



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
NASHVILLE, TENNESSEE 37243-0435

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COMMISSIONER

BILL LEE
GOVERNOR

MEMORANDUM

TO: Governor Bill Lee
Governor of the State of Tennessee

Lieutenant Governor Randy McNally
Speaker of the Senate

Speaker Cameron Sexton
Speaker of the House of Representatives

FROM: David W. Salyers, P.E.
Commissioner

DATE: March 31, 2020

SUBJECT: Annual Report on Potable Water Supplies in Tennessee Watersheds

Tennessee Code Annotated § 69-3-107 requires the Department of Environment and Conservation to prepare an annual report on the protection of potable water supplies in Tennessee watersheds.

Attached is your copy of this year's report.



**PROTECTION OF POTABLE WATER SUPPLIES
IN TENNESSEE WATERSHEDS**

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2020 Report

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1.0 INITIALS AND ACRONYMS

ARAP	Aquatic Resource Alteration Permit
ARCF	Agricultural Resources Conservation Fund
BMP	Best Management Practice
CAFO	Concentrated Animal Feeding Operation
CPCRI	Clinch-Powell Clean Rivers Initiative
CTA	Conservation Technology Assistance
CWSRF	Clean Water State Revolving Fund
DOI	Department of Interior
DWSRF	Drinking Water State Revolving Fund
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERIC	Eastern Region Initiative on the Clinch
ETSU	East Tennessee State University
FSA	Farm Services Agency
GIS	Geographic Information System
HAB	Hazardous Algal Bloom
HDSS	High Definition Stream Survey
HUC	Hydrologic Unit Code
LID	Low Impact Development
LUM	Lands Unsuitable for Mining
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
NPS	NonPoint Source
NRCS	Natural Resources Conservation Service
OSMRE	Office of Surface Mining, Reclamation, and Enforcement
PED	Petition Evaluation Document
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
QLP	Qualifying Local Program
RRAT	Runoff Reduction Assessment Tool
SDWA	Safe Drinking Water Act
SOC	Synthetic Organic Compound
SRF	State Revolving Fund

Initials & Acronyms (continued)

SWAP	Source Water Assessment Plan
TDA	Tennessee Department of Agriculture
TDEC	Tennessee Department of Environment and Conservation
TDH	Tennessee Department of Health
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy
TOC	Total Organic Carbon
TSMP	Tennessee Stream Mitigation Program
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
UD	Utility District
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
USFWS	United States Fish and Wildlife Service
UT	University of Tennessee
WRTAC	Water Resources Technical Advisory Committee
WTRBA	West Tennessee River Basin Authority

2.0 INTRODUCTION

The Tennessee Department of Environment and Conservation (TDEC) prepared this report to fulfill the requirements of Tennessee Water Quality Control Act, T.C.A. 69-3-107(24) as amended in 2006:

69-3-107. Duties and authority of the commissioner.

In addition to any power, duty, or responsibility given to the commissioner under this part, the commissioner has the power, duty, and responsibility to:

(24) "Perform a thorough and ongoing study of, and prepare recommendations regarding options for, the protection of watersheds and the control of sources of pollution in order to assure the future quality of potable drinking water supplies throughout the state. The department is authorized to use information and studies from state, federal and local governments and other sources of reliable scientific data. Initial findings and recommendations shall be presented to the governor and the general assembly no later than February 1, 2007, and annually thereafter."

This report presents a summary of some of the activities within the Division of Water Resources that TDEC uses in protecting water quality. As this report illustrates, TDEC: 1) has posted Watershed Water Quality Management Plans (watershed inventory reports) on the TDEC website, 2) reports on the status of water quality biennially, and 3) updates its water quality standards triennially. The documents associated with these three activities describe the condition of Tennessee's 55 watersheds and establish the criteria used to assess water quality in the state. In addition, TDEC requires public water systems to update source water protection/wellhead protection plans annually and submit updated reports/plans triennially.

This report is a summary of these documents as well as TDEC's ongoing programs to protect watersheds and control sources of pollution and—through a series of maps—illustrates the threats to drinking water supplies. Finally, as required by the 2006 amendment, several recommendations are presented for further protection of potable water supplies. A more thorough description of the items contained in the report is found on the department's web site.

Division of Water Resources Page:

<https://www.tn.gov/environment/program-areas/wr-water-resources-home.html>

Division of Water Resources, Watershed Stewardship Page:

<https://www.tn.gov/environment/program-areas/wr-water-resources/watershed-stewardship.html>

Division of Water Resources, Watershed Management Approach Page:

<https://www.tn.gov/environment/program-areas/wr-water-resources/watershed-stewardship/watershed-management-approach.html>

Division of Water Resources, Water Quality Page:

<https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality.html>

Division of Water Resources, Drinking Water Program Page:

<https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/drinking-water-redirect.html>

Division of Water Resources, Source Water Assessment Page:

<https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/source-water-assessment.html>

Activities related to watershed protection since the last Watershed Protection Report (2019) include:

- TDEC awarded 16 Clean Water State Revolving Fund Loans totaling \$ 83,324,500 to communities across Tennessee. (FY19)
- TDEC awarded 8 Drinking Water State Revolving Fund Loans totaling \$13,345,300 to communities across Tennessee. (FY19)
- Tennessee has submitted a plan to address nutrient impairments to Beaver Creek in the Lower Clinch River Watershed. The plan, called a 5-alt report, is based on stakeholder leadership and actions conducted over the past ten years. The plan was accepted by EPA in June of 2017. Subsequent plans have been accepted by EPA for Spring Creek in June of 2018, Crooked Fork creek in October of 2018, Flat Fork in October of 2018, Unnamed Tributary to Shelton Creek in February of 2019, and Gap Creek in 2019. All of these subsequent plans also addressed nutrient impairments.
- In August of 2016, the United States Department of Agriculture (USDA) and the West Tennessee River Basin Authority began a partnership in a nearly \$5.7 million investment in conservation projects in West Tennessee.
 - The USDA Natural Resources Conservation Service (NRCS) Regional Conservation Partnership Program (RCPP)-Environmental Quality Incentives Program (EQIP) is an agreement that established a partnership framework for cooperation between NRCS and WTRBA on activities that focus approximately \$1.9 million on 9 impaired or degraded watersheds in Hardin, Hardeman, Chester, and McNairy counties. In the first year of the RCPP the WTRBA and the NRCS entered into a number of commitments with agricultural producers to implement soil health practices. This program utilizes a variety of cover crops to improve soil health and remove nutrients.
 - The WTRBA, Tennessee Valley Authority (TVA) and the Nature Conservancy (TNC) completed a \$250,000 “pilot” stream bank stabilization project on the Tennessee River in Hardin County.

- Currently the WTRBA is working with the Tennessee Wildlife Resources Agency (TWRA) to design a large stream and floodplain restoration project on a Wildlife Management Area as a part of their partnership. A Wetland Reserve Enhancement Program agreement has been established and is a component of the USDA NRCS Agricultural Conservation Easement Program-Wetlands Reserve Easement (ACEP-WRE), which establishes a mechanism for cooperation between NRCS and WTRBA to address priority wetland protection, restoration, and enhancement in the North and Middle Fork Forked Deer (MFFD) River system. The MFFD River is an impaired stream. In 2017 the WTRBA, NRCS and TNC secured a 759 acre wetland reserve easement in the floodplain of the MFFD River. Approximately \$3M will be used to restore natural stream and floodplain function at this location.
- TDEC funded four Tennessee Healthy Watershed Initiative projects:
 - UT: Regenerative Stormwater Conveyances: An Innovative Watershed Management Tool for Tennessee (applicable statewide-finished)
 - Cumberland River Compact - Protecting Mill Creek's Headwaters (awarded \$123,750)
 - TenneSEA (Tennessee Student Environmental Alliance) - Watershed Restoration through Community Engagement and establishing a network of Urban BMP's (awarded \$78,500)
 - University of Tennessee Knoxville - Assessing Functional Lift Through Improved Monitoring and Assessment Techniques for Stream Restoration Projects (awarded \$94,846)
 - Clinch Powell RC & D - Clinch and Powell Rivers Blueways Trail Development and Watershed Restoration Project (awarded \$89,291)
- TDEC, TVA, and the University of Tennessee concluded a collaborative project. Funded by TVA, the project seeks to work with the nursery industry in the Elk River's Robinson Creek subwatershed to study and recommend changes in irrigation and fertilization practices that lead to nutrient runoff.

- TDEC continued its role with the Clinch-Powell Clean Rivers Initiative (CPCRI), the team of agencies, universities and stakeholders working on conservation issues facing the Clinch and Powell Rivers. Goals set by CPCRI members include: 1) Protect critical riverside habitat, 2) Inventory and remediate abandoned mined lands, 3) Implement agricultural best management practices, and 4) Adopt a comprehensive science plan. USGS has initiated a research program, titled “Eastern Region Initiative on the Clinch (ERIC),” to provide a basic foundation of hydrological, biological, and geographical data. The CPCRI has been working with EPA and its contractor to analyze and illustrate biological, chemical, and physical characteristics of the Clinch and Powell Rivers. Through regularly scheduled webinars, conference calls and an annual meeting, the team has shared information between states. Through an EPA grant, the initiative has completed a Healthy Watershed Initiative study of the Clinch and Powell Rivers Watersheds. The Clinch-Powell Initiative has launched a website (<http://cpcri.net/>) where the Healthy Watershed Report is found. Finally, Tennessee is collaborating with Virginia to prioritize restoration sites and to reintroduce native mussel populations. An MOU between Tennessee, Virginia, and EPA (Regions 3 and 4) was finalized and signed in 2018.
- TDEC continues to mine its centralized databases for spatial information to create new GIS layers. Many of these layers are incorporated into GIS-based web applications that can be shared with staff and the public to provide better service and transparency. TDEC is looking into ways to coordinate with other state agencies to share data in various portals and data exchanges.
- TDEC is implementing solutions to create a more mobile workforce that can conduct business from the field and on-the-go in order to increase efficiency and effectiveness.
- TDEC, through its UT contractor, taught 15 Level I, 4 Level II, and 23 recertification classes (totaling 2,646 students) in the Erosion Prevention and Sediment Control Training and Certification Program. The training is available to those who are already covered by a stormwater construction permit issued by TDEC or have submitted a Notice of Intent for future construction activities. The training classes (Level I, Level II, and recertification) for contractors, developers, engineers, and other professionals are held across the state.

- A Green Development Grant cycle opened August 11, 2014 and all projects will be complete by January of 2020. Local governments in Tennessee were invited to submit proposals for grant funding to assist in implementing green infrastructure development projects. Green infrastructure refers to the use of systems and practices that use or mimic natural processes to infiltrate, re-use stormwater runoff generated at the site, or evapotranspire. Green infrastructure can be used in a wide range of landscape applications in place of, or in addition to, more traditional stormwater control measures. A total of \$103,080 in grant funds were awarded to local governments through a competitive process for projects. In addition, the grant provides for outreach and education designed to promote green development in Tennessee communities. The grants required a 20 percent local match.
- TDEC continued to work with the TVA to implement riparian restoration projects in the Upper Elk River watershed and will expand into the Upper Duck River watershed. This multi-agency collaboration included TDEC, Tennessee Department of Agriculture (TDA), TVA, U.S. Fish and Wildlife Service (USFWS), Tennessee Wildlife Resources Agency (TWRA), Natural Resources Conservation Service (NRCS), Farm Services Administration (FSA), and Tennessee Stream Mitigation Program (TSMP).

- TDEC awarded two 604(b) Planning Grants in 2019:
 - East Tennessee Development District to consider water quality monitoring, assessment and best management practices within the City of Maryville Municipal District.
 - Upper Cumberland Development District to work with Tennessee Tech University to develop a watershed management plan for the Town of Gainesboro, located in Jackson County within the Doe Creek watershed.
-
- TDEC, in partnership with TVA and the University of Tennessee (UT), completed a feasibility study for nutrient trading. Building upon a 2008 UT report, the study will help determine the feasibility of point-to-nonpoint nutrient trading in Tennessee. Initially examining the Elk River watershed, the study will have statewide applicability.
- TDEC, as part of a multi-agency collaboration to restore connectivity in aquatic ecosystems, reviews candidate river barriers such as culverts and low-head dams for removal or restoration. The members of the committee (TWRA, United States Army Corps of Engineers (USACE), TVA, TNC, USFWS, TDEC, Cumberland River Compact, American Rivers and others) meet twice per year to prioritize the list and seek funding to implement barrier removal. The prioritized list typically represents older roadway and driveway culverts and concrete or masonry weir-type structures, normally only a few feet tall that were built many years ago to power gristmills and small industries. The list does not include farm dams (unless requested by the owner/operator), water supply lakes or power-generating dams.

Low head or run-of-river dams present a safety hazard to the public because of their capability of producing dangerous recirculating currents, large hydraulic forces, and other hazardous conditions sufficient to trap and drown victims immediately downstream from the overflowing water. Increasing numbers of kayakers, canoers, rafters, boaters, anglers, and swimmers are often unaware of, or underestimate, the dangerous forces and currents that these dams or similar hydraulic structures can produce. This type of barrier removal also eliminates barriers to fish migration, relieves stagnation, improves water quality, and increases biodiversity. (more information can be found at: <http://www.safedam.com/low-head-dams.html>)

In 2015 and 2016, two low-head dams in Davidson County were removed from Seven Mile Creek and Richland Creek. In 2017, a decrepit low head dam on the Roaring River in Jackson County was removed by the TWRA.

- TDEC entered into an agreement with the City of Cookeville to do a study in Falling Water River. The data collection phase of the project has concluded and TDEC is working with stakeholders to review the data and identify the next step in the process.
- TDEC has received a grant from the USGS to create a data entry portal for regulated water withdrawals in Tennessee. TDEC has completed Phase 1 of project to create a data entry portal for regulated water withdrawals of Tennessee. This electronic reporting system will be easier for stakeholders to report withdrawals and will reduce the number of errors.
- TDEC continued a collaborative project with the stakeholders, USGS and EPA to conduct the field work, modeling and report writing for a nutrient TMDL in the Harpeth River watershed.
- TDEC has been working with water systems to identify ones vulnerable to Harmful Algal Blooms (HAB) by sharing a list of indicators provided by EPA. Thirty-two systems were identified and TDEC continues to work to form partnerships with those systems and the private sector to address them. Sampling was conducted in the spring of 2016 and again in the summer of 2017. No significant occurrence of HAB and associated cyanotoxins were detected. TDEC continues surveillance and monitoring efforts through the use of EPA's Cyanobacteria Assessment Network (CyAN) and has formed a statewide HAB workgroup which includes stakeholders from USGS, USACE, TVA, TDA, TDH, TWRA, Tennessee State University (TSU), Middle Tennessee State University (MTSU), Tennessee Tech University, and Vanderbilt University. The Workgroup is tasked, in part, with evaluating predictive tools for HABs, and assisting in development of a response plan for a HABs toxic release in TN which includes agency roles, responsibilities and resources. TDEC has also employed USGS to assist TDEC in development and refinement of HAB model software.

- In 2018, Tennessee Gov. Bill Haslam assembled stakeholders from federal, state and local governments, as well as industry, academia, environmental advocacy groups and public utilities to develop a statewide plan for future water availability in Tennessee. The plan, named TN H2O, includes an assessment of current water resources and recommendations to help ensure Tennessee has an abundance of water resources to support future and economic growth. More about the TN H2O Plan can be found here: <https://www.tn.gov/environment/program-areas/wr-water-resources/tnh20.html>
- TDEC is collaborating with the Duck River Agency and TVA to model the effects of altered releases from Normandy Dam on dissolved oxygen and ammonia concentrations in the Duck River.

3.0 TENNESSEE WATERSHEDS

3.1 Definition

A watershed can be defined as the entire land area that ultimately drains into a particular watercourse or body of water. Watersheds vary in shapes and sizes, and are appropriate as organizational units because they are readily identifiable landscape units with readily identifiable boundaries that integrate terrestrial, aquatic, and geologic processes. Focusing on the whole watershed helps reach the best balance among efforts to control point source pollution and polluted runoff as well as protect drinking water sources and sensitive natural resources such as wetlands (EPA-840-R-98-001).

In the early 1970's, the USGS delineated 55 hydrologic watershed boundaries (HUC-8s, or 8-digit Hydrologic Unit Codes) within Tennessee. Proper names, as well as a unique grouping of numbers, are used to identify watersheds. For each watershed, this number is called the watershed's Hydrologic Unit Code, or HUC. The HUC can range from 2 to 16 digits long, more digits indicating that a smaller portion of the watershed is represented.

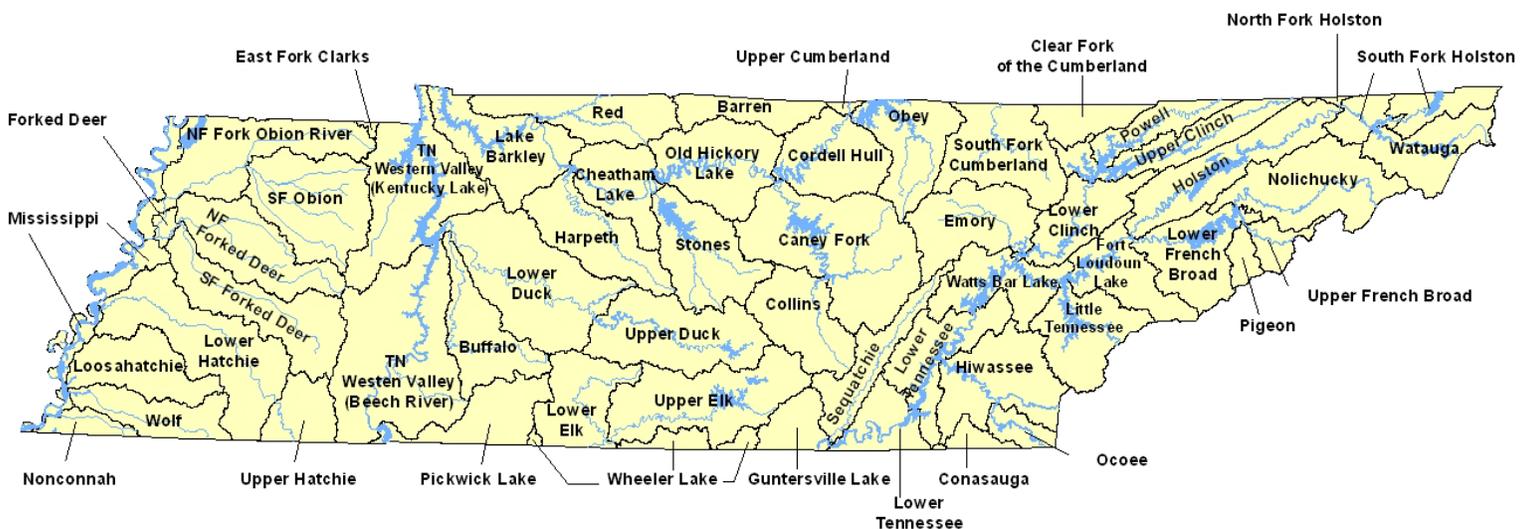


Figure 1 Watersheds in Tennessee: Tennessee contains all or part of 55 HUC-8 watersheds which were delineated by the United States Geological Survey (USGS).

3.2 The Watershed Approach

In 1996, Tennessee began the watershed approach with the goals of making processes more Efficient (administratively), more Effective (consistent with basic ecological principles), and more Equitable (increase consistency in management decisions). Today, the division continues to apply these 3-E principles as we synchronize planning, monitoring, water quality assessment, TMDL development, restoration plan development and permitting activities through a 5 year watershed cycle.

In Tennessee, activities such as permitting, planning, and monitoring are coordinated using the Watershed Approach. This Approach utilizes features already in state and federal law, such as Water Quality Standards, the permitting program (National Pollutant Discharge Elimination System, or NPDES), TMDLs, Nonpoint Source Program, and groundwater monitoring.

3.3 Watershed Planning

The 55 watersheds in Tennessee have been organized into five groups based on the year of implementation in a five-year cycle. The Division of Water Resources bases its activities for each group by the group's position in the cycle. The cycle also coincides with the issuance and duration of discharge permits.

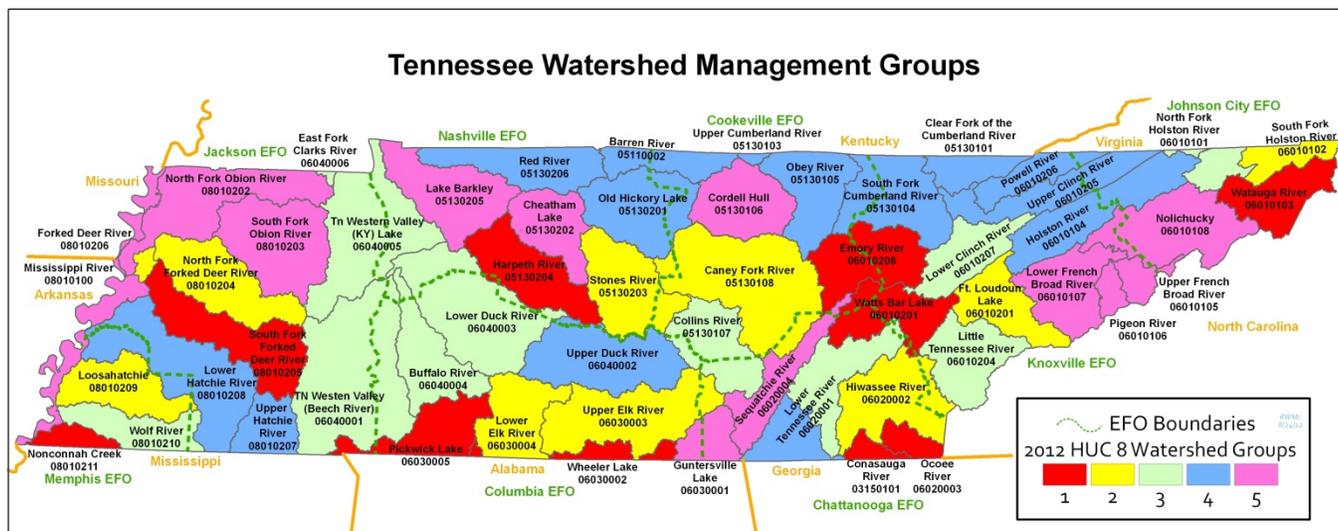


Figure 2 Watershed Management Groups in Tennessee: *Tennessee's watersheds are organized into five groups in the Watershed Approach.*

More information about Tennessee's Watershed Management Approach can be found on the department's website at: <https://www.tn.gov/environment/program-areas/wr-water-resources/watershed-stewardship/watershed-management-approach/watershed-management-cycle.html>

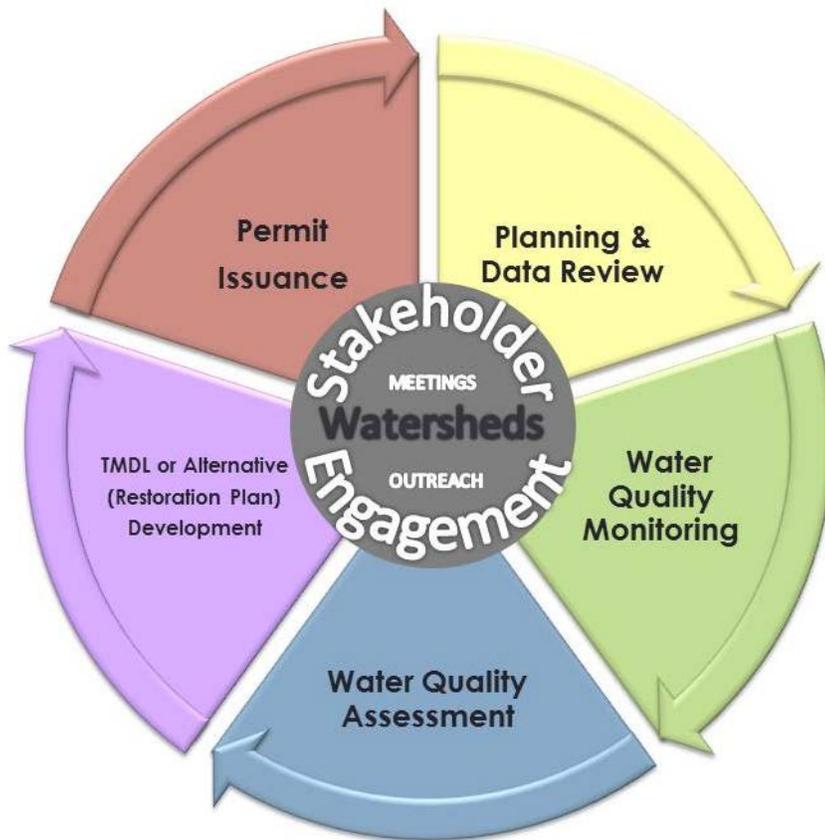


Figure 3 Watershed Approach Cycle: *Tennessee uses a five-year watershed cycle for watershed protection.*

The five key activities that take place during the five-year management cycle are:

1. Planning and Existing Data Review. Existing data and reports from appropriate agencies and organizations are compiled and used to describe the current conditions and status of lakes, rivers and streams. Reviewing existing data and comparing agencies' work plans guide the development of an effective monitoring strategy.

2. Water Quality Monitoring. Field data are collected for streams in the watershed. These data supplement existing data and are used for the water quality assessment.

3. Water Quality Assessment. Monitoring data are used to determine the status of the stream's designated use supports.

4. TMDL or Alternative (Restoration Plan) Development. Monitoring data and models (hydrologic and/or water quality) are used to analyze pollutant loads for permitted dischargers releasing wastewater in the watershed and to determine nonpoint source pollution contributions. The resulting TMDLs establish maximum allowable loadings of pollutants that a waterbody can receive while still meeting water quality standards. Alternatives to TMDLs that lead to waterbodies meeting water quality standards are also considered.

5. Permit Issuance. Issuance and expiration of discharge permits are synchronized based on watersheds. Currently, over 1,700 permits have been issued in Tennessee under the federally delegated National Pollutant Discharge Elimination System (NPDES) permit program.

Stakeholder involvement opportunities occur throughout the entire five-year cycle. Division of Water Resources Staff attend or host watershed outreach events which are interactive and designed to engage the public. Stakeholders have an opportunity to interact with representatives from federal, state, and local governments, universities, and nongovernment organizations about activities in the watershed that lead to improved water quality and learn how they can be a part of these activities.

Tennessee's Watershed Approach, Watershed Water Quality Management Plans, updates, and public participation opportunities, are found on the web at:

<https://www.tn.gov/environment/program-areas/wr-water-resources/watershed-stewardship/watershed-management-approach.html>

4.0 POINT AND NONPOINT SOURCE POLLUTION CHALLENGES TO WATERSHED PROTECTION

Water quality is impacted by both point and nonpoint source pollution. Tennessee uses the Watershed Approach to integrate point and nonpoint contributions in order to understand the challenges and identify the solutions necessary to improve water quality.

4.1 Point Sources of Pollution

Point Source pollutants are typically discharged through a discrete conveyance like a pipe or ditch. In the Clean Water Act, a point source is defined as any discernible, confined, and discrete conveyance including, but not limited to, any pipe, ditch, channel, conduit, tunnel, well, discrete fissure, container, rolling stock, Concentrated Animal Feeding Operation (CAFO), landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff.

The Division of Water Resources has authority to regulate this type of discharge through its NPDES program. Permits issued to municipalities, industries, and some agricultural operations are based on the protection of criteria set out in the state's water quality standards. More information about the point source permitting program is available at:

<https://www.tn.gov/environment/permit-permits/water-permits1/npdes-permits.html>

4.1.A Issue of Concern

Unavailable Waters. Tennessee's list of impaired streams is a compilation of the streams and lakes in Tennessee's watersheds that are water quality limited for a parameter or expected to exceed water quality standards in the next two years and need additional pollution controls. Water quality limited streams are those that have one or more properties that violate water quality standards after technology-based effluent limitations have been put in place. They are considered impaired by pollution and not fully meeting designated uses, and therefore unavailable for additional pollutant loading for that parameter.

Once a stream has been placed on the impaired list, it is considered a priority for water quality improvement efforts. These efforts include traditional regulatory approaches such as permit issuance, but also include efforts to control pollution sources that have historically been exempted from regulations, such as certain agricultural and forestry activities.

TDEC uses its regulatory authority to control point source pollution that are causes of impairment in watersheds. A new list of impaired waters will be submitted to EPA in 2020.

TDEC's draft 2020 303(d) List of Impaired Waters can be found on the division's publications page:

<https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-quality-reports---publications.html>

Stormwater. EPA and state water quality agencies have realized the severe impact that rainwater runoff from urban and urbanizing areas has on surface waters. Rainwater falling on industrial sites, urban areas, and construction sites can become contaminated with runoff loaded with sediments, bacteria, suspended solids, nutrients (phosphorus and nitrogen), metals, pesticides, organic material, and floating trash. These pollutants are then carried to surface waters. Unlike sanitary wastewater and industrial wastewater, most stormwater is not treated prior to entering streams. Pollution of stormwater runoff must be prevented at the source.

Federal, state, and local governments have passed laws and regulations to address the problem of polluted runoff. EPA initiated a national stormwater permitting program in the early 1990s that applied to industrial activities, construction sites of five acres or more, and urban runoff from larger cities (Phase I).

Phase II regulations later addressed additional urbanized areas, certain cities with a population over 10,000, and construction activities of one acre or more. In Tennessee, TDEC implements the Phase I and Phase II programs through authorization from EPA.

Based on recent census and water quality data, no new municipalities were required to obtain coverage under the NPDES Municipal Separate Storm Sewer System (MS4) permit program and develop and implement programs for control of stormwater runoff quality in 2019. The total number of regulated stormwater collection systems operators remains at 108. The success of these programs will determine to a large extent the degree to which clean water goals are achieved in urban municipal areas.

MS4s have an opportunity to apply for Qualifying Local Program (QLP) status, under which they participate with TDEC in standardized interagency enforcement protocols and the QLP status is recognized as an alternative measurement of MS4 effectiveness. Obtaining QLP status is optional, but all MS4s are encouraged to consider participation. Open enrollment for new Qualified Local Program (QLP) candidates began July 1, 2013.

The most significant benefits of a QLP include:

- A more streamlined and efficient process for managing construction stormwater by eliminating permit and review duplication at the local and state levels
- Eliminating additional effort at the state level for construction site operators by providing only one set of requirements to follow; and
- A more effective construction stormwater program resulting in greater water quality protection.

Current QLPs are Bristol, Cleveland, Cookeville, Franklin, Kingsport, Knoxville and Washington County. More information on the QLP is on the TDEC website at:

<https://www.tn.gov/content/tn/environment/permit-permits/water-permits1/npdes-permits1/npdes-stormwater-permitting-program/tennessee-qualifying-local-program.html>

Mining. Mining activity from coal and non-coal mine sites discharge mine treated wastewater and stormwater runoff. Activities at mine sites may also involve disturbance of water features such as streams and wetlands. These activities require an Aquatic Resource Alteration Permit (ARAP) and 401 Certification from the Division's Mining Section. Controlling these sources is critical to protecting waters and watersheds in our state.

Coal mining has a long history of economic importance to the Cumberland Plateau and East Tennessee communities, and a legacy of environmental impact as well. Siltation/sedimentation, acid mine drainage (AMD), and metals from improper mining practices and controls can, and has, impacted some streams. The division's mining section issues NPDES permits, for both coal and non-coal mining facilities with stringent effluent limits for the protection of the receiving streams and their classified uses. While wastewater discharges from coal mines are regulated under the NPDES program in Tennessee, surface mining permits for coal mining in Tennessee are issued by the U.S. Department of Interior, Office of Surface Mining, Reclamation, and Enforcement (OSMRE) under federal mining laws. This includes the reclamation of the mine site. All such permits are consistent with the stream buffer zone requirement that the General Assembly enacted in 2009 known as the Responsible Miners' Act of Tennessee. That law prohibits mining or disposal of waste or overburden material into a stream or within 100 feet on either side of the stream.

Operators who engage in mineral mining and surface disturbances, as per the 1972 Tennessee Surface Mining Law, are required to obtain a state surface mining permit, from the Tennessee Division of Water Resources Mining Section. An NPDES permit must accompany the surface mining permit. In all counties, mining of the following minerals requires a surface mining permit: clay, stone, phosphate rock, metallic ore and any other solid material or substance of commercial value found in natural deposits on or in the earth. There are some exemptions for other minerals. More information about TDEC's mining program can be found at:

<https://www.tn.gov/environment/permit-permits/water-permits.html>.

On October 1, 2010, the State of Tennessee filed a Lands Unsuitable for Mining (LUM) petition with the federal government requesting ridgelines on land managed for public use on the Northern Cumberland Plateau be deemed unsuitable for surface coal mining. The petition area reflected a ridgetop corridor encompassing 67,326 acres notable for its old growth forest as well as a diverse array of habitats and wildlife, some of which are considered rare or threatened. These lands are managed by the state for hunting, hiking, wildlife viewing, and other outdoor recreational activities. The petition asked the federal government to help prevent surface mining on these ridgelines to protect their important cultural, recreational, and scientific resources for future generations. Preventing surface mining on these ridgelines would also provide essential protection for vital headwater streams that supply key river systems, including Exceptional Tennessee Waters and Outstanding National Resource Waters. No new mining permits were to be issued within the proposed petition area while the petition was under review. Eight environmental groups, three industry groups, and Campbell County intervened on behalf of their constituents. OSMRE has cooperated with EPA, the US Fish and Wildlife Service, and the National Park Service to complete the combined Petition Evaluation Document/Environmental Impact Statement (PED/EIS).

On December 11, 2015, OSMRE and the Department of the Interior (DOI), upon finding merit to the state's petition, announced a draft proposal and draft EIS along with a 45-day public comment period, and released six action alternatives. The preferred alternative chosen at that time was Alternative 3. Under that alternative, OSM would designate as unsuitable for surface coal mining all public lands in the State's petition. This area included 505 miles of ridgelines with a 1200 foot corridor (600 feet on either side of each ridgeline) for a total of 67,326 acres. The designation would not have prohibited underground mining and auger mining that was based outside the petition area as long as it caused no surface disturbances within the petition area. Re-mining would also have been allowed pursuant to 30 CFR 785.25 to engage in surface coal mining to reclaim previously mined areas, as well as the development and use of access and haul roads to facilitate re-mining activities. Under this alternative, there was the potential to eliminate 183.7 of the 201.6 miles of high wall identified by re-mining.

Upon receiving public comments and subsequent evaluation by OSM, Alternative 4 was chosen. This alternative, the Expanded Corridor with Potential Re-mining and Road Access Alternative, designated 569 miles of ridgeline (1200 foot corridor) and includes 76,133 acres for protection. It included the ridgelines proposed in the state's petition plus additional ridgelines identified by OSM. With this new alternative, 219.5 miles of high wall are now subject to re-mining. This is an actual increase in the potential re-mining areas when compared to Alternative 3 with the added benefit of increased acreage and ridgelines for any new surface disturbance.

More information about the Lands Unsuitable for Mining petition is available at <http://www.osmre.gov/programs/rcm/TNLUM.shtm>

4.1.B Restoration Programs and Tools

Total Maximum Daily Loads (TMDLs). Section 303(d) of the Clean Water Act establishes the TMDL program which: 1) quantifies the amount of a pollutant in a stream, 2) identifies the sources of the pollutant, and 3) recommends regulatory or other actions that may need to be taken in order for the stream to cease being polluted. Some of the actions that might be taken are:

- Reallocation of limits on the sources of pollutants documented as impacting streams. It might be necessary to lower the amount of pollutants being discharged under NPDES permits or to require the installation of other control measures, if necessary, to ensure that water quality standards will be met.
- For sources the division does not have regulatory authority over, such as ordinary agricultural or forestry activities, provide information and technical assistance to other state and federal agencies that work directly with these groups to install appropriate Best Management Practices (BMPs).

More information on Tennessee's TMDLs program is available on the TDEC web site:

<https://www.tn.gov/environment/program-areas/wr-water-resources/watershed-stewardship/tennessee-s-total-maximum-daily-load--tmdl--program.html>

Abandoned Mine Reclamation Program. Abandoned coal mines pose serious threats to public health, safety and welfare as well as degrade the environment. The programs of the TDEC Land Reclamation Section accomplish three important things: 1) they remove dangerous health and safety hazards that threaten the citizens of Tennessee, 2) they improve the aquatic environment, and 3) they restore resources to make them available for economic development, recreation, and other uses. Problems typically addressed by the land reclamation program include open or improperly filled mine shafts, dilapidated mine buildings and equipment, toxic mine refuse and drainage, landslides, mine fires, highwalls and subsidence. Tennessee Code Annotated Section 59-8-324 authorizes the program. Although current mining operations often reclaim some scars from old mining operations, this represents a small portion of the abandoned mine lands, and it rarely addresses the more serious threats to human health and safety. More information is on the TDEC web site at:

<https://www.tn.gov/environment/program-areas/wr-water-resources/mining-information---permits.html>.

State Revolving Fund (SRF) Loan Program. Failing or insufficient water and wastewater treatment systems and wastewater treatment systems threaten the safety of Tennessee's watersheds and water supplies. A useful tool to address these problems is the Clean Water SRF (CWSRF) Loan program, which TDEC uses to provide low interest loans for water quality improvement projects.

An amendment to the federal Clean Water Act in 1987 created the CWSRF loan program in order to provide low-interest loans to cities, counties, and utility districts for the planning, design, and construction of sanitary wastewater facilities. The U.S. EPA awards annual capitalization grants to fund the program, and the State of Tennessee provides a twenty-percent funding match. The SRF Loan Program has awarded CWSRF loans totaling over \$2 billion since the creation of Tennessee's CWSRF Program. Loan repayments are returned to the program and used to fund future CWSRF loans. Tennessee's draft Clean Water SRF Intended Use Plan is available at:

<https://www.tn.gov/environment/program-areas/wr-water-resources/srfp/srf-home/clean-water-state-revolving-fund/clean-water-iup.html>.

The SRF Loan Program also administers Tennessee's Drinking Water State Revolving Fund (DWSRF) Loan Program. An amendment to the federal Safe Drinking Water Act in 1996 created the DWSRF Program in order to provide low-interest loans to cities, counties, and other utilities for the planning, design, and construction of public drinking water facilities. The U.S. EPA awards annual capitalization grants to fund the program, and the state of Tennessee provides a twenty-percent funding match. The SRF Loan Program has awarded DWSRF loans totaling over \$300 million since the creation of Tennessee's DWSRF Program. Loan repayments are returned to the program and used to fund future DWSRF loans. Tennessee's Drinking Water SRF Intended Use Plan is available at:

<https://www.tn.gov/environment/program-areas/wr-water-resources/srfp/srf-home/drinking-water-state-revolving-fund/drinking-water-intended-use-plan.html>.

4.2 Nonpoint Sources of Pollution

Nonpoint sources are diffuse pollution sources (i.e., without a single point of origin or not introduced into a receiving stream from a specific outlet). The pollutants are generally carried off the land by stormwater. The Division of Water Resources works with the Tennessee Department of Agriculture (TDA), UT-Extension, and the US Department of Agriculture Natural Resources Conservation Service (NRCS) to encourage farmers to install Best Management Practices (BMPs). The installation of these BMPs is voluntary and there are often cost-share opportunities for farmers. Financial assistance to control nonpoint sources of pollution is offered by the Tennessee Department of Agriculture (TDA) and the Natural Resources Conservation Service (NRCS).

Two grant programs make up TDA's Land and Water Stewardship Section: the Nonpoint Source Program (TDA-NPS) and the Agricultural Resources Conservation Fund (TDA-ARCF). Both fund proposals from agencies, non-profit organizations (watershed groups), and universities that will reduce water pollution.

The TDA-NPS program administers the Section 319(h) of the Federal Clean Water Act. The program is non-regulatory, promoting voluntary, incentive-based solutions. It funds three types of projects:

1. **BMP Implementation Projects.** These projects improve an impaired waterbody, or prevent waters from becoming impaired.
2. **Monitoring Projects.** Up to 20% of the available grant funds can assist water quality monitoring efforts in Tennessee streams, both in the state's watershed monitoring program, and also in performing before-and-after monitoring following BMP installation, so that water quality improvements can be verified. TDEC Division of Water Resources receives some funds from TDA to conduct water quality monitoring.
3. **Educational Projects.** These projects raise public awareness of practical steps that can be taken to eliminate nonpoint sources of pollution.

The TDA-ARCF provides cost-share assistance to Tennessee landowners to install BMPs that eliminate agricultural nonpoint source pollution. This assistance is provided through Soil Conservation Districts, Resource Conservation and Development Districts, Watershed Districts, universities, and other groups. In addition, a part of the TDA-ARCF is used to fund educational projects statewide, with a focus on landowners, producers, and managers of farms and forests.

More information is available at <https://www.tn.gov/agriculture/forests/ag-forests-forest-protection/ag-forests-water-quality.html>

NRCS, a federal agency that is a part of TDA, provides technical advice and money to landowners willing to install BMPs in accordance with programs described in the federal Farm Bill. Local District Conservationists (approximately one per county) work with landowners to identify voluntary projects that qualify for funding.

NRCS employees provide technical assistance based on sound science and suited to a landowner's specific needs. The agency provides financial assistance for many voluntary conservation activities. The Conservation Technical Assistance (CTA) program provides voluntary conservation technical assistance to land-users, communities, units of state and local government, and other federal agencies in planning and implementing conservation systems. More information about NRCS conservation programs is available at <http://www.nrcs.usda.gov/>

5.0 DRINKING WATER

Safeguarding human health by ensuring safe drinking water for the people of Tennessee is a primary mission of TDEC. The Division of Water Resources is responsible for administering the provisions of the Tennessee Safe Drinking Water Act as well as the Tennessee Water Quality Control Act of 1977 (T.C.A. 69-3-101). The Tennessee Board of Water Quality, Oil, and Gas administers both the Tennessee Safe Drinking Water Act and the Water Quality Control Act.

5.1 Drinking Water Supply

TDEC's Division of Water Resources has responsibility for regulating public water systems and ensuring that Tennessee's citizens have safe drinking water. As a part of this responsibility, the division has developed a Source Water Protection Program for public water systems. A water system works with TDEC personnel as well as other states in (those cases where the source water protection area crosses state lines), federal, and local agencies and non-governmental organizations to promote success of the source water protection program.

An important step toward prevention of contamination of public water supplies is the federal Safe Drinking Water Act Amendments of 1986. At that time, each state was required to develop a wellhead protection program to protect the water source of public water systems relying on groundwater (wells or springs). The new source water assessment provisions in the federal Safe Drinking Water Act of 1996 Amendments expanded the scope of protection beyond groundwater systems to include protection of the waters supplying surface water systems.

Water sources for Tennessee's public drinking water supplies vary considerably across the state. The predominant source of water for West Tennessee is groundwater, whereas in Middle Tennessee it is surface water. East Tennessee relies on both groundwater and surface water, with the groundwater sources frequently being springs. Appendix A contains a listing of water systems and their water sources.

Approximately 2/3 of the community public water systems using groundwater in Middle and East Tennessee have had at least one source determined to be under the direct influence of surface water. This means that these sources of groundwater are located close enough to a source of surface water to receive direct surface water recharge and are thus considered at risk from surface water contaminants and pathogens.

Each year, all public water suppliers are required to review their wellhead or source water protection area for any changes that may have occurred. These are reported to the state in three-year intervals.

5.2 Threats to Water Sources

As the sources for our drinking water vary across the state, so do the types of threats to which those water sources may be subject. The State–EPA Nutrient Innovations Task Group released a document in August 2009 entitled “An Urgent Call to Action” which is available at: <https://www.epa.gov/sites/production/files/documents/nitgreport.pdf>

Water systems threatened by nutrients, pathogens, and Total Organic Carbon (TOC) are illustrated in Appendix B.

Typical groundwater threats are chemical contaminants such as petroleum products and derivatives. These would include gasoline constituents and chlorinated solvents. For groundwater impacted by surface water, surface water contaminants play a role as well. Typical surface water concerns include siltation/sedimentation, pathogens, and nutrients.

5.2.A Drought Impact

In recent years, Tennessee had a number of water systems influenced by drought which caused some systems to institute water restrictions. Many of these water systems were impacted—not by their diminishing water—but by hydraulic or treatment capacity issues due, in large part, to the amount of irrigation of lawns, gardens, and car washing. In some cases, assimilative capacity is the major determining factor in setting minimum flow/discharge rates for streams. This, in turn, has an effect on the amount of water that can be drawn by water treatment plants. The Division developed a web page to provide information to the citizens of Tennessee regarding drought and impacts that drought has on Tennessee’s water supplies.

The web site is at:

<https://www.tn.gov/environment/program-areas/wr-water-resources/drought-updates.html>

5.2.B Emerging Problems

Across the U.S., emerging problems are:

- Cryptosporidium
- Disinfection byproducts
- Human and veterinary pharmaceuticals
- Synthetic Organic Compounds (SOCs)
- Harmful Algal Blooms
- Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS)

Cryptosporidium: Tennessee's drinking water providers have concluded the first round of source water sampling under the Long Term Surface Water Treatment Rule—Part 2. The second round is currently underway. This sampling is for Cryptosporidium to determine if additional treatment is necessary. As of December 1, 2009, community systems relying on groundwater are required to maintain disinfection at a level for 4-log-removal of viruses (99.99%) and continuously monitor effective chlorine residual as a part of the new Ground Water Rule. Very small community and non-community systems (churches, schools, restaurants, and industries) using groundwater are required to complete source water monitoring when bacteria have been detected within the system.

Disinfection Byproducts: Disinfection byproducts are tested under the Disinfection Byproducts Rule which relates to the age of the treated water and chlorine's reaction with naturally occurring organics. As of January 1, 2010, wholesale water systems are required to work with purchasing water systems where the purchasing system has violations from disinfection byproducts (trihalomethanes and haloacetic acids) when the water the purchasing system is receiving is already at or more than 60% of the drinking water standard. (Disinfection byproducts are the result of chlorine's reaction with organic molecules in the source water). The removal of organic carbon in the water treatment process is critical to maintaining the drinking water standards for trihalomethanes and haloacetic acids. Watershed protection is crucial in preventing the compromise of supplying streams by excessive organic loadings. There continues to be a small number of systems that purchase water from other systems that have had disinfection byproduct concentrations slightly above the standards.

Pharmaceuticals: Over the past decade, water quality surveys have indicated that numerous areas of the United States, including Tennessee, have pharmaceuticals and steroid hormones in their waterways. Additional studies have linked the exposure of fish and amphibians to natural and synthetic steroids to reproductive and endocrine disruption (estrogens and/or androgens). Within the State of Tennessee, little is currently known about the potential for pharmaceutical compounds and/or endocrine disrupting compounds to contaminate drinking water supplies. Therefore, TDEC began a project to sample raw (untreated) water from all community water system's source water. In this project we surveyed waters in Tennessee (surface water and groundwater) for the presence of both pharmaceutical compounds and endocrine disrupting compounds. EPA funded this project through an EPA grant through 2011.

While this is a national concern, no water systems in Tennessee were identified with pharmaceuticals above any published health-based standards or other guidance-based levels. In addition, no drinking water supplies in Tennessee are currently known to be compromised by high levels of cryptosporidium, disinfection byproducts, or pharmaceuticals in Tennessee.

Synthetic Organic Compounds: Tennessee's EPA-approved SOC monitoring waiver program required that community and non-transient non-community water systems sample for a reduced number of SOCs during the growing season in 2014, 2015 or 2016 (current monitoring period). Systems were sent letters in April of 2014 notifying them which SOCs were to be sampled based on United State Geological Survey pesticide surveys relative to the counties that the systems' source water protection areas fell within and type of water source (surface water, groundwater under the influence of surface water or true groundwater sources). A substantial number of systems chose to do their sampling in 2014 and 2015. A new round of sampling began in 2017 and ran until the end of June 2019.

PFOA & PFOS: Over time, PFOAs and PFOS have been widely used in the United States due to their ability to repel water and oil. They were used in the food industry in wrapping papers and the textile industry as a stain repellent as well as in firefighting foams. These products have not been manufactured in the United States since 2002 but some instances of contamination are still present in the environment. In Tennessee one system was identified with a PFOA occurrence in the 2016 sampling. This system is being resampled and the area is under investigation to determine if this is an actual occurrence or a lab artifact. TDEC plans to begin further sampling of PFOAs and PFOS in water system sources in 2020.

5.3 Other Issues

5.3.A Karst

Tennessee has an abundance of karst (Figure 4) which is highly susceptible to contamination. Karst is characterized by rock formations with sinkholes, springs, disappearing streams and caves; as well as by rapid, highly directional groundwater flow in discrete channels or conduits. Karst systems may be easily contaminated since the waters can travel long distances through conduits with no chance for natural filtering processes of soil or bacterial action to diminish the contamination. Transport times across entire karst flow systems may be as short as hours or weeks; orders of magnitude faster than that in sand aquifers.

Groundwater was once thought to be safe from contamination, but there is an increasing awareness that groundwater needs to be monitored and protected as a valuable resource. Groundwater can be quite vulnerable to contamination, particularly in limestone areas or in unconfined sand aquifers (water bearing zones). This vulnerability is particularly true for contamination from the highly mobile and widely used volatile organics (chlorinated solvents and gasoline components) and pathogenic microorganisms (bacteria and protozoa).

Water in karst areas is not distinctly surface water or groundwater. In unconfined or poorly confined conditions, karst aquifers have very high flow and contaminant transport rates under rapid recharge conditions such as storm events. This is a particular concern for public water systems using wells or springs in karst areas where pathogenic organisms that would not be present in true groundwater can survive in groundwater under the influence of surface water. TDEC concluded an EPA-funded study of karst terrain in five subwatersheds in the Red River Watershed (in Montgomery, Robertson, and Stewart Counties) in 2011.

KARST AREAS OF TENNESSEE

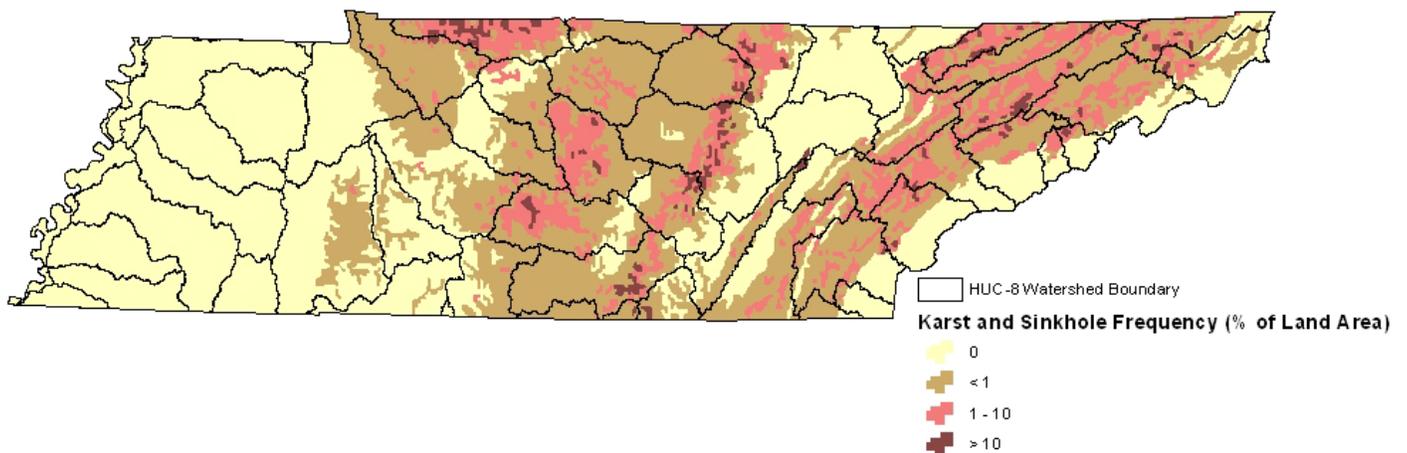


Figure 4 Karst Areas of Tennessee

5.3.B Mercury in Bridges

As part of an ongoing investigation, TDEC identified 103 locations scattered throughout Wayne, Hickman, and Lewis Counties where re-purposed panels used on bridges contain elemental mercury. The bridges consist of former mercury cell parts from a former chlor-alkali plant that the county highway departments and local residents installed as small bridges on public roads and private driveways. The panels contain mercury on the underside of the bridges in grout-like material similar to concrete. The identified locations include 89 bridges, 13 locations with loose panels (not used as bridges), and one location where a panel is part of a roadway retaining wall.

Remedial actions performed to-date include stabilization of the identified bridges to prevent further release of mercury, and remedial actions are ongoing to remove and replace these bridges in a manner that allows transportation access to county residents. The remedial actions on 82 bridges were completed as of 2018. Samples of surface water, wetlands, and fish tissue do not indicate the need for stream postings or fish consumption advisories; however, the evaluation of area streams and fish will continue as the remedial contractor removes the remaining bridges.

In October 2017, the remedial contractor chose not to bid for completion of the remaining bridges, so a new contractor is continuing this work. TDEC expects that the new contractor will complete the remaining bridges in 2020.

5.3.C Regional Water Supply Planning

TDEC partnered with the federal and state agencies, nongovernmental organizations and other regional planning experts to form a Water Resources Technical Advisory Committee (WRTAC) and to initiate a water resources planning pilot in two areas significantly impacted by the drought of 2007.

WRTAC was authorized by the Tennessee Water Resources Information Act in 2008. One of the first tasks that the committee completed was the development of a framework for regional water supply planning.

To fulfill a portion of the commissioner's charge to the WRTAC, the committee has produced a "Statewide System of Basic Hydrologic and Water System Information," and produced the "Regional Water Supply Plans Approval Process for Tennessee". The WRTAC reports can all be found on the TDEC web site at:

<https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-resources-regional-planning.html>.

6.0 WATER QUALITY

6.1 Surface Waters

The Division of Water Resources monitors surface waters and compares results with the criteria set out in Tennessee's Water Quality Standards (Rule Chapter 400-40-03). A number of specific surveys are conducted, including studies of in-stream biological communities, chemical studies, probabilistic studies, and documentation of contaminant levels in sediment and fish flesh. The fish and bacteriological data generated by the division are used by TDEC to issue advisories to the public when levels of contaminants exceed those considered to be protective of public health.

Tennessee produces a document called The Status of Water Quality in Tennessee. Also called the 305(b) Report (for the Section of the Clean Water Act requiring it), the report summarizes the status of water quality and the leading causes of impairment in each of Tennessee's watersheds.

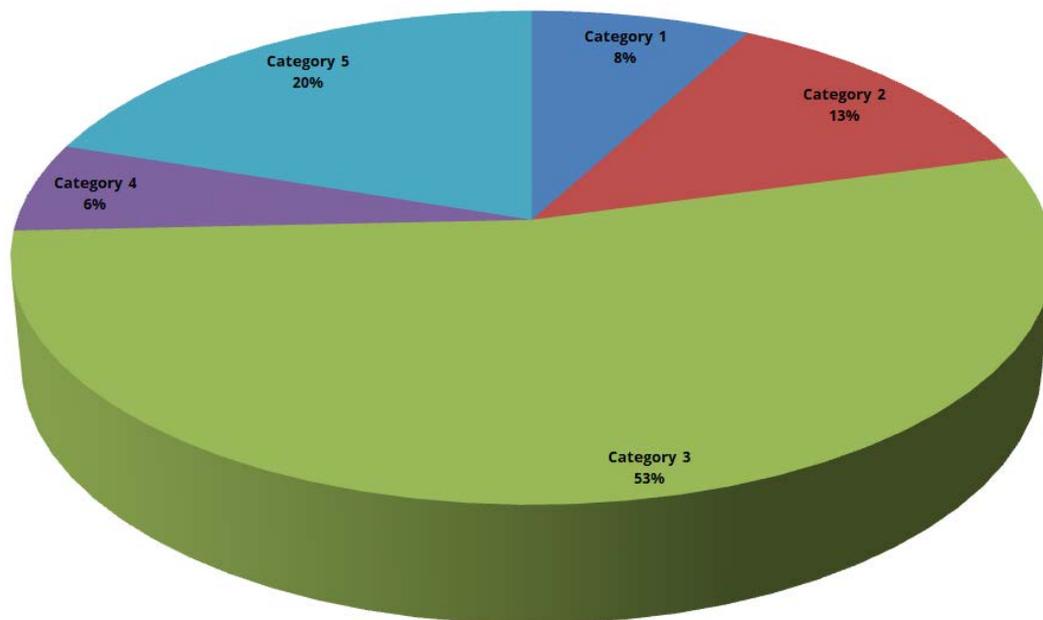


Figure 5 Water Quality Status of Rivers & Streams in Tennessee: *as illustrated in the 2018 305(b) Report.*

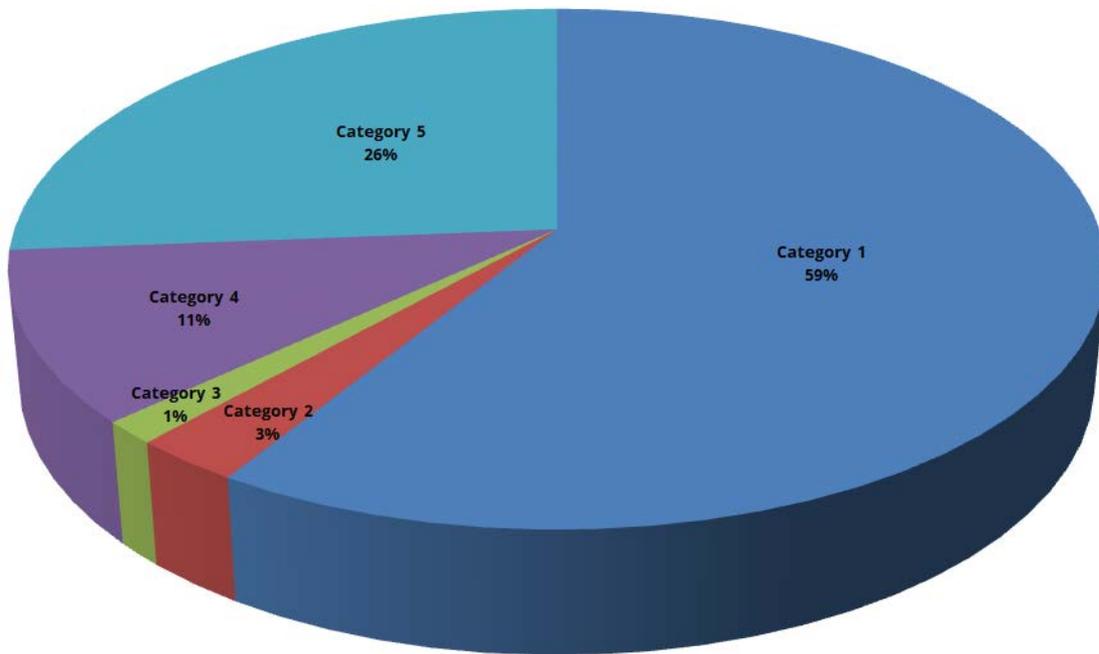


Figure 6 Water Quality Status of Lakes & Reservoirs in Tennessee: *as illustrated in the 2018 305(b) Report.*

Integrated Report Categories:

Category 1: waters are fully supporting of all designated uses. These streams, rivers, and reservoirs have been monitored and meet the most stringent water quality criteria for all designated uses for which they are classified. The biological integrity of Category 1 waters is favorably comparable with reference streams in the same subcoregion and pathogen concentrations are at acceptable levels.

Category 2: waters are fully supporting of some designated uses, but have not been assessed for all uses. In many cases, these waterbodies have been monitored and are fully supporting of fish and aquatic life but have not been assessed for recreational use.

Category 3: waters are not assessed due to insufficient or outdated data. However, streams previously identified as impaired are not moved to this category simply because data are old.

Category 4: waters are impaired, but a TMDL has been completed or is not required. Category 4 has been further subdivided into three subcategories.

Category 4a: impaired waters that have already had all necessary TMDLs approved by EPA.

Category 4b: impaired waters do not require TMDL development since “other pollution control requirements required by local, state or federal authority are expected to address all water-quality pollutants.” An example of a 4b stream might be where a discharge point will be moved in the near future to another waterbody with more assimilative capacity.

Category 4c: impaired waters in which the impacts are not caused by a pollutant (e.g., flow alterations).

Category 5: waters have been monitored and found not to meet one or more water quality standards. These waters have been identified as not supporting their designated uses. Category 5 waterbodies are moderately to highly impaired by pollution and need to have TMDLs developed. These waters are included in the 303(d) List of impaired waters in Tennessee.

The current 305(b) Report is available at:

<https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-quality-reports---publications.html>

The 2014 305(b) Report indicates that pathogens, habitat alterations, siltation, and nutrients are the leading causes of impairment in Tennessee streams.

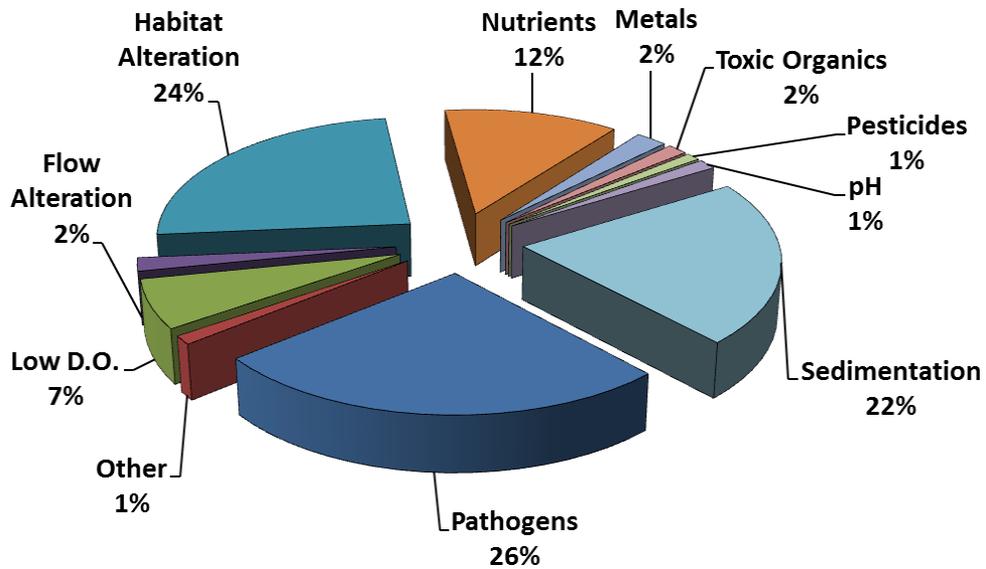


Figure 7 Relative Impacts of Pollution on Impaired Rivers & Streams in Tennessee: *as illustrated in the most recent 305(b) Report.*

The 2014 305(b) report identifies organics, metals, and low dissolved oxygen as the leading causes of impairments in Tennessee lakes

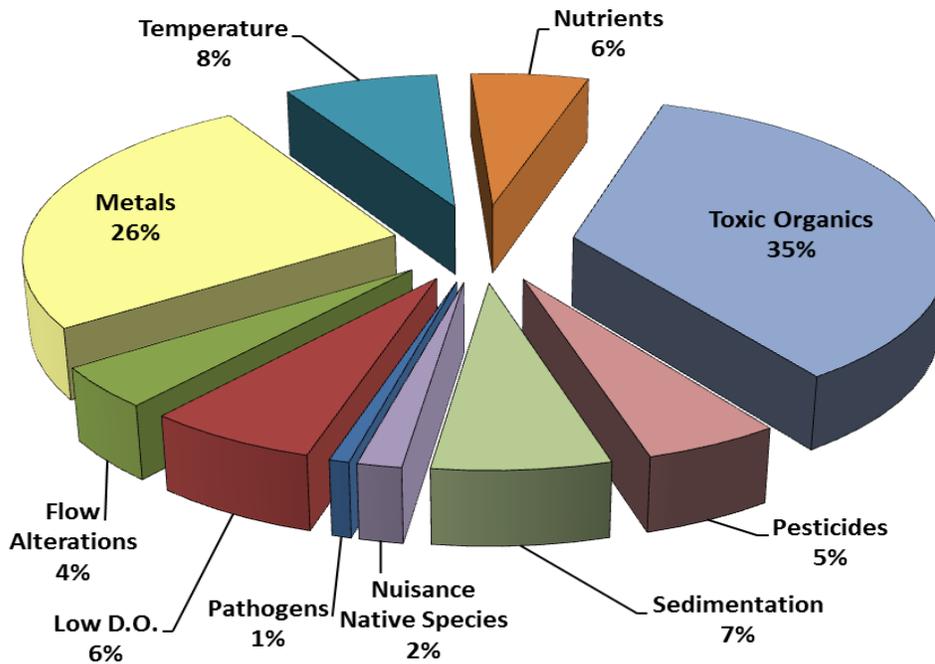


Figure 8 Relative Impacts of Pollution on Impaired Lakes & Reservoirs in Tennessee: *as illustrated in the most recent 305(b) Report.*

The Division of Water Resources also prepares a list of Impaired and Threatened Waters in Tennessee. The List is a compilation of the lakes, rivers, and streams in Tennessee that either fail to meet, or are soon expected to fail to meet, one or more water quality standards. In addition, the list provides pollutant information and TMDL prioritization for impaired and threatened segments. The new version of the List reflects the results of a reassessment of the Group 1 watersheds that took place in 2019. The draft 2020 list of Impaired and Threatened Waters is available at:

<https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-quality-reports---publications.html>

Additional information about surface water monitoring in Tennessee watersheds is found in the Watershed Water Quality Management Plans. These plans are available for viewing at: <https://www.tn.gov/environment/program-areas/wr-water-resources/watershed-stewardship/watersheds-by-basin.html>

6.2 Groundwater

The Division of Water Resources' groundwater program is responsible for reviewing wellhead protection plans, administering the Underground Injection Control program, and ambient groundwater monitoring. The division also conducts an enforcement program which requires water suppliers to meet requirements of the Safe Drinking Water Act with respect to water quality and information reporting. More information, including water withdrawal of groundwater, is at:

<https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-withdrawal-registration-program.html>

The Division of Water Resources' groundwater program produces a report that describes the status of groundwater quality. The most recent report is posted at:

<https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/drinking-water-redirect.html>.

6.3 Source Water Assessment

Section 1453 of the 1996 Safe Drinking Water Act (SDWA) Amendments required that all states establish Source Water Assessment Programs (SWAP), and submit a plan to EPA by February 6, 1999 detailing how they would:

- Delineate source water protection areas
- Inventory significant contaminants in these areas
- Determine the susceptibility of each public water supply to contamination

Tennessee's Source Water Assessment Plan was approved in November of 1999. By April of 2003, the source water assessments of the community groundwater systems and the source water assessments for the community and non-community surface water systems were completed. Shortly thereafter, they were sent to the public water systems and made available on the TDEC website (<https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/source-water-assessment.html>). The source water assessments for the non-community groundwater systems have also been completed.

The assessments are intended to enhance the protection of drinking water supplies within existing programs at the federal, state and local levels. Tennessee's SWAP efforts are being used to improve the existing source water protection efforts within Tennessee's Wellhead Protection Program and Watershed Management Program.

Source water protection areas for public water systems using surface water have been based on the portion of the watershed area upstream of the water intake using time of travel (the time it takes for water to travel a given distance) and a 1000-foot corridor on either side of the stream.

All water systems in Tennessee are to update these assessments on a regular basis as required by rule. In 2014 Tennessee updated the reporting requirements in TCA 0400-45-01-.35, requiring assessments to be updated every year with a report to the state every three years. The complete Tennessee Source Water Assessment Report and appendices are found at:

<https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/source-water-assessment.html>.

Maps illustrating delineated source water protection areas in Tennessee watersheds are found in Appendix C.

7.0 CITIZEN INVOLVEMENT

Through public hearings, meetings, and other types of public information sessions, the public provides input on proposed actions that affect watersheds and potable water quality. There are several opportunities for citizens to be involved:

- Outreach. Participate in a watershed event hosted by the division or visit a division booth at various events across the state. Information about events that are provided by the event hosts are posted on the watershed events page and on Facebook.
- Comment on proposed Water Quality Standards. Water Quality Standards are updated every three years, following a series of public hearings across the state. Public comments are considered before a final recommendation is made to the Tennessee Board of Water Quality, Oil and Gas for approval. The last update was in 2019.
- Comment throughout the year on draft permits during public comment period. Draft permits are placed on public notice and posted at:
<https://www.tn.gov/environment/ppo-public-participation/ppo-public-participation/ppo-water.html>.
- Comment on proposed list of impaired waters. Meetings are held across the state at convenient locations in order to seek public comment on the draft list. Following the meetings, the Division of Water Resources submits the list to EPA for approval. This list is compiled every two years. The most recent public meetings were held in January 2020.

- Comment on proposed TMDLs that are placed on public notice and posted at: <https://www.tn.gov/environment/ppo-public-participation/ppo-public-participation/ppo-water.html>.
- Address the Tennessee Board of Water Quality, Oil and Gas. The Board has traditionally assigned April and October as the months for the public to make comments (oral or written) on any water quality issue. Board meeting schedules and agendas are posted at <https://www.tn.gov/environment/about-tdec/boards-and-commissions/board-tennessee-board-of-water-quality--oil-and-gas.html>.

The public can navigate through a list of public participation opportunities at:

<https://www.tn.gov/environment/ppo-public-participation/ppo-public-participation/ppo-water.html>.

Comments on any issue are welcome at any time and may be made by filling out the form at: <https://www.tn.gov/environment/ask-tdec-form.html>

8.0 RECOMMENDATIONS

The 2006 amendment to the Water Quality Control Act requires that recommendations be presented to the Governor and the General Assembly annually. TDEC's recommendations are:

- Continue close communication with Tennessee's congressional delegation on matters involving water resource management, clean water programs, and funding. This includes federal lead and copper regulations.
- Tennessee's infrastructure, including municipal water/wastewater distribution, collection, transport and treatment systems, are critically important to the protection of public health and the environment. Across the state there are numerous aging systems in need of major repair. The costs for this work can be very difficult for these system to bear on their own. Federal support for water and wastewater infrastructure in Tennessee has contributed significantly over the years to water quality improvement, but needs still exceed available funds. The State Revolving Loan Programs are an option for funding water or wastewater infrastructure needs. Tennessee should continue to support the State Revolving Loan Program, as well as

take advantage of any new federal programs that become available such as newly available grants under the Water Infrastructure Improvements for the Nation (WIIN) Act and America's Water Infrastructure Act (AWIA). Tennessee became the first state in the U.S. to be awarded the Assistance to Small and Disadvantaged Communities Drinking Water Grant enacted under the 2016 Water Infrastructure Improvements for the Nation Act (WIIN Act). Two small and disadvantaged communities experiencing challenges in complying with the Safe Drinking Water Act (SDWA) will receive assistance under this grant. The City of Clifton will receive \$707,500 to develop plans and specifications for a new water treatment plant to replace the existing aging/failing plant. The City of Spencer will receive \$630,681 to develop plans and specifications to address plant-wide issues associated with excessive disinfection byproducts and water loss. The grants will be awarded in 2020.

- Drought management is essential in Tennessee. The legislature should work with TDEC and other agencies to implement the recommendations of the Tennessee H2O Plan of 2018 on outreach, developing a process for evaluating and prioritizing the recommendations, and initiating a regular cycle of updates for a water plan.
- Excess nutrient loads in Tennessee waters are becoming a larger threat for human and environmental health. Nutrients come from numerous sources, so multiple stakeholders will need to work together to solve the problem. The legislature should support the work of multi-disciplinary stakeholders in collaborating for the development and implementation of a statewide nutrient strategy aimed at reducing Tennessee's loading of nitrogen and phosphorus to the Mississippi River, and ultimately the Gulf of Mexico.

APPENDIX A – WATER SYSTEMS & THEIR SOURCES

Water System Name	County	Source Type	Source Name	Watershed Name	Population
CLARKSVILLE WATER	Montgomery	Surface Water	CUMBERLAND RVR	Lake Barkley	215421
ERIN WATER DEPARTMENT	Montgomery	Surface Water	CUMBERLAND RIVER	Lake Barkley	7283
CUNNINGHAM EAST MONT WAT	Montgomery	Surface Water	CUMBERLAND RIVER	Lake Barkley	25
FORT CAMPBELL WATER SYSTEM	Montgomery	Surface Water	BOILING SPRING	Red River	40000
LAFAYETTE WATER SYSTEM	Macon	Surface Water	ADAMS SPRING	Barren River	19146
LAFAYETTE WATER SYSTEM	Macon	Spring	SPRING CREEK SP	Barren River	19146
RED BOILING SPRINGS WATER	Macon	Spring	SABEN SPRING	Barren River	5823
RED BOILING SPRINGS WATER	Macon	Spring	MCCLELLAN SPRING	Barren River	5823
BYRDSTOWN WATER DEPT	Pickett	Surface Water	ALE HOLLOW LAKE (OBEY RIVER	Obey River	7060
CELINA WATER SYSTEM	Clay	Surface Water	OBEY RIVER	Obey River	5644
LIVINGSTON WATER DEPT	Clay	Surface Water	CUMBERLAND RIVER	Cordell Hull	14388
NORTHWEST CLAY COUNTY UTILITY	Clay	Surface Water	CUMBERLAND RIV	Cordell Hull	4048
BLOOMINGDALE UTILITY DISTRICT	Sullivan	Surface Water	REEDY CREEK	South Fork Holston River	13239
KINGSPORT WATER DEPT	Sullivan	Surface Water	SOUTH HOLSTON R	South Fork Holston River	103427
BLUFF CITY WATER DEPARTMENT	Sullivan	Spring	UNDERWOOD SPRING	South Fork Holston River	2810
BRISTOL DEPARTMENT OF	Sullivan	Surface Water	SO. FK. HOLSTON RIVER	South Fork Holston River	33199
BRISTOL-BLUFF CITY UTILITY DIS	Sullivan	Surface Water	S FORK HOLSON RIVER	South Fork Holston River	5868
MOUNTAIN CITY WATER DEPT.	Johnson	Surface Water	SILVER LAKE SURF	South Fork Holston River	11191
MOUNTAIN CITY WATER DEPT.	Johnson	Spring	SILVERLAKE SP	South Fork Holston River	11191

CARDERVIEW UTILITY DISTRICT	Johnson	Well	WELL #1	Watauga River	1077
CARDERVIEW UTILITY DISTRICT	Johnson	Well	WELL #2	Watauga River	1077
CARDERVIEW UTILITY DISTRICT	Johnson	Well	WELL #3	Watauga River	1077
MOUNTAIN CITY WATER DEPT.	Johnson	Surface Water	LOWE SPRING	Watauga River	11191
MOUNTAIN CITY WATER DEPT.	Johnson	Spring	RAMBO SPRING	Watauga River	11191
BROWNLOW UTILITY DISTRICT	Johnson	Well	ELL #1 (STONE MOUNTAIN WEL	Watauga River	599
COLD SPRINGS UTILITY DISTRICT	Johnson	Spring	COLE SPRING	Watauga River	879
HUNTSVILLE UTILITY DISTRICT	Scott	Surface Water	FLAT CREEK IMPD	South Fork Cumberland	12477
HUNTSVILLE UTILITY DISTRICT	Scott	Surface Water	NEW RIVER	South Fork Cumberland	12477
ONEIDA W&S COMM	Scott	Surface Water	HOWARD BAKER LK	South Fork Cumberland	11282
CLEARFORK UTILITY DISTRICT	Claiborne	Well	WELL #1	Clear Fork of the	1391
CLEARFORK UTILITY DISTRICT	Claiborne	Well	WELL #2	Clear Fork of the	1391
CLAIBORNE UTILITIES DISTRICT	Claiborne	Surface Water	NORRIS LK. - CLINCH RIVER	Upper Clinch River	16217
ARTHUR SHAWANEE UTILITY	Claiborne	Surface Water	POWELL RIVER	Powell River	9967
ARTHUR SHAWANEE UTILITY	Claiborne	Surface Water	DAVIS CREEK IMPOUNDMENT	Powell River	9967
SNEEDVILLE U D	Hancock	Well	FLAT GAP MINE	Upper Clinch River	2304
FIRST UTILITY DISTRICT OF HAWK	Hawkins	Surface Water	HORD CREEK	Holston River	21075
FIRST UTILITY DISTRICT OF HAWK	Hawkins	Surface Water	HOLSTON RIVER	Holston River	21075
MOORESBURG UTILITY DISTRICT	Hawkins	Spring	MOORESBURG UTILITY SPRING	Holston River	1762
ROGERSVILLE WATER SYSTEM	Hawkins	Well	WELL #1	Holston River	11443
ROGERSVILLE WATER SYSTEM	Hawkins	Surface Water	BIG CREEK	Holston River	11443
ROGERSVILLE WATER SYSTEM	Hawkins	Well	TOWN KNOB WELL	Holston River	11443

PERSIA UTILITY DISTRICT	Hawkins	Surface Water	WELLS 1, 2, 3, 4	Holston River	4486
LAKEVIEW UD WEST	Hawkins	Well	PRESSMAN'S HOME WELL #1	Holston River	2656
LAKEVIEW UD WEST	Hawkins	Well	PRESSMAN'S HOME WELL #2	Holston River	2656
LAKEVIEW UD WEST	Hawkins	Well	PRESSMAN'S HOME WELL #3	Holston River	2656
SURGOINSVILLE UTILITY DISTRICT	Hawkins	Spring	JENNINGS SPRING	Holston River	2544
SURGOINSVILLE UTILITY DISTRICT	Hawkins	Well	JENNINGS WELL	Holston River	2544
FIRST U.D. OF HAWKINS CO #2	Hawkins	Well	LIBERTY WELL	Holston River	637
FIRST U.D. OF HAWKINS CO #2	Hawkins	Well	PROSPERITY WELL	Holston River	637
LAKEVIEW UD EAST	Hawkins	Well	ATHOWOMINEE WELL #1	Holston River	1249
LAKEVIEW UD EAST	Hawkins	Well	THOWOMINEE WELL # 2 HIROST	Holston River	1249
JELLICO WATER DEPT	Campbell	Surface Water	MINE IMPOUDMENT	Clear Fork of the	5366
JELLICO WATER DEPT	Campbell	Well	CREEKMORE-HOUSLEY WELL #3	Clear Fork of the	5366
JELLICO WATER DEPT	Campbell	Well	CREEKMORE-HOUSLEY WELL #1	Clear Fork of the	5366
CARYVILLE-JACKSBORO	Campbell	Well	STONEY FORK WELLS	South Fork Cumberland	11902
CARYVILLE-JACKSBORO	Campbell	Well	STONEY FORK WELLS	South Fork Cumberland	11902
CARYVILLE-JACKSBORO	Campbell	Surface Water	NORRIS LAKE	Upper Clinch River	11902
CARYVILLE-JACKSBORO	Campbell	Spring	CAVE SPRING	Upper Clinch River	11902
LA FOLLETTE UTILITIES BOARD	Campbell	Surface Water	NORRIS LAKE	Upper Clinch River	26807
DEERFIELD RESORT WATER SYSTEM	Campbell	Well	WELL 1 A&B CONDO	Powell River	1088
DEERFIELD RESORT WATER SYSTEM	Campbell	Well	WELL 10 DEER HILL	Powell River	1088
DEERFIELD RESORT WATER SYSTEM	Campbell	Well	WELL 2 DEER LAKE-CUNNINGHA	M Powell River	1088
DEERFIELD RESORT WATER SYSTEM	Campbell	Well	WELL 3 C&D CONDOS	Powell River	1088

DEERFIELD RESORT WATER SYSTEM	Campbell	Well	WELL 4 SKYLINE CONDOS	Powell River	1088
DEERFIELD RESORT WATER SYSTEM	Campbell	Well	WELL 5 BIG PINE	Powell River	1088
DEERFIELD RESORT WATER SYSTEM	Campbell	Well	ELL 6 OFFICE/RESTAURANT/POO	Powell River	1088
DEERFIELD RESORT WATER SYSTEM	Campbell	Well	WELL 9 HILTY	Powell River	1088
HENDERSON WATER DEPT.	Chester	Well	5 WELLS	South Fork Forked Deer	9036
HENDERSON WATER DEPT.	Chester	Well	5 WELLS	South Fork Forked Deer	9036
HENDERSON WATER DEPT.	Chester	Well	5 WELLS	South Fork Forked Deer	9036
TRENTON WATER SYSTEM	Chester	Well	WELLS	South Fork Forked Deer	5295
COLLINWOOD WATER DEPT	Wayne	Well	BALL PARK WELL	Pickwick Lake	1922
CLIFTON WATER DEPT	Wayne	Surface Water	TENNESSEE RIVER	TN Westen Valley-Beech	3843
COLLINWOOD WATER DEPT	Wayne	Spring	SPRING #1	TN Westen Valley-Beech	1922
COLLINWOOD WATER DEPT	Wayne	Spring	SPRING #2	TN Westen Valley-Beech	1922
COLLINWOOD WATER DEPT	Wayne	Spring	SPRING #3	TN Westen Valley-Beech	1922
COLLINWOOD WATER DEPT	Wayne	Spring	SPRING #4	TN Westen Valley-Beech	1922
COLLINWOOD WATER DEPT	Wayne	Well	WELL 1	TN Westen Valley-Beech	1922
WAYNESBORO WATER SYSTEM	Wayne	Surface Water	GREEN RIVER	Buffalo River	4194
WAYNESBORO WATER SYSTEM	Wayne	Well	GEISSLER WELL	Buffalo River	4194
MILLINGTON WATER DEPT	Tipton	Well	2 WELLS	Mississippi River	8355
MILLINGTON WATER DEPT	Tipton	Well	2 WELLS	Mississippi River	8355

Table A-1 Water Systems, Their Watershed(s), Sources and Population Served

APPENDIX B – WATER SYSTEMS & THEIR THREATS

BACKGROUND PHOSPHORUS AND WATER SUPPLY INTAKES

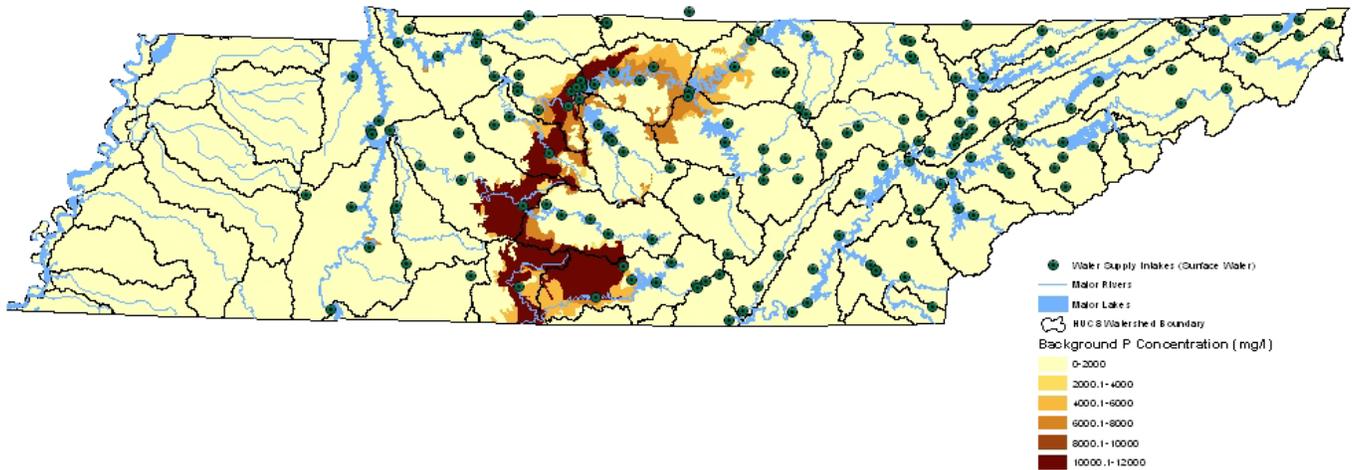


Figure B-1 Water Supply Intakes & Background Phosphorus Concentrations - Background phosphorus data are from United States Geological Survey and represents bed sediment sample concentrations as described in Scientific Investigations Map 3102 (published 2010).

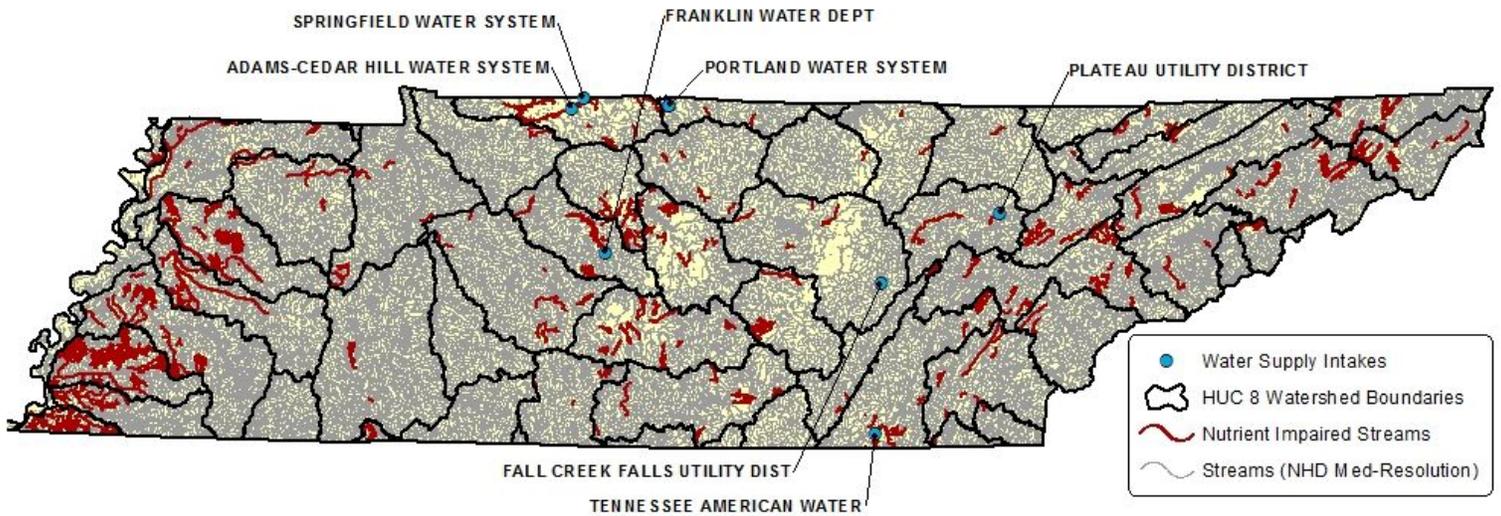


Figure B-2 Surface Water Supply Intakes Located on Nutrient-Impaired Surface Waters. Causes of nutrient impairments are nitrates, nitrites, phosphates, phosphorus (total) or nutrient/eutrophication and are based on the 2016 303(d) List. UD, Utility District.

CITY	PUBLIC WATER SUPPLY	SOURCE
Adams	Adams-Cedar Hill Water System	Red River
Chattanooga	Tennessee American Water	Tennessee River
Franklin	Franklin Water Department	Harpeth River
Pikeville	Fall Creek Falls Utility District	Bee Creek
Portland	Portland Water System	City Lake
Portland	Portland Water System	Drakes Creek
Springfield	Springfield Water System	Red River
Wartburg	Plateau Utility District	Crooked Fork Creek

Table B-1 Surface Water Supply Intakes Located on Nutrient-Impaired Surface Waters. Causes of nutrient impairments are nitrates, nitrites, phosphates, phosphorus (total) or nutrient/eutrophication and are based on the 2016 303(d) List.

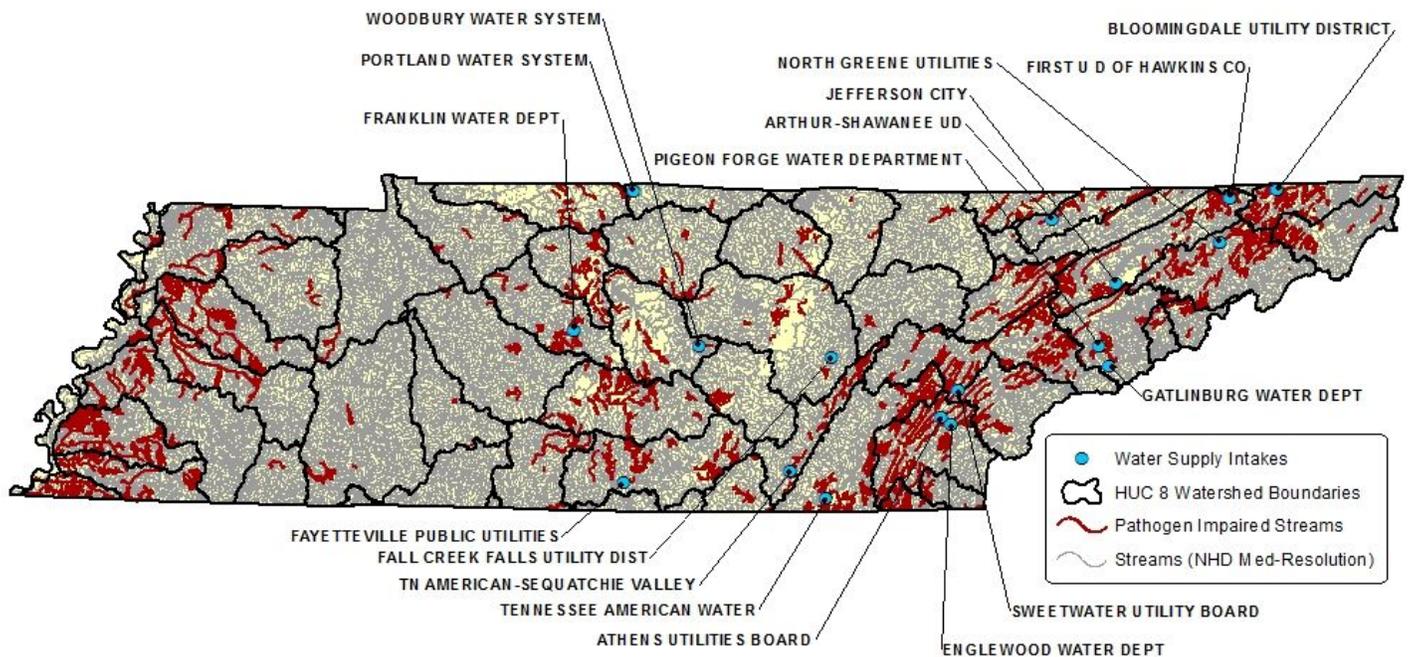


Figure B-3 Water Supply Intakes Located on Pathogen-Impaired Surface Waters. Cause of pathogen impairment is *E. coli* and is based on the draft 2016 303(d) List.

CITY	PUBLIC WATER SUPPLY	SOURCE
Athens	Athens Utility Board	Oostanaula Creek
Chattanooga	Tenn-American Water Co.	Tenn River
Church Hill	First U D Of Hawkins Co, #1	Hord Creek
Englewood	Englewood Water Dept	Middle Creek
Fayetteville	Fayetteville Public Utilities	Elk River
Franklin	Franklin Water Department	Harpeth River
Gatlinburg	Gatlinburg Water Dept	Little Pigeon River
Greeneville	North Greene U D	Lick Creek
Harrogate	Arthur-Shawnee UD	Davis Creek
Jefferson City	Jefferson City Water & Sewer	Mossy Creek
Kingsport	Bloomingdale UD	Reedy Creek
Pigeon Forge	Pigeon Forge	Walden's Creek
Pikeville	Taft Youth Center	Bee Creek
Portland	Portland Water System	Drakes Creek
Sweetwater	Sweetwater Utility Board	Sweetwater Creek
Whitwell	TN American-Sequatchie Valley	Sequatchie River
Woodbury	Woodbury Water System	East Fork Stones River

Table B-2 Water Supply Intakes Located on Pathogen-Impaired Surface Waters. Cause of pathogen impairment is *E. coli* and is based on the 2016 303(d) List.

PUBLIC WATER SYSTEM	SOURCE	#TOC EXCEEDANCES
AEDC COMPLEX-WATER PLANT	WOODS RESERVOIR	4
ANDERSON COUNTY WATER AUTHORITY	CLINCH RIVER	1
ASHLAND CITY WATER DEPT	CUMBERLAND RIVER	4
BEDFORD COUNTY UD	DUCK RIVER	2
BIG CREEK UTILITY DISTRICT	RANGER CREEK	12
BLOOMINGDALE UTILITY DISTRICT	REEDY CREEK	1
BRISTOL DEPT. UTILITIES	SO. HOLSTON RIVER	1
BYRDSTOWN WATER DEPT	DALE HOLLOW LAKE	1
CAMDEN WATER DEPT	TENNESSEE RIVER	3
CARTHAGE WATER SYSTEM	CUMBERLAND RVR	2
CHEMOURS-NEW JOHNSONVILLE	TENNESSEE RIVER	7
CITY OF MARYVILLE WATER AND SE	LITTLE RIVER	1
CLAIBORNE UTILITIES DISTRICT	NORRIS LK. - CLINCH RIVER	2
CLARKSVILLE WATER DEPARTMENT	CUMBERLAND RIVER	4
CLIFTON WATER DEPT	TENNESSEE RIVER	2
COLUMBIA POWER AND WATER	DUCK RIVER	4
CONS UD OF RUTHERFORD	EAST FK STONES RIVER	10
COOKEVILLE WATER DEPT	CENTER HILL LAKE	9
CROSSVILLE WATER DEPT	HOLIDAY HILLS LAKE	4
CROSSVILLE WATER DEPT	MEADOW PARK LAKE	4
CUMBERLAND UTILITY DISTRICT	LITTLE EMORY RIVER	1
CUNNINGHAM EAST	CUMBERLAND RIVER	12
DEKALB UTILITY DISTRICT #1	TENNESSEE RIVER	13
DOVER WATER DEPT	CUMBERLAND RIVER	3
DUCK RIVER UTILITY COMMISSION	NORMANDY LAKE	4
DUNLAP WATER SYSTEM	SEQUATCHIE RIV.	1
ENGLEWOOD WATER DEPT	MIDDLE CREEK	3
ERIN WATER DEPARTMENT	CUMBERLAND RIVER	2
FAYETTEVILLE PUBLIC UTILITIES	ELK RIVER	1
FIRST U.D. OF HARDIN COUNTY	TENNESSEE RIVER	9
FIRST UTIL DIST OF KNOX COUNTY	SINKING CREEK EMBAYMENT	1
FORT CAMPBELL WATER SYSTEM	BOILING SPRING	6
FRANKLIN WATER DEPT	HARPETH RIVER	4
GALLATIN WATER DEPARTMENT	CUMBERLAND RIVER	4
GLADEVILLE UTILITY DISTRICT	2 WELLS	2
HALLSDALE-POWELL UTILITY DISTR	MELTON HILL RESERVOIR	1
HARPETH VALLEY U D	CUMBERLAND RIVER	3
HARRIMAN UTILITY BOARD	EMORY RIVER	2
HARTSVILLE-TROUDALE	CUMBERLAND RIVER	4

PUBLIC WATER SYSTEM	SOURCE	#TOC EXCEEDANCES
HENDERSONVILLE U D	OLD HICKORY LAKE	8
JAMESTOWN WATER DEPT	N. WHITE OAK CREEK	8
JELICO WATER DEPT	MINE IMPOUDMENT	2
KINGSTON WATER SYSTEM	TN RIVER/WATTS BAR LAKE	2
KNOXVILLE UTILITIES BOARD-KUB	TENNESSEE RIVER	8
LA VERGNE WATER SYSTEM	PERCY PRIEST LAKE	11
LAFAYETTE WATER SYSTEM	BARREN RIVER	1
LAGUARDO UTILITY DISTRICT	WELL	17
LAWRENCEBURG UTILITY SYSTEMS	SHOAL CRK / HOPE SPRINGS WATER	2
LEBANON WATER SYSTEM	CUMBERLAND RIVER	1
LENOIR CITY UTILITY BOARD	TENNESSEE RIVER	1
LEWISBURG WATER SYSTEM	DUCK RIVER	3
LEXINGTON WATER SYSTEMS	BEECH LAKE	12
LIVINGSTON WATER DEPT	CUMBERLAND RIVER	2
MADISON SUBURBAN UD	CUMBERLAND RIVER	4
MCMINNVILLE WATER DEPT	BARREN FORK RIV	1
METRO LYNCHBURG/MOORE CO	TIMS FORD LAKE	2
MONTEAGLE PUBLIC UTILITY BOARD	LAUREL LAKE	2
MONTEREY WATER DEPT	CITY LAKE	8
MORRISTOWN WATER SYSTEM	RHOLSTON RIVER	2
MURFREESBORO WATER DEPT	E FORK STONES RIVER	12
NASHVILLE WATER DEPT	CUMBERLAND RIVER - HARRINGTON	4
NASHVILLE WATER DEPT	CUMBERLAND RIVER - OMOHUNDRO	3
NEW JOHNSONVILLE WATER DEPT	KY LAKE	3
NEWPORT UTILITIES BOARD	FRENCH BROAD RIVER	3
NORTH GREENE UTILITIES, INCORP	LICK CREEK	5
NORTH STEWART UTILITY DISTRICT	CUMBERLAND RIVER	9
NORTH U.D. OF DECATUR/BENTON C	TN RIVER	4
NORTH WEST UTILITY DISTRICT	SODDY CK EMB	3
NORTHEAST KNOX U D	HOLSTON RIVER	2
OLIN CORPORATION	HIWASSEE RIVER	1
ONEIDA W&S COMM	HOWARD BAKER LK	12
PARSONS WATER DEPARTMENT	BEECH RIVER	3
PIGEON FORGE WATER DEPT	DOUGLAS LAKE	1
PLATEAU UTILITY DISTRICT	CROOKED FORK CREEK	1
ROGERSVILLE WATER SYSTEM	BIG CREEK	6
SEWANEE UTILITY DISTRICT	LAKE O'DONNELL	3
SHELBYVILLE WATER SYSTEM	DUCK RIVER	4
SMITH UTILITY DISTRICT	CANEY FORK RIVER	2

PUBLIC WATER SYSTEM	SOURCE	#TOC EXCEEDANCES
SMITHVILLE WATER SYSTEM	CENTER HILL LAKE	3
SMYRNA WATER SYSTEM	STONES RIVER	11
SOUTH PITTSBURG WATER SYSTEM	TENNESSEE RIVER	59
SONTARA, OLD HICKORY INC	OLD HICKORY LAKE	6
SPARTA WATER SYSTEM	CALFKILLER RIVER	1
SPENCER WATER SYSTEM	LAUREL LAKE	6
SPRING HILL WATER DEPT	DUCK RIVER	3
TENNESSEE AMERICAN WATER	TENNESSEE RIVER	2
TN AMERICAN-SEQUATCHIE VALLEY	SEQUATCHIE RIVER	1
TRACY CITY WATER SYSTEM	BIG FIERY GIZZARD CREEK	4
TURNERY CENTER	DUCK RIVER	1
WARREN COUNTY UTILITY DISTRICT	COLLINS RIVER	1
WATER AUTH. OF DICKSON COUNTY	TURNBULL CREEK	1
WATER AUTH. OF DICKSON COUNTY	CUMBERLAND RIVER	4
WEST KNOX UTILITY DISTRICT	MELTON HILL OLD	2
WEST ROBERTSON WATER AUTHORITY	RED RIVER	1
WEST WARREN-VIOLA U. D.	BARREN FORK RIV	4
WEST WILSON UTILITY DISTRICT	CUMBERLAND RIVER	2
WHITE HOUSE UTILITY DISTRICT	CUMBERLAND RIVER	3
WINCHESTER WATER SYSTEM	TIMS FORD LAKE	4
WOODBURY WATER SYSTEM	EAST FK STONES RIVER	1

Table B-3e Communities with Water Supply Intakes Exceeding 2 Parts Per Million Total Organic Carbon *Time period for data is January 1, 2018 through December 31, 2018.*

APPENDIX C – SOURCE WATER PROTECTION AREAS

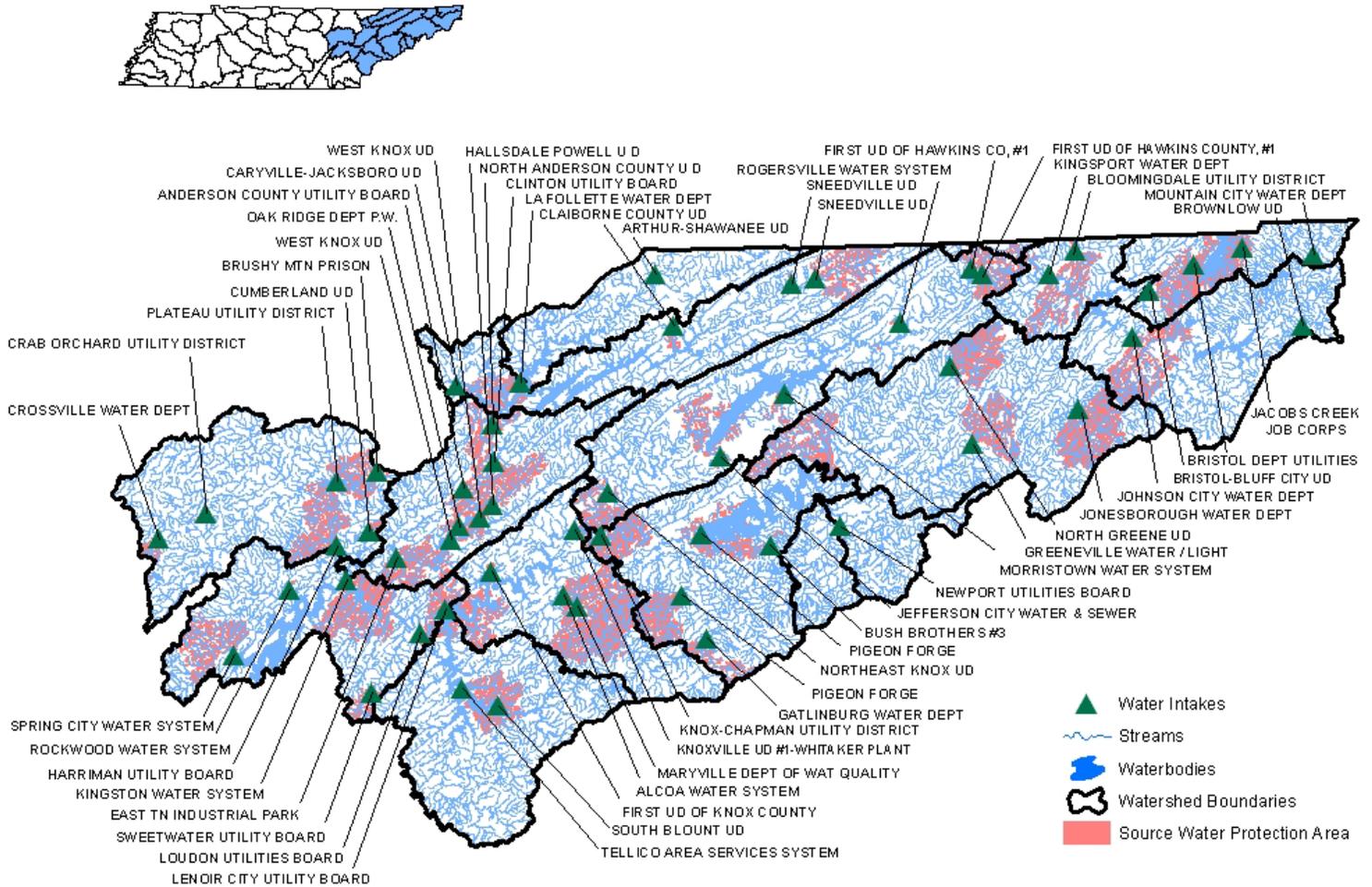


Figure C-1 Source Water Protection Areas in Upper Tennessee River Watersheds. (Watershed HUCs beginning with 0601) TDEC continues to delineate additional Source Water Protection Areas in Tennessee as required by the Safe Drinking Water Act of 1996.

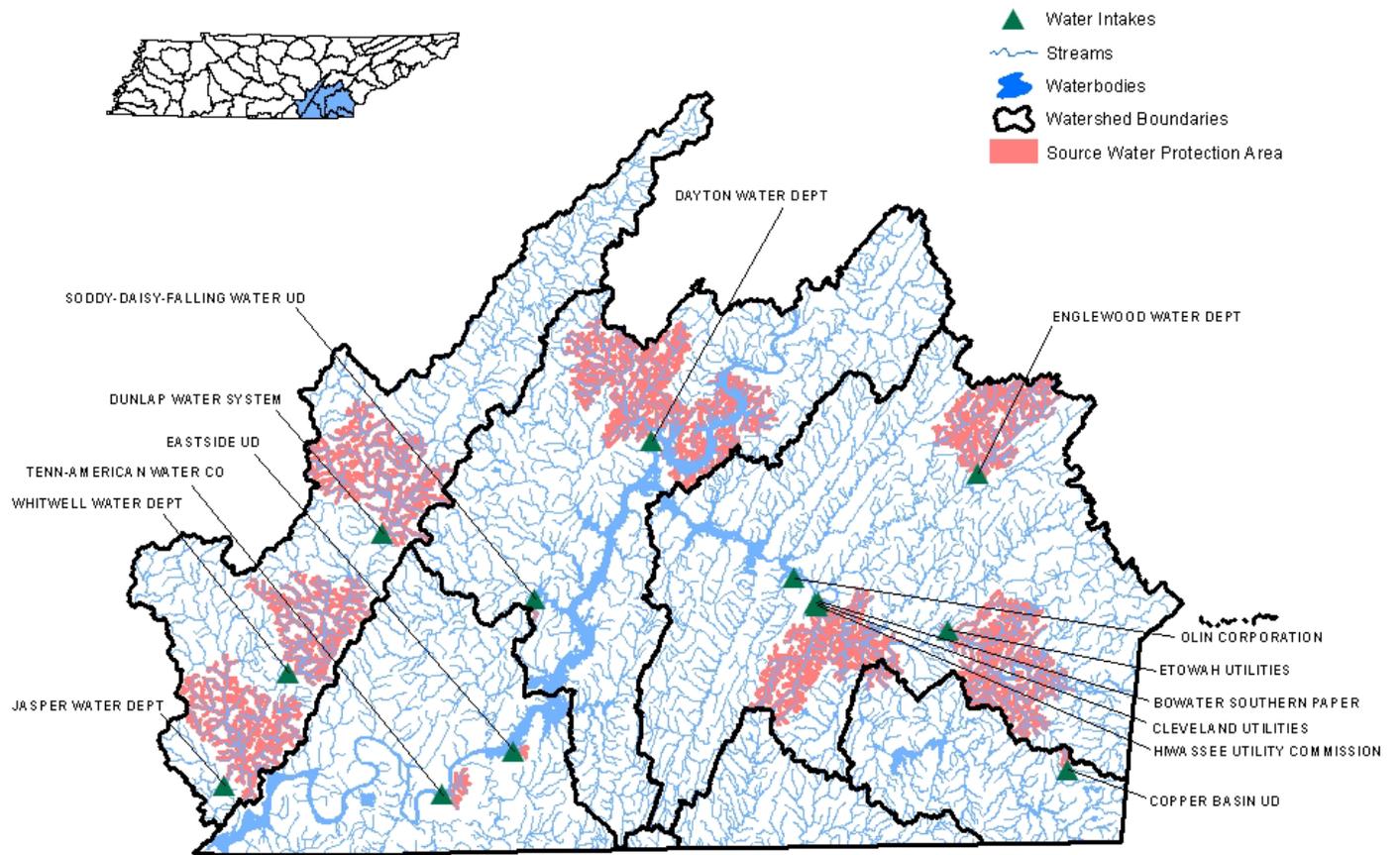


Figure C-2 Source Water Protection Areas in Tennessee River Watersheds. (Watershed HUCs beginning with 0602) TDEC continues to delineate additional Source Water Protection Areas in Tennessee as required by the Safe Drinking Water Act of 1996.

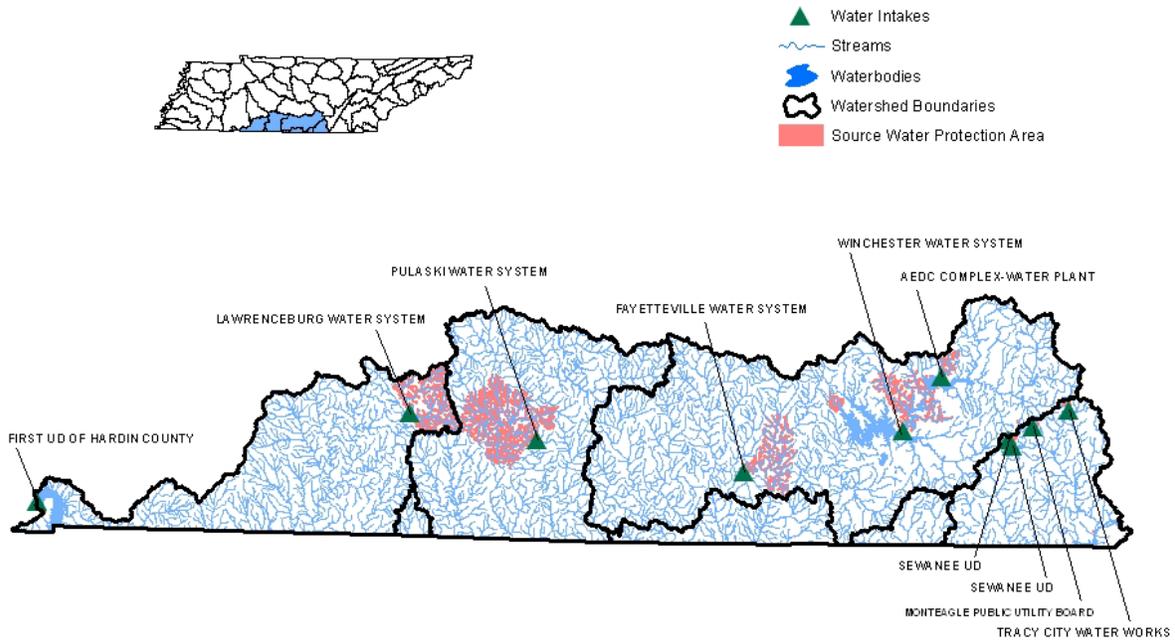


Figure C-3 Source Water Protection Areas in Middle Tennessee River Watersheds. (Watershed HUCs beginning with 0603) TDEC continues to delineate additional Source Water Protection Areas in Tennessee as required by the Safe Drinking Water Act of 1996.

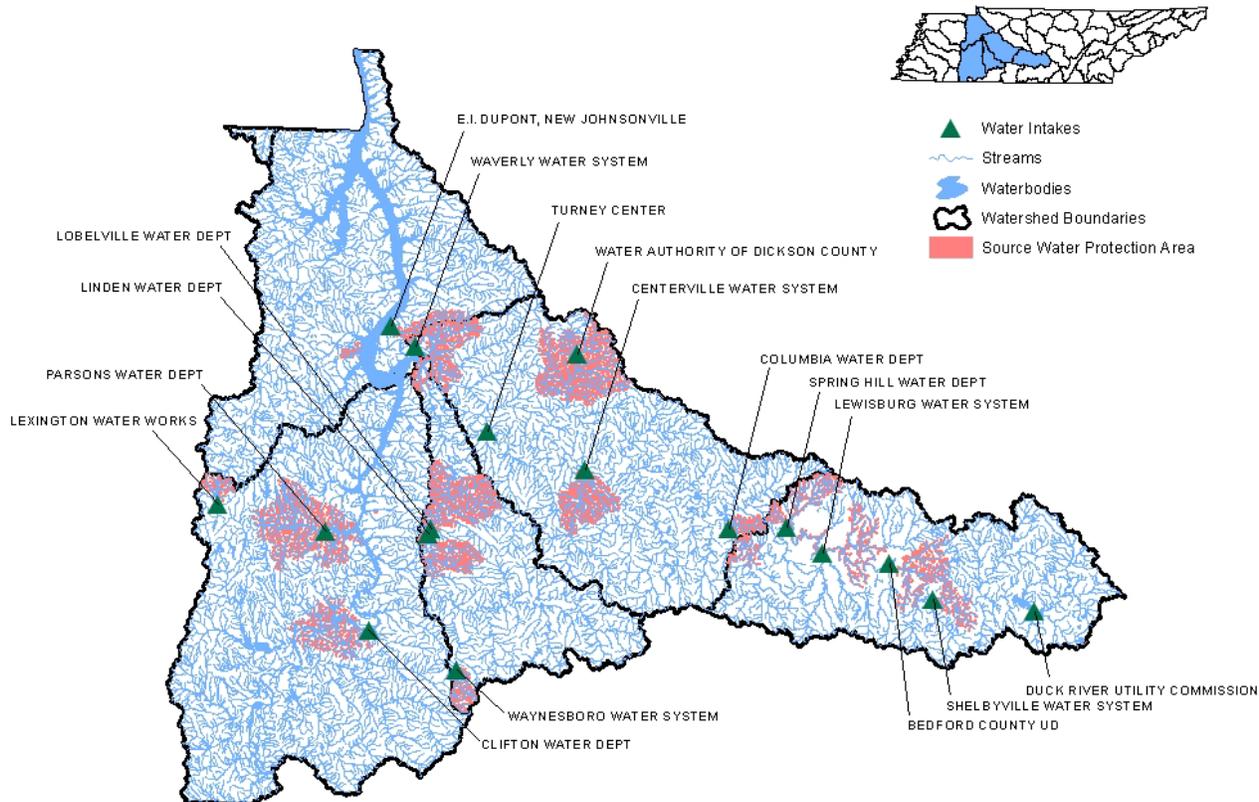


Figure C-4 Source Water Protection Areas in Lower Tennessee River Watersheds. (Watershed HUCs beginning with 0604) TDEC continues to delineate additional Source Water Protection Areas in Tennessee as required by the Safe Drinking Water Act of 1996.

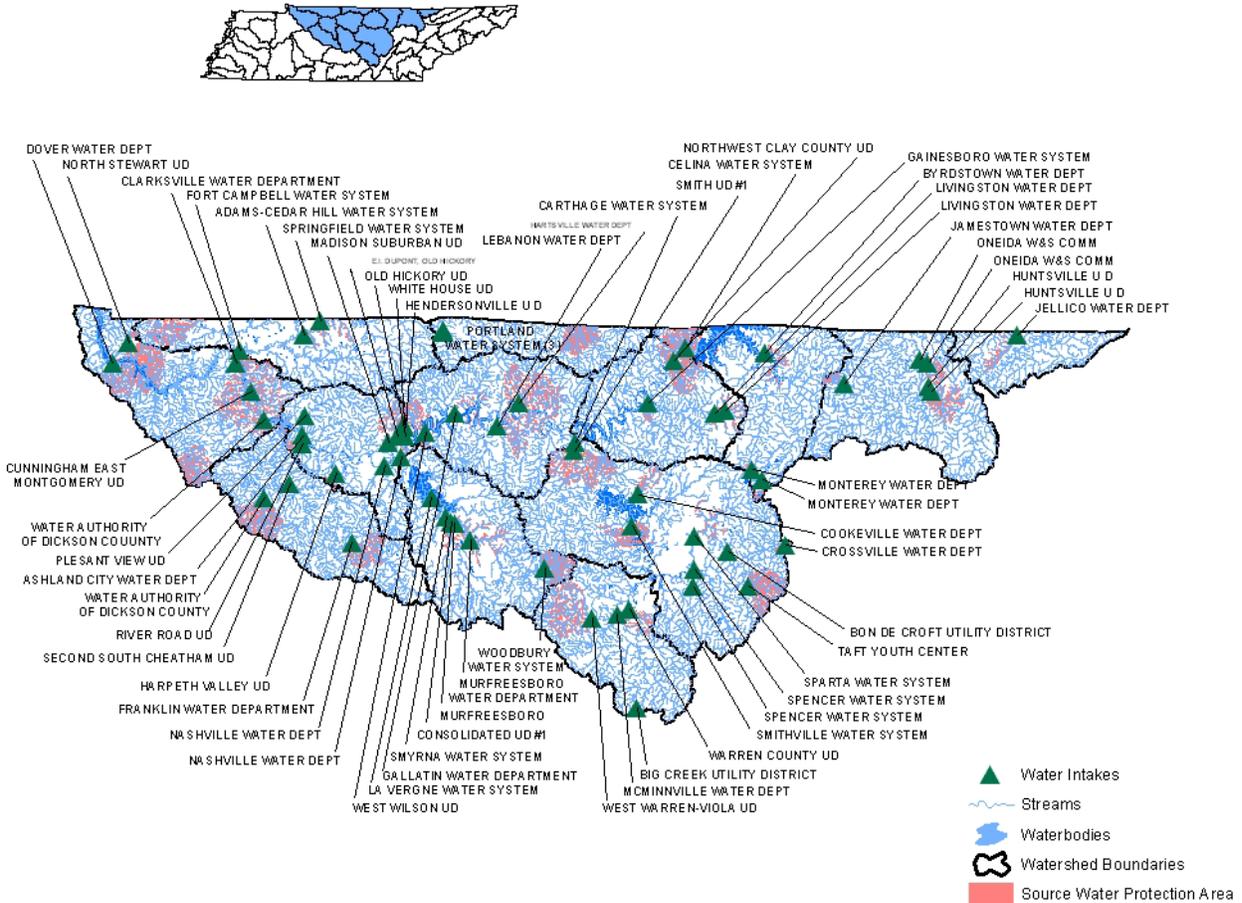


Figure C-5 Source Water Protection Areas in Cumberland River and Barren River Watersheds. (Watershed HUCs beginning with 0511 & 0513) TDEC continues to delineate additional Source Water Protection Areas in Tennessee as required by the Safe Drinking Water Act of 1996.