the previous INRMP was found to be ineffective in guiding actual land management efforts. It is hoped that many of its weaknesses have been eliminated in this iteration of the plan.

Despite the flaws in the first INRMP, natural resources management has progressed on VTS-C during the time since its implementation: a great deal of basic information has been gathered through planning level surveys, a working relationship has been developed with USFWS and GADNR with regards to two

federal threatened and endangered species, and the groundwork has been laid for a number of management actions which will be carried forward in this new INRMP. As an indicator of the current state of the program, the projects from the original INRMP have been incorporated into Table 4.2 with a description of the status of that project. Some have been fully implemented, and others are in progress. A few were sidelined for budgetary or time reasons. Several ITAM projects are incomplete due to the transfer during this period of monitoring duties from the Environmental Office to the ITAM Office, which lacks the personnel expertise needed to accomplish environmental monitoring. A number of these projects have been carried over with this revised INRMP and will be completed or implemented during the next five years (see Table 4.3).

**Table 4.2: Project Status from 2002-2006 INRMP.**

Area	Project/Management Action	Status
<b>Environmental</b>		
Ecosystem Management	Perform water quality monitoring	Initiated in 2008
	Conduct terrestrial insect and butterfly survey	Scheduled for FY14
	Conduct forest inventory	Completed 2006
	Conduct snail survey	Deemed unnecessary
	Identify known locations and suitable habitat of rare species on GIS maps	Completed 2002
	Post rare animal and plant locations in Range Control	Completed
	Monitor populations of rare fish on CATC <sup>2</sup>	Not conducted
	Create rare species identification fact sheets	In progress
	Develop a Fire Management Plan for CATC	Completed 2009 (WFMP)
	Conduct breeding and migratory bird survey	Completed 2008
	Conduct a nighttime snorkeling biosurvey of Tiger Creek	Not conducted
	Conduct a detailed mussel survey of Tiger Creek	Completed 2008
	Conduct periodic wetland ground-truthing investigations because of changes in hydrology due to beaver activities	Completed 2012
	Conduct an invasive pest plant species inventory and map (GIS) locations throughout the training site	Completed 2006
	Monitor invasive exotic species of plants and animals on CATC, especially tree of heaven, princess tree, common privet, and multiflora rose	Initial survey completed but monitoring not yet developed
Control or eradicate invasive exotic species of plants and animals	Initiated by ENV office in 2002, but sidelined by funding changes	
<b>ITAM</b>		
RTLTA (was LCTA in original INRMP)	Conduct floristic survey	Completed, 2007
	Determine locations for RTLTA special use plots on CATC	Completed by ENV office, 2002
	Establish 10 special use plots	Not completed – removed from ENV duties
	Establish other special use plots as necessary	Not completed – removed from ENV duties
	RTLTA plot monitoring	Initiated by ENV office, 2002, but sidelined by funding changes

<sup>2</sup> CATC is the acronym for Catoosa Area Training Center, an old name for the VTS-C. Integrated Natural Resources Management Plan  
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Area	Project/Management Action	Status
	RTLA analysis	Not completed – removed from ENV duties
	Obtain Global Positioning System (GPS)	Obtained by ENV
TRI	Classify, inventory, and map all roads and trails	Completed
	Determine kind of maintenance roads and trails should receive -- gravel, revegetate, or trim vegetation and perform maintenance	Annual, on-going
	Update CATC SOP -- rewrite environmental section	Completed, 2008
	Meet with the ITAM/TRI committee on a regular basis	Lapsed
	Establish standards for the amount of military training that is environmentally sustainable for CATC training areas	Practiced but not documented
	Allocate units to particular Training Areas in Master Training Schedule	Annual, on-going
	Evaluate condition of training areas following each training activity with unit leader	On-going
LRAM	Inspect completed erosion control projects to ensure success	On-going
	Harden all stream crossings used by vehicles on CATC	Completed
	Obtain equipment needed to perform LRAM projects	On-going
	Implement Best Management Practices for LRAM projects	On-going
	Establish priorities and standards for correcting unacceptable erosion	In progress
	Replace culverts in conjunction with wetland hydrology protection and update GIS layer	Completed
	Inventory Catoosa for sites needing rehabilitation (spring/fall)	Annual, on-going
	Document any new problem areas after major storm and training events and prioritize for funding	On-going
	Stabilize existing roads and tracked vehicle trails	Annual, on-going
	Perform continuous maintenance LRAM projects (erosion control and revegetation)	On-going
	Maintain lane areas	On-going
	Erosion control on trails	On-going
	Maintain turning pads	On-going
	Vegetation clearing	On-going
	Maintain hardened staging areas	On-going
Continue cooperation with NRCS on developing a native reseeding mixture for CATC	Not completed	
SRA (was EO in original INRMP)	Develop troop field card	Not completed
	Conduct environmental briefings for using units	On-going
	Develop or purchase additional Environmental Awareness materials and equipment (laminator, handbook, posters)	Not completed
	Map environmental "points of interest" on Range Control maps and update as necessary	On-going
	Provide updated copies of Range Control maps to units using CATC each year	On-going

Area	Project/Management Action	Status
	Design and publish a website about the natural resources on CATC	Not completed
	Produce troop awareness video for CATC	Not completed

#### 4.4.3 Upcoming Natural Resources Projects for INRMP

Many natural resources and training site improvement projects are planned for the upcoming years. Most are identified either in Chapter Four of this plan or else in the Integrated Training Area Management (ITAM) 5-year plan. Table 4.3 lists all of these projects, listed according to management sphere (training, ecosystem management, endangered species, wetlands, etc.) and objective.

An estimated cost is provided for projects which are expected to involve any expenditure beyond manpower. Most of these projects have been entered into the appropriate budget system; however, implementation is subject to funding availability. The anticipated method of conducting the work is given as either contract (C) or in-house (IH). The “proponent” is identified in accordance with the Sustainable Range/Installation Environmental Activities Matrix as either the Environmental office (ENV), Facilities, or the ITAM program. In certain cases, two entities are identified. For these projects, it is anticipated that funding will be provided by one source, but that the other proponent will provide subject matter expertise. “SITE” represents work to be done by the training site staff itself, rather than funding.

**Table 4.3: VTS-Catoosa Natural Resources Projects.**

Management Area	Targets (Objectives in Green)	Project Origin <sup>1</sup>	Year	Est. Cost& Method <sup>2</sup>	Proponent <sup>3</sup>	Status	Actual Cost <sup>4</sup>	
1. Ecosystem Management	<b>1-1</b>	<b>Manage for mission-suitable habitats or “missionscape”.</b>						
	1a	Missionscape statement development	N	2011	IH	ENV	Complete	
	1b	Missionscape plan development	N	2012	IH	ENV		
	<b>1-2</b>	<b>Identify ecotypes present on the training site and maintain up to date information regarding those systems.</b>						
	1c	Vegetation community planning level survey every 10 years	R	2016	C \$40,000	ENV		
	1d	Wetland survey every 10 years	R	2010	C \$40,000	ENV	Complete	\$42,364 sw
			R	2020	C \$45,000			
	1e	Surface water quality assessment every 5 years	R	2014	C \$20,000	ENV		
	<b>1-3</b>	<b>Characterize the species composition, ecosystem health, and wildlife use of the significant habitats on VTS-C.</b>						
	1f	RTE planning level survey every 5 years.	N	2012	C \$40,000	ENV	In prog	\$89,300
	1g	Bat baseline survey every 5 years.	R	2013	C \$40,000	ENV		
				2018	C \$45,000			
	1h	Avian survey every 5 years.	R	2012	C \$35,000	ENV	In prog	\$69,282 sw
				2017	C \$37,500			
	1i	Insect baseline survey	N	2014	C \$35,000	ENV		
	1j	Aquatic fauna survey every 5 years.	R	2014	C \$25,000	ENV		
	1k	Mammal survey every 10 years	R	2018	C \$25,000	ENV		
	1l	Herpetofauna survey every 10 years	R	2019	C \$35,000	ENV		
	<b>1-4</b>	<b>Develop management strategies to protect ecotypes/habitats of importance</b>						
	1m	Map and priority list of extant ecosystems	N	2013	IH	ENV		
1n	Threat and training use details	N	2013	IH	ENV			
1o	Habitat protection plan development	N	2014	IH	ENV			
<b>1-5</b>	<b>Manage for ecosystem health, wildlife, and improved habitat quality</b>							
1p	Identify locations for native species restoration	N	2012	IH	ENV			
1q	Develop restoration plan	N	2013	IH	ENV			
1r	Implement restoration plan	N	As feasible	IH	ENV			

<sup>1</sup> Whether the project appeared in the earlier INRMP: N = new to this INRMP; C = carried over from previous INRMP; R = repeat of past survey.

<sup>2</sup> Probable method of conducting project: C = contract; IH = in-house. Cost is estimate only and is not guarantee of available funding.

<sup>3</sup> Party responsible for funding and/or conduct of action: ENV = environmental office; FAC = facilities maintenance funds; ITAM = training funds; SITE = training site staff.

<sup>4</sup> “sw” indicates the total price for a project contracted statewide on at least 3 of the training sites.

Management Area	Targets (Objectives in Green)		Project Origin <sup>1</sup>	Year	Est. Cost & Method <sup>2</sup>	Proponent <sup>3</sup>	Status	Actual Cost <sup>4</sup>
2. RTE Management	<b>2-1</b>	<b>Quantify and monitor groups of large-flowered skullcap on VTS-C.</b>						
	2a	Large-flowered skullcap annual monitoring	N	Annual	C \$20,000	ENV		
	2b	Annual report of skullcap population condition	N	Annual	IH	ENV		
	<b>2-2</b>	<b>Protect the large-flowered skullcap on VTS-C.</b>						
	2c	GPS group boundaries and adjust signs	N	Biannual	IH	ENV		
	2d	Develop posters and training materials	N	2012	IH	ENV		
	<b>2-3</b>	<b>Investigate management alternatives and impacts.</b>						
	2e	Transplantation study results/report	N	2012	C \$35,000	ENV	Complete	\$25,090
	2f	Prescribed burning study results/report	N	2012	C \$35,000	ENV	Complete	\$25,090
	2g	Herbivory study results/report	N	2014	C \$60,000	ENV	In prog	\$63,455
	2h	IPP control study results/report	N	2015	IH \$10,000	ENV		
	<b>2-4</b>	<b>Characterize and protect gray bat population on VTS-C.</b>						
	<b>2-5</b>	<b>Quantify and monitor populations of state and federal RTE species on VTS-C.</b>						
	<b>2-6</b>	<b>Identify and manage native communities currently supporting or potentially supporting RTE species.</b>						
	<b>2-7</b>	<b>Manage American chestnut orchard.</b>						
	2i	Annual coordination with TACF	N	Annual	IH	ENV		
	2j	Annual orchard maintenance	N	Annual	IH \$4,000	ENV		
2k	Annual seedling inventory	N	Annual	IH	ENV			
2l	Blight testing coordination	N	2014	IH	ENV			
3. Reclamation / Mitigation	<b>No projects at this time.</b>							
4. Erosion control	<b>4-1</b>	<b>Identify &amp; rehabilitate degrading training lands.</b>						
	4a	Develop erosion reporting form	N	2011	IH	ENV	Complete	
	4b	Install reporting form on ENV webpage	N	2011	IH	ENV	Complete	
	4c	Annual erosion surveys	N	Annual	IH	ENV/SITE		
	4d	Erosion report tracking system	N	2012	IH	ENV		
	4e	Develop erosion repair guide	N	2012	IH \$2,000	ENV		
	4f	BMP training module	N	2013	IH \$1,000	ENV		
	<b>4-2</b>	<b>Restore section of Tiger Creek streambank that are badly eroded</b>						
	4g	Develop restoration plan	N	2012	IH \$15,000	ENV	In prog	
	4h	Conduct mechanical and physical repair work	N	2013	IH/C \$20,000	ENV		
4i	Revegetate streambanks	N	2013/14	IH/C \$20,000	ENV			
5. Watershed Management	<b>5-1</b>	<b>Improve knowledge of riparian areas &amp; conditions.</b>						
	5a	Implement water quality monitoring	C	2013 Annual	IH \$2,000 per year	ENV		

Management Area	Targets (Objectives in Green)		Project Origin <sup>1</sup>	Year	Est. Cost & Method <sup>2</sup>	Proponent <sup>3</sup>	Status	Actual Cost <sup>4</sup>
	<b>5-2</b>	<b>Improve buffering quality of the riparian areas</b>						
	5b	Riparian habitat assessments	N	2013	IH \$5,000	ENV		
	<b>5-3</b>	<b>Protect shoreline of Tiger Creek and all riparian areas from potential causes of erosion.</b>						
	5c	Post SMZs and maintain biennially	N	2011	IH \$5,000	ENV	In prog	
	5d	SMZ training module	N	2013	IH \$1,000	ENV		
6. Wetlands Protection	<b>5-4</b>	<b>Improve water quality for trout habitat</b>						
	<b>6-1</b>	<b>Increase knowledge of wetlands and conditions.</b>						
	6a	Wetland floristic study	C	2013	C \$25,000	ENV		
	6b	Wetland fauna study	C	2013	C \$25,000	ENV		
	<b>6-2</b>	<b>Implement and enforce buffer areas around wetlands.</b>						
	6c	Post signs identifying 50' buffer zones	N	2012	IH \$3,000	ENV		
7. Forest Management	6d	Buffer zone vegetative assessment	N	2013	IH	ENV		
	6e	Wetland buffer training module	C	2013	IH \$1,000	ENV		
	<b>7-1</b>	<b>Maintain needed forest information.</b>						
	7a	Repeat forest inventory every 10 years.	R	2015	C \$20,000	ENV		
	<b>7-2</b>	<b>Improve training areas via forest management.</b>						
	7b	Consult with training site staff	C	Annual	IH	ENV		
8. Fire Management	<b>7-3</b>	<b>Improve forest health and habitat quality.</b>						
	7c	Review data and update forest management plan	C	Annual	IH	ENV		
	7d	Annual timber ROA and RPTS system info	C	Annual	IH	ENV		
	<b>8-1</b>	<b>Ensure effective fire break system.</b>						
9. Fish & Wildlife Management	8a	ID additional fire break locations needed	C	2012	IH	ENV, FAC		
	<b>8-2</b>	<b>Implement prescribed fire program.</b>						
	8b	Annual refresher training	C	Annual	C \$1,000 per year	ENV, FAC		
10. Pest Management	8c	Annual WFMP review/update	C	Annual	IH	ENV		
	<b>9-1</b>	<b>Gain updated and complete data on wildlife use of VTS-C.</b>						
	<b>9-2</b>	<b>Manage habitats for all native species.</b>						
	9a	Install nest boxes and maintain annually	R	2012	IH \$1,000	ENV		
	9b	Wildlife training module	C	2013	IH \$1,000	ENV		
	<b>9-3</b>	<b>Determine the necessity/feasibility of a hunting program for VTS-C.</b>						
	9c	Discussion with training site over potential	N	2013	IH	ENV		
9d	Consult with GADNR on need in region	N	2013	IH	ENV			
10. Pest Management	9e	Game species population counts	N	2014	C \$30,000	ENV		
	<b>10-1</b>	<b>Control IPP for ecosystem health.</b>						
	10a	Invasive pest plant survey every 5 years	R	2012	C \$35,000	ENV		

Management Area	Targets (Objectives in Green)		Project Origin <sup>1</sup>	Year	Est. Cost & Method <sup>2</sup>	Proponent <sup>3</sup>	Status	Actual Cost <sup>4</sup>
	10b	Annual implementation of IPP control plan	C	Annual	IH/C \$10,000	ENV		
	<b>10-2</b>	<b>Control pest species for training area improvement.</b>						
	10c	Develop training specific IPP control plan	N	2014	IH	ENV		
	<b>10-3</b>	<b>Control pests for TNARNG safety and comfort.</b>						
	10d	Install and maintain bat boxes and bird nest boxes	C	Annual	IH \$1,000	ENV		
	10e	Annual fire ant survey	N	Annual	IH	ENV		
	<b>10-4</b>	<b>Control pest animals for the protection of natural communities and RTE species and to minimize loss of training land.</b>						
		Implement controlled hunting of feral pigs		As need		FAC		
	Implement beaver trapping and dam removal		As need		FAC			
11. Long-term Monitoring	<b>11-1</b>	<b>Develop and implement a vegetation monitoring program.</b>						
	11a	Develop monitoring protocol	C	2013	C \$10,000	ENV		
	11b	Establish vegetation monitoring plots	C	2015	IH	ENV		
12. Grounds Maintenance	<b>12-1</b>	<b>Utilize regionally native species for all planting.</b>						
	12a	Develop native planting guide	N	2011	IH \$500	ENV	Complete	
	<b>12-2</b>	<b>Blur the “edge” between maintained and natural areas.</b>						
	12b	Develop edge conversion plan	N	2014	IH \$500	ENV		
	<b>12-3</b>	<b>Adjust maintenance schedule to benefit environment.</b>						
	12c	Create list of values impacted by ground maintenance.	N	2014	IH	ENV		
12d	Modify maintenance calendar in INRMP	N	2014	IH	ENV			
13. Recreational Use Management	<b>No projects at this time.</b>							
14. Cultural Resources	<b>Projects are defined in the TNARNG ICRMP.</b>							
15. GIS	<b>15-1</b>	<b>Maintain constantly improving GIS.</b>						
	15a	Review contract wording	C	Annual	IH	ENV		

# CHAPTER 5

## RESOURCE PROTECTION GUIDELINES

### 5.1 LAND MANAGEMENT GUIDELINES

The projects identified in the previous chapter are intended to improve the management and conservation of the natural resources on VTS-C. In addition to large-scale projects, however, appropriate care is necessary in the day-to-day operations and activities of the training site to ensure excessive damage is not inflicted through misuse or carelessness. The following sections provide guidance for the major activity categories occurring on VTS-C to ensure that TNARNG abides by all relevant laws and regulations, the intent of this INRMP, and good stewardship in its use and management of the training site's resources.

#### 5.1.1 Training Operations

VTS-C exists for the purpose of training National Guardsmen, and that training does have environmental impacts. The following guidelines should be incorporated into all training activities:

##### Roads and Vehicles

- Only existing roads and trails will be utilized. No new entrances will be made into any training area or range without the approval of VTS-C Range Control.
- Track vehicles are restricted to trails and hardened crossings when authorized to move between training areas.
- Vehicular use of hardwood stands is limited to roads as much as possible, except for special training areas. Bivouac sites and other training areas should be rotated to minimize impact on the soils and vegetation.
- Vehicles brought to VTS-C from off-site should be thoroughly washed upon arrival at the Cantonment of VTS-C before entering the training areas to minimize the spread of invasive species.

##### Plants and Animals

- Personnel will comply with State Game and Fish Laws.
- Interaction with wildlife should be avoided due to health and safety concerns.
- Do not disturb food plots, experimental exclosures, or other wildlife management equipment or facilities.
- Avoid areas identified as containing large-flowered skullcap. All large-flowered skullcap occurrences on VTS-C will be posted with signs in accordance with AR 200-3 (see Figure 3.9 for sign).
  - There will be no off-road vehicular traffic through large-flowered skullcap posted areas.
  - There will be no soil-disturbing activities within posted areas without prior approval of the TNARNG Environmental Office.
- Trees will not be cut without prior approval of the Environmental Office and the VTS Commander. Brush and small vegetation may be used for camouflage and training barricades. Upon completion of the exercise, camouflage and trail barricades will be properly policed.

### Streams and Wetlands

- Streamside Management Zones (SMZs) shall be identified around all water bodies. Perennial streams will have an SMZ extending 50 feet to either side of the stream for a total width of 100 feet, in accordance with Georgia trout stream guidelines. There shall be an SMZ 50 feet wide surrounding all wetland areas.
- Avoid operating vehicles in SMZs.
- Road crossings of riparian zones and streams will only be conducted at designated points.
- Spills will be immediately contained and reported according to the VTS-C Spill Prevention Control and Countermeasures (SPCC) Plan.
- Foot traffic is allowed in wetlands.
- Vehicular traffic is not allowed in wetlands except on established roads.
- There will be no dredging, filling, or dumping of material within wetland areas. Any exceptions have to be approved by the Environmental Office and required state and/or federal permits obtained before the activity takes place.

### Wildfire Management

- Open burning is not allowed without a permit.
- Avoid spark-producing activities in dry weather.
- The use of tracer rounds will be suspended during periods of very high fire danger. The National Fire Rating System can be accessed at <http://www.wfas.us/> under “Fire Danger Rating.”
- Accidental fires in training areas will be combated by the unit occupying the area, or the nearest unit to an unassigned area, immediately upon discovery.
- The discoverer of a fire will immediately notify VTS-C Range Control and his own immediate superior officer. The next higher headquarters will also be advised, and Range Control will immediately notify the Environmental Office.
- Each succeeding commander in the chain of command will take action as appropriate to provide forces to extinguish or control fires pending arrival of fire fighting specialists.
- Georgia has a general prohibition against open burning during the months of May, June, July, August, and September – “smog season.” In Catoosa County, the only legal exceptions to this prohibition are agricultural burns, forestry prescribed burning (requiring permitting from the Georgia Forestry Commission), recreational and cooking fires, authorized training of fire-fighters, operation of open flame equipment, and disposal of packaging materials which previously contained explosives (Georgia Rules for Air Quality Control, Chapter 391-3-1-.02(5), Open Burning).

### 5.1.2 LRAM and Construction

Activities which disturb the vegetation and soil can be particularly damaging to the environment if improper methods lead to erosion and sedimentation problems. Even actions intended to improve conditions, such as LRAM projects, can cause damage if not handled appropriately. LRAM and Construction are the two areas which routinely involve earth moving activities and should both be subject to the following guidelines:

- Follow the Erosion Control Best Management Practices listed in Table 5.1.
  - Additional information on erosion control procedures is available in the Manual for Erosion and Sediment Control in Georgia, Fifth Edition (Georgia Soil and Water Conservation Commission 2000) available at [http://www.gaepd.org/Documents/esc\\_manual.html](http://www.gaepd.org/Documents/esc_manual.html)

- Schedule and perform land rehabilitation projects as soon as possible following disturbance, allowing sufficient time for soils to recover. Seed during optimum seeding periods for individual species. Seeding made in fall for winter cover should be mulched.
- Use temporary erosion control methods (such as cover crops) during rainy periods to protect the soil.
- Include all necessary rehabilitation work, best management practices, and associated costs in project proposals and construction contracts and specifications.
- Only native plant species will be used for landscaping and reclamation work.
  - When planting native grasses, include non-persistent grasses that act as a cover crop for the first two or three years to minimize erosion before native species become established, for example: red top, timothy, winter wheat, and grain sorghum.
- Areas that fail to establish vegetative cover will be reseeded as soon as such areas are identified and weather permits.
- Present all construction project plans to the Environmental Office for review as far in advance as possible: special permits are required when disturbing federal jurisdictional wetlands or perennial or intermittent streams and will take time to obtain.

**Table 5.1: Erosion Control Best Management Practices (BMPs) for LRAM and Construction Projects.** From the TDEC Erosion and Sediment Control Handbook (Price and Karesh 2002)

### 1. Construction Management Measures

- a. Clearing and grubbing must be held to the minimum necessary for grading and equipment operation.
- b. Construction must be sequenced to minimize exposure time of cleared surface area. Grading activities must be avoided during periods of highly erosive rainfall.
- c. Construction must be staged or phased for larger projects. Areas of one phase must be stabilized before another phase can be initiated. Stabilization shall be accomplished by temporarily or permanently protecting the disturbed soil surface from rainfall impacts and runoff.
- d. Erosion and sediment control measures must be in place and functional before earth moving operations begin and must be properly constructed and maintained throughout the construction period.
- e. Regular maintenance is vital to the success of erosion and sediment control systems. All control measures shall be checked twice per week, 72 hours apart, before anticipated storm events, and after each rainfall. During prolonged rainfall, daily checking is necessary.
- f. Construction debris must be kept from entering any stream channel.
- g. Stockpiled soil shall be located far enough from streams or drainageways so that runoff cannot carry sediment downstream.
- h. A specific individual shall be designated to be responsible for erosion and sediment controls on each project site.
- i. If the area to be disturbed is 1 acre or greater, a Georgia General Storm Water Permit is required and a site-specific Erosion, Sedimentation, and Pollution Control Plan must be developed. The Notice of Intent and fees must be submitted to the State at least 14 days prior to any disturbance of the site.

### 2. Vegetative Controls

- a. A buffer strip of vegetation at least as wide as the stream shall be left along any stream bank. For VTS-C streams, the buffer zone will be at least 50 feet back from the water's edge on both sides.

- b. Vegetation ground cover shall not be destroyed, removed, or disturbed more than 15 calendar days prior to grading.
- c. Temporary soil stabilization with appropriate annual vegetation (e.g., annual ryegrass) shall be applied on areas that will remain unfinished for more than 30 calendar days.
- d. Permanent soil stabilization with perennial vegetation shall be applied as soon as practicable after final grading.

### 3. Structural Controls

- a. Staked and entrenched straw bales and/or silt fence must be installed along the base of all fills and cuts, on the downhill sides of stockpiled soil, and along stream banks in cleared areas to prevent transport of sediment into streams. Straw bales and/or silt fence may be removed at the beginning of the work day but must be replaced at the end of each work day.
  - b. All surface water flowing toward the construction area shall be diverted around the construction area to reduce erosion potential, using dikes, berms, channels, or sediment traps, as necessary. Temporary diversion channels must be lined to the expected high water level and protected by non-erodible material to minimize erosion. Clean rock, log, sandbag, or straw bale check dams shall be properly constructed to slow runoff and trap sediment.
  - c. Sediment basins and traps shall be properly designed according to the size of the disturbed or drainage areas. Water must be held in sediment basins until at least as clear as upstream water before it is discharged to surface waters. Water must be discharged through a pipe or lined channel so that the discharge does not cause erosion and sedimentation.
  - d. Streams shall not be used as transportation routes for equipment. Crossings must be limited to one point. A stabilized pad of clean and properly sized shot rock must be used at the crossing point.
  - e. All rocks shall be clean, hard rocks containing no sand, dust, or organic materials.
- 

### 5.1.3 Facilities Management

Maintenance of an attractive, tidy facility is important; however, even activities in a heavily modified cantonment area can impact the environment. Mowing, landscaping, and pesticide use in the managed landscape should be undertaken with consideration for this impact. The presence of the protected large-flowered skullcap, in particular, must be taken into account when performing basic maintenance projects:

#### Skullcap Protection

- Check with the Environmental Office prior to soil disturbance or vegetation removal activities to ensure there is no large-flowered skullcap conflict.
- Do not apply herbicides to large-flowered skullcap areas.
  - No herbicides will be applied within the boundaries of a large-flowered skullcap occurrence. The only exception is herbicide applied for the purpose of *S. montana* protection according to the Rare Species Management Plan and cleared by the Environmental Office .
  - Use of herbicides within 50 ft. of the boundary of a large-flowered skullcap occurrence will be limited to those products which do not translocate through the soil and to those application methods which minimize the risk of accidental drift to other plants.
- Report any damage or threat to a large-flowered skullcap plant or occurrence to the Environmental Office as soon as it is noted.

### General Facilities Maintenance Guidelines

- Only native species will be used for landscaping and replanting purposes without clearance from the Environmental Office. Native plants are better adapted to local conditions and generally require less fertilizer and herbicide/pesticide input. Use of natives also limits the spread of invasive, exotic species.
- Consider seasonal variables (e.g., timing and quantity of average rainfall, appropriate planting season) in planning and scheduling projects.
- Consider erosion factors when choosing sites for training, construction, or management activities.
- Always include appropriate surface restoration, fertilization, and seeding (or other revegetation practice) as the final stage of any project which disturbs the soil or vegetation.
- Apply Best Management Practices (BMPs) (see Tables 5.1 and 5.2) to all TNARNG projects.
- Use biological pest control methods wherever feasible and economical. Only apply pesticides when effective biological or mechanical control methods cannot be found or are prohibitively expensive. See TNARNG Integrated Pest Management Plan for more information.
- Pesticides and herbicides can only be applied by certified applicators and must be reported to the Pest Management Coordinator (see section 5.1.8 for more information).
- Herbicides will be utilized to control weedy vegetation in the most time- and cost-effective manner. The herbicide spray plan presented in Annex 5 will be updated yearly to meet training site needs.

#### 5.1.4 Road Construction and Maintenance

Roads can be a significant source of sediment, as well as an on-going drain on funds, if poorly designed. This is particularly true at VTS-C where slopes over 25% are common. Proper placement, design, and construction can alleviate many of the problems associated with unpaved roads, even when utilized by heavy wheeled and track vehicles. The State Forestry Best Management Practices (Table 5.2) deal largely with road construction and should be applied to all road building activities on VTS-C.

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**Table 5.2: Forestry Best Management Practices (also apply to Construction and Rehabilitation of Tank Trails).** From Georgia's Best Management Practices for Forestry manual (Georgia Forestry Commission 1999).

1. **Access Road Location.** Access roads shall be designed and located to prevent sediment from entering the waters of the State. Methods to prevent sedimentation to streams include, but are not limited to, the following:
  - a. Minimize the amount of road to be constructed by using existing roads where practical.
  - b. Roads should follow the contour of the land as much as possible with grades ideally kept below 10%.
  - c. Locate roads as far from streams and lakes as possible and practical.
  - d. Roads should be placed on high ground where possible for proper surface drainage.
  - e. Roads should be located on the southern or western aspect of ridges for maximum exposure to sunlight.
  - f. Locate roads outside of streamside management zones (SMZs – see Section 5.1.5) except for planned stream crossings.

2. **Access Road Construction.** Access roads shall be constructed to prevent sediment from entering the waters of the State. Methods to prevent sedimentation include, but are not limited to:
  - a. To the extent possible, construct and revegetate new roads several weeks or longer in advance of logging/use.
  - b. Schedule construction for favorable (dry) weather.
  - c. Avoid excessive soil disturbance during road construction.
  - d. On permanent access roads with 3% or more grade, broad-based dips should be installed at proper intervals (30° angle across road surfaces), have reverse grades of 3%, and the bottom of the dips should be outsloped about 3%. If necessary, outfall of dips may need sediment barriers such as rock, hay bales or silt fence installed (see Georgia's Best Management Practices for Forestry manual for further information on design of broad-based dips).
  - e. On crown and ditched roads, install water turnouts at proper intervals. Turnouts should never tie directly into streams or water bodies. If necessary, outfall of turnouts may need sediment barriers such as rock, hay bales, or silt fence installed.
  - f. Avoid insloping of roads. Where unavoidable, use cross-drain culverts positioned under the road at a 30° angle and appropriate spacing. Place rip-rap at culvert outfall to prevent washing.
  - g. Keep roads free from obstructions and logging debris.
  - h. Roadbeds on erosive soils should be stabilized with appropriate measures.
  - i. Stabilize exposed soil on shoulders of access roads with any one or combination of the following: seed and mulch, silt fence, hay bales, excelsior blankets, or geotextiles.
  - j. Avoid using ditches on steep roads.
3. **Stream Crossings**
  - a. Avoid or minimize stream crossings. If crossings are necessary, roads should cross streams as close to right angles as possible.
  - b. Avoid crossings at bends in the stream.
  - c. The road fill shall be bridged, culverted, or otherwise designed to prevent the restriction of expected flood flows.
  - d. The fill shall be properly stabilized and maintained during and following construction to prevent erosion.
  - e. Vegetative disturbances shall be kept to a minimum.
  - f. The design, construction, and maintenance of the road crossing shall not disrupt the migration or other movement of those species of aquatic life inhabiting the water body.
  - g. Borrow material shall be taken from upland sources wherever feasible.
  - h. Approaches to all permanent or temporary stream crossings should be made at gentle grades of slope (3% or less) wherever possible.
  - i. Approaches should have water control structures, such as water turnouts or broad-based dips, on both sides of a crossing to prevent road runoff from entering the stream.
  - j. Stabilize approaches, if necessary, with rock extending at least 50 feet from both sides of the stream bank during the operation.
  - k. For temporary access roads, temporary bridges or spans are favored over culverts or fords.
  - l. Build wetlands fill roads outside the SMZ, except when crossing the channel. Cross-drainage structures (culverts, bridges, portable spans, etc.) may be necessary to allow for surface water movement across the site.
  - m. Stabilize exposed soil around permanent or temporary stream and wetland crossing with any one or a combination of the following: seed and mulch, hay bales, rock, silt fence, geotextiles, and/or excelsior blankets.
  - n. Avoid using asphalt materials for low water crossings.
  - o. Avoid anything that impedes the free or expected flow of water.
  - p. When bridges are used:
    1. With watersheds of 300 acres or more, use bridges to cross streams if other alternatives are not suitable for containing storm flows.

2. Remove temporary bridges and stabilize approaches and stream banks when operations are completed.
- q. When fords are used:
  1. Locate fords where stream banks are low and the bottoms are relatively hard and level.
  2. Where necessary, establish a smooth, hard-surface low water crossing. For a permanent ford use gravel or rock-filled Geoweb or concrete pads. For temporary fords, use dragline mats or logs to armor the stream bottom.
  3. Material should not significantly impound stream flow, impede fish passage, or cause erosive currents. Remove temporary crossings from the channel when operations are completed.
- r. When culverts are used:
  1. Size permanent culverts so that the cross-sectional area will accommodate expected 25-year, 24-hour storm flows.
  2. Size temporary culverts so that the cross sectional area will accommodate the 2-year, 24-hour storm flows.
  3. Under normal conditions, two alternative methods of culverting are acceptable:
    - a. Smaller multiple culverts can be substituted to provide for the same cross-sectional area of pipe.
    - b. A combination of a smaller culvert(s) with rock surfaced road dips constructed in the roadbed to handle the runaround flow from larger storm events.
  4. Culverts less than 15 inches in diameter are not recommended.
  5. Multiple culverts should be spaced at a distance of at least one-half the culvert's diameter.
  6. Place the culvert in a straight section of the stream and free of obstructions.
  7. Place the bottom of the culvert at the same elevation as the bottom of the stream.
  8. Stabilize fill at ends of a culvert with either rip-rap, Geoweb, excelsior blankets, gabions, headwalls, grass seed and mulch, hay bales, etc.

#### **4. Road Maintenance and Retirement.**

- a. Maintain existing roads in accordance with BMPs.
- b. Avoid excessive traffic on wet roads.
- c. Minimize road grading and reshaping on hilly or mountainous terrain unless required to repair damaged road sections.
- d. Keep outfall of broad-based dips, water bars, and water turnouts open at all times. If necessary, install sediment barriers such as rock, hay bales, or silt fence just below outfall.
- e. Retire temporary roads by reshaping and/or constructing water bars at recommended intervals. Stabilize as necessary by seeding and mulching or scattering logging debris over the road surface.
- f. Periodically inspect retired roads to assure stabilization techniques are still effective and permanent stream crossings are clear and operating properly.

### **5.1.5 Water Resources**

The water resources on VTS-C include several different ecotypes: trout streams, intermittent streams, the riparian areas surrounding the streams, and wetlands. While the characteristics of these sites can vary widely, they share the key factor of water and a significant role in the water cycle as well as being important habitats for many creatures. Protection of water resources is of the utmost importance, and they are habitats that can be easily damaged by accident or careless action. One of the simplest BMPs for protection of water resources is the establishment and use of Streamside Management Zones (SMZs).

Streamside management zones are buffer strips adjacent to perennial or intermittent streams or other bodies of water within which activities are limited in order to protect water quality. They shall be designated and managed to buffer water temperatures, prevent sediment and other pollutants from entering waters of the State, and provide travel corridors and habitat for wildlife. SMZs should be established along any stream (perennial or intermittent) or water body where the potential exists for the movement of sediment or pollutants into the stream or water body. Georgia does not provide a set minimum width for an SMZ. The width of the SMZ should be based upon slope and susceptibility of the soil to erosion.

For VTS-C, a minimum buffer of 25 feet will be established for intermittent streams. This applies to both sides of the stream (total minimum width of 50 feet). All perennial streams on VTS-C – Tiger Creek, Broom Branch, Catoosa Springs Branch, and their primary tributaries – are classified as trout streams by the state of Georgia. Minimum SMZ width for a trout stream is 50 ft on each side. There will be no harvesting of any timber within the first 25 ft closest to the stream, and the remainder of the SMZ will have no more than 50% of the canopy cover removed. In association with wetlands, establish SMZs at least 50 feet in width surrounding the wetland area. BMPs for actions within streamside management zones are given in Table 5.3.

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**Table 5.3: Perennial and Intermittent Stream SMZs.** From Georgia’s Best Management Practices for Forestry manual (Georgia Forestry Commission 1999).

- |   |
|---|
| <ol style="list-style-type: none"> <li>1. Avoid operating any vehicles or other equipment within an SMZ.</li> <li>2. Minimize stream crossings.</li> <li>3. Except at planned stream crossings, locate new access roads outside the SMZ.</li> <li>4. Maintain existing roads within SMZs with adequate water control structures and stabilization measures as needed.</li> <li>5. Firebreaks should be installed parallel to streams and outside SMZs.</li> <li>6. Minimize prescribed fire intensity within SMZs to maintain forest floor cover and protect the soil surface.</li> <li>7. Periodically inspect the SMZ, evaluate the effectiveness of the BMPs, and adjust practices when necessary.</li> <li>8. There will be no vegetation harvest in the first 25 feet of the SMZ.</li> <li>9. Leave an average of 50 sq ft of basal area per acre evenly distributed throughout the SMZ or at least 50% canopy cover after a harvest to provide shade to the stream.</li> <li>10. Do not cut stream bank trees.</li> <li>11. Do not fell trees into the streambed or leave logging debris in the stream.</li> <li>12. Do not locate servicing or refueling equipment within an SMZ.</li> <li>13. Do not handle, mix, or store toxic or hazardous materials within an SMZ.</li> </ol> |
|---|

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In addition to the official BMPs for Streamside Management Zones, other actions and/or limitations specific to TNARNG activities are essential to maintain high water quality and habitat quality:

#### Streams and Riparian areas

- Training is allowed in riparian areas in accordance with guidelines for forestlands. Use extra caution to avoid causing sedimentation or other contamination of the associated waterway.

- There shall be no digging for training purposes, forest management, or construction activities within an SMZ without prior review and permission from the Environmental Office. Certain activities may require a state or federal permit prior to initiation of activity.
- Spills will be immediately contained and reported according to the VTS-C Spill Prevention Control and Countermeasures (SPCC) Plan.
- Dumping of any substance on the training site is not allowed.
- Monitor for erosion problems along stream banks. Report any erosion, exposed soil, or stream bank collapse to the Environmental Office as soon as possible.
- Utilize native species for plantings to stabilize banks. Vegetative structures are preferable to riprap or concrete structures in most circumstances.
- Use Erosion Control BMPs during all LRAM projects, road construction and relocation, and maintenance (see Table 5.1).
- Any activity that will impact a stream or wetland must be presented to the Environmental Office well in advance of the planned action date: special permits are required when disturbing federal jurisdictional wetlands or perennial or intermittent streams, and these permits take time to obtain.

#### Wetlands

- Foot traffic is allowed in wetlands.
- Vehicular traffic is not allowed in wetlands except on established roads.
- Any non-foot traffic, training, or land management activity to be conducted within a wetland should be coordinated with the Environmental Office.
- There will be no dredging, filling, or dumping of any material within wetland areas. Any exceptions will have to be approved by the Environmental Office and required state and/or federal permits obtained.
- Only herbicides and pesticides labeled for wetland/surface water use will be applied within wetland boundaries (e.g., Rodeo, Aquamaster, Habitat, Accord). Within 50 feet of any wetland boundary, foliar application of herbicides will be limited to those products labeled for application to water because of the risk of drift. All other herbicide applications made within the SMZ area will be made via stem treatments (cut stump, basal bark, or stem injection).
- Any ground disturbing activities near wetland areas that might alter the hydrology of the system must be reviewed by the Environmental Office Conservation Branch before any work takes place.
- Implement Erosion and Sediment Controls in construction areas and maneuver areas, streambank stabilization methods, and forestry BMPs to minimize delivery of sediment and chemical pollutants to wetland areas.
- Present all construction plans to the Environmental Office for review as far in advance as possible: special permits are required when disturbing federal jurisdictional wetlands or perennial or intermittent streams and will take time to obtain.

#### 5.1.6 Forestland Use

TNARNG manages forest stands for multiple uses: training, habitat, large-flowered skullcap protection, and timber. To maintain the health and integrity of the forest ecosystem certain key factors should be observed:

- Only existing roads and trails will be utilized. No new entrances will be made into any training area or range without the approval of VTS Range Control.

- Vehicular use of hardwood stands is limited to roads as much as possible, except for special training areas (e.g., bivouac sites, designated training points).
- Bivouac sites and other forested training areas should be rotated to minimize impact on the soils and vegetation. Site condition should be monitored semi-annually utilizing the existing long-term vegetation monitoring protocol or the RTLA methodology.
- Clearing or thinning of forest stands to improve or expand training areas will be coordinated through the TNARNG Environmental Office.
- Trees will not be cut without prior approval of the Environmental Office and the VTS Commander. Brush and small vegetation may be used for camouflage and training barricades. Upon completion of exercise, camouflage, and trail barricades will be property policed.
- Open burning is not allowed without a permit.
- Accidental fires in training areas will be combated by the unit occupying the area, or the nearest unit to an unassigned area immediately upon discovery. Contact Range Control immediately. See 5.1.1 Training Operations Guidelines for further wildfire information.
- Interaction with wildlife should be avoided due to health and safety concerns.
- Personnel using the area will comply with State Game and Fish Laws.
- Avoid areas identified as containing large-flowered skullcap. All large-flowered skullcap occurrences on VTS-C will be posted with signs in accordance with AR 200-3 (see Figure 3.10 for sign).
  - There will be no off-road vehicular traffic through large-flowered skullcap posted areas.
  - There will be no soil-disturbing activities within posted areas without prior approval of the TNARNG Environmental Office.

### 5.1.7 Grassland Use

The grasslands on VTS-C are principally managed, man-made grasslands (ranges); however, they can provide valuable habitat in addition to training opportunities. In order to improve the ecosystem value of the grassland area the following guidance should be applied to training and management activities:

- Avoid use of non-native species for reseeding grassland areas. Utilize a native mix appropriate to the site and intended use. In particular, discontinue the use of KY 31 tall fescue (*Schedonorus phoenix*) and the non-native lespedezas – Chinese or sericea lespedeza (*Lespedeza cuneata*), shrubby lespedeza (*L. bicolor*), and Korean or kobe lespedeza (*Kummerowia stipulacea*).
- Prescribed fire is a useful tool for maintaining grassland ecosystems. TNARNG will develop and implement a burning regime for management and hazard reduction purposes.
- Existing roads and trails will be utilized whenever possible. No new entrances will be made into any training area or range without the approval of VTS Range Control.
- Avoid mowing open grasslands from April to September for the protection of nesting birds. Areas in which taller growth will not impeded training should be mowed in late March and then allowed to grow until November. Where grasslands must be maintained low cut, maintain 25-50 foot buffer strips along the forest edges which will only be mown every 3-5 years.
- Protect large, non-fragmented tracts of quality habitat which are required as territory for survival and maintenance of neotropical migratory bird and large mammal populations.

### 5.1.8 Pest Management

Pest management is an important part of maintaining facilities and protecting the health and safety of personnel, as well as the integrity of natural ecosystems. TNARNG pest management activities are regulated by federal and state law and by DoD regulation. These restrictions and the management goals and guidelines for pest control on TNARNG facilities are presented in the Integrated Pest Management Plan.

- All applications of herbicide or pesticide on VTS-C must be by a State- or DOD-certified applicator.
- All applications of herbicide or pesticide must be reported to the TNARNG Pest Management Coordinator (see Appendix H for reporting forms and contact information).
- Use non-chemical control methods wherever feasible and economical. Only apply pesticides when effective biological or mechanical control methods cannot be found or are prohibitively expensive.
- Pesticides and herbicides should be applied at the time when they will be most effective against the pest in order to achieve maximum control for minimum application. See TNARNG Integrated Pest Management Plan for more information.
- There will be no herbicide application around *Scutellaria montana* except in accordance with the Rare Species Management Plan.
- Follow the Forest Service's Nonnative Invasive Plants of Southern Forests (USDA 2003) guidelines in controlling invasive plant species.
- Only native species will be used in landscaping and in reclamation work.

Contractors who apply pesticides on VTS-C must:

- Show proof of liability insurance.
- Have State commercial certification and licensing in the category or categories of work to be performed.
- Use only EPA registered pesticides or herbicides that are on the "Approved Pesticide List" for use on TNARNG sites (see Appendix H).
- Furnish TNARNG personnel with legible copies of specimen labels and the Material Safety Data Sheets of all pesticides proposed for use.
- Furnish TNARNG personnel with the information required for pest management record keeping (see Appendix H for reporting format).
- Pesticides must be mixed, stored, and disposed of in accordance with Federal, State, and local regulations and with procedures established by the TNARNG.

### 5.1.9 Cultural Resources Management

The TNARNG Cultural Resources Management Policy is defined in the Integrated Cultural Resources Management Plan (ICRMP) for VTS-C, Georgia. The following are key points in protection of cultural resources:

- The TNARNG will consult the Georgia Heritage Resources Survey so that known historic, archaeological, and paleontological sites may be avoided.
- Cemeteries will be protected and maintained through fencing.
- For ground disturbing undertakings (ICRMP SOP #5)
  - Prior to any ground disturbance, contact the Cultural Resources office (see "Contacts" at front of this plan) to verify that the site is clear of known cultural resources.

- The avoidance or mitigation of adverse impacts to NRHP eligible sites shall be proactively incorporated into the design and planning process rather than deferred until archaeological deposits may be discovered during actual construction.
- All machine aided excavations or other earth moving projects shall be designed to avoid damage to archaeological sites or other historic properties that may be eligible for inclusion to the NRHP.
- Until such time as the GA-SHPO has determined an archaeological site to be not eligible or has concurred with a recommendation that an archaeological site is not eligible, any newly discovered sites will be treated as potentially eligible and will be avoided whenever possible.
- In the event of Emergency Discovery of Archaeological Deposits (ICRMP SOP #6)
  - Contact the Cultural Resources Office immediately. Stop all work at the site.
  - Archaeological deposits which are newly discovered in the construction of any undertaking shall be evaluated for their NRHP eligibility.
  - Until such time a the GA-SHPO has determined an archaeological site to be not eligible or has concurred with a recommendation that an archaeological site is not eligible, any newly discovered sites will be treated as potentially eligible and will be avoided whenever possible.
  - Nothing in Section 106 or other federal regulations requires TNARNG to stop work on an undertaking. However, if the SHPO indicates that the property is significant, then TNARNG shall make reasonable efforts to minimize harm to the property.
- Treatment of Human Remains and Funerary/Sacred Objects (ICRMP SOP #8)
  - No Native American human remains, funerary objects, or sacred objects from VTS-C will be knowingly kept in government possession without initiating consultation.
  - Consultation regarding the disposition of Native American human remains, funerary objects, or sacred objects shall be initiated as soon as feasible.

## 5.2 MANAGEMENT SCHEDULE

Seasonality is an important factor in protecting natural resources. Certain activities should only be done at certain times of the year, and other actions have a higher probability of success in some months than in others. Table 5.4 provides a calendar for essential natural resources activities for VTS-C. This calendar will be revised as new needs are identified and information is gathered.

**Table 5.4: Natural Resources Calendar**

<b>Issue</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>April</b>	<b>May</b>	<b>June</b>
<b>RTE</b>					Large-flowered skullcap monitoring	Large-flowered skullcap monitoring
<b>Weed Control</b>			Pre-emergent weed control on gravel lots and roads	Growth regulator on lawn/range area grasses	Contact herbicide on fencelines and other points of concern	
<b>Revegetation</b>		Plant cool season grasses	Plant cool season grasses Fertilize	April 15 -> Plant native grass seed Plant cool season grasses Fertilize	Plant native grass seed Plant warm season grasses	Plant warm season grasses
<b>Erosion control</b>		Erosion survey				
<b>Prescribed Fire</b>	Hardwood Forest RxBurns	Hardwood Forest RxBurns	Grassland RxBurns	Grassland RxBurns		
<b>IPP Control</b>	Cut-stump, Stem injection, or Basal bark treatments	Basal bark treatments	Basal bark treatments	Basal bark treatments	Basal bark treatments; Hand pull	Cut-stump or Stem injection treatments; Foliar Spray; Hand pull

Table 5.3, continued:

Issue	July	August	September	October	November	December
<b>RTE</b>						
<b>Weed Control</b>		Contact herbicide on fencelines and other points of concern				
<b>Revegetation</b>	Plant warm season grasses	Plant cool season grasses	Fertilize P&K	Fertilize P&K		
<b>Erosion control</b>		Erosion survey				
<b>Prescribed Fire</b>						Hardwood Forest RxBurns
<b>IPP Control</b>	Cut-stump or Stem injection treatments; Foliar Spray; Hand pull	Cut-stump or Stem injection treatments; Foliar Spray	Cut-stump or Stem injection treatments; Foliar Spray	Cut-stump or Stem injection treatments; Foliar Spray evergreens	Cut-stump or Stem injection treatments; Foliar Spray evergreens	Cut-stump or Stem injection treatments; Foliar Spray evergreens

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**APPENDIX A**

**ENVIRONMENTAL ASSESSMENT**

**FOR**

**THE IMPLEMENTATION OF**  
**THE REVISED INTEGRATED NATURAL RESOURCES**  
**MANAGEMENT PLAN**

**FOR THE VOLUNTEER TRAINING SITE – CATOOSA**

**TENNESSEE ARMY NATIONAL GUARD**  
**CATOOSA COUNTY, GEORGIA**

**PREPARED BY**  
**Tennessee Military Department**  
**Environmental Office**

**February 2012**

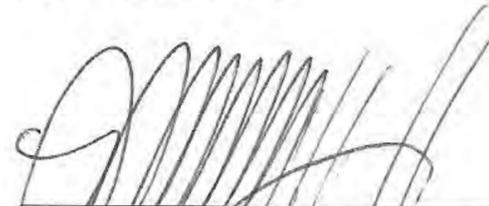


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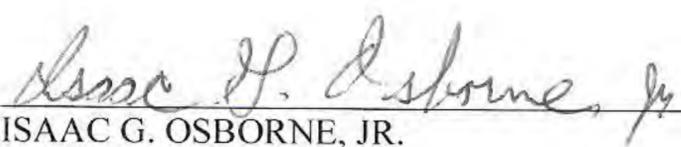
**ENVIRONMENTAL ASSESSMENT  
FOR  
IMPLEMENTATION OF THE REVISED INTEGRATED NATURAL RESOURCES  
MANAGEMENT PLAN, VOLUNTEER TRAINING SITE CATOOSA  
TENNESSEE ARMY NATIONAL GUARD**

**REVIEWED BY:**

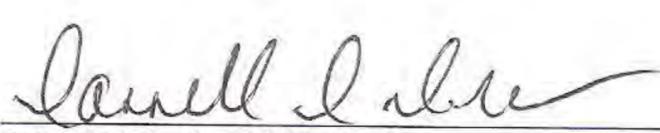
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## ACRONYMS AND ABBREVIATIONS

AR	Army Regulations
BMP	Best Management Practices
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DA	Department of the Army
DBH	Diameter at Breast Height
DoD	Department of Defense
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESMC	Endangered Species Management Component
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FNSI	Finding of No Significant Impact
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
IPP	Invasive Pest Plants
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NGB	National Guard Bureau
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
RTE	Rare, Threatened, or Endangered species
SHPO	State Historic Preservation Officer
SMZ	Streamside Management Zone
SPCC	Spill Prevention Control and Countermeasure
TA	Training Area
TMDL	Total Maximum Daily Load
TNARNG	Tennessee Army National Guard
USC	United States Code
USDA	United States Department of Agriculture
USPFO	United State Purchasing Fiscal Office
VT-S-C	Volunteer Training Site – Catoosa

## 1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

### 1.1 INTRODUCTION

In 2001, the Tennessee Army National Guard (TNARNG) implemented an Integrated Natural Resources Management Plan (INRMP) for the purpose of guiding land management activities on the Volunteer Training Site – Catoosa (VTS-C) in Catoosa County, Georgia, for the period 2002-2006. It was determined that a full revision of the document would be needed to guide future management due to the discovery of two federally listed species, the development of a forest management plan, and the need for more comprehensive guidance. To that end, the TNARNG, in cooperation with the U.S. Fish and Wildlife Service, Athens Field Office, and the Georgia Department of Natural Resources, Wildlife Resources Division, developed a Revised INRMP for the VTS-C. The revised INRMP includes a newly developed forest management and timber harvest program as well as a rare species management program for the federally listed large-flowered skullcap (*Scutellaria montana*) and gray bat (*Myotis grisescens*), both of which were not covered in the original INMRP or environmental assessment (EA). The purpose of this EA is to evaluate the impacts of implementing this Revised Integrated Natural Resources Management Plan.

This environmental assessment has been prepared in accordance with the National Environmental Policy Act (NEPA) and its implementing regulations as published by the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations (CFR) 1500-1508) as well as 32 CFR 651, *Environmental Analysis of Army Actions*; National Guard Bureau (NGB) “All States” Memoranda on NEPA policy guidance; and the NGB NEPA Handbook, June 2006. Collectively, these regulations and the guidance thereto establish a process by which the Department of the Army (DA) considers and documents the potential environmental and socioeconomic effects of proposed actions and alternatives and then invites comments of interested citizens and organizations prior to deciding on a final course of action. If the analysis presented in this EA indicates implementation of the proposed action would *not* result in significant environmental or socioeconomic impacts, then a Finding of No Significant Impact (FNSI) will be prepared. If a significant impact would result that cannot be mitigated, issuance of a notice to prepare an environmental impact statement (EIS) would be required. CEQ regulations specify that an EA should:

- briefly provide evidence and analysis for determining whether to prepare an EIS or a FNSI
- aid in an agency’s compliance with NEPA when an EIS is unnecessary
- facilitate preparation of an EIS when one is necessary

This NEPA review assesses known, potential, and reasonably foreseeable environmental consequences related to strategies presented in this INRMP. However, this NEPA review does not comprehensively assess environmental effects of specific projects presented in this INRMP. Therefore, additional NEPA analysis could be required prior to the implementation of certain actions or projects (e.g., prescribed burning, timber harvests). Furthermore, because the plan will be modified over time, additional environmental analyses pursuant to NEPA may be required if new management measures are developed for the long-term (i.e., beyond five years).

### 1.2 PURPOSE AND NEED

The Sikes Act, as amended, states “the Secretary of each military department shall prepare and implement an integrated natural resources management plan for each military installation in the United States under the jurisdiction of the Secretary, unless the Secretary determines that the absence of significant natural resources on a particular installation makes preparation of such a plan inappropriate” (16 U.S. Code

(USC) 670a et seq.). The VTS-C consists of approximately 1600 acres and contains significant natural resources, including two federal threatened and endangered species. Therefore, the TNARNG has prepared an INRMP for the VTS-C as a means of ensuring compliance with the Sikes Act.

The purpose of the proposed action is to guide land management on VTS-C to provide for the effective, long-term management of the site's natural resources while allowing the training mission to proceed. Key features of this management program are to provide for the conservation and rehabilitation of natural resources including soil, water, vegetation, and wildlife resources; the protection of rare, threatened, and endangered species; and the maintenance of healthy, functional ecosystems to support military training.

The proposed action is needed in order to ensure natural resources are managed effectively on the VTS-C while allowing the training mission to be accomplished and to maintain compliance with the Sikes Act, as amended, Department of Defense (DoD) Instruction 4715.3 (Environmental Conservation Program), and Army Regulation (AR) 200-1 (Environmental Protection and Enhancement), and applicable NGB and DoD guidance.

### **1.3 SCOPE OF THE DOCUMENT**

Two courses of action are considered under this EA: The Proposed Action and the No Action Alternative. The Proposed Action evaluated in this EA would be for TNARNG to implement the Revised Integrated Natural Resources Management Plan for VTS-Catoosa. Management would include actions for the protection of the federal threatened and endangered species found on the site, management of timber resources for forest health and training needs, protection of soil and water resources through erosion prevention and repair, and maintenance of other environmental values. The No Action Alternative considered under this EA would result in no new management plan implementation but a continuation of management according to the 2002-2006 INRMP for VTS-C.

## **2.0 DESCRIPTION OF THE PROPOSED ACTION (THE PREFERRED ALTERNATIVE)**

The Proposed Action is to implement the Revised INRMP for the VTS-C to guide natural resources on that facility. This action is designed to support the military mission by protecting and enhancing training lands (vegetation, soils, water quality, and wildlife) while providing quality conditions for training. This action would comply with the requirements of the Sikes Act and AR 200-1.

The Revised INRMP has been updated with recent survey data and streamlined to provide easy-to-understand guidance for training site managers, personnel, and users. The Revised INRMP also contains four recently developed specific management components: the Endangered Species Management Plan for large-flowered skullcap and gray bat, the forest management plan, the prescribed fire plan, and the invasive pest plant control plan.

The Revised INRMP identifies multiple natural resources management goals and the objectives and tasks that are necessary to accomplish those goals for integrated, sustainable land management at the VTS-C. It also outlines training and equipment needed to support natural resources goals. These goals, objectives, and tasks are identified in Chapter 4 of the Revised INRMP for the key resource areas defined by the Sikes Act:

- Ecosystem Management
- Rare, Threatened, and Endangered (RTE) Species

- Erosion Control and Soil Conservation
- Watershed Management
- Wetlands Protection
- Forest Management
- Fire Management
- Fish and Wildlife Management
- Pest Management
- Grounds Maintenance
- Recreational Use Management
- Cultural Resources Management
- Geographic Information Systems:

The objectives and the tasks, or projects, associated with each of the objectives are presented in Table 4.3 of the Revised INRMP (p. 81 *et seq.*). Most of the actions proposed by the INRMP have low impact on the environment (e.g., surveys, monitoring, and environmental education for staff) or are distinctly beneficial to the environment (e.g., erosion control and rehabilitation, RTE protection). Activities which involve more complex interactions with the environment include forest management, prescribed fire, invasive species control, and experiments with one of the RTE species on site (large-flowered skullcap).

#### Forestry

The forest management plan (see Annex 2 of the INRMP) presents a prioritized schedule of timber harvests for the improvement of forest health and quality and for the development of additional training situations. Harvests fall into two types: thinning all trees below the dominant/co-dominant level to lessen competition and create room for dominant individuals to grow more quickly and small group selection harvests in which areas of 2-10 acres will be cleared to encourage regeneration of desirable oak species and create uneven-aged mosaic conditions.

Approximately 610 acres are scheduled for harvest according to this plan which covers 17 years of management activity. Other stands will be reconsidered following the next forest inventory in 2015 and may be added to the harvest plan. No more than 60 acres will be harvested in any one year. Stands cut in successive years will be distributed across multiple training areas to minimize impact to wildlife habitat in any one portion of the installation at a given time.

A buffer of at least 50 feet on each side of the creeks will be protected for maintenance of riparian qualities; several of the narrow stands of bottomland hardwoods will therefore not be subject to any timber harvest. In all harvests, the large-flowered skullcap management groups plus a 50 foot buffer will be withheld – there will be no cutting of any trees within these areas. These two buffer protections will result in actual timber management on less than 610 acres in total.

#### Wildland Fire

Prescribed fire (see Annex 3 of the INRMP) will be utilized on VTS-C for the purposes of reducing fuel load and wildfire threat, creating and maintaining training conditions, controlling invasive species, and to encourage oak regeneration. Riparian areas (50 foot buffer on either side of the waterway) and large-flowered skullcap management groups (50 foot buffer surrounding) will be protected from fire (with the exception of experimental groups (see below)).

For the most part, fire will be used on the managed grasslands of the training site, e.g., the ranges. These areas will be burned on a 1-2 year rotation. Forested areas may be burned on a longer rotation (typically 6 years for hardwood stands, 3 years for mixed pine/hardwood stands) as needed for fuel control or

training area maintenance. Areas with substantial rare species value (e.g., training area 2) will not be subject to prescribed fire.

### Invasive Species Control

This revision of the INRMP provides more detailed instructions for the control of invasive pest plants (IPP) (see Annex 4 of the INRMP) than the original plan. A number of non-native plants have invaded the ecosystems of VTS-C and altered conditions and biodiversity. Control of these problem species will involve the application of herbicides.

The principle species to be controlled on VTS-C are tree-of-heaven, mimosa, princess tree, wintercreeper, woolly mullein, privet, Japanese honeysuckle, and Nepal grass. The chemicals to be used include glyphosate, Garlon 3A, Garlon 4, and Arsenal. The most controlled methods of application will be used when feasible: cut stump treatment and stem injection. For small diameter trees or saplings, basal bark spray is the method of choice. Foliar spray will be used for species (e.g., honeysuckle, Nepal grass, and wintercreeper) which are not easily subject to the other methods and for resprouts of previously treated individuals. Methods will follow recommendations by Miller (2003).

All appropriate precautions will be taken to minimize the danger of drift of herbicide onto nontarget plants. For the protection of the large-flowered skullcap, no soil active herbicides will be used at any time within 50 feet of a skullcap management group. In addition, herbicide use during this plant's March-September growing season will be limited to stem treatments (basal bark, stem-injection, or cut stump) within 50 feet of the management groups. Foliar applications within the 50 foot buffer area will only be made during the fall and winter and thus only on evergreen or semi-evergreen pest plants, to minimize the risk of spray drift affecting a protected plant.

The extensive creek system of VTS-C will also be protected from herbicide contamination: within 25 feet of water, only stem treatments will be used, and foliar treatments will be avoided in any situation where spray would be carried toward water. To minimize the risk of erosion issues from elimination of IPP near streams, dead vegetation will be left standing on creek banks wherever possible, and there will be no stump removal on creek banks or within the 50 foot streamside management zone (SMZ).

### Large-flowered skullcap experimentation

VTS-C has a large population of the federally listed threatened plant large-flowered skullcap. In cooperation with the USFWS, the TNARNG hopes to initiate several research projects described in Annex 1 of the INRMP.

To test the potential for transplanting threatened skullcap groups, a number of individuals will be transplanted from locations scheduled for development on the training site to similar locations within that region of the training site. To minimize the loss of plants from the training site, individuals will be propagated in the nursery and outplanted to the training site to replace those plants lost to construction and development. The transplanted individuals will not represent a loss of plants if survival is poor.

To investigate the impact of fire on large-flowered skullcap, several small management groups will not be protected from the prescribed burns scheduled in accordance with Annex 3 of the INRMP. Cool, dormant season burns will be allowed to burn through the chosen skullcap areas on either a 7-year or 4-year rotation, and response of the skullcap will be monitored.

Skullcap management groups which are threatened by invasive pest plants will be subject to experimental control of the IPP with herbicide treatments. The skullcap will be monitored for detrimental effects from herbicide treatments on a small portion of the management group. If the focused treatments are

successful in controlling IPP and there are no damaging effects on the protected species, herbicide treatments will be expanded to include the entire management group as needed.

### 3.0 ALTERNATIVES CONSIDERED

#### 3.1 ALTERNATIVES DEVELOPMENT

Alternatives were considered based on budget constraints, regulatory requirements, and the functionality of the action. A partial implementation alternative was examined but was discarded as incompatible with DoD and Sikes Act guidance: the INRMP is an integrated document incorporating a specified selection of topics which interact to ensure effective ecosystem management of the site. Elimination of any of those topics would result in a document that does not meet regulatory requirements and a program which is incomplete and ineffective. Therefore, only two alternatives are considered in this NEPA analysis: the Proposed Action and the No Action Alternative.

#### 3.2 NO ACTION ALTERNATIVE

In accordance with regulations promulgated by the Council on Environmental Quality, 43 CFR, Part 1500, Section 1502.14(d), a “No-Action” Alternative must be considered despite the fact that such an alternative would not currently comply with the *Sikes Act* or Army Regulation 200-1.

Under the No-Action Alternative, the VTS-C Revised INRMP would not be implemented, and current natural resources management practices would continue in accordance with the 2002-2006 INRMP with no change in management direction or intensity. The VTS-C would continue to operate using existing programs and management practices; however, new programs for endangered species management and forest management would not be implemented, and most of the projects identified in the revised INRMP, Chapter 4, would not be implemented. The installation would not be in compliance with the Sikes Act and associated guidance due to expiration of the original INRMP period without a completed review/revision. Non-compliance with AR 200-1 would occur due to the lack of an Endangered Species Management Component (ESMC) for two federally listed species now known to occur on the training site.

Under the No Action alternative the following natural resource management practices would persist as directed by the original INRMP:

- Implementation of Best Management Practices (BMPs)
- Protection of wetlands and riparian areas
- Use of temporary erosion control methods during heavy troop training periods
- Implementation of erosion control projects, as funding becomes available
- Protection of Federally listed species by avoidance
- Control of non-native invasive plant species and use of native species for revegetation where feasible
- Intermittent use of prescribed fire to maintain training conditions

Management actions that would not be implemented under the No-Action Alternative include:

- The endangered species management plan for large-flowered skullcap and gray bat
- Forest management actions (timber stand improvement, thinning, harvest, etc.)
- Prescribed fire management coordinated with timber management activities for ecosystem management

- An updated invasive pest plant control plan guided by a recent IPP survey and up-to-date control recommendations.
- Additional biological surveys to support or augment those completed in accordance with the original INRMP

## 4.0 AFFECTED ENVIRONMENT

### 4.1 LOCATION DESCRIPTION

The Volunteer Training Site – Catoosa is a 1,628 acre Tennessee Army National Guard training site located in east-central Catoosa County in northwestern Georgia, approximately two miles east of Ringgold, the county seat, and 20 miles southeast of Chattanooga, Tennessee (see **Figures 2.1**, p.12, and **2.2**, p.13, of the INRMP main body). The site is approximately 16,000 feet at its maximum length by approximately 6,625 feet at its maximum width. Georgia State Highway 2 borders the site on the south, and Salem Valley Road accesses the northern boundary.

The climate of Catoosa County is characterized by hot summers and cool winters, with precipitation averaging nearly 58” per year, spread relatively evenly through all seasons. The long growing season and plentiful rainfall combine to create a rich vegetative system dominated by broadleaf forest. The topographic relief of the training site contributes to a high diversity of ecotypes and species. Forests cover approximately 82% of the training site. Another 15% is managed grasslands on ranges and training areas. The remainder is the developed land of the cantonment area. Surrounding lands are a patchwork of forested ridges and valleys that have been cleared for pasturage, small-scale farming, and residences.

### 4.2 LAND USE

VTS-Catoosa supports the TNARNG State and Federal missions. It provides military field training exercises for both armored and artillery units. This facility provides high quality, realistic training areas, and is used to conduct small arms weapons qualification, command post exercises, field training exercises, and other training activities such as classroom work, familiarization or qualification with tank armaments, and simulated maneuvers.

#### 4.2.1 Current VTS-C Land Use

VTS-Catoosa covers approximately 1,628 acres on Federally-owned property licensed to the Tennessee Army National Guard from the Mobile District of the U.S. Army Corps of Engineers. The training site consists of 10 training areas (TAs) and a Cantonment Area (see **Figure 2.3**, p.16, of the INRMP). The 55 acre Cantonment Area is located at the southern end of the training site. It consists of administrative buildings, supply buildings, two mess halls, classrooms, and barracks and latrine facilities to accommodate 400 soldiers. The small arms range area is also considered a part of the cantonment.

The small arms range facilities include:

- 25-meter pistol range
- 25-meter rifle range
- 10-meter M-60 machine gun range
- 1200-meter machine gun transition
- Known Distance rifle range (100-600 yards)

An additional M203 practice grenade launcher range is located just west of the cantonment in TA1. A tank gunnery range (1:60 scale) and tank table VII range (1:2 scale) occupy portions of TA3, TA4, TA5, and TA7 in the central portion of the training site. Additional facilities include a demolition range, gas chamber, and hand grenade qualification course. Army aviation facilities include one lighted, non-controlled helipad. The nearest fuel point is the Chattanooga Metropolitan Airport.

#### **4.2.2 Off-Site Land Use**

The property surrounding VTS-C is primarily privately owned rural residential and agricultural land. The helicopter landing pad is approximately 100 feet north of the closest residence. Land to the north of the maneuver area and rifle range and west of VTS-C is composed of cultivated land, cattle pasture, and hardwood forest. Tiger Creek Elementary School is located approximately 0.5 mile west of the training site on Highway 2.

### **4.3 AIR QUALITY**

The ambient air quality in an area can be characterized in terms of whether it complies with the primary and secondary National Ambient Air Quality Standards (NAAQS). The Clean Air Act requires the federal government to set NAAQS for pollutants considered harmful to public health and the environment. NAAQS are provided for seven criteria pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter with an aerodynamic size less than or equal to 10 micrometers (PM-10), particulate matter with an aerodynamic size less than or equal to 2.5 micrometers (PM-2.5), and sulfur dioxide (SO<sub>2</sub>). Areas are designated as “attainment”, “nonattainment”, “maintenance”, or “unclassified” with respect to the NAAQS. General air quality monitoring is conducted in areas of high population density and near major sources of air pollutant emissions. Rural areas are typically not considered in such monitoring.

Catoosa County experiences air quality problems because of its proximity to Chattanooga, TN. The EPA has designated the area surrounding Chattanooga, including Catoosa County, as a nonattainment area for specific air quality parameters. The air quality problems relate to elevated ground-level ozone and particulate matter levels. At the time of this assessment, Catoosa County was in nonattainment status for the 8-hour ozone standard and the PM-2.5 standard (US EPA 2007a).

This nonattainment status has led the Georgia EPD to issue an annual ban on open burning between May 1 and September 30, a timeframe corresponding to the traditional smog season (Georgia Rules for Air Quality Control 391-3-1). This open burning ban does not apply to prescribed burning.

### **4.4 NOISE**

Noise refers to sounds generated by on-site activities that could affect members of the TNARNG and the public. The EPA provides information on negative effects of noise, identifying indoor and outdoor noise limits that protect public health and welfare (e.g., hearing damage, sleep disturbance, and communications disruption). Noise levels below 65 decibels are generally considered to be acceptable in suitable living environments. The following information is taken primarily from the Statewide Operational Noise Management Plan completed for the TNARNG in 2006 (USACHPPM 2006).

#### **4.4.1 Noise Environment**

Most of the surrounding lands near VTS-C are rural residential properties and small farms. There are no concentrated residential developments within the range of the noise contours described in the 2006

TNARNG Operational Noise Plan. Noise sensitive receiver sites in the area are primarily individual residences and Tiger Creek Elementary School, located 0.5 mile from the training site along Highway 2.

The topography of the region in which VTS-Catoosa is located is significant to noise considerations. The alternating steep, narrow ridges and valleys serve as natural barriers to sound travel.

Overall, there are currently few problems concerning the noise environment at VTS-C. Noise complaints are minimal, and encroachment pressures are negligible.

#### **4.4.2 Noise Sources**

The purpose of VTS-C is primarily to provide the TNARNG with a place for basic military training including small arms, maneuver, field bivouac, and tracked and wheeled vehicle operations. Training at the installation occurs year round, but the vast majority takes place in the months from June to October. The noise produced by the training at the installation is generally limited to that which is made from the small arms firing (i.e., weapons smaller than 20mm). However, there are some operations at the demolition range and the M203 range that are considered large arms.

Small Arms – VTS-C currently utilizes the following ranges:

- (1) KD rifle range (100-600 yards)
- (1) 25-m pistol range
- (1) 25-m rifle range
- (1) shotgun range
- (1) .50 caliber / tank range
- (1) hand grenade practice range

According to the Small Arms noise contour determinations in the Operational Noise Plan, the Zone III contour (incompatible with residential land use) is either contained within the installation boundary or it travels off into uninhabited woodland. The Zone II contour travels well off the facility but does not encompass any noise-sensitive areas of relevant density.

Large Explosions and Other Impulsive Sounds – VTS-C has the following large arms/demolition ranges:

- (1) M203 Grenade launcher practice range
- (1) Demolition range

The operations on these ranges are limited, but calculations in the Noise Plan indicate that both the Zone III and the Zone II contours from the M203 range extend beyond the installation boundary a significant degree in the southern portion of the training site. There are currently no high density noise sensitive uses in this area, but in the future additional development along the highway may become a source of noise complaints. The Zone III contour does encompass the Tiger Creek Elementary School.

Noise contours in the northern portion of the training site are dictated by the Demolition range. Both Zone II and Zone III contours extend past the installation boundary, especially along Route 379. There are some residences in this area, and although the density is not high at this time, future development or increased operations may result in noise complaints.

Aircraft – Aircraft operations at the VTS-C are minimal. There is one lighted, non-controlled helipad on site. Total aircraft on-site averages 15-20 in a 12 month period. Most traffic is during the daytime and includes some transportation use as well as training operations.

Transportation and Other Noise – The noise generated by the current amount of wheeled and/or tracked vehicle maneuver training is small and does not travel beyond the installation boundary.

#### 4.4.3 Current Noise Issues

Currently, VTS-C has few issues concerning noise; noise complaints are minimal and, at this time, encroachment pressures are negligible. Operational noise is contained fairly well within the installation boundary, and in those places where the noise does travel beyond the border, the existing land use is of very low density with few residences. Nevertheless, it is a possibility that future residential development around the installation, particularly to the northeast and to the south, could become a source of noise complaints.

### 4.5 GEOLOGY AND SOILS

#### 4.5.1 Physiography and Topography

The VTS-C lies within the Southern Appalachian Ridge and Valley physiographic province. The area is characterized by a series of ridges and valleys that lie in a southwest to northeast direction (see **Figure 3.2**, p.27, of the INRMP) (Hodler and Schretter 1986). Tiger Creek and Broom Branch lie within the valley portion of the training site, surrounded by several unnamed ridges, as well as Sand Mountain to the northwest. Elevations range from approximately 755 feet above mean sea level (msl) along the creek channels to more than 1,200 feet above msl on Sand Mountain and other ridges. Slopes are generally moderately steep to steep on the ridges and range from nearly level to strongly sloping in the valleys (USGS 1983). Slope is a significant contributor to a high erosion index on over 75% of the training site.

#### 4.5.2 Geologic Structure

Bedrock in the region of VTS-C is primarily Paleozoic sedimentary rock. Compressional forces deformed existing flat sedimentary formations to create folds which then eroded to the ridge and valley structure seen today. In the region east of Sand Mountain, older rocks were thrust over and now overlie younger rocks. The formations underlying the VTS-C area consist mostly of sandstone, siltstone, and shale. Depth to bedrock is typically more than 20 inches. No known mineral or petroleum resources are located on or under VTS-C (Lawrence 1993).

#### 4.5.3 Soils

Thirteen soil series within three major soil associations are found on VTS-C (see **Figure 3.3**, p.29, and **Table 3.1**, p.28, of the INRMP), as described by the 1993 Catoosa County soil survey (Lawrence 1993). The Chenneby-Rome soils on the nearly level ground of floodplains and stream terraces range from poorly drained to well drained and typically are not considered highly erodible. These silt loam soils are deep (>60 inches to bedrock) and prone to seasonal flooding and wetness. The upland soils on the training site fall within either the Townley-Cunningham-Conasauga or Townley-Tidings soil associations. These upland soils are generally well-drained and often moderately to strongly sloping and are highly erodible. They are loam or silt-loam soils 20-40 inches deep over shale bedrock.

Soil erosion potential is a significant limiting factor on the VTS-C (see **Figure 3.4**, p.32, of the INRMP). Over 75% of the soil types at VTS-C meet the criteria for highly erodible land. Slope steepness and length is the key factor in erosivity: ridge soils are much more prone to erosion than the lowland soils. Wetness and flooding are commonly limiting factors in the valleys on the training site.

## 4.6 WATER RESOURCES

The VTS-C lies within the Chickamauga watershed. The training site is drained by three named blue line streams (see **Figure 3.5**, p.34, of the INRMP): Tiger Creek and its tributaries Broom Branch and Catoosa Springs Branch. There are also nine unnamed tributaries to Tiger Creek that are shown as blue line streams. In total there are approximately 11.6 miles of intermittent or flowing stream on the site (Minkin et al. 1998).

A water quality survey conducted at VTS-C in 1998 reported the water quality in the surveyed creeks and ponds as “generally very good” (SAIC 1998a). However, the State of Georgia has developed a Total Maximum Daily Load (TMDL) Implementation Plan for the Tiger Creek watershed. Tiger Creek’s designated use is fishing, and the creek is listed as impaired on Georgia’s 303(d) list for fecal coliform bacteria. The TMDL Implementation Plan lists the primary source of the bacteria as non-point from wildlife, agricultural livestock, and urban development (Joss 2006).

Tiger Creek and its tributaries are designated as Secondary Trout Streams by GADNR. A Secondary Trout Stream is one that has no evidence of natural trout reproduction but that is capable of supporting trout throughout the year (Joss 2006). This designation results in additional controls intended to minimize sedimentation and maintain forest cover for temperature control. Current state regulation requires the maintenance of a 50 foot vegetated buffer on either side of a trout stream with permits required for any modification within that buffer area.

A 1998 delineation of wetlands and other regulated waters was performed by Minkin et al. (1998). They found that VTS-C contained approximately 7.88 acres of wetlands and ponds, the majority located in the southwestern corner of the property (see **Figure 3.5**, p. 34, of the INRMP). This small area (0.5% of the installation’s total land area) constitutes a variety of wetland communities, with many situated along streams and drainages. Six National Wetland Inventory (NWI) classes were found at VTS-C. The majority of the wetlands on VTS-C (4.55 acres) are emergent systems dominated by grasses. In addition, there are approximately 2.36 acres of forested wetlands dominated by hardwood species and 0.97 acre of shrub dominated wetland

One small pond exists on the site; it is a man-made pond behind a small dam from 1934 and is heavily clogged with silt and organic debris.

## 4.7 BIOLOGICAL RESOURCES

### 4.7.1 Vegetation

#### Vegetation Communities

The VTS-C is part of a larger ecosystem that is known as the Gulf Slope Section of the Oak-Pine Forest Region (Braun 1950). The modern landscape supports islands of somewhat natural areas (with one or more communities present) within a sea of anthropogenic features such as roads, buildings, and farms. Ten natural communities were described in the Phase II natural resources survey by Science Applications International Corporations based on edaphic conditions and dominant species types (SAIC 1998b). These community types were further refined into 11 floristic alliances according to the National Vegetation Classification Standard (see **Figure 3.6**, p.38, of the INRMP) (Dynamic Solutions 2007). During this most recent vegetation survey 171 plant species were identified on the training site (see Appendix F of the INRMP). The forests on the training site are second growth, mostly under 60 years old, regenerated after past logging or clearing for agriculture. The grasslands are human-created and maintained.

Mixed oak and oak-hickory forests predominate, occupying approximately 82% of the training site. Species composition of the overstory varies and is dependent on slope, slope aspect, and soil moisture regimes. White oak (*Q. alba*), black oak (*Q. velutina*), chestnut oak (*Q. montana*), and eastern red cedar (*Juniperus virginiana*) dominate the diverse overstory on the xeric to mesic sites along upper and mid slopes, while on lower slopes, oaks share dominance with yellow poplar (*Liriodendron tulipifera*). The much wetter bottomland hardwoods are dominated by green ash (*Fraxinus pennsylvanica*) with other species that tolerate some inundation and higher soil moisture throughout the year. The training site also contains natural stands of loblolly and shortleaf pines (*Pinus taeda* and *P. echinata*) as well as pine plantations dominated by loblolly pine.

While open fields at VTS-C are dominated by broomsedge (*Andropogon virginicus*) and crabgrass (*Digitaria sanguinalis*), the composition is somewhat dynamic and also contains shrubby and herbaceous species such as plantain (*Plantago* spp.), blackberry (*Rubus allegheniensis*), thoroughwort (*Eupatorium* spp.), and honeysuckle (*Lonicera* spp.). These areas are periodically bushhogged throughout the growing season to maintain them in an open condition for training. A mixture of crabgrass, Bermudagrass (*Cynodon dactylon*), white clover (*Trifolium repens*) and other lawn grasses and weeds occupy the lawns of the installation's cantonment area. These areas are mowed frequently throughout the growing season and are generally well-maintained.

### **Forest Inventory and Management**

A forest inventory and a management plan for VTS-Catoosa were completed in 2006. The forest inventory determined that a total of 1,313 acres of VTS-C were covered in forests in April 2005. The forest stands are typically dominated by red oaks and white oaks, with a substantial amount of pine in some stands. Yellow-poplar is a co-dominant in some stands, as is hickory. The average DBH for the entire installation was calculated as 11.7 inches, and the average basal area was 78.1 square feet per acre. Most stands are 20-40 years old; although some had trees approaching 70 years in age, and a few stands were dominated by young trees. The overall health of the forest stands was classified as good in April 2005, but there was evidence of a past infestation of southern pine beetles. In addition, stands in the impact area of the tank range show a significant amount of timber damage due to frequent hot fires (Thompson Engineering et al. 2006).

#### **4.7.2 Wildlife**

A total of 218 animal species, representing four groups of land vertebrates (17 amphibians, 134 birds, 23 mammals, and 8 reptiles) and 36 fish species have been documented at VTS-Catoosa during numerous natural resources surveys (SAIC 1998a; SAIC 1998b; URS and EcoTech 2007; AMEC unpublished). The federally listed endangered gray bat (*Myotis grisescens*) has been captured over Tiger Creek on VTS-C, but no hibernacula have been identified on the training site. Further information on the gray bat is presented in section 4.7.3.

Although the installation does not allow hunting at this time, numerous game species have been identified at VTS-C including white-tailed deer (*Odocoileus virginianus*), eastern cottontail (*Sylvilagus floridanus*), northern bobwhite quail (*Colinus virginianus*), raccoon (*Procyon lotor*), grey squirrel (*Sciurus carolinensis*), mink (*Marmota monax*), and wild turkey (*Meleagris gallopavo*).

Feral pigs (*Sus* sp.) have been a problem on the training site in the past and may require removal through contracted hunting and trapping. They threaten ground nesting birds and disturb large areas of soil with rooting and wallowing. They may be a particular threat to the large-flowered skullcap as they will dig up and eat the perennial root-stock of this threatened plant. Beaver (*Castor canadensis*) are another problem wildlife species on the VTS-C. They have built extensive dams in Tiger Creek and Broom Branch, and the resultant flooding kills timber and makes land unusable for training. A trapping program initiated in

2006 has the population under control at this time, but they will require on-going surveillance and management.

#### 4.7.3 Rare, Threatened, or Endangered Species

One federally listed plant species has been located on VTS-C: a rather large population of the threatened large-flowered skullcap (*Scutellaria montana*) occurs in clusters over most of the training site (see **Figure 3.8**, p.48, of the INRMP). Occurrences of large-flowered skullcap undergo annual monitoring, and areas in which they are located are marked off-limits to all training activities during the growing season for the plant and are off-limits to vehicular traffic year-round.

The federally listed endangered gray bat (*Myotis grisescens*) was captured while foraging over Tiger Creek on the VTS-C during a bat survey conducted in 2006-2007 (URS and EcoTech 2007). No hibernacula were identified on the training site during this survey, but further research is needed to fully characterize the gray bat presence on the training site.

In addition to the large-flowered skullcap and the gray bat, a number of federal and state-listed species have been documented within Catoosa County (Table 4-1). None of the other species have been found on the VTS-C to date. The blueside darter (*Etheostoma jessiae*), redline darter (*E. rufilineatum*), and banded darter (*E. zonale*) are Georgia “special concern species.” These fish were found at VTS-C during an aquatic resources survey in 1998 (SAIC 1998a). No further investigation has been made of their use of the training site.

#### 4.8 CULTURAL RESOURCES

No cultural resources located at the VTS-C are currently listed on the National Register of Historic Places (NRHP). There are, however, resources that have been identified as eligible. A Phase I cultural resources survey of the VTS-C was conducted in 1997 (Stanyard et al. 1998). Twenty archaeological sites and one isolated find were identified on the training site. Nine prehistoric sites and three historic sites are recommended eligible for the NRHP under Criterion D. The other sites are recommended ineligible.

In addition, 17 historic architectural resources were identified. Most were recommended ineligible due to loss of integrity. Three were recommended eligible for the NRHP: a 1934 concrete dam (with associated pond), a ca. 1907 target range, and a ca. 1940 concrete bridge. The State Historic Preservation Office (SHPO) concurred with these findings on 15 August 1998.

Twenty federally recognized American Indian tribes have a current or historic interest in TNARNG lands. All interactions between the TNARNG and these tribes are conducted in accordance with the DoD Annotated American Indian and Alaska Native Policy (27 Oct 1999).

Protection of these historic and prehistoric sites is directed by the TNARNG Integrated Cultural Resources Management Plan (ICRMP) for VTS-Catoosa. This document also guides interactions and consultation with the American Indian tribes that have a current or historic interest in TNARNG lands.

**Table 4-1. Threatened and endangered plant and animal species found in Catoosa County, Georgia. (Data obtained from Georgia Wildlife Resources Division 2012a, 2012b; Natureserve 2012; US Fish and Wildlife Service 2012.)**

Organism Type	Scientific Name	Common Name	Habitat	Federal Status <sup>(1)</sup>	State Status <sup>(2)</sup>
<b>Documented at VTS-C</b>					
Plant	<i>Scutellaria montana</i>	Large-flowered skullcap	Mature oak forests on dry, rocky slopes	LT	T
Mammal	<i>Myotis grisescens</i>	Gray bat	Cave roosts, riparian foraging areas	LE	E
<b>Not documented at VTS-C</b>					
Plant	<i>Hydrastis canadensis</i>	Goldenseal	Mesic hardwood forests with alkaline soils	None	E
Plant	<i>Leavenworthia exigua</i> var. <i>exigua</i>	Tennessee gladeceess	Limestone cedar glades	None	T
Plant	<i>Spiranthes magnicamporum</i>	Great Plains ladies' tresses	Prairies and glades with alkaline soils	None	E
Plant	<i>Thaspium pinnatifidum</i>	Glade meadowparsnip	Forests with calcareous soils	None	E
Plant	<i>Xyris tennesseensis</i>	Tennessee yellow-eyed grass	Seepy margins of limestone spring runs	LE	E
Crustacean	<i>Cambarus extraneus</i>	Chickamauga crayfish	Shallows of high gradient streams	None	T
Amphibian	<i>Cryptobranchus alleganiensis</i>	Eastern hellbender	Cool, clear streams with large rocks	None	T
Fish	<i>Erimonax monachus</i>	Spotfin chub	Large creeks to medium rivers; moderate to swift current over gravel to bedrock	LT	T
Fish	<i>Etheostoma duryi</i>	Black darter	Springs & small-medium, clear, gravel bottom streams	None	R
Fish	<i>Hemitremia flammea</i>	Flame chub	Springs & spring-fed streams with aquatic vegetation	None	E
Fish	<i>Ichthyomyzon bdellium</i>	Ohio lamprey	Adults: medium to large rivers; larvae: mud bottoms of quiet pools in creeks	None	R
Fish	<i>Notropis ariommus</i>	Popeye shiner	Large creeks to medium rivers with gravelly substrate	None	E
Fish	<i>Noturus eleutherus</i>	Mountain madtom	Small to large rivers with fast-flowing waters and sandy or rocky substrate	None	E
Fish	<i>Percina sciera</i>	Dusky darter	Low gradient creeks and small rivers with gravel substrate and plentiful vegetation	None	R
Fish	<i>Percina tanasi</i>	Snail darter	Shoals of creeks and small rivers with sandy substrate	LT	E
Fish	<i>Phenacobius uranops</i>	Stargazing minnow	Creeks to medium rivers in rocky runs and riffles	None	T
Insect	<i>Gomphus consanguis</i>	Cherokee clubtail	Mountain streams and adjacent terrestrial areas	None	T
<sup>1</sup> Federal status codes: LE (Listed Endangered) - Taxon is threatened by extinction throughout all or a significant portion of its range LT (Listed Threatened) - Any species or subspecies of wildlife that is likely to become endangered within the foreseeable future <sup>2</sup> State status codes: E (Endangered) - Any species or subspecies of wildlife whose prospects of survival or recruitment within the state are in jeopardy or are likely to become so in the foreseeable future T (Threatened) - species likely to become endangered in the immediately foreseeable future as a result of rapid habitat destruction or commercial exploitation R (Rare) – species not endangered or threatened, but which should be protected because of its scarcity					

## 4.9 SOCIOECONOMICS

Socioeconomics identifies and describes the basic attributes and resources associated with the human environment surrounding the VTS-C. This data is presented in order to provide an understanding of the socioeconomic forces that have shaped, and continue to shape, the area. Data have been collected from the U.S. Census Bureau (2007) and the U.S.D.A. Economic Research Service (2007).

**Table 4-2: Regional income data for Catoosa County, Georgia.**

	Total Resident Population, 2011 *	Median Household Income, 2006-10 *	% Persons Below the Poverty Line, 2006-10 *	Unemployment Rate (%), 2010 **
Catoosa County	64,530	\$46,544	11.2 %	8.1 %
Georgia	9,815,210	\$49,347	15.7 %	10.2 %
U.S.	311,591,917	\$51,914	13.8 %	9.6 %

\* U.S. Census Bureau (2012)

\*\* U.S.D.A. Economic Research Service (2012)

Socioeconomic areas of discussion for the affected environment precluded from this discussion due to overall inapplicability include local housing, schools, medical facilities, service facilities, recreational facilities, and associated issues of health and safety. Implementation of the subject INRMP would not affect any of these areas outside the boundaries of the VTS-C.

## 4.10 ENVIRONMENTAL JUSTICE AND PROTECTION OF CHILDREN

Because children may suffer disproportionately from environmental health risks and safety risks, Executive Order (EO) 13045, Protection of Children from Environmental Health Risks and Safety Risks, was introduced on April 21, 1997. EO 13045 was intended to prioritize the identification and assessment of these risks that may affect children and to ensure that Federal agency policies, programs, activities, and standards address these risks. Currently, there are seldom children present at the VTS-C as visitors, no children reside at the installation, and no child care centers, schools, parks, or other concentrations of children exist on the installation. However, there is a potential for children to be present in areas proximal to the training site, as Tiger Creek Elementary School is located approximately 0.5 mile west of the main gate on Highway 2.

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, dated 11 February 1994, was issued to focus attention of federal agencies on human health and environmental conditions in minority and low-income communities, and to ensure that potential disproportionately high and adverse human health or environmental effects on these communities are identified and addressed. Catoosa County, as shown in Table 4-2, has a very low percentage of minorities and has a higher median income than the state average. The area immediately surrounding the training site has a range of income levels, but no concentration of low income citizens.

**Table 4-3: 2011 Regional population by race for Catoosa County, Georgia.** Data from US Census Bureau (2012).

Area	All Individuals	White (%)	African-American (%)	American Indian & Alaska Native (%)	Asian or Pacific Islander (%)	Two or More Races (%)	Hispanic or Latino <sup>+</sup> (%)
Catoosa County	64,530	93.8	2.8	0.4	1.4	1.5	2.5
Georgia	9,815,210	63.2	31.0	0.5	3.5	1.8	9.1
U.S.	311,591,917	78.1	13.1	1.2	5.2	2.3	16.7

<sup>+</sup> Persons of Hispanic or Latino origin may be of any race.

#### 4.11 INFRASTRUCTURE

Infrastructure resources include potable water supply, wastewater treatment, solid waste disposal, energy sources, and transportation systems (i.e., roads, railways, airports).

The VTS-C is accessible via Georgia State Highway 2 on the south (the main gate) and Salem Valley Road on the north. Interstate 75 is located approximately 2 miles southwest of the installation. Approximately 30 miles of roads, predominantly maintained gravel, are within the training site. One lighted, non-controlled helipad serves the minimal aircraft operations on the site. The nearest fuel point is the Chattanooga Metropolitan Airport. There are no rail facilities on or near the VTS-C.

Electricity is supplied to the training site by Georgia Power. Telecommunications services are provided by Ringgold Telephone Service. The water supply is through the Catoosa County Utility District. There is one well located on the training site; it is not used as a potable water source but supplies the vehicle wash rack. Wastewater discharge on the VTS-C is to thirteen septic tanks across the facility. The washrack discharges to grade.

#### 4.12 HAZARDOUS AND TOXIC MATERIALS/WASTES

The VTS-C does not currently generate hazardous waste. A solvent rag laundry service is used by the training site. Any excess, expired, or unknown products are disposed of in accordance with the TNARNG Hazardous Waste Management Plan. Waste disposal would be coordinated through the Facilities Engineers Office, the United States Purchasing Fiscal Office (USPFO), and the Chattanooga FMS should any waste be generated at the VTS-C.

Based on the record search conducted in September 1994, no underground storage tanks are present in the VTS-C area. There are four active aboveground storage tanks on the training site. These tanks are located in the motor pool area. The 3,000-gallon JP8 tank is double-walled steel, pad-mounted, and has secondary containment. The three 1,000-gallon capacity tanks are used to store diesel and unleaded gasoline and are single-walled and situated on a concrete pad. All of the military vehicles used at this training site operate using diesel fuel. The Training Site has a current, active Spill Prevention Control and Countermeasures (SPCC) Plan that specifically includes actions to be taken in the event of a diesel or fuel spill.

Most pesticide use on site is done by contract with licensed pest control operators. The training site currently has one certified pesticide applicator on staff who makes weed control applications. Minimal amounts of herbicides are maintained on site for weed control and are stored and handled in accordance

with the Federal Insecticide, Fungicides, and Rodenticide Act (FIFRA), state and DoD regulations, and the product label.

## 5.0 ENVIRONMENTAL CONSEQUENCES

This section identifies the potential positive and negative environmental, cultural, and socioeconomic effects, or impacts, of the identified alternatives on each of the technical issue areas presented in Section 4.0. In addition, this section identifies any mitigation measures that may be associated with each resource area that when implemented, would reduce the level of identified impacts.

Impacts are characterized as direct or indirect. A direct impact is caused by a proposed action and occurs at the same time and place, while an indirect impact is caused by a proposed action but occurs later in time or farther removed in distance but is still reasonably foreseeable.

In addition to indicating whether impacts are direct or indirect, the impact analyses included in this section distinguish between short- and long-term impacts. In this context, short- and long-term do not refer to any rigid time period but are determined on a case by case basis in terms of the environmentally significant consequences of the proposed action.

Generally, implementation of an updated and improved plan for integrated natural resources management is expected to result in a significant, positive, long-term environmental impact to the natural, cultural, and socioeconomic environments at the VTS-C by allowing for use of a holistic management approach.

### 5.1 LAND USE

#### 5.1.1 Effects of the Proposed Action

The implementation and integration of the proposed Revised INRMP into the VTS-C overall approach to environmental and training site management would directly supplement and facilitate land management and use for nearly all installation activities. It would allow for the successful completion of military operations while providing for the conservation of natural resources.

The proposed VTS-C INRMP includes strategies that, when implemented, would ensure long-term sustainability of the natural resources on which the TNARNG depends for training. Implementation of land management practices, as described in the INRMP, would improve the quality of existing lands and enhance land use potential. The management goals, objectives, and projects contained within the INRMP would allow for continuance and even improvements of the military training mission, foster increased cooperation with regulatory agencies, and would improve habitat and water quality throughout the site via implementation of BMPs and other measures outlined in the INRMP. Therefore, this action would have *major, long-term positive impacts* to VTS-C land use and management.

#### 5.1.2 Effects of the No Action Alternative

Under the No Action alternative, current management policies and activities would continue with no further guidance from an up-to-date INRMP. Land management would be carried out as it was in the past; however, such efforts might not be conducted in the most appropriate or effective manner. Failure in these efforts could result in degradation of the natural resources of VTS-C over time and a decline in the ability of the land to support military training. As such, the No Action alternative could result in *long-term negative impacts* to VTS-C land use.

## 5.2 AIR QUALITY

### 5.2.1 Effects of the Proposed Action

The only action in the natural resources management program that could impact air quality is prescribed burning. Prescribed burning has been identified in the INRMP as a management practice for the improvement of training conditions, control of wildfire, and for experimentation in the regeneration of hardwood forest stands. The major effects of smoke on air quality are visibility reduction and respiratory impairment near the fire due to particulates. Smoke can impair general air quality in populated areas downwind from extensive burning.

Catoosa County is in a nonattainment area for air quality. Open burning restrictions do not apply to prescribed burning of forests and grasslands; however, care should be taken to minimize the influence of VTS-C burning on regional air quality. All prescribed burning would be conducted in accordance with the TNARNG prescribed burn plan and would utilize the smoke management guidelines contained therein. Appropriate smoke management and careful timing of burns to avoid the worst nonattainment periods will mitigate impacts by reducing smoke emissions, ensuring burning occurs during atmospheric conditions that favor smoke dispersion, and minimizing emissions during high-pollution seasons.

Prescribed burning in accordance with the VTS-C INRMP may have short-term, minor effects on air, but mitigation should ensure there are *no significant impacts* on air quality.

### 5.2.2 Effects of the No Action Alternative

Prescribed burning has been taking place for the maintenance of training area conditions under the minimal guidance of the 2001 INRMP. Burns are conducted with the assistance of the Georgia Division of Forestry. Under the No Action alternative, this practice will continue and there will be *no changes* in the impacts on air quality.

## 5.3 NOISE

### 5.3.1 Effects of the Proposed Action

No noticeable effects to area noise environments would be expected from implementation of the Proposed Action. The primary concern regarding noise impacts relates to increases in sound levels that exceed acceptable land use compatibility guidelines and public tolerance. The principle sources of problem noise on the VTS-C are military training activities. As the Proposed Action does not change these military activities, it would have little impact on noise levels on the training site.

Certain actions (e.g., timber harvest) would result in temporary increases in noise levels, but those increases would be well below the typical existing noise levels from military training. Therefore, implementing the Proposed Action should have *no significant impact* on the noise environment.

### 5.3.2 Effects of the No Action Alternative

Under the No Action Alternative there would be *no effects* to the noise environment. Noise from military activities would remain at present levels.

## 5.4 GEOLOGY AND SOILS

### 5.4.1 Effects of the Proposed Action

Implementation of the Proposed Action will have no effects on the geology of the area, as no major changes or management programs regarding geological resources are proposed.

As a part of the natural resources management proposed, the TNARNG would take a proactive approach to prevent soil erosion and to repair existing erosion in an appropriate and timely manner. Actions which would benefit soil resources on the training site include cultivating a thorough understanding of and the appropriate use of BMPs for all soil-disturbing activities; implementing regular surveys and the development of a reporting and planning system for identifying erosion problems and their appropriate restoration; enforcing streamside management zones for protection of riparian areas; and stabilizing creek banks, especially along Tiger Creek, to minimize undercutting, soil loss, and sedimentation.

Certain actions proposed within the INRMP have the potential to cause detrimental effects on training site soils (e.g., timber harvest skid trails, development of fire breaks, and increased runoff due to vegetation thinning through timber harvest or invasive pest plant control). However, the adverse effects of such actions would be mitigated by the appropriate use of BMPs as detailed in the INRMP.

Overall, the implementation of the proposed action would have a *long-term beneficial impact* on the soils of the training site, as implementing an effective soil conservation and erosion control program would reduce soil loss through the erosion process.

### 5.4.2 Effects of the No Action Alternative

Continuation of current management under the No Action alternative would have no effects on the geology of the site.

Under the No Action alternative, soil protection and rehabilitation measures to minimize soil erosion would still occur. Soil damage during training missions could be expected to continue at its present level, and soil damaged areas created during training missions would continue to be repaired as needed. However, current management strategies include reacting to erosion problems after they occur, rather than preemptively managing the soil resources to prevent impacts or minimize the extent of unavoidable impacts. Without the guidance and training provided for in the revised INRMP, erosion control and repair actions would follow old guidelines and utilize traditional methods which may not be the most appropriate for all circumstances. This would result in continuing soil loss through the erosion process and *minor, long-term negative impacts* to soils from the No Action alternative.

## 5.5 WATER RESOURCES

### 5.5.1 Effects of the Proposed Action

There could be some minor, temporary negative impacts to water resources from implementation of the Proposed Action: logging activities, streambank restoration, and beaver dam removal may release some sediment at time of action, although they will be managed with BMPs. In particular, removal of beaver dams should be done incrementally to minimize the sediment load increase and allow a more gradual return of open flow regimes.

However, the overall effects on water resources and water quality would be positive. The enforcement and protection of streamside management zones will intercept sediment, fertilizer, pest control chemical residue, and other pollutants transported overland toward the creek system. Maintenance of the forest cover within these streamside management zones will also preserve a natural temperature regime in the surface waters. Stabilization of creek banks, especially along Tiger Creek, will eliminate sediment loads from bank undercutting and slumping. The variety of erosion control actions, discussed above, will lessen the danger of sedimentation.

Implementation of the proposed action should have a *long-term, beneficial impact* on water resources.

### **5.5.2 Effects of the No Action Alternative**

Under the No Action Alternative, wetlands and riparian areas would continue to be protected by the current standards of avoidance. This prevents significant damage to soils or water quality from current training activities, but does nothing to repair past damages or problems from non-training related causes. There would be no actions taken to repair the banks of Tiger Creek, a regular source of sediment. Under the guidance of the original INRMP, streamside management zones are little noted and training and other activities may occur too close to the streams' banks. While there would be no timber management actions, standard training and land management activities under the old guidance would potentially contribute significant sediment and other pollutants to the creeks over the long-term.

Implementation of the No action alternative would have a *long-term detrimental impact* on water resources.

## **5.6 BIOLOGICAL RESOURCES**

### **5.6.1 Effects of the Proposed Action**

Overall, implementation of the Proposed Action would result in a wide variety of actions that will improve the health and stability of the natural ecosystems on VTS-C. Biological resources including vegetation, wildlife, and rare, threatened, and endangered species would benefit from these activities.

#### Vegetation

The forest management portion of the proposed plan would result in a short-term decrease in forest biomass but an improvement in overall forest health. The biomass would be replaced readily as residual trees expanded into the newly created space. Control of invasive pest plants would also lead to an improvement in ecosystem health and a probable increase in biodiversity. Control of wild pig populations generally has a strong positive impact on herbaceous biodiversity.

#### Wildlife

The positive impacts of the Proposed Action on wildlife species are numerous. Examples include habitat improvement through the removal of non-native plant species, maintenance of habitat corridors along creeks within the SMZs, increased mast production typically following forest thinning, protection of ground nesting species via control of wild pig populations, and protection and improvement of aquatic habitat quality through maintenance of SMZs and creek bank stabilization efforts.

There could be some short term detrimental impacts resulting from certain actions proposed within the INRMP. There may be loss of individual animals to fire during prescribed burns. To minimize this threat, burns should not be conducted during breeding season for ground-nesting species and unburned patches of similar habitat should be left contiguous to burned areas to provide "escape zones" and short-term replacement habitat. There could be loss of habitat or habitat fragmentation resulting from timber

harvests. However, since the harvested areas will be less than 60 acres and distributed around the training site, existing habitat will be retained in close proximity to all harvests and the impact on wildlife will be minimal.

Beaver and wild pig will experience a negative impact through population control efforts. However, both species are considered pests in the region, and their loss is not considered detrimental to the environment as a whole.

#### Rare, Threatened, or Endangered Species

The federally listed large-flowered skullcap and gray bat will experience significant positive effects from the Proposed Action. Their habitats will be protected, and their populations will be monitored and further studied. Monitoring and study results may benefit not only those individuals present on VTS-C but the species across their entire ranges.

Overall, implementation of the Proposed Action would have *significant, long-term positive effects* on the biological resources of VTS-C.

### **5.6.2 Effects of the No Action Alternative**

Under the No Action Alternative, existing processes would continue for managing biological resources. There would be no timber harvests; existing stands would age and lose value. In addition, in the absence of openings created by thinning, prescribed fire, or natural phenomenon, there is a strong tendency for eastern mixed oak forests to experience a change in species composition to more shade tolerant species such as red maple. This change has substantial impacts on the wildlife of the forest, as maple does not provide the food source that the oaks and hickories provide.

Prescribed fire use under the No Action Alternative would continue to be directed solely by training needs and may not be effective in controlling fuel loads. This may make the forests of the training site more subject to a serious wildfire which could cause substantial damage to vegetation, wildlife, and man-made structures and equipment.

Under the No Action Alternative, the original INRMP will be followed. This document has no plan for the management of threatened and endangered species. Regulatory requirements would be met by avoidance of the listed species and their habitats. However, there would be no projects to improve habitat for protected species or to further study their susceptibility to certain disturbances. In addition, there would be only patchy control of IPP and pest animals, and there would be no aquatic habitat improvement.

Overall, the No Action Alternative would have *long-term negative effects* on the biological resources of the VTS-C.

## **5.7 CULTURAL RESOURCES**

### **5.7.1 Effects of the Proposed Action**

Cultural resources would not be affected by the implementation of the Proposed Action. The VTS-C has been surveyed for historical and cultural resources. Identified cultural sites will be avoided by activities related to the implementation of the revised INRMP. Inadvertent discoveries would be handled in accordance with the TNARNG ICRMP for VTS-Catoosa.

There is concern over earth disturbance during timber harvest affecting unknown sites. However, all of the VTS-C has been subjected to a Phase I archaeological survey. Those few areas which are suspected of containing significant cultural resources will not be subject to timber management activities.

There should be *no significant impacts* on cultural resources as a result of the implementation of the Proposed Action.

### **5.7.2 Effects of the No Action Alternative**

All cultural resources will continue to be protected. There will be *no effects* from the No Action Alternative.

## **5.8 SOCIOECONOMICS**

### **5.8.1 Effects of the Proposed Action**

Implementation of the Proposed Action should have minimal influence on the socioeconomic environment. Trends in population, housing, and income in the region would be expected to continue in their current patterns. There will, however, be a *minor positive effect* from timber sales proposed in the INRMP: 50% of the net proceeds of all DoD timber sales are returned to the county in which the site is located to support local schools and road funds.

### **5.8.2 Effects of the No Action Alternative**

The No Action Alternative should have *no effect* on socioeconomics.

## **5.9 ENVIRONMENTAL JUSTICE AND PROTECTION OF CHILDREN**

### **5.9.1 Effects of the Proposed Action**

Implementation of the Proposed Action should not cause disproportionately high or adverse health effects that would impact minority or low-income populations in the communities surrounding the VTS-C. The Proposed Action should have *no effect* on environmental justice.

### **5.9.2 Effects of the No Action Alternative**

Implementation of the No Action Alternative should have *no effect* on environmental justice.

## **5.10 INFRASTRUCTURE**

### **5.10.1 Effects of the Proposed Action**

Logging and other land management activities proposed in the revised INRMP will result in small occasional, temporary increases in road use. This will be extremely minor relative to the typical military usage. There will be *no significant impacts* on infrastructure from implementation of the Proposed Action.

### **5.10.2 Effects of the No Action Alternative**

Under the No Action Alternative, there will be no change to current land management. There should be *no effect* on infrastructure of the VTS-C.

## **5.11 HAZARDOUS AND TOXIC MATERIALS/WASTES**

### **5.11.1 Effects of the Proposed Action**

Implementation of the Proposed Action would result in *no significant effects* on hazardous and toxic materials/wastes. There may be a small increase in the use of herbicides on the site when the IPP control plan is implemented. These herbicides will be stored, handled, and disposed of in accordance with Federal and State law and the product label. No other hazardous or toxic materials will be involved in the implementation of the revised INRMP.

### **5.11.2 Effects of the No Action Alternative**

The No Action Alternative will result in no changes to current pesticide handling and so there will be *no impact* on hazardous and toxic materials/wastes.

## **5.12 MITIGATION MEASURES**

Mitigation typically involves elimination, minimization, or compensation for impacts if unavoidable. Implementation of an INRMP to manage the natural resources of the VTS-C is a positive action that has few adverse effects. The INRMP itself provides the guidance necessary to conduct a variety of activities with the minimum of impact; implementing the actions as they are prescribed in the INRMP will include all necessary mitigation measures. Below, these measures are reiterated for those actions which have some potential for detrimental impact.

Follow appropriate protocols and precautions for smoke management during prescribed burns to minimize impacts to air quality. Do not burn during the summer when pollutant levels from nearby Chattanooga are at their highest.

Use appropriate BMPs to minimize soil loss due to timber harvest, prescribed fire/fire break construction and maintenance, and other ground-disturbing activities. Schedule timber harvests, and any other ground-disturbing activity, when feasible, to avoid wet soils in order to minimize erosion and compaction effects from equipment access and moving logs.

Use appropriate BMPs to minimize stream sedimentation due to timber harvest, prescribed fire/fire break construction and maintenance, stream bank restoration, beaver dam removal, or other ground disturbing activities. Remove beaver dams incrementally to minimize increases in sediment load at any given time.

Provide wildlife “escape zones” of unburned or unharvested habitat contiguous to prescribed fire areas or timber harvests.

Avoid archaeological sites with all actions and follow ICRMP standard operating procedures in case of any inadvertent find.

## **5.13 CUMULATIVE EFFECTS**

Cumulative impacts are those which “result from the incremental impact of the proposed actions when added to other past, present, and reasonably foreseeable future actions, without regard to the agency (federal or non-federal) or individual who undertakes such other actions” (40 CFR 1508.7).

### 5.13.1 Effects of the Proposed Action

Implementation of the Proposed Action would provide *long-term positive cumulative effects*. Protection and management of natural resources within the training site would counter the habitat fragmentation and loss to be expected as a region currently on the outskirts of a metropolitan area is engulfed by sprawl. Appropriate ecosystem management in accordance with the INRMP will provide a “safe haven” for wildlife and rare species.

The restoration and rehabilitation efforts proposed in the Plan would repair the residual effects of past military training and earlier land use. The guidance provided in the INRMP will help to mitigate potential effects of future military training activities and training facility development.

Management under the INRMP would dovetail well with other regional environmental management plans such as the Tier 2 TMDL Implementation Plan for improving water quality in Tiger Creek in Catoosa and Whitfield Counties; the State of Georgia Comprehensive Wildlife Conservation Strategy; trout stream improvement efforts by GADNR and conservation partners North Georgia Trout Online and Georgia Trout Unlimited; and large-flowered skullcap protection by the US Fish and Wildlife Service, the Tennessee Valley Authority, and several non-governmental organizations including the North Chickamauga Creek Conservancy and The Nature Conservancy to protect and improve regional environmental conditions.

### 5.13.2 Effects of the No Action Alternative

Under the No Action Alternative, the original 2002 INRMP would continue to guide natural resources management on the VTS-C. This alternative would have *no significant cumulative effects*. The guidance provided in the old INRMP would minimize negative impacts from future training activities and facility development, and the natural environment of the training site would be protected from commercial development. However, there would be no new management actions to contribute to regional environmental improvement efforts.

## 6.0 COMPARISON OF ALTERNATIVES AND CONCLUSIONS

### 6.1 COMPARISON OF THE ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

Resource Area	Proposed Action	No Action
Land Use	Long-term positive	Long-term negative
Air Quality	Temporary, minor, negative	No effect
Noise	No effect	No effect
Geology and Soils	Long-term positive	Minor, long-term negative
Water Resources	Long-term positive	Long-term negative
Biological Resources	Long-term positive	Long-term negative
Cultural Resources	No effect	No effect
Socioeconomics	Minor positive	No effect
Environmental Justice	No effect	No effect
Infrastructure	No effect	No effect
Hazardous and Toxic Materials	No effect	No effect

## 6.2 CONCLUSIONS

Based on this analysis, the Proposed Action of implementing the revised INRMP for VTS-C is identified as the preferred alternative that would provide the greatest benefit to both the environment and the TNARNG training mission. Implementation of this preferred alternative is the most effective method to comply with the Sikes Act, Army Regulation 200-1, and DoD Instruction 4715.3. It also best enables the TNARNG to meet mission and training requirements at the VTS-C while enhancing the environment through integrated natural resources management.

Implementation of the Proposed Action would result in a comprehensive natural resources management strategy for the VTS-C. Implementation could result in some minor, temporary negative impacts; however, the overall effects would be of long-term benefit to the physical, cultural, and natural environment of the VTS-C. The projects and guidance from the revised INRMP, if implemented, would improve the overall training integration with natural resources management and would minimize potential negative environmental impacts from other TNARNG activities at VTS-C.

Upon completion of public review, a determination will be made about whether to prepare an EIS. If agency and/or public review does not reveal any significant impacts, a Final Environmental Assessment and a Finding of No Significant Impact will be prepared. Any public or agency comment received during the review period will be incorporated into the final document in an appropriate manner. If an EIS is required, this document would become the basis for scoping.

## 7.0 REFERENCES

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## 8.0 LIST OF PREPARERS

This EA has been prepared by the staff of the TNARNG Environmental Office. The individuals who contributed to the preparation of this document include:

Laura P. Lecher  
Natural Resources Manager

Nancy S. Allen  
EMS/Water Quality Program Manager

Janie J. Becker  
Biologist

Greg C. Finney  
Environmental Specialist (ECAP)

CPT Mike Martin  
Pest Management Coordinator

William McWhorter  
Environmental Specialist

Mike Stokes  
Cultural Resources Specialist

Kenneth Wainscott  
Office Manager

## 9.0 AGENCIES AND INDIVIDUALS CONSULTED

The agencies listed below were contacted during the development of the proposed INRMP and EA:

U.S. Fish and Wildlife Service  
Athens Field Office  
James Rickard, Biologist

Georgia Department of Natural Resources  
Wildlife Resources Division  
Nongame Conservation Section  
Tom Patrick, Biologist

## 10.0 AGENCY REVIEW

In addition to extensive communication with the agencies listed in Section 9.0 during the development of the revised INRMP, the following agencies and organizations were notified directly of the availability of

Integrated Natural Resources Management Plan  
VTS-Catoosa

the revised INRMP and EA for the initial public review and the FNSI review. Copies of the form letters sent out for this purpose can be found in Agency Correspondence, Appendix C of the INRMP. There were no comments received.

<b>Organization</b>	<b>POC</b>	<b>Address</b>
US Army Corps of Engineers, Mobile District		PO Box 2288 Mobile, AL 36628-0001
US Army Corps of Engineers, Savannah District		PO Box 889 Savannah, Georgia 31402
US Environmental Protection Agency, Region 4		Sam Nunn Atlanta Federal Center 61 Forsyth Street, SW Atlanta, Georgia 30303
US Fish and Wildlife Service, Athens Field Office	James Rickard, Biologist	West Park Center 105 West Park Drive, Suite D Athens, Georgia 30606
US Forest Service, Southern Region		1720 Peachtree Road, NW Atlanta, Georgia 30309
Natural Resources Conservation Service	James E. Tillman, State Conservationist	355 East Hancock Ave. Stop Number 200 Athens, Georgia 30601
Georgia Department of Natural Resources, Environmental Protection Division		2 Martin Luther King Jr. Drive Suite 1152, East Tower Atlanta, Georgia 30334
Georgia Department of Natural Resources, Historic Preservation Division	Ray Luce, SHPO	34 Peachtree Street, NW Suite 1600 Atlanta, Georgia 30303
Georgia Department of Natural Resources, Wildlife Resources Division	Trina Morris, Wildlife Biologist	2117 US Highway 278 SE Social Circle, Georgia 30025
Georgia Forestry Commission		3086 Martha Berry Highway NE Rome, Georgia 30165
Absentee Shawnee Tribe of Oklahoma	Scott Miller, Governor	2025 S. Gordon Cooper Shawnee, OK 74801
Alabama-Coushatta Tribe of Texas	Ronnie Thomas, Chairman	571 State Park Road 56 Livingston, Texas 77351
Alabama-Quassarte Tribal Town	Tarpie Yargee, Chief	PO Box 187 Wetumka, Oklahoma 74883
Cherokee Nation	Chad Smith, Principal Chief	PO Box 948 Tahlequah, Oklahoma 74465
Chickasaw Nation	Bill Anoatubby, Governor	PO Box 1548 Ada, Oklahoma 74820
Choctaw Nation of Oklahoma	Gregory E. Pyle, Chief	PO Drawer 1210 Durant, Oklahoma 74702
Coushatta Tribe of Louisiana	Kevin Sickey, Chairman	PO Box 818 Elton, Louisiana 70532
Eastern Band of Cherokee Indians	Michelle Hicks, Principal Chief	PO Box 455 Cherokee, North Carolina 28719
Eastern Shawnee Tribe of	Glenna J. Wallace, Chief	PO Box 350

<b>Organization</b>	<b>POC</b>	<b>Address</b>
Oklahoma		Seneca, Missouri 64865
Jena Band of Choctaw	Christine Norris, Chief	PO Box 14 Jena, Louisiana 71342
Kialegee Tribal Town	Evelyn Bucktrot, Mekko	PO Box 332 Wetumka, Oklahoma 74883
Mississippi Band of Choctaw Indians	Phillip Martin, Chief	PO Box 6010, Choctaw Branch Choctaw, Mississippi 39350
Muscogee (Creek) Nation	A.D. Ellis, Principal Chief	PO Box 580 Okmulgee, Oklahoma 74447
Poarch Band of Creek Indians	Buford Rolon, Chairman	5811 Jack Springs Road Atmore, Alabama 36502
Quapaw Tribe of Oklahoma	John Berrey, Chairman	PO Box 765 Quapaw, Oklahoma 74363
Seminole Nation of Oklahoma	Kelly Haney, Chief	PO Box 1498 Wewoka, Oklahoma 74884
Seminole Tribe of Florida	Mitchell Cypress, Chairman	6300 Stirling Road Hollywood, Florida 33024
Thophthlocco Tribal Town	Vernon Yarholar, Mekko	PO Box 188 Okemah, OK 74859
Tunica-Biloxi Tribe of Louisiana	Earl Barbry, Sr., Chairman	PO Box 1589 Marksville, LA 71351
United Keetoowah Band of Cherokee Indians in Oklahoma	George Wickliffe, Chief	PO Box 746 Tahlequah, OK 74465

## 11.0 PUBLIC REVIEW

This Environmental Assessment was submitted for a public review period from 29 January 2010 to 2 March 2010 with notification in the Catoosa County News. Although the document was present at the library in early December 2009, complications with the publication of the notice resulted in a delay of the review period to February. No public comments were received.

The Environmental Assessment and Finding of No Significant Impact were submitted for a public review period from 27 April to 27 May 2012 with notification in the Catoosa County News. The document was available at the Catoosa County Library as well as on the Tennessee Military Department's webpage. No public comments were received.

## **APPENDIX B**

### **Finding of No Significant Impact (FNSI) Revised Integrated Natural Resources Management Plan (INRMP) and Environmental Assessment (EA) for Volunteer Training Site – Catoosa in Catoosa County, Georgia**

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FINDING OF NO SIGNIFICANT IMPACT (FNSI)  
FOR IMPLEMENTATION OF  
THE REVISED INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN AT  
VOLUNTEER TRAINING SITE - CATOOSA

### **Introduction**

The Tennessee Army National Guard (TNARNG) has prepared an Environmental Assessment (EA) that evaluates and analyzes the potential environmental effects of implementing the revised Integrated Natural Resources Management Plan (INRMP) for the Volunteer Training Site – Catoosa (VTS-C) in Catoosa County, Georgia. The revised INRMP is the result of a review for operation and effect of the original VTS-C INRMP conducted jointly by the TNARNG, the US Fish and Wildlife Service, and the Georgia Division of Natural Resources. The EA was prepared in accordance with the National Environmental Policy Act (NEPA) (42 USC § 4321 to 4370e), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (CEQ Regulations, 40 CFR Parts 1500-1508), and *Environmental Analysis of Army Actions* (32 CFR 651).

### **1. Description of Proposed Action and Alternatives**

#### **Proposed Action.**

The TNARNG proposes to implement the revised INRMP. The purpose of the Proposed Action is to ensure no general loss in the capability of the VTS-C to support the military training mission of the TNARNG by providing for long-term management of the site's natural resources. Implementation of the INRMP will provide for the conservation, rehabilitation, and sustainable use of natural resources on the installation, in accordance with the Sikes Act (as amended) and Army Regulations (AR) 200-1.

The Revised INRMP differs significantly from the initial INRMP (implemented in 2001) by including a detailed forest management program, a wildland fire management plan, and a rare species management plan to ensure the protection of two federally listed species found on the VTS-C, the large-flowered skullcap and the gray bat. The Proposed Action will enable mission accomplishment while maintaining compliance with applicable laws and regulation.

#### **Alternatives Considered.**

Under the No Action Alternative, the 2001 INRMP would continue to provide guidance for natural resources management on VTS-C. However, there would be no provision for timber management and harvest activities, and guidance on wildland fire control would be minimal. Protection of the endangered species would be piecemeal, and the lack of coordinated management and mitigation for these species could lead to limitations on the military training mission.

The overall goal is to provide for effective natural resources management on the VTS-C. The revised INRMP is an integrated document designed to meet regulatory requirements and provide an effective management program. Any partial implementation option would be ineffectual and other alternatives would not be beneficial to the VTS-C. Therefore, no other Alternative Actions were considered.

## 2. Environmental Analysis

The EA assesses potential effects on land use, air quality, noise, water resources, geology and soils, biological resources, cultural resources, hazardous materials and hazardous wastes, and socioeconomics (including environmental justice and protection of children). Based upon the analysis contained in the EA, TNARNG has determined that implementation of the revised INRMP would not have an impact on noise, cultural resources, environmental justice, infrastructure, or hazardous materials and wastes. The implementation of the revised INRMP could have a minor, temporary adverse impact on air quality through the increased use of prescribed burning for fuel control and vegetation management. The Proposed Action would have a minor positive effect on socioeconomics and long-term beneficial effects on land use, geology and soils, water resources, and biological resources at VTS-C.

Based upon the analysis contained in the EA, it has been determined that the known and potential impacts of the Proposed Action on the physical, cultural, and natural environment will be of a positive nature. Implementation of the TNARNG's revised INRMP for the VTS-C will result in the effective management of natural resources at the training site. No mitigation measures will be required for implementation of the INRMP at VTS-C.

**Mitigation.** No mitigation measures will be necessary to reduce any adverse environmental effects to below significant levels.

## 3. Regulations

The Proposed Action will not violate NEPA, the CEQ Regulations, 32 CFR 651, or any other Federal, State, or local environmental regulations.

## 4. Commitment to Implementation

The National Guard Bureau (NGB) and TNARNG affirm their commitment to implement this EA in accordance with NEPA. Implementation of the Proposed Action is dependent on funding. The TNARNG and the NGB's Environmental Programs, Training, and Installations Divisions will ensure that adequate funds are requested in future years' budgets to achieve the goals and objectives set forth in this EA.

## 5. Public Review and Comment

The draft INRMP and EA were made available for public review and comment from 29 January 2010 to 2 March 2010. No comments were received.

The final INRMP and EA and the draft FNSI was made available for public review and comment from 27 April 2012 to 27 May 2012. Copies were available at the Catoosa County Library, Ringgold, Georgia, or on-line at <http://www.tnmilitary.org/Environmental.html>. No comments were received during this time.

## 6. Finding of No Significant Impact (FNSI)

After careful review of the EA, I have concluded that implementation of the Proposed Action would not generate significant controversy or have a significant impact on the quality of the human or natural environment. This analysis fulfills the requirements of NEPA and associated

CEQ Regulations, as well as the Sikes Act, and all pertinent DoD and Army regulatory requirements.

\_\_\_\_\_  
Date



\_\_\_\_\_  
COL MICHAEL C. AHN  
Chief, Environmental Programs Division  
Army National Guard



## **APPENDIX C**

### **Agency Correspondence**

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MILITARY DEPARTMENT OF TENNESSEE  
OFFICE OF THE ADJUTANT GENERAL  
HOUSTON BARRACKS  
NASHVILLE  
37204-1502

October 11, 2005

U.S. Fish and Wildlife Service  
Georgia Ecological Services  
West Park Center, Suite D  
105 West Park Drive  
Athens, GA 30606

Dear Sir:

The Tennessee Military Department is in the process of revising and updating the Integrated Natural Resources Management Plan (INRMP) for the Tennessee Army National Guard (TNARNG) Volunteer Training Site – Catoosa (VTS-C) in Catoosa County, Georgia. Army Regulation and the Sikes Act require the TNARNG to develop an INRMP for each of its training sites and subject them to a complete revision every five years. The original VTS-C INRMP covered the period 2002-2006. This second edition will cover the years 2007-2011, and we hope to have a completed document by August 2006.

I am contacting you to inform you of this endeavor and request your agency's participation in the planning process. The USFWS and the Georgia Wildlife Resources Division are important cooperators in our task to appropriately manage TNARNG lands and are required signatories to the plan. I would appreciate any insight or information you can provide during the development of the plan.

VTS-C is located at the center of the Ringgold quadrangle. It is approximately two miles east of Ringgold, Georgia, and 20 miles south of Chattanooga, Tennessee. The enclosed map shows the full bounds of the training site. The property is licensed from the Army Corps of Engineers. Tiger Creek runs through the southern half of VTS-C, and Broom Branch bisects the northern portion. There are known populations of the federally listed threatened plant large-flowered skullcap (*Scutellaria montana*) on the training site. This will be the first iteration of the INRMP to incorporate protection of this species. The TNARNG has met previously in informal consultation with Robin Goodloe of your office to discuss management plans for this protected species. We would like to arrange another meeting to discuss plans for both the protection of the skullcap and for natural resources management.

Management goals for VTS-C include a timber management program (forest inventory and management plan development is currently in progress), control of invasive exotic pest plants such as privet, and protection and enhancement of large-flowered skullcap habitat, as well as our on-going goals of protecting Tiger Creek and its tributaries from impacts from training or construction activities, maintaining native communities and wildlife habitat, and ensuring the continued availability of a quality environment for military training.

If you have any questions or comments, please contact Laura Lecher, Natural Resources Manager, at 615-313-0669 or [Laura.Lecher@tn.ngb.army.mil](mailto:Laura.Lecher@tn.ngb.army.mil). As we get the initial organization of this project in hand, she will contact you to set up a meeting of the different cooperators to discuss our plans and goals.

Sincerely,



Carson Chessor  
Environmental Program Manager  
Tennessee Military Department

Enclosure

SCALE: 1:25,000

# VTS CATOOSA

DATE: 100205  
AUTHOR: TURNER G.  
GIS MGR: ROBERSON C.



0 250 500 1,000 1,500 2,000 Meters



MILITARY DEPARTMENT OF TENNESSEE  
OFFICE OF THE ADJUTANT GENERAL  
HOUSTON BARRACKS  
NASHVILLE  
37204-1502

October 11, 2005

Georgia Wildlife Resources Division  
Headquarters Office  
2070 U.S. Highway 278, S.E.  
Social Circle, Georgia 30025

Dear Sir:

The Tennessee Military Department is in the process of revising and updating the Integrated Natural Resources Management Plan (INRMP) for the Tennessee Army National Guard (TNARNG) Volunteer Training Site – Catoosa (VTS-C) in Catoosa County, Georgia. Army Regulation and the Sikes Act require the TNARNG to develop an INRMP for each of its training sites and subject them to a complete revision every five years. The original VTS-C INRMP covered the period 2002-2006. This second edition will cover the years 2007-2011, and we hope to have a completed document by August 2006.

I am contacting you to inform you of this endeavor and request your agency's participation in the planning process. The USFWS and the Georgia Wildlife Resources Division are important cooperators in our task to appropriately manage TNARNG lands and are required signatories to the plan. I would appreciate any insight or information you can provide during the development of the plan.

VTS-C is located at the center of the Ringgold quadrangle. It is approximately two miles east of Ringgold, Georgia, and 20 miles south of Chattanooga, Tennessee. The enclosed map shows the full bounds of the training site. The property is licensed from the Army Corps of Engineers. Tiger Creek runs through the southern half of VTS-C, and Broom Branch bisects the northern portion. There are known populations of the federally listed threatened plant large-flowered skullcap (*Scutellaria montana*) on the training site. This will be the first iteration of the INRMP to incorporate protection of this species. The TNARNG has begun the informal consultation process with the US Fish and Wildlife Service to discuss management plans for this protected species. Tom Patrick of the Georgia Department of Natural Resources sat in on our first meeting with the FWS in 2003, and we would like your office to continue to be involved with our planning process.

Management goals for VTS-C include a timber management program (forest inventory and management plan development is currently in progress), control of invasive exotic pest plants such as privet, and protection and enhancement of large-flowered skullcap habitat, as well as our on-going goals of protecting Tiger Creek and its tributaries from impacts from training or construction activities, maintaining native communities and wildlife habitat, and ensuring the continued availability of a quality environment for military training.

If you have any questions or comments, please contact Laura Lecher, Natural Resources Manager, at 615-313-0669 or [Laura.Lecher@tn.ngb.army.mil](mailto:Laura.Lecher@tn.ngb.army.mil). As we get the initial organization of this project in hand, she will contact you to set up a meeting of the different cooperators to discuss our plans and goals.

Sincerely,

A handwritten signature in cursive script that reads "Carson Chessor".

Carson Chessor  
Environmental Program Manager  
Tennessee Military Department

Enclosure

SCALE: 1:25,000

# VTS CATOOSA

DATE: 100205  
AUTHOR: TURNER G.  
GIS MGR: ROBERSON C.



**Legend**

- STREAMS
- ROADS
- INSTALLATION BOUNDARY



**From:** Lecher, Laura P CIV NGTN

**Sent:** Thursday, June 01, 2006 2:23 PM

**To:** 'James\_Rickard@fws.gov'

**Subject:** Catoosa INRMP preliminary draft

Sorry this is so late getting to you. It is very rough and is missing most of the management annexes, but it has the core of the skullcap stuff. I'll send you the other stuff as I get it together. Yellow highlighted areas are parts that I know need major revision. It is missing all the maps which will be added shortly, I hope. And don't look closely at the page numbers on the table of contents or the pages themselves – pagination is not corrected yet.

Feel free to comment in text or just make notes of what you think needs work, whatever you prefer.

My goal is to get as many comments on this prelim draft as possible by the end of June so I can put a more functional draft together. But knowing that you will be otherwise occupied for a couple weeks, don't worry too much about the deadline. Also feel free to share this around with others at FWS, as long as you make it clear how *\_rough\_* a draft it is.

If you have any questions, let me know.

Thanks,  
Laura

*Laura P. Lecher*  
*Natural Resources Manager, TNARNG*  
*615-313-0669 / fax 615-313-0769*  
*Laura.Lecher@tn.ngb.army.mil*

**From:** Lecher, Laura P CIV NGTN  
**Sent:** Monday, June 05, 2006 7:00 AM  
**To:** 'mike\_harris@dnr.state.ga.us'  
**Subject:** TNARNG Catoosa INRMP

Mr. Harris,

The Tennessee Army National Guard is in the process of revising its Integrated Natural Resources Management Plan (INRMP) for the training site that we have in Catoosa County, GA. I have been in contact with Tom Patrick and Lisa Kruse about this undertaking because we have a federally listed plant (the threatened large-flowered skullcap) on the site, and we are now adding management planning for this plant to the INRMP. But I'm not certain who the official contact should be for reviewing and eventually approving the document. Ms. Kruse suggested I contact you.

We are still in the early preliminary draft stages of our revision. I have attached the draft of the body of the document and the annex for the skullcap management plan. Please excuse the roughness of the document, but I wished to get your agency involved early in the process. I will send additional sections of the plan to you as they are ready, but I wanted to get the key parts to you as soon as possible. Lisa has a slightly earlier version of this draft which she received at a meeting last week (the RTE annex has changed dramatically). Any comments or suggestions you or your staff has would be appreciated. I am hoping to receive comments from cooperators (your agency and the USFWS) by the end of June so that I can incorporate them into another draft in July. My plan is to have a document ready for NEPA and public review by September.

Concerning the draft itself: yellow highlighted areas are parts that I know need major revision. It is missing all the maps which will be added shortly, I hope. And don't look closely at the page numbers on the table of contents or the pages themselves – pagination is not corrected yet

If you are not the correct contact for this, please help me figure out whom I should approach. The Sikes Act requires the state Fish and Wildlife Office to cooperate on INRMPs, but as each state's system is slightly different, it doesn't get any more specific.

If you have any questions, please don't hesitate to contact me either at 615-313-0669 or at this email address. I will be out of the office for most of today (Monday, June 5) and Thursday and Friday, but I should be available tomorrow or Wednesday at any time.

Thank you,  
Laura Lecher

*Laura P. Lecher*  
*Natural Resources Manager, TNARNG*  
*615-313-0669 / fax 615-313-0769*  
*Laura.Lecher@us.army.mil*

# Georgia Department of Natural Resources

## Wildlife Resources Division

Nongame Wildlife & Natural Heritage Section  
2065 U.S. Highway 278, S.E., Social Circle, Georgia 30025-4743  
(770) 918 6411

July 8, 2006

Laura P. Lecher  
Natural Resources Manager, TNARNG  
615-313-0669 / fax 615-313-0769  
[Laura.Lecher@tn.ngb.army.mil](mailto:Laura.Lecher@tn.ngb.army.mil)

**Subject: TNARNG Catoosa Integrated Natural Resources Management Plan**

Dear Ms. Lecher:

Thank you for allowing us to review the June draft of the TNARNG Integrated Natural Resources Management Plan. The Georgia Natural Heritage Program staff has always been interested in the monitoring and floristic work done in connection with the large population of large-flowered skullcap (*Scutellaria montana*) on site. The management plan addresses concerns about this federally listed species to my satisfaction. In fact, more study has been done in the field on permanent plots at this site than anywhere else. We would like to meet with the monitoring team annually to learn about new discoveries and become familiar with the sampling methods and monitoring results.

Here are a few specific comments on the draft plan:

(1) ANNEX 2., pg. 2-1, 3rd paragraph under Data Gathering - Substitute "conduct a vegetation survey to identify significant natural communities and to locate suitable habitat that may harbor rare species" for "unique ecotypes and potential habitats".

(2) ANNEX 2, pg. 2-2, discussion of Japanese Honeysuckle and "common privet". Common privet (*Ligustrum vulgare*), does not occur on site. Chinese privet (*Ligustrum sinense*) is, however, a problem.

(3) ANNEX 2., pg. 2-3, add "skullcap" to large-flowered ... last part of page, second point in Table A2.1.

(4) Chapter 1, General Information, pg. 7, under list of agencies and organizations - treatment of Georgia Dept. Natural Resources perhaps needs to be revised. Might want to just use Georgia Department of Natural Resources and under it list two Divisions: Historic Preservation Division and Wildlife Resources Division. Don't believe there is an agency called "Georgia State Historic Preservation Office."

(5) Chapter 2, Training Site Overview, 2.1. Nearby Natural Areas - could add one of the county parks in Catoosa County that has a protected population of large-flowered skullcap - Elsie Holmes Nature Preserve.

(6) Chapter 3, Physical and Biotic Environment, 3.7.1 Vegetation Community Classification, first

C-11

paragraph, pg. 28 - change "winder elm" to "winged elm."

(7) Chapter 3, 3.7.2. Forest Inventory and Management, list of "commercial trees species."

Technically the maple found on site is Florida maple (*Acer barbatum*) or Southern Sugar Maple, and the technical name for pignut hickory is *Carya glabra*. If *Carya ovalis* were found, and it is likely in the mesic forests of the ravines, its common name is Red Hickory.

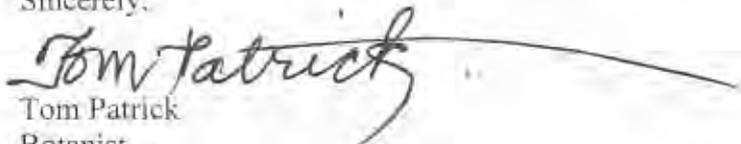
(8) Chapter 3, Paragraph 3.7.3.1 - again. Chinese privet (*Ligustrum sinense*), not common privet (*Ligustrum vulgare*).

(9) Pg. 39, Reasons for delisting paragraph. We disagree with this statement: "The plant has been found at other locations in Georgia and Tennessee and at every place there tends to be more individuals than originally realized." Unfortunately, some sites have been destroyed, several are being impacted by nearby development, and most have never been surveyed to determine whether the population is stable or not.

The plan contains an excellent plan for future floristic studies and continued work on large-flowered skullcap. The list of potential rarities to look for on site and the monitoring standards used for large-flowered skullcap are appropriate. Hopefully, funding will allow the management plan to become an effective guidance tool. The site should qualify as one of the officially protected populations of large-flowered skullcap. This detailed management plan will hopefully guarantee the protection of the plants for at least 10 years.

The staff of the Georgia Natural Heritage Program looks forward to continued participation in the conservation efforts on the Catoosa Training Center.

Sincerely,

A handwritten signature in black ink that reads "Tom Patrick". The signature is written in a cursive style and is followed by a long horizontal line that extends to the right.

Tom Patrick

Botanist

GA Natural Heritage Program

GAWRD Comments on June 2006 Preliminary Draft of VTS-Catoosa INRMP  
and TNARNG Response

Section	page	paragraph	Comment	Response
Annex 2	2-1	3rd	Substitute "conduct a vegetation survey to identify significant natural communities and to locate suitable habitat that may harbor rare species" for "unique ecotypes and potential habitats".	Rewrote with recommended phrasing.
Annex 2	2-2		Discussion of Japanese honeysuckle and "common privet". Common privet ( <i>Ligustrum vulgare</i> ) does not occur on site. Chinese privet ( <i>Ligustrum sinense</i> ) is, however, a problem.	Corrected throughout document to refer to Chinese privet or simply "privet".
Annex 2	2-3	Table A2.1	add "skullcap" to large-flowered ... last part of page, second point in table.	Added
Ch 1	7		Under list of agencies and organizations - treatment of Georgia Dept. Natural Resources perhaps needs to be revise. Might want to just use Georgia Department of Natural Resources and under it list two Divisions: Historic Preservation Division and Wildlife Resources Division.	Corrected
Ch 2		2.1	Nearby Natural Areas - could add one of the county parks in Catoosa County that has a protected population of large-flowered skullcap - Elsie Holmes Nature Preserve	Added
Ch 3	28	3.7.1	Change "winder elm" to "winged elm".	Corrected
Ch 3		3.7.2	Technically the maple found on site is Florida maple ( <i>Acer barbatum</i> ) or southern sugar maple, and the technical name for pignut hickory is <i>Carya glabra</i> . If <i>Carya ovalis</i> were found, and it is likely in the mesic forests of the ravines, its common name is red hickory.	Forest Inventory section has been rewritten, removing the list of commercial species. Species information has been corrected in plant lists for the site.
Ch 3		3.7.3.1	Chinese privet ( <i>Ligustrum sinense</i> ), not common privet ( <i>Ligustrum vulgare</i> )	Corrected.
	39		We disagree with this statement: "The plant has been found at other locations in Georgia and Tennessee and at every place there tends to be more individuals than originally realized."	Discussion about delisting, including this statement, has been removed.



MILITARY DEPARTMENT OF TENNESSEE  
OFFICE OF THE ADJUTANT GENERAL  
HOUSTON BARRACKS  
NASHVILLE  
37204-1502

April 13, 2007

U.S. Fish and Wildlife Service  
ATTN: James Rickard  
West Park Center  
105 West Park Drive, Suite D  
Athens, GA 30606

Dear Sir:

You were informed in October 2005 of the intent of the Tennessee Military Department to revise and update the Integrated Natural Resources Management Plan (INRMP) for the Tennessee Army National Guard (TNARNG) Volunteer Training Site – Catoosa (VTS-C) in Catoosa County, Georgia, in accordance with Army Regulation and the Sikes Act.

Enclosed is the preliminary draft of the revised document for your review and comment. The overall management goals have changed relatively little from the initial INRMP implemented for 2001-2005, but plans for forest management, prescribed fire, and protection of the threatened large-flowered skullcap have been added. The format and structure of the plan have also been modified.

Once we have received comments and suggestions on this preliminary draft, they will be incorporated into a second draft. NEPA documentation will be prepared at that time. The second draft and NEPA documents will be sent out for your review and for public review. I appreciate your support in this endeavor and look forward to hearing your suggestions for improving the INRMP.

Please submit your comments to me no later than 20 June 2007. My address is Ms. Laura Lecher, Tennessee Army National Guard, JFHQ-TN-ENV, 3041 Sidco Drive, Nashville, Tennessee 37204. If you have any questions regarding this document, please contact me at 615-313-0669 or [Laura.Lecher@ng.army.mil](mailto:Laura.Lecher@ng.army.mil).

Sincerely,

Laura P. Lecher  
Natural Resources Manager  
Tennessee Military Department

Enclosure

From: James\_Rickard@fws.gov  
Sent: Friday, May 04, 2007 1:30 PM  
To: Lecher, Laura P CIV NGTN  
Subject: Fw: quick thoughts and questions

I have only looked over some of your draft and intend to dig in next week but I have a few quick thoughts. Some may be addressed in this draft that I have not found so just point me to it if I missed something. For skullcap,

Sec 1.2 Could we define what triggers hog and deer control "damage above acceptable levels" & "significantly impacting" on page 1-4.

Sec 1.4

We have found that transplanting listed plants general is a poor concept, and that we get much better results by contracting with the Atlanta Botanical Garden or the Georgia Botanical Garden to collect seed and grow new plants. They can do this work very cheaply, they are not making \$\$ for what they will charge you, they do a good job, and I can provide contacts to both of these Gardens. There are several advantages to this method, including nursery grown plants suffer lower mortality from transplanting, more plants can be grown, therefore, more plants that can be placed in the new site to compensate for mortality due stochastic events or poor site selection, and some extra plants can be placed at a safe-guarding site like TNC's property or the Forest Service. I also have contacts for them if needed.

Under Fire impacts, (which is really my specialty) I would very much like to be involved with the research effort to determine the effect of Rx Fire on skullcap. I would like to assist in the experimental design, monitoring and treatment (i.e. burning!). We can likely set something up with Ga DNR to work cooperatively. What are your thoughts?

on pg 1-9, I am not certain about the "If response to the initial fire is bad (more than 33% loss of plants), the fire study will be discontinued....." I it should be evaluated to look at other alternatives, such as timing or other parameters, I am not certain on this, still thinking.....

Invasive Pest Plant Control, could we include planting a row of cedars and a row of pines along new openings (such as the 25 ft security buffer along the fence). The intent is to prevent sun light from travelling laterally into a forest stand that would encourage invasives. i understand that it would take years for the seedlings to grow up and acomplish this but its something that will eventually serve as a bearier to invasives.

I need to be able to clearly define the "Federal Action" that will effect skullcap. The actual impacts to listed species is not well defined, I assume that would have been in Appendix A. Environmental Assessment? Is there a map of which skullcap pops will be impacted? Do we know the exact acreage to be impacted and by what, (roads, fence, buffer, ranges)? Do you have a map of were (proposed transplants to go to) new populations would be placed? I think it would be helpful to creat a table with basic info for each of your populations. If that works for you then some simple things to include would be acreage of poulation, abundance of plants, management compartment, managment practices, anticipated impacts. this way we can see in one place which populations are

reciviening total protection, which are have minor impacts and which are having sever impacts.

I have to find someone smarter than me to look at effects on Bats.

Its a good start, I will provide more comments in the next few weeks.

Jimmy Rickard  
Fish & Wildlife Biologist  
U.S. Fish & Wildlife Service  
West Park Center  
105 West Park Drive, Suite D  
Athens, GA 30606  
(706) 613-9493 x 223  
FAX (706) 613-6059

USFWS Comments on April 2007 Draft of VTS-Catoosa INRMP  
and TNARNG Responses

Section	page	paragraph	Comment	Response
1.2	1-4		Could we define what triggers hog and deer control "damage above acceptable levels" & "significantly impacting"	Definitions not set; research project proposed to investigate deer and hog impacts.
1.4			We have found that transplanting listed plants general is a poor concept, and that we get much better results by contracting with the Atlanta Botanical Garden or the Georgia Botanical Garden to collect seed and grow new plants...There are several advantages to this method, including nursery grown plants suffer lower mortality from transplanting, more plants can be grown, therefore, more plants that can be placed in the new site to compensate for mortality due to stochastic events or poor site selection, and some extra plants can be placed at a safe-guarding site like TNC's property or the Forest Service.	Discussed in detail during Consultation. Result that TNARNG will use nursery grown plants to "replace" any plants damaged by training or development activities, but a research project will be conducted on transplantation using the individuals that are otherwise to be destroyed.
1.4			Under Fire impacts, I would very much like to be involved with the research efforts to determine the effect of Rx Fire on skullcap.	Will keep USFWS informed as research project is developed.
1.4	1-9		I am not certain about the "If response to the initial fire is bad (more than 33% loss of plants), the fire study will be discontinued..." I [think] it should be evaluated to look at other alternatives, such as timing or other parameters....	Damage limitation changed to 50% loss of plants. FWS will be included in discussion of next step in study if this mortality level is reached.
1.4			Invasive Pest Plant Control, could we include planting a row of cedars and a row of pines along new openings (such as the 25 ft security buffer along the fence). The intent is to prevent sun light from travelling laterally into a forest stand that would encourage invasives.	Added planting of evergreens along newly created forest opening to management plan.
			I need to be able to clearly define the "Federal Action" that will effect the skullcap. The actual impacts to listed species is not well defined.	Added sections 1.5, Assessment of Impacts on Large-flowered Skullcap and Mitigation, and 2.5, Assessment of Impacts on Gray Bat.



MILITARY DEPARTMENT OF TENNESSEE  
OFFICE OF THE ADJUTANT GENERAL  
HOUSTON BARRACKS  
NASHVILLE  
37204-1502

13 April, 2007

Georgia Department of Natural Resources  
Nongame Conservation Section  
ATTN: Matt Elliott, Program Manager  
2065 U.S. Highway 278, S.E.  
Social Circle, Georgia 30025-4743

Dear Sir:

You were informed in October 2005 of the intent of the Tennessee Military Department to revise and update the Integrated Natural Resources Management Plan (INRMP) for the Tennessee Army National Guard (TNARNG) Volunteer Training Site – Catoosa (VTS-C) in Catoosa County, Georgia, in accordance with Army Regulation and the Sikes Act.

Enclosed is the preliminary draft of the revised document for your review and comment. The overall management goals have changed relatively little from the initial INRMP implemented for 2001-2005, but plans for forest management, prescribed fire, and protection of the threatened large-flowered skullcap have been added. The format and structure of the plan have also been modified.

Once we have received comments and suggestions on this preliminary draft, they will be incorporated into a second draft. NEPA documentation will be prepared at this time. The second draft and NEPA documents will be sent out for your review and for public review. I appreciate your support in this endeavor and look forward to hearing your suggestions for improving the INRMP.

Please submit your comments to me no later than 20 June 2007. My address is Ms. Laura Lecher, Tennessee Army National Guard, JFHQ-TN-ENV, 3041 Sidco Drive, Nashville, Tennessee 37204. If you have any questions regarding this document, please contact me at 615-313-0669 or [Laura.Lecher@ng.army.mil](mailto:Laura.Lecher@ng.army.mil).

Sincerely,

Laura P. Lecher  
Natural Resources Manager  
Tennessee Military Department

Enclosure

From: Katrina Morris [Katrina\_Morris@dnr.state.ga.us]  
Sent: Monday, June 18, 2007 1:31 PM  
To: Lecher, Laura P CIV NGTN  
Cc: Tom Patrick  
Subject: Catoosa Draft INRMP Comments

Hi Laura,

We have reviewed the TNARNG Catoosa Draft INRMP. Tom Patrick thoroughly reviewed the portions of the document addressing rare plant issues. He feels restrictions on harvesting of trees in mountain skullcap management areas is well-addressed. With regard to prescribed fire and mountain skullcap, more research is needed as the proposed plan suggests. Tom recommends participation in annual reviews of recovery plan activities for mountain skullcap. The best contact for *Scutellaria* is Patricia Cox with TVA. I've included her contact information below:

Patricia B. Cox, PhD  
Senior Botanist / TVA  
Natural Heritage Project  
400 West Summit Hill Dr. - WT 11C  
Knoxville, TN 37902  
Office: 865-632-3609

Overall we feel the INRMP is an outstanding example of natural resources management concerns. Congrats on a job well done! Please let me know if you have any other questions.

Thanks,  
Trina Morris

Trina Morris, Wildlife Biologist  
Environmental Review Coordinator  
Georgia Dept. of Natural Resources  
Nongame Conservation Section  
2065 U.S. Hwy. 278 S.E.  
Social Circle, GA 30025-4743  
Ph: 770-918-6411 or 706-557-3032  
Fax: 706-557-3033  
katrina\_morris@dnr.state.ga.us <http://georgiawildlife.dnr.state.ga.us/>



MILITARY DEPARTMENT OF TENNESSEE  
Office of The Adjutant General  
Houston Barracks  
P.O. Box 41502  
Nashville, Tennessee 37204-1502

17 December 2007

MEMORANDUM FOR Ryan Orndorff, Sikes Act Coordinator, NGB-ARE-C, 111 South George Mason Drive, Arlington, VA 22204-1382

SUBJECT: Review of Draft Integrated Natural Resources Management Plan, Revised, and Environmental Assessment for the Volunteer Training Site – Catoosa

1. The Tennessee Army National Guard (TNARNG) has developed a revised Integrated Natural Resources Management Plan (INRMP) for its Volunteer Training Site – Catoosa, located in Catoosa County, Georgia, to guide environmental management for the 2008-2012 period. The INRMP was developed in collaboration with the US Fish and Wildlife Service field office and the Georgia Division of Natural Resources, and the first draft has been reviewed by both offices.
2. Due to the addition of management planning for two endangered species and timber harvests, as well as more extensive prescribed burning and invasive pest plant control measures, a new Environmental Assessment (EA) for the document was also developed. The EA is incorporated as Appendix A of the INRMP.
3. TNARNG hereby submits three hardcopies and one electronic copy of the Draft Integrated Natural Resources Management Plan, Revised, and the associated Environmental Assessment to NGB for review.
4. Point of Contact for this action is the undersigned at 731-783-3975 or [Laura.Lecher@ng.army.mil](mailto:Laura.Lecher@ng.army.mil) .

4- Encls

Laura P. Lecher  
Natural Resources Manager  
Tennessee Military Department



MILITARY DEPARTMENT OF TENNESSEE  
Office of The Adjutant General  
Houston Barracks  
P.O. Box 41502  
Nashville, Tennessee 37204-1502

25 February 2008

MEMORANDUM FOR Kenneth Conley, NGB-ARE-C, 111 South George Mason Drive,  
Arlington, VA 22204-1382

SUBJECT: Review of Biological Assessment for Impact of Revised INRMP Implementation on  
Endangered Species on Volunteer Training Site – Catoosa, Tennessee Army National Guard

1. The Tennessee Army National Guard (TNARNG) Environmental office requests NGB review of a biological assessment (BA) prior to initiating Formal Consultation with the US Fish and Wildlife Service (USFWS).
2. During discussions with the USFWS during the development of the Revised Integrated Natural Resources Management Plan (INRMP) for the Volunteer Training Site – Catoosa, it became apparent that certain projects discussed in the INRMP could have an impact on the federally threatened large-flowered skullcap (*Scutellaria montana*) which occurs in large numbers on the training site. Mitigation methods are included in the plan, but as there is the likelihood of damage to some of the plants, it was determined that informal consultation would not be sufficient, and a biological assessment was developed to more closely examine the impacts.
3. The BA is incorporated into the Rare, Threatened, and Endangered Species Management Plan (enclosed) which is Annex 1 of the Revised INRMP. As the Annex references portions of the INRMP, the full document is included in electronic format. Note that while the RTE plan includes discussion of the gray bat (*Myotis grisescens*), TNARNG has determined that the planned actions are not likely to affect this species. The assessment of impact and intended formal consultation is focused upon the large-flowered skullcap, which is likely to be impacted by the some of the planned actions.
4. Point of Contact for this action is the undersigned at 731-783-3975 or  
Laura.Lecher@state.tn.us .

Encls:  
RTE Mgmt. Plan (3 copies)  
Draft INRMP (cd)

Laura P. Lecher  
Natural Resources Manager  
Tennessee Military Department



MILITARY DEPARTMENT OF TENNESSEE  
Office of The Adjutant General  
Houston Barracks  
P.O. Box 41502  
Nashville, Tennessee 37204-1502

30 January 2009

U.S. Fish and Wildlife Service  
ATTN: James Rickard  
West Park Center  
105 West Park Drive, Suite D  
Athens, GA 30606

Dear Mr. Rickard:

The enclosed Integrated Natural Resources Management Plan (INRMP), Annex 1, contains the Biological Assessment addressing the potential impacts of implementation of this Plan on federally-listed species found on the Tennessee Army National Guard (TNARNG) Volunteer Training Site (VTS) – Catoosa in Catoosa County, Georgia. With this submission, we are requesting initiation of Formal Consultation under Section 7(a) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.), concerning the large-flowered skullcap (*Scutellaria montana*). We have determined that implementation of the INRMP will not significantly affect the gray bat (*Myotis grisescens*).

The INRMP will guide all aspects of natural resources management on the training site for the period 2009-2013. Additional planned projects with the potential to impact the large-flowered skullcap are also included in the assessment. Implementation of this Plan will likely affect the threatened large-flowered skullcap. Many of the impacts will be beneficial, but a small number of projects will result in incidental take of protected plants.

Only a small proportion of the large-flowered skullcap plants on the VTS-Catoosa will be damaged or destroyed by these projects, which are necessary to the military mission of the training site. Efforts will be made to mitigate the losses through nursery propagation and outplanting to the training site. Overall, the TNARNG anticipates a minimal impact on the health of the large-flowered skullcap population on the VTS-Catoosa.

If you have any questions or require further information, please contact the undersigned at 731-783-3975 or [Laura.Lecher@state.tn.us](mailto:Laura.Lecher@state.tn.us) or via mail at Tennessee Army National Guard, JFHQ-CFMO-HQ, P.O. Box 41502, Nashville, TN 37204.

Sincerely,

Laura P. Lecher  
Natural Resources Manager  
Tennessee Military Department

Enclosure



United States Department of the  
Interior

**Fish and Wildlife Service**

105 West Park Drive, Suite D  
Athens, Georgia 30606

West Georgia Sub Office  
P.O. Box 52560  
Ft. Benning, Georgia 31995-2560

FEB 12 2009

Coastal Sub Office  
4270 Norwich Street  
Brunswick, Georgia 31520

MG Gus L. Hargett, Jr., The Adjutant General  
Military Department of Tennessee  
Office of The Adjutant General  
Houston Barracks  
P.O. Box 41502  
Nashville, Tennessee 37204-1502  
ATTN: Laura Lecher

RE: USFWS Log# 41460-2009-F0344, VTS-Catoosa INRMP

Dear General Hargett:

Thank you for your January 30, 2009, letter regarding the Integrated Natural Resources Management Plan (INRMP) for the Tennessee Army National Guard (TNARNG) Volunteer Training Site (VTS)-Catoosa in Catoosa County, Georgia. We submit the following comments under provisions of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

The referenced project proposes to implement the INRMP to guide all aspects of natural resources management on the VTS-Catoosa for the period 2009-2013. During early project planning, TNARNG determined that the project was likely to adversely affect the threatened large-flower skullcap (*Scutellaria montana*) and was not likely to adversely affect the gray bat (*Myotis grisescens*).

We reviewed TNARNG's January 30, 2009, letter requesting initiation of formal consultation with our agency and we reviewed TNARNG's biological assessment. The information contained therein is sufficient to initiate formal consultation on February 2, 2008. We will assess project effects to the large-flowered skullcap and issue our biological opinion no later than June 17, 2009.

We concur with your finding regarding potential effects to the gray bat. Consultation under section 7(a)(2) of the ESA must be re-initiated for gray bats or other listed species if any of the following circumstances occur: (1) new information reveals impacts of this identified action that may affect listed species in a manner not previously considered; (2) this action is subsequently modified in a manner that was not considered in this assessment; or (3) a new species is listed or critical habitat determined that may be affected by the identified action.

As a reminder, the Endangered Species Act Requires that after initiation of consultation, the Federal agency may not make irreversible or irretrievable commitment of resources that limits future options. This practice insures agency actions do not preclude the formulation or implementation of of reasonable and prudent alternatives that avoid jeopardizing the continued existence of endangered or threatened species or destroying or modifying their critical habitat.

If you have any questions or require further information, please contact staff biologist Jimmy Rickard, at 706-613-9493, ext. 223.

Sincerely,

A handwritten signature in cursive script that reads "Sandra S. Tucker".

Sandra S. Tucker  
Field Supervisor

cc: file



MILITARY DEPARTMENT OF TENNESSEE  
OFFICE OF THE ADJUTANT GENERAL  
HOUSTON BARRACKS  
NASHVILLE  
37204-1502

August 17, 2009

U.S. Fish and Wildlife Service  
ATTN: James Rickard  
West Park Center  
105 West Park Drive, Suite D  
Athens, GA 30606

Dear Sir:

In April 2007 your office reviewed the first draft of the revised Integrated Natural Resources Management Plan (INRMP) for the Tennessee Army National Guard (TNARNG) Volunteer Training Site – Catoosa (VTS-C) in Catoosa County, Georgia. Your comments on that draft have been incorporated into the final draft presented here for your review. The biological assessment of the impact of the plan on the large-flowered skullcap and the USFWS biological opinion are also included in Annex 1. In addition, an Environmental Assessment (Appendix A) was prepared in accordance with the National Environmental Policy Act for the proposed action of implementing the revised INRMP.

I request that your agency review this plan according to Section 670a(a)(2) of the Sikes Act. Please provide written comments on this Final Draft INRMP and EA no later than October 30, 2009. This document will also be going out for public review during this time in accordance with the Sikes Act and NEPA.

If your office supports this plan, I request that you forward it to your Regional Director for review, and furnish this office with a letter of concurrence from the Regional Director.

Correspondence should be addressed to: Ms. Laura Lecher, Tennessee Army National Guard, JFHQ-TN-ENV, 3041 Sidco Drive, Nashville, Tennessee 37204. If you have any questions regarding this document, please contact me at 731-783-3975 or [Laura.Lecher@tn.gov](mailto:Laura.Lecher@tn.gov).

Sincerely,

Laura P. Lecher  
Natural Resources Manager  
Tennessee Military Department

Enclosure



## United States Department of the Interior

### Fish and Wildlife Service

105 West Park Drive, Suite D  
Athens, Georgia 30606

West Georgia Sub Office  
P.O. Box 52560  
Ft. Benning, Georgia 31995-2560

Coastal Georgia Sub Office  
4980 Wildlife Drive, NE  
Townsend, Georgia 31331

OCT 01 2009

Ms. Laura Lecher  
Tennessee Army National Guard  
JFHQ-TN-ENV  
3041 Sidco Dr  
Nashville, Tennessee 37204

RE: USFWS Log# 41460-2009-F-0344, VTS-Catoosa INRMP

Dear Ms. Lecher:

Thank you for your August 17, 2009, letter regarding the Integrated Natural Resources Management Plan (INRMP) for the Tennessee Army National Guard (TNARNG) Volunteer Training Site (VTS)-Catoosa in Catoosa County, Georgia. We submit the following comments under provisions of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

The referenced project proposes to implement the INRMP to guide all aspects of natural resources management on the VTS-Catoosa for the period 2009-2013. During early project planning, TNARNG determined that the project was likely to adversely affect the threatened large-flower skullcap (*Scutellaria montana*) and was not likely to adversely affect the gray bat (*Myotis grisescens*). We issued a Biological Opinion on June 12, 2009, which has been incorporated into the INRMP as Annex 1.

As of August 12, 2009, Service policy no longer requires the Regional Director to review this document, nor will a letter from the Regional Director acknowledging the mutual agreement with the plan be issued. The letter acknowledging mutual agreement will now be issued by the Field Supervisor.

We concur with your finding regarding potential effects to the gray bat. Consultation under section 7(a)(2) of the ESA must be re-initiated for gray bats or other listed species if any of the following circumstances occur: (1) new information reveals impacts of this identified action that may affect listed species in a manner not previously considered; (2) this action is subsequently modified in a manner that was not considered in this assessment; or (3) a new species is listed or critical habitat determined that may be affected by the identified

action. If you have any questions or require further information, please contact staff biologist Jimmy Rickard, at 706-613-9493, ext. 223.

Sincerely,

A handwritten signature in cursive script that reads "Sandra S. Tucker".

Sandra S. Tucker  
Field Supervisor

cc: file



MILITARY DEPARTMENT OF TENNESSEE  
OFFICE OF THE ADJUTANT GENERAL  
HOUSTON BARRACKS  
NASHVILLE  
37204-1502

17 August 2009

Georgia Department of Natural Resources  
Nongame Conservation Section  
ATTN: Trina Morris, Wildlife Biologist  
2065 U.S. Highway 278 S.E.  
Social Circle, Georgia 30025-4743

Dear Sir:

In April 2007 your office reviewed the first draft of the revised Integrated Natural Resources Management Plan (INRMP) for the Tennessee Army National Guard (TNARNG) Volunteer Training Site – Catoosa (VTS-C) in Catoosa County, Georgia. Your comments on that draft have been incorporated into the final draft presented here for your review. A biological assessment of the impact of the plan on the large-flowered skullcap was prepared for formal consultation with the U.S. Fish and Wildlife Service (USFWS). This assessment and the biological opinion of the USFWS are included in Annex 1. In addition, an Environmental Assessment (Appendix A) was prepared in accordance with the National Environmental Policy Act for the proposed action of implementing the revised INRMP.

I request that your agency review this plan according to Section 670a(a)(2) of the Sikes Act. Please provide written comments on this Final Draft INRMP and EA no later than October 30, 2009. This document will also be going out for public review during this time in accordance with the Sikes Act and NEPA.

If your office supports this plan, I request that you furnish me with a letter of concurrence from the Director of the Georgia Department of Natural Resources.

Correspondence should be addressed to: Ms. Laura Lecher, Tennessee Army National Guard, JFHQ-TN-ENV, 3041 Sidco Drive, Nashville, Tennessee 37204. If you have any questions regarding this document, please contact me at 731-783-3975 or [Laura.Lecher@tn.gov](mailto:Laura.Lecher@tn.gov).

Sincerely,

Laura P. Lecher  
Natural Resources Manager  
Tennessee Military Department

Enclosure



# GEORGIA

DEPARTMENT OF NATURAL RESOURCES

## WILDLIFE RESOURCES DIVISION

CHRIS CLARK  
COMMISSIONER

DAN FORSTER  
DIRECTOR

October 19, 2009

Ms. Laura P. Lecher  
Natural Resources Manager  
Tennessee Army National Guard  
JFHQ-TN-ENV  
3041 Sidco Drive  
Nashville, Tennessee 37204

Dear Ms. Lecher:

Thank you for the opportunity to review the Final Draft of the Integrated Natural Resources Management Plan for the Tennessee Army National Guard (TNARNG) Volunteer Training Site – Catoosa (VTS-C) in Catoosa County, GA. The final draft provides a comprehensive plan for management of the site and addresses the concerns regarding state and federally listed species present on the site. We feel our previous suggestions have been adequately addressed in this version of the plan. The Department of Natural Resources, Wildlife Resources Division supports the final draft of this INRMP.

Again, thank you for the opportunity to provides comments on this and previous versions of the plan. Please let me know of I can be of further assistance.

Sincerely,

Dan Forster

DF: km



MILITARY DEPARTMENT OF TENNESSEE  
OFFICE OF THE ADJUTANT GENERAL  
HOUSTON BARRACKS  
NASHVILLE  
37204-1502

August 17, 2009

Georgia Department of Natural Resources  
Historic Preservation Division  
ATTN: Ray Luce, SHPO  
34 Peachtree Street, NW  
Atlanta, Georgia 30303

Dear Mr. Luce:

Enclosed is the Final Draft of the revised Integrated Natural Resources Management Plan (INRMP) for the Tennessee Army National Guard (TNARNG) Volunteer Training Site – Catoosa (VTS-C) in Catoosa County, Georgia. This is the a full revision of the original INRMP, dated 2001, for this training site, with additional significant information on endangered species management, forest management activities, wildland fire management, and invasive species control. In addition, an Environmental Assessment (Appendix A) was prepared in accordance with the National Environmental Policy Act (NEPA) for the proposed action of implementing the revised INRMP.

I request that you review this project in accordance with section 106 of the National Historic Preservation Act of 1966, as amended 1980, and the regulation (36 CFR part 800) of the Advisory Council on Historic Preservation. Please advise me if you believe the implementation of this plan has the potential to cause any significant impact on historic or archaeological resource.

Please return comments to me no later than 30 October 2009. This document will also be going out for public review during this time in accordance with the Sikes Act and NEPA. Correspondence should be addressed to: Ms. Laura Lecher, Tennessee Army National Guard, JFHQ-TN-ENV, 3041 Sidco Drive, Nashville, Tennessee 37204. If you have any questions regarding this document, please contact me at 731-783-3975 or [Laura.Lecher@tn.gov](mailto:Laura.Lecher@tn.gov).

Sincerely,

Laura P. Lecher  
Natural Resources Manager  
Tennessee Military Department

Enclosure



HISTORIC PRESERVATION DIVISION

CHRIS CLARK  
COMMISSIONER

DR. DAVID CRASS  
ACTING DIVISION DIRECTOR

September 18, 2009

Laura Lecher  
Natural Resources Manager  
Tennessee Army National Guard  
JFHQ-TN-ENV  
3041 Sidco Drive  
Nashville, Tennessee 37204  
Laura.Lecher@tn.gov

**RE: INRMP, Volunteer Training Site- Catoosa (VTS-C) TNARNG  
Catoosa County, Georgia  
HP-090821-003**

Dear Ms. Lecher:

The Historic Preservation Division (HPD) has reviewed the final draft of the *Integrated Natural Resources Management Plan, Volunteer Training Site-Catoosa, 2010-2014*, dated August 2009, by the Tennessee Army National Guard. Our comments are offered to assist the U.S. Army and the Tennessee Army National Guard (TNARNG) in complying with provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA).

Based on the information contained in the Integrated Natural Resources Management Plan (INRMP), HPD concurs that the proposed project will have **no effect** on archaeological resources or historic structures that are listed in or eligible for listing in the National Register of Historic Places (NRHP), as defined in 36 CFR Part 800.4(d)(1). It is important to remember that any future changes to this project as it is currently proposed may require additional steps for Section 106 compliance. HPD encourages federal agencies and project applicants to discuss such changes with our office to ensure that potential effects to historic resources are adequately considered in project planning.

Please refer to project number **HP-090821-003** in any future correspondence regarding this undertaking. If we may be of further assistance, please do not hesitate to contact me at (404) 651-6624, or Jackie Tyson, Environmental Review Historian, at (404) 651-6777.

Sincerely,

Elizabeth Shirk  
Environmental Review Coordinator

ES: jht

cc: Dan Latham, Jr., Northwest Georgia RC



MILITARY DEPARTMENT OF TENNESSEE  
OFFICE OF THE ADJUTANT GENERAL  
HOUSTON BARRACKS  
NASHVILLE  
37204-1502

December 8, 2009

Form letter sent to agencies....

Dear Sir:

This letter is to notify you of the availability for review of the final draft of the revised Integrated Natural Resources Management Plan (INRMP) and affiliated draft Environmental Assessment (EA) for the Tennessee Army National Guard (TNARNG) Volunteer Training Site – Catoosa in Catoosa County, Georgia.

This document is a full revision of the original 2001 INRMP for the training site. The revision includes significant new information on endangered species management, forest management activities, wildland fire management, and invasive species control. A biological assessment of the impact of the plan on the federally threatened large-flowered skullcap (*Scutellaria montana*) was prepared for formal consultation with the U.S. Fish and Wildlife Service (USFWS). This assessment and the biological opinion of the USFWS are included in Annex 1. In addition, an Environmental Assessment (Appendix A) was prepared in accordance with the National Environmental Policy Act for the proposed action of implementing the revised INRMP.

The Volunteer Training Site – Catoosa is located in northwest Georgia, approximately 20 miles south of Chattanooga, Tennessee. The 1628 acre site is devoted to the preparation of National Guardsmen for their military mission, including maneuver, range operations, equipment use, and other combat readiness training.

The natural resources of the site include extensive forestlands, 11.6 miles of streams, a large population of the federally threatened large-flowered skullcap, and foraging habitat for the federally endangered gray bat (*Myotis grisescens*). The INRMP describes the baseline conditions of natural resources on the Volunteer Training Site – Catoosa and describes management programs and guidance allowing for the successful completion of the military mission while providing for the conservation of natural resources, preservation of rare and unique resources, and long-term sustainability of the training site. This revised INRMP will guide management activities on the training site from 2010-2014.

The final draft revised INRMP and draft EA will be available for public review from 14 December 2009 to 14 January 2010 and may be accessed at <http://www.tnmilitary.org/> (click on the “Environmental” link and then on “Natural Resources”).

A hard copy of the document is also available for review at the Catoosa County Library, 108 Catoosa Circle, Ringgold, Georgia 30736 (call 706-965-3600 for library hours). A limited number of hard copies

may be available to send out. If you require a paper copy of these documents or prefer an electronic copy on cd, please contact Laura Lecher at the address below.

Please provide your review comments by letter, email ([laura.lecher@tn.gov](mailto:laura.lecher@tn.gov)), fax (731-783-3901), or phone (731-783-3975) prior to December 15, 2009. Correspondence should be addressed to Ms. Laura Lecher, Tennessee Army National Guard, JFHQ-TN-ENV, 3041 Sidco Drive, Nashville, Tennessee 37204.

Thank you for your consideration in this matter.

Sincerely,

Laura P. Lecher  
Natural Resources Manager  
Tennessee Military Department



MILITARY DEPARTMENT OF TENNESSEE  
Office of The Adjutant General  
Houston Barracks  
P.O. Box 41502  
Nashville, Tennessee 37204-1502

10 March 2010

MEMORANDUM FOR RECORD

SUBJECT: Agency Review of Final Draft Revised Integrated Natural Resources Management Plan and Environmental Assessment for the VTS-Catoosa

1. Letters were sent to interested agencies in December 2009 regarding the availability for review of the final draft of the Integrated Natural Resources Management Plan and associated Environmental Assessment for the Volunteer Training Site – Catoosa.
2. The following agencies were contacted regarding this review period:
  - a. US Army Corps of Engineers, Savannah District
  - b. US Army Corps of Engineers, Mobile District
  - c. US Environmental Protection Agency, Region 4
  - d. US Forest Service, Southern Region
  - e. Georgia Department of Natural Resources, Environmental Protection Division
  - f. Georgia Division of Forestry
3. No comments were received.

Laura P. Lecher  
Natural Resources Manager  
Tennessee Military Department

**From:** "Stokes, Mike CIV CTR" <william.m.stokes@us.army.mil>  
**To:** <kkaniatobe@atribe.com>, <Actribe.doc@actribe.org>, <aqttcultural@yahoo...>  
**Date:** 12/22/2009 11:14 AM  
**Subject:** TN Army National Guard - INFORMAL Section 106 Consultation

**CC:** "Laura Lecher" <Laura.Lecher@tn.gov>, <michelle.volkema@dnr.state.ga.us>  
Dear Honored Tribes ~

The TNARNG has completed the Final Draft of the Integrated Natural Resources Management Plan (INRMP) for the Volunteer Training Site-Catoosa (VTS-C) in Catoosa County, Georgia. This is a full revision of the original INRMP, dated 2001, for this training site, with additional significant information on endangered species management, forest management activities, wild land fire management, and invasive species control.

In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended in 1980 and 1992, the TNARNG requests your review of the Final Draft of the 2010-2014 INRMP. This document is available for review through January 24, 2010 on our new document review link at [www.tnmilitary.org](http://www.tnmilitary.org).

Go to [www.tnmilitary.org](http://www.tnmilitary.org)

Click on the Green Environmental link at left side of screen

Click on the Natural Resources link to view the INRMP

If you have questions or feedback concerning the INRMP document, please contact Ms. Laura Lecher, Natural Resources Manager at 731-783-3975 or [Laura.Lecher@tn.gov](mailto:Laura.Lecher@tn.gov).

Please contact me should you have any questions and concerns with our new format.

Best wishes for a holiday season filled with good health, happiness, and the love of family & friends.

Sincerely,

Mike Stokes, CTR, BWM, Inc.  
Cultural Resources Manager  
TN Army National Guard (TNARNG)  
3041 Sidco Drive, POB 41502  
Nashville TN 37204-1502  
615-313-0794 (office)  
615-313-0766 (fax)

---

From: preservation@muscogeenation-nsn.gov  
[mailto:preservation@muscogeenation-nsn.gov]  
Sent: Tuesday, December 22, 2009 12:36 PM  
To: Stokes, Mike CIV CTR  
Subject: Re: TN Army National Guard - INFORMAL Section 106 Consultation

I am having trouble downloading the INRMP. If it is not too large, can you mail it on a CD to Muscogee (Creek) Nation Cultural Preservation Office P.O. Box 580, Okmulgee, Oklahoma 74447 ATT: Joyce Bear  
Thank you.... Merry Christmas

---

**From:** "charles coleman" <chascoleman@prodigy.net>  
**To:** "Stokes, Mike CIV CTR" <william.m.stokes@us.army.mil>, <kkaniatobe@astri...>  
**Date:** 12/28/2009 9:14 AM  
**Subject:** Re: TN Army National Guard - INFORMAL Section 106 Consultation

**CC:** "Laura Lecher" <Laura.Lecher@tn.gov>, <michelle.volkema@dnr.state.ga.us>  
Seasons Greetings to All!

Well since I was snowed in I had time to review the Executive Summary and scan the other 300 plus pages.  
I am OK with the format.  
Thlopthlocco does not need a list of plants but some tribes have requested a list in the past.  
I would like a copy of other tribes coments.

Charles Coleman  
Thlopthlocco Tribal Town

---

**From:** Laura Lecher  
**To:** charles coleman  
**Date:** 1/5/2010 9:06 AM  
**Subject:** Re: TN Army National Guard - INFORMAL Section 106 Consultation

**CC:** Mike CIV CTR Stokes  
Mr. Coleman,

Sorry for my slow response. The list of plants found on site is in Appendix F of the draft document. All public comments will become a part of the final document which will be available electronically (download or cd). I'll be happy to compile all tribe comments and send them out after the review period, as well, if you would like.

Thank you for your comments, and please let me know if you have any further suggestions or concerns.

Hope the snow wasn't too deep,  
Laura

Laura P. Lecher  
Natural Resources Manager, TNARNG  
731-783-3975 / fax 731-783-3901  
[laura.lecher@tn.gov](mailto:laura.lecher@tn.gov)

---

**From:** "charles coleman" <chascoleman@prodigy.net>  
**To:** "Laura Lecher" <Laura.Lecher@tn.gov>  
**Date:** 1/5/2010 9:29 AM  
**Subject:** Re: TN Army National Guard - INFORMAL Section 106 Consultation

MVTO ()thank you)

I hope you have a Happy New Year

.  
Coleman

---

**From:** "Stokes, Mike CIV CTR" <william.m.stokes@us.army.mil>  
**To:** <carson.chessor@tn.gov>  
**Date:** 1/5/2010 1:12 PM  
**Subject:** FW: TNARNG Followup to December 22, 2009 Email

**CC:** "Laura Lecher" <Laura.Lecher@tn.gov>  
Carson ~

This is an example of the email I am sending to each Tribe individually as I am not comfortable with who/how many Tribes got the original email?

Mike

-----Original Message-----

From: Stokes, Mike CIV CTR  
Sent: Tuesday, January 05, 2010 12:56 PM  
To: 'Kkaniatobe@astribe.com'  
Subject: TNARNG Followup to December 22, 2009 Email  
Importance: High

Happy New Year Ms. Kaniatobe ~

I am seeking your assistance with the following;

Last month, we implemented a document review link on the TNARNG public website. The intent is for the Tribes to be able to review any/all documents pertaining to cultural or natural resource areas of concern. I wanted to ensure that you received the message below, and were able to review the Catoosa INRMP on the www.tnmilitary.org line. Please contact me with any questions or concerns regarding this new format.

Secondly, I wish to validate the following POC information for accuracy.

Absentee Shawnee Tribe of Oklahoma  
Honorable Scott Miller, Governor  
2025 S. Gordon Cooper  
Shawnee, OK 74801  
(405) 275-4030  
(405) 275-1922 (fax)

Karen Kaniatobe, THPO  
2025 S. Gordon Cooper  
Shawnee, OK 74801  
(405) 275-4030, Ext 199  
(405) 878-4711 (fax)

Lastly, the best time to reach your Tribe by phone?

Sincerely,

Mike Stokes, CTR, BWM, Inc.  
Cultural Resources Manager  
TN Army National Guard (TNARNG)  
3041 Sidco Drive, POB 41502  
Nashville TN 37204-1502  
615-313-0794 (office)



MILITARY DEPARTMENT OF TENNESSEE  
Office of The Adjutant General  
Houston Barracks  
P.O. Box 41502  
Nashville, Tennessee 37204-1502

10 March 2010

MEMORANDUM FOR RECORD

SUBJECT: Public Review of the Final Draft Integrated Natural Resources Management Plan and Environmental Assessment for the Volunteer Training Site – Catoosa

1. The final draft of the revised Integrated Natural Resources Management Plan and Environmental Assessment for the Volunteer Training Site was put out for public review from 29 January until 2 March 2010. The documents were available at the Catoosa County Library as well the Tennessee Military Department's public access webpage.
2. The notice was published in the Catoosa County News.
3. No comments were received.

Laura P. Lecher  
Natural Resources Manager  
Tennessee Military Department

days to complete after a contract is secured.

Cobb said the city could potentially lose some businesses if the sewerage lines aren't in place.

## Hilltop

Continued from page A1

Costco's website describes the company as a "membership warehouse club." Gold Star and Business members pay \$50. The highest membership is Executive, which costs an additional \$50 and gives a 2 percent reward on most Costco purchases.

The company sells appliances, furniture, electronics, food and equipment for cars.

## Reform

Continued from page A1

model that includes several measures to determine students' achievement," Reese said.

According to the Race to the Top website, eligibility for funding requires reform around four areas, including "adopting standards and assessments that prepare students to succeed in college and the workplace and to compete in the global economy," and "recruiting, developing, rewarding, and retaining effective teachers and principals, especially where they are needed most."

Perdue said the state's current payment system rewards teachers for their level of education instead of their classroom achievement.

the company coming to the Cloud Springs Road site, would bring 125-250 jobs to Catoosa, with about half the jobs being full-time.

The closest Costco to Chattanooga is more than 75 miles away in Huntsville, Ala. There are two stores in Atlanta

and Business members pay \$50. The highest membership is Executive, which costs an additional \$50 and gives a 2 percent reward on most Costco purchases.

The company sells appliances, furniture, electronics, food and equipment for cars.

### --- NOTICE ---

Officials of the Tennessee Army National Guard announce the availability of a Draft Integrated Natural Resources Management Plan (INRMP) with adjoining Environmental Assessment (EA) for Catoosa Volunteer Training Site-Tunnel Hill, GA. The INRMP and EA are available for public review beginning 29 January 2010, and ending on 2 February 2010 during normal library hours at:

Catoosa County Library  
108 Catoosa Circle  
Ringgold, GA  
706-965-3600

Electronic copies are available from  
Laura Lecher, Natural Resource Manager  
Tennessee Army National Guard  
Construction and Facilities Maintenance Office (CFMO)  
3041 Sidco Dr., Room 314  
Nashville, Tennessee 37204-1502

The Draft INRMP and EA was prepared by the Tennessee Army National Guard and the National Guard Bureau in Washington, DC. The EA discusses the environmental impacts and proposed alternatives of an Integrated Natural Resources Management Plan for Volunteer Training Site-Catoosa (VTS-C), Tunnel Hill, GA.

If such impacts are judged to be minimal or insignificant, a finding of No Significant Impact will be issued, and the Tennessee Army National Guard may proceed with the proposed action.

*Comments on the Integrated Natural Resources Management Plan are invited.*  
*They should be addressed to:*  
Tennessee Army National Guard  
ATTN: Laura Lecher  
3041 Sidco Dr., Room 314  
Nashville, Tennessee 37204-1502  
Telephone: (615) 426-5940

Wednesday, January 27, 2010



MILITARY DEPARTMENT OF TENNESSEE  
OFFICE OF THE ADJUTANT GENERAL  
HOUSTON BARRACKS  
NASHVILLE  
37204-1502

5 April 2010

MEMORANDUM FOR Lisa Delmonico, Natural Resources Program Manager (East), NGB-ARE-C, 111 South George Mason Drive, Arlington, VA 22204-1382.

SUBJECT: Final Review of Finding of No Significant Impact for the Environmental Assessment of the Revised Integrated Natural Resources Management Plan for the Volunteer Training Site – Catoosa

1. The Tennessee Army National Guard (TNARNG) has determined through an Environmental Assessment (EA) that implementation of the revised Integrated Natural Resources Management Plan (INRMP) for the Volunteer Training Site – Catoosa will have No Significant Impact on environmental conditions.
2. The draft INRMP and EA were submitted to public review, and no comments were received. A Finding of No Significant Impact (FNSI) was prepared and will be submitted for public review following NGB review for legal sufficiency.
3. TNARNG hereby submits two hardcopies and one electronic copy of the Final Integrated Natural Resources Management Plan, Revised, and the associated Environmental Assessment and Finding of No Significant Impact to NGB for review and signature.
4. Point of Contact for this action is the undersigned, at 731-783-3975 or [laura.lecher@ng.army.mil](mailto:laura.lecher@ng.army.mil).

3 Encls.

Laura Lecher  
Natural Resources Manager  
Tennessee Military Department



**NATIONAL GUARD BUREAU**

111 SOUTH GEORGE MASON DRIVE  
ARLINGTON VA 22204-1382

S: 15 Apr 11

ARNG-ILE

30 Mar 11

**MEMORANDUM FOR SEE DISTRIBUTION**

**SUBJECT:** Army National Guard (ARNG) Directorate Staffing of the Integrated Natural Resource Management Plan (INRMP) for Catoosa Volunteer Training Site, Tennessee Army National Guard (TNARNG)

1. An INRMP has been prepared for Catoosa Volunteer Training Site by the TNARNG and is now ready for your review and comment. This document can be found at:  
\\EDMS\edms\backups\ARE\ARE-C(Training&Infrastructure)\Program\_Areas\INRMPs\State Projects\TN\Catoosa\In Review
2. Limit your comments to your area of expertise and reference specific laws or regulations as appropriate. Please make comments in the errata provided at the site referenced in paragraph 1.
3. Provide comments by close of business on the above noted suspense date. Negative replies are required.
4. The point of contact for this action is CPT George Leverton, Training Lands Support Officer, 703-601-7973, or george.leverton@us.army.mil

Encl

A handwritten signature in cursive script that reads "Beth A. Erickson".

BETH A. ERICKSON  
Deputy, Environmental  
Programs Division

**DISTRIBUTION:**  
ARNG-ILE (MAJ Harper, Dr Klein)



**NATIONAL GUARD BUREAU**  
111 SOUTH GEORGE MASON DRIVE  
ARLINGTON VA 22204-1382

ARNG-ILE

1 Feb 12

MEMORANDUM FOR TENNESSEE ARMY NATIONAL GUARD (TNARNG) (Attn: Ms Laura Lecher), CFMO-E, 3041 Sidco Dr, Nashville, TN 37214

SUBJECT: Army National Guard (ARNG) Directorate Review of the Integrated Natural Resource Management Plan (INRMP) for the Catoosa Training Site, Tennessee

1. References:

- a. The Sikes Act (16 U.S.C 670 et seq)
  - b. Handbook, Guidance on Preparing Environmental Documentation for Army National Guard Actions in Compliance with the National Environmental Policy Act of 1969, Jun 06.
  - c. Memorandum, NGB-ARE, 30 NOV 06, Interim Guidance for Revisions and Updates to Existing Integrated Natural Resource Management Plans.
  - d. Army Regulation 200-1, Environmental Protection and Enhancement, Dec 07.
2. The ARNG staff have reviewed the referenced draft INRMP. Attached is the errata containing their comments. Please make the necessary changes to the document and submit for final approval.
3. The POC for this action is Mr. Chuck Chamberlain, Natural Resource Program Manger. He can be contacted at [chuck.chamberlain@us.army.mil](mailto:chuck.chamberlain@us.army.mil) or at 703-607-7982.

A handwritten signature in black ink that reads "Beth A. Erickson".

BETH A ERICKSON  
Deputy, Environmental  
Programs Division

Encl  
Errata

Comment #	The comment refers to:					Comment	Reviewer	Office of NGB Reviewer	Legal Sufficiency?	Action Taken by State to Address the Comment
	Chapter	Section	Page	Paragraph	Line					
1		Sign. page				COL. Michael J. Bennet is the NGB-ARE Chief, Environmental Division	Z. Reichold	ARNG-ILE	Y	Corrected signature block
2	ES			1		Explain. What made the old plan not serviceable	Z. Reichold	ARNG-ILE	Y	Reworded and clarified paragraph 1, pg. v.
3	ES			2		No longer 200-2. All has been placed under 200-1. Replace throughout the document.	Z. Reichold	ARNG-ILE	Y	Removed/changed all references to AR 200-2.
4	ES		vi	1		The plan will not change the training the implimentation of the plan will help training	Z. Reichold	ARNG-ILE	N	Reworded paragraph to remove implication that the plan would alter the training mission.
5	1	1	1	1	2	train members of the TNARNG not Guardsmen. Does anyone else train on the facility?	Z. Reichold	ARNG-ILE	Y	Changed phrase to "members of the TN National Guard". Other groups do train on the facility but they are not the purpose for its existence.
6						Omit 2010-2014 and replace with month and year on cover and anywhere else in the document.	Z. Reichold	ARNG-ILE	Y	Removed five-year dates throughout document and changed references to state it is on-going document until such time as revision is deemed necessary.
7	A					Why is there an EA? Either explain why the EA is necessary or use a REC	Z. Reichold	ARNG-ILE	Y	The timber harvest plan and the federally listed species (skullcap and gray bat) were not included in the 2001 INRMP or EA. They had to be assessed in this INRMP with an EA. A statement to this effect has been added to the first paragraph of Section 1.1 of Appendix A.
8			101			In References section add AR 200-1 and DODI 4715.03 of 3/18/11	Z. Reichold	ARNG-ILE	Y	Added.
9	B					Update correspondence, SHPO etc.	Z. Reichold	ARNG-ILE	Y	Included all correspondence to date in final plan.
10	4					Update Goals and Objectives, must be very specific with project names, timelines and dates that have obtainable and quantifiable results.	Z. Reichold	ARNG-ILE	Y	Chapter 4 objectives and tasks have been rewritten to be more clear and with quantifiable targets.

Comment #	The comment refers to:					Comment	Reviewer	Office of NGB Reviewer	Legal Sufficiency?	Action Taken by State to Address the Comment
	Chapter	Section	Page	Paragraph	Line					
11	D					No public comment needed if a REC is used. <b>Disregard.</b>	Z. Reichold	ARNG-ILE	N	
12						Overall Comment: Please ensure that entire document is scrubbed for any reference to LCTA - this acronym no longer exists. All references to LCTA need to be changed to reference RTLA	Jackie Howard	ARNG-TRI	N	References in chapter 4 regarding historic activities when LCTA was appropriate terminology. All current references use RTLA, and remaining LCTA historic references note that it is now RTLA.
13		4.3.2.2	73			Land Rehabilitation and Maintenance Please Reverse order of Bullets: Bullet #1 "To ensure no net loss of ..."; Bullet #2 "To protect, maintain..."	Jackie Howard	ARNG-TRI	N	Done (pg. 74)
14		4.3.2.4	75			Change 'Training Resource Integration' to 'Training Requirements Integration' first sentence to read: "TRI is a decision making process that supports integration of all requirements for land use with natural and cultural resources management processes."	Jackie Howard	ARNG-TRI	N	Done (pg. 75)
15			79			Use of acronym EO confusing here - does it in fact mean 'Executive Order' or something else? I suggest it should be a reference to Sustainable Range Awareness (SRA) or Environmental Outreach (EO). Seems that the listing is a mix of environmental outreach and SRA materials. Please clarify and use correct acronym and ensure that the acronym is properly defined in the list.	Jackie Howard	ARNG-TRI	N	Is referring back to original INRMP when EO was the acronym in use. Have utilized new acronym in Table 4.2 but included statement referring to original label for continuity with 2001 INRMP.
16			89			Section 5.1.1 Under "Training Operations" delete second sentence beginning "Modification of...."	Jackie Howard	ARNG-TRI	N	Deleted
17	General					Cultural Resources has no comment	Dr Klein	ARNG-ILE	N	
18	General					The Catoosa INRMP will be legally sufficient, provided comments 25, 26, and 28 are addressed. We include additional comments to increase the clarity and usefulness of the document.	B. Gray	NGB-JA	N	

Comment #	The comment refers to:					Comment	Reviewer	Office of NGB Reviewer	Legal Sufficiency?	Action Taken by State to Address the Comment
	Chapter	Section	Page	Paragraph	Line					
19	Signature Page					Replace COL Jeffrey Phillips signature block with COL Bennett.	B. Gray	NGB-JA	Y	Corrected signature block
20	Acronyms					Include NGB on the list.	B. Gray	NGB-JA	N	NGB is on pg.2 of list. They are alphabetized by acronym not full phrase.
21			vi			Should the appendices include the ICRMP? <b>No. I will talk with Legal. Please only reference the ICRMP, but do not include as an appendix.</b>	B. Gray	NGB-JA	N	
22	1	1.1	1	1	1	It would be helpful to insert the words "federally owned" so that the sentence reads "... maintains the federally owned Volunteer Training Site ...."	B. Gray	NGB-JA	N	Added "federally owned" as suggested (pg. 1)
23	1	1.1	1			Is there an MOA of some kind between TN and GA since TNARNG runs the facility but the site is located on GA property? If so, that fact should be mentioned.	B. Gray	NGB-JA	Y	There is no MOA between TN and GA. The property is federal-owned. There may have been some agreement between USACE and GA back when the property was first turned over to TNARNG, but no ongoing agreement is maintained according to the TNARNG real estate manager.
24	1	1.1	1	3		It would be preferable to use a different word than "by-passed" in the penultimate sentence. We suggest instead the sentence read "Therefore, while conducting the formal five-year review, as defined in the Interim Guidance, would not have been useful, the spirit of the interagency cooperative effort has been honored."	B. Gray	NGB-JA	N	Wording changed as recommended (pg. 1)
25	1	1.3.1	2			It would be more accurate for the first two sentences to read as follows: "The National Guard Bureau (NGB) is the federal component of DoD through which flow funds and guidance to the TNARNG. Three Directorates at NGB are involved in the management ...."	B. Gray	NGB-JA	Y	Wording changed as recommended (pg. 2)

Comment #	The comment refers to:					Comment	Reviewer	Office of NGB Reviewer	Required for Legal Sufficiency?	Action Taken by State to Address the Comment
	Chapter	Section	Page	Paragraph	Line					
26	1	1.6.4	8	3		Third para dealing with Agriculture, Forestry, and Hunting Permit Funds – NGB-ILE should confirm that use of a certain percentage of the proceeds from forestry sales can be sent to the GA treasury to be used for the local county schools and roads. The paragraph should cite the appropriate Army or NGB regulation dealing with timber sales and use of the proceeds.	B. Gray	NGB-JA	Y	Reworded paragraph at recommendation of Larry Zimmerman, ARNG-ILE-T. Added reference to DoD FMR 7000.14-R which addresses the forestry proceeds state entitlements.
27	3	3.10.4	52	1	1	It is not clear what is meant by the word “adjudicated” as used in the sentence “The VTS-C is located on lands adjudicated to the Cherokee Nation.” In this section, and in the appropriate section of the EA, it would be useful to reference the 27 Oct 1999 DoD Annotated American Indian and Alaska Native Policy simply to indicate that such a policy will be relevant if interaction with the Native American tribes occurs.	B. Gray	NGB-JA	N	Reworded sentence to say "The VTS-C is located on lands traditionally claimed as territory of the Cherokee." Added statement to last paragraph of section 3.10.4 and to section 4.8 of the EA: "All interactions between the TNARNG and the tribes that have historic ties to the Catoosa region are conducted in accordance with the DoD Annotated American Indian and Alaska Native Policy (27 Oct 1999)."
28	App A		A-3			It is a little confusing to have the EA be “APPROVED BY” by the TN TAG since the decision on whether the EA is adequate and the decision on whether a FNSI is appropriate is made by a federal official, such as COL Bennett. We recommend simply saying something other than “APPROVED BY:”; for example, perhaps “Coordinated With” or something like that.	B. Gray	NGB-JA	Y	Removed the "approved by" line. TAG is listed as a reviewer.



MILITARY DEPARTMENT OF TENNESSEE  
Office of The Adjutant General  
Houston Barracks  
P.O. Box 41502  
Nashville, Tennessee 37204-1502

18 April 2012

U.S. Fish and Wildlife Service  
ATTN: Sandra Tucker  
West Park Center  
105 West Park Drive, Suite D  
Athens, GA 30606

Dear Ms. Tucker:

In August 2009 your office reviewed the final draft of the revised Integrated Natural Resources Management Plan (INRMP) and Environmental Assessment (EA) for the Tennessee Army National Guard (TNARNG) Volunteer Training Site – Catoosa (VTS-C) in Catoosa County, Georgia. We appreciate your comments regarding that draft.

During the interim the document has been reviewed by the National Guard Bureau. The bulk of the document has seen no substantive changes since the final draft. Chapter Four has been modified to more clearly state objectives and tasks under each management area, and Table 4.3 was reformatted. In addition, the forest management plan has been adapted to decrease the area to be harvested in any given year. The guidelines and limitations on timber management activities have not been altered. The Finding of No Significant Impact has been added to the EA at this time.

The final INRMP and EA for VTS-C are available for the final public review period and can be accessed at <http://tnmilitary.org/Environmental.html>. An electronic copy is also enclosed.

I request that your agency review this plan according to Section 670a(a)(2) of the Sikes Act. If you support this plan and have no alterations or additions to request, please furnish this office with a letter stating your agency's concurrence or mutual agreement with the document.

Correspondence should be addressed to Ms. Laura Lecher, TNARNG, JFHQ-TN-ENV, 3041 Sidco Drive, Nashville, TN 37204-1502. If you have any questions, please contact me at (731)222-5321 or email at [Laura.Lecher@tn.gov](mailto:Laura.Lecher@tn.gov).

Sincerely,

Laura P. Lecher  
Natural Resources Manager  
Tennessee Military Department

Enclosure



## United States Department of the Interior

### Fish and Wildlife Service

105 West Park Drive, Suite D  
Athens, Georgia 30606

West Georgia Sub Office  
P.O. Box 52560  
Ft. Benning, Georgia 31995-2560

Coastal Georgia Sub Office  
4980 Wildlife Drive, NE  
Townsend, Georgia 31331

**AUG 21 2012**

Ms. Laura Lecher  
Tennessee Army National Guard  
JFHQ-TN-ENV  
3041 Sidco Dr  
Nashville, Tennessee 37204-5321

RE: USFWS Log# 41460-2009-F-0344, VTS-Catoosa INRMP

Dear Ms. Lecher:

We have reviewed the Final Integrated Natural Resources Management Plan (INRMP) for the Tennessee Army National Guard (TNARNG) Volunteer Training Site (VTS)-Catoosa in Catoosa County, Georgia. We submit the following comments under provisions of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

The referenced project proposes to implement the INRMP to guide all aspects of natural resources management on the VTS-Catoosa for the period. During early project planning, TNARNG determined that the project was likely to adversely affect the threatened large-flower skullcap (*Scutellaria montana*) and was not likely to adversely affect the gray bat (*Myotis grisescens*). We issued a Biological Opinion on June 12, 2009, which has been incorporated into the INRMP as Annex 1.

We concur with your finding regarding potential effects to the gray bat. Consultation under section 7(a)(2) of the ESA must be re-initiated for gray bats or other listed species if any of the following circumstances occur: (1) new information reveals impacts of this identified action that may affect listed species in a manner not previously considered; (2) this action is subsequently modified in a manner that was not considered in this assessment; or (3) a new species is listed or critical habitat determined that may be affected by the identified action. If you have any questions or require further information, please contact staff biologist Jimmy Rickard, at 706-613-9493, ext. 223.

Sincerely,

Sandra S. Tucker  
Field Supervisor

cc: file



MILITARY DEPARTMENT OF TENNESSEE  
Office of The Adjutant General  
Houston Barracks  
P.O. Box 41502  
Nashville, Tennessee 37204-1502

18 April 2012

Georgia Department of Natural Resources  
Nongame Conservation Section  
ATTN: Trina Morris, Wildlife Biologist  
2065 U.S. Highway 278 S.E.  
Social Circle, Georgia 30025-4743

Dear Ms. Morris:

In August 2009 your office reviewed the final draft of the revised Integrated Natural Resources Management Plan (INRMP) and Environmental Assessment (EA) for the Tennessee Army National Guard (TNARNG) Volunteer Training Site – Catoosa (VTS-C) in Catoosa County, Georgia. We appreciate your letter of support for that draft.

During the interim the document has been reviewed by the National Guard Bureau. The bulk of the document has seen no substantive changes since the final draft. Chapter Four has been modified to more clearly state objectives and tasks under each management area, and Table 4.3 was reformatted. In addition, the forest management plan has been adapted to decrease the area to be harvested in any given year. The guidelines and limitations on timber management activities have not been altered. The Finding of No Significant Impact has been added to the EA at this time.

The final INRMP and EA for VTS-C are available for the final public review period and can be accessed at <http://tnmilitary.org/Environmental.html>. An electronic copy is also enclosed.

I request that your agency review this plan according to Section 670a(a)(2) of the Sikes Act. If you support this plan and have no alterations or additions to request, please furnish this office with a letter stating your agency's concurrence or mutual agreement with the document.

Correspondence should be addressed to Ms. Laura Lecher, TNARNG, JFHQ-TN-ENV, 3041 Sidco Drive, Nashville, TN 37204-1502. If you have any questions, please contact me at (731)222-5321 or email at [Laura.Lecher@tn.gov](mailto:Laura.Lecher@tn.gov).

Sincerely,

Laura P. Lecher  
Natural Resources Manager  
Tennessee Military Department

Enclosure



MARK WILLIAMS  
COMMISSIONER

DAN FORSTER  
DIRECTOR

June 8, 2012

Laura P. Lecher  
Natural Resources Manager  
Tennessee Military Department  
PO Box 41502  
Nashville, TN 37204

Dear Ms. Lecher,

Thank you for the opportunity to review the Revised Integrated Natural Resources Management Plan for the Tennessee Army National Guard (TNARNG) Volunteer Training Site – Catoosa (VTS-C) in Catoosa County, GA. The document provides a comprehensive plan for management of the site and addresses the concerns regarding state and federally listed species present on the site. The Department of Natural Resources, Wildlife Resources Division supports the revised INRMP.

Again, thank you for the opportunity to provide comments on this and previous versions of the plan. Please let me know if I can be of further assistance.

Sincerely,

A handwritten signature in cursive script that reads "Katrina Morris".

Katrina Morris  
Environmental Review Coordinator



MILITARY DEPARTMENT OF TENNESSEE  
Office of The Adjutant General  
Houston Barracks  
P.O. Box 41502  
Nashville, Tennessee 37204-1502

18 April 2012

Georgia Department of Natural Resources  
Historic Preservation Division  
ATTN: Ray Luce, SHPO  
34 Peachtree Street, NW  
Atlanta, Georgia 30303

Dear Mr. Luce:

In compliance with Section 106 of the National Historic Preservation Act, codified as 36 CFR 800 (Federal Register, December 12, 2000, 776980-77739), the Tennessee Army National Guard (TNARNG) requests your review of the attached submission. Enclosed are the Final Integrated Natural Resources Management Plan (INRMP) and associated Environmental Assessment (EA) and Finding of No Significant Impact for the TNARNG Volunteer Training Site – Catoosa (VTS-C) in Catoosa County, Georgia.

The final draft of this document was made available for your review in August 2009. During the interim the document has been reviewed by the National Guard Bureau. The bulk of the document has seen no substantive changes since the final draft. Chapter Four has been modified to more clearly state objectives and tasks under each management area, and Table 4.3 was reformatted. In addition, the forest management plan has been adapted to decrease the area to be harvested in any given year. The guidelines and limitations on timber management activities have not been altered. The Finding of No Significant Impact has been added to the EA at this time.

After review of this document, please advise if you believe the implementation of this plan has the potential to cause any significant impact on historic structures or archaeological resources. Your comments would be appreciated no later than 27 May 2012.

Correspondence should be addressed to Ms. Laura Lecher, TNARNG, JFHQ-TN-ENV, 3041 Sidco Drive, Nashville, TN 37204-1502. If you have any questions regarding this document, please contact Ms. Lecher at (731)222-5321 or email at [Laura.Lecher@tn.gov](mailto:Laura.Lecher@tn.gov).

Sincerely,

Carson Chessor  
Environmental Program Manager  
Tennessee Military Department



HISTORIC PRESERVATION DIVISION

MARK WILLIAMS  
COMMISSIONER

DR. DAVID CRASS  
DIVISION DIRECTOR

June 21, 2012

Laura Lecher  
TNARNG  
JFHQ-TN-ENV  
3041 Sidco Drive  
Nashville, Tennessee 37204  
[Laura.Lecher@tn.gov](mailto:Laura.Lecher@tn.gov)

**RE: INRMP, Volunteer Training Site – Catoosa (VTS-C) TNARNG  
Catoosa County, Georgia  
HP-090821-003**

Dear Ms. Lecher:

The Historic Preservation Division (HPD) has received the *Integrated Natural Resources Management Plan, Volunteer Training Site – Catoosa* prepared by the Tennessee Army National Guard (TNARNG) and dated March 2012. Our comments are offered to assist the U.S. Army and the TNARNG in complying with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended.

Based on the information contained in the document, HPD concurs that the plan will have no effect on archaeological resources or historic structures that are listed in or eligible for listing in the National Register of Historic Places (NRHP), as defined in 36 CFR Part 800.4(d)(1). Furthermore, HPD looks forward to receiving project Section 106 documentation for specific activities such as timber harvests and prescribed burns as available.

If you have any questions or if we may be of further assistance, please contact me at (404) 651-6624 or via email at [Elizabeth.shirk@dnr.state.ga.us](mailto:Elizabeth.shirk@dnr.state.ga.us).

Sincerely,

A handwritten signature in blue ink that reads "Elizabeth Shirk".

Elizabeth Shirk  
Environmental Review Coordinator



MILITARY DEPARTMENT OF TENNESSEE  
Office of The Adjutant General  
Houston Barracks  
P.O. Box 41502  
Nashville, Tennessee 37204-1502

18 April 2012

...Agencies

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Dear Sir:

This letter is to notify you of the final public review period for the revised Integrated Natural Resources Management Plan (INRMP) and associated Environmental Assessment (EA) and Finding of No Significant Impact for the Tennessee Army National Guard (TNARNG) Volunteer Training Site – Catoosa (VTS-C) in Catoosa County, Georgia.

The final draft of this document was made available for your review in December 2009. During the interim the document has been reviewed by the National Guard Bureau. The bulk of the document has seen no substantive changes since the final draft. Chapter Four has been modified to more clearly state objectives and tasks under each management area, and Table 4.3 was reformatted. In addition, the forest management plan has been adapted to decrease the area to be harvested in any given year. The guidelines and limitations on timber management activities have not been altered. The Finding of No Significant Impact has been added to the EA at this time.

The final INRMP and EA for VTS-C can be accessed at <http://tnmilitary.org/Environmental.html>. If you have problems downloading the document, a cd version can be mailed to you.

Please provide any comments on this document and the Finding of No Significant Impact no later than 27 May 2012.

Correspondence should be addressed to Ms. Laura Lecher, TNARNG, JFHQ-TN-ENV, 3041 Sidco Drive, Nashville, TN 37204-1502. If you have any questions, please contact me at (731)222-5321 or email at [Laura.Lecher@tn.gov](mailto:Laura.Lecher@tn.gov).

Sincerely,

Laura P. Lecher  
Natural Resources Manager  
Tennessee Military Department

# Georgia Department of Natural Resources

2 Martin Luther King, Jr. Drive, S.E., Suite 1154, Atlanta, Georgia 30334

Mark Williams, Commissioner

Environmental Protection Division

Judson H. Turner, Director

404/656-2833

May 17, 2012

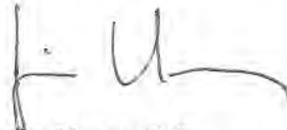
Ms. Laura Lecher  
TNARNG  
JFHQ-TN-ENV  
3041 Sideo Drive  
Nashville, TN 37204-1502

RE: Comments on the *Revised Integrated Natural Resources Management Plan and Associated Environmental Assessment and Finding of No Significant Impact for the Tennessee Army National Guard Volunteer Training Site- Catoosa* (VTS-C) in Catoosa County, Georgia, received April 24, 2012

Dear Ms. Lecher:

The Georgia Environmental Protection Division (EPD) has completed its review of the above-referenced document. Thank you for the opportunity to comment. EPD has no comments at this time.

Sincerely,



Jim Ussery, P.E.  
Assistant Director

JU:ap

File: TNARNG VTS-C (NEPA)

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MILITARY DEPARTMENT OF TENNESSEE  
Office of The Adjutant General  
Houston Barracks  
P.O. Box 41502  
Nashville, Tennessee 37204-1502

18 April 2012

...American Indian Tribes

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Dear Sir:

This letter is to notify you of the final public review period for the revised Integrated Natural Resources Management Plan (INRMP) and associated Environmental Assessment (EA) and Finding of No Significant Impact for the Tennessee Army National Guard (TNARNG) Volunteer Training Site – Catoosa (VTS-C) in Catoosa County, Georgia.

The final draft of this document was made available for your review in December 2009. During the interim the document has been reviewed by the National Guard Bureau. The bulk of the document has seen no substantive changes since the final draft. Chapter Four has been modified to more clearly state objectives and tasks under each management area, and Table 4.3 was reformatted. In addition, the forest management plan has been adapted to decrease the area to be harvested in any given year. The guidelines and limitations on timber management activities have not been altered. The Finding of No Significant Impact has been added to the EA at this time.

The final INRMP and EA for VTS-C can be accessed at <http://tnmilitary.org/Environmental.html>. If you have problems downloading the document, a cd version can be mailed to you.

Please provide any comments on this document and the Finding of No Significant Impact no later than 27 May 2012.

Correspondence should be addressed to Ms. Laura Lecher, TNARNG, JFHQ-TN-ENV, 3041 Sidco Drive, Nashville, TN 37204-1502. If you have any questions, please contact me at (731)222-5321 or email at [Laura.Lecher@tn.gov](mailto:Laura.Lecher@tn.gov).

Sincerely,

Laura P. Lecher  
Natural Resources Manager  
Tennessee Military Department



# *Jena Band of Choctaw Indians*

P. O. Box 14 • Jena, Louisiana 71342-0014 • Phone: 318-992-2717 • Fax: 318-992-8244

MILITARY DEPT. OF TENNESSEE  
OFFICE OF THE ADJUTANT GENERAL  
HOUSTON BARRACKS  
P.O. BOX 41502  
NASHVILLE, TN 37204

July 26, 2012

RE: **REVISED INTERGRATED NATURAL  
RESOURCES MANAGEMENT PLAN**

Ms. Lecher,

Thank you for the opportunity to review the **Revised Intergrated Natural Resources Management Plan**. We the Jena Band of Choctaw Indians concur with the findings of "No Significant Impact" and we look forward to working with you in the future.

Sincerely,

*Candice Chapman / THPO Secretary*

for Dana Masters  
THPO  
318-992-1205  
Fax- 318-992-8244



MILITARY DEPARTMENT OF TENNESSEE  
Office of The Adjutant General  
Houston Barracks  
P.O. Box 41502  
Nashville, Tennessee 37204-1502

15 August 2012

MEMORANDUM FOR RECORD

SUBJECT: Final Agency and Tribe Review of the Revised Integrated Natural Resources Management Plan and Environmental Assessment for the Volunteer Training Site – Catoosa

1. Letters were sent to interested agencies in April 2012 regarding the availability for review of the final draft of the Revised Integrated Natural Resources Management Plan and associated Environmental Assessment for the Volunteer Training Site – Catoosa. A reply was received from the Georgia Environmental Protection Division stating they had no comments. No other comments were received.
2. Letters were sent to American Indian tribes with ties to Tennessee Army National Guard lands in April 2012 regarding the availability for review of the final draft of the Revised Integrated Natural Resources Management Plan and associated Environmental Assessment for the Volunteer Training Site – Catoosa. No comments were received.
3. The agencies and tribes contacted were:
  - US Army Corps of Engineers, Savannah District
  - US Army Corps of Engineers, Mobile District
  - US Environmental Protection Agency, Region 4
  - US Forest Service, Southern Region
  - Natural Resources Conservation Service
  - Georgia Department of Natural Resources, Environmental Protection Division
  - Georgia Forestry Commission
  
  - Absentee Shawnee Tribe of Oklahoma
  - Alabama-Coushatta Tribe of Texas
  - Alabama-Quassarte Tribal Town
  - Cherokee Nation
  - Chickasaw Nation
  - Choctaw Nation of Oklahoma
  - Coushatta Tribe of Louisiana
  - Eastern Band of Cherokee Indians
  - Eastern Shawnee Tribe of Oklahoma
  - Jena Band of Choctaw
  - Kialegee Tribal Town
  - Mississippi Band of Choctaw Indians

SUBJECT: Final Agency and Tribe Review of the Revised Integrated Natural Resources Management Plan and Environmental Assessment for the Volunteer Training Site – Catoosa

Muscogee (Creek) Nation  
Poarch Band of Creek Indians  
Quapaw Tribe of Oklahoma  
Seminole Nation of Oklahoma  
Seminole Tribe of Florida  
Thoptlocco Tribal Town  
Tunica-Biloxi Tribe of Louisiana  
United Keetoowah Band of Cherokee Indians in Oklahoma

Laura P. Lecher  
Natural Resources Manager  
Tennessee Military Department



MILITARY DEPARTMENT OF TENNESSEE  
Office of The Adjutant General  
Houston Barracks  
P.O. Box 41502  
Nashville, Tennessee 37204-1502

15 August 2012

MEMORANDUM FOR RECORD

SUBJECT: Public Review of the Finding of No Significant Impact for the Environmental Assessment of the Revised Integrated Natural Resources Management Plan for the Volunteer Training Site – Catoosa

1. The revised Integrated Natural Resources Management Plan and Environmental Assessment for the Volunteer Training Site were put out for public review of the Finding of No Significant Impact from 27 April until 27 May 2012. The documents were available at the Catoosa County Library as well as on the Tennessee Military Department's public access webpage.
2. The notice was published in the Catoosa County News.
3. No comments were received.

Laura P. Lecher  
Natural Resources Manager  
Tennessee Military Department

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all of our customers and clients to know they are the reason for the company's success. Jackson Realty would not still be actively selling real estate without the loyal support from all past and present customers and clients.



**Joanna Jackson**

Real estate news & updates

5-7 p.m. at our office at 23 North Hwy. 27 Bypass in LaFayette. Please join us for an evening of food and fun!

Jackson Realty was founded in 1978 by Rex and Marilyn Jackson, who are both still actively selling real estate.

The company provides homeowners and property owners in the northwest

Cookout, page B9

# our help

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ber. Visit online at [www.woundedwarriorproject.org](http://www.woundedwarriorproject.org) to learn more about the program or to make a donation.

If you are a veteran looking for help, call your local VA office.

If you feel you have symptoms of depression or thoughts of suicide, please tell someone. Help is available. Make an appointment with your doctor or local VA hospital. Visit the web-sites [www.va.org](http://www.va.org) and [www.veteransinc.org](http://www.veteransinc.org) to find out about where to get help.

Remember our veterans and active duty military members in your prayers and don't let them be forgotten. They have sacrificed so much for all of us.

Resources: [www.va.org](http://www.va.org); [www.PAV.org](http://www.PAV.org); [www.DAV.org](http://www.DAV.org); [www.veteransinc.org](http://www.veteransinc.org); [www.howthingswork.org/economics/volunteer](http://www.howthingswork.org/economics/volunteer); [www.woundedwarriorproject.org](http://www.woundedwarriorproject.org)

Pam Rasmussen is a resident of LaFayette. She is a mother of a child with Spina Bifida and an advocate of special needs children and adults. She can be contacted at [jraz1230@comcast.net](mailto:jraz1230@comcast.net).

[ilkchatt.com](http://ilkchatt.com)

## --- NOTICE ---

Officials of the Tennessee Army National Guard announce the availability of an Integrated Natural Resources Management Plan (INRMP) with adjoining Environmental Assessment (EA) and Finding of No Significant Impact for **Catoosa Volunteer Training Site-Tunnel Hill, GA.**

The INRMP and EA are available for public review beginning 27 April 2012, and ending 27 May 2012 at:

<http://www.tnmilitary.org/Environmental.html>

and

**Catoosa County Library, 108 Catoosa Circle Ringgold, GA • 706-965-3600**

**Electronic copies are available from Laura Lecher, Natural Resource Manager Tennessee Army National Guard Construction and Facilities Maintenance Office (CFMO) 3041 Sidco Dr., Room 314 Nashville, Tennessee 37204-1502**

The INRMP and EA were prepared by the Tennessee Army National Guard and the National Guard Bureau in Washington D.C. The EA discusses the environmental impacts and proposed alternatives of an Integrated Natural Resources Management Plan for Volunteer Training Site-Catoosa (VTS-C), Tunnel Hill, GA.

The impacts have been judged to be minimal or insignificant and following this public review period the Tennessee Army National Guard will proceed with the proposed action.

*Comments on the Integrated Natural Resources Management plan are invited.*

*They should be addressed to:*

**Tennessee Army National Guard  
ATTN: Laura Lecher  
3041 Sidco Dr., Room 314  
Nashville, Tennessee 37204-1502  
Telephone: 731-222-5321**



## **APPENDIX D**

### **Public Comment**

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**First Public Review Period:**

The Revised Integrated Natural Resources Management Plan for the Volunteer Training Site – Catoosa of the Tennessee Army National Guard and its associated Environmental Assessment were made available via electronic access and a bound copy at the Catoosa County Public Library from 14 December 2009 until 2 March 2010. Interested agencies and American Indian Tribes were notified of the availability of the document via letter (see Appendix C, Agency Correspondence) or e-mail.

One comment was received from the representative of an American Indian Tribe; the comment and TNARNG's response are given below. The official public review period, as announced in the Catoosa County News, ran from 29 January 2010 to 2 March 2010. No public comments were received.

## NOTIFICATION:

----- Original Message -----

From: "Stokes, Mike CIV CTR" <[william.m.stokes@us.army.mil](mailto:william.m.stokes@us.army.mil)>  
 To: <[kkaniatobe@astribe.com](mailto:kkaniatobe@astribe.com)>; <[Actribe.doc@actribe.org](mailto:Actribe.doc@actribe.org)>;  
 <[aqttcultural@yahoo.com](mailto:aqttcultural@yahoo.com)>; <[rallen@cherokee.org](mailto:rallen@cherokee.org)>; <[gingy.nail@chickasaw.net](mailto:gingy.nail@chickasaw.net)>;  
 <[tcole@choctawnation.com](mailto:tcole@choctawnation.com)>; <[lovelin@coushattatribela.org](mailto:lovelin@coushattatribela.org)>;  
 <[lthompson@coushattatribela.org](mailto:lthompson@coushattatribela.org)>; <[russtown@nc-cherokee.com](mailto:russtown@nc-cherokee.com)>;  
 <[estochief@hotmail.com](mailto:estochief@hotmail.com)>; <[radushane@gmail.com](mailto:radushane@gmail.com)>; <[chief@jenachoctaw.org](mailto:chief@jenachoctaw.org)>;  
 <[Evelyn\\_bucktrot@yahoo.com](mailto:Evelyn_bucktrot@yahoo.com)>; <[kialegeetribal@yahoo.com](mailto:kialegeetribal@yahoo.com)>;  
 <[kcarleton@choctaw.org](mailto:kcarleton@choctaw.org)>; <[preservation@muscogeenation-nsn.gov](mailto:preservation@muscogeenation-nsn.gov)>;  
 <[cultural@ocevnet.org](mailto:cultural@ocevnet.org)>; <[rothrower@hotmail.com](mailto:rothrower@hotmail.com)>; <[dheghia@earthlink.net](mailto:dheghia@earthlink.net)>;  
 <[Executive1@seminolenation.com](mailto:Executive1@seminolenation.com)>; <[lupchurch@seminolenation.com](mailto:lupchurch@seminolenation.com)>;  
 <[wsteele@samtribe.com](mailto:wsteele@samtribe.com)>; <[chascoleman@prodigy.net](mailto:chascoleman@prodigy.net)>; <[pfoster@tunica.org](mailto:pfoster@tunica.org)>;  
 <[earlii@tunica.org](mailto:earlii@tunica.org)>; <[clocust@unitedkeetowahband.org](mailto:clocust@unitedkeetowahband.org)>; <[lstopp@ukb.org](mailto:lstopp@ukb.org)>  
 Cc: "Laura Lecher" <[Laura.Lecher@tn.gov](mailto:Laura.Lecher@tn.gov)>; <[michelle.volkema@dnr.state.ga.us](mailto:michelle.volkema@dnr.state.ga.us)>  
 Sent: Tuesday, December 22, 2009 11:13 AM  
 Subject: TN Army National Guard - INFORMAL Section 106 Consultation

Dear Honored Tribes ~

The TNARNG has completed the Final Draft of the Integrated Natural Resources Management Plan (INRMP) for the Volunteer Training Site-Catoosa (VTS-C) in Catoosa County, Georgia. This is a full revision of the original INRMP, dated 2001, for this training site, with additional significant information on endangered species management, forest management activities, wild land fire management, and invasive species control.

In accordance with Section 106 of the National Historic Preservation Act of 1966, as amended in 1980 and 1992, the TNARNG requests your review of the Final Draft of the 2010-2014 INRMP. This document is available for review through January 24, 2010 on our new document review link at [www.tnmilitary.org](http://www.tnmilitary.org).

Go to [www.tnmilitary.org](http://www.tnmilitary.org)

Click on the Green Environmental link at left side of screen

Click on the Natural Resources link to view the INRMP

If you have questions or feedback concerning the INRMP document, please contact Ms. Laura Lecher, Natural Resources Manager at 731-783-3975 or [Laura.Lecher@tn.gov](mailto:Laura.Lecher@tn.gov).

Please contact me should you have any questions and concerns with our new format.

Best wishes for a holiday season filled with good health, happiness, and the love of family & friends.

Sincerely,

Mike Stokes, CTR, BWM, Inc.  
Cultural Resources Manager  
TN Army National Guard (TNARNG)  
3041 Sidco Drive, POB 41502  
Nashville TN 37204-1502  
615-313-0794 (office)  
615-313-0766 (fax)

COMMENT:

**From:** "charles coleman" <chascoleman@prodigy.net>  
**To:** "Stokes, Mike CIV CTR" <william.m.stokes@us.army.mil>, <kkaniatobe@astri...>  
**Date:** 12/28/2009 9:14 AM  
**Subject:** Re: TN Army National Guard - INFORMAL Section 106 Consultation

**CC:** "Laura Lecher" <Laura.Lecher@tn.gov>, <michelle.volkema@dnr.state.ga.us>  
Seasons Greetings to All!

Well since I was snowed in I had time to review the Executive Summary and scan the other 300 plus pages.

I am OK with the format.

Thlopthlocco does not need a list of plants but some tribes have requested a list in the past.

I would like a copy of other tribes coments.

Charles Coleman  
Thlopthlocco Tribal Town

TNARNG RESPONSE:

**From:** Laura Lecher  
Integrated Natural Resources Management Plan  
VTS-Catoosa

**To:** charles coleman  
**Date:** 1/5/2010 9:06 AM  
**Subject:** Re: TN Army National Guard - INFORMAL Section 106 Consultation

**CC:** Mike CIV CTR Stokes  
Mr. Coleman,

Sorry for my slow response. The list of plants found on site is in Appendix F of the draft document. All public comments will become a part of the final document which will be available electronically (download or cd). I'll be happy to compile all tribe comments and send them out after the review period, as well, if you would like.

Thank you for your comments, and please let me know if you have any further suggestions or concerns.

Hope the snow wasn't too deep,  
Laura

Laura P. Lecher  
Natural Resources Manager, TNARNG  
731-783-3975 / fax 731-783-3901  
[laura.lecher@tn.gov](mailto:laura.lecher@tn.gov)

**Final Public Review and FNSI Review:**

The final version of the Integrated Natural Resources Management Plan for the Volunteer Training Site – Catoosa of the Tennessee Army National Guard and its associated Environmental Assessment and Finding of No Significant Impact were made available for the final public review period (FNSI review) from 27 April 2012 until 27 May 2012. Notice was published in the Catoosa County News. The document was accessible via the TNARNG public webpage and a bound copy was located at the Catoosa County Public Library.

Interested agencies and American Indian Tribes were also notified of the availability of the final document via letter (see Appendix C, Agency Correspondence) or e-mail.

No public comments were received.

## **APPENDIX E**

### **Annotated Summary of Key Legislation Related to Natural Resources Management**

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### United States Code

<i>Sikes Act, as amended; 16 U.S.C. 670(a) et seq.</i>	Authorizes military installations to carry out programs for the conservation and rehabilitation of natural resources. Requires preparation and implementation of Integrated Natural Resources Management Plans for all military installations in U.S. except those lacking significant natural resources.
<i>National Environmental Policy Act of 1969 (NEPA), as amended; P.L.91-190, 42 U.S.C. 4321 et seq.</i>	Requires Federal agencies to utilize a systematic approach when assessing environmental impacts of government activities. NEPA proposes an interdisciplinary approach in a decision-making process designed to identify unacceptable or unnecessary impacts to the environment.
<i>Leases: Non-excess Property of Military Departments, 10 U.S.C. 2667, as amended</i>	Authorizes DoD to lease to commercial enterprises Federal land that is not currently needed for Public use. Covers agricultural outleasing programs.
<i>Federal Land Use Policy and Management Act, 43 U.S.C. 1701-1782</i>	Requires management of public lands to protect the quality of scientific, scenic, historical, ecological, environmental, and archaeological resources and values; as well as to preserve and protect certain lands in their natural condition for fish and wildlife habitat. This act also requires consideration of commodity production such as timbering.
<i>Clean Air Act, 42 U.S.C. 7401-7671q, July 14, 1955, as amended</i>	This Act, as amended, is known as the Clean Air Act of 1990. The amendments made in 1990 established the core of the clean air program. The primary objective is to establish Federal standards for air pollutants. It is designed to improve air quality in areas of the country which do not meet Federal standards and to prevent significant deterioration in areas where air quality exceeds those standards.
<i>Federal Water Pollution Control Act (Clean Water Act), 33 U.S.C. 1251-1387</i>	The Clean Water Act is a comprehensive statute aimed at restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. Primary authority for the implementation and enforcement rests with the U.S. Environmental Protection Agency (USEPA).
<i>Migratory Bird Treaty Act 16 U.S.C. 703-712</i>	The Migratory Bird Treaty Act implements various treaties and for the protection of migratory birds. Under the Act, taking, killing, or possessing migratory birds is unlawful.
<i>Endangered Species Act of 1973, as amended; P.L. 93-205, 16 U.S.C.1531 et seq.</i>	Protects threatened, endangered, and candidate species of fish, wildlife, and plants and their designated critical habitats. Under this law, no Federal action is allowed to jeopardize the continued existence of an endangered or threatened species. The Endangered Species Act also requires consultation with the USFWS and the National Marine Fisheries Service and the preparation of a biological assessment when such species are present in an area that is affected by government activities.
<i>National Historic Preservation Act; 16 U.S.C. 470 et seq.</i>	Requires Federal agencies to take account of the effect of any federally assisted undertaking or licensing on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places (NRHP). Provides for the nomination, identification (through listing on the National Register), and protection of historical and cultural properties of significance.
<i>Federal Noxious Weed Act of 1974; 7 U.S.C. 2801-2814</i>	The Act provides for the control and management of non-indigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health.
<i>Sale of certain interests in land; logs; 10 U.S.C. 2665</i>	Authorizes sale of forest products and reimbursement of the costs of management of forest resources.

<i>Federal Insecticide, Fungicide, and Rodenticide Act, as amended (FIFRA);</i>	Controls pesticide distribution, sale, and use. Requires licensing/certification for commercial applications and for sales of pesticides.
<i>Archaeological and Historical Preservation Act of 1974; 16 U.S.C. 469 et seq.</i>	Provides for the preservation of historical and archaeological data which might otherwise be lost or destroyed as a result of alteration of the terrain caused by any Federal construction project or federally licensed activity or program.
<i>Archaeological Resources Protection Act of 1979; (16 U.S.C. 470 et seq.) 32 CFR 22 and 229</i>	Protects archeological resources and sites on public lands and Indian lands.

### Federal Public Laws and Executive Orders

<i>National Defense Authorization Act of 1989, Public Law (P.L.) 101-189; Volunteer Partnership Cost-Share Program</i>	Amends two acts and establishes volunteer and partnership programs for natural and cultural resources management on DoD lands.
<i>Defense Appropriations Act of 1991, P.L. 101-511; Legacy Resource Management Program</i>	Establishes a program for the stewardship of biological, geophysical, cultural, and historic resources on DoD lands.
<i>Executive Order (EO) 11988, Floodplain Management</i>	Provides direction regarding actions of Federal agencies in floodplains, and requires permits from state and Federal review agencies for any construction within a 100-year floodplain.
<i>EO 11514, Protection and Enhancement of Environmental Quality</i>	Federal agencies shall initiate measures needed to direct their policies, plans, and programs to meet national environmental goals. They shall monitor, evaluate, and control agency activities to protect and enhance the quality of the environment.
<i>EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds</i>	Requires any federal agency taking actions that have or are likely to have a measurable negative effect on migratory bird populations to develop and implement an MOU with the USFWS to promote conservation of migratory bird populations.
<i>EO 11593, Protection and Enhancement of the Cultural Environment</i>	All Federal agencies are required to locate, identify, and record all cultural and natural resources. Cultural resources include sites of archaeological, historical, or architectural significance. Natural resources include the presence of endangered species, critical habitat, and areas of special biological significance.
<i>EO 11990, Protection of Wetlands</i>	Each Agency shall take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities.
<i>EO 11987, Exotic Organisms</i>	Agencies shall restrict the introduction of exotic species into the natural ecosystems on lands and waters that they administer.
<i>EO 12088, Federal Compliance With Pollution Control Standards.</i>	This EO delegates responsibility to the head of each executive agency for ensuring that all necessary actions are taken for the prevention, control, and abatement of environmental pollution. This order gives the Environmental Protection Agency authority to conduct reviews and inspections to monitor Federal facility compliance with pollution control standards.
<i>EO 12898, Environmental Justice</i>	This EO requires certain Federal agencies, including the DoD, to the greatest extent practicable permitted by law, to make environmental justice part of their missions by identifying and addressing disproportionately high and adverse health or environmental effects on minority and low-income populations.

<i>EO 13112, Exotic and Invasive Species</i>	This EO strives to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.
<i>EO 13045, Protection of Children from Environmental Health and Safety Risks</i>	This EO makes it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children. It also directs agencies to ensure that policies, programs, activities, and standards address such risks if identified.
<i>EO 13007, Indian Sacred Sites</i>	Directs protection of Indian sacred sites Federal lands and guarantees access to and ceremonial use of Indian sacred sites on Federal lands by Indian religious practitioners.
<i>EO 13175, Consultation and Coordination with Indian Tribal Governments</i>	Establishes requirement of and process for Nation-to-Nation consultation with Indian tribal governments with regards to the development of Federal policies that have tribal implications.

### DoD Policy, Directives and Instructions

<i>DoD Directive 4700.4, Natural Resources Management Program</i>	Requires that the ARNG implement and maintain a balanced and integrated program for the management of natural resources.
<i>DoD Directive 4715.1, Environmental Security</i>	Establishes policy for protecting, preserving, and (when required) restoring and enhancing the quality of the environment. This directive also ensures that environmental factors are integrated into DoD decision-making processes that may impact the environment, and are given appropriate consideration along with other relevant factors.
<i>DoD Annotated Policy on Indian Tribes and Alaska Natives</i>	Establishes DoD American Indian and Alaska Native Policy for interacting and working with federally recognized American Indian and Alaska Native governments (hereinafter referred to as “tribes”). It defines: protected tribal resources, tribal rights, and Indian lands.
<i>DoDI 4715.3, Environmental Conservation Program</i>	Implements policy, assigns responsibility, and prescribes procedures under <i>DoD Directive 4715.1</i> for the integrated management of natural and cultural resources on property under DoD control.

### Army Instructions and Directives

<i>AR 200-1, Environmental Protection and Enhancement</i>	As of 28 August 2007, this document supersedes all previous iterations of AR 200-1, AR 200-3, AR 200-4, and AR 200-5. Provides policies, standards and procedures for the following resource areas: NEPA, Natural Resources Management, Cultural Resources Management, Natural Resource Damage Assessment (NRDA), Real Property Acquisition, Outgrant and Disposal Transactions, Environmental Agreements, Environmental Compliance Assessments, Environmental Quality Control Committee (EQCC), Army Environmental Training Program, Installation/State Environmental Training Plans, ITAM, and Pest Management Program
<i>AR 350-19, The Army Sustainable Range Program (superseded AR 210-21)</i>	Assigns responsibilities and provides policy and guidance for managing and operating U.S. Army ranges and training lands to support their long-term viability and utility to meet the National defense mission.
<i>AR 350-4, Integrated Training Area Management (ITAM)</i>	Sets forth the objectives, responsibilities and policies for the ITAM program. ITAM establishes procedures to achieve optimum, sustainable use of training lands by implementing a uniform land management program and includes inventorying and monitoring land condition,

	integrating training requirements with land carrying capacity, educating land users to minimize adverse impacts, and providing for training land rehabilitation and maintenance.
HQDA INRMP Policy Memorandum (21 March 1997), <i>Army Goals and Implementing Guidance for Natural Resources Planning Level Surveys (PLS) and Integrated Natural Resources Management Plan (INRMP)</i>	Provides guidance to ensure that natural resource conservation measures and Army activities on mission land are integrated and are consistent with Federal stewardship requirements.

### Official Code of Georgia Annotated

<i>Georgia Water Quality Control Act; OCGA 12-5-20 et seq.</i>	Charges the Environmental Protection Division of the Department of Natural Resources with responsibility for maintaining and regulating the quality and quantity of water resources within the state of Georgia.
<i>Georgia Water Use Classifications and Water Quality Standards; Chap. 391-3-6-.03</i>	Establishes water quality standards for the state of Georgia for all water use classifications.
<i>Georgia Safe Drinking Water Act of 1977; OCGA 12-5-170 et seq.</i>	Charges the Environmental Protection Division with establishing and maintaining a program to ensure adequate water of the highest quality for water-supply systems.
<i>Comprehensive State-Wide Water Management Planning Act; OCGA 12-5-520 et seq.</i>	Charges the Environmental Protection Division with development and implementation of a plan to manage water resources in a sustainable manner to support the state's economy, protect public health and natural systems, and to enhance the quality of life for all citizens.
<i>Georgia Erosion and Sedimentation Act Of 1975 (amended 2003); OCGA 12-7-1 et seq.</i>	Sets policy for control of erosion and sedimentation and creates program for permitting of land-disturbing activities and penalties for violations.
<i>Georgia Pesticide Control Act of 1976; OCGA 2-7-50 et seq.</i>	Controls pesticide labeling, distribution, storage, transportation, and disposal of pesticides in the state of Georgia.
<i>Georgia Hazardous Waste Management Act; OCGA 12-8-60 et seq.</i>	Develops a comprehensive state-wide program for the management of hazardous wastes through the regulation of the generation, transportation, storage, treatment, and disposal of hazardous wastes.
<i>Georgia Air Quality Act; OCGA 12-9-1 et seq.</i>	Sets policy for control of air pollution and creates program for permitting, inspecting, and enforcing air quality regulations.
<i>Rules of the Georgia Department of Natural Resources, Wildlife Resources Division 391-4-1 et seq.</i>	Establishes rules and regulations for hunting, fishing, and protection of wildlife, both game and rare/unusual.
<i>Conservation of Historic Areas; OCGA 12-3-50 et seq.</i>	Charges the Department of Natural Resources, Office of the State Archaeologist, with protecting and promoting prehistoric and historic resources of the state.

## **APPENDIX F**

### **Animal and Plant Species found on VTS-Catoosa**

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<i>PHYLLOSTACHYS AUREA</i>	Bamboo	G
<i>SCHEDONORUS PHOENIX</i>	Tall fescue	G
<i>Scirpus cyperinus</i>	Woolgrass	G
<i>Scirpus validus</i>	Soft-stem bulrush	G
<i>SETARIA PUMILA ssp.PUMILA</i>	Yellow foxtail	G
<i>SETARIA VIRIDIS</i>	Green foxtail	G
<i>SORGHUM HALEPENSE</i>	Johnson grass	G
<i>Achillea millefolium</i>	Yarrow	H
<i>Actaea pachypoda</i>	Baneberry	H
<i>Allium canadense</i>	Wild onion	H
<i>ALLIUM VINEALE</i>	Wild garlic	H
<i>Ambrosia artemisiifolia</i>	Annual ragweed	H
<i>Ambrosia trifida</i>	Great ragweed	H
<i>Angelica triquinata</i>	Filmy angelica	H
<i>Antennaria plantaginifolia</i>	Woman's tobacco	H
<i>Antennaria solitaria</i>	Singlehead pussytoes	H
<i>Antennaria sp.</i>	Pussytoes	H
<i>Aplectrum hyemale</i>	Puttyroot orchid	H
<i>Apocynum cannabinum</i>	Indianhemp	H
<i>Arisaema dracontium</i>	Green dragon	H
<i>Arisaema triphyllum</i>	Jack-in-the-pulpit	H
<i>Aristolochia serpentaria</i>	Virginia snakeroot	H
<i>Arnoglossum reniforme</i>	Great Indian plantain	H
<i>Asarum canadense</i>	Canadian wildginger	H
<i>Asclepias amplexicaulis</i>	Clasping milkweed	H
<i>Asclepias tuberosa</i>	Butterfly-weed	H
<i>Asclepias variegata</i>	Redring milkweed	H
<i>Astilbe biternata</i>	Appalachian false goat's beard	H
<i>Aureolaria laevigata</i>	Entireleaf yellow false-foxtail	H
<i>Aureolaria virginica</i>	Downy yellow false-foxtail	H
<i>Baptisia sp. (white-flowered)</i>	Wild-indigo	H
<i>Bidens cernua</i>	Nodding beggartick	H
<i>Boehmeria cylindrica</i>	False nettle	H
<i>Cardamine angustata</i>	Slender toothwort	H
<i>Cardamine concatenata</i>	Cutleaf toothwort	H
<i>Cardamine diphylla</i>	Toothwort; crinkleroot	H
<i>Cardamine dissecta</i>	Forkleaf toothwort	H
<i>Cardamine spp.</i>	Bittercress	H
<i>Chamaecrista fasciculata var. fasciculata</i>	Partridge pea	H
<i>Chamaesyce maculate</i>	Spotted spurge; spotted sandmat	H
<i>Chimaphila maculata</i>	Spotted wintergreen	H
<i>Cicuta maculata</i>	Water hemlock	H

<i>Claytonia virginica</i>	Spring-beauty	H	
<i>Clitoria mariana</i>	Butterfly-pea, Atlantic pigeonwings	H	
<i>Collinsonia verticillata</i>	Stoneroot; whorled horse-balm	H	
<i>Conyza canadensis</i> var. <i>canadensis</i>	Canadian horseweed	H	
<i>Coreopsis major</i>	Greater tickseed	H	
<i>Coreopsis tripteris</i>	Tall tickseed	H	
<i>Crotalaria sagittalis</i>	Arrowhead rattlebox	H	
<i>Cynoglossum virginianum</i>	Wild comfrey	H	
<b>DAUCUS CAROTA</b>	Queen Anne's lace	H	
<i>Desmanthus illinoensis</i>	Illinois bundleflower	H	
<i>Desmodium nudiflorum</i>	Nakedflower ticktrefoil	H	
<i>Desmodium rotundifolium</i>	Prostrate ticktrefoil	H	
<i>Diodia virginiana</i>	Virginia buttonweed	H	
<i>Dodecatheon meadia</i>	Pride of Ohio; shooting star	H	
<i>Elephantopus carolinianus</i>	Carolina elephantsfoot	H	
<i>Enemion biternatum</i>	Eastern false rue anemone	H	
<i>Equisetum hyemale</i>	Scouringrush horsetail	H	
<i>Erigenia bulbosa</i>	Harbinger-of-spring	H	SC
<i>Erigeron annuus</i>	Eastern daisy fleabane	H	
<i>Erigeron philadelphicus</i>	Philadelphia fleabane	H	
<i>Eryngium prostratum</i>	Creeping coyote-thistle; creeping eryngo	H	
<i>Erythronium americanum</i>	Dogtooth violet	H	
<i>Euonymus americanus</i>	Bursting-heart	H	
<i>Eupatorium perfoliatum</i>	Common boneset	H	
<i>Eupatorium purpureum</i>	Joe-pye weed	H	
<i>Eupatorium rotundifolium</i>	Roundleaf thoroughwort	H	
<i>Eupatorium sessilifolium</i>	Upland boneset	H	
<i>Euphorbia corollata</i>	Flowering spurge	H	
<i>Fragaria virginiana</i>	Wild strawberry	H	
<i>Galium aparine</i>	Stickywilly	H	
<i>Galium triflorum</i>	Fragrant bedstraw	H	
<i>Geranium carolinianum</i>	Carolina geranium	H	
<i>Geranium maculatum</i>	Spotted geranium	H	
<i>Gillenia stipulata</i>	American ipecac	H	
<b>GLECHOMA HEDERACEA</b>	Ground-ivy	H	
<i>Goodyera pubescens</i>	Downy rattlesnake plantain	H	
<i>Helenium flexuosum</i>	Purple-headed sneezeweed	H	
<i>Helianthus tuberosus</i>	Jerusalem artichoke	H	
<i>Hepatica nobilis</i> var. <i>acuta</i>	Sharplobe hepatica	H	
<i>Hepatica nobilis</i> var. <i>obtusa</i>	Roundlobe hepatica	H	
<i>Heuchera americana</i>	American alumroot	H	

<i>Hexastylis arifolia</i> var. <i>ruthii</i>	Ruth's Little brown jug	H	
<i>Hieracium gronovii</i>	Hairy hawkweed; queendevil	H	
<i>Houstonia caerulea</i>	azure bluet	H	
<i>Houstonia purpurea</i> var. <i>purpurea</i>	Houstonia; Venus' pride	H	
<i>Hypoxis hirsuta</i>	Yellowstargrass; common goldstar	H	
<i>Impatiens capensis</i>	Jewelweed	H	
<i>Impatiens pallida</i>	Pale touch-me-not	H	
<i>Iris</i> spp.	Wild iris	H	
<i>Iris verna</i>	Dwarf iris	H	
<i>Justicia americana</i>	Waterwillow	H	
<i>Krigia</i> sp.	Dwarfdandelion	H	
<i>LAMIUM AMPLEXICAULE</i>	Henbit	H	
<i>LAMIUM PURPUREUM</i>	Purple dead nettle	H	
<i>LATHYRUS LATIFOLIUS</i>	Perennial pea	H	
<i>Lemna perpusilla</i>	Duckweed	H	
<i>LESPEDEZA BICOLOR</i>	Bicolor lespedeza; shrub lespedeza	H	
<i>LESPEDEZA CUNEATA</i>	Sericea lespedeza	H	
<i>LEUCANTHEMUM VULGARE</i>	Oxeye daisy	H	
<i>Liatris aspera</i>	Tall blazing star	H	
<i>Lobelia cardinalis</i>	Cardinalflower	H	
<i>Lobelia inflata</i>	Indian-tobacco	H	
<i>Ludwigia alternifolia</i>	Bushy seedbox	H	
<i>Lycopodium clavatum</i>	Running clubmoss	H	SC
<i>Lycopodium digitatum</i>	Ground pine; fan clubmoss	H	
<i>LYSIMACHIA NUMMULARIA</i>	Creeping Jennie	H	
<i>LYTHRUM SALICARIA</i>	Purple loosestrife	H	
<i>Maianthemum racemosum</i>	Feathery false lily of the valley	H	
<i>Matelea carolinensis</i>	Maroon Carolina milkvine	H	
<i>Medeola virginiana</i>	Indian cucumber	H	
<i>MENTHA SPICATA</i>	Spearmint	H	
<i>Mertensia virginica</i>	Virginia bluebells	H	SC
<i>Mimosa microphylla</i>	Littleleaf sensitive-briar	H	
<i>Mimulus ringens</i>	Allegheny monkeyflower	H	
<i>Mitchella repens</i>	Partridge-berry	H	
<i>Monarda fistulosa</i>	Wild bergamot	H	
<i>NARCISSUS</i>			
<i>PSEUDONARCISSUS</i>	Daffodil	H	
<i>NASTURTIUM OFFICINALE</i>	Watercress	H	
<i>Nothoscordum bivalve</i>	crowpoison	H	
<i>Nuttallanthus canadensis</i>	Canada toadflax	H	
<i>Oenothera biennis</i>	Common evening-primrose	H	
<i>ORNITHOGALUM</i>			
<i>UMBELLATUM</i>	sleepydick / star-of-bethlehem	H	

<i>Oxalis rosea</i>	sorrel	H	
<i>Oxalis stricta</i>	Common yellow oxalis	H	
<i>Oxalis violacea</i>	Violet woodsorrel	H	
<i>Packera glabella</i>	Butterweed	H	
<i>Packera obovata</i>	Roundleaf ragwort	H	
<i>Packera tomentosa</i>	Woolly ragwort	H	
<i>Panax quinquefolius</i>	American ginseng	H	SC
<i>Pedicularis canadensis</i>	Lousewort; wood betony	H	
<b>PERILLA FRUTESCENS</b>	Beefsteakplant	H	
<i>Phlox amoena</i>	Hairy phlox	H	
<i>Phlox divaricata</i>	Wild blue phlox	H	
<i>Phyla nodiflora</i>	turkey tangle fogfruit	H	
<i>Phytolacca americana</i>	American pokeweed	H	
<i>Pilea pumila</i>	Clearweed	H	
<b>PLANTAGA LANCEOLATA</b>	English plantain	H	
<i>Plantago major</i>	Common plantain	H	
<i>Podophyllum peltatum</i>	Mayapple	H	
<i>Polemonium reptans</i>	Greek valerian	H	SC
<i>Polygonum hydropiperoides</i>	Water-pepper; swamp smartweed	H	
<i>Polygonum pennsylvanicum</i>	Pennsylvania smartweed	H	
<i>Polygonum sagittatum</i>	Arrowleaf tearthumb	H	
<i>Polygonum virginianum</i>	Jumpseed	H	
<i>Potentilla canadensis</i>	Dwarf cinquefoil	H	
<i>Potentilla simplex</i>	Common cinquefoil	H	
<i>Prenanthes sp.</i>	Rattlesnakeroot	H	
<i>Prunella vulgaris</i>	Common selfheal	H	
<i>Pycnanthemum incanum</i>	Hoary mountainmint	H	
<i>Pycnanthemum loomisii</i>	Loomis' mountainmint	H	
<i>Pycnanthemum tenuifolium</i>	Narrowleaf mountainmint	H	
<i>Ranunculus abortivus</i>	Littleleaf buttercup	H	
<i>Ranunculus fascicularis</i>	Early buttercup	H	
<i>Ranunculus recurvatus</i>	Blisterwort	H	
<i>Rhexia mariana</i>	Maryland meadowbeauty	H	
<i>Rudbeckia hirta</i>	Black-eyed Susan	H	
<i>Ruellia carolinensis</i>	Carolina wild petunia	H	
<b>RUMEX CRISPUS</b>	Curly dock	H	
<i>Sagittaria latifolia</i>	Arrowhead	H	
<i>Salvia lyrata</i>	Lyreleaf sage	H	
<i>Salvia urticifolia</i>	Nettleleaf sage	H	
<i>Sanguinaria canadensis</i>	Bloodroot	H	
<i>Sanicula canadensis</i>	Canadian blacksnakeroot	H	
<i>Saururus cernuus</i>	Lizard's tail	H	
<i>Scutellaria elliptica</i>	Hairy skullcap	H	

<i>Scutellaria montana</i>	Large-flowered skullcap	H	LT	T
<i>Scutellaria ovata</i>	Heartleaf skullcap	H		
<b>SHERARDIA ARVENSIS</b>	Blue fieldmadder	H		
<i>Silene virginica</i>	Fire pink	H		
<i>Sisyrinchium mucronatum</i>	Needletip blue-eyed grass	H		
<i>Smallanthus uvedalius</i>	Hairy leafcup	H		
<i>Solanum carolinense</i>	Carolina horsenettle	H		
<i>Solidago gigantea</i>	Giant goldenrod	H		
<i>Sparganium spp.</i>	Bur-reed	H		
<i>Spigelia marilandica</i>	Woodland pinkroot	H		
<b>STELLARIA MEDIA</b>	Common chickweed	H		
<i>Stellaria pubera</i>	Star chickweed	H		
<i>Symphyotrichum cordifolium</i>	Common blue wood aster	H		
<i>Symphyotrichum pilosum var. pilosum</i>	White heath aster	H		
<i>Symphyotrichum praealtum</i>	Willowleaf aster	H		SC
<b>TARAXACUM OFFICINALE</b>	Dandelion	H		
<i>Thalictrum thalictroides</i>	Rue anemone	H		
<i>Tiarella cordifolia</i>	heartleaf foamflower	H		
<i>Tipularia discolor</i>	Crippled crane fly	H		
<i>Tradescantia hirsuticaulis</i>	hairystem spiderwort	H		
<i>Tradescantia subaspera</i>	zigzag spiderwort	H		
<i>Tradescantia virginiana</i>	Virginia spiderwort	H		
<b>TRIFOLIUM REPENS</b>	White clover	H		
<i>Trillium catesbaei</i>	Catesby's wakerobin; bashful wakerobin	H		
<i>Trillium luteum</i>	Yellow trillium; yellow wakerobin	H		
<i>Trillium rugelii</i>	Southern nodding trillium; ill-scented wakerobin	H		
<i>Triodanis perfoliata</i>	Clasping Venus' looking-glass	H		
<i>Typha latifolia</i>	Cattail	H		
<i>Urtica sp.</i>	Stinging nettle	H		
<i>Uvularia perfoliata</i>	Perfoliate bellwort	H		
<i>Uvularia sessilifolia</i>	Sessileleaf bellwort	H		
<i>Valerianella radiata</i>	Beaked cornsalad	H		
<b>VERBASCUM THAPSUS</b>	Woolly mullein	H		
<i>Verbesina alternifolia</i>	Wingstem	H		
<i>Verbesina occidentalis</i>	Yellow crownbeard	H		
<i>Verbesina virginica</i>	White crownbeard	H		
<i>Vernonia sp.</i>	Ironweed	H		
<b>VERONICA PERSICA</b>	Speedwell	H		
<i>Vicia caroliniana</i>	Carolina vetch	H		
<b>VINCA MINOR</b>	Periwinkle	H		
<i>Viola blanda</i>	Sweet white violet	H		

<i>Viola hirsutula</i>	Southern woodland violet	H	
<i>Viola palmata</i>	Early blue violet	H	
<i>Viola pedata</i>	Bird-foot violet	H	
<i>Viola sororia</i>	Common blue violet	H	
<i>Xanthium strumarium</i>	Rough cocklebur	H	
<i>Xyris sp.</i>	Yellow-eyed grass	H	
<i>Alnus serrulata</i>	Smooth alder	S	
<i>Amorpha fruticosa</i>	False indigo-bush	S	
<i>Asimina triloba</i>	Pawpaw	S	
<i>Callicarpa americana</i>	American beautyberry	S	
<i>Calycanthus floridus</i>	Eastern sweetshrub	S	
<i>Ceanothus americanus</i>	New Jersey Tea	S	
<i>Cephalanthus occidentalis</i>	Buttonbush	S	
<i>Cornus amomum</i>	Silky dogwood	S	
<i>Corylus americana</i>	American hazelnut	S	
<i>Cuscuta spp.</i>	Dodder	S	
<i>Dirca palustris</i>	Leatherwood	S	
<i>Gaylussacia baccata</i>	Black huckleberry	S	
<i>Gelsemium sempervirens</i>	Carolina jessamine; evening trumpetflower	S	
<i>Hamamelis virginiana</i>	American witchhazel	S	
<i>Hydrangea arborescens</i>	Wild hydrangea	S	
<i>Hypericum galioides</i>	Bedstraw St. Johnswort	S	
<i>Kalmia latifolia</i>	Mountain laurel	S	
<b>LIGUSTRUM SINENSE</b>	Chinese privet	S	
<i>Lindera benzoin</i>	Spicebush	S	
<i>Phoradendron leucarpum</i>	Oak mistletoe	S	
<i>Physocarpus opulifolius</i>	Ninebark	S	
<i>Rhododendron periclymenoides</i>	Pink azalea	S	
<i>Rhododendron sp.</i>	Azalea	S	
<i>Rhus aromatica</i>	Fragrant sumac	S	
<i>Rhus copallinum</i>	Winged sumac	S	
<i>Rhus glabra</i>	Smooth sumac	S	
<i>Rhus typhina</i>	Staghorn sumac	S	SC
<i>Rosa carolina</i>	Carolina rose	S	
<b>ROSA MULTIFLORA</b>	Multiflora rose	S	
<i>Rubus alleghaniensis</i>	Blackberry	S	
<i>Rubus hispidus</i>	Dewberry	S	
<i>Rubus occidentalis</i>	Black raspberry	S	
<b>RUBUS PHOENICOLASIUS</b>	Wineberry	S	
<i>Salix discolor</i>	Pussy willow	S	
<i>Sambucus nigra ssp. Canadensis</i>	Common elderberry	S	
<i>Staphylea trifolia</i>	Bladderpod	S	

<i>Symphoricarpos orbiculatus</i>	Coralberry	S
<i>Toxicodendron radicans</i>	Poison-ivy	S
<i>Vaccinium arboreum</i>	Farkleberry	S
<i>Vaccinium corymbosum</i>	Highbush blueberry	S
<i>Vaccinium pallidum</i>	Low bush blueberry	S
<i>Vaccinium stamineum</i>	Deerberry	S
<i>Viburnum acerifolium</i>	Maple leaf viburnum	S
<i>Viburnum dentatum</i>	Southern arrowwood	S
<i>Viburnum nudum</i>	Possumhaw	S
<i>Viburnum prunifolium</i>	Blackhaw	S
<i>Viburnum rufidulum</i>	Rusty blackhaw	S
<i>Yucca filamentosa</i>	Adam's needle	S
<i>Acer barbatum</i>	Southern sugar maple	T
<i>Acer negundo</i>	Boxelder	T
<i>Acer rubrum</i>	Red maple	T
<i>Acer saccharinum</i>	Silver maple	T
<i>Aesculus flava</i>	Yellow buckeye	T
<i>AILANTHUS ALTISSIMA</i>	Tree-of-heaven	T
<i>ALBIZIA JULIBRISSIN</i>	Mimosa	T
<i>Amelanchier arborea</i>	Downy serviceberry	T
<i>Aralia spinosa</i>	Devil's- walking stick	T
<i>Betula nigra</i>	River birch	T
<i>Carpinus caroliniana</i>	Ironwood	T
<i>Carya alba</i>	Mockernut hickory	T
<i>Carya cordiformis</i>	Bitternut hickory	T
<i>Carya glabra</i>	Pignut hickory	T
<i>Carya ovalis</i>	Red hickory	T
<i>Carya ovata</i>	Shagbark hickory	T
<i>Carya pallida</i>	Sand hickory	T
<i>Castanea dentata</i>	American chestnut	T
<i>Celtis occidentalis</i>	Northern hackberry	T
<i>Cercis canadensis</i>	Redbud	T
<i>Cornus florida</i>	Dogwood	T
<i>Crataegus sp.</i>	Hawthorne	T
<i>Diospyros virginiana</i>	Persimmon	T
<i>Fagus grandifolia</i>	American beech	T
<i>Frangula caroliniana</i>	Carolina buckthorn	T
<i>Fraxinus americana</i>	White ash	T
<i>Fraxinus pennsylvanica</i>	Green ash	T
<i>Gleditsia triacanthos</i>	Honeylocust	T
<i>Ilex opaca</i>	American holly	T
<i>Juglans nigra</i>	Black walnut	T
<i>Juniperus virginiana</i>	Eastern redcedar	T

<i>Liquidambar styraciflua</i>	Sweetgum	T
<i>Liriodendron tulipifera</i>	Tuliptree; yellow-poplar	T
<i>Maclura pomifera</i>	Osage orange	T
<i>Magnolia macrophylla</i>	Bigleaf magnolia	T
<i>Morus rubra</i>	Red mulberry	T
<i>Nyssa sylvatica</i>	Blackgum	T
<i>Ostrya virginiana</i>	Eastern hophornbeam	T
<i>Oxydendrum arboreum</i>	Sourwood	T
<b>PAULOWNIA TOMENTOSA</b>	Princess-tree	T
<i>Pinus echinata</i>	Shortleaf pine	T
<i>Pinus taeda</i>	Loblolly pine	T
<i>Pinus virginiana</i>	Virginia pine	T
<i>Planera aquatica</i>	Water elm; planertree	T
<i>Platanus occidentalis</i>	Sycamore	T
<i>Prunus americana</i>	American plum	T
<i>Prunus serotina</i>	Black cherry	T
<i>Quercus alba</i>	White oak	T
<i>Quercus falcata</i>	Southern red oak	T
<i>Quercus marilandica</i>	Blackjack oak	T
<i>Quercus michauxii</i>	Swamp chestnut oak	T
<i>Quercus phellos</i>	Willow oak	T
<i>Quercus prinus</i>	Chestnut oak	T
<i>Quercus rubra</i>	Northern red oak	T
<i>Quercus shumardii</i>	Shumard oak	T
<i>Quercus stellata</i>	Post oak	T
<i>Quercus velutina</i>	Black oak	T
<i>Robinia pseudoacacia</i>	Black locust	T
<i>Salix nigra</i>	Black willow	T
<i>Sassafras albidum</i>	Sassafras	T
<i>Tilia americana</i>	American basswood	T
<i>Ulmus alata</i>	Winged elm	T
<i>Ulmus americana</i>	American elm	T
<i>Ulmus rubra</i>	Slippery elm	T
<i>Amphicarpaea bracteata</i>	American hogpeanut	V
<i>Apios americana</i>	Groundnut	V
<i>Berchemia scandens</i>	Alabama supplejack	V
<i>Bignonia capreolata</i>	Crossvine	V
<i>Campsis radicans</i>	Trumpet creeper	V
<i>Clematis virginiana</i>	Virgin's bower	V
<b>DIOSCOREA OPPOSITIFOLIA</b>	Chinese yam	V
<i>Dioscorea villosa</i>	Wild yam	V
<b>EUONYMUS FORTUNEI</b>	Wintercreeper	V
<i>Ipomoea pandurata</i>	Wild potato vine	V

<i>LONICERA JAPONICA</i>	Japanese honeysuckle	V
<i>Lonicera sempervirens</i>	Trumpet honeysuckle	V
<i>Menispermum canadense</i>	Canada moonseed	V
<i>Parthenocissus quinquefolia</i>	Virginia creeper	V
<i>Passiflora incarnata</i>	Purple passion-flower	V
<i>Passiflora lutea</i>	Yellow passionflower	V
<i>PUERARIA MONTANA</i>	kudzu	V
<i>Smilax bona-nox</i>	Saw greenbriar	V
<i>Smilax glauca</i>	Catbriar	V
<i>Smilax hugeri</i>	Huger's carrionflower	V
<i>Smilax rotundifolia</i>	Common greenbriar	V
<i>Smilax tamnoides</i>	Bristly greenbriar	V
<i>Vitis cinerea</i>	Graybark grape	V
<i>Vitis labrusca</i>	Fox grape	V
<i>Vitis rotundifolia</i>	Wild grape; muscadine	V

## VERTEBRATE SPECIES

Federal Status abbreviations:

LE = listed as endangered

LT = listed as threatened

PS = listed as threatened or endangered in a portion of native range (none are protected within GA)

State Status abbreviations:

E = state listed as endangered

T = state listed as threatened

R = rare species

SC = special concern species

### Amphibians

Common Name	Scientific Name	Federal Status	State Status
Blanchard's tree frog	<i>Acris crepitans blanchardi</i>		
northern cricket frog	<i>Acris crepitans crepitans</i>		
spotted salamander	<i>Ambystoma maculatum</i>		
American toad	<i>Bufo americanus</i>		
Fowler's toad	<i>Bufo woodhousii fowleri</i>		
spotted dusky salamander	<i>Desmognathus conanti</i>		
mountain dusky salamander	<i>Desmognathus ochrophaeus</i>		
blackbelly salamander	<i>Desmognathus quadramaculatus</i>		
southern two-lined salamander	<i>Eurycea cirrigera</i>		
eastern narrowmouth toad	<i>Gastrophryne carolinensis</i>		
gray treefrog	<i>Hyla versicolor</i>		
red-spotted newt	<i>Notophthalmus viridescens</i>		
slimy salamander	<i>Plethodon glutinosus</i>		
mountain chorus frog	<i>Pseudacris brachyphona</i>		SC
spring peeper	<i>Pseudacris crucifer</i>		
upland chorus frog	<i>Pseudacris feriarum</i>		
bullfrog	<i>Rana catesbeiana</i>		
green frog	<i>Rana clamitans melanota</i>		
pickerel frog	<i>Rana palustris</i>		
wood frog	<i>Rana sylvatica</i>		
southern leopard frog	<i>Rana utricularia</i>		

### Reptiles

Common Name	Scientific Name	Federal Status	State Status
common snapping turtle	<i>Chelydra serpentina</i>		
painted turtle	<i>Chrysemys picta picta</i>		
northern black racer	<i>Coluber constrictor</i>		
timber rattlesnake	<i>Crotalus horridus</i>		
black rat snake	<i>Elaphe obsoleta obsoleta</i>		
five-lined skink	<i>Eumeces fasciatus</i>		
common map turtle	<i>Graptemys geographica</i>		R
black kingsnake	<i>Lampropeltis getula nigra</i>		

scarlet king snake	<i>Lampropeltis triangulum elapsoides</i>
common water snake	<i>Nerodia sipedon</i>
midland water snake	<i>Nerodia sipedon pleuralis</i>
rough green snake	<i>Opheodrys aestivus</i>
queen snake	<i>Regina septemvittata</i>
eastern fence lizard	<i>Sceloporus undulatus</i>
box turtle	<i>Terrapene carolina</i>
common slider	<i>Trachemys scripta</i>
red-eared slider	<i>Trachemys scripta elegans</i>
softshell turtle	<i>Trionyx sp.</i>

## Fish

Common Name	Scientific Name	Federal Status	State Status
rock bass	<i>Ambloplites rupestris</i>		
yellow bullhead	<i>Ameiurus natalis</i>		
stoneroller	<i>Campostoma anomalum</i>		
large scale stoneroller	<i>Campostoma oligolepis</i>		
white sucker	<i>Catostomus commersonii</i>		
banded sculpin	<i>Cottus carolinae</i>		
greenside darter	<i>Etheostoma blennioides</i>		
rainbow darter	<i>Etheostoma caeruleum</i>		
blueside darter	<i>Etheostoma jessiae</i>		SC
redline darter	<i>Etheostoma rufilineatum</i>		SC
Tennessee snubnose darter	<i>Etheostoma simoterum</i>		
banded darter	<i>Etheostoma zonale</i>		SC
blackstripe topminnow	<i>Fundulus notatus</i>		
blackspotted topminnow	<i>Fundulus olivaceus</i>		
western mosquitofish	<i>Gambusia affinis</i>		
bigeye chub	<i>Hybopsis amplops</i>		
northern hog sucker	<i>Hypentilium nigricans</i>		
mountain brook lamprey	<i>Ichthyomyzon greeleyi</i>		
least brook lamprey	<i>Lampetra aepyptera</i>		
redbreast sunfish	<i>Lepomis auritus</i>		
redbreast-green hybrid	<i>Lepomis auritus X cyanellus</i>		
green sunfish	<i>Lepomis cyanellus</i>		
green-redear hybrid	<i>Lepomis cyanellus X microlophus</i>		
warmouth	<i>Lepomis gulosus</i>		
warmouth-bluegill hybrid	<i>Lepomis gulosus X macrochirus</i>		
bluegill	<i>Lepomis macrochirus</i>		
longear sunfish	<i>Lepomis megalotis</i>		
redear sunfish	<i>Lepomis microlophus</i>		
striped shiner	<i>Luxilus chrysocephalus</i>		
warpaint shiner	<i>Luxilus coccogenis</i>		
scarlet shiner	<i>Lythrurus fasciolaris</i>		SC
redeye bass	<i>Micropterus coosae</i>		
spotted bass	<i>Micropterus punctulatus</i>		
largemouth bass	<i>Micropterus salmoides</i>		
black redhorse	<i>Moxostoma duquesnei</i>		

golden redhorse	<i>Moxostoma erythrurum</i>	
logperch	<i>Percina caprodes</i>	
stargazing minnow	<i>Phenacobius uranops</i>	T
bluntnose minnow	<i>Pimephales notatus</i>	
black crappie	<i>Pomoxis nigromaculatus</i>	
blacknose dace	<i>Rhinichthys atratulus</i>	
creek chub	<i>Semotilus atromaculatus</i>	

**Birds**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Federal Status</b>	<b>State Status</b>
Cooper’s Hawk	<i>Accipiter cooperii</i>		
Sharp-shinned Hawk	<i>Accipiter striatus</i>	PS	
Red-winged Blackbird	<i>Agelaius phoeniceus</i>		
Wood Duck	<i>Aix sponsa</i>		
Green-winged Teal	<i>Anas carolinensis</i>		
Mallard	<i>Anas platyrhynchos</i>		
American Black Duck	<i>Anas rubripes</i>		
American Pipit	<i>Anthus rubescens</i>		
Ruby-throated Hummingbird	<i>Archilochus colubris</i>		
Great Egret	<i>Ardea alba</i>		
Great Blue Heron	<i>Ardea herodias</i>		
Ring-necked Duck	<i>Aythya collaris</i>		
Tufted Titmouse	<i>Baeolophus bicolor</i>		
Cedar Waxwing	<i>Bombycilla cedrorum</i>		
Canada Goose	<i>Branta canadensis</i>		
Great Horned Owl	<i>Bubo virginianus</i>		
Red-tailed Hawk	<i>Buteo jamaicensis</i>		
Red-shouldered Hawk	<i>Buteo lineatus</i>		
Broad-winged Hawk	<i>Buteo platypterus</i>	PS	
Green Heron	<i>Butorides virescens</i>		
Pectoral Sandpiper	<i>Calidris melanotos</i>		
Chuck-will’s-widow	<i>Caprimulgus carolinensis</i>		
Whip-poor-will	<i>Caprimulgus vociferus</i>		
Northern Cardinal	<i>Cardinalis cardinalis</i>		
American Goldfinch	<i>Carduelis tristis</i>		
House Finch	<i>Carpodacus mexicanus</i>		Exotic
Turkey Vulture	<i>Cathartes aura</i>		
Hermit Thrush	<i>Catharus guttatus</i>		
Swainson’s Thrush	<i>Catharus ustulatus</i>		
Brown Creeper	<i>Certhia americana</i>		
Belted Kingfisher	<i>Ceryle alcyon</i>		
Chimney Swift	<i>Chaetura pelagica</i>		
Killdeer	<i>Charadrius vociferus</i>		
Northern Harrier	<i>Circus cyaneus</i>		
Sedge Wren	<i>Cistothorus platensis</i>		
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	PS	
Northern Flicker	<i>Colaptes auratus</i>		
Northern Bobwhite	<i>Colinus virginianus</i>	PS	
Eastern Wood-Pewee	<i>Contopus virens</i>		

Black Vulture	<i>Coragyps atratus</i>	
American Crow	<i>Corvus brachyrhynchos</i>	
Blue Jay	<i>Cyanocitta cristata</i>	
Cerulean Warbler	<i>Dendroica cerulea</i>	R
Yellow-rumped Warbler	<i>Dendroica coronata</i>	
Prairie Warbler	<i>Dendroica discolor</i>	
Yellow-throated Warbler	<i>Dendroica dominica</i>	
Magnolia Warbler	<i>Dendroica magnolia</i>	
Palm Warbler	<i>Dendroica palmarum</i>	
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	
Pine Warbler	<i>Dendroica pinus</i>	
Black-throated Green Warbler	<i>Dendroica virens</i>	
Bobolink	<i>Dolichonyx oryzivorus</i>	
Pileated Woodpecker	<i>Dryocopus pileatus</i>	
Gray Catbird	<i>Dumetella carolinensis</i>	
Least Flycatcher	<i>Empidonax minimus</i>	SC
Acadian Flycatcher	<i>Empidonax virescens</i>	
American Kestrel	<i>Falco sparverius</i>	
Wilson's Snipe	<i>Gallinago delicata</i>	
Common Yellowthroat	<i>Geothlypis trichas</i>	
Sandhill Crane	<i>Grus canadensis</i>	PS
Worm-eating Warbler	<i>Helmitheros vermivorum</i>	
Barn Swallow	<i>Hirundo rustica</i>	
Wood Thrush	<i>Hylocichla mustelina</i>	
Yellow-breasted Chat	<i>Icteria virens</i>	
Orchard Oriole	<i>Icterus spurius</i>	
Dark-eyed Junco	<i>Junco hyemalis</i>	
Hooded Merganser	<i>Lophodytes cucullatus</i>	
Eastern Screech-owl	<i>Megascops asio</i>	
Eastern Screech-owl	<i>Megascops asio</i>	
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>	
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	
Wild Turkey	<i>Meleagris gallapavo</i>	
Swamp Sparrow	<i>Melospiza georgiana</i>	
Song Sparrow	<i>Melospiza melodia</i>	
Northern Mockingbird	<i>Mimus polyglottos</i>	
Black-and-white Warbler	<i>Mniotilta varia</i>	
Brown-headed Cowbird	<i>Molothrus ater</i>	
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	
Connecticut Warbler	<i>Oporornis agilis</i>	
Kentucky Warbler	<i>Oporornis formosus</i>	
Northern Parula	<i>Parula americana</i>	
Savannah Sparrow	<i>Passerculus sandwichensis</i>	
Fox Sparrow	<i>Passerella iliaca</i>	
Blue Grosbeak	<i>Passerina caerulea</i>	
Indigo Bunting	<i>Passerina cyanea</i>	
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	

Downy Woodpecker	<i>Picoides pubescens</i>	
Hairy Woodpecker	<i>Picoides villosus</i>	
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	
Scarlet Tanager	<i>Piranga olivacea</i>	
Summer Tanager	<i>Piranga rubra</i>	
Carolina Chickadee	<i>Poecile carolinensis</i>	
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	
Vesper Sparrow	<i>Pooecetes gramineus</i>	
Purple Martin	<i>Progne subis</i>	
Common Grackle	<i>Quiscalus quiscula</i>	
Ruby-crowned Kinglet	<i>Regulus calendula</i>	
Golden-crowned Kinglet	<i>Regulus satrapa</i>	
Eastern Phoebe	<i>Sayornis phoebe</i>	
American Woodcock	<i>Scolopax minor</i>	
Ovenbird	<i>Seiurus aurocapilla</i>	
Louisiana Waterthrush	<i>Seiurus motacilla</i>	
American Redstart	<i>Setophaga ruticilla</i>	
Eastern Bluebird	<i>Sialia sialis</i>	
Red-breasted nuthatch	<i>Sitta canadensis</i>	
White-breasted Nuthatch	<i>Sitta carolinensis</i>	
Brown-headed Nuthatch	<i>Sitta pusilla</i>	
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	
Chipping Sparrow	<i>Spizella passerina</i>	
Field Sparrow	<i>Spizella pusilla</i>	
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	
Barred Owl	<i>Strix varia</i>	
European Starling	<i>Stumus vulgaris</i>	Exotic
Eastern Meadowlark	<i>Sturnella magna</i>	
Tree Swallow	<i>Tachycineta bicolor</i>	
Carolina Wren	<i>Thryothorus ludovicianus</i>	
Brown Thrasher	<i>Toxostoma rufum</i>	
Solitary Sandpiper	<i>Tringa solitaria</i>	
House Wren	<i>Troglodytes aedon</i>	
Winter Wren	<i>Troglodytes troglodytes</i>	SC
American Robin	<i>Turdus migratorius</i>	
Eastern Kingbird	<i>Tyrannus tyrannus</i>	
Tennessee Warbler	<i>Vermivora peregrina</i>	
Blue-winged Warbler	<i>Vermivora pinus</i>	
Nashville Warbler	<i>Vermivora ruficapilla</i>	
Yellow-throated Vireo	<i>Vireo flavifrons</i>	
White-eyed Vireo	<i>Vireo griseus</i>	
Red-eyed Vireo	<i>Vireo olivaceus</i>	
Philadelphia Vireo	<i>Vireo philadelphicus</i>	
Canada Warbler	<i>Wilsonia canadensis</i>	
Hooded Warbler	<i>Wilsonia citrina</i>	
Mourning Dove	<i>Zenaida macroura</i>	
White-throated Sparrow	<i>Zonotrichia albicollis</i>	

**Mammals**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Federal Status</b>	<b>State Status</b>
domestic dog	<i>Canis familiaris</i>		
coyote	<i>Canis latrans</i>		
beaver	<i>Castor canadensis</i>		
Virginia opossum	<i>Didelphis virginianus</i>		
red bat	<i>Lasiurus borealis</i>		
hoary bat	<i>Lasiurus cinereus</i>		
North American river otter	<i>Lontra canadensis</i>		
bobcat	<i>Lynx rufus</i>		
groundhog	<i>Marmota monax</i>		
striped skunk	<i>Mephitis mephitis</i>		
meadow vole	<i>Microtus pennsylvanicus</i>		
pine/woodland vole	<i>Microtus pinetorum</i>		
mink	<i>Mustela vison</i>		
gray bat	<i>Myotis grisescens</i>	LE	E
little brown bat	<i>Myotis lucifugus</i>		
northern long-eared bat	<i>Myotis septentrionalis</i>		
evening bat	<i>Nycticeius humeralis</i>		
golden mouse	<i>Ochrotomys nuttalli</i>		
white-tailed deer	<i>Odocoileus virginianus</i>		
muskrat	<i>Ondatra zibethicus</i>		
marsh rice rat	<i>Oryzomys palustris</i>		
cotton mouse	<i>Peromyscus gossypinus</i>		
white-footed mouse	<i>Peromyscus leucopus</i>		
deer mouse	<i>Peromyscus maniculatus</i>		
eastern pipistrelle	<i>Pipistrellus subflavus</i>		
raccoon	<i>Procyon lotor</i>		
eastern harvest mouse	<i>Reithrodontomys humulis</i>		
eastern gray squirrel	<i>Sciurius carolinensis</i>		
fox squirrel	<i>Sciurius niger</i>		
hispid cotton rat	<i>Sigmodon hispidus</i>		
eastern cottontail	<i>Sylvilagus floridanus</i>		
marsh rabbit	<i>Sylvilagus palustris</i>		
eastern chipmunk	<i>Tamias striatus</i>		
gray fox	<i>Urocyon cinereoargenteus</i>		
red fox	<i>Vulpes vulpes</i>		

## AQUATIC INVERTEBRATES

Phylum	Class	Order	Family	Species	State Status
COELENTERATA	Hydrozoa		Hydridae	<i>Hydra americana</i>	
PLATYHELMINTHES	Turbellaria	Tricladida	Dugesiidae	<i>Girardia (Dugesia) tigrina</i> <i>Cura foremanii</i>	
NEMATODA	unk	unk	unk	undetermined sp.	
MOLLUSCA	Gastropoda	Basommatophora	Ancylidae	<i>Ferrissia rivularis</i>	
			Lymnaeidae	<i>Fossaria sp.</i>	
			Physidae	<i>Physella sp.</i>	
			Planorbidae	<i>Gyraulus parvus</i>	
			Pleuroceridae	<i>Elimia cf. Clavaeformis</i> <i>Elimia sp.</i> <i>Leptoxis praerosa</i>	SC
	Bivalvia	Veneroida	Viviparidae	<i>Campelema decisum</i>	
			Corbiculidae	<i>Corbicula fluminea</i>	
			Sphaeriidae	<i>Musculium parturiseum</i> <i>Musculium transversum</i> <i>Pisidium sp.</i> <i>Sphaerium fabale</i> <i>Sphaerium sp.</i>	
ANNELIDA	Clitellata	Branchiobdellida	Branchiobdellidae	undetermined sp.	
		Haplotaxida	Enchytraeidae	undetermined sp.	
			Lumbricidae	undetermined sp.	
			Naididae	<i>Arcteonais lomondi</i> <i>Dero sp.</i> <i>Nais bretscheri</i> <i>Nais bretscheri</i>	

ANNELIDA	Clitellata	Haplotaxida	Naididae	<i>Nais communis</i>		
				<i>Nais sp.</i>		
				<i>Slavina appendiculata</i>		
				<i>Stylaria lacustris</i>		
				undetermined sp.		
		Lumbriculida	Tubificida	Lumbriculidae	undetermined sp.	
					Tubificidae w.o.h.c.	<i>Limnodrilus claparedianus</i>
						<i>Limnodrilus hoffmeisteri</i>
						<i>Limnodrilus sp.</i>
						undetermined sp.
<i>Helobdella sp.</i>						
	Hirudinea	Rhynchobdellida	Glossiphoniidae			
ARTHROPODA	Arachnida	Acariformes	Hygrobatidae	<i>Atractides sp.</i>		
			Lebertiidae	<i>Lebertia sp.</i>		
	Crustacea	Amphipoda	Crangonyctidae	<i>Crangonyx sp.</i>		
			Hyalellidae	<i>Hyalella azteca</i>		
			Chydoridae	<i>Alona sp.</i>		
		Daphnida	Daphniidae	<i>Daphnia sp.</i>		
			unk	undetermined sp.		
			unk	undetermined sp.		
			unk	undetermined sp.		
		Decapoda	Cambaridae	<i>Cambarus sp.</i>		
				<i>Orconectes sp.</i>		
				<i>Procambarus sp.</i>		
				<i>Caecidotea sp.</i>		
				<i>Lirceus sp.</i>		
				<i>Candona sp.</i>		
	Insecta	Coleoptera	Candoniidae	undetermined sp.		
			unk	undetermined sp.		
			Curculionidae	<i>Copelatus sp.</i>		
			Dryopidae	<i>Helichus basalis</i>		
				<i>Helichus sp.</i>		
<i>Hydroporus sp.</i>						
			Dytiscidae	<i>Ancyronyx variegata</i>		
	Elmidae	<i>Dubiraphia quadrinotata</i>				
		<i>Dubiraphia sp.</i>				

ARTHROPODA	Insecta	Coleoptera	Elmidae	
				<i>Dubiraphia vittata</i>
				<i>Macronychus glabratus</i>
				<i>Microcylloepus pusillus</i>
				<i>Optioservus ovalis</i>
				<i>Optioservus sp.</i>
				<i>Oulimnius latiusculus</i>
				<i>Promoresia sp.</i>
				<i>Stenelmis sp.</i>
			Gyrinidae	<i>Dineutus sp.</i>
			Haliplidae	<i>Peltodytes sp.</i>
			Hydrophilidae	<i>Helochares sp.</i>
				<i>Stactobiella sp.</i>
			Psephenidae	<i>Psephenus herricki</i>
			Ptilodactylidae	<i>Anchytarsus bicolor</i>
			Scirtidae	<i>Cyphon sp.</i>
		Collembola	unk	undetermined sp.
		Diptera	Athericidae	<i>Atheric lantha</i>
			Ceratopogonidae	<i>Bezzia/Palpomyia gp.</i>
			Chaoboridae	<i>Chaoborus punctipennis</i>
			Chironomidae	<i>Lopescladius sp.</i>
				<i>Ablabesmyia annulata</i>
				<i>Ablabesmyia mallochi</i>
				<i>Ablabesmyia rhamphe gp.</i>
				<i>Ablabesmyia sp.</i>
				<i>Brillia flavifrons</i>
				<i>Cardiocladius obscurus</i>
				<i>Chaetocladius sp.</i>
				<i>Chironomus sp.</i>
				<i>Cladopelma sp.</i>
				<i>Cladotanytarsus sp.</i>
				<i>Clinotanypus pinguis</i>
				<i>Clinotanypus sp.</i>
				<i>Conchapelopia sp.</i>
				<i>Corynoneura sp.</i>
				<i>Cricotopus bicinctus</i>
				<i>Cricotopus sp.</i>

ARTHROPODA	Insecta	Diptera	Chironomidae	<i>Cricotopus tremulus</i> <i>Cryptochironomus fulvus</i> <i>Cryptochironomus sp.</i> <i>Diamesa sp.</i> <i>Dicrotendipes neomodestus</i> <i>Dicrotendipes sp.</i> <i>Diplocladius cultriger</i> <i>Einfeldia natchitocheae</i> <i>Eukiefferiella claripennis gp.</i> <i>Eukiefferiella devonica gp.</i> <i>Hydrobaenus sp.</i> <i>Larsia sp.</i> <i>Limnophyes sp.</i> <i>Micropsectra sp.</i> <i>Microtendipes pedellus gp.</i> <i>Microtendipes sp.</i> <i>Monopelopia sp.</i> <i>Nanocladius sp.</i> <i>Natarsia sp.</i> <i>Nilotanypus fimbriatus</i> <i>Nilotanypus sp.</i> <i>Orthocladius (Symposiocladius)</i> <i>lignicola</i> <i>Orthocladius sp.</i> <i>Pagastia sp.</i> <i>Paracladopelma sp.</i> <i>Parakiefferiella sp.</i> <i>Paralauterborniella</i> <i>nigrohalteralis</i> <i>Parametriocnemus lundbecki</i> <i>Parametriocnemus sp.</i> <i>Paratanytarsus sp.</i> <i>Paratendipes sp.</i> <i>Pentaneura sp.</i> <i>Phaenopsectra punctipes gp.</i> <i>Phaenopsectra sp.</i> <i>Polypedilum flavum (convictum)</i>
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ARTHROPODA	Insecta	Diptera	Chironomidae	<i>Polypedilum halterale gp.</i> <i>Polypedilum illinoense</i> <i>Polypedilum sp.</i> <i>Pothastia longimana</i> <i>Procladius bellus</i> <i>Procladius sp.</i> <i>Prodiamesa olivacea</i> <i>Psectrocladius sp.</i> <i>Psectrocladius sp.</i> <i>Pseudochironomus sp.</i> <i>Pseudorthocladius sp.</i> <i>Rheocricotopus robacki</i> <i>Rheocrocotopus glacricollis</i> <i>Rheotanytarsus exiguus gp.</i> <i>Rheotanytarsus sp.</i> <i>Smittia sp.</i> <i>Stempellina sp.</i> <i>Stictochironomous sp.</i> <i>Synorthocladius semivirens</i> <i>Tanypus stellatus</i> <i>Tanytarsus sp.</i> <i>Thienemanniella sp.</i> <i>Thienemanniella xena</i> <i>Thienemannimyia sp.</i> <i>Tribelos jucundum</i> <i>Tvetenia bavarica gp.</i> <i>Tvetenia paucunca</i> <i>Tvetenia sp.</i> <i>Tvetenia vitracies</i> <i>Zaverlia sp.</i> <i>Zaverliella sp.</i> <i>Zavreliomyia sp.</i> undetermined sp. <i>Dixa sp.</i> <i>Hemerodromia sp.</i> <i>Pericoma sp.</i>
			Culicidae	
			Dixidae	
			Empididae	
			Psychodidae	

ARTHROPODA	Insecta	Diptera	Simuliidae	<i>Simulium sp.</i>
			Stratiomyidae	<i>Myxosargus sp.</i>
			Stratiomyidae	<i>Odontomyia sp.</i>
			Tabanidae	<i>Chrysops sp.</i>
				<i>Tabanus sp.</i>
			Tipulidae	<i>Antocha sp.</i>
				<i>Hexatoma sp.</i>
				<i>Limnophila sp.</i>
				<i>Ormosia sp.</i>
				<i>Pseudolimmophila sp.</i>
				<i>Tipula sp.</i>
		Ephemeroptera	Acanthametropodidae	<i>Ameletus sp.</i>
			Baetidae	<i>Acentrella ampla</i>
				<i>Acentrella sp.</i>
				<i>Acerpenna sp.</i>
				<i>Baetis flavistriga</i>
				<i>Baetis intercalaris</i>
				<i>Baetis sp.</i>
				<i>Centroptilum sp.</i>
				<i>Dipheter hageni</i>
				<i>Plauditus sp.</i>
				<i>Pseudocloeon sp.</i>
			Caenidae	<i>Caenis sp.</i>
			Ephemerellidae	<i>Attenella sp.</i>
				<i>Ephemerella sp.</i>
				<i>Eurylophella sp.</i>
				<i>Serratella sp.</i>
			Ephemeridae	<i>Hexagenia sp.</i>
			Heptageniidae	<i>Maccaffertium (Stenonema) sp.</i>
				<i>Stenacron interpunctatum</i>
				<i>Stenonema femoratum</i>
			Heptageniidae	<i>Stenonema mediopunctatum</i>
				<i>Stenonema sp.</i>
				<i>Stenonema terminatum</i>
			Isonychiidae	<i>Isonychia sp.</i>
			Leptophlebiidae	<i>Leptophlebia sp.</i>

ARTHROPODA	Insecta			Species Lists
		Ephemeroptera		<i>Paraleptophlebia sp.</i>
		Hemiptera	Veliidae	<i>Rhagovelia obesa</i>
		Megaloptera	Corydalidae	<i>Corydalus cornutus</i>
				<i>Nigronia serricornis</i>
			Sialidae	<i>Sialis sp.</i>
		Odonata	Aeshnidae	<i>Basiaeschna janata</i>
				<i>Boyeria vinosa</i>
			Calopterygidae	<i>Calopteryx maculata</i>
				<i>Calopteryx sp.</i>
			Coenagrionidae	<i>Argia sp.</i>
				<i>Enallagma sp.</i>
			Cordulegastridae	<i>Cordulegaster sp.</i>
			Corduliidae	<i>Epithea (Epicordulia) sp.</i>
			Gomphidae	<i>Gomphus sp.</i>
				<i>Hagenius brevistylus</i>
				<i>Lanthus parvulus</i>
				<i>Lanthus sp.</i>
				<i>Stylogomphus albistylus</i>
			Libellulidae	<i>Erythemis simplicicollis</i>
				<i>Perithemis sp.</i>
		Plecoptera	Capniidae	undetermined sp.
			Leuctridae	<i>Leuctra sp.</i>
			Nemouridae	<i>Amphinemura delosa</i>
				<i>Amphinemura sp.</i>
			Perlidae	<i>Acroneuria abnormis</i>
				<i>Acroneuria evoluta</i>
				<i>Acroneuria sp.</i>
				<i>Perlesta placida sp. gp.</i>
				<i>Perlesta sp.</i>
			Perlodidae	<i>Isoperla sp.</i>
				undetermined sp.
		Plecoptera	Taeniopterygidae	<i>Taeniopteryx sp.</i>
		Trichoptera	Calamoceratidae	<i>Anisocentropus pyraloides</i>
			Glossosomatidae	<i>Agapetus sp.</i>
				<i>Glossosoma sp.</i>
			Goeridae	<i>Goera sp.</i>

ARTHROPODA	Insecta	Trichoptera		Species Lists
			Hydropsychidae	<i>Ceratopsyche morosa</i> <i>Ceratopsyche sp.</i> <i>Cheumatopsyche sp.</i> <i>Hydropsyche betteni gp.</i> <i>Hydropsyche sp.</i>
			Hydroptilidae	<i>Hydroptila sp.</i>
			Leptoceridae	<i>Ceraclea sp.</i> <i>Oecetis avara</i> <i>Oecetis sp.</i> <i>Triaenodes sp.</i>
			Limnephilidae	<i>Pycnopsyche sp.</i>
			Philopotamidae	<i>Chimarra aterrima</i> <i>Chimarra obscurus</i> <i>Chimarra sp.</i>
			Phryganeidae	<i>Ptilostomis sp.</i>
			Polycentropodidae	<i>Phylocentropus sp.</i> <i>Polycentropus sp.</i>
			Psychomyiidae	<i>Lype diversa</i>
			Rhyacophilidae	<i>Rhyacophila carolina</i> <i>Rhyacophila fenestrata/ledra</i> <i>Rhyacophila sp.</i>
			Uenoidae	<i>Neophylax fuscus</i> <i>Neophylax sp.</i>

## **APPENDIX G**

### **American Indian Tribes Consulted by Tennessee Army National Guard**

(Tribes printed in grey have indicated that they do not have an interest in the land making up the VTS-Catoosa.)

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Leyahna Hicks, Executive Secretary  
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 (918)560-6101

Mr. Charles Coleman, Warrior, NAGPRA  
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## **APPENDIX H**

### **Pest Management Forms:**

#### **General Information**

**List of Approved Pesticide Chemicals for Use on VTS-C**

**Format for Reporting Pesticide/Herbicide Applications**

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### GENERAL PEST MANAGEMENT INFORMATION

- Pest management activities on TNARNG properties are guided by the TNARNG Integrated Pest Management Plan.
- Only certified applicators may apply any herbicide or pesticide (general use or restricted use) on TNARNG facilities. Applicator must have either a DoD Pesticide Applicator Certification or a Tennessee Commercial Applicator Certification for the appropriate category of pesticide.
- All pesticide/herbicide applications made by contractor or TNARNG staff will be reported to the Pest Management Coordinator (PMC). The reporting form to be used is included in this Appendix. Contact information for the PMC is located at the bottom of the forms.
- Control of pests of facilities (e.g., termites, spiders, mice) is handled through contract by the training site maintenance office. Contract exterminators may only apply the approved pesticides listed below. Contract exterminators will fill out a Pest Control Treatment Record completely for each chemical utilized on a visit. The training site will submit a copy of this form to the PMC (see bottom of reporting form for contact information).
- Weed control and turf maintenance applications may be made by state certified applicators on staff. All in-house applications of herbicides and pesticides must be reported to the PMC quarterly.
- In certain situations, a non-certified person may apply a pesticide on a self-help basis for personal protection on a job site. The following limitations apply to self-help pesticide applications:
  - Self-help applications will include only those products listed for self-help. Applications of these products must be reported to the PMC annually.
  - Self-help applications are for personal safety and comfort within the workplace and as such will be made only to small areas. Applications to an entire building or armory do not qualify as self-help. If a large portion of the facility requires treatment, a contracted pesticide applicator is needed.
  - Food preparation areas are NOT to be treated with self-help applications. Kitchens and related areas require professional treatment.

**SELF-HELP PRODUCTS:**

<b>Product description</b>	<b>Brand name examples</b>	<b>Active ingredient (s)</b>
Cockroach bait station	Combat Quick Kill	Fipronil
Ant bait station	MaxForce Ant Bait	Fipronil
Ant bait	Advance Dual Choice Amdro Fire Ant Bait	N-ethyl perfluorooctane sulfonamide
	Amdro Fire Ant Bait	Hydramethylnon
Aerosol insecticide	Kill Zone House & Garden Insect Killer Formula 3	D-trans Allethrin, 0.15%, and Resmethrin, 0.2%
	PT 565 Plus XLO	Pyrethrin
Wasp spray	PT 515 Wasp Freeze and Hornet Killer	pyrethrin, allethrin, d-phenothrin, or resmethrin
	Wasp Stopper II Plus	
Boric acid (roach killer)	Roach Kill	boric acid
Roach trap	Mr. Sticky	NA
Rodent glue trap	Victor Holdfast	NA
Spring mouse trap	NA	NA
Fly swatter	NA	NA
Indoor Fly Catcher, cylindrical sticky trap	NA	NA
Insect Fly Catcher, sticky strips	NA	NA

For more information on self-help applications, contact the PMC.

**APPROVED PESTICIDES FOR USE  
ON TENNESSEE ARMY NATIONAL GUARD PROPERTIES**

Generic formulations of identical chemical composition may be substituted for these trade-name approved pesticides.

<b>Product Name</b>	<b>Chemical Name</b>	<b>% of A.I.</b>	<b>EPA #</b>
<b>Mosquito - Larvae</b>			
Agnique MMF	POE isooctadecanol	100	53263-28
Altosid	S-Methoprene	8.62	2724-375
Altosid LL	S-Methoprene	20	2724-446
Altosid Pellets	S-Methoprene	4.25	2724-448
Altosid XR	S-Methoprene	2.1	2724-421
Bactimos Briquets/Mosquito Dunks	Bti	10.31	6218-47
Vectolex-CG	Bacillus sphaericus	7.5	73049-20
<b>Mosquito - Adults</b>			
Aqua-Reslin	Permethrin Piperonyl butoxide	20 20	432-796
Bio-Mist 1.5 + 7.5	Permethrin Piperonyl butoxide	1.5 7.5	8329-40
Fyfanon	Malathion	96.5	67760-34
Kontrol 4,4	Permethrin Piperonyl butoxide	4.6 4.6	73748-4
Mosquito Beater	Naphthalene Butoxypolypropylene glycol	4.5 0.5	4-123
Permanone 10%EC	Permethrin	10	432-1132
Scourge 4+12	Resmethrin Piperonyl butoxide	4.14 12.42	432-716
ULD BP-100	Pyrethrin Piperonyl butoxide Octacide-264	1 2 2.94	499-452
ULD BP-300	Pyrethrin Piperonyl butoxide Octacide-264	3 6 10	499-450
<b>Fire Ants</b>			
Amdro Pro	Hydramethylnon	0.73	241-322
Avenger	Deltamethrin	0.05	40208-6
Award Fire Ant Bait	Fenoxcarb	1	100-722
Chipco Top Choice Fire Ant Bait	Fipronil	0.0143	432-1217
Maxforce Fire Ant Bait	Hydramethylnon	1	432-1265
<b>Filth Flies</b>			
Golden Malrin	Methomyl Muscamone	1.1 0.049	2724-274
Stimukil Fly Bait	Methomyl Muscamone	1 0.04	53871-3

Product Name	Chemical Name	% of A.I.	EPA #
<b>Termites</b>			
Bora-Care	Boron sodium oxide	40	64405-1
Dursban TC	Chlorpyrifos	44.9	62719-47
Premise 75	Imidacloprid	75	3125-455
Termidor 80WG	Fipronil	80	7969-209
Termidor SC	Fipronil	9.1	7969-210
Tim-Bor Professional	Boron sodium oxide	98	64405-8
<b>Bees &amp; Wasps</b>			
Prescription Treatment Wasp-Freeze	D-Phenothrin D-trans-Allethrin	0.12 0.129	499-362
<b>General Arthropod Control</b>			
Advance Ant Bait	Abamectin	0.011	499-370
Borid	Boric acid	99	9444-129
Catalyst	Propetamphos	18.9	2724-450
CB-80 Extra	Pyrethrin Piperonyl butoxide	0.5 4	9444-175
Cynoff EC	Cypermethrin	24.8	279-3081
DeltaDust	Deltamethrin	0.05	432-772
DeltaGard G	Deltamethrin	0.1	432-836
Demand CS	Lamda-cyhalothrin	9.7	100-1066
Demon EC	Cypermethrin	25.3	100-1004
Drax Ant Bait	Boric Acid	5	9444-131
Drione	Pyrethrin Piperonyl butoxide Silica gel	1 10 40	432-992
Dual Choice Ant Bait	Sulfluramid	0.5	499-459
Gentrol Point Source	Hydropene	90.6	2724-469
Kicker	Pyrethrin Piperonyl butoxide	6 60	432-1145
Maxforce Gel	Hydramethylnon	2.15	432-1254
Maxforce Roach Bait	Fipronil	0.05	432-1460
Niban Bait	Boric acid	5	64405-2
Nylar IGR	Nylar	1.3	11715-307-57076
PCO Fogger	Nylar Belmark Prallethrin	0.6 0.1 0.04	9444-168
Perma-Dust	Boric acid	35.5	499-384
PI Contact	Pyrethrin Piperonyl butoxide	0.5 4	499-444
Precor Plus Fogger	Permethrin	0.58	2724-454
PT565 Plus XLO	Pyrethrin Piperonyl butoxide Octacide-264	0.5 1 1	499-290
R Value's Roach Kill	Boric acid	99	9444-130
Saga WP	Tralomethrin	40	432-755
Sevin 80S	Sevin	80	264-316

<b>Product Name</b>	<b>Chemical Name</b>	<b>% of A.I.</b>	<b>EPA #</b>
<b>General Arthropod, Cont.</b>			
Suspend SC	Deltamethrin	4.75	432-763
Tempo SC Ultra	Cyfluthrin		3125-498
Tempo 20WP	Cyfluthrin		3125-377
ULD BP-100	Pyrethrin	1	499-452
	Piperonyl butoxide	2	
	Octacide-264	2.94	
ULD BP-300	Pyrethrin	3	499-450
	Piperonyl butoxide	6	
	Octacide-264	10	
Ultracide	Nylar	0.1	499-404
	Pyrethrin	0.05	
	Permethrin	0.4	
	Octacide-264	0.4	
Zero-In 797-A	Pyrethrin	1	432-992-70799
	Piperonyl butoxide	10	
	Silica gel	40	
<b>Rodents and Other Vertebrates</b>			
Confrac Rodenticide	Bromadiolone	0.005	12455-69
Ditrac Blox	Diphacinone	0.005	12455-80
Fastrac Pacs	Bromethalin	0.01	12455-97
Final All-Weather Blox	Brodifacoum	0.005	12455-89
Talon-G Pellets	Brodifacoum	0.005	100-1052
WeatherBlok XT	Brodifacoum	0.005	100-1055
4-the-Birds	Polybutene	93	8254-5-56
<b>All Vegetation – Bare Ground</b>			
Arsenal	Imazapyr	27.6	241-273
Escort	Metsulfuron	60	352-439
Hyvar XL	Bromacil	21.9	352-346
Krovar IDF	Bromacil	40	352-505
	Diuron	40	
Oust XP	Sulfometuron	75	352-601
Outrider	Sulfosulfuron	75	524-500
Reward Aquatic Herbicide	Diquat dibromide	37.3	100-1091
Round-up Pro	Glyphosate	41	524-475
Round-up Ultra	Glyphosate	41	524-475
Round-up UltraDry	Glyphosate	71.4	524-504
Sahara DG	Imazapyr	7.78	241-372
	Diuron	62.22	
<b>Pre-emergent Herbicide</b>			
Balan 2.5G	Benfluralin	2.5	62179-96
Banvel + 2,4-D	Dicamba	12.4	66330-287
	2,4-D	35.7	

Product Name	Chemical Name	% of A.I.	EPA #
<b>Pre-emergent, Cont.</b>			
Gordon's Pro Turf & Ornamental Barrier	Dychlobenil	4	2217-675
Surflan A.S.	Oryzalin	40.4	70506-44
MSMA	Monosodium methanearsonate	47.6	19713-42
Pennant (grasses)	S-Metolachor	83.7	100-950
<b>Selective Post-emergent</b>			
MSMA (grasses)	Monosodium methanearsonate	47.6	19713-42
Poast (grasses)	Sethoxydim	18	7969-58
Gordon's Pro Trimec Plus (broadleaf)	Dicamba MSMA 2,4 D Mecoprop-p	1.46 18 5.83 2.93	2217-808
<b>Cool Season Grasses</b>			
Plateau	Imazipic-ammonium	23.6	241-365
<b>Plant Growth Regulator</b>			
Cutless 50W	Flurprimidol	50	67690-15
Embark	Mefluidide	28	2217-759
Primo	Cimectacarb	12	100-729
<b>Brush &amp; Forestry</b>			
Accord Site Prep	Glyphosate	41	62719-322
Arsenal	Imazapyr	27.6	241-273
Garlon 3A	Triethylamin triclopyr	44.4	62719-37
Garlon 4	Butoxyethyl triclopyr	61.6	62719-40
Escort	Metsulfuron	60	352-439
Oust XP	Sulfometuron	75	352-601
Round-up Pro	Glyphosate	41	524-475
Tordon K	Picloram	24.4	62719-17
Velpar L	Hexazinone	25	352-392
Velpar ULW	Hexazinone	75	352-450
<b>Aquatic Weeds &amp; Algae</b>			
Aquashade	Acid Blue 9 Acid Yellow 23	23.63 2.39	33068-1
Citrine Ultra Algaecide	Copper	9	8959-53
Reward	Diquat dibromide	37.3	100-1091
Rodeo	Glyphosate	53.8	62719-324
Sonar AS	Fluoridone	41.7	67690-4
2,4-D amine 4	2,4-D	47.3	1381-103

**Pest Control Treatment Record**

(Have the contractor fill this form out or provide a printed receipt providing all information.)

Site: \_\_\_\_\_ Treatment Date: \_\_\_\_\_  
 Location of Treatment: \_\_\_\_\_  
 Type of Pest Problem: \_\_\_\_\_  
 Indicators of Pest Problem: \_\_\_\_\_  
 (What did you observe and where? Number of pests seen, signs of damage,...)

---

**Chemical Pesticide/Herbicide Application**

Pest control contractors must be state-certified for commercial application – include copy of certification if not on file with contract.

Pesticide/Herbicide Trade Name: \_\_\_\_\_  
 EPA Registration Number: \_\_\_\_\_  
 Active Ingredient(s) and % Concentration: \_\_\_\_\_ %  
 \_\_\_\_\_ %  
 \_\_\_\_\_ %

Quantity of Concentrate Used (if applicable): \_\_\_\_\_

Quantity of Finished Pesticide Applied: \_\_\_\_\_

% Active Ingredient as Applied: \_\_\_\_\_ %

Size of Treated Area: \_\_\_\_\_

Application Rate: \_\_\_\_\_

Applicator Name: \_\_\_\_\_ Certification # \_\_\_\_\_

Man Hours Used: \_\_\_\_\_ Category(s) \_\_\_\_\_

Pest Control Company: \_\_\_\_\_ License # \_\_\_\_\_

---

**Maintain copies of this form on site.**

**Send copies quarterly to:** TNARNG  
 Attn: Laura Lecher  
 Milan Training Site  
 325 Arsenal Lane  
 Milan, Tennessee 38348-2605

Or Fax: (731)222-5323

For more information call: (731)222-5321

or email: [Laura.Lecher@us.army.mil](mailto:Laura.Lecher@us.army.mil)

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## **APPENDIX I**

### **Annual Review of the INRMP**

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**INRMP ANNUAL REPORT****To:****From:****Subject:** ARNG Annual Report on Implementation Status of the Integrated Natural Resource Management Plan (INRMP)**Date:****Reporting Period:***(Period report covers, i.e. 1 May 06 – 1 May 07.)***Annual Coordination Meeting:** *(Identify the date and attendees of annual coordination. Indicate if this correspondence will be used in lieu of 'face-to-face' meetings. Use the following headers to document review findings)***Program Overview:** *(Short paragraph addressing the goals and objectives of the plan, the status of the mission requirements relative to the current plan and the issue of "no net loss" to training.)***Current Implementation Status:** *(List all projects for the current reporting period, those completed or on-going, and those that were planned but not initiated. Also indicate if any projects were rescheduled and the proposed new timeline. If a table is already available, paste in or submit as separate sheet and reference here.)***Proposed Implementation:** *(List all projects and actions planned for the next reporting period. If a table is already available, paste in or submit as a separate sheet and reference here.)***Installation Personnel:** *(List by title natural and cultural resource management personnel involved with implementation of the INRMP.)***USFWS Regional Office Contact Information:** *(Enter Point of Contact and contact information.)***USFWS Field Office Contact Information:** *(Enter Point of Contact and contact information.)***State Fish and Game Agency Contact Information:** *(Enter Point of Contact and contact information as applicable. Include all agencies or division involved.)*



**Annex 1**

**RARE SPECIES MANAGEMENT PLAN**



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The goals of TNARNG rare species management are straightforward: to protect populations of rare, threatened, or endangered (RTE) species, to minimize damage to individuals of those species, to maintain and enhance the native communities that support those species, and to remain in compliance with the Endangered Species Act.

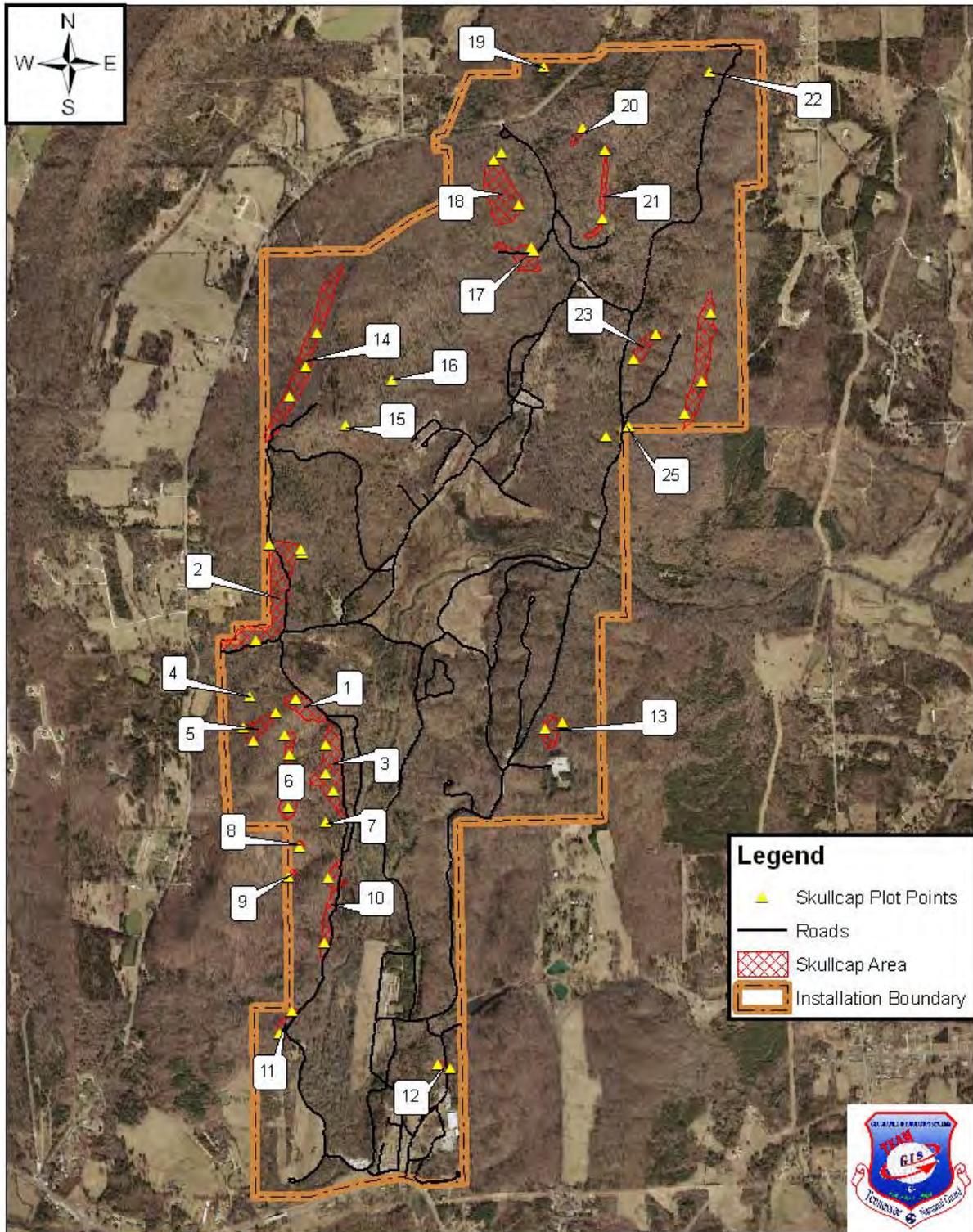
To date, TNARNG has identified the large-flowered skullcap (*Scutellaria montana*), which is a federally listed threatened species, and the gray bat (*Myotis grisescens*), which is federally endangered, on the VTS- Catoosa. A survey is being conducted in FY11 to determine the presence of any other rare, threatened, or endangered species on the training site. This plan will be modified to include other species if any are found. The next RTE survey is scheduled for FY16. The survey may be initiated earlier if new information suggests it is needed (i.e., a new species from the region is listed as threatened or endangered or a population of a different RTE species which might occur on VTS-C is identified on neighboring land).

**1.0 LARGE-FLOWERED SKULLCAP (*Scutellaria montana*)**

The large-flowered skullcap was discovered on VTS-C in 2002, during a survey initiated at the suggestion of the USFWS. Almost 1600 individual plants were counted during that initial survey; they are most extensive on the western side of the training site, but a number of concentrations can be found elsewhere on the site (Figure A1-1).



The skullcap population has been broken down into 26 management groups based on geographic proximity and habitat similarity. Each management group contains at least one monitoring plot (see Section 1.3 below) established in 2004.



**Figure A1-1: Location of large-flowered skullcap management groups at VTS-Catoosa.**

## 1.1 Background

Large-flowered skullcap is a member of the mint family (Lamiaceae) endemic to mature hardwood forests in northwest Georgia and southeast Tennessee. It flowers from mid-May to June, producing a few to many blue and white, two-lobed flowers on a plant. The U. S. Fish and Wildlife Service listed large-flowered skullcap as an endangered species in 1986. At that time there were seven populations known in Georgia and three in Tennessee. Over 90 % of the 7,000 plants known in 1986 occurred at only two sites (USFWS 1996). The USFWS defined a self-sustaining population as containing more than 100 plants. The species was reclassified (down-listed) to threatened in 2002, at which time 48 populations were known for a total of over 50,000 individual plants. Habitat alteration and destruction are considered the most significant threats to this plant.

## 1.2 Protection

There are a number of factors which pose a potential threat to the large-flowered skullcap: physical damage from human activity, soil disturbance from human activity, browsing or uprooting by wildlife, and wildfire. In order to minimize these threats, TNARNG will take certain steps:

### 1.2.1 Perimeter posting and mapping:

TNARNG has posted the perimeter of the large-flowered skullcap groups with signs (Figure 3.10 in Chapter 3 or see below) which include a statement of no access during March 1 to June 30 (flowering season) and foot traffic only during the rest of the year. These signs, in conjunction with training and environmental education efforts for the soldiers and training site personnel, should minimize unplanned, human-caused disturbance of the plants.



The signs are easily seen and should discourage accidental vehicular traffic through known clusters of plants. The signs are generally spaced 50 to 65 m apart. Trees between pairs of signs along the edge of a skullcap group will be marked with yellow paint to provide a more continuous visual barrier. The perimeter around each management group is located just outside the existing plants (no “buffer” area) to minimize restrictions on training area, but will be updated annually to ensure the majority of the plants are within the protected boundary. To date, the spatial boundaries of the groups of plants have changed little from

year to year, and it is expected that the locations of the buffer zones will remain relatively constant for the near future. The perimeter of each group has been recorded with GPS, and accurate maps can be produced for training or land management use.

A training module will be developed that explains the purpose behind these signs and provides basic information about the skullcap; this information will be presented to all training site users in their initial on-site briefing. Maps are also available to the training site staff and other users showing the location of the large-flowered skullcap to encourage avoidance of prime skullcap areas during sensitive periods.

### 1.2.2 Wildlife Control:

Herbivores can pose a threat to large-flowered skullcap. Through the monitoring program, a number of individual plants have been found that have been browsed. It is presumed that white-tail deer are responsible. Browsing does not appear to kill the plant but does limit flowering as the flower buds are typically on the portion that is eaten.

Feral hogs are a more substantial danger to the plant. Areas of disturbance indicative of hog rooting have been found within skullcap groups. It is presumed that hogs will feed on the perennial root of the skullcap and, therefore, could substantially impact the skullcap population.

Feral hog numbers on the training site have been controlled in the past through professional removal. If hog sightings or damage increase above acceptable levels, a project will be initiated to reduce their numbers. White-tailed deer are not currently controlled at VTS-C; there is no hunting on the training site. If monitoring results indicate that deer are significantly impacting the skullcap, a program will be developed to limit the numbers of deer.

An additional wildlife problem on VTS-C is a large population of beavers that are causing extensive flooding. This should not impact large-flowered skullcap, however: all skullcap populations are located at an elevation above those areas threatened by flooding.

### 1.2.3 Invasive Pest Plants Control:

Invasive exotic plants are becoming a problem throughout the world. Some large-flowered skullcap management groups do contain invasive plants (this information is collected as part of the monitoring described below). The principal problem species are Japanese honeysuckle and Chinese privet. At this time, the infestations do not appear to seriously impact the skullcap, but over time this status may change. A program for control of these problem plants around the skullcap groups will be developed (see Research section below) in conjunction with the overall training site invasive species control plan.

In the vicinity of large-flowered skullcap management groups, herbicide use will be strictly controlled. Only chemicals which are not soil active and are unlikely to translocate will be applied to invasive plants within 50' of a skullcap management group. Applications will be made in the late fall after the skullcap has gone dormant, and application methods will be utilized which minimize the risk of chemical drift. Additional monitoring will track any changes to treated management groups, and the methodology will be revised if there appears to be any damage to the large-flowered skullcap.

### 1.2.4 Fire Protection:

Fire is a tool used for natural resources management on VTS-C. The tank range and other open grassland areas are burned regularly to control woody encroachment. Most of the forested areas on the training site are dominated by hardwood species, and so have not been burned regularly in the past. TNARNG has developed a prescribed burn plan for the purposes of fuel reduction and habitat improvement and will begin implementation in 2010 (see Annex 3).

Little is known about the susceptibility of large-flowered skullcap to fire. One research goal of the TNARNG is to address this lack of knowledge through experimentation (see Research section below). Management groups not involved in a study of fire impact will be protected from prescribed burns with fire lines located well outside the boundary of the management group. Whenever possible, these fire lines will be made by removal of vegetation rather than by plowing.

### 1.3 Monitoring

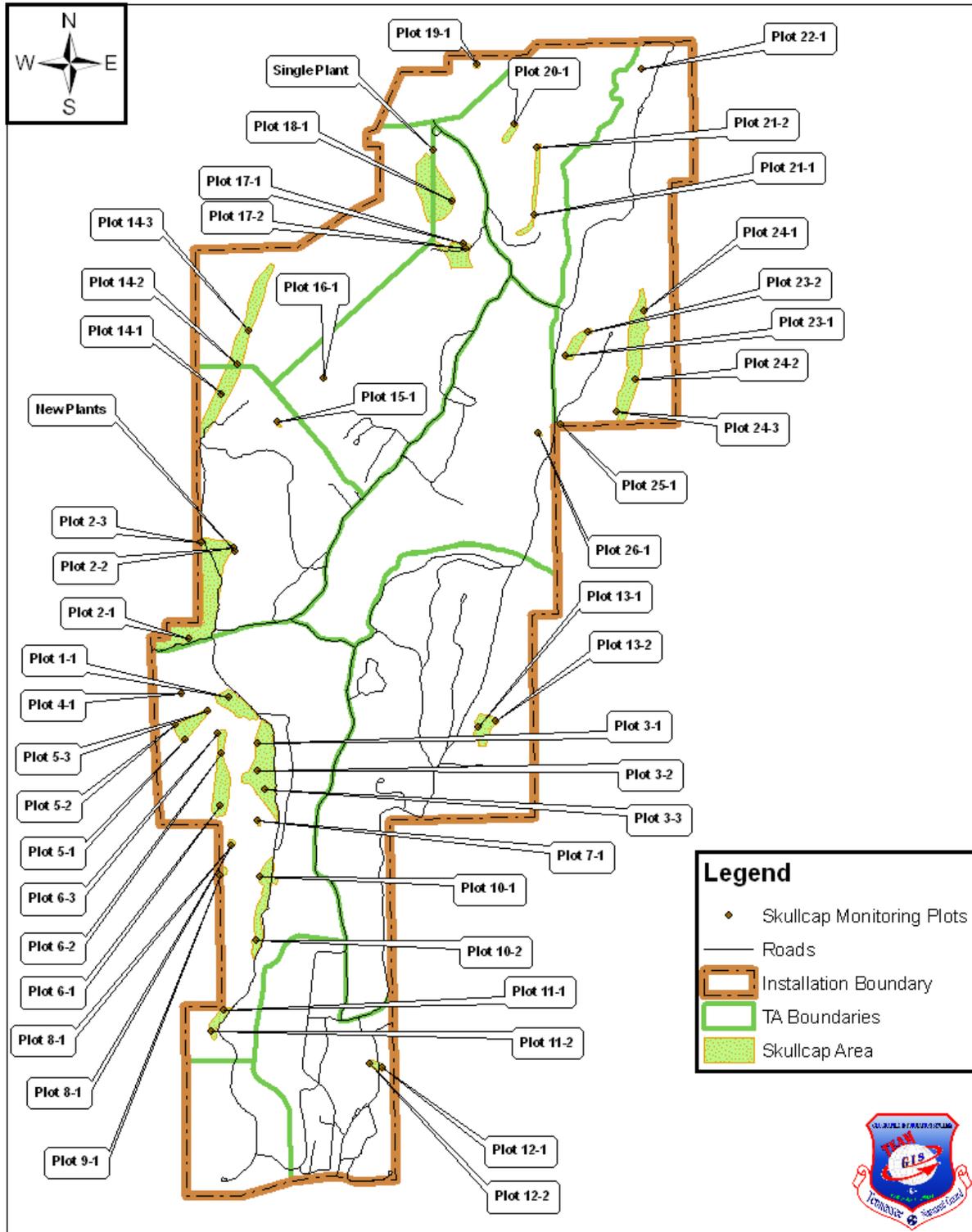
A monitoring protocol has been developed and implemented. FY2008 was the fifth year of data collection following this protocol. There were significant fluctuations in the plant counts in 2007 and 2008 – likely due to drought – and so the monitoring program will be continued for several more years to track these changes. The protocol will again be reviewed in FY2012.

The monitoring protocol is based on 10-meter radius circular plots. Forty-six of these plots have been established within the 26 management groups (at least one plot in each management group) (Figure A1-2). The plots are not randomly located but are placed subjectively in areas known to contain skullcap plants. The plot centers are permanently marked and recorded via GPS for repeat sampling.

Monitoring is conducted during the flowering season for the large-flowered skullcap which begins in mid-May and runs into June with the peak usually in the end of May. Availability of flowers makes identification simpler and more accurate. Non-flowering specimens are also recorded, however.

Within each monitoring plot, the following information is recorded: each individual *S. montana* plant is identified and characterized in terms of number of stems, flowering/nonflowering, browse or insect damage indications, adult or juvenile (under 10 cm tall). The distance and bearing from the center point of the plot to each plant is measured, allowing mapping of plant locations. In addition, a habitat description, associated plant species, threats, and evidence of disturbance are also noted for each plot. Figure A1-3 shows the datasheet used for recording this information.

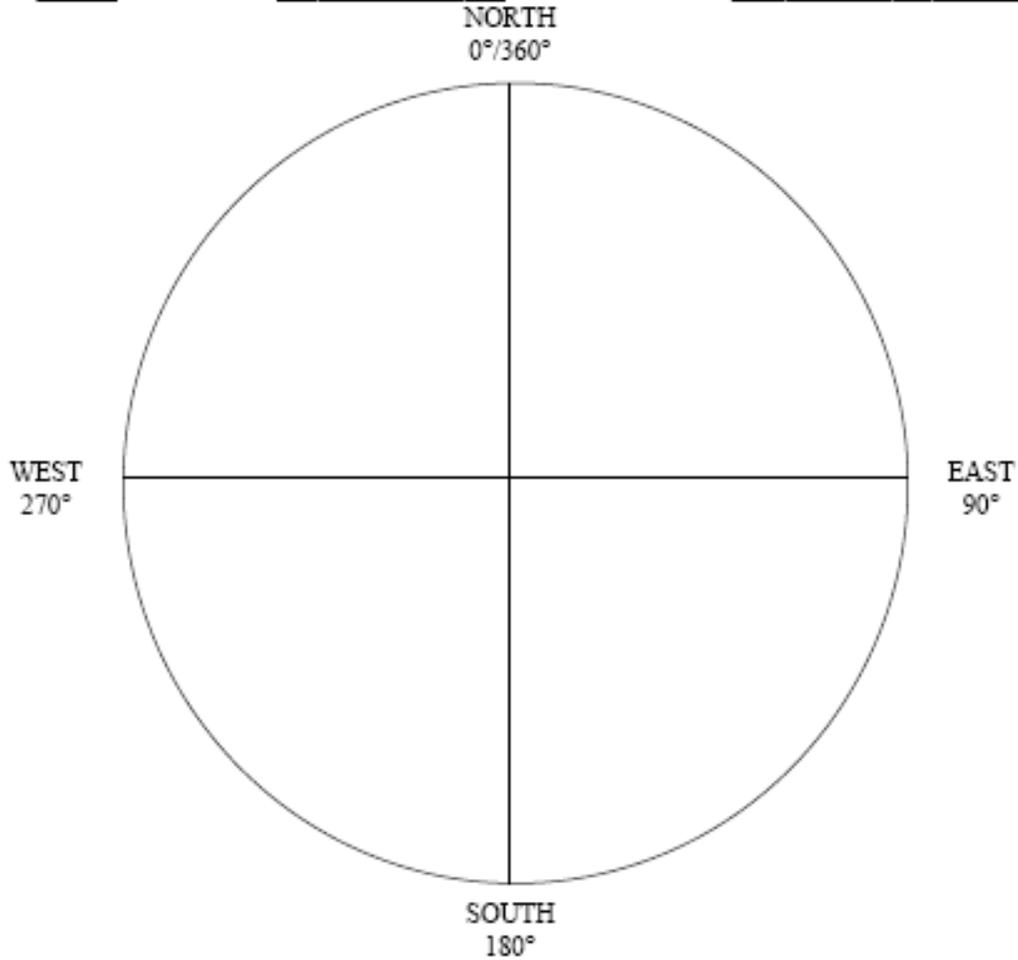
Results from each year of monitoring will be compiled and comparisons made as multiple years' data become available. After a period of five years of monitoring, the trends at each monitoring plot (increasing, decreasing, minimal change) will be evident. At that time, the monitoring protocol will be evaluated and modified, if needed.



**Figure A1-2: Large-flowered skullcap monitoring plot locations on VTS-Catoosa.**

### *Scutellaria montana* Monitoring Sheet

DATE \_\_\_\_\_ INVESTIGATORS \_\_\_\_\_  
 STATE \_\_\_\_\_ COUNTY \_\_\_\_\_ POPULATION \_\_\_\_\_



Plant #	# Stems	Flowers <sup>1</sup>	Dist <sup>2</sup>	Dir <sup>3</sup>	Plant #	# Stems	Flowers <sup>1</sup>	Dist <sup>2</sup>	Dir <sup>3</sup>	Plant #	# Stems	Flowers <sup>1</sup>	Dist <sup>2</sup>	Dir <sup>3</sup>
1					10					19				
2					11					20				
3					12					21				
4					13					22				
5					14					23				
6					15					24				
7					16					25				
8					17					26				
9					18					27				

Additional Comments \_\_\_\_\_

<sup>1</sup>: Plants in flower or not? (yes or no?); <sup>2</sup>: Distance in meters from the plot center; <sup>3</sup>: Compass bearing from the plot center

**Figure A1-3: Monitoring datasheet for large-flowered skullcap.**

## 1.4 Research

There are a number of gaps in our knowledge of large-flowered skullcap, and TNARNG has a population suitable for study. Certain questions pertaining to management issues are of particular interest, and TNARNG ENV would like to address these questions experimentally with the assistance of USFWS, GADNR, and other interested cooperators.

### 1.4.1 Transplantation

Certain management groups are threatened by required or anticipated training site construction and other activities (see Section 1.5 below). There are security requirements for a fence and a 25 ft cleared buffer to surround the entire training site. Several management groups lie along this boundary and will be impacted by this clearing: 2, 9, 14, and 24. Other groups (17 and part of 18) fall in areas that will potentially be impacted by proposed range construction. TNARNG is interested in the possibility of transplanting individuals from threatened groups to other “safer” areas on the training site. Large-flowered skullcap have been transplanted in the past onto the Chattahoochee National Forest with mixed results (Cindy Wentworth and Keith Wooster, personal comm.).

#### Preliminary Protocol:

- Plants will be transplanted within their region on training site; i.e., group 9 plants will stay in the southwest cluster of management groups, group 17 plants will stay within 18-20-21 area.
- Appropriate habitat will be identified within 250 m of the existing group, out of danger of the construction or clearing project.
- Transplant sites will be as similar as possible to the original habitat in terms of slope, aspect, elevation, soil series, canopy cover.
- No more than ½ of a group’s plants will be moved initially. A mix of both flowering adults and non-flowering juveniles will be moved. Plants will not be taken from within existing monitoring plots in the initial test.
- Plants will be marked with flags during flowering season.
  - Plants will be dug up either after seed set (July) and maintained in a greenhouse over winter or after initiation of dormancy (October) and transplanted immediately.
- As much soil as is feasible to transport will be dug up with each plant to preserve fine roots and mycorrhizal associations.
- Plants will be watered at transplanting to settle the soil, but will be subject to natural conditions after that.
- Transplant sites will be marked and individual plants mapped to allow monitoring of individual success.
- If the initial transplant success is reasonable, the remainder of the plants that are threatened by immediate military development will be relocated using the most successful methods.
- Plants will be monitored for at least 3 years.

Note: TNARNG will not depend on transplant success to maintain the skullcap population on VTS-C. If a large number of plants are to be destroyed by any given project, arrangements will be made for the greenhouse propagation of new plants, which will be transplanted into training site locations chosen in coordination with the USFWS.

### 1.4.2 Fire Impact

As noted above, prescribed burning is a tool that will be utilized for natural resources management on VTS-C, but there is currently limited understanding of the impacts of fire on large-flowered skullcap. It would be useful to know whether the skullcap can withstand occasional burning or whether all management groups within a burn area will always require protection. Information about the effect of

burning at other locations in Georgia/Tennessee would assist in better understanding the effect of burning at VTS-C, but a local experiment would ultimately provide the best information with little extrapolation needed.

Preliminary Protocol:

- Large concentrations of large-flowered skullcap will be protected from prescribed fire, either by complete restriction on burning (training area 2 and populations within SMZs such as management group 24) or by construction of a temporary fire break surrounding the group with at least 50 feet of buffer.
- Certain groups will be allowed to burn on the rotation schedule recommended in Annex 3, Prescribed Burn Plan, for fuel control in the hardwood forests of the site.
- Groups which may be subject to burning are 12, 15, 16, 17, and 19. These are all small management groups – relatively low numbers of skullcap present – in areas that will be subject to fuel-control fires in accordance with the prescribed fire plan.
- Groups 15 and 16 fall within the tank range target area which is subject to burning every 2-4 years; groups 12, 17, and 19 will be burned on a 5-7 year rotation.
- All skullcap-impacting burns will be cool, dormant season burns.
- Pre- and post-burn sampling will assess fire weather, fire behavior, flame temperature, litter consumption and impacts on vegetation.
- Data from the permanent monitoring plots will be used to assess skullcap recovery in the years following the burn, relative to pre-burn levels. If response to the initial fire is bad (more than 50% loss of plants), the fire study will be discontinued and all management groups will be protected with plowed firebreaks in all future prescribed burn events.

#### 1.4.3 Invasive Pest Plant Control

Weed control is necessary at VTS-C, especially for invasive exotic plants. In areas where such pest plants threaten the skullcap, careful application of herbicides will allow improvement of the skullcap habitat and the opportunity to monitor the impact of invasives and release from invasives. The treatment protocol will include provisos such as no accidental herbicide application to *Scutellaria montana* and no application of translocating chemicals upslope. Management groups 12, 18, 19, 23, and 24 are currently threatened by both privet and Japanese honeysuckle and so are candidates for this investigation. Careful monitoring of the groups which are treated for invasive pest plants will allow both the identification of any detrimental effects that herbicide use might have on large-flowered skullcap and a determination of whether the beneficial effects for the skullcap justify the expense and effort of focused IPP control.

Preliminary Protocol:

- Environmental personnel with appropriate pesticide applicator certification will apply all herbicides.
- Applications will be made during the late fall or early winter after the skullcap has become dormant.
- Privet will be managed primarily by cut-stump method with application of Garlon 3A or a glyphosate herbicide. Small privet plants (under 1 m tall) may be treated by foliar application of glyphosate.
- Japanese honeysuckle will be treated with foliar application of Garlon or a glyphosate herbicide.
- No more than half of a management group will be treated in the first year.
- Control and treatment plots will be established within each management group.
- Skullcap will be mapped in the study plots in the spring prior to treatment and reassessed the following spring.
- If initial results indicate little damage to the skullcap from the herbicide applications, the pest plant treatments may be expanded to include the entirety of the threatened plots.

- Monitoring of skullcap response will continue for at least 2 years following the last herbicide application.

## 1.5 Assessment of Impacts on Large-Flowered Skullcap and Mitigation

Many aspects of TNARNG management and use of the VTS-C have the potential to impact the large-flowered skullcap. It is one goal of this management plan to ensure that those impacts are as benign and minimal as possible while still allowing the essential military training mission to continue unhindered. Table 4.3 in Chapter Four of the INRMP provides a list of all anticipated environmental projects for 2010-2014, as well as the primary ITAM and site improvement projects planned. The majority of these projects will have little influence on the skullcap due either to the non-impact nature of the project (e.g., wildlife surveys) or its location (e.g., management of existing grassland ranges). Those projects which could influence the large-flowered skullcap are presented below with more detail on the possible impacts and the measures to be taken to ensure protection of the VTS-C large-flowered skullcap population.

### 1.5.1 Skullcap management

A number of projects planned for the 2010-2014 period are designed to improve conditions for the large-flowered skullcap on VTS-C. These projects should have a positive influence on the threatened species and negative impacts should be minimal. Such projects include: annual monitoring, maintaining the posted perimeter around *S. montana* management groups, and controlling pest animals which may threaten the flower (feral hogs and white-tailed deer).

In order to investigate management alternatives and impacts on *S. montana*, three research projects are proposed: transplanting of individual skullcap plants, assessing fire impacts, and monitoring the influence of chemical and manual control of invasive pest plants. These are described in more detail in Section 1.4 above. The transplant experiment will not result in any additional take of large-flowered skullcap plants: the only individuals to be transplanted will be a part of the anticipated “take” of the fence-line clearance project (see below under “Training Site Maintenance”). These plants will be relocated prior to the planned disturbance and, if the transplant process is successful, will provide a reduction in the take from the clearing project. However, because of the uncertainty involved in transplantation, it will not be considered an official mitigation to the take.

The fire impact study will involve 5 management groups which totaled 191 large-flowered skullcap plants in the 2002 survey. This is approximately 12% of the training site total in 2002. Application of prescribed fire to these groups may result in the death of individual plants. In the worst case scenario, between 50 and 100% of these plants could be killed in the first fire, and the experiment would be terminated. Maximum loss possible would be 12% of the training site population, located in 5 discrete groups. The concentration of large-flowered skullcap groups in the southeastern region of the training site would be unaffected. It is anticipated, however, that fire will not be so damaging and that while there will be a percentage of plants killed, the majority will survive.

Herbicide treatment of invasive pest plants within large-flowered skullcap groups carries some risk for the protected plants from chemical drift and translocation. Careful choice of herbicide and treatment methods, as discussed in Section 1.4 will minimize the hazard. As a precaution, initial treatments will only cover one-half of any IPP infested management group. Any herbicide damage to large-flowered skullcap in these groups will require a revision of methods prior to any further chemical IPP control efforts within the management groups. It is anticipated that there will be no detrimental impacts from this controlled herbicide use on the large-flowered skullcap. If IPP can be controlled in the vicinity of the large-flowered skullcap, it will be a beneficial impact.

Overall, the skullcap management projects included in this plan are expected to improve conditions for the large-flowered skullcap on the VTS-C. There will probably be some take of individual plants associated with the fire research projects, but the number of lost plants is anticipated to be low and non-significant to the population as a whole.

#### 1.5.2 General natural resources management actions:

Most of the projects identified in Table 4.3 for natural resources management, other than the RTE projects discussed above, will have little impact on *S. montana*. Wildlife surveys, riparian restoration, and wetlands protection have little relation to the protected plant. Three areas of management, however, could affect the skullcap: forest management, prescribed fire, and chemical pest plant control.

TNARNG intends to conduct timber harvests on approximately 550 acres of VTS-C over the 2010-2014 period (see Annex 2). These harvests will predominantly be commercial thinnings of either overmature timber or dense sub-dominant timber. There is significant temporary soil and understory disturbance associated with timber harvest, and so efforts will be made to avoid impacting large-flowered skullcap during these actions:

- Known large-flowered skullcap groups will be reserved from timber sales with an additional 50' buffer surrounding. No trees will be harvested within these protected areas, nor will any equipment be allowed to pass through these areas. Additional signs or other markings will be installed around the groups and buffer prior to any nearby timber sale.
- Timber harvests within stands that contain or are adjacent to known skullcap groups will be conducted during the fall or winter when the plant is dormant to minimize any accidental damage which may occur.

No direct take of large-flowered skullcap plants is anticipated from the timber harvests scheduled for 2010-2014 on VTS-C. There is the potential for a flush of growth by invasive pest plants such as privet and honeysuckle following the opening of the canopy by timber harvest. It is anticipated that the 50' buffer will help minimize such a threat to the large-flowered skullcap, but IPP presence will continue to be monitored in conjunction with the annual RTE monitoring, and specific control efforts will be initiated if needed.

Prescribed burning is a useful tool for land management, but the resilience of large-flowered skullcap to various fire regimes is not well-known. Most burning at VTS-C will be conducted in the grassland areas, thus posing no threat to the skullcap. However, longer-interval burns will be conducted within forest stands as needed to lower fuel loads and minimize wildfire risks. See Annex 3 for the schedule of burns for VTS-C. The majority of large-flowered skullcap management groups will be protected from these burns by firebreaks installed at least 50' outside the edge of the group, and Training Area 2 will not be subject to any prescribed burns due to the extensive skullcap presence, pending results from fire impact research.

As discussed above in Section 1.4, certain skullcap management groups (12, 15, 16, 17, and 19) will be subjected to the scheduled prescribed burns for experimental purposes. These five management groups represent 191 plant, or approximately 12% of the total VTS-C population in the 2002 survey. If post-burn sampling indicates a mortality rate of 50% or higher, the burn study will be discontinued. Some take of large-flowered skullcap plants is anticipated as a result of the experimental prescribed fire evaluation, but will be limited by the constraints of the experimental design. Damage to the overall population from fire impacts should be negligible.

Chemical weed control is utilized on VTS-C against both invasive exotic pest plants and the more benign weeds degrading parking areas, roads, and the managed landscape of the cantonment. Annexes 4 and 5

discuss both occasions of herbicide use and the restrictions thereon. Care will be taken to avoid accidental contamination of large-flowered skullcap with herbicide:

- There will be no application of any herbicide for general weed control within 50' of a large-flowered skullcap management group.
- There will be no application of any soil active herbicide within 50 yds (or directly uphill) of a management group.
- All appropriate efforts (IAW the label) will be made to avoid drift of herbicide products.

These rules have been in effect for all roadside and other general herbicide applications made by contract or TNARNG personnel since the large-flowered skullcap was found on VTS-C, and to date there have been no indications of damage to individual plants or to the population as a whole from these treatments.

The INRMP includes a plan (Annex 4) for attempting to control the invasive pest plants on the training site, as well. These control efforts will include the large-flowered skullcap management groups and so will negate the first of the above restrictions. However, within management groups and the 50' buffer herbicides will be very carefully applied to avoid accidental damage:

- There will be no foliar application of any herbicide during the large-flowered skullcap growing season.
- Stem treatments (basal bark, cut-stump, stem injection) will be the preferred methods of application whenever feasible.
- There will be no use of soil active herbicides.

As noted in Section 1.4 above, initial treatments will only cover one-half of any IPP infested management group. Any herbicide damage to large-flowered skullcap in these groups will require a revision of methods prior to any further chemical IPP control efforts within the management groups. No significant detrimental impacts are expected from the careful application of chemical weed control at VTS-C.

#### 1.5.3 Training activities:

Training activities on the VTS-C have the potential for minor impacts on the large-flowered skullcap, but in practice such impacts are easily avoided. Due to the topography of the region and the forested condition of most of the site, vehicular traffic is restricted to established roads and trails and to prepared open maneuver areas, thus avoiding known large-flowered skullcap groups. Foot traffic can have some impact, especially in the Land Navigation Course in the north-central portion of the site. All known large-flowered skullcap groups are posted with signs restricting entry during the growing season (vehicular traffic is prohibited at all times), and training maps display the skullcap locations as off-limits, so there is limited threat to the plants from soldiers on foot. Likewise, bivouac sites experience high foot traffic, as well as vehicular disturbance immediately off-road, but such training areas are situated at a distance from known large-flowered skullcap groups to avoid disturbance. Range operations hold little threat to the protected plants on the existing live-fire and non-live-fire ranges (range maintenance, on the other hand, is discussed below). Overall, TNARNG training operations have little impact on the large-flowered skullcap.

#### 1.5.4 Training Site Maintenance and Improvement Projects:

Training site maintenance and improvement involves a wide variety of actions; most will have little effect on the large-flowered skullcap, but certain construction projects, in particular, may have a substantial impact on the large-flowered skullcap on VTS-C. Maintenance of range facilities and grounds has little influence on the skullcap, which are generally not located in close proximity to these heavily managed portions of the training site. The use of prescribed fire to maintain the target area of the tank range has affected management groups 15 and 16 in the past; these two groups are now protected by a fire break and will remain so protected until the prescribed fire experiment discussed in Section 1.4 (and above

under “Skullcap management”) is initiated. Road maintenance has the potential to impact those management groups located directly beside the major roads, but all groups have been marked, and training site personnel avoid altering the road shoulder in the vicinity of the large-flowered skullcap.

Several construction and training site improvement projects are planned for the 2010-2014 period; these are listed at the end of Table 4.3. Several buildings and associated parking areas will be added to the cantonment area. This area is already developed and contains only one small management group (#12) on the eastern side. All building, road, and parking area construction will be located well away from this group and so there will be no impact on the large-flowered skullcap. Reclamation of an old roadway across the northern edge of the training site is anticipated. This will be routed around management groups 20 and 21, and so will have little impact on the skullcap (see Figure A1-4).

Portions of the Land Navigation Course in the north-central portion of the training site are overgrown with dense understory vegetation that makes foot travel difficult. These areas will have their understory opened up by mechanical vegetation removal. Several management groups fall within this area (17, 18, 19, and 20), but they are posted and mapped, and vegetation removal will occur no closer than 50' from the group edges. No direct impact on the large-flowered skullcap is anticipated. Annual monitoring will continue to track IPP presence, and if the understory clearing leads to greater competitive stress from exotic plants, pest plant control will be initiated.

Security requirements include complete fencing around military installation boundaries. At this time the VTS-C perimeter is only partially enclosed. Fencing efforts will continue during 2010-2014, typically in 2500'-5000' segments. Several management groups (2, 9, 11, 14, 19, 24, and 25) abut or straddle the boundary. In order to minimize impact on these plants, all fence building activities will occur during the dormant season. Due to the terrain of the training site, erection of the fence is done manually, with minimal disturbance to the soil. Transport of the equipment to the boundary is typically via ATV. Pathways are marked in advance by the ENV office if there are any nearby skullcap management groups to be avoided. There is potential for damage to individual plants that lie directly on the fenceline, but there should be minimal peripheral impact from the construction of the security fence.

Security requirements also dictate that 25' line-of-sight clearance be maintained on either side of the boundary fence. This clearing of trees and routine mowing will significantly impact management group 2 and will somewhat impact other groups, including 9, 14, 24, 25, and possibly 8, 11, and 19 (see Figure A1-1). The degree of impact will be dictated by the number of plants within that 25' buffer. Clearing of the trees will vastly alter the habitat. In addition, the process of cutting the timber and clearing the lower vegetation will probably damage many of the large-flowered skullcap plants in that strip. TNARNG anticipates eventual loss of all skullcap plants within 30' of the fenceline after the clearing is completed; TNARNG estimates as many as 100 plants will be lost.

In order to mitigate this loss, the TNARNG will tally the number of plants which fall within this hazard zone prior to any clearing. A nursery (the Atlanta Botanical Garden or other acceptable to the USFWS) will be contracted to propagate large-flowered skullcap from the VTS-C population (if possible, from the threatened management groups). When ready, the nursery stock will be out-planted to an appropriate location on the VTS-C, as determined from soil, slope/aspect, and vegetative characteristics, which is not subject to immediate military need. The goal will be 75% replacement of plants lost to fenceline clearing.

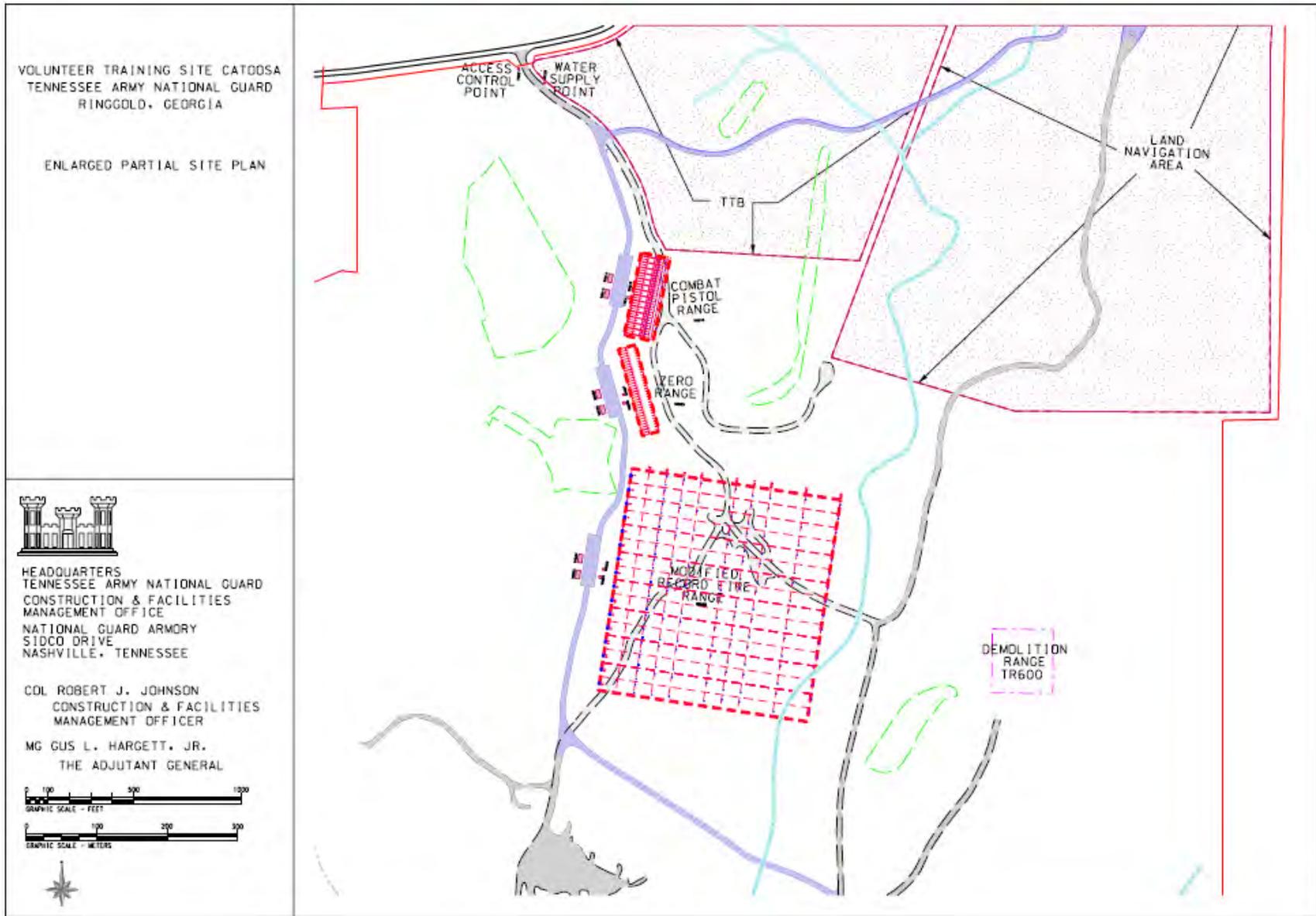
Although nursery-propagated large-flowered skullcap plants will be used as replacements for the take associated with the fenceline clearing and the new range complex, the TNARNG will utilize some of the “taken” individuals for the transplant experiment described in Section 1.4.

Construction of a new range complex is scheduled to begin in 2010 (Figure A1-4). Three ranges will be established in the north-central portion of the training site in the vicinity of large-flowered skullcap management groups 17 and 18: a 300m x 300m Modified Record Fire Range (MRFR), a 100m x 30m Zero Range, and a 100m x 30m Combat Pistol Range. Topography, the shape of the VTS-C, the location of existing ranges, and surface danger zone requirements dictate the location of these ranges. None of the ranges will directly impact any known large-flowered skullcap; however, the support facilities for the MRFR and the Zero Range may impinge upon skullcap group 17. Support facilities to be developed will include: an access road, three parking areas of approximately 1/3 acre each, and an observation tower, ammo breakdown area, target house, and covered training area at each range. Approximately 40 acres will be cleared for the range complex construction.

Grading for the access road and the support facilities at the Zero Range will likely result in incidental take of some large-flowered skullcap from management group 17 (69 plants). It is anticipated that less than 25% of plants in management group 17 will be lost during construction. Management group 18 (94 plants) will be thoroughly marked and completely avoided with all construction and earth-moving efforts.

TNARNG will mitigate the loss of plants from management group 17 as for the fenceline clearing: large-flowered skullcap will be nursery propagated to replace the individuals lost, with a goal of at least 75% successful replacement. The replacement plants will be out-planted to the west of the management group, if appropriate habitat is available. If not, they will be planted in appropriate habitat in another part of the training site. Aside from the direct take associated with clearing ground for the range and associated construction, there is the potential for loss of large-flowered skullcap plants to excess competition which may arise when the forest cover just beyond the management group is removed. To minimize this impact, TNARNG will plant evergreen tree species (eastern red cedar, shortleaf pine, and/or Virginia pine) along the edges of cleared areas that lie within 30 feet of a large-flowered skullcap group. The goal is to provide a dense edge to minimize increased sunlight intrusion into what had been forest interior.

Overall, the projects identified in this INRMP will influence the large-flowered skullcap. While many of the impacts will be positive, a small number of projects will result in incidental take of protected plants. Implementation of this plan will likely have an adverse effect on individual large-flowered skullcap plants on the VTS-C. However, it is not likely to adversely affect the total large-flowered skullcap population health on the training site, and the projects presented in this plan are necessary for the training site to provide needed training facilities and to remain in compliance with DoD security standards.



**Figure A1-4: Proposed ranges and associated construction for the VTS-Catoosa.** — indicates new road construction.  
 - - delineates existing large-flowered skullcap management groups.

## 2.0 GRAY BAT (*Myotis grisescens*)

Gray bats were captured on VTS-C during a baseline bat survey in 2006. Ten individuals were trapped along Tiger Creek during the June mistnetting session; three individuals (one a recapture from summer) were caught in September. No cave habitats have yet been located on the training site. Due to the distances gray bats may travel while foraging (up to 20 km), it is uncertain whether these bats are resident on the training site or merely utilizing the foraging habitat. However, several of the females captured in June 2006 were pregnant, indicating the likelihood of a maternity colony near the training site.

Further surveys will be conducted as funding becomes available to more completely characterize the gray bat usage of VTS-C. As a part of this investigation, a project is planned to radio-track the bats foraging on the training site to locate their roosting habitat.

### 2.1 Background

Gray bats occur primarily in the karst regions of the southeastern United States. They migrate between winter hibernation sites and summer maternity caves. Gray bat colonies are usually restricted to caves or cave-like habitats located within one kilometer of a river or reservoir. In winter they utilize only deep, vertical caves having a temperature of 6-11°C. The largest member of its genus in the eastern United States, the gray bat weighs from 7 to 16 grams. Its forearm ranges from 40 to 46 millimeters in length (U.S. Fish and Wildlife Service, 1982). One feature which distinguishes this species from all other eastern bats is its uni-colored dorsal fur. The other bats have bi- or tri-colored fur on their backs. Also, the gray bat's wing membrane connects to the foot at the ankle instead of at the base of the first toe as in other species of *Myotis* (U.S. Fish and Wildlife Service 1982). Gray bats feed on insects, of which the majority are aquatic species, particularly mayflies.

The gray bat was listed as federally endangered in 1976. The principle reasons for decline are believed to be human disturbance of caves and loss of appropriate cave habitat through human alteration or natural change.

### 2.2 Protection

The principle protection for gray bat on the training site will be maintenance of the quality foraging habitat that Tiger Creek provides. Gray bats feed primarily on aquatic insects, especially mayflies, which are particularly susceptible to pollutants. Objectives described in Section 4.2.5 are intended to maintain or improve water quality through the protection of riparian habitat. Careful implementation of Streamside Management Zones and attention to erosion issues should ensure appropriate feeding habitat for the gray bat. SMZ restrictions on timber harvest and construction will also maintain forested travel corridors along streams for bats.

A project completed in 2009 utilized radio-tracking to try to locate the local roost sites. Seven gray bats were radio-tagged and tracked for several days. The tagged bats included three reproductive males, two adult females, and two juvenile females. None of the bats was successfully followed to its roost; however, no transmitter signals could be located on or in the immediate vicinity of the training site during the daylight hours. At this time, it appears that gray bats are utilizing the VTS-C only for foraging habitat. If a cave or other hibernaculum is found in the future, a plan will be developed with the help of USFWS to protect the site, gate the opening, if necessary, and post or fence the immediate surroundings to minimize disturbance from training activities.

In addition to maintaining habitat, training will be developed to educate training site personnel and users on the significance of bats for insect control and to debunk fears commonly associated with bats such as the threat of rabies.

### **2.3 Monitoring**

A monitoring protocol for gray bats on VTS-C will be developed if it is determined through consultation with the USFWS that the population utilizing the site warrants on-going monitoring.

### **2.4 Research**

No research projects are planned for the gray bat on VTS-C at this time.

### **2.5 Assessment of Impacts on Gray Bat**

VTS-C contains no known roost sites or hibernacula. The gray bat is known to forage over Tiger Creek, but no other use of the training site has been documented. Training activities on the site have minimal impact on the riparian areas: utilization of the riparian areas is limited to established road crossings and some foot traffic within the land navigation course. Riparian areas on the training site are protected by streamside management zone best management practices for all land management activities. This INRMP includes projects designed to maintain or improve water and habitat quality in the streams and riparian areas (see Section 4.2.5 and Table 4.3 in Chapter 4 for more detail). The gray bat may benefit from such habitat improvement actions. Overall, the TNARNG anticipates that the implementation of this INRMP is not likely to significantly affect the gray bat.

**BIOLOGICAL OPINION OF THE U.S. FISH AND WILDLIFE SERVICE  
Regarding Impacts on the Large-flowered Skullcap  
(*Scutellara montana*)**



# United States Department of the Interior

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JUN 12 2009

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P.O. Box 41502  
Nashville, Tennessee 37204-1502  
ATTN: Laura Lecher

RE: USFWS Log# 41460-2009-F0344, VTS-Catoosa INRMP

Dear General Hargett:

This document transmits the Fish and Wildlife Service's (Service) biological opinion based on our review of the Tennessee Army National Guard (TNARNG) proposed Integrated Natural Resources Management Plan (INRMP) for Volunteer Training Site-Catoosa (VTS-C) in Catoosa County, Georgia and its effects on the threatened large-flowered skullcap (*Scutellaria montana*) in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended, (16 U.S.C. 1531 *et seq.*). Your January 30, 2009, request for consultation was received on February 2, 2009, with adequate information to initiate formal consultation.

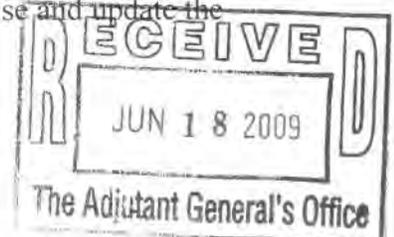
## ***CONSULTATION HISTORY***

This biological opinion is based on: (1) the December 2008, Draft Environmental Assessment; (2) multiple letters, emails and phone calls between TNARNG personnel and the Service; and (3) multiple visits to the project site by the Service. A complete administrative record of the consultation is on file in the Athens Ecological Services office.

**2002:** The original VTS-C INRMP was implemented. During the first years of implementation, it became apparent that the format and content of the original INRMP were not conducive to applied management. In addition, the discovery of a federally-listed threatened plant species required substantive changes in the VTS-C management plan.

**December 15, 2003:** TNARNG informed the Service of large-flower skullcap on the property.

**October 11, 2005:** The TNARNG informed the Service of the intent to revise and update the INRMP.



**May 30, 2006:** The TNARNG and Service met on site to discuss management options.

**November 22, 2006:** The TNARNG and Service met in Athens, Georgia to discuss the INRMP.

**April 16, 2007:** The TNARNG provided a draft INRMP for the Service to review.

**January 30, 2009:** Formal consultation was initiated on the INRMP.

**February 12, 2009:** The Service provided a letter (re: USFWS Log# 41460-2009-F0344, VTS-Catoosa INRMP) to inform the TNARNG that the Service had sufficient information to initiate consultation on the large-flower skullcap and that we concurred with the TNARNG's finding that the INRMP was "not likely to adversely affect" the gray bat (*Myotis grisescens*).

## **BIOLOGICAL OPINION**

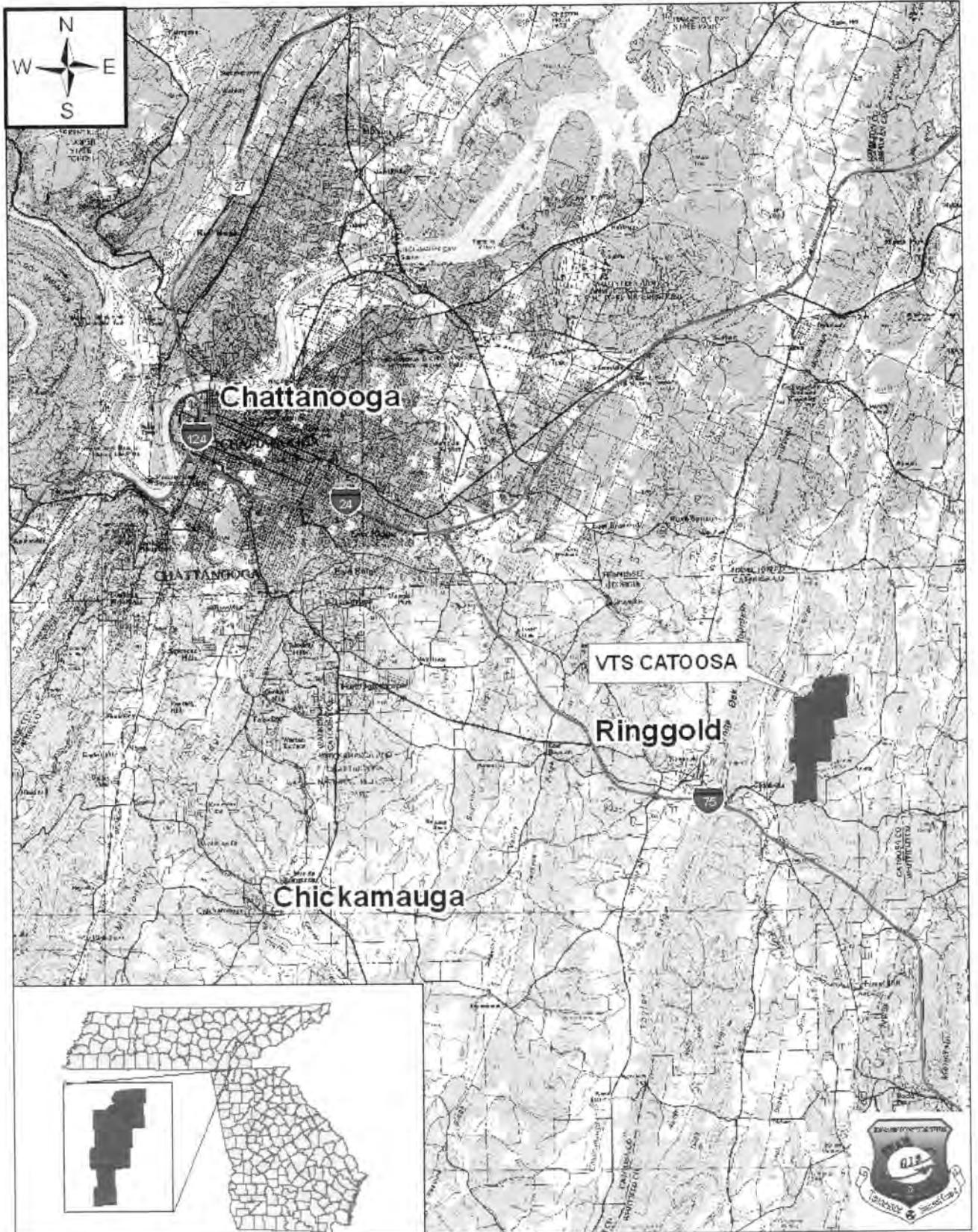
### **I. DESCRIPTION OF PROPOSED ACTION**

The VTS-C is located in east-central Catoosa County in northwestern Georgia (Figure 1), approximately two miles east of Ringgold, Georgia. The 1,628-acre training site is in the Appalachian Highlands physiographic province, approximately 90 miles northwest of Atlanta, and approximately 20 miles southeast of Chattanooga, Tennessee. Georgia State Highway 2 borders the site on the south, and Rifle Range Road accesses the northern boundary. VTS-C is owned by the U.S Army Corps of Engineers and has licensed its use to the TNARNG since 1960. The TNARNG maintains the VTS-C for the purpose of training Tennessee National Guardsmen. The TNARNG manages the land on this training site with the goal of no net loss of training land resulting from training or natural resources management activities.

TNARNG will use the VTS-C INRMP as the principle guiding document for land management activities taking place on the training site for the next five years (2009-2013); it is a revision of the original VTS-C INRMP which covered the period 2002-2006. The proposed action is to implement the revised VTS-C INRMP to guide all natural resource management practices, on-site training, and training site maintenance and improvement projects on the facility from 2009 to 2013. This action is designed to integrate all management activities to support the military mission by protecting and enhancing training lands (vegetation, soils, water quality, and wildlife) while providing quality conditions for training.

The revised INRMP identifies multiple natural resources management goals and the objectives and tasks that are necessary to accomplish those goals for integrated, sustainable land management at the VTS-C. The revised INRMP also contains four specific management components: the Endangered Species Management Plan for large-flowered skullcap and gray bat, the forest management plan, the prescribed fire plan, and the invasive pest plant control plan (TNARNG 2008).

Figure 1 Location Map



### **Training Activities**

Training activities on VTS-C are variable and during FY2009-2013 are expected to be similar to previous years. Typical uses include small arms range firing, maneuvering, and combined arms training including field bivouac; tracked and wheeled vehicle operations on developed roads and major trails; mounted and dismounted maneuvers; and weapons firing. Off-road maneuvers are permitted within designated open terrain areas and in designated fringe areas within 100 feet of specified roads and trails within the maneuver area. Up to one battalion-size infantry, artillery, engineer, or combat service support unit, conducting non-live fire exercises, can be accommodated at one time. Average training site usage over the past four years has been approximately 42,700 soldiers per year, a decrease from the average of 50,400 during the late 1990's. Training site use is generally dispersed across the year with peaks of National Guard usage occurring in October-November, February-April, and June (TNARNG 2008).

In order to educate land users on their environmental stewardship responsibilities the VTS-C implements a Sustainable Range Awareness (SRA) program. The SRA program provides for the development and distribution of educational materials to land users, including maps marking environmentally-sensitive areas and the VTS-C field card that identifies environmental considerations and guidelines for military tenants utilizing the facilities. These materials relate the principles of land stewardship and the practices of reducing training and/or testing impacts. Environmental Outreach also includes information provided to environmental professionals concerning operational requirements. The purpose of the SRA program is to prevent unnecessary damage to the environment and in particular, training lands, by providing information to all site users. The SRA program targets all land users to include soldiers, leaders, Department of Army (DA) civilians, and the local community who may use training lands for recreational purposes. The SRA program is designed to improve understanding of the effects of the mission, training, or activity on the natural resources of the VTS-C and seeks to create a conservation ethic that will minimize damage to training lands and natural resources (TNARNG 2008).

### **Training Site Maintenance and Improvement Projects**

The primary objective of VTS-C natural resources management is to ensure the availability of mission-critical training land now and for the future. Mission-related objectives that will be accomplished by or in cooperation with the natural resources management actions proposed in the VTS-C INRMP include: increasing number of bivouac sites, increasing mounted and dismounted mobility by opening up the forest understory through silvicultural treatments in accordance with the forest management plan, creating additional open maneuver areas for tracked and wheeled vehicles, ensuring there is no net loss of training land due to environmental and/or natural resources management issues, and developing a plan to avoid encroachment of natural resource management on training (TNARNG 2008).

The TNARNG intends to implement construction and training site improvement projects during 2009-2013. Buildings and associated parking areas will be added to the cantonment area. Reclamation of an old roadway along the northern edge of VTS-C is anticipated. The Land Navigation Course in the north-central portion of VTS-C is covered with dense understory vegetation that makes foot travel difficult, reducing the effectiveness of the course, and will be opened by mechanical vegetation removal. Security requirements include complete fencing

around military installation boundaries. At this time the VTS-C perimeter is only partially enclosed. Fencing efforts will continue during 2009-2013, typically in 2500-ft to 5000-ft segments. Security requirements also dictate that 25-ft, line-of-sight clearance be maintained on either side of the boundary fence, requiring clearing of trees and routine mowing (TNARNG 2008).

Construction of a new range complex is proposed to begin in 2010. Approximately 40 acres will be cleared in the north-central portion of VTS-C for three ranges: a 300m x 300m (984ft x 984ft) Modified Record Fire Range (MRFR), a 100m x 30m (328ft x 98ft) Zero Range, and a 100m x 30m Combat Pistol Range. Topography, the shape of the VTS-C, the location of existing ranges, and surface danger zone requirements necessitate the location of these ranges. Support facilities to be developed will include: an access road, three parking areas of approximately 1/3 acre each, and an observation tower, ammo breakdown area, target house, and covered training area at each range (TNARNG 2008).

### **General Natural Resources Management Actions**

The forestland inventory conducted in 2005 was used to develop a management plan based on forest health and timber management needs, as well as military needs and plans. It presents the recommended forestry management prescriptions for the forest stands occurring within the Cantonment Area and each of the 10 training areas that comprise VTS-Catoosa. Individual forest management prescriptions are provided for the forest stands occurring within each training area. The forest management prescriptions are generally focused on actions that would enhance the quality and economic value of the forestry resources on VTS-C. The use of prescribed fire is also addressed for each forest stand (TNARNG 2008).

### **Fire Protection**

Fire is a tool used for natural resources management on VTS-C. The tank range and other open grassland areas are burned regularly to control woody encroachment. Most of the forested areas on the training site are dominated by hardwood species, and have not been burned regularly in the past. TNARNG has developed a prescribed burn plan for the purposes of fuel reduction and habitat improvement and will begin implementation in 2009. Prescribed burning will generally be restricted to burns that would reduce excessive accumulation of fuels thereby reducing wildfire risks. In forested areas, prescribed fire would be infrequently used at intervals of between 5 to 7 years. Managing with fire is expected to provide for the safety of fire crews, be a cost-effective means to reduce wildfire potential on the training site, maintain and improve the usability of the training site, effectively protect and enhance natural resources, and facilitate ecosystem management (TNARNG 2008).

## **1. Avoidance/Minimization Measures Incorporated Into the Proposed Action**

### **Skullcap Management**

TNARNG has mapped and designated 26 skullcap management groups on VTS-C (Figure 2). At VTS-C, there are a number of factors that pose a potential threat to the large-flowered skullcap: physical damage from human activity, soil disturbance from human activity, browsing or uprooting by wildlife, and wildfire. In order to minimize these threats, TNARNG has developed the skullcap management plan and will implement the following avoidance and minimization

efforts: Perimeter posting and mapping, wildlife control, invasive pest plants (IPP) control and fire protection (TNARNG 2008).

### **Perimeter Posting and Mapping**

TNARNG has posted the perimeter of all large-flowered skullcap groups with signs that include a statement of no access during March 1 to June 30 (flowering season), and foot traffic only during the rest of the year. These signs, in conjunction with training and environmental education efforts for the soldiers and training site personnel, should minimize unplanned, human-caused disturbance of the plants. The signs are easily seen and should discourage accidental vehicular traffic through known clusters of plants. The signs are generally spaced 50 to 65 m apart. Trees between pairs of signs along the edge of a skullcap group will be marked with yellow paint to provide a more continuous visual barrier. The perimeter around each management group is located just outside the existing plants (no buffer area) to minimize restrictions on training area, but will be updated annually to ensure the majority of the plants are within the protected boundary. To date, the spatial boundaries of the groups of plants have changed little from year to year, and it is expected that the locations of the buffer zones will remain relatively constant for the near future. The perimeter of each group has been recorded with a GPS, and accurate maps can be produced for training or land management use. A training module will be developed that explains the purpose behind these signs and provides basic information about the skullcap; this information will be presented to all training site users in their initial on-site briefing. Maps are also available to the training site staff and other users showing the location of the large-flowered skullcap to encourage avoidance of prime skullcap areas during sensitive periods (TNARNG 2008).

### **Wildlife Control**

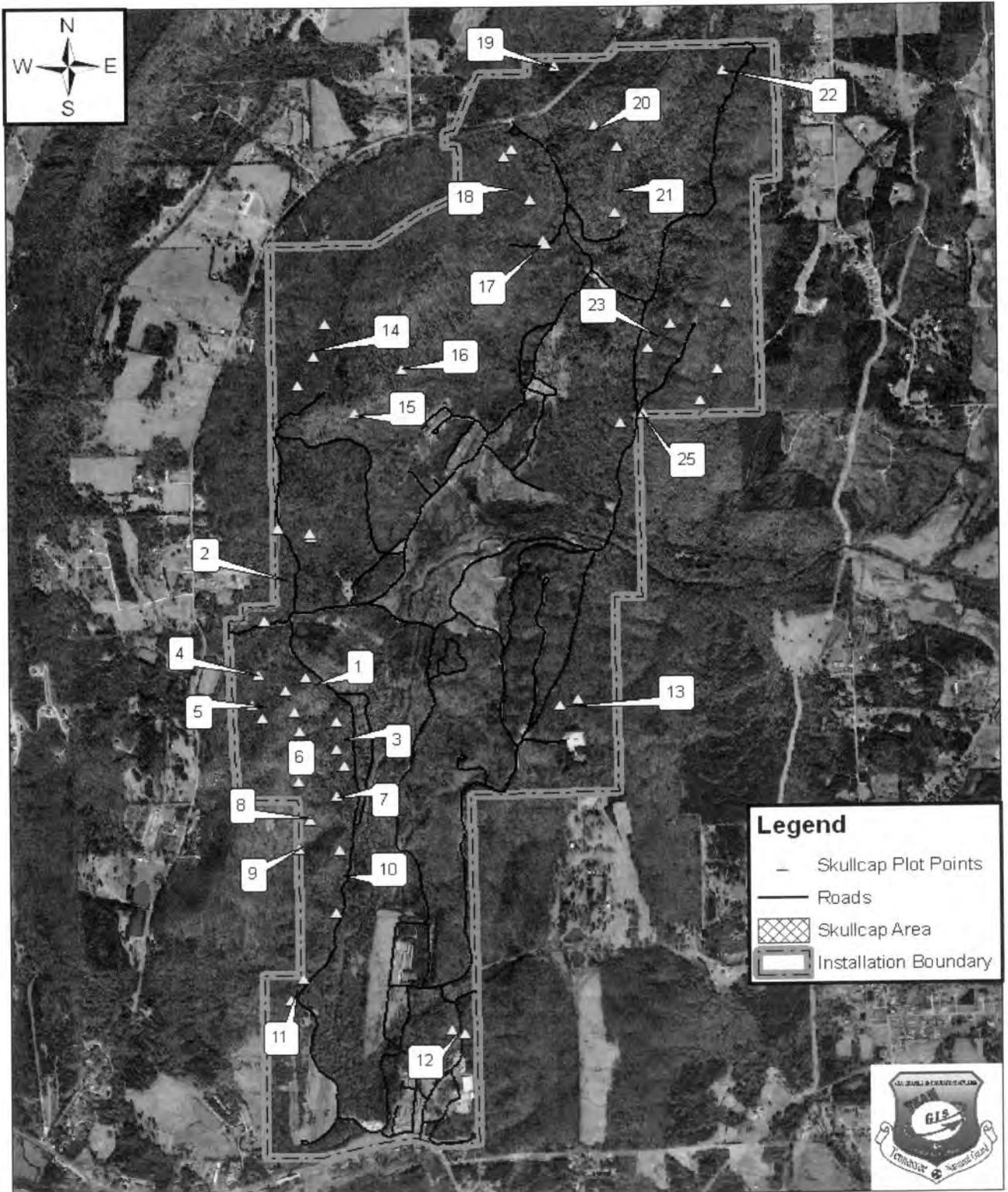
Herbivores can pose a threat to large-flowered skullcap. A number of individual plants have been found that were browsed during the monitoring program. White-tail deer are presumed responsible, however, browsing does not appear to kill the plant, but limits flowering as the buds are typically on the portion that is eaten. White-tailed deer are not currently controlled at VTS-C and there is no hunting on the training site. The TNARNG will coordinate with the Service to determine if monitoring results indicate that deer are significantly impacting the skullcap, and a program should be developed to limit the numbers of deer (TNARNG 2008).

Feral hogs are a more substantial danger to the plant. Disturbance indicative of hog rooting has been found within skullcap groups. It is presumed that hogs will feed on the perennial root of the skullcap and, therefore, could substantially impact the skullcap population. Feral hog numbers on the training site have been controlled in the past through professional removal. The TNARNG will coordinate with the Service to determine acceptable levels of hog damage and a threshold for initiating hog reduction efforts (TNARNG 2008).

### **Invasive Pest Plants Control**

Invasive exotic plants are a problem at VTS-C and some skullcap management groups contain invasive plants. The principal problem species include Japanese honeysuckle (*Lonicera japonica*) and Chinese privet (*Ligustrum sinense*). At this time, the infestations do not appear to seriously impact the skullcap, but over time this status may change (TNARNG 2008).

Figure 2 Management Groups



Herbicide use will be strictly controlled in the vicinity of skullcap management groups. Only chemicals that are not soil active and are unlikely to translocate will be applied to IPP within 50-ft of a skullcap management group. Applications will be restricted to late fall after the skullcap is dormant, and application methods will be utilized that minimize the risk of chemical drift. Additional monitoring will track any changes to treated skullcap management groups, and the methodology will be revised if there appears to be any damage to the skullcap. Where IPP threaten the skullcap, careful application of herbicides will allow improvement of the skullcap habitat. Management groups 12, 18, 19, 23, and 24 are currently threatened by privet and honeysuckle. Monitoring of management groups treated for IPP will allow the identification of any detrimental effects that herbicide use might have on skullcap, and a determination of whether the beneficial effects to the skullcap justify the expense and effort of focused IPP control.

Herbicide treatment of IPP within large-flowered skullcap groups carries some risk for the protected plants from chemical drift and translocation. Careful choice of herbicide and treatment methods will minimize the hazard. As a precaution, initial treatments will only cover one-half of any IPP infested management group. Any herbicide damage to large-flowered skullcap in these groups will require a revision of methods prior to any further chemical IPP control efforts within the management groups.

TNARNG will ensure that environmental personnel with appropriate pesticide applicator certification will apply all herbicides and that applications will be made during the late fall or early winter after the skullcap has become dormant. Privet will be managed primarily by cut-stump method with application of Garlon 3A or a glyphosate herbicide with small privet plants (under 1 m tall) treated by foliar application of glyphosate. Japanese honeysuckle will be treated with foliar application of Garlon or a glyphosate herbicide. No more than half of a skullcap management group will be treated in the first year. Control and treatment plots will be established within each skullcap management group, skullcap will be mapped in the study plots in the spring prior to treatment and reassessed the following spring, if initial results indicate little damage to the skullcap from the herbicide applications, the IPP treatments may be expanded to include all threatened skullcap management groups. Monitoring of skullcap response will continue for at least two years following the last herbicide application (TNARNG 2008).

## **2. Recovery/Conservation/Environmental Stewardship Measures Incorporated Into the Proposed Action**

To investigate management alternatives and impacts on large-flowered skullcap, three research projects are proposed: transplanting of individual skullcap plants, assessing fire impacts, and monitoring the influence of chemical and manual control of invasive pest plants. These projects will expand our understanding of management options and population dynamics for this species and may eventually contribute to the recovery of the species.

### **Transplanting**

Certain management groups are threatened by required or anticipated training site construction and other activities. There are security requirements for a fence and a 25-ft cleared buffer to surround the entire training site. Several management groups (2, 9, 14, and 24) lie along this

boundary and will be affected by clearing. Other groups (17 and part of 18) fall in areas that will potentially be impacted by proposed range construction. TNARNG will transplant individuals from threatened groups to other areas on VTS-C where effects of training are not expected to occur. An adaptive management approach will be used for the transplant effort. Initial transplants will occur using the preliminary protocol below. Information gathered from the initial efforts, in coordination with the Service, will be used to update the protocol to maximize success.

#### Preliminary Protocol:

- Plants will be transplanted into the best available habitat within the same training site; i.e., group 9 plants will stay in the southwest cluster of management groups, group 17 plants will stay within the 18-20-21 area.
- Appropriate habitat will be identified within 750 ft of the existing group, out of danger of the construction or clearing project.
- Transplant sites will be as similar as possible to the original habitat in terms of slope, aspect, elevation, soil series, canopy cover.
- No more than ½ of a group's plants will be moved initially. A mix of flowering adults and non-flowering juveniles will be moved. Plants will not be taken from within existing monitoring plots in the initial test.
- Plants will be marked with flags during flowering season.
  - o Plants will be dug up either after seed set (July) and maintained in a greenhouse over winter or after initiation of dormancy (October) and transplanted immediately.
- As much soil as is feasible to transport will be dug up with each plant to preserve fine roots and mycorrhizal associations.
- Plants will be watered at transplanting to settle the soil, but will be subject to natural conditions after that.
- Transplant sites will be marked and individual plants mapped to allow monitoring of individual success.
- If the initial transplant success is reasonable, the remainder of the plants that are threatened by immediate military development will be relocated using the most successful methods.
- Plants will be monitored for at least 3 years.

Because efforts to transplant can be complicated by natural factors such as weather, soils and predation, TNARNG will not depend solely on transplant success to maintain the skullcap population on VTS-C. In a redundant effort to maintain the population of large-flowered

skullcap on the training site, arrangements will be made for the greenhouse propagation of new plants, to replace plants that are displaced by construction and training. Propagated plants will be outplanted into training site locations chosen in coordination with the Service (TNARNG 2008).

### **Fire Impact Research**

Prescribed burning is a tool that will be utilized for natural resources management on VTS-C. Currently, there is a limited understanding of the impacts of fire on large-flowered skullcap. It would be useful to know whether the skullcap can withstand occasional burning or whether all management groups within a burn area will always require protection. The fire impact study will involve five skullcap management groups that may result in the death of individual plants. Skullcap response to fire will be monitored and in the worst case scenario, between 50 and 100% of these plants could be killed in the first fire, resulting in the termination of the experiment. It is anticipated, however, that fire will not significantly damage management groups and may improve seed germination and recruitment (TNARNG 2008).

#### **Preliminary Protocol:**

- Large concentrations of large-flowered skullcap will be protected from prescribed fire, either by complete restriction on burning (training area 2 and populations within SMZs such as management group 24) or by construction of a temporary fire break surrounding the group with at least 50 feet of buffer.
- Certain groups will be allowed to burn on the rotation schedule recommended in INRMP, Annex 3, Prescribed Burn Plan, for fuel control in the hardwood forests of the site.
- Groups 15 and 16 fall within the tank range target area which is subject to burning every 2-4 years; groups 12, 17, and 19 will be burned on a 5-7 year rotation.
- All skullcap-impacting burns will be cool, dormant season burns.
- Pre- and post-burn sampling will assess fire weather, fire behavior, flame temperature, litter consumption and impacts on vegetation.
- Data from the permanent monitoring plots will be used to assess skullcap recovery in the years following the burn, relative to pre-burn levels. If response to the initial fire is bad (more than 50% loss of plants), the fire study will be discontinued and all management groups will be protected with plowed firebreaks in all future prescribed burn events.

### **Monitoring**

A monitoring protocol has been developed and implemented. Plants that are transplanted, nursery grown or that are within burned areas will be monitored. The monitoring protocol is based on 10-meter radius circular plots. Forty-six of these plots have been established within the 26 management groups (Figure 2) with at least one plot in each management group. The plots are not randomly located but are placed subjectively in areas known to contain skullcap plants. The plot centers are permanently marked and recorded via GPS for repeat sampling. Monitoring is conducted during the flowering season for the large-flowered skullcap which begins in

mid-May and runs into June with the peak usually in the end of May. Within each monitoring plot, the following information is recorded: each individual large-flowered skullcap plant is identified and characterized in terms of number of stems, flowering/nonflowering, browse or insect damage indications, adult or juvenile. The distance and bearing from the center point of the plot to each plant is measured, allowing mapping of plant locations. In addition, a habitat description, associated plant species, threats, and evidence of disturbance are noted for each plot (TNARNG 2008).

FY2008 was the fifth year of data collection following this protocol (Table 1, p. 15). With significant fluctuations in the plant counts in 2007 and 2008, possibly due to drought, the monitoring program will be continued for several more years to track population dynamics. Results from each year of monitoring will be compiled and comparisons made as multiple years' data become available. After a period of five years of monitoring, the trends at each monitoring plot will be evident. At that time, the monitoring protocol will be evaluated and modified, if needed.

## **II. STATUS OF THE SPECIES/CRITICAL HABITAT**

### **1. Species/Critical Habitat Description**

The large-flowered skullcap, (*Scutellaria montana*), is a member of the mint family (Lamiaceae) that was listed as an endangered species on June 20, 1986 (U.S. Fish and Wildlife Service 1986). It is a perennial herb that grows to a height of 30 to 50 centimeters (U.S. Fish and Wildlife Service 1994). The stems are erect and square, and the leaves are lanceolate to ovate, 5 to 8 centimeters long, 3 to 5 centimeters wide, with crenate to serrate margins and hairs on both surfaces. The inflorescence is a terminal raceme with or without paired lateral racemes at the base, and the flowers are relatively large, 2.6 to 3.5 centimeters long and are blue and white in color (U.S. Fish and Wildlife Service 1994).

The Service reclassified large-flowered skullcap from endangered to threatened status in 2002, at which time there were 84 occurrences of the species distributed among 48 populations (U.S. Fish and Wildlife Service 2002). Of these 48 populations, 22 were protected through ownership by conservation organizations, county parks, historic sites, or Federal land; 11 of these protected populations were deemed self-sustaining.

Habitat of large-flowered skullcap has been described as rocky, submesic to xeric, well-drained, slightly acidic slope, ravine and stream bottom forest in the Ridge and Valley and the Cumberland Plateau provinces of northwestern Georgia, southeastern Tennessee, and probably northeastern Alabama (U.S. Fish and Wildlife Service 1994). Specific habitat components are thought to consist of a history of natural pine occurrence, canopy dominated by oaks and hickories, a deciduous shrub layer with some evergreen, a moderately dense herb layer consisting of mesic and xeric species, and well-consolidated strata of sandstone and shale with some exposed rock. Data collected on sites where large-flowered skullcap occurs indicates that it is a mid- to late-successional species (U.S. Fish and Wildlife Service 1994).

Large-flowered skullcap releases nutlets from late June through early July. Nutlets overwinter and germination begins the following year in late March. Flowers appear from mid-May through early June, are pollinated primarily by bees, and fall from the plant one to two days after pollination. The reproductive potential of large-flowered skullcap is low; observers have found that only 10 to 40 percent of flowers produce fruit. Reasons for variation in fruiting as well as conditions needed for germination and dispersal, are unknown (U.S. Fish and Wildlife Service 1994).

## **2. Life History, Ecology, Population Dynamics, and Threats to the Species**

Throughout the range of large-flowered skullcap, numerous entities contribute to monitoring including Tennessee Department of Environment and Conservation-Division of Natural Areas (TDEC-DNA), Tennessee Valley Authority (TVA), National Park Service (NPS), Georgia Department of Natural Resources (GDNR), Tennessee Aquarium, TNARNG, and the Service. In recent years, TVA and Tennessee Aquarium have organized annual meetings for the purpose of sharing information and coordinating monitoring activities among these groups. Monitoring methods used have varied over time and across agencies, but TDEC initiated a standardized approach to monitoring in 2004.

Large-flowered skullcap will be considered for delisting when there are 15 adequately protected and managed self-sustaining populations. Populations must be distributed throughout the range and must be maintained for 10 years. A population will be considered adequately protected when it is legally protected and all needed active management is provided. A population will be considered “self-sustaining” if monitoring data support the conclusion that it is reproducing successfully and is stable or increasing in size. The minimum number of individuals necessary for a self-sustaining population should be considered to be at least 100 until otherwise determined by demographic studies.

Skullcap is known from southern Tennessee and northwestern Georgia (Figure 3). According to data provided by TDEC-DNA (D. Lincicome, email dated August 21, 2008), there currently are 155 extant large-flowered skullcap element occurrences (EOs) in Tennessee; however, the number of populations that these occurrences are distributed among has not been evaluated. In Georgia, there are 52 extant EOs (K. Morris, GDNR, email dated August 18, 2008). Element occurrences are the fundamental unit of information tracked by the Natural Heritage methodology and are defined as “an area of land and/or water in which a species or natural community is, or was, present” (NatureServe 2004). An analysis of the EOs throughout the range of large-flowered skullcap is necessary in order to delineate populations and assess whether they are protected and self-sustaining. Unless new criteria are developed, this analysis should be based on the definitions that the Service used when it reclassified the species (U.S. Fish and Wildlife Service 2002): (1) a population is an occurrence that is generally at least 0.5 mile from other occurrences, taking into account the position of occurrences with respect to physical barriers (ridges, highways, etc.), contiguous habitat (e.g., two or more occurrences deemed part of a single population could be one mile apart on the same ridge or slope), and richness or diversity of the occurrence, and (2) a population is considered self-sustaining, or viable, if it has a minimum of 100 individuals. Due to the number of new EO’s it is likely that the criteria for delisting large-flowered skullcap have been met, this analysis of population

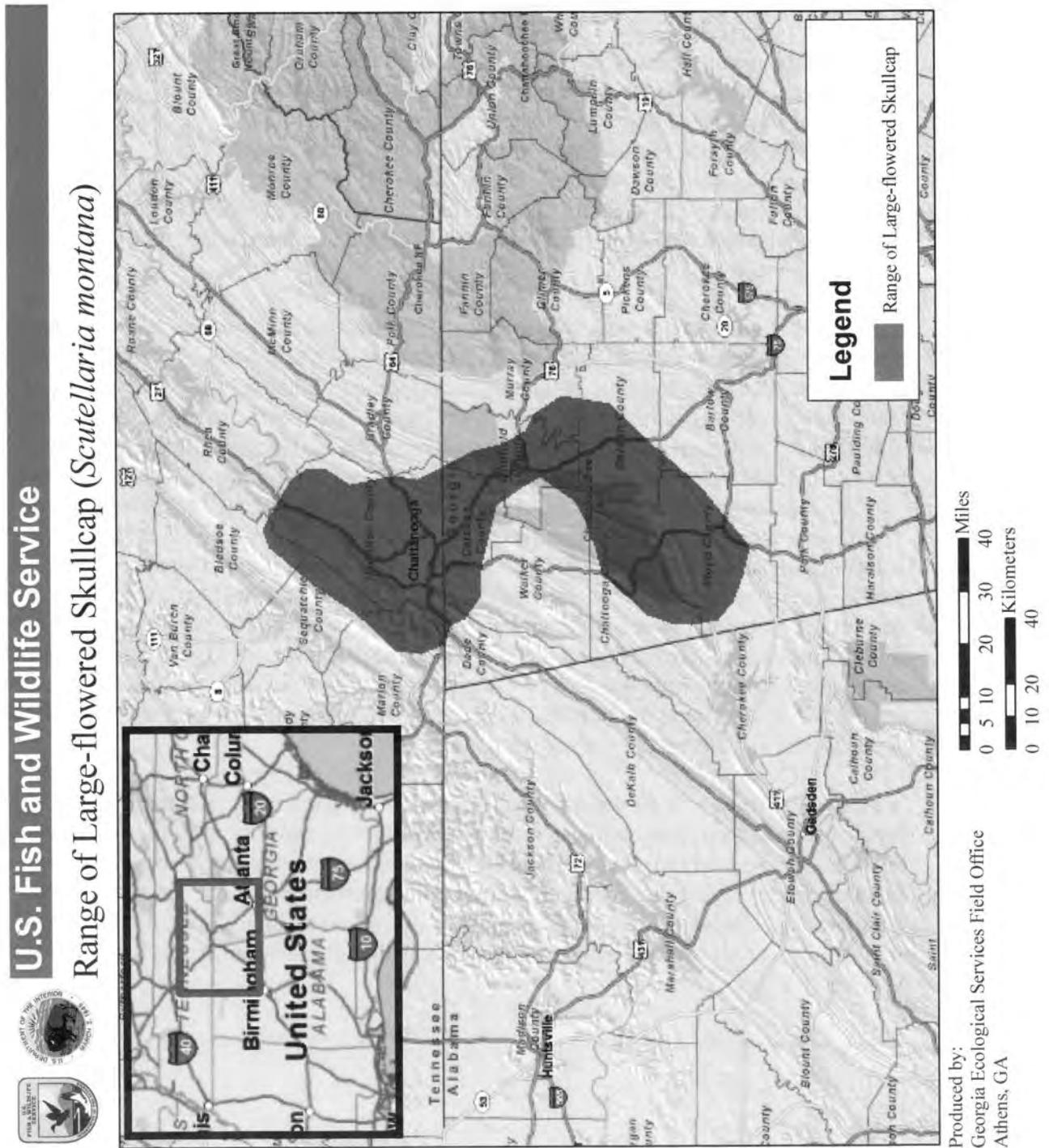
numbers, viability, and protection status must be completed before we can determine whether the species should be considered recovered. The status of large-flowered skullcap is considered stable throughout its range.

The State of Tennessee initiated a monitoring program for large-flowered skullcap in 2004, and has now established 36, 10-meter radius circular plots in locations where the species was found to be reasonably abundant after surveying plant numbers and distribution throughout each monitored occurrence (TVA 2005; TDEC-DNA 2008). Total numbers of flowering and vegetative plants are tracked in each plot. Areas targeted for monitoring included Tennessee River Gorge, Prentice Cooper Forest, North Chickamauga Creek Gorge State Natural Area (SNA), Falling Water Falls State Natural Area, Rock Creek Gorge – Cumberland Trail State Park (CTSP), Soddy Creek Gorge – CTSP, Possum Creek Gorge – CTSP, and Chickamauga and Chattanooga National Military Park (CCNMP). The NPS monitors occurrences in the CCNMP and provides data to TDEC-DNA for reporting purposes. Data collected from these plots have not been analyzed to evaluate trends in large-flowered skullcap, but in the future will provide a basis for doing so.

Range wide threats could affect some EO's of large-flowered skullcap, however, none of these threats are severe enough to cause the further decline of the species. Threats include habitat destruction caused by logging, residential development, grazing, wildfire, clearing of wooded areas for pasture, off-road vehicle (ORV) damage, hiking traffic, maintenance or rerouting of hiking trails, and rapid urbanization in the vicinity of Chattanooga, Tennessee. The threat of habitat destruction has recently been heightened owing to a rapidly growing, but poorly regulated, industry associated with surface rock mining to produce the material marketed as "Tennessee mountain stone". This threat could be especially problematic because of the complexities surrounding conveyance through deeds of mineral and surface rights, which are often held by separate entities. Because of the severance of these legal rights, persons and public entities that currently own surface rights on properties that harbor large-flowered skullcap could find themselves unable to protect the species and its habitat from the destruction caused by surface rock mining when holders of mineral rights choose to exercise those rights. Such a circumstance occurred on lands held by the State of Tennessee that contain large-flowered skullcap and are traversed by a section of the CTSP.

A number of factors, however, may have contributed to the rarity of the species. Browsing, by species such as deer, may result in reduced reproductive capacity of individual plants if they are browsed before seed set. Competition by other plant species may also be a contributory factor. Japanese honeysuckle and privet are known to be problems for some large-flowered skullcap populations. Timber harvest might also affect the species; recruitment of large-flowered skullcap into areas disturbed by such activities is thought to be unlikely (U.S. Fish and Wildlife Service 1994).

Figure 3. Range of the Large-flowered Skullcap (*Scutellaria montana*)



### **III. ENVIRONMENTAL BASELINE**

#### **Status of the Species Within the Action Area**

Surveys conducted late in 2002 at TNARNG's VTS-C produced 60 discrete clusters of large-flowered skullcap that contained a total of 1,581 plants, which were grouped into 26 skullcap management groups based on habitat similarity and geographic proximity (Figure 2). The 2002 data was a comprehensive survey of all plants, all subsequent data was extrapolated from monitoring plots. Therefore, for the purpose of this opinion, data from 2002 has been used because they are the most comprehensive data available. Data in Table 1 appear to indicate that the number of skullcap may be declining at VTS-C. The decline is likely a natural fluctuation due to drought conditions on site, because the TNARNG has not altered the natural habitat and natural processes are still intact.

The only large-flowered skullcap occurrences monitored in Georgia are those at TNARNG's Volunteer Training Site, Catoosa County (VTS-C). The data in Table 1 demonstrate the importance of long-term monitoring programs for establishing population trends and examining them for cyclical patterns of variability and responses to environmental conditions. For example, the declining trend in numbers of plants observed that began in 2007 could be attributable to effects from severe drought conditions that occurred in northwest Georgia during this period (SpecPro, Inc. 2008). It will be vital to continue long-term monitoring of all populations to determine whether the effects of this drought, which extended into the Tennessee portion of the range of large-flowered skullcap, and other factors will result in sustained reductions in population sizes. The potential for sustained demographic reductions could have implications for maintaining genetic diversity within large-flowered skullcap populations, and ultimately the species as a whole. Cruzan (2001) interpreted patterns of genetic variation among populations of different sizes as evidence of recent changes in the abundance of this species, noting that large populations consistently had high levels of genetic variation, whereas smaller populations displayed greater variability in this regard. Genetic variation was diminished in some small populations, and Cruzan (2001) concluded that these patterns of variance in large-flowered skullcap provided evidence that the species is generally in the process of demographic decline, because substantial loss of genetic diversity would tend to be expected in small populations only if they were reduced in size for extended periods of time (Cruzan 2001).

**Table 1. Counts of all large-flowered skullcap plants within 46, 10-meter radius circular monitoring plots from TNARNG's VTS-C for the period 2004-2008.**

Year	Min	Max	Average	Total
2004 <sup>1</sup>	4	112	24	1,121
2005 <sup>2</sup>	4	116	32	1,475
2006 <sup>3</sup>	6	131	39	1,799
2007 <sup>4</sup>	0	79	18	827
2008 <sup>3</sup>	1	30	8	355

<sup>1</sup>Science Applications International Corporations (SAIC) (2006); <sup>2</sup>SAIC (2006); <sup>3</sup>unpublished data provided by TNARNG; <sup>4</sup>SpecPro, Inc.

## **IV. EFFECTS OF THE ACTION**

### **1. Direct Effects**

Potential impacts of the INRMP were evaluated using 2002 data.

#### **Training Activities**

Although training activities on the VTS-C have the potential for adverse impacts to the large-flowered skullcap, measures implemented by TNARNG should eliminate training related destruction of skullcap. Due to the topography of the region and the forested condition of most of the site, vehicular traffic is restricted to established roads and trails and to prepared open maneuver areas, thus avoiding known large-flowered skullcap groups. The potential for impacts from foot traffic has been largely eliminated and is considered discountable. All known large-flowered skullcap groups are posted with signs restricting entry during the growing season (vehicular traffic is prohibited at all times), and training maps display the skullcap locations as off-limits, so there is limited threat to the plants from soldiers on foot. Bivouac sites experience high foot traffic, as well as, vehicular disturbance immediately off-road, but such training areas are situated at a distance from known skullcap groups to avoid disturbance. Range operations hold little threat to the protected plants on the existing live-fire and non-live-fire ranges (range maintenance, is discussed below). TNARNG training operations are not likely to adversely affect the large-flowered skullcap.

#### **Training Site Maintenance and Improvement Projects**

Training site maintenance and improvement involves a wide variety of actions; most will have little effect on the large-flowered skullcap, but certain construction projects may have a substantial impact on the large-flowered skullcap on VTS-C. Maintenance of range facilities and grounds has little influence on the skullcap, which are generally not located in close proximity to these heavily-managed portions of the training site. The use of prescribed fire to maintain the target area of the tank range has affected management groups 15 and 16 in the past; these two groups are now protected by a fire break and will remain protected until the prescribed fire experiment is initiated (see prescribed burning below).

Road maintenance has the potential to impact those management groups located directly beside the major roads; however, all groups have been marked, and training site personnel avoid altering the road shoulder in the vicinity of the large-flowered skullcap. No impacts are expected from road maintenance.

Construction in the cantonment area will be located well away from group 12 and so there will be no impact on the large-flowered skullcap. Reclamation of an old roadway across the northern edge of the training site is anticipated. The roadway will be routed around management groups 20 and 21, and will have no direct impact on the skullcap.

Table 2 Summary of Effects

Management Group	Training Area	Total Number Plants <sup>1</sup>	Anticipated activities	Cluster # <sup>2</sup>	Estimated # impacted plants <sup>3</sup>	Approximate area impacted (acres)	Probable impacts
1	C-2	108					
2	C-5	67	boundary	cluster 51	11	0.282	likely destroyed
3	C-2	99					No effect
4	C-2	8					No effect
5	C-2	28					No effect
6	C-2	199					No effect
7	C-2	6					No effect
8	C-2	12	boundary	cluster 22	12	0.084	edge effect
9	C-2	9	boundary	cluster 23	9	0.208	likely destroyed
10	C-2	142					No effect
11	C-2	69	boundary	cluster 24	11	0.371	likely destroyed
12	Cantonment	22	prescribed fire		11	0.466	burned 5-7 yr rotation
13	C-3	77					No effect
14	C-6/C-5	165	boundary	cluster 31	8	0.043	likely destroyed
15	C-5	5	prescribed fire		5	0.053	burned 2-4 yr rotation
16	C-7	14	prescribed fire		14	0.048	burned 2-4 yr rotation
17	C-7	69	prescribed fire		69	2.826	burned 5-7 yr rotation
			range	cluster 47	12	0.188	edge effect
			range	cluster 49	4	0.012	likely destroyed
18	C-6/C-7	69	range	cluster 48	16	0.086	edge effect
19	C-8	26	prescribed fire		26	0.167	burned 5-7 yr rotation
			boundary	cluster 54	10	0.080	likely destroyed
			boundary	cluster 54	16	0.080	edge effect
20	C-9	20					No effect

21	C-9	53					No effect
22	C-10	14					No effect
23	C-10	56					No effect
24	C-10	209	boundary	plot 24-3	10	0.046	likely destroyed
25	C-10	9	boundary	cluster 55	9	0.047	likely destroyed
26	C-4	14					No effect
		1569	Total plants in 2002		211		total expected impact *
		70 acres	approx. area in mgmt. groups		72	1.089	likely destroyed by boundary clearing
					56	0.438	edge effect from clearing
					125	3.560	burn effects

<sup>1</sup> Number of plants is based on 2002 full census of large-flowered skullcap.  
<sup>2</sup> Cluster # is based on 2002 census.  
<sup>3</sup> # impacted plants is estimated based on the location of impact relative to the 2002 "clusters."  
\* Total expected impact does not equal the sum of column F because management groups 17 and 19 include plants counted twice - for range or boundary and for fire.

Although several management groups (17, 18, 19 and 20) are located in the vicinity of the Land Navigation Course in the north-central portion of the training site, they are posted and mapped, and no vegetation removal will occur within 50 ft of group edges. No direct impact on the large-flowered skullcap is anticipated due to operation or maintenance of the Land Navigation Course.

Security requirements include complete fencing around military installation boundaries. At this time the VTS-C perimeter is only partially enclosed. Fencing efforts will impact several management groups (2, 9, 11, 14, 19, 24, and 25) that abut or straddle the boundary. In order to minimize impact on these plants, all fence building activities will occur during the dormant season. Due to the terrain of the training site, erection of the fence will be done manually, with minimal disturbance to the soil. Transport of the equipment to the boundary is typically via ATV. Pathways are marked in advance by the Environmental office if there are any nearby skullcap management groups to be avoided. There is potential for damage to individual plants that lie directly on the fenceline, however the actual footprint of the fence is small, therefore, there should be minimal peripheral impact from the construction of the security fence.

Security requirements also dictate that 25-ft line-of-sight clearance be maintained on either side of the boundary fence. This clearing of trees and routine mowing will significantly impact management group 2 and will somewhat impact other groups, including 9, 14, 24, 25, and

possibly 8, 11, and 19. The degree of impact will be dictated by the number of plants within that 25-ft buffer. Clearing of the trees will vastly alter the habitat. In addition, the process of cutting the timber and clearing the lower vegetation will probably damage many of the large-flowered skullcap plants in that strip. TNARNG anticipates eventual loss of all skullcap plants within 30-ft of the fenceline after the clearing is completed; TNARNG estimates as many as 72 plants will be lost (see likely destroyed, Table 2).

In order to offset this loss, the TNARNG will tally the number of plants that fall within this hazard zone prior to any clearing. A nursery (the Atlanta Botanical Garden or other repository acceptable to the Service) will be contracted to propagate large-flowered skullcap from the VTS-C population (if possible, from the threatened management groups). When ready, the nursery stock will be out-planted to an appropriate location on the VTS-C, as determined from soil, slope/aspect, and vegetative characteristics, that is not subject to immediate military need. The goal will be 75% replacement of plants lost to fenceline clearing. Although nursery-propagated skullcap plants will be used as replacements for the loss associated with the fenceline clearing and the new range complex, the TNARNG will utilize some of the lost individuals for the transplant experiment as described.

Construction of a new range complex is proposed to begin in 2010. Three ranges will be established in the north-central portion of the training site in the vicinity of large-flowered skullcap management groups 17 and 18. These ranges will not directly impact any known large-flowered skullcap; however, the support facilities for the MRFR and the Zero Range may impinge upon skullcap group 17. Grading for the access road and the support facilities at the Zero Range will destroy 69 skullcaps on 2.8 acres (see likely destroyed, Table 2) from management group 17. Management group 17 will retain 75% of its original plants after construction. Management group 18 (94 plants) will be thoroughly marked and completely avoided with all construction and earth-moving efforts.

As with other projects, TNARNG will offset the loss of plants from management group 17. Large-flowered skullcap will be nursery propagated to replace the individuals lost, with a goal of at least 75% successful replacement. The replacement plants will be out-planted to the west of the management group, if appropriate habitat is available. If not, they will be planted in appropriate habitat in another part of the training site.

### **Prescribed Burning**

Prescribed burning is a useful tool for land management, but the resilience of large-flowered skullcap to various fire regimes is not well-known. Most burning at VTS-C will be conducted in the grassland areas; thus, posing no threat to the skullcap. However, longer-interval burns will be conducted within forest stands as needed to lower fuel loads and minimize wildfire risks. The majority of large-flowered skullcap management groups will be protected from these burns by firebreaks installed at least 50 ft outside the edge of the group, and Training Area 2 will not be subject to any prescribed burns due to the extensive skullcap presence, pending results from fire impact research.

As part of range maintenance (described above) will be subject to regular fire, this will be incorporated into the prescribed fire experiment. The initiation of the prescribed fire experiment could destroy plants in groups 15 and 16 (5 and 14 respectively, see burned 2-4 yr rotation, Table 2) occupying 0.1 acres. Additional skullcap management groups (12, 17, and 19) will be subjected to the scheduled prescribed burns for experimental purposes. These five management groups include 125 plants on 3.56 acres (see burned 5-7 yr rotation, Table 2). If post-burn sampling indicates a mortality rate of 50% or higher, the burn study will be discontinued. Some loss of large-flowered skullcap plants is anticipated as a result of the experimental prescribed fire evaluation, but will be limited by the constraints of the experimental design. The effect of fire on skullcap has not been evaluated and may benefit the population by eliminating woody competition and exposing mineral soil for seed germination. Although fire is not expected to wipeout all plants and may in fact turn out to be beneficial, the effects are not known, therefore, this Opinion considers the worst case scenario with all 125 plants within the burn areas being destroyed.

### **Wildlife Control**

Herbivores can pose a threat to large-flowered skullcap. Through the monitoring program, a number of individual plants have been found that have been browsed. It is presumed that white-tail deer are responsible. Browsing does not appear to kill the plant but limits flowering as the flower buds are typically on the portion that is eaten. If monitoring results indicate that deer are significantly impacting the skullcap, as determined through coordination between the Service and TNARNG, a program will be developed to limit the numbers of deer.

Feral hogs are a more substantial danger to the plant. It is presumed that hogs will feed on the perennial root of the skullcap and, therefore, could substantially impact the skullcap population. If hog sightings or damage increase above acceptable levels, as determined through coordination between the Service and TNARNG, a project will be initiated to reduce their numbers (TNARNG 2008).

### **Invasive Pest Plants Control**

Weed control is necessary at VTS-C, especially for invasive exotic plants. In areas where such pest plants threaten the skullcap, careful application of herbicides will allow improvement of the skullcap habitat and the opportunity to monitor the impact of invasives and release from invasives. The treatment protocol will include provisos such as no herbicide application to skullcap. Management groups 12, 18, 19, 23, and 24 are currently threatened by privet and Japanese honeysuckle. Careful monitoring of the groups treated for invasive pest plants will allow the identification of any detrimental effects that herbicide use might have on large-flowered skullcap and a determination of whether the beneficial effects for the skullcap justify the expense and effort of focused IPP control.

Herbicide treatment of invasive pest plants within large-flowered skullcap groups carries some risk for the protected plants from chemical drift and translocation. Careful choice of herbicide and treatment methods will minimize the hazard. As a precaution, initial treatments will only cover half of any IPP infested management group. Any herbicide damage to large-flowered skullcap in these groups will require a revision of methods prior to any further chemical IPP control efforts within the management groups. If IPP can be controlled in the vicinity of the

large-flowered skullcap, it will be a beneficial impact. No detrimental impacts are expected from the careful application of chemical weed control at VTS-C.

### **Transplanting**

Where the implementation of this INRMP is expected to destroy skullcap, the TNARNG will transplant individuals from threatened groups to other areas on the training site where effects of training are not expected to occur. A total of 72 plants from skullcap management groups 2, 9, 11, 14, 17, 19, 24, and 25 (see, likely destroyed, Table 2) will be transplanted. An adaptive management approach will be used for the transplant effort. Because efforts to transplant can be complicated by natural factors such as weather, soils and predation, TNARNG will not depend on solely on transplant success to maintain the skullcap population on VTS-C. If a large number of plants are to be displaced by any given project, arrangements will be made for the greenhouse propagation of new plants, which will be outplanted into training site locations chosen in coordination with the Service.

### **Monitoring**

Results from each year of monitoring will be compiled and comparisons made as multiple years' data become available. After a period of five years of monitoring, the trends at each monitoring plot (increasing, decreasing, minimal change) will be evident. At that time, the monitoring protocol will be evaluated and modified, if needed.

## **2. Indirect Effects**

Roads are known corridors for the spread of invasive plant species (Forman et al. 2003), as disturbed soil and the maintenance of open, sunny conditions create favorable conditions where invasive species can establish and spread into the forest interior (Fraver 1994). Fraver (1994) investigated the edge effects associated with agriculturally-maintained openings (similar to maintained right-of-ways for roads) on mixed hardwood forests in North Carolina. He observed that effects influencing vegetative cover, species richness, and presence of exotic species infiltrated into forest interiors up to 60 meters (197 feet) in response to changes in microclimate and increased incidence of sunlight, depending on slope aspect. Of exotic species found along forest edges, two species (Japanese honeysuckle and Chinese privet) were most pervasive. Significant differences in Japanese honeysuckle abundance were observed up to 10 (32.8 feet) and 60 meters (197 feet) from maintained edges on north and south-facing slopes, respectively.

Aside from the direct loss associated with clearing ground for the range and associated construction, there is the potential for loss of skullcap plants to excess competition that may arise when the forest cover just beyond management group 17 (12 plants) and 18 (16 plants) is removed (Table 2). Additionally, skullcap management group 8 and 19 could have 12 and 16 plants affected by edge effect (Table 2). To minimize this impact, TNARNG will plant evergreen tree species (eastern red cedar, shortleaf pine, and/or Virginia pine) along the edges of cleared areas that lie within 30 feet of a large-flowered skullcap group. The goal is to provide a dense edge to minimize increased sunlight intrusion into what had been forest interior.

### **General Natural Resources Management**

There is the potential for a flush of growth by IPP such as privet and honeysuckle following the opening of the canopy by timber harvest. It is anticipated that the 50-ft undisturbed buffer will help minimize such a threat to the large-flowered skullcap; however, IPP presence will continue to be monitored in conjunction with the annual rare, threatened or endangered monitoring, and specific control efforts will be initiated if needed.

### **3. Interrelated and Interdependent Actions**

Interrelated actions are part of a larger action and depend on the larger action for their justification. Interdependent actions are actions having no independent utility apart from the proposed action. The Service is not aware of any interrelated or interdependent actions associated with the project.

## **V. CUMULATIVE EFFECTS**

Cumulative effects include the effects of future State, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Reasonably certain to occur means that permits, grants, contracts, authority, obligations of expenditures, etc. have been initiated. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The Service cannot identify cumulative effects in the defined action area.

## **VI. CONCLUSION**

Overall, the projects identified in this INRMP will affect the large-flowered skullcap. While many of the impacts will be positive, a small number of projects will result in loss of plants. Implementation of this plan will destroy 72 plants, 125 will be affected by burning and 56 will be affected by edge effect; however, some plants are affected by burning and edge effect. Therefore, a total of 211 individual skullcap plants on 4.6 acres will be adversely affected (Table 2). Many of these plants will be transplanted and additional nursery grown plants will be outplanted to ensure that impacts are unlikely to significantly diminish the skullcap population.

After reviewing the current status of the large flowered-skullcap, environmental baseline in the action area, effects of the proposed action, and cumulative effects, it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of this species. No critical habitat has been designated for this species; therefore, none will be affected.

We reached this opinion based on the occurrence of at least 207 global EO's of large-flowered skullcap and the fact that proposed projects will affect 211 stems on a little more than 4.6 acres (Table 2). VTS-C will retain almost 64 acres of occupied habitat with 1358 stems remaining. Although threats and impacts continue to burden sites harboring large-flowered skullcap, the baseline status for this species has improved since its listings under the Act due to: (1) the discovery of new EO's and/or expansion of existing EO's; (2) changes in management practices

that benefit the species; and (3) permanent protection of sites as public nature preserves (11 of the 15 sites needed to delist).

### ***INCIDENTAL TAKE STATEMENT***

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Sections 7(b)(4) and 7(o)(2) of the Act do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of federally-listed endangered plants or the malicious damage of such plants on areas under Federal jurisdiction, or the destruction of endangered plants on non-Federal areas in violation of State law or regulation or in the course of any violation of a State criminal trespass law. Large-flowered skullcap is provided accessory, yet limited, protection under the Georgia Wildflower Protection Act (Ga. Code Ann. § 12-6-170 to -176), under which act these species are also designated as endangered. The Georgia Wildflower Protection Act prohibits removal of State-designated threatened and endangered species from State-owned lands and charges GDNR with regulating the sale of plants designated as protected under this law.

### ***CONSERVATION RECOMMENDATIONS***

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

During the extensive informal consultation period for this project, TNARNG incorporated many conservation measures into the proposed action. TNARNG included extensive recovery and conservation measures (monitoring, fire research, invasive plant control and wildlife control) that would likely provide long-lasting, beneficial improvements to the global baseline of the species.

The Service commends TNARNG for the progressive approach it has taken towards the furtherance of recovery mandates under section 7(a)(1) of the Act and the preservation of

biodiversity. The protection of the habitat for large-flowered skullcap, throughout VTS-C, is an exceptional and, in Georgia, an unparalleled example of how rare ecosystems can be preserved and enhanced through rare species conservation. TNARNG has met or exceeded all expectations of the Service for its treatment of this project.

***REINITIATION NOTICE***

This concludes formal consultation on the actions outlined in the biological assessment and supporting consultation materials. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if (1) new information reveals effects of the TNARNG action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (2) the TNARNG action is modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (3) a new species is listed or critical habitat designated that may be affected by the action.

The above findings and recommendations constitute the report of the Department of the Interior. Please contact staff biologist Jimmy Rickard at 706-613-9493, ext. 223 if you require additional information.

Sincerely,



Sandra S. Tucker  
Field Supervisor

File

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**Annex 2**

**FOREST MANAGEMENT PLAN  
VTS-CATOOSA**



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## 1.0 INTRODUCTION

The forestlands of VTS-C were inventoried in 2005. A management plan was then developed based on forest health and timber management needs. This plan has been modified to include military needs and plans. It presents the recommended forestry management prescriptions for the forest stands occurring within the Cantonment Area and each of the 10 training areas that comprise VTS-Catoosa (see Figure A2.1). Details of timber volumes and other stand characteristics are available in the Forest Inventory (Thompson Engineering 2006).

Individual forestry management prescriptions are provided for the forest stands occurring within each training area. The forest management prescriptions are generally focused on actions that would enhance the quality and economic value of the forestry resources on VTS-Catoosa. The use of prescribed fire is also addressed for each forest stand. Recommendations for prescribed burning are almost always restricted to burns that would be directed toward reducing excessive accumulations of fuels to reduce wildfire risks and, in most cases, would be conducted infrequently on a 6-year rotation, unless otherwise specified. Annex 3 should be referred to for information on the weather guidelines that should be considered when conducting prescribed burns and for the management objectives that are to be accomplished by burning.

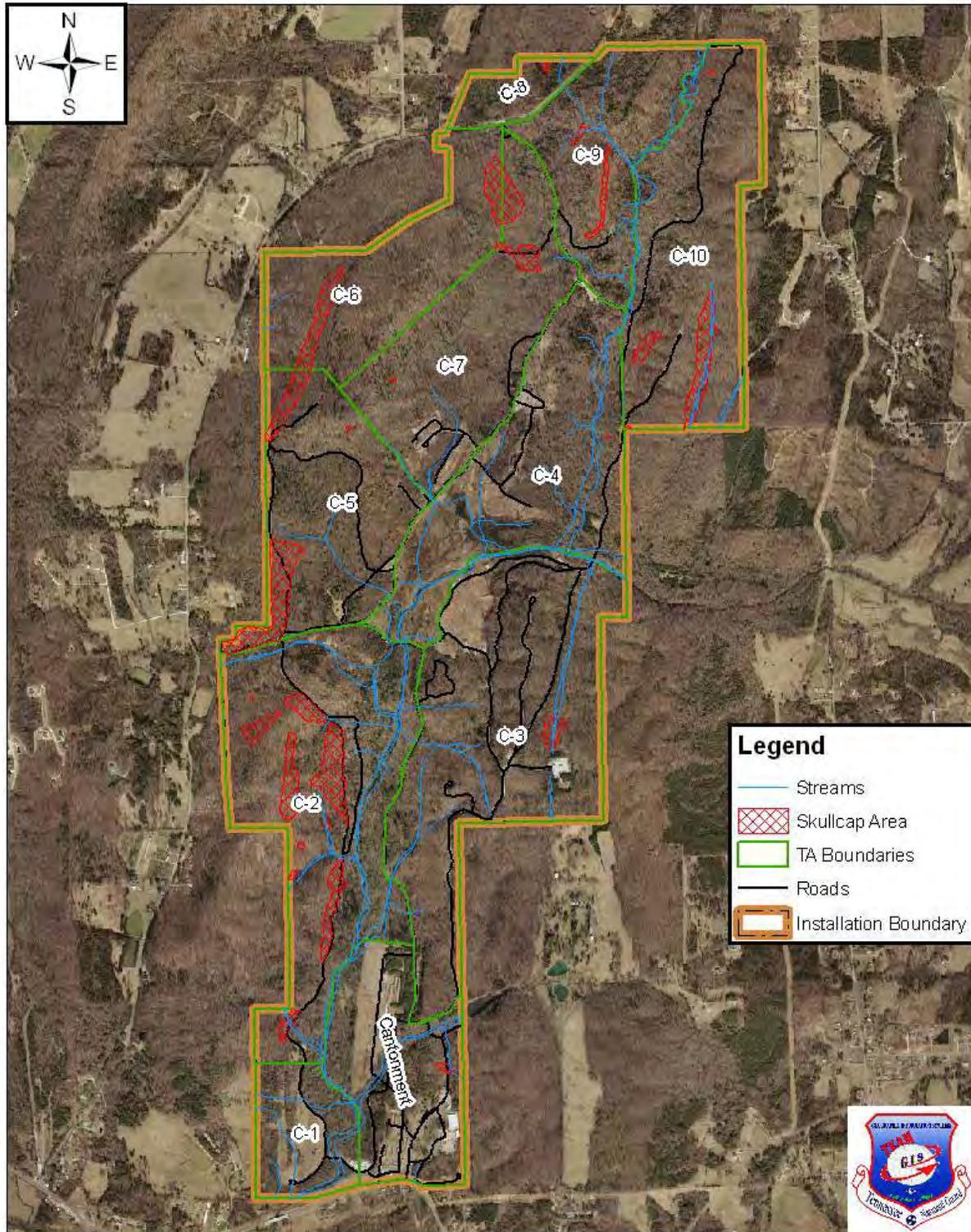
## 2.0 LARGE-FLOWERED SKULLCAP

The presence of the large-flowered skullcap (*Scutellaria montana*) on VTS-Catoosa will influence timber management operations performed on the installation. The large-flowered skullcap is designated by the U.S. Fish and Wildlife Service as a threatened herbaceous perennial plant that occurs in mature oak-pine forests. While the large-flowered skullcap can benefit from selective thinning of the forest canopy, it does not compete well with the explosive growth of understory plants that is typically encouraged following timber harvests. Populations of the large-flowered skullcap have been found at a number of locations on VTS-Catoosa (Figure A2.1). Since the forested habitat favored by the plant is prevalent throughout most of the installation, all forestry management operations should consider that the plant may be present whenever a timber management action is being planned within any of the 10 training areas. Skullcap management groups and a 50 foot buffer surrounding them will be withheld from any timber sales that occur on the training site, and harvests in the vicinity of skullcap groups will be timed to avoid the growing season for the plant. Logging and skidding equipment will not travel through skullcap management groups at any time.

## 3.0 FOREST INVENTORY

The forest inventory for VTS-Catoosa was conducted in April 2005 by personnel with the Forest Management Group, Inc., located in Hattiesburg, Mississippi. The forest inventory was developed using the established training areas and Cantonment Area to serve as the basic forestry management units. Figure A2.1 shows the locations of the Cantonment Area and the 10 training areas that make up the VTS-Catoosa.

The forest resources occurring within the forestry management units were inventoried. Each management unit was subdivided as appropriate into individual forest stands based on the sharing of common characteristics that served to define each stand. Among the parameters considered to delineate the forest stands were species composition, age, size, condition, etc. Delineation of the stands was accomplished by both the use of aerial imagery and ground observations of the different timber types and ages. A



**Figure A2.1: Training areas and large-flowered skullcap occurrences on VTS-Catoosa.**

consistent forest stand numbering system was used throughout the inventory to identify each stand based on the major land features and forest types that characterized each stand.

The forest inventory provides the volumes of sawtimber (in tons and board feet) and pulpwood (in tons and cords) that was available within each stand at the time the inventory was performed in April 2005. The sawtimber is apportioned between pine, pine poles, CNS (chip-n-saw: pine timber that can yield both 2x4s and chips), spruce pine, red oak, white oak, hickory, poplar, cedar, ash, walnut, and miscellaneous hardwood (i.e., all other hardwood species that may be present). The pulpwood is apportioned between pine and hardwoods. The timber volume data is presented on both a per acre basis and as a total per stand for each product class.

The forest inventory also provides supplementary information to better understand the major characteristics of each stand. That information includes:

- Dominant and co-dominant tree species occurring within each stand
- Average basal area and DBH of trees within each stand on a per acre basis
- Average number of snags per acre
- The minimum and maximum age of the trees
- A general assessment of the overall health of the stand
- An evaluation of the current condition of the stand
- General remarks on other major characteristics of the stand where appropriate and useful.

The forest inventory determined that a total of 1,313 acres of VTS-Catoosa was covered in forests at the time the forest inventory was conducted in April 2005. Table A2.1 presents summary volume data for the inventoried timber products on a per acre basis and for the entire installation.

**Table A2.1: Forest Product Volume Summary for VTS-Catoosa Based on the April 2005 Forest Inventory (from Thompson Engineering, et al. 2006).**

Timber Product	Per Acre		Installation Total	
	Tons	Board feet	Tons	Board feet
<i>Sawtimber</i>				
Pine	5	640.1	6,837	875,273
Pole	0.1	6.4	137	8,751
CNS	1.9	198.8	2,598	266,370
Cedar	0	4.4	0	6,017
Red Oak	10.7	1485.4	14,631	2,031,136
Hickory	2.9	358.2	3,965	489,803
White Oak	7.2	941.7	9,845	1,287,681
Ash	1.1	148.2	1504	202,649
Poplar	4.8	650.9	6,564	890,041
Walnut	0.2	23.6	273	32,271
Misc. Hardwood	2.6	322.4	3,555	440,850
<i>Pulpwood</i>				
Pine	0.6	0.2	820	273
Hardwood	19.5	7.2	36,664	9,845

The Forest Inventory also revealed that the overall average diameter at breast height (DBH) of trees on the entire installation was 11.7 inches and that the installation had an average basal area of 78.1 square feet per acre. The forest stands on VTS-Catoosa are typically dominated by red oaks and white oaks, with a substantial amount of pine being present in some stands. Yellow poplar is also a co-dominant species in some stands and hickory in others. Most stands were characterized by trees ranging from 20-40 years old, but some had trees approaching 70 years in age, while a few stands were dominated by young trees. While the overall health of the forest stands was observed to be good during the April 2005 Forest Inventory, evidence of a past infestation of Southern pine beetles was present based on damage to the pine timber. In addition, frequent hot fires within the Impact Area shared between Training Areas 5 and 7 have resulted in a significant amount of timber damage in the forest stands occurring within these areas.

Army guidance requires all installations with a forestry program to keep their forest inventories current (i.e., not older than 10 years) when such forests are essential to the mission and/or capable of commercial use. Since the existing forest inventory for VTS-Catoosa was conducted in April 2005, the forest resources should be re-inventoried no later than 2015. The inventory intensity should be appropriate at that time to reflect the planned use of the forest and for monitoring the long-term health and sustainability of the forest. In addition to determining the volume of merchantable forest products available on the installation in 2015, the inventory should be directed at evaluating the overall health and characteristics of the forest community and to assessing the effectiveness of the forest management prescriptions that have been implemented during the intervening 10-year period.

#### **4.0 FOREST MANAGEMENT GUIDELINES**

Based on the results of the 2005 forest inventory, the health of most of the VTS-Catoosa forest stands is judged to be good to excellent, although a number of the stands showing signs of having experienced past fires that were too hot and caused some damage to the trunks.

VTS-Catoosa forests will be managed on approximately an 80 year rotation. Forest management for the training site will consist of both even-aged and uneven-aged techniques for improving forest health, modifying stands to meet objectives, and regenerating stands when needed.

Generally no more than 60 acres per year will be harvested on the training site. The priority for management will be:

1. Mission needs
2. Fire damaged stands
3. Oldest stands

Final harvests will generally be small clearcuts or large group selection cuts (2-10 acres) as required by topography and accessibility. Openings of at least 2 acres are most effective for encouraging oak regeneration. Openings will be placed at sites containing sufficient advance regeneration of appropriate size when possible. No more than 30% of a stand acreage will fall within the cleared areas in a group selection harvest. The remainder of the stand may be lightly thinned at the same time to release desirable hardwood species.

Some stands will require pre-commercial thinning or mid-story removal to improve growth of the dominant/co-dominant trees or to encourage advance regeneration of desirable species. This will be done as funding allows, on no more than 60 acres per year. The shelterwood-burn method of regeneration will be applied experimentally as feasible (see Annex 3 of the INRMP).

In all harvest activities, there will be no timber removal within 100 feet of creeks. A 100 ft buffer will also be maintained along property boundaries except for the 20 ft security line of site clearing required along the fence-line itself.

Harvest activities will be limited in the vicinity of skullcap management groups. Harvest operations must be scheduled for the fall or winter when the plants are dormant. No vehicles, skidders included, may pass through a management group at any time, and soil disturbance must be minimized. There will be a 50' buffer surrounding the skullcap group; no timber will be cut within the management groups or the buffer zone. Tops and limbs will not be left within a management group or buffer.

#### **4.1 Forest Management Objectives**

The individual forestry management recommendations were based upon a consideration of the following broad management objectives developed for the overall forest community occurring on VTS-Catoosa.

- Provide appropriate vegetation cover for training needs as determined by mission requirements.
- Maintain a healthy forest ecosystem appropriate to the region through even and uneven aged management techniques. Forest values to be protected or improved are:
  - Soil conservation and stream quality protection
  - Wildlife habitat
  - Biodiversity
  - Timber and forest products
- Control invasive pest plants (IPP) for the health of the forest.
- Use prescribed fire only as necessary for fuel reduction or to meet military mission needs, unless deemed appropriate to regeneration efforts. Hardwood stands should be burned no more often than every six years.
  - The shelterwood-burn method of hardwood regeneration may be experimentally applied to a stand within training area 10 on a 5-year test case to determine the potential of this method to produce a regenerated oak-dominated forest while enhancing the military mission (see Annex 3).

#### **4.2 Timber Harvest Operations**

The periodic harvest of timber is the major measure used to manage forestry resources. The principle purpose of the forest management program on the VTS-Catoosa is to support military mission and ecosystem management goals, while optimizing the forest resource and its associated forest products and benefits. Timber harvest decisions are not to be directed solely to generate revenue.

Timber harvests must be consistent with the military mission and comply with federal laws and policies, including avoiding adverse impacts on sensitive species and cultural resources. Prerequisites for timber harvests include the following:

- A current and approved Forest Management Plan that is normally included in an INRMP.
- National Environmental Policy Act documentation
- Comply with applicable laws
- Be a fiscally sound investment

- Capable of ecosystem sustainability
- Comply with installation safety restrictions
- Consider potential effects on significant archeological resources and historic properties.

The process for conducting a timber sale on VTS-C will start several months prior to harvest time:

- A stand-specific harvest plan will be developed in accordance with this plan (January)
- A Record of Environmental Consideration will be prepared for the harvest plan to satisfy NEPA requirements
- The harvest plan and REC will be sent to the USFWS field office for consideration (before March 1)
- The harvest plan and REC will be sent to the GA SHPO for consideration (before March 1)
- The harvest plan and REC must be submitted to NGB with a Timber Report of Availability (ROA) (by May 30 prior to the fiscal year in which the harvest is planned)

### 4.3 Pest Management

Trees are susceptible to periodic infestations of insects and fungi that have the potential to result in serious damage to an installation's forest resources and overall landscape. This can result in the diminishment in the quality of the training landscape; economic loss of potential merchantable timber; modification of habitat conditions within the forest ecosystem that could influence wildlife populations; and an increased risk of wildfire. While such infestations are a natural phenomenon, actions may be required on occasion to prevent the spread of the infecting vector and/or remove damaged and diseased trees.

The U.S. Forest Service (USFS) is responsible for protecting forests from insects and disease in cooperation with the owners of forest lands. The Department of Defense (DoD) and the U.S. Department of Agriculture entered into a Memorandum of Agreement (MOA) in 1990 to conduct forest insect and disease suppression on lands administered by the DoD. Under the MOA, the USFS provides technical assistance and funds to provide foliage protection, reduce specific insect and disease populations, reduce risk of artificial spread to uninfested areas, and to prevent tree mortality.

Army installations may receive funds from the USFS for forest pest suppression projects under the terms of the MOA. Installations wanting to receive pest management funding should have a biological assessment of the forest resources in question conducted by the local USFS staff. The biological assessment should recommend the type of technical assistance required and management actions that could be pursued to address the pest problem. This could include population monitoring, surveys, biological evaluations, determination of trends and projected damage, and consideration of environmental and economic impacts. Approximately one year is required before funds are received for approved requests. The USFS funds are provided to the installations through Army channels to the proponent organizations for distribution to the appropriate installations. In the case of the TNARNG, pest management funds are received from the NGB.

The 2005 Forest Inventory revealed that a substantial amount of the pine timber on VTS-Catoosa had been damaged and/or destroyed by an infestation of southern pine beetles that occurred around two years or more ago. Such infestations are cyclic and should be expected to recur in the future at approximately seven-year intervals depending upon weather conditions. Since pines are a major component of the VTS-Catoosa's mixed pine hardwood forest, periodic monitoring should be performed to identify localized outbreaks of southern pine beetles on the installation in the early stages of development, as well as the occurrence of regional infestations. The Georgia Forestry Commission conducts regular aerial surveys to

identify outbreaks and provides that information to landowners. The best time of the year to obtain that information is during the hot summer when the symptoms of infestations are most apparent in the tree canopy from the air. This information should be obtained from the Georgia Forestry Commission's local offices (Scott Griffin, Forest Health Forester, Gainesville, Georgia, 770-538-2666 or Lee Kelley, Area Forester, Lafayette, Georgia, 706-638-5557) each year and a plan developed as needed to remove the infected trees.

Beavers have also been identified as a potential pest that can adversely impact VTS-Catoosa's timber resources. Beaver activity is primarily restricted to the lower reaches of the tributary streams that drain into Tiger Creek. For the most part, beavers seem to be most active in Broom Branch that flows through Training Areas 4, 9, and 10 before joining Tiger Creek. Besides damaging trees, beaver impoundments can restrict access and cause physical damage to roads. Beaver were removed from the training site in 2006 through an MOA with the USDA Animal Damage Control Office in Georgia. The level of beaver activity on the installation should be monitored annually to assess whether such activity is increasing, remaining stable, or declining.

#### **4.4 Salvage of Disaster Damaged Trees**

Natural weather phenomena such as tornadoes and ice storms can have a severe impact on forests. For example, large swaths of trees can be uprooted and/or their trunks broken above the ground by tornadoes, while large ice storms can create extensive alterations in the forest canopy by damaging limbs and small branches. If the damage to trees is significant and widespread, individual trees can be weakened and become more susceptible to disease and parasites in the years following the weather event. That damage can reduce growth rates and possibly even result in the death of individual trees.

If the damaged trees represent a significant economic loss or if the physical aftermath creates a safety hazard, impediment to training, or threat of insect infestation, it may prove prudent to undertake salvage operations in an attempt to recover as much of the lost volume and value of the damaged timber as possible. Salvage actions must be pursued relatively quickly following the disaster to prevent the deterioration in the quality of the damaged wood so as to recover as much economic value as possible. Even though prompt action is needed, the environmental evaluation requirements are typically not waived. In the event a salvage harvest is deemed necessary, TNARNG will coordinate with USACE to conduct the necessary environmental review and emergency harvest procedures.

### **5.0 ENVIRONMENTAL CONSIDERATIONS IN FOREST MANAGEMENT**

All timber sales must be consistent with all applicable environmental laws and regulations. Experience has shown that cultural resources (i.e., historic and/or archaeological) and endangered and threatened species issues have the greatest potential to affect forestry management operations, including timber sales.

#### **5.1 Cultural Resources**

Forest management activities must not negatively impact cultural resources on the VTS-C. Several aspects of timber management have the potential to affect cultural resources, including timber harvest operations, site preparation and planting, and prescribed fire. A Phase I survey of VTS-C conducted in 1997 identified 20 archaeological sites and 17 historic architectural resources on the installation (Stanyard et al. 1998). These sites are identified in the TNARNG GIS system and will be incorporated into forest management planning. All efforts will be made to minimize any impacts on known cultural resources.

The eleven sites considered eligible for inclusion on the national Register of Historic Places will be excluded from ground-disturbing activities unless full consultation with the Georgia State Historic Preservation Officer (SHPO) has been conducted for the project. Such activities include, but are not limited to, the construction of plowed fire breaks (see Annex 3 for the “no plow zones”), the use of dozers or other heavy equipment to clear stumps and logging slash, and the use of mechanical planting equipment. Historic structures and cemeteries will be protected from damage during forestry activities by maintaining a 50 foot buffer zone surrounding them.

This plan will be submitted for review by the Georgia SHPO prior to implementation. In addition, the SHPO will be contacted for comments on the annual report of timber availability submitted each year for timber sale planning. Other forestry projects which have the potential to impact known cultural resources on the VTS-C will be coordinated with the SHPO as appropriate.

## 5.2 Sensitive Species

Chapter 3 of the INRMP contains information on sensitive species occurring or having the potential to occur on the installation. The federal listed threatened large-flowered skullcap (*Scutellaria montana*) exists at a number of well marked locations in the oak-pine forests on the installation. The federal listed endangered gray bat (*Myotis grisescens*) has been captured feeding over Tiger Creek on the training site. In addition, seven species of fish that are listed to be of concern to the State of Georgia have been found in the streams on the installation. A number of other species of concern (see Section 3.9 in Chapter 3) have been reported from Catoosa County, but have not yet been observed on VTS-Catoosa.

Timber management activities will be limited in those areas where large-flowered skullcap occurs. Known large-flowered skullcap groups will be reserved from timber sales with an additional 50’ buffer surrounding the group well-posted prior to any nearby timber sale – no trees will be harvested within the protected area, nor will any equipment be allowed to pass through these areas. Timber harvests within stands that contain or are adjacent to known skullcap groups will be conducted during the fall or winter when the plant is dormant to minimize any accidental damage. Large-flowered skullcap groups will be protected from prescribed burning (see Annex 3 for more details). Ground disturbing activities such as the construction of plowed fire breaks, the traverse of heavy equipment, and log skidding will not be allowed in the known large-flowered skullcap locations.

The gray bat has only been found foraging on VTS-C; no roost sites have been located on site. Therefore, impacts from timber management will be minimal, and protection of waterways and riparian areas through the Streamside Management Zone best management practices (see Section 5.3 below) will ensure the maintenance of foraging habitat quality.

Any activities which may impact federal threatened or endangered species require consultation with the USFWS. Annex 1, the Rare Species Management Plan, contains the biological assessment of the potential impacts of the INRMP on the large-flowered skullcap. The TNARNG will initiate formal consultation with the USFWS prior to the implementation of this plan.

All efforts will be made to protect state listed species from detrimental impacts from forest management activities, as well. In the event any are discovered on the training site, the TNARNG will consult with the Georgia Department of Natural Resources, Wildlife Resources Division, to determine any needed modifications to this forest management plan for the protection of such species.

### 5.3 Forestry Best Management Practices

Protection of watersheds and water quality during forest management activities can be a significant concern. Forestry practices can generate nonpoint source (NPS) pollution including sediment, organic matter, pesticides, nutrients, and elevated water temperatures. Removal of or damage to vegetative cover can increase runoff and erosion. Eight of the 10 training areas on the VTS-C include portions of Tiger Creek or its tributaries within their limits. Only Training Areas 6 and 8 do not contain any part of the stream system.

Tiger Creek and its tributary streams are protected by the State of Georgia through their designation as secondary trout waters. To maintain high water quality conditions appropriate to trout habitat, a relatively contiguous tree canopy cover over trout streams is important in providing shade from excessive solar radiation heating, and suspended sediment concentrations should be at low levels. As a result, trout streams require additional protection from timber harvest operations along their immediate stream banks if they are to continue to support trout populations. A Streamside Management Zone (SMZ) of 50 feet on both sides of designated trout streams and tributaries is required for protection by State of Georgia regulations. There will be no timber harvested within this SMZ on the VTS-C.

Forestry Best Management Practices (BMPs) have been developed to reduce the adverse effects of forest operations on ecosystems and to protect water quality. A BMP is a practice or combination of practices considered to be the most effective means of preventing or reducing the amount of pollution by nonpoint sources to a level compatible with water quality goals and protecting fish and wildlife populations and habitats. BMPs will be applied to all timber management activities on the VTS-C.

Both Tennessee and Georgia forestry offices have developed BMPs for forestry operations:

<http://www.state.tn.us/agriculture/forestry/bmpmanual.html> and

<http://www.gfc.state.ga.us/ForestManagement/documents/GeorgiaForestryBMPManual.pdf>. The recommendations differ very little between the states. The following synthesis of the state BMPs (Table A2.2) will guide forestry activities on VTS-C. BMP training and technical guidance is available from the Georgia Forestry Commission district office (District 1, Rome, GA, 478-751-3465. Further assistance can be requested from the Catoosa County forester (Gary McGinnis, 706-295-6021), the District 1 water quality forester (Carl Melear, 706-295-6021), or the State Water Quality Coordinator (478-751-3498).

**Table A2.2: Forestry Best Management Practices for VTS-Catoosa.**

Forestry Practice	Activity/Resource	BMPs
Planning		Locate log landings before planning road system.
		Streamside Management Zone (SMZ) planning should be done before beginning timber harvest.
		Plan site preparation before starting work to ensure best treatment is implemented.
Forest Roads	Locating Roads	Identify laws, regulations, and/or ordinances applying to road construction and maintenance.
		Use soil surveys and topographic maps to develop plan.
		Locate control points on maps prior to design
		Evaluate condition of existing roads and only construct new roads when necessary.
		Minimize the number, length, and width of access roads.
		Locate roads outside of Stream Management Zones and sensitive areas.

Forestry Practice	Activity/Resource	BMPs	
		Avoid locating roads at the confluence of streams.	
		Locate new access roads on high ground on sides of ridges for drainage.	
		Locate new access roads on southern and western sides of ridges to expose roadbed to sunlight.	
		Minimize stream crossings. When that is not possible, crossings should be constructed at right angles to the stream.	
		Locate roads on upper slopes near ridge crests to promote drainage, but avoid the top of ridges.	
		Permanent Roads – Follow natural contours and keep grade below 10 percent. Install water control structures properly.	
		Temporary Roads – Follow natural contours. Allow grades to run up to 25 percent for short distances provided water control structures are properly installed.	
		Conduct site reconnaissance to verify site conditions.	
	Constructing Roads		Complete construction several weeks in advance of use by logging traffic to allow road bed time to settle.
			Construct access roads only wide enough to safely handle equipment to minimize soil disturbance.
			Schedule construction during favorable weather.
			Maximize sunlight exposure along roadsides for drainage.
			Install appropriate dips, turnouts, and water bars to control drainage from the road surface. The number and design should be determined by the prevailing slope of the road segments involved.
			Stabilize exposed soil on shoulders.
			Runoff from roads should not directly discharge into streams.
			Minimize runoff at stream crossings.
			Push cleared trees and brush to downhill side of road to assist in trapping sediment.
			Maximize sunlight exposure to road surface.
			Revegetate exposed soils in potential problem areas that could generate sediment.
			Road Maintenance
	Maintain points of ingress from paved roads to prevent mud and debris from being carried onto roads.		
	Minimize grading and reshaping on hilly terrain unless necessary.		
	Keep dips, water bars and water turnouts open		
	Road Retirement		Construct water bars or other drainage structures immediately after active logging has ceased.
			If logging will be delayed, construct temporary drainage and erosion control structures.
			Remove temporary fills, bridges, culverts, and pole fords.
			Remove sediment and debris from dips, ditches, and culverts.
			Use mulch and/or seed with lime and fertilizer to prevent soil erosion.
			Periodically inspect retired roads.
	Streamside Management Zones (SMZs)	SMZs	Mark SMZ boundary prior to harvest.
			SMZ width should be a minimum of 100 feet for Tiger Creek and its tributaries: 50 feet on either side of the stream.
			No harvest is allowed within the 50-foot SMZ.
Maintain integrity of stream banks.			

Forestry Practice	Activity/Resource	BMPs
		Minimize exposure of mineral soils by spreading logging slash and using it to drive over.
		Minimize soil exposure and compaction to protect ground vegetation.
		Do not use stream channels as roadways for equipment.
		Avoid equipment operation within SMZ.
		Avoid skidding within drains during wet conditions.
		Avoid locating roads in drains except when necessary for crossings.
		Do not empty road runoff into drains.
Stream crossings	Stream crossings	Avoid or minimize stream crossings. When that is not possible, crossings should be constructed at right angles.
		Locate crossings on straightest stream sections.
		Avoid locating crossings at confluence of streams.
		The road fill shall be bridged, culverted, or otherwise designed to prevent restriction of flood flows.
		Borrow shall be obtained from upland sources.
		Fill shall be stabilized and maintained to prevent erosion.
		Minimize disturbance to stream during construction.
		Design to minimize disruption of movement of aquatic life.
		Approaches should be graveled and should rise away from streams at a gentle grade (<3 percent) to minimize erosion.
		Stabilize approaches with rocks if necessary.
		Install broad-based dips and wing ditch turnouts to turn water off roads before entering stream.
		Temporary bridges should be favored over culverts or fords for temporary crossings.
		Minimum encroachment into SMZs when aligning and constructing stream crossings.
	Fords	Use fords for haul roads only, not for skid trails.
		Locate fords where stream banks are low.
		Fords should have a solid bottom.
		Where necessary, use gravel to establish low water crossing. Material should not significantly impound stream flow or impede fish passage or cause erosive currents.
		Remove temporary crossings from channel when operations completed.
	Culverts	Use culverts for watersheds less than 300 acres
		Permanent culverts should be sized to accommodate 25-year, 24-hour storm flows.
		Temporary culverts will accommodate 2-year, 24-hour storm flows, but must be removed after completion of logging.
		Install culverts in a manner that minimizes disturbance of stream. Stabilize fill material with riprap and/or vegetation.
		Place at least 15 inches of fill over the culvert so that the culvert becomes the high spot in the stream crossing so flood flows run around the culvert.
		Inspect culverts periodically to ensure they are free of blockages.
		Install culverts on grade with bottom of channel to allow movement of aquatic life.
	Bridges	Use bridges for watersheds of 300 acres or more.
Locate bridges across narrow points of stream and on firm soils.		

Forestry Practice	Activity/Resource	BMPs	
		Protect banks from sloughing during construction.	
		Remove temporary bridges.	
		Do not cover bridges with soil.	
		Use temporary bridges for skid trails to prevent equipment and logs from entering stream channels.	
Timber harvesting	Landings or log decks	Locate landings outside of SMZs and away from streams and sensitive areas.	
		Minimize number of landings.	
		Minimize size of landings.	
		Locate landings uphill and skid up to them.	
		Locate landings in a stable and well-drained area away from gullies.	
		Slope lands 2-5 percent to allow for drainage.	
		Stabilize and revegetate landings after use if they pose a potential water quality problem.	
		Install drainage and sediment control structures to divert runoff.	
	Skid trails	Minimize number of skid trails by using existing trails.	
		Skid uphill to log landings.	
		Locate skid trails on slopes up to 15 percent. Steeper slopes can be used for short distances if water control/drainage structures are provided.	
		Have periodic breaks in grade to help disperse surface flow.	
		Runoff from skid trails should not discharge into a stream.	
		Control runoff by varying trail grade, water bars, wing ditches and/or sediment control structures.	
		Minimize number of stream crossings.	
		Avoid skidding across streams, drains, and sensitive areas. However, if that is necessary, skid at right angles.	
		Use temporary bridges or spans instead of culverts for crossing structures.	
		Use logs as fill over temporary culverts instead of fill dirt.	
		Do not use fords to skid across streams.	
		Do not operate equipment in streams.	
		Avoid skidding directly up or down hill, but follow contours or “zigzag” if possible.	
		Use low ground pressure tires on skidders when available and concentrate skidding as much as possible on a few primary skid trails to minimize site disturbance and soil compaction.	
		After completing logging, remove temporary bridges and culverts, sediment and debris from dips, ditches, and culverts, and revegetate problem areas.	
		Use mulch and/or seed with appropriate amounts of lime and fertilizer when needed to prevent soil erosion.	
		Avoid ruts that risk channeling water into a stream.	
		Retire trails as soon as possible.	
		Logging Debris	Trees should not be felled in or across streams.
			Pull treetops far enough from waterways to prevent them from being washed in during high water.
	Do not drag trees and tops through a stream channel.		
	Do not remove stumps and roots from stream banks.		
	Servicing and Maintaining Equipment		Wash and service any equipment away from any area that may create a water quality problem.
			Dispose of oils and lubricants in their containers and other

Forestry Practice	Activity/Resource	BMPs
		wastes in accordance with applicable regulations.
		Remove all used tires, batteries, oil cans, and trash from site when logging operations are completed.
		Prevent oil and fuel spills. Prevent debris and fuels/lubricants from entering drains from where they could be washed by runoff into streams.
		If a spill occurs, clean up all spilled materials and contaminated soils and dispose of both properly. Notify the Georgia Environmental Protection Division of spill incident.
Site Preparation for Tree Planting	Mechanical	Choose site preparation method that will expose and disturb as little bare soil as possible. Use the minimum intensity for treatment.
		Establish SMZs to minimize sediment entering streams.
		Carry out all mechanical site preparation operations and tree planting along the contour of the land.
		Slopes over 30 percent should use only hand tools and be hand planted and not be subjected to mechanical site preparation.
		Leave logging debris and other litter scattered over erosion problem areas.
	Chemical	Establish SMZs.
		Favor chemical methods over mechanical methods on steep slopes and erodible soils to control undesirable vegetation.
		Follow all EPA label instructions
		Never apply pesticides directly to water except when registered for application over water.
		Establish SMZ to minimize chemicals entering streams.
		Avoid use of chemicals in or near sensitive areas.
		Consider weather conditions and equipment capabilities to avoid herbicide drift.
		Calibrate spray equipment to apply chemicals uniformly and in correct quantities.
		Prevent chemical leaks from equipment and check equipment.
		Mix and load chemicals outside of SMZs and other sensitive areas.
		Rinse spray equipment and discharge rinse water only in areas that are part of the application site. Never rinse tanks or sprayers in or near streams
		Dispose of chemical containers according to label instructions.
		Report all spills to the Georgia Environmental Protection Division.
	Prescribed Fire	Locate windrows well away from drains to prevent materials from being washed into streams.
		Construct firelines on the contour in advance of prescribed burning.
Avoid high intensity fires in SMZs.		
Plow firelines only as deep and wide as necessary to control the spread of the prescribed fire and to minimize soil disturbance.		
Construct water bars and wing ditches at appropriate intervals on firelines to turn water into adjacent undisturbed areas.		
Reforestation		Hand plant on slopes >21 percent.
		Machine plant on the contour between 5 and 20 percent slope.
Fertilization		Determine appropriate amounts and types of fertilizer needed before application.

Forestry Practice	Activity/Resource	BMPs
		Consider weather conditions and equipment capabilities to avoid drift into SMZs.
		Conduct all on-site fertilizer handling away from waterbodies, wells, ditches, and sensitive areas.
		Clean up and/or contain all fertilizer spills immediately.
		Dispose of fertilizer containers and/or excess fertilizer according to applicable governmental regulations and label requirements.

Sources: “Georgia’s Best Management Practices for Forestry” (January 1999), Georgia Forestry Commission and “Guide to Forestry: Best Management Practices in Tennessee (2003), Tennessee Department of Agriculture, Division of Forestry

## 5.4 Monitoring and Inspections

Monitoring is a key element in ecosystem management. Army forest managers are required to balance increasing demands for resource use, such as military training, forest product sales, biodiversity conservation, and, where applicable, recreation use of military lands. The VTS-C forestry program should be periodically monitored to: (1) assess whether or not forest management objectives are being met; and (2) detect trends in forest health and condition in response to the forest management actions proposed in this plan.

Forestry program monitoring on the VTS-C will include:

- The progress of each timber sale will be monitored to ensure that the harvest is being conducted in accordance with the terms of the contract. Monitoring will be coordinated with the USACE’s Mobile District if the timber sale is administered by the USACE. At the conclusion of the timber harvest, a final inspection of the site will be conducted jointly by the USACE and the TNARNG to assure the cut was conducted in accordance with the contract stipulations to allow release of the buyers’ bond.
- Effective management requires feedback on the results of the management activities. The necessary assessment may be conducted specifically for the forestry program or as a part of another program area. The VTS-C forests will be monitored annually to assess:
  - Whether the overall condition of the forest is meeting military mission requirements
  - The effects of training activities on forest resources
  - Response to forest management activities
  - Wildlife habitat quality
  - Influence of forest management on sensitive species
  - Impacts on cultural resources
  - Erosion problems related to timber management practices and the success of repair efforts
  - Any areas affected by disease or insect infestations (particularly southern pine beetles during summer months)
  - Storm or other natural damage
  - Beaver activity
  - Invasive pest plant problems
  - Fuel loads on the forest floor and the risk for wildfires
  - Areas for inclusion in future timber ROAs
  - Emergency harvests needs

- The baseline forest inventory was conducted for VTS-Catoosa in 2005. Forest resources should be re-inventoried in 2015. If that work is to be accomplished by contract, adequate advance time should be allowed to prepare the scope of work and to award the contract by that timeframe. The 2015 inventory should include a specific task requiring a comparison of the forest condition in 2015 with the results of the 2005 inventory to determine the direction the installation's forest is headed; how effective management measures have been in assuring a quality forest is provided; and identifying adjustments in the long-term management goals in the installation's forest management program.

## **6.0 MANAGEMENT PRESCRIPTIONS**

The following stand descriptions and management prescriptions are based on the 2005 forest inventory. Timber harvests will typically involve thinning the stands to encourage improved growth rather than clearcutting a stand, unless mission needs require a cleared site. Recommendations for the use of prescribed fire are also included; full burn prescriptions are found in the prescribed fire section of the Wildland Fire Management Plan in Annex 3 of the INRMP. There will be no harvesting or prescribed fire within the 50' SMZs bordering Tiger Creek and its tributaries. In addition, there will be no harvesting of timber within any large-flowered skullcap management groups or a 50' buffer surrounding each. Skullcap groups will also be protected from prescribed burning, with the exception of a potential research study, discussed in more detail in Annex 3 and Annex 1.

## 6.1 Cantonment Area

The 106-acre Cantonment Area is the management center for VTS-Catoosa and contains most of the building infrastructure occurring on the installation. A portion of the southern boundary borders State Highway 2 which provides the primary access onto the installation. The Cantonment Area is dominated by two large open areas, one of which contains the installation's buildings and the other is the range complex. The open areas contribute to the fragmentation of the two forest stands occurring within the Cantonment Area.

### Stand Description

Stand cc01 is a mature upland pine and hardwood forest. This highly fragmented 63-acre stand is divided into four units. The stand is dominated by pine and miscellaneous hardwoods, with a mix of oaks, hickory, and poplar. Ages of the trees range from 20 to 50 years. The overall health of the stand is excellent.

Stand cc02 is a 1.9-acre pre-merchantable natural pine stand. The stand is 3 to 5 years old. The overall health of the stand is excellent.

### Forest Management Prescription

**Stand cc01.** Section (a) (17 ac west of the KD range) will be thinned as needed for training use, leaving the 50 ft SMZ along Tiger Creek unharvested. Hardwood trees 20 inches DBH and larger will be selectively removed to make the area traversable. A few small (<1 ac) clearings may be created by taking groups of trees without regard to the size limit.

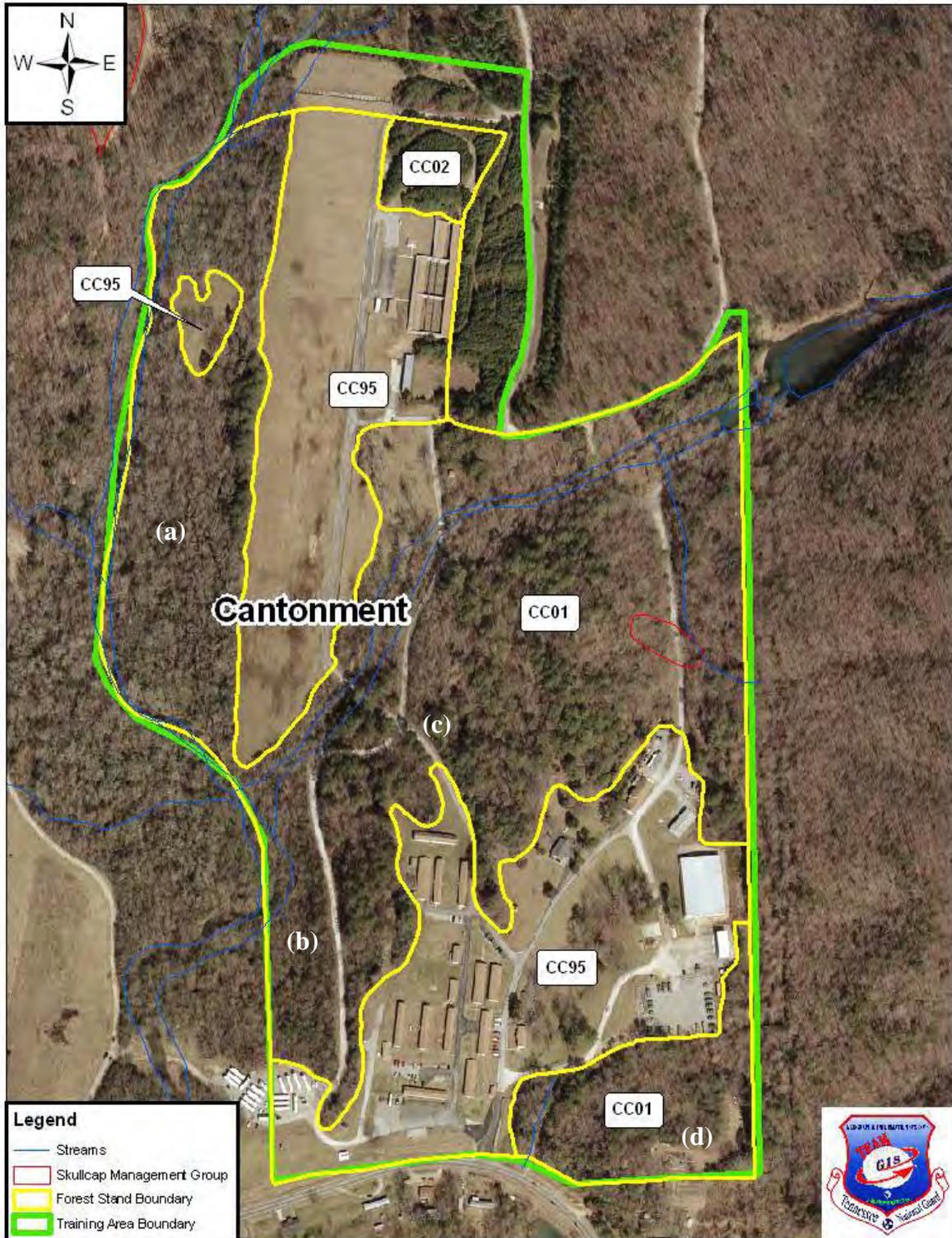
Section (b) (5 ac west of the road to the southern creek crossing) will not be harvested to ensure sufficient buffer for Tiger Creek.

Section (c) (35 acres north of the barracks, office, and shop complex) will be thinned by small group selection for training and construction needs and to create a patchwork of age classes. Areas to be harvested will be chosen on the basis of advance regeneration and seed tree quality unless intended to remain clear for training or construction. No more than 30% of the section acreage will be harvested in groups. The remainder may be lightly thinned to release desirable hardwood trees. A 50 ft SMZ along all creeks will not be harvested, and a 50 ft unharvested buffer will surround the large-flowered skullcap management group.

Section (d) (6 ac south east of the developed area) will be left unharvested as a visual buffer from the road.

Prescribed burning can be done in this stand every 6 years for fuel reduction. No burning will be conducted in the portion of the stand bordering Tiger Creek or within the large-flowered skullcap group.

**Stand cc02.** This stand will be allowed to grow and self-thin for the immediate future. There will be no prescribed burning due to density of the young trees.



**Figure A2.2: Forest stands in the Cantonment Area of VTS-Catoosa.**

## 6.2 Training Area 1

Training Area 1 is a 57-acre tract located along the southern boundary of the installation and immediately to the west of the Cantonment Area. State Highway 2 parallels the southern border of this training area. Training Area 1 contains some of the installation's small arms firing ranges which are essentially located within a large central open area that is surrounded by the two forest stands occurring within this training area. Large portions of the training area fall into "stand" c0195 which identifies the non-forested areas which do not have stand prescriptions.

### Stand Description

Stand c0101 is a 22.7-acre immature pine and hardwood forest. Unlike much of VTS-Catoosa, the stand occurs on flat land and is characterized by wet, heavy soils. The stand is dominated by poplar and pine, with a mix of hickory, walnut, and oaks. The trees range in age from 5 to 15 years old. Although the overall health of the stand is good, conditions are expected to decline within the next ten years without management.

Stand c0110 is a narrow 6-acre mature bottomland pine and hardwood forest that is located within the flood plain of Tiger Creek. The stand is dominated by red oak and white oak, with a mix of hickory, poplar, walnut, and a few large pines. The trees range in age from 30 to 70 year old. The overall health of the stand is good, but will decline without management.

### Forest Management Prescription

**Stand c0101.** This stand will be thinned by removing all trees that are not in the dominant or co-dominant crown class. Some of the co-dominants may also be removed to allow more room for growth by the remaining trees. The goal will be for the tree crowns not to touch each other on at least 3 sides. This will allow room for the remaining trees to grow, plus aide in training. Prescribed burning can be done once every 4 years for fuel reduction. No burning will be undertaken before thinning is completed.

**Stand c0110.** This stand will be thinned by removing trees that are 20 inches DBH and larger and selectively releasing desirable hardwood trees if needed. This will allow room for the remaining trees to grow, plus aide in training. The 50-foot Stream Management Zone will be clearly demarcated in that portion of the stand that borders Tiger Creek and there will be no harvesting within the SMZ. Prescribed burning can be done once every 4 years for fuel reduction. No burning should be undertaken before thinning is completed.



**Figure A1.3: Forest stands in Training Area 1.**

### 6.3 Training Area 2

Training Area 2 is a heavily forested elongated 256-acre tract. This is the second largest training area occurring on VTS-Catoosa. Tiger Creek flows along the entire eastern boundary of the training area. Two forest stands occur within the training area, along with three small scattered open areas.

#### Stand Descriptions

Stand c0201 is a 182.3-acre mature upland pine and hardwood forest characterized by steep, rolling hills. The stand is dominated by red oak and white oak, with a mix of hickory, ash, poplar, walnut, and a few pines. Most of pines were killed by southern pine beetles in the past. The trees range in age from 20 to 60 years old. The overall health of the stand is good. However, the health of the stand will decline in the next five years without management. A high percentage of the large-flowered skullcap population on the training site occurs within this stand.

Stand c0202 is a 66-acre immature upland pine and hardwood forest, located in the floodplain of Tiger Creek. The stand is dominated by red oak and poplar, with a mix of hickory, white oak, walnut, and a few large pines. The trees range in age from 20 to 50 year old. The overall health of the stand is excellent, but is expected to decline in the next ten years without management.

#### Forest Management Prescription

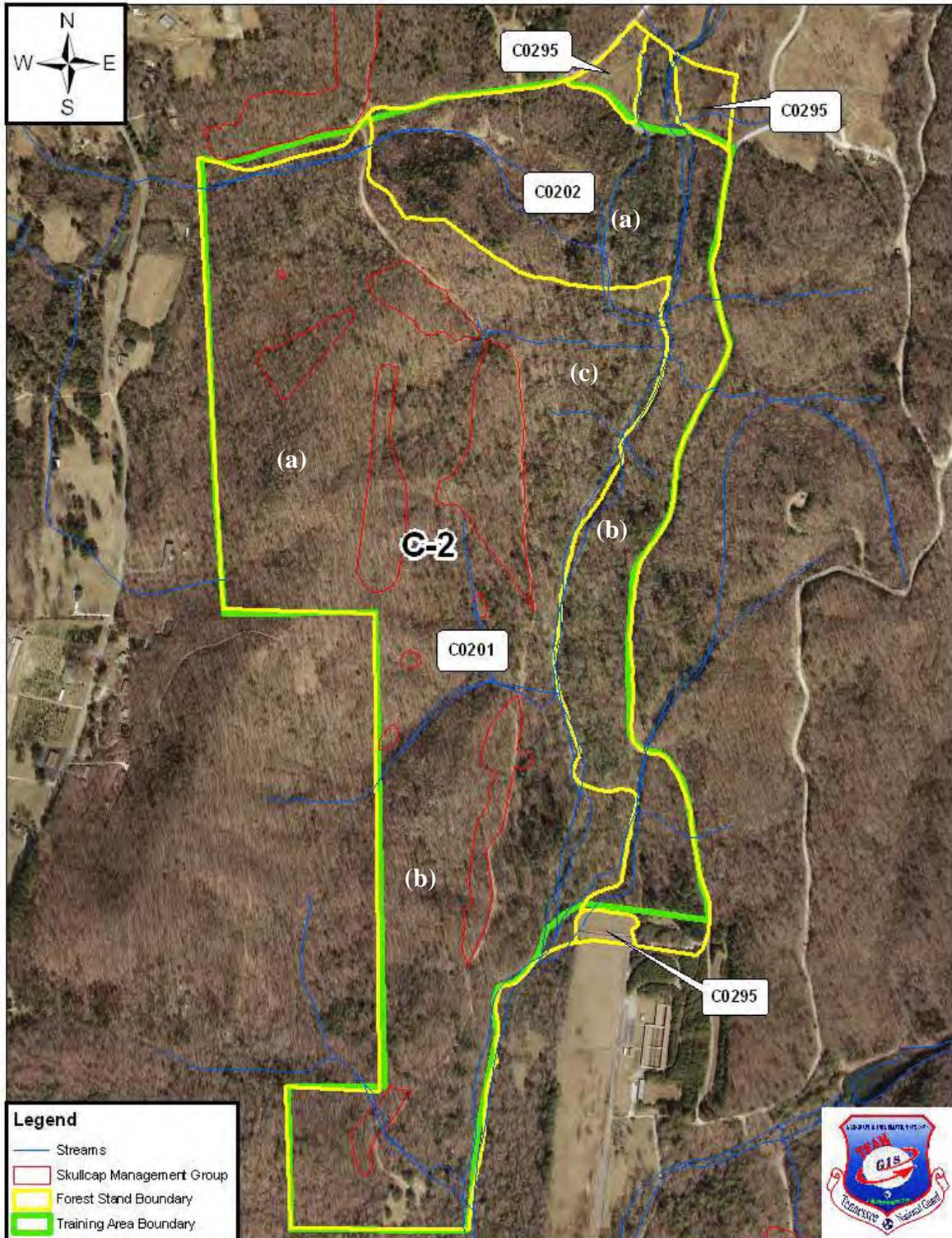
**Stand c0201.** Section (a) (90 ac west of the road and north of the tributary) will not be harvested due to the predominance of large-flowered skullcap in the area.

Sections (b) (35 ac west of the road and south of the tributary) and (c) (47 ac east of the road) will be subject to small group selections to create a patchwork of age classes. Areas to be harvested will be chosen on the basis of advance regeneration and seed tree quality. No more than 30% of the section acreage will be harvested in groups. The remainder of each section may be lightly thinned to release desirable hardwood trees. The two sections will not be harvested in the same year. There will be no harvesting in the 50 ft SMZs along the Tiger Creek and its tributaries.

Harvest activities will be limited in the vicinity of skullcap management groups. Harvest operations must be scheduled for the fall or winter when the plants are dormant. No vehicles, skidders included, may pass through a management group at any time, and soil disturbance must be minimized. There will be a 50' buffer surrounding the skullcap group; no timber will be cut within the management groups or the buffer zone. Tops and limbs will not be left within a management group or buffer. There will be no prescribed burning in this stand until the susceptibility of large-flowered skullcap to fire is determined.

**Stand c0202.** Sections (a) (32 ac west of Tiger Creek) and (b) (34 ac east of Tiger Creek) will be thinned by removing all trees that are not in the dominant or co-dominant crown class. Some of the co-dominants may be removed to allow more room to improve growing conditions for those trees that would not be removed during the thinning operation. The goal would be for the tree crowns not to touch each other on at least 3 sides. This will allow room for the remaining trees to grow, plus aid in training. There will be no harvesting within the SMZ along Tiger Creek.

Prescribed burning can be done once every 4 years for fuel reduction. No burning should be undertaken before thinning is completed.



**Figure A2.4: Forest stands in Training Area 2.**

## 6.4 Training Area 3

The 277-acre Training Area 3 is the largest of the training areas comprising VTS-C. The training area is characterized by a diverse assemblage of habitat types. Training activities have greatly influenced the juxtaposition of the forest stands with open areas and an extensive internal road network. Four different forest stands are divided into various sub-units by the mixture of habitats.

### Stand Description

Stand c0301 is an immature upland pine and hardwood forest that occurs on steep, rolling hills. Totalling 115.4 acres, the stand is broken into two large separated units, with the northernmost unit being somewhat larger. The stand is dominated by red oak and white oak, with a mix of hickory, poplar, walnut, and a few pines that still remain following a past problem with Southern pine beetles. The trees range from 20 to 50 years old. The overall health of the stand is excellent.

Stand c0302 is 42.5-acre immature upland pine and hardwood forest located in steep, rolling hills. The stand is divided into two units by a hardwood drain that flanks a tributary flowing into Tiger Creek. The stand is dominated by red oak and white oak, with a mix of hickory, poplar, walnut, and a few pines that remain from a past southern pine beetle infestation. The trees range from 10 to 20 years old.

Stand c0303 is 6.43-acre area of pre-merchantable pines that appear to have naturally regenerated within an open area that was formerly associated with the Cantonment Area and has since been abandoned. The stand is estimated to be 3 to 5 years old. The overall health of the stand is excellent.

Stand c0310 is a 12.8-acre immature upland pine and hardwood forest located within steep, rolling hills. The stand is associated with the lower elevations along and almost evenly divided between two tributary streams that drain into Tiger Creek. The stand is dominated by red oak and white oak, with a mix of hickory, poplar, walnut, and a few pines that remain from a past infestation by southern pine beetles. The trees range from 20 to 50 years old. The current overall health of the stand is excellent.

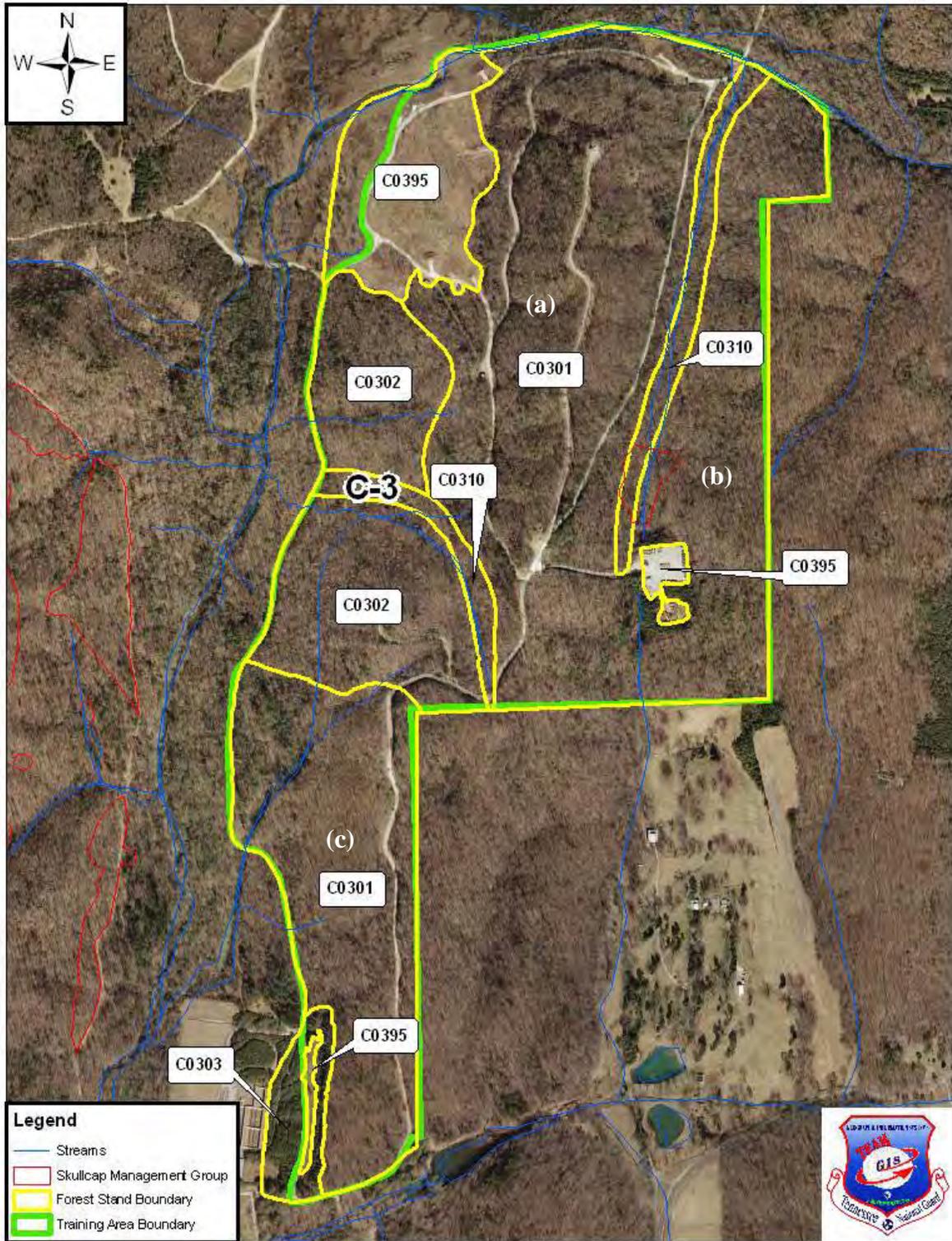
### Forest Management Prescription

**Stand c0301.** This stand will require thinning in the future. This stand will be re-assessed in the next inventory and a thinning prescription developed at that time. No burning should be conducted before thinning is completed.

**Stand c0302.** No forestry actions will be taken in stand c0302 during the next 10 years. At the next inventory, the condition of the stand should be reconsidered and appropriate management measures identified at that time. Prescribed burning can be done once every 4 years for fuel reduction.

**Stand c0303.** This stand will be allowed to grow and self-thin for the immediate future. There will be no prescribed burning due to density of the young trees.

**Stand c0310.** This stand falls almost entirely within the SMZ; therefore, there will be no timber harvest or prescribed burning in this stand.



**Figure A2.5: Forest stands in Training Area 3.**

## 6.5 Training Area 4

The 173-acre Training Area 4 is also characterized by a mixture of forest conditions and habitat types. Tiger Creek flows along the southern boundary of the training area, while Broom Branch flows near the western boundary before joining Tiger Creek. In addition, an extensive open area is associated with the firing points, the installation Impact Area, and the line-of-sight in between. Three forest stands were identified in the training area.

### Stand Description

Stand c0401 is an 88-acre immature pine and hardwood forest that contains very few pines. The stand is divided into eastern and western units by the presence of Broom Branch that flows through the training area. The stand is dominated by red oak and white oak, with a mix of hickory, poplar, walnut, and pine. The trees range in age from 20 to 50 years old. The overall health of the stand is considered to be excellent.

Stand c0402 is a 28.4 acre young oak and pine stand occurring on rolling hills. This stand has developed from past cuttings that removed most of the pines. There is some scattered pine regeneration in the stand. This stand is of excellent health, with trees ranging in age from 10 to 25 years old.

Stand c0410 is a narrow, elongated 10.3-acre immature pine and hardwood forest exhibiting similar characteristics as Stand c0401. However, since Stand c0410 is located at the lower elevations flanking Broom Branch, for the purposes of this Forest Management Plan it has been determined to be a Streamside Management Zone in which forestry measures should be pursued with extreme caution.

### Forest Management Prescriptions

**Stand c0401.** Section (a) (45 ac west of the drainage) and (b) (33 ac east of the drainage) will be subject to small group selections to create a patchwork of age classes. Areas to be harvested will be chosen on the basis of advance regeneration and seed tree quality. No more than 30% of the section acreage will be harvested in groups. The remainder of each section may be lightly thinned to release desirable hardwood trees. The two sections will not be harvested in the same year.

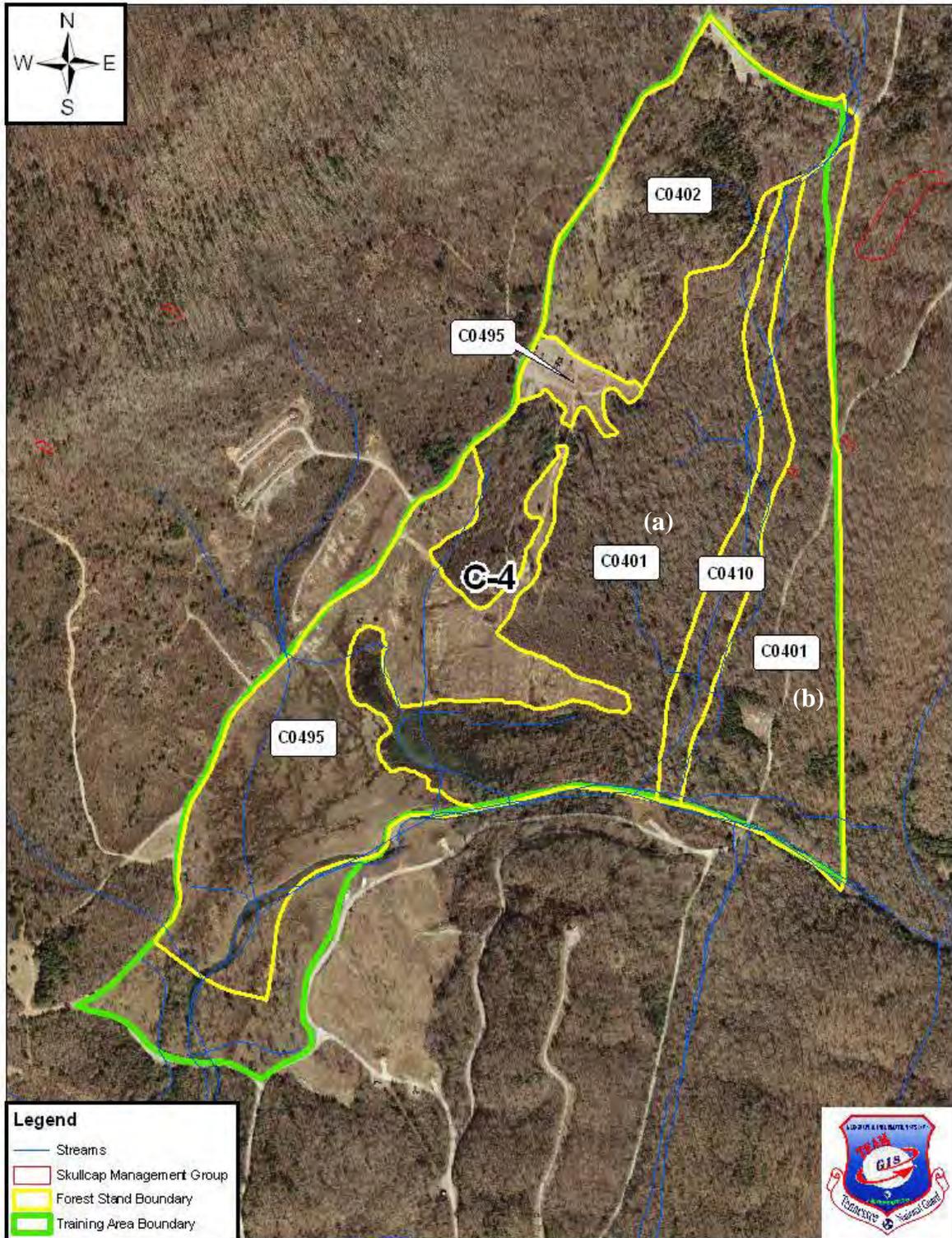
Harvest activities will be limited in the vicinity of skullcap management groups. Harvest operations must be scheduled for the fall or winter when the plants are dormant. No vehicles, skidders included, may pass through a management group at any time, and soil disturbance must be minimized. There will be a 50' buffer surrounding the skullcap group; no timber will be cut within the management groups or the buffer zone. Tops and limbs will not be left within a management group or buffer.

Prescribed burning can be done once every 6 years for fuel reduction. No burning should be undertaken before thinning is completed.

**Stand c0402.** Approximately 12 acres at the southern end of this stand may be cleared for mission related activities. The remainder of the stand will be left to develop and re-assessed after the next inventory.

Prescribed burning can be done once every 6 years for fuel reduction.

**Stand c0410.** This stand falls almost entirely within the SMZ; therefore, there will be no timber harvest or prescribed burning in this stand.



**Figure A2.6: Forest stands in Training Area 4.**

## 6.6 Training Area 5

Training Area 5 is 145 acres in size and is essentially completely covered in forest with the exception of a small open area along its southeastern margin. Three different forest stands have been identified in this training area. Some evidence of fire damage is shown in the forested areas occurring along the eastern boundary of the training area. The fires have originated from annual controlled burns and wildfires that have initiated from military firing operations.

### Stand Descriptions

Stand c0501 is a 17.1-acre mature upland pine and hardwood forest. The stand is dominated by red oak, with a mix of hickory, white oak, poplar, walnut, and a few pines. The trees range in age from 30 to 70 years old. The overall health of the stand is good. A portion of a large-flowered skullcap management group occurs in this stand.

Stand c0502 is a 95.7-acre immature pine and hardwood forest. The stand is dominated by red oak and pine, with a mix of hickory, poplar, walnut, and white oak. The trees range from 10 to 40 years old. The overall health of the stand is excellent, but is expected to decline during the next ten years without any management. There is some evidence of fire damage along the eastern boundary of this stand.

Stand c0503 is a 31.6-acre mature upland pine and hardwood forest. The stand is dominated by pines and cedar, with a mix of hickory, white oak, and poplar. The trees range in age from 30 to 70 years old. The overall health of the stand is poor due to poor site index and rocky ground conditions. An extensive large-flowered skullcap management group occurs at the southern end of this stand.

### Forest Management Prescriptions

**Stand c0501.** No harvest will be conducted at this time. Selective cutting will be considered after the next inventory. Prescribed burning can be conducted once every 6 years for fuel reduction purposes.

**Stand c0502.** Sections (a) (50 ac north of tank trail) and (b) (40 ac south of tank trail) will be thinned by removing all trees that are not in the dominant or co-dominant crown class. Some of the co-dominants may also be removed to allow more room for the remaining trees to grow, plus aide in training. The goal would be for the tree crowns not to touch each other on at least 3 sides.

Harvest activities will be limited in the vicinity of skullcap management groups. Harvest operations must be scheduled for the fall or winter when the plants are dormant. No vehicles, skidders included, may pass through a management group at any time, and soil disturbance must be minimized. There will be a 50' buffer surrounding the skullcap group; no timber will be cut within the management groups or the buffer zone. Tops and limbs will not be left within a management group or buffer.

Prescribed burning can be done once every 6 years for fuel reduction. No burning should be undertaken before thinning is completed.

**Stand c0503.** Due to the rocky ground and poor site conditions, there are few viable forestry management options to improve the quality of the forest stand occurring on this site. No management actions will be taken at this time; the stand will be reconsidered after the next Forest Inventory is conducted. Prescribed burning can be conducted once every 6 years for fuel reduction purposes. The skullcap management group will be protected from prescribed fire with a temporary firebreak placed outside the 50' buffer.



**Figure A1.7: Forest stands in Training Area 5.**

## **6.7 Training Area 6**

Training Area 6 is a 129-acre tract located along the northwestern boundary of VTS-Catoosa. This training area includes the summit of Sand Mountain which represents the most rugged terrain occurring on the installation. The site is completely covered by a single forest stand.

### **Stand Description**

Stand c0601 is a mature upland pine and hardwood forest that is dominated by red oak with a mix of hickory, white oak, poplar, walnut, and a few pines. The trees range in age from 30 to 70 years old. The overall health of the stand is good. A large skullcap management group is located on the west-facing slope of Sand Mountain, and a portion of another group occurs on the northeast edge of the stand.

### **Forest Management Prescription**

Stand 0601 is divided into three sections (a: 50 ac to the west, b: 44 ac in the center, and c: 37 ac to the west). All three will be subject to small group selections to create a patchwork of age classes. Areas to be harvested will be chosen on the basis of advance regeneration and seed tree quality. No more than 30% of the section acreage will be harvested in groups. The remainder of each section may be lightly thinned to release desirable hardwood trees. The sections will not be harvested in the same year.

Harvest activities will be limited in the vicinity of skullcap management groups. Harvest operations must be scheduled for the fall or winter when the plants are dormant. No vehicles, skidders included, may pass through a management group at any time, and soil disturbance must be minimized. There will be a 50' buffer surrounding the skullcap group; no timber will be cut within the management groups or the buffer zone. Tops and limbs will not be left within a management group or buffer.

Prescribed burning can be done once every 6 years for fuel reduction. The skullcap management group will be protected from prescribed fire with a temporary firebreak placed outside the 50' buffer.



**Figure A2.8: Forest stands in Training Area 6.**

## 6.8 Training Area 7

Training Area 7 consists of 154 acres. This site contains most of the Impact Area for military firing exercises. Two forest stands occur within the training area, along with a small acreage of open lands occurring along the southeastern boundary of the area.

### Stand Description

Stand c0701 is a mature upland pine and hardwood forest that is located on the very steep and rocky terrain of Sand Mountain. The stand exists as two separated units. The stand is dominated by red oak and white oak, with a mix of hickory, poplar, walnut, and a very few pines. The trees range in age from 20 to 60 years old. The overall health of the stand is excellent. The stand exhibits signs of fire damage resulting from wildfires ignited by military firing exercises and/or by controlled burns. The fire damage has resulted in major damage to the hardwood species and allowed erosion of the soil to occur. Two large-flowered skullcap management groups occur in the northeastern portion of this stand.

Stand c0702 is a contiguous 106.6-acre area of immature pine and hardwood forest, containing areas in which significant pine and hardwood regeneration has occurred. The trees range from 10 to 30 years old. The stand has experienced past hot fires and wind damage that has reduced the condition of the stand.

### Forest Management Prescription

**Stand c0701.** Section (a) (8 ac) in the west will be subject to small group selections at the same time as Stand c0601 (b) to create a patchwork of age classes. Areas to be harvested will be chosen on the basis of advance regeneration and seed tree quality. No more than 30% of the section acreage will be harvested in groups. The remainder may be lightly thinned to release desirable trees. Due to the prevalence of fire in this portion of the training site, pine species will be maintained whenever possible

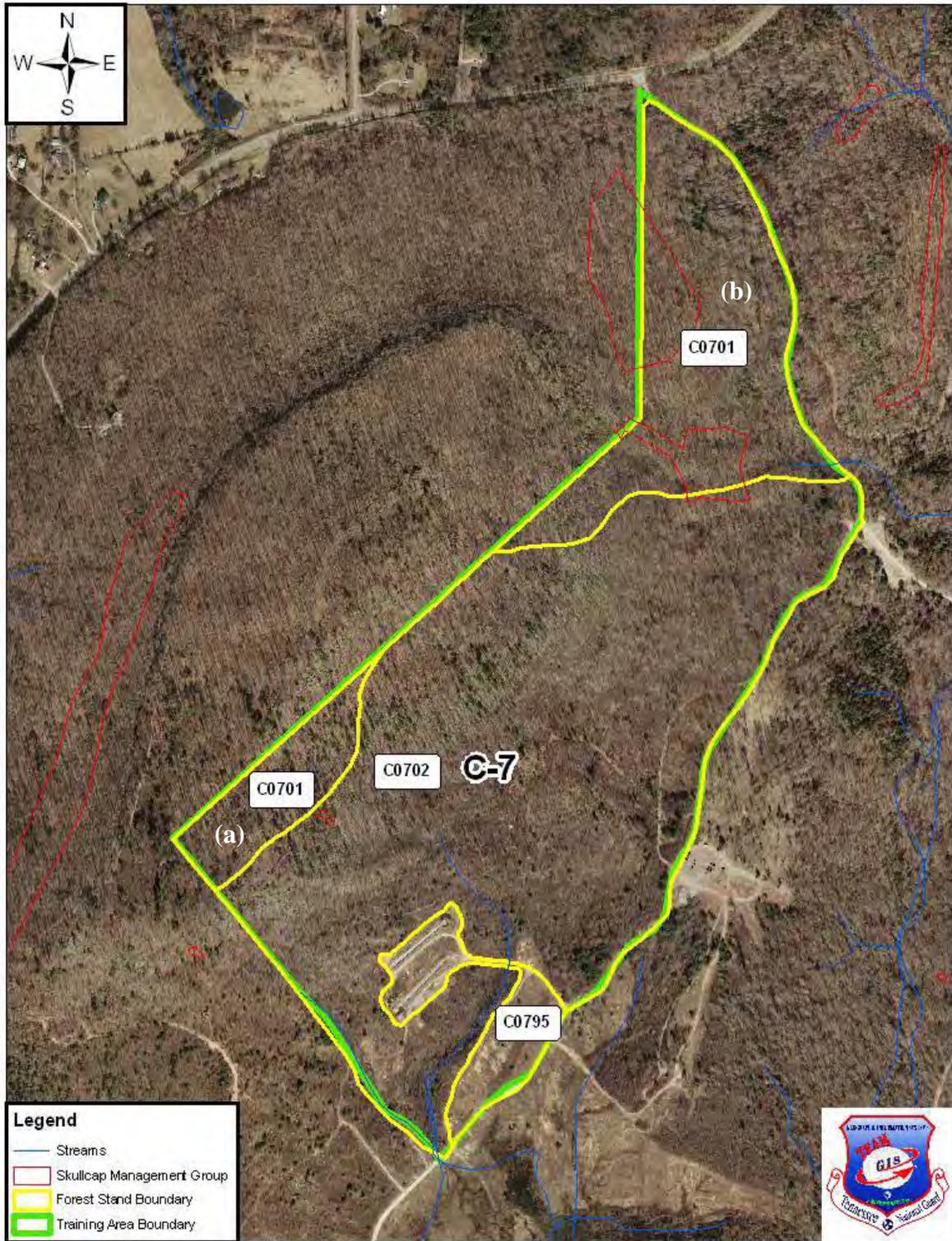
Section (b) (32 ac) in the east will be subject to small group selections. Areas to be harvested will be chosen on the basis of advance regeneration and seed tree quality. No more than 30% of the section acreage will be harvested in groups. The remainder may be lightly thinned to release desirable trees. Due to the prevalence of fire in this portion of the training site, pine species will be maintained whenever possible.

Harvest activities will be limited in the vicinity of skullcap management groups. Harvest operations must be scheduled for the fall or winter when the plants are dormant. No vehicles, skidders included, may pass through a management group at any time, and soil disturbance must be minimized. There will be a 50' buffer surrounding the skullcap group; no timber will be cut within the management groups or the buffer zone. Tops and limbs will not be left within a management group or buffer.

Prescribed burning can be done once every 6 years for fuel reduction.

**Stand c0702.** This stand will be left alone for the immediate future. Fire, both accidental and intentional, will continue to influence the conditions. Following the next inventory the stand will be reassessed. If expansion of the target area is required, areas of the stand will be cleared of damaged forest vegetation and maintained in an open state..

Prescribed burning can be done once every 6 years for fuel reduction.



**Figure A2.9: Forest stands in Training Area 7.**

## **6.9 Training Area 8**

Training Area 8 consists of a small 24.8-acre tract on the extreme northwestern boundary of the installation that is forested over its entire area. This area supports a single forest stand and a small cluster of large-flowered skullcap.

### **Stand Description**

Stand c0801 is a mature upland pine and hardwood forest. The stand is dominated by white oak and hickory, with a mix of red oak, poplar, walnut, and a very few pines. The trees range in age from 30 to 60 years old. The overall health of the stand is excellent and there is good hardwood regeneration present.

### **Forest Management Prescriptions**

**Stand c0801** will be subject to small group selections. Areas to be harvested will be chosen on the basis of advance regeneration and seed tree quality. No more than 30% of the section acreage will be harvested in groups. The remainder of each section may be lightly thinned to release desirable hardwood trees.

Harvest activities will be limited in the vicinity of skullcap management groups. Harvest operations must be scheduled for the fall or winter when the plants are dormant. No vehicles, skidders included, may pass through a management group at any time, and soil disturbance must be minimized. There will be a 50' buffer surrounding the skullcap group; no timber will be cut within the management groups or the buffer zone. Tops and limbs will not be left within a management group or buffer zone.

Prescribed burning can be done once every 6 years for fuel reduction. The skullcap management group will be protected from prescribed fire with a temporary firebreak placed outside the 50' buffer.



**Figure A2.10: Forest stands in Training Area 8.**

## **6.10 Training Area 9**

Training Area 9 is a 112-acre tract located along the northern boundary of the installation. This training area is mostly forested, with Broom Branch (a major tributary to Tiger Creek) flowing along its eastern boundary. A beaver pond occurs within the stream. Two forest stands were identified in the training area.

### **Stand Description**

Stand c0901 is a 96.3-acre contiguous area of immature sawtimber. The stand is dominated by poplar, oaks, hickory, pines, and miscellaneous hardwoods. Hardwood saplings and some mature pines and hardwood are scattered throughout the stand. This area was harvested during the past 20 years. The overall health of the stand is excellent, although evidence of damage from beaver-induced flooding is present at the lowermost elevations along Broom Branch. Large-flowered skullcap management groups are present in the southern portion of this stand.

Stand c0910 is a narrow 13.1-acre mature hardwood sawtimber stand stretched along either bank of the tributary streams occurring within the stand. This stand was not harvested when the adjacent Stand c0901 was. The overall health of the stand is judged to be excellent although evidence of beaver damage is present.

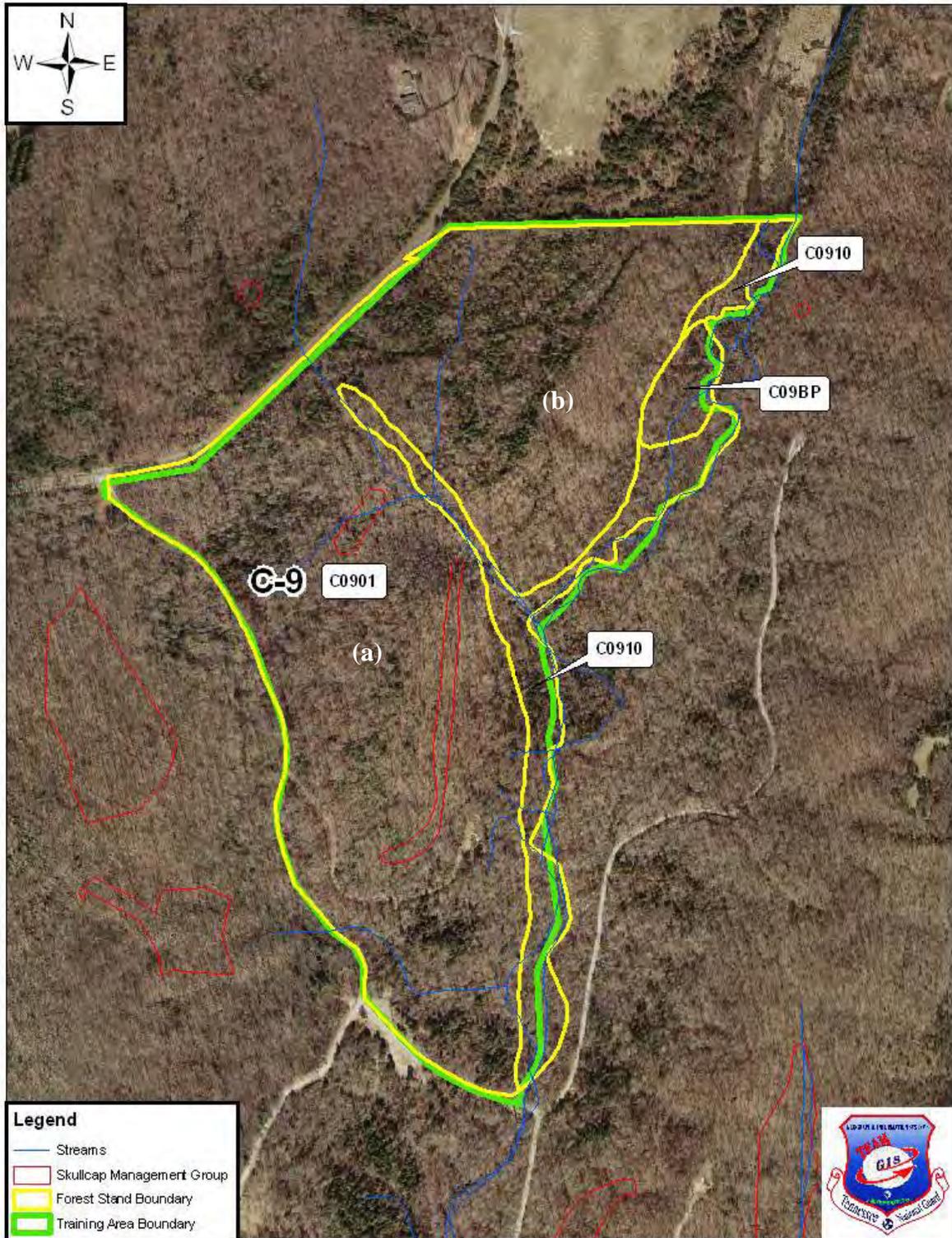
### **Forest Management Prescription**

**Stand c0901.** The trees in this stand will be allowed to continue to grow for the immediate future. The stand will be reassessed following the next inventory when it may be due to be thinned of trees that are not in the dominant or co-dominant crown class in the next management cycle.

No prescribed burning should be pursued before the thinning is completed.

**Stand c0910.** Due to the intimate association of the tributary streams to Tiger Creek with Stand c0910, there are limited forest management options. No harvesting will be conducted in this stand.

No prescribed burning should be pursued before the thinning is completed.



**Figure A2.11: Forest stands in Training Area 9.**

## 6.11 Training Area 10

Training Area 10 is located along the northeastern boundary of the installation. This 178-acre area also borders Broom Creek to the west. The site contains three forest stands and portions of streams that are tributaries to Tiger Creek.

### Stand Description

Stand c1001 is a 123.8-acre mature upland pine and hardwood forest that occurs on steep rolling hills. The stand is predominantly red oak and white oak, with a mix of hickory, poplar, walnut, and a few pines that remain from a past infestation of southern pine beetles. The trees range in age range from 20 to 50 years old. The overall health of the stand is excellent. Several small skullcap management groups are located within this stand.

Stand c1002 is a 35.1-acre immature sawtimber stand of poplar, oaks, hickory, pines, and miscellaneous hardwoods. Hardwood saplings with some mature pines and hardwoods are scattered throughout the stand. This area was harvested within the past 20 years. The overall health is excellent for the stand.

Stand c1010 is a 15.2-acre mature hardwood sawtimber stand. The stand is relatively narrow and is divided between two units, both of which are associated with tributary streams. The overall health of the stand is excellent, with the age of the trees ranging from 25 to 50 years old. The southern unit of this stand is largely occupied by a large-flowered skullcap group.

### Forest Management Prescription

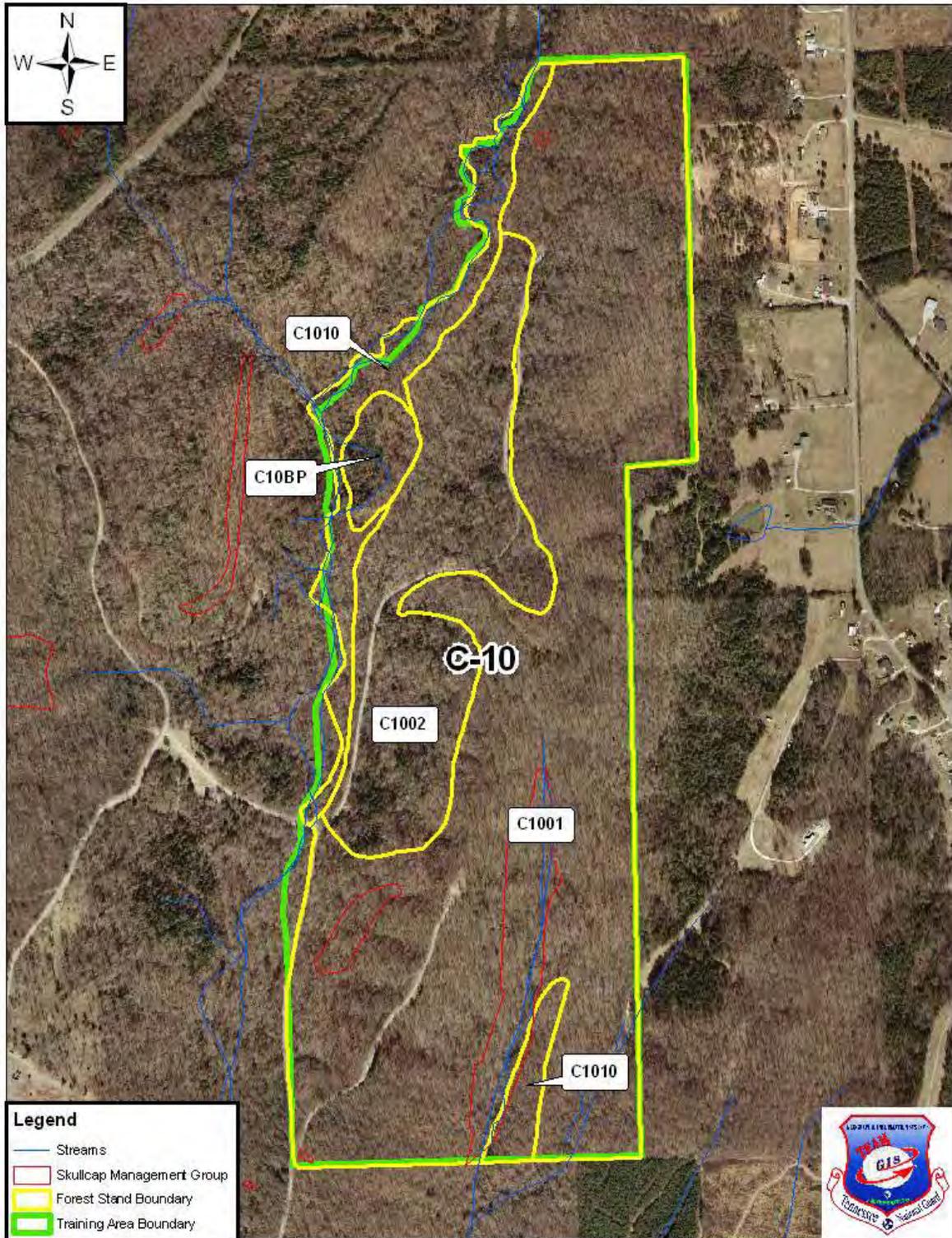
**Stand c1001.** This stand will be left alone until the next inventory when it will be reassessed. This is the likely location for an experimental application of the shelterwood – burn method of hardwood regeneration, which will be addressed following the 2015 inventory.

No prescribed burning should be conducted at this time.

**Stand c1002.** This stand will be thinned by removing all trees that are not in the dominant or co-dominant crown class. Some of the co-dominants may also be removed to allow more room for the remaining trees to grow, plus aide in training. The goal would be for the tree crowns not to touch each other on at least 3 sides.

Prescribed burning can be done once every 6 years for fuel reduction. No burning should be undertaken before thinning is completed.

**Stand c1010.** Due to the close association of Stand c1010 with the tributary streams and the large-flowered skullcap management group, there will be no timber harvest activities or prescribed burning in this stand.



**Figure A2.12: Forest stands in Training Area 10.**

## 7.0 IMPLEMENTATION SCHEDULE

A total of 25 individual forest stands have been designated on VTS-Catoosa. Some stands have been further divided into management units of 50 acres or less. Stand designations indicate site (C), training area (05), stand (01), and unit (a): C0501(a).

In general, the overall health of the installation's forest resources is considered to be relatively good, with the exception of portions of Training Areas 5 and 7. These two areas contain the installation Impact Area that has experienced frequent periodic fires that have resulted in damage to the timber. Due to the age and density of trees occurring over most of the installation, it appears that a sizable timber harvest took place some time around 20+ years ago.

Generally, stands totaling less than 50 acres will be harvested in any one year. This figure indicates total stand acreage; actual cleared acres will be much lower for group selection cuts. In addition, many stands contain large-flowered skullcap management groups which are not subject to timber harvest, thereby further lowering the impacted acreage.

Table A2.3 lists stands in order of the priority of treatment for the next 12 years; stand-specific management actions are planned for 19 of the stands during this time period. The recommended order of work summarized in Table A2.3 would be scattered over the installation's training areas in any given year (Figure A2.13) to avoid concentrating forestry operations in a single portion of the installation, while contributing to the creation of a long term mosaic of differing habitat conditions.

This schedule is subject to change based on military mission needs and updated forest inventory data. A resurvey of the VTS-C forest stands is scheduled for 2015. This plan and the harvest priority will be revised as dictated by the results of the new inventory.

**Table A2.3: Timber stand harvest priority for VTS-Catoosa.**

<b>Training Area</b>	<b>Stand &amp;Section</b>	<b>Acres</b>	<b>Primary Management Action</b>
01	C0101	23	Thin everything below dominant/co-dominant
02	C0202 (a)	32	Thin everything below dominant/co-dominant
08	C0801 *	25	Group selection and thin
Cantonment	CC01 (c) *	35	Group selection and thin
05	C0502 (a) *	50	Thin everything below dominant/co-dominant
07	C0701 (b) *	32	Group section and thin
02	C0202 (b)	31	Thin everything below dominant/co-dominant
06	C0601 (c) *	37	Group selection and thin
04	C0401 (b) *	31	Group selection and thin
Cantonment	CC01 (a)	17	Selectively thin trees above 20" dbh
01	C0110 **	6	Selectively thin trees above 20" dbh
05	C0502 (b) *	40	Thin everything below dominant/co-dominant
02	C0201 (b) *	35	Group selection and thin
06	C0601 (a) *	50	Group selection and thin
04	C0401 (a)	33	Group selection and thin
02	C0201 (c) *	47	Group selection and thin
10	C1002	35	Thin everything below dominant/co-dominant
06	C0601 (b)	44	Group selection and thin
07	C0701 (a)	8	Group selection and thin

\* Harvesting will be limited to outside the large-flowered skullcap management groups and surrounding 50' buffer. Acreages to be cut are overestimated in this table.

\*\* Riparian stands will only be thinned outside the 50' SMZ on each side of the stream.



**Annex 3**

**Wildland Fire Management Plan**  
VTS-Catoosa  
Tennessee Army National Guard

**Prepared By**

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USDA Forest Service

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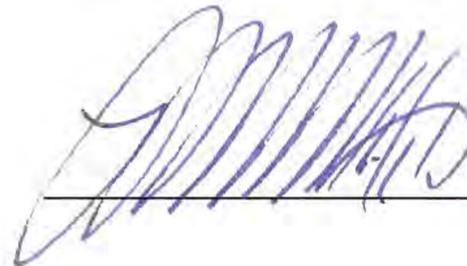
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12 Oct 2012

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## 1.0 INTRODUCTION

This Wildland Fire Management Plan (WFMP) has been developed in accordance with the 2002 Department of Army (DA) Wildland Fire Policy Guidance. It presents the standards by which the VTS-Catoosa wildland fire control and prescribed burning programs will be conducted. This plan is a component of the Integrated Natural Resources Management Plan (INRMP) for the training site and is especially linked to the Forest Management Plan annex to the INRMP.

This plan shall be in compliance with:

- Army Regulation (AR) 420-90, 10 Sep 97, Fire and Emergency Services
- AR 200-1, 28 Sep 2007, Environmental Protection and Enhancement
- DOD Instruction 6055.6, 10 Oct 00, DoD Fire and Emergency Services Program
- Army Memorandum, 04 Sep 2002, Army Wildland Fire Policy Guidance

### 1.1 Goals and Objectives

Fire management policy for VTS-Catoosa was developed to support the following goals:

- Provide for the safety of fire crews on every wildland fire management activity.
- Reduce wildfire potential on the training site and suppress undesired wildfires to protect lives, property, and natural and cultural resources in a cost-effective manner.
- Utilize prescribed fire to maintain and improve the usability of the training site to support all aspects of the military mission.
- Utilize prescribed fire to effectively protect and enhance valuable natural resources and to implement ecosystem management goals and objectives.

### 1.2 Key Definitions

**Wildland.** An area in which development is essentially nonexistent, except for roads, railroads, power lines and similar transportation facilities. Structures, if any, are widely scattered.

**Wildland Fire.** Any non-structure fire occurring in the wildland that is not meeting management objectives and thus requires a suppression response.

**Wildland Fire Use.** The application of the appropriate management response to naturally-ignited wildland fires to accomplish specific resource management objectives in pre-defined designated areas outlined in Fire Management Plans.

**Wildfire.** An unplanned, unwanted wildland fire, including unauthorized human caused fires, naturally occurring wildland fires, and escaped prescribed fires, where the objective is to put out the fire.

**Prescribed Fire.** Controlled, purposeful application of fire to wildland fuels in either their natural or modified state, under specified environmental conditions which allow the fire to be confined to a predetermined area and produce the fire behavior and fire characteristics required to attain planned fire treatment and resource management objectives.

### **1.3 Location and Physical Features**

The VTS-Catoosa consists of 1,628 acres in the northwestern portion of Georgia in Catoosa County, approximately 5 miles south of the Tennessee-Georgia border. The VTS-Catoosa is located approximately 90 miles northwest of Atlanta, Georgia, and approximately 20 miles southeast of Chattanooga, Tennessee. Georgia State Highway 2 borders the installation on the south, and Salem Valley Road provides access to the northern boundary. The VTS-Catoosa is approximately 16,000 feet at its maximum length (north-south) and around 6,625 feet at its maximum width (east-west).

The closest town is Ringgold, Georgia, the county seat of Catoosa County, which is located approximately two miles west of the VTS-Catoosa along I-75 between Atlanta and Chattanooga. The VTS-Catoosa was originally used as the Fort Oglethorpe Rifle Range and Training Site between 1910 and 1946. Fort Oglethorpe was closed immediately after World War II and placed under the jurisdiction of the U.S. Army Corps of Engineers (USACE). Since 1960, the Tennessee Army National Guard (TNARNG) has operated the VTS-Catoosa under a license from the USACE.

The VTS-Catoosa is comprised of a relatively small Cantonment Area and 10 designated training areas. Topographic relief across the site is significant, with an elevation change from approximately 755 feet above mean sea level (msl) along the creek system that bisects the training site to over 1,200 feet above msl on the northeast-southwest running ridges on either side of the stream valley. Slopes on the training site range from 0% to 53%.

Approximately 1,300 acres of the VTS-Catoosa is forested, principally with mixed hardwood species. Managed grasslands cover about 80 acres on the small weapons ranges and tank range. There is no unexploded ordinance on the VTS-Catoosa.

## **2.0 PROGRAM OVERVIEW**

### **2.1 Organizational Structure and Responsibilities**

The wildland fire program on VTS-Catoosa will operate in accordance with DA Memo (4 Sep 2002), “Army Wildland Fire Policy Guidance,” and the DA “Sustainable Range/Installation Environmental Activities Matrix” (2 Sep 2005) for funding. The Adjutant General (TAG) as commander of the TNARNG is directly responsible for the operation and maintenance of the Volunteer Training Sites, including implementation of this WFMP. TAG delegates fire-related duties among environmental and training site staffs.

The Wildland Fire Program Manager for the TNARNG is the Natural Resources Manager (NRM) in the Environmental Office. The NRM is responsible for preparing and maintaining this WFMP. The NRM also ensures that firefighters are trained to National Wildfire Coordinating Group (NWCG) Firefighter Type 2 standards, at a minimum, maintaining training records and scheduling training as needed.

VTS-Catoosa Range Control is responsible for immediate wildland fire control response on the training site. There is a verbal MOA for firefighting support in place with the Georgia Forestry Commission (GFC), which is located within a few miles of the training site. A unified command will be set up with the GFC and any qualified VTS-Catoosa personnel in the event that the GFC is called in to help control a wildland fire that is beyond the capabilities of the training site staff. Catoosa County also has six volunteer fire departments (VFDs). Ringgold VFD would respond to any structural fires on the training site.

Prescribed fire activities on the VTS-Catoosa are cooperative actions conducted by training site personnel and the Georgia Forestry Commission. A GFC forester acts as burn boss for all prescribed burns on the training site. Environmental personnel also participate in prescribed burns conducted for ecosystem management goals.

## 2.2 Interagency Cooperation and Mutual Aid Agreements

There is a verbal MOA in place with the Georgia Forestry Commission, which is located near VTS-Catoosa. The GFC conducts the prescribed burns and controls any wildland fires that are too large for the VTS-Catoosa personnel to handle.

## 2.3 Personnel

VTS-Catoosa currently has 4 trained wildland firefighters (FFT2). Additional firefighters may be requested from other TNARNG facilities to aid in prescribed burning. The GFC County Forester acts as the burn boss for all prescribed burns, as no training site personnel have yet received prescribed fire training.

## 2.4 Available Equipment

The VTS-Catoosa maintains a cache of fire equipment for wildland fire suppression and prescribed burning (Table A3.1). In addition, personal protective equipment (PPE) conforming to National Fire Protection Act (NFPA) 1977 (Standard on Protective Clothing and Equipment for Wildland Fire Fighting) is maintained for all trained personnel on site. Each firefighter is outfitted with:

- Nomex pants
- Nomex shirt
- Firefighting helmet
- Leather gloves
- Goggles
- Fire shelter
- Pack for gear
- Leather boots are required, but are provided by the individuals.

**Table A3.1: Available fire equipment at VTS-Catoosa.**

Fire rake	8
Pulaski axe	4
Shovels	5
Drip cans	2
5 gal Backpack sprayer - metal	1

Collapsible backpack sprayer	2
500 gal Fire Trailer + pump + 500' hose	1
Hydro-seeder 800 gal water capacity + 100' hose	1
Trailer-type pressure washer 300 gal + 25' hose	1
D-7 dozer	1
120-G grader	2
Gyro-track with brush grinder	1
245 Massey tractor	1
6400 JD tractor	2
4720 JD tractor with dump bucket	1
New Holland back hoe	1
24-C skid loader	2
Track hoe	1
GMC 4WD diesel pickup truck	4
6' scraper	1
6' box blade	1
10' bush hog	1
7' bush hog	1
Disc harrow	1
100 gal spray tank	1

## 2.5 Funding Requirements

The funding responsibilities for wildland fire are defined in the DA Sustainable Range/ Installation Environmental Activities Matrix (2 Sep 2005). Wildland fire expenses are primarily the responsibility of the Facilities/Real Property Division. Funding for WFMP implementation, wildland fire prevention, fuels management for hazard reduction, wildland fire suppression, prescribed burning, firebreak construction and maintenance, and other wildland fire management is an installation operations and maintenance responsibility.

Integrated Training Area Management funds may be utilized for prescribed burning intended to improve training facilities/environments, as well as for construction and maintenance of fire breaks or other fuel removal directly associated with training-induced fire hazard on ranges and training areas.

Environmental funds may be utilized for prescribed burning that has a specific ecosystem management or rare, threatened, and endangered species management objective as presented in the INRMP and for wildland fire management activities conducted for the purpose of compliance with environmental laws and regulations. Forestry reserve account funds may be requested for fire-related projects that will improve forest health or timber management concerns on the facility.

The funds available will be used to continue the training of the on-site resources and maintain a cache of personal protective equipment and wildfire tools. The VTS-Catoosa personnel should use appropriate management response in all incidents which will maintain a cost efficient program.

## 2.6 Public Relations

When involved with any fire application, VTS-Catoosa personnel should always consult with the Georgia Forestry Commission and should also consider contacting the local VFDs. At the minimum the main

Ringgold VFD should be contacted. The surrounding public should be made aware of any smoke issues that may arise and could cause any health issues.

## **2.7 Environmental Review**

Implementation of this Integrated Wildland Fire Management Plan requires an assessment of the environmental effects as required by AR 200-1, *Environmental Protection and Enhancement*, and the National Environmental Policy Act of 1969. This assessment will be completed before implementation of the plan, in conjunction with the Environmental Analysis (EA) for the Integrated Natural Resources Management Plan for the VTS-Catoosa.

## **3.0 SAFETY AND EMERGENCY OPERATIONS**

All emergency operations go through Range Control and will be handled through the 911 dispatch. The Range Control Officer will function as the Incident Commander for small scale fire suppression. If a wildfire is beyond the capabilities of the on-site staff, Incident Command will be turned over to the Georgia Forestry Commission or Ringgold VFD representative, as appropriate to the nature of the outside aid required.

The on-site Incident Commander will ensure all firefighter and public safety precautions are taken and are the highest priority in all operations. Except in the event of a threat to human life, no wildland fire situation will require placing a firefighter or equipment in extreme danger.

Before fire suppression or prescribed fire activities are initiated, the Incident Commander (or burn boss, in the case of prescribed burning) will go over the plan of operation with all personnel directly participating and ensure all personnel have at least the minimum PPE required.

All TNARNG personnel involved in wildland fire activities will receive appropriate training for their tasks (see Section 3.2). Firefighters will be issued a Fireline Handbook NWCG Handbook (3 PMS-410/NFES 0065) and the Incident Response Pocket Guide (PMS-461/NFES 1077). Each firefighter will be knowledgeable and review the 10 Standard Fire Orders and the 18 Watchout situations. No emergency situation will be approached without the proper safety mitigations in place with the use of Lookouts, Communications, Escape Routes and Safety Zones (LCES).

All safety gear will comply with NFPA 1977 Standard on Protective Clothing and Equipment for Wildland Fire Fighting. This standard specifies the minimum design, performance, testing, and certification requirements for items of wildland fire fighting protective clothing and equipment, including protective garments, helmets, gloves, footwear, goggles, chain saw protectors, and load carrying equipment.

The VTS-Catoosa does not contain any unexploded ordinance.

## **3.1 Risk Assessment Process**

Safety of TNARNG personnel, firefighters, civilians, and neighbors is of paramount importance in all wildland fire actions. Risk assessment for all emergency response situations will follow the five step process outlined below (from the Incident Response Pocket Guide PMS-461/NFES 1077). Situational awareness must be maintained throughout the changeable conditions of a wildland fire activity and re-assessment conducted whenever there is a significant alteration of circumstances.

### 3.1.1 The Risk Management Process

#### Step 1. Situational Awareness

- Gather information
  - Objective(s)
  - Previous fire behavior
  - Communication
  - Weather forecast
  - Who's in charge?
- Any local factors
  - Scout the fire/incident

#### Step 2. Hazard Assessment

- Estimate potential fire behavior hazards
  - Look Up / Down / Around indicators
- Identify tactical hazards
  - Watch Outs
- What other safety hazards exist?
- Consider severity vs. probability

#### Step 3. Hazard Control

- Firefighting Orders and LCES Checklist – MANDATORY
  - Anchor point
  - Downhill checklist (if applicable)
- What other controls are necessary?

#### Step 4. Decision Point

- Are controls in place for identified hazards?
  - NO: Reassess situation      YES: Next question
- Are selected tactics based on expected fire behavior?
  - NO: Reassess situation      YES: Next question
- Have instructions been given and understood?
  - NO: Reassess situation      YES: Initiate action

#### Step 5: Evaluate

- Personnel: Low experience level with local factors?
  - Distracted from primary tasks?
  - Fatigue or stress reaction?
  - Hazardous attitude?
- The Situation: What is changing?
  - Are strategy and tactics working?

### 3.1.2 Prescribed Burning Risk Assessment

The above Risk Management Process will be applied during prescribed fire activities. Prescribed burning will not be conducted under any of the following conditions, as based on the Fire Weather information from the Georgia Forestry Commission (<http://weather.gfc.state.ga.us>):

- A predicted temperature greater than 85° F
- A predicted wind speed greater than 18 mph at the 20' level
- A predicted relative humidity less than 25%

- An atmosphere with Red Flag conditions issued by GFC or USDA-FS
- Inadequate personnel or equipment available to manage the prescribed burn

### 3.1.3 Fire Danger Rating and Burning Index

Fire danger (Table A3.2) rating is a classification based on the Burning Index and is available from the Georgia Forestry Commission fire weather system. Fire danger rating will be routinely checked during fire season, as it provides guidance of importance both for prescribed burn activities and also for military training. Prescribed burns will generally be conducted at low fire danger rating, or occasionally moderate. Pyrotechnic devices and live fire training will be limited in accordance with the recommendations in the table below:

**Table A3.2: Fire Danger Rating.**

<b>Fire Danger Rating and Color Code</b>	<b>Burning Index (BI)</b>	<b>Description</b>	<b>Recommended Military Considerations</b>
(1) Low (Green)	0-20	Fuels do not ignite readily from small firebrands. Most prescribed burns are conducted in this range.	None.
(2) Moderate (Blue)	21-40	Fires are not likely to become serious and control is relatively easy. Fires burning in these conditions generally represent the limit of control for direct attack methods.	None.
(3) High (Yellow)	41-60	Fires may become serious and their control difficult unless they are attacked successfully while small. Machine methods are usually necessary or indirect attack should be used.	Recommend firing pyrotechnics into open drums; altering firing times to hours with lower fire danger.
(4) Very High (Orange)	61-79	Fires start easily from all causes and, immediately after ignition, spread rapidly and increase quickly in intensity. The prospects for direct control by any means are poor at this intensity.	No pyrotechnics or tracer rounds allowed, except with written authorization from Range Control.
(5) Extreme (Red)	80+	Fires start quickly, spread furiously, and burn intensely. All fires are potentially serious. The heat load on people within 30 feet of the fire is dangerous.	No pyrotechnics or tracer rounds allowed.

### 3.2 Personnel Training and Certification

Training will adhere to the standards set by NWCG as described in PMS-310 (<http://www.nwcg.gov/pms/docs/docs.htm>). All firefighters need to obtain the basic Firefighter Type 2 (FFT2) qualifications (S130/190 classes) and will need to attend an annual fireline safety refresher provided on-site or off.

The Natural Resource Manager (NRM) for TNARNG, is responsible for maintaining and tracking the training records for VTS-Catoosa personnel. The NRM will keep track of the training being offered close to the installation and inform training site personnel of its availability. VTS-Catoosa should look for opportunities to train with the Georgia Forestry Commission.

### **3.3 Physical Fitness Standards**

Based on the conditions and terrain encountered in wildland fire situations on the VTS-Catoosa, the moderate level fitness standard is considered sufficient for TNARNG wildland firefighters. The field test will be administered by the Natural Resources Manager and/or the Environmental Program Manager according to the standards in PMS-307/NFES 1109, Work Capacity Test Administrator's Guide (2003). All TNARNG personnel with current firefighter training will be required to pass the test prior to the end of FY2009. New personnel with fire suppression or prescribed fire duties will be tested prior to their first fire activities (unless they already have their Red Card).

## **4.0 FIRE FACTORS**

### **4.1 Fire History**

No significant wildfires have occurred on the training site. All wildfires have been associated with military activities such as firing blanks or tracer rounds. Each fire has been less than one acre in size and has been extinguished by on-site staff.

### **4.2 Mission Considerations**

The mission of the VTS-Catoosa is to support unit requirements for maneuver, range operations, equipment use, and other combat readiness training. These training activities occur within the developed Cantonment Area, the small arms ranges, and throughout the maneuver areas which comprise 96% of the training site. The VTS-Catoosa facilities are used to conduct small arms range firing, maneuvering, and combined arms training including field bivouac; tracked and wheeled vehicle operations on all military roads and developed major trails; mounted and dismounted maneuvers; and weapons firing. Off-road maneuvers are performed within designated open terrain areas and in designated fringe areas (concealment parking sites) within 100 feet of specified roads and trails within the maneuver areas. Over 80% of training site utilization is by military users; use by non-military entities is generally restricted to the small arms firing ranges.

This WFMP supports the military mission of the VTS-Catoosa by providing for timely wildfire response, thus minimizing training downtime and facility loss to wildfires. The prescribed burn program provides a cost effective method of maintaining and expanding open training areas such as ranges and controls fuel buildup to minimize wildfire intensity.

Potential negative impacts of the wildland fire program include smoke impacts and interruption of training activities. Care in scheduling burns to accommodate the training calendar will minimize all effects on training activities. Wildfire control downrange will require a range shutdown, which could lead to loss of training time. Smoke management will be addressed through the guidelines provided in this plan.

### 4.3 Natural and Cultural Resources Considerations

Fire management may have beneficial or negative impacts on both the natural and cultural resources of a site, and both can represent constraints on the fire program, especially prescribed burning.

#### 4.3.1 Cultural Resources

Development of firebreaks is the greatest fire-related threat to Cultural Resources on VTS-Catoosa. No new permanent firebreaks (off existing roads and trails) will be developed without consultation with the Georgia State Historic Preservation Officer (SHPO). Temporary plow line firebreaks may be constructed in those portions of the training site which have been surveyed and identified as free of significant archaeological or historical resources.

A Phase I survey of VTS-Catoosa conducted in 1997 identified 20 archaeological sites and 17 historic architectural resources on the installation. The historical architectural sites are located within the Cantonment Area; the archaeological sites are scattered across the training site. These sites are considered “no plow” zones, and are included on Figure A3.1 with the natural resource sites that are also protected from the fire plow. Fire control in “no plow” zones will depend on existing firebreaks or methods that do not disturb the soil.

One family cemetery is located on the VTS-Catoosa (the cultural zone in the northeast corner of the training site). It is fenced and will be protected from wildfire and prescribed burns.

#### 4.3.2 Natural Resources

- One federally listed threatened plant species (large-flowered skullcap (*Scutellaria montana*)) occurs at multiple locations across VTS-Catoosa. The occurrences of this plant are identified as “management groups” and have been marked in the field and recorded on the installation GIS. The large-flowered skullcap areas are “no plow” zones, as indicated on Figure A3.1. Vehicles are not allowed within the management groups, and earth disturbance is prohibited. Large-flowered skullcap management groups will be protected from wildfire as possible using existing firebreaks, plowed breaks at least 50 feet outside of group boundaries, or control methods that do not disturb the soil.

The impact of fire on large-flowered skullcap is relatively unknown. It is possible that a “cool” prescribed fire applied early in the spring could assist in reducing competition from other herbaceous ground cover plants and exotic invasive plant species without damaging the protected plant. The TNARNG has proposed a study to investigate the susceptibility of large-flowered skullcap to light burning. Formal consultation with the U.S. Fish and Wildlife Service (USFWS) must be completed prior to any experimental burning of the skullcap. Until that time, all known large-flowered skullcap occurrences will be protected from prescribed fire by a temporary fireline constructed at least 50 feet outside of the posted boundaries of the management group. Any research activities will impact only specific management groups (see Annex 1); all other groups will continue to be protected from prescribed fire, as well as from wildfire.

- The gray bat (*Myotis grisescens*) is the only federally listed animal species that has been observed on VTS-Catoosa. No roosting sites have been found on the training site, and the species has only been documented foraging over Tiger Creek. Appropriate care of streamside management zones in the development of firebreaks and limiting fire within the riparian areas should ensure minimal impact on the gray bat on VTS-Catoosa. If a roost site is ever found on the training site, the immediate area and a sufficient buffer surrounding it will be removed from the burn program.

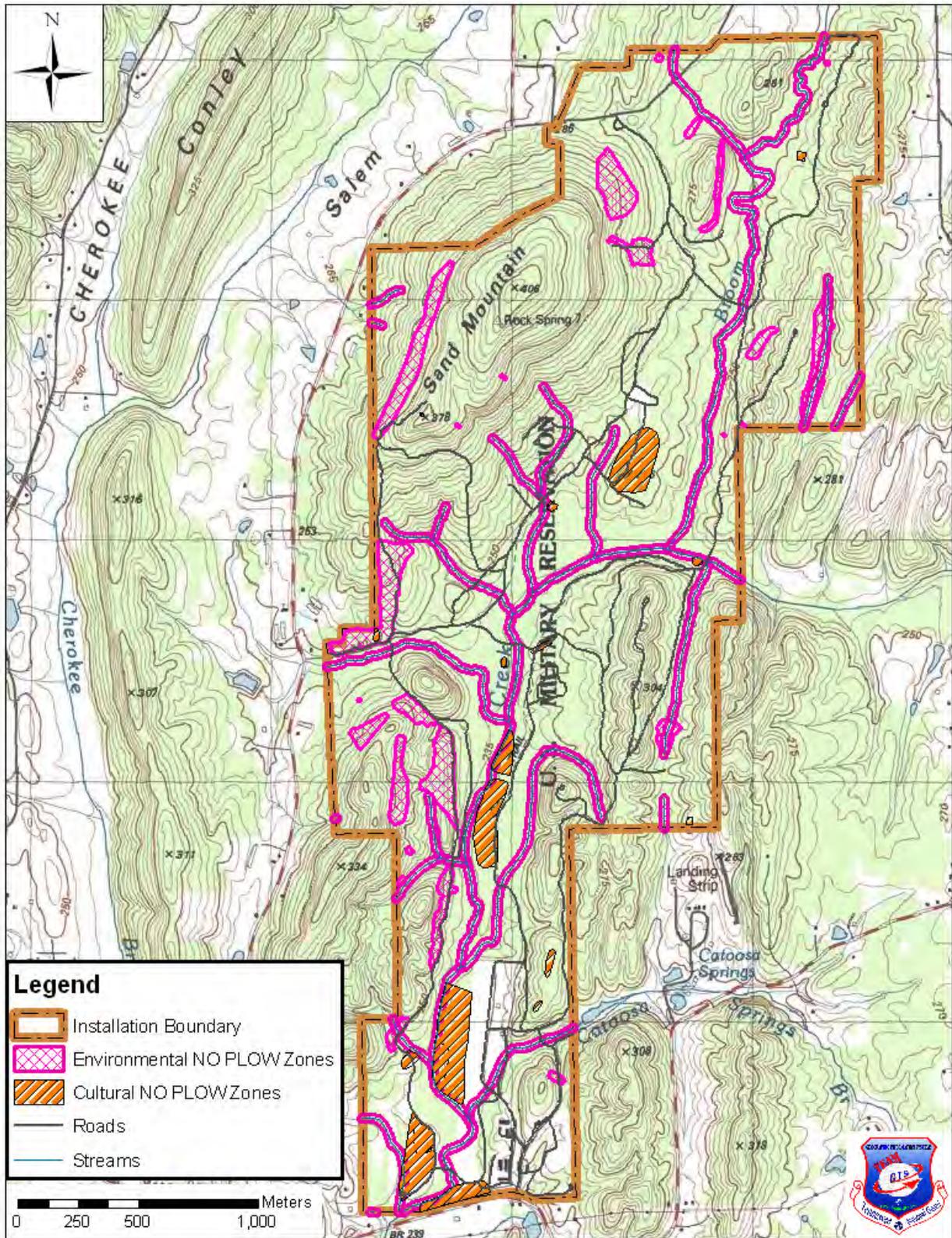


Figure A3.1: No-Plow Zones on VTS-Catoosa due to significant natural and/or cultural resources.

- The VTS-Catoosa contains 11.6 miles of intermittent or flowing streams. Two of these, Tiger Creek and Broom Branch, are recognized by the state of Georgia as secondary trout streams. To protect water quality, the 50 foot Streamside Management Zone on each side of the streams will be a no-plow zone. Firebreaks within riparian corridors must be designed in coordination with the NRM and will be outside of the 50 foot SMZ (Figure A3.1). Prescribed burning within riparian areas will be limited and subject to careful planning to ensure streambanks are not denuded of vegetation.
- The topography of the VTS-Catoosa makes the site prone to soil erosion. In order to minimize erosion problems on firebreaks, water control structures to manage surface water movement will be installed during firebreak construction. Permanent fire lines will have water control structures maintained. Temporary firelines will be rehabilitated as soon as practicable after any fire. Existing barriers such as roads and trails will be used whenever possible to reduce the need for fire line construction and to minimize resource impacts.

#### 4.4 Fire Regime

The fire regime classification system is used to characterize the personality of a fire in a given vegetation type, including the frequency that the fire visits the landscape, the type of pattern created, and the ecological effects. The following natural fire regimes are arranged along a temporal gradient, from the most frequent to the least frequent fire return interval. The definitions below are from the General Technical Report, Rocky Mountain Research Station #87 (GTR-RMRS-87).

Fire Regime Frequency Effect to Dominant Vegetation:

Fire Regime I	0-35 years	Low Severity
Fire Regime II	0-35 years	Stand Replacement
Fire Regime III	35-100+ years	Mixed Severity
Fire Regime IV	35-100+ years	Stand Replacement
Fire Regime V	200+ years	Stand Replacement

Fire Regime I: Fires in the under-story fire regime generally do not kill the dominant vegetation or substantially change its structure. Approximately 80 percent or more of the above ground dominant vegetation survives fire. The under-story fire regime occurs primarily in southern pine and oak-hickory forests, including the upland hardwood forest types found at VTS-Catoosa. Fire is a natural maintenance disturbance for these types of stands, and is used to maintain and regenerate oak-hickory for timber stand improvement and wildlife stand improvement concerns.

#### 4.5 Fuel Types

Wildland fuels are classified by diameter:

- less than 0.25” 1-hour fuel
- 0.25”-1” 10-hour fuel
- 1-3” 100-hour fuel
- 3-8” 1000 hour fuel

VTS-Catoosa is considered to be over 90% forested. The training site consists of the following fuel models (Figure A3-2). Each group has an approximate acreage that occurs on site and gives a general description of the fuel and the fire behavior typically seen with the given fuels.

#### 4.5.1 Grass Group

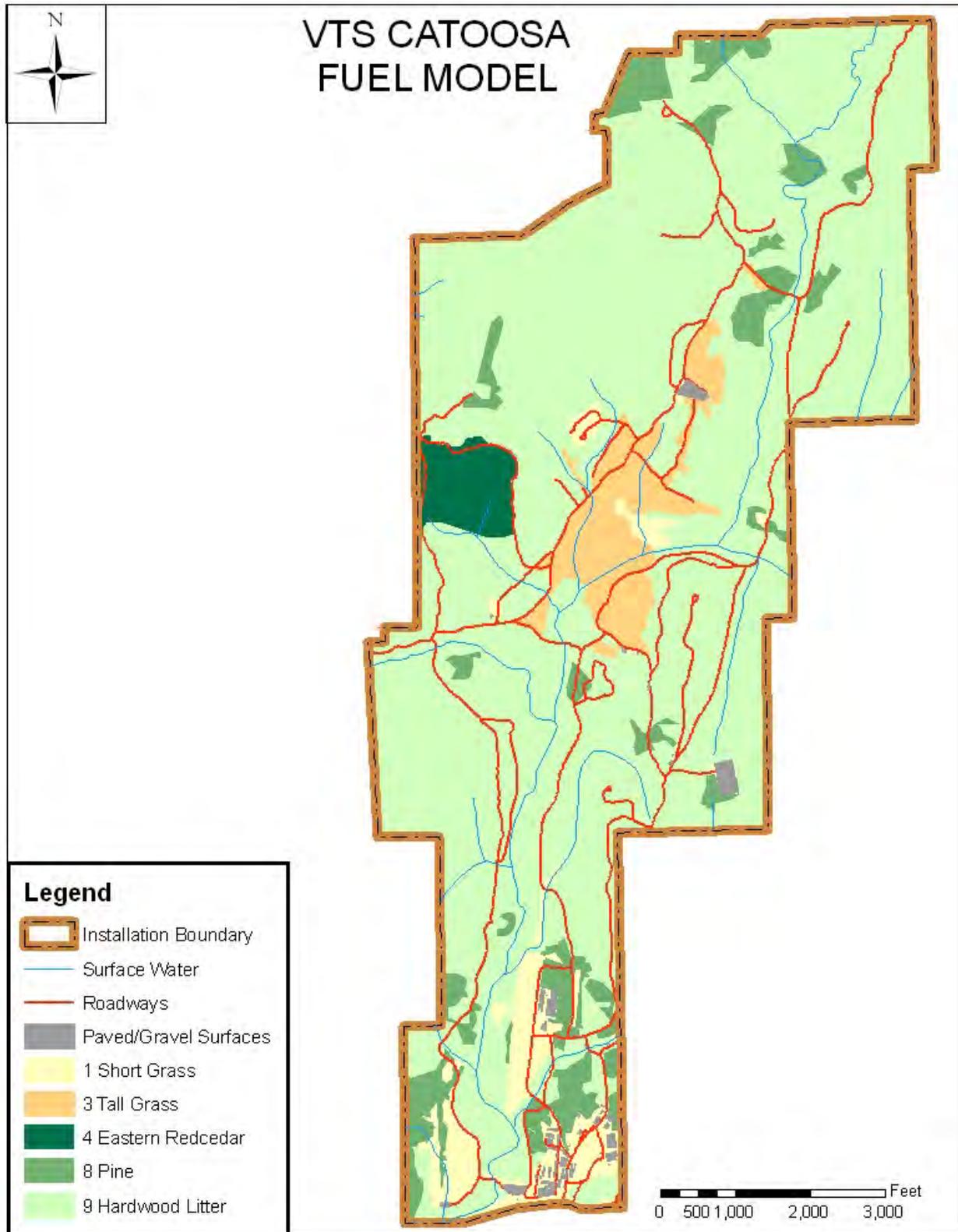
These fuels are seen on approximately 80 acres on VTS-Catoosa. Grasses are generally associated with weeds, ferns and other seasonal plants. During the growing season, they are green with high moisture content. They act as barriers to fire when green rather than as a carrier of fire. As the season advances, they cure and when fully mature, all but the roots will die and dry out. When dry, they have the fastest rate of spread of any fuel. The loading, however, is low and the fire will not be as intense. The intensity of these fires will be closely associated with the rate of spread. Slow moving fires in grass fuel will have very low intensity but high winds can change it to a very fast moving fire of moderate intensity. Moisture content closely follows daily weather changes. It is very sensitive to changes in relative humidity and wind.

- **Fuel Model 1** (1-foot deep) Fire spread is governed by the fine herbaceous fuels that have cured or are nearly cured. Fires are surface fires that move rapidly through cured grass and associated material. Very little shrub or timber is present, generally less than one-third of the area. Grasslands and savanna are represented along with stubble, grass-tundra, and grass-shrub combinations that meet the above area constraint. Annual and perennial grasses are included in this fuel model.  
=> Regularly mowed ranges and lawns on the VTS-Catoosa.
- **Fuel Model 3** (2.5 feet deep) Fires in this fuel are the most intense of the grass group and display high rates of spread under the influence of wind. The fire may be driven into the upper heights of the grass stand by the wind and cross over standing water. Stands are tall, averaging about 3 feet, but considerable variation may occur. Approximately one-third or more of the stand is considered dead or cured and maintains the fire.  
=> Range areas on the VTS-Catoosa that are maintained by occasional bush-hogging.

#### 4.5.2 Shrub Group

These fuels are not seen very frequently on VTS-Catoosa and only make up approximately 200 acres. Red cedar can be a very volatile fuel, especially during a drought or given a significant amount of grasses under and between trees. The volume of available fuel will continue to increase until the crowns begin to close, shading out the weeds and grasses. As this occurs, a smaller percentage of the total fuel loading becomes available to most fires due to the height of the crowns and less “ladder” fuel to carry the fire into them. The fuel available to most fires will generally be the understory fuels that are on the surface.

- **Fuel Model 4** (6 feet deep) Fire intensity and fast spreading fires involve the foliage and live and dead fine woody materials in the crowns of a nearly continuous secondary over-story. Besides flammable foliage, there is dead woody material in the stand that significantly contributes to the fire intensity. Heights of stands, qualifying for this model, vary with local conditions. There may be also a deep litter layer that confounds suppression efforts. Red cedar is considered in this group.  
=> One redcedar-dominated stand on the south slope of Sand Mountain.
- **Fuel Model 6** (2.5 feet deep) Fires carry through the shrub layer where the foliage is more flammable than Fuel Model 5, but require moderate winds (>8 mi/h) at mid-flame height. Fire will drop to the ground at low wind speeds or openings in the stand. Shrubs are older, but not as tall as shrub types of Model 4, nor do they contain as much fuel as Model 4. This model covers a broad range of shrub conditions. Typical examples include intermediate stands of chamise, chaparral, oak brush, low pocosins, Alaskan spruce taiga, and shrub tundra. Cured hardwood slash can be considered.  
=> No typical stands present; timber harvest slash could result in similar fire activity.



**Figure A3.2: Fuel types on the VTS-Catoosa.**

#### 4.5.3 Timber Litter Group

These fuels are the majority of what will be seen on-site. Approximately 1,300 acres of VTS-Catoosa is in the timber litter group, and the majority of that falls in fuel model 9. The fuel under most forest stands consists of light to moderate loading of fuel, most of which is compacted on the ground. Fuels of this type are found throughout the Piedmont and Upper Coastal Plain regions of the Southeast. In dense pine stands, the predominant fuel is the matted pine needles. In upland hardwoods, it is compacted hardwood leaves. The amount of brush will vary from almost non-existent to almost solid brush, especially if there is little over-story. This type fuel will generally consist of grasses, pine needles, deciduous shrubs, small saplings, pinecones, twigs and branches. Fires in this type fuel will generally be of low intensity and slow spreading. The surface fuel is compacted and dries out very slowly. Consequently, much of it will not be available. Shrubs and small saplings tend to be more readily available and will add to the intensity where they are present. Most fires will be of rather low intensity and easy to control except during droughts when a larger percent of the fuel will be available. Firefighters can be surprised when this happens if they are not alert because of the increased intensity and rapid spread of the fire.

- **Fuel Model 8** (0.2-foot deep) slow burning ground fires with low flame heights are generally the case, although an occasional “jackpot” or heavy fuel concentration may cause a flare up. Only under severe weather conditions do these fuels pose fire problems. Closed-canopy stands of short needle conifers or hardwoods that have leafed out support fire in the compact litter layer. This layer is mainly needles, leaves, and some twigs since little undergrowth is present in the stand.  
=> Pine-dominated stands scattered across the training site
- **Fuel Model 9** (0.2 foot deep) Fires run through the surface litter faster than model 8 and have higher flame height. Both long-needle conifer and hardwood stands, especially the oak-hickory types, are typical. Fall fires in hardwoods are representative, but high winds will actually cause higher rates of spread than predicted because of spotting caused by rolling blowing leaves. Closed stands of long-needled pine like ponderosa, Jeffrey, and red pines or southern pine plantations are grouped in this model. Concentrations of dead-down woody material will contribute to possible torching out of trees, spotting, and crowning activity.  
=> The hardwood forests that occur throughout the VTS-Catoosa.

## 5.0 WILDLAND FIRE CONTROL

Due to its small size, the VTS-Catoosa is not subdivided into fire management zones. Wildfire in all areas outside the Cantonment (where structural firefighters would almost always be needed) will be addressed similarly with the objectives of:

- preserving firefighter and other human safety
- protecting real property
- containing all fires within the training site boundaries
- protecting significant natural and cultural resources
- suppressing or using wildland fire in accordance with military and environmental needs

### 5.1 Suppression and Prevention

Qualified VTS-Catoosa firefighters respond to all wildland fires on the training site. At no time will the firefighting assets be used for fighting vehicle, fuel, or structure fires without approval from the Installation Commander or the Range Officer. The Catoosa County VFD’s will be contacted through 911.

Under normal circumstances, immediate suppression will be the goal of wildland fire response on VTS-Catoosa. Occasionally, an accidental fire within an open grassland area may be allowed to burn the entirety of a range or fire unit which is due for prescribed burning in that FY.

Wildfire prevention on the VTS-Catoosa encompasses the involvement of the following activities. First, all units will be briefed prior to the start of any exercises on what the fire potential for that day will be and any restrictions on use of pyrotechnics and/or tracers. All personnel will understand how fires are reported through range control and who will be responding that day. All firebreaks will be maintained in a functional manner. The use of prescribed burning will keep fuels loads down.

## **5.2 Detection**

All personnel using or working on VTS-Catoosa are responsible for detecting and reporting wildfires. All wildfires must be reported to Range Control.

## **5.3 Dispatch Procedures**

VTS-Catoosa Range Control is responsible for wildland firefighting activities on the training site. There is a verbal MOA in place with the Georgia Forestry Commission, which is located within miles of the training site. Catoosa County has six volunteer fire departments (VFD's) on-site. A unified command will be set up with the VFD's and any qualified VTS-Catoosa personnel.

## **5.4 Communications Plan**

All dispatch runs through range control; the following radio channels will be used.

- Channel 1-Repeater channel
- Channel 2- Car to Car channel (Tactical Channel)

There is cellular phone signal throughout most of VTS-Catoosa that can be used if radio traffic is heavy.

## **5.5 Extended Attack Procedures**

If a fire cannot be contained in the first operational period, the Georgia Forestry Commission will be requested to manage the incident.

## **5.6 Rehabilitation Needs and Procedures**

The Natural Resource Manager (NRM) for TNARNG should evaluate all burned locations and suggest any site rehabilitation measures that may be needed. Rehabilitation costs will be the responsibility of facility maintenance or ITAM budgets

## **5.7 Records, Reports, and Monitoring**

Firefighters call in a fire report to Range Control after every fire. These fire reports should include:

- Incident name
- Date and Time
- Incident Commander
- Location

- Size in Acres
- Fuel Type
- Brief description of the events
- Documented After-Action-Review:
  - What did we set out to do (what was planned)?
  - What actually happened?
  - Why did it happen that way?
  - What should be sustained? What can be improved?

The Range Control Officer will forward copies of these wildfire reports to the Natural Resource Manager for TNARNG who is responsible for maintaining fire records for all wildfires. The NRM will conduct a basic post-burn evaluation of the site to determine the need for rehabilitation and/or further monitoring of fire impact on natural resources.

## 6.0 PRESCRIBED FIRE MANAGEMENT

Prescribed fire can be used as a land management tool at VTS-Catoosa. However, because of the dominance of hardwood forests throughout much of the installation, prescribed fire should be used selectively and under a limited set of circumstances. The sensitivity of hardwoods to fire necessitates that the burner be experienced in conducting prescribed burns in hardwood forest communities. In view of the preponderance of hardwoods, the following overall burning guidelines were considered in developing the prescribed fire objectives and the recommended prescribed burn program for VTS-Catoosa.

- If burning is done in hardwood stands, the fire should be done 2-6 days after good rainfall and when relative humidity is 40 to 50%.
- Prescribed burns should be directed at reducing excessive fuel loads and should consume only the top layer of litter matter when burning under any type timber.
- Open fields should be burned clean to topsoil, but not so hot as to burn the grass roots.

### 6.1 Objectives

The following are the primary objectives for the prescribed burning program at VTS-C which are described in more detail below:

- Reduce fuel load and wildfire threat.
- Utilize prescribed fire, as appropriate, to create and maintain conditions as required by the military mission.
- Utilize prescribed fire, as appropriate, to aid in control of invasive plant species.
- Test the use of shelterwood harvest/burn method to regenerate mixed oak-pine forest.

6.1.1 Reduce fuel load and wildfire threat. Fire management activities should concentrate on preventing, managing, and controlling wildfires that originate on the installation, as well as fires that may encroach onto the installation from neighboring properties.

The upland hardwood forests should be burned on a 5- to 7-year interval to reduce fuel loads while minimizing damage to the timber. Burns should be conducted in mid-winter (December – February) under conditions that will produce the coolest fires possible. More frequent burning could damage or

stress the trees. Forests on VTS-Catoosa will be monitored for degradation due to burning, and the burn frequency will be adjusted as necessary to maintain a healthy forest ecosystem.

6.1.2 Create and maintain conditions required by the military mission. Some aspects of the military mission demand conditions other than the closed canopy, mixed hardwood forests native to the training site. Open areas and grasslands may be effectively managed by prescribed burning to control woody species encroachment and to rejuvenate herbaceous and graminoid species. Areas subject to higher fire danger (target sites, ranges) also require more thorough control of fuel loads to minimize wildfire threat.

- The southeast-facing slope of Sand Mountain functions as an impact area and has been routinely burned on a 2-3 year rotation to maintain a clear line-of-sight and to control fuel load in an area subject to training-sparked wildfire. The open nature of the woodland and shrubland of this area is conducive to dense understory growth, which demands on-going prescribed burning to control. Prescribed burns should be conducted every two years in late spring (April) immediately prior to green-up. That timeframe will provide the best opportunity to remove the accumulated vegetative material produced by the previous growing season, while minimizing the period of time the area would be without vegetative cover and thus exposed to erosive forces.
- Grassland areas constitute less than 5% of the total installation area, with the most significant areas occurring in portions of the Cantonment Area and Training Areas 1, 2, 3, 4, and 7. For the most part, the grassland areas are restricted to the firing ranges and are crucial to providing the required line-of-sight for effective military training. Although the open areas have historically been maintained by bushhogging, use of prescribed fire could minimize the frequency of bushhogging required, while promoting the growth of the grasses and other herbaceous plants and better controlling woody successional vegetation.

The application of prescribed fire will be tested in Training Areas 1, 3, and 4 to determine if its use is practical and efficient in contributing to meeting the training needs. These areas will be burned during March and/or April 2010 (before the spring green-up of grasses and woody plants) to remove the accumulated dead organic litter produced during the prior growing season and killed by the preceding winter. The test should evaluate the compatibility of the burns with military activities and also their influence on the timing and frequency of subsequent bushhogging events for the growing season following conduct of the controlled burn. Controlled burns will be conducted at 2-year intervals for at least two cycles and the effects evaluated thereafter.

- Prescribed fire will be applied in established openings within upland hardwood forests at 3-year intervals. The installation desires additional 2- to 4-acre openings for training within the upland forests of Training Area 4 and in the lower, level areas within Training Areas 9 and 10 to better satisfy the training mission needs for bivouac training, camouflage set-ups, and dismounted infantry tactics.

The use of fire alone will not create the openings. However, once the areas are mechanically cleared, fire will be applied to eliminate the slash materials produced by the initial clearing activities, and then periodically applied to prevent the encroachment of woody plants and vines and to maintain the openings in a desired condition. Prescribed fire will be applied on at 3-year intervals and will be performed during late spring. The openings will also be bushhogged periodically during the remainder of the growing season in order to maintain the areas.

6.1.3 Aid in the control of invasive species. Prescribed fire may be used in combination with mechanical and herbicidal methods to control two of the invasive species that are problematic on VTS-C: common privet and Japanese honeysuckle. Care will be taken to avoid the use of prescribed fire in those locations where fire could stimulate the spread of other invasive plant species.

6.1.4 Regenerate native mixed oak-pine forest through shelterwood harvest/burn methods. The results of recent research indicate that low intensity backing fire in mature hardwood stands would probably have little adverse affect on the existing timber and could be used in combination with established forestry management methods to favor regeneration of oaks and oak-pine mixtures over less desirable hardwood species that are particularly sensitive to the effects of fire. Under this approach, an initial shelterwood harvest is made to remove roughly half of the basal area of the overstory in a hardwood stand near the end of its rotation. Logging slash must be kept away from the bases of the residual oaks that are not harvested to minimize damage from fires.

The initial partial harvest is followed by a 3- to 5-year waiting period during which time undesirable species such as yellow-poplar will dominate the advance regeneration pool of young trees. At the end of the waiting period, a relatively hot growing-season prescribed fire is conducted that topkills the seedlings and frees the oaks to replace the fire-sensitive species that are killed. The 3- to 5-year waiting period provides the shelterwood overstory trees that remain from the initial harvest sufficient time to recover from the shock of the logging operations before they are shocked again by the burn. If compatible with mission needs, an experimental application of this method will be applied to an appropriate stand in training area 10.

## 6.2 Constraints

In addition to minimizing damage to the hardwood timber, prescribed fire on VTS-C must be conducted cautiously with concern for two other major limitations on burning on the training site:

6.2.1 Protection of the waterways. Tiger Creek is designated as a “Secondary Trout Water” because it is capable of supporting trout populations throughout the year. Accordingly, the Georgia Environmental Protection Division regulations require a buffer of 50 horizontal feet be provided on each bank of the stream between the stream bank and any ground disturbing activity. Although controlled burns typically would not be considered to represent a ground disturbing activity, it is recommended that all efforts possible be made to refrain from intentionally burning within 50 feet of the top of the stream bank for both Tiger Creek and Broom Branch so as to maintain the protective vegetative buffer flanking the streams. This 50 foot buffer is also a “no-plow zone” (Figure A3.1); firebreaks should be established further than 50 feet from the stream bank as needed.

6.2.2 Protection of sensitive species. All prescribed fire applications should be conducted with maximum sensitivity to the biological requirements and behavioral patterns of species of special concern that have the potential to occur on VTS-Catoosa.

One federally listed threatened plant species (large-flowered skullcap (*Scutellaria montana*)) occurs at numerous locations across VTS-Catoosa. The occurrences of this plant are identified as “management groups” and have been marked in the field and recorded on the installation GIS. The large-flowered skullcap areas are “no plow” zones, as indicated on Figure A3.1. Vehicles are not allowed within the management groups, and earth disturbance is prohibited. Large-flowered skullcap management groups will be protected from wildfire as possible using existing firebreaks, plowed breaks at least 50 feet outside of group boundaries, or control methods that do not disturb the soil.

The impact of fire on large-flowered skullcap is relatively unknown. It is possible that a “cool” prescribed fire applied early in the spring could assist in reducing competition from other herbaceous ground cover plants and exotic invasive plant species without damaging the protected plant. The TNARNG has proposed a study to investigate the susceptibility of large-flowered skullcap to light burning. Formal consultation with the U.S. Fish and Wildlife Service must be completed prior to any experimental burning of the skullcap. Until that time, all known large-flowered skullcap occurrences will be protected from prescribed fire by a temporary fireline constructed at least 50 feet outside of the posted boundaries of the management group. Training Area 2 will not be subjected to prescribed burning due to the abundance of large-flowered skullcap. Any research activities will impact only specific management groups (see Annex 1 of the INRMP); all other groups will continue to be protected from prescribed fire, as well as from wildfire.

The endangered species gray bat (*Myotis grisescens*) is the only federally listed animal species that has been observed on VTS-C. The gray bat has been captured feeding over Tiger Creek. At this time, no caves or other suitable hibernacula have been located on the training site. Foraging habitat for this species will be protected through the SMZ system – there will be no prescribed fire within 50 feet of either side of any perennial stream on VTS-C. If a roost site is ever found, the immediate area and a sufficient buffer surrounding it will be removed from the burn program.

### **6.3 Smoke Management and Air Quality**

The U.S. Environmental Protection Agency (EPA) monitors specific air quality parameters to determine if a particular area is in attainment with the National Ambient Air Quality Standards (NAAQS). The parameters of interest are ozone, particulate matter, carbon monoxide, sulfur dioxide, nitrogen oxides, and lead. Smoke produced by wildfires contains a number of these pollutants.

Catoosa County experiences air quality problems because of its proximity to Chattanooga, Tennessee. The EPA has designated the region surrounding Chattanooga, including Catoosa County, as a non-attainment area for ground-level ozone and particulate matter. At the time this Plan was prepared, Catoosa County failed to meet the 8-hour ozone standard which requires that the three-year average of the annual fourth-highest daily maximum 8-hour ozone concentration in an area must be less than or equal to 84 ppb. Catoosa County also failed to meet the fine particulate matter standard of 2.5 microns (PM<sub>2.5</sub>). EPA has adopted two PM<sub>2.5</sub> standards, known as the 24-hour and annual standards. The 24-hour standard is met in an area when, as averaged over a consecutive three-year period, at least 98 percent of the of the 24-hour average PM<sub>2.5</sub> concentrations per year at each monitor are less than or equal to 65 micrograms per cubic meter of air. The annual standard is met in an area when, averaged over a consecutive three-year period, the annual PM<sub>2.5</sub> average concentration is less than or equal to 15 micrograms per cubic meter of air. Fuels, paints, solvents, vegetation, and industrial combustion processes contribute to elevated ozone concentrations. Fine particulate matter (PM<sub>2.5</sub>) is emitted from vehicle engine combustion and burning of various materials, including prescribed burns and wildfires.

The Georgia Environmental Protection Division (EPD) is responsible for protecting Georgia’s air quality. The EPD has developed regulations governing open burning and has issued an annual ban on open burning between May 1 and September 30. This timeframe corresponds to the traditional annual smog season in Georgia. Citizens and businesses are not allowed to burn yard and land-clearing debris during the burn ban season. Although prescribed burns are considered a type of open burning, EPD regulations exempt prescribed burning of forestlands from the EPD permitting requirements and from the burn ban. The EPD places no special requirements on the conduct of prescribed burns, other than directing burners to obtain Burn Permits from the Georgia Forestry Commission and complying with applicable local burn regulations and ordinances. Despite the open burning ban from May through September, prescribed

burning is allowed during that period provided the Georgia Forestry Commission determines that conditions are not conducive to the formation of ozone.

Although the conduct of prescribed burns are not regulated by the EPD, to avoid potential air quality compliance problems, the area to be burned should be visually inspected prior to the burn to assure that no items that are prohibited from open burning have been abandoned within the site (i.e., tires, oils, paints, vinyl siding, treated woods, etc.). Should such materials be present, they should be removed prior to burning. Further, in light of the air quality problems affecting Catoosa County, current air quality conditions near the training site will be taken into consideration when planning a prescribed burn. Information on air quality, the status of burn bans, and the existence of any other emergency measures that may be in effect to protect air quality can be obtained from the Georgia EPD by calling 404/675-6210 or at <http://www.air.dnr.state.ga.us/airpermit/openburning>. If any special air quality protection measures are in effect, the prescribed burn will be postponed until conditions improve.

Atmospheric conditions should be favorable for smoke to rise into the upper air and away from smoke-sensitive areas such as highways, airports, and urban areas. There are several smoke-sensitive areas at VTS-Catoosa that will warrant consideration during the conduct of every prescribed burn:

- Roads – Highway 2 parallels the southern boundary of VTS-Catoosa. Crossing Tiger Creek, this road passes through the floor of the lower valley within which the installation is located. To the east and west of the installation are County Roads 1286 and 224 (Salem Valley Road), respectively. Both of these roads are located on the floor of their respective valleys and downslope from the boundary of VTS-Catoosa. To the north, Rifle Range Road parallels a portion of the installation's northern boundary. These roads could be affected if atmospheric conditions, particularly in the evening following a burn, resulted in the smoke settling to the lowest elevations of their valleys. Local law enforcement personnel should be informed of an impending prescribed burn so a determination can be made as to whether an officer(s) should be assigned to the area to aid in directing traffic movement should smoke impede visibility on the roads. Consideration should also be given to placing temporary signage during prescribed burns to inform motorists of potential smoke hazard issues.
- Tiger Creek Elementary School is located less than a mile west of the training site on Highway 2.
- Scattered along the roads surrounding the VTS-Catoosa are a number of rural residences. The heaviest Wildland Urban Interface is on the west-northwest and north sides of the training site. All burn activities should consider the potential effects of smoke dispersion on the residents located within these areas.

#### **6.4 Use of Fire Breaks**

Fire breaks can consist of established roads, logging trails, cleared lanes used for the sole purpose of controlled burns, utility rights-of-way, and watercourses. Ideally, fire breaks should be capable of supporting groundcover to guard against erosion when not being used to contain fires. Prior to the conduct of a prescribed burn, the fire breaks should be inspected to ensure that they are in the proper condition to contain the fire. Following the burn, the fire breaks should be inspected again to determine if any remedial measures are needed to prevent erosion and other problems from developing.

To ensure that fire breaks are available when needed, a regular maintenance program must be pursued to maintain the fire breaks in a cleared and open condition, with a minimum of undergrowth and low hanging limbs. The best maintenance scenario exists when the fire breaks serve dual or multiple purposes

(i.e., roads, utility rights-of-way, etc.). In such situations, it is possible to distribute maintenance costs to other installation activities instead of having to assign the total costs to the prescribed fire program.

The existing road system provides the basis of the fire break network on the VTS-Catoosa. A perimeter fire break should be developed in conjunction with the security line-of-sight clearing along the boundary fence, as funds are available. Additional fire breaks will be developed to subdivide large areas (e.g., Sand Mountain in training areas 6 and 7); where possible, these fire breaks will function as and be maintained as tank trails. Temporary fire breaks will be cut, as needed, prior to prescribed burns or during wildfire control, in accordance with the no-plow zones (Figure A3.1). These fire breaks will be reclaimed and revegetated as soon as possible following the fire.

## 6.5 Training and Crew Requirements

Prescribed fire personnel will follow the training set forth in the PMS-310-1 (<http://www.nwcg.gov/pms/docs/docs.htm>). The following positions should be filled during operations:

- Prescribed Fire Crew Members (VTS-Catoosa personnel with FFT2 training)
- Prescribed Fire Burn Boss (1, 2, or 3) depending on complexity (GFC Forester)

## 6.6 Burn Plans

A site specific burn plan is developed for each prescribed burn on the VTS-Catoosa, containing the elements listed below. The prescribed burn plan format for the TNARNG is located in Section 7.3.

- Burn Objectives
- Acceptable weather and fuel moisture parameters – Spot and General Forecast
- Required personnel and equipment resources
- Burn area map
- Smoke management plan
- Safety considerations
- Pre-burn authorization/notification checklist
- Coordination procedures
- Contingency Plan
- Evaluation and Monitoring plan

## 6.7 Notification

Agencies and individuals who may play a role in the prescribed burn or may be affected by the burn will be notified prior to the ignition of a prescribed fire.

- The Georgia Forestry Commission, Catoosa County office, will be contacted well in advance to arrange the assistance of a forester to function as a burn boss. In addition, a burn permit will be requested from the GFC county office: 706-935-3162.
- The Catoosa County Volunteer Fire Department will be contacted at 706-935-2001 or [fire\\_fight1070@hotmail.com](mailto:fire_fight1070@hotmail.com)
- Local law enforcement agencies will be notified so that they can plan for smoke-induced traffic duties, as needed.
  - Catoosa County Sheriff Department      706-935-2323
  - Ringgold Police Department            706-935-3061
  - Georgia State Patrol                      706-271-2825

- Temporary signs may be placed along Highway 2 to inform motorists of potential visibility hazards from smoke resulting from the burn.
- A news release may be utilized to inform the public if the planned burn is extensive or located close to the property line.

### **6.8 Contingencies for an Escaped Burn**

Prior to any prescribed burn, a small test fire will be ignited to confirm that the fire will behave in the desired manner. However, if after conducting a successful test fire and igniting the main burn any of the following conditions develop, burning will be stopped and the fire will be plowed under:

- Fire behavior is erratic
- Fire is difficult to control
- Wind shifts or other unforeseen weather conditions develop
- Weather conditions move outside the prescription range
- Smoke is not dispersing as predicted
- Public road or other sensitive area becomes smoked-in
- Burn does not comply with all laws, regulations, and standards
- Large fuels are igniting and burning
- There are not enough personnel to mop-up before dark and the likelihood exists that smoke will settle in a smoke-sensitive area overnight

Under any of these conditions, Range Control will be notified that contingency actions are being taken. If the contingency actions are successful at bringing the project back within the scope of the Prescribed Fire Plan, the project may continue. If contingency actions are not successful by the end of the next burning period, then the prescribed fire will be converted to a wildfire, and TNARNG will request assistance from the Georgia Forestry Commission.

### **6.9 Monitoring**

Three types of post fire monitoring should be conducted to determine if fire management activities are reaching the stated objectives: post operational report, post fire effects monitoring, and burn program objective monitoring.

6.9.1 Post operational reports are an important written record of the burn, enabling future staff to learn from previous activities. They will be completed during and immediately following a prescribed fire activity to address the effectiveness of the overall burn process – the plan, implementation, personnel, and effectiveness at meeting objectives. The post-operational report will include:

- Burn unit information
- Burn dates
- Forecasted weather conditions
- On-site burn day weather conditions
- Crew assignments
- Burn schedule
- Fire narrative
- Immediate post burn effects
- Comparison of post burn effects with unit fire management objective
- Notes and recommendations.

Within this report, several questions should be answered:

- Were the fuel conditions within plan guidelines and were guidelines appropriate?
- Did the burn stay within planned parameters?
- Were the fire lines installed as planned and were they adequate?
- Was the equipment in the plan available and appropriate?
- Did the equipment work?
- Was the crew number, training, and assignments appropriate?
- Did the crew understand what they were doing?
- Were the rate of spread and flame length as predicted in the plan?
- Were public interactions satisfactory?

To answer some of these questions, during the burn, a designated crewmember should be assigned to estimate behavior, establish benchmarks (height and distance), record rate of spread for back, flank, and head fires, record flame heights for back, flank, and head fires stratify for fuel type and topography. Post fire estimates of fire intensity (scorch height and class, char, understory burn severity, and litter consumption), should be recorded after each burn to determine if unit-specific fire management objectives were met. Permanent transects with photo points may be established to monitor and measure tree densities and plant composition. Observations of rare species reaction to fire management will be noted.

6.9.2 Fire effects monitoring will be conducted via a post-burn evaluation of the physical effects of the fire. This monitoring should include data collected during and immediately following the fire, as well as during the first growing season following the fire. Parameters to be evaluated will include tree mortality, midstory kill, pine bark beetle or other pest infestation, erosion problems, and whether overall burn objectives were met. These evaluations are completed and filed with the burn plan.

6.9.3 Burn program objective monitoring will be conducted over a longer time scale in conjunction with the review of INRMP objectives and achievements.

## 6.10 Prescriptions

The prescriptions below describe the preferred environmental conditions for a burn. Some deviation from these prescriptions in response to specific objectives will be possible on the recommendation of an experienced burn boss, such as the GFC District Forester. The general prescription for prescribed burning in the open grassland areas of VTS-Catoosa is presented in Table A3.3, and the prescription for burning the hardwood forest habitat of the training site is presented in Table A3.4.

**Table A3.3. Prescription for controlled burns in grasslands, fields, and forest openings.**

Stand Description:	Overstory	None to scattered trees
	Understory	Grasses and low shrubs
	Fuels	1, 3, 6
	Topography	Gentle rolling hills to flat
Weather Range	Surface wind (dir/speed)	North, West, South at 5 – 8 mph
	Transport wind (dir/speed)	Greater than 5 mph
	Mixing height	Greater than 500 m
	Stagnation index	0 – 3 daytime
	Relative humidity	35 – 55 %
	Temperature	High 70°F
		Low 30°F
	Start time	9:30 am (or as soon as permit allows)

**Table A3.4. Prescription for controlled burns in upland hardwoods.**

Stand Description:	Overstory	Closed canopy mature hardwood stands
	Understory	Open, small areas of brush
	Fuels	8, 9
	Topography	Gentle rolling hills
Weather Range	Surface wind (dir/speed)	North, West, South at 5 – 10 mph
	Transport wind (dir/speed)	Greater than 5 mph
	Mixing height	Greater than 500 m
	Stagnation index	0 – 3 daytime
	Relative humidity	40 – 55 %
	Temperature	High 70°F
		Low 30°F
	Start time	9:30 am (or as soon as permit allows)

### 6.11 Schedule

The planned prescribed fire management actions for VTS-Catoosa are presented in Table A3.5. Recommended fire frequency is depicted for all burn units in Figure A3.3. The prescribed fire management measures and their recommended frequency of occurrence are based on the objectives identified in Section 6.1 and correlate to the forest management prescriptions described in the forest management plan (Annex 2 of the INRMP).

The open grasslands of the small weapons ranges and the tank range will be subject to a 2 year fire rotation. Forest stands that are dominated by pine species will be burned on a 3 year rotation, while hardwood stands will only be burned approximately every 6 years. Table A3.6 is subject to minor changes because certain stands will not be burned until a thinning harvest can be completed. Areas with a substantial large-flowered skullcap presence (e.g., most of training area 2) will not be subject to prescribed fire at this time. Select skullcap management groups will be subject to light burning for the purposes of investigating fire impact on this protected species in accordance with the research project discussed in Annex 1 of the INRMP, subject to USFWS approval.

### 6.12 Test application of shelterwood-burn method to regenerate mixed oak-pine forest

Over 90% of the forest occurring on VTS-Catoosa is classified as hardwood forest. Traditionally, fire has not been used as a management tool in hardwood stands due to the perceived danger to timber quality and value. Recent research, however, has indicated that frequent burning may create an environment in which oaks can have a competitive advantage over other hardwood species. The shelterwood-burn method described by Van Lear et al. (2000) will be applied to a hardwood stand in training area 10 to test whether this technique will encourage greater oak regeneration in place of the dominant yellow poplar. A small stand will be subject to a shelterwood harvest, followed by a prescribed burn, in accordance with the forestland burn prescription, 3-5 years after the timber is cut. When the exact location and timing of this project is determined, Table A3.5 and Figure A3.3 will be modified to include the proposed burn. For more information, see the Forest Management Plan in Annex 2 of the INRMP.

**Table A3.5: Burn schedule.**

Year	Burn Units						Total Acreage
	2 yr rotation		3 yr rotation		6 yr rotation		
2012	KD Rge (C-3) 4-1	19 37	3-2	41			97
2013	M203 Rge(1-2) 3-8 4-7 7-1	18 26 21 4	7-3 ^*	105			174
2014	KD Range 4-1	19 37	3-3 3-10	21 31	6-2	63	171
2015	M203 range 3-8 4-7 7-1	18 26 21 4	3-2	41	8-1 ^	24	134
2016	KD Range 4-1	19 37	5-2 ^ 7-3 ^*	43 105	6-3 * 7-5 ^*	26 26	256
2017	M203 range 3-8 4-7 7-1	18 26 21 4	3-3 3-10	21 31	5-1 *	83	204
2018	KD Range 4-1	19 37	C-6 3-1 3-2	2 7 41	5-3 * 6-1 * 7-4 ^	18 38 14	176
2019	M203 range 3-8 4-7 7-1	18 26 21 4	5-2 ^ 7-3 ^*	43 105	C-2 ^	21	238
2020	KD Range 4-1	19 37	3-3 3-10	21 31	6-2	63	171
2021	M203 range 3-8 4-7 7-1	18 26 21 4	C-6 3-1 3-2 3-6	2 4 41 51	4-2 8-1 ^	61 24	252
2022	KD Range 4-1	19 37	3-4 3-7 5-2 ^ 7-3 ^*	24 32 43 105	4-4 ^ 4-5	16 11	287

\* Significant large-flowered skullcap management group will be protected from fire.

^ Small large-flowered skullcap management group will be subjected to fire for purposes of research.

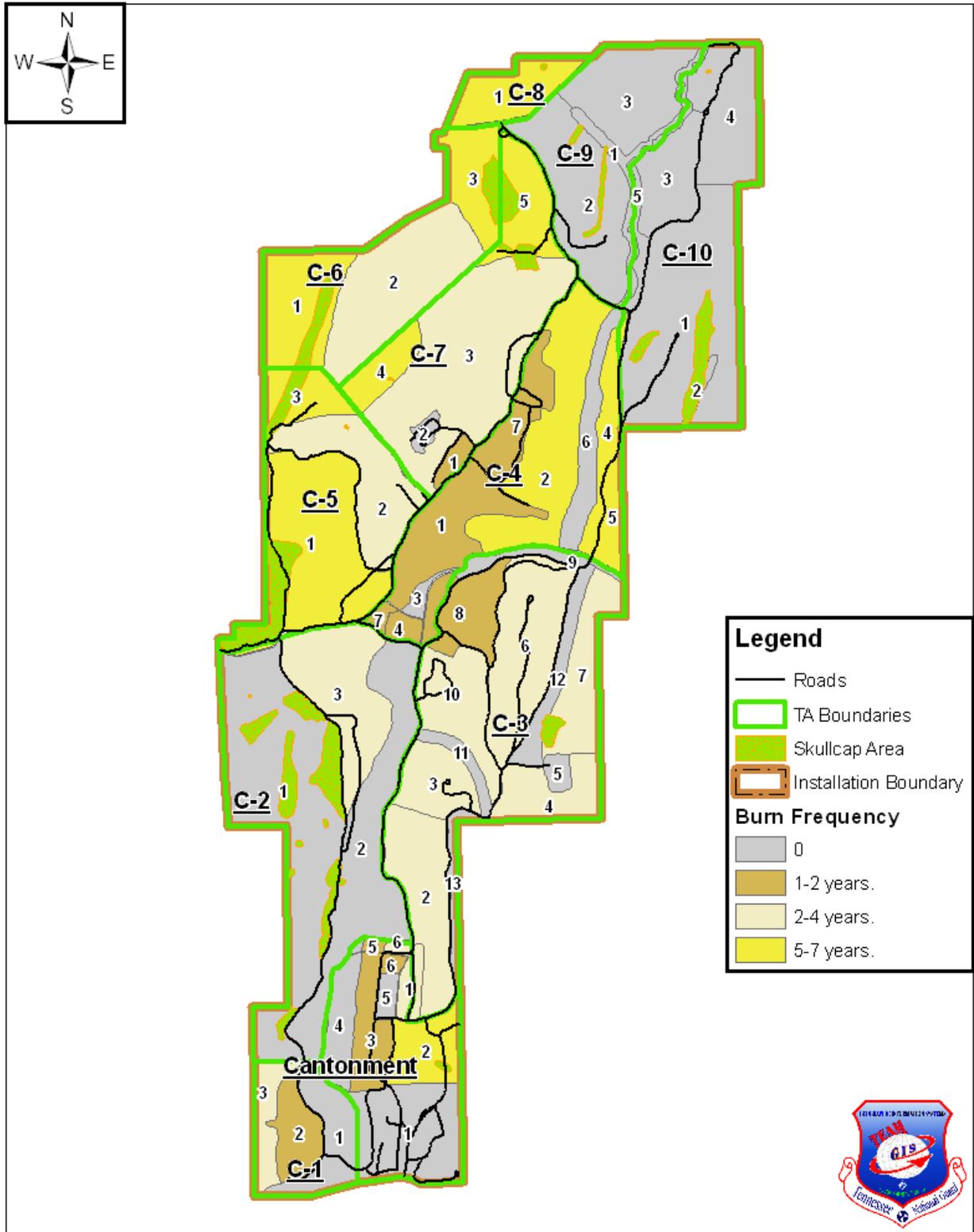


Figure A3.3: Prescribed burn frequency for burn units on VTS-Catoosa.

## 7.0 ATTACHMENTS

### 7.1 Reference Materials

#### Department of Army

Memorandum 4 Sep 2002, Army Wildland Fire Policy Guidance.  
2 Sep 2005, Sustainable Range/Installation Environmental Activities Matrix.

#### Interagency Prescribed Fire – Planning and Implementation Procedures Guide (July 2008)

Available at [http://www.nifc.gov/fire\\_policy/rx/rxfireguide.pdf](http://www.nifc.gov/fire_policy/rx/rxfireguide.pdf)

#### NFPA 1977: Standard on Protective Clothing and Equipment for Wildland Fire Fighting (2005 edition)

#### NWCG Publications – available at <http://www.nwcg.gov/pms/pms.htm>

PMS 307, Work Capacity Test Administrator's Guide (March 2003)  
PMS 310-1, Wildland Fire Qualification System Guide (January 2006)  
PMS 410-1, Fireline Handbook (March 2004)  
PMS 410-1, Appendix B, Fire Behavior (April 2006)  
PMS 424, Prescribed Fire Complexity Rating System Guide (January 2004)  
PM 461, Incident Response Pocket Guide (January 2006)

Schmidt, K.M., J.P. Menakis, C.C. Hardy, W.J. Hann, and D.L. Bunnell. 2002. Development of coarse-scale spatial data for wildland fire and fuel management. Gen. Tech. Rep. RMRS-GTR-87. USDA Forest Service, Rocky Mountain Research Station.

Thompson Engineering, Forest Management Group, and Aerostar Environmental Services. 2006. Volunteer Training Site – Catoosa Forest Management Plan. Prepared for the TNARNG.

TRC Garrow and Science Applications International Corporation. 2002. Integrated Cultural Resources Management Plan and Environmental Assessment of the Implementation of the Plan, Catoosa Training Center, TNARNG, 2002-2006. Prepared for the TNARNG.

Van Lear, D.H., P.H. Brose, and P.D. Keyser. 2000. Using prescribed fire to regenerate oaks. In: Workshop Proceedings of Fire, People, and the Central Hardwoods Landscape.

#### Weather Information

Spot Weather Forecast, <http://spot.nws.noaa.gov/cgi-bin/spot/spotmon?site=ffc>  
General Forecast, <http://www.srh.noaa.gov/ffc/html/firewx.shtml>  
Georgia Fire Weather, <http://weather.gfc.state.ga.us>

**7.2 Burn Plan Format**

**TNARNG PRESCRIBED FIRE PLAN**

Facility: \_\_\_\_\_

Training Area: \_\_\_\_\_ Burn Unit Number/Name: \_\_\_\_\_

Fuel Type: \_\_\_\_\_ Acres: \_\_\_\_\_

Burn Permit #: \_\_\_\_\_

Fire Planner(s):

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Burn Boss:

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Complexity Rating: \_\_\_\_\_ (Low, Moderate, High)

Approved By:

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**A. Pre-Burn Go/No Go Checklist**

	<b>YES</b>	<b>NO</b>
Has the area (inside and outside the unit) experience unusual drought conditions or does it contain above-normal fuel loadings which were not considered in the prescription development? If YES, go to question below. If NO, continue with Section B.		
If YES, have appropriate changes been made to plans for ignition, holding, mop-up, and patrol? If YES, continue with Section B. If NO, <b>stop</b> and consult Fire Manager.		

**B. Prior to Crew Briefing:**

- Fire Unit is as described in plan
- Copy of burn plan is on site
- Certified Burn Boss present; Permit obtained (# \_\_\_\_\_)
- Required number personnel present, with required PPE
- Weather forecast obtained & within prescription; Long-range forecast checked for chance of severe weather
- Official & neighbor notifications complete
- Required equipment for holding, weather monitoring, ignition, & suppression is on-site & functioning
- Crew has reviewed equipment
- Planned ignition & containment methods are appropriate for current & predicted conditions
- Planned contingencies & mop-ups are appropriate for current & predicted conditions
- List of emergency phone numbers are in each vehicle
- Off-site contingency resources are operational and available

**C. Crew Briefing:**

- Prescribed Fire Objectives
- Burn Unit size & boundaries
- Burn unit hazards & safety issues
- Expected weather & fire behavior
- Organization of crew & assignments
- Methods of ignition, holding, mop-up, communications
- Contact with the public; Traffic concerns
- Safety & medical plan
- Location of back-up equipment, supplies, & water
- Contingencies for escaped prescribed fire
- Contingencies for medical emergency

**D. Prior to Ignition:**

- On-site weather and fuel conditions are within prescription & consistent with forecast
- Test burn conducted; fire & smoke behavior within prescribed parameters.

**Burn Boss:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**1. Burn Objectives**

---



---

**2. Location and Physical Description (Attach map)**

**A. Site** \_\_\_\_\_ **Training Area** \_\_\_\_\_

**B. Size** \_\_\_\_\_

**C. Topography / Slope** \_\_\_\_\_

**D. Project Boundary** \_\_\_\_\_

**E. Complexity** \_\_\_\_\_

**3. Vegetation / Fuels Description**

**A. On-site Fuels**

Vegetation Types	Fuel Models	% of Unit Area	% Slope	Aspect

**B. Adjacent Fuels**

Vegetation Types	Fuel Models	% of Unit Area	% Slope	Aspect

**4. Description of Unique Features**

**A. Natural:** \_\_\_\_\_

**B. Cultural:** \_\_\_\_\_

**5. Special considerations (fences, power poles, ...):**

---



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**6. Prescription**

**A. Environmental Prescription:** \_\_\_\_\_

\_\_\_\_\_

**B. Fire Behavior Prescription:** \_\_\_\_\_

\_\_\_\_\_

**7. Fuel and Weather Prescription (acceptable ranges)**

<b>Fuel Parameters</b>	<b>Prescription MIN/MAX</b>	<b>Forecast* MIN/MAX</b>	<b>Test Fire</b>	<b>Rx Burn</b>
1-Hour Fuel Moisture (%)				
10-Hour Fuel Moisture (%)				
100-Hour Fuel Moisture (%)				
Live Fuel Moisture (%)				
Other (e.g., KBDI, live/dead ratio,...)				
<b>Weather Parameters</b>				
Air Temperature (°F)				
Relative Humidity (%)				
Days Since Rain				
20 ft Wind Speed (mph)				
Wind Direction(s)				
Midflame Windspeed (mph)				
Atmospheric Mixing Height (ft)				
Atmospheric Stability				
Rate of Spread				
Flame Length (ft)				
Scorch Height (ft)				
Probability of Ignition				

\*Attach weather forecast.

**8. Scheduling**

**A. Ignition Timeframe / Season(s):** \_\_\_\_\_

**B. Projected Duration:** \_\_\_\_\_

**C. Constraints:** \_\_\_\_\_

**9. Pre-burn Considerations and Weather**

**A. On-site Considerations:** \_\_\_\_\_

\_\_\_\_\_

**B. Off-site Considerations:** \_\_\_\_\_

**C. Method & Frequency for Obtaining Weather and Smoke Management Information:**

\_\_\_\_\_

\_\_\_\_\_

**D. Notifications (List all agencies and neighbors):**

Name	Date	Method	Contact Information
Public		Press Release	
Public		Road Signs	
Georgia Forestry Commission		Telephone	706-935-3162
Catoosa County VFD		Telephone	706-935-2001
Catoosa County Sheriff		Telephone	706-935-2323
Ringgold Police Department		Telephone	706-271-2825
Georgia State Patrol		Telephone	706-271-2825

**10. Ignition Plan**

**A. Firing Methods** (including Techniques, Sequences, and Patterns): \_\_\_\_\_

\_\_\_\_\_

**B. Devices:** \_\_\_\_\_

**C. Ignition Staffing:** \_\_\_\_\_

\_\_\_\_\_

**11. Holding Plan**

**A. General Procedures:** \_\_\_\_\_

\_\_\_\_\_

**B. Critical Holding Points:** \_\_\_\_\_

\_\_\_\_\_

**C. Minimum Organization or Capabilities Needed:** \_\_\_\_\_

\_\_\_\_\_

**12. Contingency Plan**

**A. Trigger Points:** \_\_\_\_\_

\_\_\_\_\_

**B. Actions Needed:** \_\_\_\_\_

\_\_\_\_\_

**C. Additional Resources and Maximum Response Time:** \_\_\_\_\_

**D. Secondary Control Lines:** \_\_\_\_\_

**E. Backup Water Supply:** \_\_\_\_\_

**13. Crew Organization**

- **Burn Boss:**
- **Ignition Boss:**
  - **Ignition:**
  - **Ignition:**
- **Holding Boss:**
  - **Holding:**
  - **Holding:**
  - **Holding:**
- **Monitor:**

**14. Equipment**

Equipment Item	Quantity	Source

**15. Fire Details**

**Ignition Time** \_\_\_\_\_ **Fire Declared Out** \_\_\_\_\_

**Narrative** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**7.3 Post Burn Evaluation**

**1. Site** \_\_\_\_\_ **Training Area** \_\_\_\_\_

**Burn Date** \_\_\_\_\_

**Evaluation Date** \_\_\_\_\_ (immediately following burn)

**Re-evaluation Date** \_\_\_\_\_ (follow-up as needed)

**2. Amount litter left** (immediately after burn) \_\_\_\_\_ **(inches)**

**3. Understory vegetation consumed** \_\_\_\_\_ **(%)**

**4. Scorch: % of Area with Crown Scorch**

**<1/3** \_\_\_\_\_ **1/3 – 2/3** \_\_\_\_\_ **2/3+** \_\_\_\_\_

**5. Any spotting / jumpovers?** (immediately after burn)

---

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**6. Tree Damage (insects, disease, mortality)?** \_\_\_\_\_

---

**7. Understory kill of undesired vegetation (% top-killed)** \_\_\_\_\_

**8. Any smoke management violations?** (immediately after burn)

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**9. Any escapes?** (immediately after burn)

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**10. Any complaints? (immediately after burn)**

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**11. Adverse effects?**

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**12. Any restoration needed?**

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**13. Were objectives met (results)?**

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**Immediate Evaluation By:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Recommendations for future evaluation:**

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**Follow-up Evaluation By:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**7.4 After-Action Review**

**What did we set out to do?** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**What actually happened?** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Why did it happen?** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**What are we going to do next time?** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Which activities should be sustained?** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**What can be improved?** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## **Annex 4**

### **INVASIVE PEST PLANT CONTROL**



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## 1.0 INTRODUCTION

### 1.1 Background

Like most regions of the world today, the VTS-C suffers from infestations of invasive exotic pest plants. The primary problem species on the training site are privet, Japanese honeysuckle, multiflora rose, wintercreeper, princess tree, Nepalese browntop, sericea lespedeza, mimosa, and tree-of-heaven. These problem species are found throughout the training site, but the most significant problems generally occur along the banks of Tiger Creek and its tributaries. Figure A4.1 shows locations of small invasive occurrences; the extensive presence of privet along the creek banks is not depicted. The infestation information included here is based on the 2006 invasive plant species survey by Dynamic Solutions.

This annex provides more detailed information on each of these problem species, including recommended methods of control. It also outlines the plan of attack for controlling these species on the training site, to be implemented as funding allows. It is important to note that complete eradication of widespread invasive plant species is nearly impossible and is cost-prohibitive. Small, confined occurrences may be completely eliminated by prompt, decisive action; however, with well-established populations (e.g., the privet on VTS-C) the only feasible goal is to contain and thin the infestation and hopefully prevent it from spreading further. Both eradication and control will take multiple years of repeated treatment to achieve.

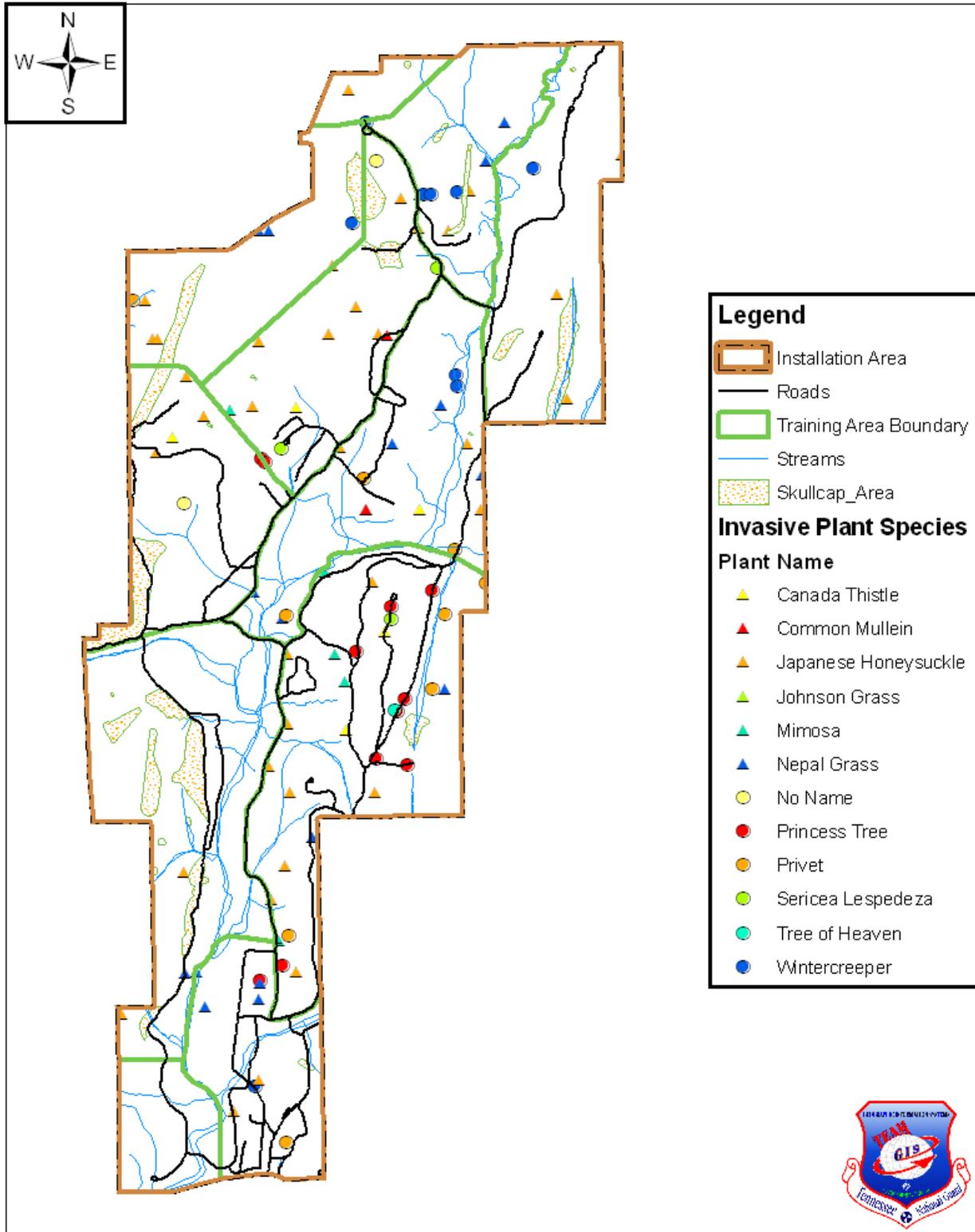


Figure A4.1: Invasive exotic plant occurrences on VTS-Catoosa (small groups and individual plants). From Dynamic Solutions (2006).

The control plan on VTS-C will be a two-tiered approach: first, small occurrences (tree-of-heaven, mimosa, princess tree, wintercreeper, woolly mullein) will be identified and treated on a training area-by-training area basis, and second, the larger infestations (privet, honeysuckle, Nepalese browntop) will be treated on a species basis in manageable sections. The spatial occurrence of the invasive species is described in more detail below. Control methods will typically be a combination of mechanical (cutting, mowing) and chemical (herbicide) and will follow US Forest Service and TN Exotic Pest Plant Council (TN-EPPC) control recommendations (Miller 2003; TN-EPPC 1997).

The presence of the federally listed large-flowered skullcap (*Scutellaria montana*) requires extra caution with the use of herbicides. The 26 management groups in which it occurs are located throughout the training site, though typically not in the areas of heaviest non-native infestation. Care must be taken at all times to ensure this protected species is not harmed by the process of invasive pest plant control. Restrictions on the use of chemicals around the large-flowered skullcap groups are detailed in Section 2.3.

## 1.2 Objectives

The objective of this plan is to provide effective control of invasive exotic pest plants on the VTS-C, limiting the areas infected by exotics and allowing the native vegetation communities to reestablish themselves.

Important guidelines for the control program:

- The large-flowered skullcap should not be stressed or damaged during any phase of these control efforts;
- Eradication and suppression efforts will be coordinated and scheduled to avoid interference with training events;
- There should be no detrimental environmental impact resulting from this control effort.

## 1.3 Species Targeted for Suppression

Invasive plant species are successful invaders because they generally grow rapidly, create large amounts of seed, and are thus positioned ecologically to exploit the greater amount of light found on the edges of man-made and natural openings as well as all disturbed areas. The roads and openings of the forested and woodland portion of the VTS-C have provided many places for invasive plant species to seed into and dominate.

The Georgia Exotic Pest Plant Council (GA-EPPC) has developed a List of Non-native Invasive Plants in Georgia (GA-EPPC 2006). This list categorizes plants that pose threats to natural areas in Georgia, but does not include plants that are only problems in agricultural or pastoral systems. The list groups exotic species as:

- Category 1: exotic plants that are a serious problem in Georgia natural areas because they are extensively invading native plant communities and displacing native species;
- Category 1 Alert: exotic plants that are not yet a serious problem but have significant potential to become such;
- Category 2: exotic plants that are a moderate problem through invading native plant communities and displacing native species to a lesser degree than category 1 species;
- Category 3: exotic plants that are a minor problem in Georgia or are not yet known to be a problem in Georgia but are a problem in adjacent states; or
- Category 4: exotic plants that are naturalized in Georgia and generally do not pose a problem in natural areas; also, species that are potentially invasive but in need of further information to make a determination.

The classification of each invasive plant species observed at VTS-C is noted in the list below. The Tennessee Exotic Pest Plant Council (TN-EPPC) has also developed a list of invasive plants and ranked them according to the threat that they pose. The TN-EPPC ranking is included in the table below for consistency with other TNARNG training sites. TN-EPPC recommends that Rank 1 and Rank 2 species be controlled and managed in the early stages of detection when possible.

Table A4.1 is a summary of the invasive species observed at the VTS-C site during the 2006 invasive species survey. It is organized alphabetically by species observed. Abundance of the invasive species in the aggregation was coded Dominant, greater than 50%, Present, 10 to 50 %, and Sparse, less than 10%.

**Table A4.1: Invasive exotic plant species observed on VTS-Catoosa (from Dynamic Solutions 2006).**

Scientific Name	Common Name	GA-EPPC Category	TN-EPPC Ranking	Abundance at VTS-C
<i>Ailanthus altissima</i>	tree of heaven	1	Rank 1: Severe Threat	Sparse with an isolated location in TA-3
<i>Albizia julibrissin</i>	mimosa	1	Rank 1: Severe Threat	Present in clusters in TA-2, 3, 7, 9, and the Cantonment.
<i>Cirsium arvense</i>	Canada thistle	4	Rank 2: Significant Threat	Present along edges and in openings in TA-3, 4, 5, 7
<i>Euonymus fortunei</i>	wintercreeper	3	Rank 1: Severe Threat	Sparse at several isolated location in TA-5, 9, 10, and the Cantonment. Where observed generally formed 1/3 acre and larger stands dominated by wintercreeper.
<i>Lespedeza cuneata</i>	sericea lespedeza	1	Rank 1: Severe Threat	Present in roads road edges, and openings in TA-2, 3, 5, 7, and the Cantonment
<i>Ligustrum sinense</i> &/or <i>Ligustrum vulgare</i>	privet	1	Rank 1: Severe Threat	Present to dominant in every training area and the Cantonment. Privet population increases as you move south along Broom Branch to Tiger Creek with dense stand along the banks and flood plain of the southern part of Tiger Creek in TA-1, 2, 3, and the Cantonment.
<i>Lonicera japonica</i>	Japanese honeysuckle	1	Rank 1: Severe Threat	Present pervasively in all training areas. Dominant in sunny edges of roads and openings.
<i>Microstegium vimineum</i>	Nepalese browntop; microstegium	1	Rank 1: Severe Threat	Present in all low lying and moist shaded areas in all training areas and the Cantonment.
<i>Paulownia tomentosa</i>	princess tree, royal paulownia	1	Rank 1: Severe Threat	Sparse at isolated locations in TA-3, 7, and the Cantonment.
<i>Rosa multiflora</i>	multiflora rose	1	Rank 1: Severe Threat	Sparsely present in TA-2, 3, 4, and the Cantonment. Multiflora rose is a part of the invasives mix, but generally a minor one at VTS-C.
<i>Sorghum halepense</i>	Johnson Grass	3	Rank 1: Severe Threat	Sparsely present along roads and in openings in TA-1, 2, 3, 5, 9, and 10.
<i>Verbascum thapsus</i>	wooly mullein	4	Rank 2: Significant Threat	Isolated and sparse in TA-7 near tank target pits and one location in TA-4.

## 2.0 CONTROL PLAN

### 2.1 Small Infestations

The several small occurrences of tree-of-heaven, mimosa, princess tree, wintercreeper, and woolly mullein will be treated first, with the goal of completely eradicating these species on VTS-C.

Tree-of-heaven and mimosa will be treated at the same time. A crew will travel the road system and trails of the training site during the late summer or mid-winter and treat all individuals of these species that they encounter. Tree-of-heaven has previously been found only in training area 3, but mimosa occurs in clusters in training areas 2, 3, 7, and 9 as well as the cantonment. Large trees will be stem-injected or felled and the stump treated with Garlon 3A. Saplings will be basal-bark treated with Garlon 4. The following summer, a crew will return to treat all sprouts and seedling with a foliar spray of Garlon 4.

Princess tree occurrences may be treated at the same time as the previous two trees. However, the recommended herbicides differ for this species, and so the crew will have to maintain an additional herbicide preparation or else mark the trees and return at another time to treat the princess tree. This species has been noted in training areas 3 and 7 and in the cantonment. Large trees will be stem injected or cut-stump treated with a glyphosate herbicide. Saplings will be basal bark treated with Garlon 4. The following summer, the crew will treat all sprouts and seedlings with a foliar spray of Garlon 4.

Wintercreeper occurs in several patches in the cantonment and training areas 5, 9, and 10. Two of the patches are located very close to large-flowered skullcap groups. The wintercreeper will be treated in late summer to fall with a foliar application of Garlon 4. This will be repeated annually for several years. In August, prior to spraying, the patch should be inspected and all vertical climbing stems and any visible flowering stems will be cut to minimize fruit development.

Woolly mullein was found in a few places in training areas 4 and 7. It will be treated by hand pulling in May-June. Plants will be bagged for disposal, and the areas in which it is occurring will be sown with an appropriate native grass and forb seed mixture. These areas will be scouted and treated annually for several years until the seed bank is exhausted.

### 2.2 Extensive Infestations

A number of invasive species have become thoroughly established on the VTS-C and are unlikely to ever be completely removed. The goal of this program is to bring those infestations under control, reducing the numbers of exotic plants, rehabilitating native communities that have been affected, and limiting further spread of the invasives. The principle species are privet, Japanese honeysuckle, Nepalese browntop and an open-areas conglomeration of sericea lespedeza, Canada thistle, and Johnson grass.

For each of these species, the control effort will be intensive and require several years of effort. It would be most efficient to have a firm commitment of manpower and funding for at least 3 years' work prior to initiating any control efforts. A single year of effort without follow-up will have little long-term impact on the invasive species and will represent wasted effort and money.

In addition to the control efforts, it will be necessary to be prepared with a plan for reestablishing native vegetation once the invasives have been cleared. Native species restoration plans will be developed individually for areas requiring such. Restoration efforts will utilize all native species and will involve a minimum of soil disturbance.

### 2.2.1 Privet

Privet occurs in every training area on VTS-C and the cantonment. It is generally most common along the creek banks and becomes more dense as you move south through the training site. Control, therefore, will begin at the northern end of the site. Roadsides, forest openings, and the Broom Branch shoreline will be treated. Individuals less than 5" dbh will be treated with a basal bark spray of Garlon 4. Larger stems will be cut and immediately stump treated with Arsenal AC. This process will be repeated in manageable chunks moving south to take in Tiger Creek and the remainder of the training site. This effort should be conducted in winter. The following late summer, a return visit will be made to treated areas to foliar spray sprouts with Arsenal.

The same program will need to be repeated each winter for several years.

If there are areas of infestation in which little to no desirable vegetation remains, at least 50 feet beyond any creek banks and more than 50 feet from any skullcap management group boundary, a brush cutter or similar equipment may be used to mow down the privet while leaving any other trees and shrubs standing, as possible. This should be conducted in summer when the ground is dry but before seed set. This will be followed up in the fall with broadcast foliar application of Arsenal AC to the sprouts.

### 2.2.2 Japanese honeysuckle

Japanese honeysuckle is also present throughout the training site. It is typically less overpowering on VTS-C than the privet, but honeysuckle is the species most commonly threatening large-flowered skullcap groups. The first stage of control will be to treat infestations along roads and near skullcap groups. Foliar spray with Garlon 3A will be conducted in the late fall. Care will be taken when spraying near skullcap management groups to ensure that drift is minimized and directed away from the protected species. Areas will be checked the following summer to determine the need for retreatment. Additional infestations of honeysuckle that are documented during the course of other work will be treated the following winter.

### 2.2.3 Nepalese browntop

Nepalese browntop occurs in low-lying and moist, shaded areas throughout VTS-C. Management will be concentrated along the creeks and drainages, beginning, as with privet, at the northern end of the training site where conditions are somewhat less impacted.

Treatment will consist of foliar application of herbicide: glyphosate where there is little desirable vegetation mixed with the Nepalese browntop. Vantage or Select 2EC (grass-specific post emergent herbicide) will be applied in locations where native herbaceous vegetation is still present. Treatment will be made in early June, with a second application in late July to ensure complete kill. Care will be taken to avoid drift onto the waterways. Infestations on shorelines will be treated with a glyphosate herbicide labeled for aquatic use. Sites will be inspected the following June for new germination. Complete removal will require several years to exhaust the seedbank.

Areas that are accessible and also sufficiently dry may be treated without chemicals by mowing in August. This method requires careful timing to remove the flowers before seed set but late enough to negate the possibility of new flower development. This method will also require several years of repeat treatments to exhaust the seedbank.

Areas that were heavily infested with Nepalese browntop will need to be reseeded or planted with native species to minimize the available space for re-invasion.

#### 2.2.4 Open areas complex

Most open fields and roadsides around the training site are infested with some combination of sericea lespedeza, Johnson grass, and Canada thistle. Control of these species will be undertaken in combination with an effort to restore native grasses where feasible on the training site. Small arms ranges and lawns are typically not appropriate locations for native warm season grasses, due to their tall growth form. Such areas will be maintained with the existing mixtures of fescue, bermudagrass, crabgrass, and similar species. Canada thistle will be spot treated with Garlon 3A when found in these areas. Johnsongrass clumps will be spot treated with glyphosate or Arsenal when found.

Less manicured open areas such as the tank range impact area may be treated for invasive pest plants in preparation for reseeding native warm season grasses (NWSG). The standard site preparation for conversion to NWSG involves a combination of herbicide treatments, mowing, and burning prior to sowing the NWSG seed. Glyphosate or triclopyr herbicides in conjunction with Plateau herbicide are used to control fescue and should control the other exotic species in these areas. Establishment of native grasses requires several years of effort before a good stand is present. Repeated area treatments and spot treatments may be required during this time to control the exotic plant species.

### 2.3 Environmental Precautions

As noted above, the federally protected large-flowered skullcap occurs in 26 management groups scattered around the training site. This perennial wildflower begins shoot growth in March, blooms in May-June and maintains its aboveground vegetation until late summer. Herbicide use during this active growing season will be carefully controlled in the vicinity of known large-flowered skullcap groups: only stem treatments (basal bark, stem-injection, or cut stump) of invasive plants will be allowed within 50 feet of a skullcap group from March to September. Foliar applications of herbicides within 50 feet of a group may only be made during the fall and winter to minimize the risk of spray reaching an active large-flowered skullcap. No soil active herbicides will be used at anytime within 50 feet of a large-flowered skullcap group.

VTS-C also contains significant waterways in the trout streams Tiger Creek, Broom Branch, and Catoosa Springs Branch. Protecting stream habitat from both chemical pollutants and sedimentation is of utmost importance.

- There will be no herbicide applications to water unless the chemical is labeled for aquatic use
- Within 25 feet of water, only stem treatments will be used to minimize risk of drift
- Foliar treatments will be avoided in any situation where the spray would be carried toward water
- Where possible, dead vegetation will be left standing on the creek banks
- There will be no stump removal on creek banks
- Where creek banks are more than 50% invasive species, revegetation and bank stabilization will be conducted immediately following IPP control

All label requirements will be followed, as will state and DoD pesticide regulations. Only state or DoD certified applicators will apply herbicides for IPP control. Non-certified personnel may help with non-chemical aspects of control, but will be briefed on pesticide safety prior to initiating work.

### 2.4 Personal Protective Equipment (PPE)

Personnel who handle and/or apply pesticides are required to wear personal protective equipment and clothing designated on the herbicide label IAW the Federal Insecticide, Fungicide, and Rodenticide Act (40 CFR 162), Occupational Safety and Health Standards (29 CFR 1910), and DOD Directive 4150.7.

Such protective devices include masks, respirators, gloves, goggles, and protective clothing necessary for the pest management operations being conducted and the pesticides used. All personnel involved in pesticide operations will utilize, at minimum, the PPE required by the product label.

## **2.5 Treatment Methods**

### **2.5.1 Cut stump**

The cut stump method is a method used for trees and woody shrubs greater than 5" dbh. The tree is cut down, leaving a stump 2 to 6 inches high (excessive stump height can limit the effectiveness of this method). The appropriate herbicide solution is applied to the outer 20% of the freshly cut surface within a few minutes, if possible. (After 2 hours, a basal bark treatment with penetrant will have to be applied.) All stems coming from the base or roots of the plant should be cut and treated at the same time.

The cut stump method is most effective when the plant is actively growing but not during the first flush of spring growth. Therefore, cut stump treatments may be initiated in May and continue through the summer. Cut stump can also be applied during the dormant season.

### **2.5.2 Stem injection**

Stem injection is another method for use on large trees and shrubs. Incision cuts are made downward into the stem, and herbicide is applied into the cut. With hard to control species, the cuts should completely frill the stem. There is less physical effort required for this method as opposed to completely cutting down the tree, but it leaves a dead snag standing, which may or may not be acceptable, depending on the situation.

Like cut stump, stem injection is most effective in late winter or throughout the summer. It should not be utilized during the heavy spring sap flow.

### **2.5.3 Basal bark spray**

The basal bark method is a recommended method for controlling young trees with smooth bark (generally individuals under 5" dbh). A 6 to 12 inch band of herbicide is applied around the circumference of the tree trunk approximately one foot above ground level. The width of the sprayed band depends on the size of the tree and the species' susceptibility to the herbicide. Ester formulations of pesticides are most effective due to their ability to readily pass through tree bark. Esters are volatile and care must be taken to follow the label – avoid ester formulations on hot days because vapor drift can injure nontarget plants. A chemical penetrant should be included in the herbicide mixture.

Basal bark applications are usually made in late winter and early spring, when leaves do not interfere with trunk access. This method is effective during the summer, but much more difficult.

### **2.5.4 Foliar spray**

The foliar spray method can be used for all target species not in close proximity to environmentally sensitive areas. This method is most effective in areas where there is a low density of desirable vegetation. Care must be taken to use appropriate spray equipment with sufficient droplet size to minimize drift to nontarget plants. Handheld sprayers can only treat plants up to about 6' in height. Leaves should be wet thoroughly but not to the point that herbicide runs off and impacts non-target species. Air temperature should be above 65°F to ensure absorption of herbicides.

Foliar sprays should not be used on windy days. Care must be taken to minimize threat to surrounding nontarget vegetation and other sensitive sites (riparian areas).

The foliar spray method only works when the plant has full or near full leaf cover and is most effective from mid-summer to late fall, depending on the target species' life cycle. Evergreen or semi-evergreen species like privet and honeysuckle can be treated in the late fall to winter as long as they retain a significant portion of their leaf cover.

## 2.6 Herbicides

Table A4.2 reflects the recommended herbicide and standard concentration to use per plant species and the primary method of control. These recommendations must be corroborated with the concentrations approved on each product label. **The label is the law.**

**Table A4.2: Herbicide concentrations for use on VTS-C invasive pest plants.**

Species	Season	Method	Chemical	Concentration	Additive
Canada thistle	Summer (pre-flower)	Foliar	Garlon 3a	2%	Surfactant
Johnsongrass	Summer	Foliar	Arsenal	Label	Surfactant
Japanese honeysuckle	Late fall	Foliar	Garlon 3A	5%	Surfactant
Nepalese browntop	June & July	Foliar	Glyphosate	2%	Surfactant
	June & July	Foliar	Select	12 oz/ac	Surfactant
Mimosa	Fall/winter	Cut stump	Garlon 3A	Label	
	Fall/winter	Basal bark	Garlon 4	20%	Basal oil + penetrant
	Summer	Sprout – Foliar	Garlon 4	2%	Surfactant
Multiflora rose	April-June	Foliar	Arsenal AC	1%	surfactant
	Fall/winter	Cut stump	Arsenal AC	10%	
	Summer/winter	Basal bark	Garlon 4	20%	Basal oil + penetrant
Princess tree	Fall/winter	Cut stump	Glyphosate	Label	
	Fall/winter	Basal bark	Garlon 4	20%	Basal oil + penetrant
	Summer	Sprout – Foliar	Garlon 4	2%	Surfactant
Privet	Fall/winter	Cut stump	Arsenal AC	10%	Surfactant
	Fall/winter	Basal bark	Garlon 4	20%	Basal oil + penetrant
	Summer	Sprout – Foliar	Arsenal AC	1%	Surfactant
Sericea lespedeza	Summer	Foliar	Garlon 4 or Glyphosate	2% 2%	Surfactant
Tree-of-heaven	Fall/winter	Cut stump	Garlon 3A	Label	
	Fall/winter	Basal bark	Garlon 4	20%	Basal oil + penetrant
	Summer	Sprout – Foliar	Garlon 4	2%	Surfactant
Wintercreeper	August	Hand cut	N/A	N/A	N/A
	Summer/fall	Foliar	Garlon 4	4%	Surfactant
Woolly mullein	May-June	Hand pull	N/A	N/A	N/A

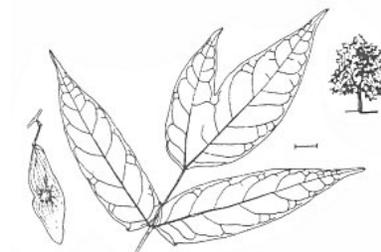
### 3.0 INVASIVE SPECIES DETAILS

#### *Ailanthus altissima* (tree of heaven)

- Description:** Tree of heaven is a rapidly growing small tree but can reach up to 80 feet in height and 6 feet in diameter. It has pinnately compound leaves that are 1-4 feet in length with 10-41 leaflets. Tree of heaven resembles the sumacs and hickories, but is easily recognized by the glandular, notched base on each leaflet. It is extremely tolerant of poor soil conditions and has been known to grow even in cement cracks. It cannot grow in shaded conditions but thrives in disturbed forests or edges. Dense clonal thickets displace native species and can rapidly take over fields and meadows.
- Specific Control Prescription:** Small trees may be effectively controlled by hand pulling. Pulling may be done any season. Moist soil facilitates pulling. During growing season, re-inspect pulled sites in 30 days for regrowth from unpulled roots.



Larger trees should be cut at the stump during the growing season. Treat the cut stump immediately with Garlon 3A. As a follow-up when and if stump sprouting occurs, apply Garlon 4 in a 2% solution of herbicide and water plus a 0.5% non-ionic surfactant to thoroughly wet all leaves. Use a low pressure and coarse spray pattern to reduce spray drift damage to non-target species.



Present in Training Area	
3	

***Albizia julibrissin* (mimosa)**

- **Description:** Mimosa is a small tree that is 10 to 50 feet in height, often having multiple trunks. It has delicate looking bi-pinnately compound leaves that resemble ferns. Mimosa has very showy, pink flowers that are fragrant, giving way to small, flat bean-pod like fruits. Mimosa invades any type of disturbed habitat. It is commonly found in old fields, stream banks, and roadsides. Once established, mimosa is difficult to control due to the long-lived seeds and its ability to re-sprout vigorously.



- **Specific Control Prescription:** Small trees may be effectively controlled by hand pulling any time of year. Areas where pulling has been done should be re-inspected during the growing season after 30 days to look for sprouts.

Larger trees should be cut at the stump. Treat the cut stump immediately with Garlon 3A, mixed in accordance with the label.

As a follow-up when and if stump sprouting occurs, apply Garlon 4 in a 2% solution of herbicide and water plus a 0.5% non-ionic surfactant to thoroughly wet all leaves. Use a low pressure and coarse spray pattern to reduce spray drift damage to non-target species.



Present in Training Area	
2	3
7	9
<b>Cantonment</b>	

***Cirsium arvense* (Canada thistle)**

- **Description:** Canada thistle is a tall, erect, spiny herbaceous plant that grows to 4 feet tall. It has an extensive creeping rootstock. The leaves are lance-shaped, irregularly lobed with very prickly margins. The stems are ridged and hairy. The flowers are purple to white and can be up to .5 inch in diameter. The small seeds, called achenes, are 1 to 1.5 inches long and have a feathery structure attached to the base, which lets them float through the air. Canada thistle can invade a variety of open habitats including prairies, savannas, fields, pastures, wet meadows, and open forests. It forms dense stands, which can shade out and displace native vegetation. Once established it spreads rapidly and is difficult to remove.



- **Specific Control Prescription:** Canada thistle control can be achieved through hand cutting, mowing, and controlled burning, and chemical means, depending on the level of infestation and the type of area being managed. Due to its perennial nature, entire plants must be killed in order to prevent regrowth from rootstock. Hand cutting of individual plants or mowing of larger infestations should be conducted prior to seed set and must be repeated until the starch reserves in the roots are exhausted. Because early season burning of Canada thistle can stimulate its growth and flowering, controlled burns should be carried out late in the growing season for best effect.

In natural areas where Canada thistle is interspersed with desirable native plants, utilize a targeted application of a 2% solution of Garlon 3A with surfactant. For extensive infestations in disturbed areas with little desirable vegetation, broad application of this type herbicide may be the most effective method. Repeated applications are usually necessary due to the long life of seeds stored in the soil.



Present in Training Area	
3	4
5	7

***Euonymus fortunei* (wintercreeper)**

- Description: Wintercreeper, also known as climbing euonymus, is an evergreen, clinging vine.

It can form a dense groundcover or shrub to 3 feet in height, or climb 40-70 foot high vertical surfaces with the aid of aerial roots. Dark green, shiny, egg-shaped leaves, from 1 - 2 1/2 inches long, with toothed margins and silvery veins, occur in pairs along the stems. Stems are narrow, minutely warty, and have abundant rootlets or trailing roots. Clusters of inconspicuous green-white flowers are produced on a long stalk from June to July and are followed in the autumn by pinkish to red capsules that split open to expose seeds adorned with a fleshy orange seed coat, or aril.



Clusters of inconspicuous green-white flowers are produced on a long stalk from June to July and are followed in the autumn by pinkish to red capsules that split open to expose seeds adorned with a fleshy orange seed coat, or aril.

- Specific Control Prescription: For small populations, like those observed in TA-A1, individual vines should be pulled up by the roots or cut off at ground level and removed from the area. Follow-up with a foliar application to resprouts; a 4% concentration of Garlon 4 with a surfactant is reported to be effective. Treatment should be in late winter when most native vegetation is dormant and prior to the emergence of spring wildflowers.



Present in Training Area	
3	5
9	10
Cantonment	

***Lespedeza cuneata* (sericea lespedeza)**

- **Description:** Sericea lespedeza is an upright semi-woody forb, 3 to 6 feet in height with one to many slender stems. It has thin, alternate, abundant, three-parted leaves. Flowers are small and whitish-yellow. It is an extremely aggressive invader of open areas, out competing native vegetation. Once it is established is very difficult to remove due to the seed bank, which can remain viable for decades. Native to Asia and introduced into the Unites States in the late 1800s, sericea lespedeza has been widely planted for wildlife habitat, erosion control, and mine reclamation.
- **Specific Control Prescription:** The best control of lespedeza combines both mechanical and chemical treatments. Hand pulling is impractical due to its extensive perennial root system, but mowing plants at the flower bud stage for two to three consecutive years can significantly reduce the vigor of stands as well as control further spread. Mowing followed by an herbicide treatment is likely the most effective option for the successful control.



Herbicide should be applied in mid- to late-summer, July through September. Apply Garlon 4 as a 2% solution. Note that lespedeza and Johnson grass were observed to be growing together and any treatment of one will harm or benefit the other, so plan accordingly.



Present in Training Area	
2	3
5	7
Cantonment	

***Ligustrum sinense* &/or *Ligustrum vulgare* (privet)**

- **Description:** Privet is a thick, semi-evergreen shrub to 30 feet in height. Trunks usually occur as multiple stems with many long, leafy branches attached at near right angles. Leaves are opposite, oval and .5 to 1.5 inches long. White flowers are very abundant and occur at the end of branches in clusters. Fruits ripen to a dark purple to black color and persist into winter. Although several species occur, they are hard to distinguish. It commonly forms dense thickets in the fields or in the understory of forests. It shades and out-competes many native species and, once established, is very difficult to remove.



- **Specific Control Prescription:** Privet has leaves throughout the year in Tennessee and thus can be identified and treated at any time during the year. Small plants may be may be effectively controlled by hand pulling. Plants should be pulled as soon as they are large enough to grasp, but before they produce seeds. Seedlings are best pulled after a rain when the soil is loose. The entire root must be removed since broken fragments may re-sprout. Smaller shrubs are usually easy to pull; larger individuals are likely to require mechanical assistance in pulling.



Mowing or other mechanical reduction of plant mass is effective for providing safer spraying access but is not an effective control by itself. Foliar Spraying can be effective for large thickets of privet where risk to non-target species is minimal. Timing applications for late fall or early spring when many native species are dormant will help minimize damage to non-target species. Generally foliar

herbicides offer better control in warmer weather, as plants are growing faster, but privet keeps its leaves which can make it easier to locate when most other plants don not have leaves. To spray, apply a 1% solution of Arsenal AC plus a surfactant to thoroughly wet all leaves. Use a low pressure and coarse spray pattern to reduce spray-drift damage to non-target species.

Present in Training Area	
1	2
3	4
5	6
7	8
9	10
<b>Cantonment</b>	

Larger or un-pullable plants require cutting at ground level with saws. Cutting is most effective when plants have begun to flower to prevent seed production. Re-sprouting is common after treatment. Cutting is an initial control measure, and success will require either an herbicidal control or repeated cutting of re-sprouts.

Treat the cut stump immediately with Arsenal AC applying a 10% solution of herbicide and water to the cut stump. As a follow-up when and if stump sprouting occurs, apply a 1% solution of Arsenal AC plus a surfactant as a foliar spray.

***Lonicera japonica* (Japanese honeysuckle)**

- Description:** Japanese honeysuckle is a perennial vine that climbs by twisting its stems around vertical structures, including limbs and trunks of shrubs and small trees. Leaves are oblong to oval, sometimes lobed, have short stalks, and occur in pairs along the stem. In Tennessee, Japanese honeysuckle leaves often remain attached through the winter. Flowers are tubular, with five fused petals, white to pink, turning yellow with age, very fragrant, and occur in pairs along the stem at leaf junctures. Stems and leaves are sometimes covered with fine, soft hairs. Japanese honeysuckle blooms from late April through July and sometimes into October. Small black fruits are produced in autumn, each containing 2-3 oval to oblong, dark brown seeds about 1/4 inch across.



- Specific Control Prescription:** Mowing and fire are effective at reducing the aboveground mass of plant material, but require herbicide follow-up for effective control of honeysuckle.

Foliar spraying with a 5% solution of Garlon 3A is may be effective for controlling Japanese honeysuckle. Timing applications for late fall or early spring when many native species are dormant will help minimize damage to non-target species. Generally foliar herbicides offer better control in warmer weather, as plants are growing faster, but honeysuckle keeps its leaves, which can make it easier to locate when most other plants do not have leaves.



Present in Training Area	
1	2
3	4
5	6
7	8
9	10
Cantonment	

***Microstegium vimineum* (Japanese grass, Nepalese browntop)**

- **Description:** Japanese grass, also known as Nepalese browntop and other names is an annual plant. It has a sprawling habit and grows slowly through the summer months, ultimately reaching heights of 2 to 3 1/2 ft. (6-10 dm.). The leaves are pale green, lance-shaped, asymmetrical, 1-3 in. (3-8 cm.) long, and have a distinctive shiny midrib. Slender stalks of tiny flowers are produced in late summer (August - September). The fruits or achenes mature soon after flowering and the plant dies back completely by late fall.
- **Specific Control Prescription:** Mow plants as close to the ground as possible using a weedeater or similar grass-cutting tool. Treatments should be made when plants are in flower and before seeds are produced. Treatments made earlier may result in plants producing new seed heads in the axils of lower leaves.



Herbicide treatments should be made late in the growing season (June-July) but before the plants set seed. Treatments made earlier in the growing season may allow a second cohort of plants to produce seeds. Apply a 2% solution of glyphosate and water plus a 0.5% non-ionic surfactant to thoroughly wet all foliage. Do not spray to the point of runoff. Ambient air temperature should be above 65°F to ensure translocation of the herbicide to the roots. Do not apply if rainfall is expected within two hours following application. Additional treatments are likely to be necessary to exhaust the supply of seed in the soil.



Present in Training Area	
1	2
3	4
5	6
7	8
9	10
Cantonment	

An alternative chemical treatment is to use the grass killer clethodim (Select). Apply 12 oz/ac of Select plus a crop oil concentrate according to the label. Do not spray to the point of runoff. Ambient air temperature should be above 65°F. Do not apply if rainfall is expected within one hour following application.

***Paulownia tomentosa* (Princess tree, royal paulownia)**

- **Description:** Princess tree, also known as royal paulownia or empress tree, is a small to medium sized tree that may reach 30-60 feet in height. The bark is rough, gray-brown, and interlaced with shiny, smooth areas. Stems are olive-brown to dark brown, hairy and markedly flattened at the nodes (where stems and branches meet). Leaves are large, broadly oval to heart-shaped, or sometimes shallowly three-lobed, and noticeably hairy on the lower leaf surfaces. They are arranged in pairs along the stem. Conspicuous upright clusters of showy, pale violet, fragrant flowers open in the spring. The fruit is a dry brown capsule with four compartments that may contain several thousand tiny winged seeds. Capsules mature in autumn when they open to release the seeds and then remain attached all winter, providing a handy identification aid.



- **Specific Control Prescription:** Princess tree can be controlled using a variety of mechanical and chemical controls. Hand pulling may be effective for young seedlings. Plants should be pulled as soon as they are large enough to grasp. Seedlings are best pulled after a rain when the soil is loose. The entire root must be removed since broken fragments may resprout. Trees can be cut at ground level with power or manual saws. Cutting is most effective when trees have begun to flower to prevent seed production. Because Princess tree spreads by suckering, resprouts are common after cutting. Cutting should be considered an initial control measure that will require either repeated cutting of resprouts or an herbicide treatment.



Princess tree seedlings and small trees can be controlled by applying a 2% solution of Garlon 4 and water plus a 0.5% non-ionic surfactant to thoroughly wet all leaves. Use a low pressure and coarse spray pattern to reduce damage from spray drift on non-target species.

Present in Training Area	
3	7
9	10
<b>Cantonment</b>	

The cut stump method can be used with a glyphosate herbicide; see label for concentration. Basal bark applications are also effective on small saplings; utilize Garlon 4 in a 20% solution plus basal oil and penetrant. Girdling is effective on large trees where the use of herbicides is impractical. Using a hatchet, make a cut through the bark encircling the base of the tree, approximately six inches above the ground. Be sure that the cut goes well below the bark. This method will kill the top of the tree but resprouts are common and may require a follow-up treatment with a foliar herbicide.

***Rosa multiflora* (multiflora rose)**

- **Description:** Multiflora rose is a thorny, perennial shrub with arching stems (canes), and leaves divided into five to eleven sharply toothed leaflets. The base of each leaf stalk bears a pair of fringed bracts. Beginning in May or June, clusters of showy, fragrant, white to pink flowers appear, each about an inch across. Small bright red fruits, or rose hips, develop during the summer, becoming leathery, and remain on the plant through the winter.
- **Specific Control Prescription:** Mowing/Cutting is appropriate for small initial populations or environmentally sensitive areas where herbicides cannot be used. Repeated mowing or cutting will control the spread of multiflora rose but will not eradicate it. Stems should be cut at least once per growing season as close to ground level as possible. Hand cutting of established clumps is difficult and time consuming due to the long arching stems and prolific thorns.



Three methods using herbicides are practical for different plant situations. Foliar spray is appropriate for large thickets of multi-flora rose where risk to non-target species is minimal. It is most effective during April to June, around the flowering period. Apply a 1% solution of Arsenal AC thoroughly wetting all leaves. Use a low pressure and coarse spray pattern to reduce spray drift damage to non-target species.



If non-target plants are in close proximity, a 4% solution of glyphosate can be applied May through October to avoid soil contamination.

The cut stump method should be considered when treating individual bushes or where the presence of desirable species precludes foliar application. This treatment remains effective at low temperatures as long as the ground is not frozen. Horizontally cut multiflora rose stems at or near ground level. Immediately apply a 10% solution of Arsenal AC to the cut stump making sure to cover the entire surface.

<b>Present in Training Area</b>	
	<b>2</b>
<b>3</b>	<b>4</b>
<b>Cantonment</b>	

The basal bark method is effective throughout the year as long as the ground is not frozen. Apply a mixture of 20% Garlon 4 plus basal oil to the bark of the shrub to a height of 30-38 cm (12-15 in) from the ground. Thorough wetting is necessary for good control; spray until run-off is noticeable at the ground line.

***Sorghum halepense* (Johnson grass)**

- Description:** Johnson grass grows as tall as six feet and is a rhizomatous perennial grass that invades open areas throughout the United States. The two-foot long, lanceolate leaves are arranged alternately along a stout, hairless, somewhat upward branching stem. Flowers occur in a loose, spreading, purplish panicle. Johnson grass is adapted to a wide variety of habitats including open forests, old fields, ditches, and wetlands. It spreads aggressively and can form dense colonies, displacing native vegetation and restricting tree seedling establishment.
- Specific Control Prescription:** Johnson grass reproduces through rhizomes and seeds. It cannot be controlled simply by mowing or cutting. It is recommended that mowing followed by herbicide treatment, several times during the growing season for several seasons, utilizing Arsenal and a surfactant as directed on the label.



Present in Training Area	
1	2
3	5
9	10

***Verbascum thapsus* (wooly mullein)**

- Description: Woolly or common mullein is an erect herb. First year mullein plants are low-growing rosettes of bluish gray-green, feltlike leaves that range from 4-12 inches in length and 1-5 inches in width. Mature flowering plants are produced the second year, and grow to 5 to 10 feet in height, including the conspicuous flowering stalk. The five-petaled yellow flowers are arranged in a leafy spike and bloom a few at a time from June-August. Leaves alternate along the flowering stalks and are much larger toward the base of the plant. The tiny seeds are pitted and rough with wavy ridges and deep grooves and can germinate after lying dormant in the soil for several decades.
- Specific Control Prescription: Common mullein can be very difficult to eradicate. There are a variety of management methods available, depending on the particular situation. Because mullein seedling emergence is dependent on the presence of bare ground, sowing sites with early successional native grasses or other plants may decrease seed germination and the chance of successful emergence of mullein seedlings.



Mullein plants are easily hand pulled on loose soils due to relatively shallow tap roots. This is an extremely effective method of reducing populations and seed productivity, especially if plant is pulled before seed set. If blooms or seed capsules are present, reproductive structures should be removed, bagged, and properly disposed of in a sanitary landfill. Care should be taken, however, to minimize soil disturbance since loose soil will facilitate mullein seed germination.

Present in Training Area	
4	7





**Annex 5**

**GROUNDS MAINTENANCE – HERBICIDE SPRAY PLAN**



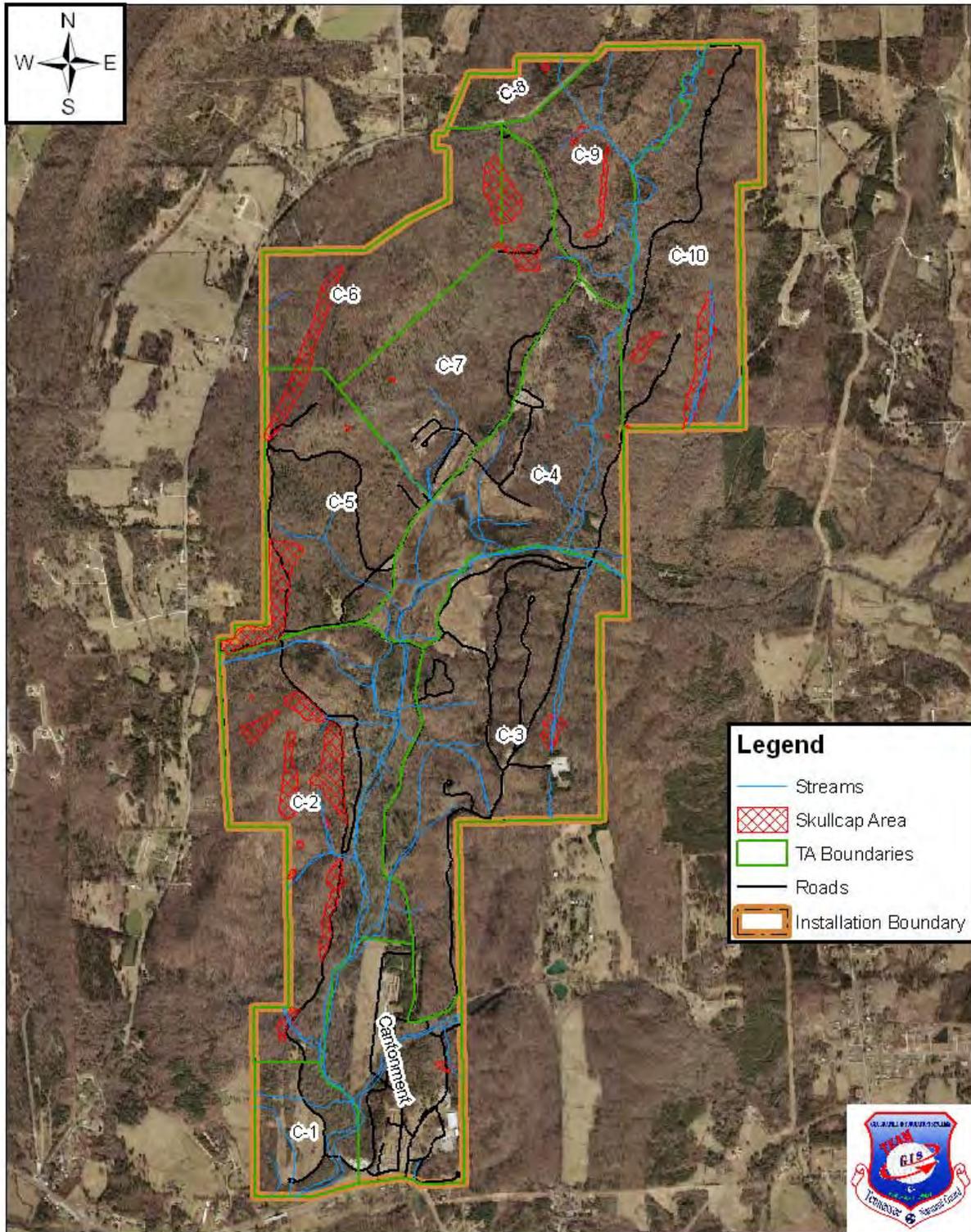
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**1.0 General Information**

Herbicide use for weed control is a necessary part of grounds maintenance on VTS-Catoosa. In order to meet federal and DoD regulations and effectively protect sensitive features of the training site, certain restrictions must be followed:

- Catoosa has a large population of a federally listed threatened plant, the large-flowered skullcap (see Figure A5.1). All herbicide applications will be designed to avoid damage to this protected plant. Skullcap management groups are located within mixed oak forests and are marked with signs. There will be no contract application of herbicide for weed control within **100 feet** of a known large-flowered skullcap group. There will be no application of soil active herbicides within **100 yards** of a skullcap group.
- Only herbicides labeled for aquatic use may be utilized within **50 feet** of creeks, wetlands, or other bodies of water. Roadside spraying of other herbicides must stop **50 feet** prior to all creek crossings and may not be reinitiated until beyond the 50 foot restricted zone.
- The contractor must be licensed with the state of Georgia as a pesticide contractor, and all applicators must have a Georgia commercial applicator license.
- All applications must be recorded on the pesticide control treatment record (see Appendix H) and turned in to the training site personnel. Training site personnel will turn this information in to the TNARNG Pest Management Coordinator. Complete information is necessary; one herbicide per page.
- One goal of management at Catoosa is to minimize chemical pesticide use. Treatments should be made using the minimum application of active ingredient which will **effectively** control the weeds.
- Instructions on the pesticide label will be followed at all times.



**Figure A5.1: Large-flowered skullcap management groups on VTS-Catoosa.**

## 2.0 Limited Herbicide Use Areas

These areas can have only restricted use of herbicides due to their proximity to large-flowered skullcap management groups. The contractor must be made aware of these locations on the ground to ensure that no herbicide is applied too close to the protected plants.

### 2.1 ASP (Ammunition Storage Point)

There will be NO use of soil-active herbicides in or around the ASP. Roundup or similar glyphosate herbicide may be used to control weeds around the fenceline and around buildings in the ASP. Care will be taken that there is no spray drift downhill to the nearby skullcap population.

### 2.2 Back gate fence-line

There will be no foliar application of soil-active herbicides along the back fence-line of the training site. Roundup or similar glyphosate herbicide may be used to control herbaceous weeds and vines on the fence. Woody plants encroaching on the fence can be treated with a broadleaf-selective herbicide using a cut-stump or stem injection treatment to minimize transport of the chemical to the soil.

### 2.3 Roads

Certain stretches of road throughout the training site will be marked with signs indicating proximity of a skullcap patch to the road. There will be NO use of herbicides within those sections of road. All weed control there must be non-chemical (mowing, pulling, or cutting brush).

## 3.0 Acceptable Chemicals

A list is included (Table A5.1) of the herbicides approved for use on the training site. Contract bids should be based on use of approved chemicals only.

Basic weed control at VTS-C should include:

- A bareground residual herbicide such as Krovar IDF or Oust to be applied once in the early spring as a pre-emergent for vegetation control on parking lots, motorpools, and other graveled areas. The application rate should be appropriate to noncrop areas for broadleaf weed and grass control. If weeds reappear in the treated areas later in the summer, an additional treatment can be scheduled.
- A non-residual contact herbicide such as Roundup or similar glyphosate formulation should be used along fencelines, roads, and edges where minimal mobility in soils is important. Multiple applications may be needed through the growing season
- A broadleaf-specific chemical such as Garlon 3A may be used for brush control along roads or fencelines. Preferred method of application is cut stump or stem injection, but other methods may be acceptable in certain circumstances.
- Garlon 4 or similar product may be used to control brush and sprouts in areas that cannot be easily bushhogged.
- Growth regulators may be used for grasses on the ranges.

**Table A5.1: Herbicides for use on Tennessee Army National Guard Properties.**

<b>Product Name</b>	<b>Chemical Name</b>	<b>% of A.I.</b>	<b>EPA #</b>
<b>All Vegetation – Bare Ground</b>			
Arsenal	Imazapyr	27.6	241-273
Escort	Metsulfuron	60	352-439
Hyvar XL	Bromacil	21.9	352-346
Krovar IDF	Bromacil	40	352-505
	Diuron	40	
Oust XP	Sulfometuron	75	352-601
Outrider	Sulfosulfuron	75	524-500
Reward Aquatic Herbicide	Diquat dibromide	37.3	100-1091
Round-up Pro	Glyphosate	41	524-475
Round-up Ultra	Glyphosate	41	524-475
Round-up UltraDry	Glyphosate	71.4	524-504
Sahara DG	Imazapyr	7.78	241-372
	Diuron	62.22	
<b>Pre-emergent Herbicide</b>			
Balan 2.5G	Benfluralin	2.5	62179-96
Banvel + 2,4-D	Dicamba	12.4	66330-287
	2,4-D	35.7	
Gordon's Pro Turf & Ornamental Barrier	Dychlobenil	4	2217-675
Surflan A.S.	Oryzalin	40.4	70506-44
MSMA	Monosodium methanearsonate	47.6	19713-42
Pennant (grasses)	S-Metolachor	83.7	100-950
<b>Selective Post-emergent</b>			
MSMA (grasses)	Monosodium methanearsonate	47.6	19713-42
Poast (grasses)	Sethoxydim	18	7969-58
Gordon's Pro Trimec Plus (broadleaf)	Dicamba	1.46	2217-808
	MSMA	18	
	2,4 D	5.83	
	Mecoprop-p	2.93	
<b>Cool Season Grasses</b>			
Plateau	Imazipic-ammonium	23.6	241-365
<b>Plant Growth Regulator</b>			
Cutless 50W	Flurprimidol	50	67690-15
Embark	Mefluidide	28	2217-759
Primo	Cimectacarb	12	100-729

Product Name	Chemical Name	% of A.I.	EPA #
<b>Brush &amp; Forestry</b>			
Accord Site Prep	Glyphosate	41	62719-322
Arsenal	Imazapyr	27.6	241-273
Garlon 3A	Triethylamin triclopyr	44.4	62719-37
Garlon 4	Butoxyethyl triclopyr	61.6	62719-40
Escort	Metsulfuron	60	352-439
Oust XP	Sulfometuron	75	352-601
Round-up Pro	Glyphosate	41	524-475
Tordon K	Picloram	24.4	62719-17
Velpar L	Hexazinone	25	352-392
Velpar ULW	Hexazinone	75	352-450
<b>Aquatic Weeds &amp; Algae</b>			
Aquashade	Acid Blue 9	23.63	33068-1
	Acid Yellow 23	2.39	
Cutrine Ultra Algaecide	Copper	9	8959-53
Reward	Diquat dibromide	37.3	100-1091
Rodeo	Glyphosate	53.8	62719-324
Sonar AS	Fluoridone	41.7	67690-4
2,4-D amine 4	2,4-D	47.3	1381-103

#### 4.0 Prescription by Area

The following guidelines should direct all commercial weed control efforts on the training site. If an area that is not listed requires weed control, contact the Pest Management Coordinator to discuss appropriate actions.

##### Area 5/Bradley Motor Pool

- Gravel parking lot and around the fence
- Pre-emergent on the gravel lot, careful to avoid drift beyond the edges
- May need to use a contact herbicide to eliminate already established weeds in the gravel
- Glyphosate on the fenceline; broadleaf-selective for persistent vines and brush

##### ASP

- Around the fence, around the buildings, and gravel area as needed (two applications)
- There will be NO use of soil active herbicides in or around the ASP.
- Glyphosate herbicide may be used to control weeds around the fenceline and buildings and in spot treatments in the gravel in the ASP.
- Care will be taken that there is no spray drift downhill to the nearby skullcap population.

##### Bradley Firing Points

- Gravel area at each firing point (multiple applications)
- Due to proximity of Tiger Creek, no use of soil-active herbicide
- Apply glyphosate to weeds as they encroach on gravel areas

**Cantonment**

- Around buildings and along road shoulders
- Glyphosate to control weed encroaching on buildings or road shoulders
- Pre-emergent under gravel in parking areas
- Growth regulator on lawns to minimize mowing requirements

**Cemetery**

- Gravel area and around the fence
- Pre-emergent on the gravel lot, if needed, careful to avoid drift beyond the edges
- Glyphosate on the fenceline

**Front Fence**

- Along the road and around the front gate
- Approx. 2 acres
- Glyphosate or broadleaf-selective herbicide as appropriate for control of existing weeds
- Do not apply herbicides within 25 feet of creeks or other surface water

**KD Range (gravel)**

- Along the roadside around all posts and pit area behind the concrete wall
- Approx. 0.25 acre
- Pre-emergent on graveled areas including the pop-up target pit (behind and below the concrete wall), take care to avoid drift beyond the edge of the gravel

**KD Range (turf)**

- Entire KD Range
- 8 acres
- Apply growth regulator after first mowing to minimize mowing needs over growing season
- Embark or Primo are acceptable growth regulators

**MK 19 Range**

- Throughout the cleared zone providing line of sight from the firing point
- Approx. 0.5 acre
- Garlon 4 or similar applied to the sprouts and other brush in the recently cleared area
- Do not spray low-growing ground cover
- Avoid drift to surrounding vegetation

**MLRS Staging Area**

- Around the edge of the staging area and spot treat the rest of the area as needed
- Pre-emergent for the outer 5-10 feet of the large graveled area, careful to avoid drift beyond edges
- If weeds become problem later in summer, spot treat with contact herbicide

**Observation Tower and Tower Road**

- Gravel parking area at the tower, around the base of the tower, and center two feet of tower road
- Approx. 0.25 acre + 4000 sq.ft. on road
- Pre-emergent for the gravel parking area and base of tower and also down the center two feet of the road leading to tower
- Broadleaf selective herbicide on road shoulders to minimize brush encroachment

**Rear Fence**

- Along the road and around the rear gate
- Approx. 4 acres
- There will be no foliar application of soil active herbicides along the back fence-line of the training site. Roundup or similar glyphosate herbicide may be used to control herbaceous weeds and vines on the fence.
- Woody plants encroaching on the fence can be treated with Tordon or Garlon as a cut-stump treatment or a stem injection treatment to minimize transport of the chemical to the soil.
- The 3-6 foot buffer strip should be maintained with broadleaf-selective herbicide to ensure grass cover for soil protection

**Roadways**

- Approximately 10 miles along the sides of the gravel roads (3 applications)
- Broadleaf selective herbicide on the brush up to 4 feet on either side of the road, except where identified as close to skullcap

**Tank Firing Points (Four)**

- Around and on top of the firing point
- Approx. 0.5 acre each
- Should be burned in early spring
- Growth regulator on grasses on the mound
- Broadleaf selective herbicide (Tordon or Garlon) may be applied to individual woody plants that germinate on mound (preferably as cut-stump treatment)

**Tank Laser Target Pits**

- In and around 13 target pits
- 225 sq ft each
- Pre-emergent in gravel of the target pits
- Glyphosate on weeds invading at edges as summer progresses

**Tank Target RR Tracks**

- All of the gravel area, around both buildings, around both retaining walls, and all of the area in between the two targets
- Pre-emergent in gravel areas along tracks, buildings, and walls, careful to avoid drift beyond edges
- Glyphosate on weeds invading at edges as summer progresses

**Two Loading Ramps**

- Around both loading ramps in the training area
- Pre-emergent on the gravel, careful to avoid drift beyond edges
- Glyphosate at the edges as vegetation intrudes
- May need to use a contact herbicide to eliminate already established weeds

**Urban Assault Course (UAC)**

- Gravel parking areas, roads, and training structures
- Pre-emergent on the gravel of parking areas, roads, and training points, no closer than 8” to the edge
- Glyphosate as needed at the edges as vegetation intrudes
- Glyphosate to control weeds around structures as needed

- Broadleaf selective as needed on mowed areas to minimize brush encroachment
- Take care to avoid drift onto skullcap group north of UAC near northern entrance road

**50 Cal Range**

- 4 pits and gravel area
- Approx. 160 sq ft total
- Pre-emergent under the center gravel, no closer than 8” to the edge
- Glyphosate may be needed at the edges as vegetation intrudes

**203 Range**

- Gravel parking area, around the observation tower, and all firing points
- Approx. 0.5 acre
- Pre-emergent on the gravel areas, up to edges
- Glyphosate on weeds invading at edges as summer progresses

Point of Contact for pest control questions is:

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