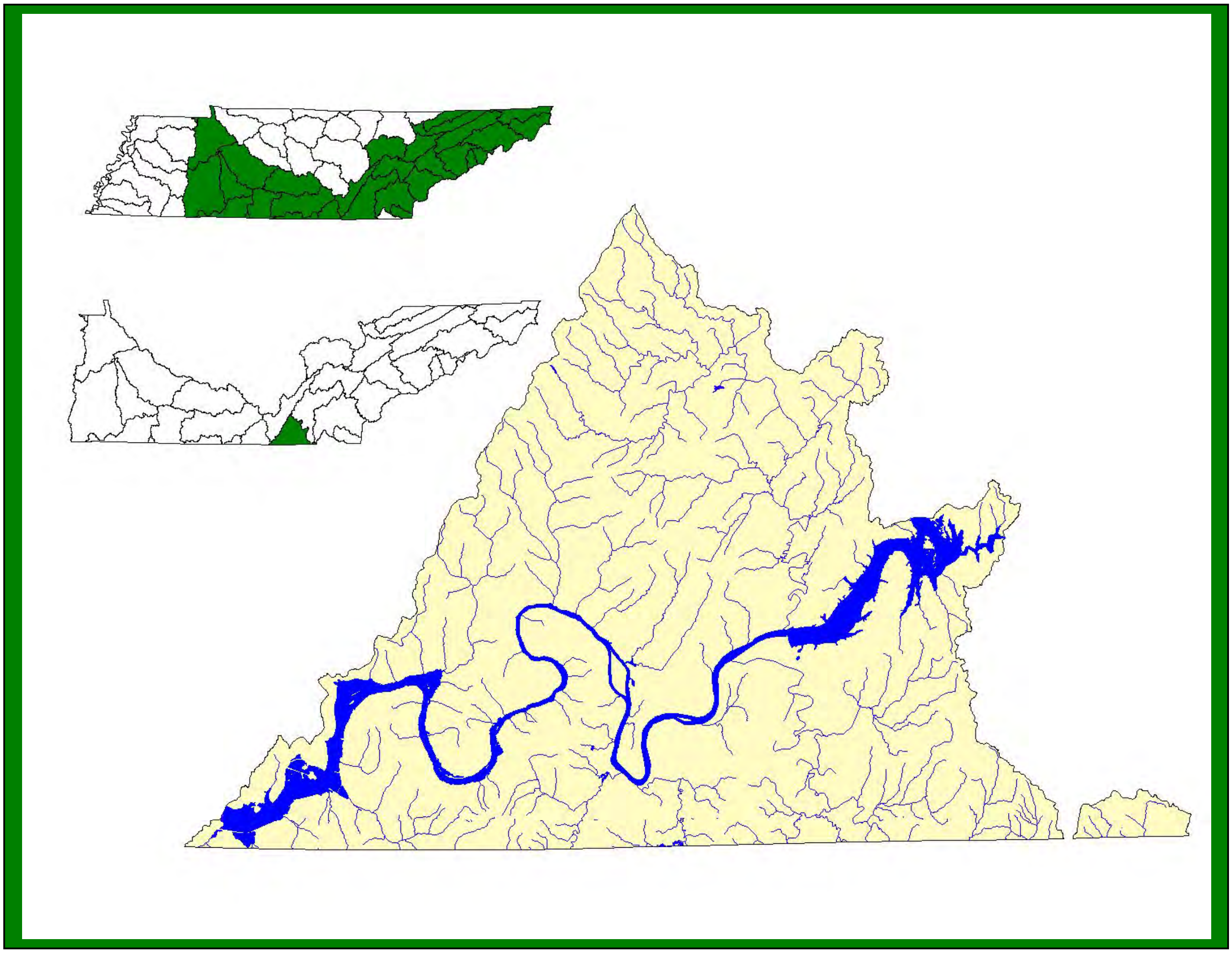
LOWER TENNESSEE RIVER WATERSHED-GROUP 4 (06020001) OF THE TENNESSEE RIVER BASIN

WATERSHED WATER QUALITY MANAGEMENT PLAN



TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER POLLUTION CONTROL
WATERSHED MANAGEMENT SECTION

Presented to the people of the Lower Tennessee River Watershed by the Division of Water Pollution Control October 9, 2007.

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LOWER TENNESSEE RIVER WATERSHED (GROUP 4)
WATER QUALITY MANAGEMENT PLAN

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GLOSSARY

1Q20. The lowest average 1 consecutive days flow with average recurrence frequency of once every 20 years.

30Q2. The lowest average 3 consecutive days flow with average recurrence frequency of once every 2 years.

7Q10. The lowest average 7 consecutive days flow with average recurrence frequency of once every 10 years.

303(d). The section of the federal Clean Water Act that requires a listing by states, territories, and authorized tribes of impaired waters, which do not meet the water quality standards that states, territories, and authorized tribes have set for them, even after point sources of pollution have installed the minimum required levels of pollution control technology.

305(b). The section of the federal Clean Water Act that requires EPA to assemble and submit a report to Congress on the condition of all water bodies across the Country as determined by a biennial collection of data and other information by States and Tribes.

AFO. Animal Feeding Operation.

Ambient Sites. Those sites established for long term instream monitoring of water quality.

ARAP. Aquatic Resource Alteration Permit.

Assessment. The result of an analysis of how well streams meet the water quality criteria assigned to them.

Bankfull Discharge. The momentary maximum peak flow before a stream overflows its banks onto a floodplain.

Basin. An area that drains several smaller watersheds to a common point. Most watersheds in Tennessee are part of the Cumberland, Mississippi, or Tennessee Basin (The Conasauga River and Barren River Watersheds are the exceptions).

Benthic. Bottom dwelling.

Biorecon. A qualitative multihabitat assessment of benthic macroinvertebrates that allows rapid screening of a large number of sites. A Biorecon is one tool used to recognize stream impairment as judged by species richness measures, emphasizing the presence or absence of indicator organisms without regard to relative abundance.

BMP. An engineered structure or management activity, or combination of these, that eliminates or reduces an adverse environmental effect of a pollutant.

BOD. Biochemical Oxygen Demand. A measure of the amount of oxygen consumed in the biological processes that break down organic and inorganic matter.

CAFO. Concentrated Animal Feeding Operation.

Designated Uses. The part of Water Quality Standards that describes the uses of surface waters assigned by the Water Quality Control Board. All streams in Tennessee are designated for Recreation, Fish and Aquatic Life, Irrigation, and Livestock Watering and Wildlife. Additional designated uses for some, but not all, waters are Drinking Water Supply, Industrial Water Supply, and Navigation.

DMR. Discharge Monitoring Report. A report that must be submitted periodically to the Division of Water Pollution Control by NPDES permitees.

DO. Dissolved oxygen.

EPA. Environmental Protection Agency. The EPA Region 4 web site is http://www.epa.gov/region4/

Field Parameter. Determinations of water quality measurements and values made in the field using a kit or probe. Common field parameters include pH, DO, temperature, conductivity, and flow.

Fluvial Geomorphology. The physical characteristics of moving water and adjoining landforms, and the processes by which each affects the other.

HUC-8. The 8-digit Hydrologic Unit Code corresponding to one of 54 watersheds in Tennessee.

HUC-10. The 10-digit NRCS Hydrologic Unit Code. HUC-10 corresponds to a smaller land area than HUC-8.

HUC-12. The 12-digit NRCS Hydrologic Unit Code. HUC-12 corresponds to a smaller land area than HUC-10.

MRLC. Multi-Resolution Land Classification.

MS4. Municipal Separate Storm Sewer System.

Nonpoint Source (NPS). Sources of water pollution without a single point of origin. Nonpoint sources of pollution are generally associated with surface runoff, which may carry sediment, chemicals, nutrients, pathogens, and toxic materials into receiving waterbodies. Section 319 of the Clean Water Act of 1987 requires all states to assess the impact of nonpoint source pollution on the waters of the state and to develop a program to abate this impact.

NPDES. National Pollutant Discharge Elimination System. Section 402 of the Clean Water Act of 1987 requires dischargers to waters of the U.S. to obtain NPDES permits.

NRCS. Natural Resources Conservation Service. NRCS is part of the federal Department of Agriculture. The NRCS home page is http://www.nrcs.usda.gov

Point Source. Any discernable, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture (Clean Water Act Section 502(14)).

Q Design. The average daily flow that a treatment plant or other facility is designed to accommodate.

Reference Stream (Reference Site). A stream (site) judged to be least impacted. Data from reference streams are used for comparisons with similar streams.

SBR. Sequential Batch Reactor.

Stakeholder. Any person or organization affected by the water quality or by any watershed management activity within a watershed.

STATSGO. State Soil Geographic Database. STATSGO is compiled and maintained by the Natural Resources Conservation Service.

STORET. The EPA repository for water quality data that is used by state environmental agencies, EPA and other federal agencies, universities, and private citizens. STORET (Storage and Retrieval of National Water Quality Data System) data can be accessed at http://www.epa.gov/storet/

TDA. Tennessee Department of Agriculture. The TDA web address is http://www.state.tn.us/agriculture

TDEC. Tennessee Department of Environment and Conservation. The TDEC web address is http://www.tdec.net

TMDL. Total Maximum Daily Load. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of the amount to the pollutant's sources. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. The calculation includes a margin of safety to ensure that the waterbody can be used for the purposes the State has designated. The calculation must also account for seasonal variation in water quality. A TMDL is required for each pollutant in an impaired stream as described in Section 303 of the Federal Clean Water Act of 1987. Updates and information on Tennessee's TMDLs can be found at http://www.tdec.net/wpc/tmdl/

TMSP. Tennessee Multi-Sector Permit.

USGS. United States Geological Survey. USGS is part of the federal Department of the Interior. The USGS home page is http://www.usgs.gov/.

WAS. Waste Activated Sludge.

Water Quality Standards. A triad of designated uses, water quality criteria, and antidegradation statement. Water Quality Standards are established by Tennessee and approved by EPA.

Watershed. A geographic area which drains to a common outlet, such as a point on a larger stream, lake, underlying aquifer, estuary, wetland, or ocean.

WET. Whole Effluent Toxicity.

WWTP. Waste Water Treatment Plant

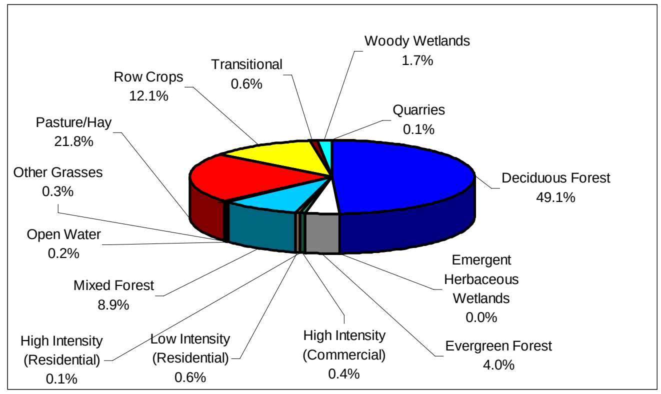
Summary – Lower Tennessee River Watershed (06020001)

In 1996, the Tennessee Department of Environment and Conservation Division of Water Pollution Control adopted a watershed approach to water quality. This approach is based on the idea that many water quality problems, like the accumulation of point and nonpoint pollutants, are best addressed at the watershed level. Focusing on the whole watershed helps reach the best balance among efforts to control point sources of pollution and polluted runoff as well as protect drinking water sources and sensitive natural resources such as wetlands. Tennessee has chosen to use the USGS 8-digit Hydrologic Unit Code (HUC-8) as the organizing unit.

The Watershed Approach recognizes awareness that restoring and maintaining our waters requires crossing traditional barriers (point *vs.* nonpoint sources of pollution) when designing solutions. These solutions increasingly rely on participation by both public and private sectors, where citizens, elected officials, and technical personnel all have opportunities to participate. The Watershed Approach provides the framework for a watershed-based and community-based approach to address water quality problems.

Chapter 1 of the Lower Tennessee River Watershed Water Quality Management Plan discusses the Watershed Approach and emphasizes that the Watershed Approach is not a regulatory program or an EPA mandate; rather it is a decision-making process that reflects a common strategy for information collection and analysis as well as a common understanding of the roles, priorities, and responsibilities of all stakeholders within a watershed. Traditional activities like permitting, planning and monitoring are also coordinated in the Watershed Approach.

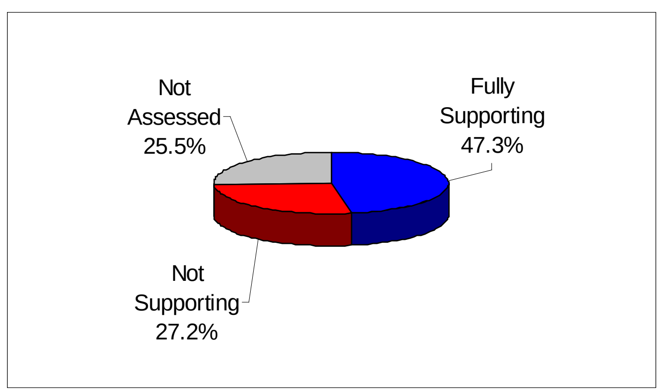
A detailed description of the watershed can be found in Chapter 2. The Lower Tennessee River Watershed is approximately 1,870 square miles (1,201 mi^2 in Tennessee; 457 mi^2 in the Group 4 portion) and the Group 4 portion includes parts of four Tennessee counties. A part of the Tennessee River drainage basin, the Group 4 portion of the watershed has 482.6 stream miles and 10,380 lake acres.



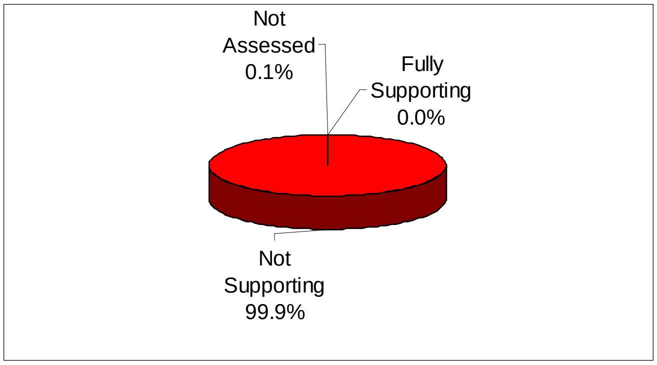
Land Use Distribution in the Tennessee Portion of the Group 4 Portion of the Lower Tennessee River Watershed.

One national military park, three designated state natural areas, one state forest, one state park, and two wildlife management areas are located in the watershed. One hundred eleven rare plant and animal species have been documented in the watershed, including six rare fish species, eight rare mussel species, five rare amphibian species, one rare snail species, and three rare crustacean species. A Portion of one stream in the Lower Tennessee River Watershed is listed in the National Rivers Inventory as having one or more outstanding natural or cultural values.

A review of water quality sampling and assessment is presented in Chapter 3. Using the Watershed Approach to Water Quality, 215 sampling events occurred in the Group 4 portion of the Lower Tennessee River Watershed in 2000-2005. These were conducted at ambient, ecoregion or watershed monitoring sites. Monitoring results support the conclusion that 47.3% of stream miles assessed fully support one or more designated uses.



Water Quality Assessment of Streams and Rivers in the Tennessee portion of the Group 4 Portion of the Lower Tennessee River Watershed. Assessment data are based on the 2004 Water Quality Assessment of 482.6 stream miles in the watershed.



Water Quality Assessment of Lakes in the Tennessee Portion of the Group 4 Portion of the Lower Tennessee River Watershed. Assessment data are based on the 2004 Water Quality Assessment of 10,380 lake acres in the watershed.

Also in Chapter 3, a series of maps illustrate overall use support in the watershed, as well as use support for the individual uses of Fish and Aquatic Life Support, Recreation, Irrigation, and Livestock Watering and Wildlife. Another series of maps illustrate streams that are listed for impairment by specific causes (siltation/habitat alteration, E. coli, pH).

Point and Nonpoint Sources are addressed in Chapter 4. Chapter 4 is organized by HUC-12 subwatersheds. Maps illustrating the locations of STORET monitoring sites and stream gauging stations are also presented in each subwatershed.

HUC-10	HUC-12
0602000105	060200010501 (Tennessee River)
	060200010502 (Tennessee River)
	060200010503 (Chattanooga Creek)
	060200010504 (Lookout Creek)
	060200010505 (Suck Creek)
	060200010506 (Tennessee River)
	060200010507 (Tennessee River)
0602000107	060200010701 (Upper N. Chickamauga Ck)
	060200010702 (Lower N. Chickamauga Ck)
0602000108	060200010801 (East Chickamauga Creek)
	060200010802 (Little Chickamauga Creek)
	060200010803 (West Chickamauga Creek)
	060200010804 (South Chickamauga Creek)

The Group 4 Portion of the Lower Tennessee River Watershed is Composed of thirteen USGS-Delineated Subwatersheds (12-Digit Subwatersheds).

Point source contributions to the Group 4 portion of the Tennessee portion of the Lower Tennessee River Watershed consist of 24 individual NPDES-permitted facilities, sixteen of which discharge into streams that have been listed on the 2004 303(d) list. Other point source permits in the watershed (as of October 9, 2007) are Tennessee Multi-Sector Permits (166), Aquatic Resource Alteration Permits (27), Ready Mix Concrete Plant Permits (7), Mining Permits (6), Water Treatment Plant Permits (1), and Aquatic Herbicide Application Permits (1). Agricultural operations include cattle, chicken, hog, and sheep farming. Maps illustrating the locations of permit sites and tables summarizing livestock practices are presented in each subwatershed.

Chapter 5 is entitled *Water Quality Partnerships in the Lower Tennessee River Watershed* and highlights partnerships between agencies and between agencies and landowners that are essential to success. Programs of federal agencies (Natural Resources Conservation Service, U.S. Fish and Wildlife Service, U.S. Geological Survey, U.S. Army Corps of Engineers, and Tennessee Valley Authority), and state agencies (TDEC/State Revolving Fund, TDEC Division of Water Supply, Tennessee Department of Agriculture, and Georgia Department of Natural Resources/Environmental Protection Division) are summarized. Local initiatives of organizations active in the watershed (North Chickamauga Creek Conservancy, The Nature Conservancy, and Southeast Tennessee RC&D Council) are also described.

Point and Nonpoint source approaches to water quality problems in the Group 4 portion of the Lower Tennessee River Watershed are addressed in Chapter 6. Chapter 6 also includes comments received during public meetings, links to EPA-approved TMDLs in the watershed, and an assessment of needs for the watershed.

The full Group 4 portion of the Lower Tennessee River Watershed Water Quality Management Plan can be found at:
http://www.state.tn.us/environment/wpc/watershed/wsmplans/

CHAPTER 1

WATERSHED APPROACH TO WATER QUALITY

1.1 BACKGROUND. The Division of Water Pollution Control is responsible for administration of the Tennessee Water Quality Control Act of 1977 (TCA 69–3–101). Information about the Division of Water Pollution Control, updates and announcements, may be found at http://www.state.tn.us/environment/wpc/index.html, and a summary of the organization of the Division of Water Pollution Control may be found in Appendix I.

The mission of the Division of Water Pollution Control is to abate existing pollution of the waters of Tennessee, to reclaim polluted waters, to prevent the future pollution of the waters, and to plan for the future use of the waters so that the water resources of Tennessee might be used and enjoyed to the fullest extent consistent with the maintenance of unpolluted waters.

The Division monitors, analyzes, and reports on the quality of Tennessee's water. In order to perform these tasks more effectively, the Division adopted a Watershed Approach to Water Quality in 1996.

This Chapter summarizes TDEC's Watershed Approach to Water Quality.

1.2 WATERSHED APPROACH TO WATER QUALITY. The Watershed Approach to Water Quality is a coordinating framework designed to protect and restore aquatic systems and protect human health more effectively (EPA841-R-95-003). The Approach is based on the concept that many water quality problems, like the accumulation of pollutants or nonpoint source pollution, are best addressed at the watershed level. In addition, a watershed focus helps identify the most cost-effective pollution control strategies to meet clean water goals. Tennessee’s Watershed Approach, updates and public participation opportunities, may be found on the web at http://www.state.tn.us/environment/wpc/wshed1.htm.

Watersheds 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).

Four main features are typical of the Watershed Approach: 1) Identifying and prioritizing water quality problems in the watershed, 2) Developing increased public involvement, 3) Coordinating activities with other agencies, and 4) Measuring success through increased and more efficient monitoring and other data gathering.

Typically, the Watershed Approach meets the following description (EPA841-R-95-003):

- Features watersheds or basins as the basic management units
- Targets priority subwatersheds for management action
- Addresses all significant point and nonpoint sources of pollution
- Addresses all significant pollutants
- Sets clear and achievable goals
- Involves the local citizenry in all stages of the program
- Uses the resources and expertise of multiple agencies
- Is not limited by any single agency's responsibilities
- Considers public health issues

An additional characteristic of the Watershed Approach is that it complements other environmental activities. This allows for close cooperation with other state agencies and local governments as well as with federal agencies such as the Tennessee Valley Authority and the U.S. Army Corps of Engineers, U.S. Department of Agriculture (*e.g.*, Natural Resources Conservation Service, United States Forest Service), U.S. Department of the Interior (*e.g.* United States Geological Survey, U.S. Fish and Wildlife Service, National Park Service). When all permitted dischargers are considered together, agencies are better able to focus on those controls necessary to produce measurable improvements in water quality. This also results in a more efficient process: It encourages agencies to focus staff and financial resources on prioritized geographic locations and makes it easier to coordinate between agencies and individuals with an interest in solving water quality problems (EPA841-R-003).

The Watershed Approach is not a regulatory program or a new EPA mandate; rather it is a decision making process that reflects a common strategy for information collection and analysis as well as a common understanding of the roles, priorities, and responsibilities of all stakeholders within a watershed. The Watershed Approach utilizes features already in state and federal law, including:

- Water Quality Standards
- National Pollutant Discharge Elimination System (NPDES)
- Total Maximum Daily Loads (TMDLs)
- Clean Lakes Program
- Nonpoint Source Program
- Groundwater Protection

Traditional activities like permitting, planning, and monitoring are also coordinated in the Watershed Approach. A significant change from the past, however, is that the Watershed Approach encourages integration of traditional regulatory (point source pollution) and nonregulatory (nonpoint sources of pollution) programs. There are additional changes from the past as well:

THE PAST	WATERSHED APPROACH
Focus on fixed-station ambient monitoring	Focus on comprehensive watershed monitoring
Focus on pollutant discharge sites	Focus on watershed-wide effects
Focus on WPC programs	Focus on coordination and cooperation
Focus on point sources of pollution	Focus on all sources of pollution
Focus on dischargers as the problem	Focus on dischargers as an integral part of the solution
Focus on short-term problems	Focus on long-term solutions

Table 1-1. Contrast Between the Watershed Approach and the Past.

This approach places greater emphasis on all aspects of water quality, including chemical water quality (conventional pollutants, toxic pollutants), physical water quality (temperature, flow), habitat quality (channel morphology, composition and health of benthic communities), and biodiversity (species abundance, species richness).

1.2.A. Components of the Watershed Approach. Tennessee is composed of fifty-five watersheds corresponding to the 8-digit USGS Hydrologic Unit Codes (HUC-8). These watersheds, which serve as geographic management units, are combined in five groups according to year of implementation.

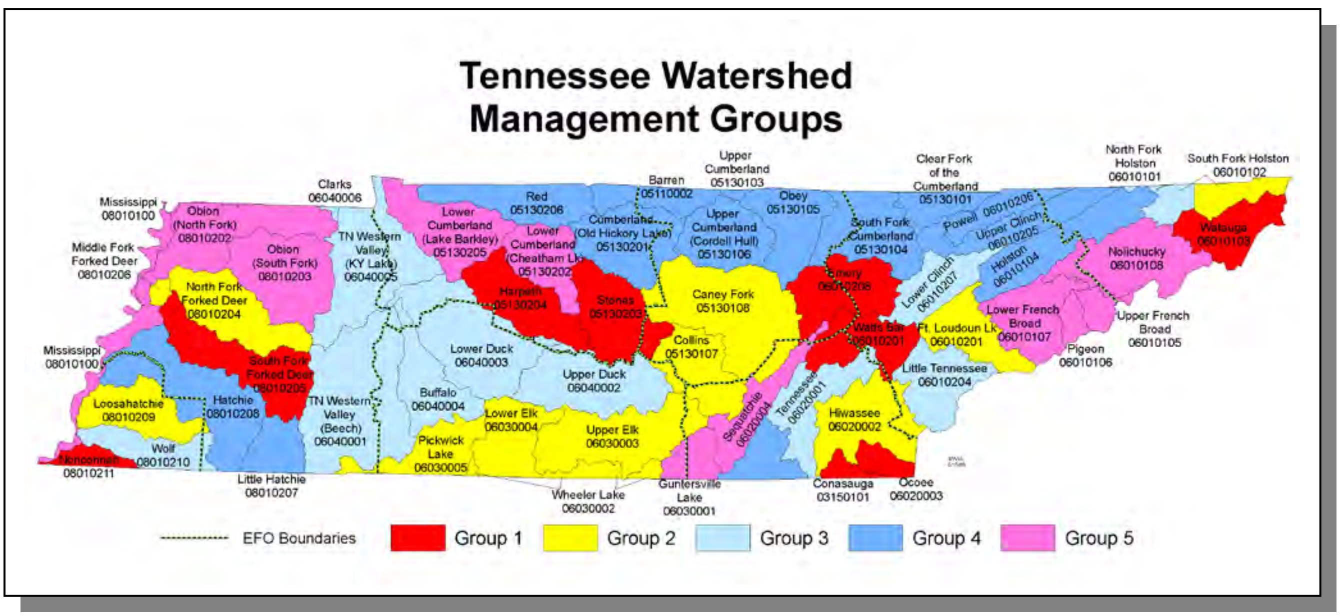


Figure 1-1. Watershed Groups in Tennessee's Watershed Approach to Water Quality.

Each year, TDEC conducts monitoring in one-fifth of Tennessee's watersheds; assessment, priority setting and follow-up monitoring are conducted in another one fifth of watersheds; modeling and TMDL studies in another one fifth; developing management plans in another one fifth; and implementing management plans in another one fifth of watersheds.

GROUP	WEST TENNESSEE	MIDDLE TENNESSEE	EAST TENNESSEE
1	Nonconnah South Fork Forked Deer	Harpeth Stones	Conasauga Emory Ocoee Watauga Watts Bar
2	Loosahatchie Middle Fork Forked Deer North Fork Forked Deer	Caney Fork Collins Lower Elk Pickwick Lake Upper Elk Wheeler Lake	Fort Loudoun Hiwassee South Fork Holston (Upper) Wheeler Lake
3	Tennessee Western Valley (Beech River) Tennessee Western Valley (KY Lake) Wolf River	Buffalo Lower Duck Upper Duck	Little Tennessee Lower Clinch North Fork Holston South Fork Holston (Lower) Tennessee (Upper)
4	Lower Hatchie Upper Hatchie	Barren Obey Red Upper Cumberland (Cordell Hull Lake) Upper Cumberland (Old Hickory Lake) Upper Cumberland (Cumberland Lake)	Holston Powell South Fork Cumberland Tennessee (Lower) Upper Clinch Upper Cumberland (Clear Fork)
5	Mississippi North Fork Obion South Fork Obion	Guntersville Lake Lower Cumberland (Cheatham Lake) Lower Cumberland (Lake Barkley)	Lower French Broad Nolichucky Pigeon Upper French Broad

Table 1-2. Watershed Groups in Tennessee's Watershed Approach.

In succeeding years of the cycle, efforts rotate among the watershed groups. The activities in the five year cycle provide a reference for all stakeholders.

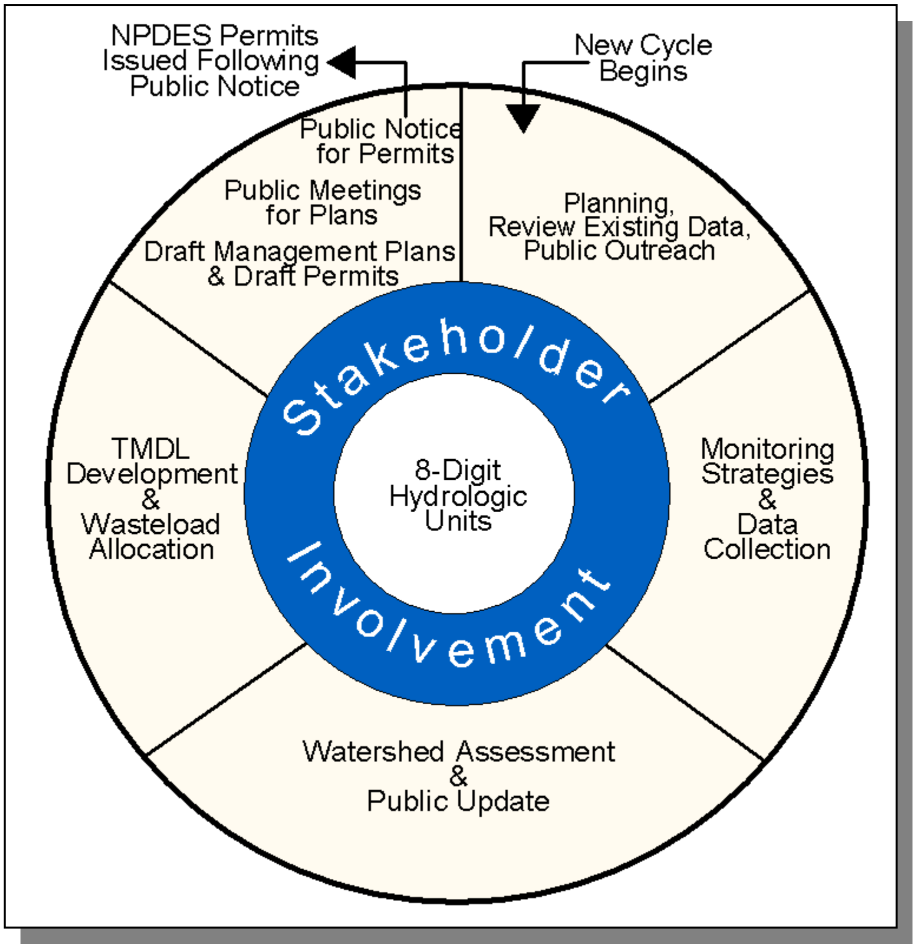


Figure 1-2. The Watershed Approach Cycle.

The six key activities that take place during the 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 rivers and streams. Reviewing all existing data and comparing agencies' work plans guide the development of an effective monitoring strategy.

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

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

4. Wasteload Allocation/TMDL Development. Monitoring data are used to determine nonpoint source contributions and pollutant loads for permitted dischargers releasing wastewater to the watershed. Limits are set to assure that water quality is protected.

5. Permits. Issuance and expiration of all discharge permits are synchronized based on watersheds. Currently, 1700 permits have been issued in Tennessee under the federally delegated National Pollutant Discharge Elimination System (NPDES).

6. Watershed Management Plans. These plans include information for each watershed including general watershed description, water quality goals, major water quality concerns and issues, and management strategies.

Public participation opportunities occur throughout the entire five year cycle. Participation in Years 1, 3 and 5 is emphasized, although additional meetings are held at stakeholder's request. People tend to participate more readily and actively in protecting the quality of waters in areas where they live and work, and have some roles and responsibilities:

- Data sharing
- Identification of water quality stressors
- Participation in public meetings
- Commenting on management plans
- Shared commitment for plan implementation

1.2.B. Benefits of the Watershed Approach. The Watershed Approach fosters a better understanding of the physical, chemical and biological effects on a watershed, thereby allowing agencies and citizens to focus on those solutions most likely to be effective. The Approach recognizes the need for a comprehensive, ecosystem-based approach that depends on local governments and local citizens for success (EPA841-R-95-004). On a larger scale, many lessons integrating public participation with aquatic ecosystem-based programs have been learned in the successful Chesapeake Bay, Great Lakes, Clean Lakes, and National Estuary Programs.

Benefits of the Watershed Approach include (EPA841-R-95-004):

- Focus on water quality goals and ecological integrity rather than on program activities such as number of permits issued.

- Improve basis for management decisions through consideration of both point and nonpoint source stressors. A watershed strategy improves the scientific basis for decision making and focuses management efforts on basins and watersheds where they are most needed. Both point and nonpoint control strategies are more effective under a watershed approach because the Approach promotes timely and focused development of TMDLs.

- Enhance program efficiency, as the focus becomes watershed. A watershed focus can improve the efficiency of water management programs by facilitating consolidation of programs within each watershed. For example, handling all point source dischargers in a watershed at the same time reduces administrative costs due to the potential to combine hearings and notices as well as allowing staff to focus on more limited areas in a sequential fashion.

- Improve coordination between federal, state and local agencies including data sharing and pooling of resources. As the focus shifts to watersheds, agencies are better able to participate in data sharing and coordinated assessment and control strategies.

- Increase public involvement. The Watershed Approach provides opportunities for stakeholders to increase their awareness of water-related issues and inform staff about their knowledge of the watershed. Participation is via three public meetings over the five-year watershed management cycle as well as meetings at stakeholder’s request. Additional opportunities are provided through the Department of Environment and Conservation homepage and direct contact with local Environmental Assistance Centers.

- Greater consistency and responsiveness. Developing goals and management plans for a basin or watershed with stakeholder involvement results in increased responsiveness to the public and consistency in determining management actions. In return, stakeholders can expect improved consistency and continuity in decisions when management actions follow a watershed plan.

Additional benefits of working at the watershed level are described in the Clean Water Action Plan (EPA-840-R-98-001), and can be viewed at http://www.cleanwater.gov/action/toc.html.

The Watershed Approach represents awareness that restoring and maintaining our waters requires crossing traditional barriers (point *vs.* nonpoint sources of pollution) when designing solutions. These solutions increasingly rely on participation by both public and private sectors, where citizens, elected officials and technical personnel all have opportunity to participate. This integrated approach mirrors the complicated relationships in which people live, work and recreate in the watershed, and suggests a comprehensive, watershed-based and community-based approach is needed to address these (EPA841-R-97-005).

CHAPTER 2

DESCRIPTION OF THE LOWER TENNESSEE RIVER WATERSHED

2.1. BACKGROUND. Nickajack Dam is located about 30 miles downstream and to the west of Chattanooga, and extends 46 miles upstream from the dam to Chickamauga Dam. It was built to replace the old and leaking Hales Bar Dam. The resulting lake is located amid the spectacular scenery of the Tennessee River Gorge.

Construction of the reservoir created by Nickajack Dam began April 1, 1964 and the filling of the lake began September 14, 1967. Two days after closing the gates on the dam the lake was full. Nickajack Dam contains four hydroelectric units generating 96,000 kilowatts of electricity.

Nickajack Dam was named for Nickajack Cave located about a mile upstream.

This Chapter describes the location and characteristics of the Group 4 portion of the Lower Tennessee River Watershed.

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. The Group 4 portion of the Tennessee portion of the Lower Tennessee River Watershed is located in East Tennessee and includes parts of Bradley, Hamilton, Marion, and Sequatchie Counties.

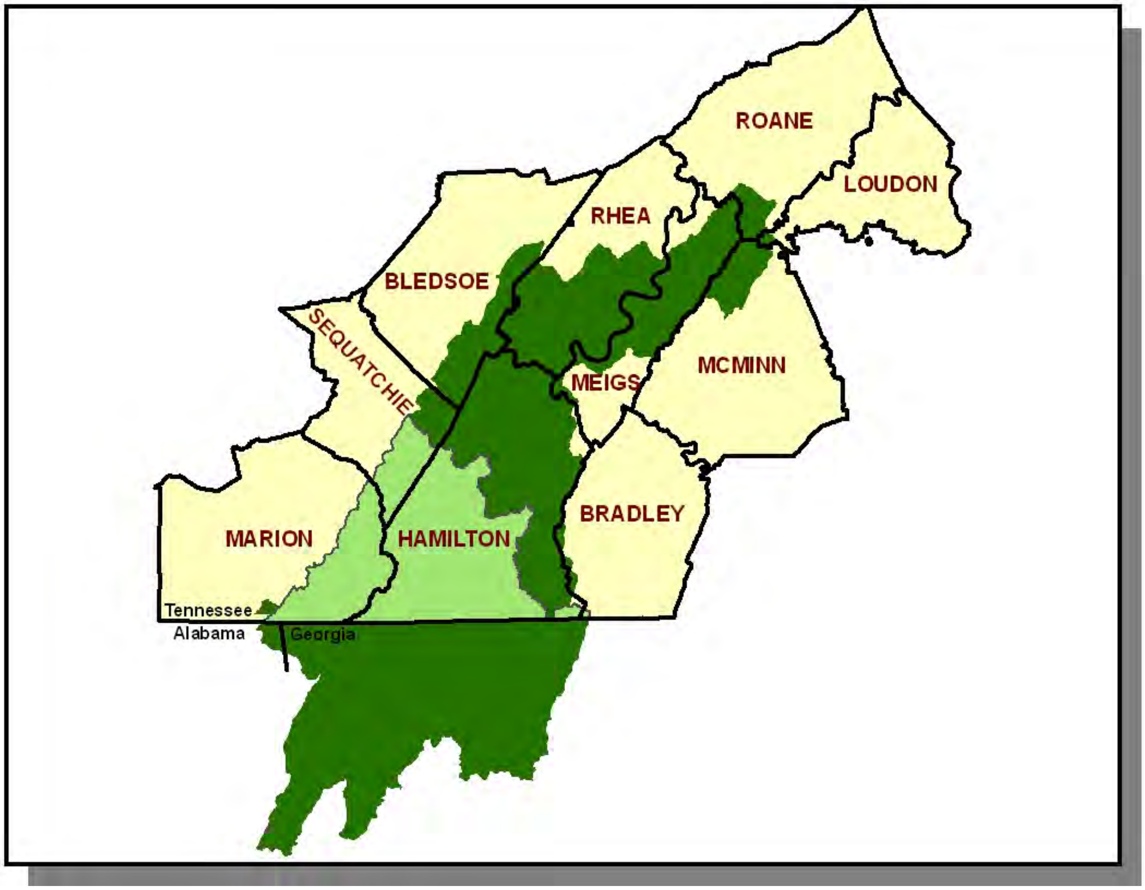


Figure 2-1. General Location of the Lower Tennessee River Watershed. *The light green area illustrates the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed.*

COUNTY	% OF WATERSHED IN EACH COUNTY
Hamilton	63.8
Marion	25.5
Sequatchie	10.5
Bradley	0.2

Table 2-1. The Lower Tennessee River Watershed Includes Parts of Four East Tennessee Counties.

2.2.B. Population Density Centers. Fourteen highways serve the major communities in the Group 4 portion of the Tennessee portion of the Lower Tennessee River Watershed.

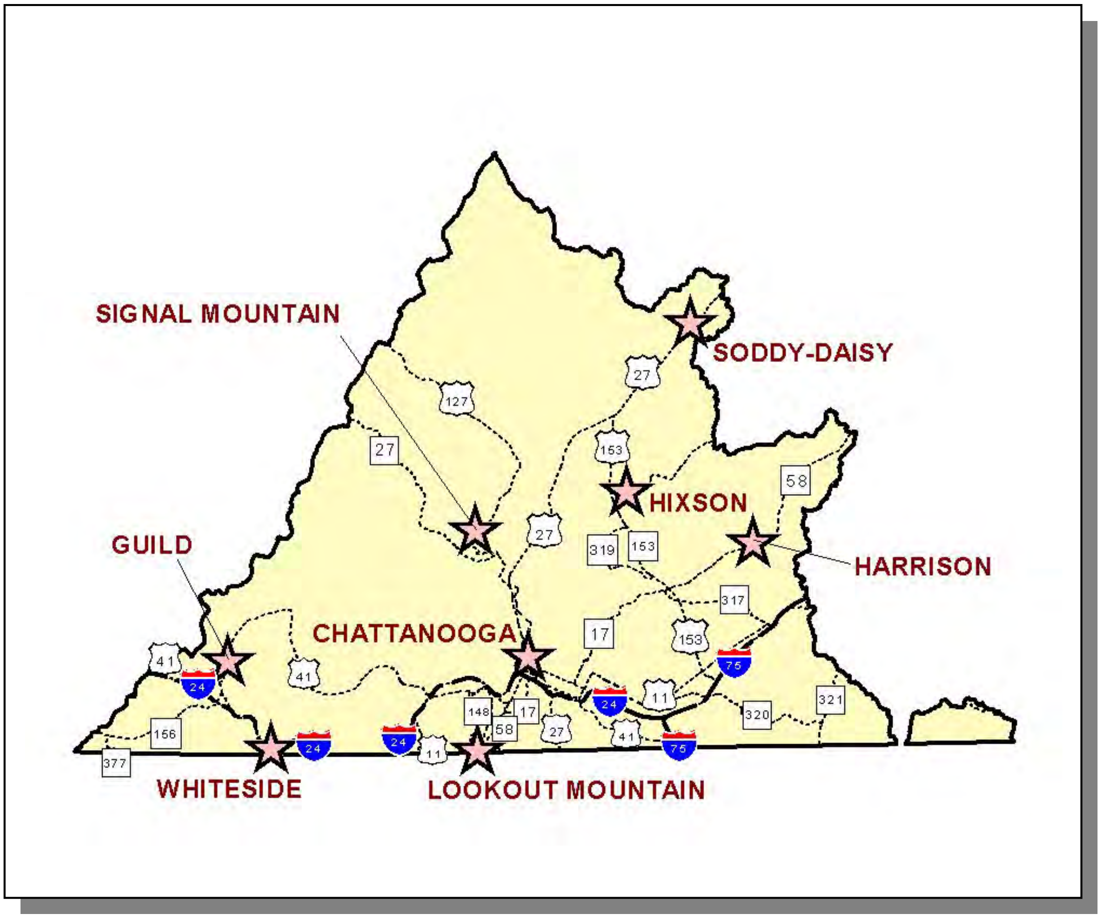


Figure 2-2. Communities and Roads in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed.

MUNICIPALITY	POPULATION	COUNTY
Chattanooga*	155,554	Hamilton
Hixson	37,305	Hamilton
Soddy-Daisy	11,530	Hamilton
Signal Mountain	7,725	Hamilton
Harrison	7,630	Hamilton
Lookout Mountain	2,000	Hamilton
Guild	764	Marion
Whiteside	355	Marion

Table 2-2. Municipalities in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed. *Population based on 2000 census (Tennessee Blue Book) or http://www.hometownlocator.com. Asterisk (*) indicates county seat.*

2.3. GENERAL HYDROLOGIC DESCRIPTION.

2.3.A. Hydrology. The Lower Tennessee River Watershed, designated 06020001 by the USGS, drains approximately 1,870 square miles, 1,201 square miles of which are in Tennessee. The Group 4 portion is 457 square miles.

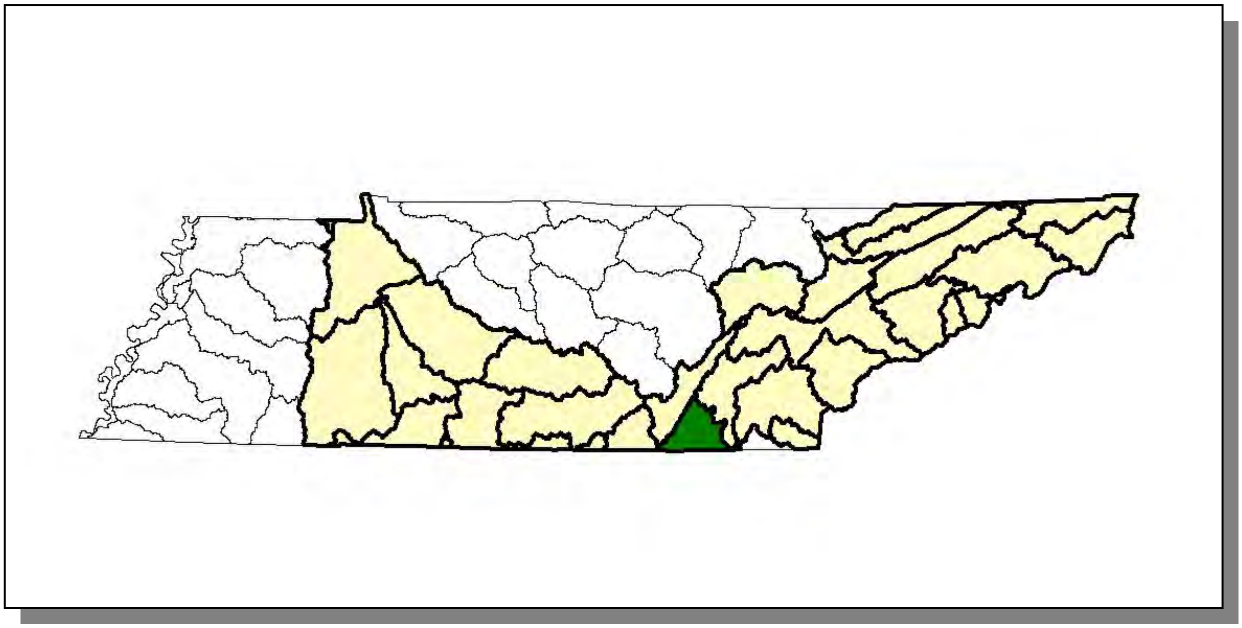


Figure 2-3. The Lower Tennessee River Watershed is Part of the Tennessee River Basin.

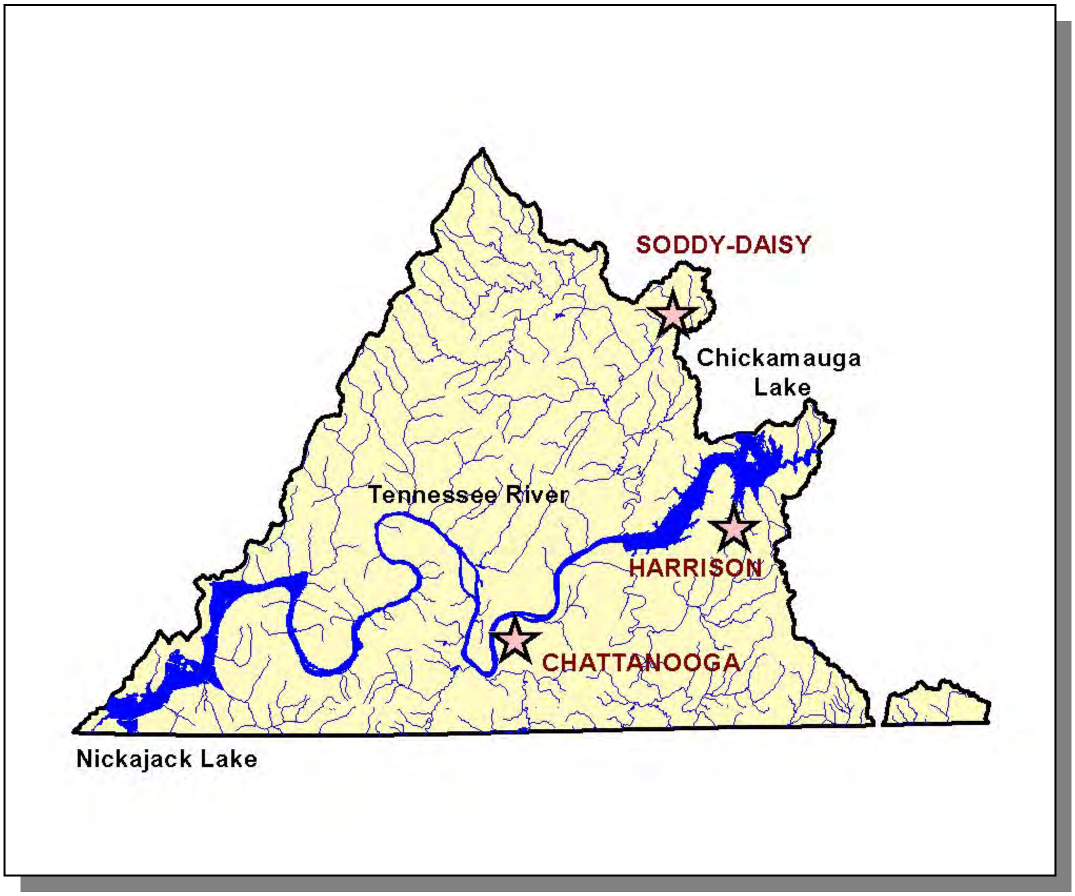


Figure 2-4. Hydrology in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed. *There are 482.6 stream miles and 10,380 lake acres recorded in River Reach File 3 in the Group 4 portion of the Tennessee portion of the Lower Tennessee River Watershed. Location of the Tennessee River including Nickajack and Chickamauga Lakes, and the cities of Chattanooga, Harrison, and Soddy-Daisy are shown for reference.*

2.3.B. Dams. There are 12 dams inventoried by TDEC Division of Water Supply in the Group 4 portion of the Tennessee Portion of the Lower Tennessee River Watershed. These dams either retain 30 acre-feet of water or have structures at least 20 feet high.

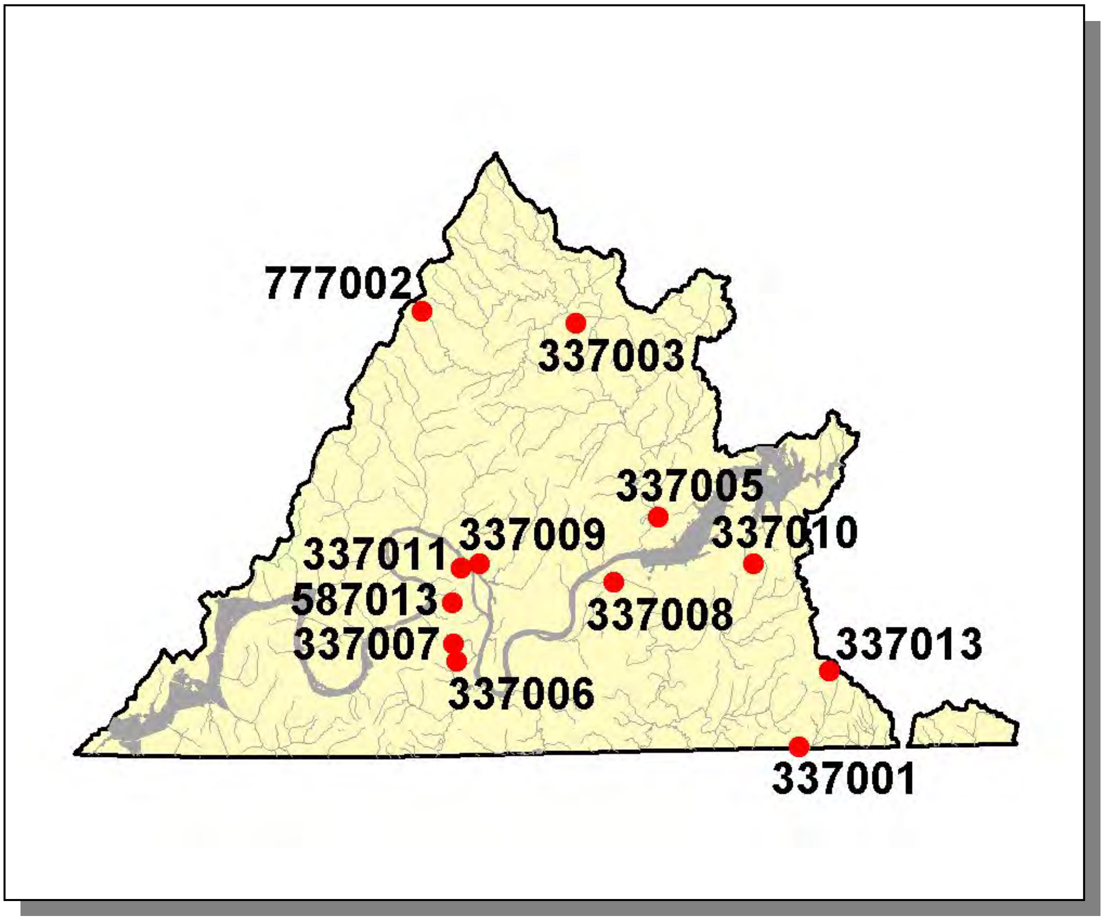


Figure 2-5. Location of Inventoried Dams in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed. *More information, including identification of inventoried dams labeled, is provided in Appendix II and at http://gwidc.memphis.edu/website/dams/viewer.htm.*

2.4. LAND USE. Land Use/Land Cover information was provided by EPA Region 4 and was interpreted from 1992 Multi-Resolution Land Cover (MRLC) satellite imagery.

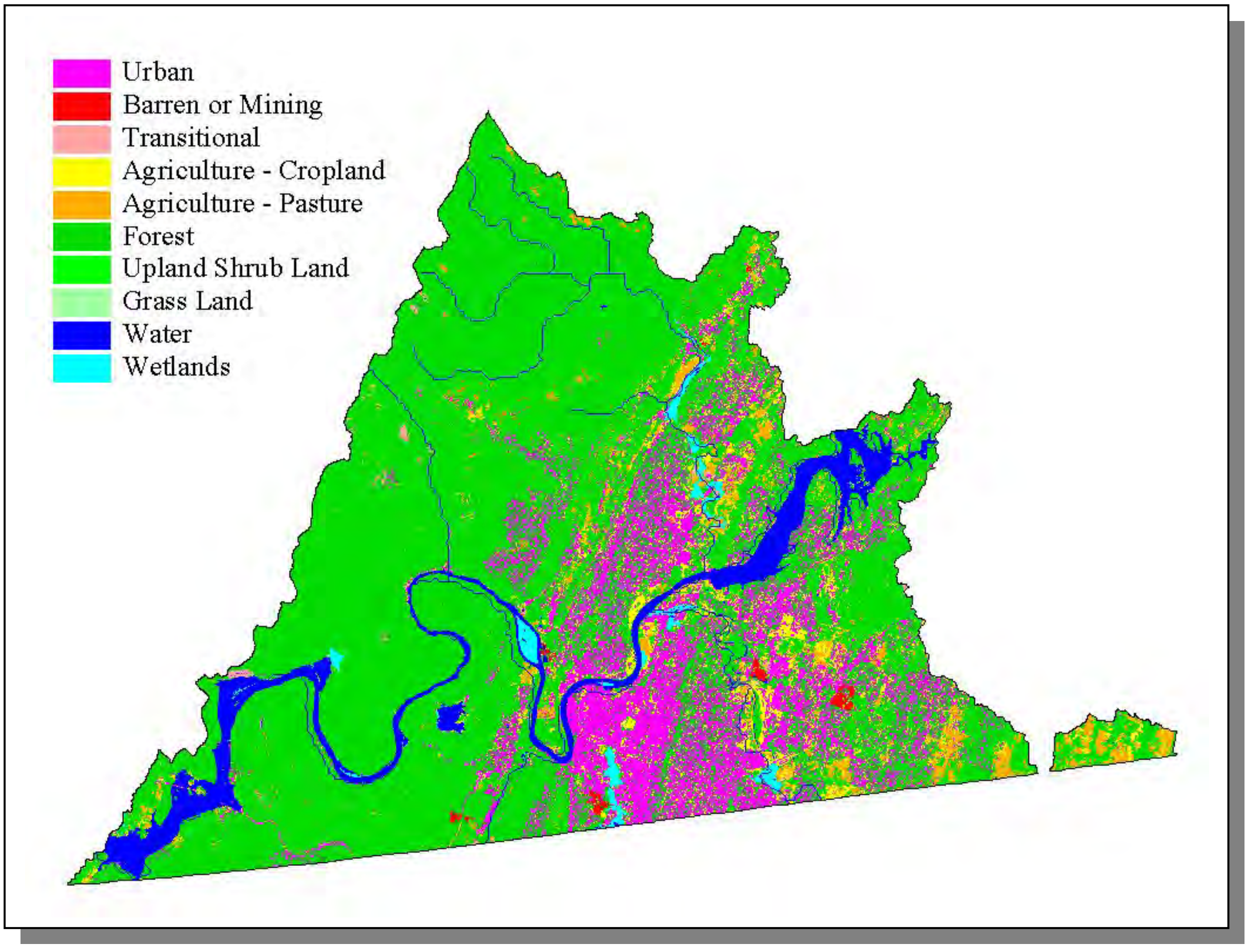


Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery.

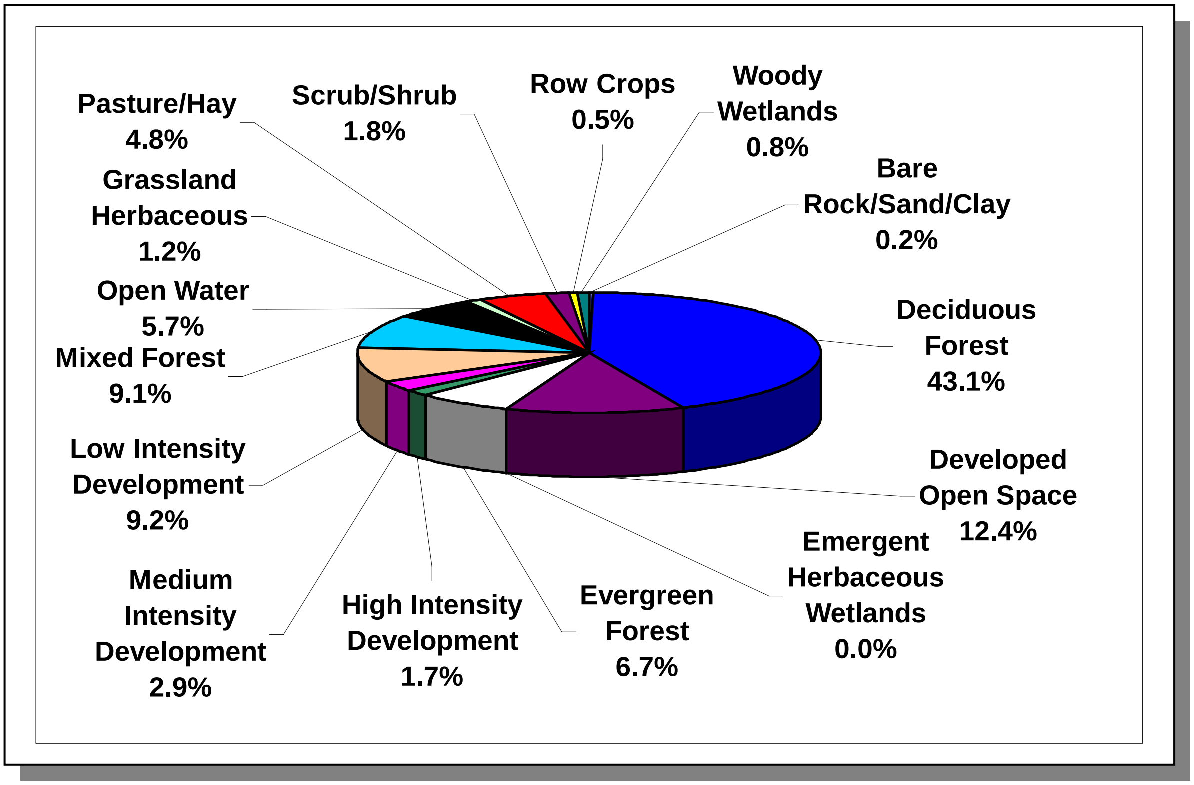


Figure 2-7. Land Use Distribution in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed. *More information is provided in Appendix II.*

Sinkholes, springs, disappearing streams and caves characterize karst topography. The term “karst” describes a distinctive landform that indicates dissolution of underlying soluble rocks by surface water or ground water. Although commonly associated with limestone and dolomite (carbonate rocks), other highly soluble rocks such as gypsum and rock salt can be sculpted into karst terrain. In karst areas, the ground water flows through solution-enlarged channels, bedding planes and microfractures within the rock. The characteristic landforms of karst regions are: closed depressions of various size and arrangement; disrupted surface drainage; and caves and underground drainage systems. The term “karst” is named after a famous region in the former country of Yugoslavia.

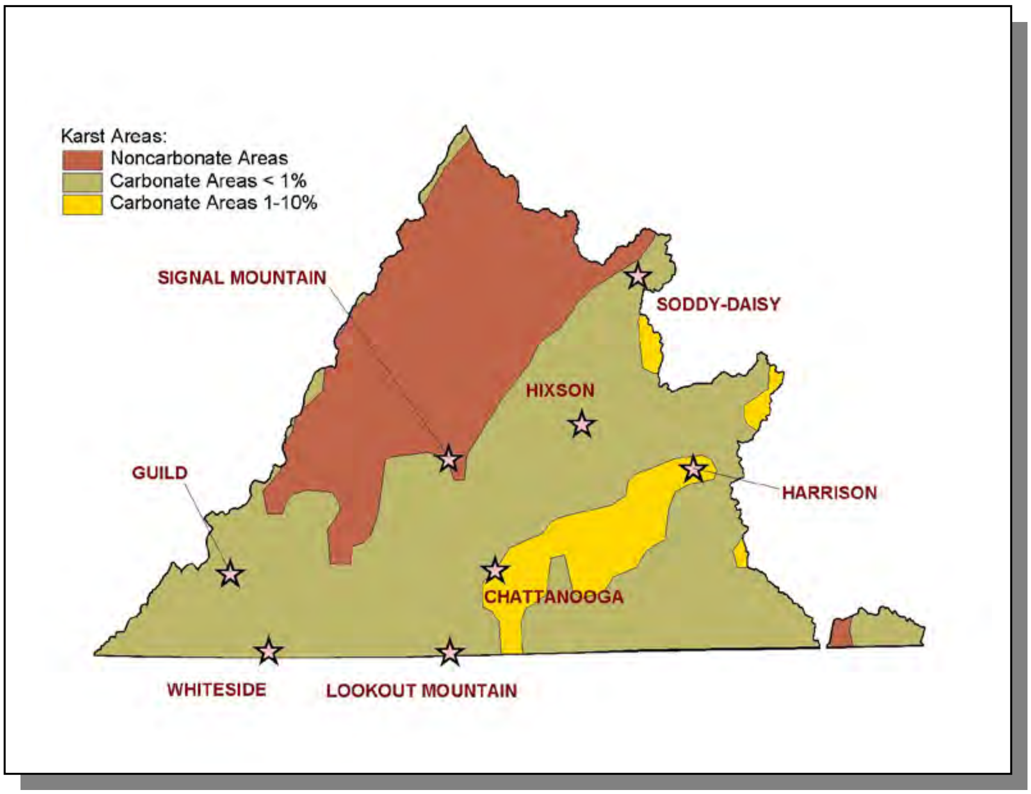


Figure 2-8. Illustration of Karst Areas in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed. *Locations of communities in the watershed are shown for reference.*

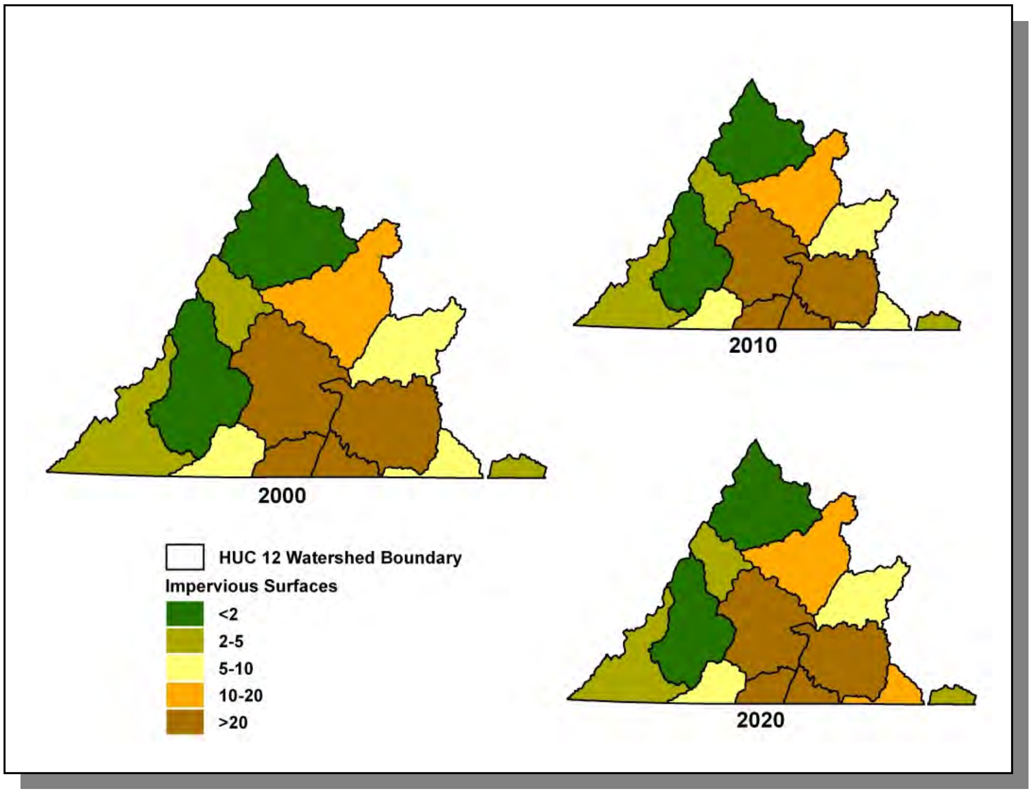


Figure 2-9. Illustration of Total Impervious Area in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed. *All HUC-12 subwatersheds are shown. Current and projected total impervious cover (percent of total area) is provided by EPA Region 4. More information can be found at: http://www.epa.gov/ATHENS/research/impervious/*

2.5. ECOREGIONS AND REFERENCE STREAMS. Ecoregions are relatively homogeneous areas of similar geography, topography, climate and soils that support similar plant and animal life. Ecoregions serve as a spatial framework for the assessment, management, and monitoring of ecosystems and ecosystem components. Ecoregion studies can aid the selection of regional stream reference sites, identifying high quality waters, and developing ecoregion-specific chemical and biological water quality criteria.

There are eight Level III Ecoregions and twenty-five Level IV subecoregions in Tennessee. The Group 4 portion of the Tennessee portion of the Lower Tennessee River Watershed lies within 2 Level III ecoregions (Ridge and Valley and Southwestern Appalachians) and contains 6 Level IV subecoregions:

- The **Southern Limestone / Dolomite Valleys and Low Rolling Hills (67f)** form a heterogeneous region composed predominantly of limestone and cherty dolomite. Landforms are mostly low rolling ridges and valleys, and the solids vary in their productivity. Landcover includes intensive agriculture, urban and industrial, or areas of thick forest. White oak forests, bottomland oak forests, and sycamore-ash-elm riparian forests are the common forest types, and grassland barrens intermixed with cedar-pine glades also occur here.

- The **Southern Shale Valleys (67g)** consist of lowlands, rolling hills, and slopes and hilly areas that are dominated by shale materials. The northern areas are associated with Ordovician-age calcareous shale, and the well-drained soils are often slightly acid to neutral. In the south, the shale valleys are associated with Cambrian-age shales that contain some narrow bands of limestone, but the soils tend to be strongly acid. Small farms and rural residences subdivide the land. The steeper slopes are used for pasture or have reverted to brush and forested land, while small fields of hay, corn, tobacco, and garden crops are grown on the foot slopes and bottom land.

- The **Southern Sandstone Ridges (67h)** ecoregion encompasses the major sandstone ridges, but these ridges also have areas of shale and siltstone. The steep, forested ridges have narrow crests, and the soils are typically stony, sandy, and of low fertility. The chemistry of streams flowing down the ridges can vary greatly depending on the geologic material. The higher elevation ridges are in the north, including Wallen Ridge, Powell Mountain, Clinch Mountain, and Bays Mountain. White Oak Mountain in the south has some sandstone on the west side, but abundant shale and limestone as well. Grindstone Mountain, capped by the Gizzard Group sandstone, is the only remnant of Pennsylvanian-age strata in the Ridge and Valley of Tennessee.

- The **Cumberland Plateau's (68a)** tablelands and open low mountains are about 1000 feet higher than to the west, and receive slightly more precipitation with cooler annual temperatures than the surrounding lower-elevation ecoregions. The plateau surface is less dissected with lower relief compared to the Cumberland Mountains or the Plateau Escarpment (68c). Elevations are generally 1200-2000 feet, with the Crab Orchard Mountains reaching over 3000 feet. Pennsylvania-age conglomerate, sandstone, siltstone, and shale is covered by mostly well-drained, acidic soils of low fertility. The region is forested, with some agriculture and coal mining activities.

- The **Plateau Escarpment (68c)** is characterized by steep, forested slopes and high velocity, high gradient streams. Local relief is often 1000 feet or more. The geologic strata include Mississippian-age limestone, sandstone, shale, and siltstone, and Pennsylvania-age shale, siltstone, sandstone, and conglomerate. Streams have cut down into the limestone, but the gorge talus slopes are composed of colluvium with huge angular, slabby blocks of sandstone. Vegetation community types in the ravines and gorges include mixed oak and chestnut oak on the upper slopes, more mesic forests on the middle and lower slopes (beech-tulip poplar, sugar maple-basswood-ash-buckeye), with hemlock along rocky streamsides and river birch along floodplain terraces.

- The **Sequatchie Valley (68b)** is structurally associated with an anticline, where erosion of broken rock to the south of the Crab Orchard Mountains scooped out the linear valley. The open, rolling, valley floor, 600-1000 feet in elevation, is generally 1000 feet below the top of the Cumberland Plateau. A low, central, cherty ridge separates the west and east valleys of Mississippian to Ordovician-age limestones, dolomites, and shales. Similar to parts of the Ridge and Valley (67), this is an agriculturally productive region, with areas of pasture, hay, soybeans, small grain, corn, and tobacco.

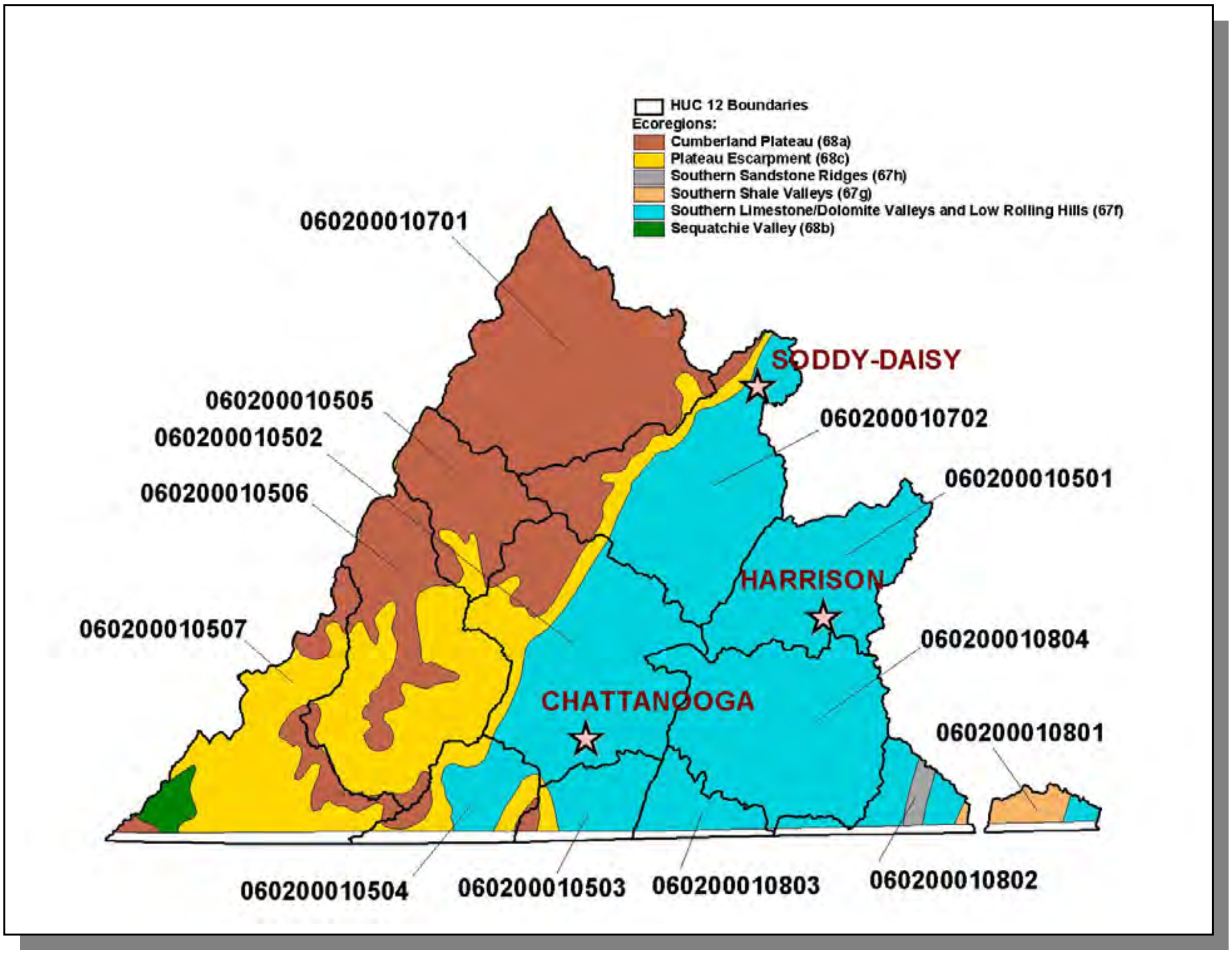


Figure 2-10. Level IV Ecoregions in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed. *HUC-12 subwatershed boundaries and locations of Chattanooga, Harrison, and Soddy-Daisy are shown for reference.*

Each Level IV Ecoregion has at least one reference stream associated with it. A reference stream represents a least impacted condition and may not be representative of a pristine condition.

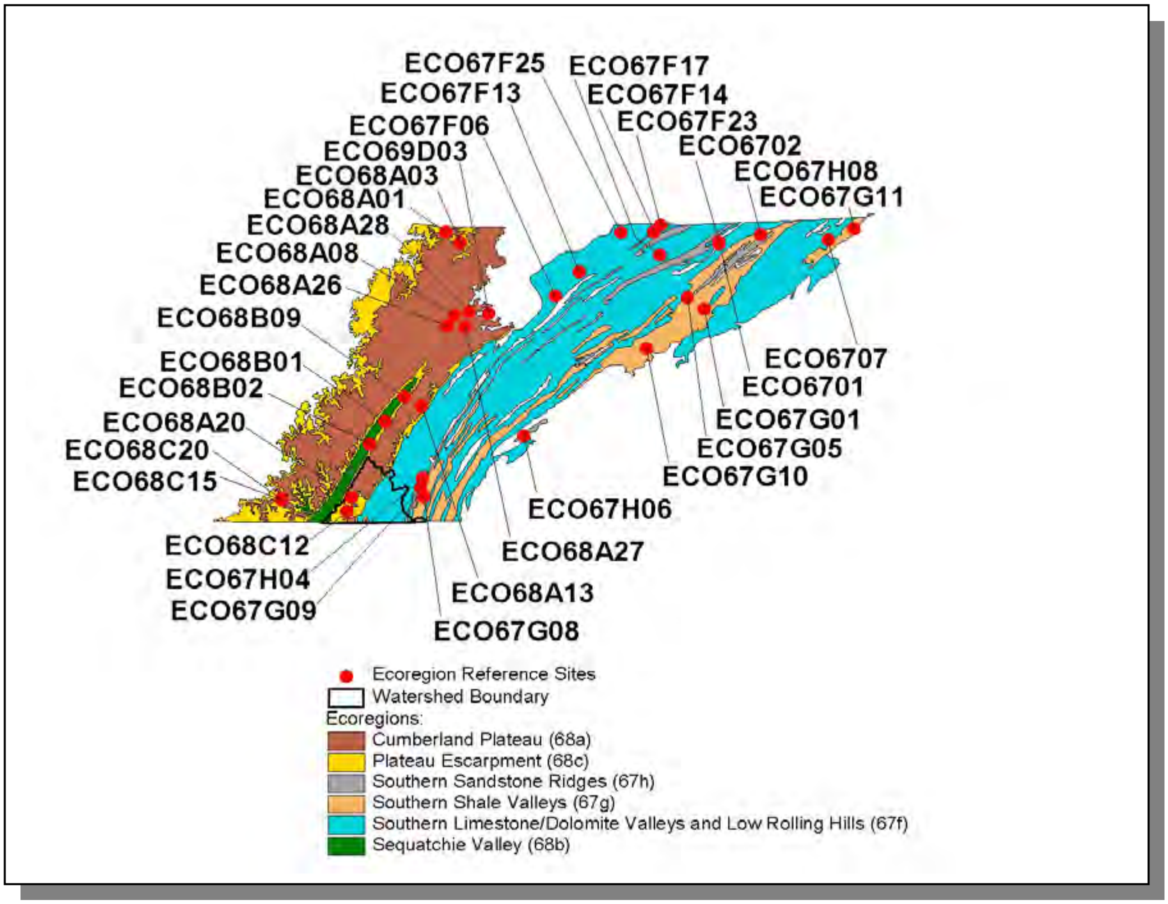


Figure 2-11. Ecoregion Monitoring Sites in Level IV Ecoregions 68a, 68b, 68c, 67h, 67f, and 67g. *The Group 4 portion of the Tennessee portion of the Lower Tennessee River Watershed is shown for reference. More information, including which ecoregion reference sites were inactive or dropped prior to 01/01/2006, is provided in Appendix II.*

2.6. NATURAL RESOURCES.

2.6.A. Designated State Natural Area. The Natural Areas Program was established in 1971 with the passage of the Natural Areas Preservation Act. TDEC/Division of Natural Heritage administers the State Natural Areas program. Further information may be found at http://www.state.tn.us/environment/na/.

The Group 4 portion of the Tennessee portion of the Lower Tennessee River Watershed has three Designated State Natural Areas:

Falling Water Falls Class I Natural-Recreational State Natural Area is a 136-acre natural area in Hamilton County. It is named for the 110 feet high waterfall on Little Falling Water Creek. The diversity of forestland near a large urban area gives the area even greater significance. A scenic vista of the Tennessee River Valley, Pickett Gulf and Buzzard Point exists at the top of the falls above the 840-feet-high escarpment. Far below, Levi Cave is located at the base of the escarpment slope. A small 2-foot wide hole leads down into a 750-feet-long cave consisting of several large rooms and dripstone formations.

Hicks Gap Class II Natural-Scientific State Natural Area is a 350-acre natural area in Marion County. The natural area occurs along the slopes of the Cumberland Plateau Escarpment in the Tennessee River Gorge just outside of Chattanooga. It is a part of the 26,000-acre Prentice Cooper State Forest and is adjacent to Tennessee River Gorge Trust property known as Kelley's Ferry Slopes. While Hicks Gap is a small site, it is located within a large conservation area deep within the biologically rich Tennessee River Gorge. The gorge is also home to many archeological sites dating back 10,000 years.

North Chickamauga Creek Gorge Class II Natural-Scientific State Natural Area is a 352-acre natural area located in Hamilton County. The creek is a popular kayaking stream during parts of the year. It is also a popular destination for hikers. The natural area is contiguous to the 1,000 acre Bowater owned North Chickamauga Creek Pocket Wilderness and Registered Natural Area on the east side of the creek. It is also contiguous with tens of thousands of gorge in private ownership. The North Chickamauga Conservancy played an essential role in the acquisition and protection of North Chickamauga Creek Gorge.

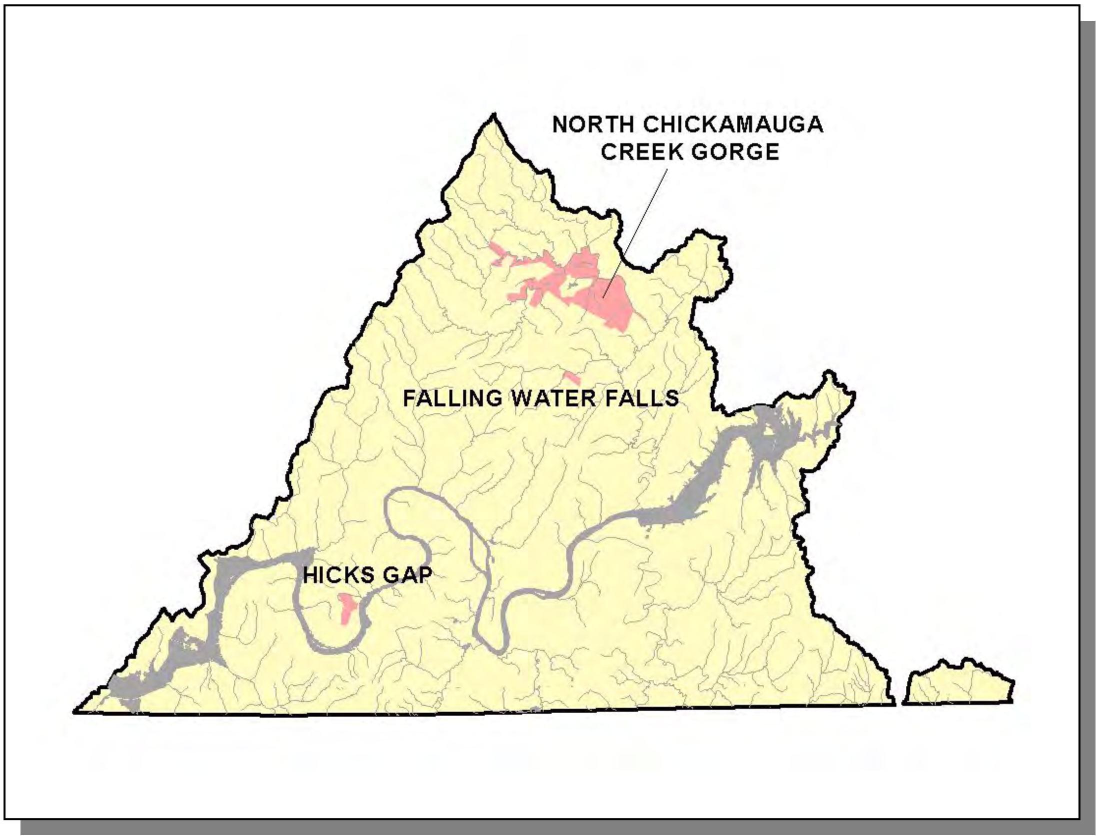


Figure 2-12. There are Three Designated State Natural Areas in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed.

2.6.B. Rare Plants and Animals. The Heritage Program in the TDEC Division of Natural Heritage maintains a database of rare species that is shared by partners at The Nature Conservancy, Tennessee Wildlife Resources Agency, the US Fish and Wildlife Service, and the Tennessee Valley Authority. The information is used to: 1) track the occurrence of rare species in order to accomplish the goals of site conservation planning and protection of biological diversity, 2) identify the need for, and status of, recovery plans, and 3) conduct environmental reviews in compliance with the federal Endangered Species Act.

GROUPING	NUMBER OF RARE SPECIES
Crustaceans	3
Insects and Spiders	5
Mussels	8
Snails	1
Amphibians	5
Birds	11
Fish	6
Mammals	6
Reptiles	2
Plants	64
Total	**111**

Table 2-3. There are 111 Known Rare Plant and Animal Species in the Tennessee Portion (Groups 3 and 4) of the Lower Tennessee River Watershed.

In the Tennessee Portion of the Lower Tennessee River Watershed (Groups 3 and 4 portions), there are six known rare fish species, eight known rare mussel species, five known rare amphibian species, two known rare snail species, and three known rare crustacean species.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
Carpiodes velifer	Highfin carpsucker		D
Hemitremia flammea	Flame chub		D
Percina tanasi	Snail darter	LT	T
Foxinus saylori	Laurel dace		E
Phoxinus tennesseensis	Tennessee dace		D
Typhlichthys subterraneus	Southern cavefish		D
Cyprogenia irrorata	Eastern fanshell pearlymussel	LE	E
Dromus dromas	Dromedary pearlymussel	LE	E
Lampsilis abrupta	Pink mucket	LE	E
Plethobasus cooperianus	Orange-foot pimpleback	LE	E
Pleurobema oviforme	Tennessee clubshell		
Pleurobema plenum	Rough pigtoe	LE	E
Pleurobema rubrum	Pyramid pigtoe		
Quadrula intermedia	Cumberland monkeyface	LE	E
Aneides aeneus	Green salamander		
Cryptobranchus alleganiensis	Hellbender		D
Gyrinophilus palleucus	Tennessee cave salamander		T
Hemidactylium scutatum	Four-toed salamander		D
Hyla gratiosa	Barking Treefrog		D
Io fluvialis	Spiny riversnail		
Apocrangonyx nortoni	Norton's cave amphipod		
Caecidotea nickajackensis	Nickajack cave isopod		
Cambarus extraneus	Chickamauga crayfish		T

Table 2-4. Rare Aquatic Species in the Collins River Watershed. *Federal Status: LE, Listed Endangered by the U.S. Fish and Wildlife Service; LT, Listed Threatened by the U.S. Fish and Wildlife Service. State Status: E, Listed Endangered by the Tennessee Wildlife Resources Agency; T, Listed Threatened by the Tennessee Wildlife Resources Agency D; Deemed in Need of Management by the Tennessee Wildlife Resources Agency. More information may be found at http://www.state.tn.us/environment/na/.*

2.6.C. Wetlands. The Division of Natural Areas maintains a database of wetland records in Tennessee. These records are a compilation of field data from wetland sites inventoried by various state and federal agencies. Maintaining this database is part of Tennessee's Wetland Strategy, which is described at:

http://www.state.tn.us/environment/na/wetlands/

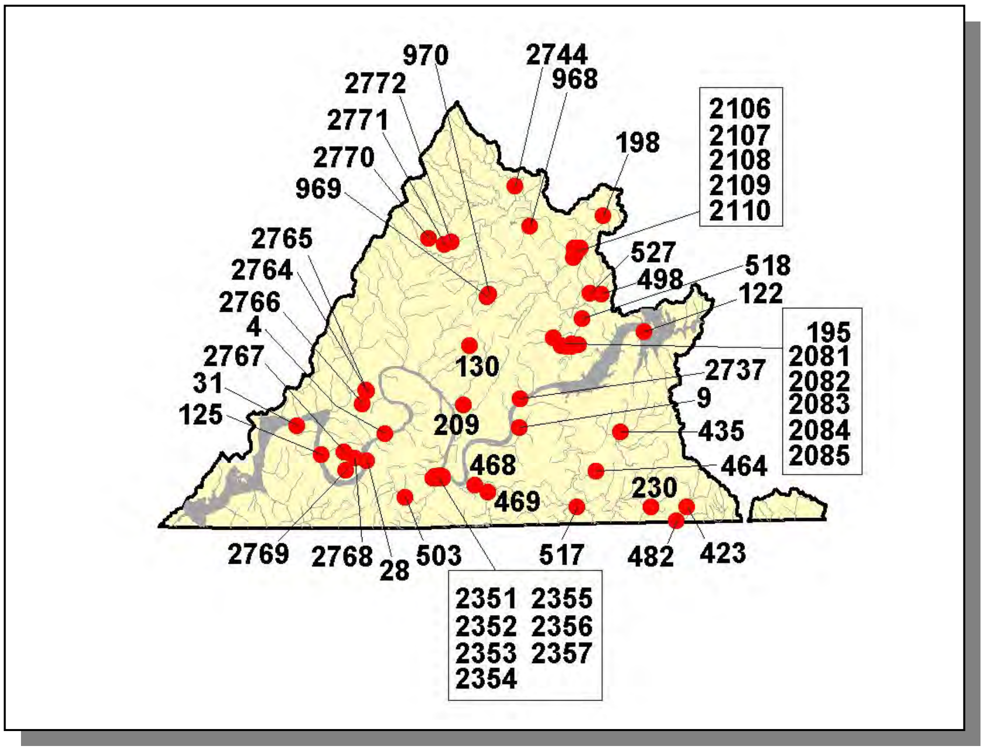


Figure 2-13. Location of Wetland Sites in TDEC Division of Natural Heritage Database in Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed. This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands. *There may be additional wetland sites in the watershed. More information, including identification of wetland sites labeled, is provided in Appendix II.*

2.7. CULTURAL RESOURCES.

2.7.A. Nationwide Rivers Inventory. The Nationwide Rivers Inventory, required under the Federal Wild and Scenic Rivers Act of 1968, is a listing of free-flowing rivers that are believed to possess one or more outstanding natural or cultural values. Exceptional scenery, fishing or boating, unusual geologic formations, rare plant and animal life, cultural or historic artifacts that are judged to be of more than local or regional significance are the values that qualify a river segment for listing. The Tennessee Department of Environment and Conservation and the Rivers and Trails Conservation Assistance branch of the National Park Service jointly compile the Nationwide Rivers Inventory from time to time (most recently in 1997). Under a 1980 directive from the President's Council on Environmental Quality, all Federal agencies must seek to avoid or mitigate actions that would have an adverse effect on Nationwide Rivers Inventory segments.

The most recent version of the Nationwide Rivers Inventory lists portions of one stream in the Group 4 portion Tennessee portion of the Lower Tennessee River Watershed:

> North Chickamauga Creek (RM 13 to RM 31) is a spring-fed, crystal clear mountain stream with a variety of flora and abundance of wildlife.

RIVER	SCENIC	RECREATION	GEOLOGIC	FISH	WILDLIFE	HISTIORIC	CULTURAL
North Chickamauga Creek	X	X	X	X	X	X	X

Table 2-5. Attributes of Streams Listed in the Nationwide Rivers Inventory.

Additional information may be found online at http://www.ncrc.nps.gov/rtca/nri/

2.7.B. Public Lands. Some sites representative of the cultural heritage are under state or federal protection:

- Amnicola Marsh Refuge is part of Chattanooga's Tennessee River Park.

- Big Ridge Small Wild Area is a 200-acre tract owned and administered by TVA and registered as a State Natural Area. More information may be found at http://www.northchick.org/greenway.html.

- Booker T. Washington State Recreation Area is a 353-acre state park located on Chickamauga Lake. More information may be found at http://www.state.tn.us/environment/parks/parks/BookerTWashington.

- Chattanooga City Park is owned and operated by the city of Chattanooga. More information on Chattanooga parks may be found at http://www.chattanooga.gov/PRAC/30_955.htm.

- Chickamauga and Chattanooga National Military Park, the nation's first military park, is over 5,000 acres. More information may be found at http://www.nps.gov/chch/.

- Cummings Cove-Aetna Mountain is a 1,200-acre property that the landowner voluntarily placed in conservation protection through the Forest Legacy Program. More information may be found at http://www.na.fs.fed.us/legacy/library/newsletters/03aug_fl.htm.

- Falling Water Falls is a Class I Natural-Recreational State Natural Area located in Hamilton County. More information may be found at http://www.state.tn.us/environment/na/natareas/fallingwater/ .

- Hales Bar Public Use Area is located in Marion County on Nickajack Lake.

- Harrison Bay State Recreation Area is a 1,200-acre state park located on Chickamauga Lake. More information may be found at http://www.state.tn.us/environment/parks/parks/HarrisonBay.

- Hicks Gap is a 350-acre Class II Natural-Scientific State Natural Area located in Marion County and part of Prentice-Cooper State Forest. More information on Hicks Gap State Natural Area may be found at http://www.state.tn.us/environment/na/natareas/hicks/.

- Nickajack Dam Public Campground and Access Site is located in Marion County. More information may be found at http://www.tnvacation.com/vendors/nickajack_dam_reservation/.

- Nickajack Lake is a 10,370-acre TVA Lake. More information may be found at http://www.tva.gov/sites/nickajack.htm.

- North Chickamauga Creek Gorge State Natural Area is a Class II Natural-Scientific State Natural Area. More information may be found at http://www.state.tn.us/environment/na/natareas/northchick/.

- North Chickamauga Creek Wildlife Management Area is a 5,400-acre area managed by TWRA in Hamilton County.

- Prentice Cooper State Forest is a 24,311-acre state forest located in Marion County in the Tennessee River Gorge. More information may be found at http://www.state.tn.us/agriculture/forestry/stateforests/7.html.

- Prentice Cooper State Forest Wildlife Management Area is a 24,000-acre area managed by TWRA in Marion County.

- TDOT Mitigation-Thrasher Tract is located at North Chickamauga Wildlife Management Area and is patrolled by Tennessee Wildlife Resources Agency.

- Volunteer Army Ammunition Plant is part of the federal government's Lands to Parks program. 2757 acres have been deeded to Hamilton County and Chattanooga for public park and recreation use. More information may be found at http://www.nps.gov/flp/tn_volunteeraap_story.htm.

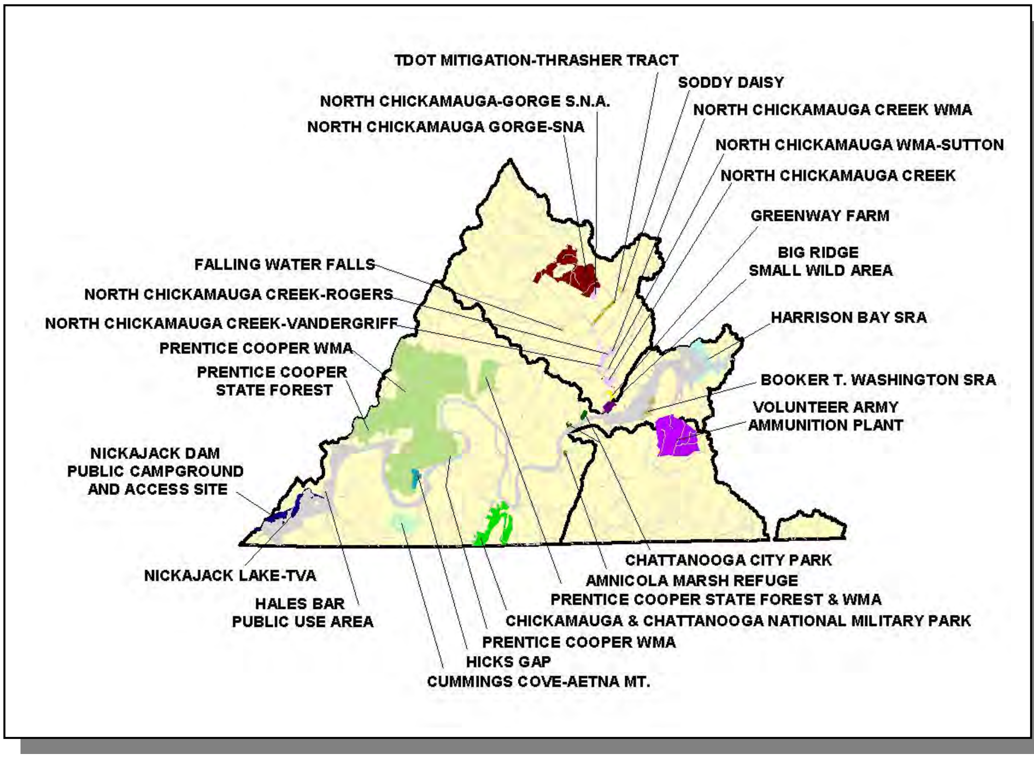


Figure 2-14. Public Lands in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed. *Data are from Tennessee Wildlife Resources Agency. SNA, State Natural Area; SRA, State Recreation Area; TDOT, Tennessee Department of Transportation; TVA, Tennessee Valley Authority; WMA, Wildlife Management Area.*

2.8. TENNESSEE RIVERS ASSESSMENT PROJECT. The Tennessee Rivers Assessment is part of a national program operating under the guidance of the National Park Service's Rivers and Trails Conservation Assistance Program. The Assessment is an inventory of river resources, and should not be confused with "Assessment" as defined by the Environmental Protection Agency. A more complete description can be found in the Tennessee Rivers Assessment Summary Report, which is available from the Department of Environment and Conservation and on the web at:

http://www.state.tn.us/environment/wpc/publications/riv/

STREAM	NSQ	RB	RF		STREAM	NSQ	RB	RF
Bear Branch Creek	2				McGill Greek	2	3	
Big Possum Creek	1				North Suck Creek	2	2,3	
Big Sewee Creek	2	2	3,4		Paine Creek	2		
Black Ankle Creek	3				Polebridge Creek	3		
Blue Springs Branch Creek	3				Possum Creek	2	2	
Broad Camp Creek	3				Richland Creek	1	2,3	
Brush Creek	1				Roaring Creek	1,2	2	
Clear Creek	3		3		Rock Creek	1	2	
Dry Fork Creek	3				Sale Creek	3		
Fork Creek	2				Soddy Creek	1	2	
Goodfield Creek	3				South Chickamauga Creek	3	2	
Gray Creek	1				South Fork Little Sewee Creek	2		
Henderson Creek	1	2			South Suck Creek	1		
Hurricane Creek	3				Suck Creek	2	2	
Little Ooltewah Creek	2				Sugar Creek	3		
Little Possum Creek	1	2			Tenmile Creek	3		3
Little Sewee Creek	3		3		Tigues Creek	3	2	
Little Woftever Creek	4				Woltever Creek	3		
Long Savannah Creek	3				Yellow Creek	4		

Table 2-6. Tennessee Rivers Assessment Project Stream Scoring in the Group 4 Portion of the Lower Tennessee River Watershed. *Streams listed may be in the Group 3 or Group 4 portions of the watershed.*

Categories: NSQ, Natural and Scenic Qualities
RB, Recreational Boating
RF, Recreational Fishing

Scores: 1. Statewide or greater Significance; Excellent Fishery
2. Regional Significance; Good Fishery
3. Local Significance; Fair Fishery
4. Not a significant Resource; Not Assessed

CHAPTER 3

WATER QUALITY ASSESSMENT OF THE LOWER TENNESSEE RIVER WATERSHED.

3.1. BACKGROUND. Section 305(b) of The Clean Water Act requires states to report the status of water quality every two years. Historically, Tennessee's methodologies, protocols, frequencies and locations of monitoring varied depending upon whether sites were ambient, ecoregion, or intensive survey. Alternatively, in areas where no direct sampling data existed, water quality may have been assessed by evaluation or by the knowledge and experience of the area by professional staff.

In 1996, Tennessee began the watershed approach to water quality protection. In the Watershed Approach, resources—both human and fiscal—are better used by assessing water quality more intensively on a watershed-by-watershed basis. In this approach, water quality is assessed in year three of the watershed cycle, following one to two years of data collection. More information about the Watershed Approach may be found in Chapter 1 and at http://www.state.tn.us/environment/wpc/watershed/

The assessment information is used in the 305(b) Report (The Status of Water Quality in Tennessee) and the 303(d) list as required by the Clean Water Act.

The 305(b) Report documents the condition of the State's waters. Its function is to provide information used for water quality based decisions, evaluate progress, and measure success.

Tennessee uses the 305(b) Report to meet four goals (from 2006 305(b) Report):

1. Describe the water quality assessment process

2. Categorize waters in the State by placing them in the assessment categories suggested by federal guidance

3. Identify waterbodies that pose imminent human health risks due to elevated bacteria levels or contamination of fish

4. Provide detailed information on each watershed

EPA aggregates the state use support information into a national assessment of the nation's water quality. This aggregated use support information can be viewed at EPA's "Surf Your Watershed" site at http://cfpub.epa.gov/surf/locate/index.cfm.

The 303(d) list is a compilation of the waters of Tennessee that fail to support some or all of their classified uses. The 303(d) list does not include streams determined to be fully supporting designated uses nor streams the Division of Water Pollution Control cannot assess due to lack of water quality information. Also absent are streams where a control strategy is already in the process of being implemented.

Once a stream is placed on the 303(d) list, it is considered a priority for water quality improvement efforts. These efforts not only 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. If a stream is on the 303(d) list, the Division of Water Pollution Control cannot use its regulatory authority to allow additional sources of the same pollutant(s) for which it is listed.

States are required to develop Total Maximum Daily Loads (TMDLs) for 303(d)-listed waterbodies. The TMDL process establishes the maximum amount of a pollutant that a waterbody can assimilate without exceeding water quality standards and allocates this load among all contributing pollutant sources. The purpose of the TMDL is to establish water quality objectives required to reduce pollution from both point and nonpoint sources and to restore and maintain the quality of water resources.

The current 303(d) List is available on the TDEC homepage at:
http://tennessee.gov/environment/wpc/publications/303d2006.pdf

and information about Tennessee's TMDL program may be found at:
http://www.state.tn.us/environment/wpc/tmdl/.

This chapter provides a summary of water quality in the Group 4 portion of the Tennessee portion of the Lower Tennessee River Watershed, summarizes data collection and assessment results, and describes impaired waters.

3.2. DATA COLLECTION. The figures and table below represent data collected in the last 5-year cycle (July 1, 2000 through June 30, 2005). Water quality data are from one of four site types: (1) Ambient sites, (2) Ecoregion sites, (3) Watershed Screening sites, or (4) Tier Evaluation sites.

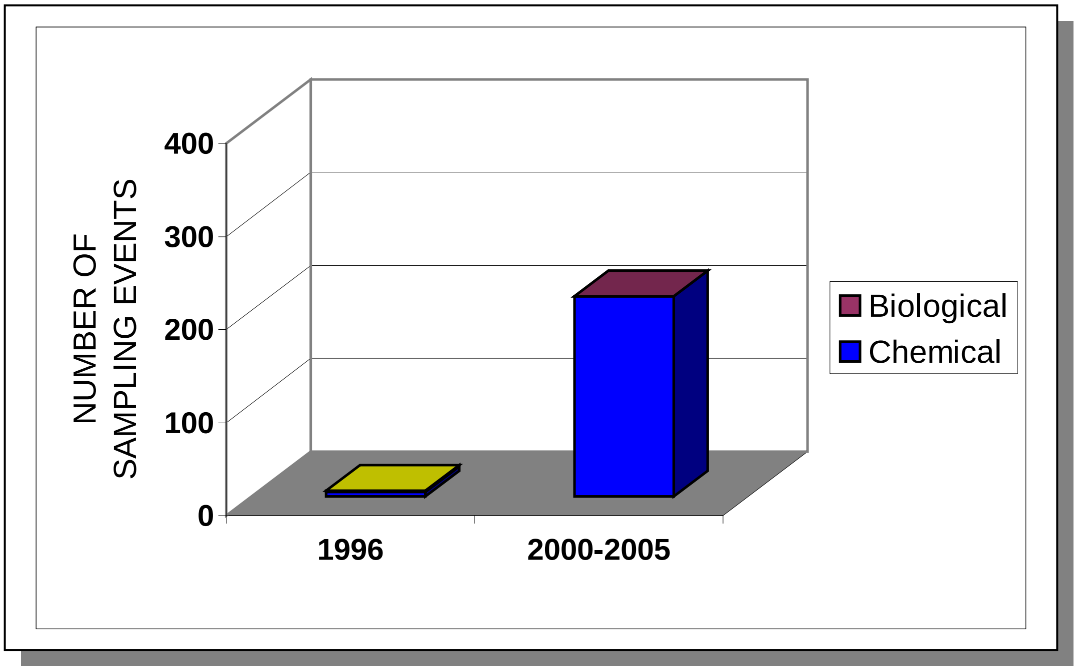


Figure 3-1. Number of Sampling Events Using the Traditional Approach (1996) and Watershed Approach (July 1, 2000 through June 30, 2005) in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed.

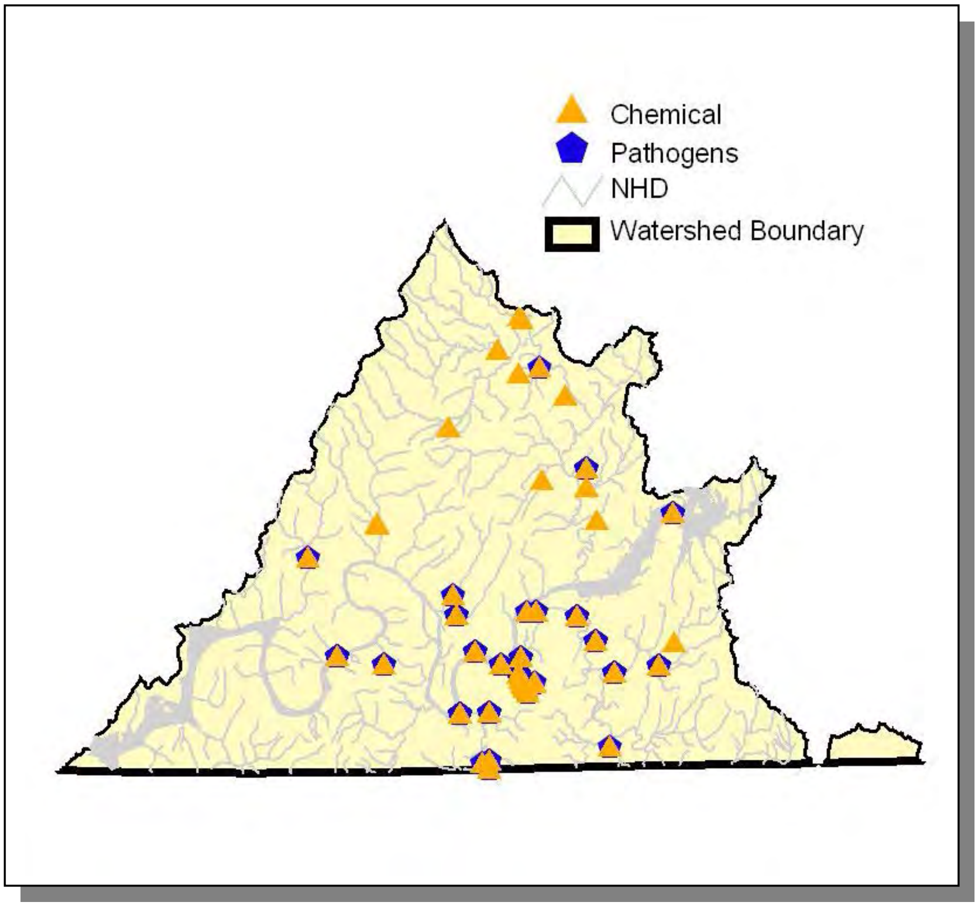


Figure 3-2. Location of Monitoring Sites in the* Group 4 Portion of the Tennessee Portion of the Lower *Tennessee River Watershed (July 1, 2000 through June 30, 2005). *NHD, National Hydrography Dataset of Streams.*

	1996	2000-2005
Biological	1	0
Chemical	4	267
Total	**5**	**267**

Table 3-1. Number of Sampling Events in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed in the last 5-Year Cycle (July 1, 2000 through June 30, 2005).

3.2.A. Ambient Monitoring Sites. These fixed-station chemical monitoring sites are sampled quarterly or monthly by the Environmental Field Office-Chattanooga staff (this is in addition to samples collected by water and wastewater treatment plant operators). Samples are analyzed by the Tennessee Department of Health, Division of Environmental Laboratory Services. Ambient monitoring data are used to assess water quality in major bodies of water where there are NPDES facilities and to identify trends in water quality. Water quality parameters traditionally measured at ambient sites in the Group 4 portion of the Tennessee portion of the Lower Tennessee River Watershed are provided in Appendix IV.

Data from ambient monitoring stations are entered into the STORET (Storage and Retrieval) system administered by EPA.

3.2.B. Ecoregion Sites. Ecoregions are relatively homogeneous areas of similar geography, topography, climate and soils that support similar plants and animals. The delineation phase of the Tennessee Ecoregion Project was completed in 1997 when the ecoregions and subecoregions were mapped and summarized (EPA/600/R-97/022). There are eight Level III Ecoregions and twenty-five Level IV subecoregions in Tennessee (see Chapter 2 for more details). The Group 4 portion of the Tennessee portion of the Lower Tennessee River Watershed lies within 3 Level III ecoregions (Ridge and valley and Southwestern Appalachians) and contains 6 subecoregions (Level IV):

- Southern Limestone/Dolomite Valleys and Low Rolling Hills (67f)
- Southern Shale Valleys (67g)
- Southern Sandstone Ridges (67h)
- Cumberland Plateau (68a)
- Sequatchie Valley (68b)
- Plateau Escarpment (68c)

Ecoregion reference sites are chemically monitored using methodology outlined in the Division's Chemical Standard Operating Procedure (Standard Operating Procedure for Modified Clean Technique Sampling Protocol). Macroinvertebrate samples are collected in spring and fall. These biological sample collections follow methodology outlined in the Tennessee Biological Standard Operating Procedures Manual. Volume 1: Macroinvertebrates and EPA's Revision to Rapid Bioassessment Protocols for use in Streams and Rivers.

Ecoregion stations are scheduled to be monitored during the watershed sampling time period.

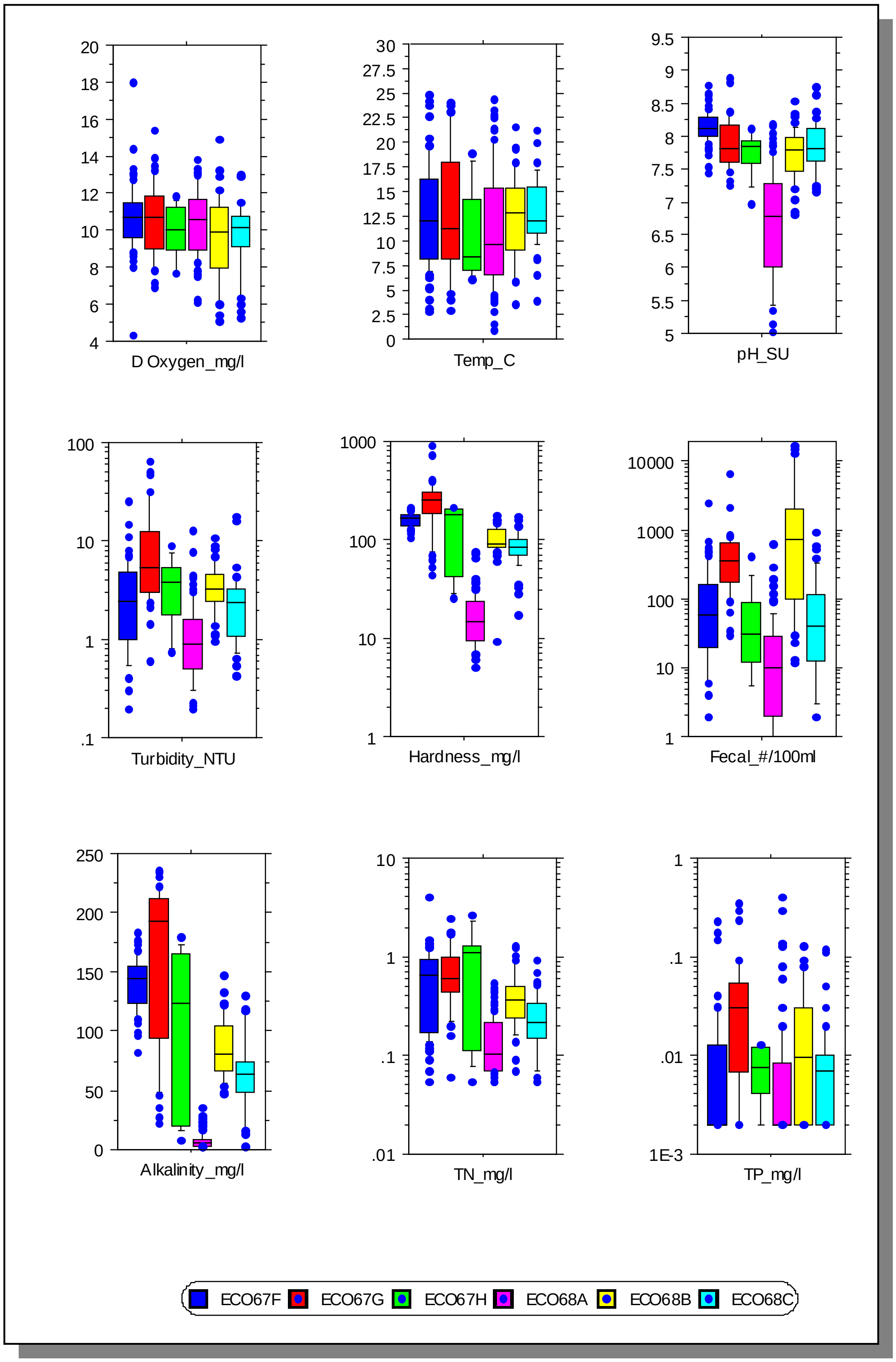


Figure 3-3. Select Chemical Data Collected in the Tennessee Portion of Lower Tennessee River Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th*

percentiles. Extreme values are also shown as dots. Fecal, fecal coliform bacteria; TN, Total Nitrogen; TP, Total Phosphorus.

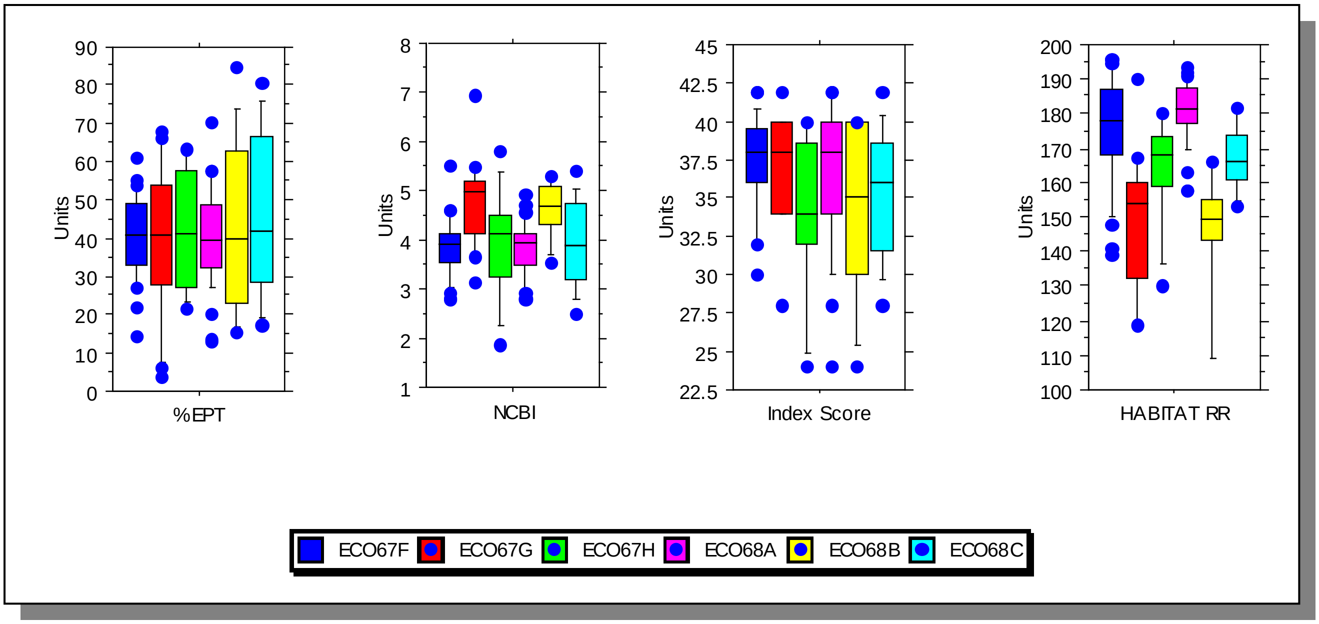


Figure 3-4. Benthic Macroinvertebrate and Habitat Scores for the Tennessee Portion of Lower Tennessee River Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th percentiles. Extreme values are also shown as dots. NCBI, North Carolina Biotic Index. Index Score and Habitat Riffle/Run scoring system are described in TDEC's Quality System Standard Operating Procedure for Macroinvertebrate Stream Surveys (2006).*

3.2.C. Watershed Screening Sites. Activities that take place at watershed sites are benthic macroinvertebrate stream surveys, physical habitat determinations and/or chemical monitoring. Following review of existing data, watershed sites are selected in Year 1 of the watershed approach when preliminary monitoring strategies are developed. Additional sites may be added in Year 2 when additional monitoring strategies are implemented.

A Biological Reconnaissance (BioRecon) is used as a screening tool to describe the condition of water quality, in general, by determining the absence or presence of clean water indicator organisms, such as EPT (Ephemeroptera [mayfly], Plecoptera [stonefly], Trichoptera [caddisfly]). Factors and resources used for selecting BioRecon sites are:

- The current 303(d) list,
- HUC-10 maps (every HUC-10 is scheduled for a BioRecon)
- Land Use/Land Cover maps
- Topographic maps
- Locations of NPDES facilities
- Sites of recent ARAP activities.

An intensive multiple or single habitat assessment involves the regular monitoring of a station over a fixed period of time. Intensive surveys (Rapid Bioassessment Protocols) are performed when BioRecon results warrant it.

3.2.D. Special Surveys. These investigations are performed when needed and include:

- ARAP in-stream investigation
- Time-of-travel dye study
- Sediment oxygen demand study
- Lake eutrophication study

3.3. STATUS OF WATER QUALITY. Overall use support is a general description of water quality conditions in a water body based on determination of individual use supports. Use support determinations, which can be classified as monitored or evaluated, are based on:

- Data less than 5 years old (monitored)
- Data more than 5 years old (evaluated)
- Knowledge and experience of the area by technical staff (evaluated)
- Complaint investigation (monitored, if samples are collected)
- Other readily available Agencies' data (monitored)
- Readily available Volunteer Monitoring data (monitored, if certain quality assurance standards are met)

All readily available data are considered, including data from TDEC Environmental Field Offices, Tennessee Department of Health (Aquatic Biology Section of Laboratory Services), Tennessee Wildlife Resources Agency, National Park Service, Tennessee Valley Authority, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Geological Survey, U.S. Forest Service, universities and colleges, the regulated community, and the private sector.

The assessment is based on the degree of support of designated uses as measured by compliance with Tennessee's water quality standards.

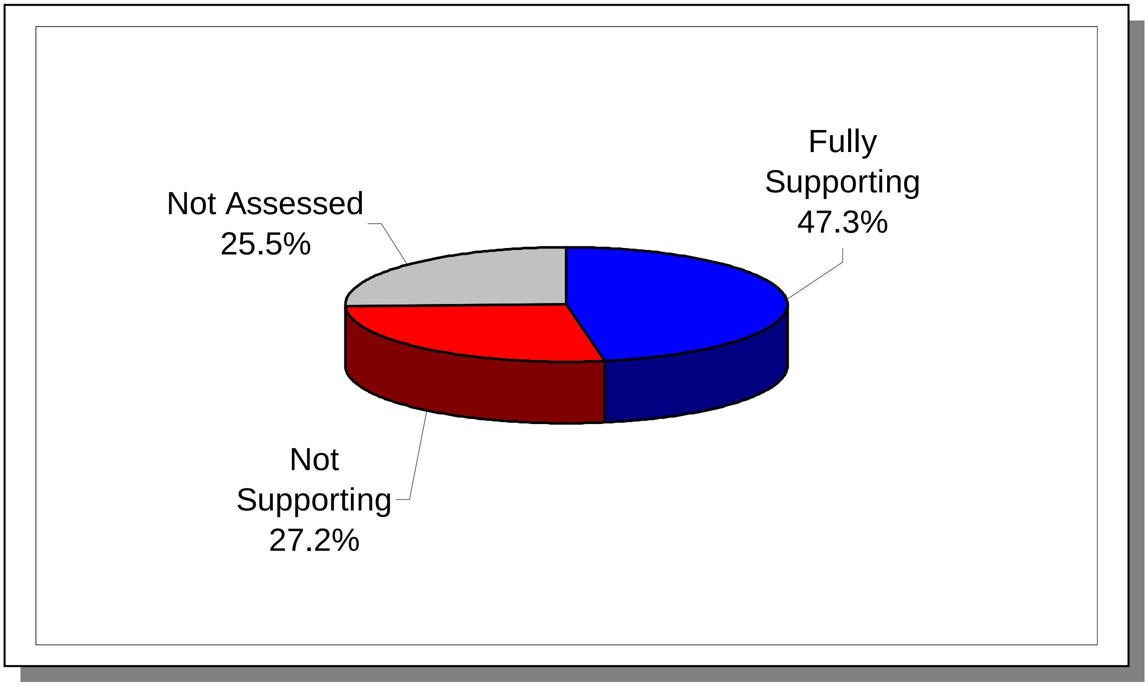


Figure 3-5. Water Quality Assessment of Streams in the* Group 4 Portion of the Tennessee Portion of the Lower *Tennessee River Watershed. *Assessment data are based on the 2004 Water Quality Assessment of 482.6 stream miles in the watershed. More information is provided in Appendix III.*

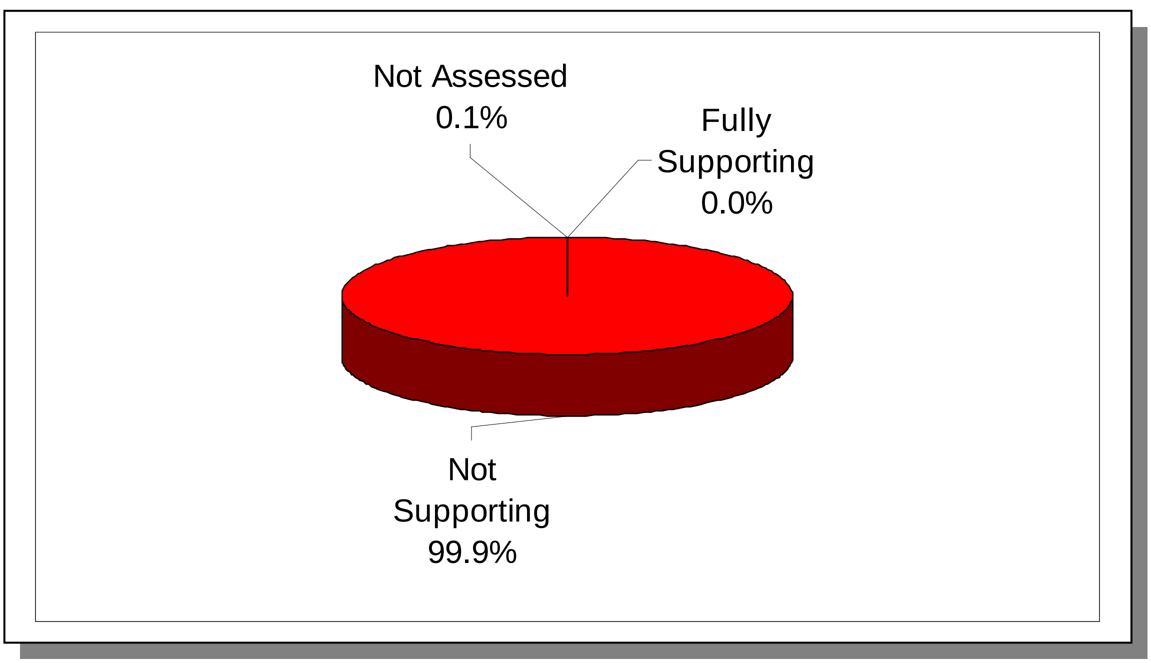


Figure 3-6. Water Quality Assessment of Lakes in the* Group 4 Portion of the Tennessee Portion of the Lower *Tennessee River Watershed. *Assessment data are based on the 2004*

Water Quality Assessment of 10,380 lake acres in the watershed. More information is provided in Appendix III.

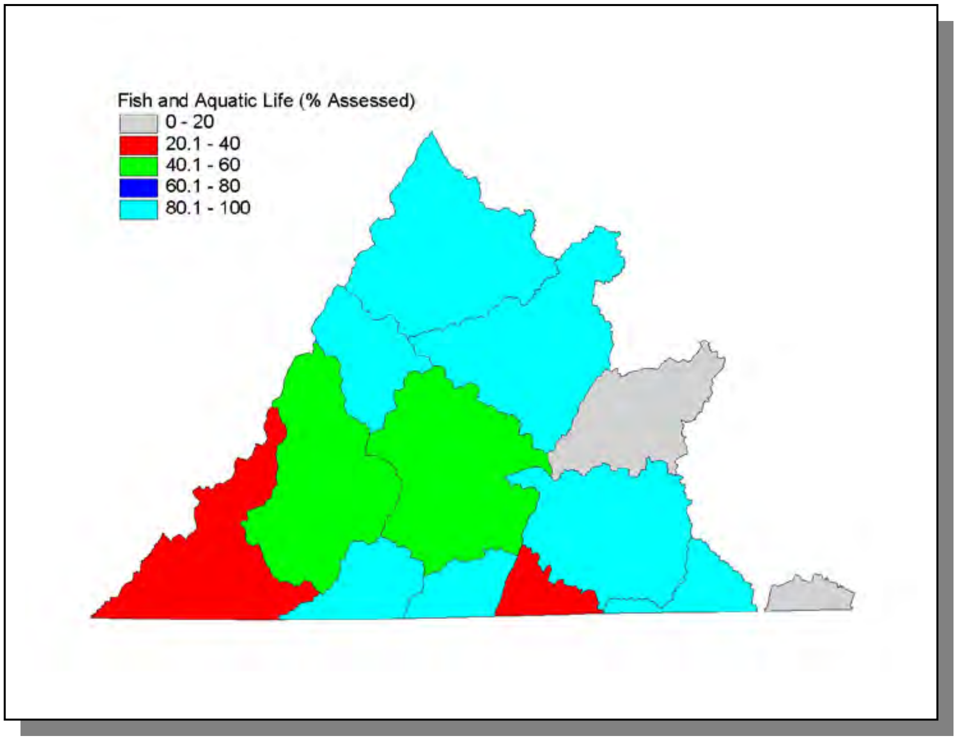


Figure 3-7. Percentage of Stream Miles Assessed for Support of Fish and Aquatic Life Designated Use in HUC-12 Subwatersheds.

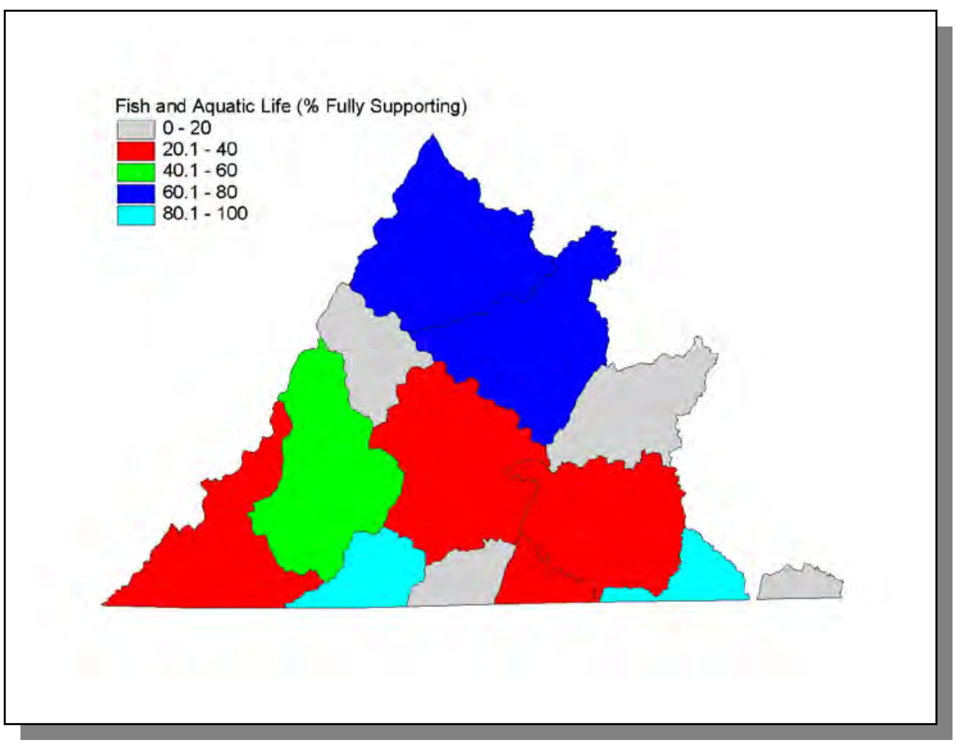


Figure 3-8. Percentage of Stream Miles Fully Supporting for Fish and Aquatic Life Designated Use in HUC-12 Subwatersheds.

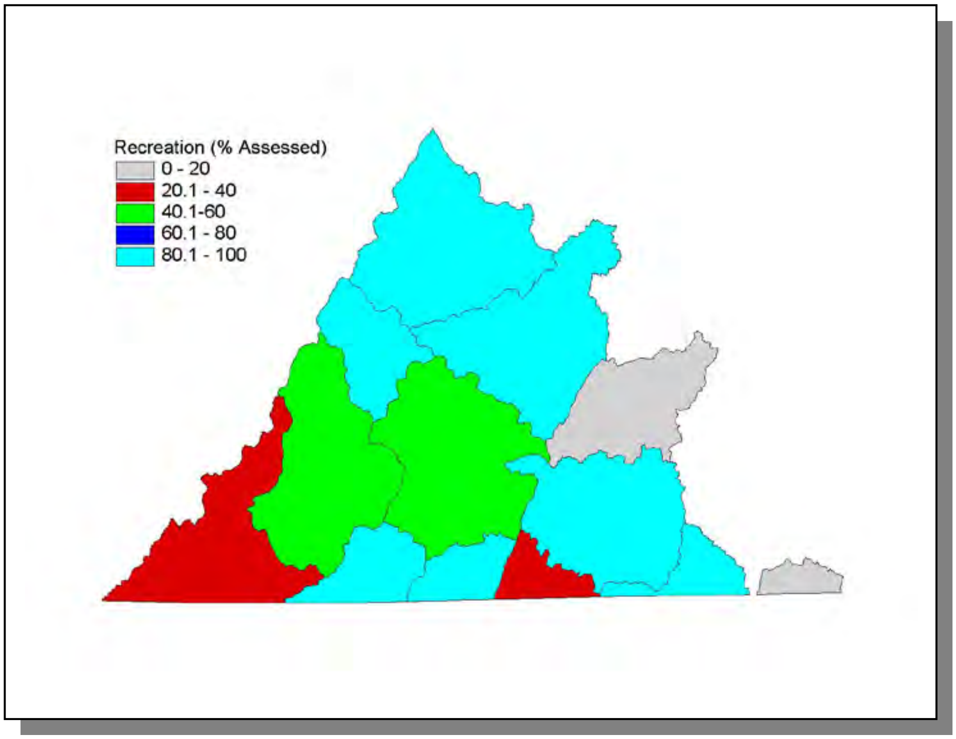


Figure 3-9. Percentage of Stream Miles Assessed for Support of Recreation Designated Use in HUC-12 Subwatersheds.

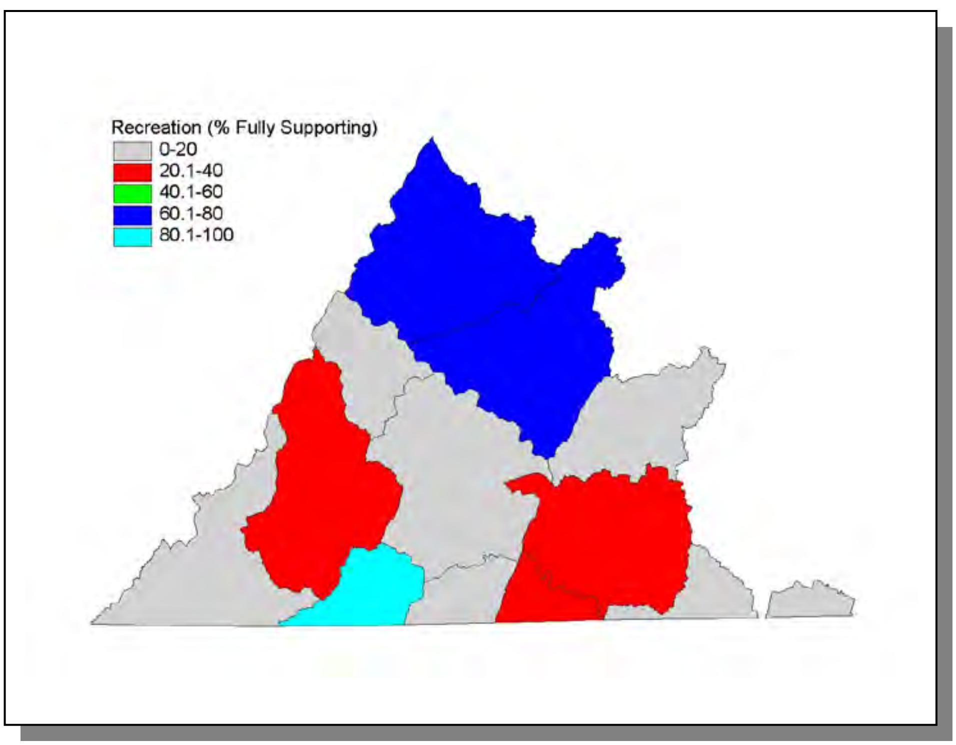


Figure 3-10. Percentage of Stream Miles Fully Supporting for Recreation Designated Use in HUC-12 Subwatersheds.

3.3.A. Assessment Summary.

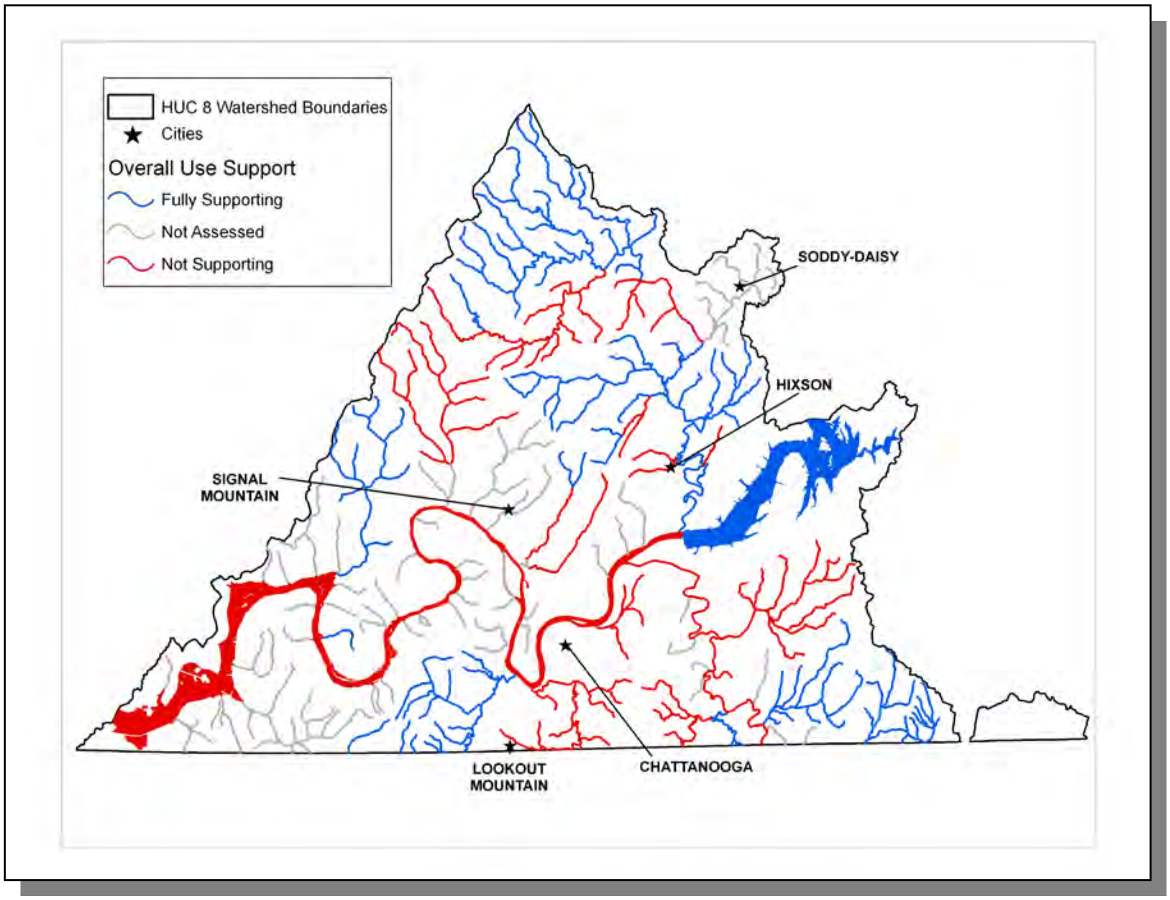


Figure 3-11. Overall Use Support Attainment in the* Group 4 Portion of the Tennessee Portion of the Lower *Tennessee River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Chattanooga, Hixson, Lookout Mountain, Signal Mountain, and Soddy-Daisy are shown for reference. More information is provided in Appendix III.*

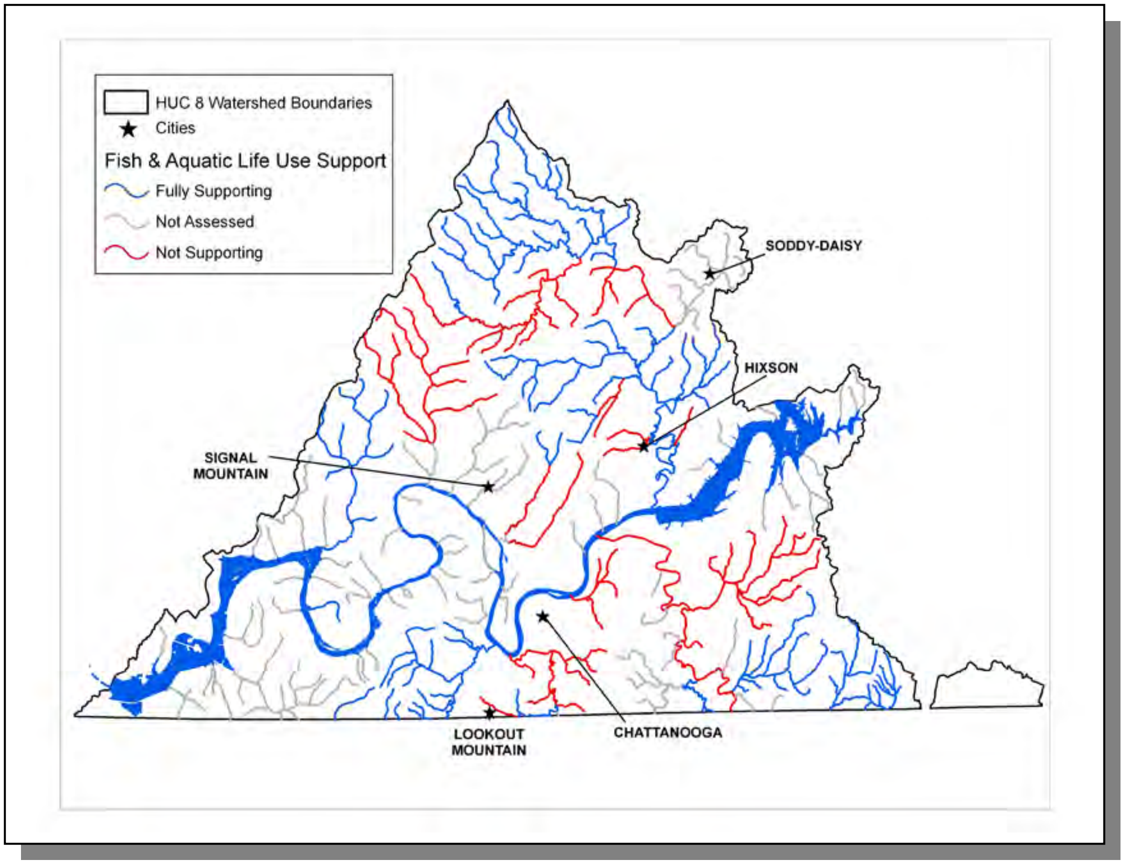


Figure 3-12. Fish and Aquatic Life Use Support Attainment in the* Group 4 Portion of the Tennessee Portion of the Lower *Tennessee River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Chattanooga, Hixson, Lookout Mountain, Signal Mountain, and Soddy-Daisy are shown for reference. More information is provided in Appendix III.*

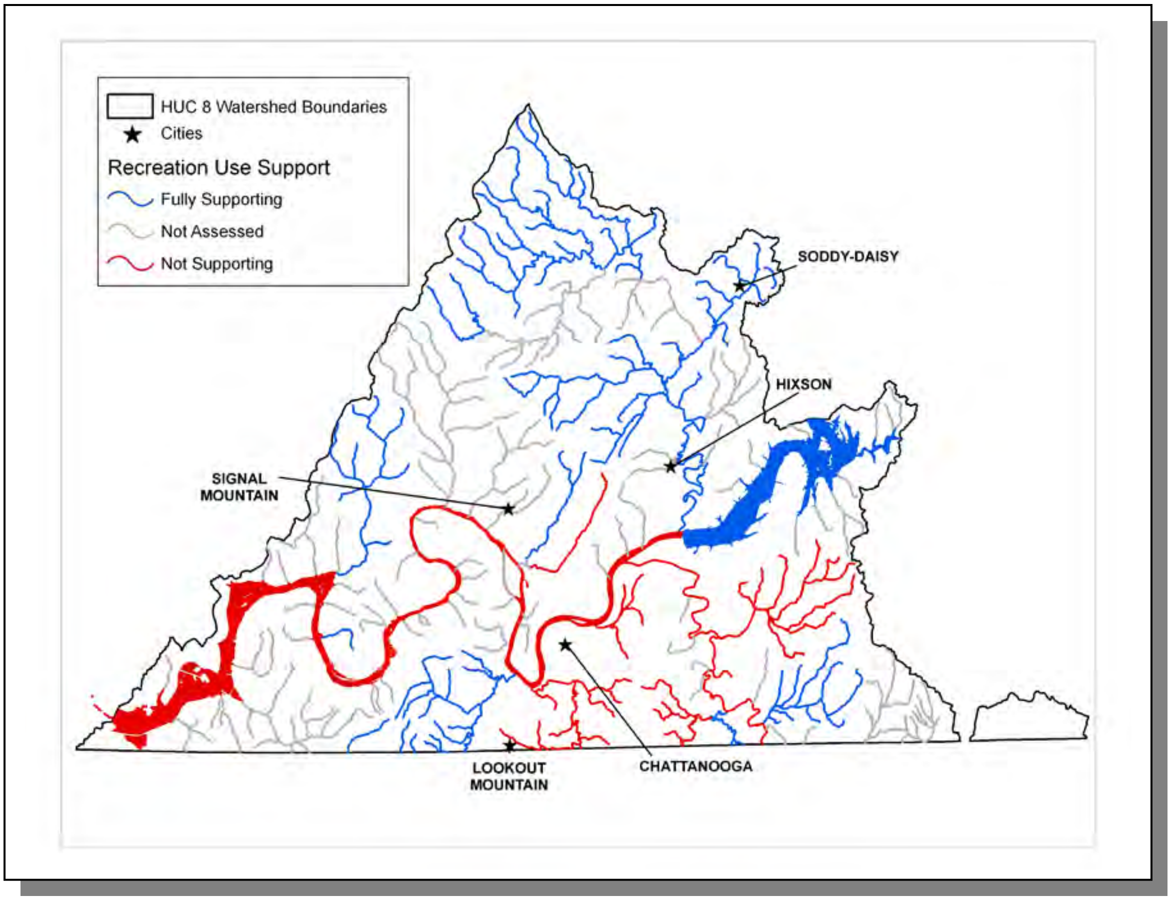


Figure 3-13. Recreation Use Support Attainment in the* Group 4 Portion of the Tennessee Portion of the Lower *Tennessee River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Chattanooga, Hixson, Lookout Mountain, Signal Mountain, and Soddy-Daisy are shown for reference. More information is provided in Appendix III.*

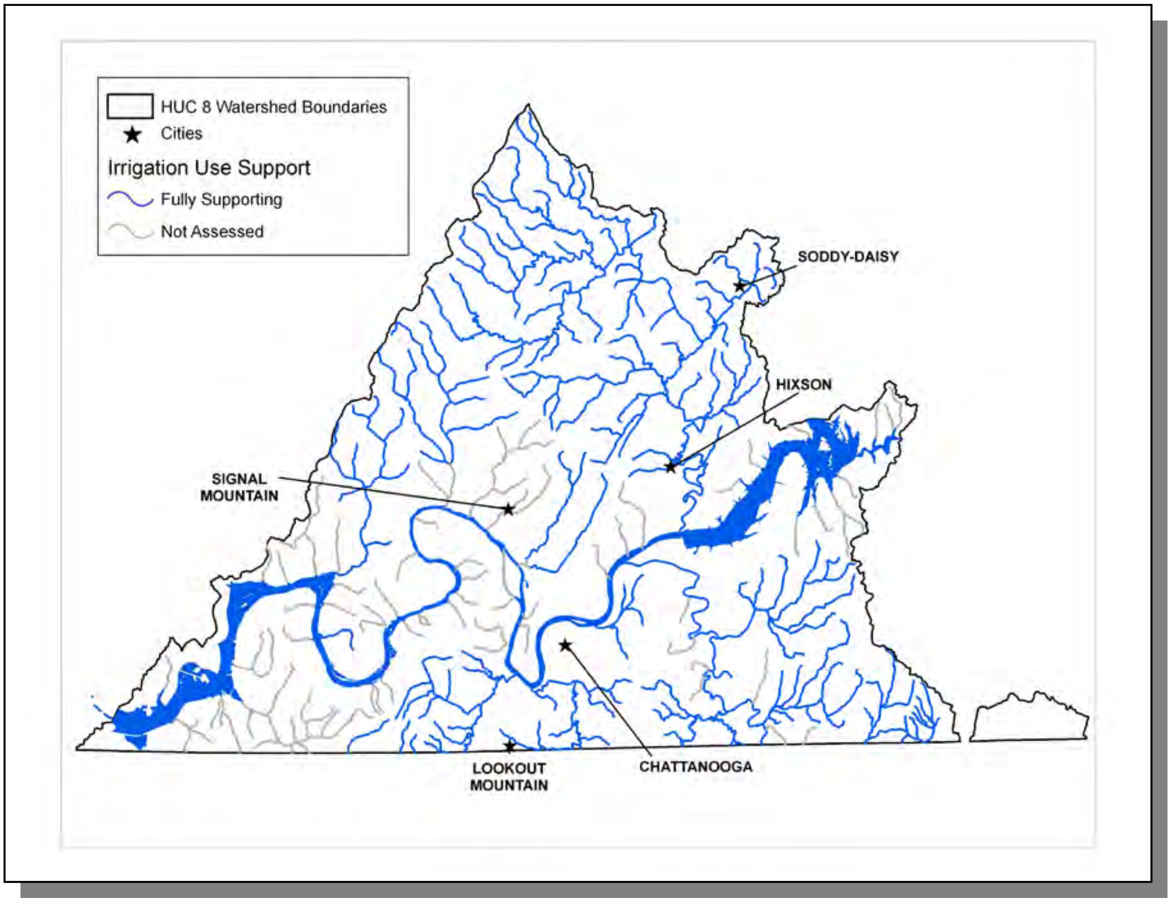


Figure 3-14. Irrigation Use Support Attainment in the* Group 4 Portion of the Tennessee Portion of the Lower *Tennessee River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Chattanooga, Hixson, Lookout Mountain, Signal Mountain, and Soddy-Daisy are shown for reference. More information is provided in Appendix III.*

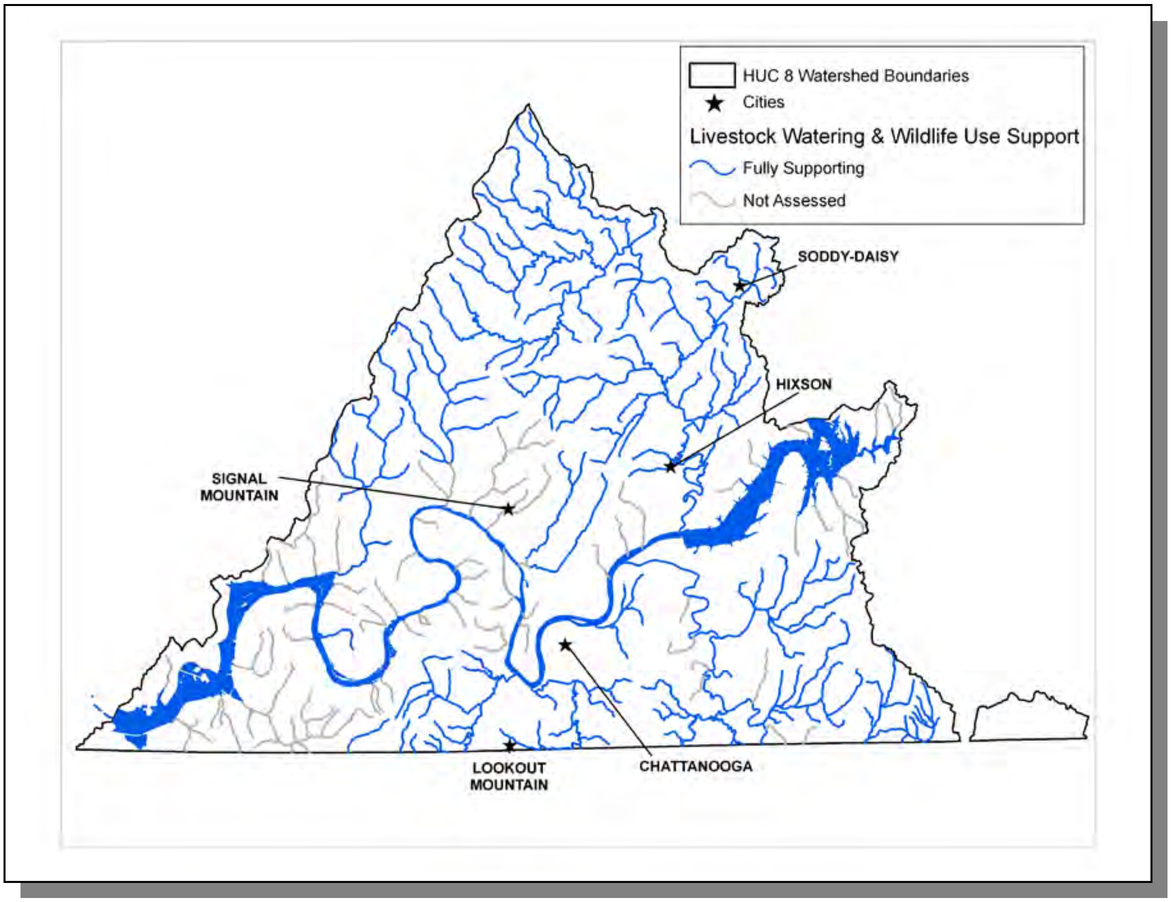


Figure 3-15. Livestock Watering and Wildlife Use Support Attainment in the **Group 4 Portion of the Tennessee Portion of the Lower** ***Tennessee River Watershed.*** *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Chattanooga, Hixson, Lookout Mountain, Signal Mountain, and Soddy-Daisy are shown for reference. More information is provided in Appendix III.*

3.3.B. Use Impairment Summary.

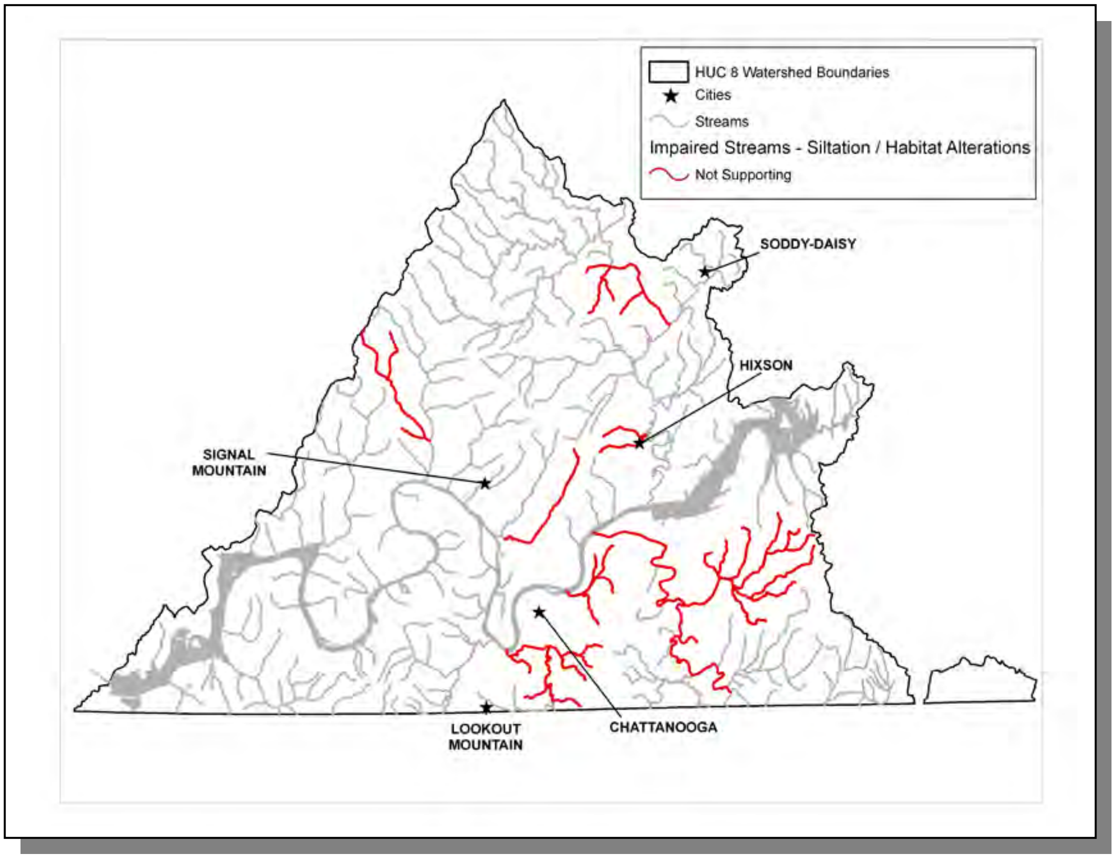


Figure 3-16. Impaired Streams Due to Siltation/Habitat Alteration in the* Group 4 Portion of the Tennessee Portion of the Lower *Tennessee River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Locations of Chattanooga, Hixson, Lookout Mountain, Signal Mountain, and Soddy-Daisy are shown for reference. More information is provided in Appendix III.*

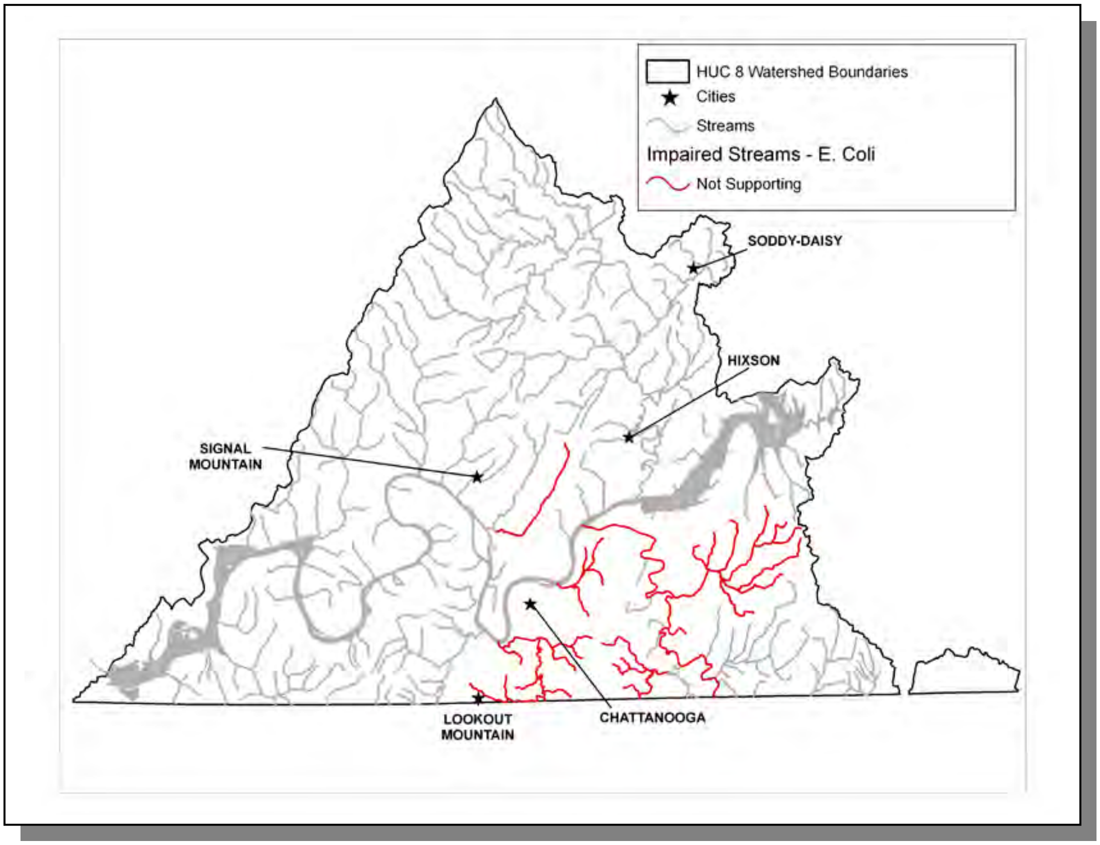


Figure 3-17. Impaired Streams Due to E.coli in the* Group 4 Portion of the Tennessee Portion of the Lower *Tennessee River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Locations of Chattanooga, Hixson, Lookout Mountain, Signal Mountain, and Soddy-Daisy are shown for reference. More information is provided in Appendix III.*

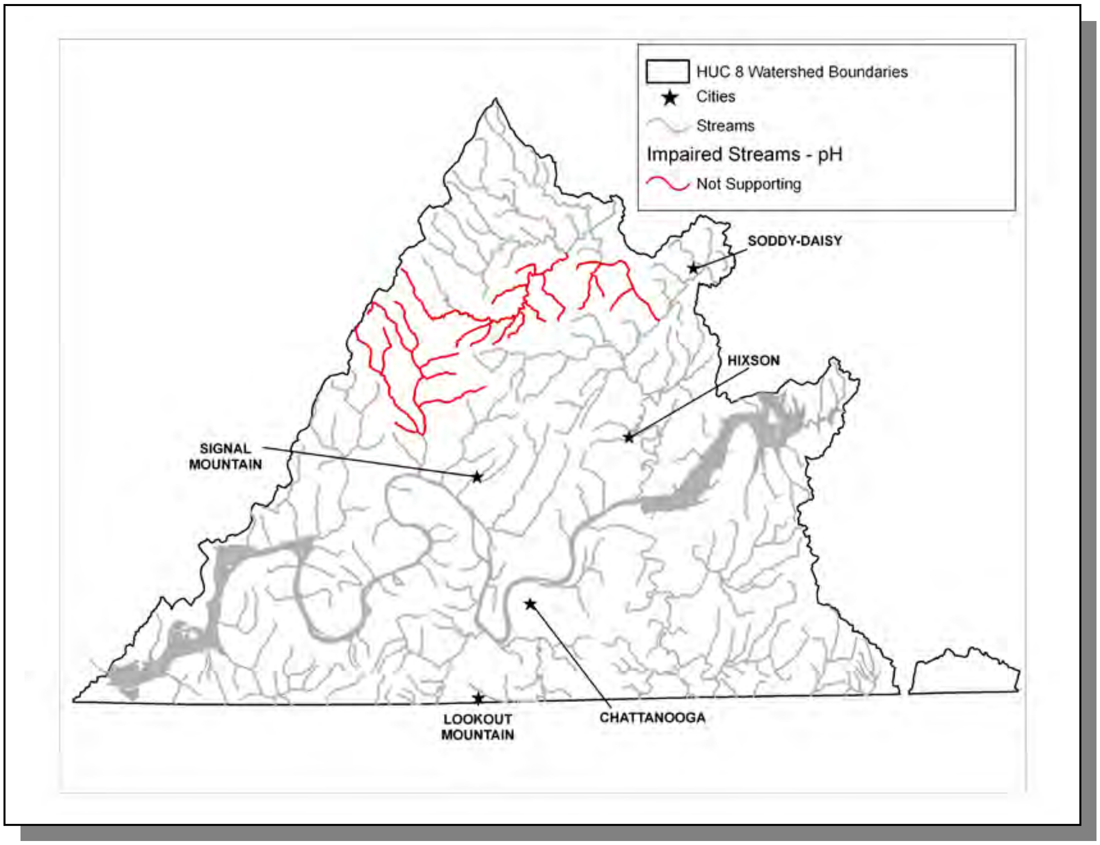


Figure 3-18. Impaired Streams Due to pH in the* Group 4 Portion of the Tennessee Portion of the Lower *Tennessee River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Locations of Chattanooga, Hixson, Lookout Mountain, Signal Mountain, and Soddy-Daisy are shown for reference. More information is provided in Appendix III.*

The listing of impaired waters that do not support designated uses (the 303(d) list) is traditionally submitted to EPA every two years. A copy of the most recent 303(d) list may be downloaded from:
http://tennessee.gov/environment/wpc/publications/303d2006.pdf

Since the year 2002, the 303(d) list ha been compiled by using EPA's ADB (Assessment Database) software developed by RTI (Research Triangle Institute). The ADB allows for a more detailed segmentation of waterbodies. While this results in a more accurate description of the status of water quality, it makes it difficult when comparing water quality assessments with and without using this tool. A more meaningful comparison will be between assessments completed in Year 3 of each succeeding five-year cycle.

The ADB was used to create maps that illustrate water quality. These maps may be viewed on TDEC's homepage at http://gis2.memphis.edu/wpc.

CHAPTER 4

POINT AND NONPOINT SOURCE CHARACTERIZATION OF THE LOWER TENNESSEE RIVER WATERSHED

4.1. BACKGROUND. This chapter is organized by HUC-12 subwatershed, and the description of each subwatershed is divided into four parts:

i. General description of the subwatershed
ii. Description of point source contributions
ii.a. Description of facilities discharging to water bodies listed on the 2004 303(d) list
iii. Description of nonpoint source contributions

The Tennessee portion of the Lower Tennessee River Watershed (HUC 06020001) is composed of one HUC 10 (10-digit) subwatershed and seven HUC-12 subwatersheds.

Information for this chapter was obtained from databases maintained by the Division of Water Pollution Control or provided in the WCS (Watershed Characterization System) data set. The WCS used was version 2.0 (developed by Tetra Tech, Inc for EPA Region 4) released in 2003.

WCS integrates with ArcView® v3.x and Spatial Analyst® v1.1 to analyze user-delineated (sub)watersheds based on hydrologically connected water bodies. Reports are generated by integrating WCS with Microsoft® Word. Land Use/Land Cover information from 1992 MRLC (Multi-Resolution Land Cover) data are calculated based on the proportion of county-based land use/land cover in user-delineated (sub)watersheds. Nonpoint source data in WCS are based on agricultural census data collected 1992–1998; nonpoint source data were reviewed by Tennessee NRCS staff.

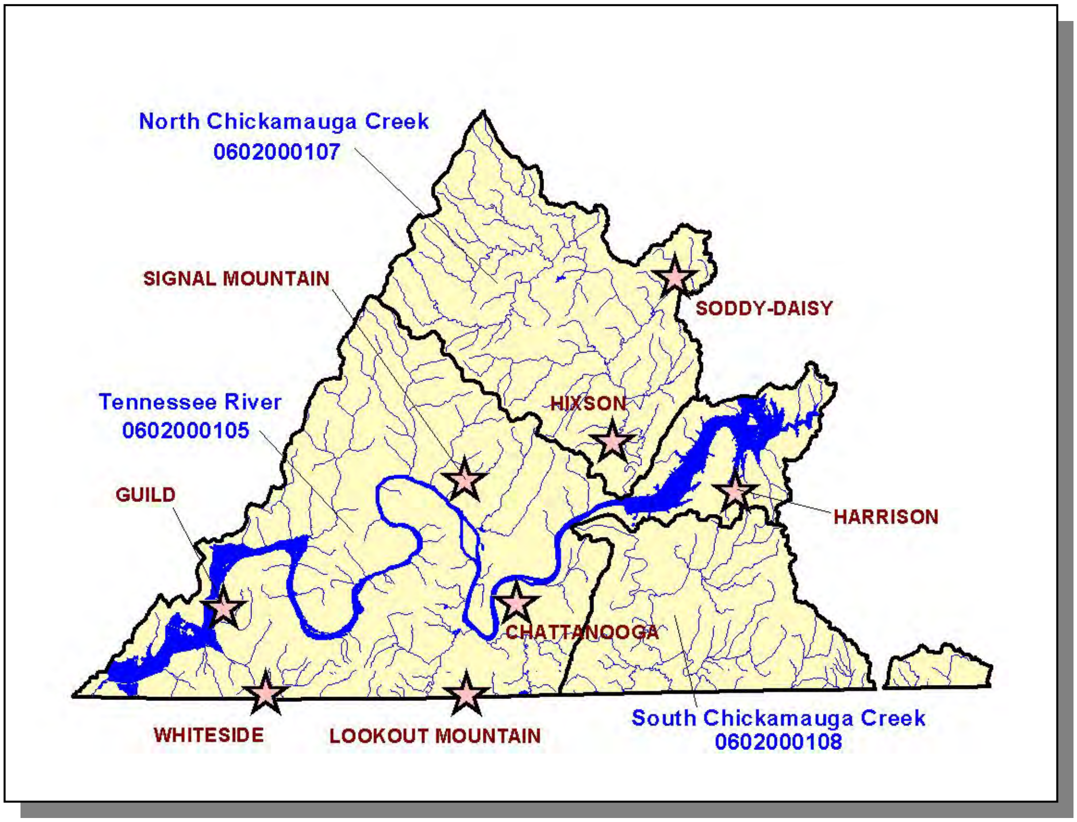


Figure 4-1. The Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed Consists of three USGS-Delineated Subwatersheds (10-Digit Subwatersheds). *Locations of Chattanooga, Guild, Harrison, Hixson, Lookout Mountain, Signal Mountain, Soddy-Daisy, and Whiteside are shown for reference.*

4.2. CHARACTERIZATION OF HUC-10 SUBWATERSHEDS. The Watershed Characterization System (WCS) software and data sets provided by EPA Region IV were used to characterize each subwatershed in the Group 4 portion of the Tennessee portion of the Lower Tennessee River Watershed.

HUC-10	HUC-12
0602000105	060200010501 (Tennessee River)
	060200010502 (Tennessee River)
	060200010503 (Chattanooga Creek)
	060200010504 (Lookout Creek)
	060200010505 (Suck Creek)
	060200010506 (Tennessee River)
	060200010507 (Tennessee River)
0602000107	060200010701 (Upper North Chickamauga Creek)
	060200010702 (Lower North Chickamauga Creek)
0602000108	060200010801 (East Chickamauga Creek)
	060200010802 (Little Chickamauga Creek)
	060200010803 (West Chickamauga Creek)
	060200010804 (South Chickamauga Creek)

Table 4-1. HUC-12 Drainage Areas are Nested Within HUC-10 Drainages. *NRCS worked with USGS to delineate the HUC-10 and HUC-12 drainage boundaries.*

4.2.A. 0602000105.

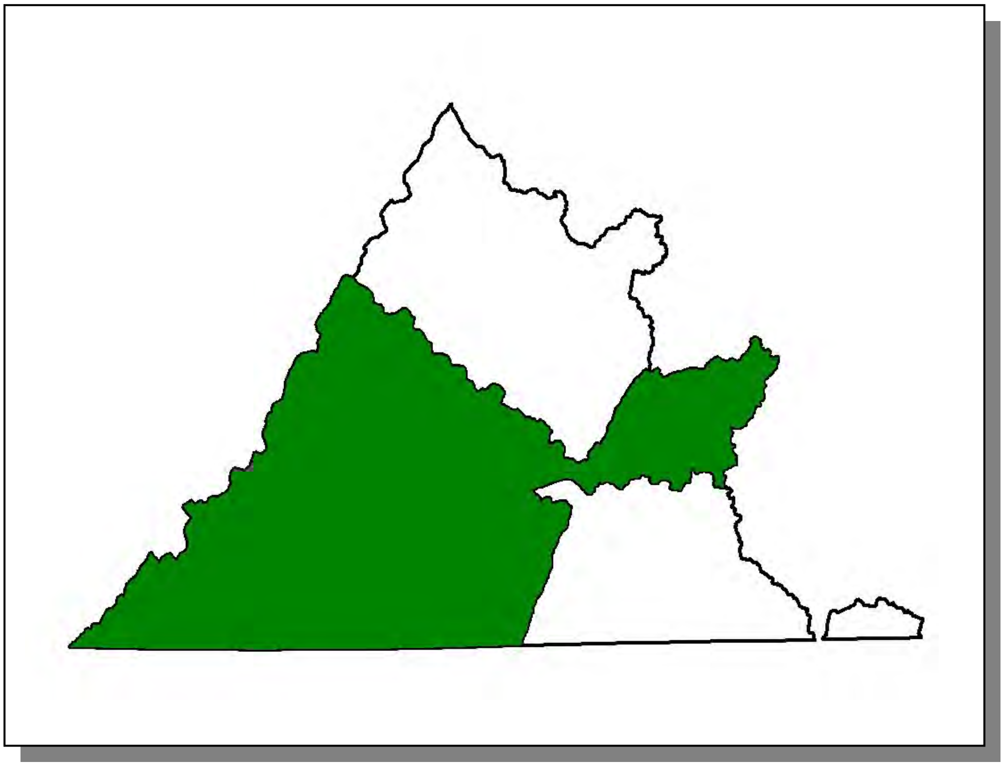


Figure 4-2. Location of Subwatershed 0602000105. *All Group 4 Lower Tennessee River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.A.i. 060200010501 (Tennessee River).

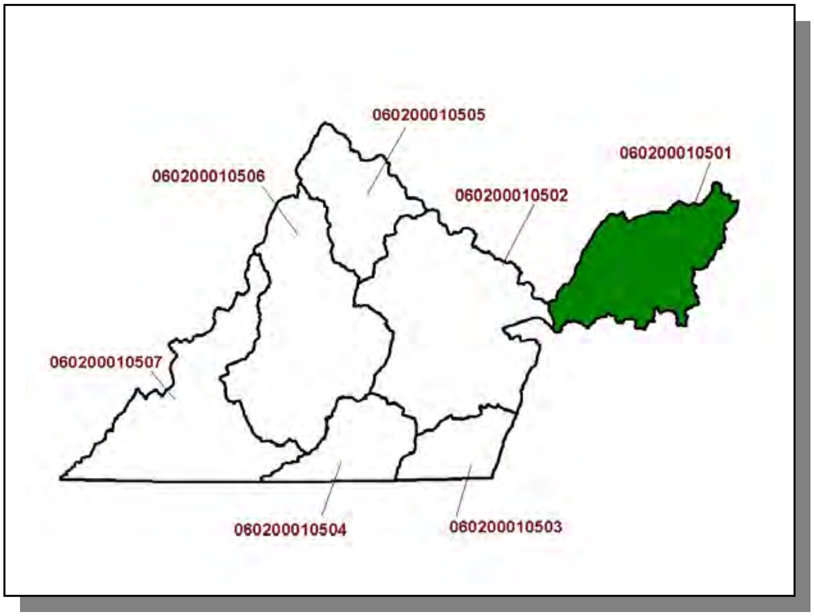


Figure 4-3. Location of Subwatershed 060200010501. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

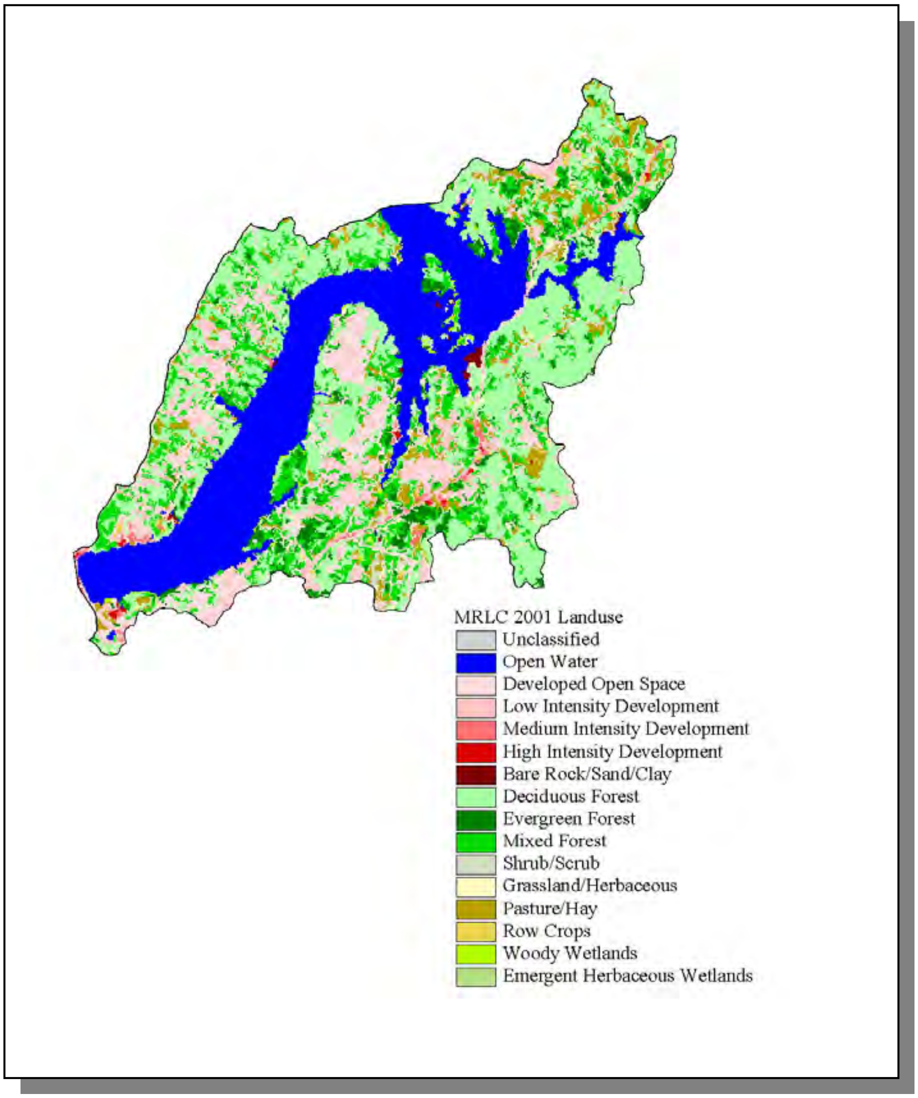


Figure 4-4. Illustration of Land Use Distribution in Subwatershed 060200010501.

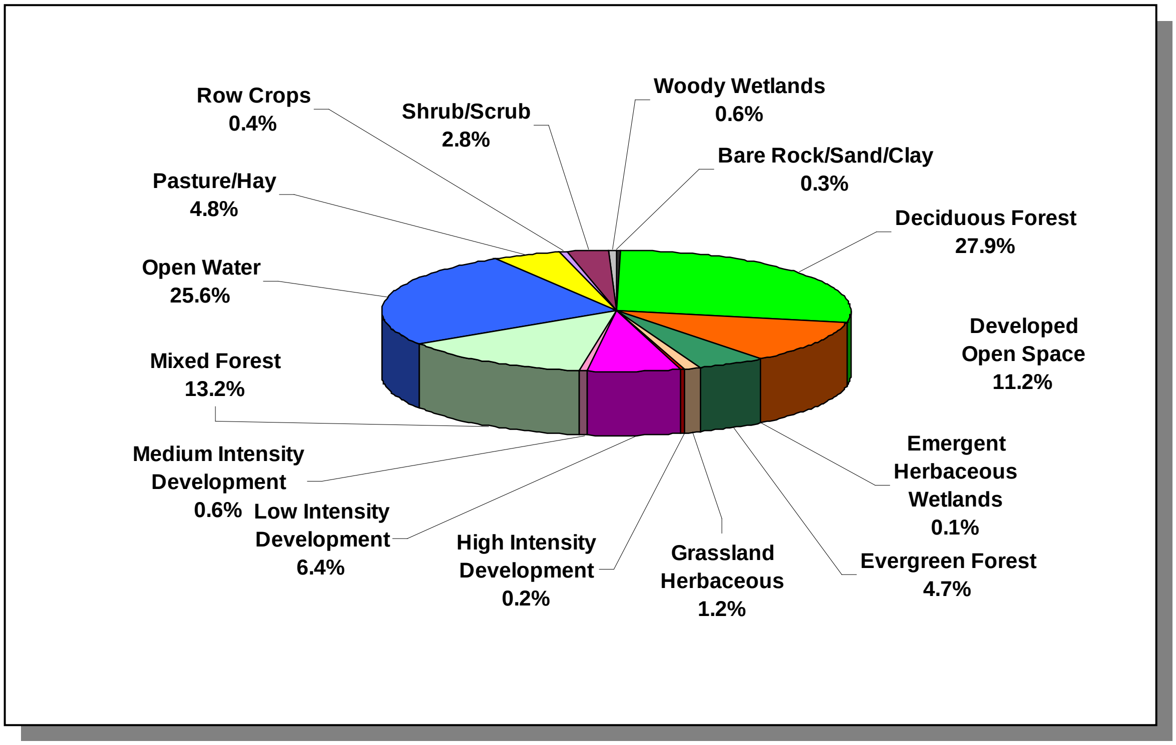


Figure 4-5. Land Use Distribution in Subwatershed 060200010501. *More information is provided in Appendix IV.*

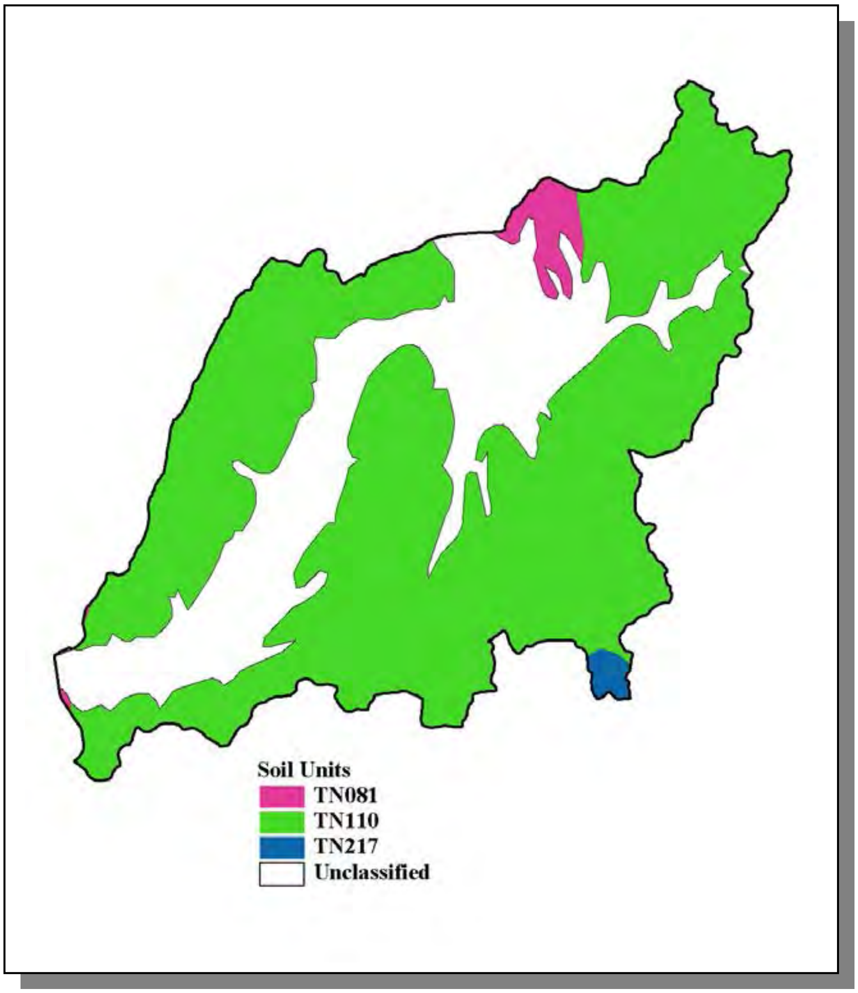


Figure 4-6. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010501.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN081	5.00	C	1.41	5.48	Silty Loam	0.35
TN110	0.00	B	2.22	4.96	Loam	0.31
TN217	0.00	C	2.34	5.32	Loam	0.35

Table 4-2. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010501. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Hamilton	285,536	294,865	307,896	5.89	16,825	17,375	18,143	7.8

Table 4-3. Population Estimates in Subwatershed 060200010501.

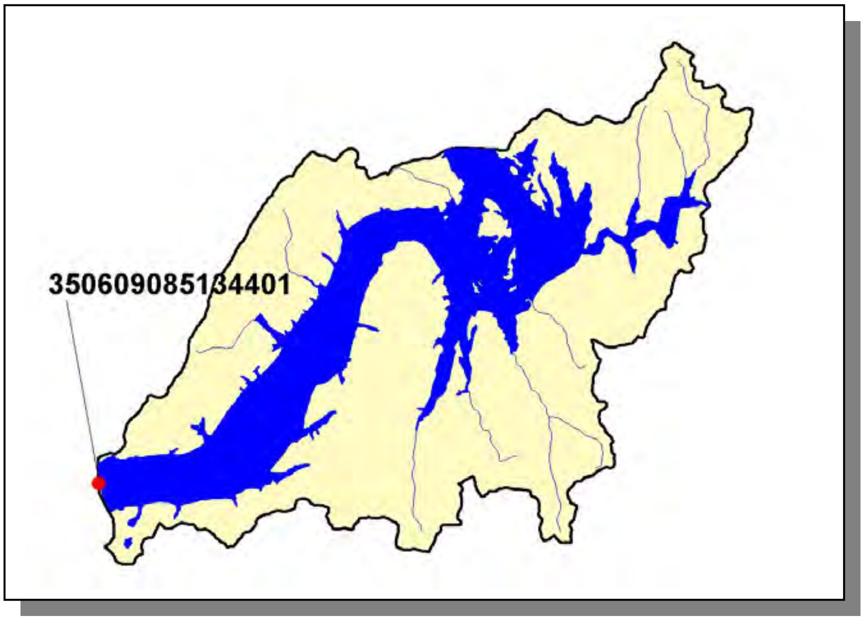


Figure 4-7. Location of Historical Streamflow Data Collection Sites in Subwatershed 060200010501. *More information is provided in Appendix IV.*

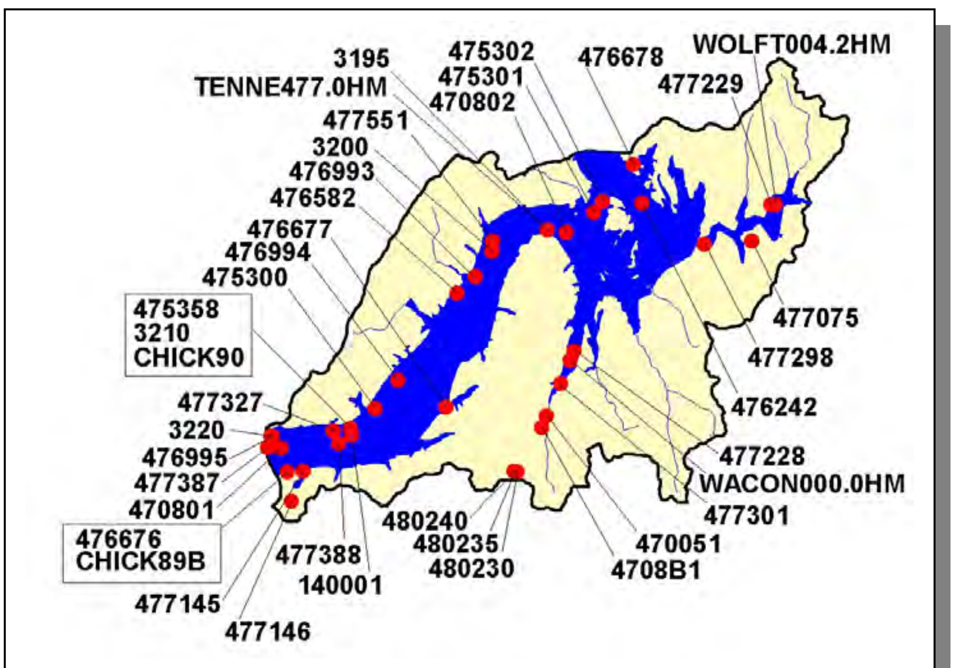


Figure 4-8. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200010501. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.A.i.a. Point Source Contributions.

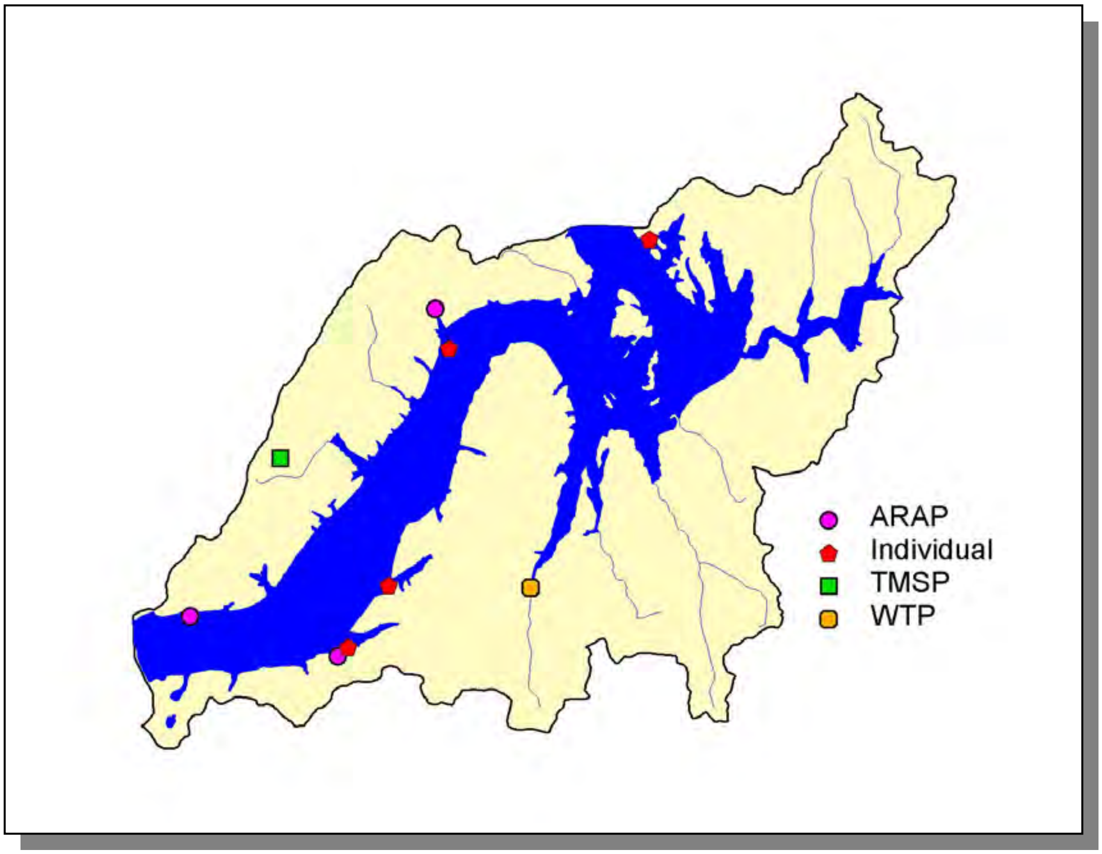


Figure 4-9. Location of Permits Issued in Subwatershed 060200010501. *More information, including the names of facilities, is provided in Appendix IV.*

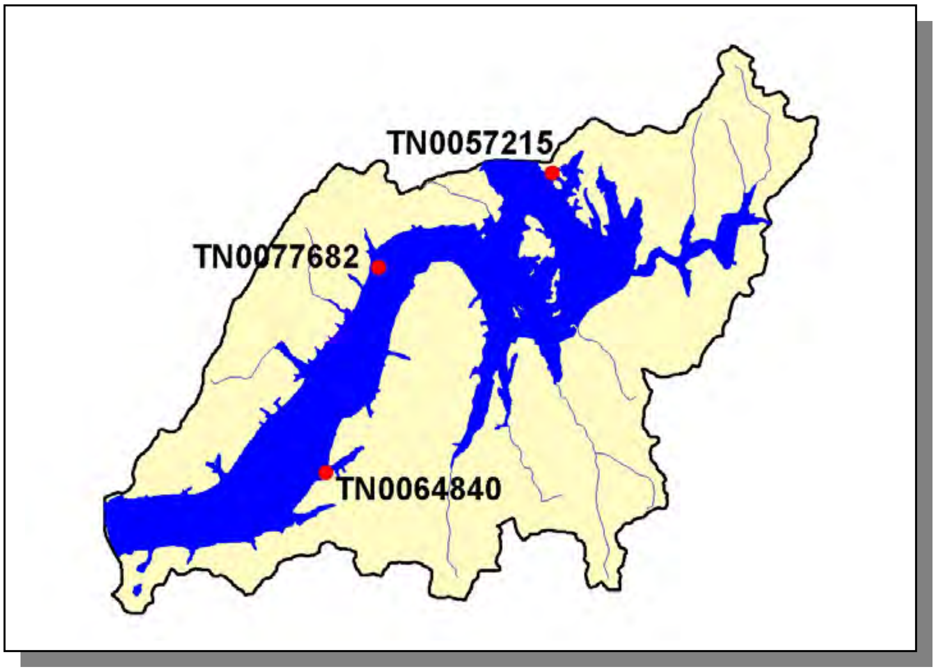


Figure 4-10. Location of Active NPDES Sites in Subwatershed 060200010501. *More information, including the names of facilities, is provided in Appendix IV.*

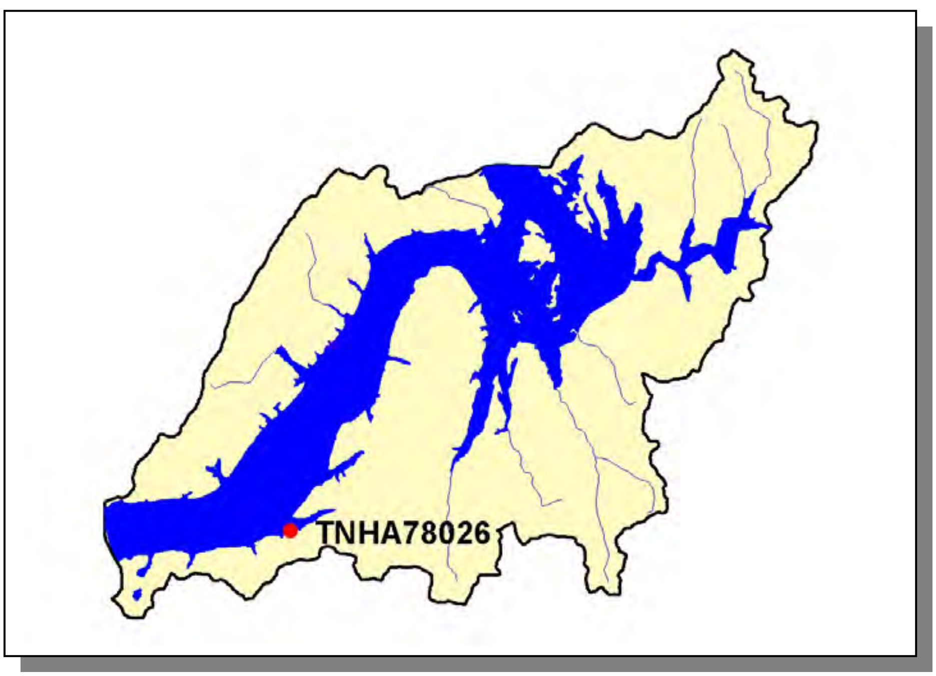


Figure 4-11. Location of Permitted Herbicide Application Sites in Subwatershed 060200010501. *More information is provided in Appendix IV.*

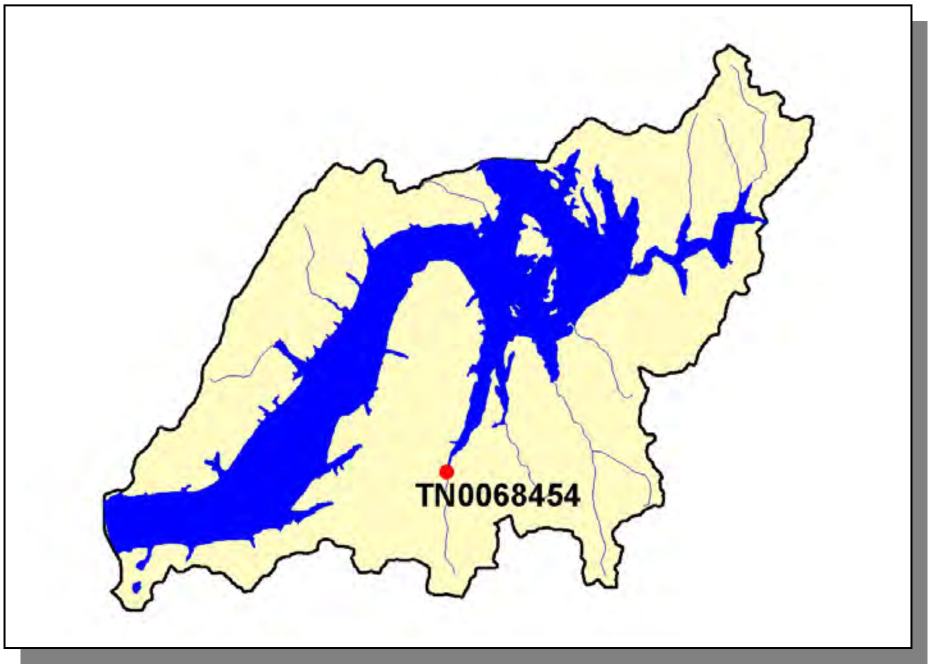


Figure 4-12. Location of Water Treatment Plants in Subwatershed 060200010501. *More information, including the names of facilities, is provided in Appendix IV.*

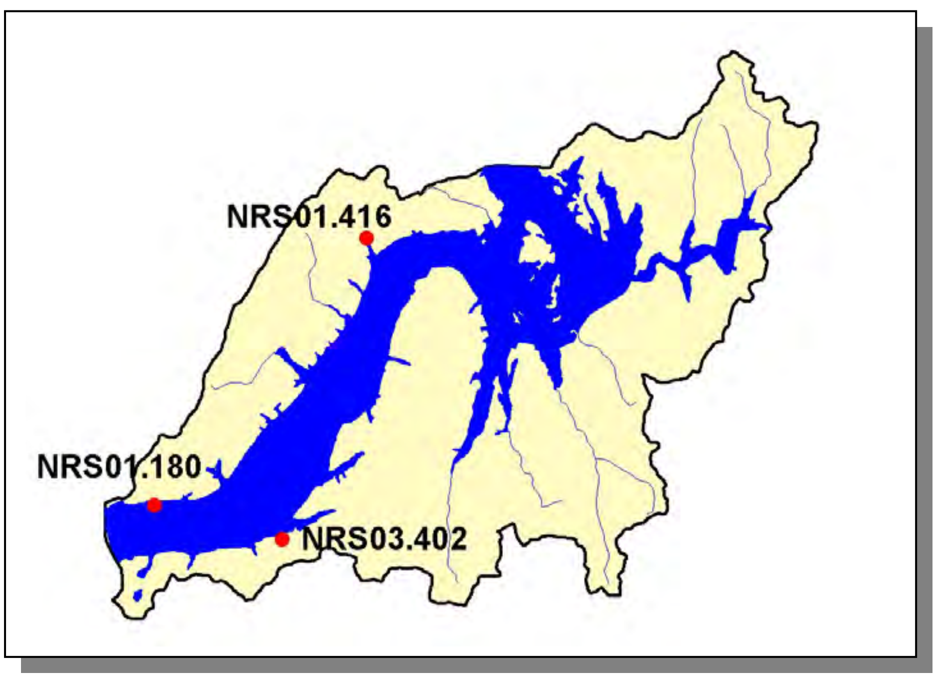


Figure 4-13. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 060200010501. *More information is provided in Appendix IV.*

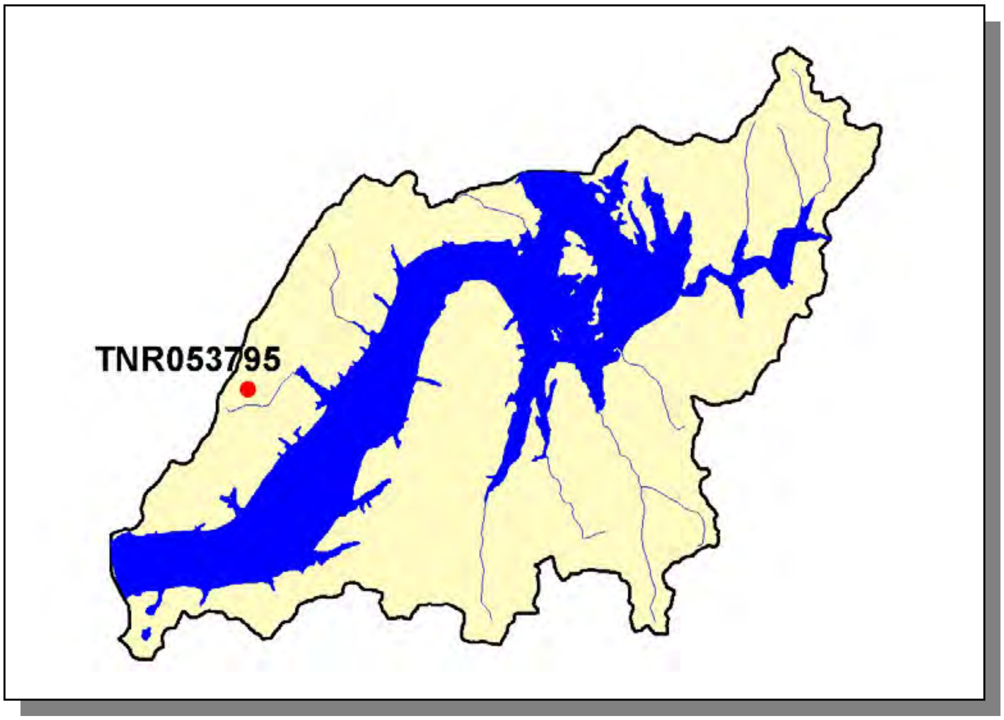


Figure 4-14. Location of TMSP Sites in Subwatershed 060200010501. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.A.i.a.i. Dischargers to Water Bodies Listed on the 2004 303(d) List

There is one NPDES facility discharging to water bodies listed on the 2004 303(d) list in Subwatershed 060200010501:

- TN0068454 (Eastside Utility District WTP) discharges to Chickamauga Lake

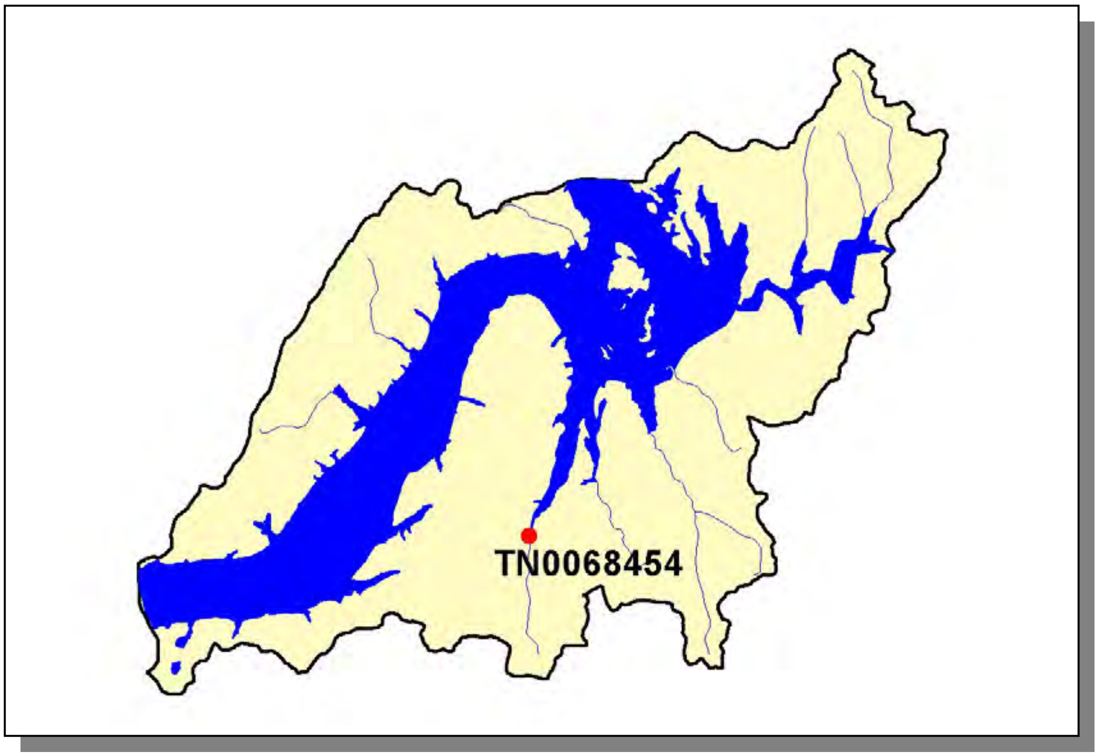


Figure 4-15. Location of NPDES Dischargers to Water Bodies Listed on the 2004 303(d) List in Subwatershed 060200010501. *More information, including the names of facilities, is provided in Appendix IV.*

PERMIT #	3Q2	1Q10	3Q10	3Q20	7Q10
TN0068454	na	na	na	na	na

Table 4-4 Receiving Stream Low Flow Information for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 060200010501. *Data are in cubic feet per second (CFS). Data were obtained from the USGS web application StreamStats at http://water.usgs.gov/osw/streamstats/. (na, data not available)*

PERMIT #	FLOW	Al
TN0068454	X	X

Table 4-5. Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 060200010501.

PERMIT #	TRC	TSS	SETTLEABLE SOLIDS	pH
TN0068454	X	X	X	X

Table 4-6. Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed. *TRC, Total Residual Chlorine; TSS, Total Suspended Solids.*

4.2.A.i.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Hogs	Sheep
114	242	13	15,351	17	<5

Table 4-7. Summary of Livestock Count Estimates in Subwatershed 060200010501. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Hamilton	6,913	14,734	801	30	934,564	1,017	109

Table 4-8. Summary of Livestock Count Estimates in Hamilton County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Hamilton	210.7	210.7	2.2	6.0

Table 4-9. Forest Acreage and Annual Removal Rates (1987-1994) in Hamilton County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.34
Grass (Hayland)	2.33
Legumes, Grass (Hayland)	0.20
Legumes (Pastureland)	0.07
Grass, Forbs, Legumes (Mixed Pasture)	0.27
Corn (Row Crops)	5.28
Oats (Close-Grown Cropland)	3.13
Wheat (Close-Grown Cropland)	3.14
All Other Close-Grown Cropland	1.99
Farmsteads and Ranch Headquarters	0.10

Table 4-10. Annual Estimated Total Soil Loss in Subwatershed 060200010501.

4.2.A.ii. 060200010502 (Tennessee River).

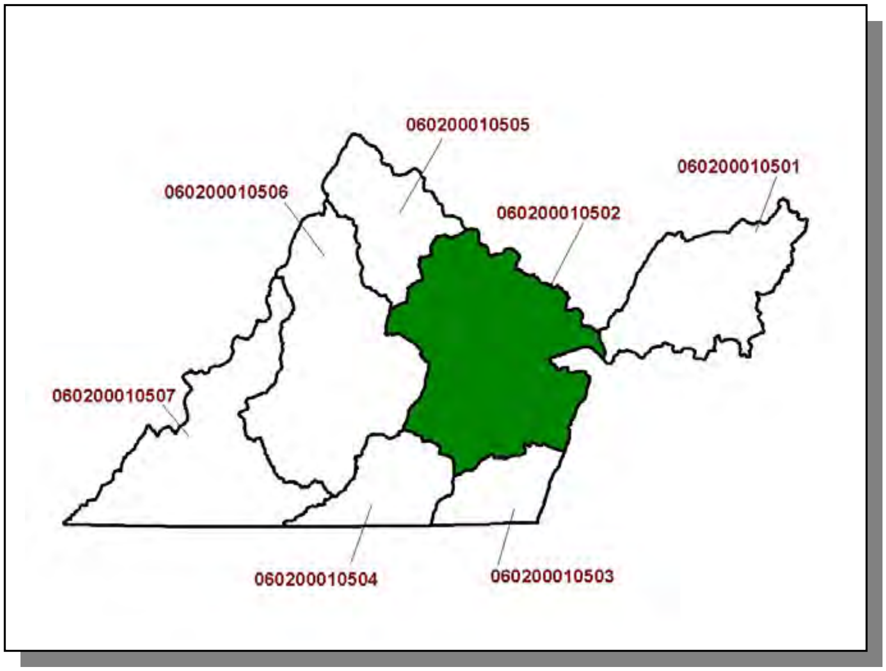


Figure 4-16. Location of Subwatershed 060200010502. *Group 4 Lower Tennessee River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

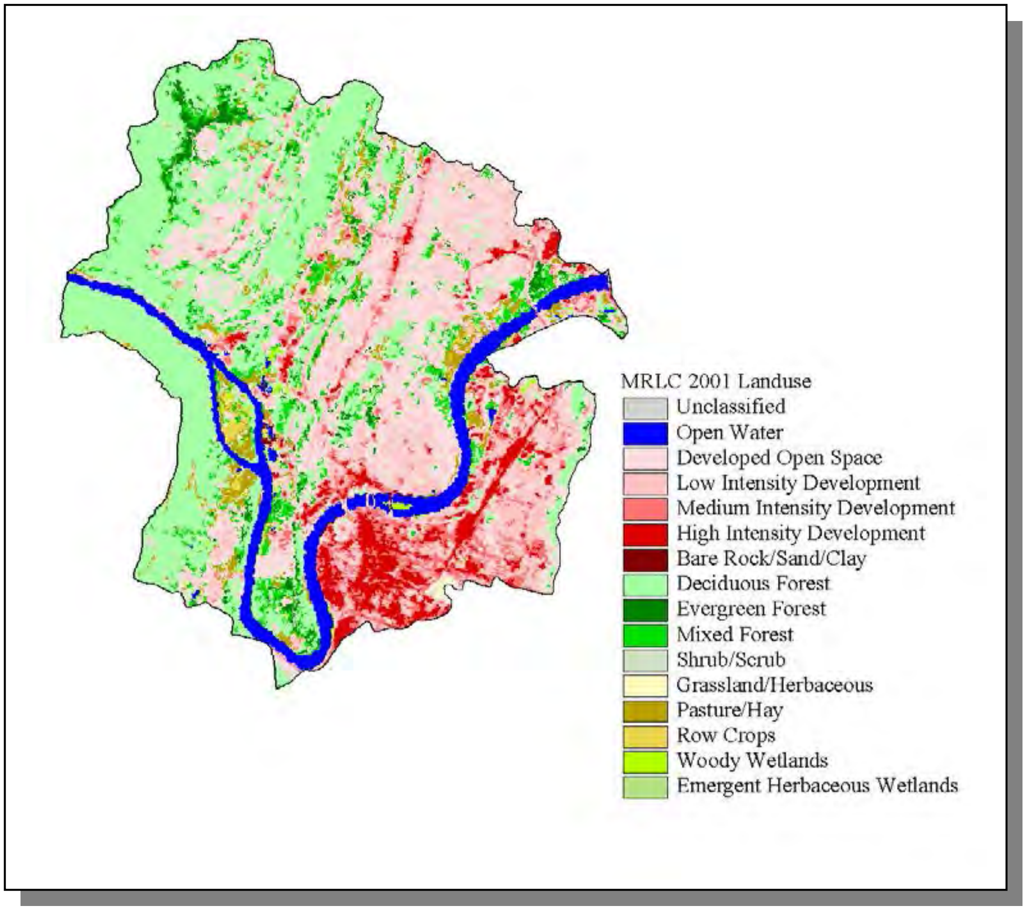


Figure 4-17. Illustration of Land Use Distribution in Subwatershed 060200010502.

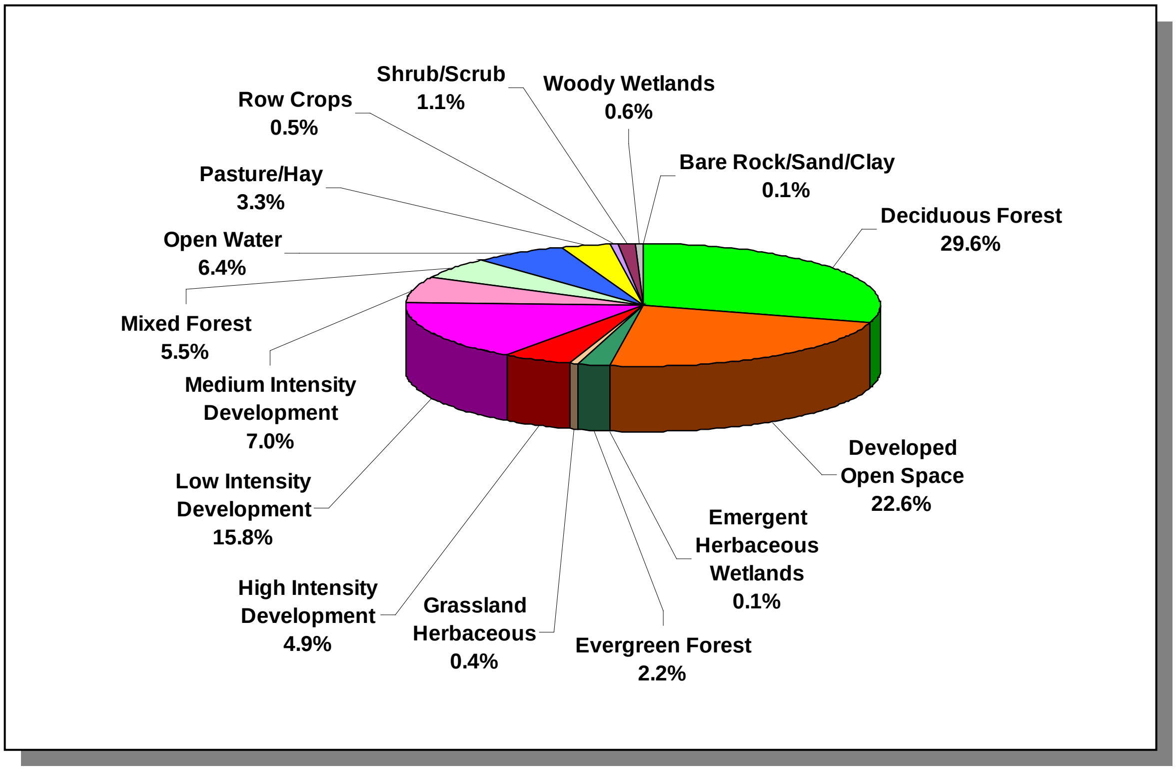


Figure 4-18. Land Use Distribution in Subwatershed 060200010502. *More information is provided in Appendix IV.*

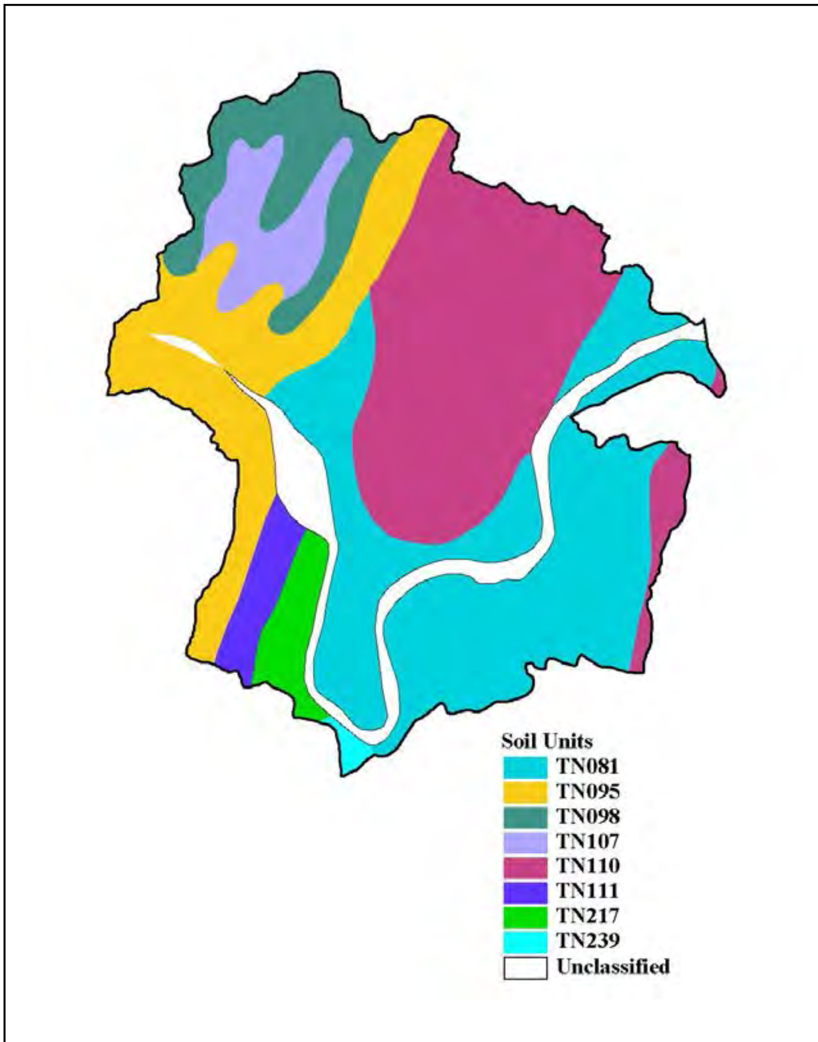


Figure 4-19. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010502.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN081	5.00	C	1.41	5.48	Silty Loam	0.35
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28
TN110	0.00	B	2.22	4.96	Loam	0.31
TN111	0.00	C	1.41	5.10	Loam	0.34
TN217	0.00	C	2.34	5.32	Loam	0.35
TN239	2.00	C	2.94	4.86	Loam	0.22

Table 4-11. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010502. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Hamilton	285,536	294,865	307,896	10.38	29,639	30,607	31,960	7.8
Marion	24,860	26,674	27,776	0.2	29	53	55	12.2
Total	**310,396**	**321,539**	**335,672**		**29,688**	**30,660**	**32,015**	**7.8**

Table 4-12. Population Estimates in Subwatershed 060200010502.

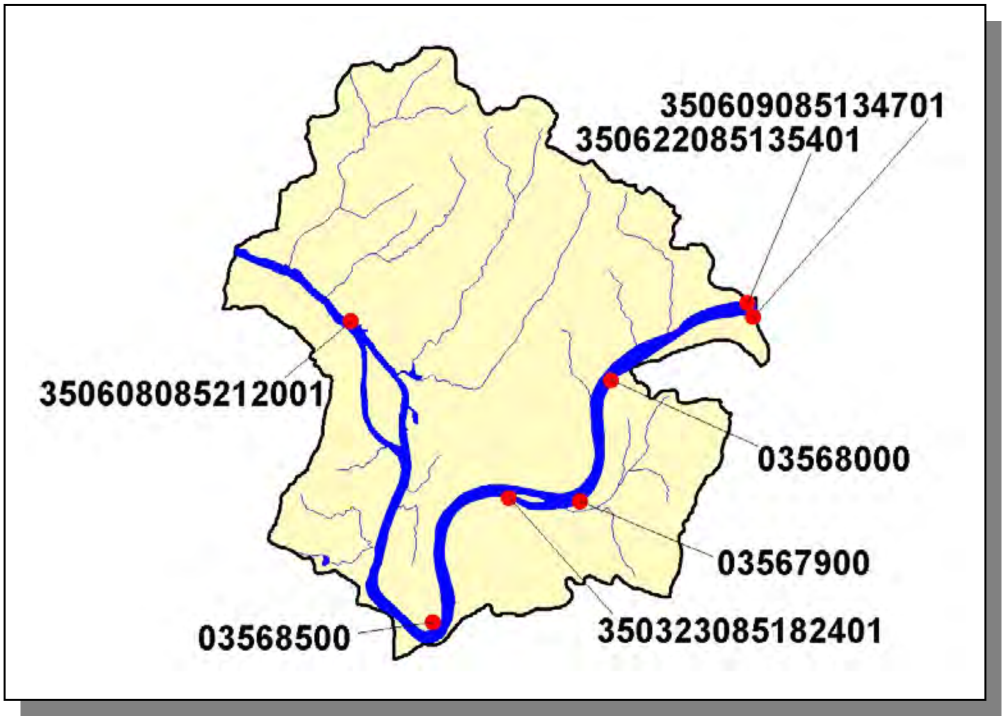


Figure 4-20. Location of Historical Streamflow Data Collection Sites in Subwatershed 060200010502. *More information is provided in Appendix IV.*

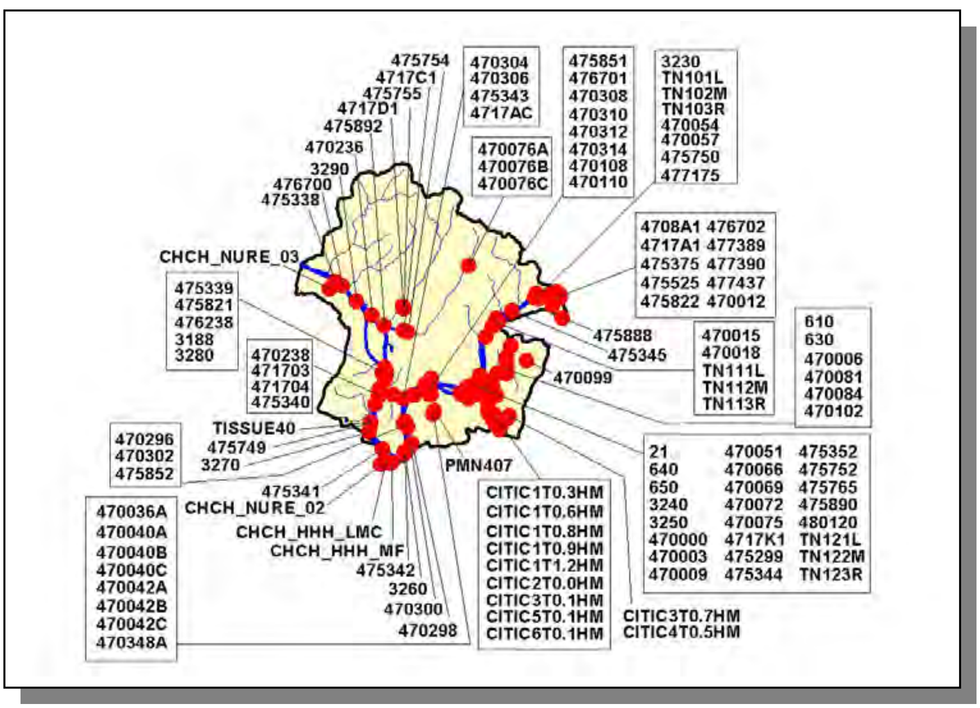


Figure 4-21. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200010502. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.A.ii.a. Point Source Contributions.

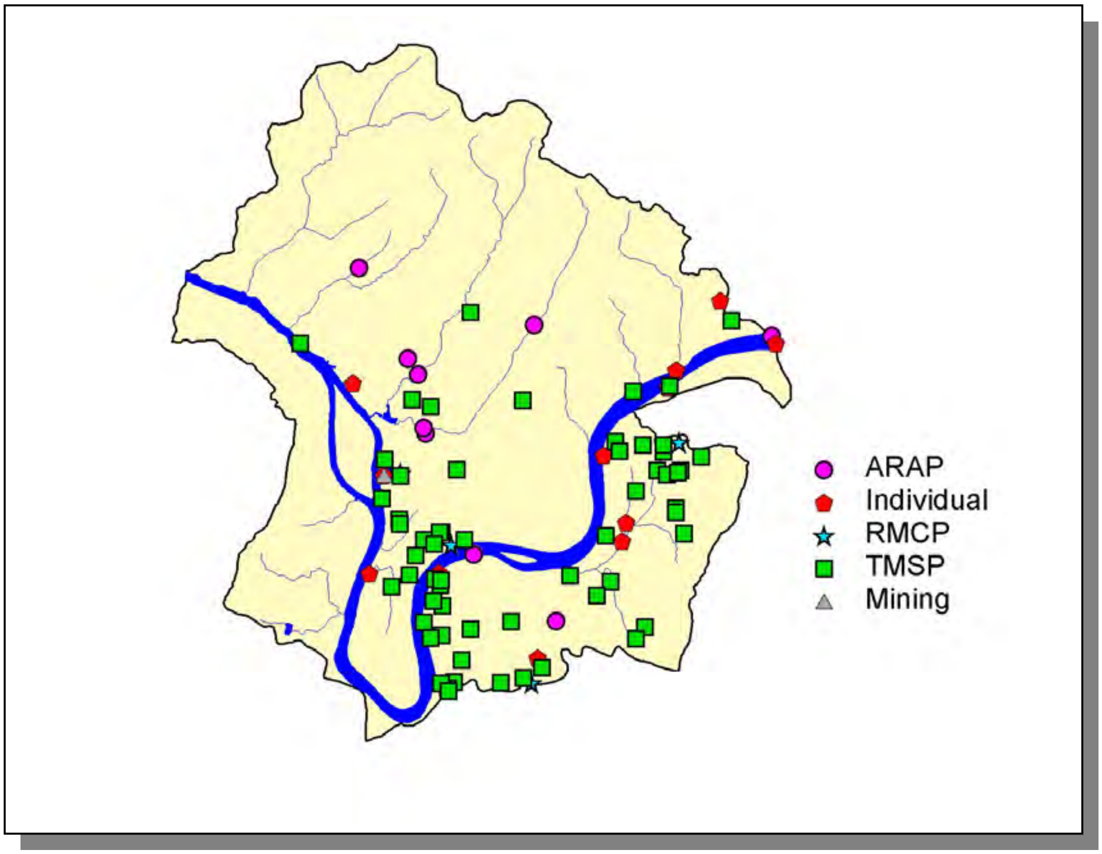


Figure 4-22. Location of Permits Issued in Subwatershed 060200010502. *More information, including the names of facilities, is provided in Appendix IV.*

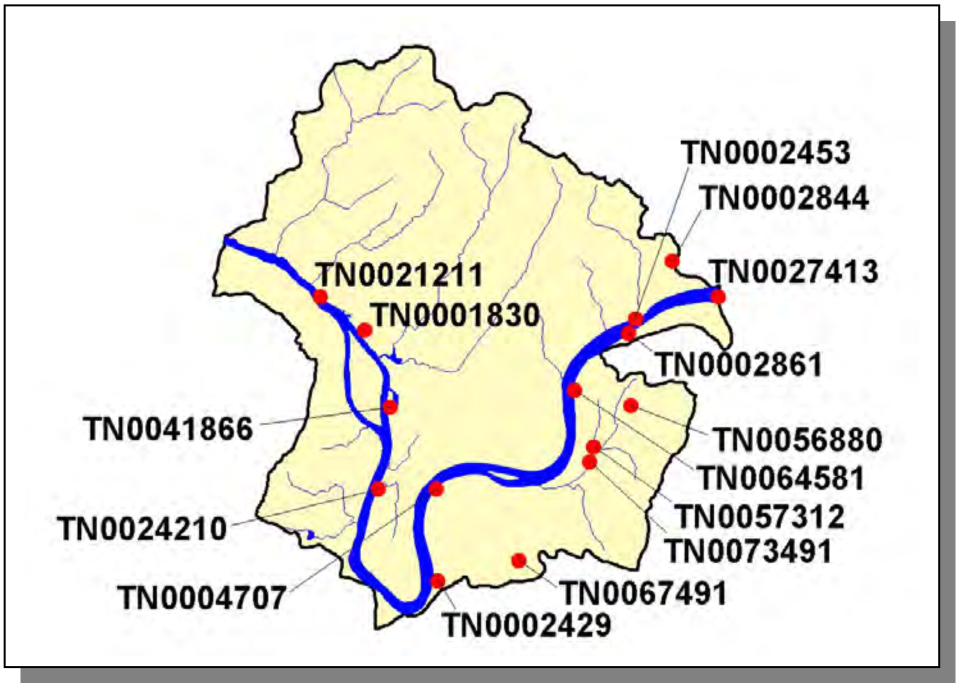


Figure 4-23. Location of Active NPDES Sites in Subwatershed 060200010502. *More information, including the names of facilities, is provided in Appendix IV.*

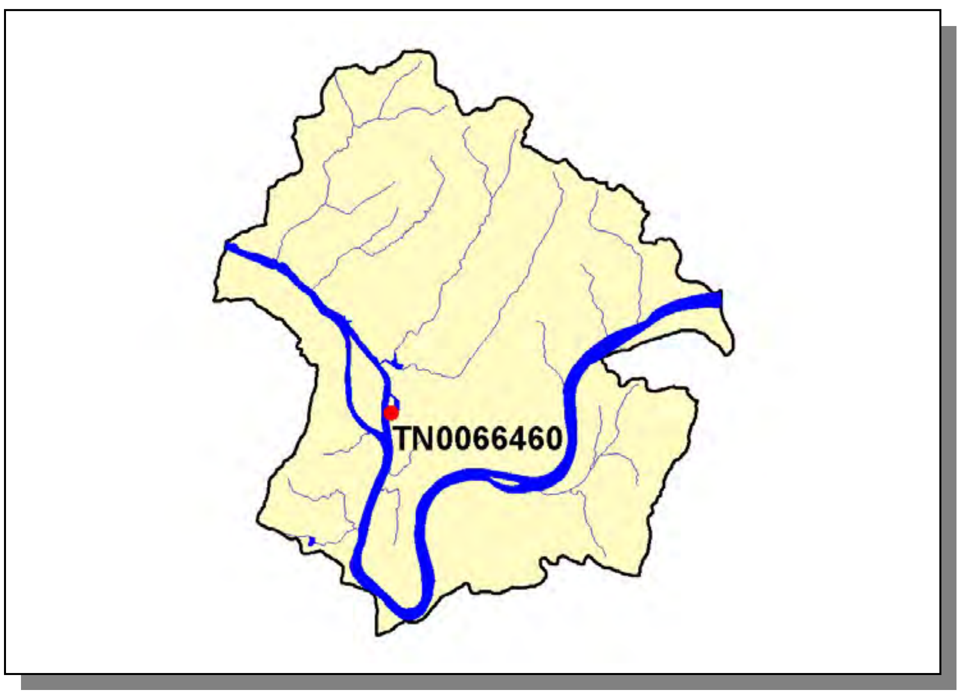


Figure 4-24. Location of Active Mining Sites in Subwatershed 060200010502. *More information, including the names of mining operations, is provided in Appendix IV.*

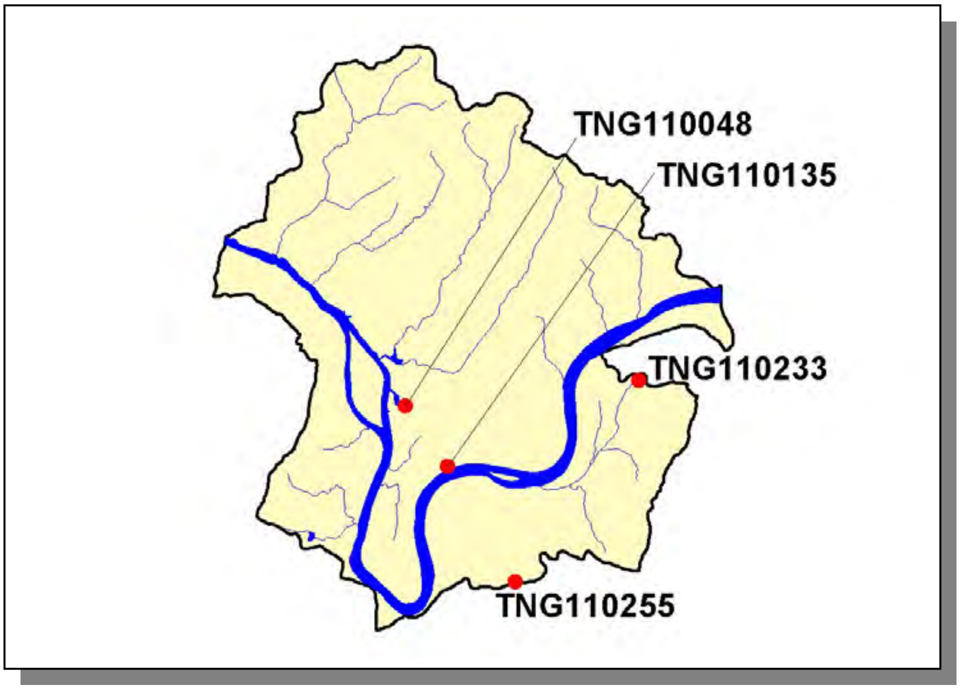


Figure 4-25. Location of Ready Mix Concrete Plants (RMCP) in Subwatershed 060200010502. *More information is provided in Appendix IV.*

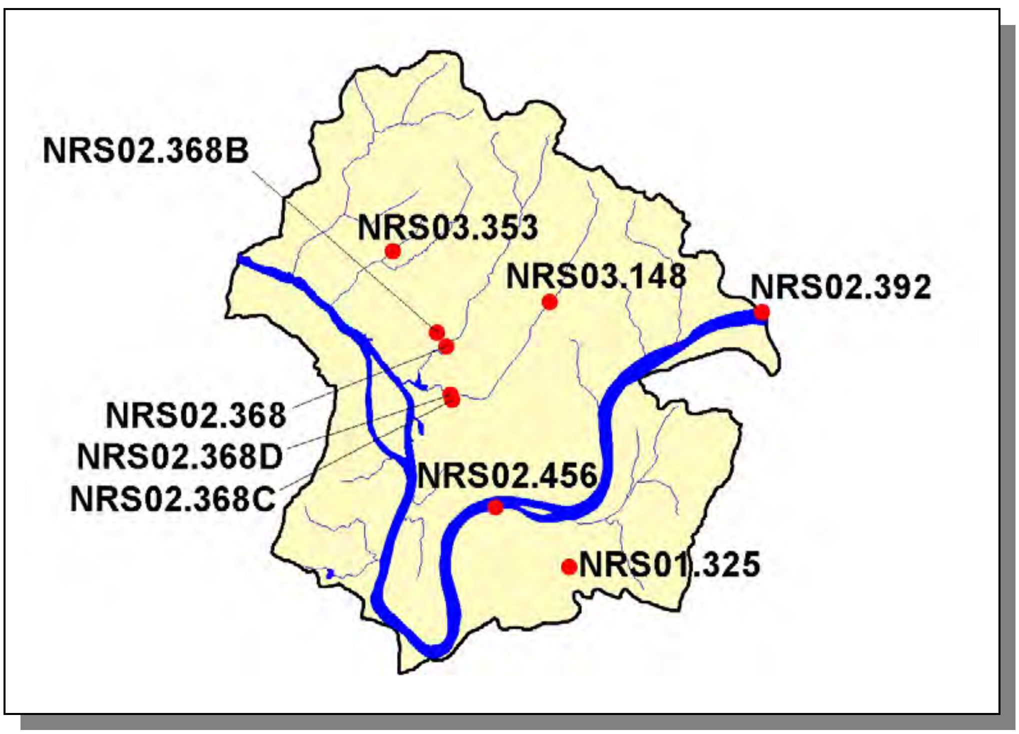


Figure 4-26. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 060200010502. *More information is provided in Appendix IV.*

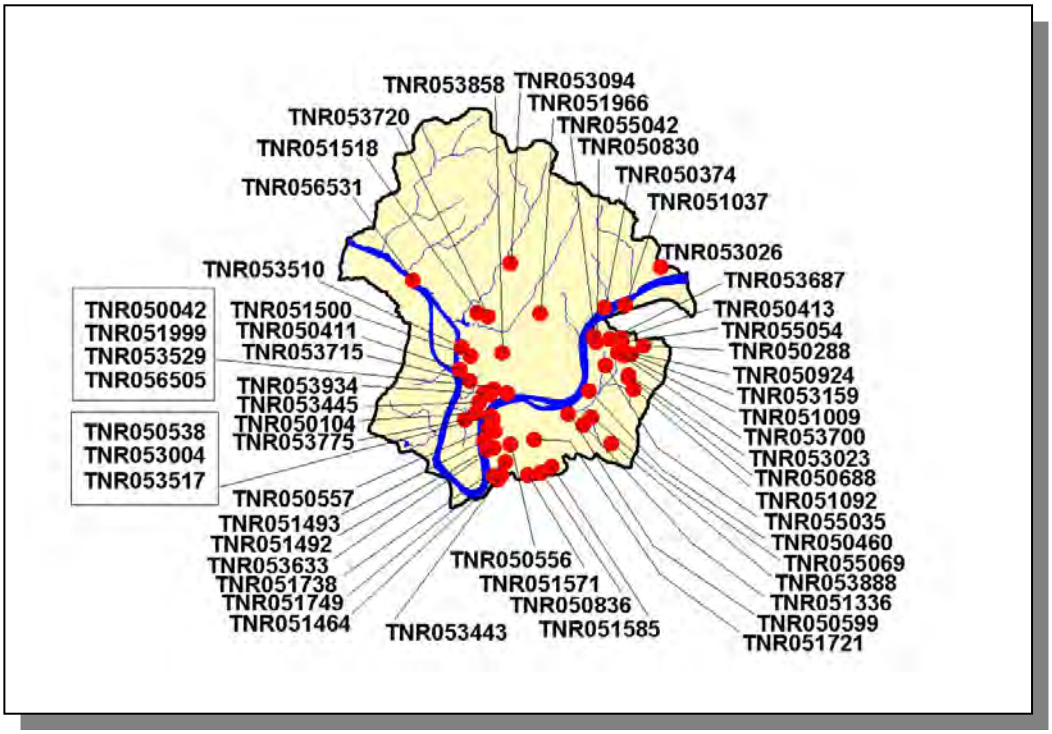


Figure 4-27. Location of TMSP Sites in Subwatershed 060200010502. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.A.ii.a.i. Dischargers to Water Bodies Listed on the 2004 303(d) List

There are fourteen NPDES facilities discharging to water bodies listed on the 2004 303(d) list in Subwatershed 060200010502:

- TN0001830 (Signal Mountain Cement Company) discharges to the Tennessee River @ RM 454.5
- TN0002453 (R.L. Stowe Mills) discharges to the Tennessee River @ RM 469.3
- TN0002844 (Artiva Specialties) discharges to the Tennessee River @ RM 469.9, a wetland, a wet weather conveyance to the Tennessee River @ RM 469.7, and to an unnamed tributary to North Chickamauga Creek
- TN0002861 (BASF Corporation) discharges to the Tennessee River @ RM 469
- TN0021211 (Hamilton County Waste Water Treatment Plant) discharges to the Tennessee River @ RM 453.7
- TN0024210 (Chattanooga Moccasin Bend Waste Water Treatment Plant) discharges to the Tennessee River @ RM 457.8
- TN0027413 (TVA-Chickamauga Hydro Plant) discharges to the Tennessee River @ RM 471
- TN0041866 (Ergon Terminating, Inc.) discharges to the Tennessee River @ RM 456.4 and @ 456.0
- TN0004707 (Vulcan Construction Materials) discharges to the Tennessee River @ RM 463.2
- TN0056880 (Parman Lubricants) discharges to Citico Creek @ RM 1.9
- TN0057312 (Chattanooga Gas Company Liquified Natural Gas) discharges to a wet weather conveyance to Citico Creek @ RM 3.2
- TN0064581 (NA Industries, Inc.) discharges to the Tennessee River @ RM 467.2
- TN0067491 (Top Flight, Incorporated) discharges to Dobbs Branch @ RM 0.3
- TN0073491 (Norfolk Southern Railway) discharges to Citico Creek and to an unnamed tributary to Citico Creek

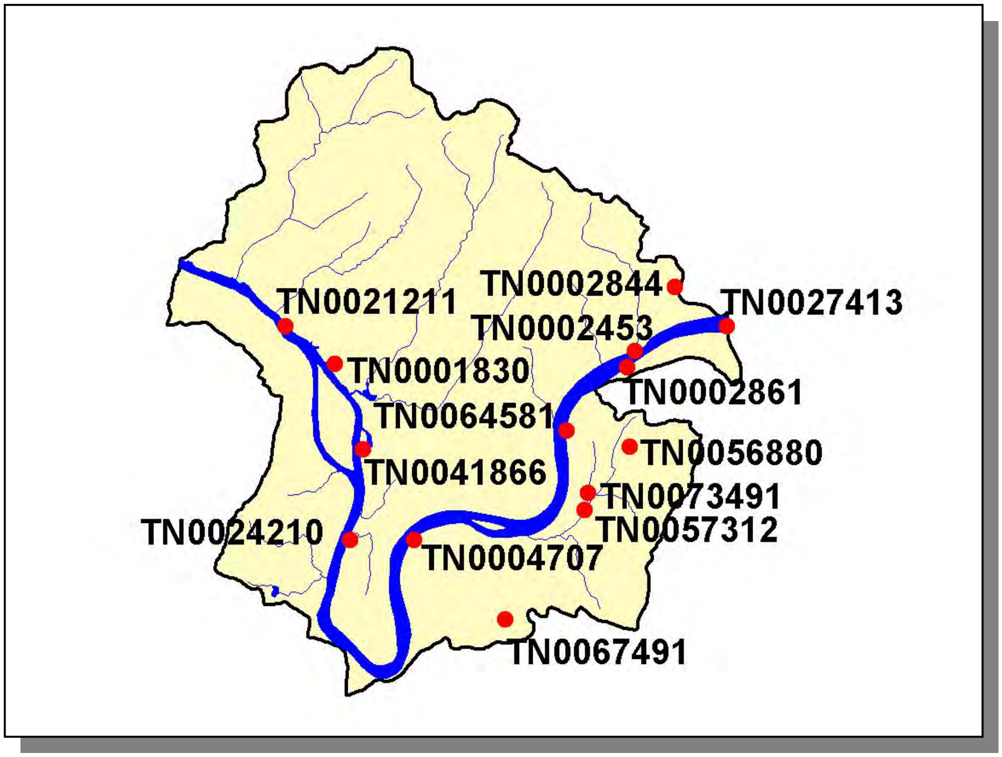


Figure 4-28. Location of NPDES Dischargers to Water Bodies Listed on the 2004 303(d) List in Subwatershed 051302060502. *More information, including the names of facilities, is provided in Appendix IV.*

PERMIT #	3Q2	1Q10	3Q10	3Q20	7Q10
TN0001830	4250.00	na	3220.00	2790.00	3130.00
TN0002453	4140.00	na	3150.00	2730.00	3060.00
TN0002844	4140.00	na	3140.00	2730.00	3060.00
TN0002861	4140.00	na	3150.00	2730.00	3060.00
TN0004707	4220.00	na	3210.00	4780.00	3120.00
TN0021211	4250.00	3018.00	3220.00	2790.00	3130.00
TN0024210	4250.00	na	3220.00	2790.00	3130.00
TN0027413	na	na	na	na	na
TN0041866	4250.00	na	3220.00	2790.00	310.00
TN0056880	0.17	na	0.11	0.10	0.12
TN0057312	0.07	na	0.05	0.04	0.05
TN0064581	4250.00	na	3220.00	2790.00	3130.00
TN0067491	0.13	na	0.08	0.06	0.08
TN0073491	0.02	na	0.08	0.07	0.08

Table 4-13. Receiving Stream Low Flow Information for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 060200010502. *Data are in cubic feet per second (CFS). Data were obtained from the USGS web application StreamStats at http://water.usgs.gov/osw/streamstats/. (na, data not available)*

PERMIT #	P	FLOW	TEMPERATURE	NO_3+NO_2	N
TN0001830		X			
TN0002453		X	X		
TN0002844		X	X		
TN0002861		X	X		
TN0004707		X			
TN0024210	X	X		X	X
TN0027413		X			
TN0041866		X			
TN0064581		X	X		
TN0067491		X			
TN0073491		X			

Table 4-14. Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 060200010502.

PERMIT #	Zn	Cu	Pb	Cd	Hg	As	Se	V
TN0002453	X	X						
TN0002844	X	X	X	X	X	X	X	X

Table 4-15. Inorganic Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 060200010502.

PERMIT #	TRICHLOROETHYLENE	TETRACHLOROETHYLENE	STYRENE
TN0002844	X	X	
TN0041866			X

Table 4-16. Organic Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 060200010502.

PERMIT #	COMBINED RELEASES	RAINFALL EVENTS
TN0024210	X	X

Table 4-17. Additional Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 060200010502.

PERMIT #	WET	COD	$CBOD_5$	NH_3	N	TRC	TSS	SETTLEABLE SOLIDS	DO	pH
TN0001830							X			X
TN0002453			X	X			X			X
TN0002844		X	X		X		X			
TN0002861		X								X
TN0021211			X			X	X	X	X	X
TN0024210	X		X	X		X	X	X	X	X
TN0027413							X			
TN0041866							X	X		X
TN0056880							X			X
TN0057312	X						X			X
TN0064581										X
TN0067491										X
TN0073491		X					X			X

Table 4-18. Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 060200010502. *wed, Whole Effluent Toxicity; COD, Chemical Oxygen Demand; $CBOD_5$, Carbonaceous Biochemical Oxygen Demand (5-Day); TRC, Total Residual Chlorine; TSS, Total Suspended Solids.*

PERMIT #	*E. coli*	FECAL COLIFORM
TN0021211	X	X
TN0024210	X	X

Table 4-19. Bacteria Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 060200010502.

PERMIT #	OIL and GREASE	PCB	BENZENE	ETHYLBENZENE	TOLUENE	XYLENE
TN0002453	X					
TN0002844	X					
TN0024210	X					
TN0027413		X				
TN0041866	X		X	X	X	X
TN0057312	X					
TN0067491	X					
TN0073491	X					

Table 4-20. Organic Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 060200010502. *PCB, Polychlorinated Biphenyls.*

4.2.A.ii.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
258	549	30	<5	34,818	38	<5

Table 4-21. Summary of Livestock Count Estimates in Subwatershed 060200010502. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Hamilton	6,913	14,734	801	30	934,564	1,017	109
Marion	4,424	8,939	311	246	3,782,097	279	0

Table 4-22. Summary of Livestock Count Estimates in Hamilton and Marion Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.34
Grass (Hayland)	2.33
Legumes, Grass (Hayland)	0.20
Legumes (Pastureland)	0.07
Grass, Forbs, Legumes (Mixed Pasture)	0.27
Corn (Row Crops)	5.25
Soybeans (Row Crops)	4.56
Oats (Close-Grown Cropland)	3.13
Wheat (Close-Grown Cropland)	3.14
All Other Close-Grown Cropland	1.99
Other (Horticultural)	0.29
Other Vegetable and Truck Crops	7.28
Farmsteads and Ranch Headquarters	0.10

Table 4-23. Annual Estimated Total Soil Loss in Subwatershed 060200010502.

4.2.A.iii. 060200010503 (Chattanooga Creek).

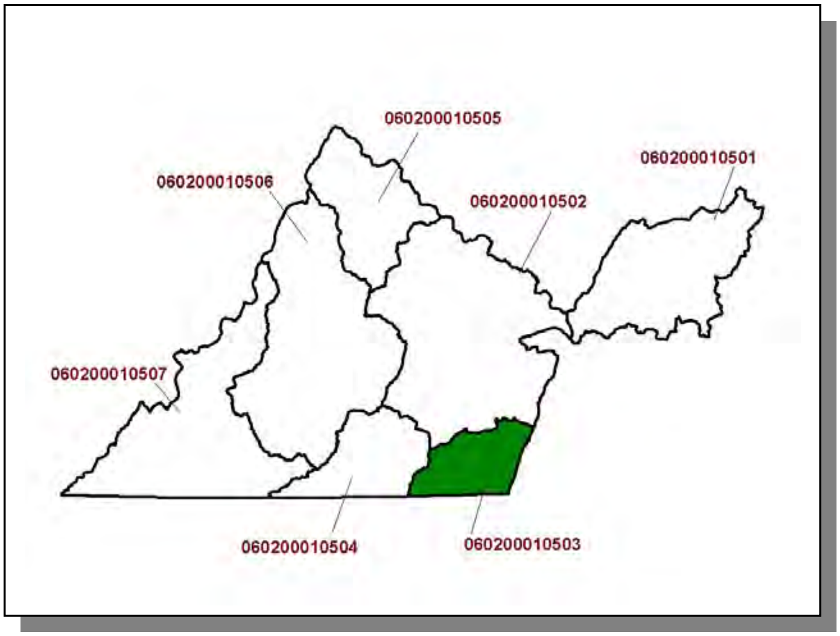


Figure 4-29. Location of Subwatershed 060200010503. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

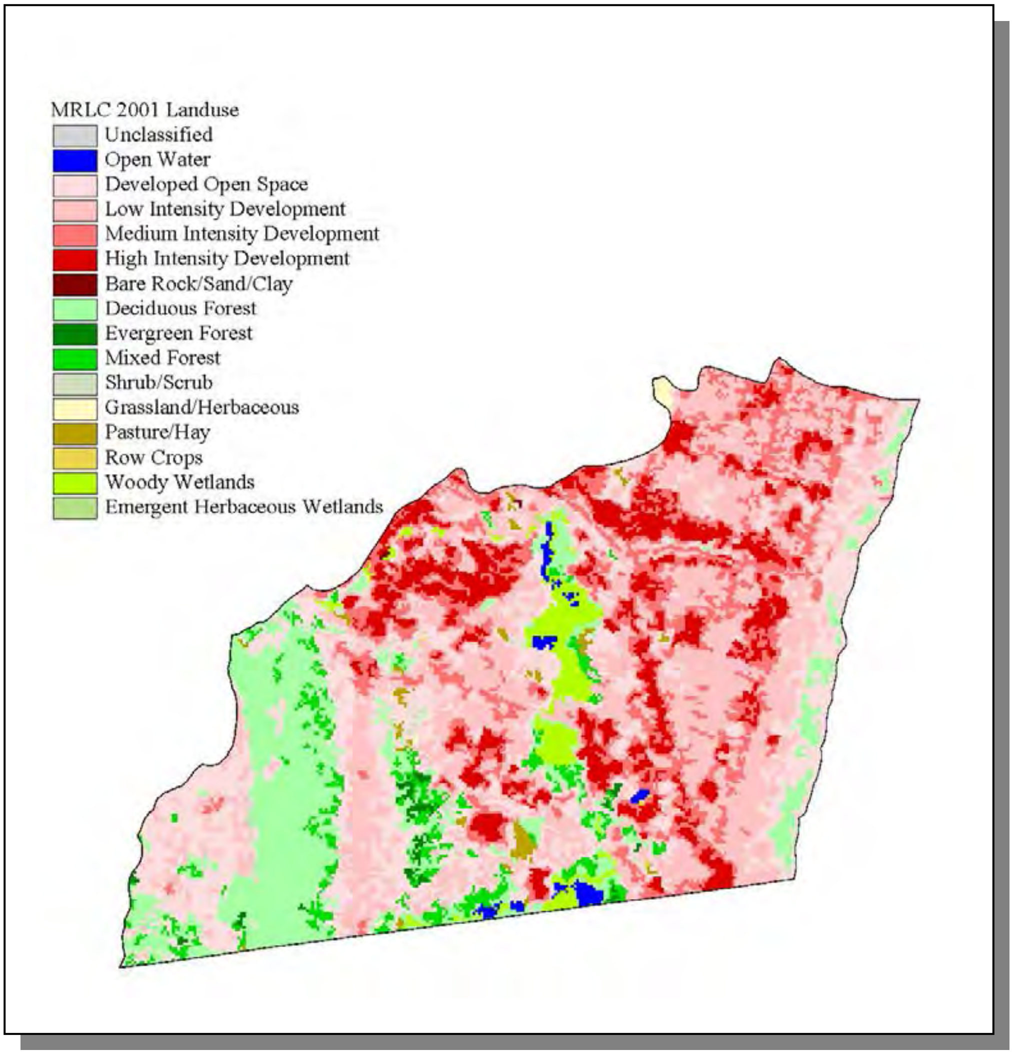


Figure 4-30. Illustration of Land Use Distribution in Subwatershed 060200010503.

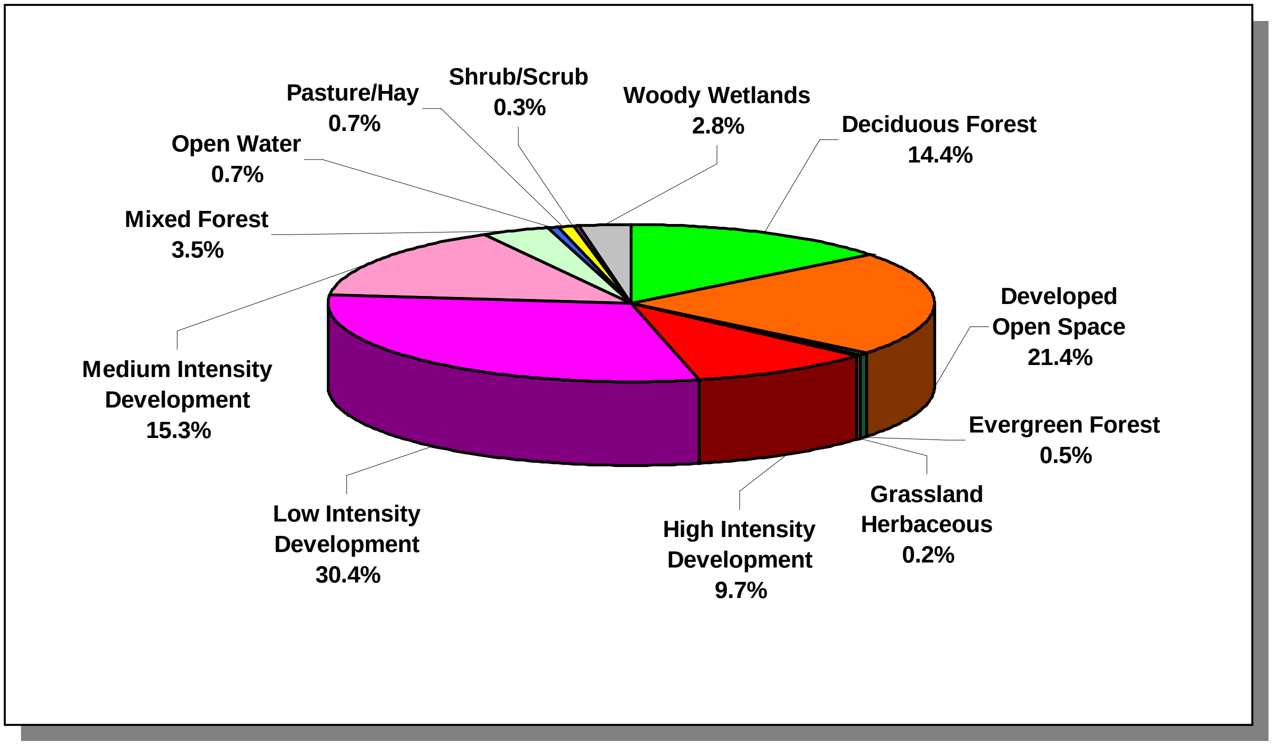


Figure 4-31. Land Use Distribution in Subwatershed 060200010503. *More information is provided in Appendix IV.*

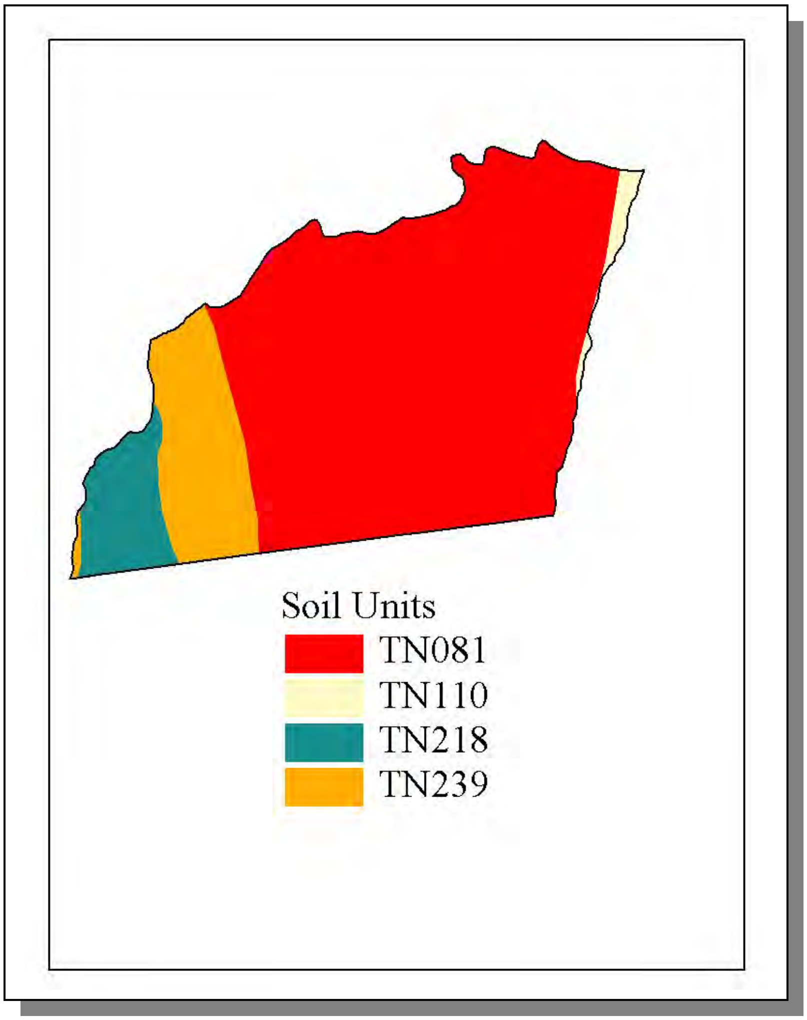


Figure 4-32. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010503.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN081	5.00	C	1.41	5.48	Silty Loam	0.35
TN110	0.00	B	2.22	4.96	Loam	0.31
TN218	0.00	C	3.41	4.95	Sandy Loam	0.23
TN239	2.00	C	2.94	4.86	Loam	0.22

Table 4-24. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010503. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Hamilton	285,536	294,865	307,896	1.98	5,645	5,830	6,087	7.8

Table 4-25. Population Estimates in Subwatershed 060200010503.

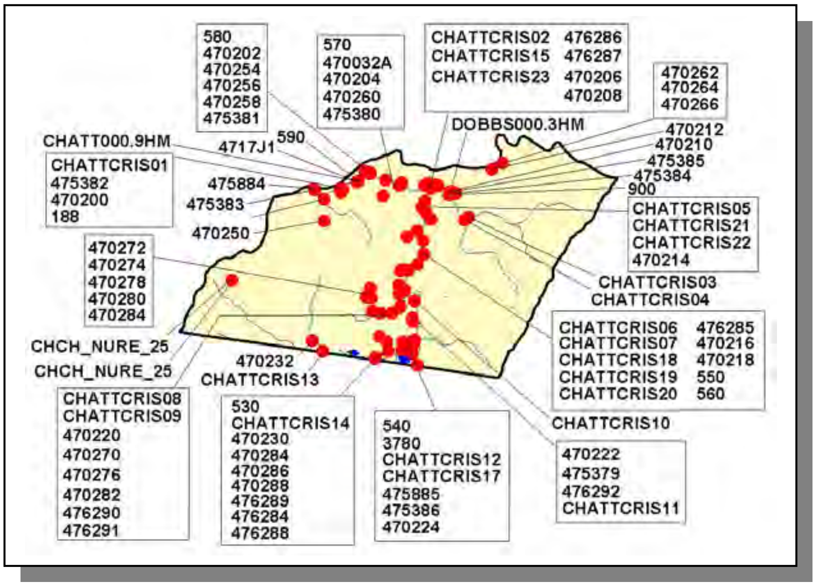


Figure 4-33. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200010503. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.A.iii.a. Point Source Contributions.

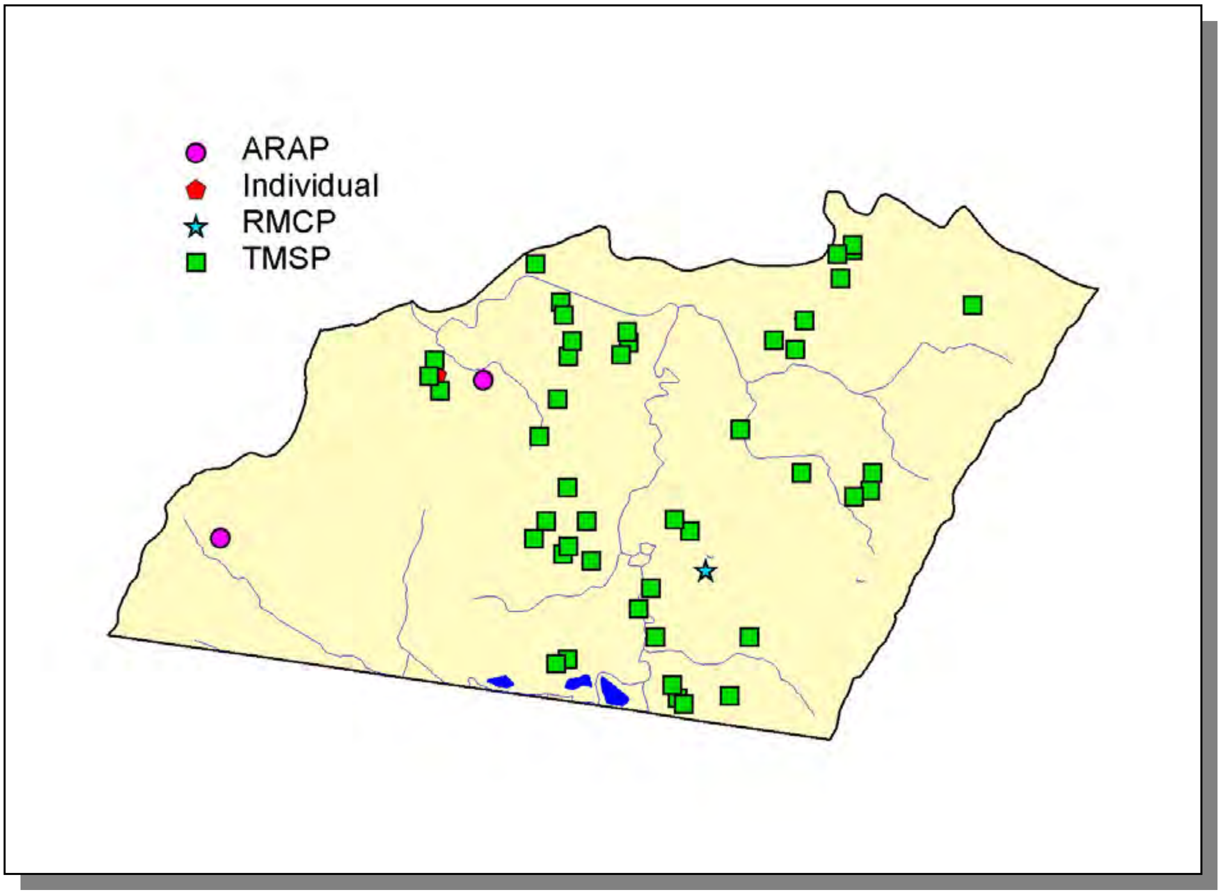


Figure 4-34. Location of Permits Issued in Subwatershed 060200010503. *More information, including the names of facilities, is provided in Appendix IV.*

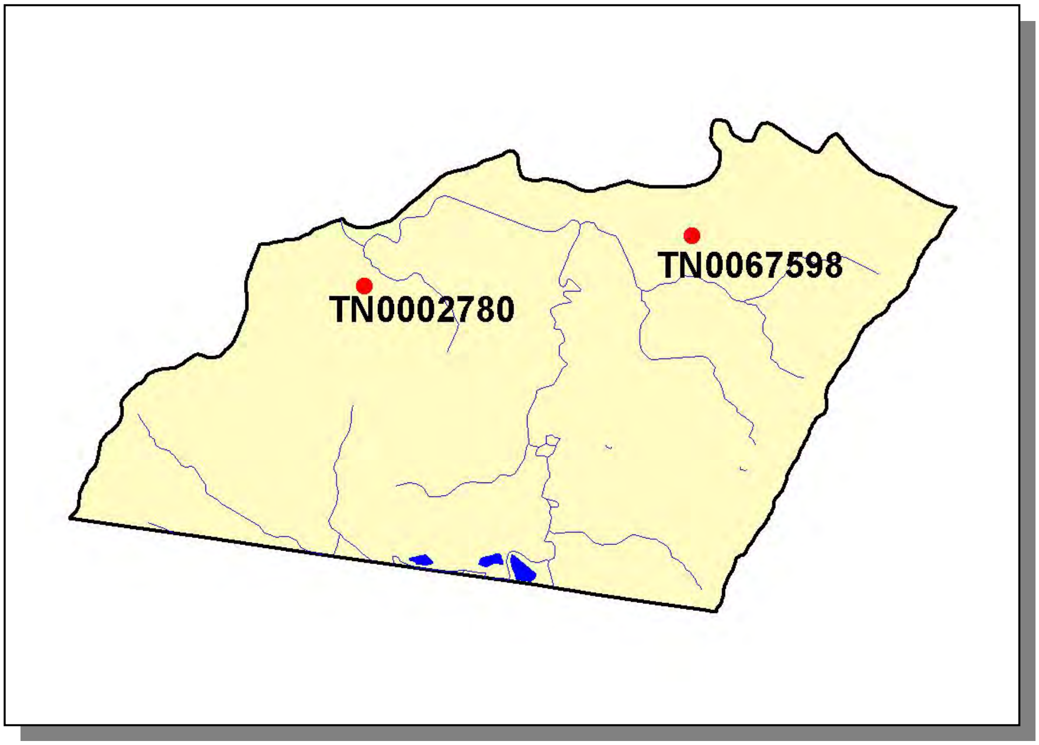


Figure 4-35. Location of Active NPDES Sites in Subwatershed 060200010503. *More information, including the names of facilities, is provided in Appendix IV.*

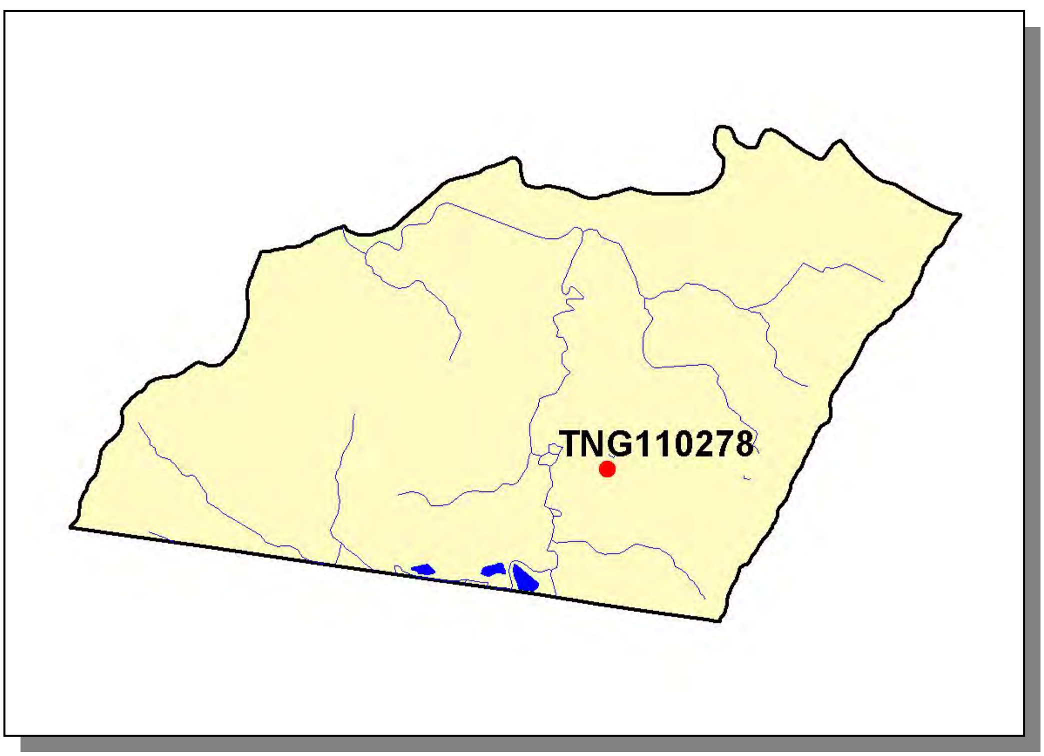


Figure 4-36. Location of Ready Mix Concrete Plants (RMCP) in Subwatershed 060200010503. *More information is provided in Appendix IV.*

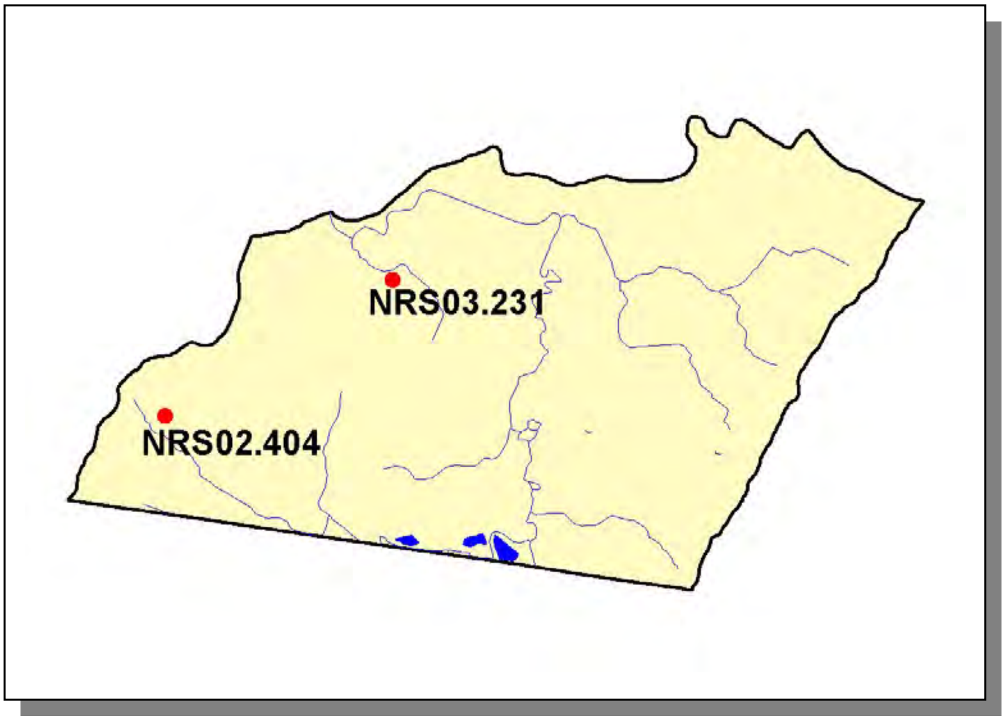


Figure 4-37. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 060200010503. *More information is provided in Appendix IV.*

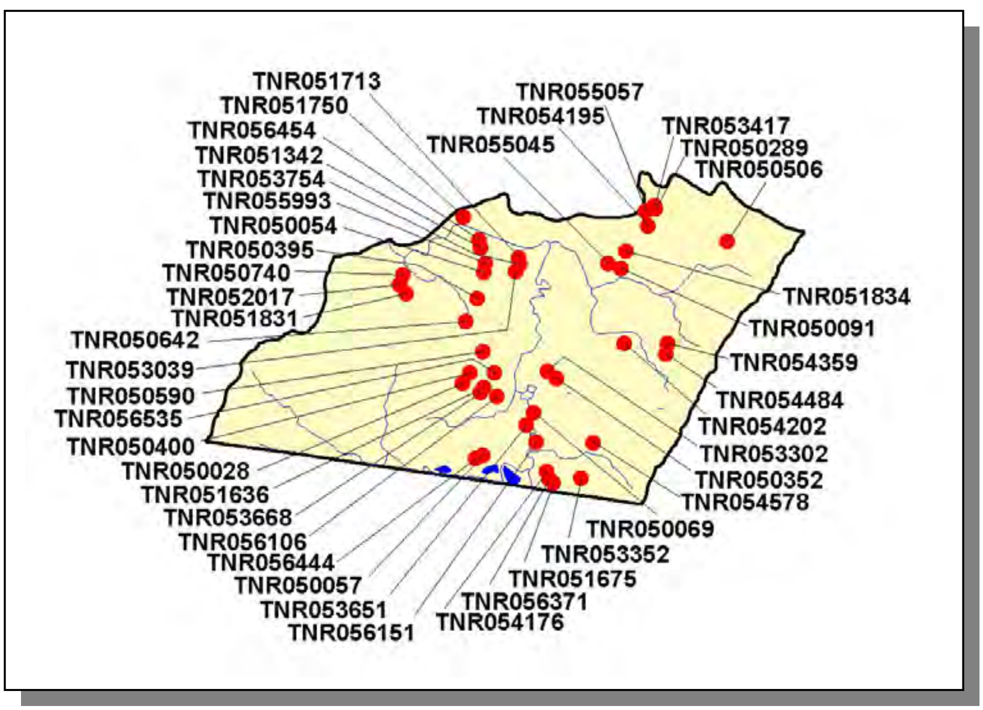


Figure 4-38. Location of TMSP Sites in Subwatershed 060200010503. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.A.iii.a.i. Dischargers to Water Bodies Listed on the 2004 303(d) List

There is one NPDES facility discharging to water bodies listed on the 2004 303(d) list in Subwatershed 060200010503:

- TN0067598 (Hunter Oil Company) discharges to an unnamed tributary @ RM 0.4 to Dobbs Creek

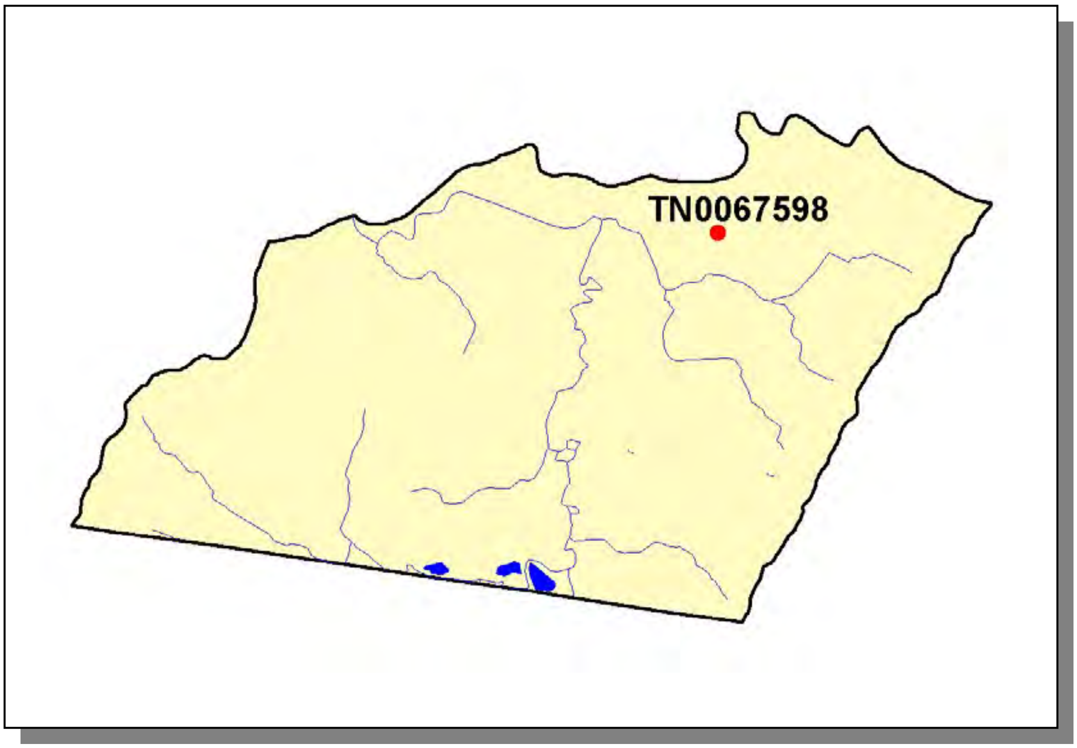


Figure 4-39. Location of NPDES Dischargers to Water Bodies Listed on the 2004 303(d) List in Subwatershed 060200010503. *More information, including the names of facilities, is provided in Appendix IV.*

PERMIT #	3Q2	1Q10	3Q10	3Q20	7Q10
TN0067598	0.02	na	0.01	0.02	0.02

Table 4-26. Receiving Stream Low Flow Information for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 060200010503. *Data are in cubic feet per second (CFS). Data were obtained from the USGS web application StreamStats at http://water.usgs.gov/osw/streamstats/. (na, data not available)*

PERMIT #	FLOW
TN0067598	X

Table 4-27. Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 060200010503.

PERMIT #	OIL SHEEN
TN0067598	X

Table 4-28. Organic Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 060200010503.

PERMIT #	FOAM	COLOR	FLOATING MATTER
TN0067598	X	X	X

Table 4-29. Additional Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 060200010503.

PERMIT #	$CBOD_5$	TSS	pH
TN0067598	X	X	X

Table 4-30. Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 060200010503. *$CBOD_5$, Carbonaceous Biochemical Oxygen Demand (5-Day); TSS, Total Suspended Solids.*

PERMIT #	OIL and GREASE
TN0067598	X

Table 4-31. Organic Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 060200010503.

4.2.A.iii.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS				
Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Hogs
11	24	<5	6,593	<5

Table 4-32. Summary of Livestock Count Estimates in Subwatershed 060200010503. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Hamilton	6,913	14,734	801	30	934,564	1,017	109

Table 4-33. Summary of Livestock Count Estimates in Hamilton County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Hamilton	210.7	210.7	2.2	6.0

Table 4-34. Forest Acreage and Annual Removal Rates (1987-1994) in Hamilton County.

CROPS	TONS/ACRE/YEAR
Legumes (Pastureland)	0.07
Grass (Pastureland)	0.32
Grass (Hayland)	2.05
Legumes, Grass (Hayland)	0.20
Grass, Forbs, Legumes (Mixed Pasture)	0.27
Corn (Row Crops)	5.28
Potatoes (Row Crops)	5.26
Soybeans (Row Crops)	8.85
Oats (Close-Grown Cropland)	3.13
Wheat (Close-Grown Cropland)	3.14
All Other Close-Grown Cropland	1.99
Other Cropland not Planted	1.26
Farmsteads and Ranch Headquarters	0.31

Table 4-35. Annual Estimated Total Soil Loss in Subwatershed 060200010503.

4.2.A.iv. 060200010504 (Lookout Creek).

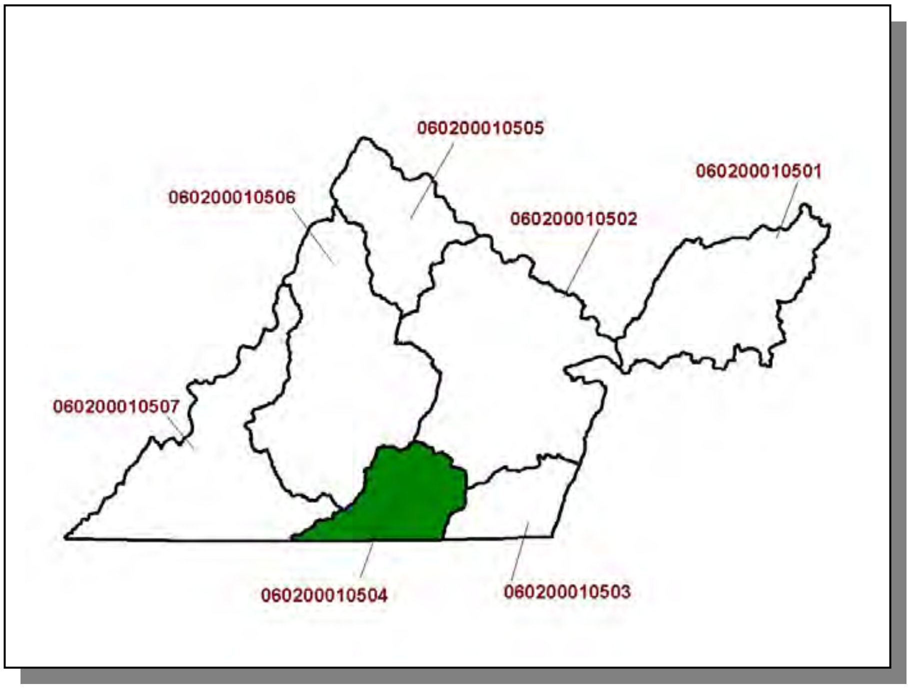


Figure 4-40. Location of Subwatershed 060200010504. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

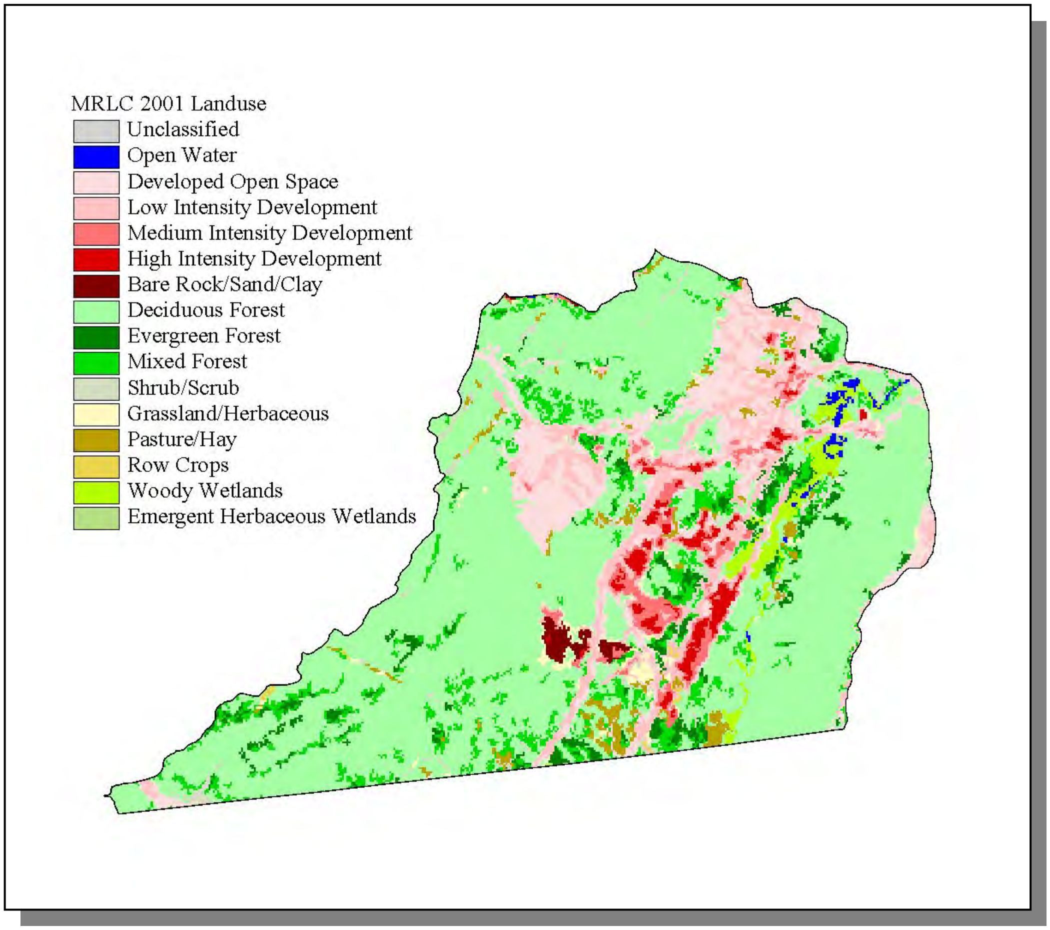


Figure 4-41. Illustration of Land Use Distribution in Subwatershed 060200010504.

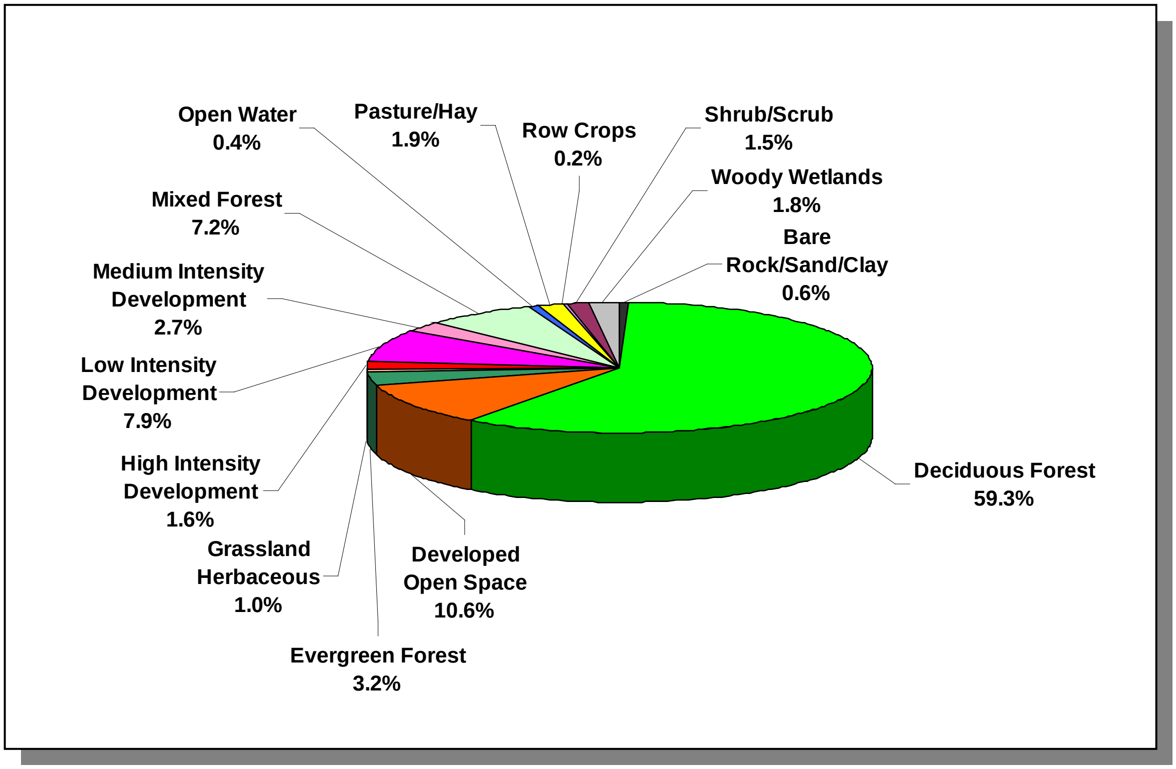


Figure 4-42. Land Use Distribution in Subwatershed 060200010504. *More information is provided in Appendix IV.*

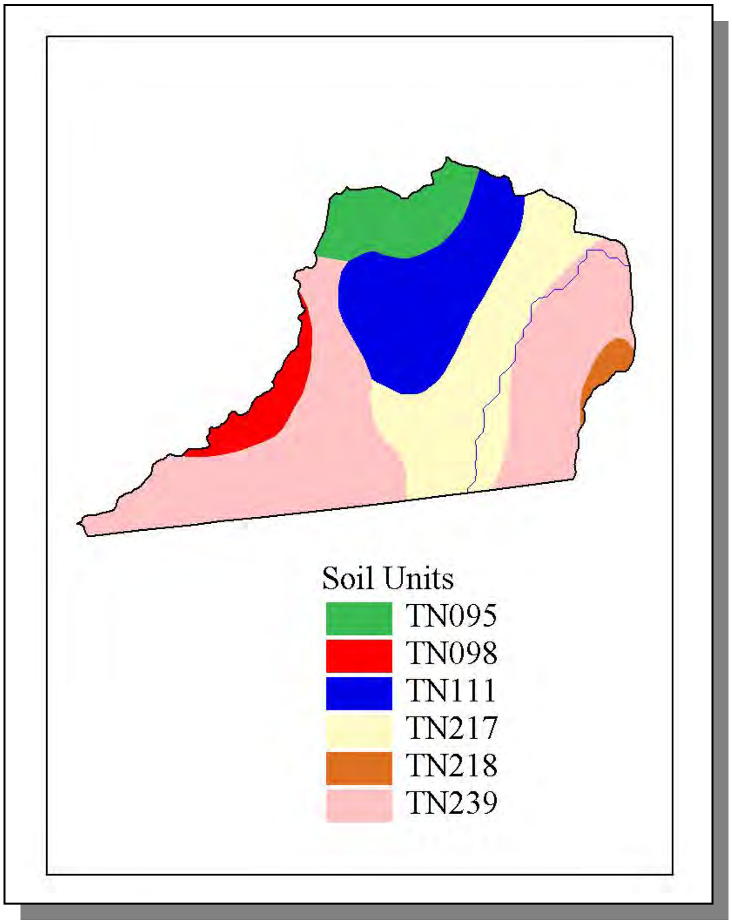


Figure 4-43. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010504.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN111	0.00	C	1.41	5.10	Loam	0.34
TN217	0.00	C	2.34	5.32	Loam	0.35
TN218	0.00	C	3.41	4.95	Sandy Loam	0.23
TN239	2.00	C	2.94	4.86	Loam	0.22

Table 4-36. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010504. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Hamilton	285,536	294,865	307,896	2.61	7,444	7,688	8,027	7.8

Table 4-37. Population Estimates in Subwatershed 060200010504.

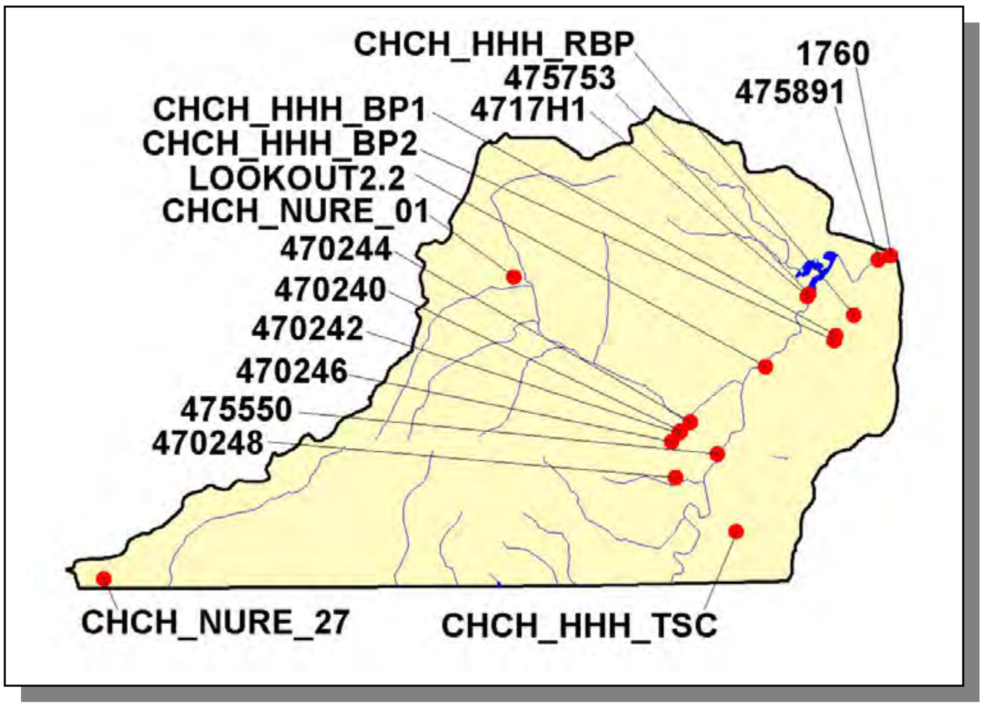


Figure 4-44. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200010504. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.A.iv.a. Point Source Contributions.

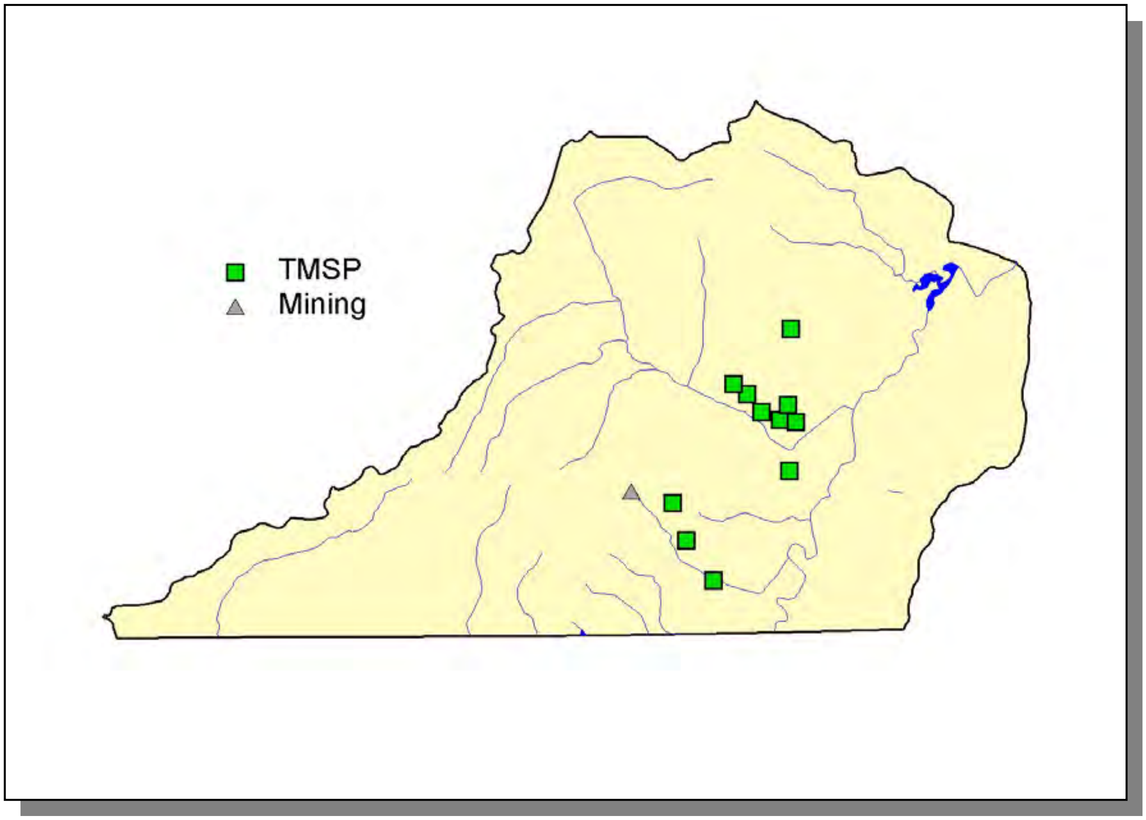


Figure 4-45. Location of Permits Issued in Subwatershed 060200010504. *More information, including the names of facilities, is provided in Appendix IV.*

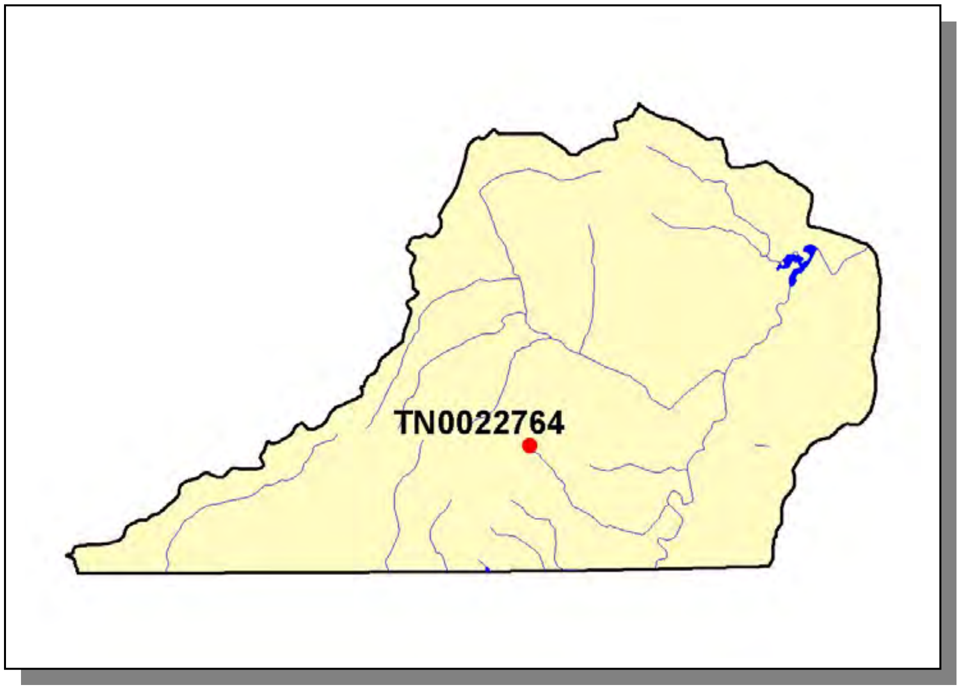


Figure 4-46. Location of Active Mining Sites in Subwatershed 060200010504. *More information, including the names of mining operations, is provided in Appendix IV.*

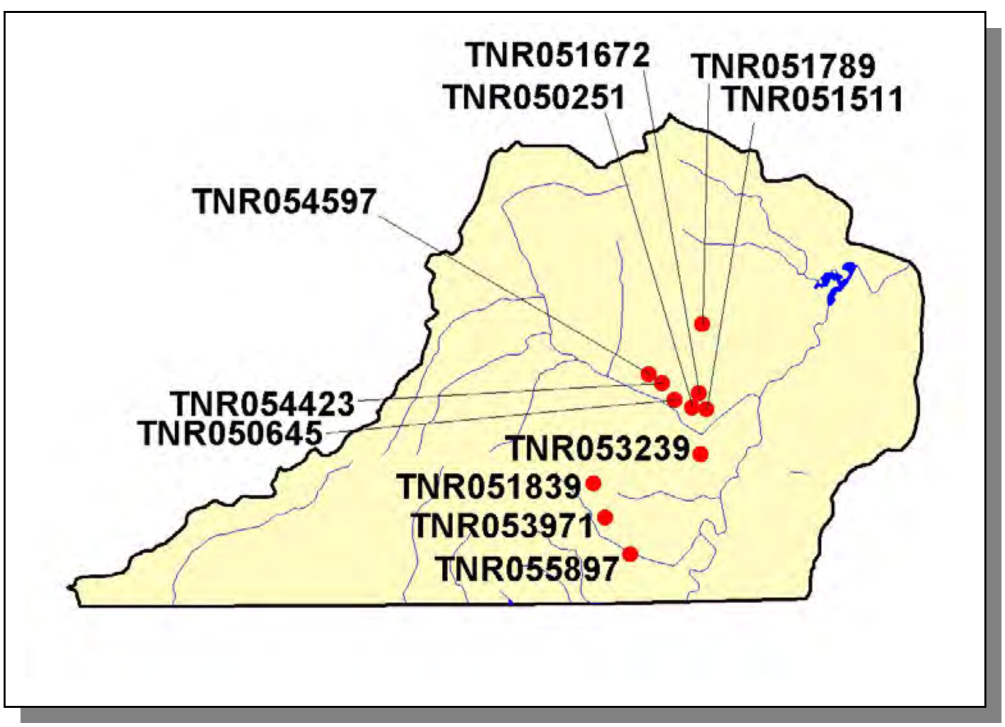


Figure 4-47. Location of TMSP Sites in Subwatershed 060200010504. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.A.iv.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS				
Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Hogs
15	33	<5	18,004	<5

Table 4-38. Summary of Livestock Count Estimates in Subwatershed 060200010504. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Hamilton	6,913	14,734	801	30	934,564	1,017	109
Marion	4,424	8,939	311	246	3,782,097	279	0

Table 4-39. Summary of Livestock Count Estimates in Hamilton and Marion Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

CROPS	TONS/ACRE/YEAR
Legumes (Pastureland)	0.07
Grass (Pastureland)	0.33
Grass (Hayland)	2.04
Legumes, Grass (Hayland)	0.20
Grass, Forbs, Legumes (Mixed Pasture)	0.27
Corn (Row Crops)	5.28
Potatoes (Row Crops)	5.26
Soybeans (Row Crops)	3.84
Oats (Close-Grown Cropland)	3.13
Wheat (Close-Grown Cropland)	3.14
All Other Close-Grown Cropland	1.99
Other (Horticultural)	0.29
Other Vegetable and Truck Crops	7.28
Other Cropland not Planted	1.26
Farmsteads and Ranch Headquarters	0.09

Table 4-40. Annual Estimated Total Soil Loss in Subwatershed 060200010504.

4.2.A.v. 060200010505 (Suck Creek).

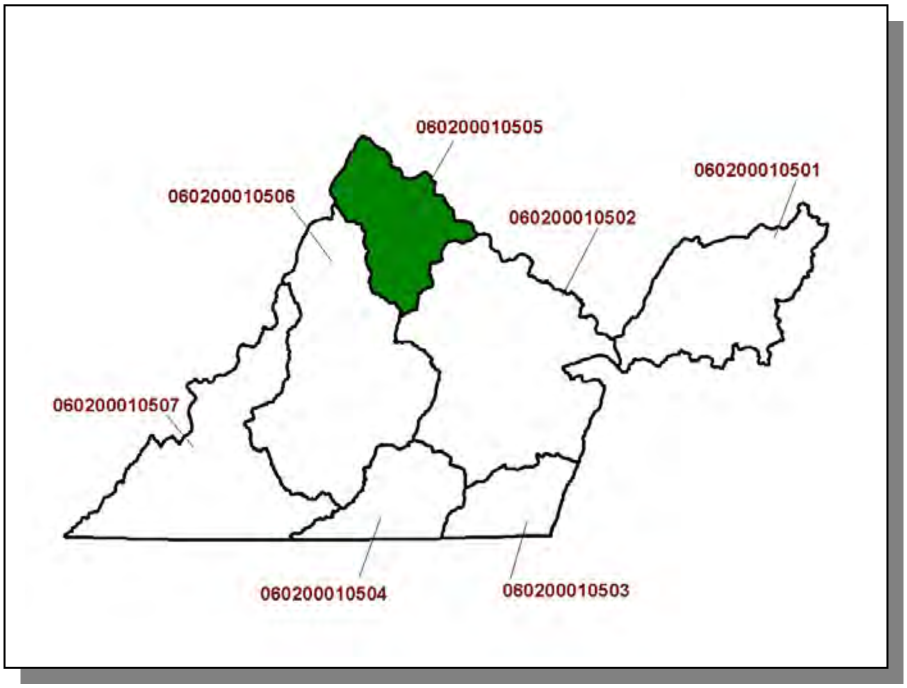


Figure 4-48. Location of Subwatershed 060200010505. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

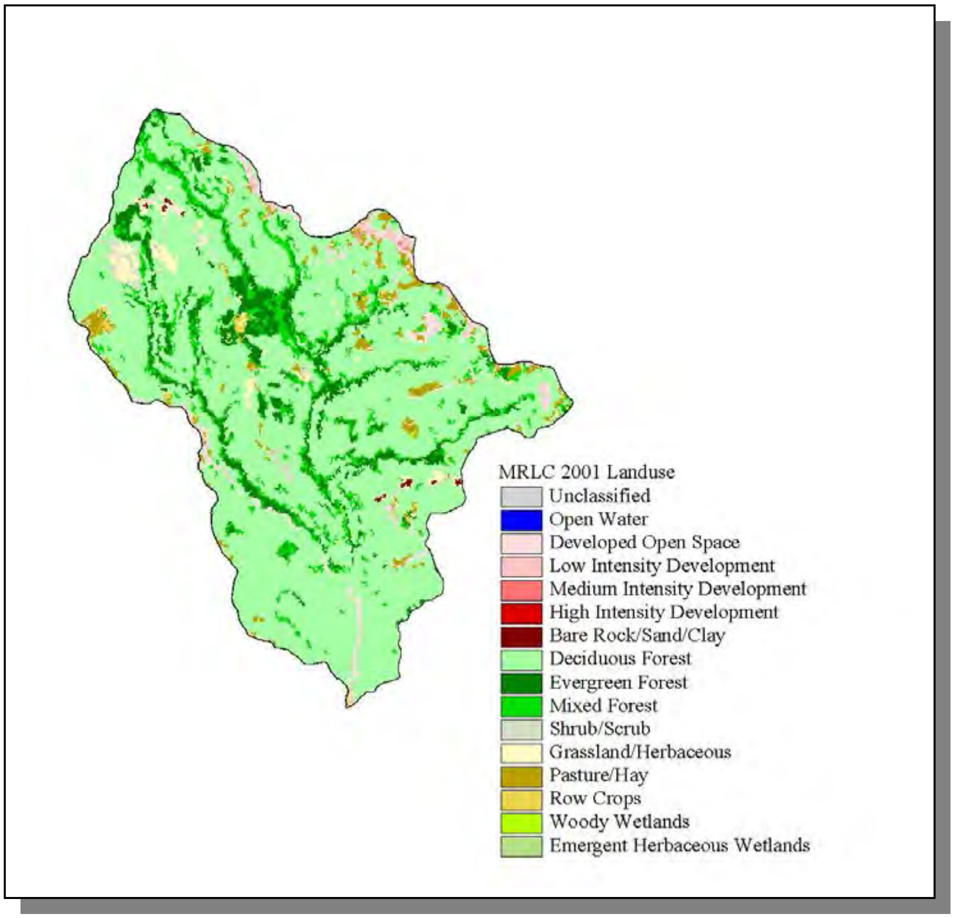


Figure 4-49. Illustration of Land Use Distribution in Subwatershed 060200010505.

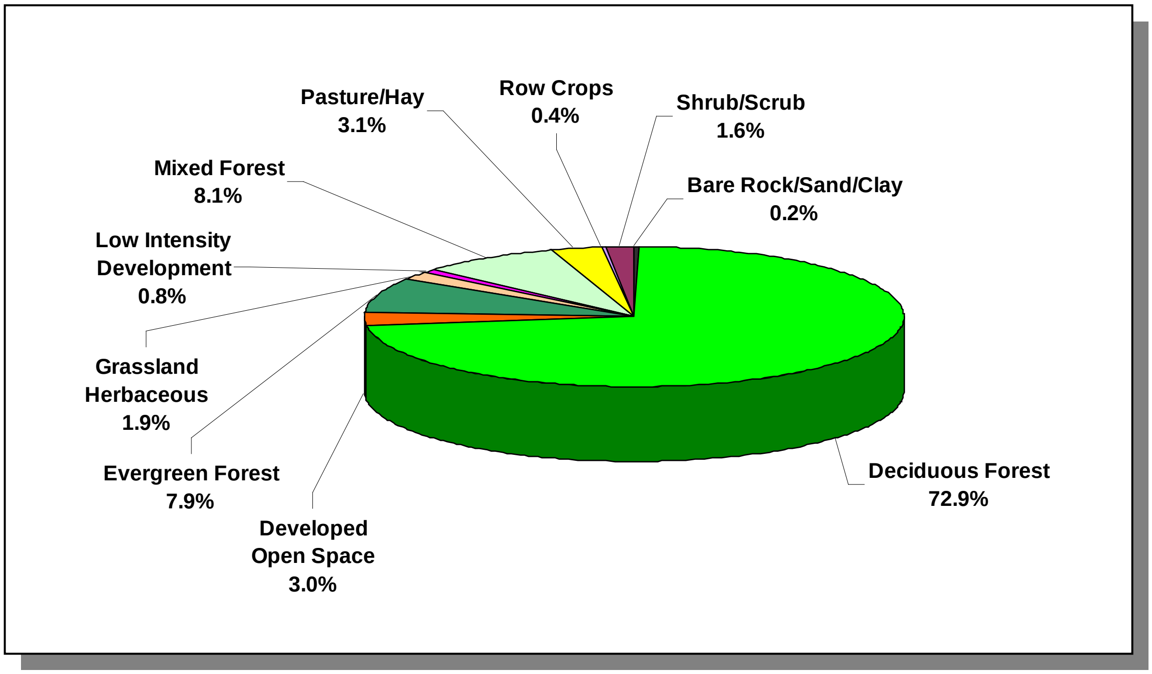


Figure 4-50. Land Use Distribution in Subwatershed 060200010505. *More information is provided in Appendix IV.*

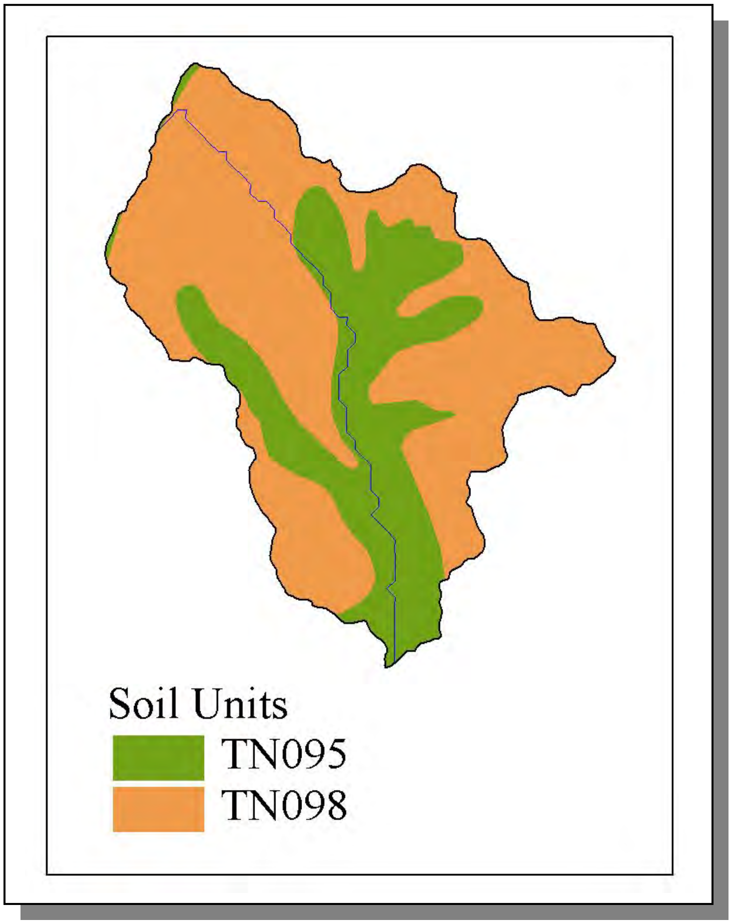


Figure 4-51. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010505.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32

Table 4-41. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010505. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Hamilton	285,536	294,865	307,896	0.88	2,512	2,594	2,709	7.8
Marion	24,860	26,674	27,776	2.59	643	690	719	11.8
Sequatchie	8,863	10,119	11,370	1.57	139	159	179	28.8
Total	**319,259**	**331,658**	**347,042**		**3,294**	**3,443**	**3,607**	**9.5**

Table 4-42. Population Estimates in Subwatershed 060200010505.

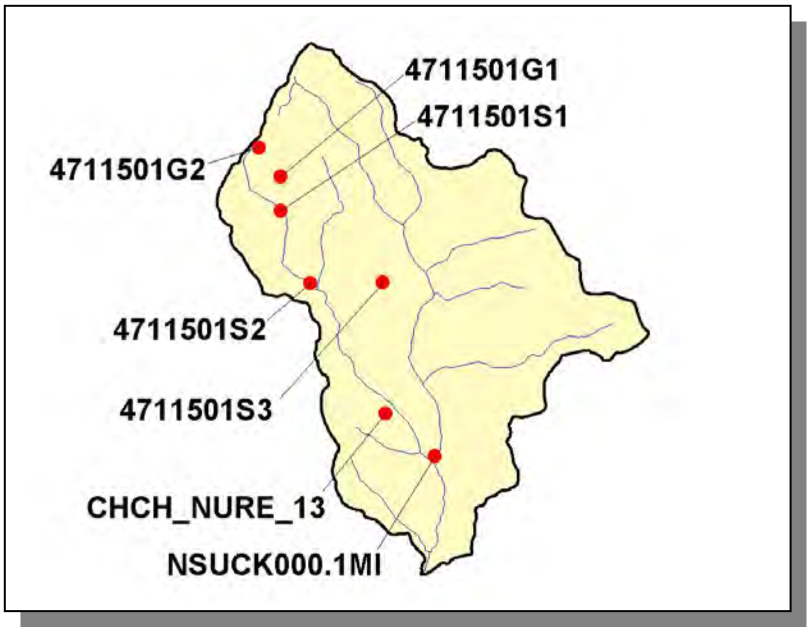


Figure 4-52. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200010505. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.A.v.a. Point Source Contributions.

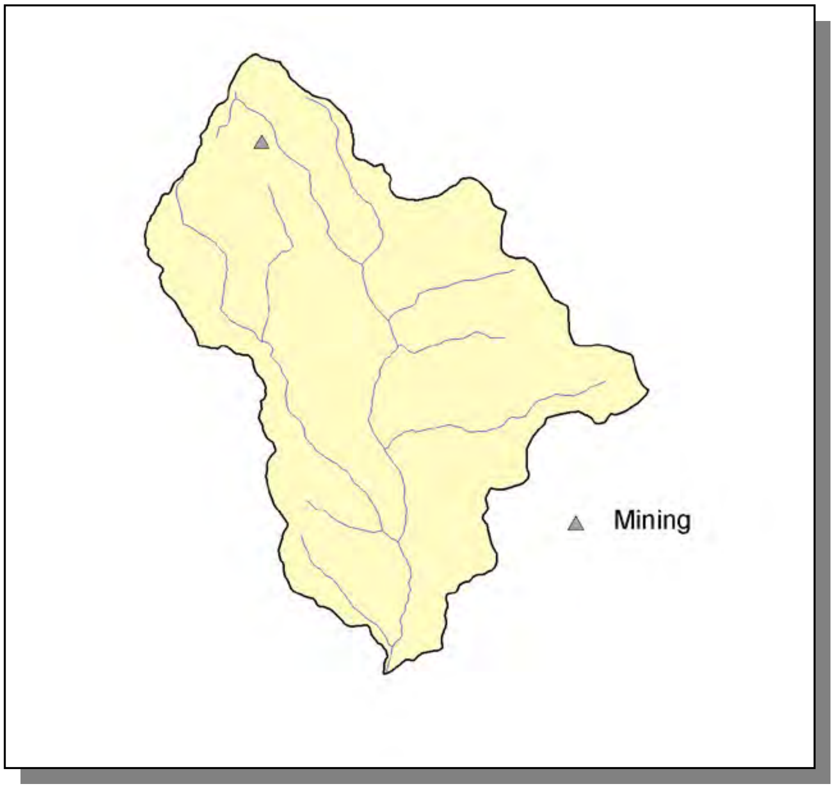


Figure 4-53. Location of Permits Issued in Subwatershed 060200010505. *More information, including the names of facilities, is provided in Appendix IV.*

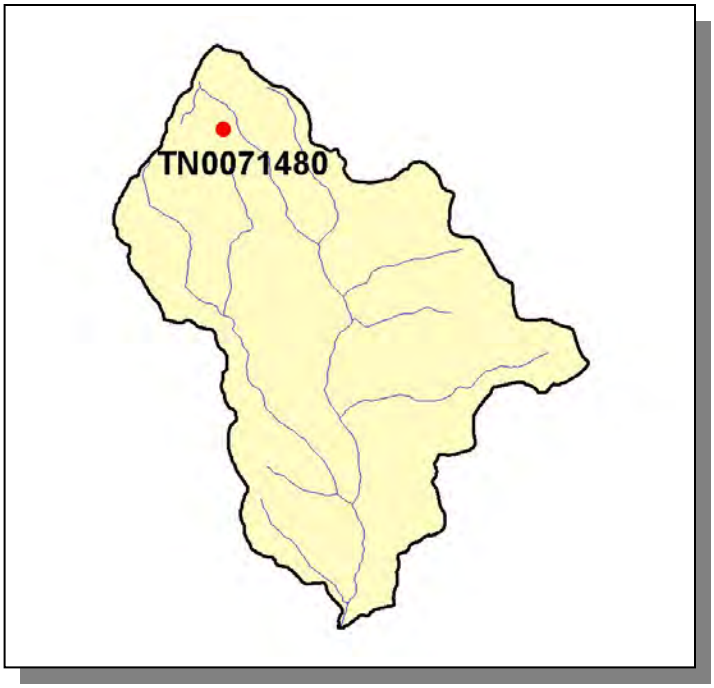


Figure 4-54. Location of Active Mining Sites in Subwatershed 060200010505. *More information, including the names of mining operations, is provided in Appendix IV.*

4.2.A.v.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS				
Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Hogs
33	76	<5	13,036	<5

Table 4-43. Summary of Livestock Count Estimates in Subwatershed 060200010505. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Hamilton	6,913	14,734	801	30	934,564	1,017	109
Marion	4,424	8,939	311	246	3,782,097	279	0
Sequatchie	2,763	6,739	221	6	960,000	0	0

Table 4-44. Summary of Livestock Count Estimates in Hamilton, Marion, and Sequatchie Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

CROPS	TONS/ACRE/YEAR
Legumes (Pastureland)	0.07
Grass (Pastureland)	0.64
Grass (Hayland)	1.50
Legumes, Grass (Hayland)	0.21
Grass, Forbs, Legumes (Mixed Pasture)	0.44
Corn (Row Crops)	3.75
Soybeans (Row Crops)	4.56
Oats (Close-Grown Cropland)	3.13
Wheat (Close-Grown Cropland)	3.14
All Other Close-Grown Cropland	1.99
Other (Horticultural)	0.29
Other Vegetable and Truck Crops	7.28
Farmsteads and Ranch Headquarters	0.16

Table 4-45. Annual Estimated Total Soil Loss in Subwatershed 060200010505.

4.2.A.vi. 060200010506 (Tennessee River).

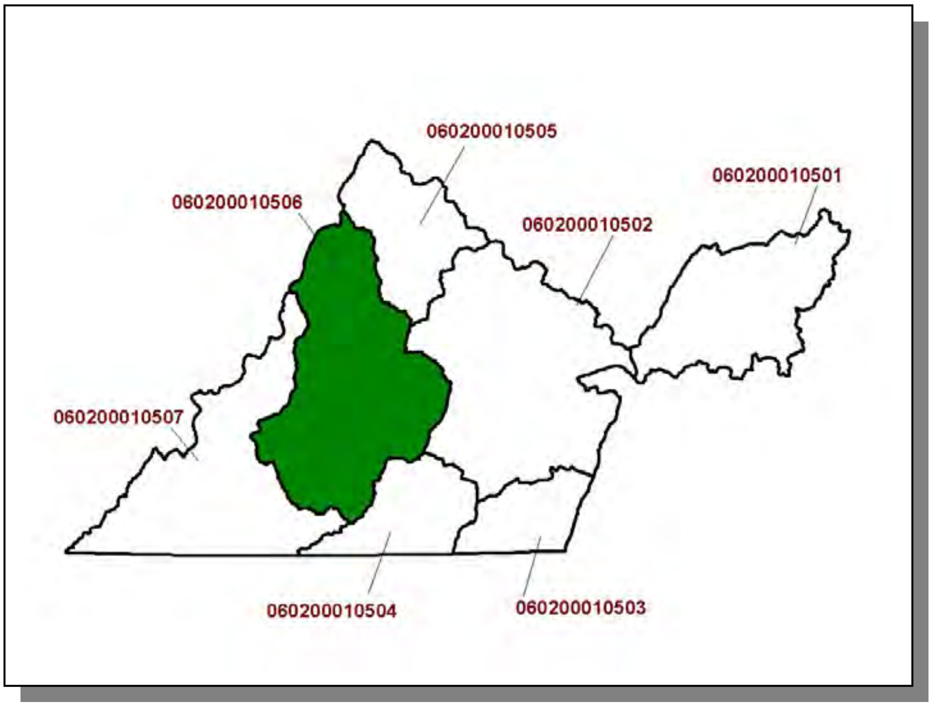


Figure 4-55. Location of Subwatershed 060200010506. *All Group 4 Lower Tennessee River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

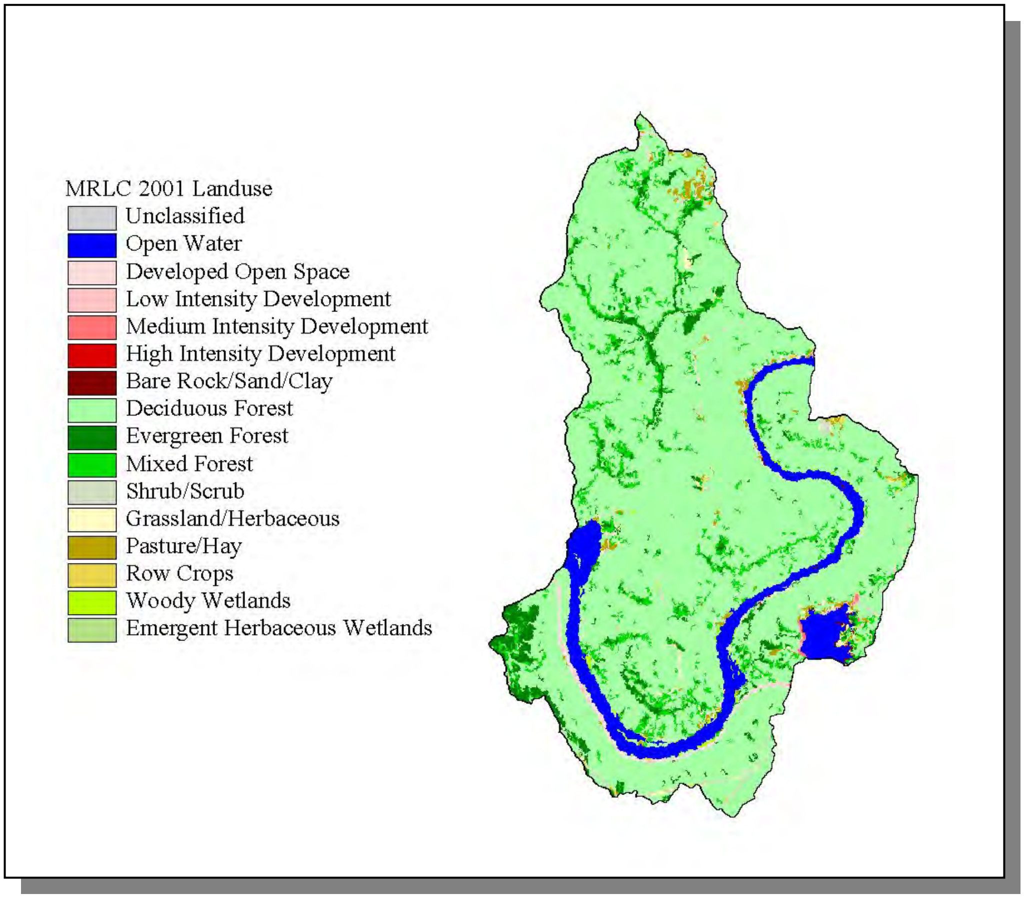


Figure 4-56. Illustration of Land Use Distribution in Subwatershed 060200010506.

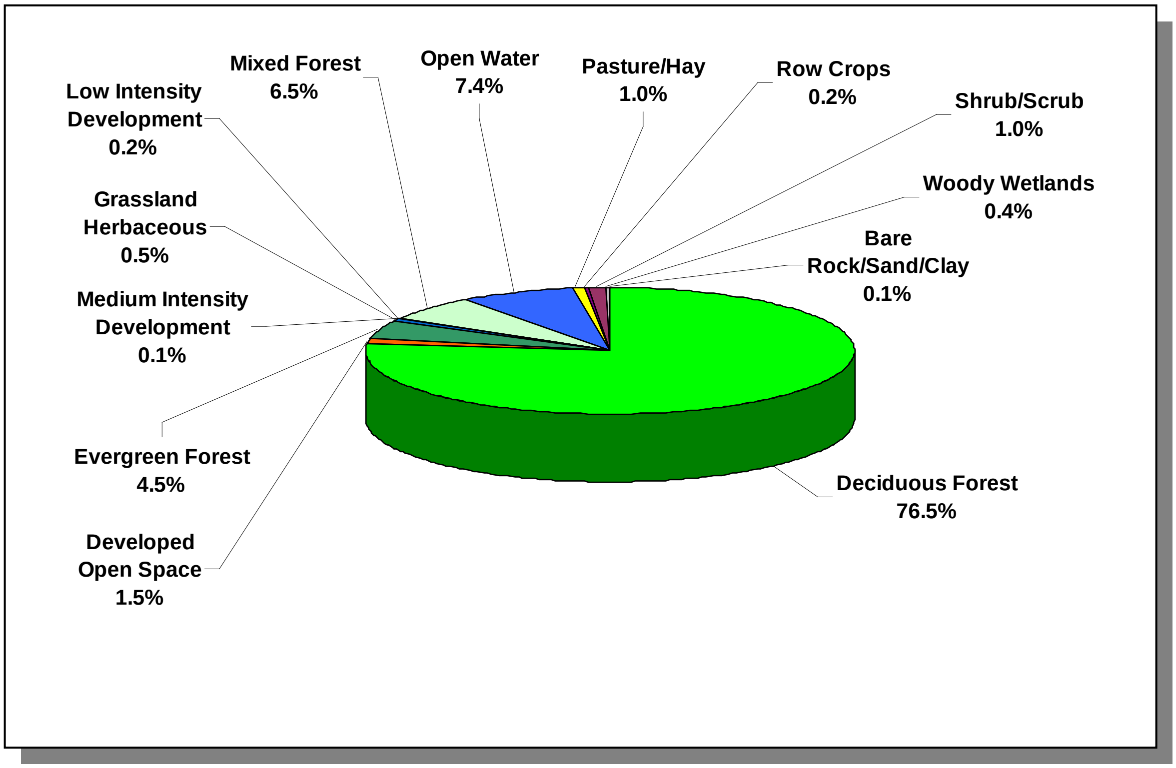


Figure 4-57. Land Use Distribution in Subwatershed 060200010506. *More information is provided in Appendix IV.*

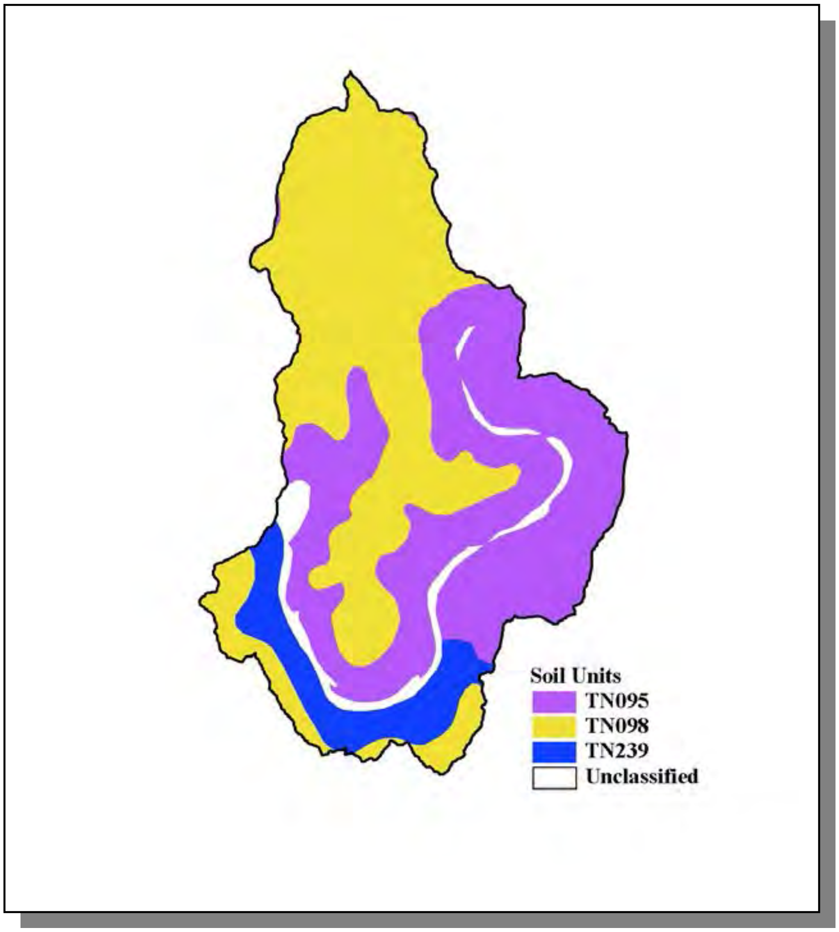


Figure 4-58. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010506.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN239	2.00	C	2.94	4.86	Loam	0.22

Table 4-46. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010506. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Hamilton	285,536	294,865	307,896	0.32	922	952	994	7.8
Marion	24,860	26,674	27,776	10.54	2,620	2,811	2,928	11.8
Total	**310,396**	**321,539**	**335,672**		**3,542**	**3,763**	**3,922**	**10.7**

Table 4-47. Population Estimates in Subwatershed 060200010506.

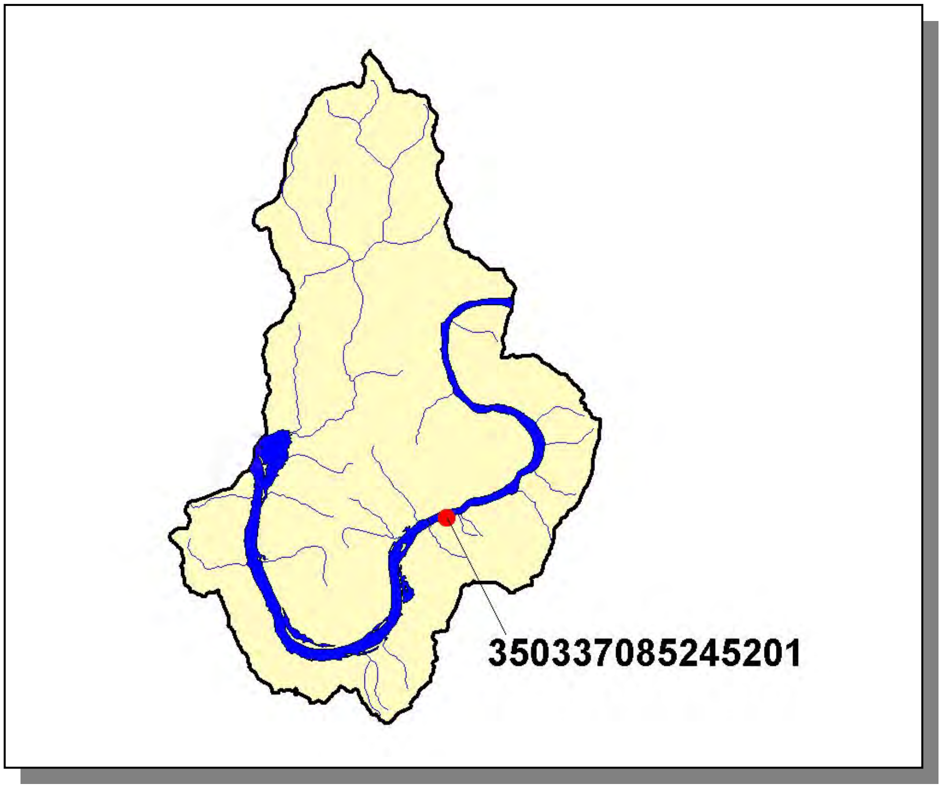


Figure 4-59. Location of Historical Streamflow Data Collection Sites in Subwatershed 060200010506. *More information is provided in Appendix IV.*

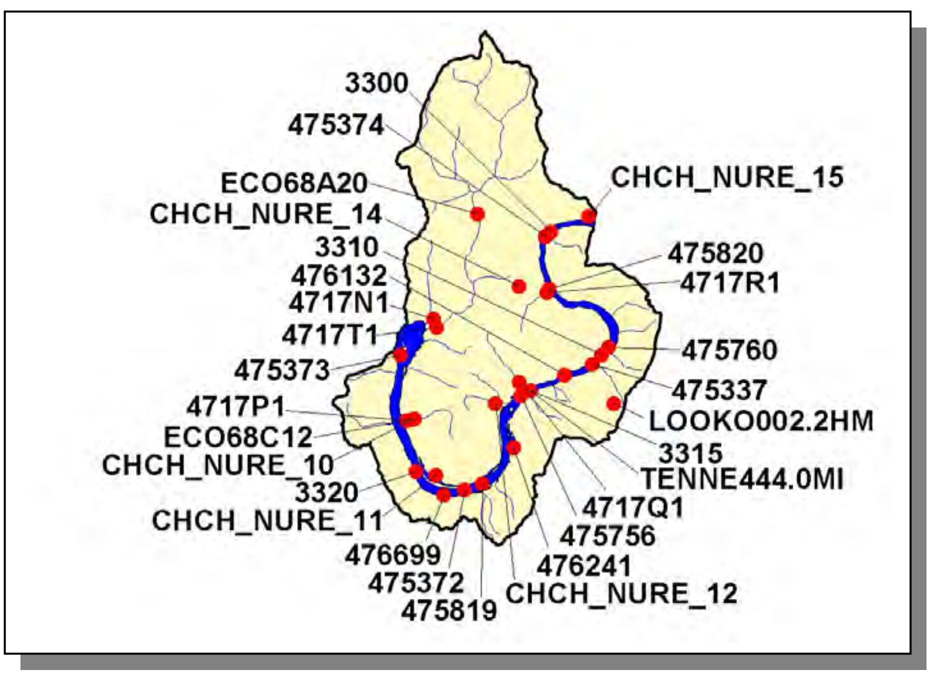


Figure 4-60. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200010506. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.A.vi.a. Point Source Contributions.

There are no point sources in this subwatershed.

4.2.A.vi.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS				
Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Hogs
17	35	<5	13,528	<5

Table 4-48. Summary of Livestock Count Estimates in Subwatershed 060200010506. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Hamilton	6,913	14,734	801	30	934,564	1,017	109
Marion	4,424	8,939	311	246	3,782,097	279	0

Table 4-49. Summary of Livestock Count Estimates in Hamilton and Marion Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

CROPS	TONS/ACRE/YEAR
Legumes (Pastureland)	0.07
Grass (Pastureland)	0.61
Grass (Hayland)	2.33
Legumes, Grass (Hayland)	0.20
Grass, Forbs, Legumes (Mixed Pasture)	0.29
Corn (Row Crops)	3.61
Soybeans (Row Crops)	4.56
Oats (Close-Grown Cropland)	3.13
Wheat (Close-Grown Cropland)	3.14
All Other Close-Grown Cropland	1.99
Other (Horticultural)	0.29
Other Vegetable and Truck Crops	7.28
Farmsteads and Ranch Headquarters	0.19

Table 4-50. Annual Estimated Total Soil Loss in Subwatershed 060200010506.

4.2.A.vii. 060200010507 (Tennessee River).

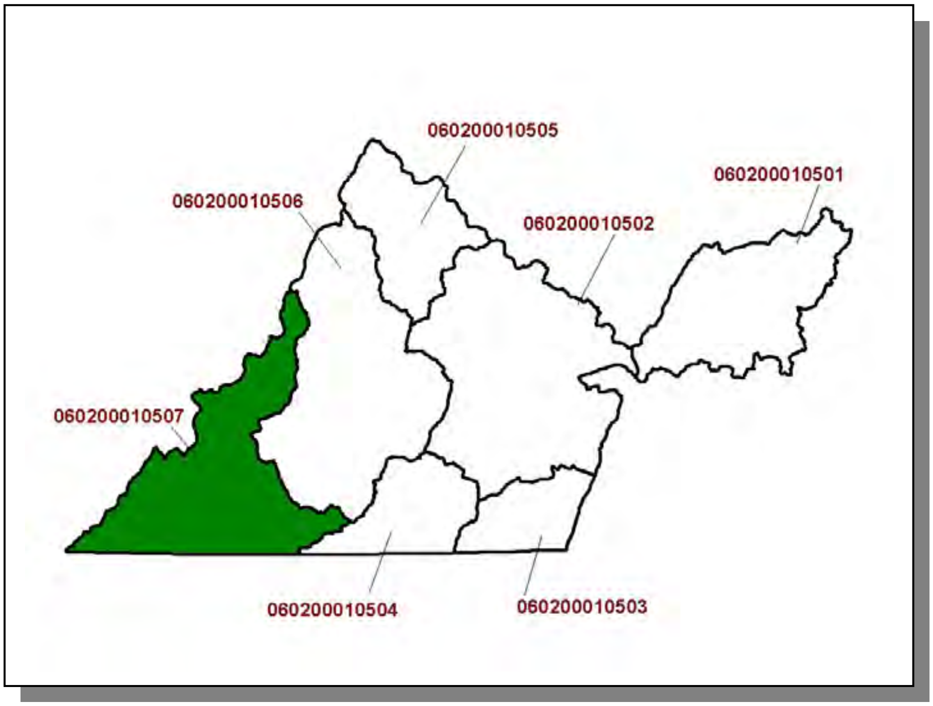


Figure 4-61. Location of Subwatershed 060200010507. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

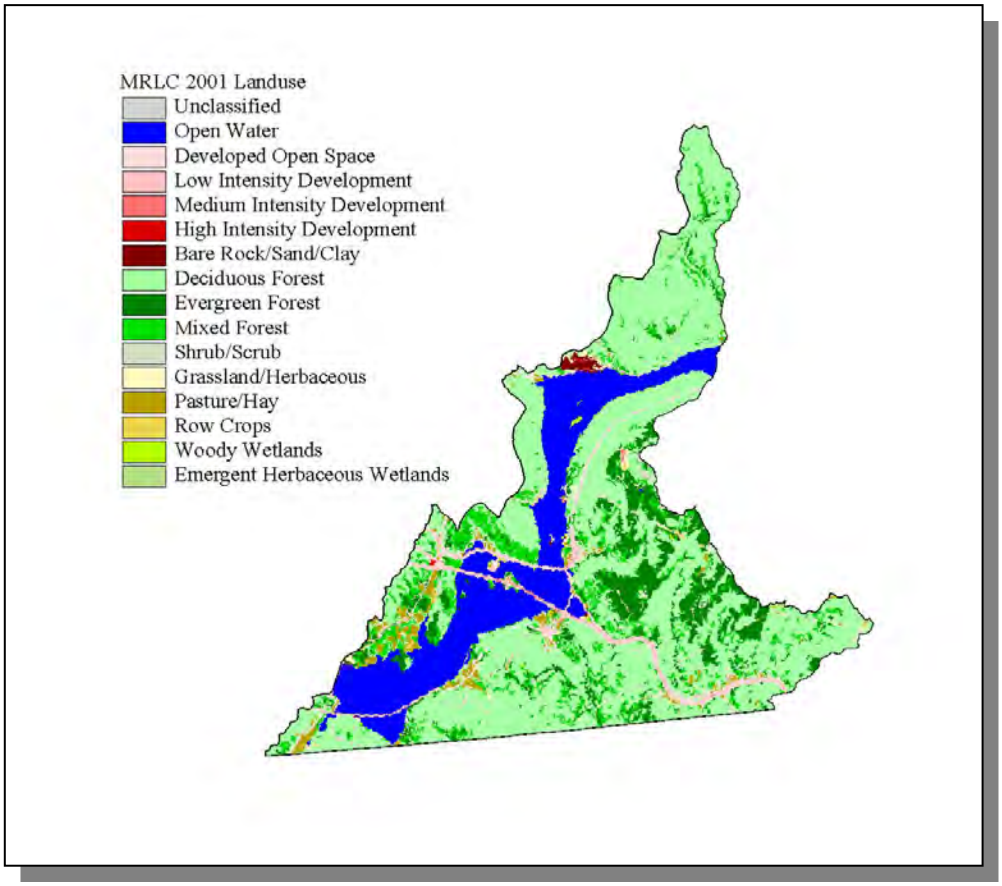


Figure 4-62. Illustration of Land Use Distribution in Subwatershed 060200010507.

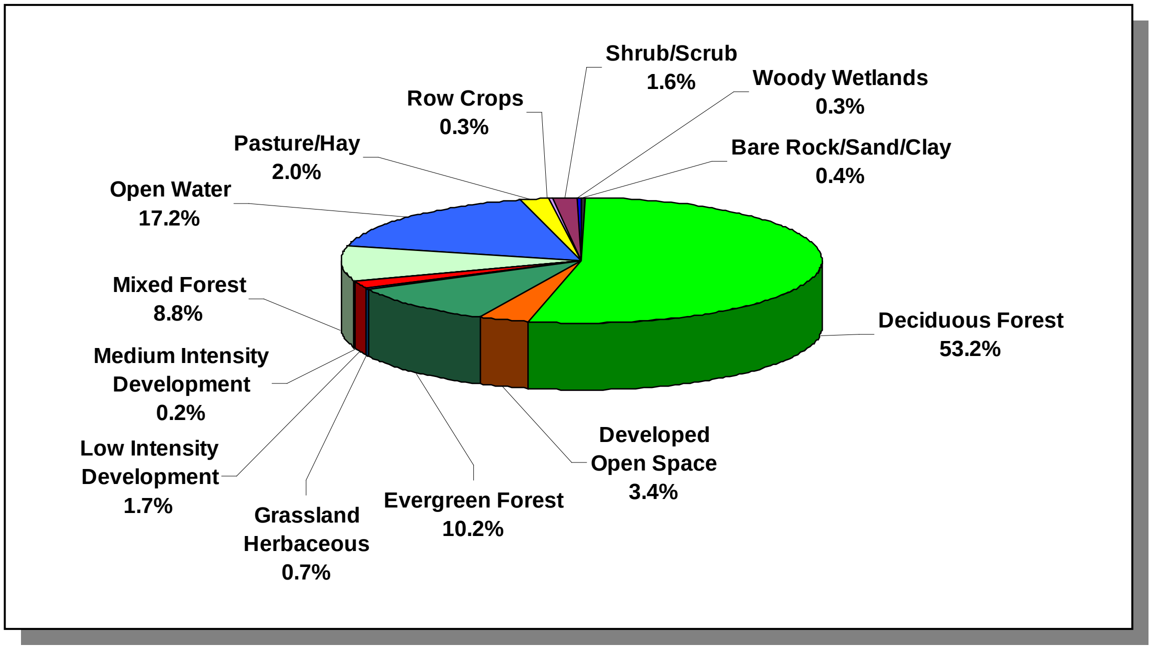


Figure 4-63. Land Use Distribution in Subwatershed 060200010507. *More information is provided in Appendix IV.*

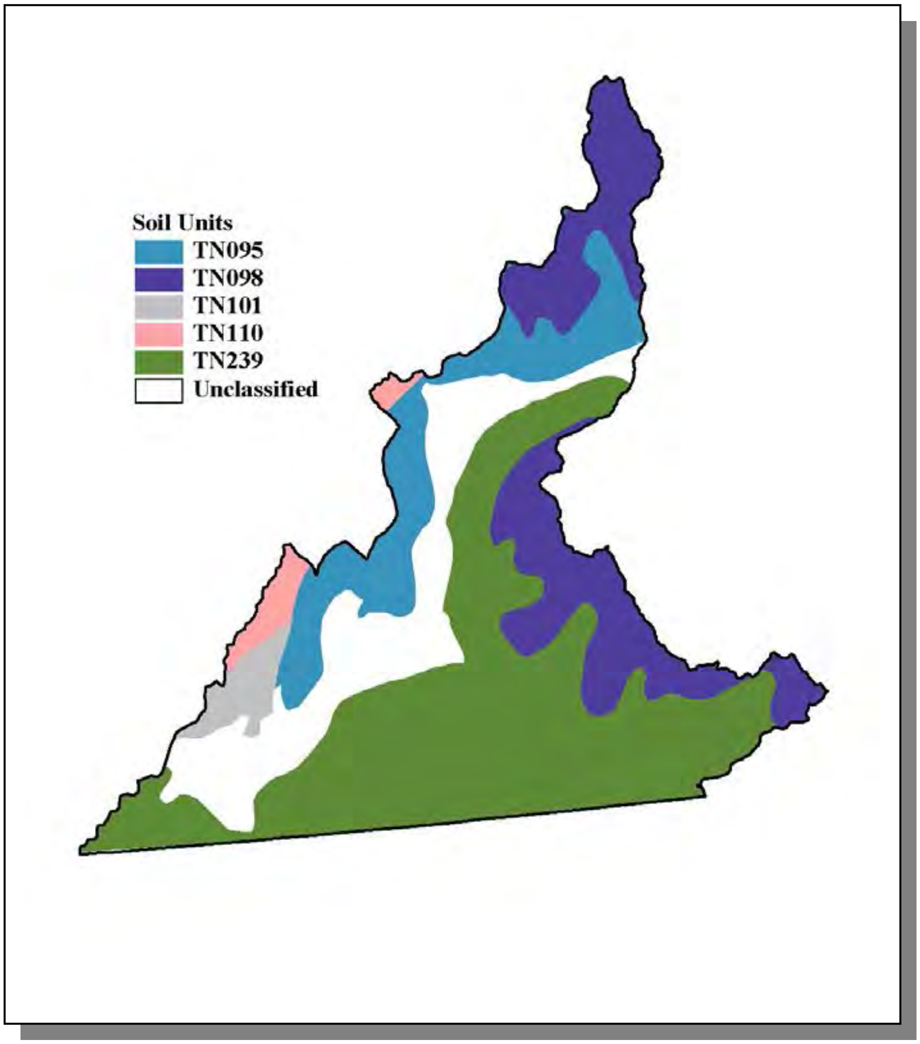


Figure 4-64. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010507.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN101	0.00	B	1.71	5.39	Loam	0.35
TN110	0.00	B	2.22	4.96	Loam	0.31
TN239	2.00	C	2.94	4.86	Loam	0.22

Table 4-51. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010507. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Hamilton	285,536	294,865	307,896	0.13	364	376	392	7.7
Marion	24,860	26,674	27,776	8.07	2,006	2,152	2,241	11.7
Total	**310,396**	**321,539**	**335,672**		**2,370**	**2,528**	**2,633**	**11.1**

Table 4-52. Population Estimates in Subwatershed 060200010507.

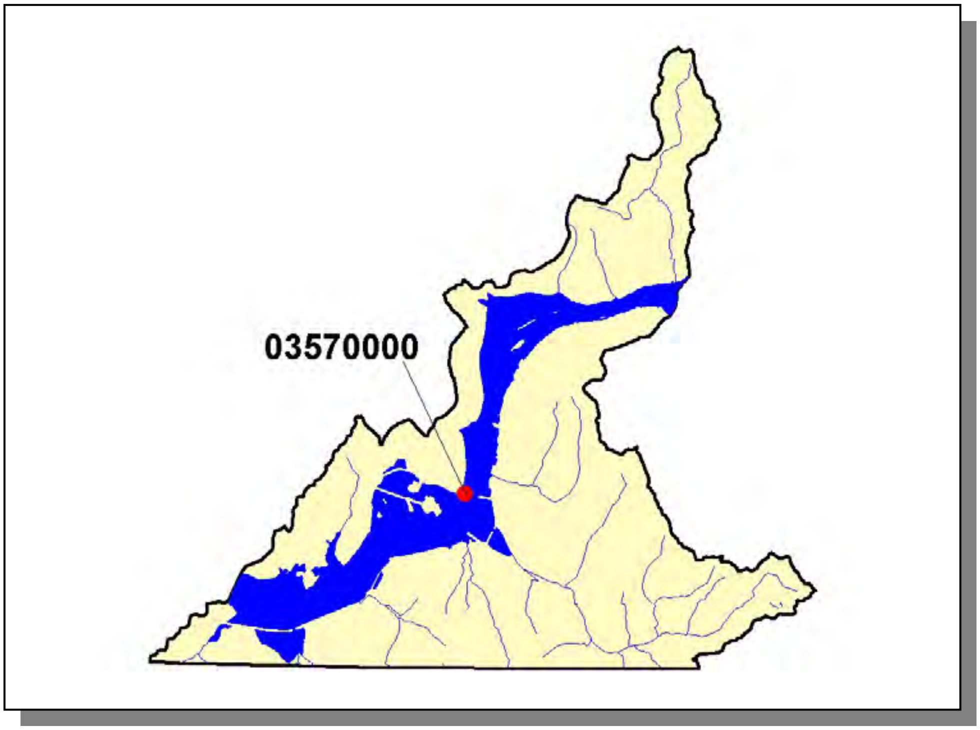


Figure 4-65. Location of Historical Streamflow Data Collection Sites in Subwatershed 060200010507. *More information is provided in Appendix IV.*

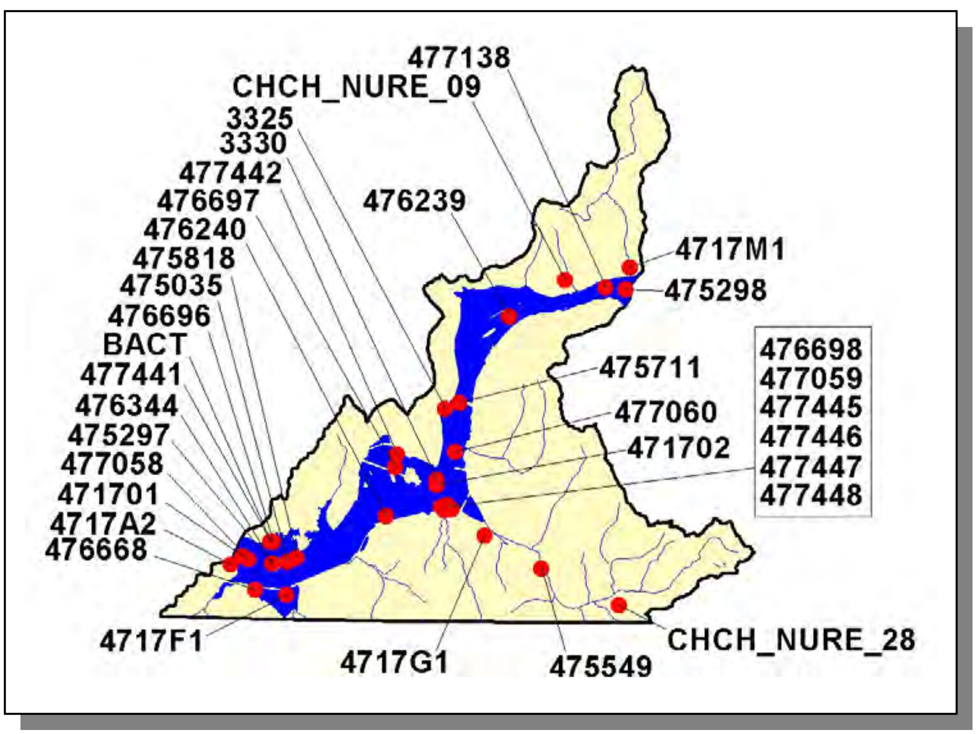


Figure 4-66. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200010507. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.A.vii.a. Point Source Contributions.

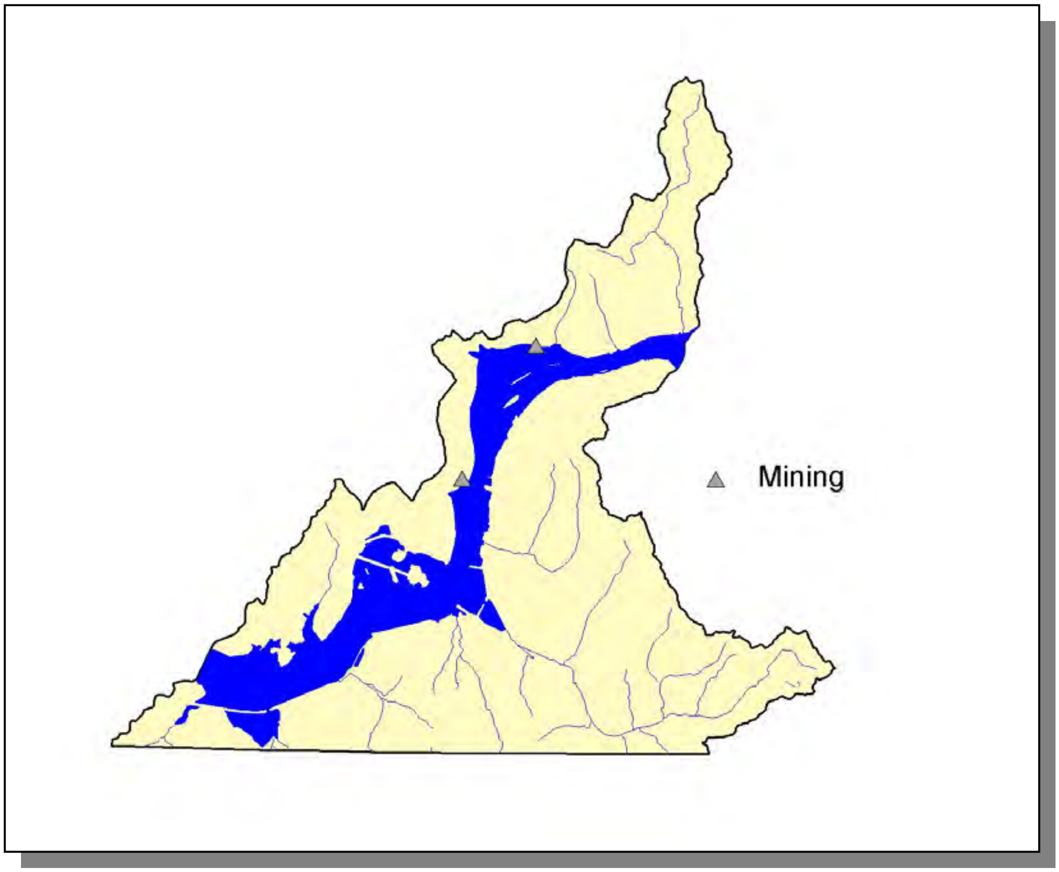


Figure 4-67. Location of Permits Issued in Subwatershed 060200010507. More information, including the names of facilities, is provided in Appendix IV.

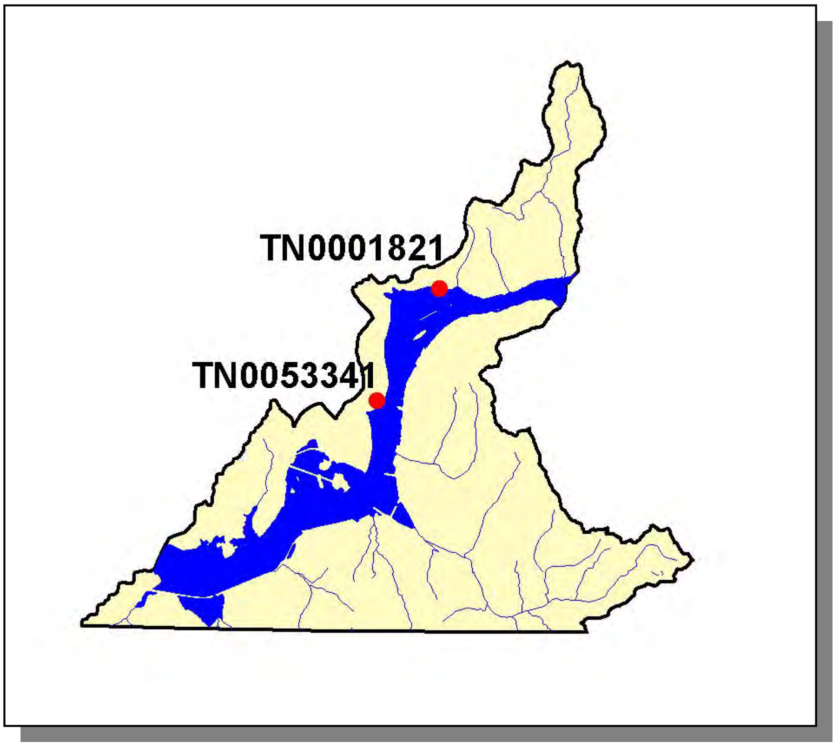


Figure 4-68. Location of Active Mining Sites in Subwatershed 060200010507. *More information, including the names of mining operations, is provided in Appendix IV.*

4.2.A.viii.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS				
Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Hogs
91	184	6	81,376	6

Table 4-53. Summary of Livestock Count Estimates in Subwatershed 060200010507. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Hamilton	6,913	14,734	801	30	934,564	1,017	109
Marion	4,424	8,939	311	246	3,782,097	279	0

Table 4-54. Summary of Livestock Count Estimates in Hamilton and Marion Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

CROPS	TONS/ACRE/YEAR
Legumes (Pastureland)	0.07
Grass (Pastureland)	0.59
Grass (Hayland)	0.84
Legumes, Grass (Hayland)	0.20
Grass, Forbs, Legumes (Mixed Pasture)	0.29
Corn (Row Crops)	3.58
Potatoes (Row Crops)	5.26
Soybeans (Row Crops)	4.51
Oats (Close Grown Cropland)	3.13
Wheat (Close-Grown Cropland)	3.14
All Other Close-Grown Cropland	1.99
Other (Horticultural)	0.29
Other Vegetable and Truck Crops	7.28
Other Cropland not Planted	1.26
Farmsteads and Ranch Headquarters	0.18

Table 4-55. Annual Estimated Total Soil Loss in Subwatershed 060200010507.

4.2.B. 0602000107.

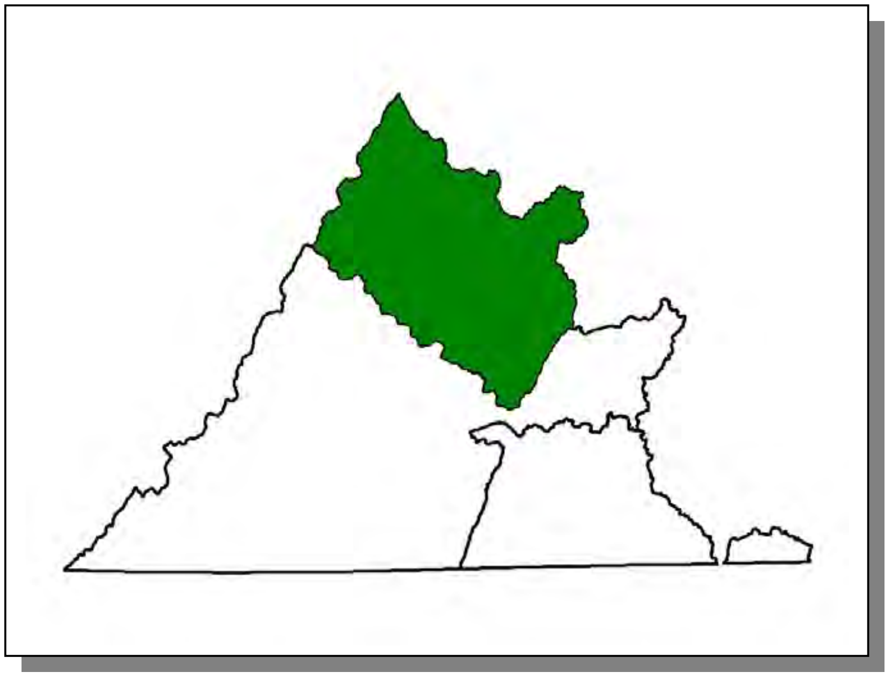


Figure 4-69. Location of Subwatershed 0602000107. *All Group 4 Lower Tennessee River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.B.i. 060200010701 (Upper North Chickamauga Creek).

Figure 4-70. Location of Subwatershed 060200010701. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

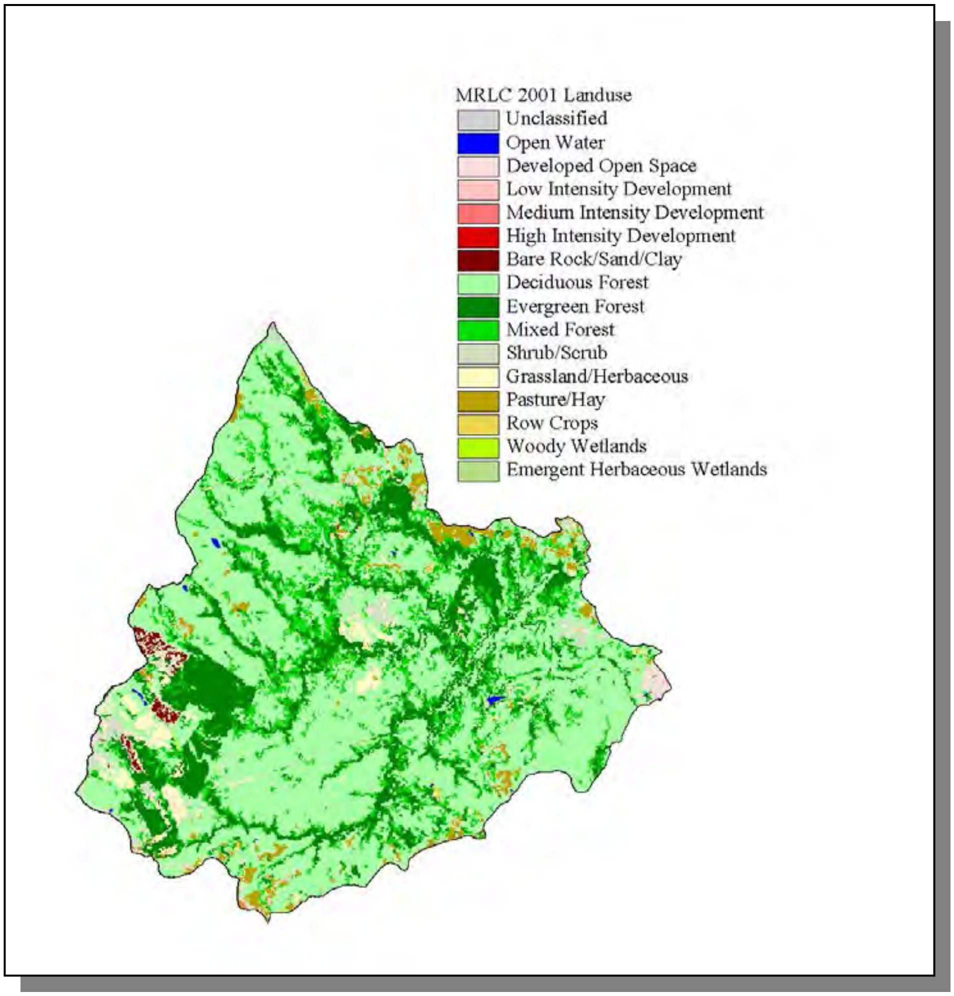


Figure 4-71. Illustration of Land Use Distribution in Subwatershed 060200010701.

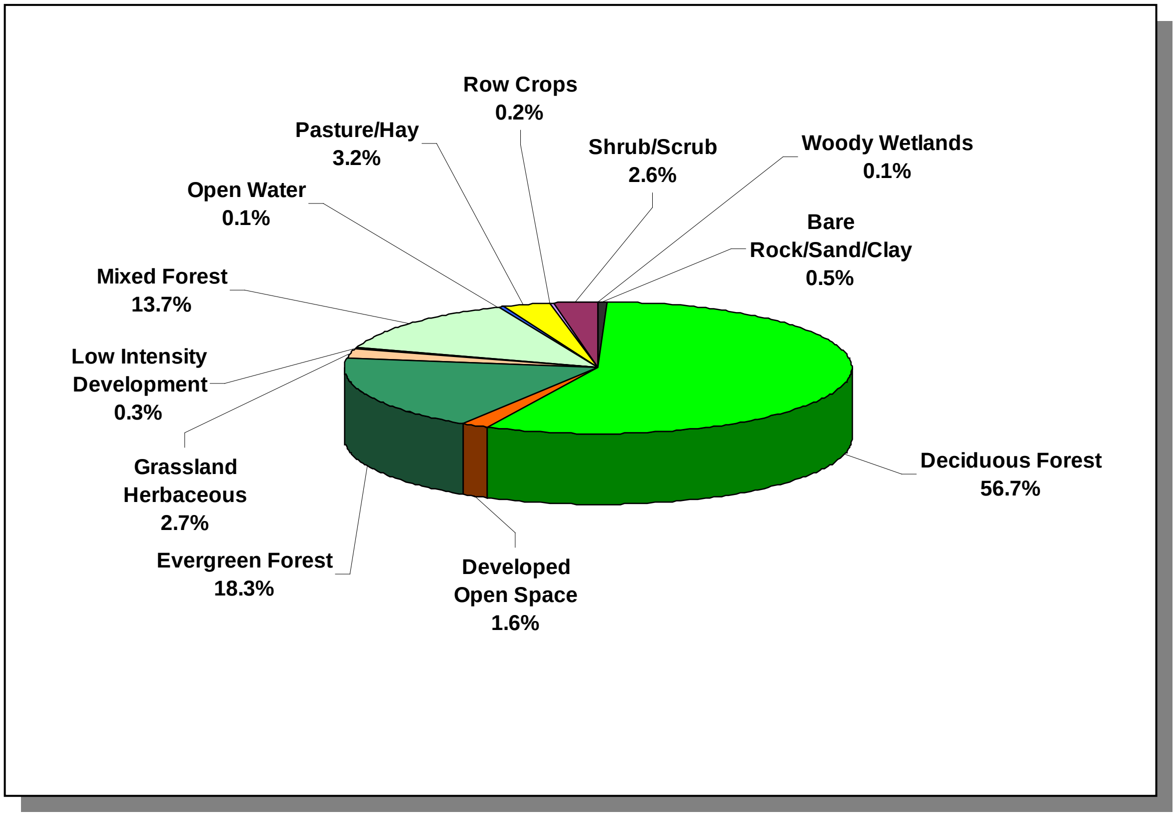


Figure 4-72. Land Use Distribution in Subwatershed 060200010701. *More information is provided in Appendix IV.*

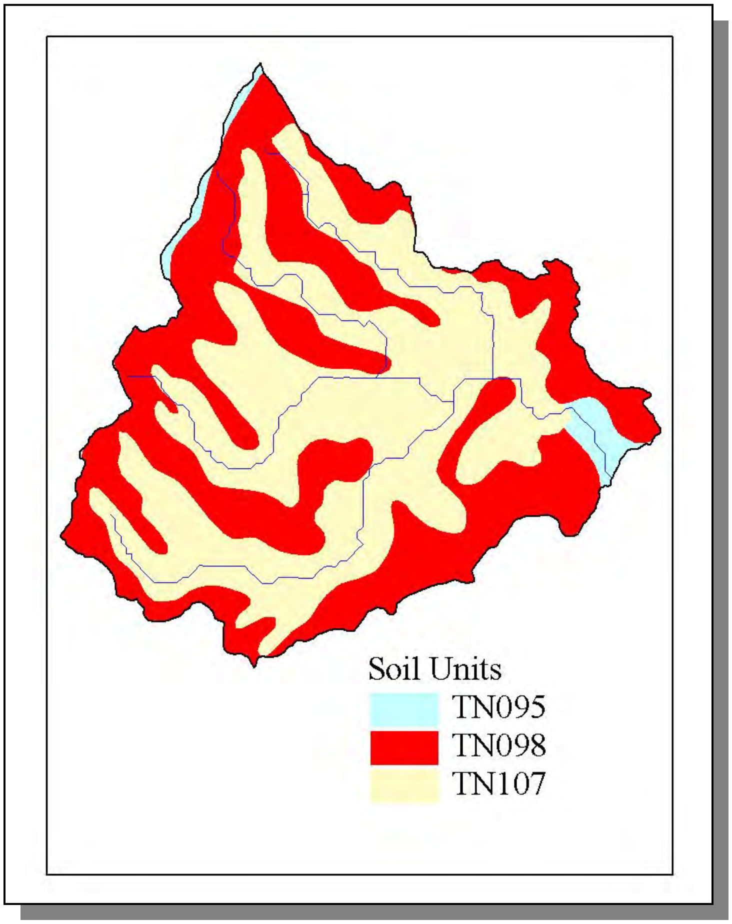


Figure 4-73. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010701.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28

Table 4-56. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010701. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Hamilton	285,536	294,865	307,896	4.00	11,424	11,797	12,318	7.8
Marion	24,860	26,674	27,776	0.07	17	18	19	11.8
Sequatchie	8,863	10,119	11,370	14.22	1,261	1,439	1,617	28.2
Total	**319,259**	**331,658**	**347,042**		**12,702**	**13,254**	**13,954**	**9.9**

Table 4-57. Population Estimates in Subwatershed 060200010701.

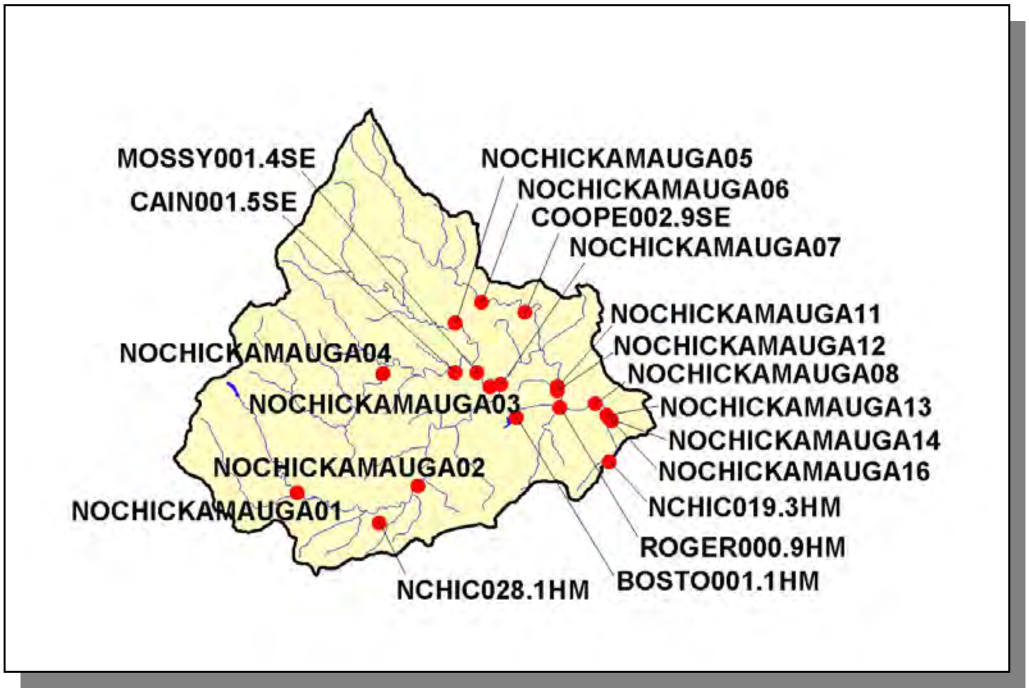


Figure 4-74. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200010701. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.B.i.a. Point Source Contributions.

There are no point sources in this subwatershed.

4.2.B.i.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Hogs	Sheep
138	322	13	38,018	7	<5

Table 4-58. Summary of Livestock Count Estimates in Subwatershed 060200010701. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Hamilton	6,913	14,734	801	30	934,564	1,017	109
Marion	4,424	8,939	311	246	3,782,097	279	0
Sequatchie	2,763	6,739	221	6	960,000	0	221

Table 4-59. Summary of Livestock Count Estimates in Hamilton, Marion, and Sequatchie Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

CROPS	TONS/ACRE/YEAR
Legumes (Pastureland)	0.07
Grass (Pastureland)	0.80
Grass (Hayland)	1.19
Legumes, Grass (Hayland)	0.21
Grass, Forbs, Legumes (Mixed Pasture)	0.80
Corn (Row Crops)	3.56
Soybeans (Row Crops)	4.56
Oats (Close Grown Cropland)	3.13
Wheat (Close-Grown Cropland)	3.14
All Other Close-Grown Cropland	1.99
Other (Horticultural)	0.29
Other Vegetable and Truck Crops	7.28
Farmsteads and Ranch Headquarters	0.11

Table 4-60. Annual Estimated Total Soil Loss in Subwatershed 060200010701.

4.2.B.ii. 060200010702 (Lower North Chickamauga Creek).

Figure 4-75. Location of Subwatershed 060200010702. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

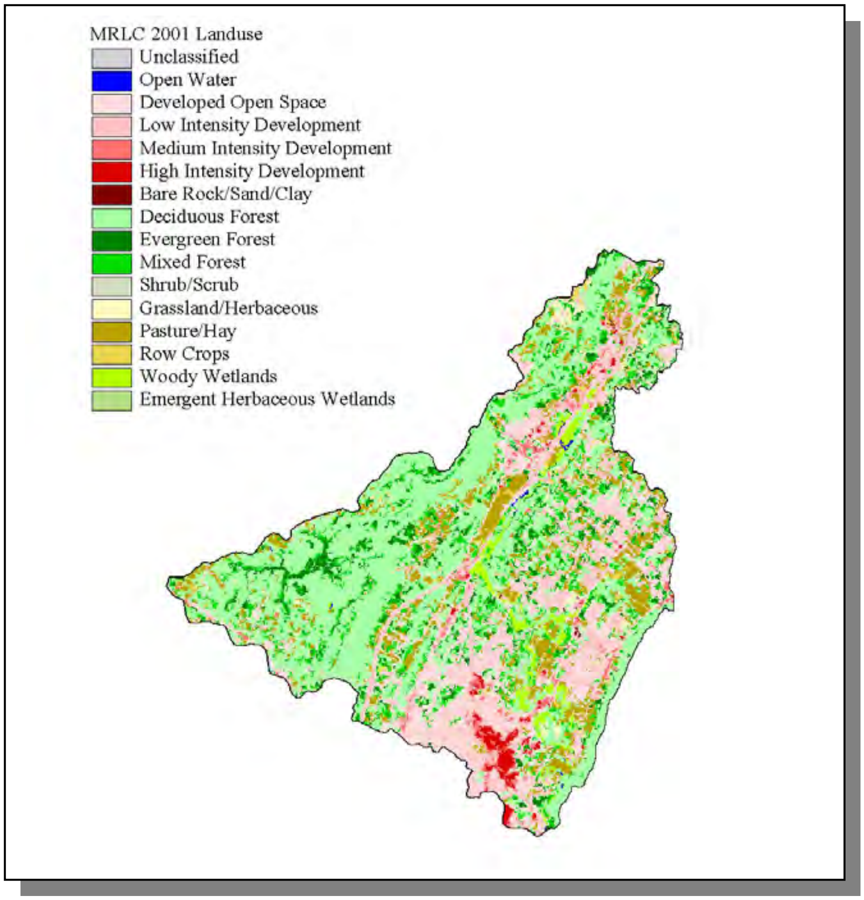


Figure 4-76. Illustration of Land Use Distribution in Subwatershed 060200010702.

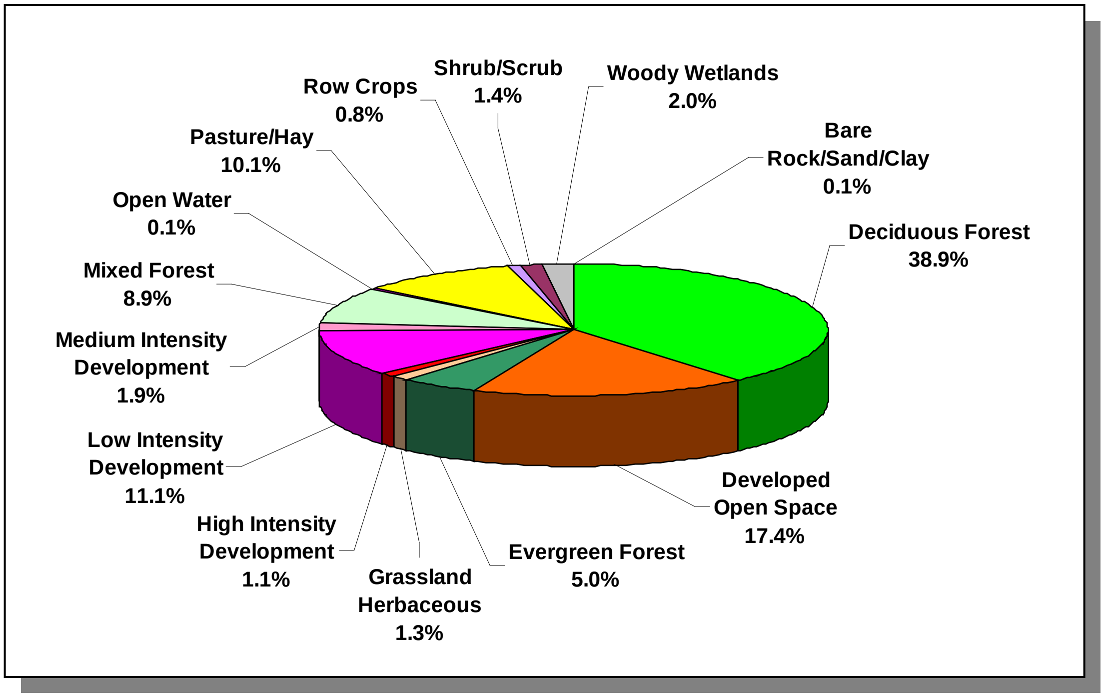


Figure 4-77. Land Use Distribution in Subwatershed 060200010702. *More information is provided in Appendix IV.*

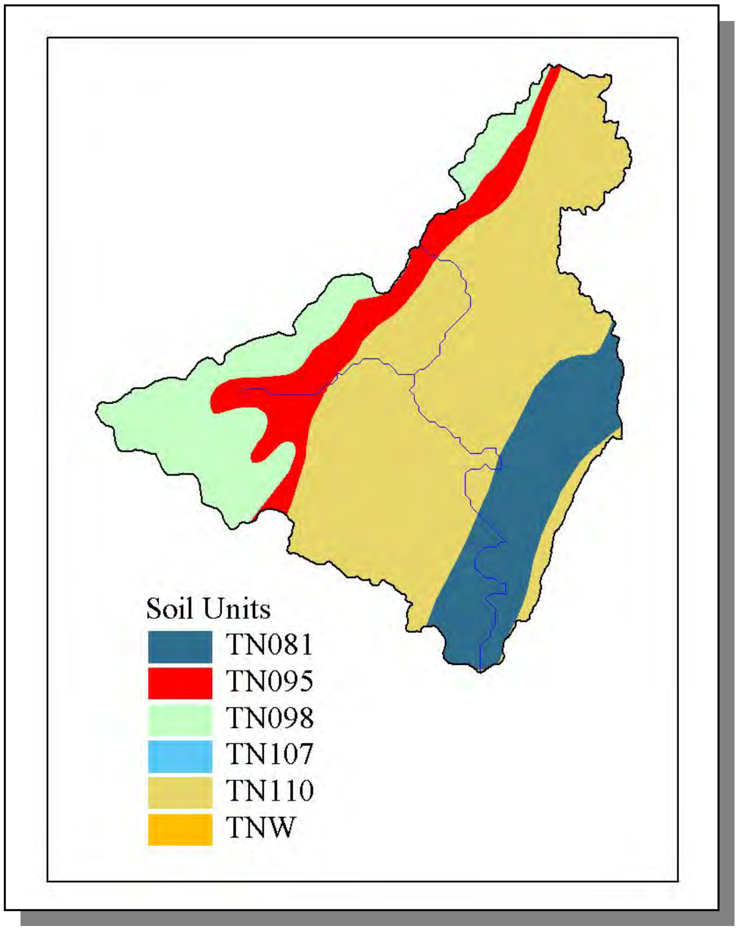


Figure 4-78. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010702.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN081	5.00	C	1.41	5.48	Silty Loam	0.35
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28
TN110	0.00	B	2.22	4.96	Loam	0.31

Table 4-61. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010702. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Hamilton	285,536	294,865	307,896	9.81	28,003	28,918	30,196	7.8

Table 4-62. Population Estimates in Subwatershed 060200010702.

Figure 4-79. Location of Historical Streamflow Data Collection Sites in Subwatershed 060200010702. *More information is provided in Appendix IV.*

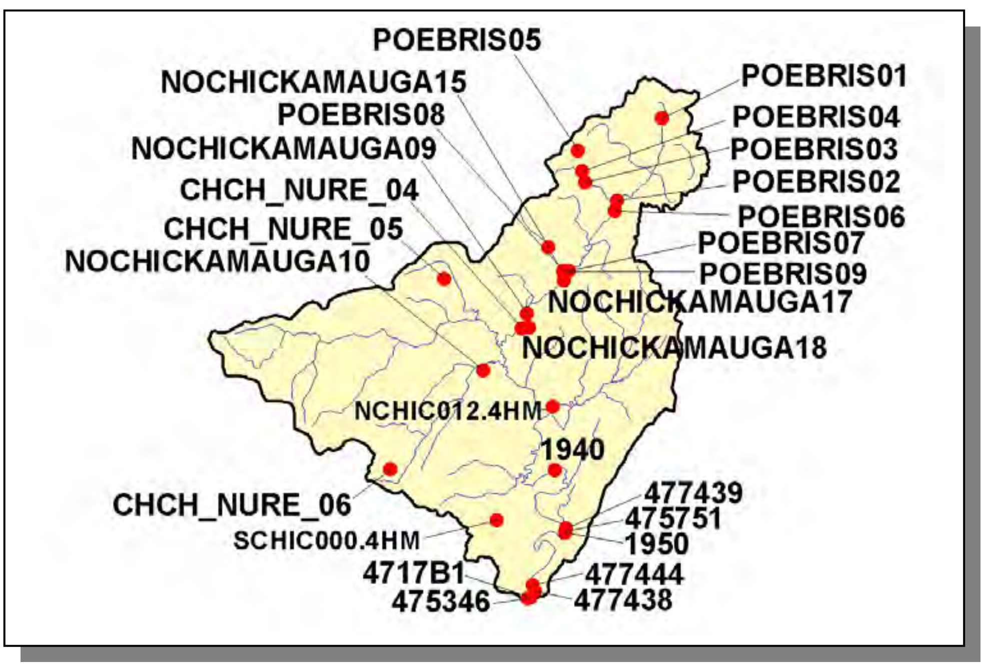


Figure 4-80. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200010702. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.B.ii.a. Point Source Contributions.

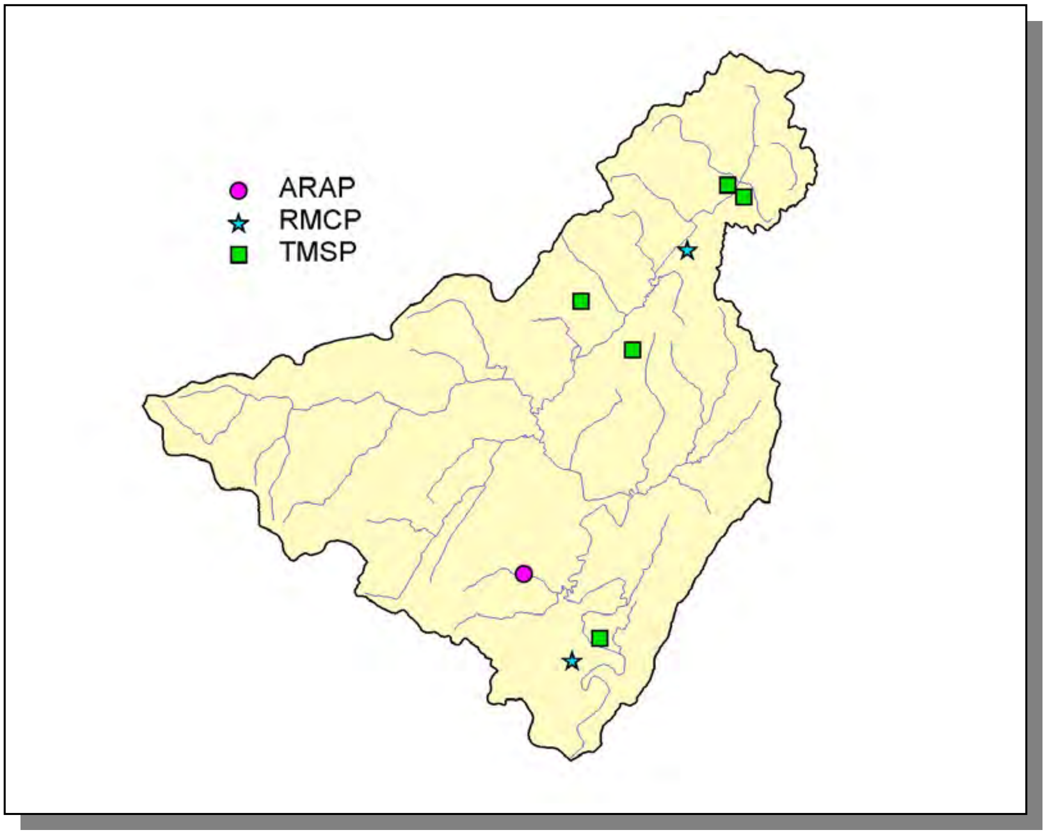


Figure 4-81. Location of Permits Issued in Subwatershed 060200010702. *More information, including the names of facilities, is provided in Appendix IV.*

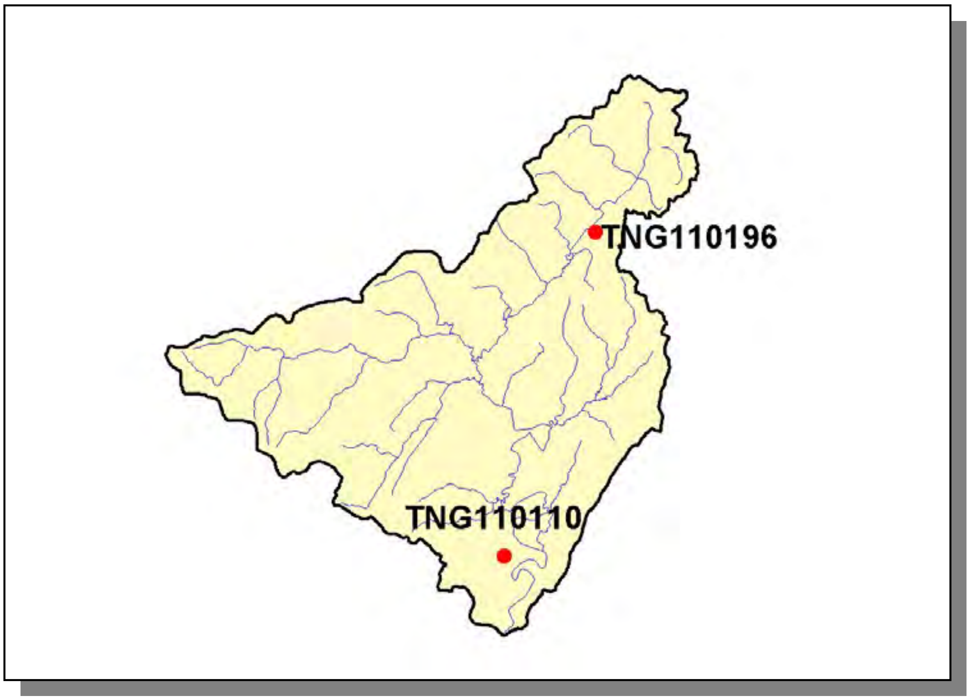


Figure 4-82. Location of Ready Mix Concrete Plants (RMCP) in Subwatershed 060200010702. *More information is provided in Appendix IV.*

Figure 4-83. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 060200010702. *More information is provided in Appendix IV.*

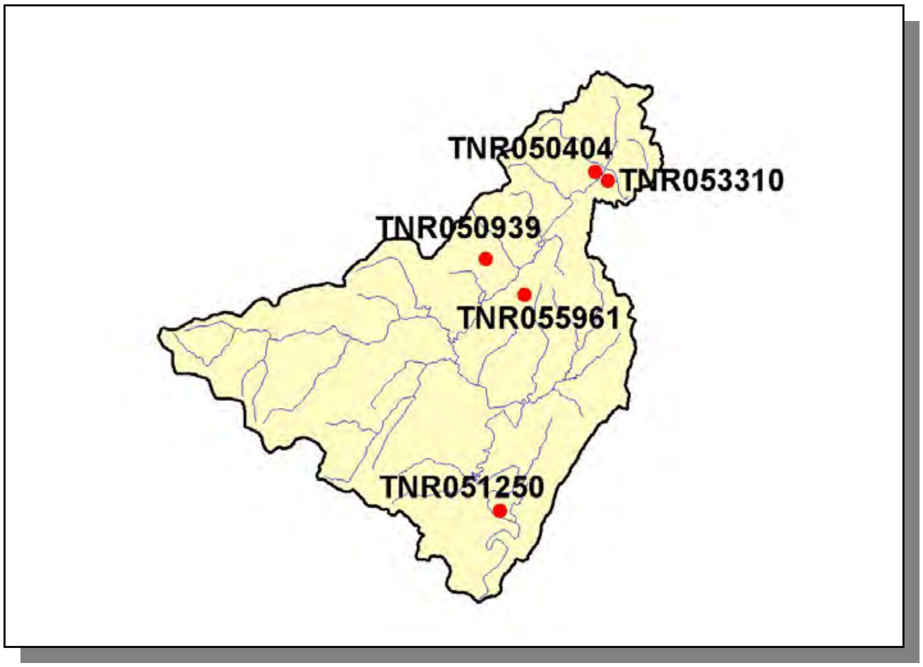


Figure 4-84. Location of TMSP Sites in Subwatershed 060200010702. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.B.ii.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
576	1,227	67	<5	77,850	85	9

Table 4-63. Summary of Livestock Count Estimates in Subwatershed 060200010702. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Hamilton	6,913	14,734	801	30	934,564	1,017	109

Table 4-64. Summary of Livestock Count Estimates in Hamilton County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Hamilton	210.7	210.7	2.2	6.0

Table 4-65. Forest Acreage and Annual Removal Rates (1987-1994) in Hamilton County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.34
Grass (Hayland)	2.33
Legumes, Grass (Hayland)	0.20
Legumes (Pastureland)	0.07
Grass, Forbs, Legumes (Mixed Pasture)	0.27
Corn (Row Crops)	5.28
Oats (Close-Grown Cropland)	3.13
Wheat (Close-Grown Cropland)	3.14
All Other Close-Grown Cropland	1.99
Farmsteads and Ranch Headquarters	0.10

Table 4-66. Annual Estimated Total Soil Loss in Subwatershed 060200010702.

4.2.C. 0602000108

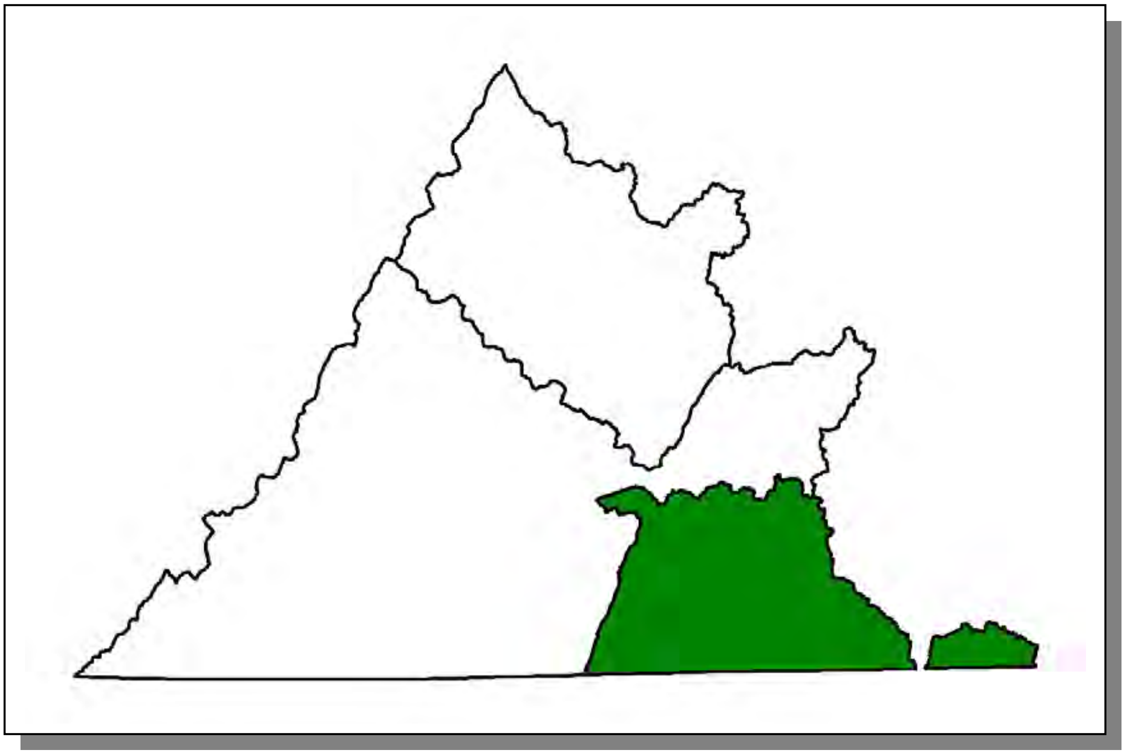


Figure 4-85. Location of Subwatershed 0602000108. *All Group 4 Lower Tennessee River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.C.i. 060200010801 (East Chickamauga Creek).

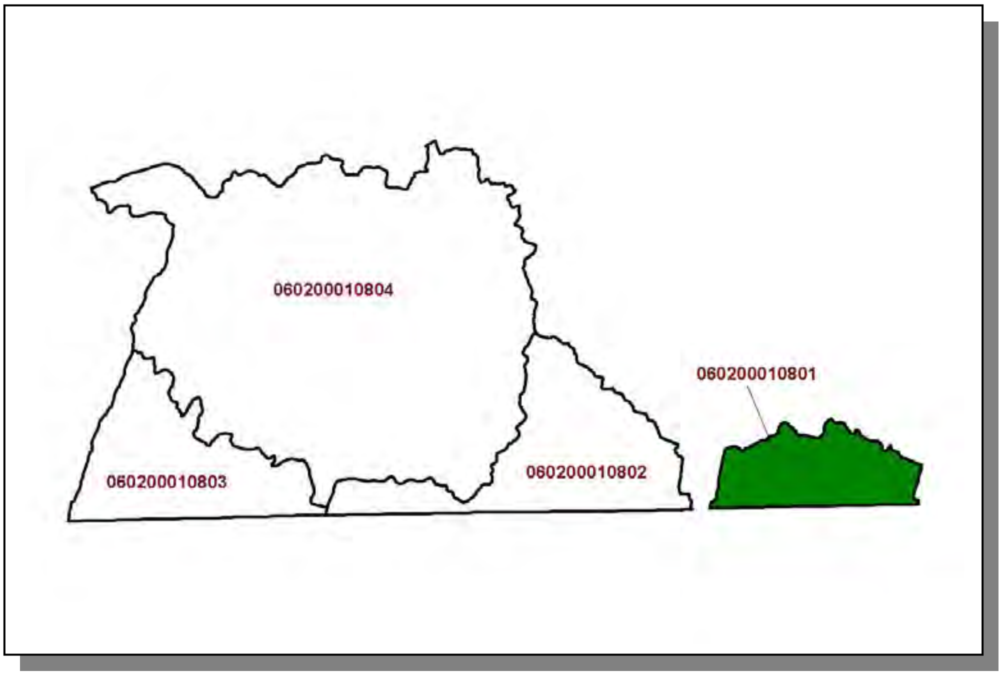


Figure 4-86. Location of Subwatershed 060200010801. *Group 4 Lower Tennessee River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

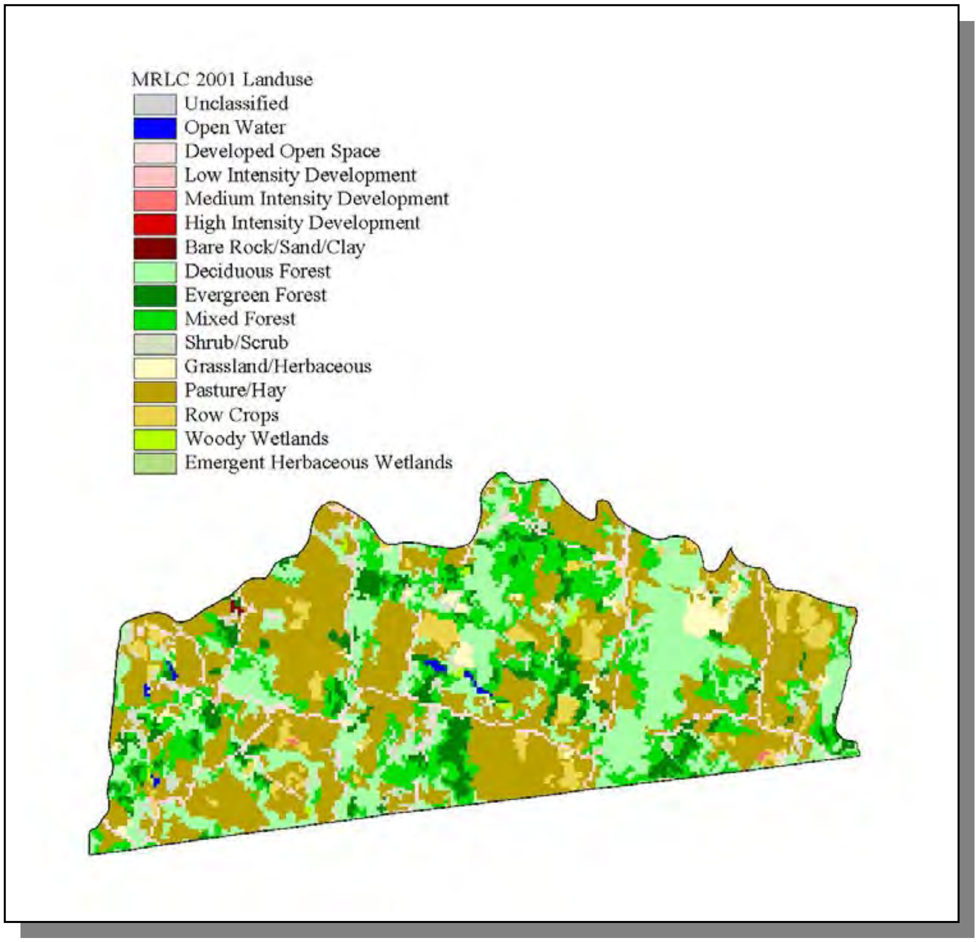


Figure 4-87. Illustration of Land Use Distribution in Subwatershed 060200010801.

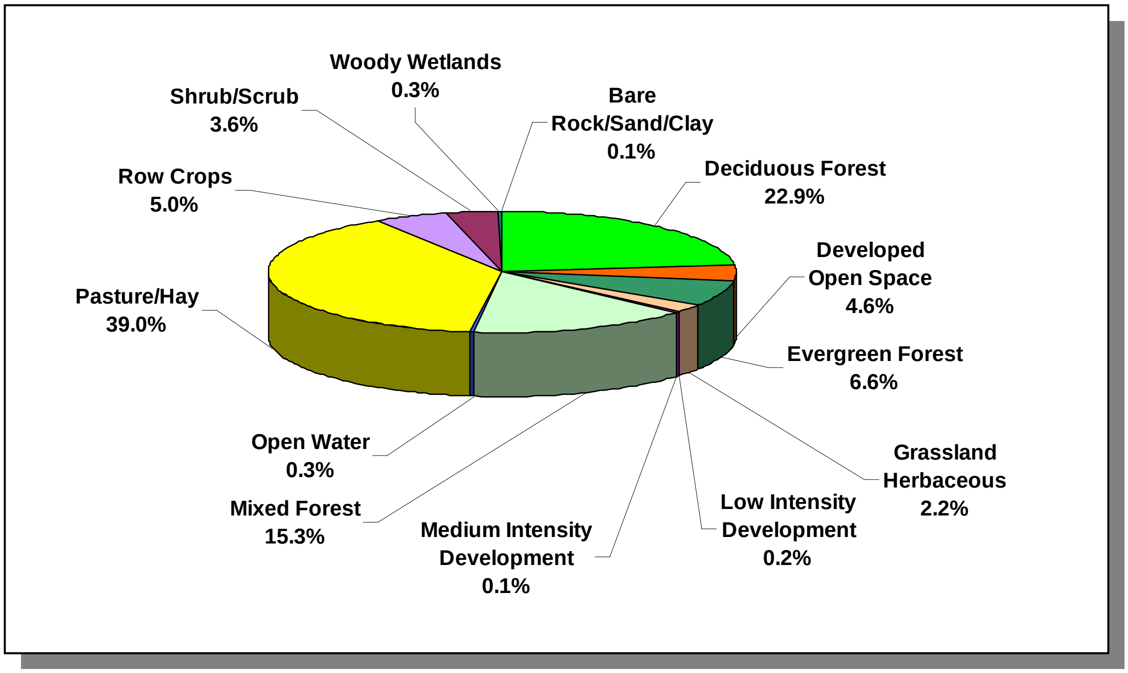


Figure 4-88. Land Use Distribution in Subwatershed 060200010801. *More information is provided in Appendix IV.*

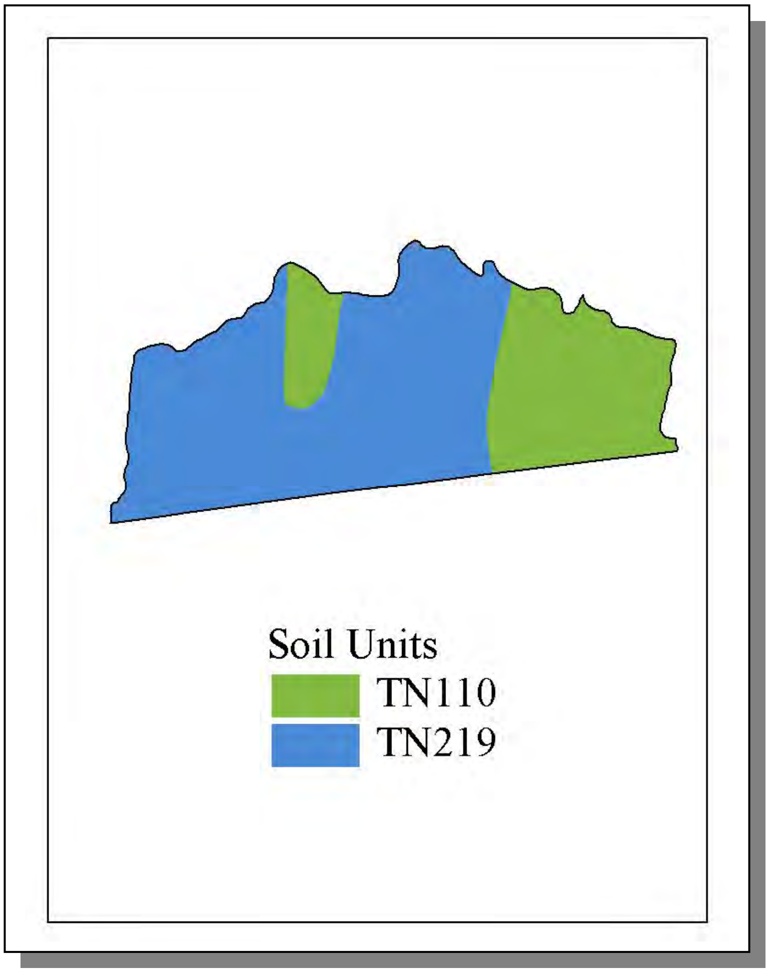


Figure 4-89. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010801.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN110	0.00	B	2.22	4.96	Loam	0.31
TN219	0.00	C	1.35	4.95	Loam	0.33

Table 4-67. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010801. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Bradley	73,712	80,800	87,965	0.23	170	187	203	19.4
Hamilton	285,536	294,865	307,896	0.67	1,912	1,975	2,062	7.8
Total	**359,248**	**375,665**	**395,861**		**2,082**	**2,162**	**2,265**	**8.8**

Table 4-68. Population Estimates in Subwatershed 060200010801.

4.2.C.i.a. Point Source Contributions.

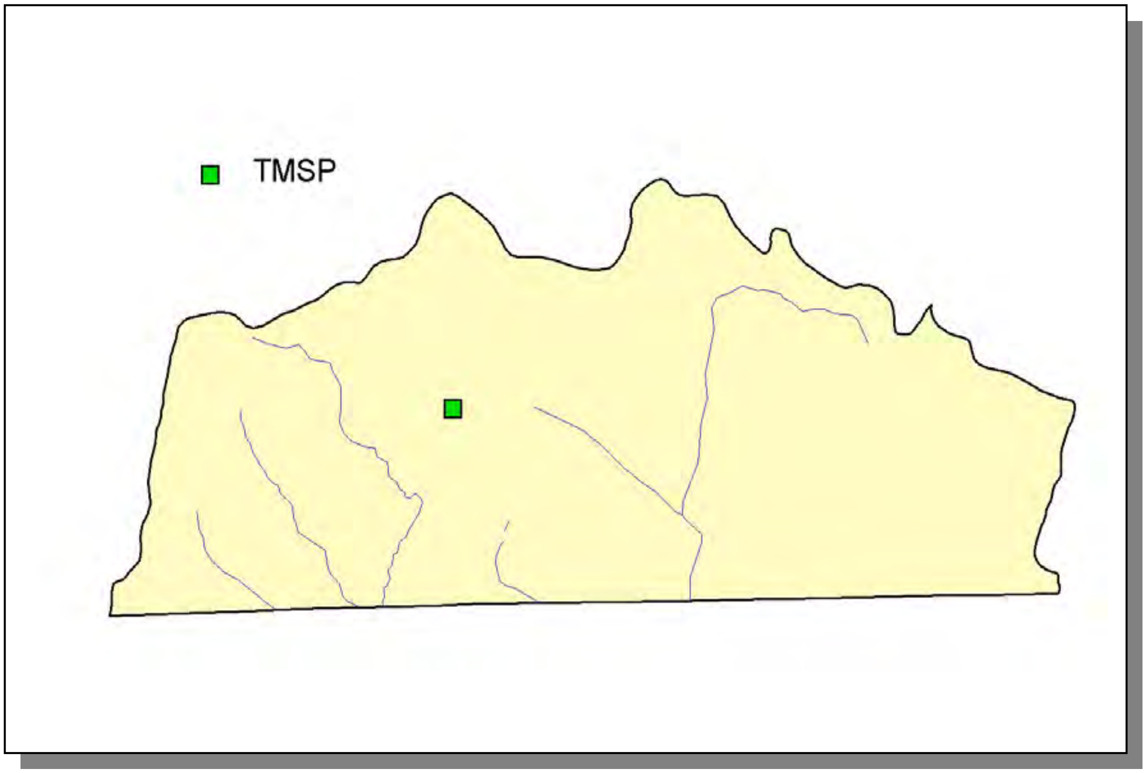


Figure 4-90. Location of Permits Issued in Subwatershed 060200010801. *More information, including the names of facilities, is provided in Appendix IV.*

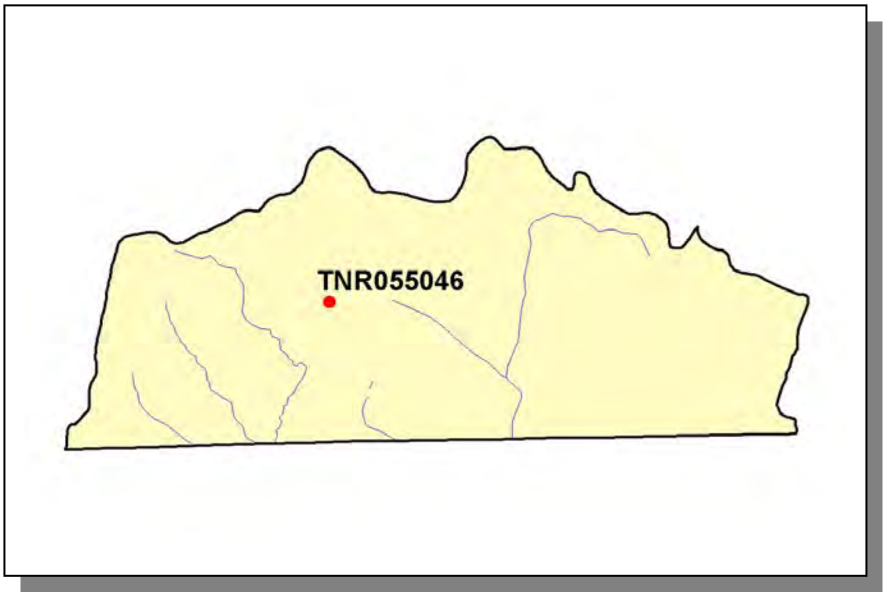


Figure 4-91. Location of TMSP Sites in Subwatershed 060200010801. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.C.i.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
207	471	35	<5	248,802	25	<5

Table 4-69. Summary of Livestock Count Estimates in Subwatershed 060200010801. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Bradley	10,876	30,454	3,856	265,577	21,279,814	253	129
Hamilton	6,913	14,734	801	30	934,564	1,017	109

Table 4-70. Summary of Livestock Count Estimates in Bradley and Hamilton Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Bradley	92.5	92.5	8.2	18.1
Hamilton	210.7	210.7	2.2	6.0

Table 4-71. Forest Acreage and Annual Removal Rates (1987-1994) in Bradley and Hamilton Counties.

CROPS	TONS/ACRE/YEAR
Legumes (Pastureland)	0.07
Grass (Pastureland)	0.32
Grass (Hayland)	1.54
Legumes, Grass (Hayland)	0.19
Grass, Forbs, Legumes (Mixed Pasture)	0.38
Corn (Row Crops)	5.28
Soybeans (Row Crops)	7.38
Oats (Close-Grown Cropland)	3.13
Wheat (Close-Grown Cropland)	3.14
All Other Close-Grown Cropland	1.99
Other Cropland not Planted	0.48
Conservation Reserve Program Lands	0.27
Other Land in Farms	0.60
Farmsteads and Ranch Headquarters	0.46

Table 4-72. Annual Estimated Total Soil Loss in Subwatershed 060200010801.

4.2.C.ii. 060200010802 (Little Chickamauga Creek).

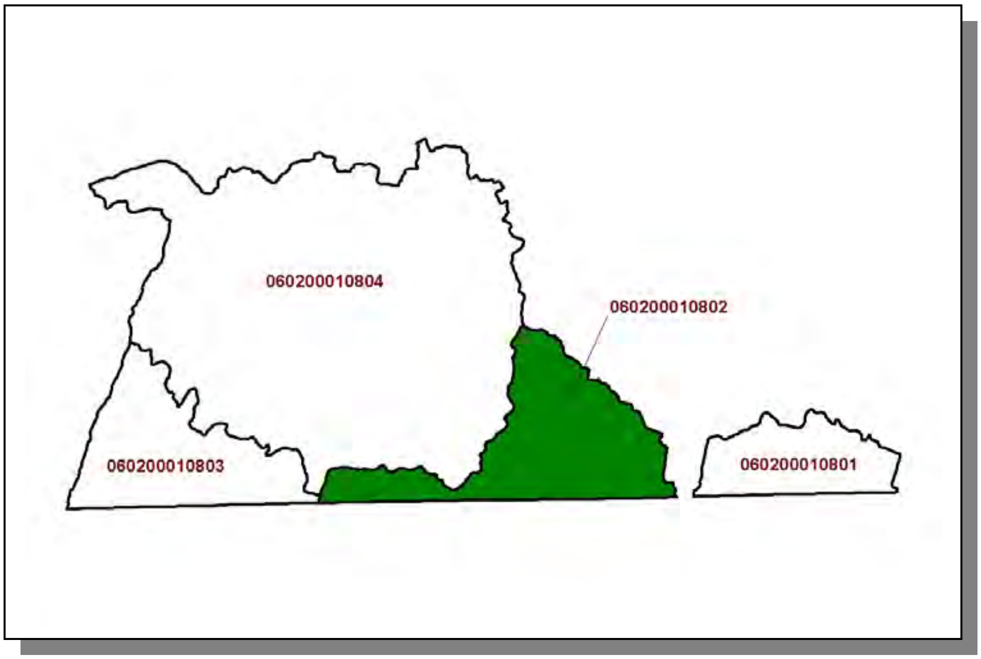


Figure 4-92. Location of Subwatershed 060200010802. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

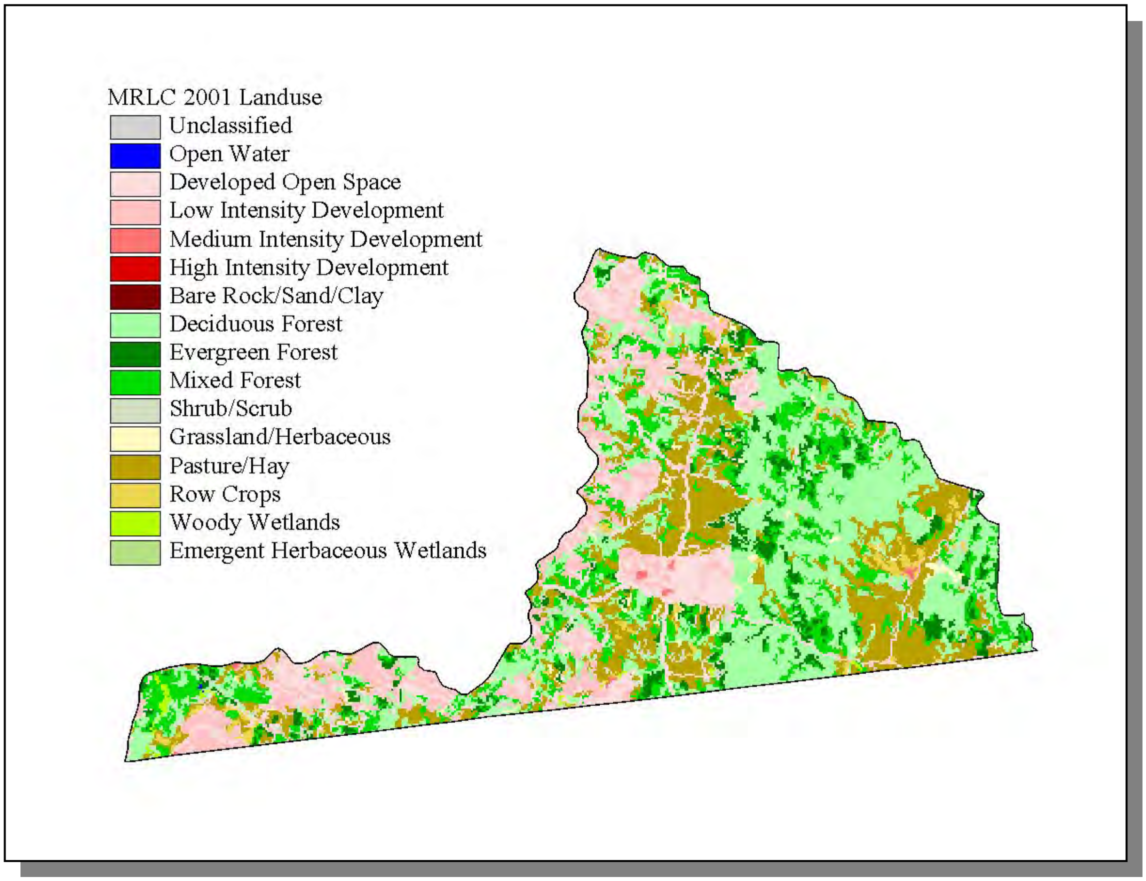


Figure 4-93. Illustration of Land Use Distribution in Subwatershed 060200010802.

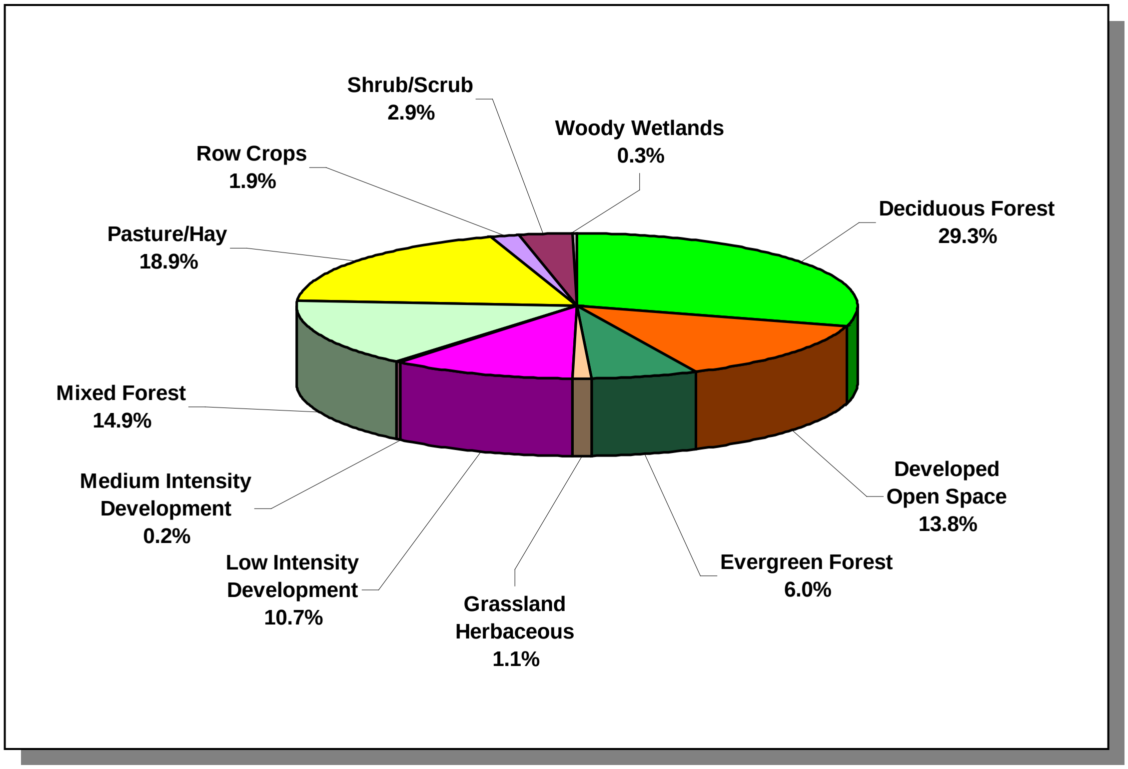


Figure 4-94. Land Use Distribution in Subwatershed 060200010802. *More information is provided in Appendix IV.*

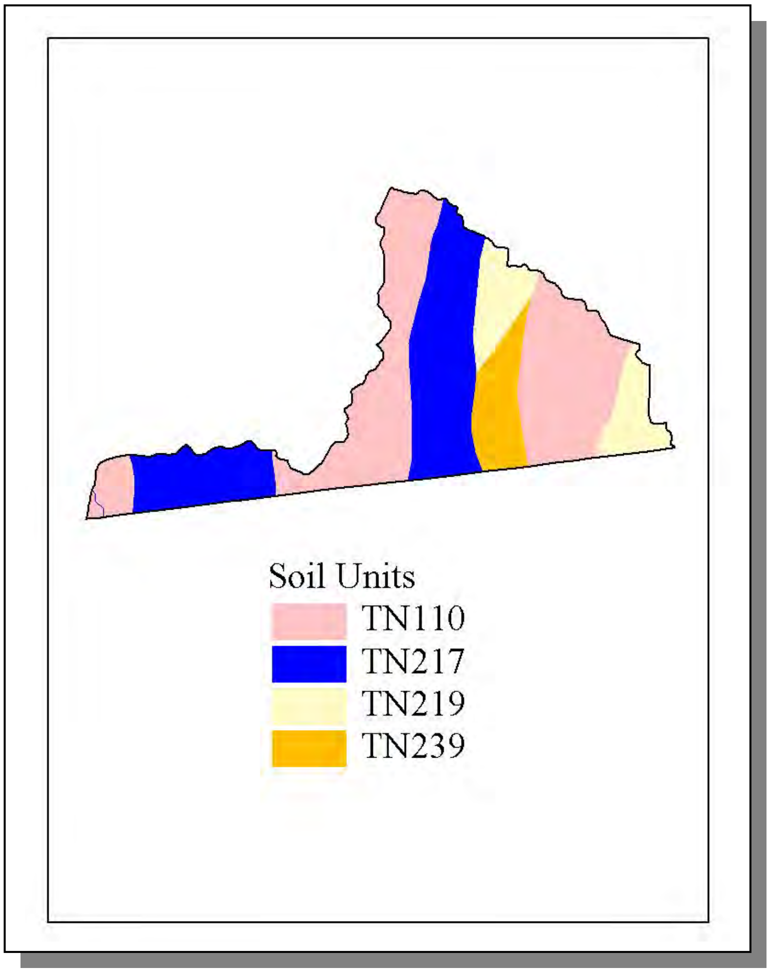


Figure 4-95. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010802.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN110	0.00	B	2.22	4.96	Loam	0.31
TN217	0.00	C	2.34	5.32	Loam	0.35
TN219	0.00	C	1.35	4.95	Loam	0.33
TN239	2.00	C	2.94	4.86	Loam	0.22

Table 4-73. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010802. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Hamilton	285,536	294,865	307,896	1.73	4,945	5,106	5,332	7.8

Table 4-74. Population Estimates in Subwatershed 060200010802.

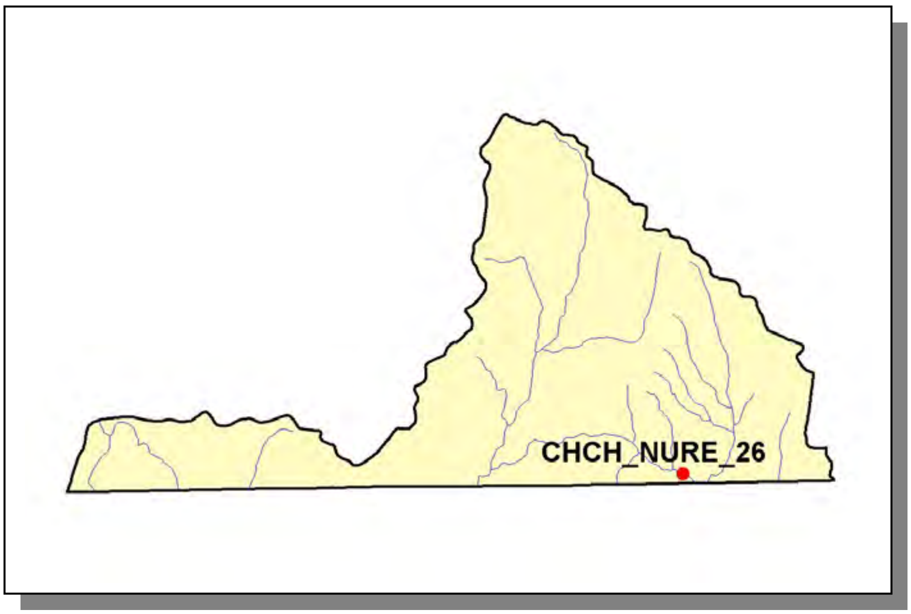


Figure 4-96. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200010802. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.C.ii.a. Point Source Contributions.

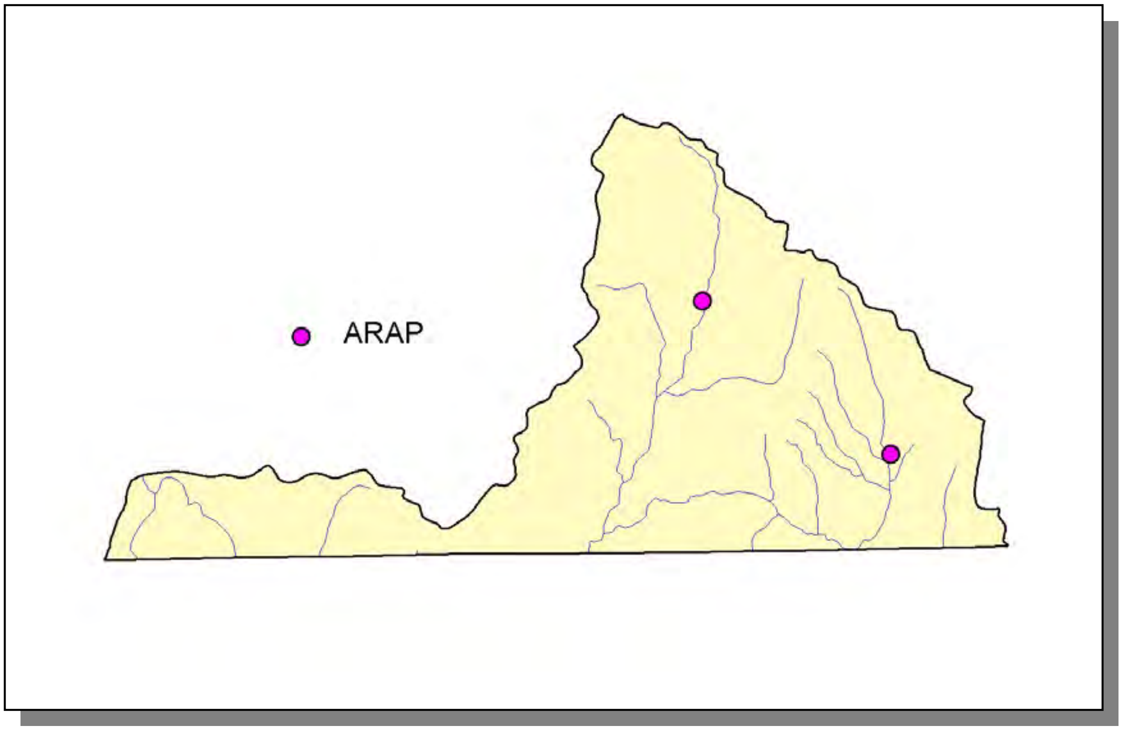


Figure 4-97. Location of Permits Issued in Subwatershed 060200010802. *More information, including the names of facilities, is provided in Appendix IV.*

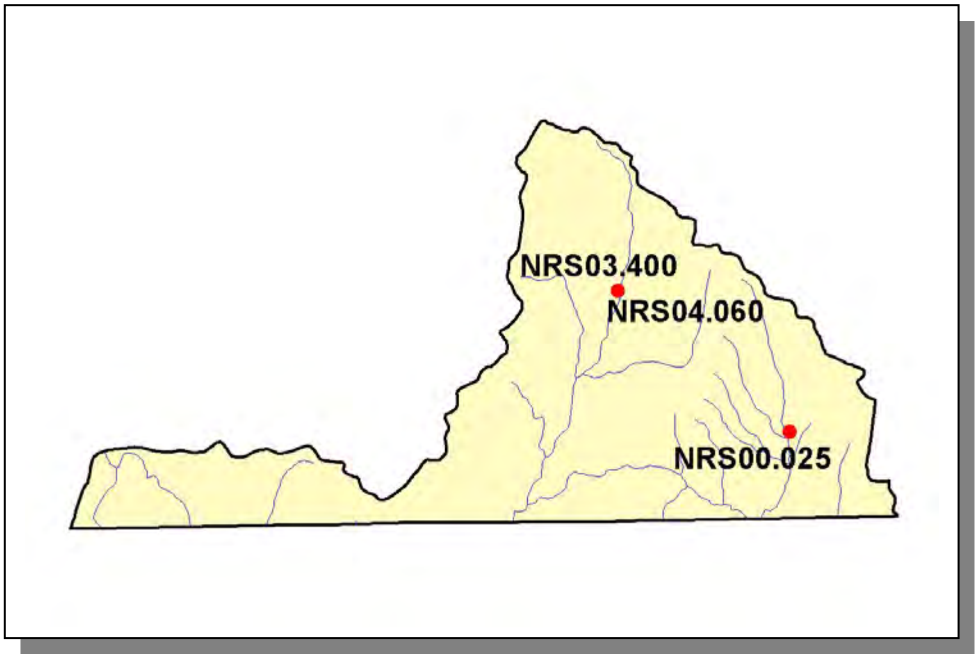


Figure 4-98. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 060200010802. *More information is provided in Appendix IV.*

4.2.C.ii.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
238	507	28	<5	165,598	35	<5

Table 4-75. Summary of Livestock Count Estimates in Subwatershed 060200010802. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Hamilton	6,913	14,734	801	30	934,564	1,017	109

Table 4-76 Summary of Livestock Count Estimates in Hamilton County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Hamilton	210.7	210.7	2.2	6.0

Table 4-77. Forest Acreage and Annual Removal Rates (1987-1994) in Hamilton County.

CROPS	TONS/ACRE/YEAR
Legumes (Pastureland)	0.07
Grass (Pastureland)	0.32
Grass (Hayland)	1.88
Legumes, Grass (Hayland)	0.20
Grass, Forbs, Legumes (Mixed Pasture)	0.27
Corn (Row Crops)	5.28
Soybeans (Row Crops)	7.48
Oats (Close-Grown Cropland)	3.13
Wheat (Close-Grown Cropland)	3.14
All Other Close-Grown Cropland	1.99
Other Cropland not Planted	0.48
Other Land in Farms	0.30
Farmsteads and Ranch Headquarters	0.31

Table 4-78. Annual Estimated Total Soil Loss in Subwatershed 060200010802.

4.2.C.iii. 060200010803 (West Chickamauga Creek).

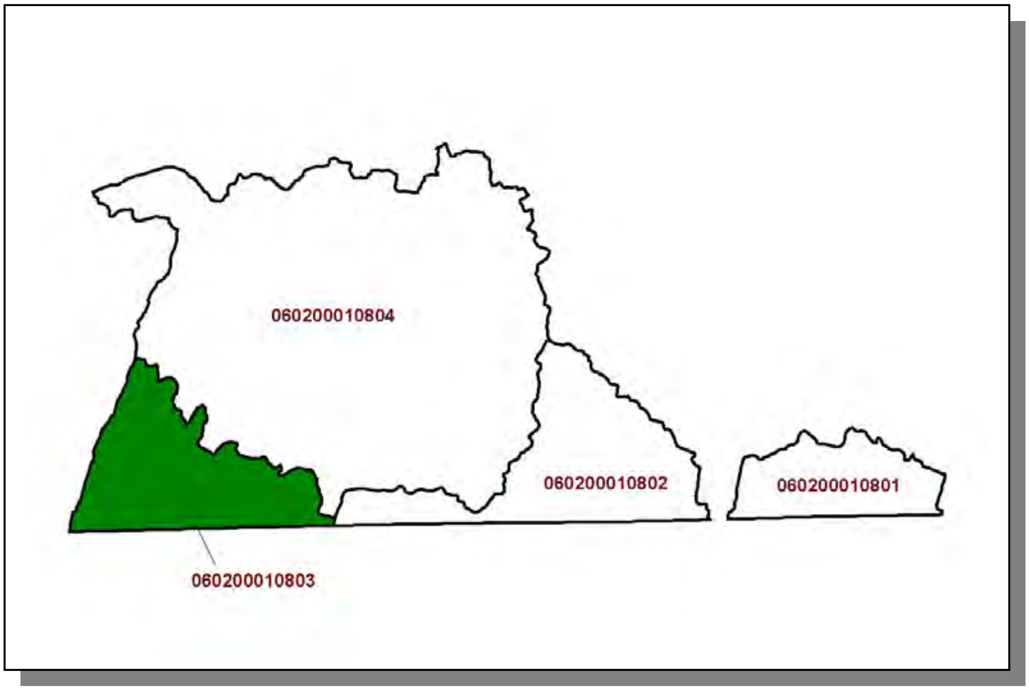


Figure 4-99. Location of Subwatershed 060200010803. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

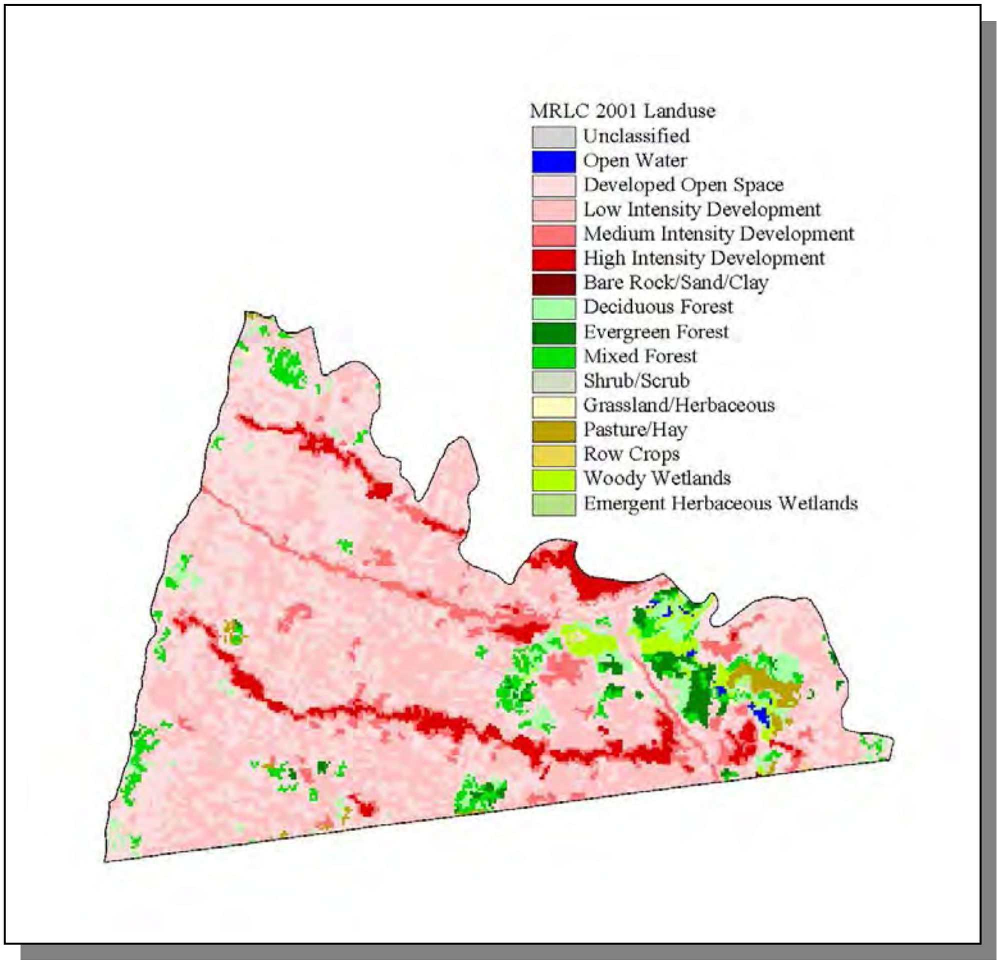


Figure 4-100. Illustration of Land Use Distribution in Subwatershed 060200010803.

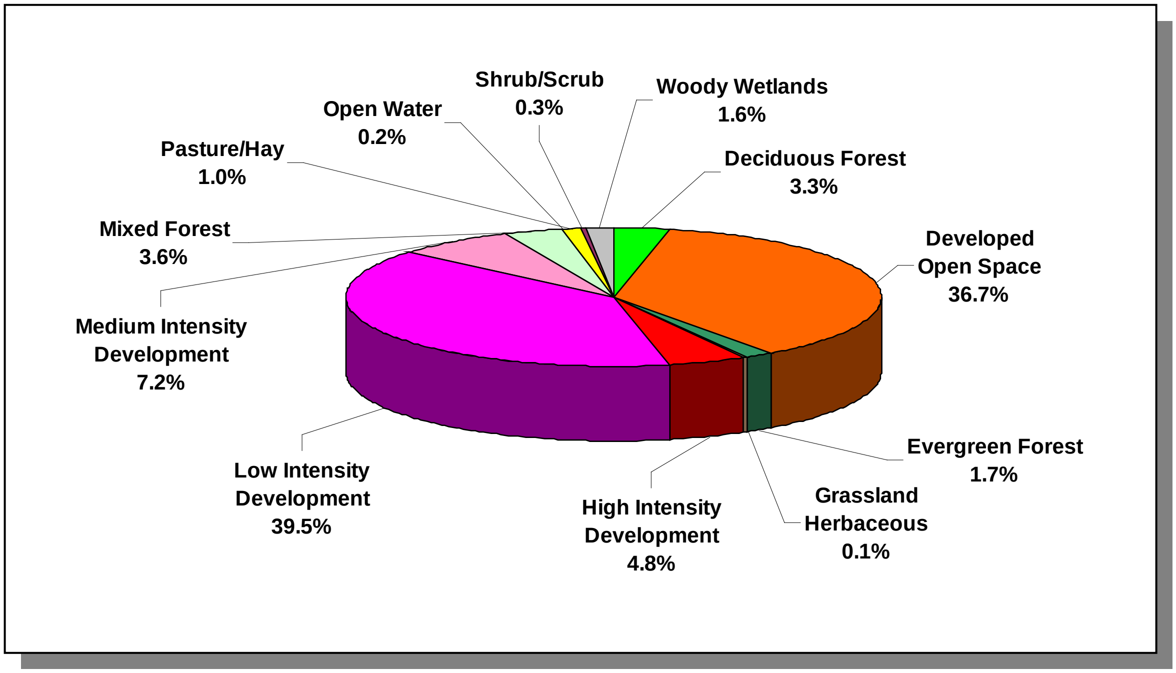


Figure 4-101. Land Use Distribution in Subwatershed 060200010803. *More information is provided in Appendix IV.*

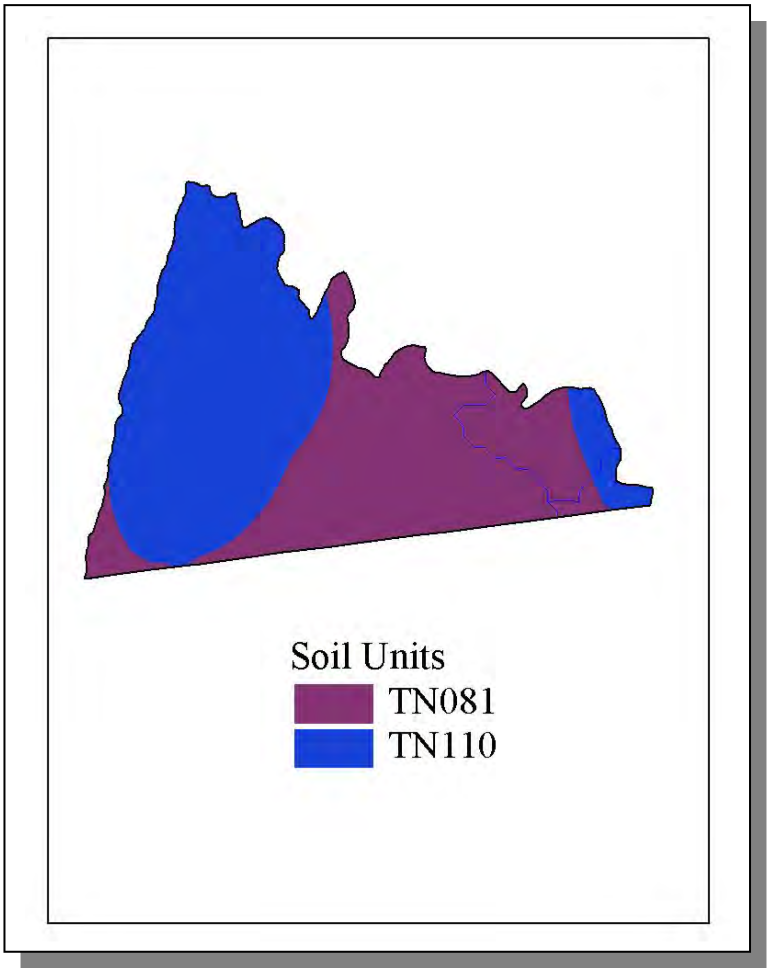


Figure 4-102. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010803.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN081	5.00	C	1.41	5.48	Silty Loam	0.35
TN110	0.00	B	2.22	4.96	Loam	0.31

Table 4-79. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010803. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Hamilton	285,536	294,865	307,896	1.53	4,360	4,503	4,701	7.8

Table 4-80. Population Estimates in Subwatershed 060200010803.

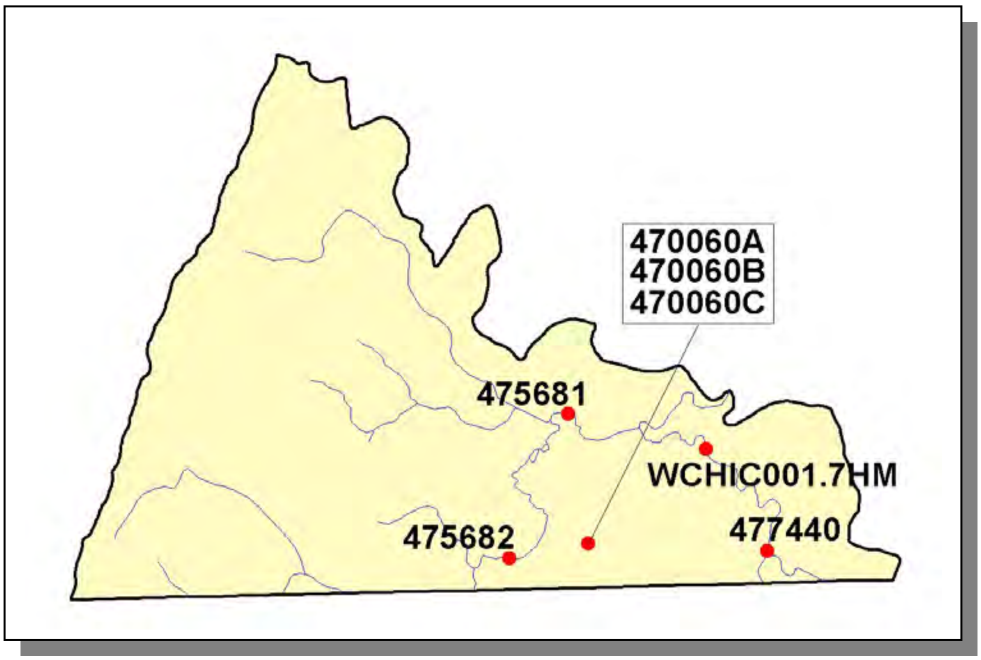


Figure 4-103. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200010803. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.C.iii.a. Point Source Contributions.

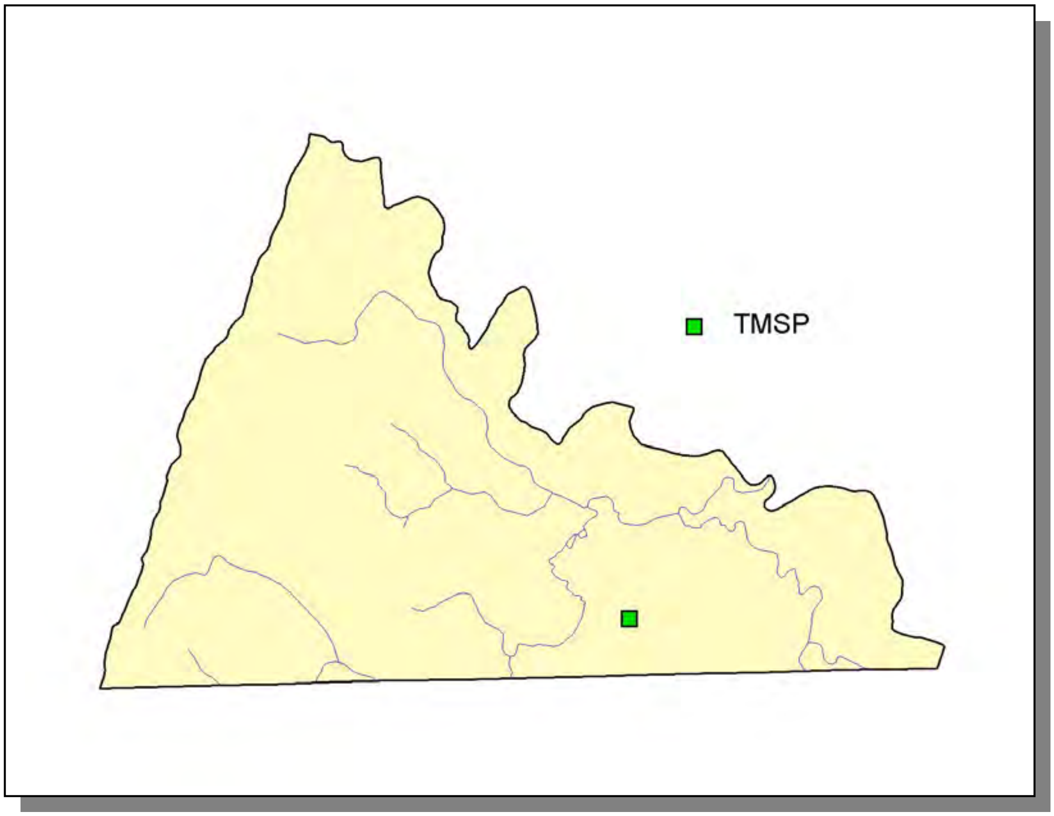


Figure 4-104. Location of Permits Issued in Subwatershed 060200010803. *More information, including the names of facilities, is provided in Appendix IV.*

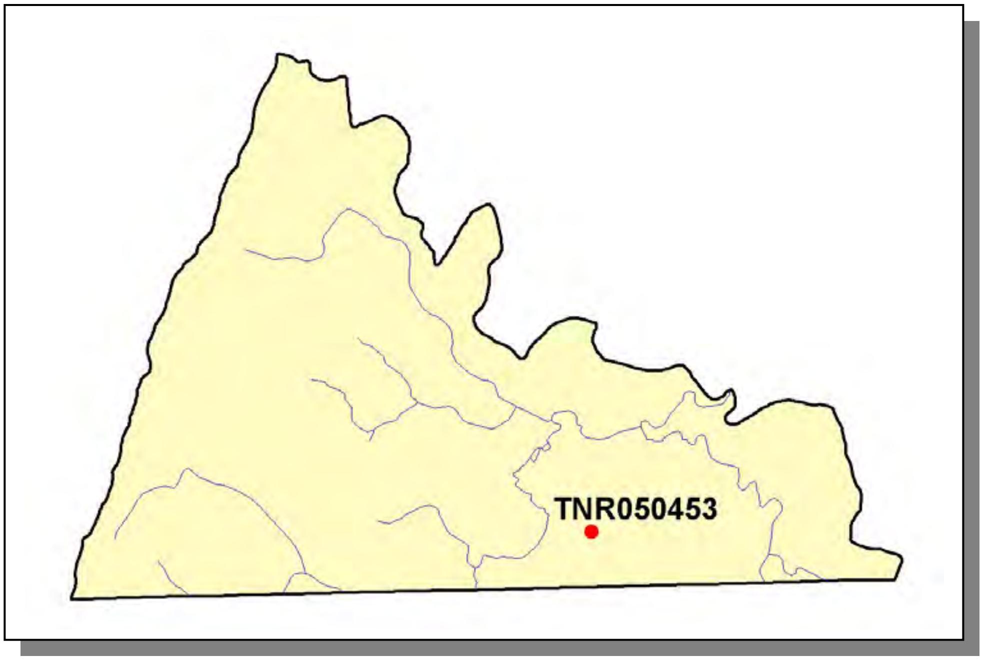


Figure 4-105. Location of TMSP Sites in Subwatershed 060200010803. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.C.iii.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS				
Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Hogs
27	59	<5	6,782	<5

Table 4-81. Summary of Livestock Count Estimates in Subwatershed 060200010803. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Hamilton	6,913	14,734	801	30	934,564	1,017	109

Table 4-82. Summary of Livestock Count Estimates in Hamilton County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Hamilton	210.7	210.7	2.2	6.0

Table 4-83. Forest Acreage and Annual Removal Rates (1987-1994) in Hamilton County.

CROPS	TONS/ACRE/YEAR
Legumes (Pastureland)	0.07
Grass (Pastureland)	0.32
Grass (Hayland)	1.99
Legumes, Grass (Hayland)	0.20
Grass, Forbs, Legumes (Mixed Pasture)	0.27
Corn (Row Crops)	5.28
Soybeans (Row Crops)	7.64
Oats (Close-Grown Cropland)	3.13
Wheat (Close-Grown Cropland)	3.14
All Other Close-Grown Cropland	1.99
Other Cropland not Planted	0.48
Other Land in Farms	0.21
Farmsteads and Ranch Headquarters	0.27

Table 4-84. Annual Estimated Total Soil Loss in Subwatershed 060200010803.

4.2.C.iv. 060200010804 (South Chickamauga Creek).

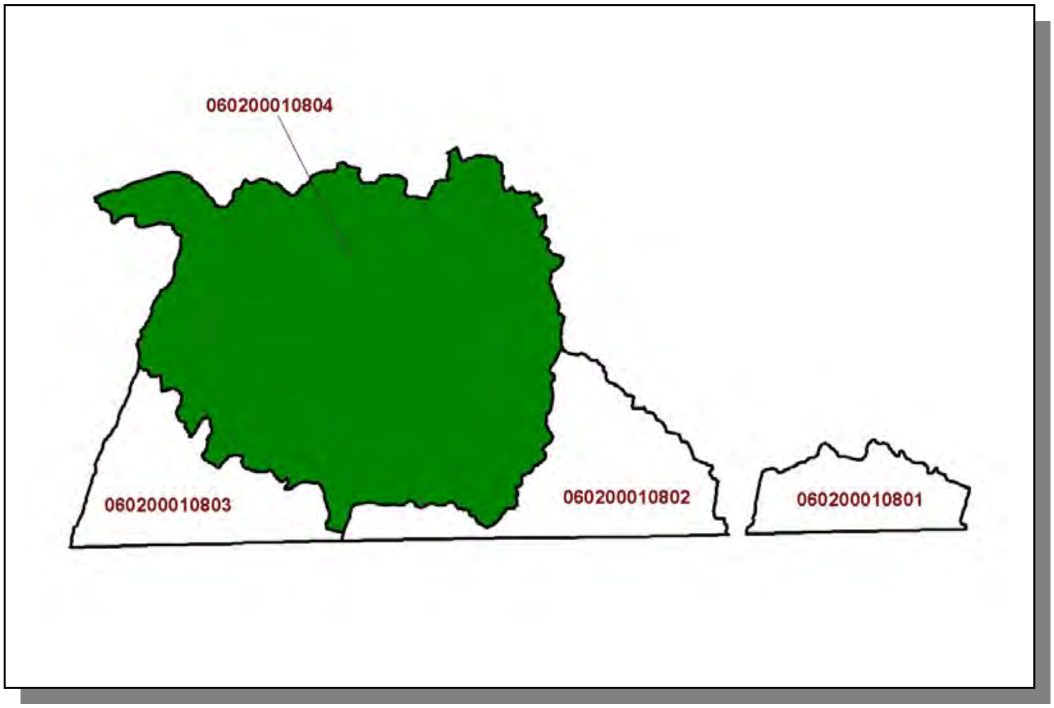


Figure 4-106. Location of Subwatershed 060200010804. HUC-12 subwatershed boundaries in Tennessee are shown for reference.

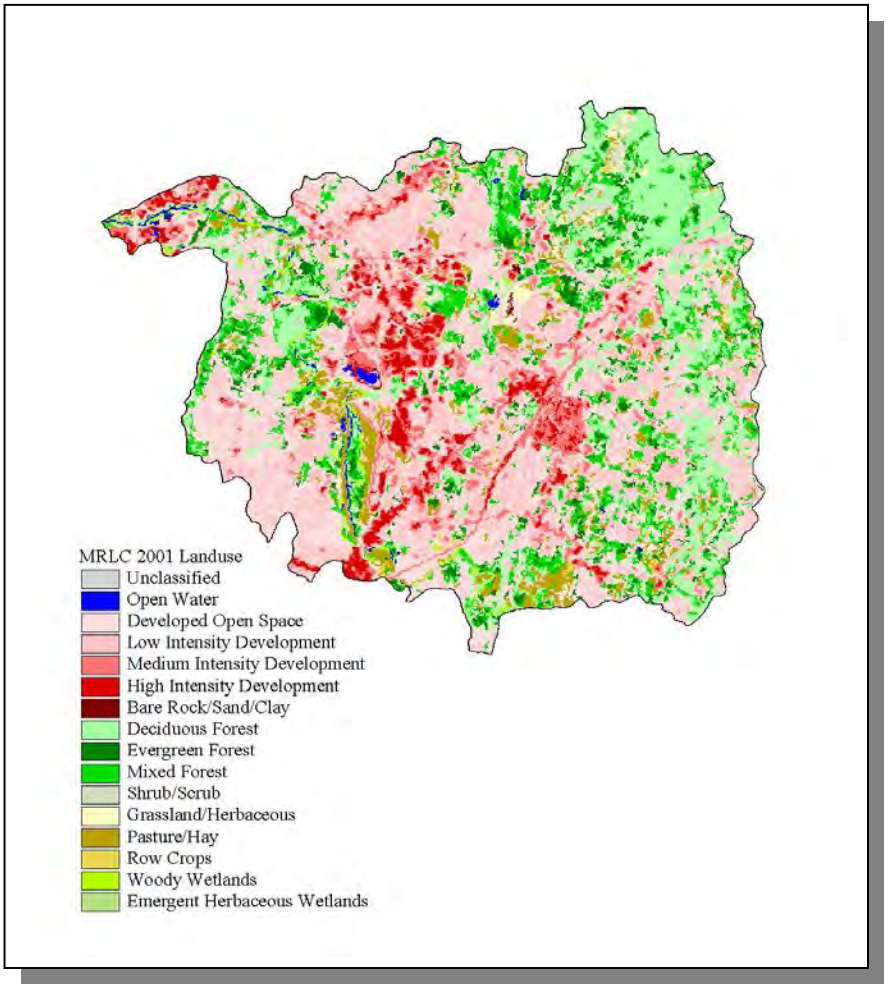


Figure 4-107. Illustration of Land Use Distribution in Subwatershed 060200010804.

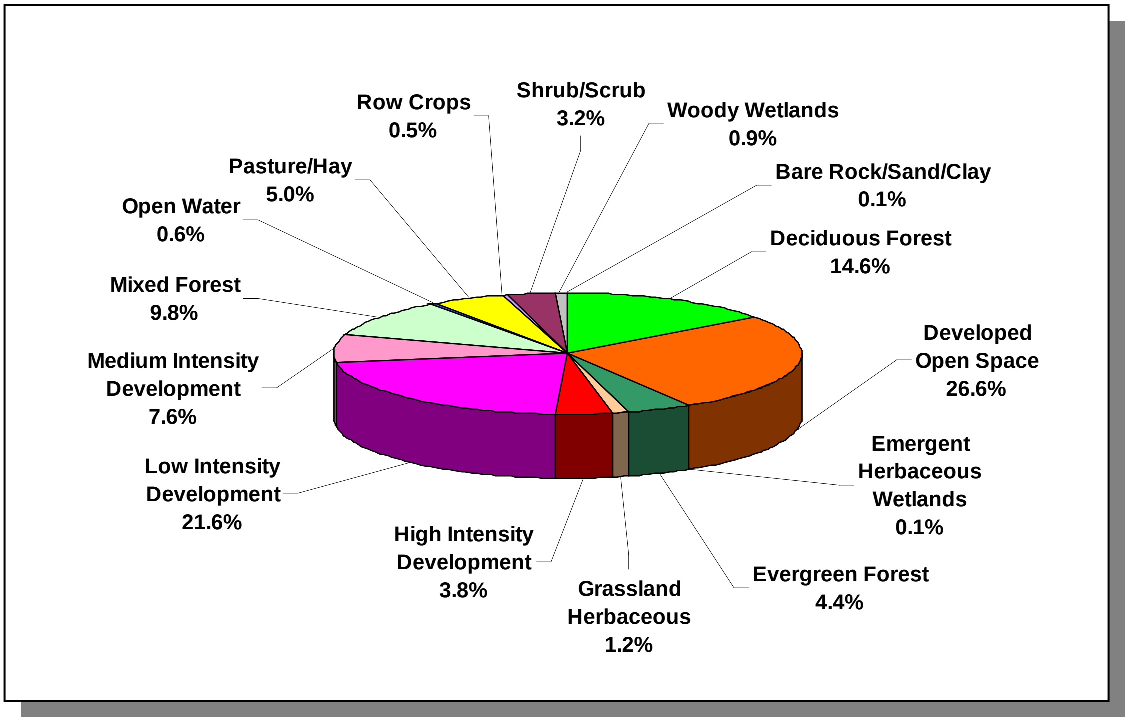


Figure 4-108. Land Use Distribution in Subwatershed 060200010804. *More information is provided in Appendix IV.*

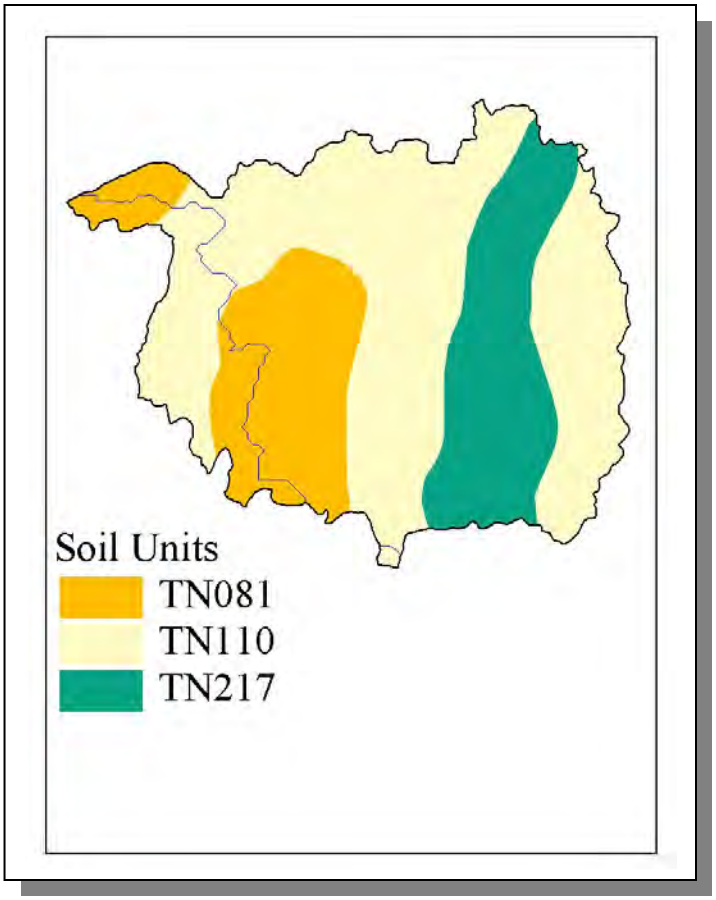


Figure 4-109. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010804.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN081	5.00	C	1.41	5.48	Silty Loam	0.35
TN110	0.00	B	2.22	4.96	Loam	0.31
TN217	0.00	C	2.34	5.32	Loam	0.35

Table 4-85. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200010804. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Hamilton	285,536	294,865	307,896	8.68	24,784	25,594	26,725	7.8

Table 4-86. Population Estimates in Subwatershed 060200010804.

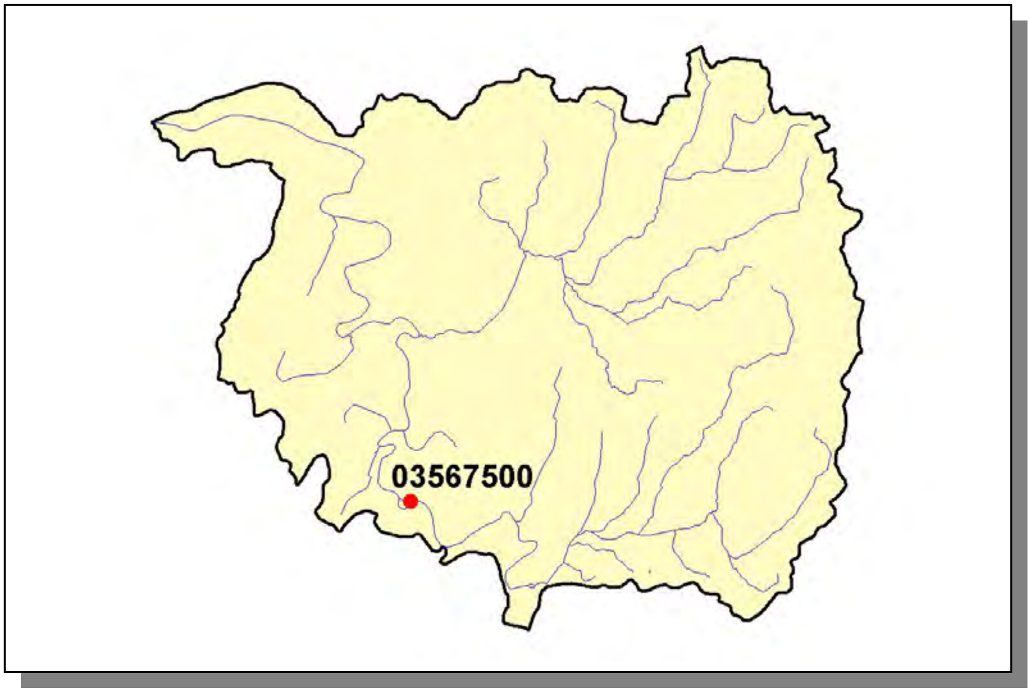


Figure 4-110. Location of Historical Streamflow Data Collection Sites in Subwatershed 060200010804. *More information is provided in Appendix IV.*

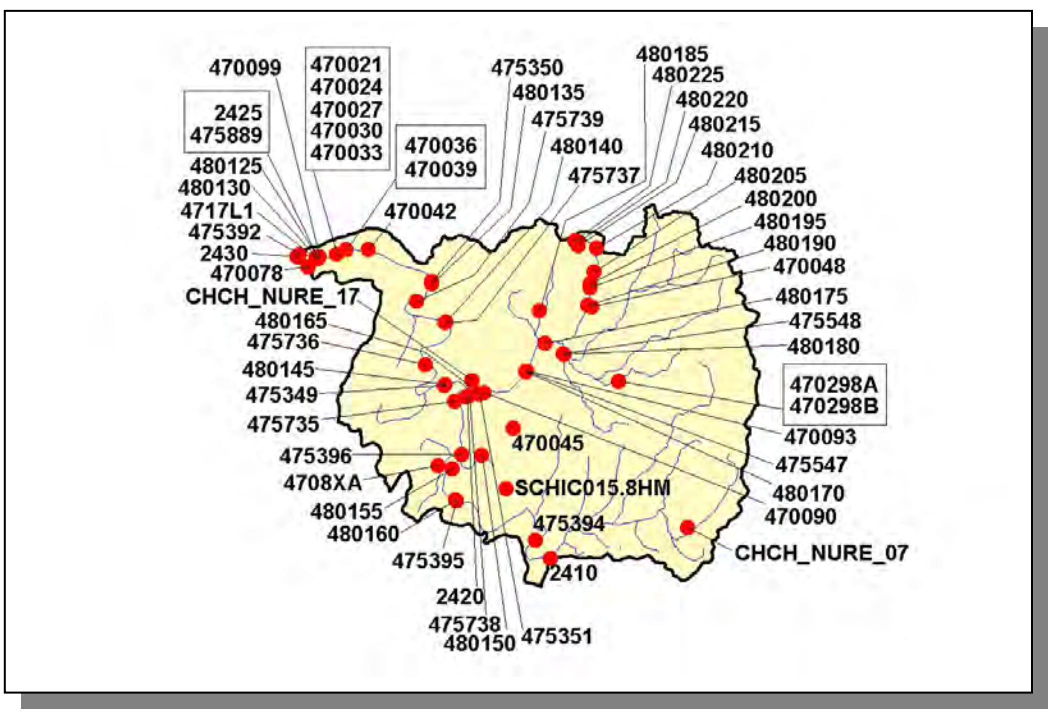


Figure 4-111. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200010804. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.C.iv.a. Point Source Contributions.

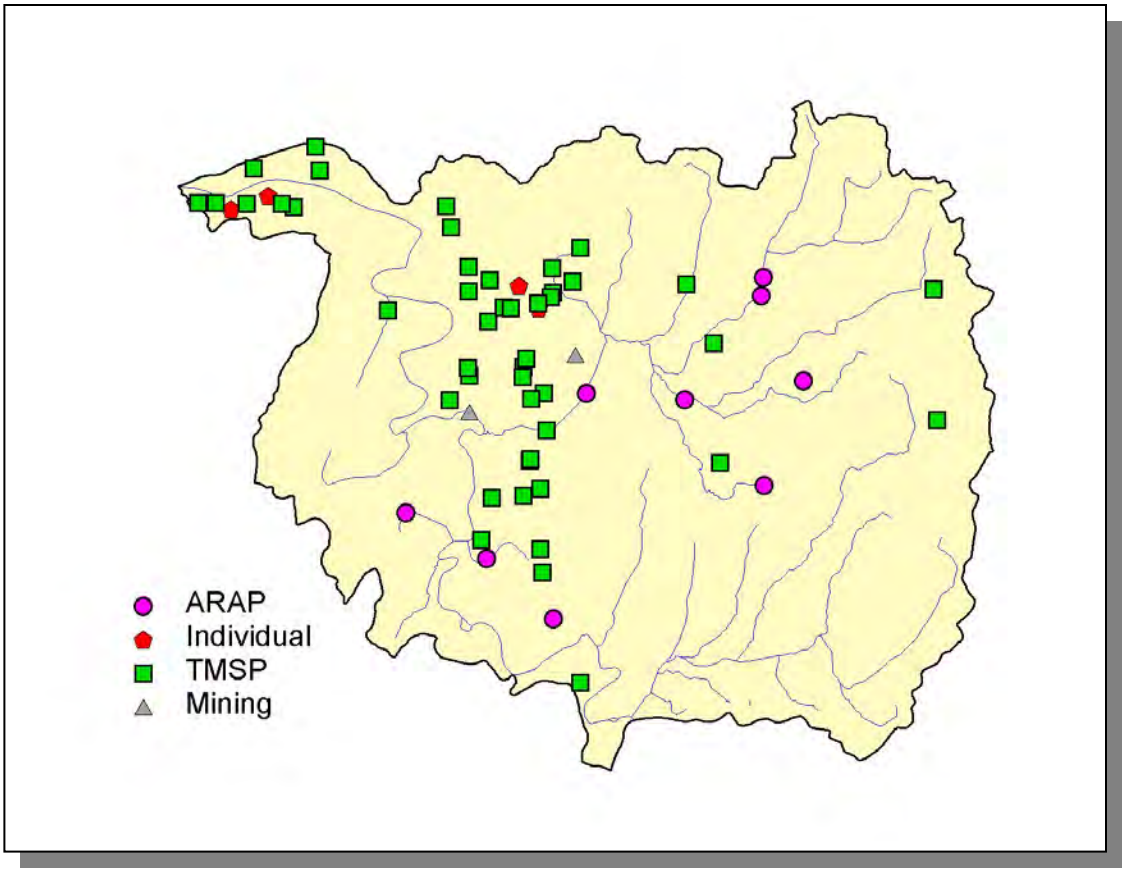


Figure 4-112. Location of Permits Issued in Subwatershed 060200010804. *More information, including the names of facilities, is provided in Appendix IV.*

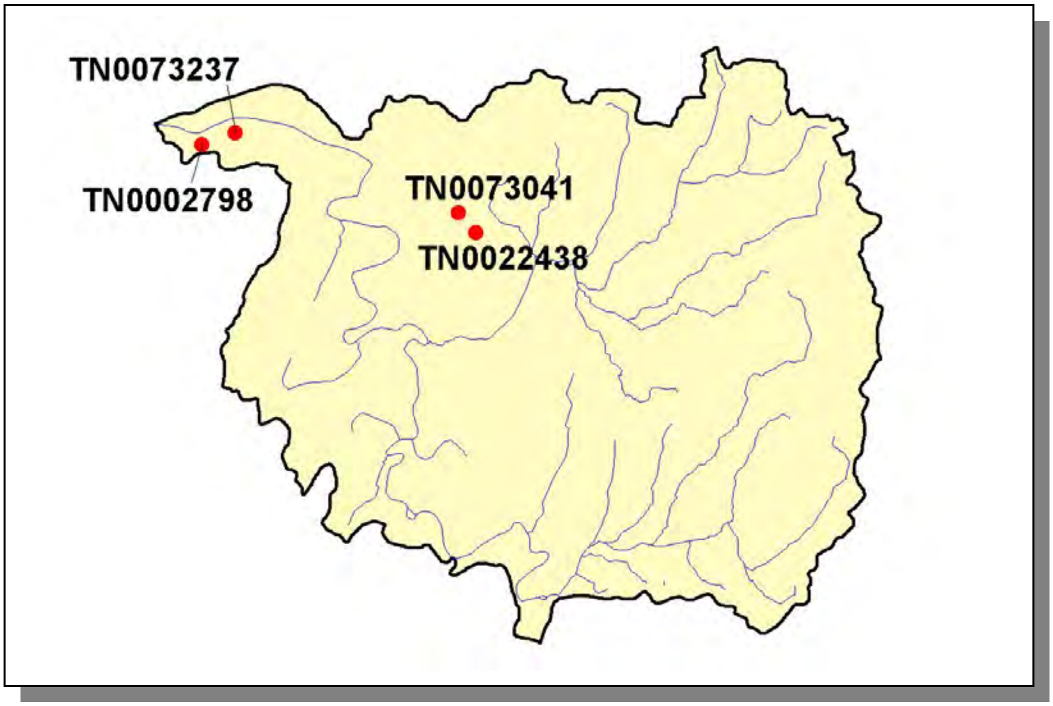


Figure 4-113. Location of Active NPDES Sites in Subwatershed 060200010804. *More information, including the names of facilities, is provided in Appendix IV.*

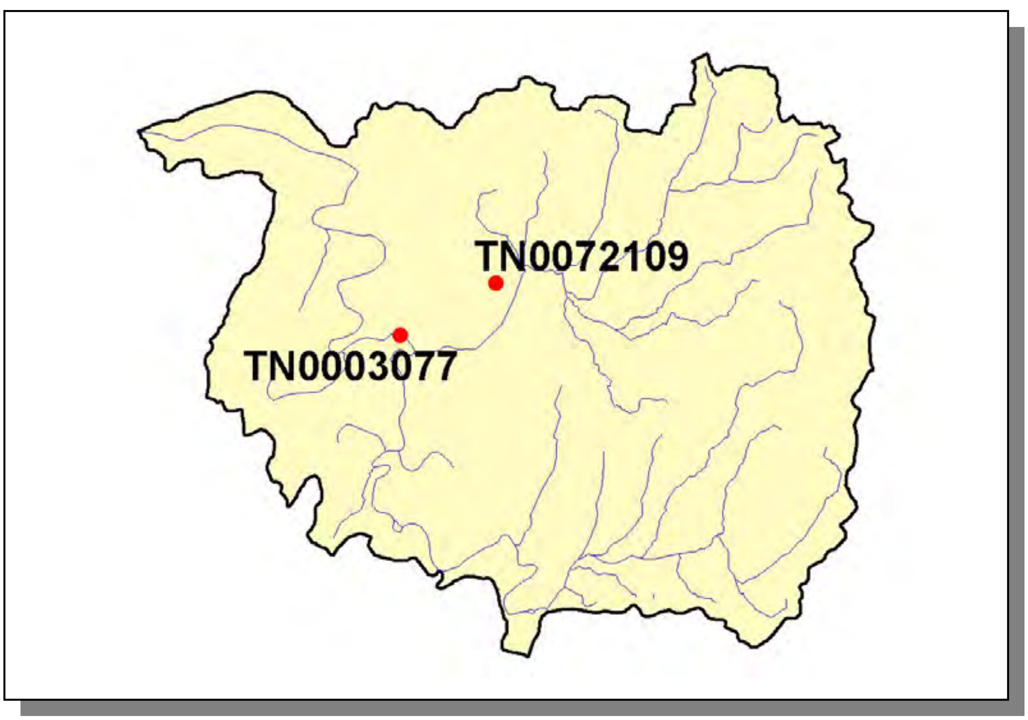


Figure 4-114. Location of Active Mining Sites in Subwatershed 060200010804. *More information, including the names of mining operations, is provided in Appendix IV.*

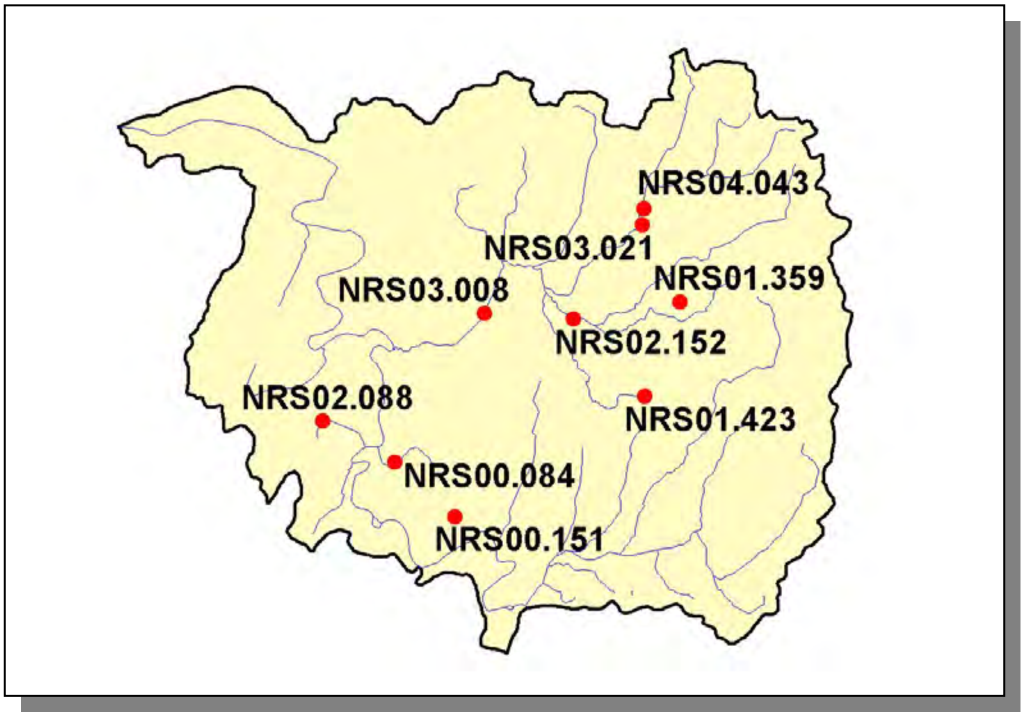


Figure 4-115. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 060200010804. *More information is provided in Appendix IV.*

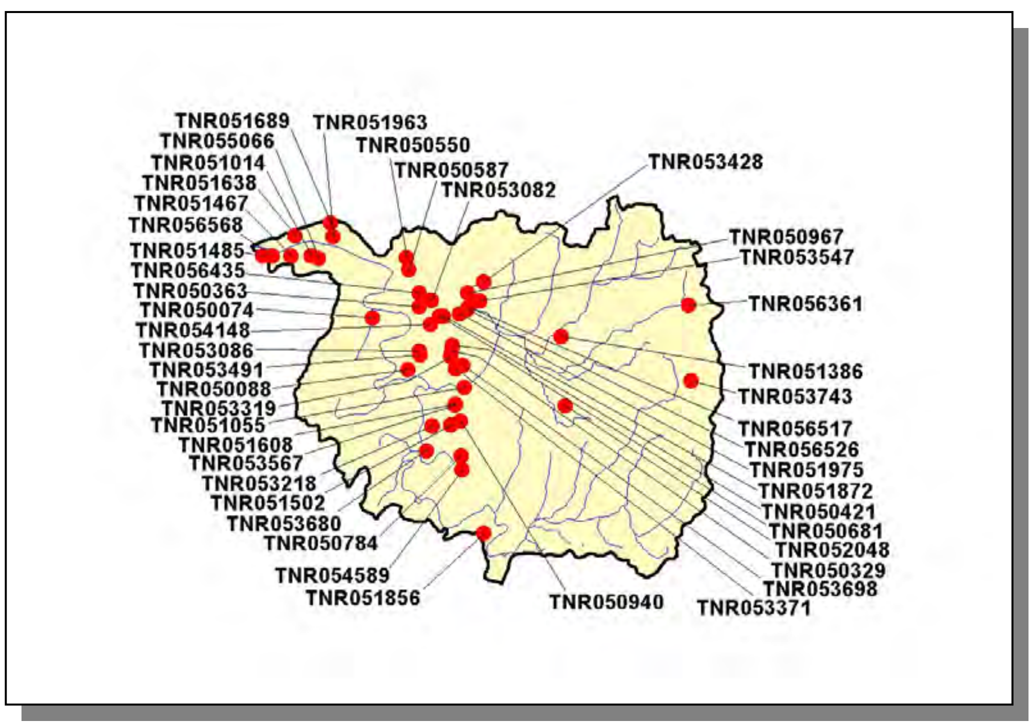


Figure 4-116. Location of TMSP Sites in Subwatershed 060200010804. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.C.iv.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
324	690	38	<5	43,781	48	5

Table 4-87. Summary of Livestock Count Estimates in Subwatershed 060200010804. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Hamilton	6,913	14,734	801	30	934,564	1,017	109

Table 4-88. Summary of Livestock Count Estimates in Hamilton County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Hamilton	210.7	210.7	2.2	6.0

Table 4-89. Forest Acreage and Annual Removal Rates (1987-1994) in Hamilton County.

CROPS	TONS/ACRE/YEAR
Legumes (Pastureland)	0.07
Grass (Pastureland)	0.34
Grass (Hayland)	2.33
Legumes, Grass (Hayland)	0.20
Grass, Forbs, Legumes (Mixed Pasture)	0.27
Corn (Row Crops)	5.28
Soybeans (Row Crops)	7.48
Oats (Close-Grown Cropland)	3.13
Wheat (Close-Grown Cropland)	3.14
All Other Close-Grown Cropland	1.99
Other Cropland not Planted	0.48
Farmsteads and Ranch Headquarters	0.10

Table 4-90. Annual Estimated Total Soil Loss in Subwatershed 060200010804.

CHAPTER 5

WATER QUALITY PARTNERSHIPS IN THE LOWER TENNESSEE RIVER WATERSHED

5.1. BACKGROUND. The Watershed Approach relies on participation at the federal, state, local and nongovernmental levels to be successful. Two types of partnerships are critical to ensure success:

- Partnerships between agencies
- Partnerships between agencies and landowners

This chapter describes both types of partnerships in the group 4 portion of the Tennessee portion of the Lower Tennessee River Watershed. The information presented is provided by the agencies and organizations described.

5.2. FEDERAL PARTNERSHIPS.

5.2.A. Natural Resources Conservation Service. The Natural Resources Conservation Service (NRCS), an agency of the U.S. Department of Agriculture, provides technical assistance, information, and advice to citizens in their efforts to conserve soil, water, plant, animal, and air resources on private lands.

Performance Results System (PRS) is a Web-based database application providing USDA Natural Resources Conservation Service, conservation partners, and the public fast and easy access to accomplishments and progress toward strategies and performance. The PRS may be viewed at http://prms.nrcs.usda.gov/prs. From the opening menu, select “Reports” in the top tool bar. You will select the time period that you are interested in and the conservation treatment of interest on the page that comes up. Depending on the time period of interest, you will have various report options to choose from, such as location, reporting period and program involved in the reporting. You may be required to “refresh” the page in order to get the current report to come up.

The data can be used to determine broad distribution trends in service provided to customers by NRCS conservation partnerships. These data do not show sufficient detail to enable evaluation of site-specific conditions (e.g., privately-owned farms and ranches) and are intended to reflect general trends.

Conservation Practice	Feet	Acres	Number
Conservation Buffers	78,087	58	
Erosion Control		8,955	
Nutrient Management		14,076	
Pest Management		14,633	34
Grazing / Forages	59,532	7,093	
Tree and Shrub Practices		3,085	
Tillage and Cropping		5,010	
Waste Management Systems			8
Wildlife Habitat Management		7,580	
Water Supply	10,365		23

Table 5-1. Landowner Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Lower Tennessee River Watershed. *Data are from PRMS for October 1, 2001 through September 30, 2005 reporting period. More information is provided in Appendix V.*

5.2.B. United States Geological Survey – Tennessee Water Science Center Programs. The United States Geological Survey (USGS) provides relevant and objective scientific information and data for public use in evaluation of the quantity, quality, and use of the Nation's water resources. National USGS water resource assessments include the National Streamflow Information Program (http://water.usgs.gov/nsip/), National Atmospheric Deposition Network (http://bqs.usgs.gov/acidrain/), the National Stream Quality Accounting Network (http://water.usgs.gov/nasqan/), and the National Water-Quality Assessment Program (http://water.usgs.gov/nawqa). For a national overview of USGS water resources programs, please visit http://water.usgs.gov. Specific information on the Upper and Lower Tennessee River NAWQA study units can be found at http://tn.water.usgs.gov/lten/tenn.html .

In addition to National assessments, the USGS also conducts hydrologic investigations and data collection in cooperation with numerous Federal, State, and local agencies to address issues of National, regional, and local concern. Hydrologic investigations conducted by the USGS Tennessee Water Science Center address scientific questions pertaining to five general thematic topics:

1. Water Use and Availability,
2. Landforms and Ecology,
3. Watersheds and Land Use,
4. Occurrence, Fate, and Transport of Contaminants, and
5. Floods and Droughts.

In support of these investigations, the USGS Tennessee Water Science Center records streamflow continuously at more than 100 gaging stations, makes instantaneous measurements of streamflow at numerous other locations as needed or requested, monitors ground-water levels Statewide, and analyzes the physical, chemical, and biologic characteristics of surface and ground waters. In addition, the Water Science Center compiles annual water-use records for the State of Tennessee and collects a variety of data in support of National USGS baseline and other networks. More information pertaining to USGS activities in Tennessee can be accessed at http://tn.water.usgs.gov .

USGS Water Resources Information on the Internet. Real-time and historical streamflow, water-level, and water-quality data at sites operated by the USGS Tennessee Water Science Center can be accessed on-line at http://waterdata.usgs.gov/tn/nwis/nwis . Data can be retrieved by county, hydrologic unit code, or major river basin using drop-down menus on the web page. For specific information or questions about USGS streamflow data, contact Donna Flohr at (615) 837-4730 or dfflohr@usgs.gov . Recent USGS Tennessee Water Science Center publications can be accessed by visiting http://tn.water.usgs.gov/pubpg.html . A searchable bibliographic database is also provided for locating other USGS reports and products addressing specific scientific topics.

5.2.C. U.S. Fish and Wildlife Service. The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people. Sustaining our nation's fish and wildlife resources is a task that can be accomplished only through the combined efforts of governments, businesses, and private citizens. The U.S. Fish and Wildlife Service (Service) works with State and Federal agencies and Tribal governments, helps corporate and private landowners conserve habitat, and cooperates with other nations to halt illegal wildlife trade. The Service also administers a Federal Aid program that distributes funds annually to States for fish and wildlife restoration, boating access, hunter education, and related projects across America. The funds come from Federal excise taxes on fishing, hunting, and boating equipment.

Endangered Species Program

Through the Endangered Species Program, the Service consults with other federal agencies concerning their program activities and their effects on endangered and threatened species. Other Service activities under the Endangered Species Program include the listing of rare species under the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended: 16 U.S.C. 1531 et seq.) and the recovery of listed species. Once listed, a species is afforded the full range of protections available under the ESA, including prohibitions on killing, harming or otherwise taking a species. In some instances, species listing can be avoided by the development of Candidate Conservation Agreements, which may remove threats facing the candidate species, and funding efforts such as the Private Stewardship Grant Program. Federally endangered and threatened species in the Lower Tennessee River watershed in Hamilton and Marion Counties, Tennessee, include the gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), pink mucket (*Lampsilis abrupta*), and large-flowered skullcap (*Scutellaria montana*). For a complete listing of endangered and threatened species in Tennessee, please visit the Service's website at http://*cookeville.fws.gov*.

Recovery is the process by which the decline of an endangered or threatened species is stopped and reversed, and threats to the species' survival are eliminated, so that long-term survival in nature can be ensured. The goal of the recovery process is to restore listed species to a point where they are secure and self-sustaining in the wild and can be removed from the endangered species list. Under the ESA, the Service and National Marine Fisheries Service were delegated the responsibility of carrying out the recovery program for all listed species.

In a partnership with the Tennessee Nature Conservancy (TNC), Tennessee Wildlife Resources Agency (TWRA), and Tennessee Department of Environment and Conservation (TDEC) Division of Natural Heritage, the Service developed a State Conservation Agreement for Cave Dependent Species in Tennessee (SCA). The SCA targets unlisted but rare species and protects these species through a suite of proactive conservation agreements. The goal is to preclude the need to list these species under the ESA. This agreement covers middle and eastern Tennessee and will benefit water quality in many watersheds within the State.

In an effort to preclude the listing of a rare species, the Service engages in proactive conservation efforts for unlisted species. The program covers not only formal candidates but other rare species that are under threat. Early intervention preserves management options and minimizes the cost of recovery.

Partners for Fish and Wildlife Program

The U.S. Fish and Wildlife Service established the Partners for Fish and Wildlife Program to restore historic habitat types which benefit native fishes and wildlife. The program adheres to the concept that restoring or enhancing habitats such as wetlands or other unique habitat types will substantially benefit federal trust species on private lands by providing food and cover or other essential needs. Federal trust species include threatened and endangered species, as well as migratory birds (e.g. waterfowl, wading birds, shorebirds, neotropical migratory songbirds).

Participation is voluntary and various types of projects are available. Projects include livestock exclusion fencing, alternate water supply construction, streambank stabilization, restoration of native vegetation, wetland restoration/enhancement, riparian zone reforestation, and restoration of in-stream aquatic habitats.

HOW TO PARTICIPATE ...

- Interested landowners contact a Partners for Fish and Wildlife Biologist to discuss the proposed project and establish a site visit.
- A visit to the site is then used to determine which activities the landowner desires and how those activities will enhance habitat for trust resources. Technical advice on proposed activities is provided by the Service, as appropriate.
- Proposed cost estimates are discussed by the Service and landowner.
- A detailed proposal which describes the proposed activities is developed by the Service biologist and the landowner. Funds are competitive, therefore the proposal is submitted to the Service's Ecosystem team for ranking and then to the Regional Office for funding.
- After funding is approved, the landowner and the Service co-sign a Wildlife Extension Agreement (minimum 10-year duration).
- Project installation begins.
- When the project is completed, the Service reimburses the landowner after receipts and other documentation are submitted according to the Wildlife Extension Agreement.

For more information regarding the Endangered Species and Partners for Fish and Wildlife programs, please contact the Tennessee Ecological Services Field Office at 931/528-6481 or visit their website at http://*cookeville.fws.gov*.

5.2.D. Tennessee Valley Authority (TVA). Tennessee Valley Authority's (TVA) goals for the 21st century are to generate prosperity for the Tennessee Valley by promoting economic development, supplying low-cost, reliable power, and supporting a thriving river system. TVA is committed to the sustainable development of the region and is engaged in a wide range of watershed protection activities to improve or protect water quality conditions.

TVA's watershed activities are conducted by Watershed Teams located throughout the Valley. Watershed Teams help communities develop and implement protection and restoration activities in their local watersheds. In addition to water quality efforts, Watershed Teams carry out varied resource stewardship functions including management of TVA lands and shorelines, recreation, and resource management. TVA also operates a comprehensive monitoring program to provide water quality and aquatic information.

The following is a summary of TVA's resource stewardship and monitoring activities in the Lower Tennessee Watershed.

Water Quality Improvement Efforts

Watershed Initiatives: Watershed initiatives are major efforts to improve or protect water quality on a watershed scale. These long-term efforts represent a considerable commitment of resources. TVA participation is strategically targeted based on resource condition, partnership opportunity, and a need for TVA involvement. Watershed initiatives are cooperative efforts in which TVA's role varies depending on the needs and the capabilities of other participants.

While each watershed initiative is unique in many respects, TVA applies a conceptual model that provides a consistent framework and structure. This provides a basis for monitoring progress and ensures that each effort is of a sufficient quality to compete successfully for grant funds. Each initiative is viewed as proceeding through four stages of development: Explore, Build/Prepare, Implement, and Transition from an active initiative to a maintenance status. Within these phases, there a key elements that are deemed essential for a successful watershed initiative. These are cause/source identification, development of local capability, communication and marketing, funding strategy, and action plan development.

There are no targeted watershed initiatives currently underway in the Lower Tennessee Watershed. For more information on TVA's overall approach to watershed water quality, contact Donald Anderson at dwanderson@tva.gov or 423-876-6711.

Tennessee Valley Clean Marina Initiative: The Tennessee Valley Clean Marina Initiative is an effort to promote environmentally responsible marina practices. This voluntary program helps marina operators protect the resource that provides them with their livelihood. It addresses sewage management, oil and gas control, marina siting, and erosion prevention. The program certifies marinas that comply with pollution-control standards and allows them to use the Clean Marina logo and flag. As of October 3, 2005, 53 marinas were flying the Clean Marina flag and going the extra mile to protect the waters of the Tennessee Valley.

In the Chattanooga area, five marinas have successfully met all requirements and have been awarded Clean Marina certification:

- Gold Point Marina first certified in 2002 and recertified in 2004
- Chickamauga Marina, first certified in 2003 and recertified in 2005
- Island Cove Marina and Resort first certified in 2003 and recertified in 2005
- Shady Grove Harbor completed certification in 2005
- Hales Bar Marina originally certified in 2004 with recertification is expected to occur in 2006.

For more information, contact Linda Harris, Chickamauga-Hiwassee Watershed Team, at lbharris@tva.gov or 423-876-4178.

Growth Readiness: The Tennessee Growth Readiness program helps communities learn how land use decisions affect water quality, and then make informed choices about managing growth. It helps them comply with regulatory requirements. Planners and public works officials are the program's target audience. They are intimately involved in the nuts-and-bolts of their community's land use and water quality decisions. Since the program began in the fall of 2003, representatives from 280 Tennessee communities have participated. Nearly 200 of these communities have evaluated their existing development rules against a set of model development principles. Development following these principles is economically viable and protects the environment. Statewide, 40 communities have changed their development rules to adopt these principles.

Water Quality Monitoring

TVA's monitoring efforts fall generally in three components: monitoring the ecological health and water quality of TVA reservoirs; assessing the ecological condition of selected stream sites; and monitoring of conditions directly related to human use of aquatic resources.

Reservoir Ecological Health: TVA's Reservoir Ecological Health Monitoring program evaluates current conditions, provides data for trend analysis, and provides assessments of current and future operations. TVA monitors ecological conditions at 69 sites on 31 reservoirs. Each site is monitored every other year unless a substantial change in the ecological health score occurs during a two-year cycle. The overall health ratings of TVA reservoirs include five ecological indicators: dissolved oxygen, chlorophyll, fish, bottom life, and sediment quality. Results from each of the five indicators are evaluated based on TVA's reservoir evaluation system and assigned a rating ranging from 1 (poor) to 5 (excellent).

The Lower Tennessee Watershed includes portions of two TVA reservoirs, Chickamauga and Nickajack.

As in previous years, the ecological health of Chickamauga Reservoir rated Good in 2003.

Individual component and site ratings are shown in Table 1.

Table 1: Ratings for Individual Ecological Health Indicators for Chickamauga Reservoir, 2003

Monitoring Location	Dissolved Oxygen	Chlorophyll	Fish	Bottom Life	Sediment Quality
Forebay	Good	Fair	Fair	Good	Good
Mid-Reservoir	Good	Good	Fair	Good	Good

As in previous years, Nickajack Reservoir rated good in 2003. The ecological health score for Nickajack has consistently been among the highest of all the reservoirs monitored by TVA. Nickajack is a small, narrow reservoir with a short retention time; that is, it usually takes only three or four days for water to flow through the reservoir. That helps keep the water from stratifying (separating into layers of different temperatures) during the summer and limits the production of chlorophyll. Individual component and site ratings are shown in Table 2.

Table 2: Ratings for Individual Ecological Health Indicators for Nickamauga, 2003

Monitoring Location	Dissolved Oxygen	Chlorophyll	Fish	Bottom Life	Sediment Quality
Forebay	Good	Good	Fair	Good	Good
Inflow	--	--	Good	Good	--

In conjunction with the Reservoir Ecological Health monitoring, TVA collects additional water samples to be analyzed for parameters of interest to public and industrial water supplies.

More information about Reservoir Ecological Health Monitoring and related monitoring can be obtained by contacting Tyler Baker at (423)-876-6733 or tfbaker@tva.gov or http://www.tva.gov.

Stream Monitoring

The condition of water resources in the streams is measured using three independent methods: Index of Biotic Integrity (IBI), number of mayfly, stonefly, and caddisfly taxa (EPT), and Habitat Assessment. EPT sampling and fish community assessment (IBI) are conducted at the same sites. Site selection is governed by study objectives, stream physical features, and stream access. TVA's objective is to characterize the quality of water resources within a sub-watershed (11-digit hydrologic unit). Sites are typically located in the lower end of sub-watersheds and at intervals on the mainstem to integrate the effects of land use.

IBI: The index of biotic integrity (IBI) assesses the water quality in flowing water by examining a stream's fish assemblage. Twelve metrics address species richness and composition, trophic structure (structure of the food chain), fish abundance, and fish health. Each metric reflects the condition of one aspect of the fish assemblage and is scored against high quality reference streams in the region.. Potential scores for each of the twelve metrics are 1-poor, 3-intermediate, or 5-the best to be expected. Scores for the 12 metrics are summed to produce the IBI for the site.

EPT: The number and types of aquatic insects, like fish, are indicative of the general quality of the environment in which they live. The method TVA uses involves only qualitative sampling and field identification of mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Trichoptera) to the family taxonomic level (EPT). The score for each site is simply the number of EPT families. The higher EPT scores are indicative of high quality streams because these insect larvae are intolerant of poor water quality.

Habitat Assessment: The quality and quantity of habitat (physical structure) directly affects aquatic communities. Habitat assessments are done at most stream sampling sites to help interpret IBI and EPT results. If habitat quality at a site is similar to that found at a good reference site, any impacts identified by IBI and EPT scores can reasonably be attributed to water quality problems. However, if habitat at the sample site differs considerably from that at a reference site, lower than expected IBI and EPT scores might be due to degraded habitat rather than water quality impacts.

The habitat assessment method used by TVA (modified EPA protocol) compares observed in-stream, channel, and bank characteristics at a sample site to those expected at a similar high-quality stream in the region. Individual attributes are scored from 1 (poorest condition) to 4 (best condition). The habitat score for the sample site is the sum of these attributes. Scores can range from a low of 10 to a high of 40.

EPT sampling and fish community assessment (IBI) are conducted at the same sites. Site selection is based on study objectives, stream physical features, and stream access. TVA's objective is to characterize the quality of water resources within a sub-watershed (11-digit hydrologic unit). Sites are typically located in the lower end of sub-watersheds and at intervals on the mainstem to integrate the effects of land use. Twenty-three sites in the Holston have been sampled since 2000 and are being sampled routinely. These sites are typically sampled every five years.

Details about stream sampling sites and scores can be obtained by contacting Amy Wales akewales@tva.gov or 423-876-6748.

Human Use

Bacteriological Monitoring at Recreational Areas: Each summer TVA evaluates about 250 swimming areas and informal water contact recreational sites for *Escherichia coli* (*E. coli*) bacteria. These sites include those operated by TVA and many operated by other agencies. Indicator organisms such as *E. coli* are used to help protect bathers from illnesses that may be contracted from recreational activities in waters contaminated by fecal pollution. Although these tests are not proof of human health threats, they may indicate the presence of more harmful pathogens in waterbodies.

Bacteriological water sampling is conducted between Memorial Day and Labor Day when people are most likely to be recreating. Typically, swimming areas and heavily used canoe sites are monitored every year, while boat ramps and other canoe sites are monitored every other year.

There are no state advisories against swimming in Nickajack Reservoir. *E. coli* bacteria levels in samples collected on Nickajack Reservoir in 2005 were within the state of Tennessee's guidelines for water contact with a few exceptions. The single-sample maximum concentration was exceeded in at least one of the 10 samples at Shellmound Public Use Area Beach, Smith's Camp-on-the-Lake Beach, and Hixson Greenway canoe take-out point.

The other locations sampled in 2005 were Maple View beach, Marion County Park Beach, Cole City Creek boat ramp, Grand Canyon boat ramp, Guild boat ramp, Raccoon Mountain Pumped Storage Plant boat ramp, North Chickamauga Creek Greenway canoe access take-out , and North Chickamauga Creek canoe access at Greenway Farm.

While the reservoir has no swimming advisories, the state of Tennessee has bacteriological advisories on three tributary streams that flow into Nickajack Reservoir: Chattanooga Creek, Stringer's Branch, and Citico Creek. More information about state advisories can be obtained at this site: http://www.tennessee.gov/environment/wpc/

There are no state advisories against swimming in Chickamauga Reservoir. *E. coli* bacteria levels in samples collected on the reservoir in 2005 were within the state of Tennessee's guidelines for water contact with a few exceptions. One site, Grasshopper Creek Beach, had an elevated geometric mean and exceeded the single-sample maximum at least one time when compared to the state of Tennessee's guidelines for water contact. The single-sample maximum concentration was exceeded in at least one of the 10 samples at Savannah Bay Informal Recreation Area boat access site, Cottonport Campground informal swim area, and Fraizer Park swim area.

The other locations sampled in 2005 were Chickamauga Dam TVA beach, Chickamauga Dam boat ramp, Harrison Bay State Park informal swimming area, Harrison Bay State Park informal swimming area (inside park), Chester Frost Park Beach, Skull Island Recreation Area Beach, Possum Creek (East) boat ramp, Sale Creek Beach, Armstrong Ferry Beach, and Chickamauga boat ramp on Watts Bar Dam Reservation.

Fish Flesh Monitoring: TVA conducts fish tissue monitoring by collecting fish from its reservoirs and checking the tissue for metals, pesticides, PCBs, and other chemicals that could affect human health. This data is shared with state agencies, which are responsible for advising the public of health risks from eating contaminated fish.

The state of Tennessee has issued a precautionary fish consumption advisory for channel catfish from Nickajack Reservoir because of PCB contamination. A precautionary advisory means that pregnant women, nursing mothers, and children should not eat the contaminated fish. All others should limit their consumption of the named species to no more than one meal per month. Additionally, the state has issued an advisory that fish from Chattanooga Creek, a tributary stream of Nickajack, should not be eaten because of elevated PCB and chlordane levels.

TVA collected channel catfish, striped bass, and largemouth bass from Nickajack Reservoir for tissue analysis in fall 2003. The results, which were similar to those of previous years, were provided to state agencies in Tennessee.

There are no fish consumption advisories for Chickamauga Reservoir. TVA collected channel catfish and largemouth bass from the reservoir for tissue analysis in fall 2003. The results, which were similar to those of previous years, were provided to state agencies in Tennessee. TVA will analyze fish from the reservoir again in autumn 2005.

More information about Bacteriological Monitoring at Recreational Areas and Fish Flesh Monitoring can be obtained by contacting Rebecca Hallman at (423)-876-6736 or rlhallman@tva.gov or http://www.tva.gov .

Spring Sport Fish Monitoring: TVA conducts an annual spring sportfish survey to determine the number, age, and general health of black bass and crappie populations in its reservoirs. Results are used by state agencies to protect and improve sport fisheries.

More information about Spring Sport Fish Monitoring can be obtained by contacting Kurt Lakin at (423)-876-6737 or kmlakin@tva.gov or http://www.tva.gov .

Sport Fishing Index: TVA and state fisheries agencies have created a Sport Fishing Index (SFI) to help anglers decide where they have the best chance of catching their favorite types of fish. SFI scores for different species are based both on population measures (the size and health of the individual fish, along with the number of fish present) and angler use and success information (the number of anglers looking for a particular type of fish, and the number of that type that they actually catch). The SFI score ranges from a high of 60 (excellent) to a low of 20 (very poor).

The spring sportfish surveys are conducted from March through early June and include twelve 30-minute electrofishing runs covering the various habitat types present. Fish are weighed, measured, checked for anomalies, and released. This approach to determining fish abundance is used by state game and fish agencies and academia. The survey predominantly targets three species of black bass — largemouth, smallmouth, and spotted bass — and black and white crappie.

Information about the Sport Fishing Index can be obtained by contacting Greg Shaffer at (865)632-6365 or gshaffer@tva.gov or http://www.tva.gov.

5.2.D. United States Army Corps of Engineers-Nashville District. The Nashville District, U.S. Army Corps of Engineers is one of seven districts in the Lakes and Rivers Division. The district's area is determined by the Cumberland River and the Tennessee River's watersheds and encompasses 59,000 square miles in portions of seven states. This geographic area is represented by 14 senators and 20 Congressional representatives. The Nashville District's missions include providing flood protection, recreation, hydropower, and navigation. The District also provides environmental stewardship through our Regulatory and Civil Works programs, conducts emergency response to disasters, and to performs other authorized Civil Works projects.

Within the 18,000 square mile Cumberland River Basin, overall responsibilities for the Nashville District include operation and maintenance of 10 reservoir projects. Each of these is operated for some or all of the following purposes: hydropower production, flood control, navigation, water supply, water quality, fish and wildlife, and recreation.

Within the much larger, 41,000 square mile Tennessee River Basin the Nashville District operates a series of navigation locks and has regulatory permit authority over dredge and fill activities under the Clean Water Act and the Rivers and Harbors Act.

As of 2005, the District's flood control projects have prevented more than $1.96 billion in flood damages. The District also provides flood prevention planning assistance to the states and local governments.

Lakes in the Nashville District are the most popular in the nation. More than 36 million people visited our 10 lakes last year. These recreation users had an economic impact on the region of nearly $877 million dollars. Five Nashville District lakes rank among the top 25 in Corps-wide visitation. In 2000, the District's 70 commercial concessionaires produced $1.3 million in profit, and returned more than $300,000 to the U.S. Treasury in rent payments for leases.

The Nashville District has the capacity to produce more than 914 megawatts of clean electricity, enough to power the needs of a city the size of Nashville, at nine different hydropower generations plants in the Cumberland River Basin. The District generates about $44 million in revenue from the sale of this power annually. This revenue is returned to the U.S. Treasury.

The Nashville District operates and maintains 1,175 commercially navigable river miles; almost 10% of the total within the U.S. Army Corps of Engineers. The district operates and maintains 14 navigation lock projects; nine on the Tennessee River, four on the Cumberland River, and one on the Clinch River. There are more than 40,000 commercial and recreational lockages annually. More than 74 million tons of commodities passed through these 14 locks during 2005. Wilson Lock in Alabama has the highest single lift east of the Rocky Mountains, between 93 and 100 feet, depending on the current river water level.

Regulatory Program

The U.S. Army Corps of Engineers has been involved in regulating certain activities in the nation's water since 1890. Prior to 1968, the primary thrust for the regulatory program was the protection of navigation. As a result of new laws and judicial decisions, the program has evolved to one that considers the full public interest by balancing the favorable impacts against detrimental impacts. The Nashville District annually handles more than 3,000 regulatory actions, 97% of which were evaluated in less than 60 days.

Section 10 of the Rivers and Harbors Act of 1899 **-** requires approval prior to the accomplishment of any work in or over navigable waters of the United States, or which affects the course, location, condition or capacity of such waters. Typical activities requiring Section 10 permits are:

•Construction of piers, wharves, bulkheads, dolphins, marinas, ramps, and cable/pipeline crossings.
• Dredging and excavation

Section 404 of the Clean Water Act **-** requires approval prior to discharging dredged or fill material into the waters of the United States. Typical activities requiring Section 404 permits are:

- Depositing of fill or dredged material in waters of the U.S. or adjacent wetlands.
- Site development fill for residential, commercial, or recreational developments.
- Construction of revetments, breakwaters, levees, dams, dikes, and weirs.
- Placement of riprap and road fills.

Civil Works Program

The Corps' ongoing Civil Works responsibilities date back to the early 1800's when Congress authorized the removal of navigation hazards and obstacles. Over the years, succeeding Administrations and Congresses have expanded the Corps' missions to include most all water-related planning, development, and construction areas where a Federal interest is involved. Funds for Congressionally Authorized Projects are provided through Energy and Water Appropriations Acts and through contributions from non-Federal entities for specific projects.

Civil Works projects may also be funded under the Continuing Authorities Program (CAP). Congress has provided the Corps with standing authorities to study and build specific water resources projects for specific purposes and with specified spending limits. CAP projects are usually implemented in a faster time frame, are limited in complexity, have Federal cost limits, are approved by the Division Commander, and do not need Congressional authorization.

Nashville District Corps of Engineers Water Quality Program

The Nashville District Corps of Engineers collects a significant volume of physical, chemical, and biological water quality data every year. These data are collected at representative points both within all ten Nashville District lakes, on various major and/or representative inflow streams, and in the tailwaters. Where there are known water quality problems, such as seasonal low DO in certain turbine releases, monitoring is significantly intensified to track and quantify a particular problem. This information is used to make informed decisions about how a project's powerplant should operate. Baseline, continuous recording, multiparameter water quality monitors keep track of conditions at critical points on the main stem of the Cumberland River from the mouth of the Obey River near Celina, Tennessee to the tailwater of Lake Barkley in western Kentucky. The monitor at the Old Hickory Dam tailwater, in particular, provides key information, since water discharged from Old Hickory must be able to absorb inputs from Nashville which is just downstream.

The data collected by the Nashville District are used to help determine watershed water quality trends and to provide for better management of the comprehensive reservoir system. The data are essential for running predictive water quality models, a growing trend in Corps' water management practice.

Additional information concerning projects, programs, and activities of the Nashville District Corps of Engineers can be obtained on the World Wide Web at http://www.orn.usace.army.mil/

Environmental Education

Environmental education opportunities are provided to area school age children by the Nashville District Corps of Engineers. Water Quality personnel have participated in environmental awareness programs for the past several years at the majority of Nashville District lakes. These programs are organized by the local lake Resource Management staff and involve various area schools. The programs provided allow students to have a "hands on" experience in water quality surveillance techniques. Typically the programs include an interactive discussion of overall water quality issues. This is supplemented with demonstrations of sophisticated water quality instrumentation, collection and analysis of biological specimens from local aquatic environments, and viewing of reference materials and preserved specimens. The value of such environmental education is enormous, because it reaches young people early in their lives and exposes them to a scientific learning experience that is impossible to duplicate in a formal classroom. This experience hopefully contributes to a greater lifelong awareness by the individual of the importance of conserving and improving water quality and wise use of water resources.

Additional Information

To obtain additional information about the District, please refer to the home page at:
http://www.lrn.usace.army.mil/, or contact the following offices:
Public Affairs Office (General Information): (615) 736-7161
Regulatory Branch: (615) 369-7500

5.3. STATE PARTNERSHIPS.

5.3.A. TDEC Division of Water Supply. The Source Water Protection Program, authorized by the 1996 Amendments to the Safe Drinking Water Act, outline a comprehensive plan to achieve maximum public health protection. According to the plan, it is essential that every community take these six steps:

1) Delineate the drinking water source protection area
2) Inventory known and potential sources of contamination within these areas
3) Determine the susceptibility of the water supply system to these contaminants
4) Notify and involve the public about threats identified in the contaminant source inventory and what they mean to their public water system
5) Implement management measures to prevent, reduce or eliminate threats
6) Develop contingency planning strategies to deal with water supply contamination or service interruption emergencies (including natural disaster or terrorist activities).

Source water protection has a simple objective: to prevent the pollution of the lakes, rivers, streams, and ground water (wells and springs) that serve as sources of drinking water before they become contaminated. This objective requires locating and addressing potential sources of contamination to these water supplies. There is a growing recognition that effective drinking water system management includes addressing the quality and protection of the water sources.

Source Water Protection has a significant link with the Watershed Management Program goals, objectives and management strategies. Watershed Management looks at the health of the watershed as a whole in areas of discharge permitting, monitoring and protection. That same protection is important to protecting drinking water as well. Communication and coordination with a multitude of agencies is the most critical factor in the success of both Watershed Management and Source Water Protection.

Watershed management plays a role in the protection of both ground water and surface water systems. Watershed Management is particularly important in areas with karst (limestone characterized by solution features such as caves and sinkholes as well as disappearing streams and spring), since the differentiation between ground water and surface water is sometimes nearly impossible. What is surface water can become ground water in the distance of a few feet and vice versa.

Source water protection is not a new concept, but an expansion of existing wellhead protection measures for public water systems relying on ground water to now include surface water. This approach became a national priority, backed by federal funding, when the Safe Drinking Water Act amendments (SDWA) of 1996 were enacted. Under this Act, every public drinking water system in the country is scheduled to receive an assessment of both the sources of potential contamination to its water source of the threat these sources may pose by the year 2003 (extensions were available until 2004). The assessments are intended to enhance the protection of drinking water supplies within existing programs at the federal, state and local levels. Source water assessments were mandated and funded by Congress. Source water protection will be left up to the individual states and local governments without additional authority from Congress for that progression.

Tennessee's Wellhead Protection Rules were revised as of October 29, 2005 to include requirements for similar protection for public water systems using surface water sources under the heading of Drinking Water Source Protection Rule (1200-5-1-.34) in addition to the previous requirements for wellhead protection for public water systems using ground water sources. The rule addresses surface or ground water withdrawals in the vicinity of public water sources as well as potential contaminant sources threatening public water sources to reflect the amended prohibitions in the 2002 Amendments to the Tennessee Safe Drinking Water Act, TCA 68-221-771. There are additional reporting requirements of potential contaminant source inventories and emergency response for the public water systems as well. The Division of Water Supply will be able to use the Drinking Water Source Protection Rule to work in complimentary fashion with the Division of Water Pollution Control and other Departmental agencies in activities to protect public water sources.

As a part of the Source Water Assessment Program, public water systems are evaluated for their susceptibility to contamination. These individual source water assessments with susceptibility analyses are available to the public at http://www.state.tn.us/environment/dws as well as other information regarding the Source Water Assessment Program and public water systems.

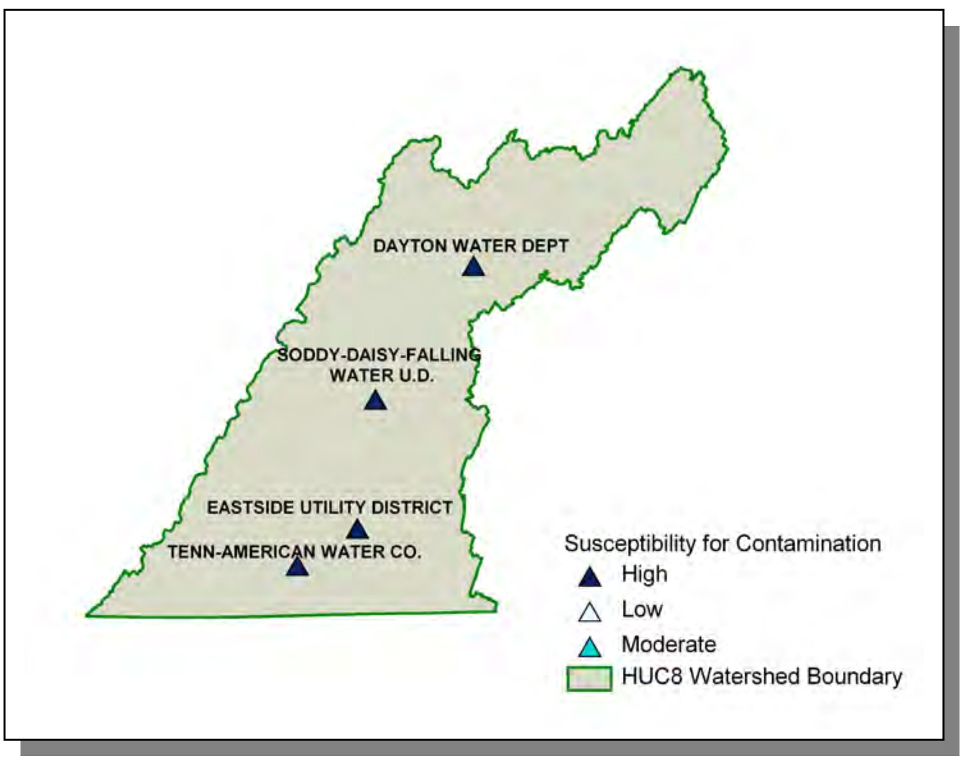


Figure 5-1. Susceptibility for Contamination in the Tennessee River Watershed.

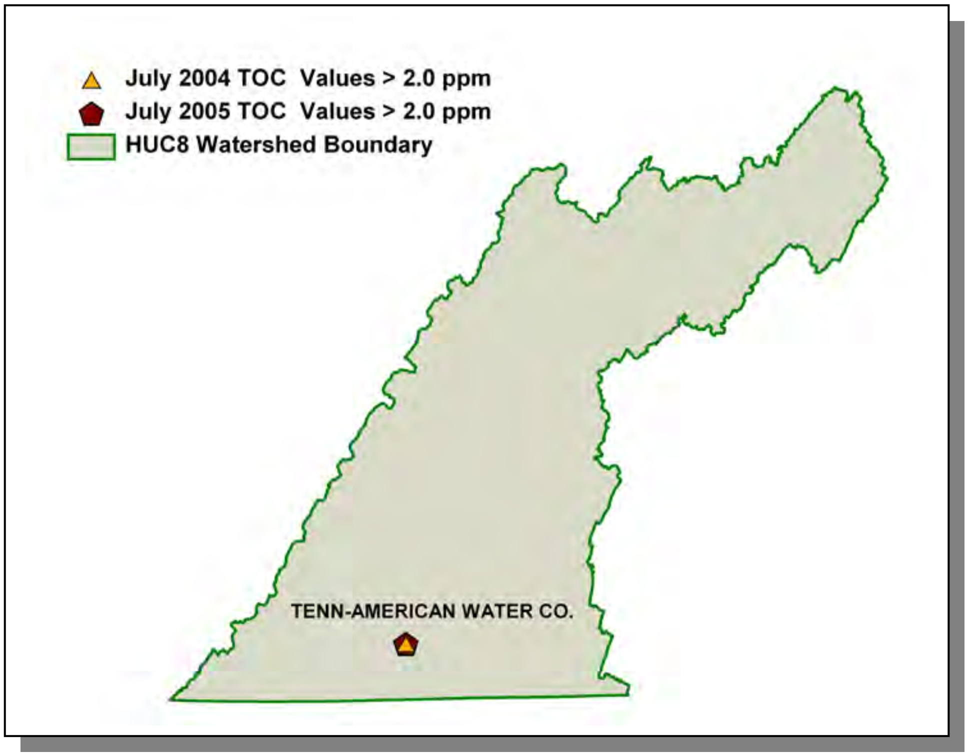


Figure 5-2. July 2004 and 2005 Raw Water Total Organic Carbon (TOC) Analysis in the Tennessee River Watershed.

For further discussion on ground water issues in Tennessee, the reader is referred to the Ground Water Section of the 305(b) Water Quality Report at http://www.tdec.net/water.shtml.

5.3.B. State Revolving Fund. TDEC administers the state's Clean Water State Revolving Fund Program. Amendment of the Federal Clean Water Act in 1987 created the Clean Water State Revolving Fund (SRF) Program to provide low-interest loans to cities, counties, and utility districts for the planning, design, and construction of wastewater facilities. The U.S. Environmental Protection Agency awards annual capitalization grants to fund the program and the State of Tennessee provides a twenty-percent funding match. TDEC has awarded loans totaling approximately $550 million since the creation of the SRF Program. SRF loan repayments are returned to the program and used to fund future SRF loans.

SRF loans are available for planning, design, and construction of wastewater facilities, or any combination thereof. Eligible projects include new construction or upgrading/expansion of existing facilities, including wastewater treatment plants, pump stations, force mains, collector sewers, interceptors, elimination of combined sewer overflows, and nonpoint source pollution remedies.

SRF loan applicants must pledge security for loan repayment, agree to adjust user rates as needed to cover debt service and fund depreciation, and maintain financial records that follow governmental accounting standards. SRF loan interest rates range from zero percent to market rate, depending on the community's per-capita income, taxable sales, and taxable property values. Most SRF loan recipients qualify for interest rates between 2 and 4 percent. Interest rates are fixed for the life of the term of the loan. The maximum loan term is 20 years or the design life of the proposed wastewater facility, whichever is shorter.

TDEC maintains a Priority Ranking System and Priority List for funding the planning, design, and construction of wastewater facilities. The Priority Ranking List forms the basis for funding eligibility determinations and allocation of Clean Water SRF loans. Each project's priority rank is generated from specific priority ranking criteria and the proposed project is then placed on the Project Priority List. Only projects identified on the Project Priority List may be eligible for SRF loans. The process of being placed on the Project Priority List must be initiated by a written request from the potential SRF loan recipient or their engineering consultant. SRF loans are awarded to the highest priority projects that have met SRF technical, financial, and administrative requirements and are ready to proceed.

Since SRF loans include federal funds, each project requires development of a Facilities Plan, an environmental review, opportunities for minority and women business participation, a State-approved sewer use ordinance and Plan of Operation, and interim construction inspections.

For further information about Tennessee's Clean Water SRF Loan Program, call (615) 532-0445 or visit their Web site at http://www.tdec.net/srf.

5.3.C. Tennessee Department of Agriculture. The Tennessee Department of Agriculture's Water Resources Section consists of the federal Section 319 Nonpoint Source Program and the Agricultural Resources Conservation Fund Program. Both of these are grant programs which award funds to various agencies, non-profit organizations, and universities that undertake projects to improve the quality of Tennessee's waters and/or educate citizens about the many problems and solutions to water pollution. Both programs fund projects associated with what is commonly known as "nonpoint source pollution."

The Tennessee Department of Agriculture's Nonpoint Source Program (TDA-NPS) has the responsibility for management of the federal Nonpoint Source Program, funded by the US Environmental Protection Agency through the authority of Section 319 of the Clean Water Act. This program was created in 1987 as part of the reauthorization of the Clean Water Act, and it established funding for states, territories and Indian tribes to address NPS pollution. Nonpoint source funding is used for installing Best Management Practices (BMPs) to stop known sources of NPS pollution, training, education, demonstrations and water quality monitoring. The TDA-NPS Program is a non-regulatory program, promoting voluntary, incentive-based solutions to NPS problems. The TDA-NPS Program basically funds three types of programs:

- BMP Implementation Projects. These projects aid in the improvement of an impaired waterbody, or prevent a non-impaired water from becoming listed on the 303(d) List.

- Monitoring Projects. Up to 20% of the available grant funds are used to assist the water quality monitoring efforts in Tennessee streams, both in the state's 5-year watershed monitoring program, and also in performing before-and-after BMP installation, so that water quality improvements can be verified. Some monitoring in the Tennessee portion of the Lower Tennessee River Watershed was funded under an agreement with the Tennessee Department of Agriculture, Nonpoint Source Program (U.S. Environmental Protection Agency Assistance Agreement C99944674-04-0).

- Educational Projects. The intent of educational projects funded through TDA-NPS is to raise the awareness of landowners and other citizens about practical actions that can be taken to eliminate nonpoint sources of pollution to the waters of Tennessee.

The Tennessee Department of Agriculture Agricultural Resources Conservation Fund Program (TDA-ARCF) provides cost-share assistance to landowners across Tennessee 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. Additionally, a portion of the TDA-ARCF is used to implement information and education projects statewide, with the focus on landowners, producers, and managers of Tennessee farms and forests.

Participating contractors in the program are encouraged to develop a watershed emphasis for their individual areas of responsibility, focusing on waters listed on the Tennessee 303(d) List as being impaired by agriculture. Current guidelines for the TDA-ARCF are available. Landowners can receive up to 75% of the cost of the BMP as a reimbursement.

Since January of 1999, the Department of Agriculture and the Department of Environment and Conservation have had a Memorandum of Agreement whereby complaints received by TDEC concerning agriculture or silviculture projects would be forwarded to TDA for investigation and possible correction. Should TDA be unable to obtain correction, they would assist TDEC in the enforcement against the violator. More information forestry BMPs is available at:

http://www.state.tn.us/agriculture/forestry/bmpmanual.html

The complaint form is available at:

http://www.state.tn.us/environment/wpc/forms/wqlogging_cn1274.doc

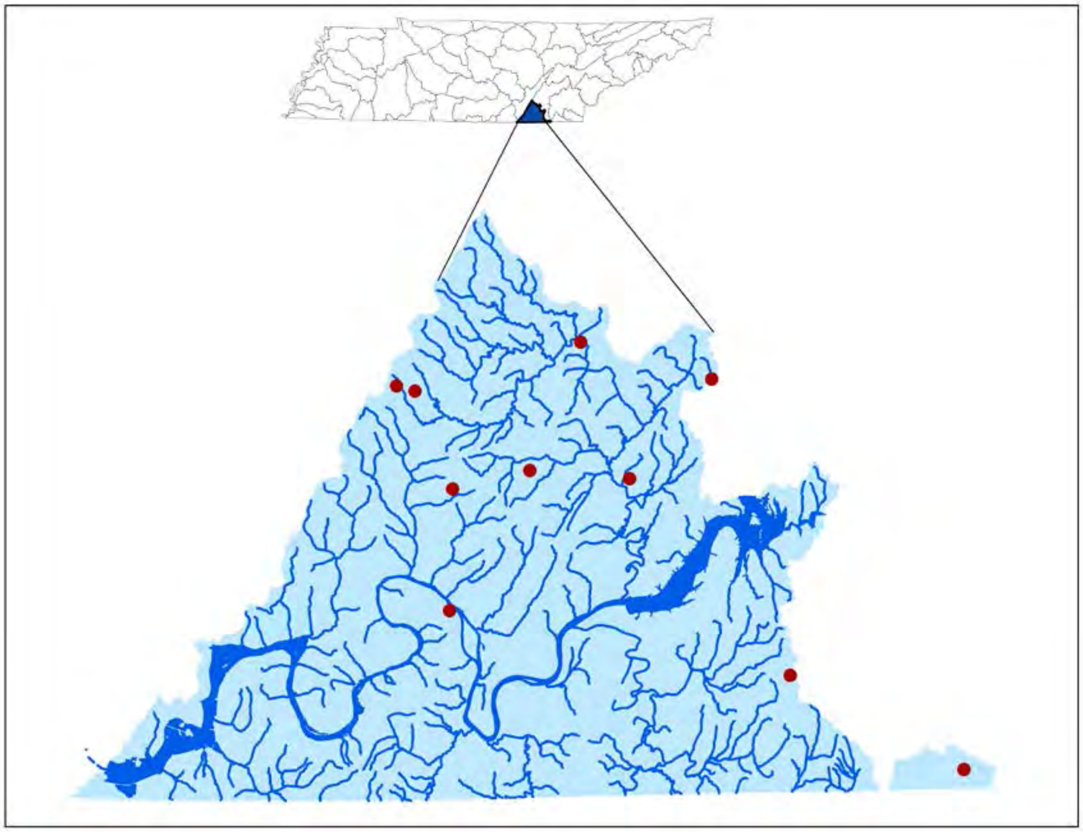


Figure 5-3. Location of BMPs installed from 1999 through 2005 in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed with Financial Assistance from the Tennessee Department of Agriculture's Nonpoint Source and Agricultural Resources Conservation Fund Grant Programs. *More information is provided in Appendix V.*

5.3.D. Georgia Department of Natural Resources, Environmental Protection Division. Georgia follows a 5 year basin group planning cycle for their watersheds. The Environmental Protection Division of Georgia manages their water quality and water resource issues through its Watershed Protection Branch. The Watershed Protection Branch manages water quality in Georgia. It issues permits to local governments and industry to regulate the discharge of treated wastewater. This branch also works to control nonpoint sources of pollution, including erosion and sedimentation, and manages storm water discharges. This Branch also conducts monitoring and modeling of Georgia's waterways.

Stream segment listing information, including name, location, HUC, associated sampling site location, etc., can be found in at www.gaepd.org. (scroll down to and click on "Browse by Program" "Water", then click "Watershed Protection Branch", "Georgia 305 (b)/303 (d) List Documents", "2006 Rivers/Streams Not Fully Supporting", and scroll through to the Tennessee Basin Streams.)

A discussion and table of the data used for listing and modeling in the TMDLs prepared in the Tennessee Basin can also be found at this site, (scroll down to and click on

"Browse by Program" "Water", then click "Watershed Protection Branch", "Total Maximum Daily Loadings" and scroll through to the Tennessee basin.)

In addition, a regional water management initiative, the Northwest Georgia Regional Water Resources Partnership, is a collaborative effort of two Regional Development Centers which has prepared and produced an updated scope of services for preparation of a comprehensive water management plan, and is involved with additional efforts which may have a bearing on the watershed.

Several links with possible contacts regarding water issues in Georgia are listed below:

http://garivers.org/pdf_files/river_basin_facts/tennessee.pdf

http://www.southeastwaterforum.org/roundtables/georgia.asp

http://www.tva.gov/river/neighbors/nov05/interbasin.htm

Regarding publicly owned treatment works (POTW) in the Georgia portion of the Lower Tennessee Watershed, the cities of Ringgold and Lafayette are preparing "permit-driven" watershed assessments and protection plans in the Lower Tennessee Watershed. According to 2000 DNR Board policy watershed assessments, including a monitoring plan and monitoring, a watershed assessment, and a watershed protection plan must be prepared for the service area or jurisdiction of the following POTWs:

1. POTWs with flows in excess of 1 MGD and any new or expanding treatment facilities (regardless of design capacity) are required to develop and implement a watershed protection plan.
    - For new or expanding facilities with flows in excess of 1 MGD, the plan applies to watersheds contained within the municipality's political boundaries and the areas to which the municipality provides sewer service
    - For new or expanding facilities with flows of 1 MGD or less, the plan applies only to areas where service is provided.
2. New and expanding facilities must receive approval of the watershed protection plan from EPD before permission to operate the facility under the permit (or at higher flows) will be given.

3. Existing POTWs that have flows greater than 1 MGD and which are not expanding, will have requirements for the development and approval of a watershed protection plan incorporated into their permits during the next river basin planning cycle.

For further information or questions, please contact Ted Mikalsen at (404-675-1614).

5.4. LOCAL INITIATIVES.

5.4.A. The North Chickamauga Creek Conservancy. The North Chickamauga Creek Conservancy (NCCC) is a citizen-created nonprofit 501(c)(3) organization that provides a structured, dedicated framework for constructive, pro-active citizen involvement and support in conserving the significant natural, historic, and cultural resources located within and near the North Chickamauga Creek watershed. NCCC was founded in 1993 as the Friends of the North Chickamauga Creek Greenway to create a public park for the North River communities of the Chattanooga metropolitan area. In its short 13 year history, NCCC has grown into an organization that has helped to conserve over 9,000 acres within and near the North Chickamauga Creek watershed. NCCC's work is supported through a combination of grants from local and national foundations and contributions and volunteer services from supportive individuals, companies, and organizations. NCCC often works in partnership with other organizations and governmental entities to accomplish common conservation goals. Our Projects Include:

- Extension of the Greenway along North Chickamauga Creek
- Linking the popular North Chickamauga Creek Greenway with the Tennessee Riverpark and downtown Chattanooga.
- Preservation of the scenic North Chickamauga Creek Gorge
- Establishing a trailhead for the Cumberland Trail State Scenic Trail within the North Chickamauga Creek Gorge and linking North Chick's scenic upland trails with the Cumberland Trail.
- Stewardship and restoration of ecologically significant habitats along North Chickamauga Creek including the water quality in the upper 18 miles of the creek
- Creation of opportunities for citizen involvement and education

North Chickamauga Creek begins with the union of two small streams, Standifer and Brimer Creeks, near the western rim of Walden's Ridge in Sequatchie County, Tennessee, approximately 15 miles from the city of Chattanooga. As the creek flows eastward into Hamilton County, it collects flow from Mossy, Cain, and Cooper Creeks and their upland tributaries before beginning a rapid descent toward the valley floor. North Chickamauga Creek cuts a spectacularly scenic, deep central gorge through the sandstone of the Cumberland Plateau. Past Hogskin Branch, the creek curves southward, rounding the wall of the escarpment. As it enters the valley, the waters of the creek spill into several caves and fissures eroded into the porous limestone of the valley floor causing the stream to disappear during much of the year to leave an exposed bed of dry white cobbles. A short distance downstream, the creek reemerges to wind its way through the Soddy Daisy, Middle Valley, and Hixson communities – some of the fastest growing areas in Hamilton County – before emptying into the Tennessee River just below Chickamauga Dam. In its 32-mile course from ridge top to river, the creek drains some 120 square miles of upland and valley land.

The centerpiece of NCCC's conservation effort to date is the 3,900 acre North Chickamauga Creek Gorge Pocket Wilderness. Across the creek, Bowater Inc.'s 1,100 acre North Chickamauga Pocket Wilderness is a favorite destination for hikers and kayakers and protects a large part of the viewshed of the Natural Area. The North Chickamauga Creek Gorge is listed by the National Park Service in their Nationwide

Rivers Inventory for its "outstanding scenic, recreational, geologic, fish and wildlife, historic, and cultural values." In addition, it is on the "Top 200" list of the American Rivers Conservation Council, on AWA's Top 40 list for 1993/1994 "Most Deserving of Attention for Protection," is one of the highest quality and most difficult whitewater creeks in eastern U.S., and a branch of the Cumberland Trail State Scenic Trail is planned for within the Gorge. A portion of the Gorge, primarily the lower area, has been surveyed for rare plant and animal species. Several have been identified and located in the gorge area. Protection of the pristine wilderness areas within and adjoining the North Chickamauga Creek Gorge is possibly the most urgent land conservation need in the Hamilton County area.

Significant sources of acid mine drainage originate from historic abandoned underground and surface coal mines and impact the headwaters and upper 18 miles of the creek. A multi-year project to design and install passive treatment systems, such as anoxic limestone drains and constructed wetlands, is underway. NCCC's partners include the U.S. Office of Surface Mining (OSM), TVA, Tennessee Division of Water Pollution Control and its Land Reclamation section, Tennessee Department of Agriculture, among others. The goal of the project is to improve the water quality to a level that will support restoration of a warm water fishery, and possibly provide an opportunity to reestablish a state endangered fish, the Ohio River Muskellunge. OSM uses its efforts in the North Chickamauga Creek watershed as a national model for its Appalachian Clean Streams Initiative.

The creek's water quality is sufficient below Cave Springs to support a modest trout fishery (the only one in Hamilton County). It is regularly stocked by the Tennessee Wildlife Resources Agency.

More information about the North Chickamauga Creek Conservancy and our projects is available on our website: http://www.northchick.org, or by emailing NCCC at contact@northchick.org.

5.4.B. The Nature Conservancy (TNC). The Tennessee State Wildlife Action Plan (SWAP), formerly known as the Comprehensive Wildlife Conservation Strategy (CWCS), was developed by the Tennessee Wildlife Resources Agency with assistance from The Nature Conservancy in 2005. Congress mandated that each state and territory in the United States develop a SWAP as a requirement for continued receipt of federal State Wildlife Grant funding. These plans require the completion of 8 key elements of wildlife planning: 1) a list of animal species of greatest conservation need, 2) information about the distribution and abundance of species targets, 3) locations and relative conditions of key habitats, 4) descriptions of problems affecting target species and their habitats, 5) descriptions of conservation actions and priorities for conserving target species and habitats, 6) details for monitoring target species, conservation actions, and adaptive management, 7) discussion of plans to review the SWAP at specific intervals, and 8) information about coordination and implementation of the SWAP with major stakeholders. In Tennessee, the SWAP was integrated into a spatial model using Geographic Information Systems (GIS) and other database technology. Priority aquatic, terrestrial, and subterranean areas for conservation were identified across the state. Priorities were determined in the GIS model based upon relative differences in species rarity, population viability, and potential mobility of species across habitat units. Priority problems affecting species and needed conservation actions are detailed across each region of the state. For complete information about the Tennessee SWAP, please visit: http://www.state.tn.us/twra/cwcs/cwcsindex.html to read or download the full report.

Contact:
Chris Bullington
State Conservation Planning Manager
The Nature Conservancy, TN Chapter
2021 21st Avenue South; Suite C-400
Nashville, TN 37212
phone: (615) 383-9909 x 227

5.4.C. Southeast Tennessee Resource Conservation and Development (RC&D) Council. The RC&D program is a United States Department of Agriculture (USDA) program administered by the Natural Resources Conservation Service. This program helps people on a local level, with the assistance of a Federal Coordinator, to work together with many local organizations, county and city governments and conservation districts to implement natural resource protection and community development. Once a specific area has been authorized by the Secretary of Agriculture, that area is eligible for assistance through its RC&D council.

RC&D council projects involving water are designed to help improve surface and groundwater quality and quantity. Projects may include watershed management; construction or rehabilitation of irrigation, flood control and water drainage systems; construction or rehabilitation of aquaculture, wastewater treatment and purification systems; installation of buffer strips; and efficient use of aquifers.

The Southeast Tennessee RC&D council area includes 12 Tennessee counties: Bledsoe, Bradley, Grundy, Hamilton, Loudon, Marion, McMinn, Meigs, Monroe, Polk, Rhea and Sequatchie.

For more information please contact Bob Peters, coordinator, at bobby.peters@tn.usda.gov.

5.4.D. South Chickamauga Creek Greenway Alliance. The South Chickamauga Creek Greenway Alliance (SCCGA) is made up of citizens from government, business, industry, non-profit organizations and other concerned individuals. Collectively they advocate for the protection, preservation, conservation and improvement of the watershed. South Chickamauga Creek Watershed has its origins in Georgia eventually emptying into the Tennessee River at the River Park in Chattanooga, Tennessee making up about 36% of the Nickajack Lake drainage area. It drains nearly 250,000 acres of land via about 463 miles of streams.

Formed in 1993, the SCCGA has been instrumental in supporting the establishment of greenway extensions to the existing Brainerd Levee and enhancement of the creek ecosystem. SCCGA speaks out when water quality is threatened, attends regional planning and permitting meetings, writes letters, speaks with media, makes key phone calls, and mounts appropriate strategies when the water quality of the creek will be degraded or the riparian edge is threatened. In 2001, the group received both the TDEC Aquatic Resource Preservation Award (Citizen Category) and a Chattanooga Volunteer Appreciation Award. SCCGA participates annually in River Rescue, monitors water quality, spots general conditions of concern along the creek and reports these to appropriate agencies.

For more information, visit the SCCGA web site at http://www.envirocity.org/sccga/ or contact Sandy Kurtz at sandykurtz@comcast.net.

CHAPTER 6

RESTORATION STRATEGIES IN THE LOWER TENNESSEE RIVER WATERSHED

6.1. BACKGROUND.

The Watershed Water Quality Management Plan serves as a comprehensive inventory of resources and stressors in the watershed, a recommendation for control measures, and a guide for planning activities in the next five-year watershed cycle and beyond. Water quality improvement will be a result of implementing both regulatory and nonregulatory programs.

In addition to the NPDES program, some state and federal regulations, such as the TMDL and ARAP programs, address point and nonpoint issues. Construction and MS4 storm water rules (implemented under the NPDES program) have transitioned from Phase 1 to Phase 2. More information on storm water rules may be found at: http://www.state.tn.us/environment/wpc/stormh2o/.

This Chapter addresses point and nonpoint source approaches to water quality problems in the Group 4 portion of the Tennessee portion of the Lower Tennessee River Watershed.

6.2. COMMENTS FROM PUBLIC MEETINGS. Watershed meetings are open to the public, and most meetings were represented by citizens who live in the watershed, NPDES permitees, business people, farmers, and local river conservation interests. Locations for meetings were chosen after consulting with people who live and work in the watershed. Everyone with an interest in clean water is encouraged to be a part of the public meeting process. The times and locations of watershed meetings are posted at: http://www.state.tn.us/environment/wpc/watershed/public.shtml.

6.2.A. Year 1 Public Meeting. The first Lower Tennessee River Watershed public meeting was held March 21, 1999 at the Chattanooga Environmental Field Office in Chattanooga. The goals of the meeting were to: (1) present, and review the objectives of, the Watershed Approach, (2) introduce local, state, and federal agency and nongovernmental organization partners, (3) review water quality monitoring strategies, and (4) solicit input from the public.

Major Concerns/Comments

- Increasing amount of sediment in streams
- Impacts of urbanization
- Problems related to industrial forestry
- Loss of vegetative buffer strips as TVA opens shorelines to development
- Rate of urban sprawl in Hamilton County
- Pressures on STPs from unplanned development
- Chickamauga dam expansion and the increased extraction of natural resources that will follow
- Lack of incentive for single family residences to be good land stewards
- Nutrient loading in Nickajack Lake

6.2.B. Year 3 Public Meeting. The second Lower Tennessee River Watershed public meeting was held December 11, 2001 at the Environmental Assistance Center in Chattanooga. The goals of the meeting were to: (1) provide an overview of the watershed approach, (2) review the monitoring strategy, (3) summarize the most recent water quality assessment, (4) discuss the TMDL schedule and citizens' role in commenting on draft TMDLs, and (5) discuss BMPs and other nonpoint source tools available through the Tennessee Department of Agriculture 319 Program and NRCS conservation assistance programs.

Major Concerns/Comments

- Several comments about lack of manpower to do adequate monitoring
- Firebreaks (from bulldozers) in response to forest fires cause sediment to get into streams
- Silt from clear cuts gets to second order streams
- Not enough protection of threatened and endangered species

6.2.C. Year 5 Public Meeting. The third scheduled Lower Tennessee River Watershed public meeting was held October 9, 2007 at the Environmental Field Office in Chattanooga and featured nine educational components:

- Overview of watershed approach flash video
- Benthic macroinvertebrate specimens and interpretation
- SmartBoard™ with interactive GIS maps
- "Is Your Stream Healthy" self-guided slide show
- "Why We Do Biological Sampling" self-guided slide show
- Water supply and ground water protection educational display
- Water quality and land use maps
- South Chickamauga Creek Greenway Alliance
- Tennessee Valley Authority educational display

In addition, citizens had the opportunity to make formal comments on the draft Watershed Water Quality Management Plan.

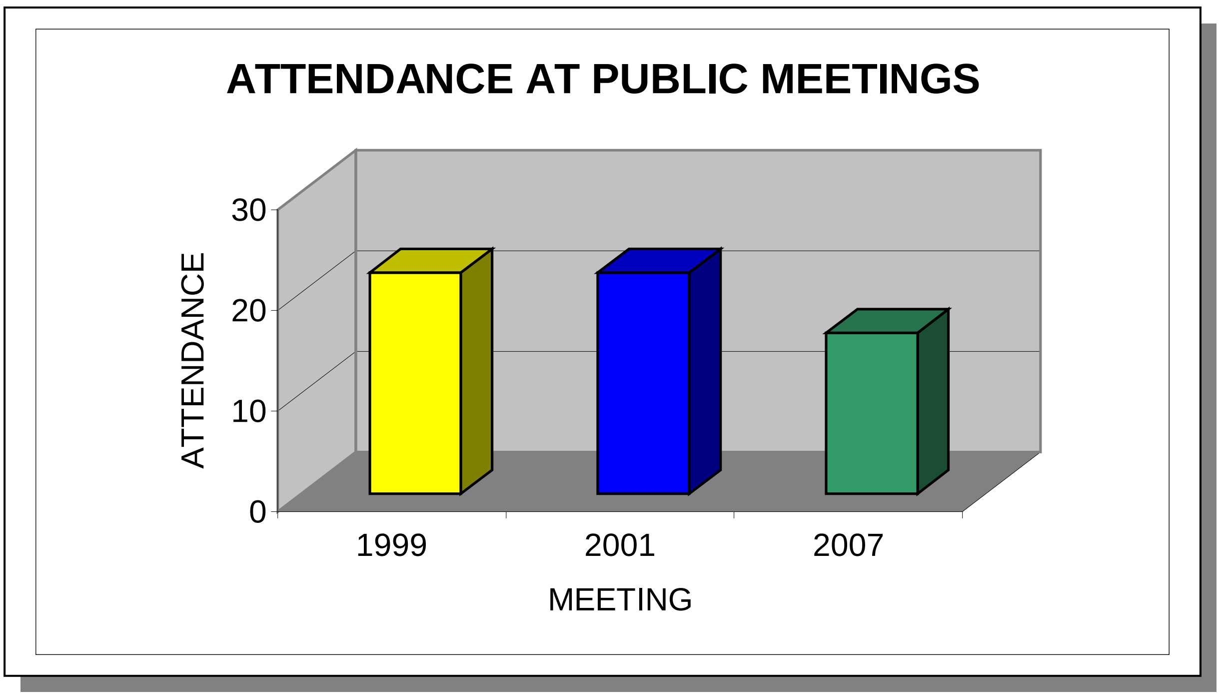


Figure 6-1. Attendance at the Lower Tennessee River Watershed Public Meetings. *Attendance numbers do not include TDEC personnel.*

Figure 6-2. Watershed Meetings Typically Begin with a Short Presentation by Staff.

Figure 6-3. Watershed Meetings Provide a Good Opportunity for Local Groups to Talk About Their Projects in the Watershed With Citizens in Attendance*. In this case, Sandy Kurtz (North Chickamauga Creek Conservancy) describes the work her organization does in the watershed.*

Figure 6-4. At Watershed Meetings, Citizens Learn About Benthic Macroinvertebrates (Small Invertebrates that Live on the Bottom of the Streams) in Their Watershed.

Figure 6-5. Scotty Sorrells (Division of Water Supply) explains the complicated issues involved with groundwater as a source of drinking water.

Figure 6-6. Watershed Meetings Provide a Good Opportunity for Citizens to Speak with Staff About Concerns and Activities in the Watershed.

Figure 6-7. Networking is a Valuable Outcome of Watershed Meetings.

Figure 6-8. The SmartBoard™ is an Effective Interactive Tool to Teach Citizens About the Power of GIS.

6.3. APPROACHES USED.

6.3.A. Point Sources. Point source contributions to stream impairment are primarily addressed by NPDES and ARAP permit requirements and compliance with the terms of the permits. Notices of NPDES and ARAP draft permits available for public comment can be viewed at http://www.state.tn.us/environment/wpc/wpcppo/. Discharge monitoring data submitted by NPDES-permitted facilities may be viewed at http://www.epa.gov/enviro/html/pcs/pcs_query_java.html.

The purpose of the TMDL program is to identify remaining sources of pollution and allocate pollution control needs in places where water quality goals are still not being achieved. TMDL studies are tools that allow for a better understanding of load reductions necessary for impaired streams to return to compliance with water quality standards. More information about Tennessee's TMDL program may be found at:
http://www.state.tn.us/environment/wpc/tmdl/.

Approved TMDL:

Lower Tennessee River. A Total Maximum Daily Load for pH and Iron in North and South Suck Creek in the Lower Tennessee River Watershed in Bledsoe, Bradley, Hamilton, Loudon, Marion, McMinn, Meigs, Rhea, Roane, and Sequatchie Counties. Approved July 7, 2006.
http://www.state.tn.us/environment/wpc/tmdl/approvedtmdl/LowerTnEcoli.pdf

North and South Suck Creek. A Total maximum Daily Load for pH and Iron in North and South Suck Creek in the Lower Tennessee River Watershed in Hamilton, Marion, and Sequatchie Counties. Approved August 16, 2006.
http://www.state.tn.us/environment/wpc/tmdl/approvedtmdl/SuckCreekPH&Iron.pdf

Lower Tennessee River. Total Maximum Daily Load for Siltation and Habitat Alteration in the Lower Tennessee River Watershed in Bledsoe, Bradley, Hamilton, Loudon, Marion, McMinn, Meigs, Rhea, Roane, and Sequatchie Counties. Approved September 25, 2006.
http://www.state.tn.us/environment/wpc/tmdl/approvedtmdl/LowerTnSed.pdf

North Chickamauga Creek. A Total Maximum Daily Load for pH for North Chickamauga Creek in the Tennessee River Watershed. Approved March 17, 2005.
http://www.state.tn.us/environment/wpc/tmdl/approvedtmdl/NChickFinal.pdf

TMDLs are prioritized for development based on many factors.

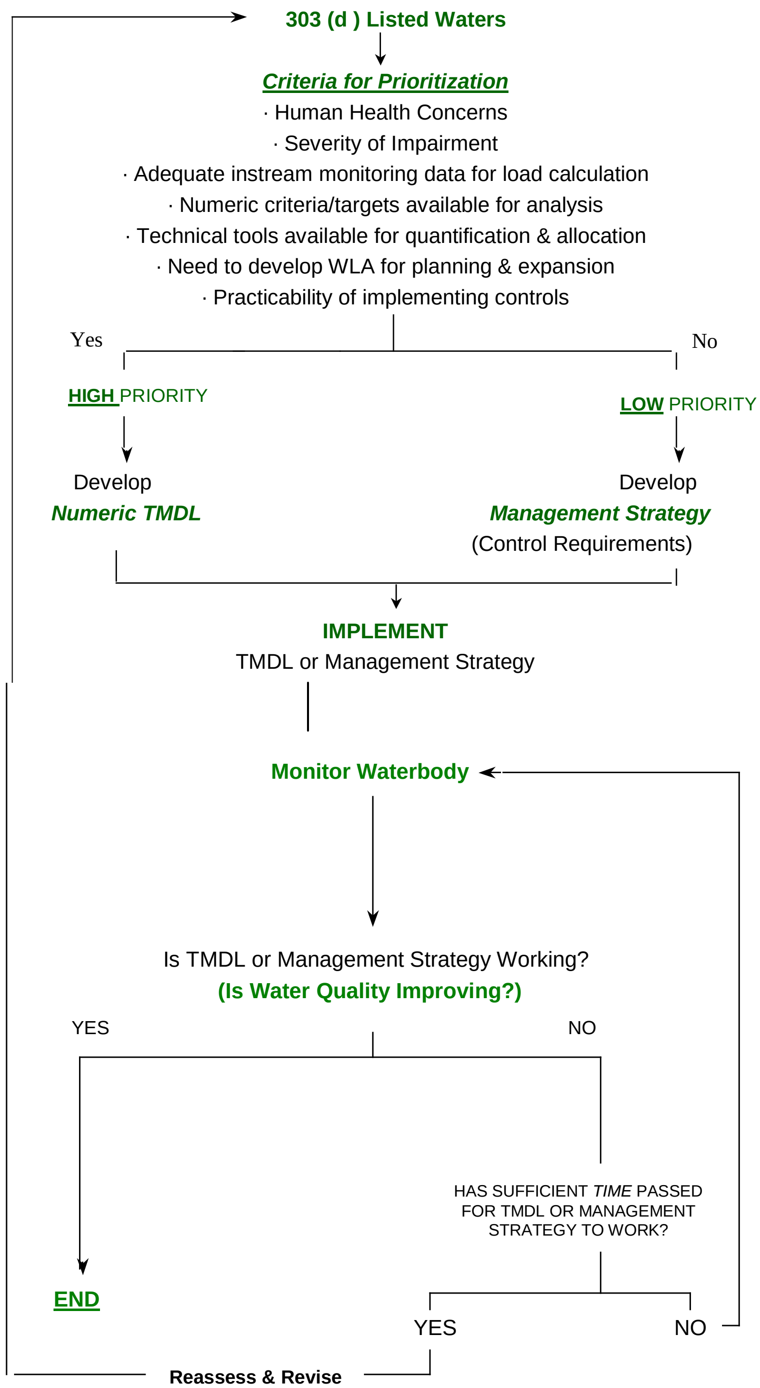


Figure 6-9. Prioritization Scheme for TMDL Development.

6.3.B. Nonpoint Sources

Common nonpoint sources of pollution in the Lower Tennessee River Watershed include urban storm water runoff, riparian vegetation removal and other habitat alterations, inappropriate land development, off road vehicles, poor road construction practices, acid mine drainage from historical mine and rock harvesting sites, as well as inappropriate agricultural practices. Since nonpoint pollution exists essentially everywhere rain falls, existing point source regulations can have only a limited effect. Other measures are, therefore, necessary.

There are several state and federal regulations that address contaminants impacting waters in the Lower Tennessee River Watershed, specifically the tributaries flowing into Nickajack Lake as well as Nickajack Lake itself. Most of these are limited to point sources: a pipe or ditch. Often, controls of point sources are not sufficient to protect waters, so other measures are necessary. Some measures include efforts by landowners and volunteer groups and the possible implementation of new regulations. Many agencies, such as the Tennessee Department of Agriculture (TDA) and the Natural Resources Conservation Service (NRCS), offer financial assistance to landowners for corrective actions (like Best Management Practices) that may be sufficient for recovery of impacted streams. Many nonpoint problems will require an active civic involvement at the local level geared towards establishment of improved zoning guidelines, building codes, streamside buffer zones and greenways, and general landowner education. Other problem sources, such as acid mine drainage, require assistance from the Office of Surface Mining and Remediation in order for the streams affected by acid mine drainage to meet water quality standards.

The following text describes types of impairments, possible causes, and suggested improvement measures. Restoration efforts should not be limited to only those streams and measures suggested below.

6.3.B.i. Sedimentation.

6.3.B.i.a. From Construction Sites. Construction activities have historically been considered “nonpoint sources.” In the late 1980’s, EPA designated them as being subject to NPDES regulation if more than 5 acres were being disturbed. In the spring of 2003, that threshold became 1 acre. The general permit issued for such construction sites establishes conditions for maintenance of the sites to minimize pollution from storm water runoff, including requirements for installation and inspection of erosion prevention and sediment controls. Also, the general permit imposes more stringent inspection, design criteria, sediment control measures, and self-monitoring requirements on sites in the watershed of streams that are already impaired due to sedimentation or are considered high quality. Regardless of the size, no construction site is allowed to cause a condition of pollution. Examples of streams impaired by sediment and land development in the Lower Tennessee River Watershed are Friar Branch, South Chickamauga Creek, and Mountain Creek.

Beginning in 2003, the state began requiring some municipalities to obtain coverage under a permit designed to address nonpoint runoff issues: the General NPDES Municipal Separate Storm Sewer System Permit, commonly known as MS4. This permit requires the holder to develop a comprehensive storm water management program, including the adoption of local regulatory ordinances, regular inspection of construction sites and other discharges into their storm sewers, and a variety of educational, mapping, and monitoring activities. The state audits and oversees these local MS4 programs.

Construction sites within a sediment-impaired watershed may also have higher priority for inspections by WPC and MS4 personnel, and are likely to have enforcement actions for failure to control erosion.

6.3.B.i.b. From Channel and/or Bank Erosion. Many streams within the Lower Tennessee River Watershed suffer from varying degrees of streambank erosion. When steam channels are altered, banks can become unstable and highly erodable. Heavy livestock traffic can also severely disturb banks. When large tracts of land are cleared of vegetation (especially trees) and replaced with impermeable surfaces like asphalt and rooftops, the large increases in the velocities and volumes of storm water runoff can also overwhelm channel and bank integrity because destabilized banks contribute to sediment loadings and to the loss of beneficial riparian vegetation. Some inappropriate agricultural practices and overzealous land development have impacted the hydrology and morphology of stream channels in this watershed.

Unpermitted rock harvesting can also severely disturb stream banks. Destabilized banks contribute to sediment load and to the loss of beneficial riparian vegetation to the stream. The historical removal of cobble and rock from stream channels has resulted in destabilization of stream channels and aggressive erosion of stream banks.

Several agencies such as the NRCS, TVA, and TDA, as well as citizen watershed groups, are working to stabilize portions of stream banks using bioengineering and other techniques. Many of the affected streams could benefit from these types of projects.

Some methods or controls that might be necessary to address common problems are:

Voluntary Activities

- Re-establish bank vegetation (Citico Creek, Friar Branch, Rogers Branch, Dobbs Branch, Gillespie Springs Branch, Chattanooga Creek, Stringers Branch, Mountain Creek, and unnamed tributaries to South Chickamauga Creek, North Chickamauga Creek, Citico Creek, and Chattanooga Creek).
- Increase efforts in the Master Logger Program to recognize impaired streams and require more effective management practices.
- Better community planning for the impacts of development on small streams, especially development in growing areas (Friar Branch, Hurricane Creek, Lick Branch, Mountain Creek).
- Establish off-channel watering areas for livestock by moving watering troughs and feeders back from stream banks, or at least limit cattle access to restricted areas with armored bank entry.
- Limit cattle access to streams and bank vegetation.

Regulatory Strategies

- Restrict rock harvesting to permitted sites.
- Require post-construction run-off rates to be no greater than pre-construction rates in order to avoid in-channel erosion (all MS4 areas should establish these ordinances).
- Limit clearing of stream and ditch banks or other alterations. *Note: Permits may be required for any work along streams.*
- Implement additional restrictions on logging in streamside management zones (North Chickamauga Creek).
- Restrict the use of off-highway vehicles on stream banks and in stream channels (upper portions of the North Chickamauga Creek Watershed, North Suck Creek Watershed, Mullens Creek Watershed, Conner Creek Watershed).

Additional Strategies

- Better community planning and MS4 oversight for the impacts of development on small streams, especially development in growing areas.
- Encourage or require strong local buffer ordinances.
- Restrict the use of off-highway vehicles on stream banks and in stream channels.
- Limit road and utility crossings of streams through better site design.

6.3.B.i.c. From Agriculture and Silviculture. The Water Quality Control Act exempts normal agricultural and silvicultural practices that do not result in a point source discharge. Nevertheless, efforts are being made to address impacts due to these exempted practices.

The Master Logger Program has been in place for several years to train loggers how to install Best Management Practices that lessen the impact of logging activities on streams. Recently, laws and regulations established the authority for the Commissioners of the Departments of Environment and Conservation and of Agriculture to stop the logging operation that, upon failing to install these BMPs, is causing impacts to streams.

Since the Dust Bowl era, the agriculture community has strived to protect the soil from wind and water erosion. Agencies such as the Natural resources Conservation Service (NRCS), the University of Tennessee Agricultural Extension Service, and the Tennessee Department of Agriculture are striving to identify better ways of farming, to educate the farmers, and to install the methods that address the sources of some of the impacts due to agriculture. Cost sharing is available for many of these measures.

Many sediment problems traceable to agricultural practices also involve riparian loss due to close row cropping or pasture clearing for grazing. Lack of vegetated buffers along stream corridors is a problem in some areas of the Lower Tennessee River Watershed, due both to agricultural and residential/commercial land uses. Many streams could benefit from the establishment of more extensive riparian buffer zones.

6.3.B.ii. Pathogen Contamination.

Possible sources of pathogens in streams are inadequate or failing septic tank systems, overflows or breaks in public sewer collection systems, poorly disinfected discharges from sewage treatment plants, and fecal matter from pets, livestock and wildlife washed into streams and storm drains. When fecal bacterial levels are shown to be consistently elevated to dangerously high levels, especially in streams with high potential for recreational uses, the division must post signage along the creek warning the public to avoid contact. Once pathogen sources have been identified and corrected, and pathogen level reductions are documented, the posting is lifted.

Permits issued by the Division of Water Pollution Control regulate discharges from point sources and require adequate control for these sources. Individual homes are required to have subsurface, on-site treatment (i.e., septic tank and field lines) if public sewers are not available. The Division of Ground Water Protection within the Chattanooga Environmental Field Office and delegated county health departments regulate septic tanks and field lines. In addition to discharges to surface waters, businesses may employ subsurface treatment for domestic wastewater or surface discharge of treated process wastewater. The Division of Water Pollution Control regulates surface water discharges and near-surface land application of treated wastewater.

Currently, seventeen streams in the Group 4 portion of the Tennessee portion of the Lower Tennessee River Watershed are known to have excessive pathogen contamination. North Market Street Branch, Friar Branch, Spring Creek, West Chickamauga Creek, South Chickamauga Creek, Citico Creek, Dobbs Branch, Chattanooga Creek, Stringers Branch, Gillespie Springs Branch, and unnamed tributaries to South Chickamauga Creek, Citico Creek, and Chattanooga Creek are impacted by urban areas, with contributions of bacterial contamination coming from storm water runoff, sewage collection system leaks, and treatment plant operation failures originating from the Chattanooga area. In the Signal Mountain area, numerous failing septic tank systems affect Shoal Creek, Short Creek, and Bee Creek. McFarland Springs Branch and a portion of South Chickamauga Creek are impacted Georgia before they flow into Tennessee. Therefore, it is necessary to involve the Georgia Environmental Protection Division in order for these streams to reach attainment status.

Some measures that may be necessary to control pathogens are:

Voluntary Activities

- Clean up pet waste.
- Repair failed septic systems.
- Establish off-channel watering of livestock.
- Limit livestock access to streams and restrict stream crossings.
- Improve and educate on the proper management of animal waste from confined feeding operations.

Regulatory Strategies

- Strengthen enforcement of regulations governing on-site wastewater treatment.
- Determine timely and appropriate enforcement for non-complying sewage treatment plants, large and small, and their collection systems.
- Identify Concentrated Animal Feeding Operations not currently permitted.
- Develop and enforce leash laws and controls on pet fecal material.
- Review the pathogen limits in discharge permits to determine the need for further restriction.

Additional Strategies

- Develop intensive planning in areas where sewer is not available and treatment by subsurface disposal is not an option due to poor soils, floodplains, or high water tables.
- Greater efforts by sewer utilities to identify leaking lines or overflowing manholes.

6.3.B.iii. Excessive Nutrients and/or Dissolved Oxygen Depletion.

These two impacts are usually listed together because high nutrients often contribute to low dissolved oxygen within a stream. Since nutrients often have the same source as pathogens, the measures previously listed can also address many of these problems. Elevated nutrient loadings are also often associated with urban runoff from impervious surfaces, from fertilized lawns and croplands, and faulty sewage disposal processes. Nutrients are often transported with sediment, so many of the measures designed to reduce sediment runoff will also aid in preventing organic enrichment of streams and lakes.

Dissolved oxygen depletion can also be due to the discharge of other biodegradable materials. These are limited in NPDES permits as ammonia and as either Biological Oxygen Demand (BOD) or Carbonaceous Oxygen Demand (CBOD).

Some sources of nutrients can be addressed by:

Voluntary Activities

- Educate homeowners and lawn care companies in the proper application of fertilizers.
- Encourage landowners, developers, and builders to leave stream buffer zones. Streamside vegetation can filter out many nutrients and other pollutants before they reach the stream. These riparian buffers are also vital along livestock pastures. Examples of streams that can benefit are Citico Creek, South Chickamauga Creek, Lick Branch, Friar Branch, and Rogers Branch.
- Use grassed drainage ways that can remove fertilizer before it enters streams.
- Use native plants for landscaping since they don't require as much fertilizer and water.
- Develop better overall storm water management in urban and residential areas, including retrofitting existing commercial lots, homes, and roadways with storm water quality and quantity BMPs. This would especially improve the urban streams and lakes currently polluted by excessive nutrient inputs.

Physical changes to streams can prevent them from providing enough oxygen to biodegrade the materials that are naturally present. A few additional actions can address this problem:

- Maintain shade over a stream. Cooler water can hold more oxygen and retard the growth of algae. As a general rule, all stream channels suffer from some canopy removal. An intact riparian zone also acts as a buffer to filter out nutrient loads before they enter the water.
- Discourage impoundments. Ponds and lakes do not aerate water. *Note: Permits may be required for any work on a stream, including impoundments.*

Regulatory Strategies

- Strengthen enforcement of regulations governing on-site wastewater treatment.
- Impose more stringent permit limits for nutrients discharged from sewage treatment plants.
- Impose timely and appropriate enforcement for noncomplying sewage treatment plants, large and small, and their collection systems.
- Identify Concentrated Animal Feeding Operations (CAFO) not currently permitted.
- Identify any Animal Feeding Operations (AFO) that contribute to stream impacts and declare them as a CAFO requiring a permit.
- Support and train local MS4 programs within municipalities to deal with storm water pollution issues and require additional storm runoff quality control measures.
- Require nutrient management plans for all golf courses.

Additional Strategies

- Encourage TDA- and NRCS-sponsored educational programs targeted to agricultural landowners and aimed at better nutrient management, as well as information on technology-based application tools.

6.3.B.iv. Toxins and Other Materials.

Although some toxic substances are discharged directly into waters of the state from a point source, much of these materials are washed in during rainfalls from an upland location, or via improper waste disposal that contaminates groundwater. In the Group 4 portion of the Tennessee portion of the Lower Tennessee River Watershed, a relatively small number of streams are damaged by storm water runoff from industrial facilities or urban areas. More stringent inspection and regulation of permitted industrial facilities, and local storm water quality initiatives and regulations, could help reduce the amount of contaminated runoff reaching state waters.

Individuals may also cause contaminants to enter streams by activities that may be attributed to apathy or the lack of knowledge or civility. Litter in roadside ditches, garbage bags tossed over bridge railings, paint brushes washed off over storm drains, and oil drained into ditches are all blatant examples of pollution in streams. To lessen the future impact to the waters of the state, each community can strive to raise its awareness for better conservation practices and prosecution of violators.

Some of these problems can be addressed by:

Voluntary Activities
- Provide public education.
- Paint warnings on storm drains that connect to a stream.
- Sponsor community clean-up days.
- Landscape public areas.
- Encourage public surveillance of their streams and reporting of dumping activities to their local authorities.

Regulatory Strategies
- Continue to prohibit illicit discharges to storm drains and to search them out.
- Strengthen litter law enforcement at the local level.
- Increase the restrictions on storm water runoff from industrial facilities.

6.3.B.v. Habitat Alteration.

The alteration of the habitat within a stream can have severe consequences. Whether it is the removal of the vegetation providing a root system network for holding soil particles together, the release of sediment, which increases the bed load and covers benthic life and fish eggs, the removal of gravel bars, "cleaning out" creeks with heavy equipment, or the impounding of the water in ponds and lakes, many alterations impair the use of the stream for designated uses. Habitat alteration also includes the draining or filling of wetlands.

Although large-scale public projects such as highway construction can alter significant portions of streams, individual landowners and developers are responsible for the vast majority of stream alterations.

Some measures that can help address these problems are:

Voluntary Activities
- Sponsor litter pickup days to remove litter that might enter streams
- Organize stream cleanups removing trash, limbs and debris before they cause blockage.
- Avoid use of heavy equipment to "clean out" streams. Instream work other than debris removal will require an Aquatic Resource Alteration Permit (ARAP).
- Plant native vegetation along streams to stabilize banks and provide habitat (Citico Creek).
- Encourage developers to avoid extensive use of culverts in streams.

Regulatory Strategies

- Restrict modification of streams by means such as culverting, lining, or impounding (Gillespie Springs Branch, McFarland Springs Branch, Citico Creek, Friar Branch, Mackey Branch).
- Require mitigation for impacts to streams and wetlands when modifications are allowed.
- Require permitting of all rock harvesting operations.
- Increased enforcement may be needed when violations of current regulations occur, especially for illicit gravel dredging.

6.3.B.vi. Acid Rock Drainage (ARD).

Another source of pollution comes from abandoned and active mines as well as the disturbance of strata containing certain sulphide minerals such as those containing pyrite. Fore example, roads cuts through certain types of rock layers can also contribute to the pollution of waters of the state. These streams are impacted by ARD, which causes the pH to drop to below 6.0.

Streams may be impacted by chemical reactions that result in orange flocculant material in the water and on the bottom of streams. Seeps may develop an oily film on the surface of the water. The orange color comes from the iron in the water precipitating out when the water reaches the surface and starts to oxidize. Once the iron has precipitated out, other metals will start to precipitate, like manganese and aluminum (manganese forms a hard black coating on the substrate and aluminum a fine white chalky layer). Examples of streams affected by ARD in the Group 4 Portion of the Lower Tennessee River Watershed are North and South Suck Creeks, North Chickamauga Creek, and a number of its tributaries.

The means necessary to remove ARD from these streams is complicated and expensive. There are two types of treatment systems, Passive Treatment and Active Treatment. Two examples of Passive Treatment facilities are anoxic limestone drains and constructed wetlands (alone or in some combination lined with limestone rock). These systems are used to precipitate the flocculants and stabilize the pH. Active Treatment systems collect the water at the source and actively drop neutralizing chemicals into the water in order to stabilize the pH and precipitate iron prior to discharging to a stream. Since these treatment systems will have to go on for many years, the most cost effective means to treat these streams is by Passive Treatment. In order to install these systems the landowners, stakeholders and Office of Surface Mining all have to work together. Most of the streams in the North Chickamauga Creek watershed have passive treatment systems. Hogskin Branch is the one exception, due to its location.

Some of these problems can be addressed by:

Voluntary Activities

- Provide public education.
- Get stakeholders involved in the construction and maintenance of the wetlands.

Regulatory Strategies

- Mining (and some TDOT) activities covered by an NPDES or ARAP permit should have a longer period of post-termination monitoring and remediation as a requirement of permit issuance.

Abandoned Coal Mines pose serious threats to public health, safety, and welfare as well as degrade the environment. The programs of Tennessee 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 environment, and (3) They restore resources to make them available for economic development, recreation, and other uses. Problems typically addressed by the Land reclamation Section include open or improperly filled mine shafts, dilapidated mine buildings and equipment, toxic mine refuse and drainage, landslides, mine fires, highwalls, and subsidence.

Projects on the ground:

- Standifer 3 and 6. A project to construct an acid mine drainage treatment system by Nickajack Lake.

6.3.B.vii. Storm Water.

MS4 discharges are regulated through the Phase I or II NPDES-MS4 permits. These permits require the development and implementation of a Storm Water Management Program (SWMP) that will reduce the discharge of pollutants to the maximum extent practicable and not cause or contribute to violations of state water quality standards. The NPDES General Permit for Discharges from Phase I and II MSF facilities can be found at:

http://www.state.tn.us/environment/wpc/stormh2o/.

For discharges into impaired waters, the MS4 General Permit requires that SWMPs include a section describing how discharges of pollutants of concern will be controlled to ensure that they do not cause or contribute to instream exceedances of water quality standards. Specific measurements and BMPs to control pollutants of concern must also be identified. In addition, MS4s must implement the proposed waste load allocation provisions of an applicable TMDL (i.e., siltation/habitat alteration, pathogens) and describe methods to evaluate whether storm water controls are adequate to meet the waste load allocation. In order to evaluate SWMP effectiveness and demonstrate compliance with specified waste load allocations, MS4s must develop and implement appropriate monitoring programs.

Some storm sewer discharges are not regulated through the NPDES MS4 program. Strategies to address runoff from in these urban areas include adapting Tennessee Growth Readiness Program (TGRP) educational materials to the watershed. TGRP is a statewide program built on existing best management practices from the Nonpoint Education for Municipal Officials program and the Center for Watershed Protection. TGRP developed the program to provide communities and counties with tools to design economically viable and watershed friendly developments. The program assists community leaders in reviewing current land use practices, determining impacts of imperviousness on watershed functions, and allowing them to understand the economics of good watershed management and site design.

6.4. PERMIT REISSUANCE PLANNING

Under the *Tennessee Water Quality Control Act*, municipal, industrial and other dischargers of wastewater must obtain a permit from the Division. Approximately 1,700 permits have been issued in Tennessee under the federally delegated National Pollutant Discharge Elimination System (NPDES). These permits establish pollution control and monitoring requirements based on protection of designated uses through implementation of water quality standards and other applicable state and federal rules.

The following three sections provide specific information on municipal, industrial, and water treatment plant active permit holders in the Lower Tennessee River Watershed. Compliance information was obtained from EPA's Permit Compliance System (PCS). All data was queried for a five-year period between August 1, 2002 and July 31, 2007. PCS can be accessed publicly through EPA's Envirofacts website. This website provides access to several EPA databases to provide the public with information about environmental activities that may affect air, water, and land anywhere in the United States:

http://www.epa.gov/enviro/html/ef_overview.html

Stream Segment information, including designated uses and impairments, are described in detail in Chapter 3, *Water Quality Assessment of the Lower Tennessee River Watershed.*

6.4.A. Municipal Permits

TN0021211 Hamilton County Wastewater Treatment Authority, Signal Mountain STP

Discharger rating: Minor
City: Signal Mountain
County: Hamilton
EFO Name: Chattanooga
Issuance Date: 10/1/07
Expiration Date: 8/31/09
Receiving Stream(s): Tennessee River at mile 453.7
HUC-12: 060200010502
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: Contact stabilization and chlorination

Segment	TN06020001001_1000
Name	Nickajack Reservoir
Size	10370
Unit	Acres
First Year on 303(d) List	-
Designated Uses	Recreation (Non-Supporting), Irrigation (Supporting), Fish and Aquatic Life (Supporting), Industrial Water Supply (Supporting), Domestic Water Supply (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls
Sources	Contaminated Sediments

Table 6-1. Stream Segment Information for Hamilton County Wastewater Treatment Authority, Signal Mountain STP.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD % removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
BOD % removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
BOD5	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
BOD5	All Year	133	lb/day	DMax Load	3/Week	Composite	Effluent
BOD5	All Year	30	mg/L	WAvg Conc	3/Week	Composite	Effluent
BOD5	All Year	100	lb/day	MAvg Load	3/Week	Composite	Effluent
BOD5	All Year	40	mg/L	MAvg Conc	3/Week	Composite	Effluent
D.O.	All Year	1	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
E. coli	All Year	487	#/100mL	MAvg Ari Mean	3/Week	Grab	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	3/Week	Composite	Effluent
TRC	All Year	2	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year	100	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year	133	lb/day	DMax Load	3/Week	Composite	Effluent
TSS	All Year	30	mg/L	WAvg Conc	3/Week	Composite	Effluent
TSS	All Year	40	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-2. Permit Limits for Hamilton County Wastewater Treatment Authority, Signal Mountain STP.

Compliance History:
The following numbers of exceedences were noted in PCS:

7 Biological Oxygen Demand
2 Total Suspended Solids
2 Settleable Solids
1 Total Chlorine
1 Suspended Solids % Removal

Comments:
Contact stabilization and chlorination; Modification imposes limits on new sewer connections until collection system overflows are remedied and aligns pathogen monitoring and limits with current water quality standards for recreation.

TN0024210 Chattanooga - Moccasin Bend WWTP and Combined Sewer System

Discharger rating:	Major
City:	Chattanooga
County:	Hamilton
EFO Name:	Chattanooga
Issuance Date:	4/1/07
Expiration Date:	12/30/09
Receiving Stream(s):	Tennessee River (Nickajack Reservoir) miles 457.8 (001-WWTP), 465.2 (004-Citico), 463.3 (005-Tremont, 007-M.L. King Blvd.), 464 (006-Ross's Landing), 462.5 (008-19th St.), 461.6 (009-Carter St.), and Chattanooga Creek miles 2.0 (002-Central Ave.) and 1.4 (003-Williams St.).
HUC-12:	060200010502
Effluent Summary:	Biological treatment of municipal wastewater and primary treatment of combined sewer wastewater including chlorine disinfecting from Outfall 001 (WWTP); Primary treated combined sewer wastewater from Outfalls 002 through 009 for designed releases with partial treatment of combined sewer wastewater for only a limited number of discharge events.
Treatment system:	Municipal Wastewater: High purity oxygen activated sludge treatment with chlorine disinfection; Combined wastewater: Screening or floatable removal, grit removal and primary clarification for designed releases; other releases are limited.

Segment	TN06020001001_1000
Name	Nickajack Reservoir
Size	10370
Unit	Acres
First Year on 303(d) List	-
Designated Uses	Recreation (Non-Supporting), Irrigation (Supporting), Fish and Aquatic Life (Supporting), Industrial Water Supply (Supporting), Domestic Water Supply (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls
Sources	Contaminated Sediments

Table 6-3. Stream Segment Information for Moccasin Bend WWTP and Combined Sewer System.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	All Year	30	mg/L	DMax Conc	Daily	Composite	Effluent
Ammonia as N (Total)	All Year	24853	lb/day	DMax Load	Daily	Composite	Effluent
Ammonia as N (Total)	All Year	15	mg/L	WAvg Conc	Daily	Composite	Effluent
Ammonia as N (Total)	All Year	18640	lb/day	MAvg Load	Daily	Composite	Effluent
Ammonia as N (Total)	All Year	20	mg/L	MAvg Conc	Daily	Composite	Effluent
Ammonia as N (Total)	May and Sep	30	mg/L	DMax Conc	Daily	Composite	Effluent
Ammonia as N (Total)	May and Sep	16263	lb/day	MAvg Load	Daily	Composite	Effluent
Ammonia as N (Total)	May and Sep	20	mg/L	MAvg Conc	Daily	Composite	Effluent
Ammonia as N (Total)	May and Sep	21684	lb/day	DMax Load	Daily	Composite	Effluent
Ammonia as N (Total)	May and Sep	15	mg/L	WAvg Conc	Daily	Composite	Effluent
Ammonia as N (Total)	Oct	30	mg/L	DMax Conc	Daily	Composite	Effluent
Ammonia as N (Total)	Oct	19015	lb/day	DMax Load	Daily	Composite	Effluent
Ammonia as N (Total)	Oct	20	mg/L	MAvg Conc	Daily	Composite	Effluent
Ammonia as N (Total)	Oct	14261	lb/day	MAvg Load	Daily	Composite	Effluent
Ammonia as N (Total)	Oct	15	mg/L	WAvg Conc	Daily	Composite	Effluent
Ammonia as N (Total)	Summer	30	mg/L	DMax Conc	Daily	Composite	Effluent
Ammonia as N (Total)	Summer	16680	lb/day	DMax Load	Daily	Composite	Effluent
Ammonia as N (Total)	Summer	15	mg/L	WAvg Conc	Daily	Composite	Effluent
Ammonia as N (Total)	Summer	20	mg/L	MAvg Conc	Daily	Composite	Effluent
Ammonia as N (Total)	Summer	12510	lb/day	MAvg Load	Daily	Composite	Effluent
Bypass of Treatment (occurrences)	All Year		Occurrences/ Month	MAvg Load	Continuous	Visual	Wet Weather
CBOD % Removal	All Year	40	Percent	DMin % Removal	Daily	Calculated	Percent Removal
CBOD % Removal	All Year	79	Percent	MAvg % Removal	Daily	Calculated	Percent Removal
CBOD % Removal	All Year	65	Percent	MAvg % Removal	Daily	Calculated	Effluent net value
CBOD5	All Year	40	mg/L	DMax Conc	Daily	Composite	Effluent
CBOD5	All Year		mg/L	MAvg Conc	Daily	Composite	Intake
CBOD5	All Year		mg/L	DMax Conc	Daily	Composite	Intake
CBOD5	All Year	65	Percent	MAvg Conc	Daily	Composite	Effluent net value
CBOD5	All Year	31066	lb/day	MAvg Load	Daily	Composite	Effluent
CBOD5	All Year	35	mg/L	MAvg Conc	Daily	Composite	Effluent
CBOD5	All Year	25	mg/L	DMin Conc	Daily	Composite	Effluent
CBOD5	May and Sep	40	mg/L	DMax Conc	Daily	Composite	Effluent
CBOD5	May and Sep	35	mg/L	MAvg Conc	Daily	Composite	Effluent
CBOD5	May and Sep	27105	lb/day	MAvg Load	Daily	Composite	Effluent
CBOD5	May and Sep	25	mg/L	DMin Conc	Daily	Composite	Effluent
CBOD5	Oct	40	mg/L	DMax Conc	Daily	Composite	Effluent
CBOD5	Oct	35	mg/L	MAvg Conc	Daily	Composite	Effluent
CBOD5	Oct	23769	lb/day	MAvg Load	Daily	Composite	Effluent
CBOD5	Oct	25	mg/L	DMin Conc	Daily	Composite	Effluent

Table 6-4a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
CBOD5	Summer	40	mg/L	DMax Conc	Daily	Composite	Effluent
CBOD5	Summer	35	mg/L	MAvg Conc	Daily	Composite	Effluent
CBOD5	Summer	20850	lb/day	MAvg Load	Daily	Composite	Effluent
CBOD5	Summer	25	mg/L	DMin Conc	Daily	Composite	Effluent
D.O.	All Year	4	mg/L	DMin Conc	Daily	Grab	Effluent
Discharge Event Observation	All Year		Occurrences/ Month	MAvg Load	Monthly	Visual	Effluent
E. coli	All Year	487	#/100mL	DMax Conc	Daily	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	Daily	Grab	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
Flow, Totalizer	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow, Totalizer	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
IC25 7day Ceriodaphnia dubia	May and Sep	2.8	Percent	DMin Conc	Annually	Composite	Effluent
IC25 7day Ceriodaphnia dubia	Oct	5.5	Percent	DMin Conc	Annually	Composite	Effluent
IC25 7day Ceriodaphnia Dubia	Summer	1.2	Percent	DMin Conc	Annually	Composite	Effluent
IC25 7day Ceriodaphnia Dubia	Winter	6.7	Percent	DMin Conc	Annually	Composite	Effluent
IC25 7day Fathead Minnows	May and Sep	2.8	Percent	DMin Conc	Annually	Composite	Effluent
IC25 7day Fathead Minnows	Oct	5.5	Percent	DMin Conc	Annually	Composite	Effluent
IC25 7day Fathead Minnows	Summer	1.2	Percent	DMin Conc	Annually	Composite	Effluent
IC25 7day Fathead Minnows	Winter	6.7	Percent	DMin Conc	Annually	Composite	Effluent
Nitrogen Total (as N)	All Year		mg/L	MAvg Conc	Monthly	Composite	Effluent
Nitrogen Total (as N)	All Year		mg/L	DMax Conc	Monthly	Composite	Effluent
Overflow Use Occurrences	All Year		Occurrences Month	MAvg Load	Continuous	Visual	Wet Weather
Overflow Use Occurrences	All Year		Occurrences/ Month	MAvg Load	Continuous	Visual	Non Wet Weather
Phosphorus Total	All Year		mg/L	DMax Conc	Monthly	Composite	Effluent
Phosphorus Total	All Year		mg/L	MAvg Conc	Monthly	Composite	Effluent
Rainfall	All Year		Inches	MAvg Load	Monthly	Visual	Effluent
Rainfall Duration	All Year		Hours	MAvg Load	Monthly	Visual	Effluent
Rainfall Events	All Year		Occurrences/ Month	MAvg Load	Monthly	Visual	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	Daily	Composite	Effluent
TRC	All Year	0.28	mg/L	DMax Conc	Daily	Grab	Effluent
TRC	May and Sep	0.68	mg/L	DMax Conc	Daily	Grab	Effluent
TRC	Oct	0.34	mg/L	DMax Conc	Daily	Grab	Effluent
TRC	Summer	1.61	mg/L	MAvg Conc	Daily	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	Daily	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	Daily	Composite	Intake
TSS	All Year		mg/L	DMax Conc	Daily	Composite	Intake
TSS	All Year	37280	lb/day	MAvg Load	Daily	Composite	Effluent
TSS	All Year	40	mg/L	MAvg Conc	Daily	Composite	Effluent
TSS	All Year	30	mg/L	WAvg Conc	Daily	Composite	Effluent
TSS	May and Sep	45	mg/L	DMax Conc	Daily	Composite	Effluent
TSS	May and Sep	32526	lb/day	MAvg Load	Daily	Composite	Effluent
TSS	May and Sep	40	mg/L	MAvg Conc	Daily	Composite	Effluent
TSS	May and Sep	30	mg/L	WAvg Conc	Daily	Composite	Effluent
TSS	Oct	45	mg/L	DMax Conc	Daily	Composite	Effluent
TSS	Oct	30	mg/L	WAvg Conc	Daily	Composite	Effluent

Table 6-4b.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
TSS	Oct	40	mg/L	MAvg Conc	Daily	Composite	Effluent
TSS	Oct	28523	lb/day	MAvg Load	Daily	Composite	Effluent
TSS	Summer	45	mg/L	DMax Conc	Daily	Composite	Effluent
TSS	Summer	30	mg/L	WAvg Conc	Daily	Composite	Effluent
TSS	Summer	40	mg/L	MAvg Conc	Daily	Composite	Effluent
TSS	Summer	25020	lb/day	MAvg Load	Daily	Composite	Effluent
TSS % Removal	All Year	40	Percent	DMin % Removal	Daily	Calculated	Percent Removal
TSS % Removal	All Year	80	Percent	MAvg % Removal	Daily	Calculated	Percent Removal
TSS % Removal	All Year	65	Percent	MAvg % Removal	Daily	Calculated	Effluent net value
pH	All Year	9	SU	DMax Conc	Daily	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Daily	Grab	Effluent

Table 6-4c.

Tables 6-4a-c. Permit Limits for Outfall 001 at Moccasin bend WWTP and Combined Sewer System.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD5	All Year		mg/L	DMax Conc	1/Discharge	Composite	Effluent
BOD5	All Year		mg/L	MAvg Conc	1/Discharge	Composite	Effluent
D.O.	All Year		mg/L	DMin Conc	1/Discharge	Grab	Effluent
Discharge Event Observation	All Year		Occurences/Month	MAvg Load	Monthly	Visual	Effluent
E. coli	All Year		#/100mL	DMax Conc	1/Discharge	Grab	Effluent
E. coli	All Year		#/100mL	MAvg Geo Mean	1/Discharge	Grab	Effluent
Flow	All Year		MGD	DMax Load	Monthly	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Monthly	Continuous	Effluent
Nitrite + Nitrate Total (as N)	All Year		mg/L	DMax Conc	1/Discharge	Composite	Effluent
Oil and Grease (Freon EM)	All Year		mg/L	DMax Conc	1/Discharge	Grab	Effluent
Phosphorus, Total	All Year		mg/L	DMax Conc	1/Discharge	Composite	Effluent
Settleable Solids	All Year		mL/L	DMax Conc	1/Discharge	Grab	Effluent
TKN - Total Kjeldahl Nitrogen	All Year		mg/L	DMax Conc	1/Discharge	Composite	Effluent
TSS	All Year		mg/L	DMax Conc	1/Discharge	Composite	Effluent
TSS	All Year		lb/day	MAvg Load	1/Discharge	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	1/Discharge	Composite	Effluent
pH	All Year	9	SU	DMax Conc	1/Discharge	Grab	Effluent
pH	All Year	6	SU	DMin Conc	1/Discharge	Grab	Effluent

Table 6-5. Permit Limits for Outfall 002 at Moccasin Bend WWTP and Combined Sewer System.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD5	All Year		mg/L	DMax Conc	1/Discharge	Composite	Effluent
BOD5	All Year		mg/L	MAvg Conc	1/Discharge	Composite	Effluent
BOD5	All Year		lb/day	MAvg Load	1/Discharge	Composite	Effluent
D.O.	All Year		mg/L	DMin Conc	1/Discharge	Grab	Effluent
Discharge Event Observation	All Year		Occurrences/Month	MAvg Load	Monthly	Visual	Effluent
Discharge Event Observation	All Year	3	Occurrences/Year	MAvg Conc	Annually	Visual	Annual Avg
E. coli	All Year		#/100mL	MAvg Geo Mean	1/Discharge	Grab	Effluent
Fecal Coliform	All Year		#/100mL	DMax Conc	1/Discharge	Grab	Effluent
Flow	All Year		MGD	DMax Load	Monthly	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Monthly	Continuous	Effluent
Nitrite + Nitrate Total (as N)	All Year		mg/L	DMax Conc	1/Discharge	Composite	Effluent
Oil and Grease (Freon EM)	All Year		mg/L	DMax Conc	1/Discharge	Grab	Effluent
Phosphorus, Total	All Year		mg/L	DMax Conc	1/Discharge	Composite	Effluent
Settleable Solids	All Year		mL/L	DMax Conc	1/Discharge	Grab	Effluent
TKN - Total Kjeldahl Nitrogen	All Year		mg/L	DMax Conc	1/Discharge	Composite	Effluent
TSS	All Year		mg/L	DMax Conc	1/Discharge	Composite	Effluent
TSS	All Year		lb/day	MAvg Load	1/Discharge	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	1/Discharge	Composite	Effluent
pH	All Year	9	SU	DMax Conc	1/Discharge	Grab	Effluent
pH	All Year	6	SU	DMin Conc	1/Discharge	Grab	Effluent

Table 6-6. Permit Limits for Outfall 003 at Moccasin Bend WWTP and Combined Sewer System.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD5	All Year		mg/L	DMax Conc	1/Discharge	Composite	Effluent
BOD5	All Year		mg/L	MAvg Conc	1/Discharge	Composite	Effluent
BOD5	All Year		lb/day	MAvg Load	1/Discharge	Composite	Effluent
D.O.	All Year		mg/L	DMin Conc	1/Discharge	Grab	Effluent
Discharge Event Observation	All Year		Occurrences/Month	MAvg Load	Monthly	Visual	Effluent
E. coli	All Year		#/100mL	MAvg Geo Mean	1/Discharge	Grab	Effluent
Fecal Coliform	All Year		#/100mL	DMax Conc	1/Discharge	Grab	Effluent
Fecal Coliform	All Year		#/100mL	MAvg Geo Mean	1/Discharge	Grab	Effluent
Flow	All Year		MGD	DMax Load	Monthly	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Monthly	Continuous	Effluent
Settleable Solids	All Year		mL/L	DMax Conc	1/Discharge	Grab	Effluent
TSS	All Year		mg/L	DMax Conc	1/Discharge	Composite	Effluent
TSS	All Year		lb/day	MAvg Load	1/Discharge	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	1/Discharge	Composite	Effluent
pH	All Year	9	SU	DMax Conc	1/Discharge	Grab	Effluent
pH	All Year	6	SU	DMin Conc	1/Discharge	Grab	Effluent

Table 6-7. Permit Limits for Outfall 004, 005, & 008 at Moccasin Bend WWTP and Combined Sewer System.

Parameter	Season	Limit	Units	Designator	Frequency	Sample Type	Monitoring Location
BOD5	All Year		mg/L	DMax Conc	1/Discharge	Composite	Effluent
BOD5	All Year		mg/L	MAvg Conc	1/Discharge	Composite	Effluent
BOD5	All Year		lb/day	MAvg Load	1/Discharge	Composite	Effluent
D.O.	All Year		mg/L	DMin Conc	1/Discharge	Grab	Effluent
Discharge Event Observation	All Year		Occurrences/Month	MAvg Load	Monthly	Visual	Effluent
Discharge Event Observation	All Year	12	Occurences/Year	MAvg Conc	Annually	Visual	Annual Avg
E. coli	All Year		#/100mL	MAvg Geo Mean	1/Discharge	Grab	Effluent
Fecal Coliform	All Year		#/100mL	DMax Conc	1/Discharge	Grab	Effluent
Fecal Coliform	All Year		#/100mL	MAvg Geo Mean	1/Discharge	Grab	Effluent
Flow	All Year		MGD	DMax Load	Monthly	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Monthly	Continuous	Effluent
Settleable Solids	All Year		mL/L	DMax Conc	1/Discharge	Grab	Effluent
TSS	All Year		mg/L	DMax Conc	1/Discharge	Composite	Effluent
TSS	All Year		lb/day	MAvg Load	1/Discharge	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	1/Discharge	Composite	Effluent
pH	All Year	9	SU	DMax Conc	1/Discharge	Grab	Effluent
pH	All Year	6	SU	DMin Conc	1/Discharge	Grab	Effluent

Table 6-8. Permit Limits for Outfall 007& 009 at Moccasin Bend WWTP and Combined Sewer System.

Compliance History:
The following numbers of exceedences were noted in PCS:

7 Total Suspended Solids
2 Total Silver
8 Fecal Coliform
7 Total Chlorine
6 Carbonaceous Biological Oxygen Demand
Suspended Solids % Removal
1 pH
2 Carbonaceous Oxygen Demand

Enforcement:
8/23/07 Notice of Violation:
It has been brought to the attention of the Chattanooga EFO-WPC that several farm sites in the Sequatchie Valley have received Biosolids without state approval.

Based on the permitee's Annual Sludge Report (2006) received by the Chattanooga EFO office on February 15, 2007, 30 sites received biosolids in 2006 and were not approved by the field office.

The purpose of a land application site approval is to ensure that proper application locations are used and that procedures for biosolids applications are being followed; it is also a method to track the locations used for biosolids application throughout the state. By not following proper sludge management practices, The City of Chattanooga has violated Part 3.3 d. NPDES Permit Number TN0024210.

Comments:
5/7/07 Technical Assistance Visit and file review. In compliance
12/14/06 Pretreatment Compliance Inspection. In compliance
Comments: In-house Lab needs better turnaround time on analytical results.

TN0064947 River Landing Condo Owners Association

Discharger rating: Minor
City: Chattanooga
County: Marion
EFO Name: Chattanooga
Issuance Date: 2/1/06
Expiration Date: 12/30/09
Receiving Stream(s): Tennessee River at mile 451.7
HUC-12: 060200010506
Effluent Summary: Treated domestic wastewater from Outfall 001
Treatment system: Septic tanks and recirculating sand filter

Segment	TN06020001001_1000
Name	Nickajack Reservoir
Size	10370
Unit	Acres
First Year on 303(d) List	-
Designated Uses	Recreation (Non-Supporting), Irrigation (Supporting), Fish and Aquatic Life (Supporting), Industrial Water Supply (Supporting), Domestic Water Supply (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls
Sources	Contaminated Sediments

Table 6-9. Stream Segment Information for River Landing Condo Owners Association.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD5	All Year	45	mg/L	DMax Conc	2/Month	Grab	Effluent
BOD5	All Year	30	mg/L	MAvg Conc	2/Month	Grab	Effluent
D.O.	All Year	1	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	941	#/100mL	DMax Conc	2/Month	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	2/Month	Grab	Effluent
Flow	All Year		MGD	MAvg Load	Weekdays	Estimate	Effluent
Flow	All Year		MGD	DMax Load	Weekdays	Estimate	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Week	Grab	Effluent
TRC	All Year	2	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	2/Month	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	2/Month	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6	SU	DMin Conc	2/Week	Grab	Effluent

Table 6-10. Permit Limits for River Landing Condo Owners Association.

Comments:
9/6/06 Compliance Evaluation Inspection, resulted in an NOV.
Comments: Recirculationg sand filter in unsatisfactory condition. Excessive chlorine residual violations.

TN0027626 TN DOT I-24 R.A. Marion

Discharger rating: Minor
City: Jasper
County: Marion
EFO Name: Chattanooga
Issuance Date: 10/1/05
Expiration Date: 8/31/09
Receiving Stream(s): Tennessee River at mile 429.1 (Nickajack Reservoir)
HUC-12: 060200010507
Effluent Summary: Treated domestic wastewater from Outfall 001
Treatment system: Septic tank followed by recirculating tank, followed by recirculating sand filter, followed by disinfection by ultraviolet light

Segment	TN06020001001_1000
Name	Nickajack Reservoir
Size	10370
Unit	Acres
First Year on 303(d) List	-
Designated Uses	Recreation (Non-Supporting), Irrigation (Supporting), Fish and Aquatic Life (Supporting), Industrial Water Supply (Supporting), Domestic Water Supply (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls
Sources	Contaminated Sediments

Table 6-11. Stream Segment Information for TN DOT I-24 R.A. Marion.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD5	All Year	45	mg/L	DMax Conc	2/Month	Grab	Effluent
BOD5	All Year	30	mg/L	WAvg Conc	2/Month	Grab	Effluent
D.O.	All Year	1	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	487	#/100mL	DMax Conc	2/Month	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	2/Month	Grab	Effluent
Flow	All Year		MGD	MAvg Load	Weekdays	Continuous	Effluent
Flow	All Year		mg/L	DMax Load	Weekdays	Continuous	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Week	Grab	Effluent
TRC	All Year	2	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	2/Month	Grab	Effluent
TSS	All Year	30	mg/L	WAvg Conc	2/Month	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6	SU	DMin Conc	2/Week	Grab	Effluent

Table 6-12. Permit Limits for TN DOT I-24 R.A. Marion.

6.4.B. Industrial Permits

TN0057312 Chattanooga Gas Company Liquefied Natural Gas Plant

Discharger rating:	Minor
City:	Chattanooga
County:	Hamilton
EFO Name:	Chattanooga
Issuance Date:	4/1/05
Expiration Date:	8/31/09
Receiving Stream(s):	Wet weather conveyance at approximate mile 0.4 into Citico Creek at approximate mile 3.2, Outfall 001 discharges into South Chickamauga Creek at approximate mile 2
HUC-12:	060200010804
Effluent Summary:	Cooling tower blowdown and storm water runoff through Outfall 001
Treatment system:	None

Segment	TN06020001007_1000
Name	South Chickamauga Creek
Size	17.6
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Livestock Watering and Wildlife (Supporting), Irrigation (Supporting), Recreation (Non-Supporting), Industrial Water Supply (Supporting), Fish and Aquatic Life (Non-Supporting)
Causes	Physical substrate habitat alterations, Sedimentation/Siltation, Phosphate, Escherichia coli
Sources	Discharges from Municipal Separate Storm Sewer Systems (MS4), Site Clearance (Land Development or Redevelopment), Channelization, Sources Outside State Jurisdiction or Borders, Sanitary Sewer Overflows (Collection System Failures)

Table 6-13. Stream Segment Information for Chattanooga Gas Company Liquefied Natural Gas Plant.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Flow	All Year		MGD	DMax Load	Weekly	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Weekly	Instantaneous	Effluent
IC25 7day Ceriodaphnia dubia	All Year	0.77	Percent	MAvg Min	Quarterly	Composite	Effluent
IC25 7day Fathead Minnows	All Year	0.77	Percent	MAvg Min	Quarterly	Composite	Effluent
pH	All Year	9	SU	DMax Conc	Weekly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekly	Grab	Effluent

Table 6-14. Permit Limits for Chattanooga Gas Company Liquefied Natural Gas Plant.

Comments:
None

TN0002844 Invista S.à.r.l.

Discharger rating:	Major
City:	Chattanooga
County:	Hamilton
EFO Name:	Chattanooga
Issuance Date:	3/1/05
Expiration Date:	7/30/09
Receiving Stream(s):	Tennessee River at mile 469.9 (Outfall 001), a wet weather conveyance to Tennessee River at mile 469.7 (Outfalls 003 and S01-S04), a wetland on Invista property (S5A and S5B) and an unnamed tributary to North Chickamauga Creek (Outfalls S06-S12)
HUC-12:	060200010502
Effluent Summary:	Process wastewater, non-contact cooling water, boiler ash sluice wastewater, water treatment filter backwash, and storm water runoff from Outfall 001, cooling tower blowdown and reverse osmosis "reject" water from Outfall 003 and storm water runoff from Outfalls S01-S12
Treatment system:	Screening, sedimentation

Segment	TN06020001001_1000
Name	Nickajack Reservoir
Size	10370
Unit	Acres
First Year on 303(d) List	-
Designated Uses	Recreation (Non-Supporting), Irrigation (Supporting), Fish and Aquatic Life (Supporting), Industrial Water Supply (Supporting), Domestic Water Supply (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls
Sources	Contaminated Sediments

Table 6-15. Stream Segment Information for Invista S.à.r.l..

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
48hr LC50: Ceriodaphnia dubia	All Year	1	Percent	DMin Conc	Annually	Grab	Effluent
48hr LC50: Fathead Minnows	All Year	1	Percent	DMin Conc	Annually	Grab	Effluent
Ammonia as N (Total)	Summer	280	lb/day	DMax Load	Weekly	Composite	Effluent
Ammonia as N (Total)	Summer	95	lb/day	MAvg Load	Weekly	Composite	Effluent
Ammonia as N (Total)	Winter	306	lb/day	DMax Load	Weekly	Composite	Effluent
Ammonia as N (Total)	Winter	200	lb/day	MAvg Load	Weekly	Composite	Effluent
Flow	All Year		MGD	DMax Load	Continuous	Recorder	Effluent
Flow	All Year		MGD	MAvg Load	Continuous	Recorder	Effluent
TSS	All Year	55	mg/L	DMax Conc	Daily	Composite	Effluent
TSS	All Year	32	mg/L	MAvg Conc	Daily	Composite	Effluent
Temperature (°C)	All Year		Deg. C	DMax Conc	Daily	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Daily	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Daily	Grab	Effluent

Table 6-16. Permit Limits for outfall 001 Invista S.à.r.l.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Flow	All Year		MGD	DMax Load	Weekly	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Weekly	Instantaneous	Effluent
TSS	All Year		mg/L	DMax Conc	Weekly	Grab	Effluent
TSS	All Year		mg/L	MAvg Conc	Weekly	Grab	Effluent
pH	All Year		SU	DMax Conc	Weekly	Grab	Effluent
pH	All Year		SU	DMin Conc	Weekly	Grab	Effluent

Table 6-17. Permit Limits for outfall 003 Invista S.à.r.l.

Compliance History:
The following numbers of exceedences were noted in PCS:

3 pH
7 Total Suspended Solids
1 Ammonia

Comments:
10/20/06 Compliance Evaluation Inspection: In compliance

TN0002798 Alco Chemical, Division of National Starch and Chemical Company

Discharger rating:	Minor
City:	Chattanooga
County:	Hamilton
EFO Name:	Chattanooga
Issuance Date:	12/30/04
Expiration Date:	11/30/09
Receiving Stream(s):	South Chickamauga Creek at mile 0.6
HUC-12:	060200010804
Effluent Summary:	Non contact cooling water from Outfall 001 and storm water runoff from Outfall SW1
Treatment system:	None

Segment	TN06020001007_1000
Name	South Chickamauga Creek
Size	17.6
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Livestock Watering and Wildlife (Supporting), Irrigation (Supporting), Recreation (Non-Supporting), Industrial Water Supply (Supporting), Fish and Aquatic Life (Non-Supporting)
Causes	Physical substrate habitat alterations, Sedimentation/Siltation, Phosphate, Escherichia coli
Sources	Discharges from Municipal Separate Storm Sewer Systems (MS4), Site Clearance (Land Development or Redevelopment), Channelization, Sources Outside State Jurisdiction or Borders, Sanitary Sewer Overflows (Collection System Failures)

Table 6-18. Stream Segment Information for Alco Chemical.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Flow	All Year		MGD	DMax Load	Monthly	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Monthly	Instantaneous	Effluent
IC25 7day Ceriodaphnia dubia	All Year	3.8	Percent	DMin Conc	Annually	Composite	Effluent
IC25 7day Fathead Minnows	All Year	3.8	Percent	DMin Conc	Annually	Composite	Effluent
Temperature (°C)	All Year		°C	DMax Load	Monthly	Grab	Effluent
Temperature (°C)	All Year		°C	MAvg Load	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Monthly	Grab	Effluent

Table 6-19. Permit Limits for Alco Chemical.

Comments:
None

TN0002861 BASF Corporation

Discharger rating:	Minor
City:	Chattanooga
County:	Hamilton
EFO Name:	Chattanooga
Issuance Date:	11/1/04
Expiration Date:	9/29/09
Receiving Stream(s):	Tennessee River at mile 469
HUC-12:	060200010502
Effluent Summary:	Noncontact cooling water from Outfall 002
Treatment system:	None

Segment	TN06020001001_1000
Name	Nickajack Reservoir
Size	10370
Unit	Acres
First Year on 303(d) List	-
Designated Uses	Recreation (Non-Supporting), Irrigation (Supporting), Fish and Aquatic Life (Supporting), Industrial Water Supply (Supporting), Domestic Water Supply (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls
Sources	Contaminated Sediments

Table 6-20. Stream Segment Information for BASF Corporation.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
COD	All Year		mg/L	DMin Conc	Quarterly	Grab	Effluent
Flow	All Year		MGD	DMax Load	2/Month	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	2/Month	Instantaneous	Effluent
Temperature (°C)	All Year		°F	MAvg Min	2/Month	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Month	Grab	Effluent
pH	All Year	6	SU	DMin Conc	2/Month	Grab	Effluent

Table 6-21. Permit Limits for BASF Corporation.

Comments:
None

TN0002780 Chattem Chemicals, Inc.

Discharger rating:	Minor
City:	Chattanooga
County:	Hamilton
EFO Name:	Chattanooga
Issuance Date:	8/30/04
Expiration Date:	9/29/09
Receiving Stream(s):	Chattanooga Creek at mile 0.3 via storm sewer system
HUC-12:	60200010502
Effluent Summary:	Noncontact cooling water and storm water from Outfall 001
Treatment system:	None

Segment	TN060200011244_1000
Name	Chattanooga Creek
Size	8.4
Unit	Miles
First Year on 303(d) List	1990
Designated Uses	Industrial Water Supply (Supporting), Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Other anthropogenic substrate alterations, Polychlorinated biphenyls, Escherichia coli, Dissolved Oxygen, Oil and Grease, Dioxin (including 2,3,7,8-TCDD)
Sources	Discharges from Municipal Separate Storm Sewer Systems (MS4), Other Spill Related Impacts, Municipal (Urbanized High Density Area), Combined Sewer Overflows, Contaminated Sediments

Table 6-22. Stream Segment Information for Chattem Chemicals, Inc.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Al (T)	All Year	0.359	mg/L	MAvg Conc	Quarterly	Composite	Effluent
Al (T)	All Year	2	mg/L	DMax Conc	Monthly	Composite	Effluent
Ammonia as N (Total)	All Year	2.4	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	1.6	mg/L	MAvg Conc	3/Week	Composite	Effluent
BOD5	All Year	20	mg/L	DMax Conc	Weekly	Composite	Effluent
BOD5	All Year	10	mg/L	MAvg Conc	Weekly	Composite	Effluent
D.O.	All Year	5	mg/L	DMin Conc	3/Week	Composite	Effluent
Flow	All Year		MGD	DMax Load	Continuous	Recorder	Effluent
Flow	All Year		MGD	MAvg Load	Continuous	Recorder	Effluent
Hg (T)	All Year	2E-04	mg/L	DMax Conc	Quarterly	Composite	Effluent
Hg (T)	All Year	1E-04	mg/L	MAvg Conc	Quarterly	Composite	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	Quarterly	Grab	Effluent
Oil and Grease (Freon EM)	All Year	10	mg/L	MAvg Conc	Quarterly	Grab	Effluent
TSS	All Year	25	mg/L	DMax Conc	Weekly	Grab	Effluent
TSS	All Year	15	mg/L	MAvg Conc	Weekly	Grab	Effluent
Zn (T)	All Year	0.3	mg/L	DMax Conc	Monthly	Composite	Effluent
Zn (T)	All Year	0.05	mg/L	MAvg Conc	Monthly	Composite	Effluent
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-23. Permit Limits for Chattem Chemicals.

Comments:
None

TN0077682 Hidden Harbor Swimming Pool

Discharger rating:	Minor
City:	Hixson
County:	Hamilton
EFO Name:	Chattanooga
Issuance Date:	11/1/02
Expiration Date:	9/29/07
Receiving Stream(s):	Unnamed tributary at river mile 0.5 to the Tennessee River at river mile 476
HUC-12:	060200010501
Effluent Summary:	Swimming pool filter backwash
Treatment system:	Sand Filter

Segment	TN06020001020_1000
Name	Chickamauga Reservoir
Size	35400
Unit	Acres
First Year on 303(d) List	-
Designated Uses	Livestock Watering and Wildlife (Supporting), Domestic Water Supply (Supporting), Industrial Water Supply (Supporting), Fish and Aquatic Life (Supporting), Recreation (Supporting), Irrigation (Supporting)
Causes	N/A
Sources	N/A

Table 6-24. Stream Segment Information for Hidden Harbor Swimming Pool.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Flow	All Year		MGD	DMax Load	Monthly	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Monthly	Instantaneous	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Monthly	Grab	Effluent
TRC	All Year	0.019	mg/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Monthly	Grab	Effluent

Table 6-25. Permit Limits for Hidden Harbor Swimming Pool.

Comments:
None.

TN0073041 Chevron Products Co.

Discharger rating:	Minor
City:	Chattanooga
County:	Hamilton
EFO Name:	Chattanooga
Issuance Date:	6/1/04
Expiration Date:	5/30/09
Receiving Stream(s):	Unnamed tributary to Friar Branch at mile 2.3, at river mile 476
HUC-12:	060200010804
Effluent Summary:	Storm water run-off associated with industrial activities through Outfall 01A, (dike area discharge under wet weather conditions), Outfall 01B (discharge through the oil/water separator, under dry weather conditions), and Outfall 01C (discharge through the oil/water separator)
Treatment system:	Oil/water separator

Segment	TN06020001007_0100
Name	Friar Branch
Size	18.94
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Escherichia coli, Physical substrate habitat alterations, Sedimentation/Siltation, Nutrient/Eutrophication Biological Indicators
Sources	Discharges from Municipal Separate Storm Sewer Systems (MS4), Site Clearance (Land Development or Redevelopment), Sanitary Sewer Overflows (Collection System Failures)

Table 6-26. Stream Segment Information for Chevron Products, Inc.

No Limits

Comments:
None

TN0022438 Citgo Petroleum Corporation

Discharger rating:	Minor
City:	Chattanooga
County:	Hamilton
EFO Name:	Chattanooga
Issuance Date:	6/1/04
Expiration Date:	5/30/09
Receiving Stream(s):	Unnamed tributary at mile 0.6 to Friar Branch at mile 2.3, at river mile 476
HUC-12:	060200010804
Effluent Summary:	Storm water runoff, loading rack wastewater, and hydrostatic tank test water from Outfall 001
Treatment system:	Sand Filter

Segment	TN06020001007_0100
Name	Friar Branch
Size	18.94
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Escherichia coli, Physical substrate habitat alterations, Sedimentation/Siltation, Nutrient/Eutrophication Biological Indicators
Sources	Discharges from Municipal Separate Storm Sewer Systems (MS4), Site Clearance (Land Development or Redevelopment), Sanitary Sewer Overflows (Collection System Failures)

Table 6-27. Stream Segment Information for Citgo Petroleum Corporation.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Benzene	All Year	0.5	mg/L	DMax Conc	Quarterly	Grab	Effluent
Ethylbenzene	All Year	0.2	mg/L	DMax Conc	Quarterly	Grab	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	Quarterly	Grab	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Quarterly	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Quarterly	Composite	Effluent
Toluene	All Year	1	mg/L	DMax Conc	Quarterly	Grab	Effluent
Xylene	All Year	0.5	mg/L	DMax Conc	Quarterly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Quarterly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Quarterly	Grab	Effluent

Table 6-28. Permit Limits for Citgo Petroleum Corporation.

Comments:
None

TN0041866 Ergon Terminaling Inc-Chattanooga

Discharger rating:	Minor
City:	Chattanooga
County:	Hamilton
EFO Name:	Chattanooga
Issuance Date:	10/31/04
Expiration Date:	10/30/09
Receiving Stream(s):	Tennessee River at mile 456.4 (Outfall 001) and Tennessee River at mile 456.0 (Outfall 002)
HUC-12:	060200010502
Effluent Summary:	Boiler blowdown, hydrostatic test water, loading rack washwater and storm water runoff from Outfall 001 and styrene loading rack washwater and storm water runoff from Outfall 002
Treatment system:	None

Segment	TN06020001001_1000
Name	Nickajack Reservoir
Size	10370
Unit	Acres
First Year on 303(d) List	-
Uses	Recreation (Non-Supporting), Irrigation (Supporting), Fish and Aquatic Life (Supporting), Industrial Water Supply (Supporting), Domestic Water Supply (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls
Sources	Contaminated Sediments

Table 6-29. Stream Segment Information for Ergon Terminaling, Inc.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Benzene	All Year	0.5	mg/L	DMax Conc	Monthly	Grab	Effluent
Ethylbenzene	All Year	0.2	mg/L	DMax Conc	Monthly	Grab	Effluent
Flow	All Year		MGD	MAvg Conc	Monthly	Instantaneous	Effluent
Flow	All Year		MGD	DMax Conc	Monthly	Instantaneous	Effluent
Oil and Grease (Freon EM)	All Year	10	mg/L	MAvg Conc	Monthly	Grab	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Monthly	Grab	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Monthly	Grab	Effluent
Styrene	All Year		mg/L	DMax Conc	Semi-annually	Grab	Effluent
Toluene	All Year	1	mg/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Monthly	Composite	Effluent
Xylene	All Year	0.5	mg/L	DMax Conc	Monthly	Grab	Effluent

Table 6-30. Permit Limits for Ergon Terminaling, Inc.

Comments:
None

TN0067598 Hunter Oil Company

Discharger rating:	Minor
City:	Chattanooga
County:	Hamilton
EFO Name:	Chattanooga
Issuance Date:	2/1/05
Expiration Date:	12/30/09
Receiving Stream(s):	Unnamed tributary at mile 0.4 to Dobbs Branch
HUC-12:	060200010503
Effluent Summary:	Storm water runoff, truck wash water and pressure wash water though outfall 001
Treatment system:	None

Segment	TN060200011244_0100
Name	Dobbs Branch
Size	5.3
Unit	Miles
First Year on 303(d) List	2006
Designated Uses	Fish and Aquatic Life (Non-Supporting), Livestock Watering and Wildlife (Supporting), Recreation (Non-Supporting), Irrigation (Supporting)
Causes	Other anthropogenic substrate alterations, Ammonia (Un-ionized), Oxygen, Dissolved, Escherichia coli
Sources	Sanitary Sewer Overflows (Collection System Failures), Municipal (Urbanized High Density Area)

Table 6-31. Stream Segment Information for Hunter Oil Company.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Floating Solids Or Visible Foam-Visual	All Year		YES=1 NO=0	DMax Load	Quarterly	Visual	Effluent
Floating Solids Or Visible Foam-Visual	All Year		YES=1 NO=0	MAvg Load	Quarterly	Visual	Effluent
Flow	All Year		MGD	DMax Load	Quarterly	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Quarterly	Instantaneous	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	Quarterly	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Quarterly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Quarterly	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Quarterly	Grab	Effluent

Table 6-32. Permit Limits for Hunter Oil Company.

Comments:
None

TN0064581 NA Industries, Inc.

Discharger rating:	Minor
City:	Chattanooga
County:	Hamilton
EFO Name:	Chattanooga
Issuance Date:	5/1/05
Expiration Date:	4/30/09
Receiving Stream(s):	Tennessee River at mile 467.2
HUC-12:	060200010502
Effluent Summary:	Non-contact cooling water from Outfall 001
Treatment system:	None

Segment	TN06020001001_1000
Name	Nickajack Reservoir
Size	10370
Unit	Acres
First Year on 303(d) List	-
Designated Uses	Recreation (Non-Supporting), Irrigation (Supporting), Fish and Aquatic Life (Supporting), Industrial Water Supply (Supporting), Domestic Water Supply (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls
Sources	Contaminated Sediments

Table 6-33. Stream Segment Information for NA Industries, Inc.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Flow	All Year		MGD	DMax Conc	Continuous	Recorder	Effluent
Flow	All Year		MGD	MAvg Load	Continuous	Recorder	Effluent
Temperature (°C)	All Year		°C	DMax Conc	Weekly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Continuous	Recorder	Effluent
pH	All Year	6	SU	DMin Conc	Continuous	Recorder	Effluent

Table 6-34. Permit Limits for NA Industries, Inc.

Comments:
None

TN0073491 Norfolk Southern Railway Company - DeButts Yard

Discharger rating:	Minor
City:	Chattanooga
County:	Hamilton
EFO Name:	Chattanooga
Issuance Date:	5/1/05
Expiration Date:	3/31/09
Receiving Stream(s):	Citico Creek for Outfalls C01, F01, L01, and R07 and unnamed tributary to Citico Creek for Outfalls R01, R02, R03, R04, R05 and R06 at river mile 476
HUC-12:	060200010502
Effluent Summary:	Storm water runoff from Outfalls C01, F01, L01, R01, R02, R03, R04, R05, R06 and R07
Treatment system:	Sand Filter

Segment	TN060200011240_1000
Name	Citico Creek
Size	6.1
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Nitrates, Other anthropogenic substrate alterations, Oxygen, Dissolved, Escherichia coli
Sources	Discharges from Municipal Separate Storm Sewer Systems (MS4), Sanitary Sewer Overflows (Collection System Failures), Municipal (Urbanized High Density Area)

Table 6-35. Stream Segment Information for Norfolk Southern Railway Company-DeButts Yard.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
COD	All Year		mg/L	DMax Conc	Quarterly	Grab	Effluent
Flow	All Year		MGD	DMax Load	Quarterly	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Quarterly	Instantaneous	Effluent
Oil and Grease (Freon EM)	All Year		mg/L	DMax Conc	Quarterly	Grab	Effluent
TSS	All Year		mg/L	DMax Conc	Quarterly	Grab	Effluent
pH	All Year		SU	MAvg Ari Mean	Quarterly	Grab	Effluent

Table 6-36. Permit Limits for Norfolk Southern Railway Company - DeButts Yard.

Comments:
None

TN0002429 U.S. Pipe and Foundry Company

Discharger rating: Minor
City: Chattanooga
County: Hamilton
EFO Name: Chattanooga
Issuance Date: 11/1/04
Expiration Date: 10/10/09
Receiving Stream(s): Tennessee River at mile 461.3 (Outfalls 001 and SW1) and mile 461.2 (Outfalls 002 and SW2)
HUC-12: 060200010502
Effluent Summary: Cooling tower blowdown and storm water runoff from Outfalls 001 and SW1 and air dryer cooling water and storm water runoff from Outfalls 002 and SW2
Treatment system: None

Segment	TN06020001001_1000
Name	Nickajack Reservoir
Size	10370
Unit	Acres
First Year on 303(d) List	-
Designated Uses	Recreation (Non-Supporting), Irrigation (Supporting), Fish and Aquatic Life (Supporting), Industrial Water Supply (Supporting), Domestic Water Supply (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls
Sources	Contaminated Sediments

Table 6-37. Stream Segment Information for U.S. Pipe and Foundry Company.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD5	All Year	40	mg/L	DMax Conc	2/Month	Composite	Effluent
BOD5	All Year	30	mg/L	MAvg Conc	2/Month	Composite	Effluent
Fe (T)	All Year	10	mg/L	DMax Conc	2/Month	Composite	Effluent
Fe (T)	All Year	5	mg/L	MAvg Conc	2/Month	Composite	Effluent
Flow	All Year		MGD	DMax Load	Daily	Composite	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Composite	Effluent
Oil and Grease (Freon EM)	All Year	30	mg/L	DMax Conc	2/Month	Grab	Effluent
Oil and Grease (Freon EM)	All Year	20	mg/L	MAvg Conc	2/Month	Grab	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Weekly	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Weekly	Composite	Effluent
TSS	All Year	30	mg/L	MAvg Conc	Weekly	Composite	Effluent
Temperature (°C)	All Year		°C	DMax Conc	Weekly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Month	Grab	Effluent
pH	All Year	6	SU	DMin Conc	2/Month	Grab	Effluent

Table 6-38. Permit Limits for U.S. Pipe and Foundry Company.

Comments:
None

TN0002453 R.L. Stowe Mills, Inc. - Lupton Plant

Discharger rating:	Minor
City:	Lupton City
County:	Hamilton
EFO Name:	Chattanooga
Issuance Date:	2/1/05
Expiration Date:	12/30/09
Receiving Stream(s):	Tennessee River (Nickajack Lake) at mile 469.3
HUC-12:	060200010502
Effluent Summary:	Non-contact cooling water and autoclave discharges from Outfall 001 and storm water runoff from Outfall SW1
Treatment system:	None

Segment	TN06020001001_1000
Name	Nickajack Reservoir
Size	10370
Unit	Acres
First Year on 303(d) List	-
Uses	Recreation (Non-Supporting), Irrigation (Supporting), Fish and Aquatic Life (Supporting), Industrial Water Supply (Supporting), Domestic Water Supply (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls
Sources	Contaminated Sediments

Table 6-39. Stream Segment Information for R.L. Stowe Mills, Inc. - Lupton Plant.

Parameter	Season	Limit	Units	Designator	Frequency	Sample Type	Monitoring Location
Flow	All Year		MGD	DMax Load	Monthly	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Monthly	Instantaneous	Effluent
Temperature (°C)	All Year		°C	DMax Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Monthly	Grab	Effluent

Table 6-40. Permit Limits for R.L. Stowe Mills, Inc. - Lupton Plant.

Comments:
None

TN0001830 Signal Mountain Cement Company d/b/a Buzzi Unicem USA

Discharger rating:	Minor
City:	Chattanooga
County:	Hamilton
EFO Name:	Chattanooga
Issuance Date:	12/30/04
Expiration Date:	11/30/09
Receiving Stream(s):	Unnamed tributary to Tennessee River (Outfall SW2) and Tennessee River at mile 454.5 (Outfalls 001 and SW3)
HUC-12:	060200010502
Effluent Summary:	Non-contact cooling water, rainwater runoff, and non-contaminated storm water through Outfall 001, and storm water runoff through Outfalls SW2 and SW3
Treatment system:	None

Segment	TN06020001001_1000
Name	Nickajack Reservoir
Size	10370
Unit	Acres
First Year on 303(d) List	-
Designated Uses	Recreation (Non-Supporting), Irrigation (Supporting), Fish and Aquatic Life (Supporting), Industrial Water Supply (Supporting), Domestic Water Supply (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls
Sources	Contaminated Sediments

Table 6-41. Stream Segment Information for Signal Mountain Cement Company d/b/a Buzzi Unicem USA.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Flow	All Year		MGD	DMax Load	Continuous	Recorder	Effluent
Flow	All Year		MGD	MAvg Load	Continuous	Recorder	Effluent
TSS	All Year	50	mg/L	DMax Conc	Weekly	Composite	Effluent
pH	All Year	9	SU	DMax Conc	Weekly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekly	Grab	Effluent

Table 6-42. Permit Limits for Signal Mountain Cement Company d/b/a Buzzi Unicem USA.

Compliance History:
The following numbers of exceedences were noted in PCS:

1 pH
3 Total Suspended Solids

Comments:
None

TN0067491 Stationery, Tablets, and Related Products

Discharger rating:	Minor
City:	Chattanooga
County:	Hamilton
EFO Name:	Chattanooga
Issuance Date:	5/1/04
Expiration Date:	3/31/09
Receiving Stream(s):	Dobbs Branch at approximate mile 0.3 via Chattanooga Storm Sewer system
HUC-12:	060200010502
Effluent Summary:	Vacuum pump sealant water through Outfall 001
Treatment system:	None

Segment	TN060200011244_0100
Name	Dobbs Branch
Size	5.3
Unit	Miles
First Year on 303(d) List	2006
Designated Uses	Fish and Aquatic Life (Non-Supporting), Livestock Watering and Wildlife (Supporting), Recreation (Non-Supporting), Irrigation (Supporting)
Causes	Other anthropogenic substrate alterations, Ammonia (Un-ionized), Oxygen, Dissolved, Escherichia coli
Sources	Sanitary Sewer Overflows (Collection System Failures), Municipal (Urbanized High Density Area)

Table 6-43. Stream Segment Information for Stationery, Tablets, and Related Products.

Parameter	Season	Limit	Units	Designator	Frequency	Sample Type	Monitoring Location
Flow	All Year		MGD	DMax Load	Monthly	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Monthly	Instantaneous	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Monthly	Grab	Effluent

Table 6-44. Permit Limits for Stationery, Tablets, and Related Products.

Comments:
None.

TN0027413 TVA Chickamauga Hydro Plant

Discharger rating:	Minor
City:	Chattanooga
County:	Hamilton
EFO Name:	Chattanooga
Issuance Date:	2/1/05
Expiration Date:	12/29/09
Receiving Stream(s):	Tennessee River (Nickajack Reservoir) at mile 471
HUC-12:	060200010502
Effluent Summary:	Non-contact cooling water, station sump wastewater (which includes waters such as cooling water, river water that that has leaked into the plant at various points; river water from un-watering of penstock, scroll case, and draft tube; air compressor blowdown.
Treatment system:	None

Segment	TN06020001001_1000
Name	Nickajack Reservoir
Size	10370
Unit	Acres
First Year on 303(d) List	-
Designated Uses	Recreation (Non-Supporting), Irrigation (Supporting), Fish and Aquatic Life (Supporting), Industrial Water Supply (Supporting), Domestic Water Supply (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls
Sources	Contaminated Sediments

Table 6-45. Stream Segment Information for TVA Chickamauga Hydro Plant.

No Limits

Comments:
6/14/07 Compliance Evaluation Inspection. In compliance

TN0073237 W. R. Grace & Company

Discharger rating: Minor
City: Chattanooga
County: Hamilton
EFO Name: Chattanooga
Issuance Date: 12/1/05
Expiration Date: 10/30/09
Receiving Stream(s): South Chickamauga Creek at mile 1.2
HUC-12: 060200010804
Effluent Summary: Storm water runoff through Outfalls SWA, SWD and SWE
Treatment system: None

Segment	TN06020001007_1000
Name	South Chickamauga Creek
Size	17.6
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Livestock Watering and Wildlife (Supporting), Irrigation (Supporting), Recreation (Non-Supporting), Industrial Water Supply (Supporting), Fish and Aquatic Life (Non-Supporting)
Causes	Physical substrate habitat alterations, Sedimentation/Siltation, Phosphate, Escherichia coli
Sources	Discharges from Municipal Separate Storm Sewer Systems (MS4), Site Clearance (Land Development or Redevelopment), Channelization, Sources Outside State Jurisdiction or Borders, Sanitary Sewer Overflows (Collection System Failures)

Table 6-46. Stream Segment Information for W. R. Grace & Company.

No Limits

Comments:
None.

TN0027472 TVA Nickajack Hydro Plant

Discharger rating: Minor
City: Jasper
County: Marion
EFO Name: Chattanooga
Issuance Date: 10/1/06
Expiration Date: 10/31/09
Receiving Stream(s): Tennessee River
HUC-12: 060300010101
Effluent Summary: Cooling water, miscellaneous drainage from internal operations of dam, river water evacuated during unwatering operations
Treatment system: None

Segment	TN06020001001_1000
Name	Nickajack Reservoir
Size	10370
Unit	Acres
First Year on 303(d) List	-
Designated Uses	Recreation (Non-Supporting), Irrigation (Supporting), Fish and Aquatic Life (Supporting), Industrial Water Supply (Supporting), Domestic Water Supply (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls
Sources	Contaminated Sediments

Table 6-47. Stream Segment Information for TN DOT I-24 R.A. Marion.

No Limits

Comments:
None

TN0031631 TVA Raccoon Mountain Hydro Power plant

Discharger rating:	Minor
City:	Chattanooga
County:	Marion
EFO Name:	Chattanooga
Issuance Date:	12/1/05
Expiration Date:	10/31/09
Receiving Stream(s):	Tennessee River
HUC-12:	060200010506
Effluent Summary:	Cooling water, miscellaneous drainage from internal operations of dam, river water evacuated during unwatering operations from Outfall 001
Treatment system:	None

Segment	TN06020001020_1000
Name	Chickamauga Reservoir
Size	35400
Unit	Acres
First Year on 303(d) List	-
Designated Uses	Livestock Watering and Wildlife (Supporting), Domestic Water Supply (Supporting), Industrial Water Supply (Supporting), Fish and Aquatic Life (Supporting), Recreation (Supporting), Irrigation (Supporting)
Causes	N/A
Sources	N/A

Table 6-48. Stream Segment Information for TVA Raccoon Mountain Hydro Power plant.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Flow	All Year		MGD	MAvg Load	Daily	Estimate	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Daily	Grab	Effluent

Table 6-49. Permit Limits for TVA Raccoon Mountain Hydro Power plant.

Comments:
None

APPENDIX II

ID	NAME	HAZARD
337006	Coffelt	H
337007	Lake Lookout	0
337003	Stone Lake	3
337008	Boston Branch	X
337010	Huber Effluent Pond	F
337009	Volunteer Arsenal	3
777002	Dunaway	L
337001	Turley Mountain Slurry	2
337011	Shields Creek	0
337005	Cuthbertson	X
587013	Lake Tara	L
337013	Sherrell	0

Table A2-1. Inventoried Dams in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed. *Hazard Codes: H, High; 2, Significant; (L, 3); 0, Too small to regulate; X, A non-dam structure; F, Federally owned or operated. TDEC only regulates dams indicated by a numeric hazard score.*

LAND COVER/LAND USE	ACRES	% OF WATERSHED
Bare Rock/Sand/Clay	616	0.2
Deciduous Forest	126,087	43.1
Developed Open Space	36,223	12.4
Emergent Herbaceous Wetlands	98	0.0
Evergreen Forest	19,650	6.7
Grassland/Herbaceous	3,394	1.2
High Intensity Development	4,998	1.7
Low Intensity Development	26,824	9.2
Medium Intensity Development	8,364	2.9
Mixed Forest	26,548	9.1
Open Water	16,605	5.7
Pasture/Hay	13,938	4.8
Row Crops	1,446	0.5
Shrub Scrub	5,356	1.8
Woody Wetlands	2,228	0.8
Total	**292,373**	**100.0**

Table A2-2. Land Use Distribution in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed. *Data are from Multi-Resolution Land Characterization (MRLC) derived by applying a generalized Anderson level II system to mosaics of Landsat thematic mapper images collected every five years.*

ECOREGION	REFERENCE STREAM	WATERSHED (HUC)	
Southern Limestone/Dolomite Valleys and Low Rolling Hills (67f)	Big Creek (6701)	Holston River	06010104
	Fisher Creek (6702)	Holston River	06010104
	Possum Creek (6707)	SF Holston River	06010102
	Clear Creek (67F06)	Lower Clinch River	06010207
	White Creek (67F13)	Upper Clinch River	06010205
	Powell River (67F14)	Powell River	06010206
	Big War Creek (67F17)	Upper Clinch River	06010205
	Martin Creek (67F23)	Powell River	06010206
	Powell River (67F25)	Powell River	06010206
Southern Shale Valleys (67g)	Little Chuckey Creek (67G01)	Nolichucky River	06010108
	Bent Creek (67G05)	Nolichucky River	06010108
	Brymer creek (67G08)	Hiwassee River	06020002
	Harris Creek (67G09)	Hiwassee River	06020002
	Flat Creek (67G10)		06010107
	North Prong Fishdam Creek (67G11)	Holston River	06010104
Southern Sandstone Ridges (67h)	Blackburn Creek (67H04)	Hiwassee River	06020002
	Laurel Creek (67H06)	Little Tennessee River	06010204
	Parker Branch (67H08)	Holston River	06010104
Cumberland Plateau (68a)	Rock Creek (68A01)	South Fork Cumberland	05130104
	Laurel Fork (68A03)	South Fork Cumberland	05130104
	Clear Creek (68A08)	Emory River	06010208
	Piney Creek (68A13)	Ft Loudoun/Watts Bar	06010201
	Mullens Creek (68A20)	Lower Tennessee River	06020001
	Daddys Creek (68A26)	Emory River	06010208
	Island Creek (68A27)	Emory River	06010208
	Rock Creek (68A28)	Emory River	06010208
Sequatchie Valley (68b)	Crystal Creek (68B01)	Sequatchie River	06020004
	McWilliams Creek (68B02)	Sequatchie River	06020004
	Mill Branch (68B09)	Sequatchie River	06020004
Plateau Escarpment (68c)	Ellis Gap Branch (68C12)	Lower Tennessee River	06020001
	Crow Creek (68C15)	Guntersville Lake	06030001
	Crow Creek (68C20)	Guntersville Lake	06030001

Table A2-3. Ecoregion Monitoring Sites in Ecoregions 67f, 67g, 67h, 68a, 68b, and 68c.

CODE	NAME	AGENCY	AGENY ID
4	TDEC/DNA Piney Branch Bottomland Site	TDEC/DNA	S.USTNHP 492
9	TDEC/DNA Amnicola Marsh Wildlife Observation Site	TDEC/DNA	S.USTNHP 104
28	TDEC/DNA Cummings Lake Site	TDEC/DNA	S.USTNHP 493
31	TDEC/DNA Mile 343 Oaks Site	TDEC/DNA	S.USTNHP 527
122	TDEC/DNA Chickamauga Reservoir Reservation Site	TDEC/DNA	M.USTNHP 172
125	TDEC/DNA Ellis Spring-Shakerag Site	TDEC/DNA	S.USTNHP 503
130	TDEC/DNA Hampton Swamp Site	TDEC/DNA	S.USTNHP 222
195	TDEC/DNA North Chickamauga Creek Oak Forest Site	TDEC/DNA	DeSelm Report
198	USACOE-Nashville Client Site	USACOE-Nashville	
209	USACOE-Nashville Client Site	USACOE-Nashville	
230	USACOE-Nashville Client Site	USACOE-Nashville	
423	TDEC/WPC E. Brainerd/Hurricane Creek WPC Permit Site	TDEC/WPC	
435	TDEC/WPC Friar Branch Tributary Mitigation Site	TDEC/WPC	
464	TDEC/WPC Unnamed Tributary Wpc Permit Site	TDEC/WPC	
468	TDEC/WPC Chattanooga Creek Wpc Permit Site	TDEC/WPC	
469	TDEC/WPC Chattanooga Creek Wpc Mitigation Site	TDEC/WPC	
482	TDEC/WPC Hurricane Creek Permit/Mitigation Site	TDEC/WPC	
498	TDEC/WPC Middle Valley Permit/Mitigation Site	TDEC/WPC	
503	TDEC/WPC Tributary Of Black Creek Permit/Mitigation Site	TDEC/WPC	
517	TDEC/WPC Spring Creek Permit Mitigation Site	TDEC/WPC	
518	TDEC/WPC Rogers Branch Permit Site	TDEC/WPC	
527	TDOT Middle Valley/Gann Rd Permit/Mitigation Site	TDOT	
968	TDEC/DNA Ron Jones Report: Hamilton County Site 62	TDEC/DNA	Sourcecode F88JON01TNUS
969	TDEC/DNA Ron Jones Report: Hamilton County Site 63a	TDEC/DNA	Sourcecode F88JON01TNUS
970	TDEC/DNA Ron Jones Report: Hamilton County Site 63b	TDEC/DNA	Sourcecode F88JON01TNUS
2081	TWRA North Chickamauga Creek Site	TWRA	
2082	TWRA North Chickamauga Creek Site	TWRA	
2083	TWRA North Chickamauga Creek Site	TWRA	
2084	TWRA North Chickamauga Creek Site	TWRA	
2085	TWRA North Chickamauga Creek Site	TWRA	
2106	TWRA Soddy-Daisy Site	TWRA	
2107	TWRA Soddy-Daisy Site	TWRA	
2108	TWRA Soddy-Daisy Site	TWRA	
2109	TWRA Soddy-Daisy Site	TWRA	
2110	TWRA Soddy-Daisy Site	TWRA	
2351	TWRA Lookout Creek Site	TWRA	
2352	TWRA Lookout Creek Site	TWRA	
2353	TWRA Lookout Creek Site	TWRA	
2354	TWRA Lookout Creek Site	TWRA	
2355	TWRA Lookout Creek Site	TWRA	
2356	TWRA Lookout Creek Site	TWRA	

Table A2-4a.

CODE	NAME	AGENCY	AGENY_ID
2357	TWRA Lookout Creek Site	TWRA	
2737	USACOE Rivermont Golf Club Site	USACOE-Nashville	4348300
2744	TVA Pond 3	TDEC/DNA	
2764	TVA Pond 26	TDEC/DNA	
2765	TVA Pond 27	TDEC/DNA	
2766	TVA Pond 28	TDEC/DNA	
2767	TVA Pond 29	TDEC/DNA	
2768	TVA Pond 30	TDEC/DNA	
2769	TVA Pond 31	TDEC/DNA	
2770	TVA Pond 32	TDEC/DNA	
2771	TVA Pond 33	TDEC/DNA	
2772	TVA Pond 34	TDEC/DNA	

Table A2-4b.

Table A2-4a-b. Wetland Sites in the Lower Tennessee River Watershed in TDEC Database. *TDEC, Tennessee Department of Environment and Conservation; DNA, Division of Natural Areas; WPC, Water Pollution Control; TDOT, Tennessee Department of Transportation; USACOE, US Army Corps of Engineers; TWRA, Tennessee Wildlife Resources Agency.* ***This table represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands in the watershed.***

APPENDIX III

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Black Creek	TN06020001003_0100	11.4
Chattanooga Creek	TN060200011244_2000	3.5
Ellis Gap Branch	TN06020001001T_0100	2.0
Mountain Creek	TN06020001426_2000	4.0
Mullens Creek	TN06020001397_1000	20.2

Table A3-1. Streams Fully Supporting Fish and Aquatic Life Designated Use in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (ACRES)
Nickajack Reservoir	TN06020001001_1000	10,370

Table A3-2. Lakes Fully Supporting Fish and Aquatic Life Designated Use in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Chattanooga Creek	TN060200011244_1000	8.4
Citico Creek	TN060200011240_1000	6.1
Dobbs Branch	TN060200011244_0100	5.3
Gillespie Springs Branch	TN060200011244_0400	1.9
Mountain Creek	TN06020001426_1000	3.2
North Suck Creek	TN06020001421_0200	16.2
South Chickamauga Creek	TN06020001007_1000	17.6
South Suck Creek	TN06020001421_0100	9.2
Stringers Branch	TN06020001426_0100	5.8
Unnamed Trib to Chattanooga Creek	TN060200011244_0200	1.4
Unnamed Trib to Citico Creek	TN060200011240_0100	1.2

Table A3-3. Streams Not Supporting Fish and Aquatic Life Designated Use in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Chickamauga Reservoir misc Tribs	TN06020001020T_1000	180.6
Dry Creek	TN06020001394_1000	6.2
McFarland Spring Branch	TN060200011244_0300	1.2
Middle Creek	TN06020001109_1000	9.3
Nickajack Reservoir misc Tribs	TN06020001001T_0999	56.8
Running Water Creek	TN060200011441_1000	19.0
Shoal Creek	TN06020001087_1000	5.4
Suck Creek	TN06020001421_1000	3.7

Table A3-4. Streams Not Assessed for Fish and Aquatic Life Designated Use in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (ACRES)
Baylor Lake	TN06020001BAYLORLK_1000	10

Table A3-5. Lakes Not Assessed for Fish and Aquatic Life Designated Use in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Black Creek	TN06020001003_0100	11.4
Ellis Gap Branch	TN06020001001T_0100	2.0
Lookout Creek	TN06020001003_1000	20.5
Mountain Creek	TN06020001426_1000	3.2
Mountain Creek	TN06020001426_2000	4.0
Mullens Creek	TN06020001397_1000	20.2

Table A3-6. Streams Fully Supporting Recreation Designated Use in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Chattanooga Creek	TN060200011244_1000	8.4
Citico Creek	TN060200011240_1000	6.1
Dobbs Branch	TN060200011244_0100	5.3
Gillespie Springs Branch	TN060200011244_0400	1.9
McFarland Spring Branch	TN060200011244_0300	1.2
South Chickamauga Creek	TN06020001007_1000	17.6
Stringers Branch	TN06020001426_0100	5.8
Unnamed Trib to Chattanooga Creek	TN060200011244_0200	1.4
Unnamed Trib to Citico Creek	TN060200011240_0100	1.2

Table A3-7. Streams Not Supporting Recreation Designated Use in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (ACRES)
Nickajack Reservoir	TN06020001001_1000	10,370

Table A3-8. Lakes Not Supporting Recreation Designated Use in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Chickamauga Reservoir misc Tribs	TN06020001020T_1000	180.6
Dry Creek	TN06020001394_1000	6.2
Middle Creek	TN06020001109_1000	9.3
Nickajack Reservoir misc Tribs	TN06020001001T_0999	56.8
North Suck Creek	TN06020001421_0200	16.2
Running Water Creek	TN060200011441_1000	19.0
Shoal Creek	TN06020001087_1000	5.4
South Suck Creek	TN06020001421_0100	9.2
Suck Creek	TN06020001421_1000	3.7

Table A3-9. Streams Not Assessed for Recreation Designated Use in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (ACRES)
Baylor Lake	TN06020001BAYLORLK_1000	10

Table A3-10. Lakes Not Assessed for Recreation Designated Use in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
South Chickamauga Creek	TN06020001007_1000	17.6
South Suck Creek	TN06020001421_0100	9.2

Table A3-11. Stream Impairment Due to Siltation in the Group 4 Portion of the Tennessee Portion of the Lower Tennessee River Watershed.

APPENDIX IV

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0501	0502	0503	0504	0505
Bare Rock/Sand/Clay	62	40	3	75	1
Deciduous Forest	6,206	11,801	1,236	6,978	6,516
Developed Open Space	2,502	9,015	1,833	1,242	676
Emergent Herbaceous Wetlands	23	21	1	3	2
Evergreen Forest	1,043	893	45	380	440
Grassland/Herbaceous	270	156	18	123	559
High Intensity Development	37	1,945	835	192	
Low Intensity Development	1,428	6,293	2,607	930	10
Medium Intensity Development	141	2,790	1,314	314	4
Mixed Forest	2,934	2,198	298	842	96
Open Water	5,700	2,574	58	49	18
Pasture/Hay	1,079	1,336	64	225	5,968
Row Crops	94	195	3	21	556
Shrub/Scrub	623	440	28	175	
Woody Wetlands	139	223	236	214	
Total	**22,281**	**39,920**	**8,579**	**11,764**	**14,846**

Table A4-1a.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0506	0507	0701	0702	0801
Bare Rock/Sand/Clay	39	114	201	24	2
Deciduous Forest	27,944	16,086	22,409	14,412	913
Developed Open Space	554	1,021	628	6,462	183
Emergent Herbaceous Wetlands	13	8			
Evergreen Forest	1,659	3,085	7,236	1,841	263
Grassland/Herbaceous	199	199	1,054	495	89
High Intensity Development		7		393	
Low Intensity Development	60	508	104	4,109	6
Medium Intensity Development	34	52	4	704	3
Mixed Forest	2,389	2,673	5,417	3,313	609
Open Water	2,690	5,209	56	36	10
Pasture/Hay	376	596	1,264	3,750	1,553
Row Crops	83	90	88	305	199
Shrub/Scrub	363	493	1,032	523	142
Woody Wetlands	130	83	39	727	12
Total	**36,533**	**30,225**	**39,533**	**37,093**	**3,984**

Table A4-1b.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)		
	0802	0803	0804
Bare Rock/Sand/Clay		1	29
Deciduous Forest	2,393	226	4,793
Developed Open Space	1,123	2,487	8,733
Emergent Herbaceous Wetlands			27
Evergreen Forest	487	112	1,449
Grassland/Herbaceous	90	8	409
High Intensity Development		324	1,264
Low Intensity Development	876	2,678	7,105
Medium Intensity Development	18	488	2,497
Mixed Forest	1,217	241	3,230
Open Water	1	15	206
Pasture/Hay	1,542	70	1,627
Row Crops	152	2	160
Shrub/Scrub	233	21	1,046
Woody Wetlands	28	106	280
Total	**8,160**	**6,778**	**32,856**

Table A4-1c.

Tables A4-1a-c. Land Use Distribution in the Lower Tennessee River Watershed by HUC-12. *Data are from 1992 Multi-Resolution Land Characterization (MRLC) derived by applying a generalized Anderson Level II system to mosaics of Landsat thematic mapper images collected every five years.*

HYDROLOGIC SOIL GROUPS
GROUP A SOILS have low runoff potential and high infiltration rates even when wet. They consist chiefly of sand and gravel and are well to excessively drained.
GROUP B SOILS have moderate infiltration rates when wet and consist chiefly of soils that are moderately deep to deep, moderately to well drained, and moderately coarse to coarse textures.
GROUP C SOILS have low infiltration rates when wet and consist chiefly of soils having a layer that impedes downward movement of water with moderately fine to fine texture.
GROUP D SOILS have high runoff potential, very low infiltration rates, and consist chiefly of clay soils.

Table A4-2. Hydrologic Soil Groups in Tennessee as Described in WCS. *Soils are grouped into four hydrologic soil groups that describe a soil's permeability and, therefore, its susceptibility to runoff.*

STATION	HUC 10	STREAM	AREA (MI^2)	DAILY FLOW			3Q2	1Q10	3Q10	7Q10	3Q20
				AVG	MAX	MIN					
3568000	0602000105	Tennessee River	21400	36730.5	361000.0	1200.0	12928.8	5770.0	8173.2	10048.0	7137.3
3568500	0602000105	Chattanooga Creek	50.60	na	na	na	5.5	2.8	2.3	3.0	2.3

Table A4-3. Stream Flow Data from USGS Gaging Stations in the Lower Tennessee River Watershed. *Data are in cubic feet per second (CFS). Data were obtained from the USGS web application StreamStats at http://water.usgs.gov/osw/streamstats. (na, data not available)*

AGENCY	STATION	LOCATION	HUC-12
TDECWPC	TENNE477.0HM	Tennessee River @ RM 477.0	060200010501
TDECWPC	WACON000.0HM	Waconda Creek @ RM 0.0	060200010501
TDECWPC	WOLFT004.2HM	Wolftever Creek @ RM 4.2	060200010501
11NPSWRD	CHCH_HHH_LMC	Lookout Mountain Cave	060200010502
11NPSWRD	CHCH_HHH_MF	Mystery Falls	060200010502
11NPSWRD	CHCH_NURE_03	Tnhm504r	060200010502
TDECWPC	CITIC1T0.3HM	UT to Citico Creek @ RM 0.3	060200010502
TDECWPC	CITIC1T0.6HM	UT to Citico Creek @ RM 0.6	060200010502
TDECWPC	CITIC1T0.8HM	UT to Citico Creek @ RM 0.8	060200010502
TDECWPC	CITIC1T0.9HM	UT to Citico Creek @ RM 0.9	060200010502
TDECWPC	CITIC1T1.2HM	UT to Citico Creek @ RM 1.2	060200010502
TDECWPC	CITIC2T0.0HM	UT to Citico Creek @ RM 0.0	060200010502
TDECWPC	CITIC3T0.1HM	UT to Citico Creek @ RM 0.1	060200010502
TDECWPC	CITIC3T0.7HM	UT to Citico Creek @ RM 0.7	060200010502
TDECWPC	CITIC4T0.5HM	UT to Citico Creek @ RM 0.5	060200010502
TDECWPC	CITIC5T0.1HM	UT to Citico Creek @ RM 0.1	060200010502
TDECWPC	CITIC6T0.1HM	UT to Citico Creek @ RM 0.1	060200010502
TDECWPC	CHATT000.9HM	Chattanooga Creek @ RM 0.9	060200010503
11NPSWRD	CHCH_NURE_25	Tnhm567r	060200010503
TDECWPC	DOBBS000.3HM	Dobbs Branch @ RM 0.3	060200010503
11NPSWRD	CHCH_HHH_BP1	Battlefield Pit #1	060200010504
11NPSWRD	CHCH_HHH_BP2	Battlefield Pit #2	060200010504
11NPSWRD	CHCH_HHH_RBP	Red Barrel Pit	060200010504
11NPSWRD	CHCH_HHH_TSC	Twenty-Seven Spider Cave	060200010504
11NPSWRD	CHCH_NURE_01	Tnhm502r	060200010504
11NPSWRD	CHCH_NURE_02	Tnhm503r	060200010504
11NPSWRD	CHCH_NURE_27	Tnhm501r	060200010504
11NPSWRD	CHCH_NURE_13	Tnmr508r	060200010505
TDECWPC	NSUCK000.1MI	North Suck Creek @ RM 0.1	060200010505
11NPSWRD	CHCH_NURE_10	Tnmr502r	060200010506
11NPSWRD	CHCH_NURE_11	Tnmr504r	060200010506
11NPSWRD	CHCH_NURE_12	Tnmr506r	060200010506
11NPSWRD	CHCH_NURE_14	Tnmr509r	060200010506
11NPSWRD	CHCH_NURE_15	Tnmr511r	060200010506
TDECWPC	ECO68A20	Mullens Creek @ RM 5.0	060200010506
TDECWPC	ECO68C12	Ellis Gap Branch @ RM 0.4	060200010506
TDECWPC	LOOKO002.2HM	Lookout Creek @ RM 2.2	060200010506
TDECWPC	TENNE444.0MI	Tennessee River @ RM 444.0	060200010506
11NPSWRD	CHCH_NURE_09	Tnmr501r	060200010507
11NPSWRD	CHCH_NURE_28	Tnmr557r	060200010507
TDECWPC	BOSTO001.1HM	Boston Branch @ RM 1.1	060200010701

Table A4-4a.

AGENCY	STATION	LOCATION	HUC-12
TDECWPC	CAIN001.5SE	Cain Creek @ RM 1.5	060200010701
TDECWPC	COOPE002.9SE	Cooper Creek @ RM 2.9	060200010701
TDECWPC	MOSSY001.4SE	Mossy Creek @ RM 1.4	060200010701
TDECWPC	MOSSY004.1SE	Mossy Creek @ RM 4.1	060200010701
TDECWPC	NCHIC019.3HM	North Chickamauga Creek @ RM 19.3	060200010701
TDECWPC	NCHIC028.1HM	North Chickamauga Creek @ RM 28.1	060200010701
TDECWPC	ROGER000.9HM	Rogers Creek @ RM 0.9	060200010701
11NPSWRD	CHCH_NURE_04	Tnhm507r	060200010702
11NPSWRD	CHCH_NURE_05	Tnhm509r	060200010702
11NPSWRD	CHCH_NURE_06	Tnhm510r	060200010702
TDECWPC	NCHIC012.4HM	North Chickamauga Creek @ RM 12.4	060200010702
TDECWPC	SCHIC000.4HM	South Chickamauga Creek @ RM 0.4	060200010702
11NPSWRD	CHCH_NURE_26	Tnhm513r	060200010802
TDECWPC	WCHIC001.7HM	West Chickamauga Creek @ RM 1.7	060200010803
11NPSWRD	CHCH_NURE_07	Tnhm512r	060200010804
11NPSWRD	CHCH_NURE_17	Tnhm566r	060200010804
TDECWPC	SCHIC015.8HM	South Chickamauga Creek @ RM 15.8	060200010804
11NPSWRD	CHCH_HHH_HHC	Ha-Ha Cave	Georgia
11NPSWRD	CHCH_HHH_SS	Skyuka Spring	Georgia
11NPSWRD	CHCH_NURE_18	Gacs517r	Georgia
11NPSWRD	CHCH_NURE_19	Gacs523r	Georgia
11NPSWRD	CHCH_NURE_20	Gacs530r	Georgia
11NPSWRD	CHCH_NURE_21	Gada504r	Georgia
11NPSWRD	CHCH_NURE_22	Gada520r	Georgia
11NPSWRD	CHCH_NURE_23	Gawa530r	Georgia
11NPSWRD	CHCH_NURE_24	Gawa554r	Georgia
11NPSWRD	CHCH_NURE_29	Gacs505r	Georgia
11NPSWRD	LIRI_ALGS_D-2	White Sulphur Spring (Spring # D-E)	Georgia
11NPSWRD	LIRI_ALGS_D-6	Morgan Spring (Spring # D-6)	Georgia
11NPSWRD	LIRI_ALGS_J-1	Kaolin Spring (Spring # J-1)	Georgia
11NPSWRD	LIRI_ALGS_J-3	Phillips Spring (Spring # J-3)	Georgia
11NPSWRD	LIRI_ALGS_J-4	Gifford Spring (Spring # J-4)	Georgia
11NPSWRD	LIRI_NURE_5	Aldk524r	Georgia

Table A4-4b.

Tables A4-4a-b. STORET Water Quality Monitoring Stations in the Lower Tennessee River Watershed. *NPSWRD, National Park Service Water Resources Division; TDECWPC, Tennessee Department of Environment and Conservation Division of Water Pollution Control; UT, Unnamed Tributary.*

FACILITY NUMBER	FACILITY NAME	SIC	SIC NAME	MADI	WATERBODY	HUC-12
TN0057215	Harrison Bay State Park	4952	Sewerage System	Minor	Tennessee River @ RM 479.5	060200010501
TN0064840	Booker T. Washington State Park	7999	Amusement or Recreation Services	Minor	Tennessee River @ RM 473.5	060200010501
TN0077682	Hidden Harbor Swimming Pool	7997 7999	Membership Sports and recreation Club	Minor	Tennessee River @ RM 476	060200010501
TN0001830	Signal Mountain Cement Company	3241	Cement Hydraulic	Minor	Tennessee River @ RM 454.5	060200010502
TN0002429	U.S. Pipe and Foundry	3321	Gray and Ductile Iron Foundry	Minor	Tennessee River @ RM 461.3	060200010502
TN0002453	R.L. Stowe Mills, Inc.	2281	Yarn Spinning Mills	Minor	Tennessee River @ RM 469.3	060200010502
TN0021211	Hamilton County WWTP	4952	Sewerage System	Minor	Tennessee River @ RM 453.7	060200010502
TN0024210	Chattanooga Moccasin Bend WWTP	4952	Sewerage System	Major	Tennessee River @ RM 457.8	060200010502
TN0027413	TVA-Chickamauga Hydro Plant	4911	Electric Services	Minor	Tennessee River @ RM 471	060200010502
TN0002844	Artiva Specialties	2821	Plastics Material Synthetic Resins	Major	Tennessee River @ RM 469.9, Wetland, WWC to Tennessee River @ RM 469.7, and UT to North Chickamauga Creek	060200010502
TN0002861	BASF Corporation	2822	Synthetic Rubber	Minor	Tennessee River @ RM 469	060200010502
TN0041866	Ergon Terminating, Inc.	4226	Special Warehousing and Storage	Minor	Tennessee River @ RM 456.4 and @ RM 456.0	060200010502
TN0004707	Vulcan Construction Materials	1422	Crushed and Broken Limestone	Minor	Tennessee River @ RM 463.2	060200010502
TN0056880	Parman Lubricants	5171	Petroleum Bulk Station and Terminal	Minor	Citico Creek @ RM 1.9	060200010502
TN0057312	Chattanooga Gas Co. Liquified Natural Gas	4925	Mixed, Manufacturing, or Liquified Petroleum Gas Products and Distribution	Minor	WWC to Citico Creek @ RM 3.2	060200010502
TN0064581	NA Industries, Inc.	2869	Industrial Organic Chemicals	Minor	Tennessee River @ RM 467.2	060200010502
TN0067491	Top Flight, Incorporated	2678	Stationary, Tablets, and related Products	Minor	Dobbs Branch @ RM 0.3	060200010502

Table A4-5a.

FACILITY NUMBER	FACILITY NAME	SIC	SIC NAME	MADI	WATERBODY	HUC-12
TN0073491	Norfolk Southern Railway	4011	Local and Suburban Transit	Minor	Citico Creek and UT to Citico Creek	060200010502
TN0002780	Chattanooga Chemicals	2833 2834 2819 2869	Medicinal Chemicals and Botanicals	Minor	Chattanooga Creek @ RM 0.3	060200010503
TN0067598	Hunter Oil Company	5171	Petroleum Bulk Station and Terminal	Minor	UT @ RM 0.4 to Dobbs Creek	060200010503
TN0002798	Alco Chemical (National Starch and Chemical Co.)	2821 2879	Plastics, Synthetic Resins, and Nonvulcanizable Elastomers. Pesticides and Agricultural Chemicals	Minor	South Chickamauga Creek @ RM 0.6	060200010804
TN0022438	Citgo Petroleum Corp.	5171	Heating Oil, LP Gas, and Petroleum Storage and Sales		UT @ RM 0.6 to Friar Branch @ RM 2.3	060200010804
TN0073041	Chevron Products Co.	5171	Heating Oil, LP Gas, and Petroleum Storage and Sales	Minor	UT to Friar Branch @ RM 2.3	060200010804
TN0073237	W.R. Grace and Company	2819	Activated Carbon and Charcoal, Alumina, Inorganic Dyes, Industrial Inorganic Chemicals	Minor	South Chickamauga Creek @ RM1.2	060200010804

Table A4-5b.

Tables A4-5a-b. NPDES Permittees in the Lower Tennessee River Watershed. *SIC, Standard Industrial Classification; MADI, Major Discharge Indicator; UT, Unnamed Tributary; WWC, Wet Weather Conveyance.*

FACILITY NUMBER	FACILITY NAME	SIC	SIC NAME	MADI	WATERBODY	HUC-12
TNHA78026	Windward Pointe Subdivision	0782	Lawn and Garden Service	Minor	Chickamauga Lake (Tennessee River @ RM 473)	060200010501

Table A4-6. NPDES Permittees (for Herbicide Application) in the Lower Tennessee River Watershed. *SIC, Standard Industrial Classification; MADI, Major Discharge Indicator; UT, Unnamed Tributary.*

FACILITY NUMBER	PERMITEE	WATERBODY	HUC-12
TN0068454	Eastside Utility District STP	Chickamauga Reservoir	060200010501

Table A4-7. Water Treatment Plants in the Lower Tennessee River Watershed.

FACILITY NUMBER	PERMITEE	SIC	SIC NAME	WATERBODY	HUC-12
TN0066460	Signal Mountain Cement Co. Area #1	1459	Clay, Ceramics and Refractory Minerals	UT to Tennessee River	060200010502
TN0022764	Old Castle Materials SE SRM Aggregates	1422	Crushed and Broken Limestone	Lookout Creek	060200010504
TN0071480	Big Fork Mining Company (Area #15)	1459	Clay, Ceramics and Refractory Minerals	North Suck Creek	060200010505
TN0001821	Signal Mountain Cement Co. Bennett's lake Quarry	1422	Crushed and Broken Limestone	Tennessee River	060200010507
TN0053341	TN Consolidated Cement Co. River Dock	1221	Bituminous Coal and Lignite Surface Mining	Tennessee River	060200010507
TN0003077	Vulcan Contruction Materials	1422	Crushed and Broken Limestone	South Chickamauga Creek, Friar Branch	060200010804

Table A4-8. Active Permitted Mining Sites in the Lower Tennessee River Watershed. *SIC, Standard Industrial Classification; UT, Unnamed Tributary.*

FACILITY NUMBER	FACILITY NAME	WATERBODY	HUC-12
TNG110048	C.B.S. Ready-Mix	WWC to Tennessee River	060200010502
TNG110110	M&M Ready Mix Concrete	UT to North Chickamauga Creek	060200010702
TNG110135	Vulcan Construction Materials	UT to Tennessee River @ RM 463.7	060200010502
TNG110196	P&S Ready Mix Concrete	Poe Branch to North Chickamauga Creek @ RM 16.6	060200010702
TNG110233	Chattanooga Ready-Mix	Citico Creek	060200010502
TNG110255	BHY Ready-Mix	Dobbs Branch	060200010502
TNG110278	Sequatchie Concrete	Chattanooga Creek	060200010503

Table A4-9. Ready Mix Concrete Plants in the Lower Tennessee River Watershed. *UT, Unnamed Tributary; WWC, Wet Weather Conveyance.*

LOG NUMBER	COUNTY	DESCRIPTION	WATERBODY	HUC-12
NRS01.180	Hamilton		UT to Tennessee River @ RM 475	060200010501
NRS01.416	Hamilton	Boat Dock Construction	Tennessee River	060200010501
NRS03.402	Hamilton	Dredging and Sand bar Removal	Tennessee River	060200010501
NRS01.325	Hamilton	Bridge and Approach	Citico Creek	060200010502
NRS02.368	Hamilton	Stream Crossing	Mountain Creek	060200010502
NRS02.368B	Hamilton		UT to Stringers Branch	060200010502
NRS02.368C	Hamilton		Stringerrs Branch	060200010502
NRS02.368D	Hamilton		Stringers Branch	060200010502
NRS02.392	Hamilton	New Lock at Chickamauga Dam	Tennessee River	060200010502
NRS02.456	Hamilton	Modify City Waterfront Park	Tennessee River	060200010502
NRS03.148	Hamilton	Bridge Replacement	Stringers Branch	060200010502
NRS03.353	Hamilton	Road Crossing	Flat Creek	060200010502
NRS02.404	Hamilton	Bridge and Approaches	Unnamed Tributary	060200010503
NRS03.231	Hamilton	Relocate Culvert	UT to Chattanooga Creek	060200010503
NRS00.291	Hamilton	Impoundment	UT to Chesnutt Creek	060200010702
NRS00.025	Hamilton	Isolated Wetland Fill	Isolated Wetland	060200010802
NRS03.400	Hamilton	Sewer Line Extension	Hurricane Creek	060200010802
NRS04.060	Hamilton	Road /Wetland Crossing	Friar Branch	060200010802
NRS00.151	Hamilton	Spring Box, French Drain	UT to South Chickamauga Creek	060200010804
NRS00.084	Hamilton	Wetland Fill	UT to Chattanooga Creek	060200010804
NRS01.359	Hamilton	Channel Relocation, Channel Alteration, Culverts	Friar Branch, South Chickamauga Creek	060200010804
NRS01.423	Hamilton	Stream Encapsulation	UT to Friar Branch	060200010804
NRS02.088	Hamilton	Wetland Fill	UT to South Chickamauga Creek	060200010804
NRS02.152	Hamilton	Stream Crossing	Friar Branch	060200010804
NRS03.008	Hamilton		Friar Branch	060200010804
NRS03.021	Hamilton		Poe Branch	060200010804
NRS04.043	Hamilton	Stream/Wetland Fill	Tennessee River	060200010804

Table A4-10. Individual ARAP Permits Issued January 2000 Through June 2004 in the Lower Tennessee River Watershed. *UT, Unnamed Tributary.*

FACILITY NUMBER	FACILITY NAME	SECTOR	RECEIVING STREAM	AREA*	HUC-12
TNR053795	Birchwood Pike C and D Landfill	L	UT to Frog Level Branch	44	060200010501
TNR050042	Southern Champion Tray Company	B, P	UT to Tennessee River	15.67	060200010502
TNR050104	Mid-South Terminals	Q	Tennessee River	2	060200010502
TNR050288	Dixie Industries-Columbus Mckinn	AA, AB	South Chickamauga Creek	4.4	060200010502
TNR050374	Sofix Corporation	C	Tennessee River	22	060200010502
TNR050411	Marathon Ashland Petroleum, LLC	P	Tennessee River	16	060200010502
TNR050413	Nu-Foam Products Incorporated	Y	UT to Citico Creek	11	060200010502
TNR050460	Synair Corporation	C	Tennessee River	1	060200010502
TNR050538	CE Metals	N	Tennessee River	3.23	060200010502
TNR050556	Plate Formed Products	AA, P	Tennessee River	45.9	060200010502
TNR050557	Tubular Products Manufacturing	AA, P	Tennessee River	56.1	060200010502
TNR050599	Cannon Equipment Southeast	AA	Citico Creek	33.83	060200010502
TNR050688	Accu Cast Operations	F	Citico Creek	1.4	060200010502
TNR050830	NA Industries, Incorporated	C	Tennessee River	17.7	060200010502
TNR050836	Chattanooga Paperboard Corporation	B	Chattanooga Creek	7.9	060200010502
TNR050924	Industrial Plating Company	AA	UT to Citico Creek	1.29	060200010502
TNR051009	Roadtec	AB, P	Chattanooga Storm Drain to Citico Creek	4	060200010502
TNR051037	BASF Corporation	C	Tennessee River	23	060200010502
TNR051092	Lockwood's Auto Center	M	WWC to Citico Creek	9	060200010502
TNR051336	The PQ Corporation	E	UT to Citico Creek	8.5	060200010502
TNR051464	Wheland Foundry - Broad Street Plant	F	Chattanooga Creek	38.4	060200010502
TNR051492	PSC Metals	N, P	Tennessee River	29.45	060200010502
TNR051493	PSC Metals	N, P	Tennessee River	6.74	060200010502
TNR051500	Ramsey Trucking	P	UT to Tennessee River	5	060200010502
TNR051518	Komatsu America International Company	AB	Unknown	47.3	060200010502
TNR051571	Gaither Machine Works	AB	Tennessee River	0.9	060200010502
TNR051585	Chattanooga Boiler & Tank	AB	Storm Sewer to Tennessee River @ RM 463	4.55	060200010502
TNR051721	Chattanooga Scrap Metal Processors	N	Storm Sewer to Tennessee River	0.5	060200010502
TNR051738	P & J Iron & Metal	N	Unknown	0.3	060200010502
TNR051749	U.S. Pipe and Foundry Company	F	Tennessee River	58	060200010502
TNR051966	Red Bank Landfill	L	Stringers Branch	14	060200010502
TNR051999	Atlanta Terminal Company	P	WWC to Tennessee River	13.4	060200010502
TNR053004	Chattanooga Sand And Gravel	J	Tennessee River	13	060200010502
TNR053023	Sonoco Products Company	B	UT to South Chickamauga Creek	4.1	060200010502
TNR053026	MG Industries	C, P	Ditch to UT to Tennessee River	7	060200010502
TNR053094	Standard Iron	F	Stringers Branch	8.67	060200010502
TNR053159	A-1 Shipley's Waste Oil	N	UT of Citico Creek	0.8	060200010502

Table A4-11a.

FACILITY NUMBER	FACILITY NAME	SECTOR	RECEIVING STREAM	AREA*	HUC-12
TNR053443	TRANSFLO Terminal Services	P	Tennessee River	10	060200010502
TNR053445	Chattanooga Bakery	U	Tennessee River	9.91	060200010502
TNR053510	Commercial Metals Company	N	UT to Tennessee River	8.5	060200010502
TNR053529	Rock - Tenn Converting Company	B, P	Tennessee River	42	060200010502
TNR053633	PSC Metals	N, P	Tennessee River	4.13	060200010502
TNR053687	Cargill Sweetener Dist. Terminal	P	Ditch to Tennessee River	4.4	060200010502
TNR053700	Chattanooga Wilbert Vault	E	Citico Creek	1.9	060200010502
TNR053715	Geo Specialty Chemicals	C	Tennessee River	9.73	060200010502
TNR053720	R.K. Haskew & Company	AB	Springers Branch	1.56	060200010502
TNR053775	Moccasin Bend WWTP	T	UT to Tennessee River @ RM 457.3	80	060200010502
TNR053858	Herman Grant Company	AB	UT to Springers Branch	20	060200010502
TNR053888	John F. Germ Recycling Center	N	Citico Creek	2.5	060200010502
TNR053934	Roadtec	AB	Tennessee River	12	060200010502
TNR055035	National Posters, Incorporated	X	Tennessee River	8.73	060200010502
TNR055042	Horizon Milling	U	WWC to Tennessee River	6.2	060200010502
TNR055054	Edward W Daniel Company	AA	Tennessee River	6	060200010502
TNR055069	TFS Fabricators	AA	Citico Creek	7.817	060200010502
TNR056505	JIT Terminal	P	Tennessee River	23.89	060200010502
TNR056531	Signal Mountain STP	T	Tennessee River @ RM 543.7	3.59	060200010502
TNR050028	Bunge Foods-Chattanooga Plant	U	UT to Chattanooga Creek	10.8	060200010503
TNR050054	Niagara LaSalle Corporation	F	UT to Chattanooga Creek	6.2	060200010503
TNR050057	Heatec	AB	Chattanooga Creek	7.46	060200010503
TNR050069	Astec-Chattanooga	AB	Chattanooga Creek	6.2	060200010503
TNR050091	Covenant Transport, Incorporated	P	Dobbs Branch	40	060200010503
TNR050289	Dixie Industries	AA, AB	Storm Sewer to Dobbs Branch	1.6	060200010503
TNR050352	Steward	AC, P	Municipal Sewer to UT to Chattanooga Creek	1.8	060200010503
TNR050395	American Colloid Company	E	UT to Chattanooga Creek	1.6	060200010503
TNR050400	ADM/Southern Cellulose Products	B	Chattanooga Creek	15	060200010503
TNR050506	R.L. Stowe Mills	V	Dobbs Branch	7.9	060200010503
TNR050590	Sherman & Reilly, Incorporated	AC	UT to Chattanooga Creek	13	060200010503
TNR050642	Acheson Foundry & Machine Works	F	UT to Tennessee River	3.9	060200010503
TNR050740	Wheland Foundry - St. Elmo Ave. Landfill	L	Chattanooga Creek	6	060200010503
TNR051342	Wheland Foundry - Long St. Landfill	L	Chattanooga Creek	19	060200010503
TNR051636	Valley Machine & Welding Company	AA		3.4	060200010503
TNR051675	M & J Auto Rebuilding and Salvage	M	Chattanooga Creek	4.85	060200010503
TNR051713	Chattanooga Recycled Fiber	N	Chattanooga Storm Sewer to Chattanooga Creek	2.1	060200010503
TNR051750	U.S. Pipe and Foundry Company Landfill	L	Tennessee River	23	060200010503
TNR051831	Chattem Chemicals Warehouse	AD	Chattanooga Storm Sewer to Chattanooga Creek	1.7	060200010503

Table A4-11b.

FACILITY NUMBER	FACILITY NAME	SECTOR	RECEIVING STREAM	AREA*	HUC-12
TNR051834	Hunter Oil Company	P	Chattanooga Creek	2	060200010503
TNR052017	Chattem	AD, C	UT to Gillespie Springs Branch	10.1	060200010503
TNR053039	Con-Way Southern Express - NCT	P	Chattanooga Creek	2.25	060200010503
TNR053302	BFI Services	P	Chattanooga Creek	8	060200010503
TNR053352	Goins Waste Oil Company	N, P	Chattanooga Creek	0.3	060200010503
TNR053417	Dixie Stamping & Machine	AB, AA	Not Reported	0.1	060200010503
TNR053651	Hamil Road Closed Landfill	H	Hutson Branch, Chimney Hollow, and Brimstone Creek		060200010503
TNR053668	Sharrock Machine & Welding Company	AB	Not Reported	5	060200010503
TNR053754	Quala Systems, Incorporated	AD, P	Metro Storm Sewer to Chattanooga Creek	5	060200010503
TNR054176	Car Gone II Used Auto Parts	M	Ditch to Chattanooga Creek	3	060200010503
TNR054195	Blow Pipe Sheet Metal	AA	UT to Chattanooga Creek	1.5	060200010503
TNR054202	Kirk Machine Shop	AB	UT to Chattanooga Creek	0.46	060200010503
TNR054359	AML Industries	A, X	Dobbs Branch	0.6	060200010503
TNR054484	Alloway Stamping & Machine Company	AA	Metro Storm Sewer to UT to Chattanooga Creek	1.01	060200010503
TNR054578	Lane Steel Fabricators, Incorporated	AA	Chattanooga Creek	0.77	060200010503
TNR055045	Tuftco Corporation	AB	Dobbs Branch	16.1	060200010503
TNR055057	Millennium Packaging Solutions	B	Chattanooga Creek	9.5	060200010503
TNR055993	Hickman	C	Chattanooga Creek	3.26	060200010503
TNR056106	Don's Auto Salvage & Sales	M	Chattanooga Creek	15	060200010503
TNR056151	Hegwood Auto Parts	M	WWC to Chattanooga Creek	9	060200010503
TNR056371	S & M Auto Parts	M	Chattanooga Creek	5	060200010503
TNR056444	Astec - Wilson Road	AB	Chattanooga Creek	3	060200010503
TNR056454	Griffin Industries	U	UT to Chattanooga Creek	2.3	060200010503
TNR056535	S & M Auto Parts	M	UT to Chattanooga Creek	20	060200010503
TNR051839	Southeastern Materials	D	Black Creek	2	060200010504
TNR050645	Sather Trucking	P	Black Creek	6.1	060200010504
TNR050251	Chattanooga Plating & Machine	AA, AB	Blade Creek	2	060200010504
TNR051511	Clean Harbors Chattanooga	AD	Black Creek	4.2	060200010504
TNR051672	Ring Can Corporation	Y	Black Creek	3.61	060200010504
TNR051789	Lookout Valley Equipment	AC	Lookout Creek	0.5	060200010504
TNR053239	Wauhatchie Yard	P	Black Creek	3	060200010504
TNR053971	Koch Foods Feed Mill	U	UT to Lookout Creek	105	060200010504
TNR054423	Burner Systems International	AA	Municipal Storm Sewer System	14	060200010504
TNR054597	JRB Company	AB	Black Creek	1.7	060200010504
TNR055897	Pilgram's Pride Corporation of Delaware	U, P	UT to Lookout Creek	17	060200010504
TNR050404	Saint-Gobain Norpro	E	Poe Creek	19	060200010702
TNR051250	Card-Monroe Corporation	AB	UT to North Chickamauga Creek	14	060200010702

Table A4-11c.

FACILITY NUMBER	FACILITY NAME	SECTOR	RECEIVING STREAM	AREA*	HUC-12
TNR055961	B&B Steel Erection Company	AE	UT to North Chicakamauga Creek	3	060200010702
TNR055046	Stainless tank Incorporated	AA	Metro Storm Sewer to Chattanooga Creek	0.3	060200010801
TNR050453	Textile Printing Company	B	Spring Creek to West Chickamauga Creek	7.2	060200010803
TNR050074	Hoyt's Automotive Incorporated	M	WWC to South Chickanauga Creek	7	060200010804
TNR050088	Wikoff Color Corporation	C	UT to South Chickamauga Creek	0.6	060200010804
TNR050329	Wrigley Manufacturing Company	U	UT to Friar Branch	6.7	060200010804
TNR050363	SI Concrete Systems Incorporated	V	South Chickamauga Creek	10.5	060200010804
TNR050421	SMP Industries Incorporated	AA	South Chickamauga Creek	7.3	060200010804
TNR050550	Stowers Machinery Corporation	P	South Chickamauga Creek	3.2	060200010804
TNR050681	Brach's Confections Incorporated	U	UT to Friar Branch	30	060200010804
TNR050784	East Brainerd Lumber Company, Inc.	A	UT to South Chickamauga Creek	25	060200010804
TNR050940	Bacon Products Corporation	C	Chickamauga Creek	6	060200010804
TNR050967	Benton Oil Services, Incorporated	P	UT to Friar Branch	3.7	060200010804
TNR051014	Array-Chattanooga	AA	Citico Creek	26	060200010804
TNR051055	BASF Corporation	C	Friar Branch	9.8	060200010804
TNR051386	Shaver Metal Systems	AA	Poe Branch	0.5	060200010804
TNR051467	Mueller Company	F, AA, P, L	South Chickamauga Creek	46	060200010804
TNR051485	Woodbridge Foam Fabricating	Y	South Chickamauga Creek	11	060200010804
TNR051502	TAC Air-South	S	UT to South Chickamauga Creek	8.6	060200010804
TNR051608	Steff's Company, Incorporated	AA	South Chickamauga Creek	10	060200010804
TNR051638	Chattanooga Coca-Cola Bottling Company	U	South Chickamauga Creek	25	060200010804
TNR051689	South Atlantic Galvanizing	AA	South Chickamauga Creek	4.56	060200010804
TNR051856	Advanced Technical Ceramics Company	AC, E	UT to Tennessee River	9.3	060200010804
TNR051872	Benton Oil Service, Incorporated	P	UT to Friar Branch	2.7	060200010804
TNR051963	MetalTek International	F	South Chickamauga Creek	18.5	060200010804
TNR051975	Magellan Terminals Holdings	P	WWC to UT to Friar Branch	2.285	060200010804
TNR052048	UPS Ground Freight, Incorporated	P	Friar Branch	8	060200010804
TNR053082	SMP Industries, Incorporated	AA	South Chickamauga Creek	7.8	060200010804
TNR053086	Sequatchie Concrete Service, Incorporated	E	Ditch to South Chickamauga Creek	4	060200010804
TNR053218	Lovell Field-Chattanooga Metro Airport	S	South Chickamauga Creek	978	060200010804
TNR053319	Bi-Lo	P	UT to Friar Branch	38	060200010804
TNR053371	FedEx Ground	P	South Chickamauga Creek	11.5	060200010804
TNR053491	Sherman-Dixie Concrete Industries, Inc.	E	UT to Chickamauga Creek	8.8	060200010804
TNR053547	UPS-Chattanooga	P	UT to Friar Branch	8.2	060200010804
TNR053567	Highway Transport, Incorporated	P	Friar Branch	2	060200010804

Table A4-11d.

FACILITY NUMBER	FACILITY NAME	SECTOR	RECEIVING STREAM	AREA*	HUC-12
TNR053680	TAC Air Maintenance Center	S	UT to South Chickamauga Creek	19.2	060200010804
TNR053698	FedEx Freight East, Incorporated	P	Friar Branch	8	060200010804
TNR053743	Summit Landfill	L	WWC to UT to Wolftever Creek	11	060200010804
TNR054148	LD Vault Company	E	Not Reported	1	060200010804
TNR054589	TJ Snow Company, Incorporated	AA	South Chickamauga Creek	5.29	060200010804
TNR055066	Lamberti Synthesis USA, Incorporated	C	UT to South Chickamauga Creek	13.7	060200010804
TNR056361	Sage of America, Incorporated	AA	UT to Friar Branch	2	060200010804
TNR056435	Smurfit-Stone Container Corporation	B	Chickamauga Creek @ RM 0.75	0.5	060200010804
TNR056517	Magellan's Chattanooga II Terminal	P	Friar Branch	17	060200010804
TNR056526	Nutritive Sweeteners, Incorporated	C, AD	UT to Friar Branch	3.2	060200010804
TNR056568	Pepsi Bottling Group	P	South Chickamauga Creek	5.49	060200010804
TNR053491	Sherman-Dixie Concrete Industries, Inc.	E	UT to Chickamauga Creek	8.8	060200010804
TNR053547	UPS-Chattanooga	P	UT to Friar Branch	8.2	060200010804
TNR053567	Highway Transport, Incorporated	P	Friar Branch	2	060200010804
TNR053680	TAC Air Maintenance Center	S	UT to South Chickamauga Creek	19.2	060200010804
TNR053698	FedEx Freight East, Incorporated	P	Friar Branch	8	060200010804
TNR053743	Summit Landfill	L	WWC to UT to Wolftever Creek	11	060200010804

Table A4-11e.

Tables A4-11a-e. Active Permitted TMSP Facilities in the Lower Tennessee River Watershed. *Area, acres of property associated with industrial activity; UT, Unnamed Tributary; WWC, Wet Weather Conveyance. Sector details may be found in Table A4-12.*

SECTOR	TMSP SECTOR NAME
A	Timber Products Facilities
AA	Facilities That Manufacture Metal Products including Jewelry, Silverware and Plated Ware
AB	Facilities That Manufacture Transportation Equipment, Industrial or Commercial Machinery
AC	Facilities That Manufacture Electronic and Electrical Equipment and Components, Photographic and Optical Goods
AD	Facilities That Are Not Covered Under Sectors A Thru AC (Monitoring Required)
AE	Facilities That Are Not Covered Under Sectors A Thru AC (Monitoring Not Required)
B	Paper and Allied Products Manufacturing Facilities
C	Chemical and Allied Products Manufacturing Facilities
D	Asphalt Paving, Roofing Materials, and Lubricant Manufacturing Facilities
E	Glass, Clay, Cement, Concrete, and Gypsum Product Manufacturing Facilities
F	Primary Metals Facilities
G	Metal Mines (Ore Mining and Dressing) (RESERVED)
H	Inactive Coal Mines and Inactive Coal Mining-Related Facilities
I	Oil or Gas Extraction Facilities
J	Construction Sand and Gravel Mining and Processing and Dimension Stone Mining and Quarrying Facilities
K	Hazardous Waste Treatment Storage or Disposal Facilities
L	Landfills and Land Application Sites
M	Automobile Salvage Yards
N	Scrap Recycling and Waste and Recycling Facilities
O	Steam Electric Power Generating Facilities
P	Vehicle Maintenance or Equipment Cleaning areas at Motor Freight Transportation Facilities, Passenger Transportation Facilities, Petroleum Bulk Oil Stations and Terminals, the United States Postal Service, or Railroad Transportation Facilities
Q	Vehicle Maintenance Areas and Equipment Cleaning Areas of Water Transportation Facilities
R	Ship or Boat Building and Repair Yards
S	Vehicle Maintenance Areas, Equipment Cleaning Areas or From Airport Deicing Operations located at Air Transportation Facilities
T	Wastewater Treatment Works
U	Food and Kindred Products Facilities
V	Textile Mills, Apparel and other Fabric Product Manufacturing Facilities
W	Furniture and Fixture Manufacturing Facilities
X	Printing and Platemaking Facilities
Y	Rubber and Miscellaneous Plastic Product Manufacturing Facilities
Z	Leather Tanning and Finishing Facilities

Table A4-12. TMSP Sectors and Descriptions.

APPENDIX V

Land Treatment - Conservation Buffers				
	Field Borders (feet)	Filter Strip (feet)	Streambank / Shoreline Protection (feet)	Riparian Forest Buffer (acres)
FY 2001	10570		3945	14
FY 2002		9	20326	16
FY 2003		237	750	
FY 2004	10200		17750	18
FY 2005	4300		10000	10

Table A5-1a. Land Treatment Conservation Practice (Conservation Buffers), in Partnership with NRCS in the Tennessee Portion of the Lower Tennessee River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Erosion Control		
	Est. soil saved (tons/year)	Land Treated with erosion control measures (acres)
FY 2001	24223	4616
FY 2002	19982	2304
FY 2003	30690	2035
FY 2004		
FY 2005		

Table A5-1b. Erosion Control Conservation Practices, in Partnership with NRCS in the Tennessee Portion of the Lower Tennessee River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Nutrient Management				
	Waste Utilization (acres)	AFO Nutrient Mgmt Applied (acres)	Non-AFO Nutrient Mgmt. Applied (acres)	Total Applied (acres)
FY 2001		745	3646	4391
FY 2002		468	2491	2959
FY 2003		1179	1847	3026
FY 2004	48	1708		1756
FY 2005	145	1799		1944

Table A5-1c. Nutrient Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Lower Tennessee River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Pest Management		
	Pest Mgmt. Systems (number)	Pest Mgmt. Systems (acres)
FY 2001	34	4337
FY 2002		2910
FY 2003		2896
FY 2004		1885
FY 2005		2605

Table A5-1d. Pest Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Lower Tennessee River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Grazing / Forages				
	Prescribed Grazing (acres)	Fencing (feet)	Heavy Use Area Protection (acres)	Pasture and Hay Planting (acres)
FY 2001	1348			
FY 2002	1039			
FY 2003	1078			
FY 2004	1014	40977	18	499
FY 2005	1949	18555		148

Table A5-1e. Grazing/Forages Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Lower Tennessee River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Tree & Shrub Practices				
	Land Improved through Forest Stand improvement (acres)	Total Tree & Shrub Estab. (acres)	Forestland Re-established or improved (acres)	Use Exclusion (acres)
FY 2001	1107	138	1245	
FY 2002	216		216	
FY 2003	11	409	420	
FY 2004	413	5	418	22
FY 2005	461		461	303

Table A5-1f. Tree and Shrub Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Lower Tennessee River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Land Treatment - Tillage & Cropping						
	Residue Mgmt, No-till, Strip till (acres)	Residue Mgmt - Mulch Till (acres)	Tillage & Residue Mgmt Systems (acres)	Conservation Crop Rotation (acres)	Contour Farming (acres)	Cover Crop (acres)
FY 2001			1430			
FY 2002	1287		1287			
FY 2003	891	53	944			
FY 2004	162		162	214		
FY 2005	111		111	513	297	52

Table A5-1g. Land Treatment Conservation Practices (Tillage and Cropping), in Partnership with NRCS in the Tennessee Portion of the Lower Tennessee River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Waste Management Facilities			
	Waste Storage Facility (number)	Composting Facility (number)	Total Facilities (number)
FY 2001			
FY 2002	1		1
FY 2003	4	1	5
FY 2004	1		1
FY 2005	1		1

Table A5-1h. Waste Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Lower Tennessee River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Wildlife Habitat Management			
	Upland Habitat Mgmt (acres)	Wetland Habitat Mgmt (acres)	Total Wildlife Habitat Mgmt Applied (acres)
FY 2001	2381	21	2402
FY 2002	1586	57	1643
FY 2003	1605		1605
FY 2004	530		530
FY 2005	1400		1400

Table A5-1i. Wildlife Habitat Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Lower Tennessee River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Water Supply			
	Pipeline (ft)	Pond (number)	Watering Facility (number)
FY 2001			
FY 2002			
FY 2003			
FY 2004	9,985		14
FY 2005	380	2	7

Table A5-1j. Water Supply Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Lower Tennessee River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

COMMUNITY	AWARD DATE	AWARD AMOUNT
CHATTANOOGA	02/03/03	$ 40,721,000
RED BANK	10/14/97	$ 6,917,000

Table A5-2. Communities in the Group 3 Portion of the Tennessee Portion of the Lower Tennessee Watershed that have received Clean Water State Revolving Fund Grants or Loans since the inception of the program.

PRACTICE	NRCS CODE	NUMBER OF BMPs
Waste Management System	312	2
Pond	378	1
Fence	382	3
Acid Mine Reclamation	454	1
Pasture/Hay Planting	512	2
Nutrient Management	590	1
Watering Facility	614	1
TOTAL BMPs	**-**	**11**

Table A5-3. Best Management Practices Installed by Tennessee Department of Agriculture and Partners in the Group 3 Portion of the Tennessee Portion of the Lower Tennessee River Watershed.