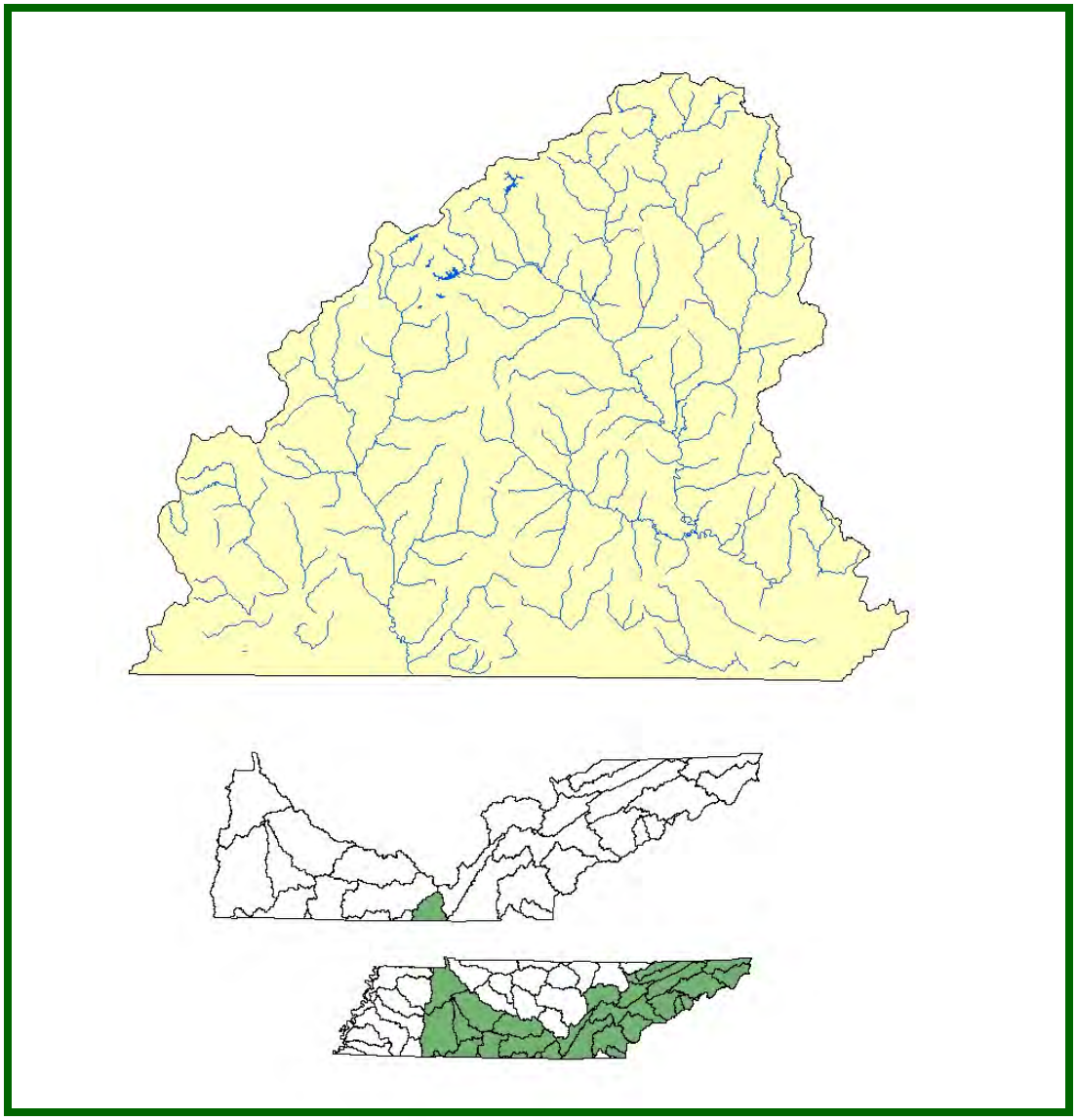
GUNTERSVILLE LAKE WATERSHED (06030001) OF THE TENNESSEE RIVER BASIN

WATERSHED WATER QUALITY MANAGEMENT PLAN



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

GUNTERSVILLE LAKE WATERSHED
WATER QUALITY MANAGEMENT PLAN

TABLE OF CONTENTS

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 – Guntersville Lake Watershed (06030001)

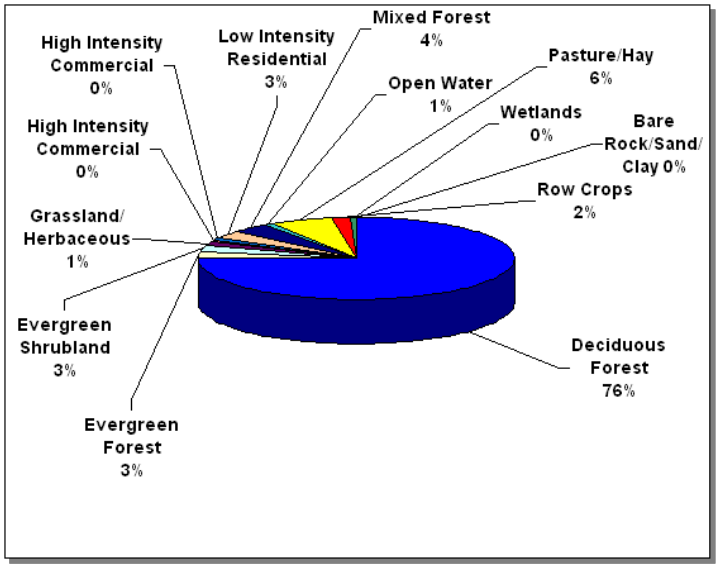
In 1996, the Tennessee Department of Environment and Conservation Division of Water Pollution Control adopted a watershed approach to water quality. This approach is based on the idea that many water quality problems, like the accumulation of point and nonpoint pollutants, are best addressed at the watershed 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 Guntersville Lake 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.

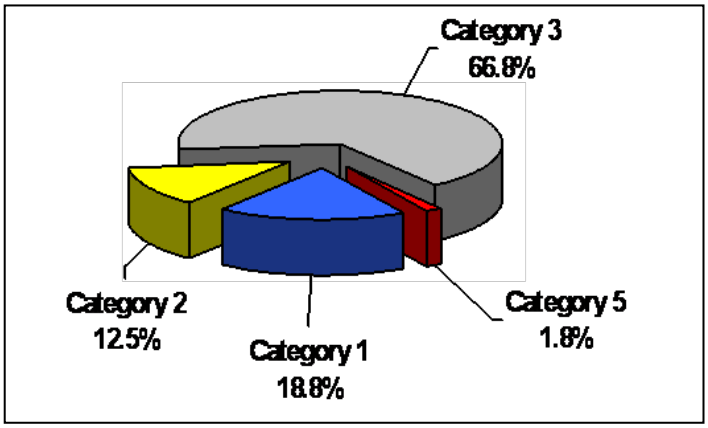
A detailed description of the watershed can be found in Chapter 2. The Guntersville Lake Watershed is approximately 1,983 square miles (337 mi^2 in Tennessee) and includes parts of three Tennessee counties. A part of the Tennessee River drainage basin, the watershed has 424.3 stream miles and 1,479 lake acres in the Tennessee portion of the watershed.

Two wildlife management areas, three Designated State Natural Areas, one state park, one state forest, and two streams listed in the National Rivers Inventory are located in the watershed. Sixty-eight rare plant and animal species have been documented in the watershed, including one rare mussel species and one rare crustacean species.



Land Use Distribution in the Tennessee Portion of the Guntersville Lake Watershed.

A review of water quality sampling and assessment is presented in Chapter 3. Using the Watershed Approach to Water Quality, 241 sampling events occurred in the Guntersville Lake Watershed in 2000-2005. These were conducted at ambient, ecoregion or watershed monitoring sites. Monitoring results support the conclusion that 94.4% of stream miles assessed fully support one or more designated uses.



Water Quality Assessment of Streams and Rivers in the Tennessee Portion of the Guntersville Lake Watershed. Assessment data are based on the 2006 Water Quality Assessment of 424.3 stream miles in the Tennessee portion of the watershed.

Also in Chapter 3, a series of maps illustrates 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. An additional map illustrates streams that are listed for impairment by specific causes (E. coli).

Point and Nonpoint Sources are addressed in Chapter 4 which 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-8	HUC-10	HUC-12
06030001	060300101	06030010101 Tennessee River
		06030010103 Dry Creek
	060300102	06030010201 Battle Creek, Upper
		06030010202 Big Fiery Gizzard Creek
		06030010203 Battle Creek, Lower
		06030010204 Sweden Cove
	060300105	06030010501 Crow Creek, Lower
		06030010502 Crow Creek, Upper
		06030010503 Little Crow Creek
	060300106	06030010601 Little Coon Creek
		06030010602 Big Coon Creek

The Tennessee Portion of the Guntersville Lake Watershed is Composed of eleven USGS-Delineated Subwatersheds (12-Digit Subwatersheds).

Point source contributions to the Tennessee Portion of the Guntersville Lake Watershed consist of 5 individual NPDES-permitted facilities. Other permits in the watershed (as of October 20, 2008) are Mining Permits (8), Aquatic Resource Alteration Permits (3), Tennessee Multi-Sector Permits (17), Construction General Permits (2), Water Treatment Plant Permits (1), CAFO Permits (1), and Ready Mix Concrete Plant Permits (2). 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 Guntersville Lake 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, and Tennessee Valley Authority) and state agencies (TDEC/State Revolving Fund, TDEC Division of Water Supply, Tennessee Department of Agriculture, Tennessee Wildlife Resources Agency, and Alabama Department of Environmental Management). Local initiatives of organizations active in the watershed (Southeast Tennessee RC&D Council, Alabama Wildlife Federation) are also described.

Point and Nonpoint source approaches to water quality problems in the Guntersville Lake 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 Guntersville Lake 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.

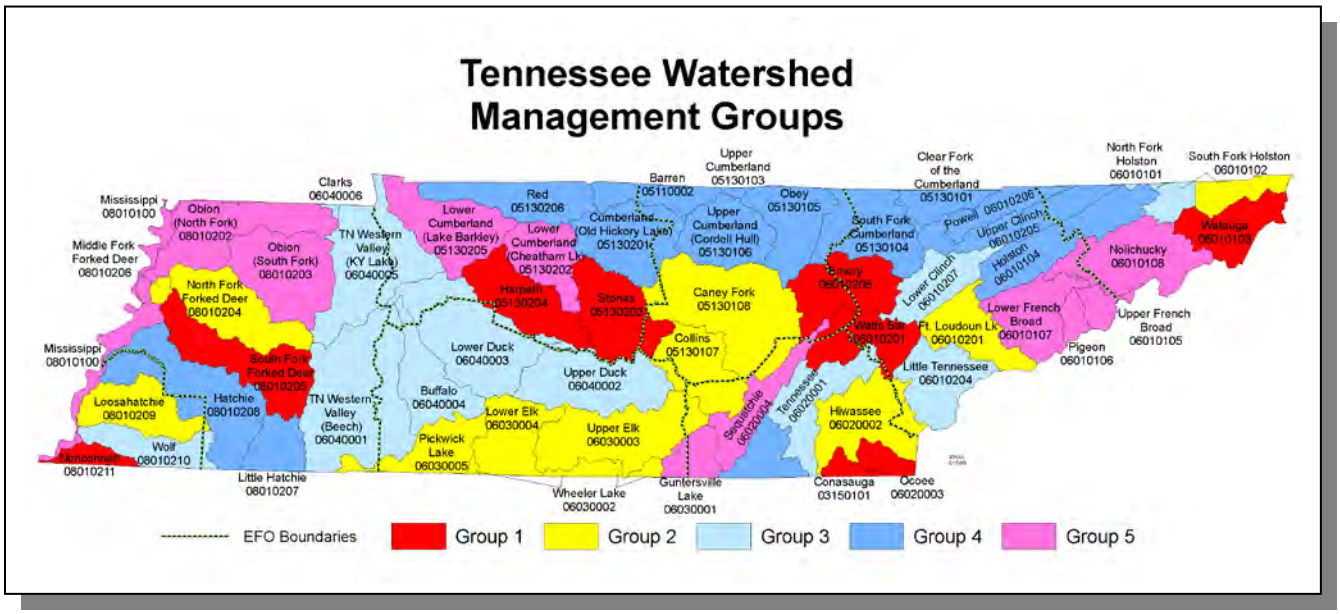


Figure 1-1. Watershed Groups in Tennessee's Watershed Approach to Water Quality.

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.

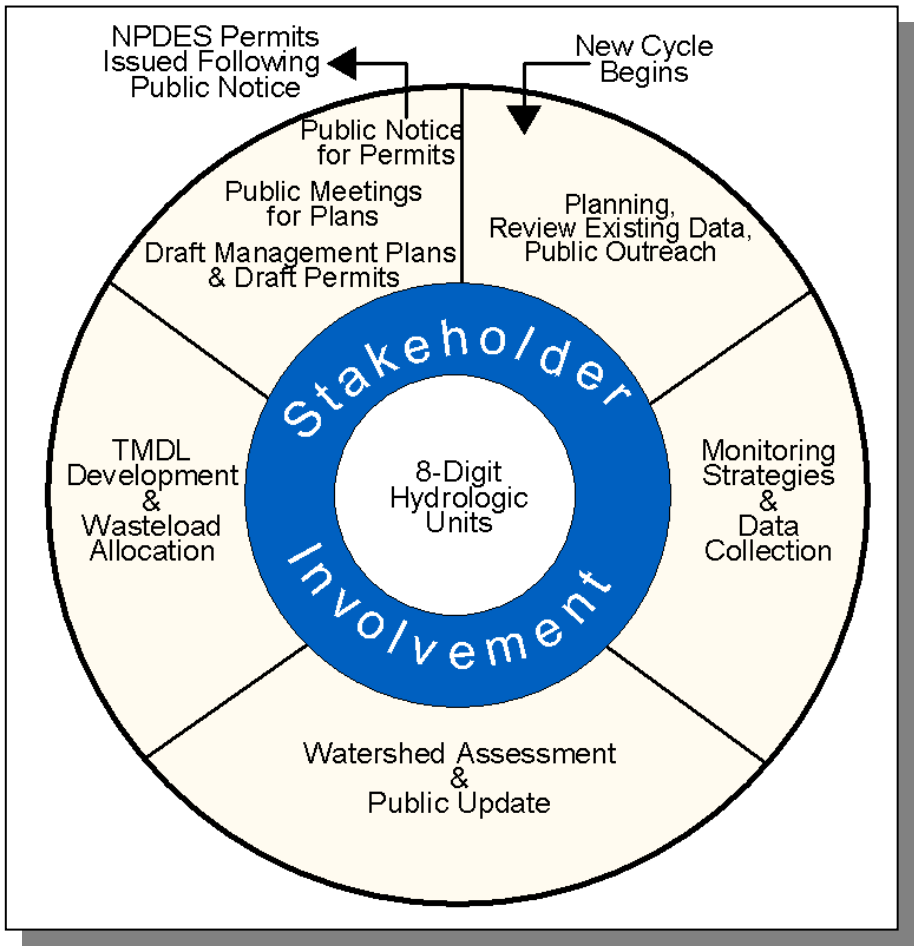


Figure 1-2. The Watershed Approach Cycle.

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 GUNTERSVILLE LAKE WATERSHED

2.1. BACKGROUND. Guntersville Reservoir is located in northeast Alabama and southeast Tennessee, extending 76 miles up the Tennessee River into Tennessee. The nearby town of Guntersville is named for John Gunter, an early Scottish settler and adopted member of the Cherokee tribe, who established the town the year after the American Revolution. The Tennessee Valley Authority (TVA) established the stairway of dams and locks that turned the Tennessee into a 652-mile-long river highway. Guntersville Lake construction began in 1935 primarily for flood control and for the production of hydroelectric power.

This Chapter describes the location and characteristics of the Tennessee portion of the Guntersville Lake Watershed.

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. The Tennessee portion of the Guntersville Lake Watershed is located in southeast Tennessee and includes parts of Franklin, Grundy, and Marion Counties.

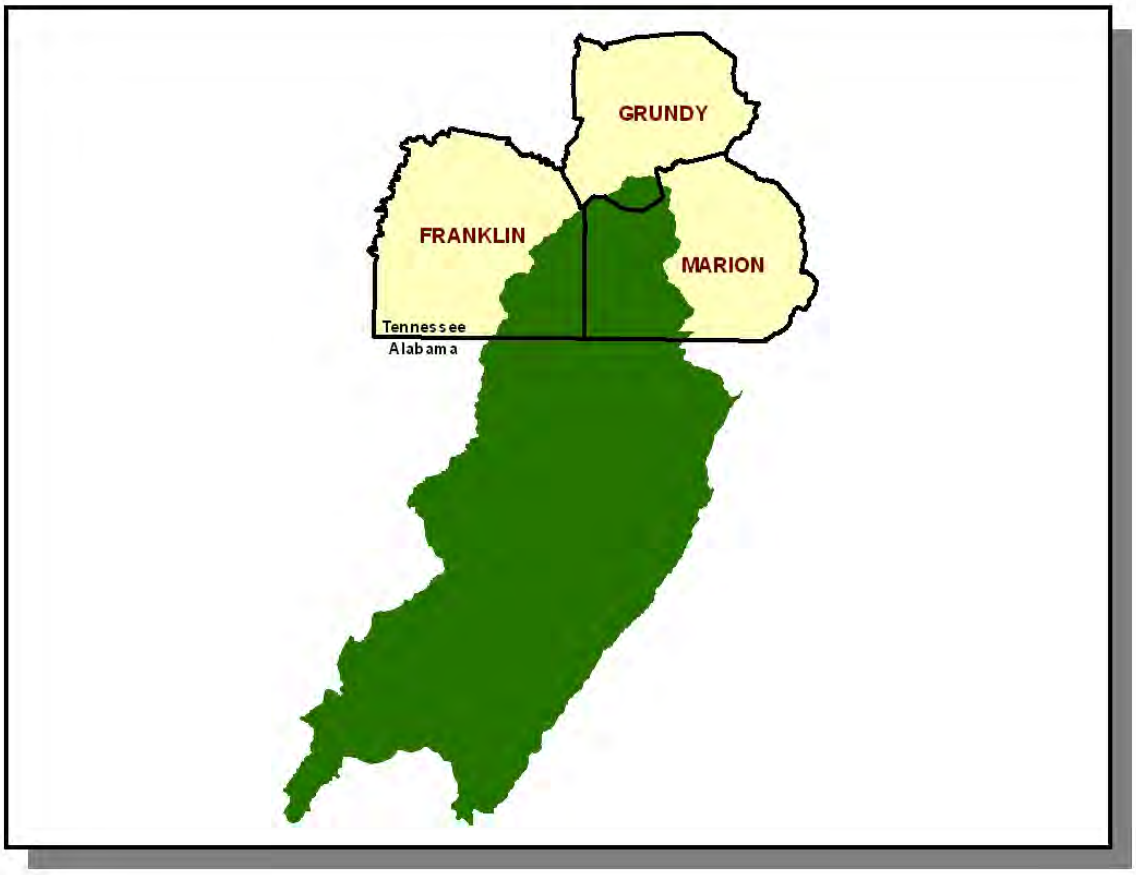


Figure 2-1. General Location of the Guntersville Lake Watershed.

COUNTY	% OF WATERSHED IN EACH COUNTY
Marion	60.51
Franklin	33.04
Grundy	6.45

Table 2-1. The Tennessee Portion of the Guntersville Lake Watershed Includes Parts of Three Middle and East Tennessee Counties.

2.2.B. Population Density Centers. One interstate and seven highways serve the major communities in the Tennessee portion of the Guntersville Lake Watershed.

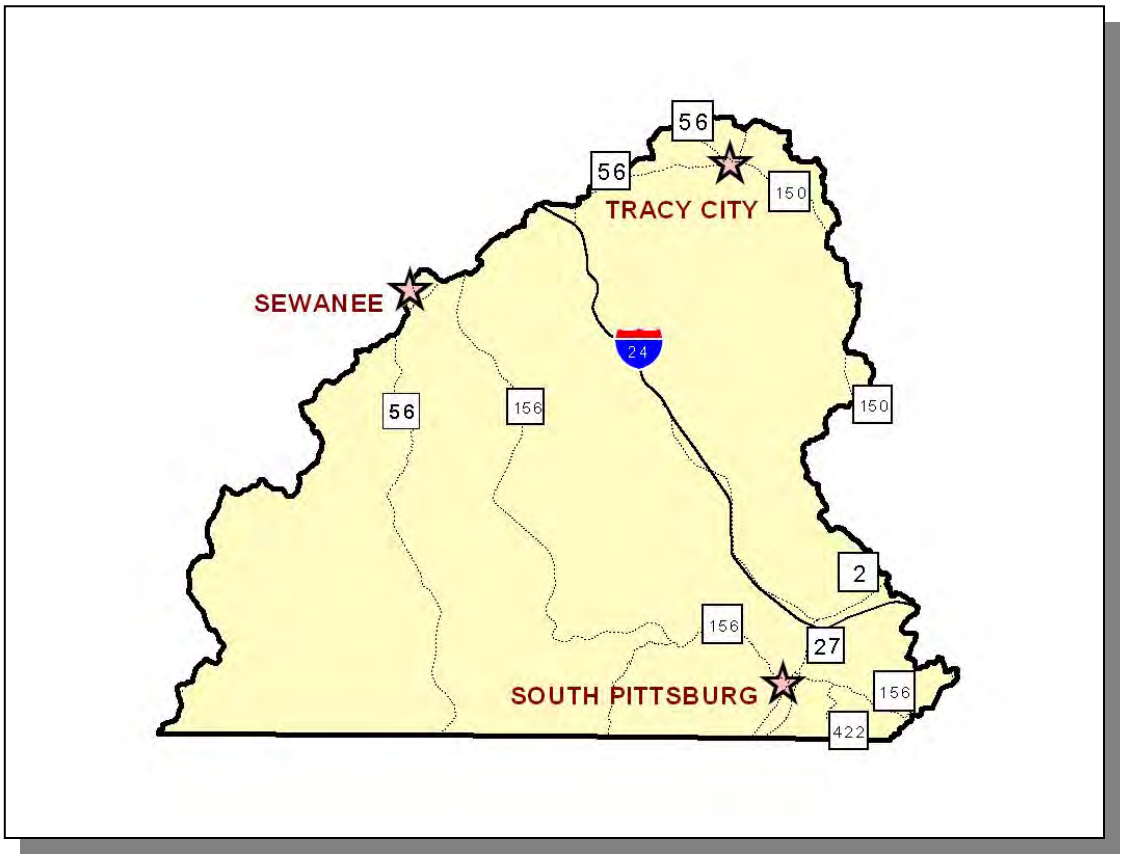


Figure 2-2. Communities and Roads in the Tennessee Portion of the Guntersville Lake Watershed.

MUNICIPALITY	POPULATION	COUNTY
South Pittsburg	3,295	Marion
Sewanee	2,361	Franklin
Tracy City	1,679	Grundy

Table 2-2. Municipalities in the Tennessee Portion of the Guntersville Lake Watershed. *Population based on 2000 census (Tennessee Blue Book) or http://www.hometownlocator.com.*

2.3. GENERAL HYDROLOGIC DESCRIPTION.

2.3.A. Hydrology. The Tennessee portion of the Guntersville Lake Watershed, designated 06030001 by the USGS, is approximately 1,983 square miles (337 square miles in Tennessee) and drains to the Tennessee River.

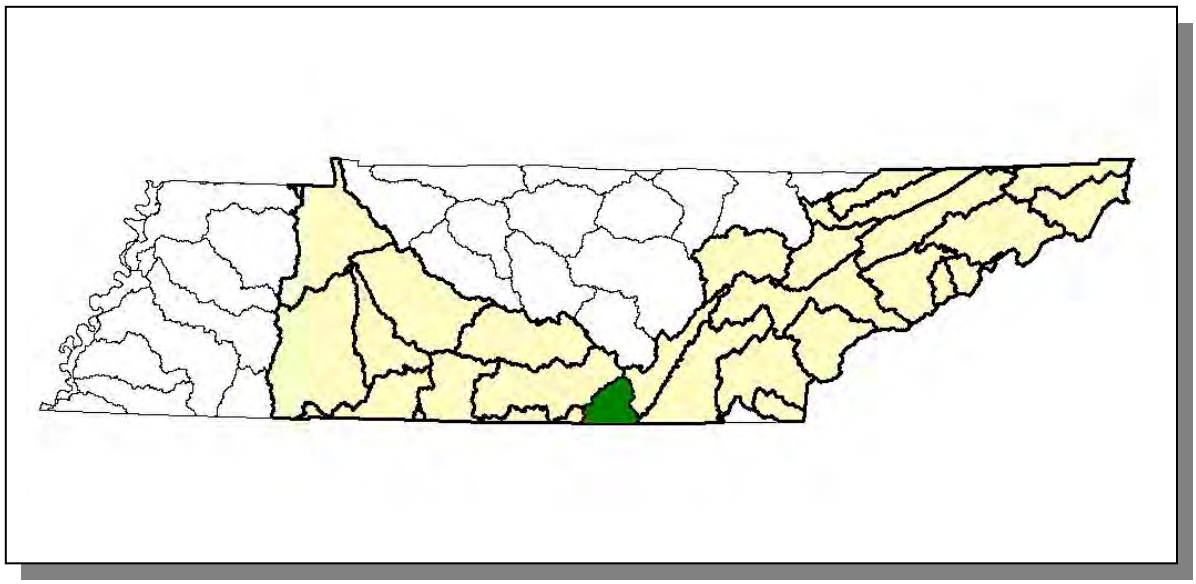


Figure 2-3. The Guntersville Lake Watershed is Part of the Tennessee River Basin.

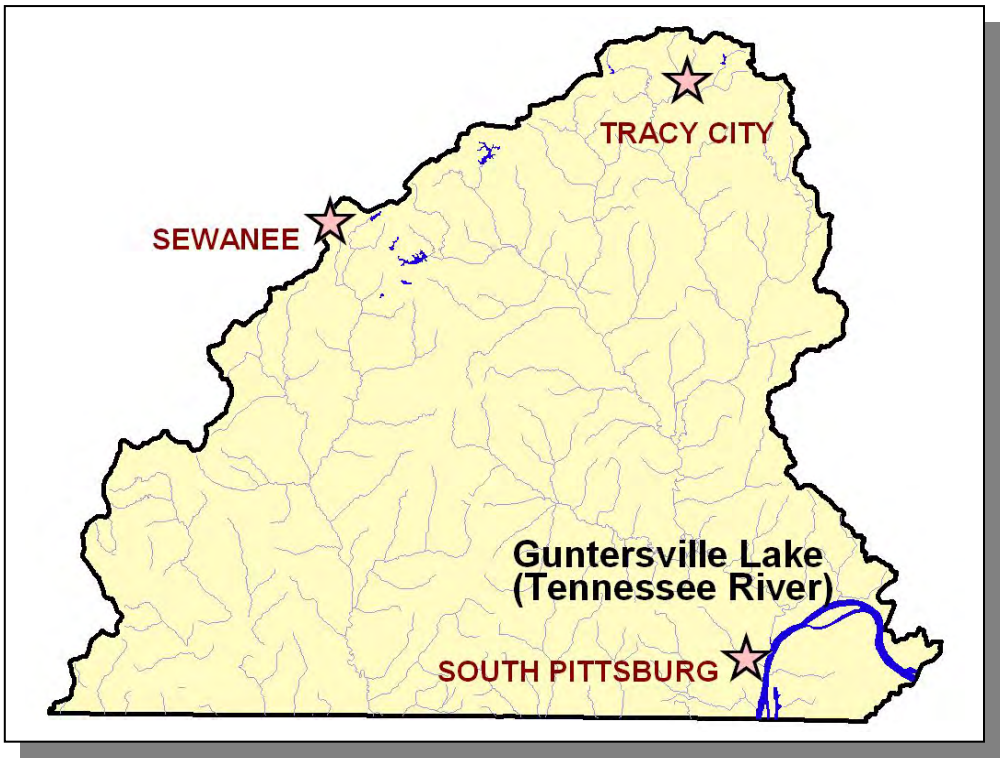


Figure 2-4. Hydrology in the Tennessee Portion of the Guntersville Lake Watershed. *There are 424.3 stream miles and 1,479 lake acres recorded in River Reach File 3 in the Tennessee Portion of the Guntersville Lake Watershed. Location of the Tennessee River and the cities of Sewanee, South Pittsburg, and Tracy City are shown for reference.*

2.3.B. Dams. There are 25 dams inventoried by TDEC Division of Water Supply in the Tennessee portion of the Guntersville Lake Watershed. These dams either retain 30 acre-feet of water or have structures at least 20 feet high.

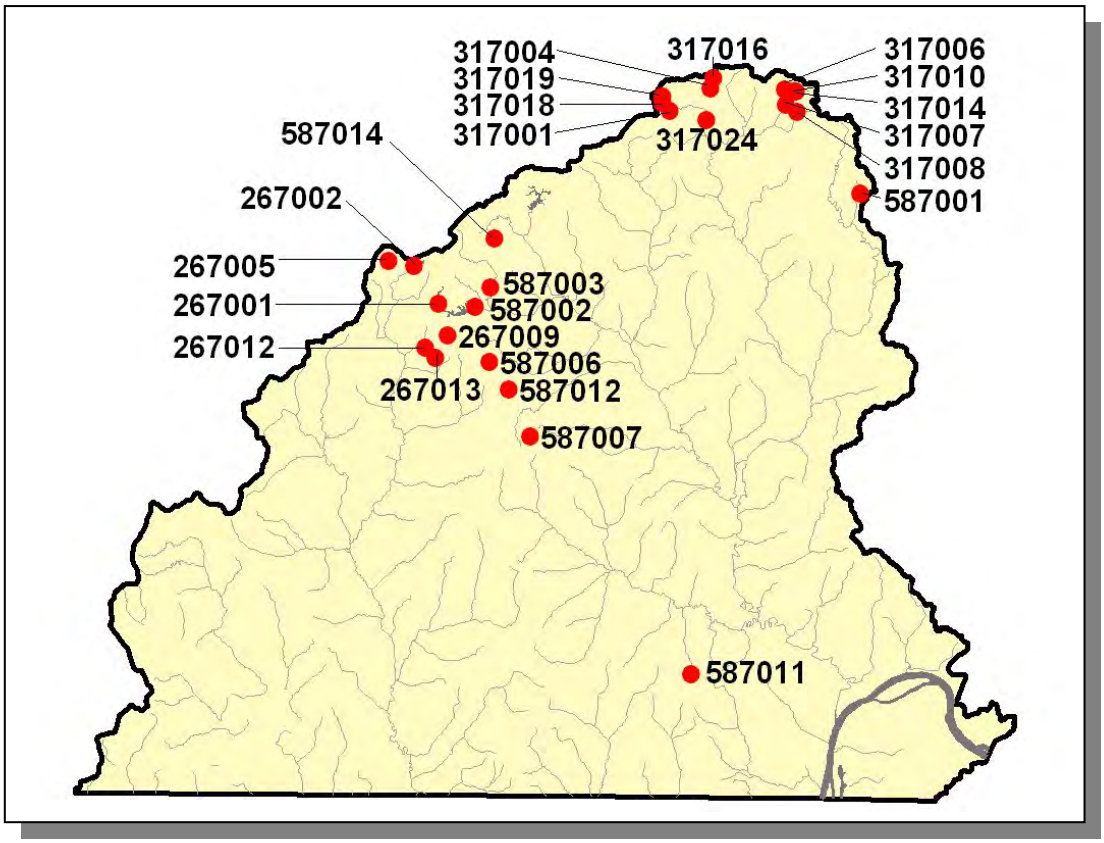


Figure 2-5. Location of Inventoried Dams in the Tennessee portion of the Guntersville Lake Watershed. *More information, including identification of inventoried dams labeled, is provided in Appendix II and at http://gwidc.memphis.edu/website/dams/viewer.htm.*

2.4. LAND USE. Land Use/Land Cover information was provided by EPA Region 4 and was interpreted from 2001 Multi-Resolution Land Cover (MRLC) satellite imagery.

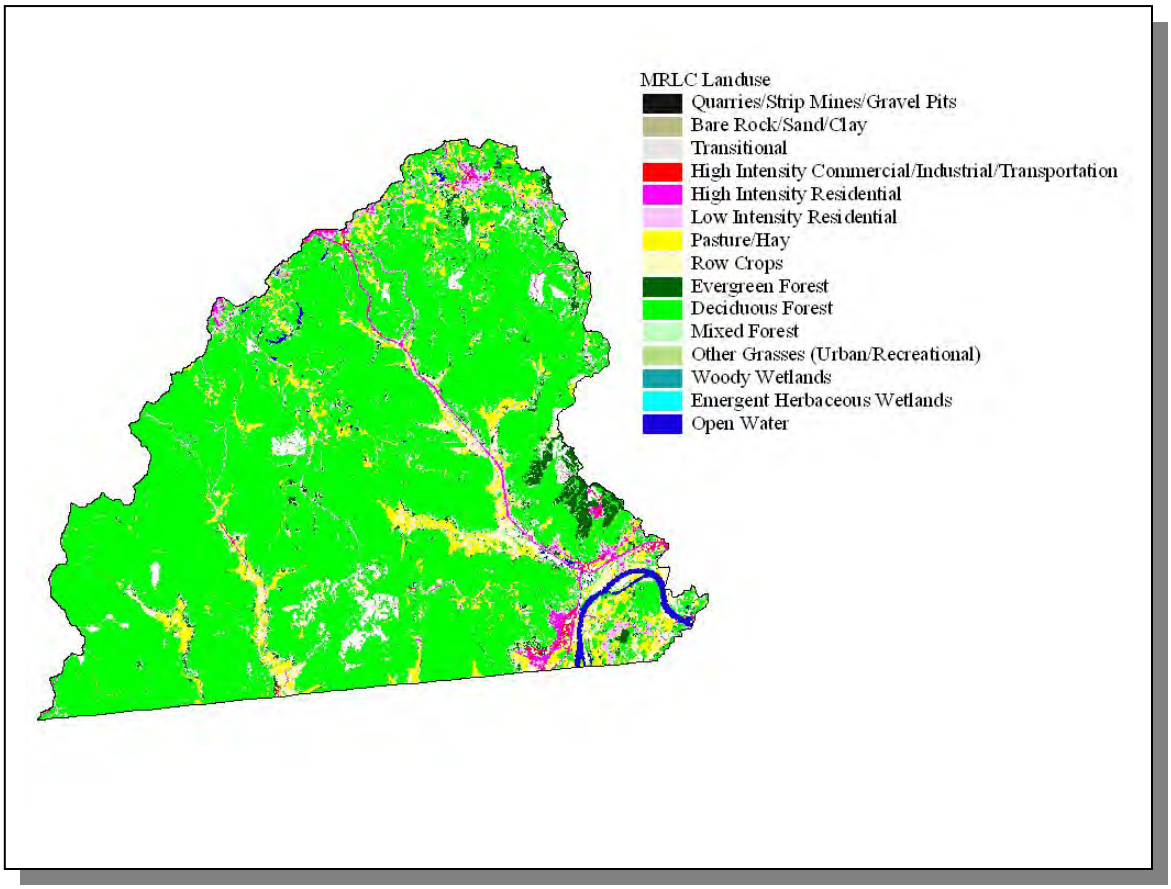


Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery.

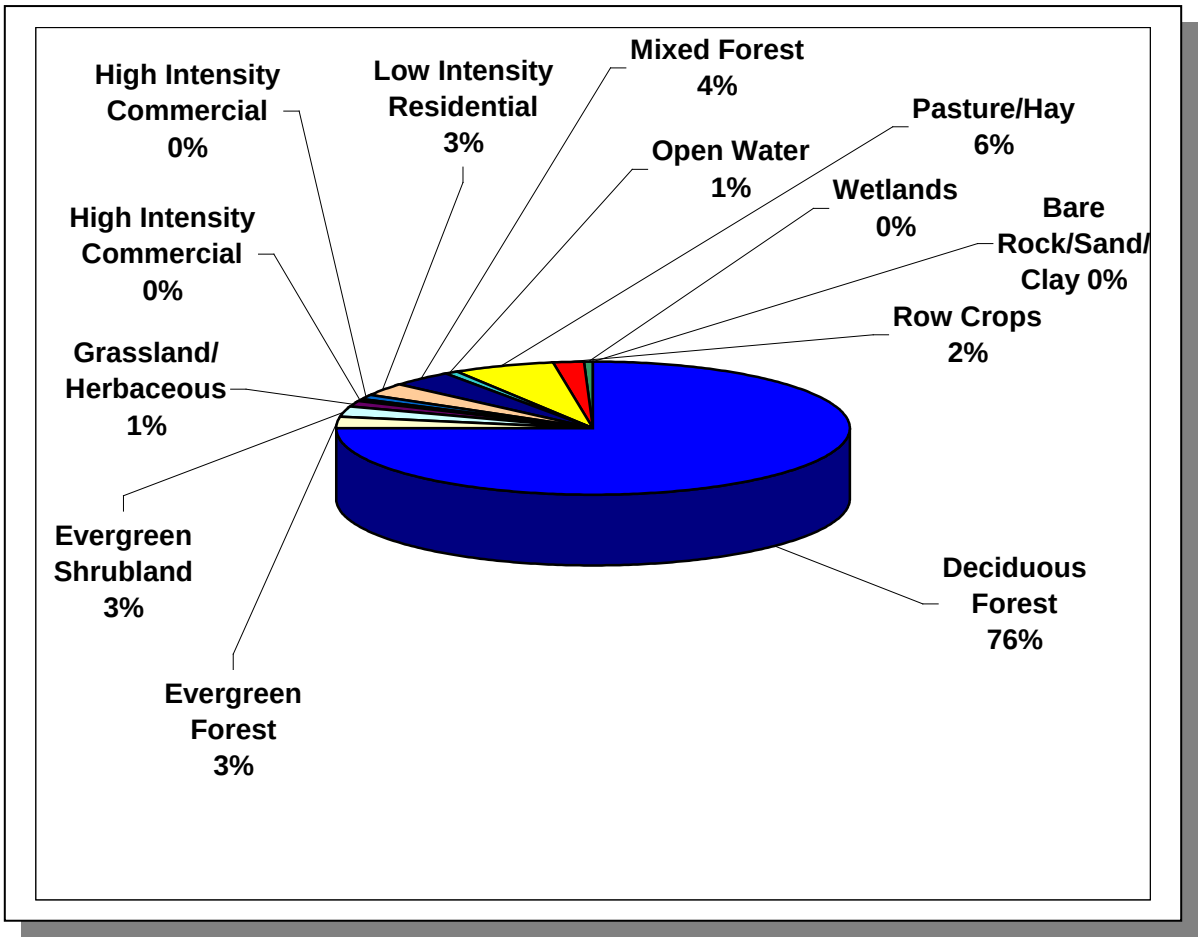


Figure 2-7. Land Use Distribution in the Tennessee Portion of the Guntersville Lake Watershed. *More information is provided in Appendix II.*

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.

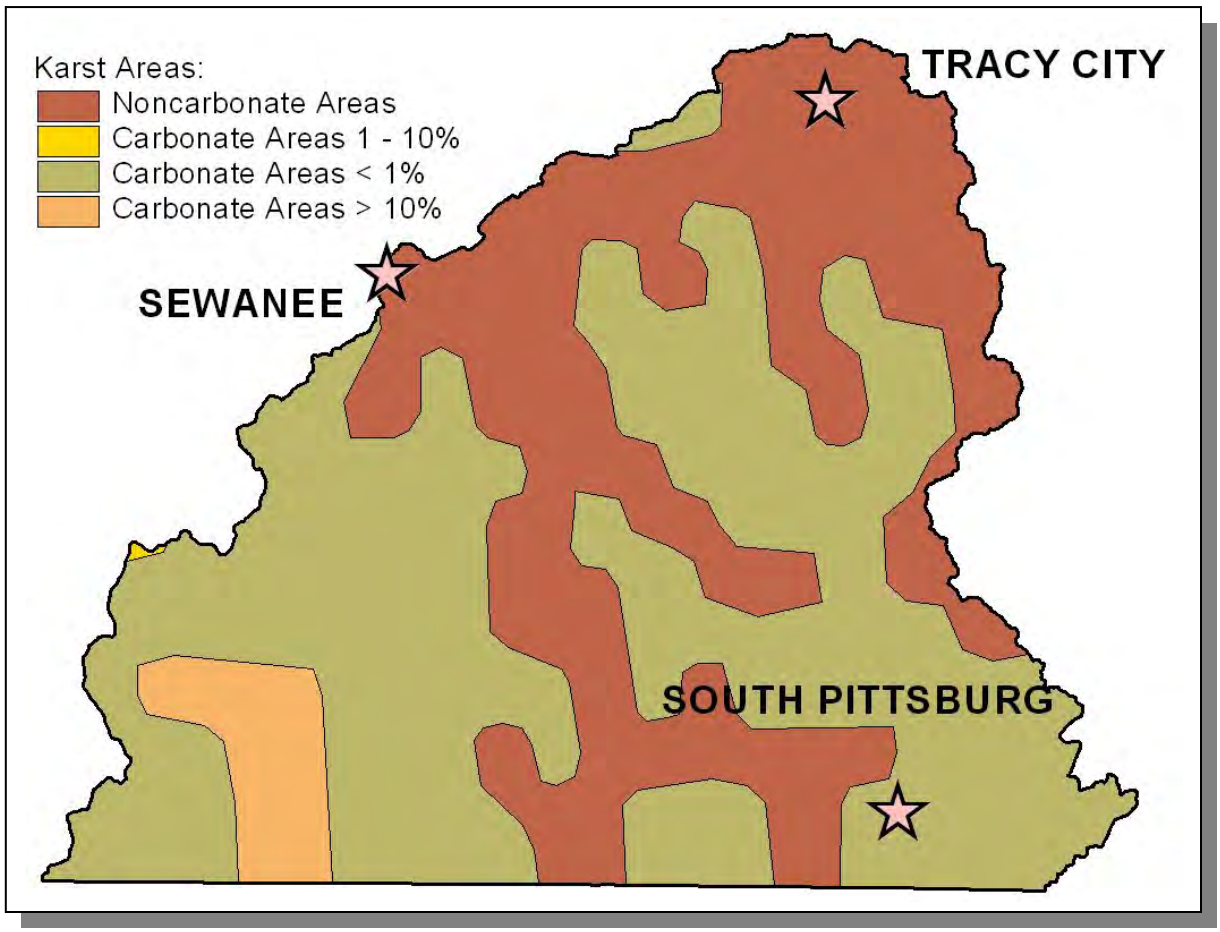


Figure 2-8. Illustration of Karst Areas in the Tennessee Portion of the Guntersville Lake Watershed. *Locations of communities in the watershed are shown for reference.*

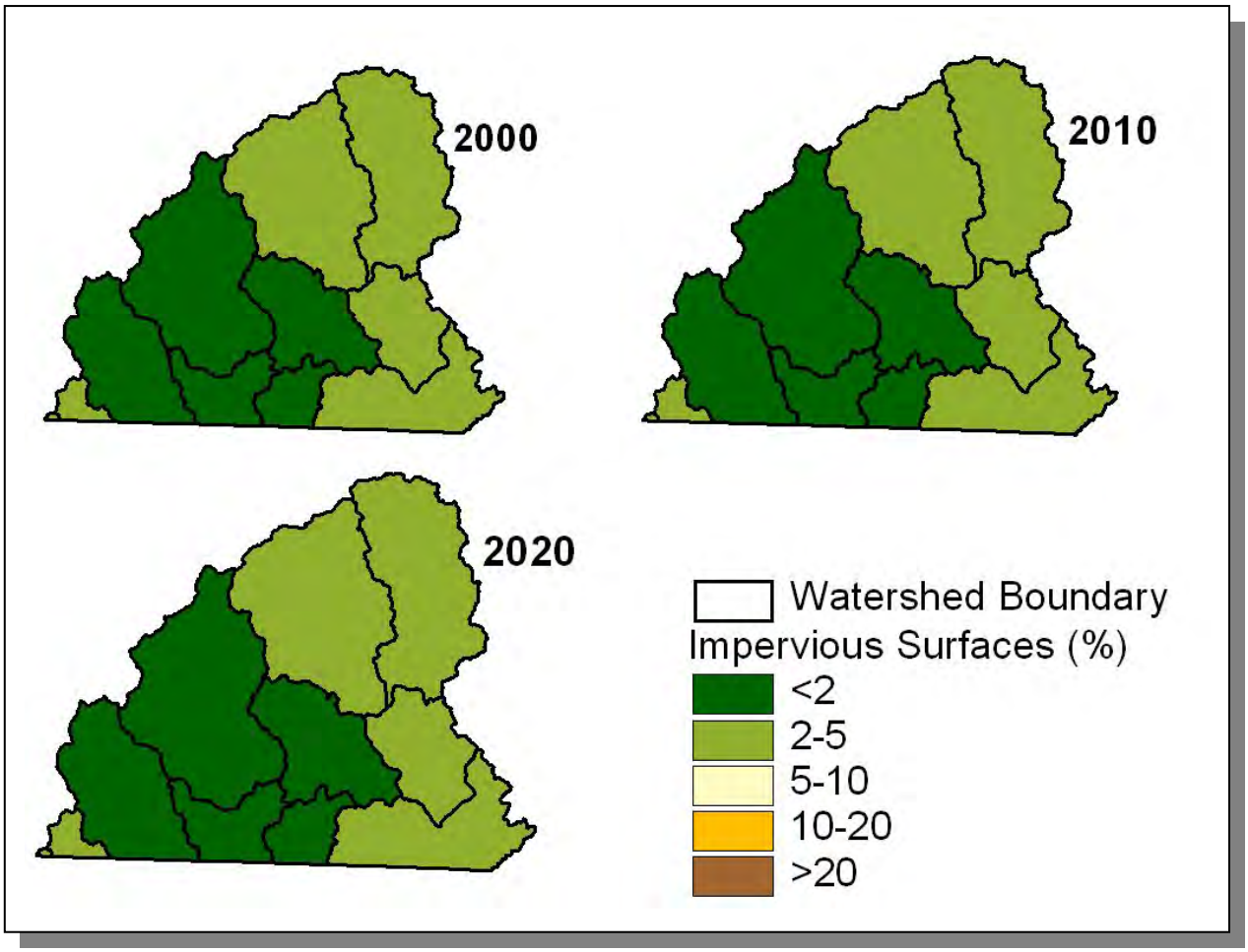


Figure 2-9. Illustration of Total Impervious Area in the Tennessee Portion of the Guntersville Lake Watershed. *All HUC-12 subwatersheds are shown. Current estimates and projected total impervious cover calculated by HUC-12 are provided by EPA Region 4. More information can be found at: http://www.epa.gov/ATHENS/research/impervious/*

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 Tennessee Portion of the Guntersville Lake Watershed lies within 1 Level III ecoregion (Southwestern Appalachians) and contains 3 Level IV subecoregions:

- 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 **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 chert ridge separates the west and east valleys of Mississippian to Ordovician-age limestones, dolomites, and shales. Similar to parts of the Ridge and Valley (^&), this is an agriculturally productive region, with areas of pasture, hay, soybeans, small grain, corn, and tobacco.

- 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.

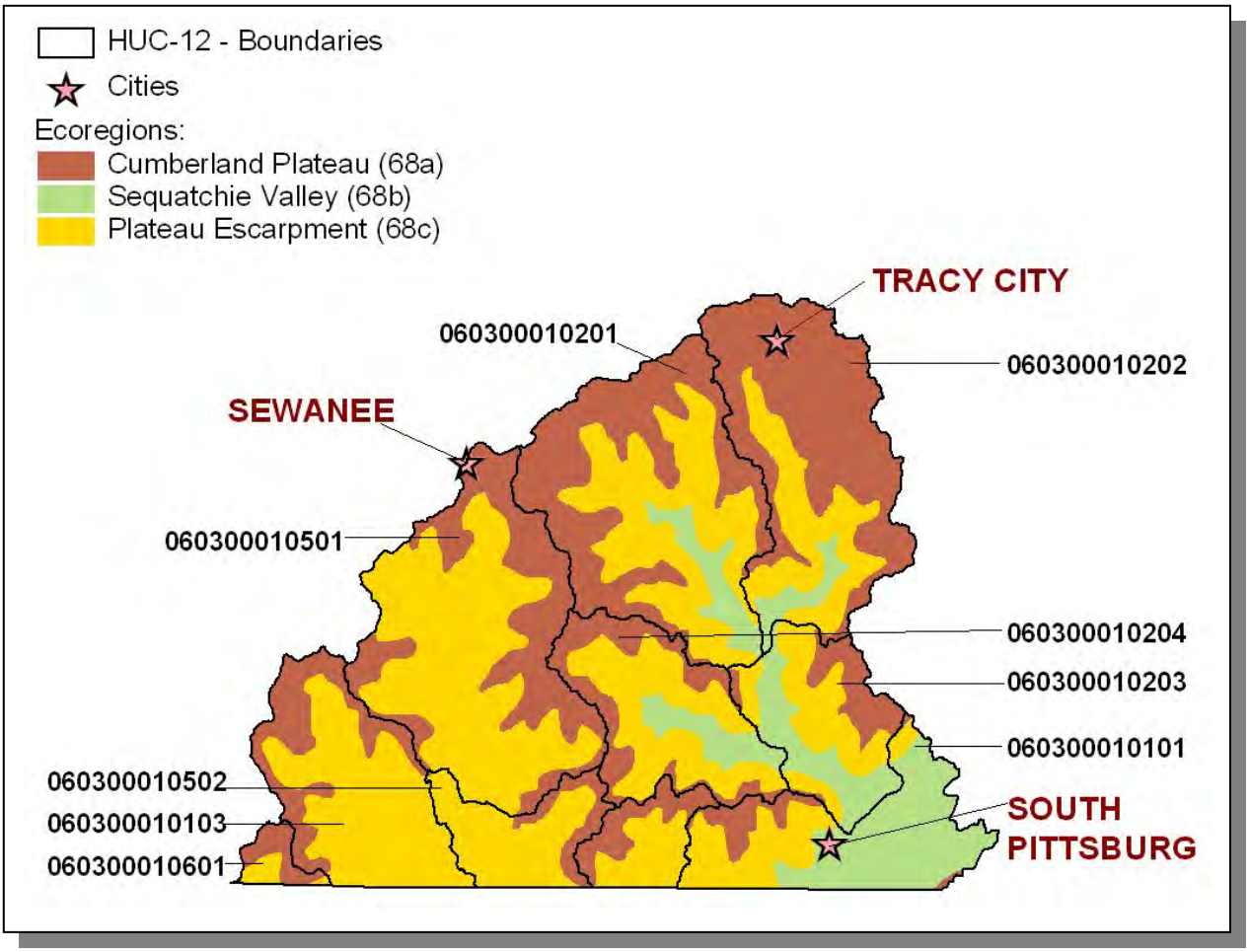


Figure 2-10. Level IV Ecoregions in the Tennessee Portion of the Guntersville Lake Watershed. *HUC-12 subwatershed boundaries and locations of Tracy City, Sewanee, and South Pittsburg are shown for reference.*

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

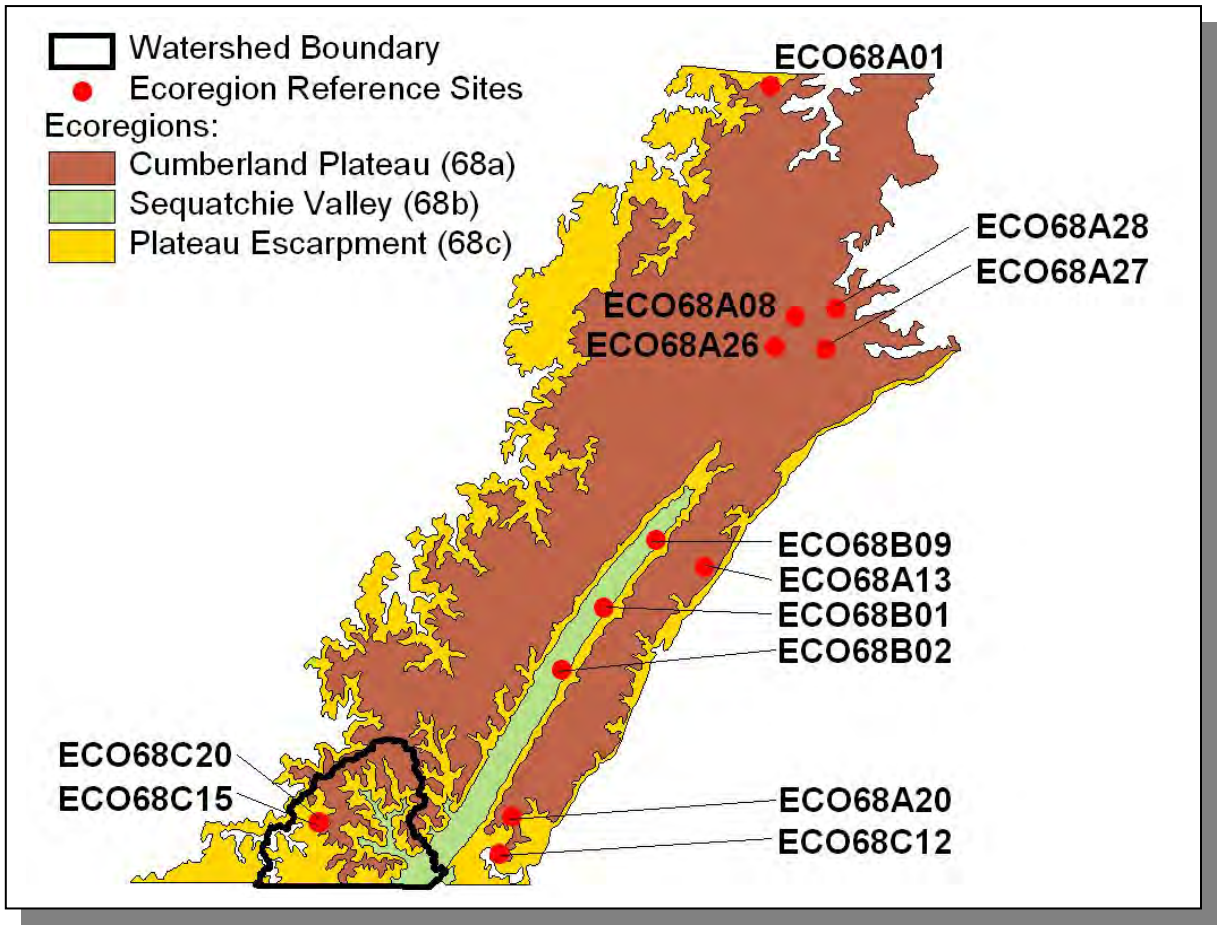


Figure 2-11. Ecoregion Monitoring Sites in Level IV Ecoregions 68a, 68b, and 68c. *The Tennessee Portion of the Guntersville Lake Watershed is shown for reference. More information, including which ecoregion reference sites were inactive or dropped prior to 06/01/2006, is provided in Appendix II.*

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 Areas administers the State Natural Areas program. Further information may be found at http://www.state.tn.us/environment/na/.

The Tennessee Portion of the Guntersville Lake Watershed has three Designated State Natural Areas:

The Mr. and Mrs. Harry Lee Carter Natural Area is a 375-acre natural area located in Franklin County that is part of the South Cumberland Recreation Area. Named after the couple that donated the land to the state, this natural area protects part of a large solution valley associated with the karst erosional processes characteristic of the Cumberland Plateau escarpment. A significant cave system extends from Lost Cove to the head of Crow Creek. The stream systems draining into Lost Cove disappear into the Lost Cove Cave at the Big Sinks and travel underground for over a mile, emerging at the main entrance of Buggytop Cave. This impressive cave entrance is 100 feet wide and 80 feet high. Peter Cave is the other main cave entrance. There have been considerable archeological artifacts of the Woodland and Mississippian period excavated from the entrance. The artifacts are on display at University of the South in Savannah, Tenn.

Natural Bridge is a three-acre natural area located in Franklin County. Natural Bridge is a 25-foot high natural sandstone arch with a span of 50 feet that provides a scenic overlook of Lost Cove. There is a wet weather spring associated with a rock house located behind the natural bridge. The spring probably contributed to the formation of the arch. Lost Cove is a large karst formation on the dissected section of the Cumberland Plateau. It is essentially a giant sinkhole. Lost Creek flows into the valley and disappears into Lost Cove Cave at the Big Sinks and re-emerges as Crow Creek from Buggytop Cave within Mr. & Mrs. Harry Lee Carter State Natural Area. The site also has been referred to as Sewanee Natural Bridge, as the University of the South in Sewanee once owned it. The natural area is a part of the South Cumberland Recreation Area.

Grundy Forest is a 234-acre natural area located in Grundy County. In 1935, it was donated to the state by the town of Tracy City to accommodate a Civilian Conservation Corps (CCC) camp. The CCC built the picnic shelter here in the 1930's. The state originally managed the site as Grundy State Forest. The management responsibility was transferred from the Division of Forestry to the Division of Parks and Recreation in 1978. It eventually became part of the South Cumberland Recreation Area. The natural area serves as the northern trailhead of the Fiery Gizzard Trail that connects with the TVA Foster Falls Small Wild Area at the southern trailhead 12 miles away.

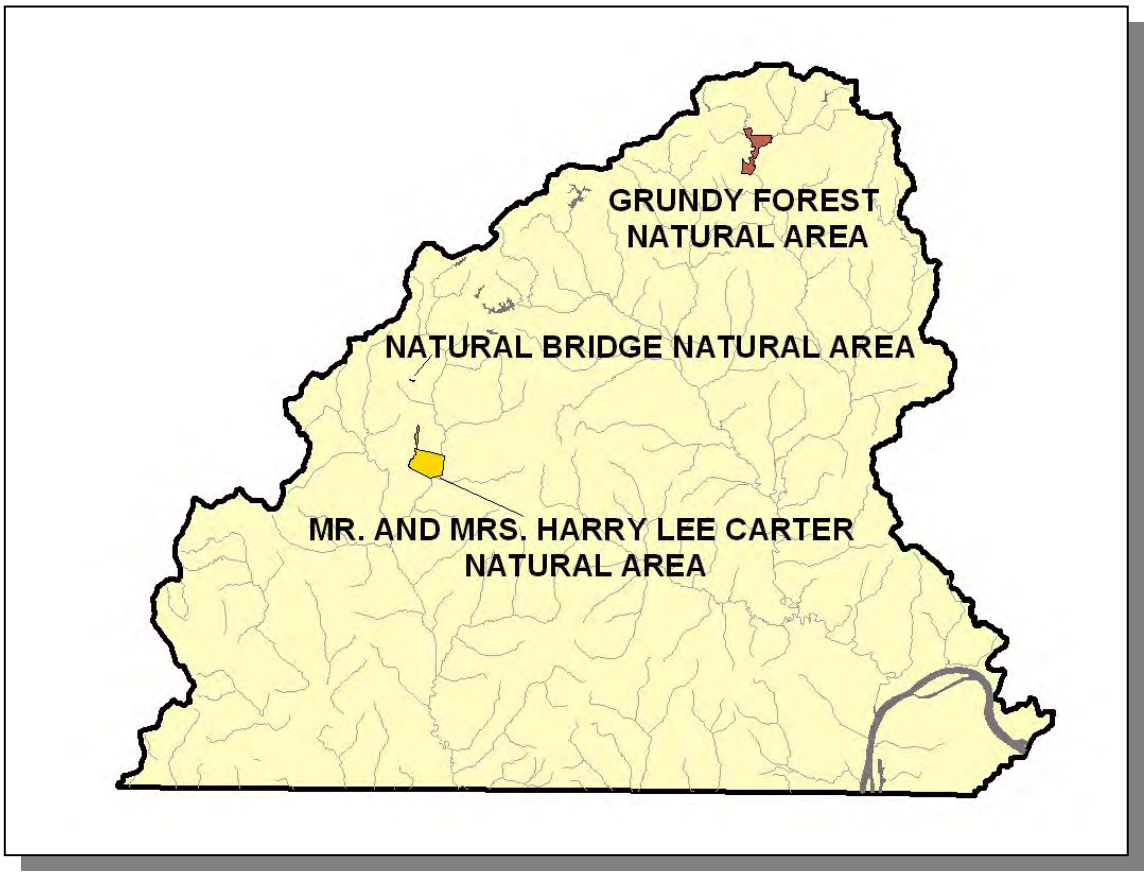


Figure 2-12. There are three Designated State Natural Areas in the Tennessee Portion of the Guntersville Lake Watershed.

2.6.B. Rare Plants and Animals. The Natural Heritage Inventory Program in the TDEC Division of Natural Areas 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	1
Insects	1
Mussels	1
Snails	6
Other	1
Amphibians	4
Birds	3
Mammals	6
Reptiles	1
Plants	44
Total	**68**

Table 2-3. There are 68 Known Rare Plant and Animal Species in the Tennessee Portion of the Guntersville Lake Watershed.

In the Guntersville Lake Watershed, there are four known rare amphibian species, one known rare crustacean species, one known rare mussel species, and six known rare snail species.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
Aneides aeneus	Green Salamander		
Hyla gratiosa	Barking Treefrog		D
Gyrinophilus palleucus	Tennessee Cave Salamander		T
Hemidactylium scutatum	Four-toed Salamander		D
Cambarus hamulatus	Cave Crayfish	LE	E
Lampsilis abrupta	Pink Mucket	LE	E
Zonitoides lateumbilicatus	Striate Gloss		
Somatogyrus aureus	Golden Pebblesnail		
Mesodon smithi	Alabama Shagreen		
Mesodon sanus	Squat Globelet		
Athearnia anthonyi	Anthony's River Snail	LE, XN	E
Anguispira picta	Painted Disc	LT	E

Table 2-4. Rare Aquatic Species in the Tennessee Portion of the Guntersville Lake 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, and XN, listed as Experimental Populations. State Status: T, Listed Threatened by the Tennessee Wildlife Resources Agency; E, Listed Endangered 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/

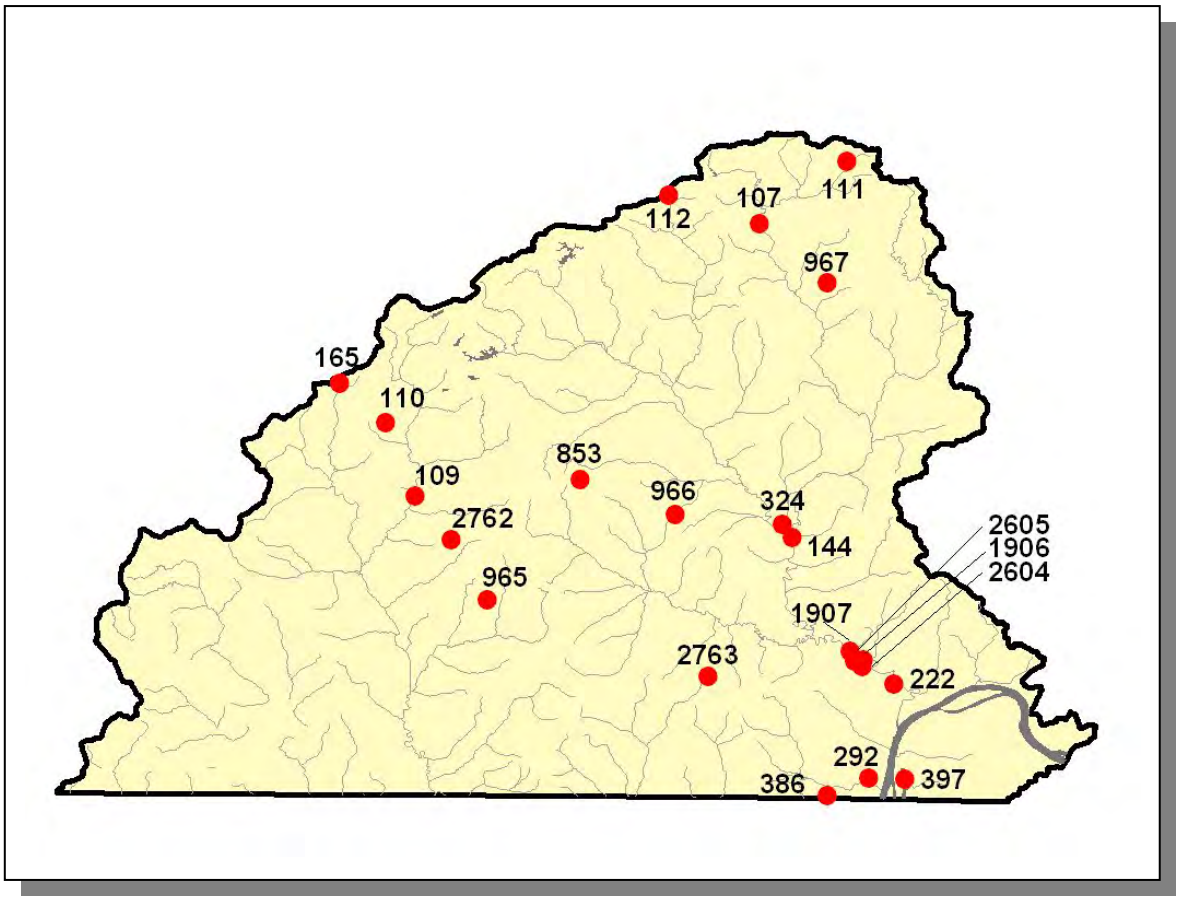


Figure 2-13. Location of Wetland Sites in TDEC Division of Natural Areas Database in the Tennessee Portion of the Guntersville Lake Watershed. This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands. *There may be additional wetland 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 two streams in the Tennessee Portion of the Guntersville Lake Watershed:

Big Fiery Gizzard Creek (RM 0 to RM 17) is a densely forested stream within Tennessee Valley Authority (TVA) Foster Falls Recreation Area.

Sweden Creek (RM 0 to RM 15) is a wilderness stream affording recreational opportunities.

RIVER	SCENIC	RECREATION	GEOLOGIC	FISH	WILDLIFE	HISTORIC	CULTURAL
Big Fiery Gizzard Creek	X	X	X	X			
Sweden Creek	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 in the Tennessee portion of the Guntersville Lake Watershed are under state or federal protection:

- Grundy Lakes State Park is located inside South Cumberland State Park. This 81-acre site features the Lone Rock Coke Ovens. These ovens, operated in the late 1800s with convict labor, were used in making coke for the smelting of iron ore. More information may be found at http://www.friendsofscsra.org/aboutthepark.htm

- Little Gizzard Creek Small Wild Area is a 329-acre site classified as a Tennessee Valley Authority (TVA) Natural Area. More information may be found at http://www.tva.gov/environment/land/habitat.htm.

- University of the South is situated on a 10,000-acre campus known as "The Domain" which is located on the Cumberland Plateau in South Central Tennessee. More information may be found at: http://www.sewanee.edu/biology/herbarium/virtualtour.html

- Franklin State Forest is a 7,291-acre forest managed by the Tennessee department of Agriculture, Division of Forestry. More information may be found at: http://tennessee.gov/agriculture/forestry/stateforests/6.html

- Battle Creek Wildlife Management Area is a 79-acre site managed by Tennessee Wildlife Resources Agency.

- Nickajack Lake is a 10,370-acre reservoir on the Tennessee River managed by the Tennessee Valley Authority (TVA). More information may be found at: http://www.tva.com/sites/nickajack.htm

- Bear Hollow Wildlife Management Area is the Tennessee portion of the Nature Conservancy's Walls of Jericho purchase of 21,453-acres in Alabama and Tennessee. More information may be found at: http://tennessee.gov/twra/reg2bearhollow.html

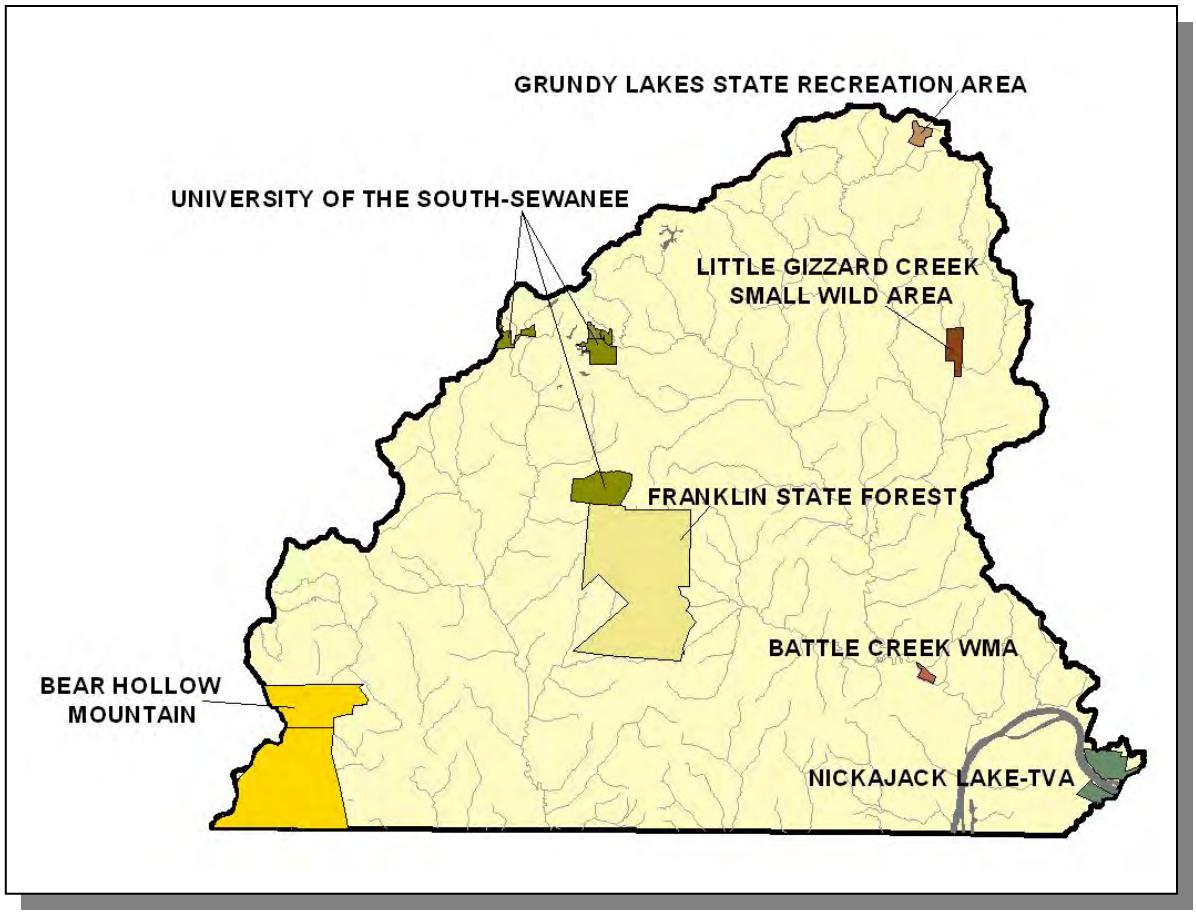


Figure 2-14. Public Lands in the Tennessee Portion of the Guntersville Lake Watershed. *Data are from Tennessee Wildlife Resources Agency. WMA, Wildlife Management Area.*

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
Battle Creek	1,2	2	1	Little Crow Creek	1		
Big Fiery Gizzard Creek	2	2	1	Little Gizzard Creek	1		
Cave Cove Branch Battle Creek	2	2		Lost Creek	1		
Cross Creek	1			Rush Creek	1		
Crow Creek	3			Sweeten Creek	2	2	1
Custard Hollow Creek	1			Talleys Fork Rush Creek	1		
Holly Flat Creek	1			West Fork Battle Creek	3	2	

Table 2-6. Tennessee Rivers Assessment Project Stream Scoring in the Guntersville Lake 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 GUNTERSVILLE LAKE 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 2008 305(b) Report):

1. Assess the general water quality conditions of rivers, streams, lakes and wetlands

2. Identify causes of water pollution and the sources of pollutants

3. Specify waters which have been found to pose human health risks due to elevated bacteria levels or contamination of fish

4. Highlight areas of improved water quality

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 non-point sources and to restore and maintain the quality of water resources.

The current 303(d) List is available on the TDEC homepage at:
http://www.state.tn.us/environment/wpc/publications/2004_303dlist.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 Tennessee portion of the Guntersville Lake Watershed, summarizes data collection and assessment results, and describes impaired waters.

3.2. DATA COLLECTION. The following figures and table 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.

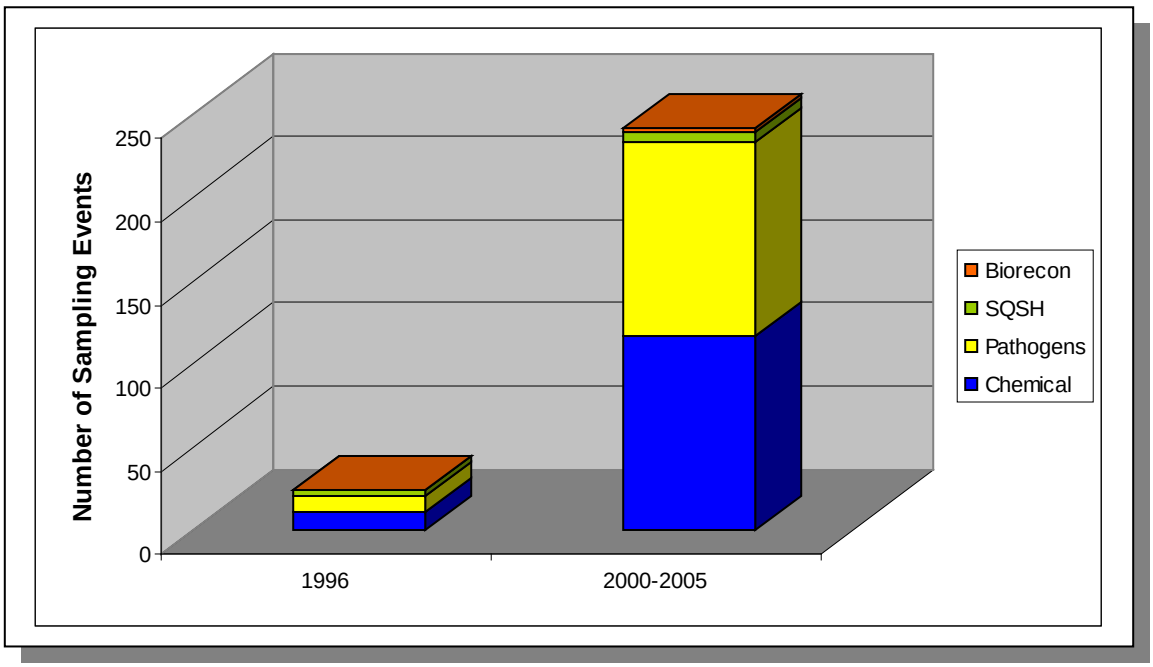


Figure 3-1. Number of Sampling Events Using the Traditional Approach (1996) and Watershed Approach (July 1, 2000 through June 30, 2005) in the Tennessee Portion of the Guntersville Lake Watershed.

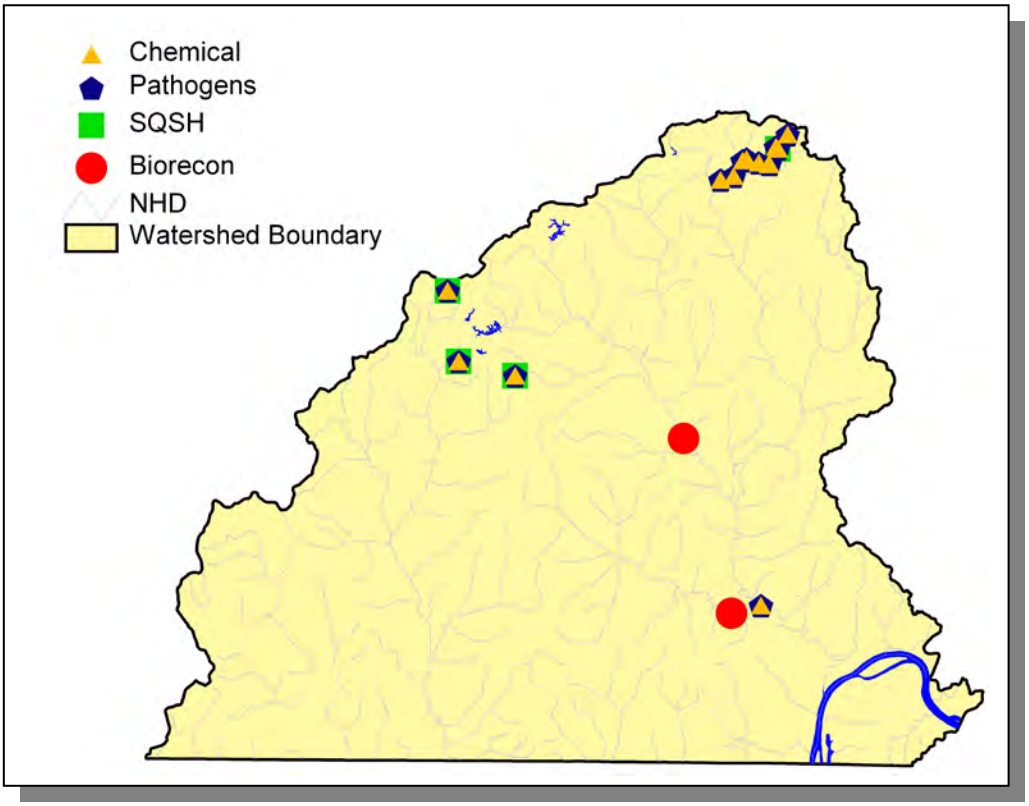


Figure 3-2. Location of Monitoring Sites in the Tennessee Portion of the Guntersville Lake Watershed (July 1, 2000 through June 30, 2005). *Pathogens include E. coli and fecal coliform; NHD, National Hydrography Dataset of Streams.*

	1996	2000-2005
Chemical	10	116
Pathogens	10	116
SQSH	3	7
Biorecon	0	2
Total	**23**	**241**

Table 3-1. Number of Sampling Events in the Tennessee Portion of the Guntersville Lake Watershed in 1996 and 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 and Environmental Field Office-Columbia 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 Tennessee portion of the Guntersville Lake 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 Tennessee portion of the Guntersville Lake Watershed lies within 1 Level III ecoregion (Southwestern Appalachians) and contains 3 subecoregions (Level IV):

- 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.

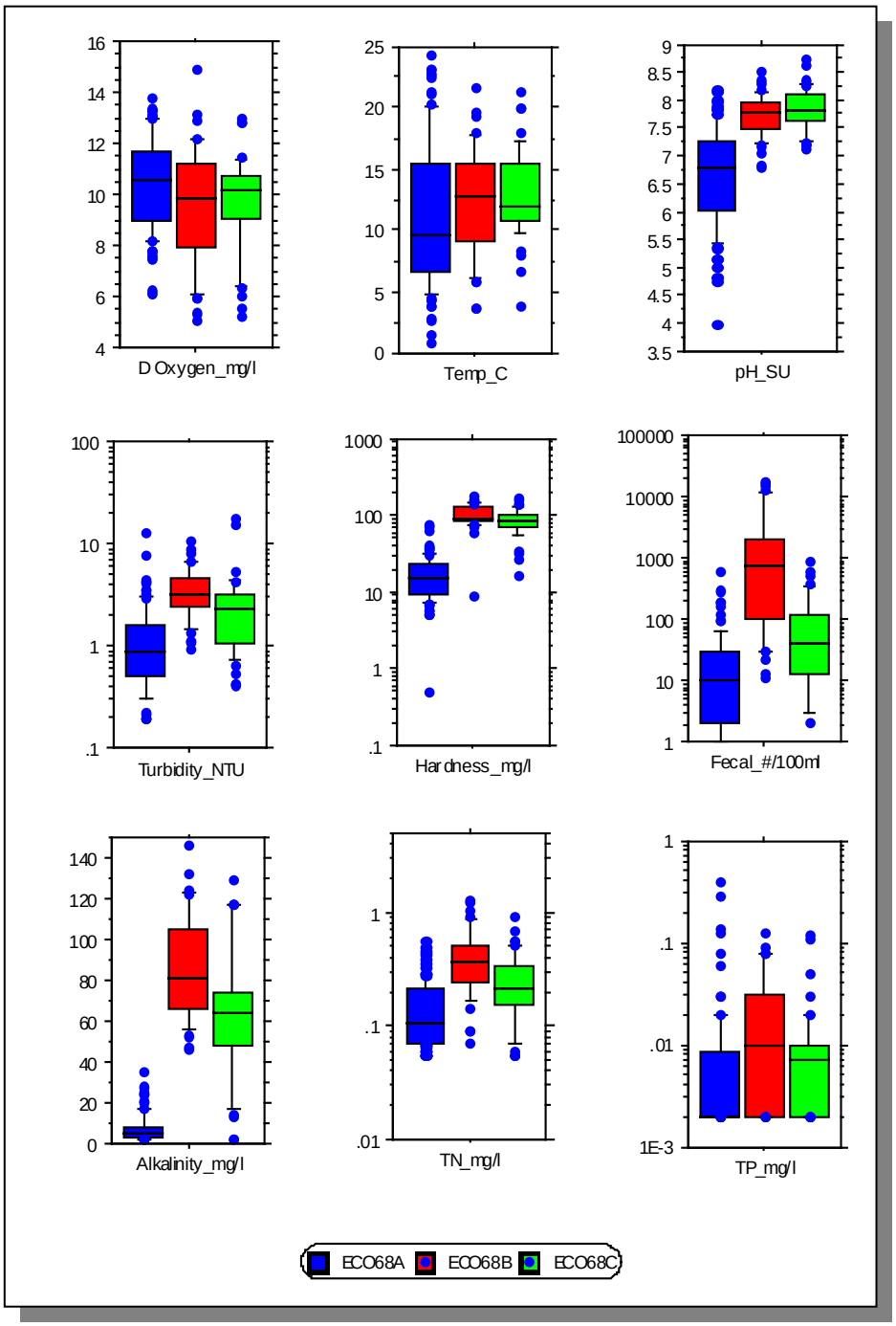


Figure 3-3. Select Chemical Data Collected in the Tennessee portion of the Guntersville Lake Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th percentiles. Extreme values are also shown as dots. Fecal, fecal coliform bacteria; TN, Total Nitrogen; TP, Total Phosphorus.*

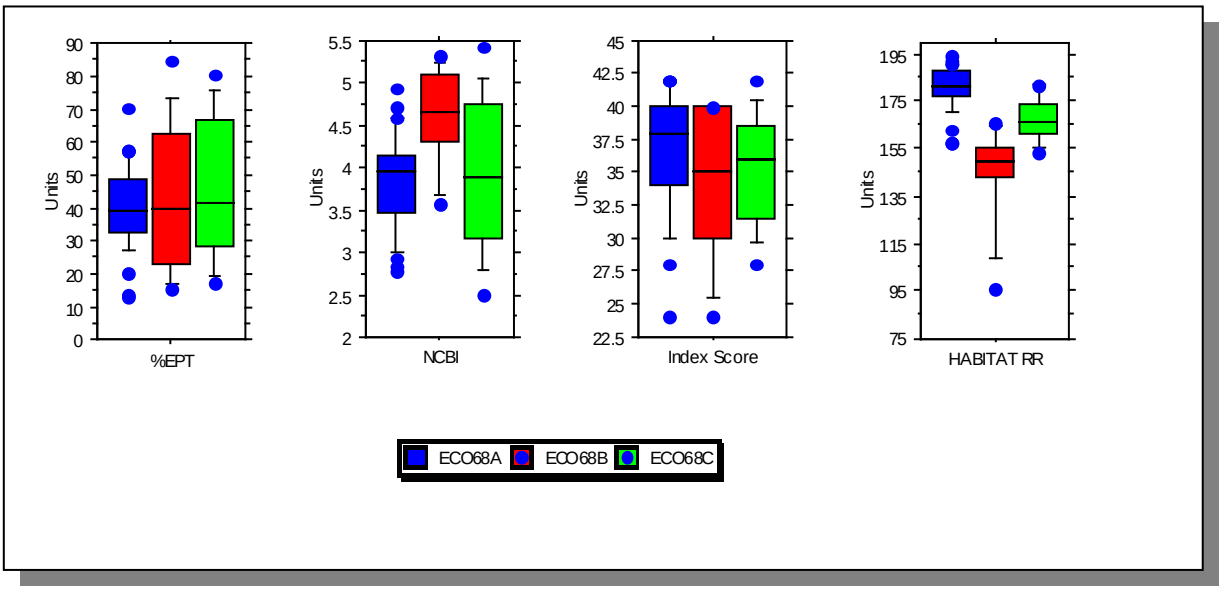


Figure 3-4. Benthic Macroinvertebrate and Habitat Scores for the Tennessee portion of the Guntersville Lake Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th percentiles. Extreme values are also shown as dots. NCBI, North Carolina Biotic Index. Index Score and Habitat Riffle/Run scoring system are described in TDEC's Quality System Standard Operating Procedure for Macroinvertebrate Surveys (2002).*

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. 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.

Waterbodies are assessed by comparing monitored water conditions to water quality standards for the stream, river, or reservoir's designated uses. Data that meet state quality control standards and collection techniques are used to generate assessments. After use support is determined, waterbodies are placed in one of the following five categories recommended by EPA. A description of categories appears below.

Category Assessment	Stream Miles	Reservoir Acres
Total	424.3	1,479
Assessed	140.7	1,479
Category 1	79.9	1,463
Category 2	53.2	16
Category 3	283.6	0
Category 4	0.0	0
Category 5	7.6	0

Table 3.2. Use Support categories (Stream Miles and/or Reservoir Acres) in the Tennessee Portion of the Guntersville Lake Watershed.

Use Support Categories: (2008 305(b) Report)

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

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

Category 3 waters are **not assessed** due to insufficient or outdated data.

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

- **Category 4a** impaired waters that have already had all necessary TMDLs approved by EPA.
- **Category 4b** impaired waters do not require TMDL development since "other pollution control requirements required by local, State or Federal authority are expected to address all water-quality pollutants" (EPA, 2003). An example of a 4b stream might be where a discharge point will be moved in the near future to another waterbody with more assimilative capacity.
- **Category 4c** impaired waters in which the impacts are not caused by a pollutant (e.g., certain habitat or flow alterations).

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

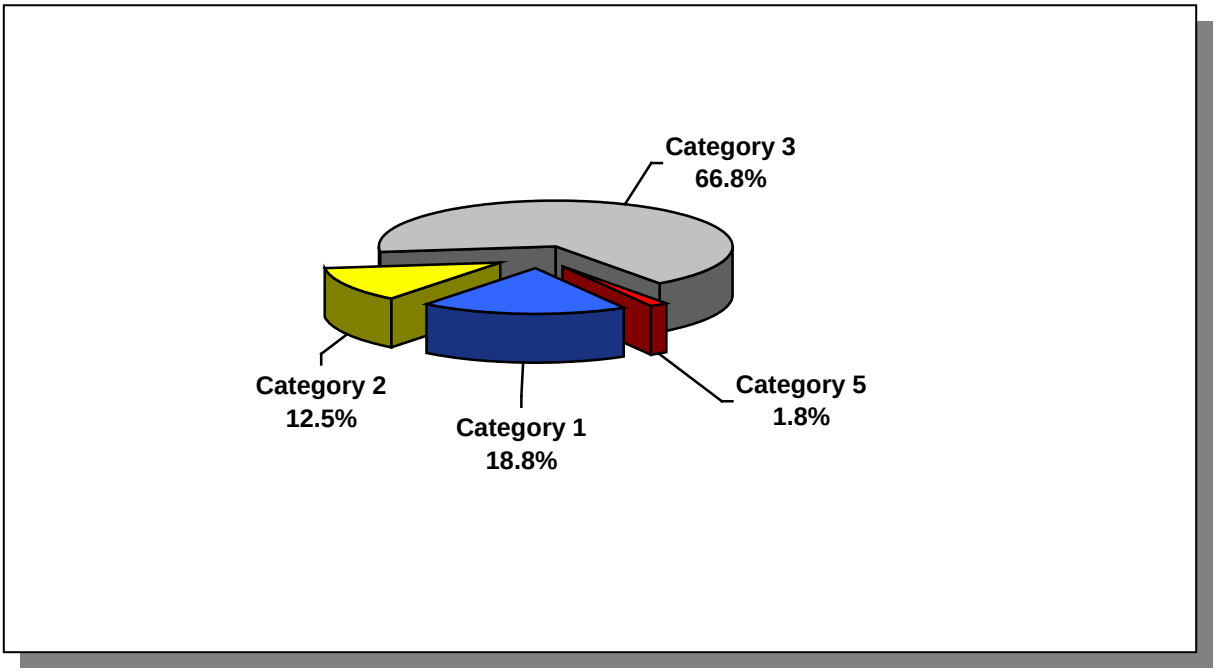


Figure 3-5. Water Quality Assessment of Streams in the Tennessee Portion of the Guntersville Lake Watershed. *Assessment data are based on the 2006 Water Quality Assessment of 424.3 stream miles in the watershed. More information is provided in Appendix III.*

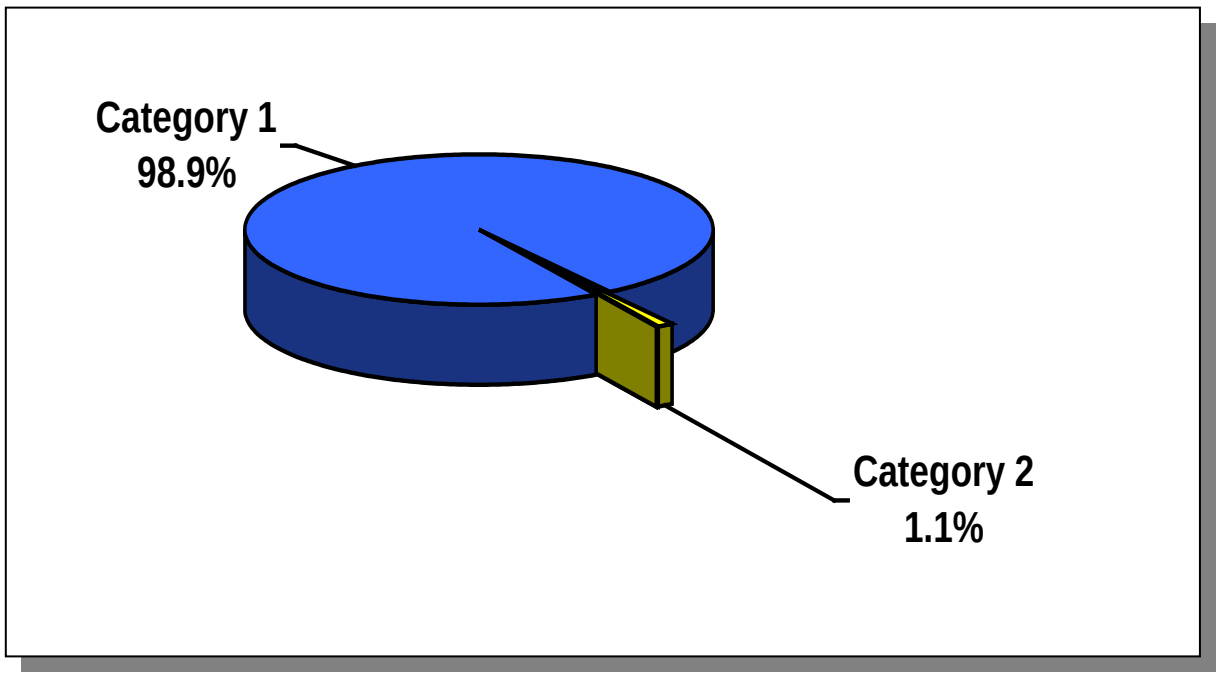


Figure 3-6. Water Quality Assessment of Lakes in the Tennessee Portion of the Guntersville Lake Watershed. *Assessment data are based on the 2006 Water Quality Assessment of 1,479 lake acres in the watershed. More information is provided in Appendix III.*

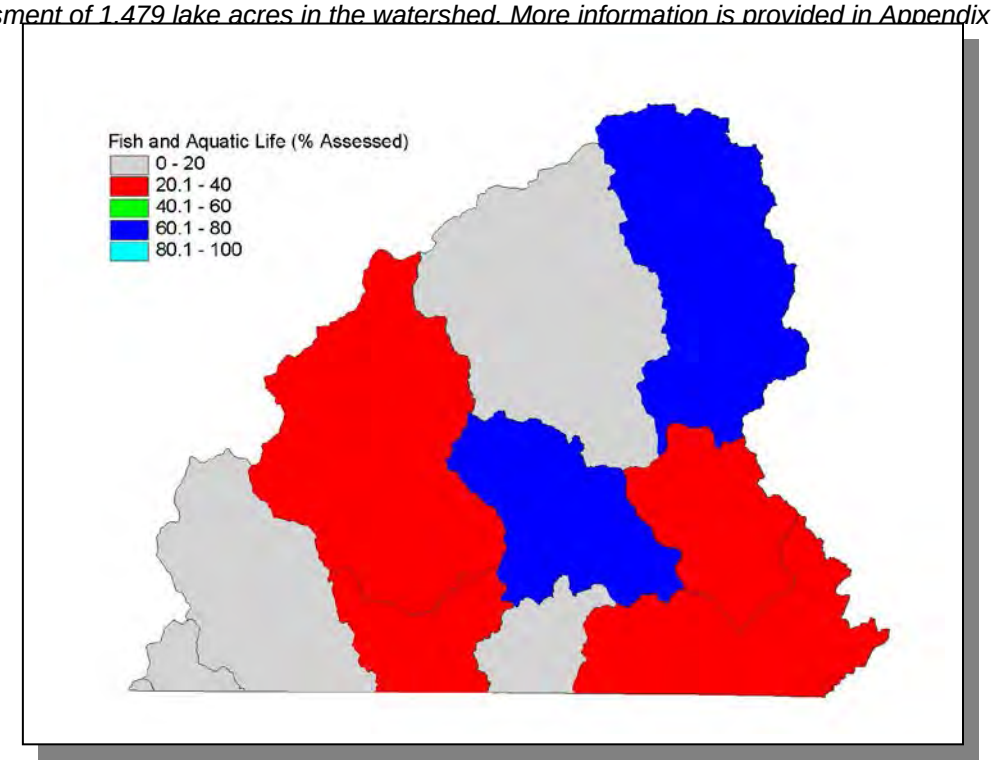


Figure 3-7. Percentage of Stream Miles Assessed for Support of Fish and Aquatic Life Designated Use in HUC-12 Subwatersheds.

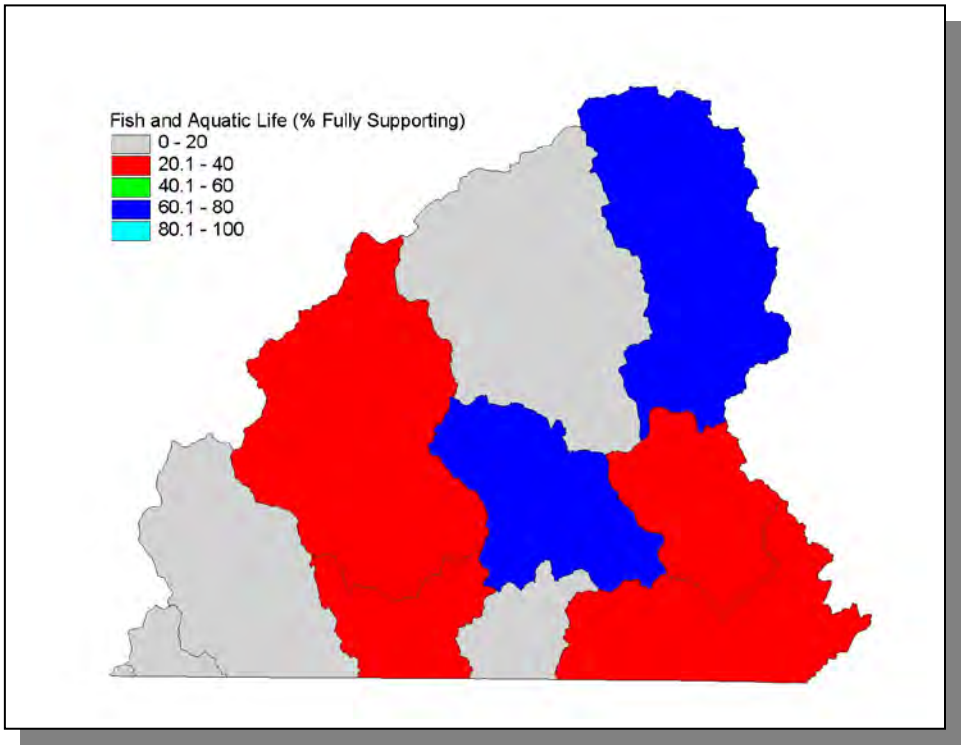


Figure 3-8. Percentage of Stream Miles Fully Supporting for Fish and Aquatic Life Designated Use in HUC-12 Subwatersheds.

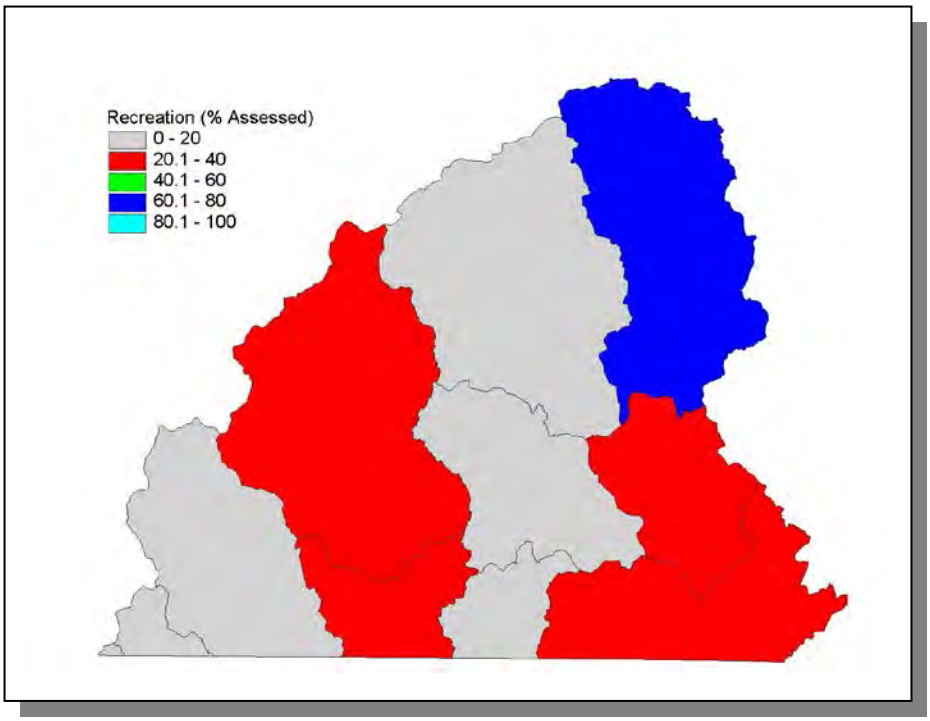


Figure 3-9. Percentage of Stream Miles Assessed for Support of Recreation Designated Use in HUC-12 Subwatersheds.

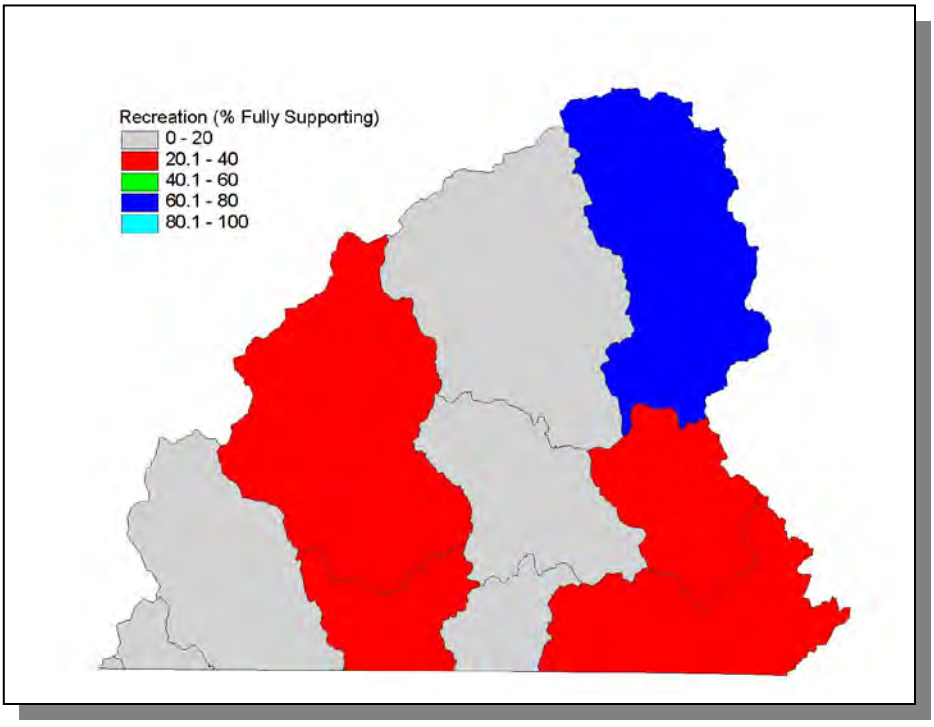


Figure 3-10. Percentage of Stream Miles Fully Supporting for Recreation Designated Use in HUC-12 Subwatersheds.

3.3.A. Assessment Summary.

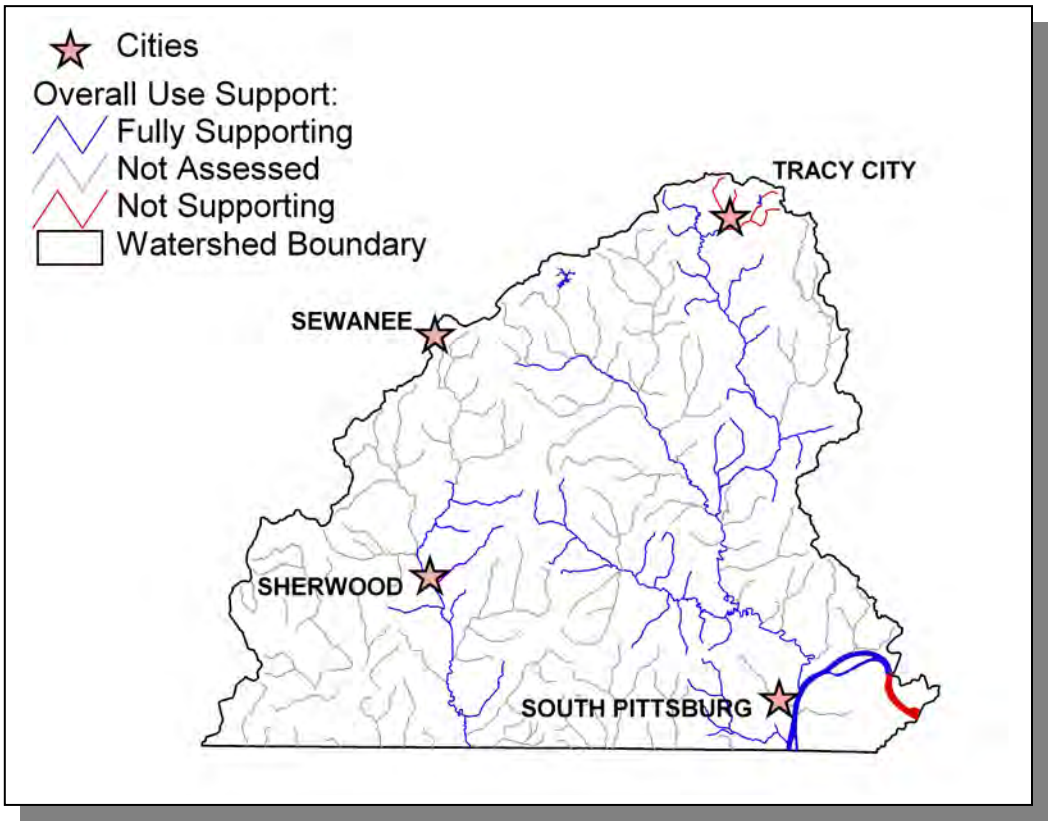


Figure 3-11. Overall Use Support Attainment in the Tennessee Portion of the Guntersville Lake Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Sewanee, Sherwood, South Pittsburg and Tracy City are shown for reference. More information is provided in Appendix III.*

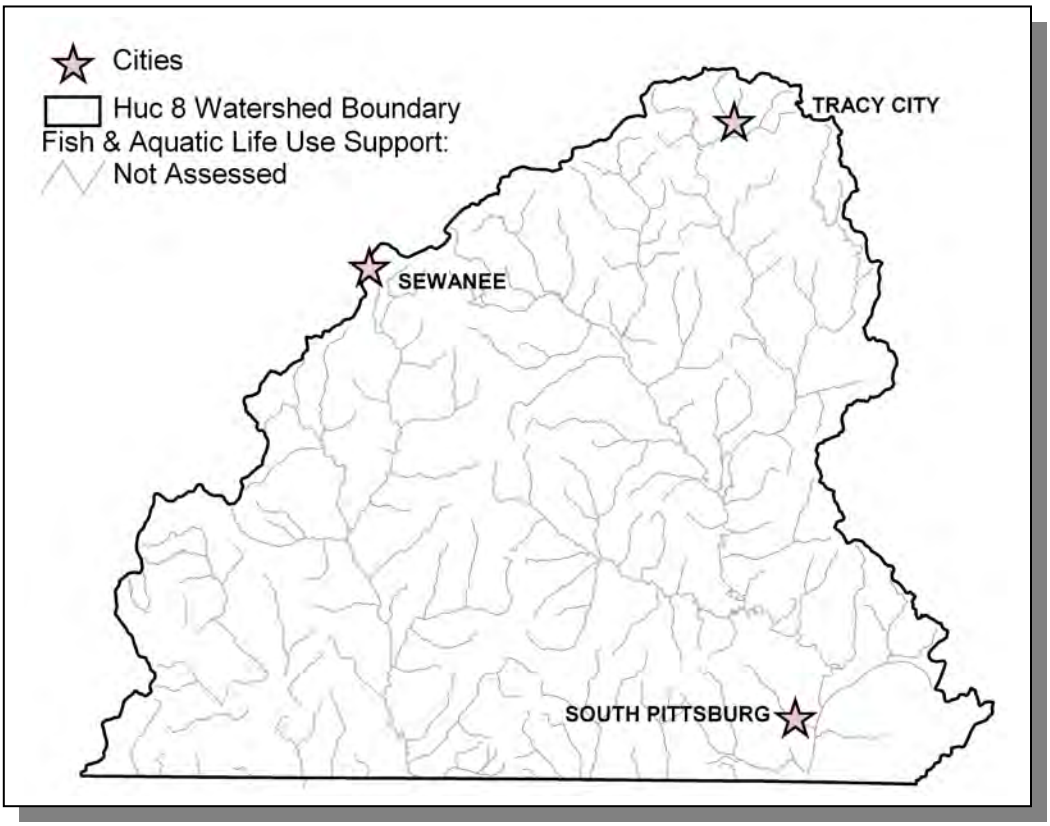


Figure 3-12. Fish and Aquatic Life Use Support Attainment in the Tennessee Portion of the Guntersville Lake Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Sewanee, South Pittsburg, and Tracy City are shown for reference. More information is provided in Appendix III.*

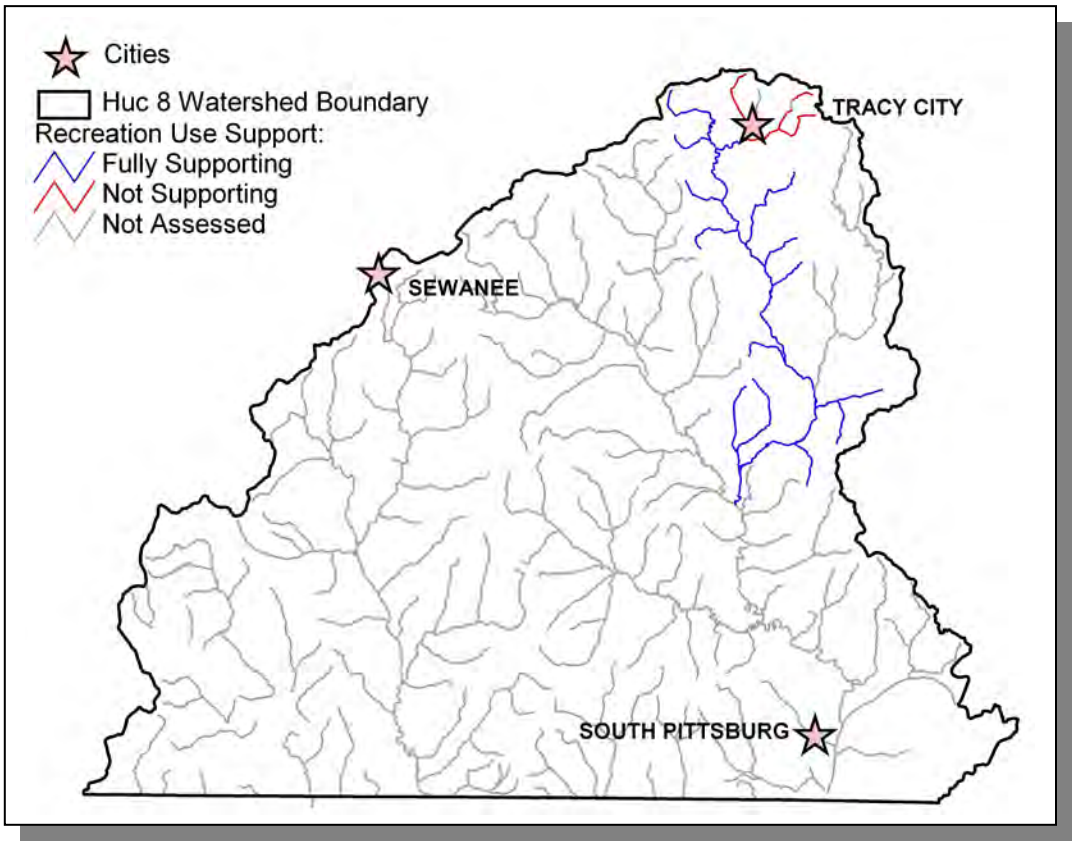


Figure 3-13. Recreation Use Support Attainment in the Tennessee Portion of the Guntersville Lake Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Sewanee, South Pittsburg, and Tracy City are shown for reference. More information is provided in Appendix III.*

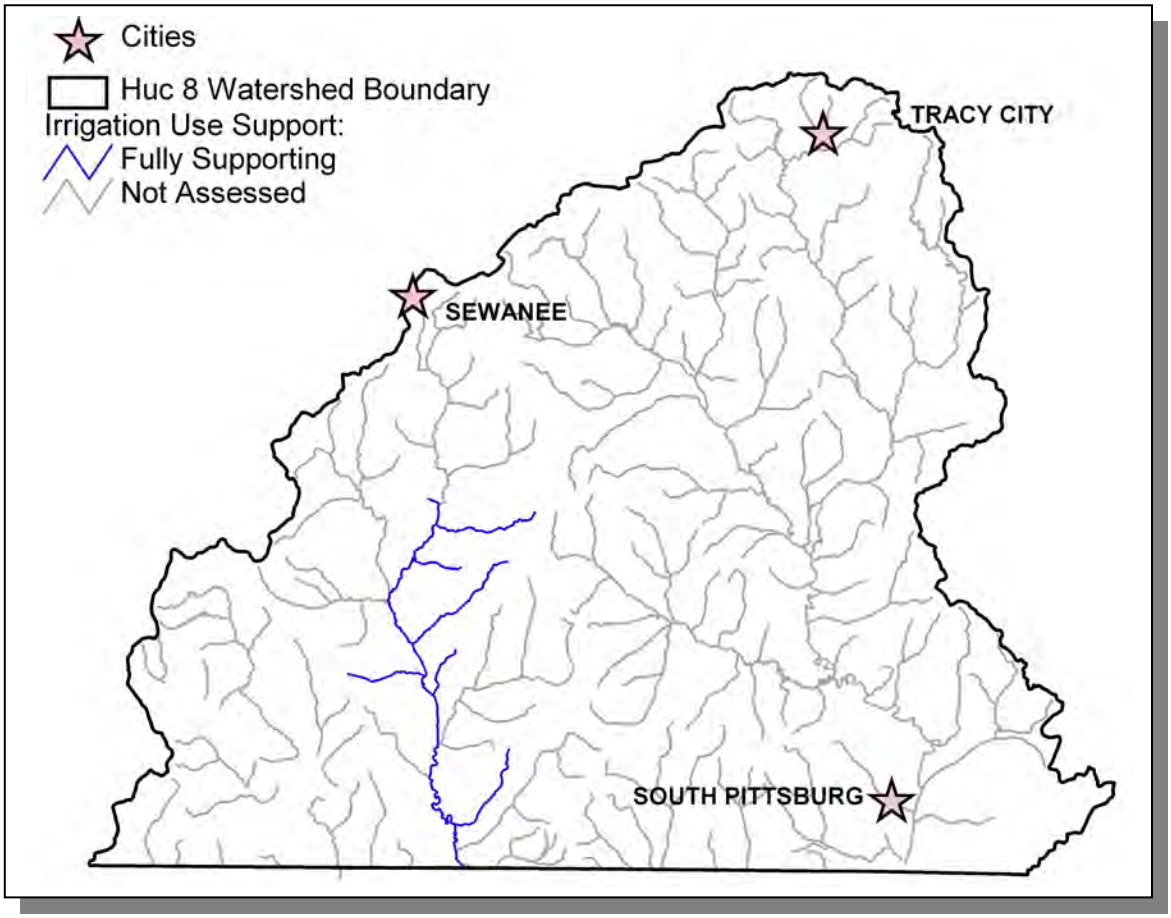


Figure 3-14. Irrigation Use Support Attainment in the Tennesse Portion of the Guntersville Lake Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Sewanee, South Pittsburg, and Tracy City are shown for reference. More information is provided in Appendix III.*

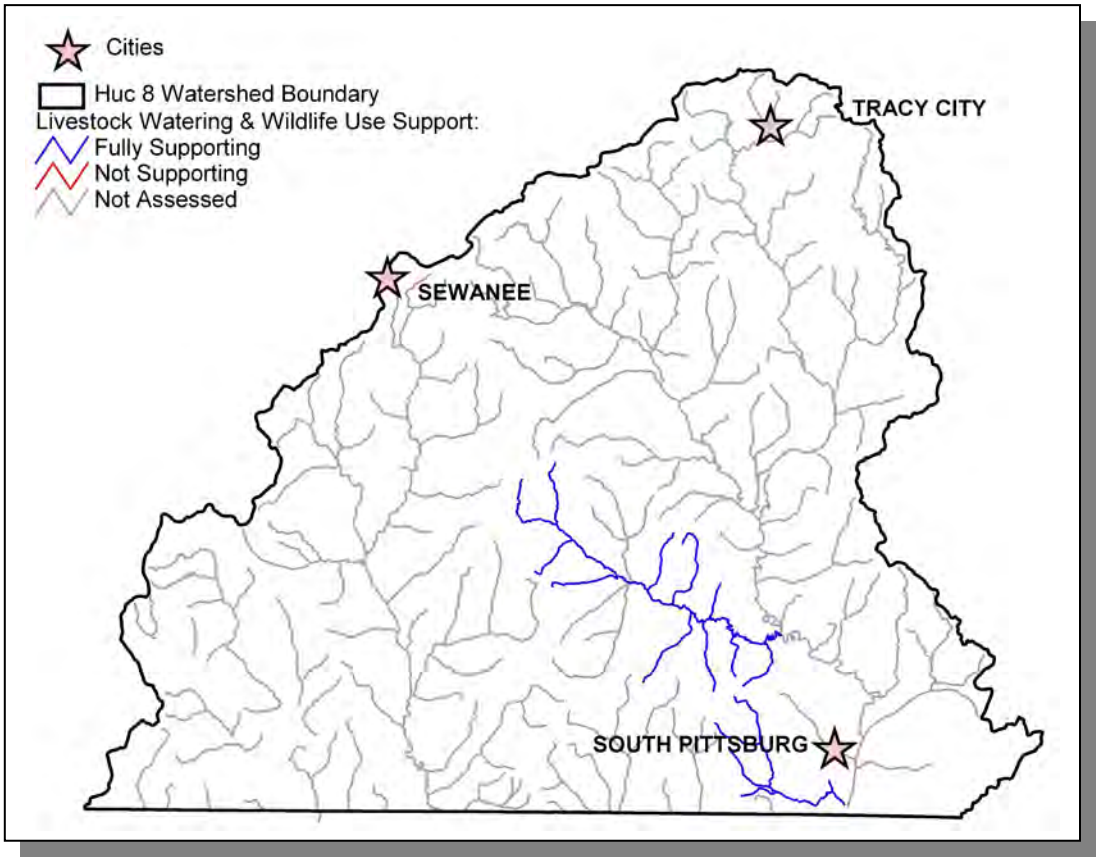


Figure 3-15. Livestock Watering and Wildlife Use Support Attainment in the Tennessee Portion of the Guntersville Lake Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Sewanee, South Pittsburg, and Tracy City are shown for reference. More information is provided in Appendix III.*

3.3.B. Use Impairment Summary.

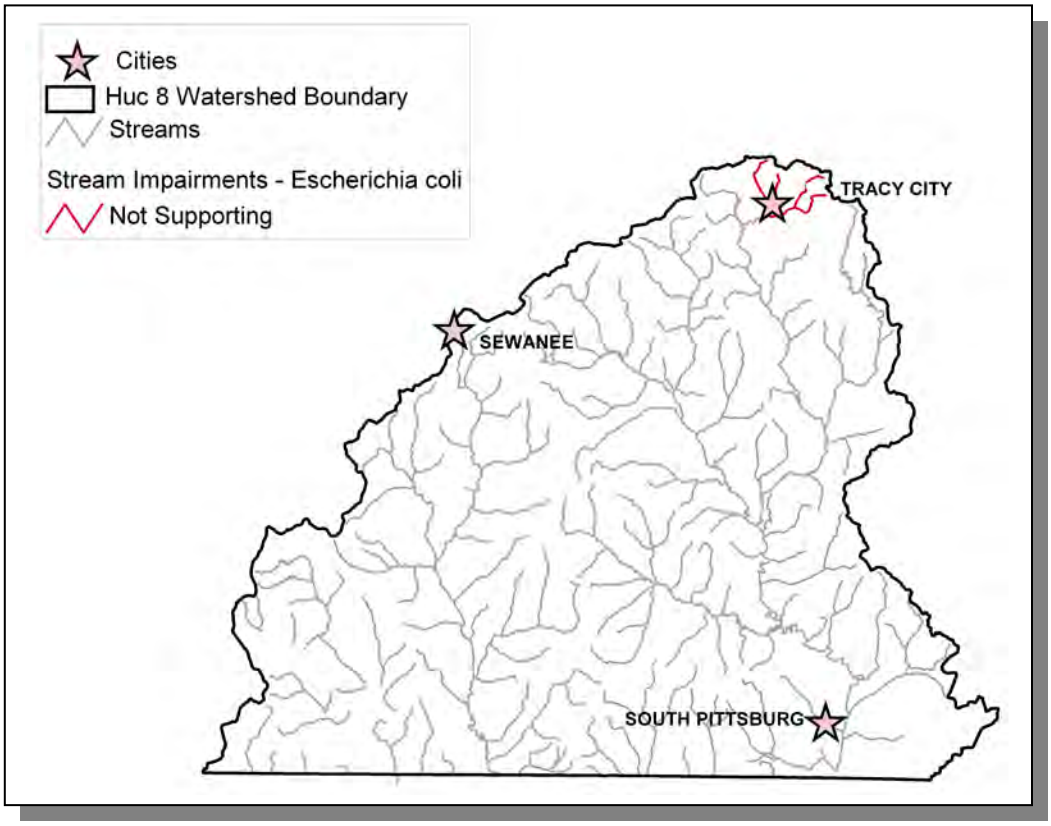


Figure 3-16. Impaired Streams Due to Escherichia coli in the Tennessee Portion of the Guntersville Lake Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Locations of Sewanee, South Pittsburg, and Tracy City are shown for reference. More information is provided in Appendix III.*

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

Since the year 2002, the 303(d) list is 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 at http://gis3.memphis.edu/wpc/.

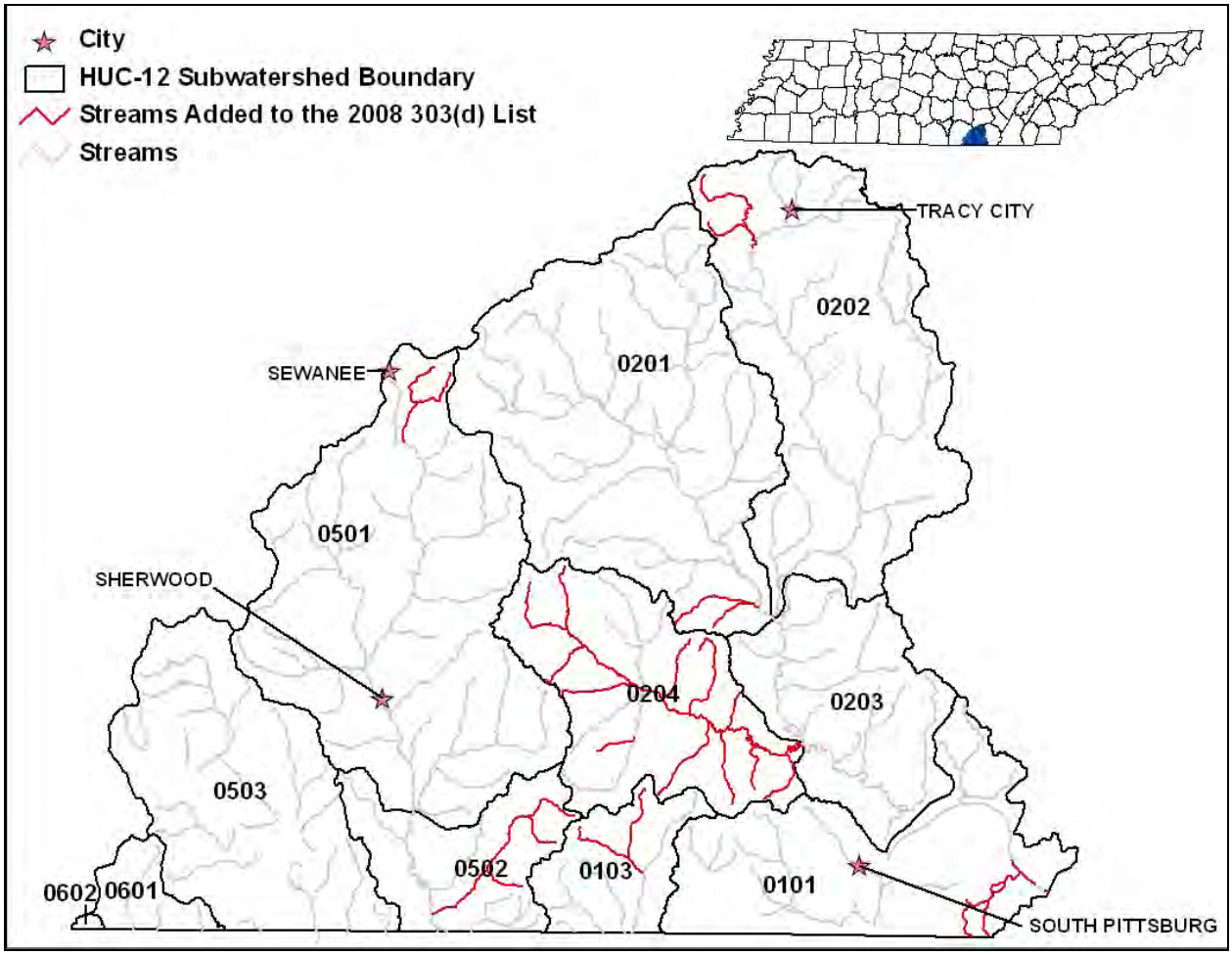


Figure 3-17. Changes to the 303(d) List of Impaired Waters in the Tennessee Portion of the Guntersville Lake Watershed Since Approval of the 2006 List by EPA. *More information is provided in Appendix III.*

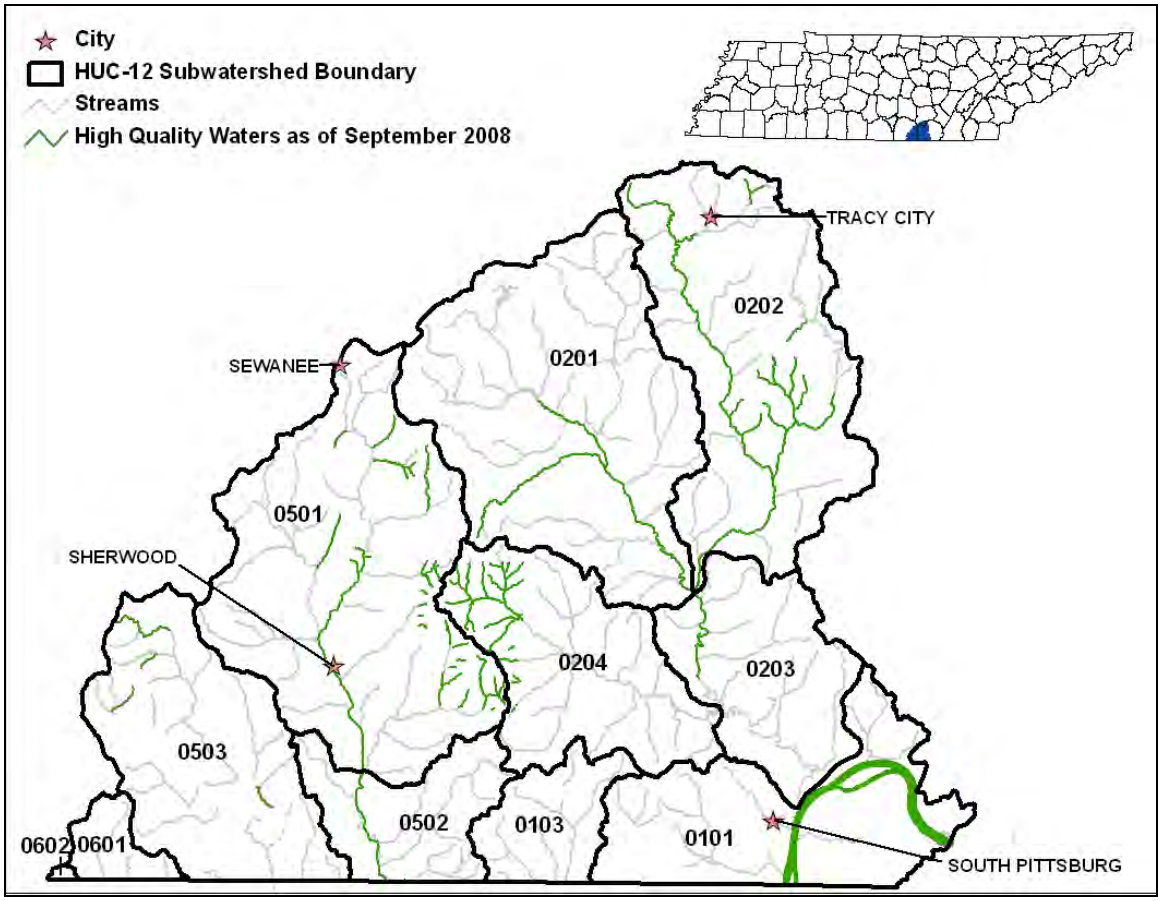


Figure 3-18. High Quality Waters Identified in the Tennessee Portion of the Guntersville Lake Watershed. *More information is provided in Appendix III.*

CHAPTER 4

POINT AND NONPOINT SOURCE CHARACTERIZATION OF THE GUNTERSVILLE LAKE 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. Location of USGS (United States Geological Survey) gaging stations and STORET sites
iii. Location of permitted activities
iv. Description of nonpoint source contributions

The HUC can range from 2 to 16 digits long, more digits indicating a smaller and smaller portion of the watershed is represented. The Tennessee portion of the Guntersville Lake Watershed (HUC 06030001) has been delineated into eleven 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 2001 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.

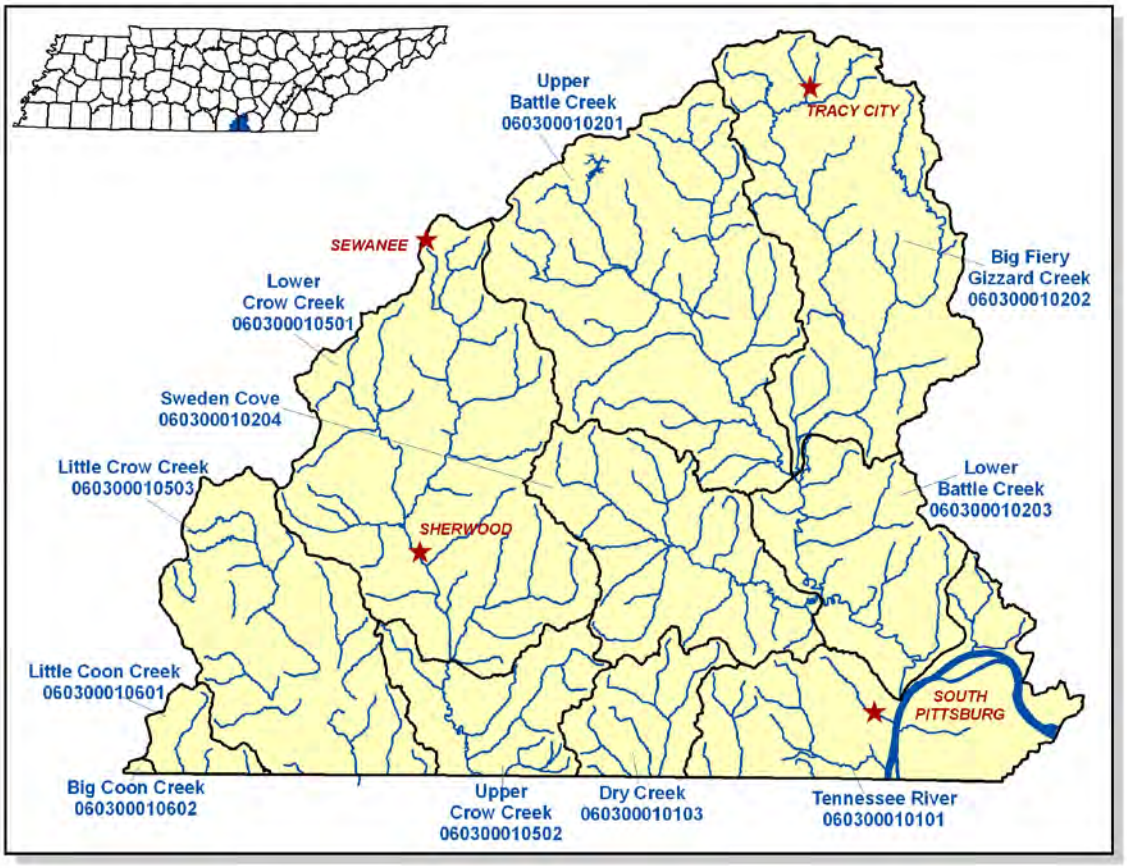


Figure 4-1. The Tennessee Portion of the Guntersville Lake Watershed is Composed of eleven USGS-Delineated Subwatersheds (12-Digit Subwatersheds).

4.2. CHARACTERIZATION OF HUC-12 SUBWATERSHEDS. The Watershed Characterization System (WCS) software and data sets provided by EPA Region IV were used to characterize each subwatershed in the Tennessee portion of the Guntersville Lake Watershed.

HUC-8	HUC-10	HUC-12
06030001	060300101	06030010101 Tennessee River
		06030010103 Dry Creek
	060300102	06030010201 Battle Creek, Upper
		06030010202 Big Fiery Gizzard Creek
		06030010203 Battle Creek, Lower
		06030010204 Sweden Cove
	060300105	06030010501 Crow Creek, Lower
		06030010502 Crow Creek, Upper
		06030010503 Little Crow Creek
	060300106	06030010601 Little Coon Creek
		06030010602 Big Coon 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. 060300010101 (Tennessee River).

4.2.A.i. General Description.

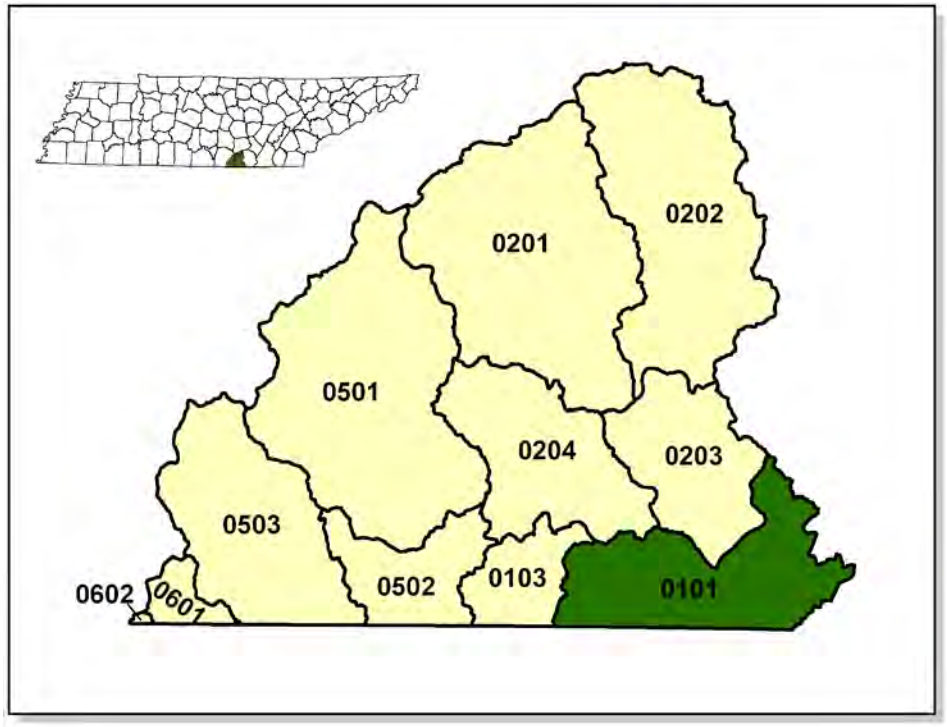


Figure 4-2. Location of Subwatershed 060300010101. *All Guntersville Lake HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

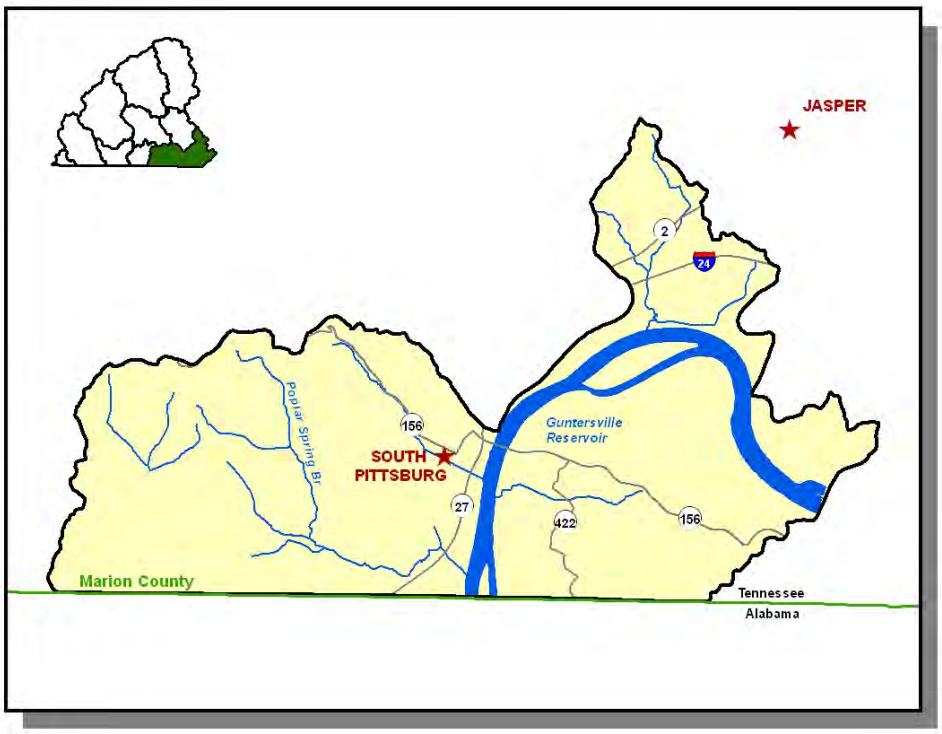


Figure 4-3. Locational Details of Subwatershed 060300010101.

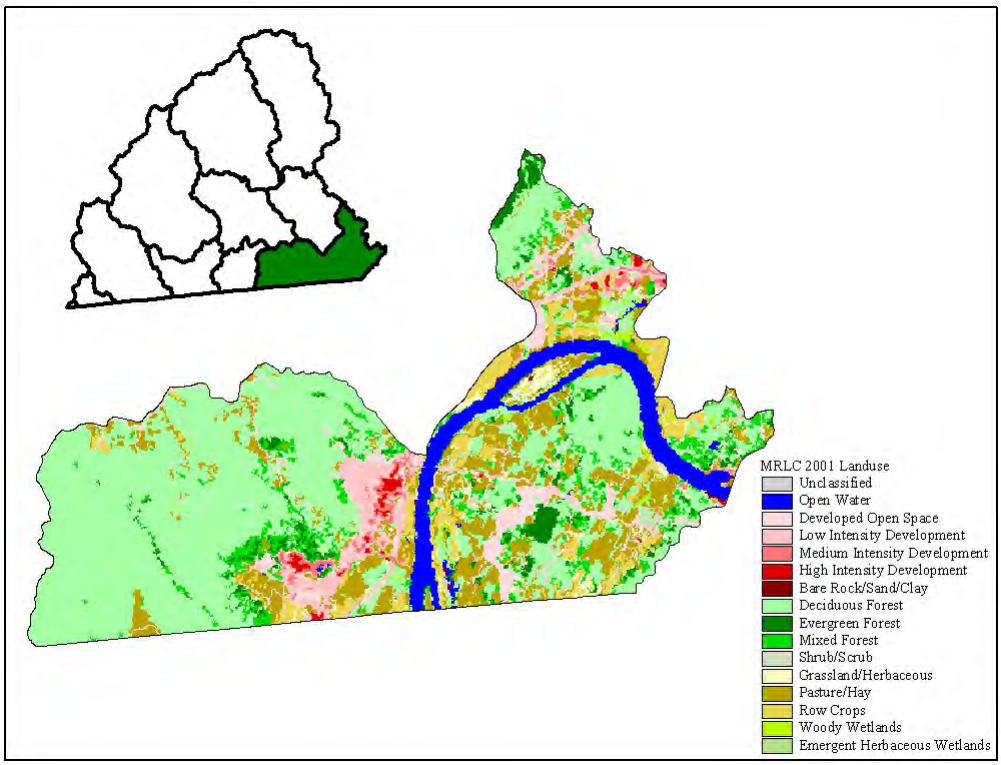


Figure 4-4. Illustration of Land Use Distribution in Subwatershed 060300010101.

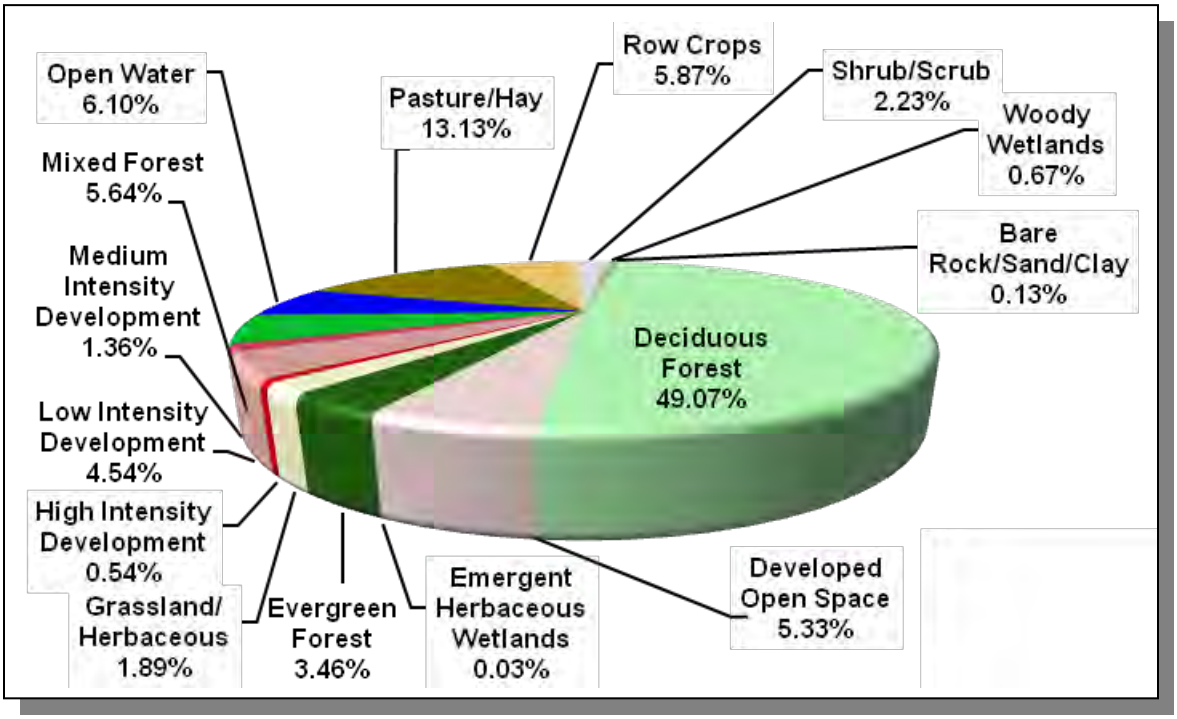


Figure 4-5. Land Use Distribution in Subwatershed 060300010101. *More information is provided in Appendix IV.*

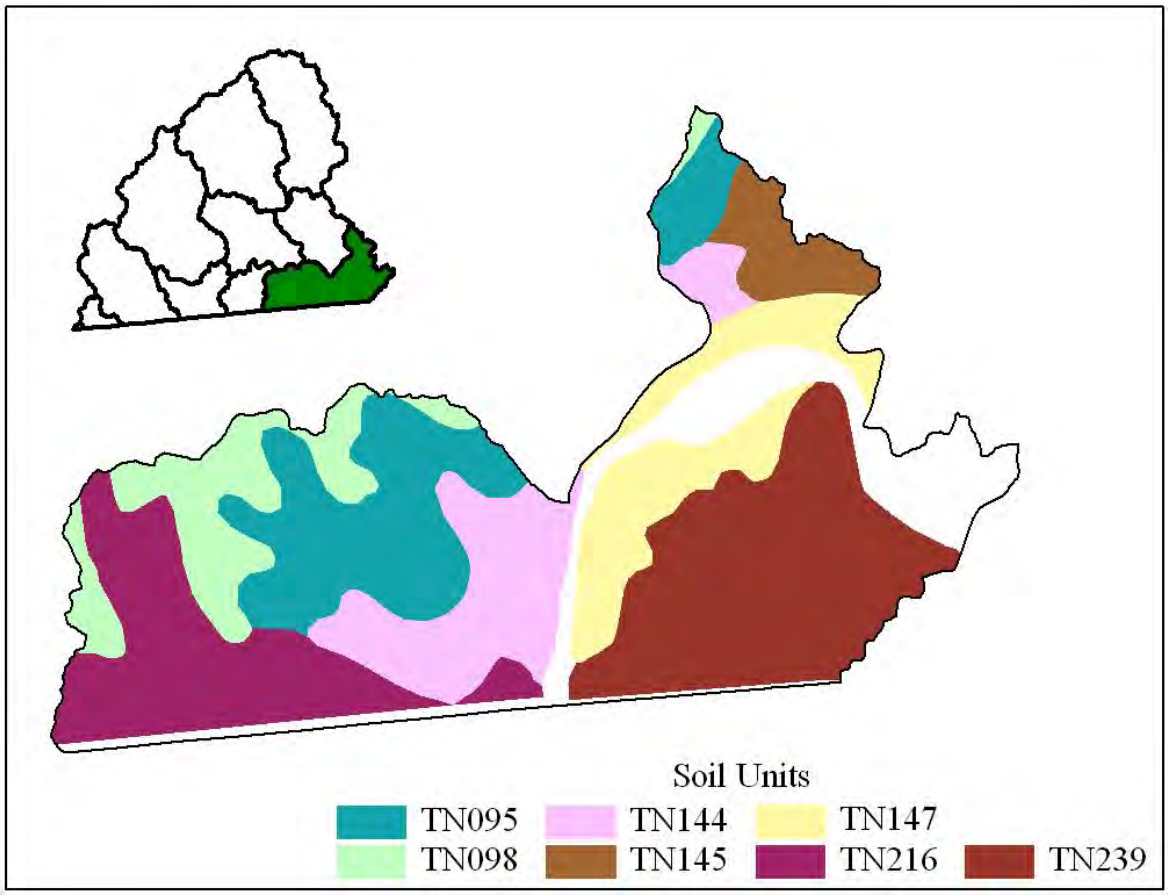


Figure 4-6. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010101.

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
TN144	0.00	B	2.43	5.43	Loam	0.31
TN145	0.00	B	1.84	4.83	Loam	0.27
TN147	41.00	C	1.30	5.95	Silty Loam	0.38
TN216	0.00	C	2.51	4.59	Loam	0.25
TN239	2.00	C	2.94	4.86	Loam	0.22

Table 4-2. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010101. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Marion	24,860	26,674	27,776	6.0	1,492	1,601	1,667	11.7

Table 4-3. Population Estimates in Subwatershed 060300010101.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Jasper	Marion	2,780	1,199	966	225	8
Kimball	Marion	1,243	507	54	448	5
New Hope	Marion	818	329	2	318	9
Orme	Marion	156	61	6	55	0
South Pittsburg	Marion	3,295	1,444	1,278	153	13
Total		**8,292**	**3,540**	**2,306**	**1,199**	**35**

Table 4-4. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 060300010101.

4.2.A.ii. USGS Gaging Stations and STORET Sites.

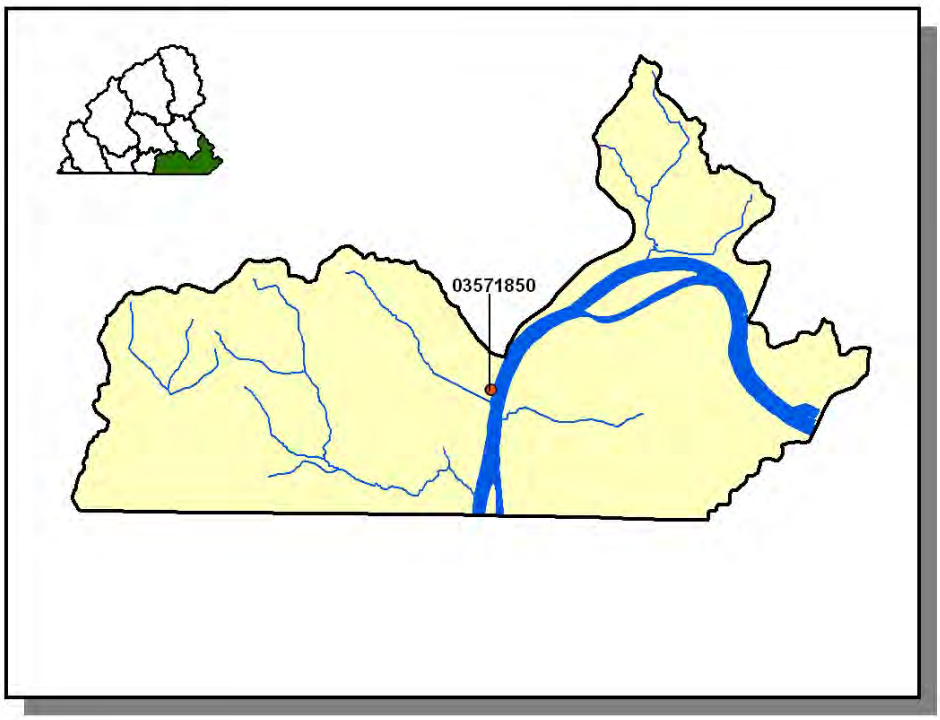


Figure 4-7. Location of USGS Continuous Record Gaging Stations in Subwatershed 060300010101. *More information is provided in Appendix IV.*

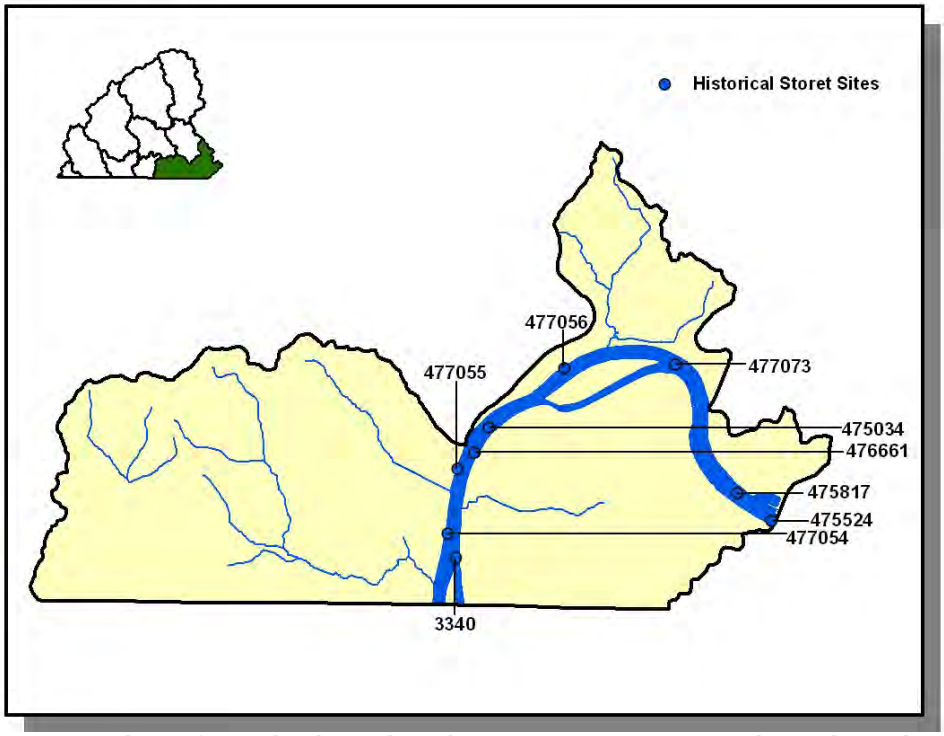


Figure 4-8. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060300010101. *More information, including site names and locations, is provided in Appendix IV.*

4.2.A.iii. Permitted Activities.

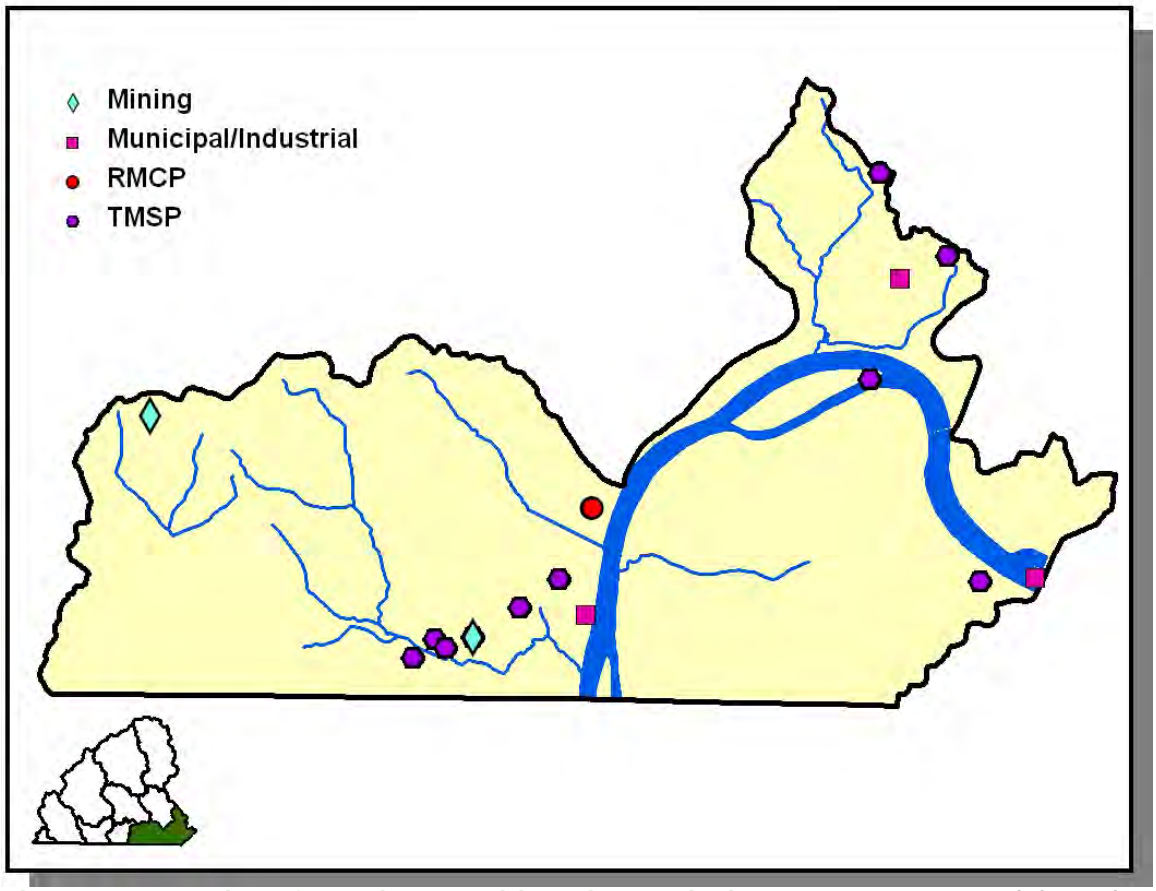


Figure 4-9. Location of Permits Issued in Subwatershed 060300010101. *More information, including the names of facilities, is provided in Appendix IV.*

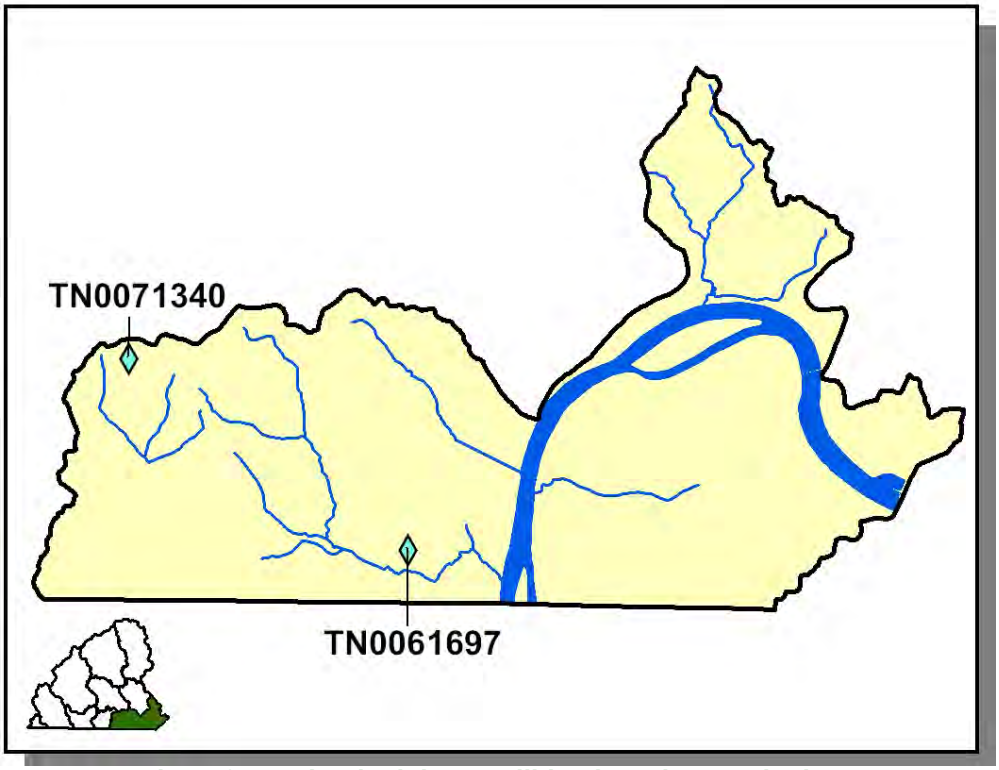


Figure 4-10. Location of Permitted Mining Facilities in Subwatershed 060300010101. *More information is provided in Appendix IV.*

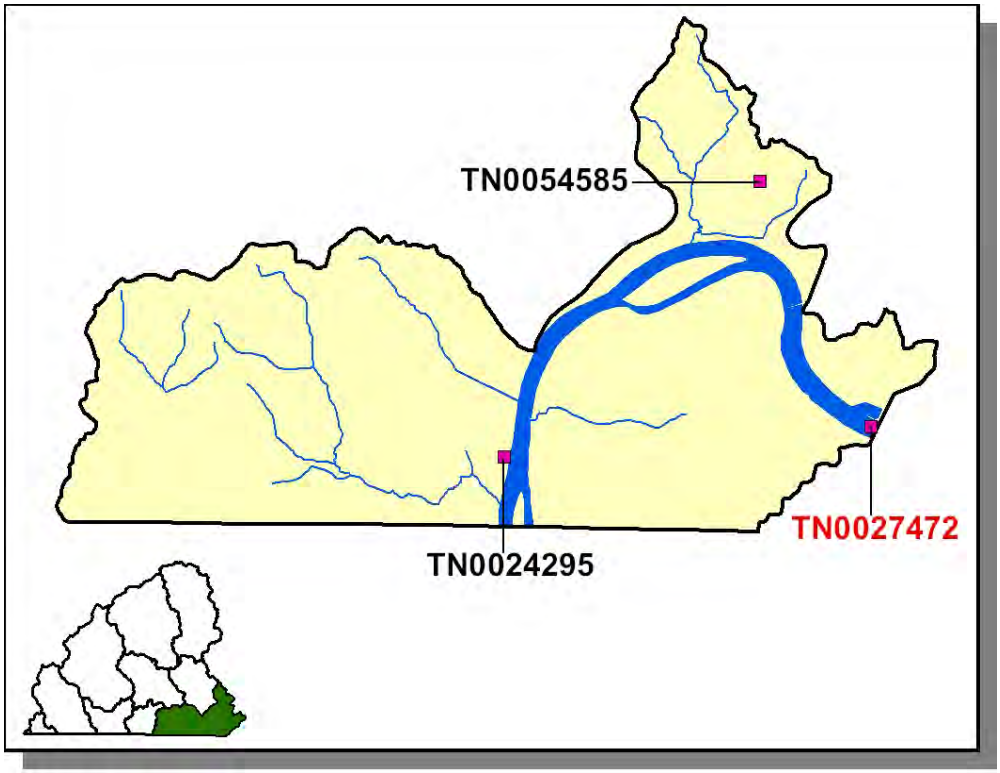


Figure 4-11. Location of Permitted Municipal and Industrial Facilities in Subwatershed 060300010101. *Permit numbers in red indicate that the facility discharges to a stream listed on the 2006 303(d) list. More information, including the name of the facility is provided in Appendix IV.*

PERMIT #	DISCHARGE FLOW
TN0027472	6.07

Table 4-5. Receiving Stream Flow Information Used for Limit Calculations for NPDES Dischargers to Waterbodies Listed on the 2006 303(d) List in Subwatershed 060300010101. *Data are in million gallons per day (MGD).Data were obtained from permit files. This permit has no effluent limits on a regular basis.*

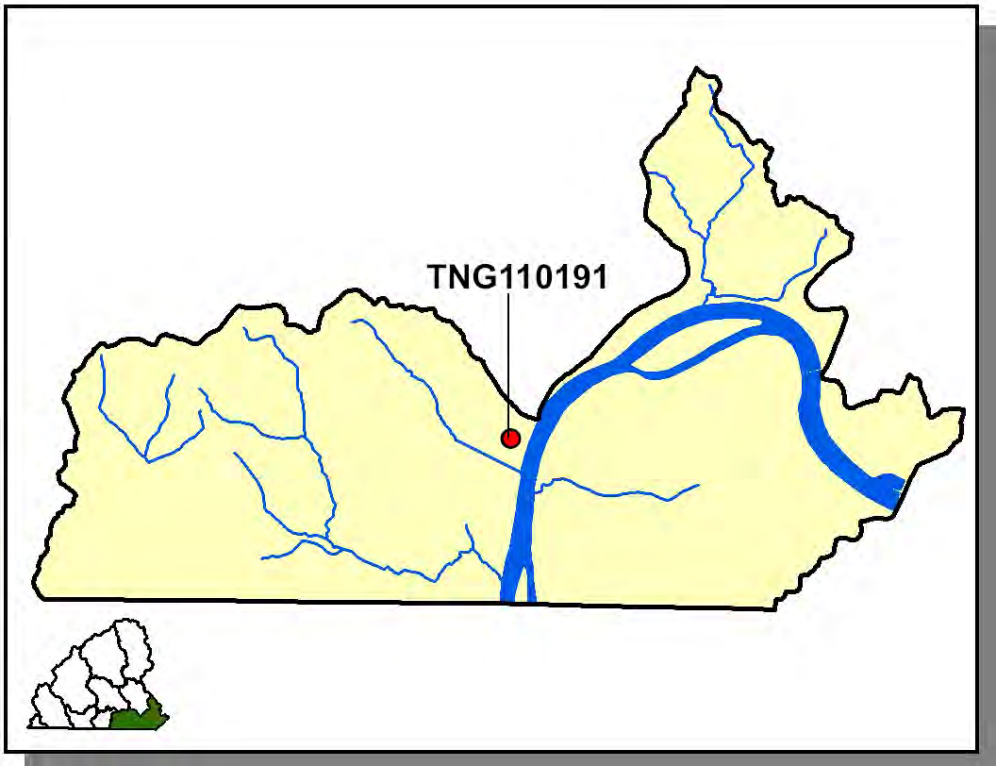


Figure 4-12. Location of RMCP (Ready Mix Concrete Plant) facilities in Subwatershed 060300010101. *More information, including the names of facilities, is provided in Appendix IV.*

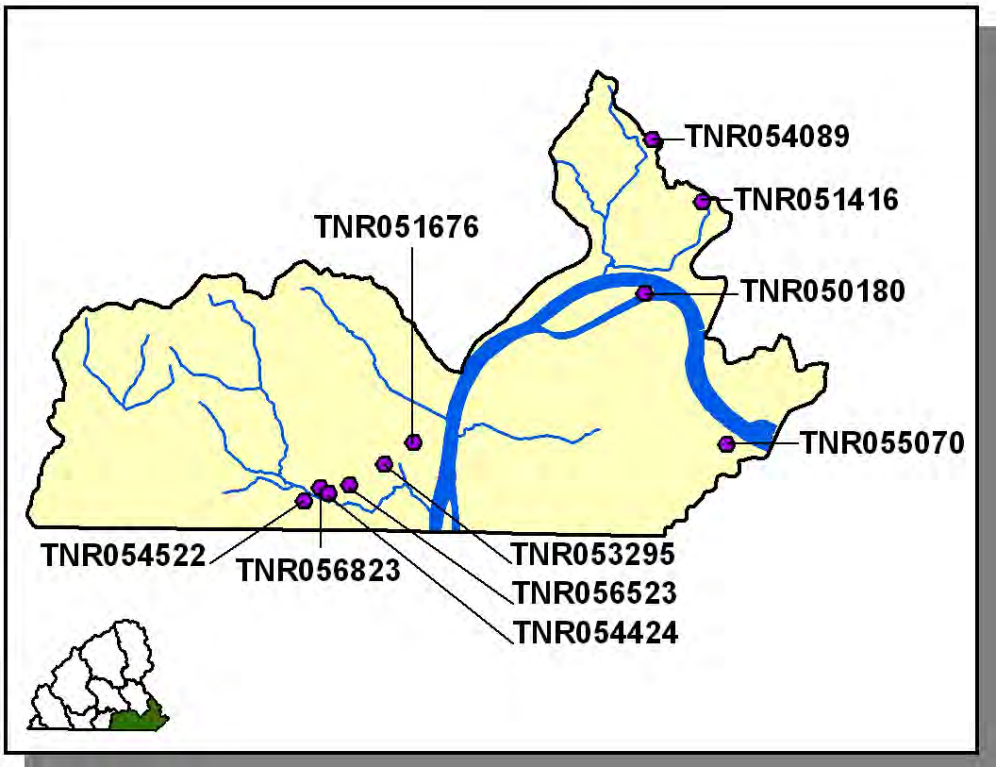


Figure 4-13. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 060300010101. *More information is provided in Appendix IV.*

4.2.A.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Marion	4,424	8,939	311	246	279	

Table 4-6. Summary of Livestock Count Estimates by 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.*

CROPS	TONS/ACRE/YEAR
Other Vegetable and Truck Crop	7.28
Soybeans (Row Crops)	4.56
Corn (Row Crops)	3.55
Grass (Pastureland)	0.62
Grass Forbs Legumes Mixed (Pastureland)	0.29
Other (Horticultural)	0.29
Farmsteads and Ranch Headquarters	0.19

Table 4-7. Annual Estimated Total Soil Loss in Subwatershed 060300010101.

4.2.B. 060300010103 (Dry Creek).

4.2.B.i. General Description.

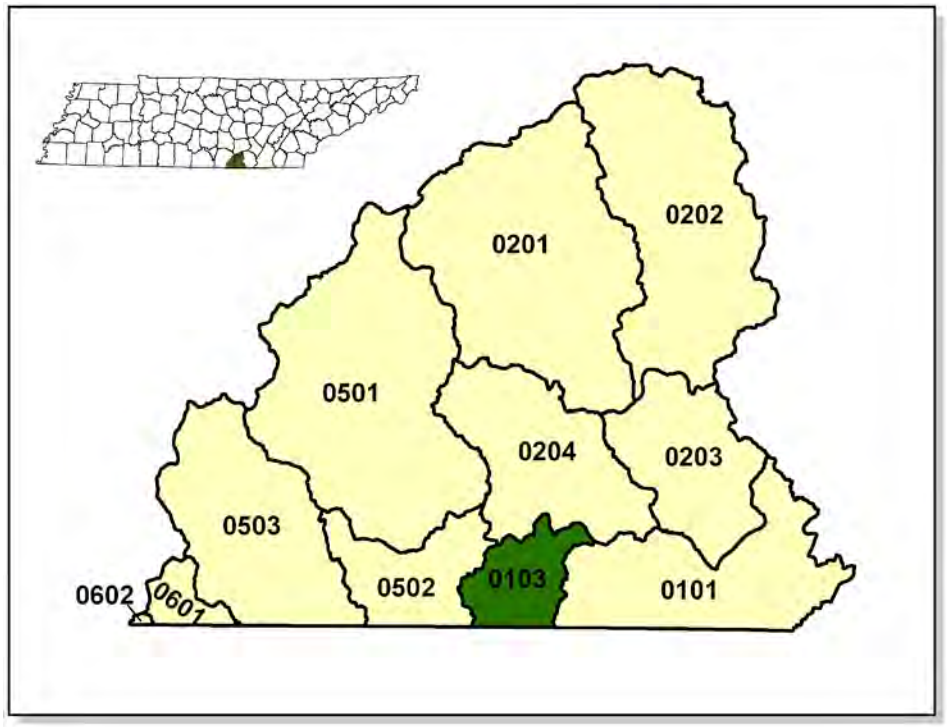


Figure 4-14. Location of Subwatershed 060300010103. *All Guntersville Lake HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

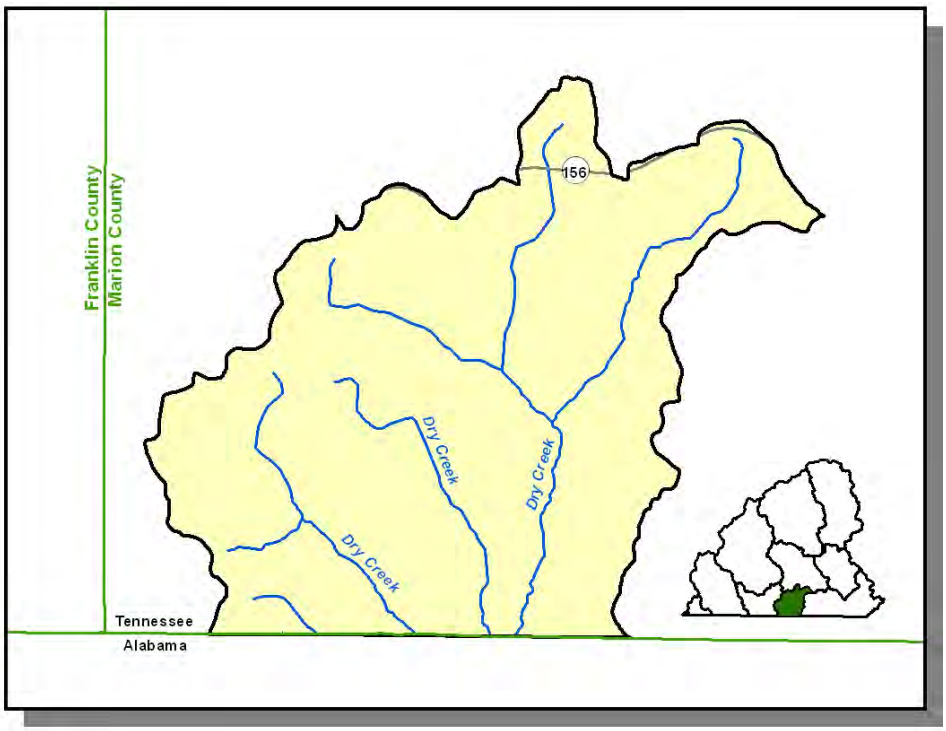


Figure 4-15. Locational Details of Subwatershed 060300010103.

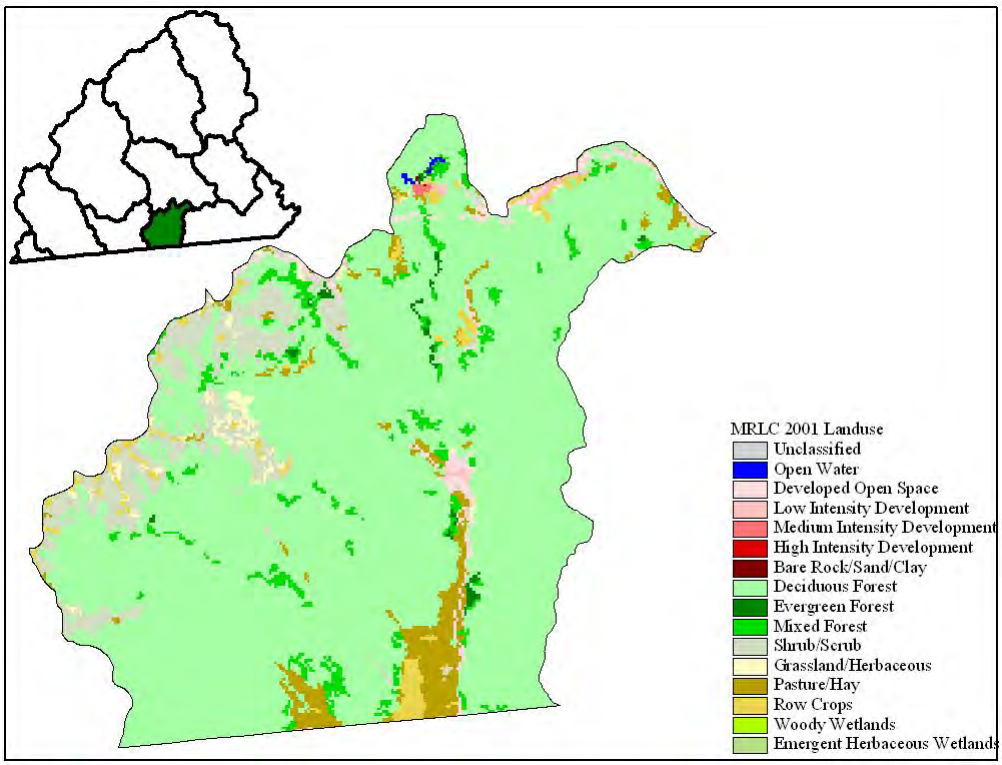


Figure 4-16. Illustration of Land Use Distribution in Subwatershed 060300010103.

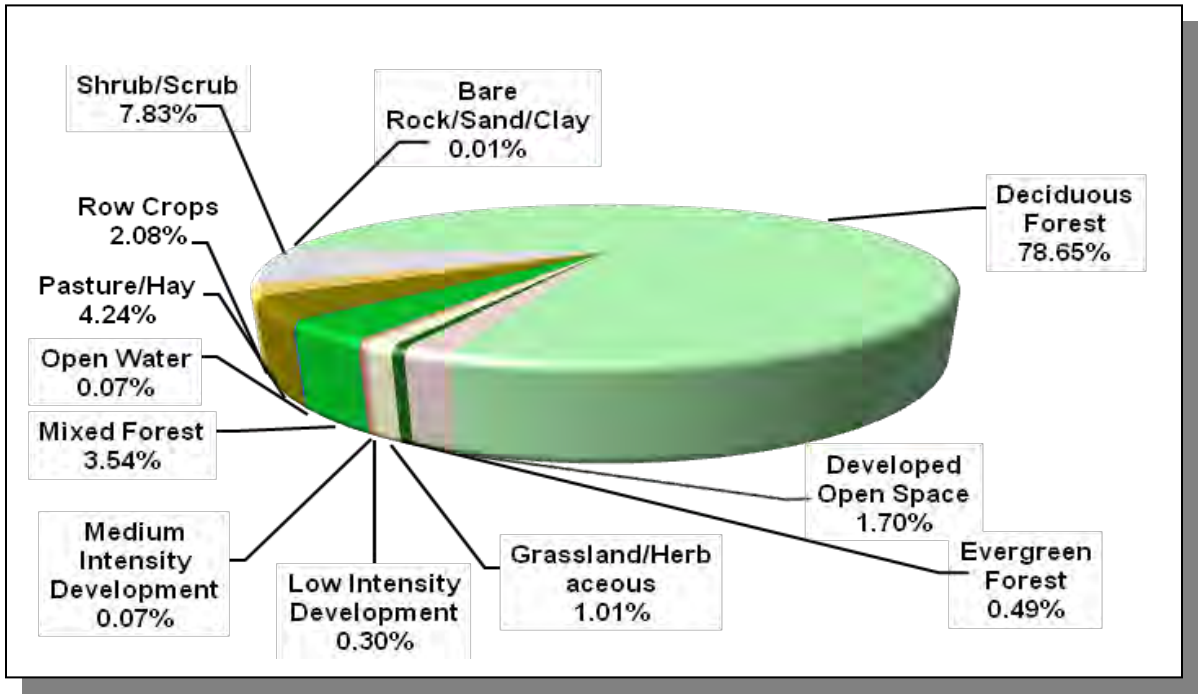


Figure 4-17. Land Use Distribution in Subwatershed 060300010103. *More information is provided in Appendix IV.*

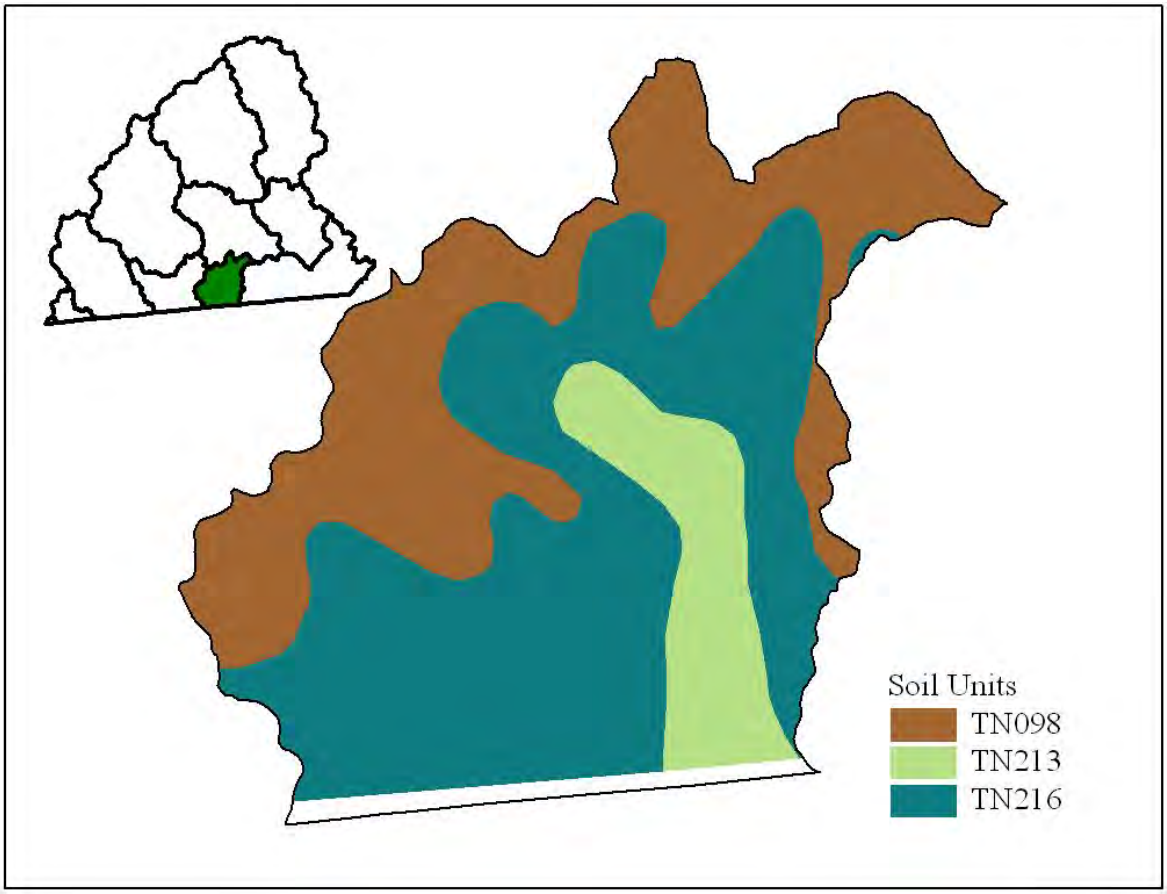


Figure 4-18. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010103.

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
TN213	9.00	C	1.89	5.30	Loam	0.35
TN216	0.00	C	2.51	4.59	Loam	0.25

Table 4-8. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010103. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Marion	24,860	26,674	27,776	2.02	503	540	562	11.70

Table 4-9. Population Estimates in Subwatershed 060300010103.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Orme	Marion	156	61	6	55	0

Table 4-10. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 060300010103.

4.2.B.ii. USGS Gaging Stations and STORET Sites.

There are no USGS continuous record gaging stations or STORET sites located in subwatershed 060300010103.

4.2.B.iii. Permitted Activities.

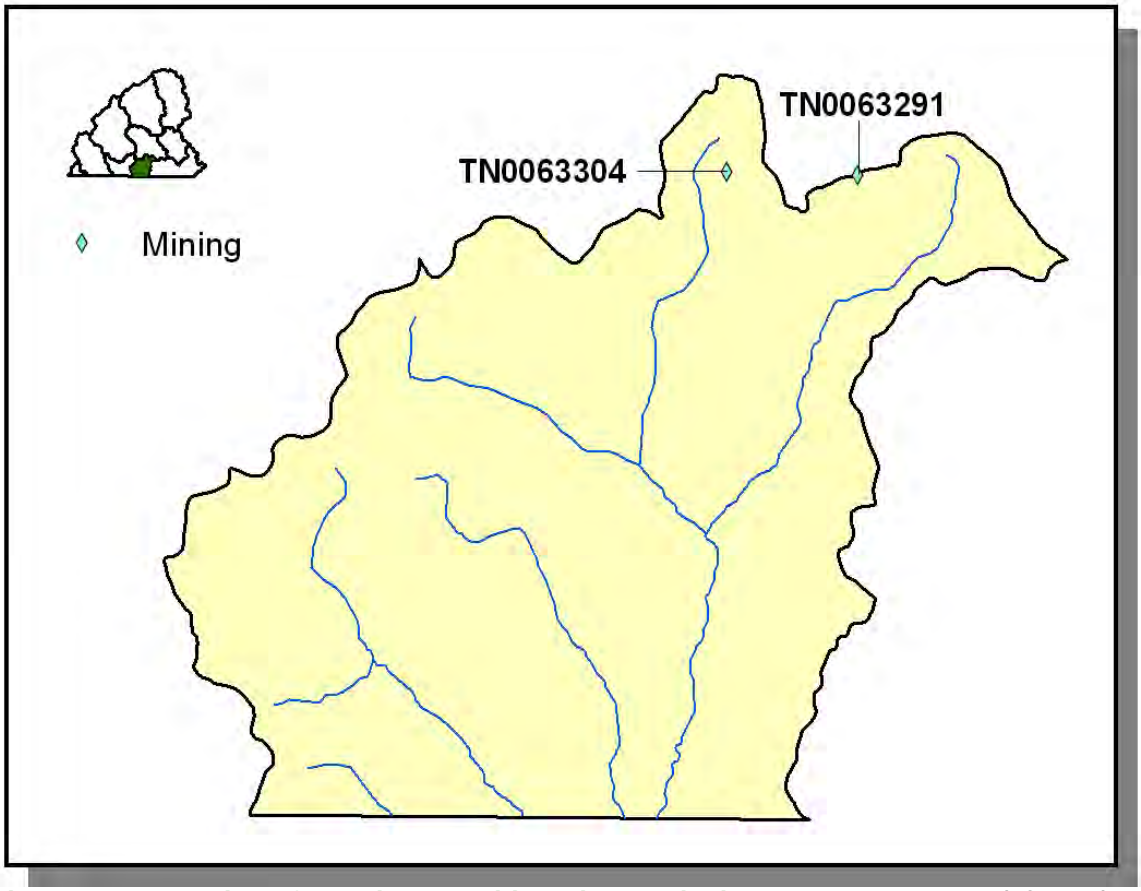


Figure 4-19. Location of Permits Issued in Subwatershed 060300010103. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.B.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Marion	4,424	8,939	311	246	279	

Table 4-11. Summary of Livestock Count Estimates by 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.*

CROPS	TONS/ACRE/YEAR
Other Vegetable and Truck Crop	7.28
Soybeans (Row Crops)	4.56
Corn (Row Crops)	3.55
Grass (Pastureland)	0.62
Grass Forbs Legumes Mixed (Pastureland)	0.29
Other (Horticultural)	0.29
Farmsteads and Ranch Headquart	0.19

Table 4-12. Annual Estimated Total Soil Loss in Subwatershed 060300010103.

4.2.C. 060300010201 (Battle Creek, Upper).

4.2.C.i. General Description.

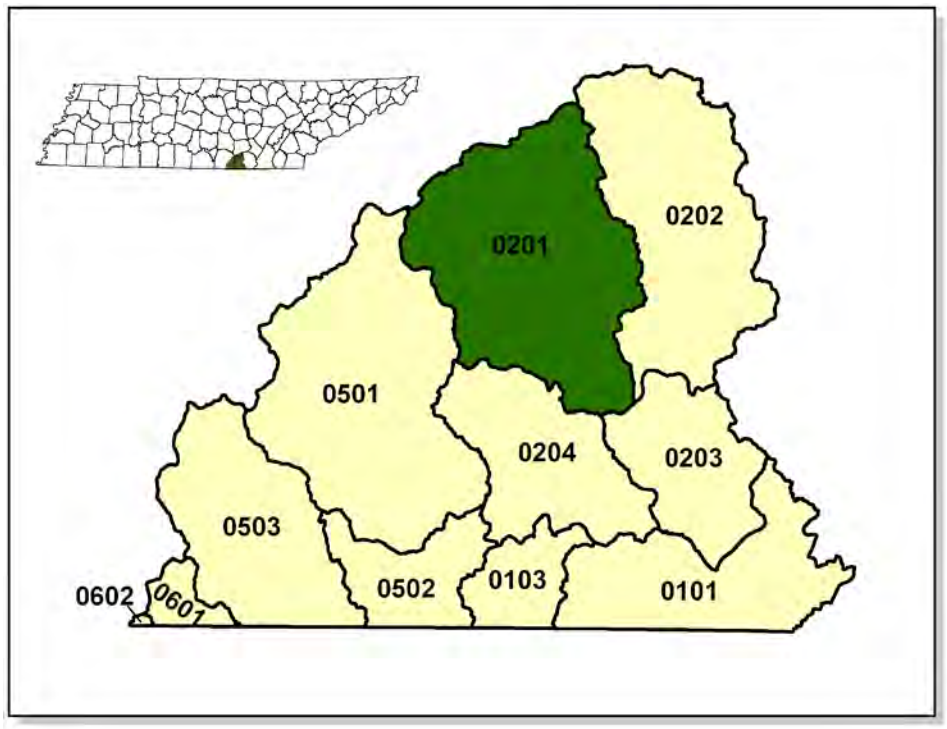


Figure 4-20. Location of Subwatershed 060300010201. *All Guntersville Lake HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

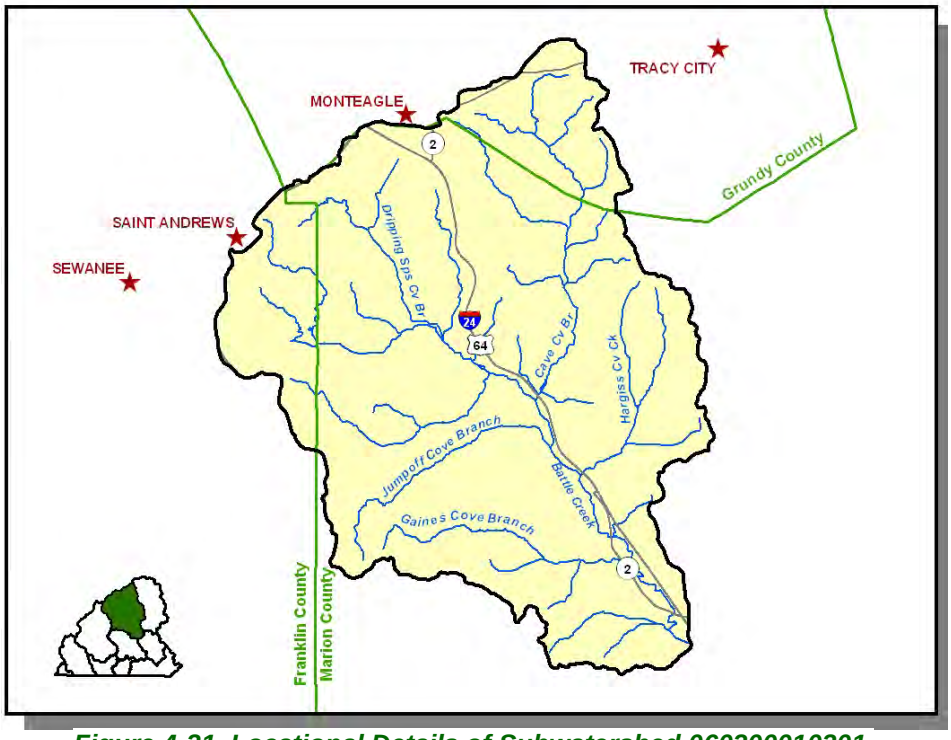


Figure 4-21. Locational Details of Subwatershed 060300010201.

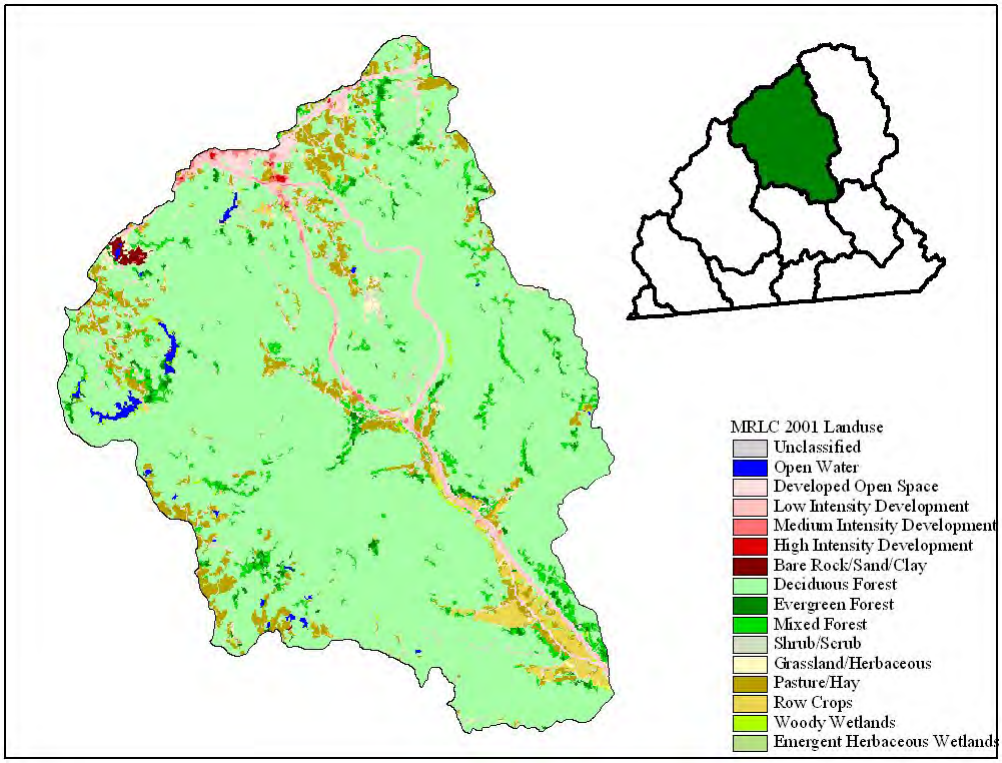


Figure 4-22. Illustration of Land Use Distribution in Subwatershed 060300010201.

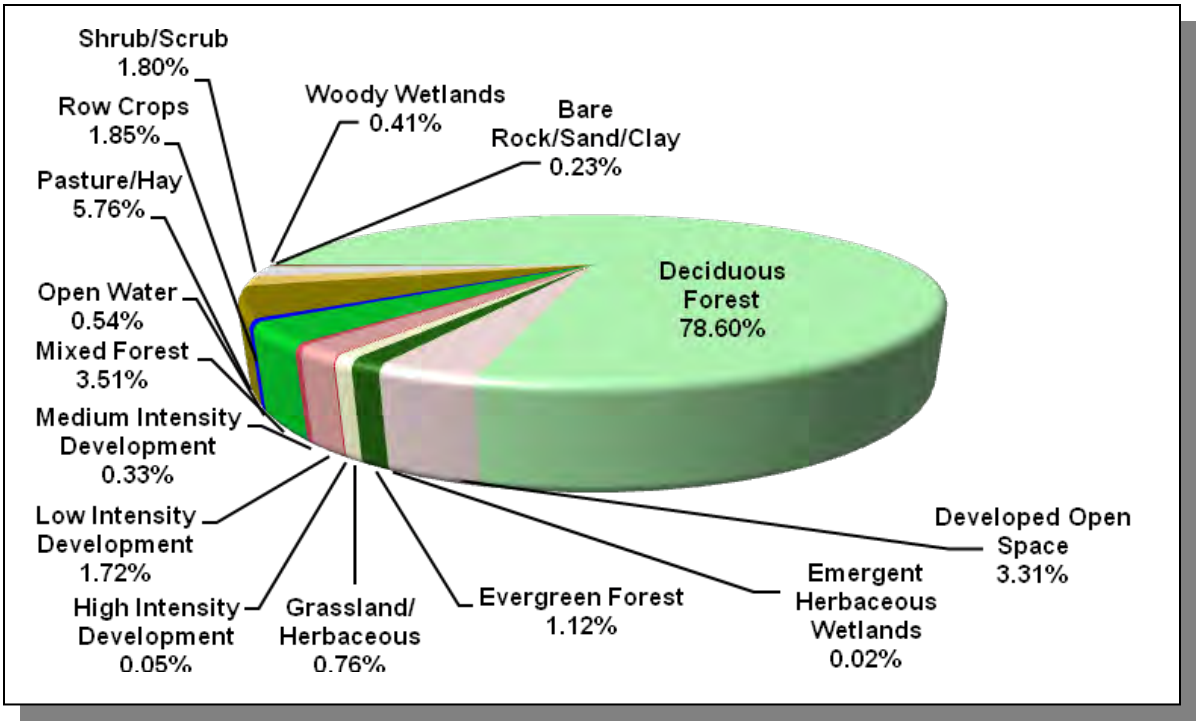


Figure 4-23. Land Use Distribution in Subwatershed 060300010201. *More information is provided in Appendix IV.*

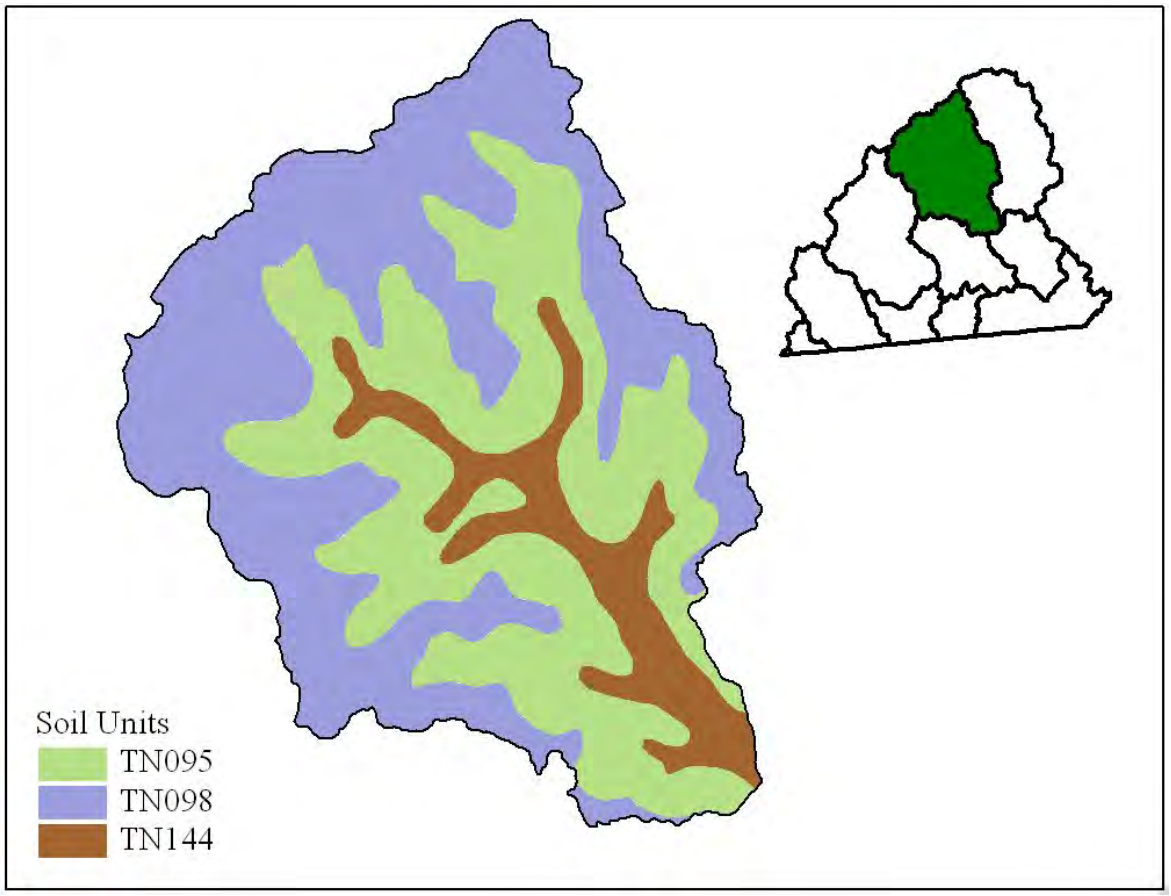


Figure 4-24. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010201.

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
TN144	0.00	B	2.43	5.43	Loam	0.31

Table 4-13. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010201. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Franklin	34,725	37,152	39,270	0.74	257	275	291	13.20
Grundy	13,362	14,012	14,332	1.04	139	145	149	7.20
Marion	24,860	26,674	27,776	10.19	2,533	2,717	2,830	11.70
Totals	**72,947**	**77,838**	**81,378**		**2,929**	**3,137**	**3,270**	**11.60**

Table 4-14. Population Estimates in Subwatershed 060300010201.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Monteagle	Grundy	1,187	453	258	191	4
Tracy City	Grundy	1,512	660	43	603	14
Total		**2,699**	**1,113**	**301**	**794**	**18**

Table 4-15. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 060300010201.

4.2.C.ii. USGS Gaging Stations and STORET Sites.

There are no USGS continuous record gaging stations located in subwatershed 060300010201.

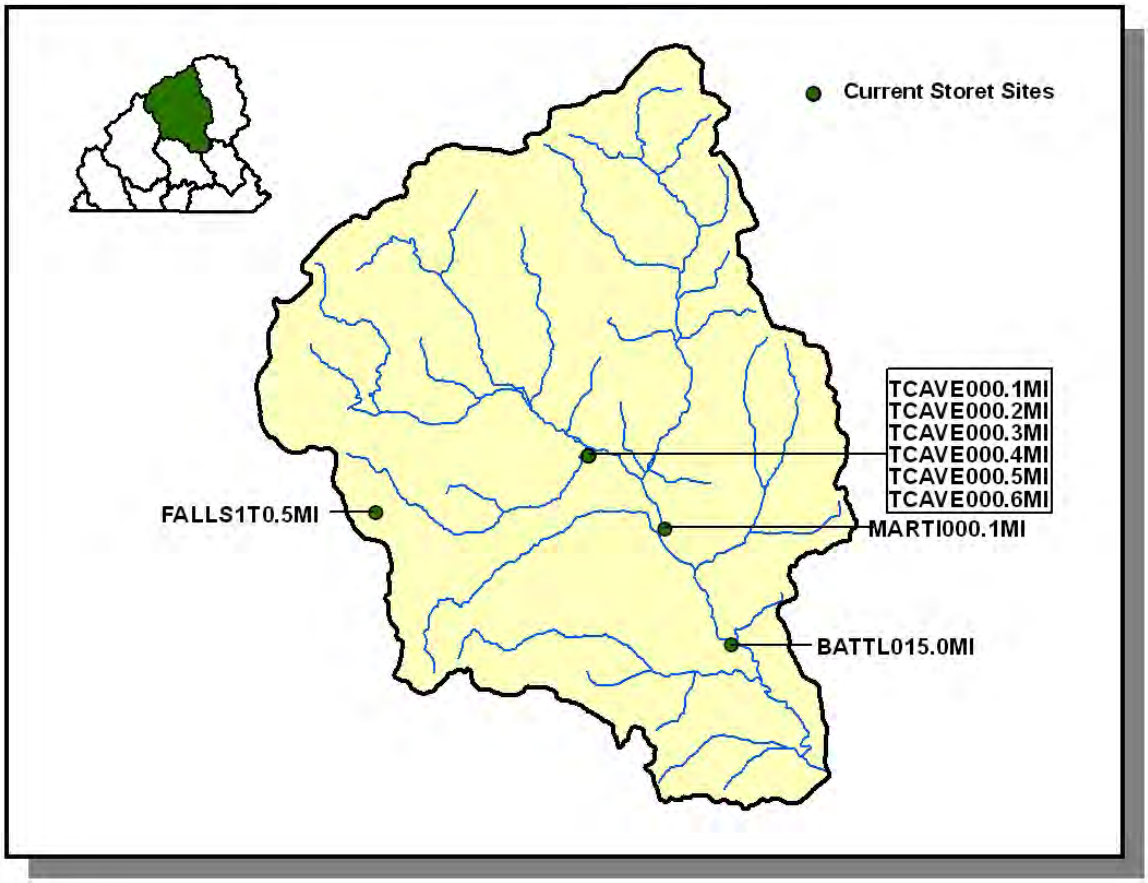


Figure 4-25. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060300010201. *More information, including site names and locations, is provided in Appendix IV.*

4.2.C.iii. Permitted Activities.

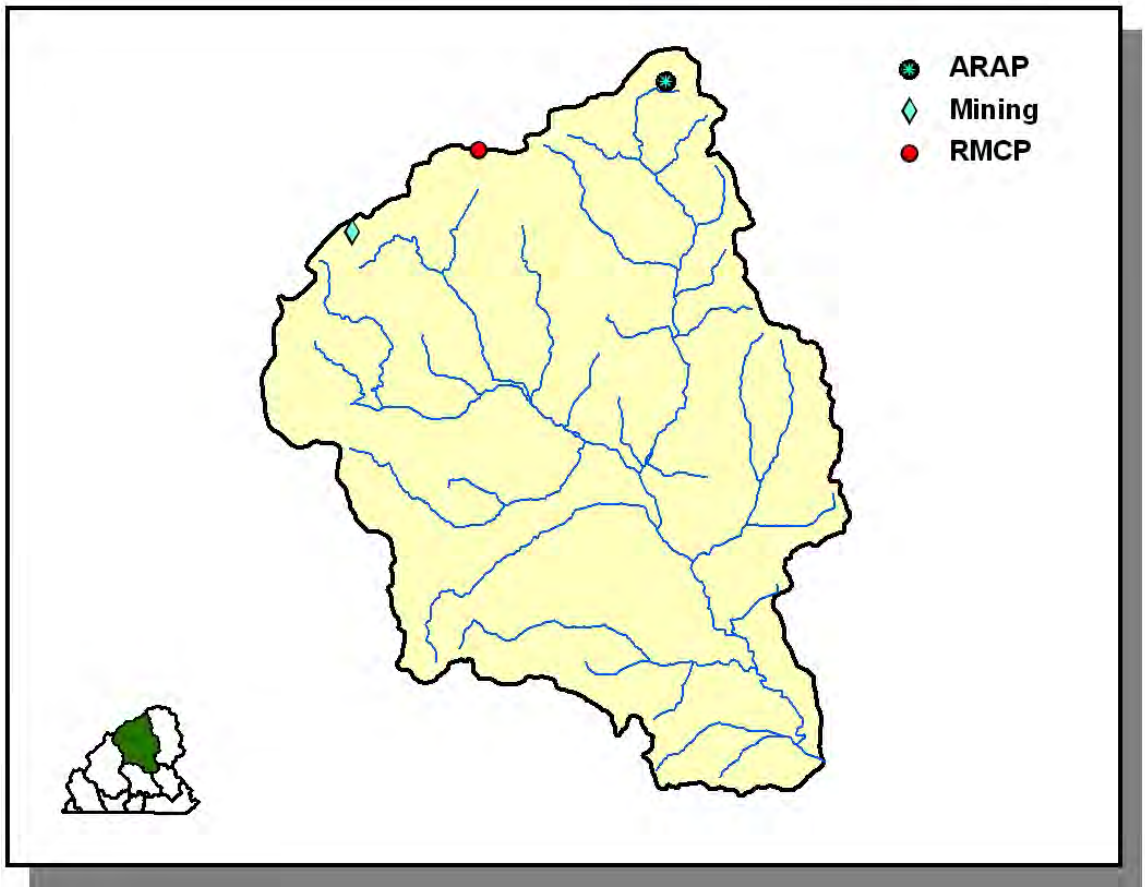


Figure 4-26. Location of Permits Issued in Subwatershed 060300010201. *More information, including the names of facilities, is provided in Appendix IV.*

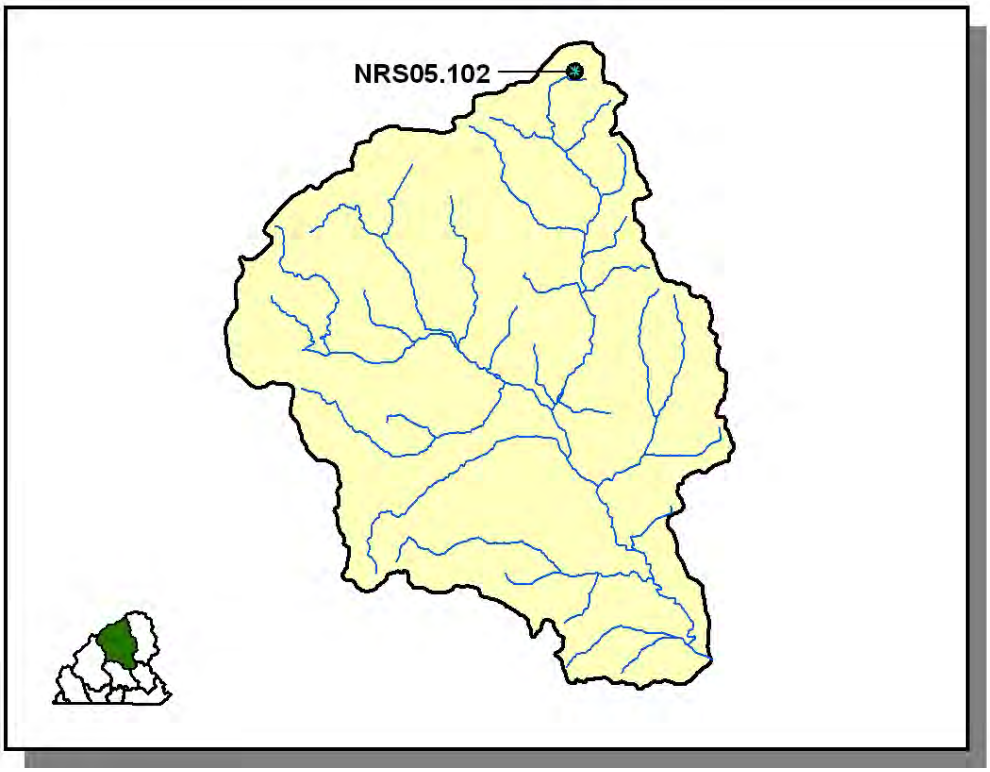


Figure 4-27. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 060300010201. *More information is provided in Appendix IV.*

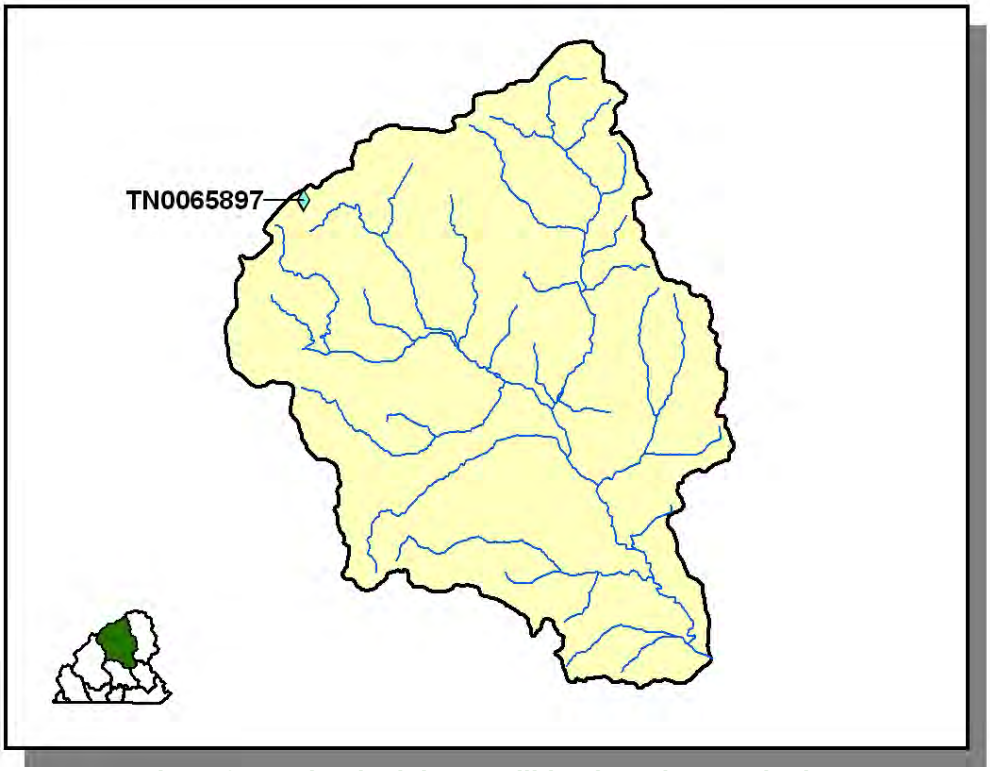


Figure 4-28. Location of Permitted Mining Facilities in Subwatershed 060300010201. *More information is provided in Appendix IV.*

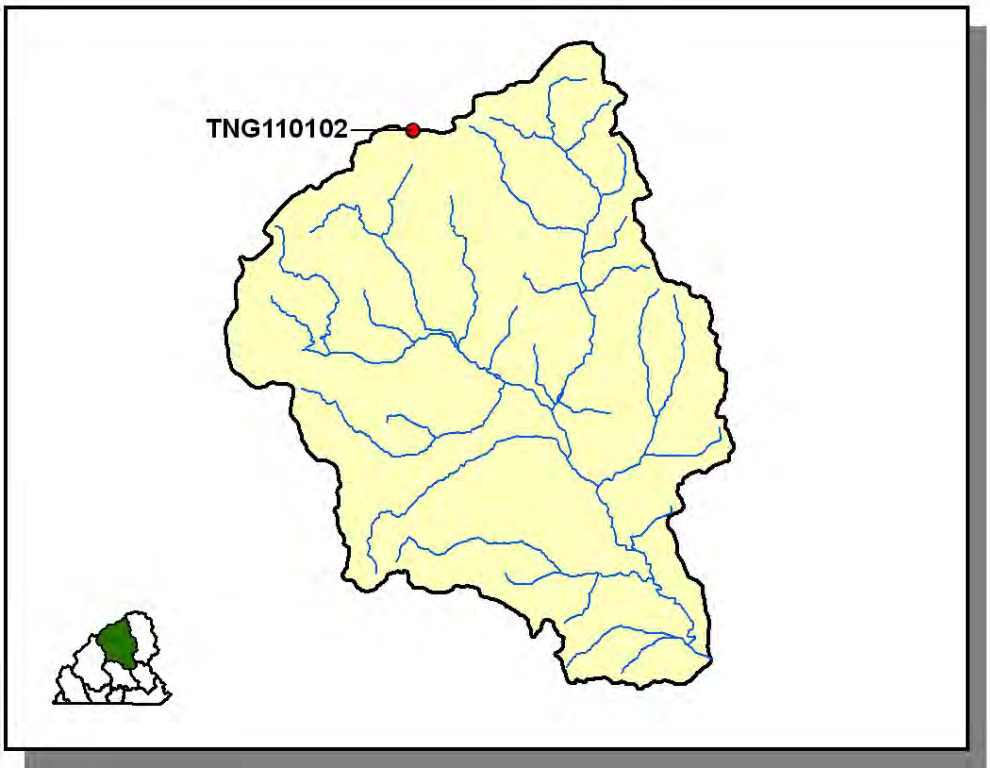


Figure 4-29. Location of RMCP (Ready Mix Concrete Plant) facilities in Subwatershed 060300010201. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.C.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Franklin	13,877	30,702	2,999	28	19,333	105
Grundy	3,276	7,673	466	68,155	1761	
Marion	4,424	8,939	311	246	279	

Table 4-16. Summary of Livestock Count Estimates by 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.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Franklin	183.4	183.0	6.0	28.7
Grundy	174.5	165.9	5.6	17.7

Table 4-17. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Other Vegetable and Truck Crop	7.28
All Other Close Grown Cropland	5.82
Wheat (Close Grown Cropland)	5.55
Soybeans (Row Crops)	4.52
Corn (Row Crops)	3.79
Other Cropland not Planted	2.04
Legume (Hayland)	1.64
Other (Horticultural)	0.67
Grass (Pastureland)	0.60
Grass (Hayland)	0.39
Grass Forbs Legumes Mixed (Pastureland)	0.31
Legume Grass (Hayland)	0.19
Farmsteads and Ranch Headquarters	0.19
Conservation Reserve Program Land	0.09

Table 4-18. Annual Estimated Total Soil Loss in Subwatershed 060300010201.

4.2.D. 060300010202 (Big Fiery Gizzard Creek).

4.2.D.i. General Description.

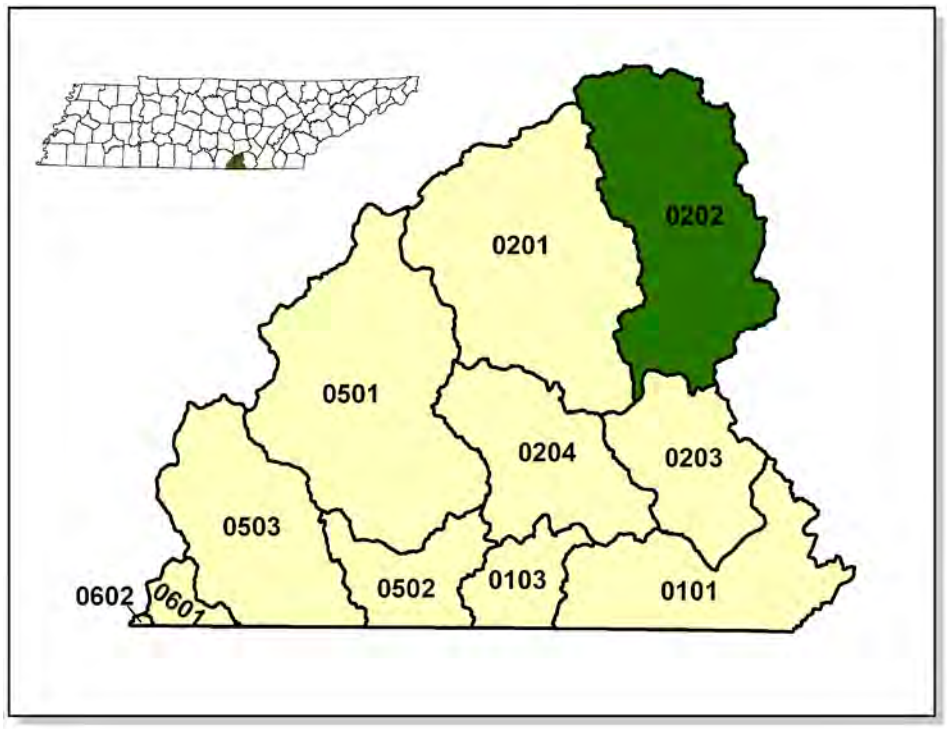


Figure 4-30. Location of Subwatershed 060300010202. *All Guntersville Lake HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

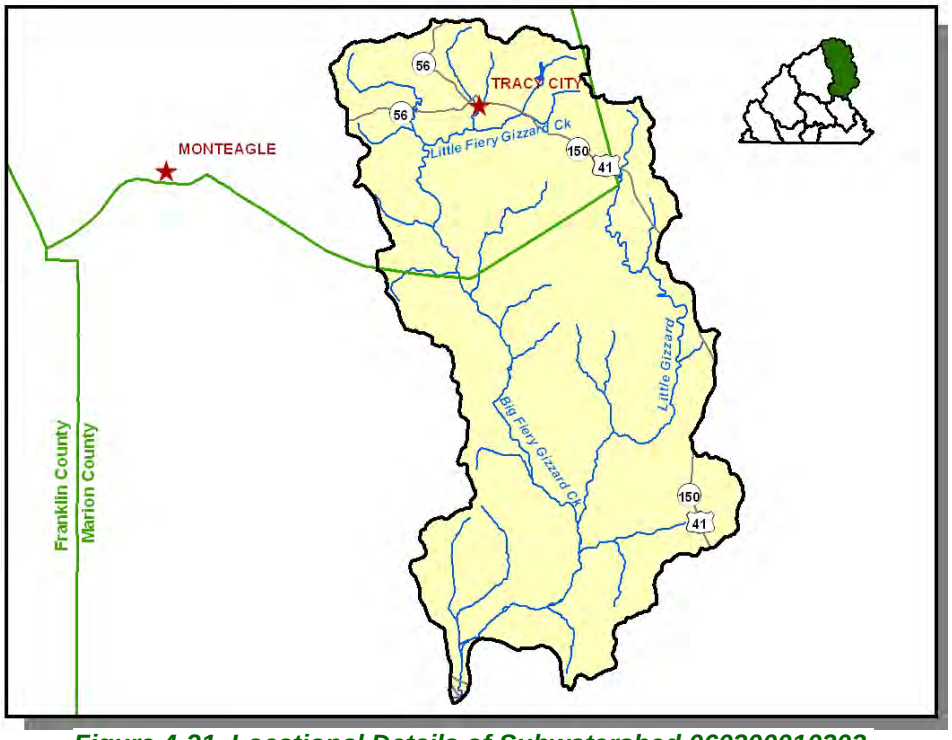


Figure 4-31. Locational Details of Subwatershed 060300010202.

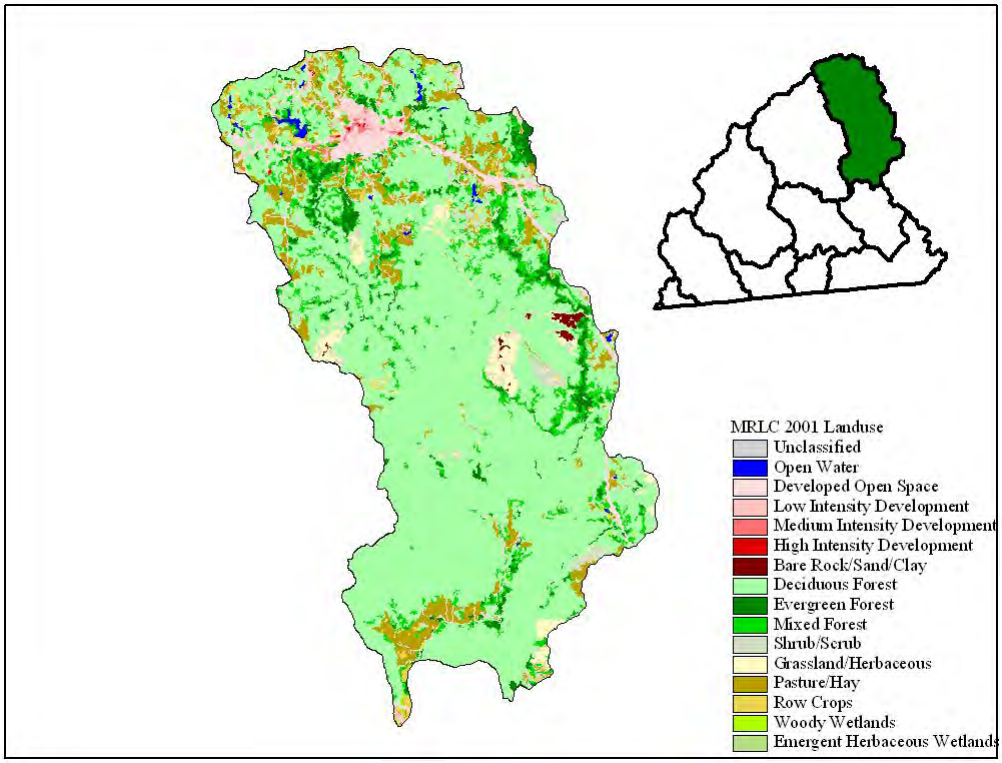


Figure 4-32. Illustration of Land Use Distribution in Subwatershed 060300010202.

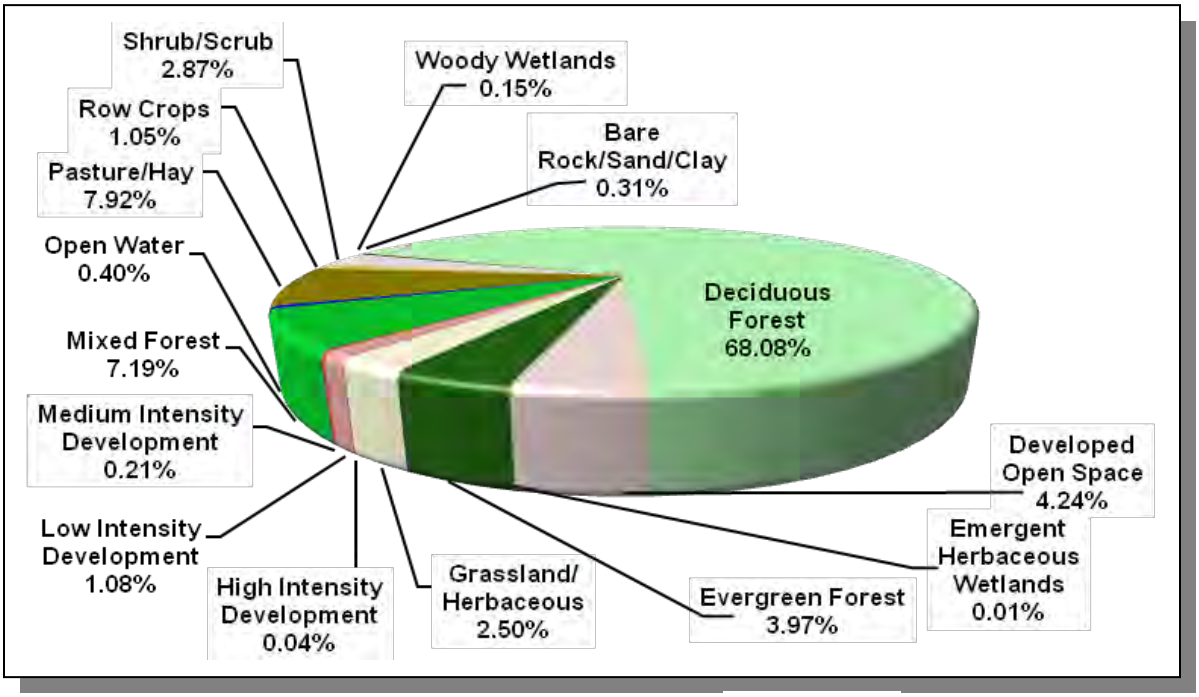


Figure 4-33. Land Use Distribution in Subwatershed 060300010202. *More information is provided in Appendix IV.*

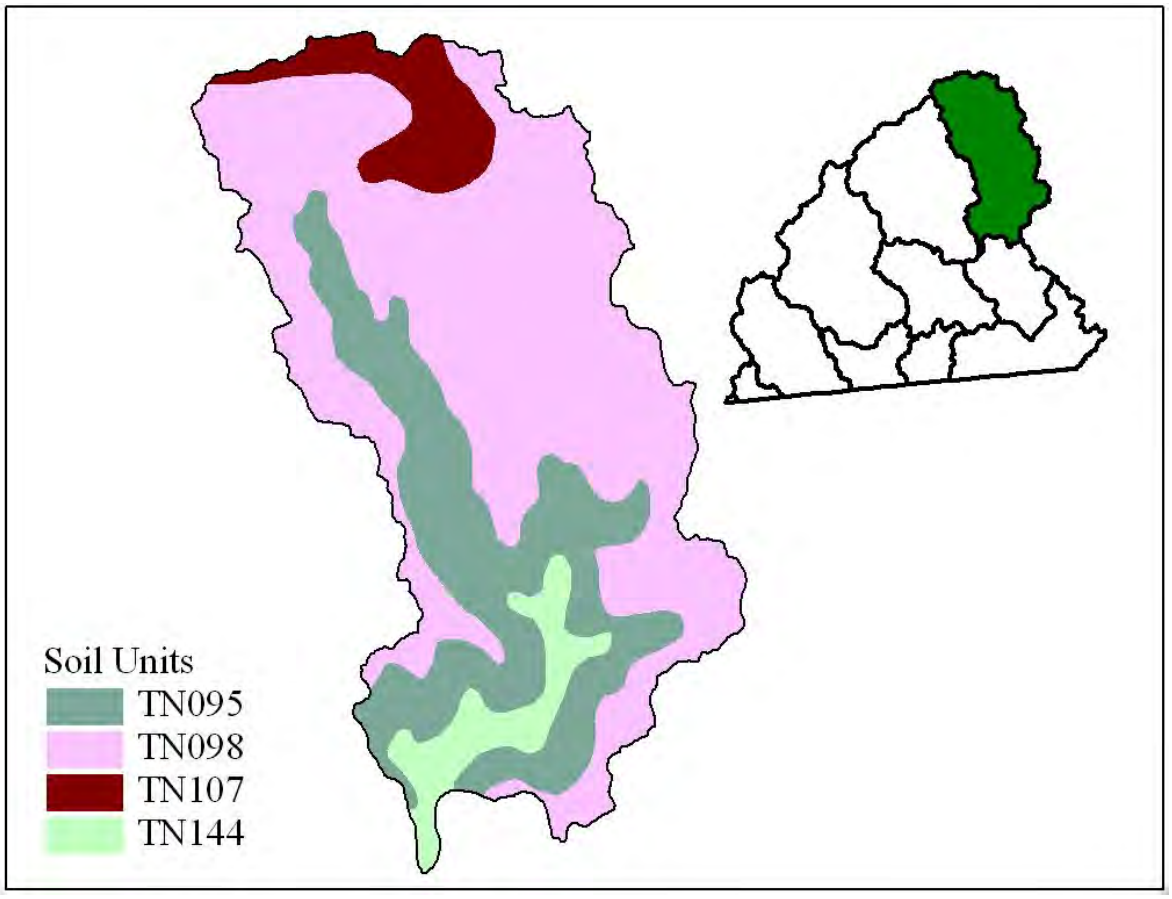


Figure 4-34. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010202.

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
TN144	0.00	B	2.43	5.43	Loam	0.31

Table 4-19. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010202. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Grundy	13,362	14,012	14,332	4.06	542	568	581	7.20
Marion	24,860	26,674	27,776	7.15	1,776	1,906	1,985	11.80
Totals	**38,222**	**40,686**	**42,108**		**2,318**	**2,474**	**2,566**	**10.70**

Table 4-20. Population Estimates in Subwatershed 060300010202.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Tracy City	Grundy	1,512	660	43	603	14

Table 4-21. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 060300010202.

4.2.D.ii. USGS Gaging Stations and STORET Sites.

There are no USGS continuous record gaging stations located in subwatershed 060300010202.

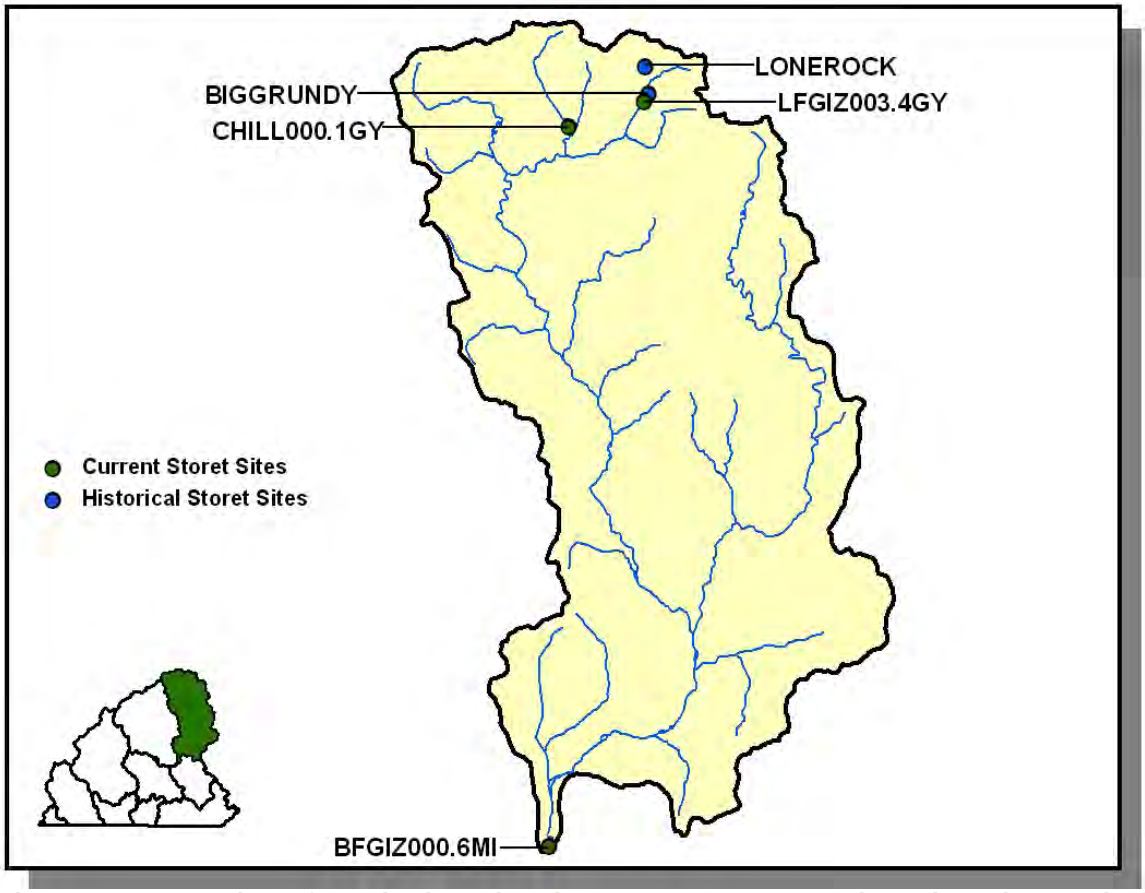


Figure 4-35. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060300010202. *More information, including site names and locations, is provided in Appendix IV.*

4.2.D.iii. Permitted Activities.

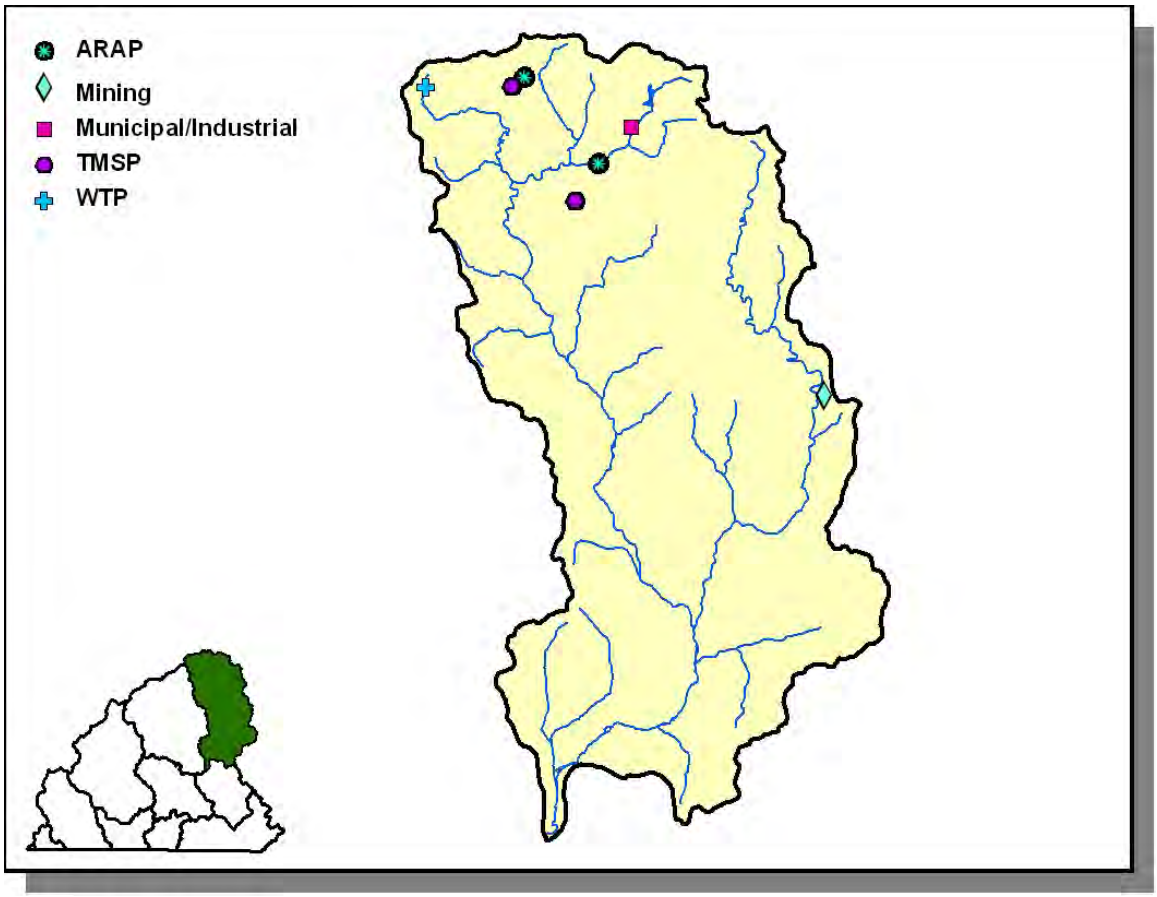


Figure 4-36. Location of Permits Issued in Subwatershed 060300010202. *More information, including the names of facilities, is provided in Appendix IV.*

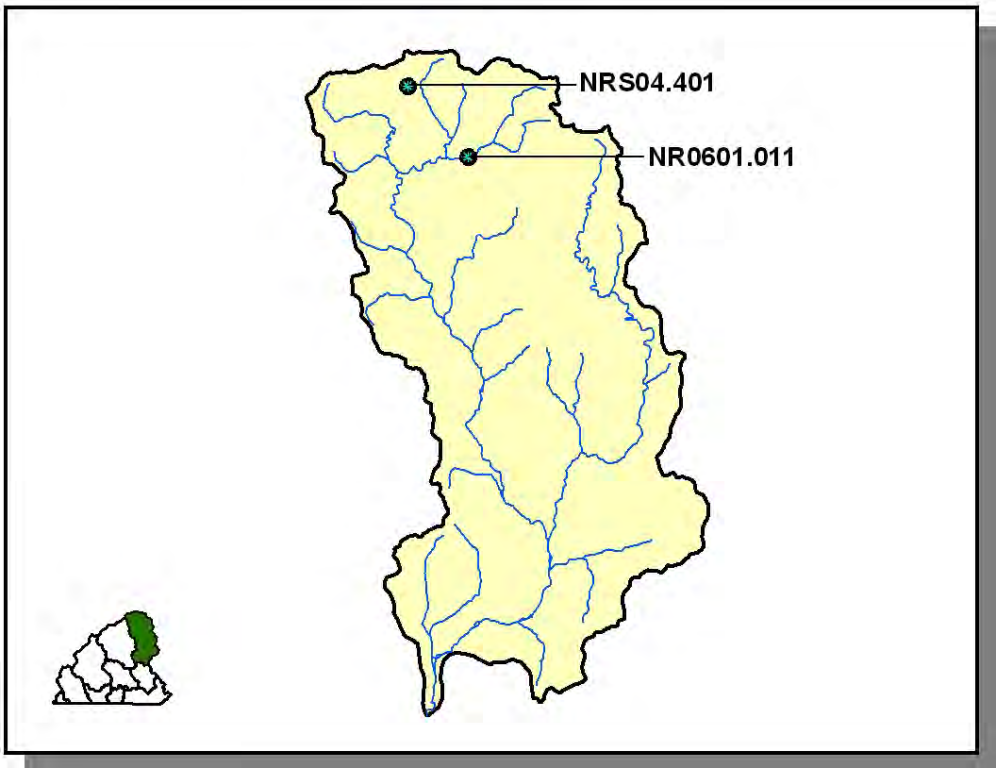


Figure 4-37. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 060300010202. *More information is provided in Appendix IV.*

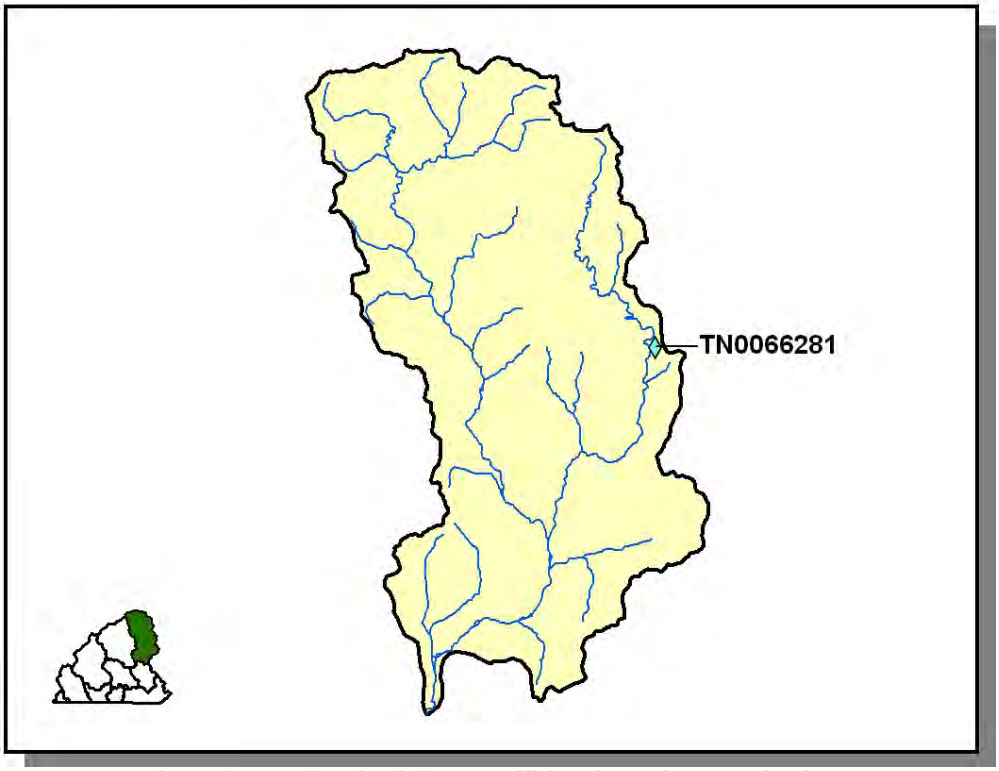


Figure 4-38. Location of Permitted Mining Facilities in Subwatershed 060300010202. *More information is provided in Appendix IV.*

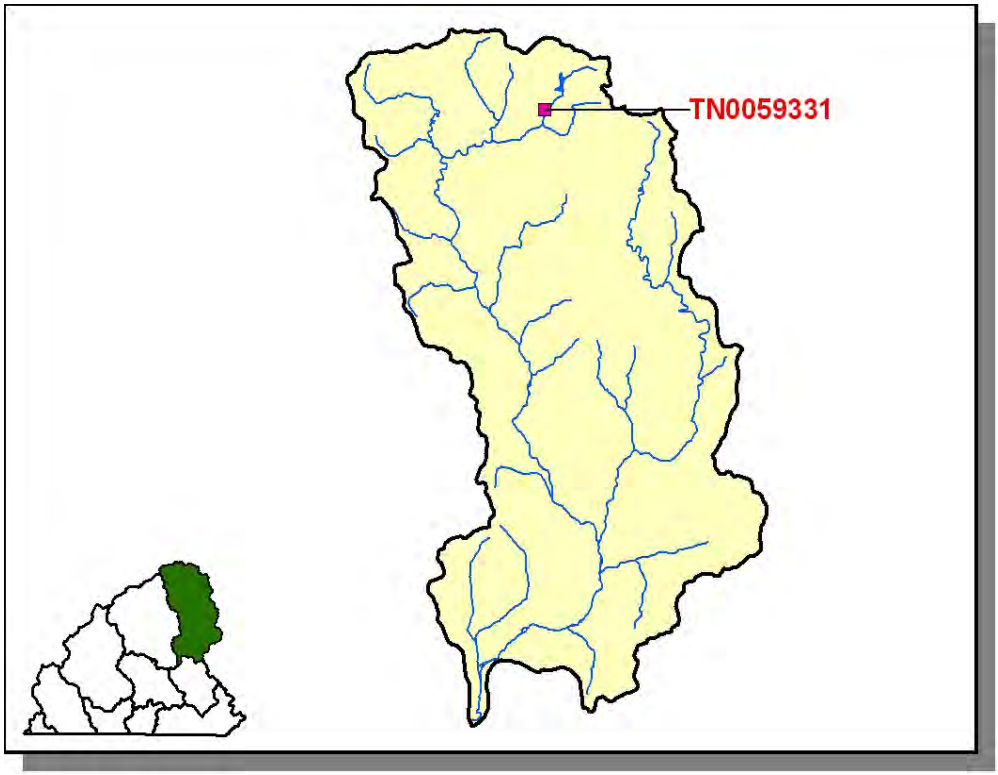


Figure 4-39. Location of Permitted Municipal and Industrial Facilities in Subwatershed 060300010202. *Permit numbers in red indicate that the facility discharges to a stream listed on the 2006 303(d) list. More information, including the name of the facility is provided in Appendix IV.*

PERMIT #	7Q10	DISCHARGE FLOW
TN0059331	0.0	0.012

Table 4-22. Receiving Stream Flow Information Used for Limit Calculations for NPDES Dischargers to Waterbodies Listed on the 2006 303(d) List in Subwatershed 060300010202. *Data are in million gallons per day (MGD).Data were obtained from permit files.*

PERMIT #	AMMONIA AS N TOTAL	$CBOD_5$	DO	E. *coli*	FLOW	TSS	SS	TRC	pH
TN0059331	X	X	X	X	X	X	X	X	X

Table 4-23. Parameters Monitored for Limits for NPDES Dischargers to Waterbodies Listed on the 2006 303(d) List in Subwatershed 060300010202. *$CBOD_5$, Carbonaceous Biochemical Oxygen Demand (5-day) ; DO, Dissolved Oxygen; TSS, Total Suspended Solids; SS, Settleable Solids; TRC, Total Residual Chlorine.*

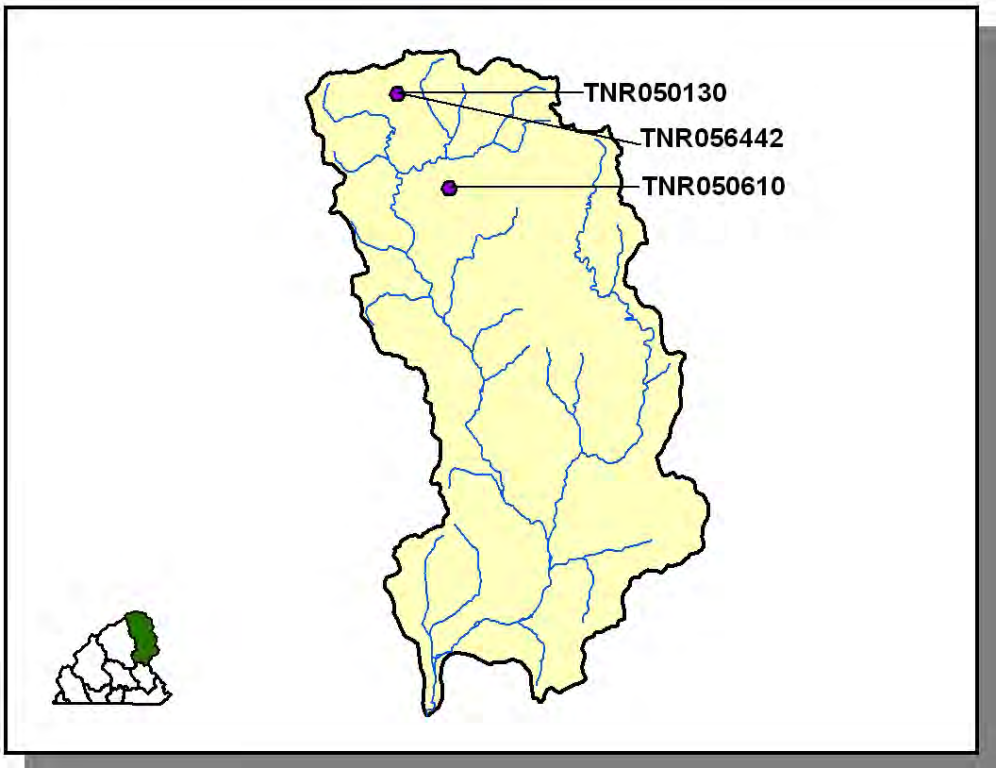


Figure 4-40. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 060300010202. *More information is provided in Appendix IV.*

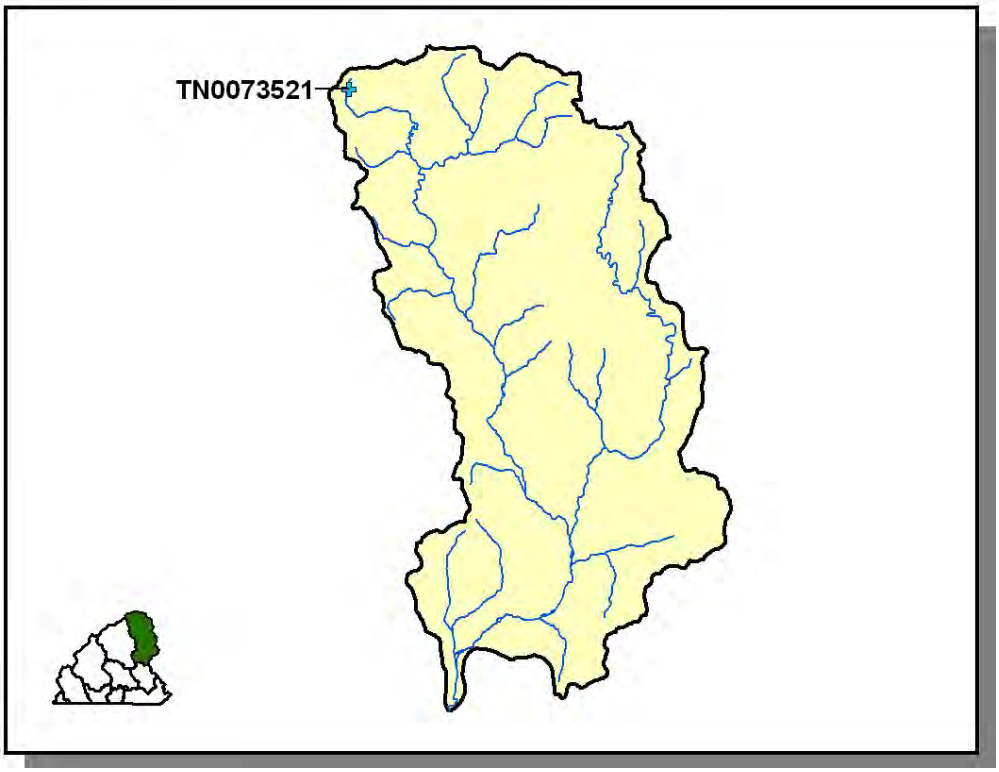


Figure 4-41. Location of Active WTP (Water Treatment Plant) Facilities in Subwatershed 060300010202. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.D.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Grundy	3,276	7,673	466	68,155	1,761	
Marion	4,424	8,939	311	246	279	

Table 4-24. Summary of Livestock Count Estimates by 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.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Grundy	174.5	165.9	5.6	17.7

Table 4-25. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Other Vegetable and Truck Crop	7.28
Soybeans (Row Crops)	4.59
Corn (Row Crops)	3.99
Other (Horticultural)	1.52
Grass (Pastureland)	0.62
Grass (Hayland)	0.39
Grass Forbs Legumes Mixed (Pastureland)	0.31
Farmsteads and Ranch Headquarters	0.22
Legume Grass (Hayland)	0.19

Table 4-26. Annual Estimated Total Soil Loss in Subwatershed 060300010202.

4.2.E. 060300010203 (Battle Creek, Lower).

4.2.E.i. General Description.

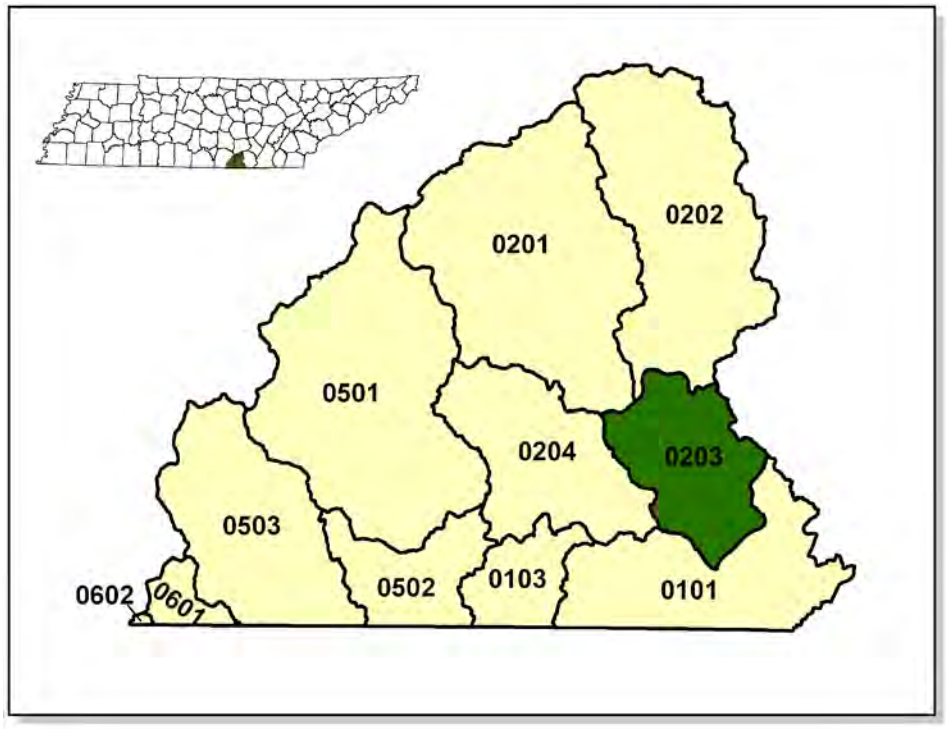


Figure 4-42. Location of Subwatershed 060300010203. *All Guntersville Lake HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

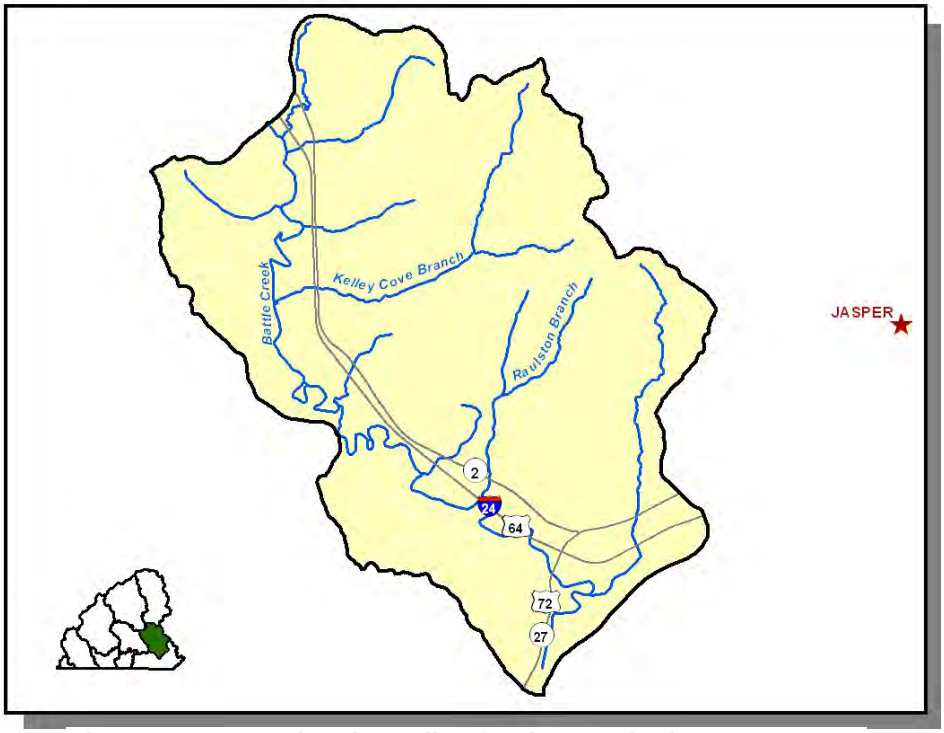


Figure 4-43. Locational Details of Subwatershed 060300010203.

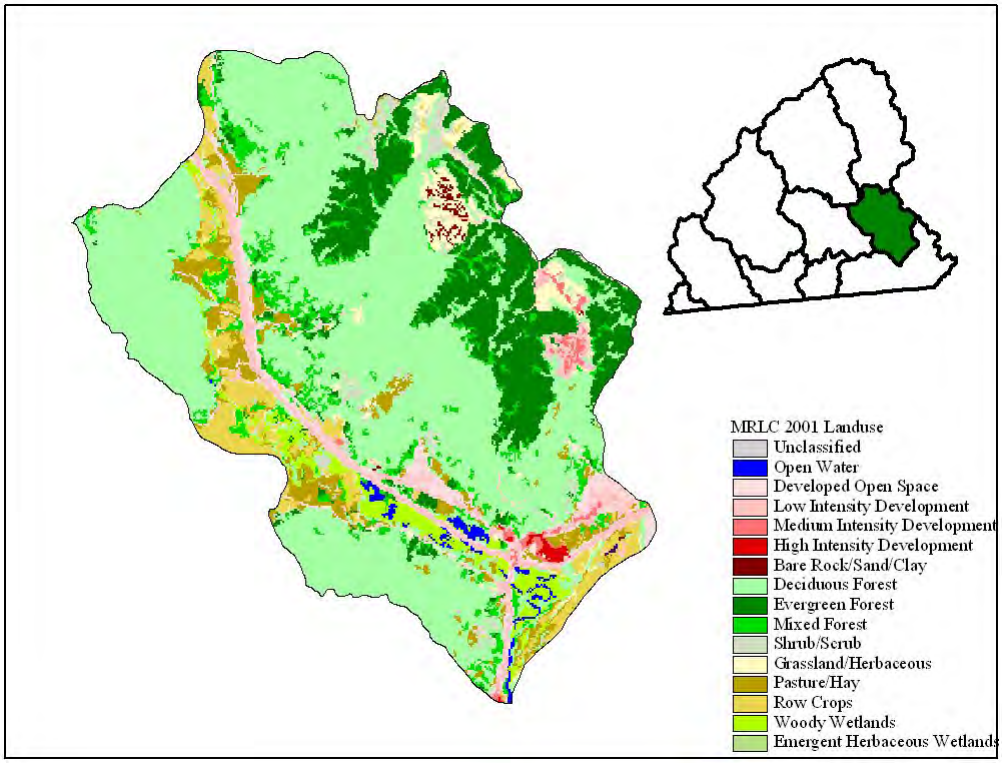


Figure 4-44. Illustration of Land Use Distribution in Subwatershed 060300010203.

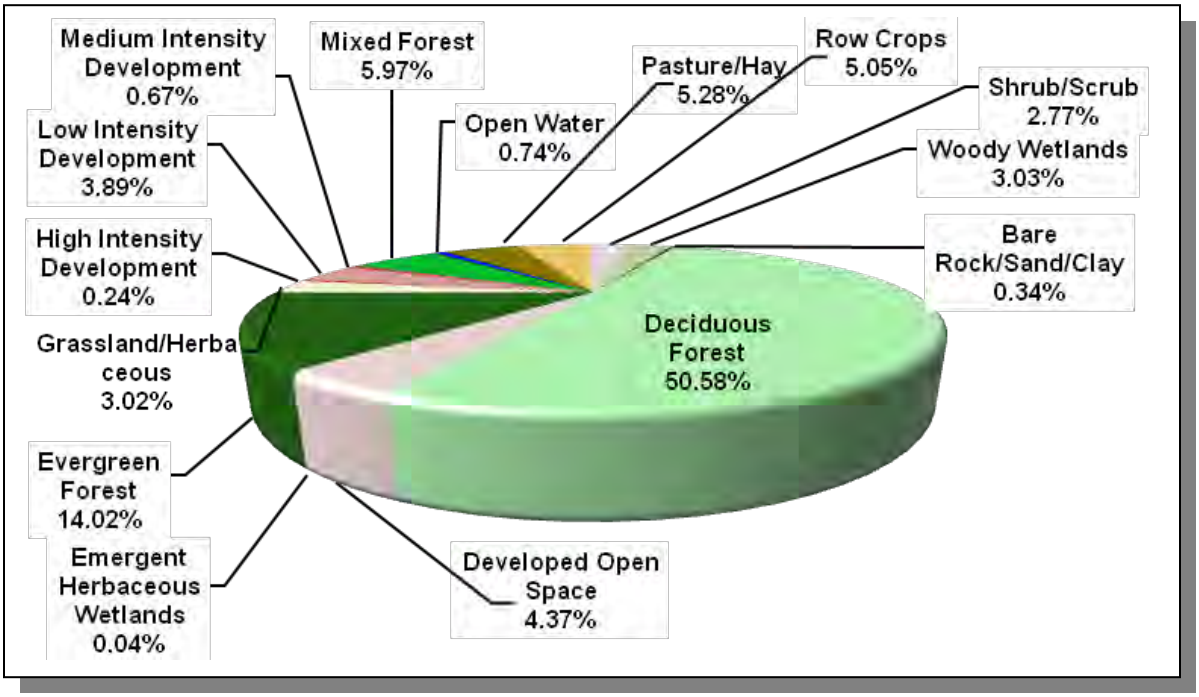


Figure 4-45. Land Use Distribution in Subwatershed 060300010203. *More information is provided in Appendix IV.*

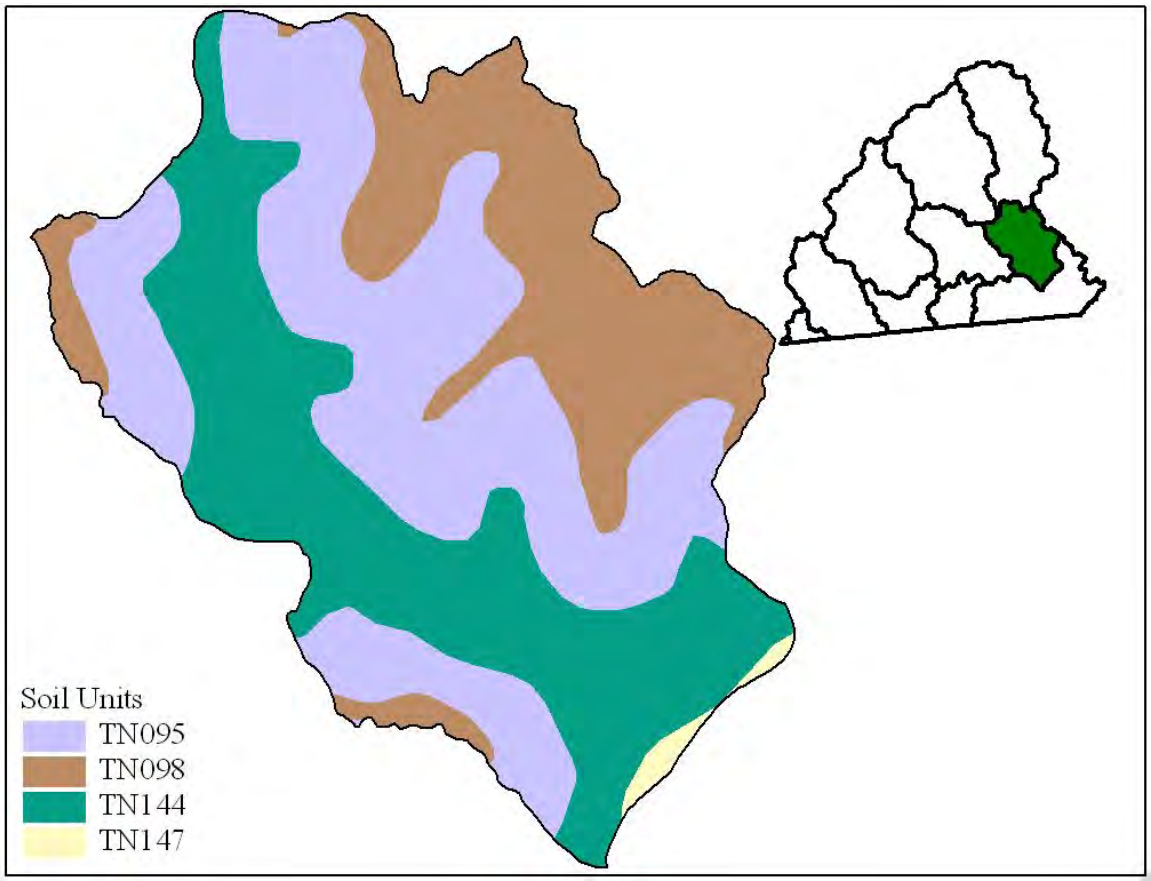


Figure 4-46. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010203.

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
TN144	0.00	B	2.43	5.43	Loam	0.31
TN147	41.00	C	1.30	5.95	Silty Loam	0.38

Table 4-27. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010203. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Marion	24,860	26,674	27,776	4.69	1,166	1,251	1,303	11.7

Table 4-28. Population Estimates in Subwatershed 060300010203.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Kimball	Marion	1,243	507	54	448	5
South Pittsburg	Marion	3,295	1,444	1,278	153	13
Total		**4,538**	**1,951**	**1,332**	**601**	**18**

Table 4-29. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 060300010203.

4.2.E.ii. USGS Gaging Stations and STORET Sites.

There are no USGS continuous record gaging stations located in subwatershed 060300010203.

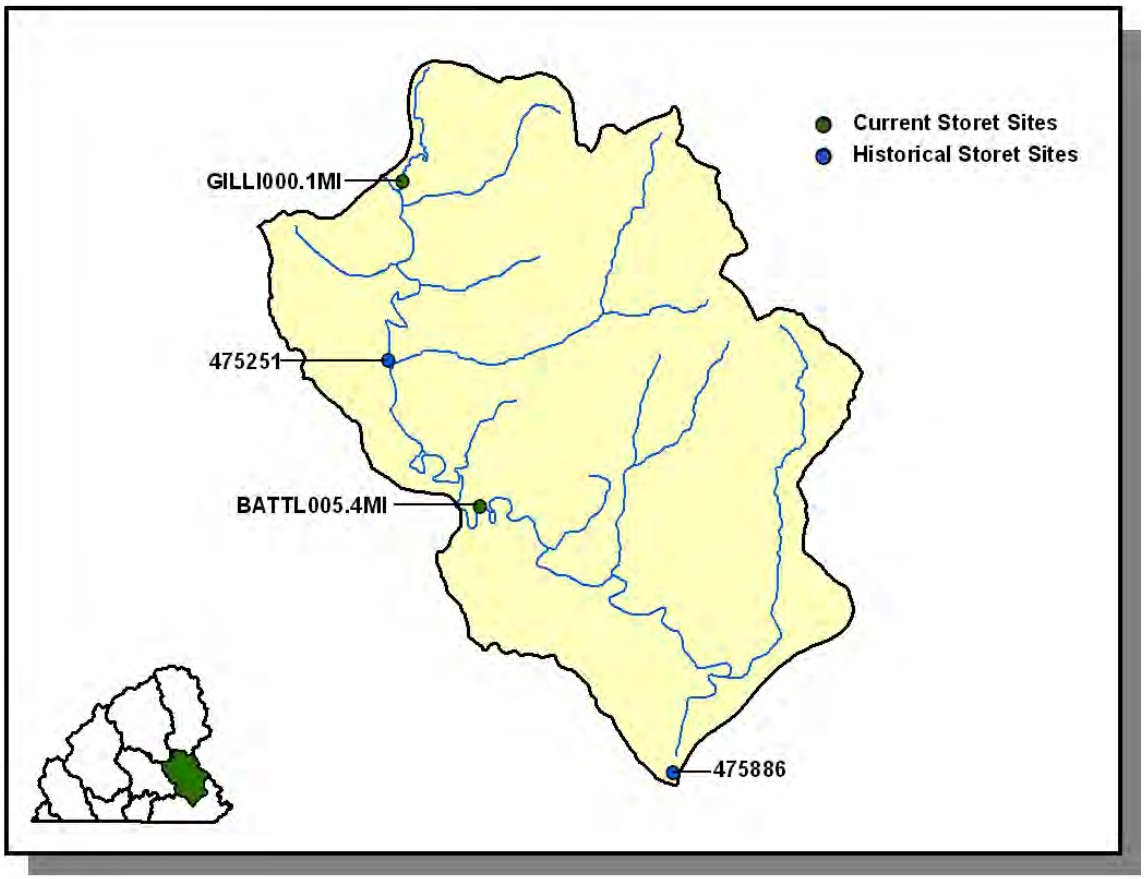


Figure 4-47. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060300010203. *More information, including site names and locations, is provided in Appendix IV.*

4.2.E.iii. Permitted Activities.

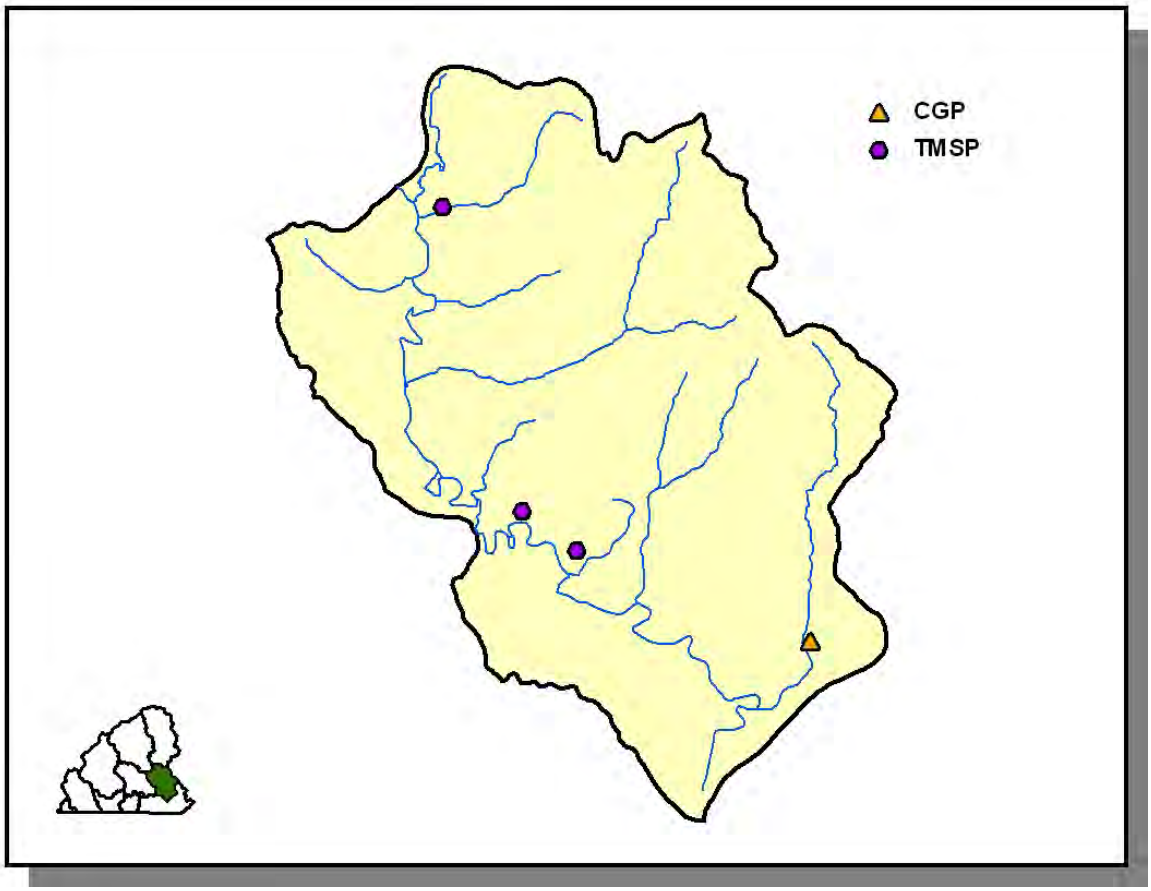


Figure 4-48. Location of Permits Issued in Subwatershed 060300010203. *More information, including the names of facilities, is provided in Appendix IV.*

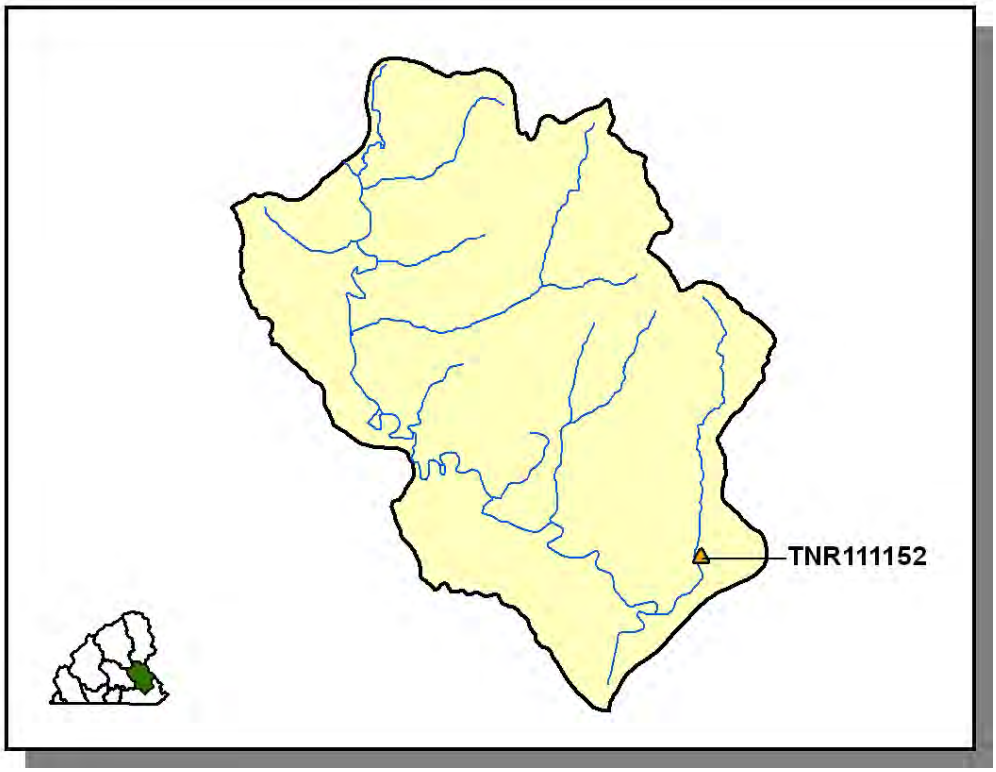


Figure 4-49. Location of CGP (Construction General Permit) Sites in Subwatershed 060300010203. *More information is provided in Appendix IV.*

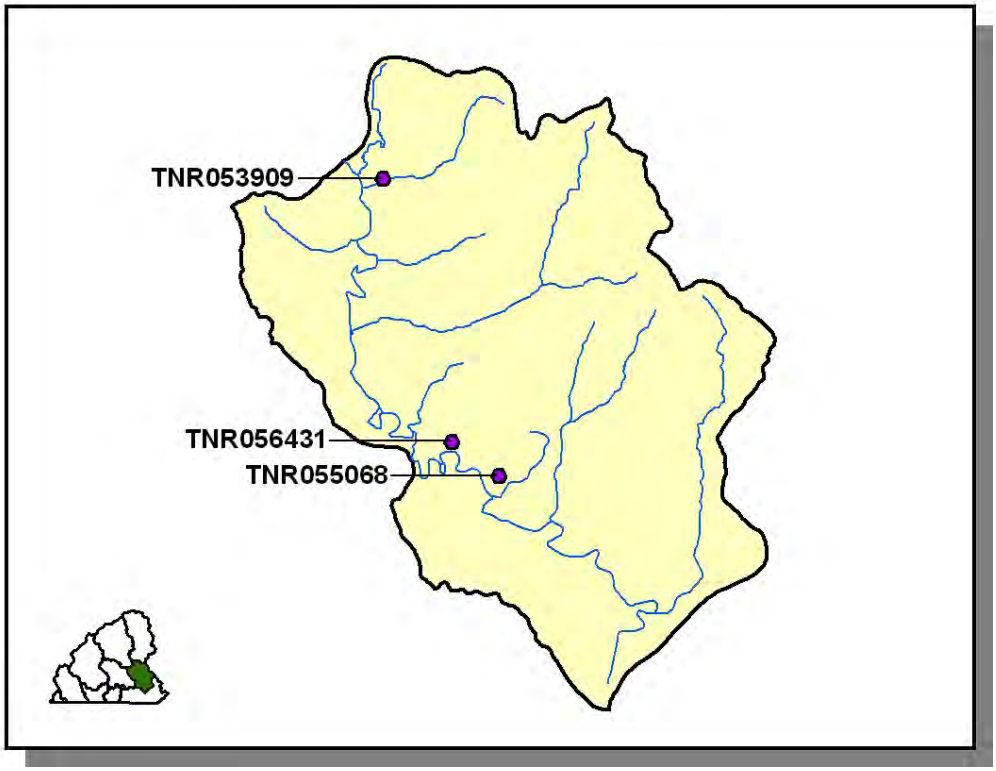


Figure 4-50. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 060300010203. *More information is provided in Appendix IV.*

4.2.E.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Marion	4,424	8,939	311	246	279	

Table 4-30. Summary of Livestock Count Estimates by 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.*

CROPS	TONS/ACRE/YEAR
Other Vegetable and Truck Crop	7.28
Soybeans (Row Crops)	4.56
Corn (Row Crops)	3.55
Grass (Pastureland)	0.62
Grass Forbs Legumes Mixed (Pastureland)	0.29
Other (Horticultural)	0.29
Farmsteads and Ranch Headquarters	0.19

Table 4-31. Annual Estimated Total Soil Loss in Subwatershed 060300010203.

4.2.F. 060300010204 (Sweden Cove).

4.2.F.i. General Description.

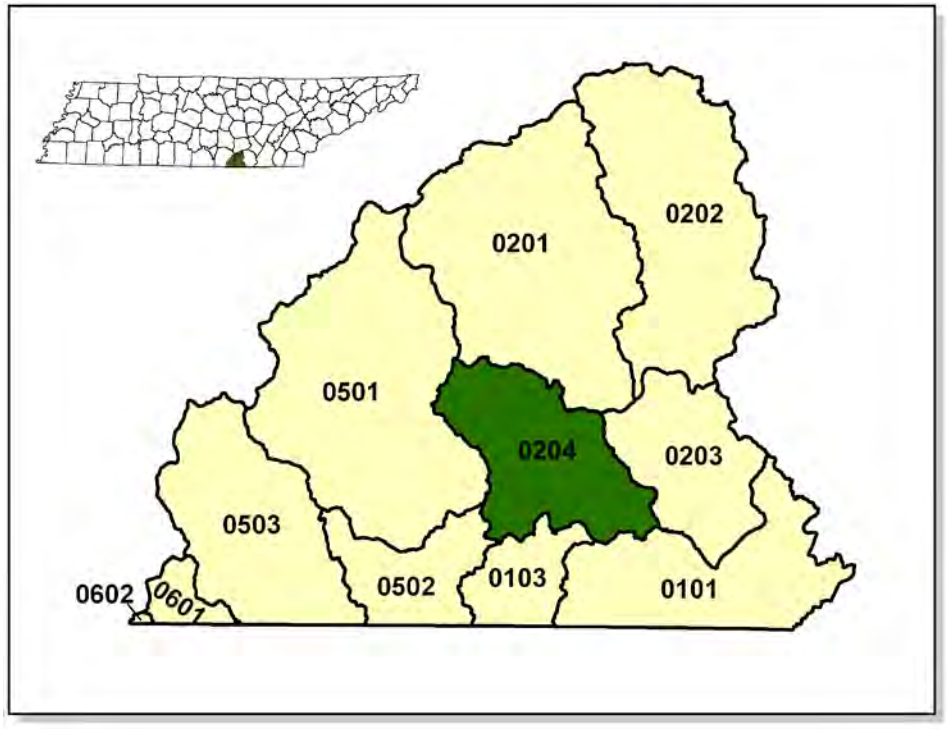


Figure 4-51. Location of Subwatershed 060300010204. *All Guntersville Lake HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

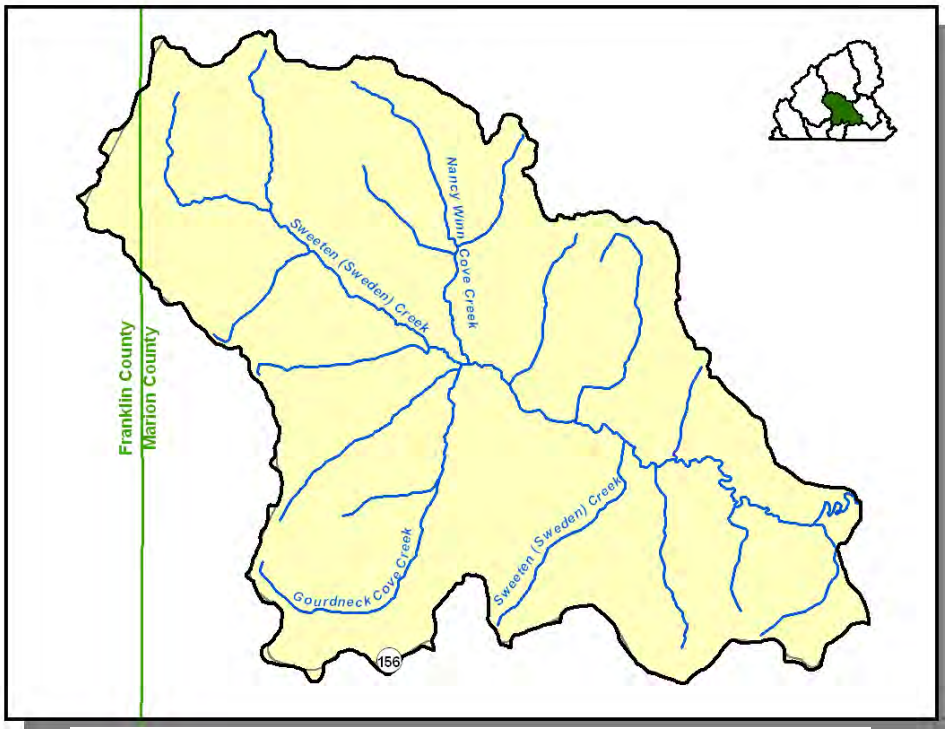


Figure 4-52. Locational Details of Subwatershed 060300010204.

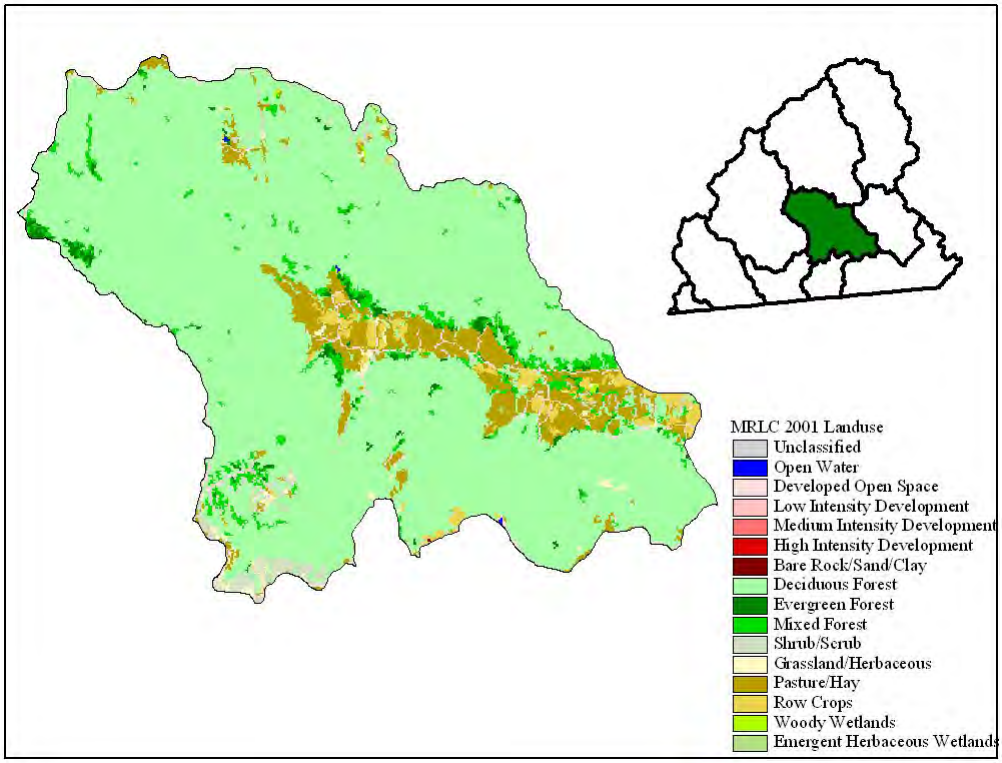


Figure 4-53. Illustration of Land Use Distribution in Subwatershed 060300010204.

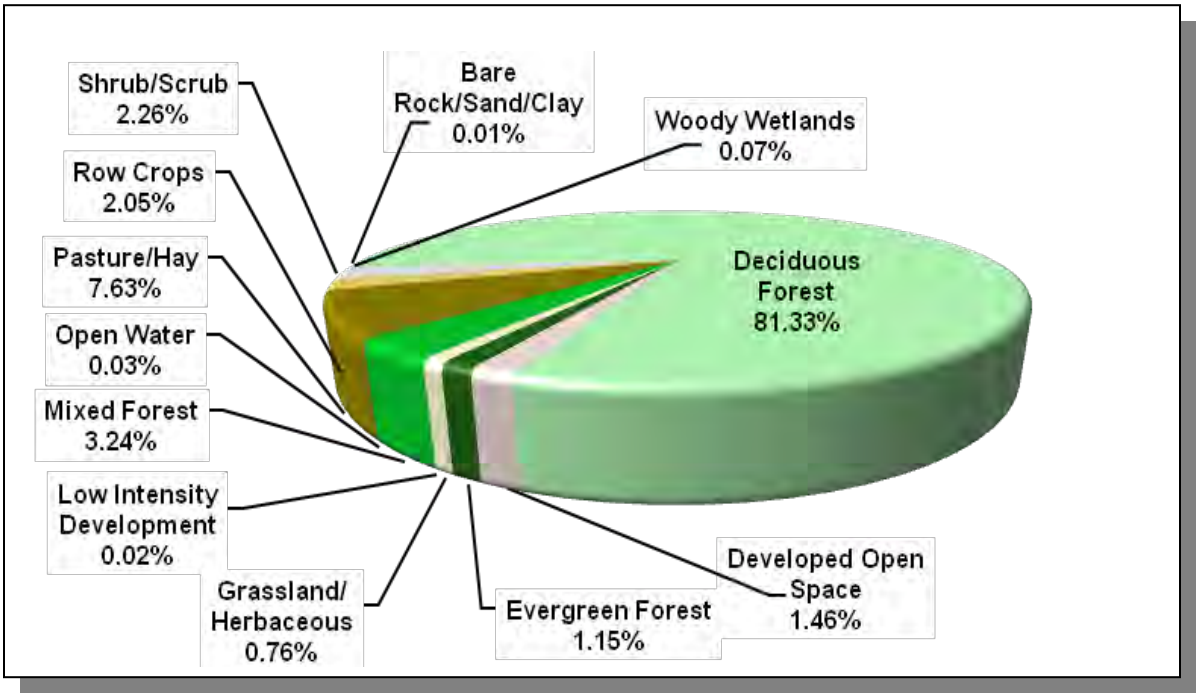


Figure 4-54. Land Use Distribution in Subwatershed 060300010204. *More information is provided in Appendix IV.*

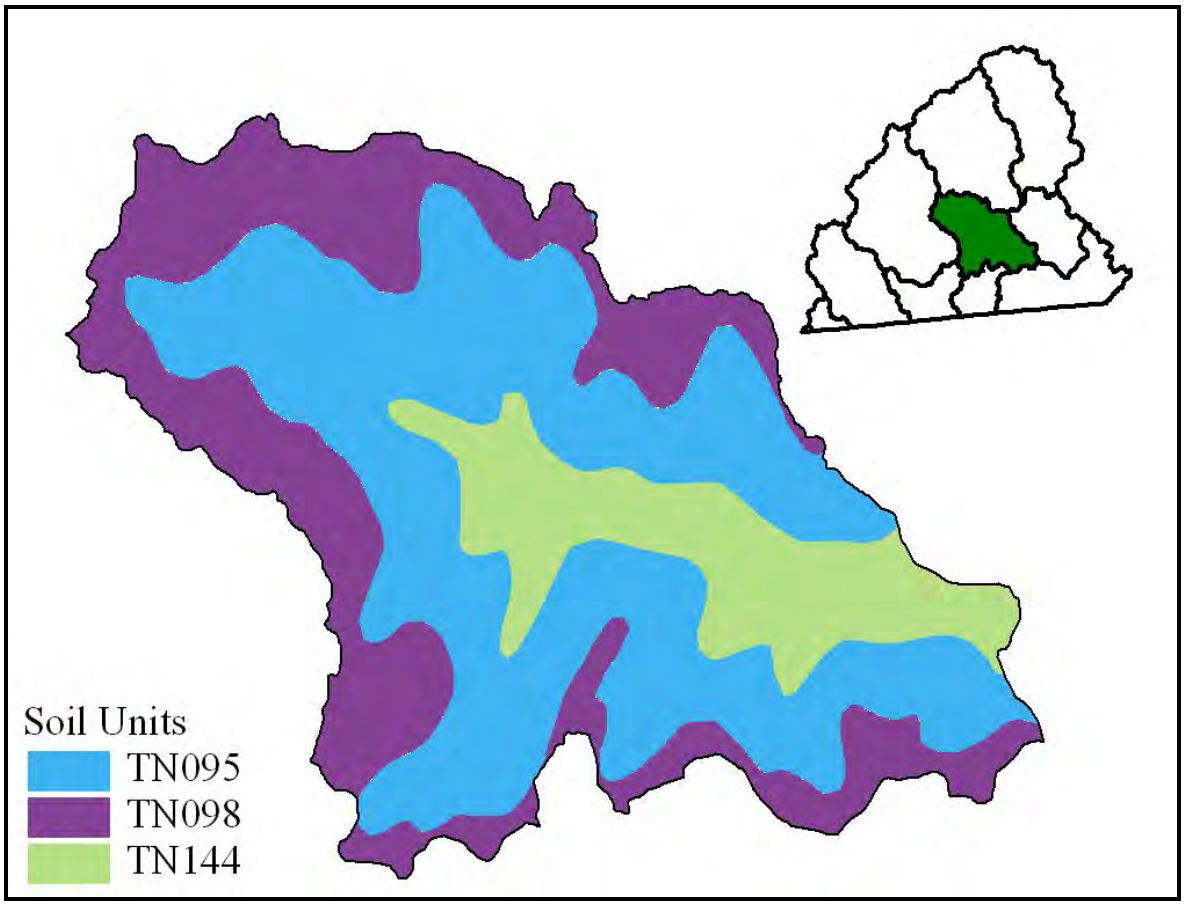


Figure 4-55. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010204.

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
TN144	0.00	B	2.43	5.43	Loam	0.31

Table 4-32. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010204. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Franklin	34,725	37,152	39,270	0.04	12	13	14	16.70
Marion	24,860	26,674	27,776	5.90	1,466	1,572	1,637	11.70
Totals	**59,585**	**63,826**	**67,046**		**1,478**	**1,585**	**1,651**	**11.70**

Table 4-33. Population Estimates in Subwatershed 060300010204.

4.2.F.ii. USGS Gaging Stations and STORET Sites.

There are no USGS continuous record gaging stations located in subwatershed 060300010204.

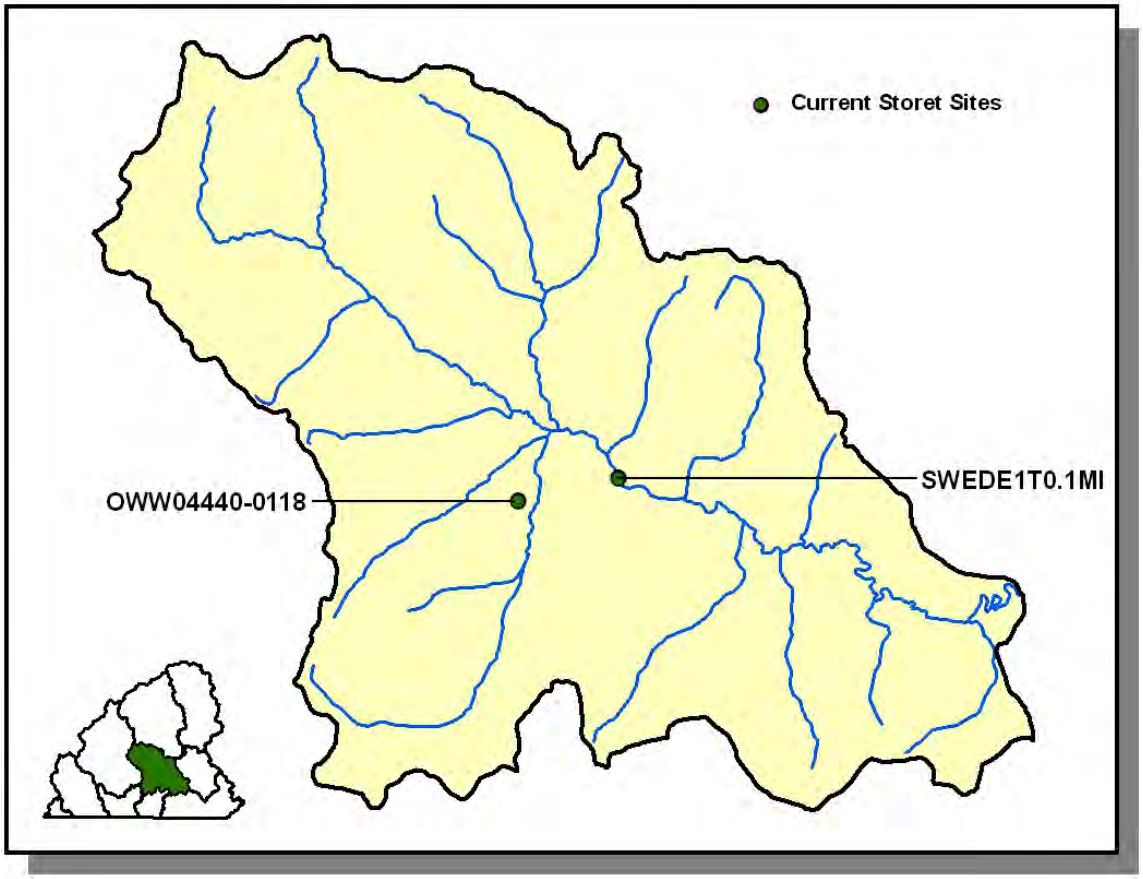


Figure 4-56. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060300010204. *More information, including site names and locations, is provided in Appendix IV.*

4.2.F.iii. Permitted Activities.

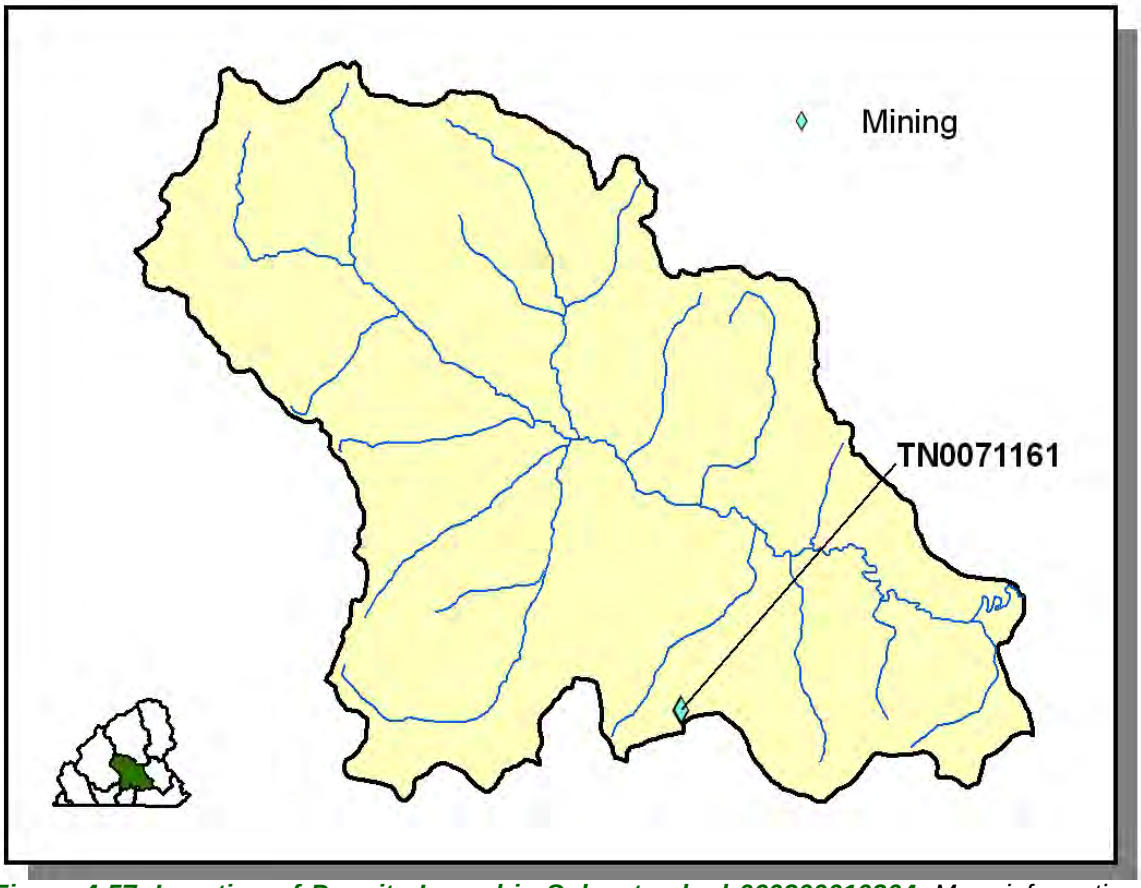


Figure 4-57. Location of Permits Issued in Subwatershed 060300010204. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.F.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Franklin	13,877	30,702	2,999	28	19,333	105
Marion	4,424	8,939	311	246	279	

Table 4-34. Summary of Livestock Count Estimates by 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.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Franklin	183.4	183.0	6.0	28.7

Table 4-35. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Other Vegetable and Truck Crop	7.28
All Other Close Grown Cropland	5.82
Wheat (Close Grown Cropland)	5.55
Soybeans (Row Crops)	4.56
Corn (Row Crops)	3.56
Other Cropland not Planted	2.04
Legume (Hayland)	1.64
Grass (Pastureland)	0.62
Other (Horticultural)	0.30
Grass Forbs Legumes Mixed (Pastureland)	0.29
Farmsteads and Ranch Headquarters	0.19
Conservation Reserve Program Land	0.09

Table 4-36. Annual Estimated Total Soil Loss in Subwatershed 060300010204.

4.2.G. 060300010501 (Crow Creek, Lower).

4.2.G.i. General Description.

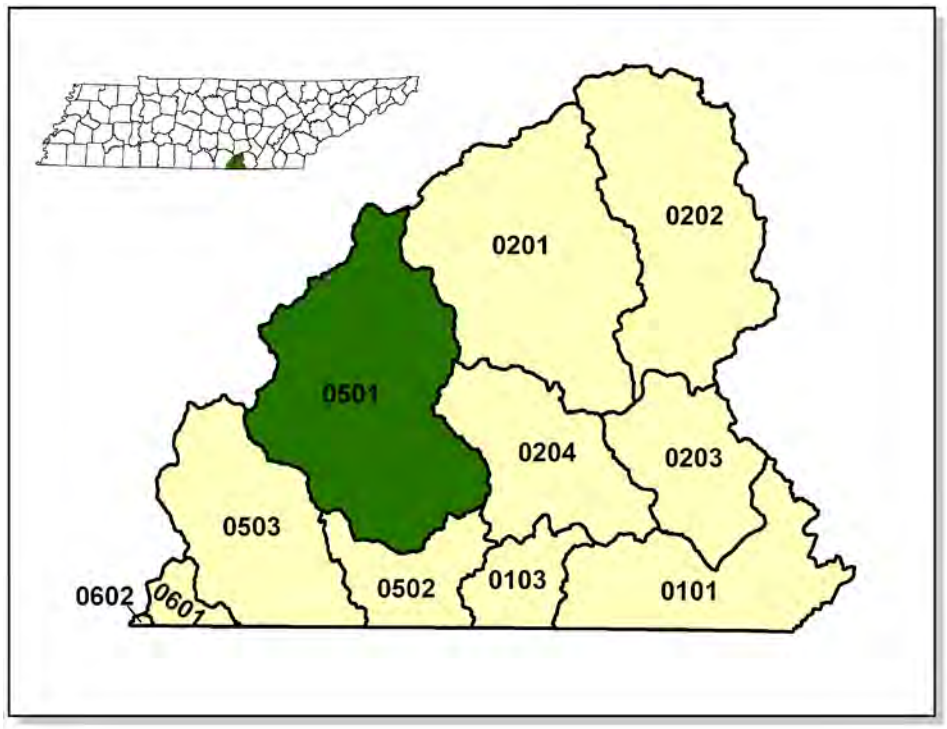


Figure 4-58. Location of Subwatershed 060300010501. *All Guntersville Lake HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

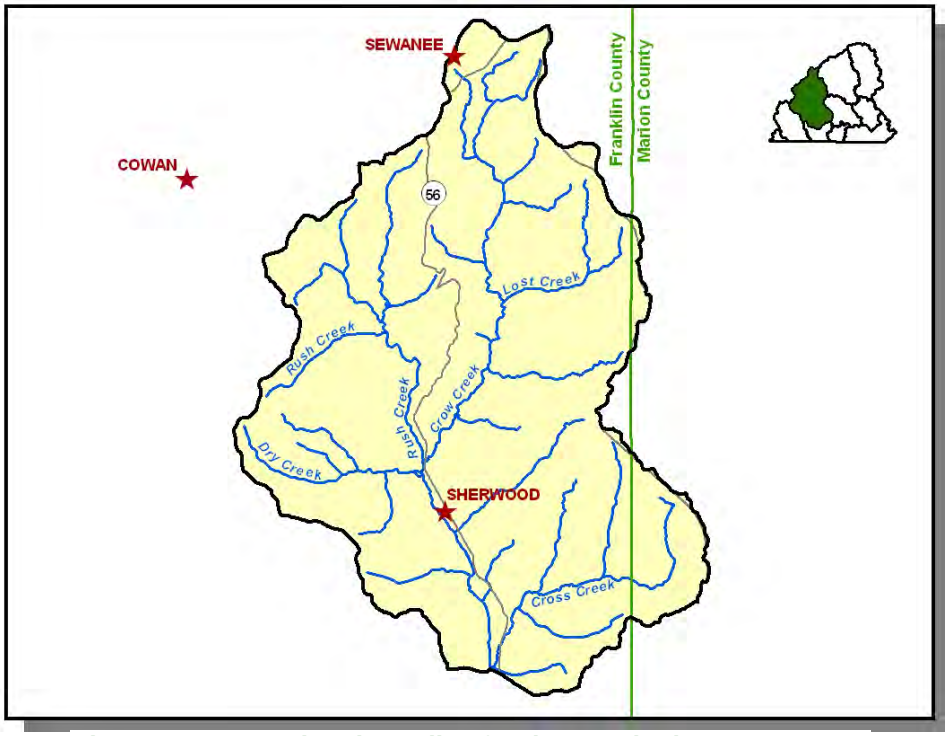


Figure 4-59. Locational Details of Subwatershed 060300010501.

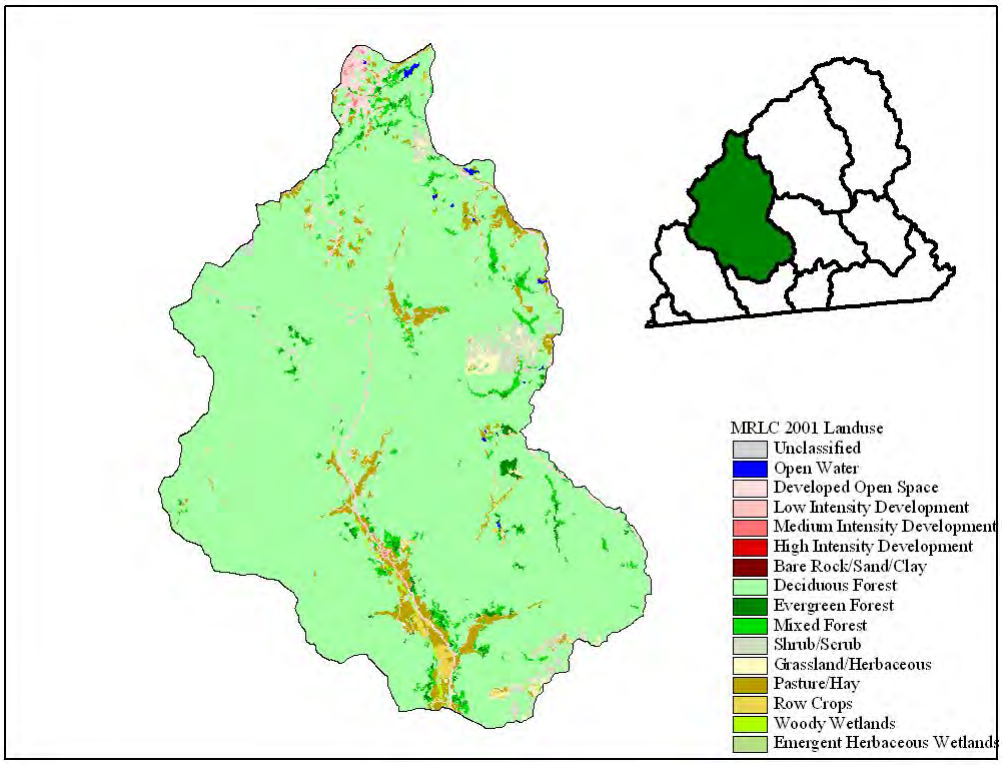


Figure 4-60. Illustration of Land Use Distribution in Subwatershed 060300010501.

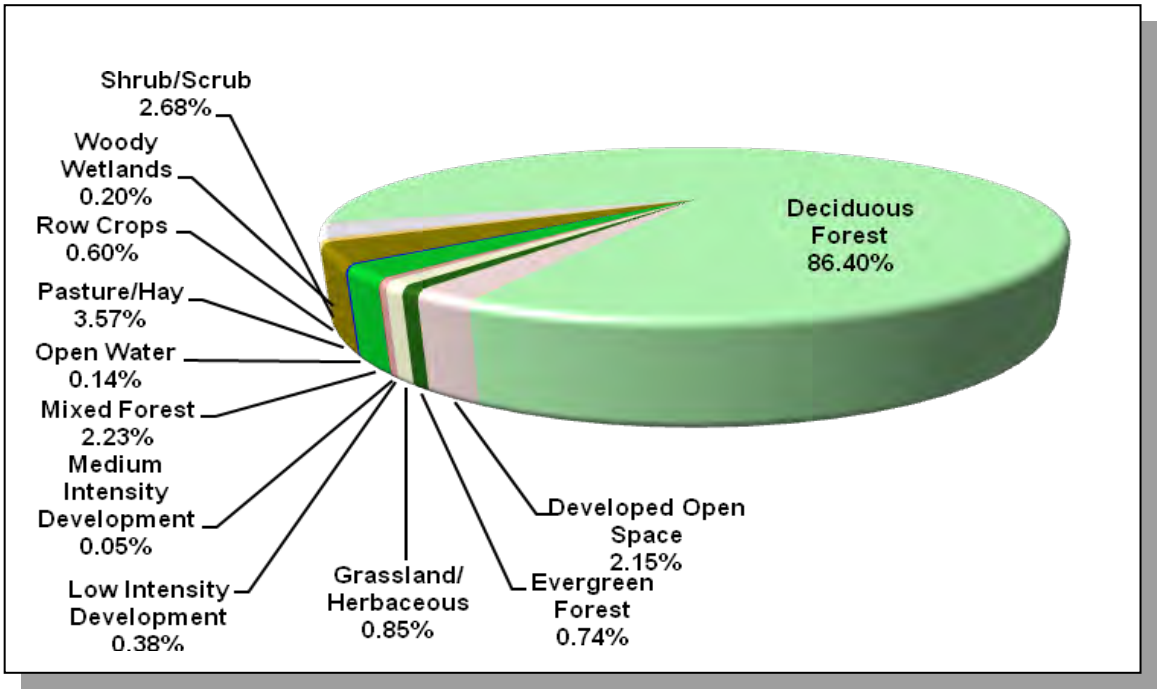


Figure 4-61. Land Use Distribution in Subwatershed 060300010501. *More information is provided in Appendix IV.*

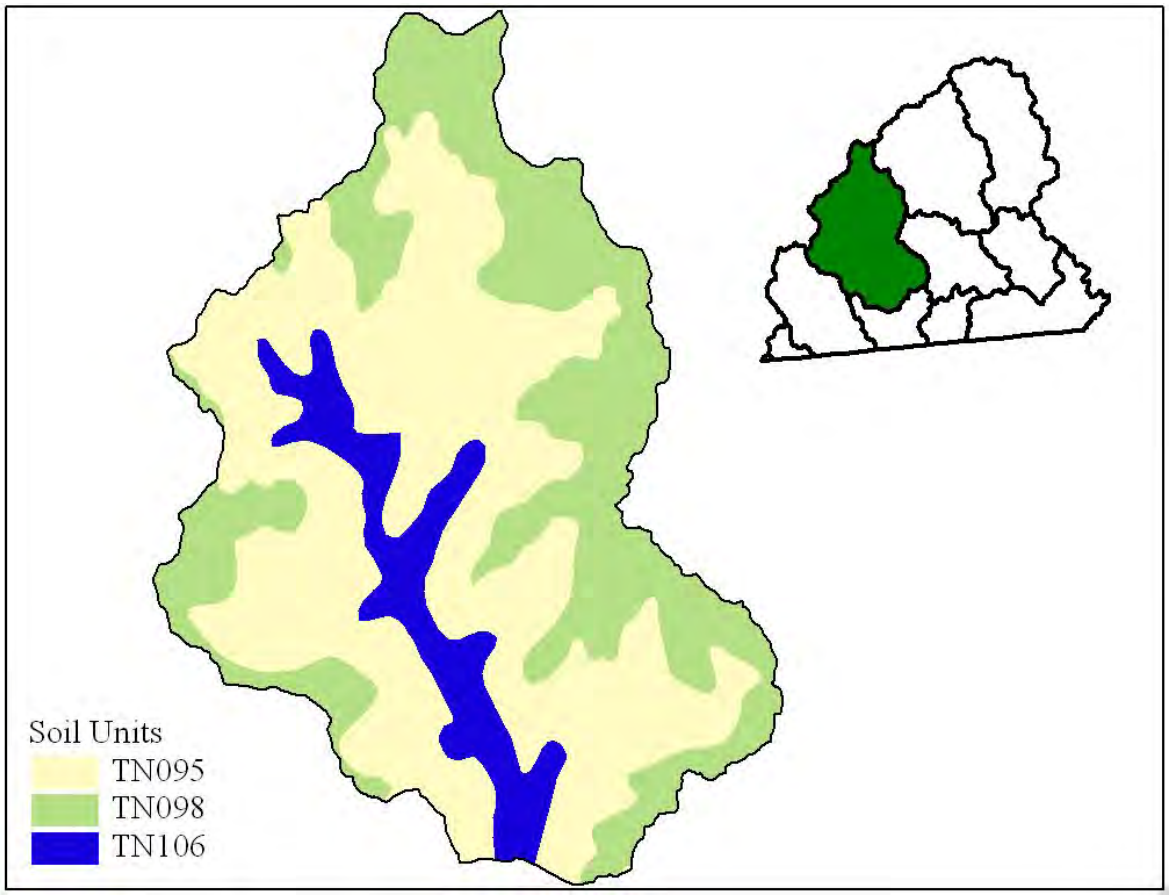


Figure 4-62. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010501.

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
TN106	10.00	C	1.19	5.24	Loam	0.35

Table 4-37. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010501. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Franklin	34,725	37,152	39,270	10.35	3,593	3,844	4,063	13.10
Marion	24,860	26,674	27,776	1.08	267	287	299	12.00
Totals	**59,585**	**63,826**	**67,046**		**3,860**	**4,131**	**4,362**	**13.00**

Table 4-38. Population Estimates in Subwatershed 060300010501.

4.2.G.ii. USGS Gaging Stations and STORET Sites.

There are no USGS continuous record gaging stations located in subwatershed 060300010501.

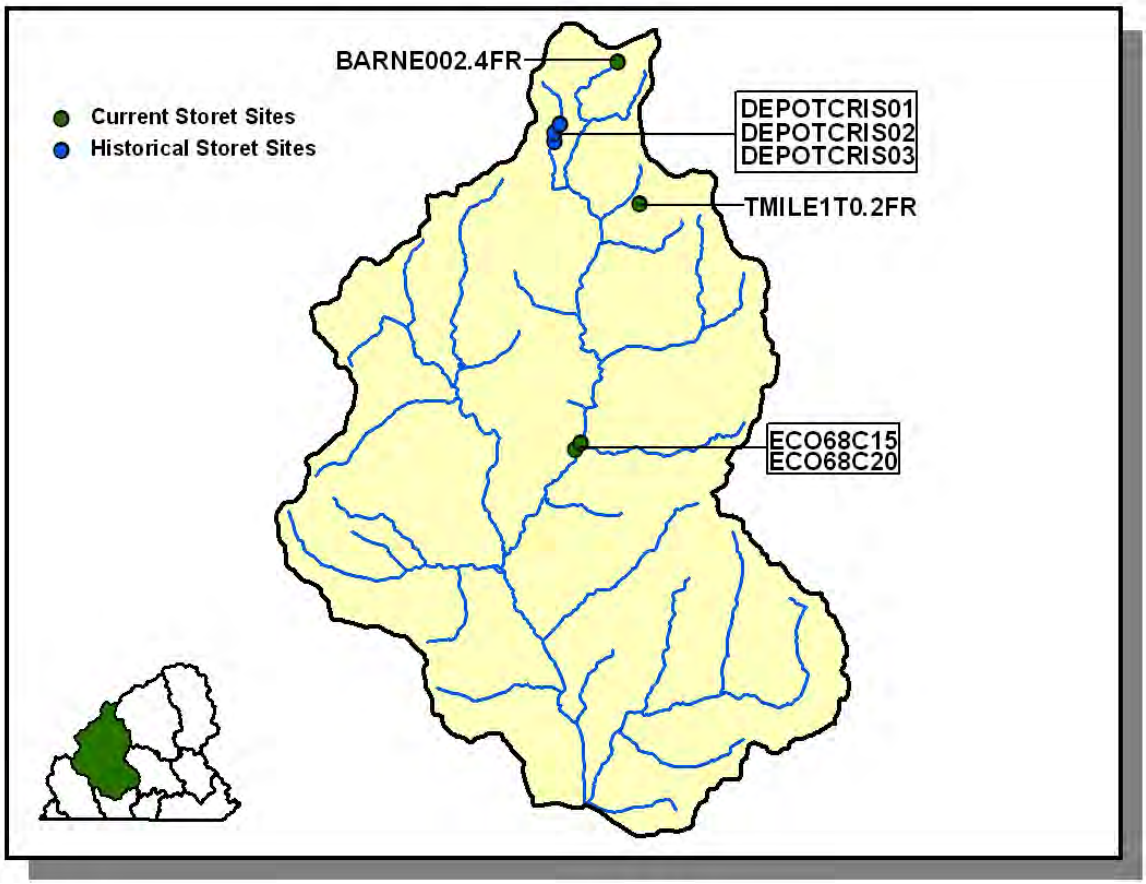


Figure 4-63. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060300010501. *More information, including site names and locations, is provided in Appendix IV.*

4.2.G.iii. Permitted Activities.

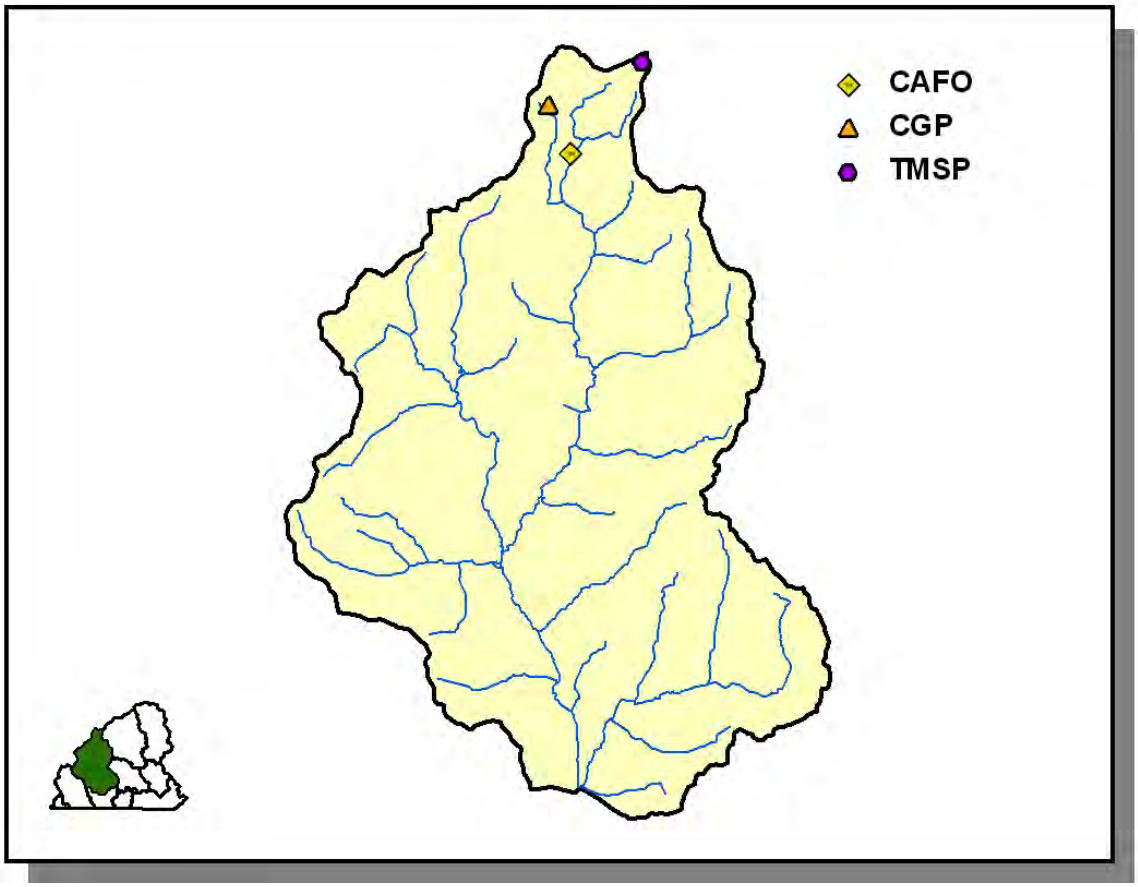


Figure 4-64. Location of Permits Issued in Subwatershed 060300010501. *More information, including the names of facilities, is provided in Appendix IV.*

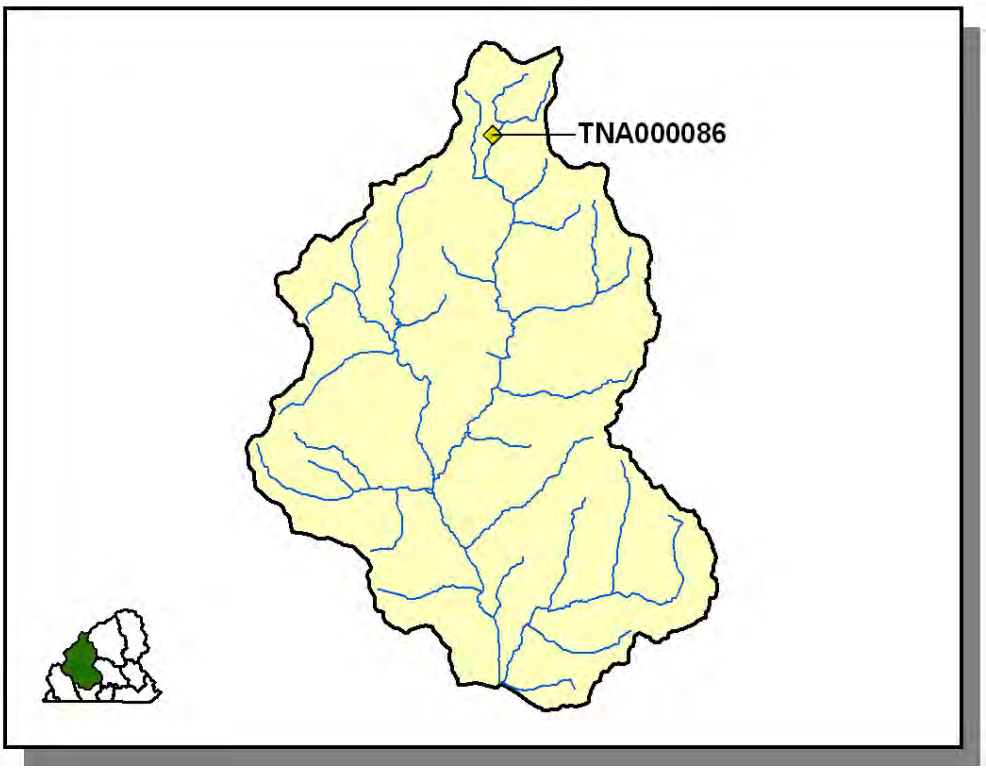


Figure 4-65. Location of CAFO (Concentrated Animal Feel Operation) Permit Sites in Subwatershed 060300010501. *More information, including the names of facilities, is provided in Appendix IV.*

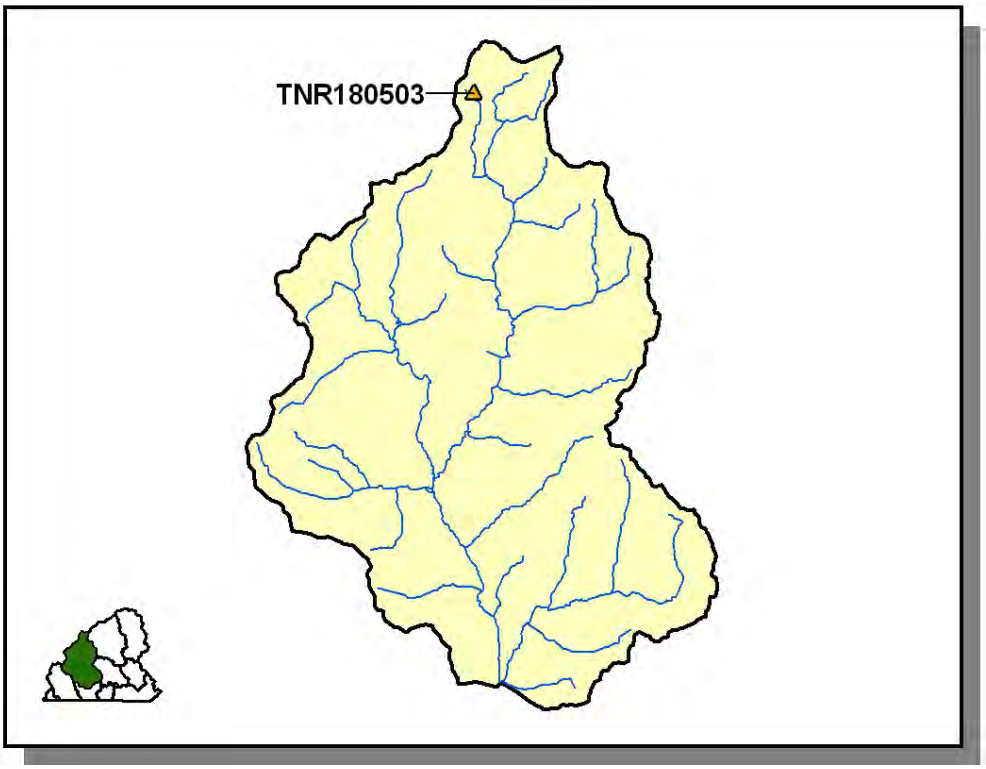


Figure 4-66. Location of CGP (Construction General Permit) Sites in Subwatershed 060300010501. *More information is provided in Appendix IV.*

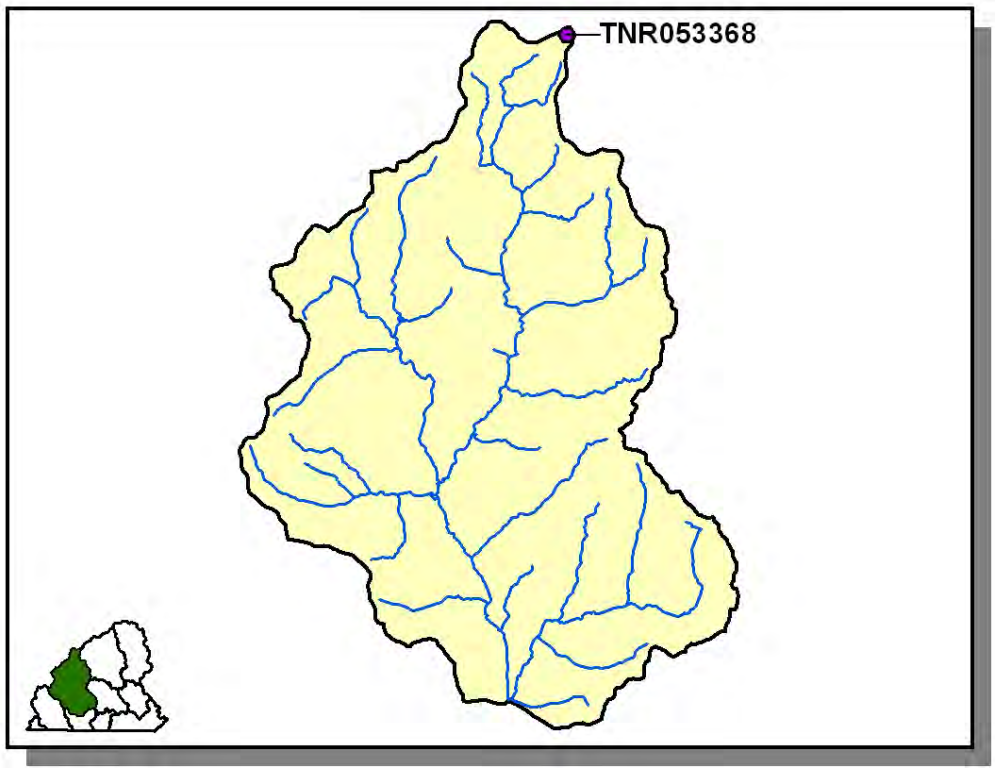


Figure 4-67. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 060300010501. *More information is provided in Appendix IV.*

4.2.G.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Franklin	13,877	30,702	2,999	28	19,333	105
Marion	4,424	8,939	311	246	279	

Table 4-39. Summary of Livestock Count Estimates by 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.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Franklin	183.4	183.0	6.0	28.7

Table 4-40. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Other Vegetable and Truck Crop	7.28
All Other Close Grown Cropland	5.82
Wheat (Close Grown Cropland)	5.55
Corn (Row Crops)	5.40
Soybeans (Row Crops)	3.94
Other Cropland not Planted	2.04
Other (Horticultural)	1.78
Legume (Hayland)	1.64
Grass Forbs Legumes Mixed (Pastureland)	0.50
Grass (Pastureland)	0.35
Farmsteads and Ranch Headquarters	0.13
Conservation Reserve Program Land	0.09
Other Vegetable and Truck Crop	7.28
All Other Close Grown Cropland	5.82

Table 4-41. Annual Estimated Total Soil Loss in Subwatershed 060300010501.

4.2.H. 060300010502 (Crow Creek, Upper).

4.2.H.i. General Description.

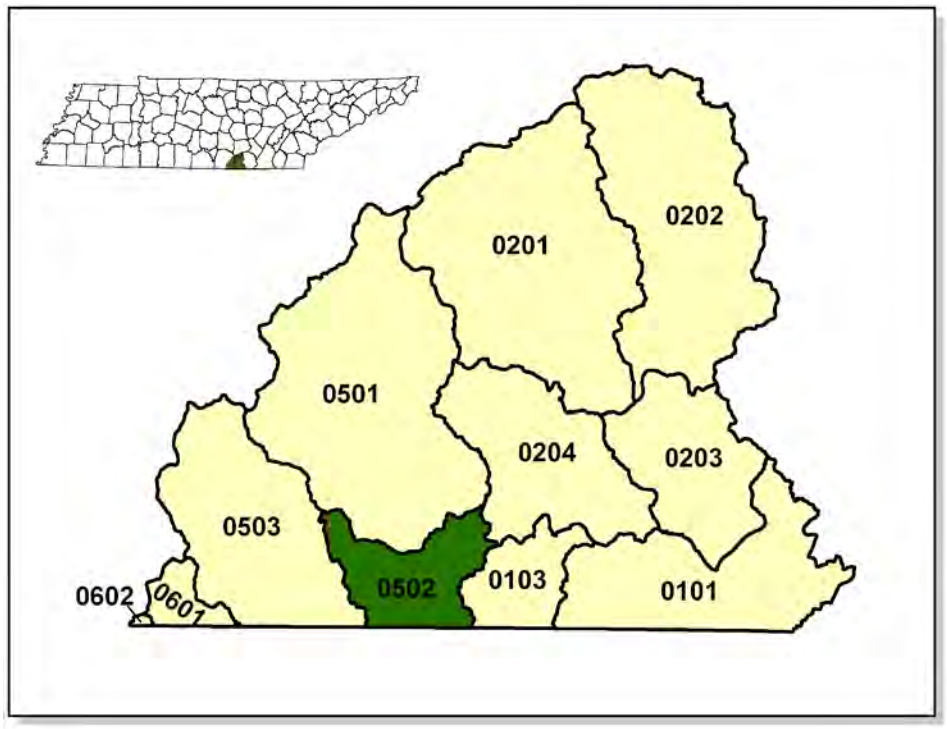


Figure 4-68. Location of Subwatershed 060300010502. *All Guntersville Lake HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

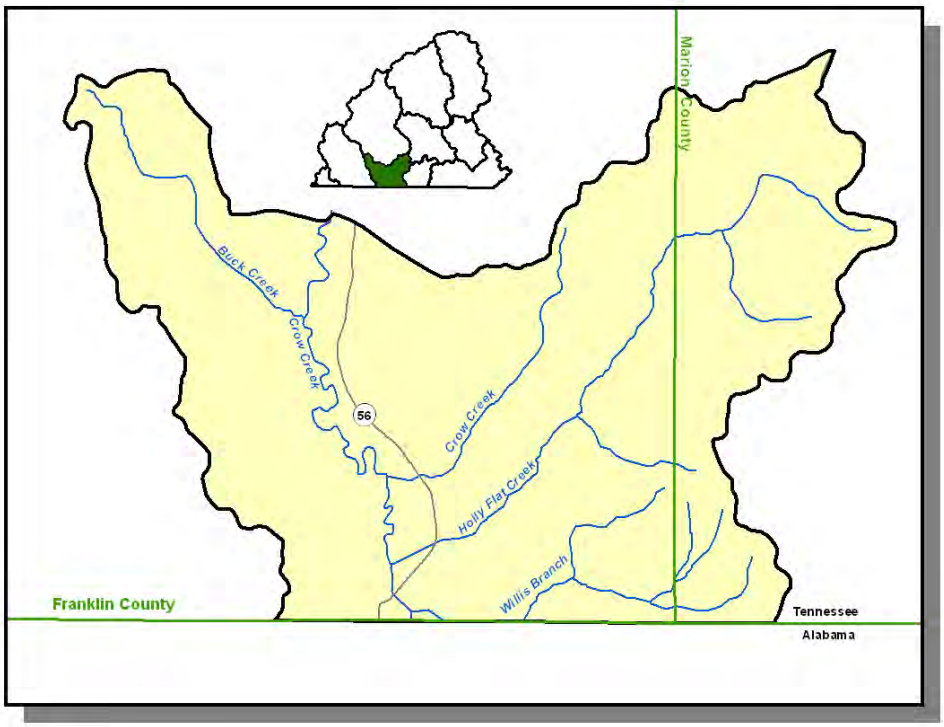


Figure 4-69. Locational Details of Subwatershed 060300010502.

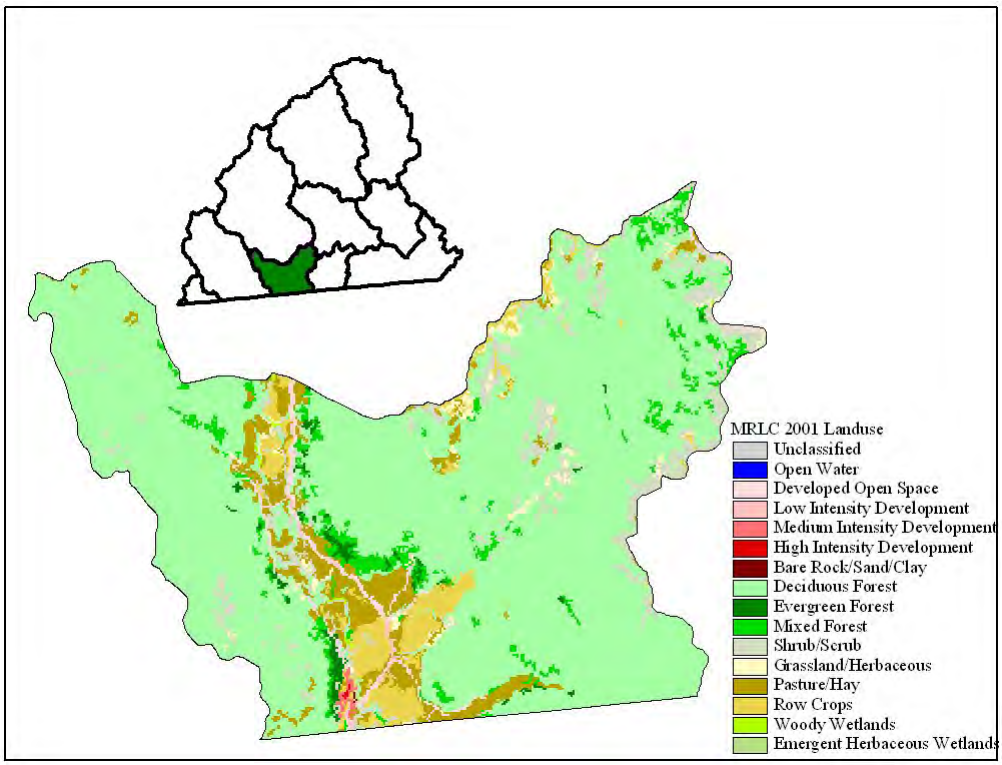


Figure 4-70. Illustration of Land Use Distribution in Subwatershed 060300010502.

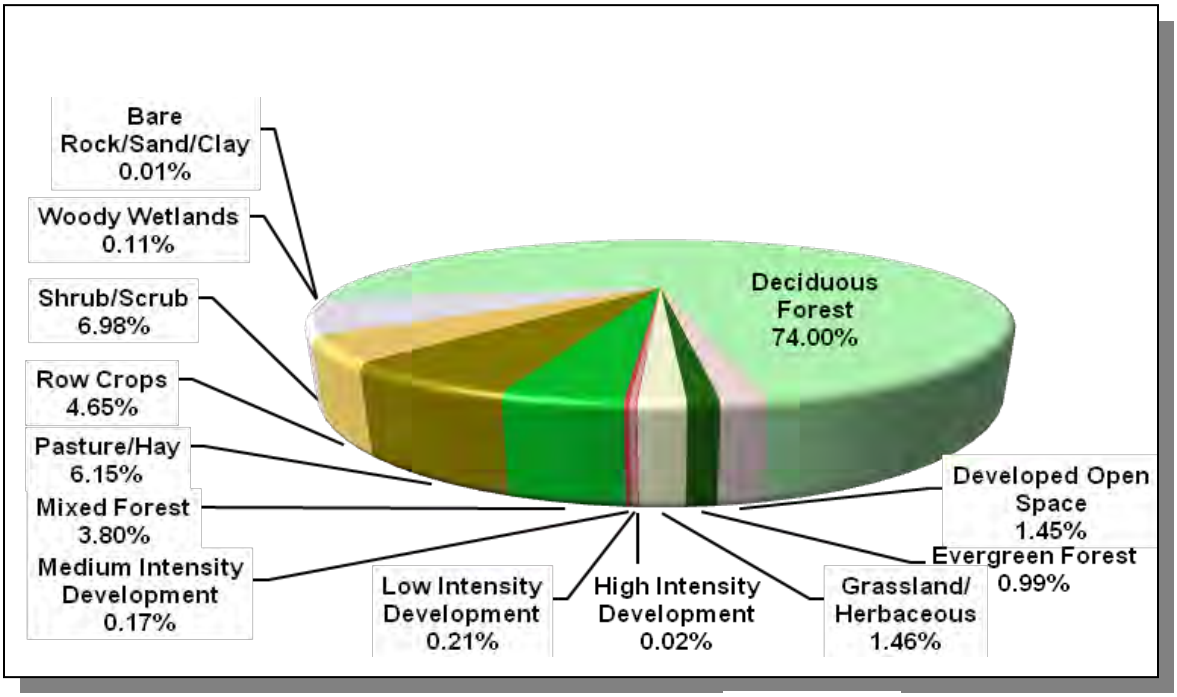


Figure 4-71. Land Use Distribution in Subwatershed 060300010502. *More information is provided in Appendix IV.*

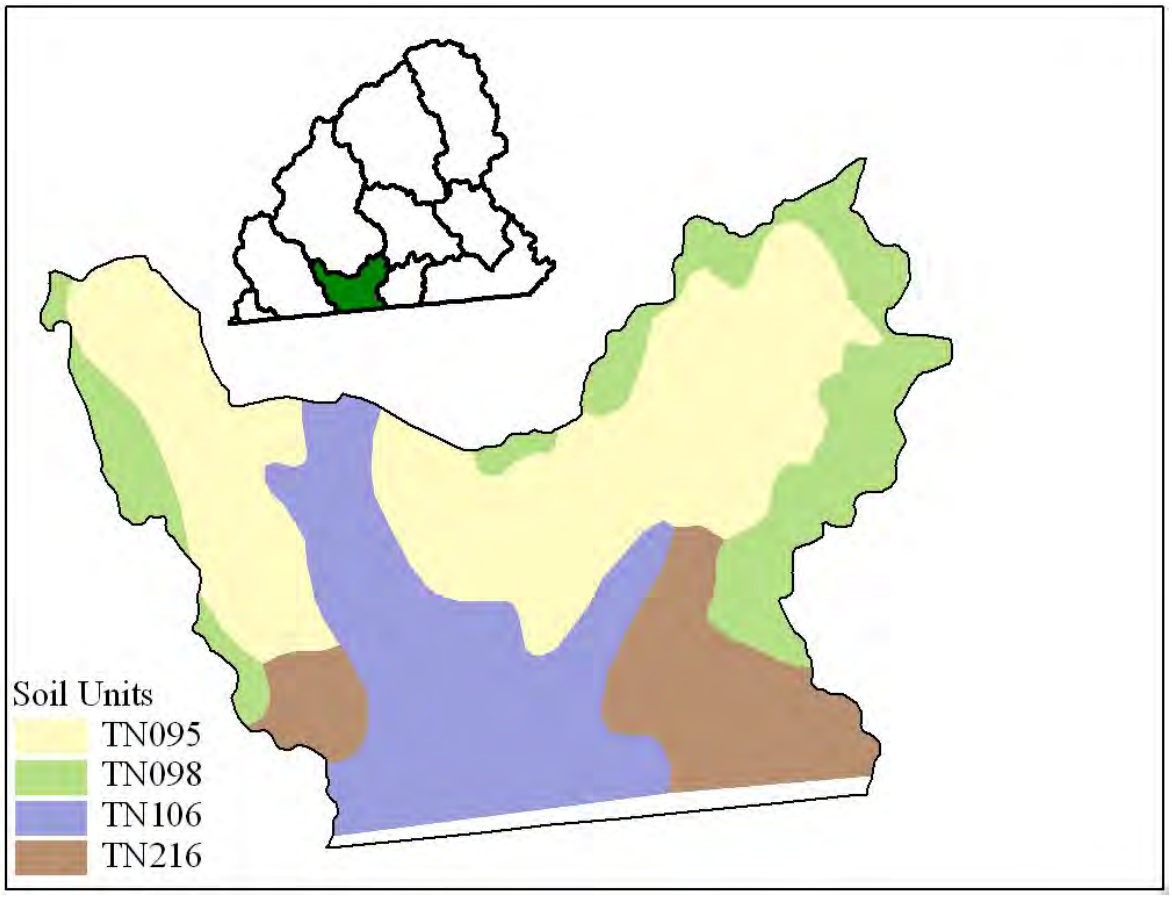


Figure 4-72. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010502.

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
TN106	10.00	C	1.19	5.24	Loam	0.35
TN216	0.00	C	2.51	4.59	Loam	0.25

Table 4-42. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010502. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Franklin	34,725	37,152	39,270	1.86	645	690	729	13.00
Marion	24,860	26,674	27,776	0.94	233	250	261	12.00
Totals	**59,585**	**63,826**	**67,046**		**878**	**940**	**990**	**12.80**

Table 4-43. Population Estimates in Subwatershed 060300010502.

4.2.H.ii. USGS Gaging Stations and STORET Sites.

There are no USGS continuous record gaging stations or STORET sites located in subwatershed 060300010502.

4.2.H.iii. Permitted Activities.

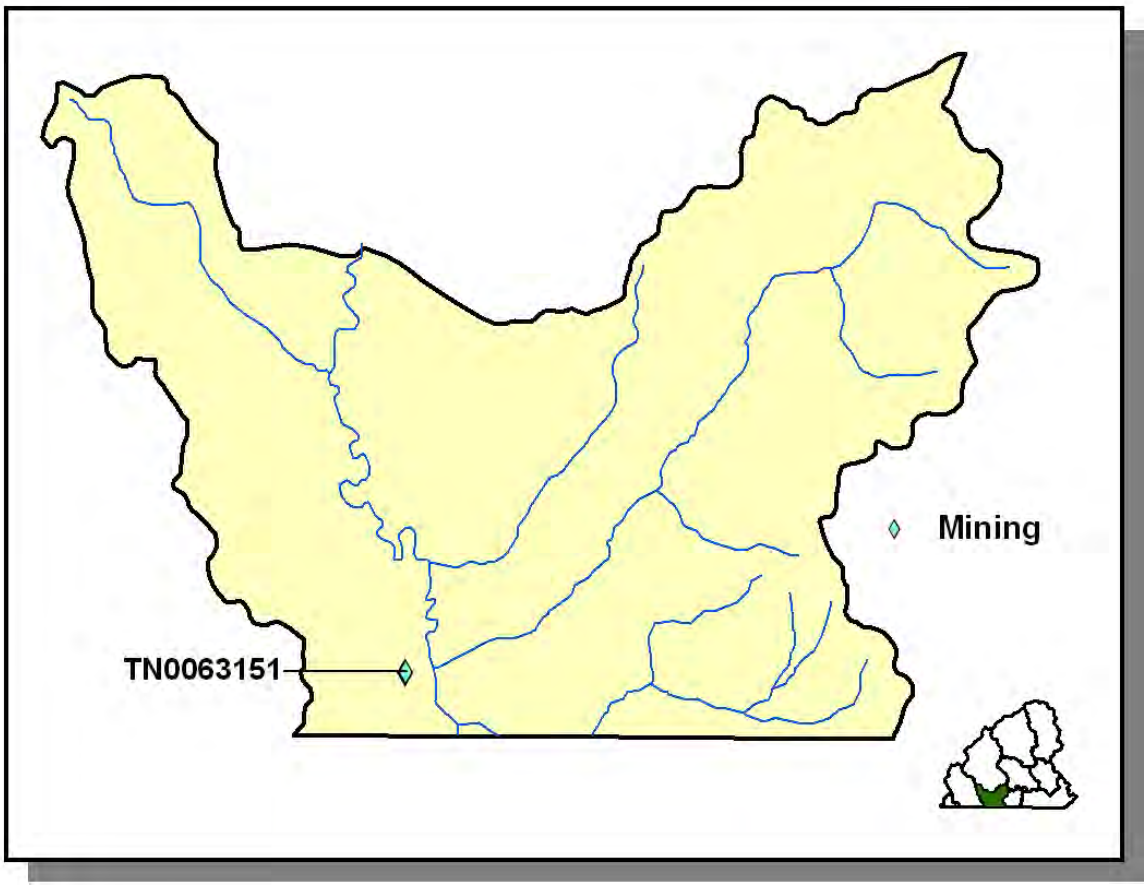


Figure 4-73. Location of Permits Issued in Subwatershed 060300010502. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.H.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Franklin	13,877	30,702	2,999	28	19,333	105
Marion	4,424	8,939	311	246	279	

Table 4-44. Summary of Livestock Count Estimates by 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.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Franklin	183.4	183.0	6.0	28.7

Table 4-45. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Other Vegetable and Truck Crop	7.28
All Other Close Grown Cropland	5.82
Wheat (Close Grown Cropland)	5.55
Corn (Row Crops)	4.93
Soybeans (Row Crops)	4.10
Other Cropland not Planted	2.04
Legume (Hayland)	1.64
Other (Horticultural)	1.40
Grass Forbs Legumes Mixed (Pastureland)	0.45
Grass (Pastureland)	0.42
Farmsteads and Ranch Headquarters	0.15
Conservation Reserve Program Land	0.09

Table 4-46. Annual Estimated Total Soil Loss in Subwatershed 060300010502.

4.2.I. 060300010503 (Little Crow Creek).

4.2.I.i. General Description.

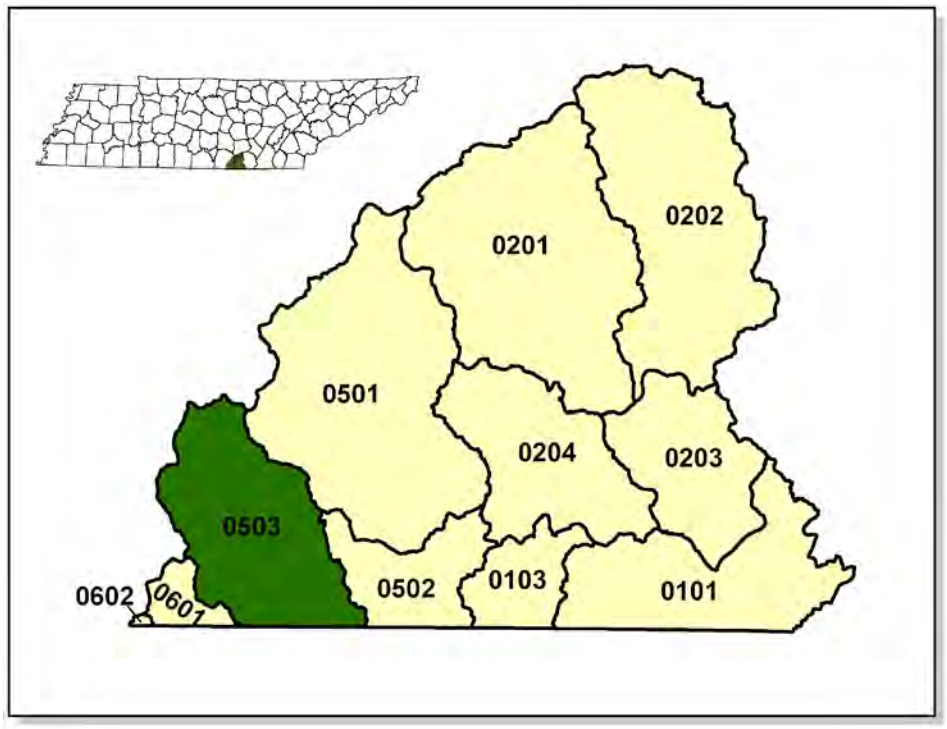


Figure 4-74. Location of Subwatershed 060300010503. *All Guntersville Lake HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

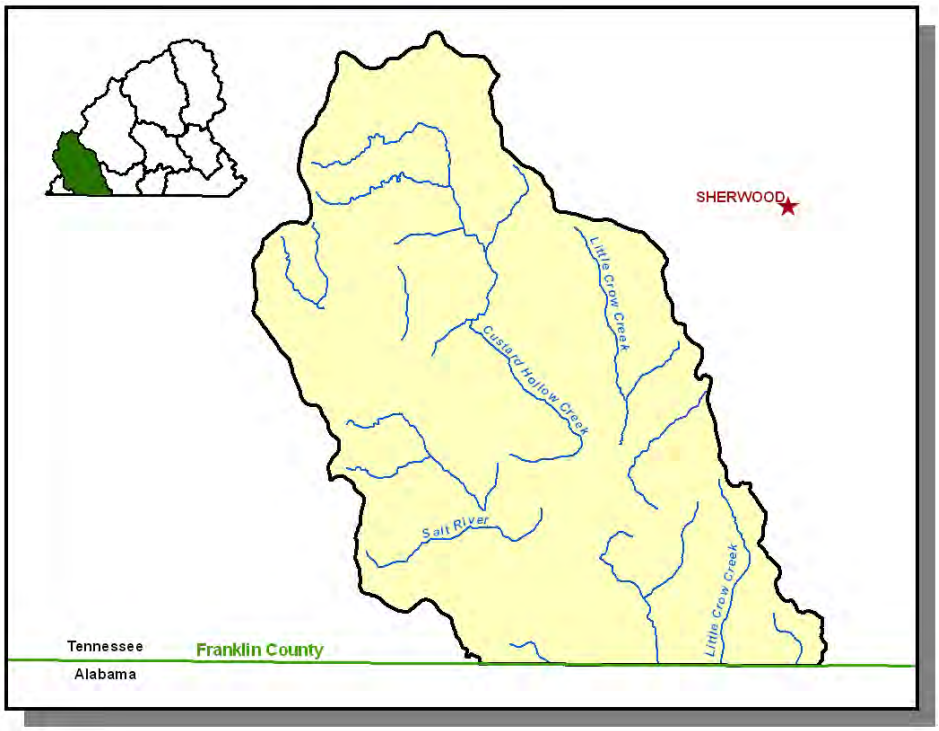


Figure 4-75. Locational Details of Subwatershed 060300010503.

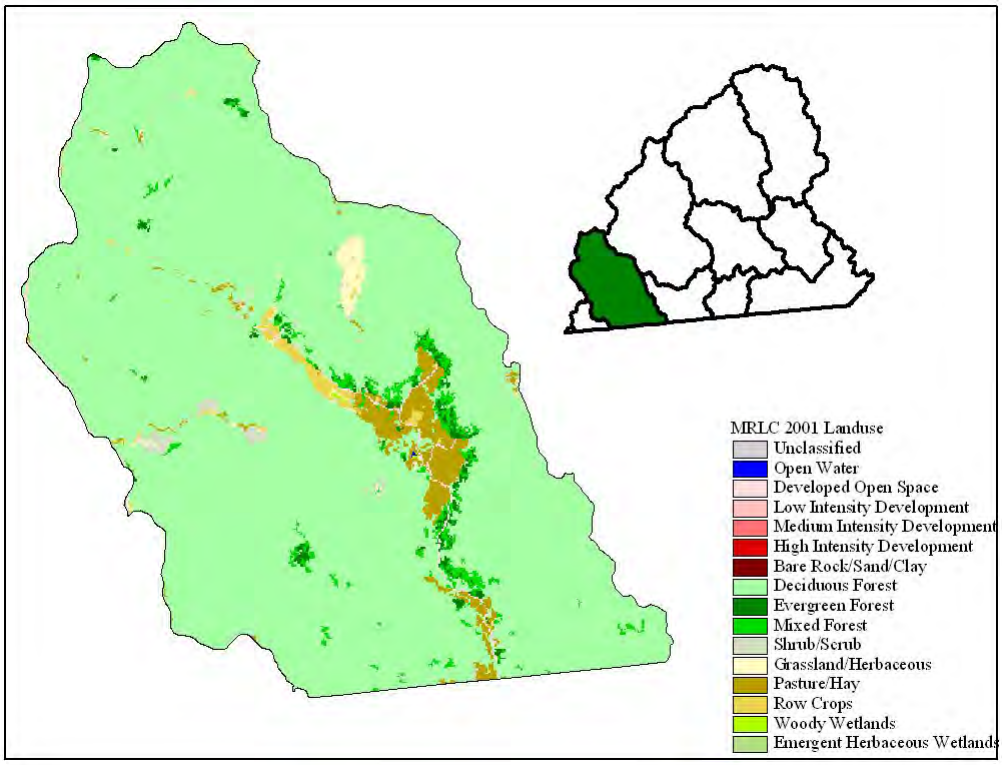


Figure 4-76. Illustration of Land Use Distribution in Subwatershed 060300010503.

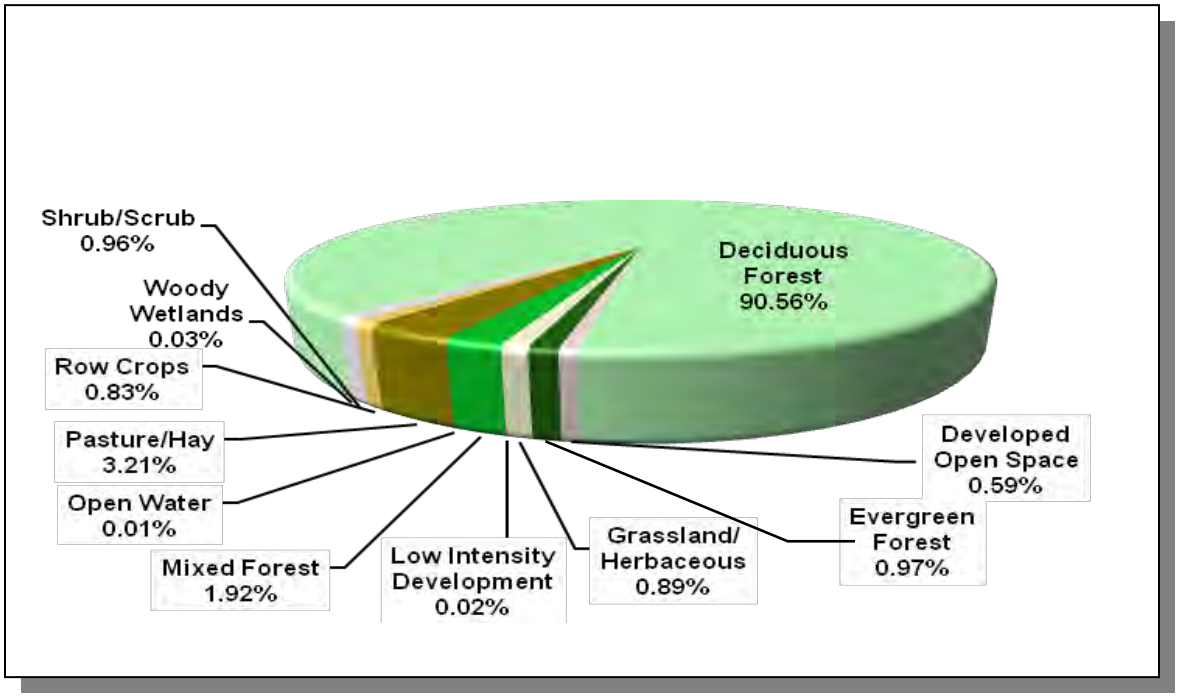


Figure 4-77. Land Use Distribution in Subwatershed 060300010503. *More information is provided in Appendix IV.*

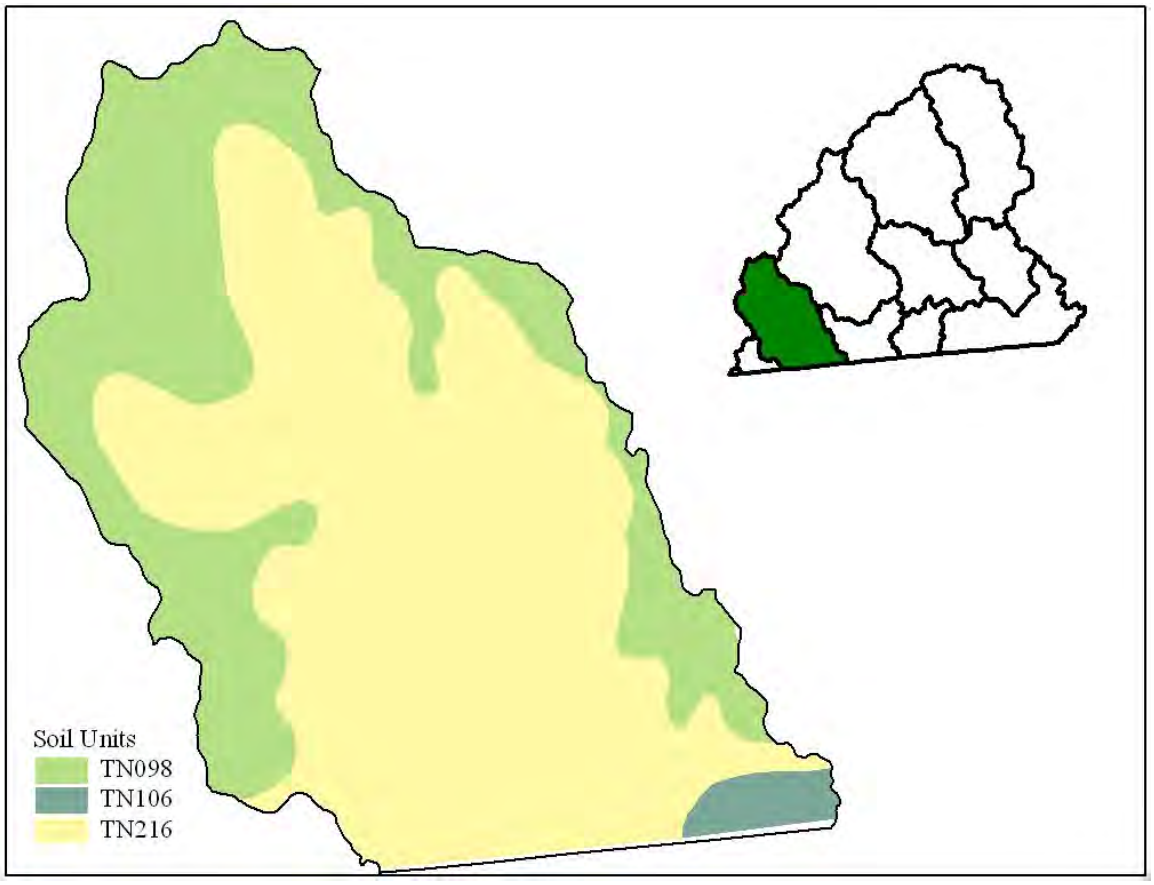


Figure 4-78. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010503.

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
TN106	10.00	C	1.19	5.24	Loam	0.35
TN216	0.00	C	2.51	4.59	Loam	0.25

Table 4-47. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010503. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Franklin	34,725	37,152	39,270	6.26	2,175	2,327	2,460	13.1

Table 4-48. Population Estimates in Subwatershed 060300010503.

4.2.I.ii. USGS Gaging Stations and STORET Sites.

There are no USGS continuous record gaging stations or STORET sites located in subwatershed 060300010503.

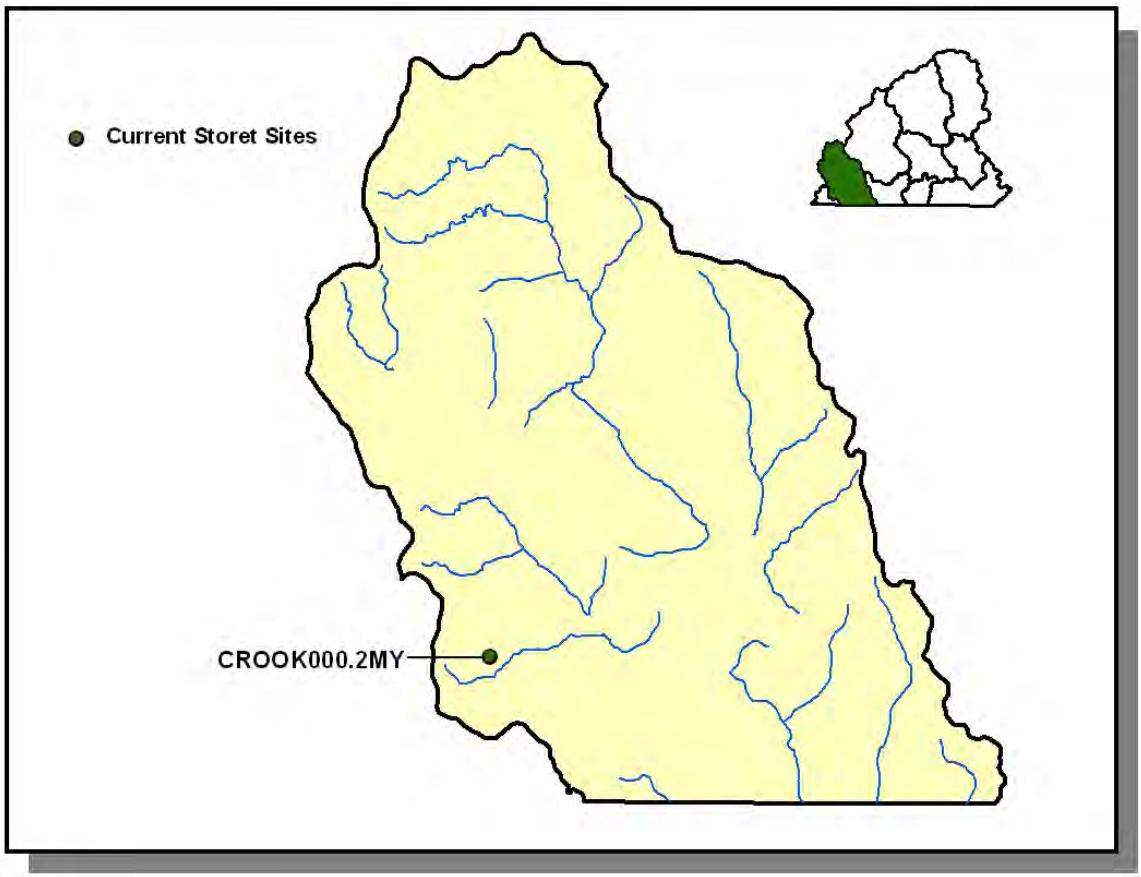


Figure 4-79. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060300010503. *More information, including site names and locations, is provided in Appendix IV.*

4.2.I.iii. Permitted Activities.

There are no permitted activities located in subwatershed 060300010503 as of June 30th, 2007.

4.2.I.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Franklin	13,877	30,702	2,999	28	19,333	105

Table 4-49. Summary of Livestock Count Estimates by 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.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Franklin	183.4	183.0	6.0	28.7

Table 4-50. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
All Other Close Grown Cropland	5.82
Corn (Row Crops)	5.57
Wheat (Close Grown Cropland)	5.55
Soybeans (Row Crops)	3.88
Other Cropland not Planted	2.04
Other (Horticultural)	1.92
Legume (Hayland)	1.64
Grass Forbs Legumes Mixed (Pastureland)	0.52
Grass (Pastureland)	0.32
Farmsteads and Ranch Headquarters	0.13
Conservation Reserve Program Land	0.09

Table 4-51. Annual Estimated Total Soil Loss in Subwatershed 060300010503.

4.2.J. 060300010601 (Little Coon Creek).

4.2.J.i. General Description.

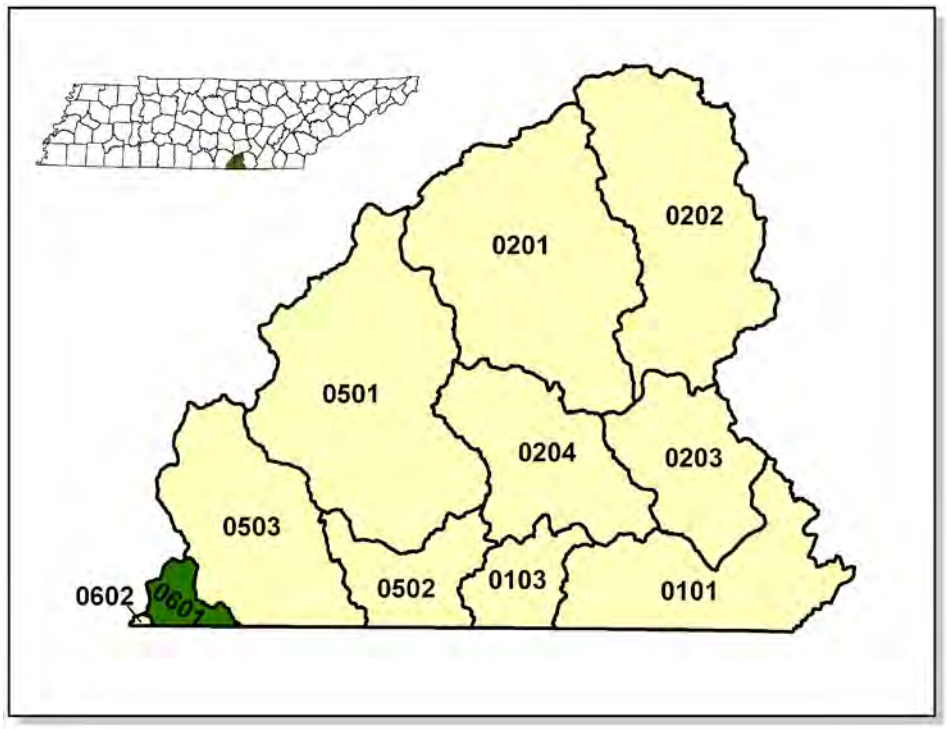


Figure 4-80. Location of Subwatershed 060300010601. *All Guntersville Lake HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

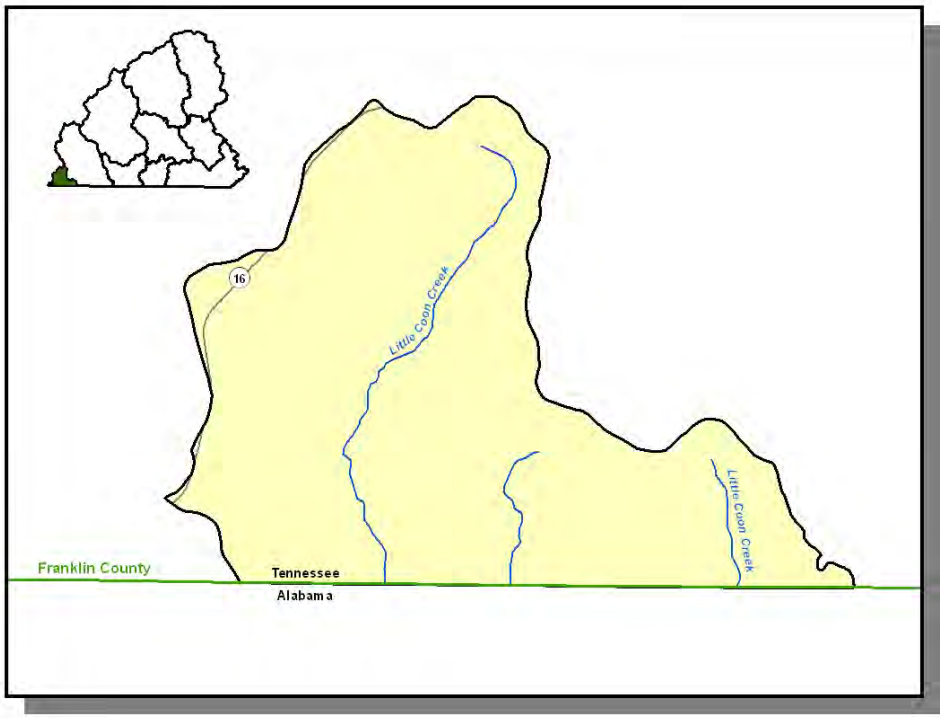


Figure 4-81. Locational Details of Subwatershed 060300010601.

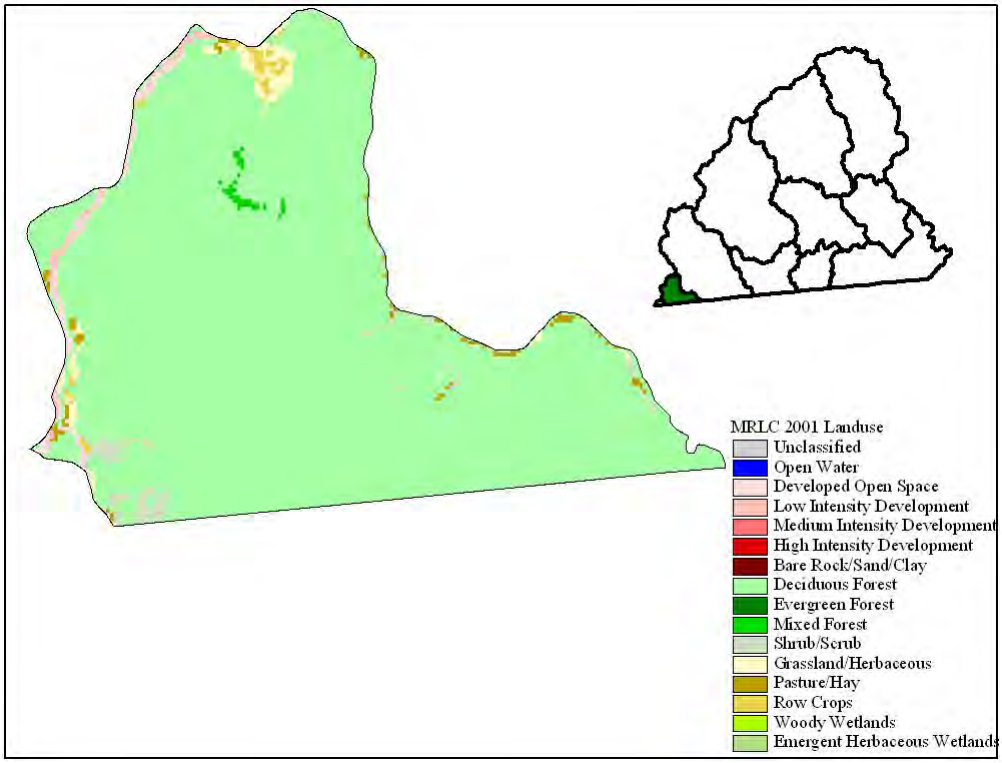


Figure 4-82. Illustration of Land Use Distribution in Subwatershed 060300010601.

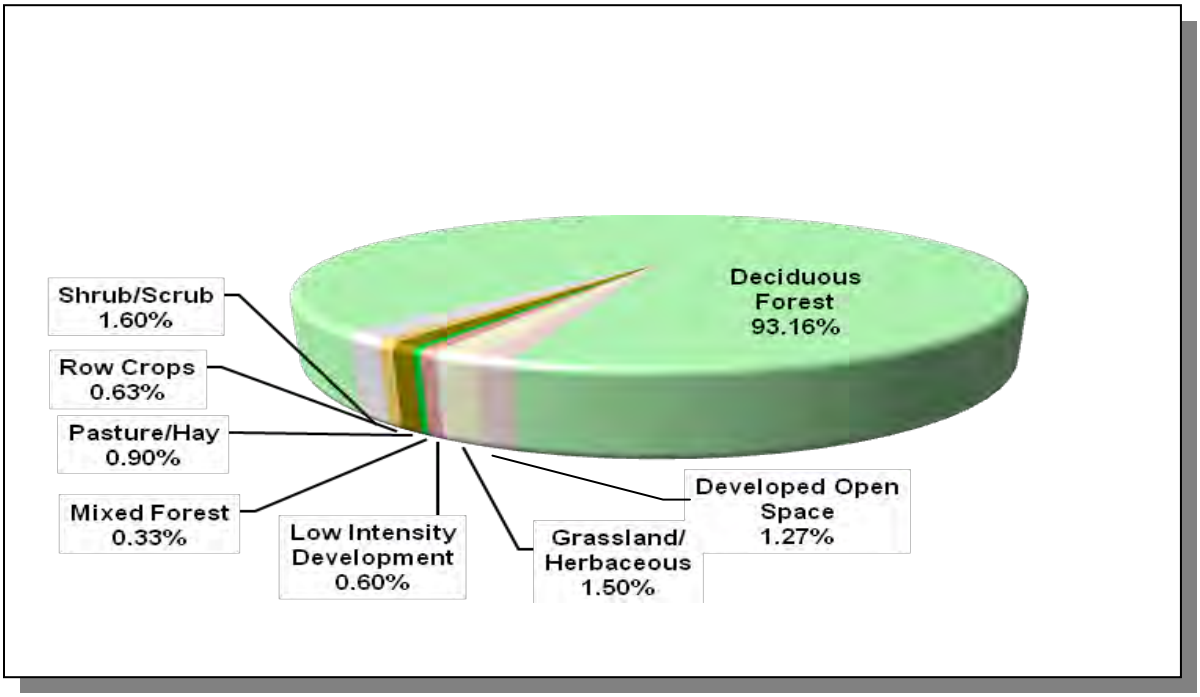


Figure 4-83. Land Use Distribution in Subwatershed 060300010601. *More information is provided in Appendix IV.*

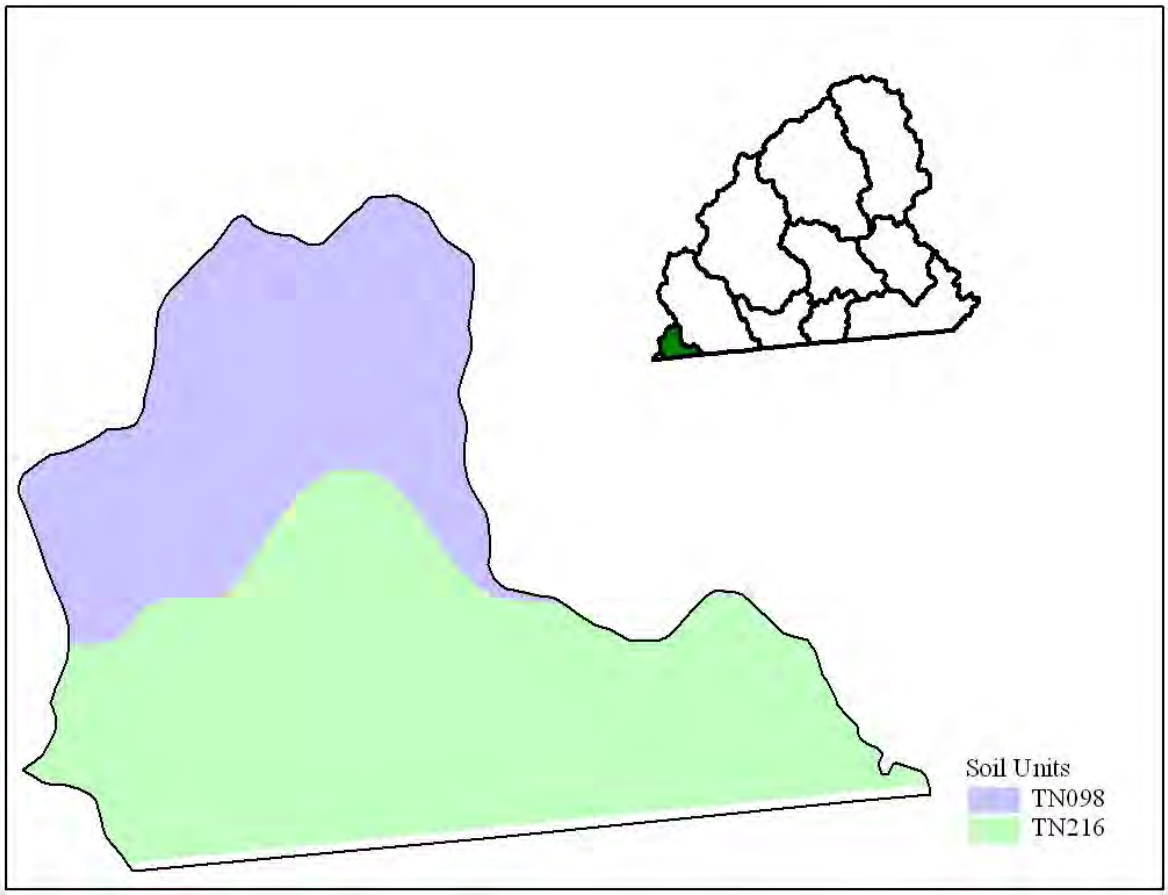


Figure 4-84. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010601.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN098	1.00	C	3.98	4.82	Loam	0.32
TN216	0.00	C	2.51	4.59	Loam	0.25

Table 4-52. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010601. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Franklin	34,725	37,152	39,270	0.65	227	243	257	13.20

Table 4-53. Population Estimates in Subwatershed 060300010601.

4.2.J.ii. USGS Gaging Stations and STORET Sites.

There are no USGS continuous record gaging stations or STORET sites located in subwatershed 060300010601.

4.2.J.iii. Permitted Activities.

There are no permitted activities located in subwatershed 060300010601 as of June 30th, 2007.

4.2.J.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Franklin	13,877	30,702	2,999	28	19,333	105

Table 4-54. Summary of Livestock Count Estimates by 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.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Franklin	183.4	183.0	6.0	28.7

Table 4-55. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
All Other Close Grown Cropland	5.82
Corn (Row Crops)	5.57
Wheat (Close Grown Cropland)	5.55
Soybeans (Row Crops)	3.88
Other Cropland not Planted	2.04
Other (Horticultural)	1.92
Legume (Hayland)	1.64
Grass Forbs Legumes Mixed (Pastureland)	0.52
Grass (Pastureland)	0.32
Farmsteads and Ranch Headquarters	0.13
Conservation Reserve Program Land	0.09

Table 4-56. Annual Estimated Total Soil Loss in Subwatershed 060300010601.

4.2.K. 060300010602 (Big Coon Creek).

4.2.K.i. General Description.

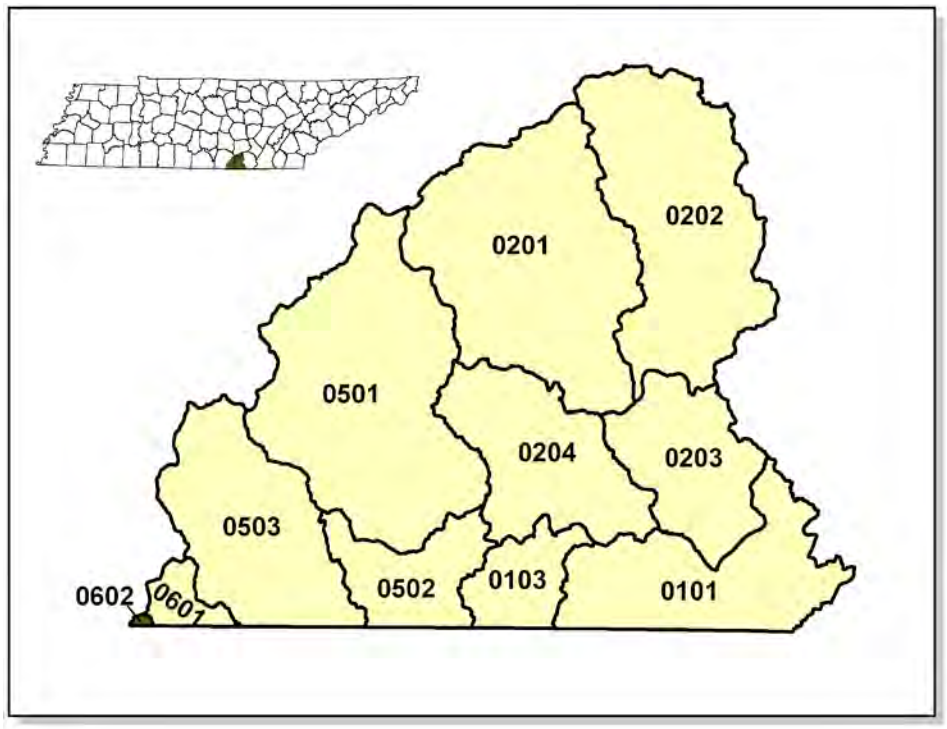


Figure 4-85. Location of Subwatershed 060300010602. *All Guntersville Lake HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

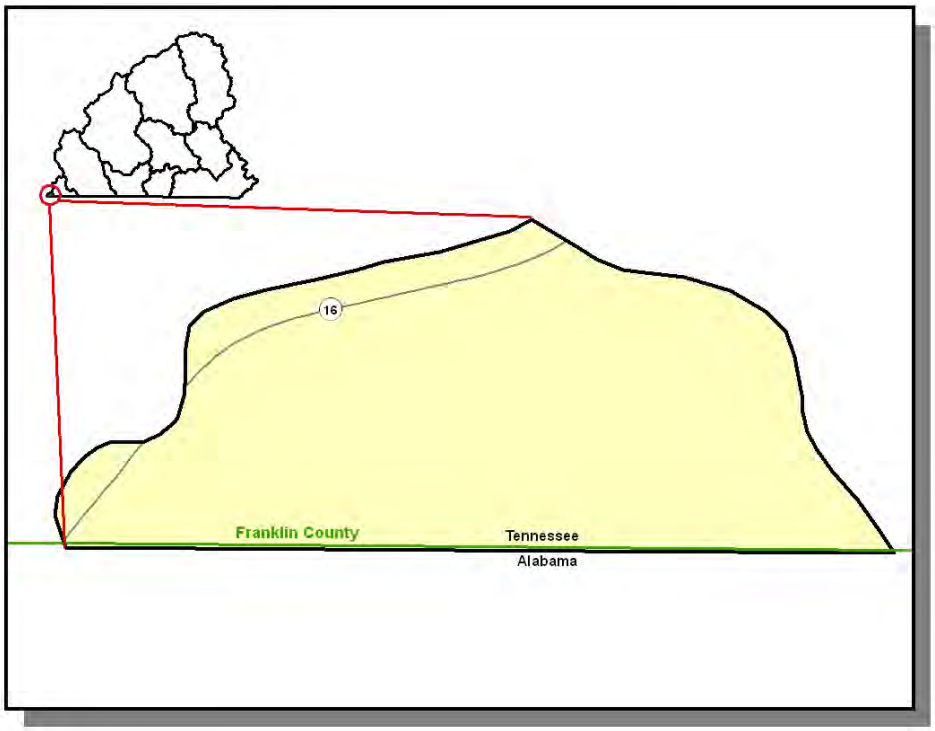


Figure 4-86. Locational Details of Subwatershed 060300010602.

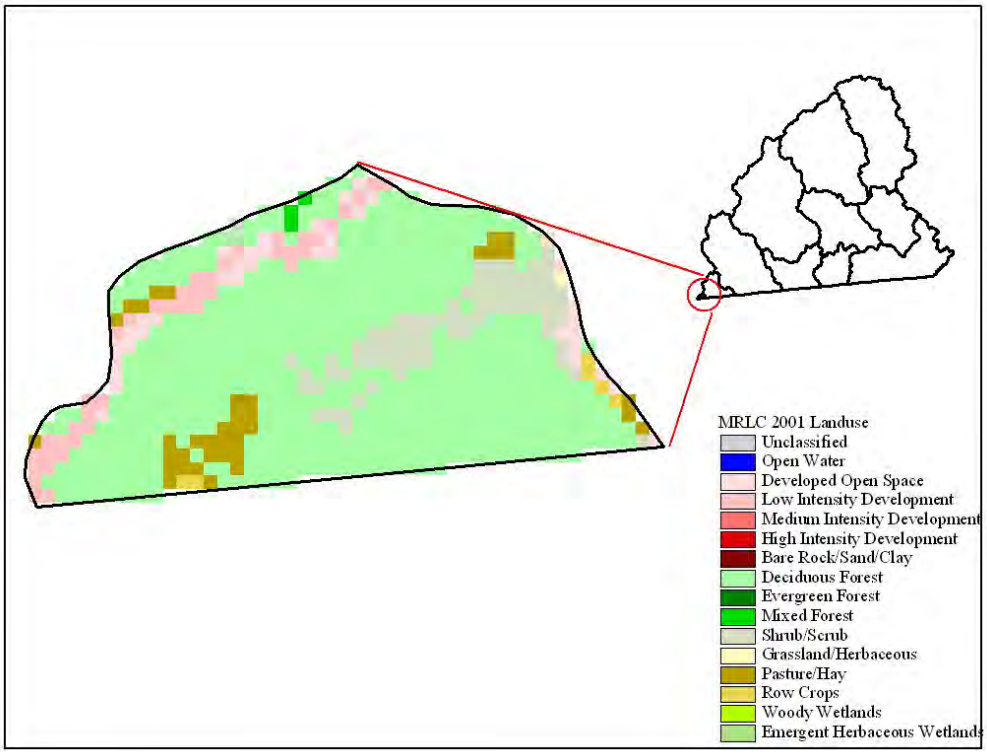


Figure 4-87. Illustration of Land Use Distribution in Subwatershed 060300010602.

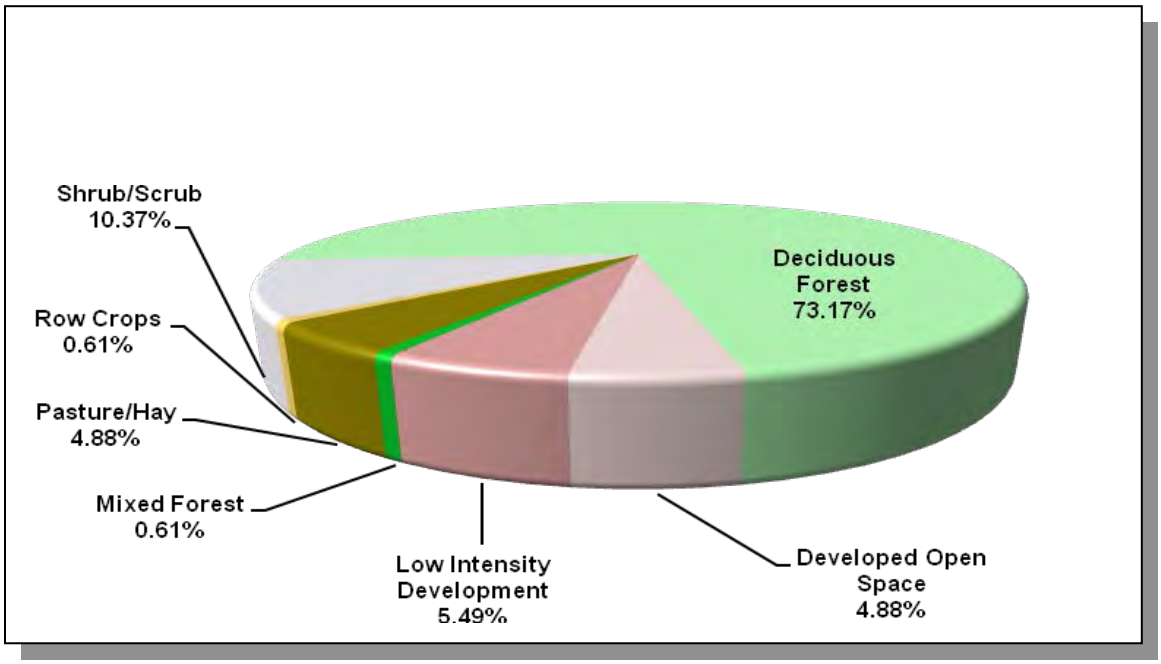


Figure 4-88. Land Use Distribution in Subwatershed 060300010602. *More information is provided in Appendix IV.*

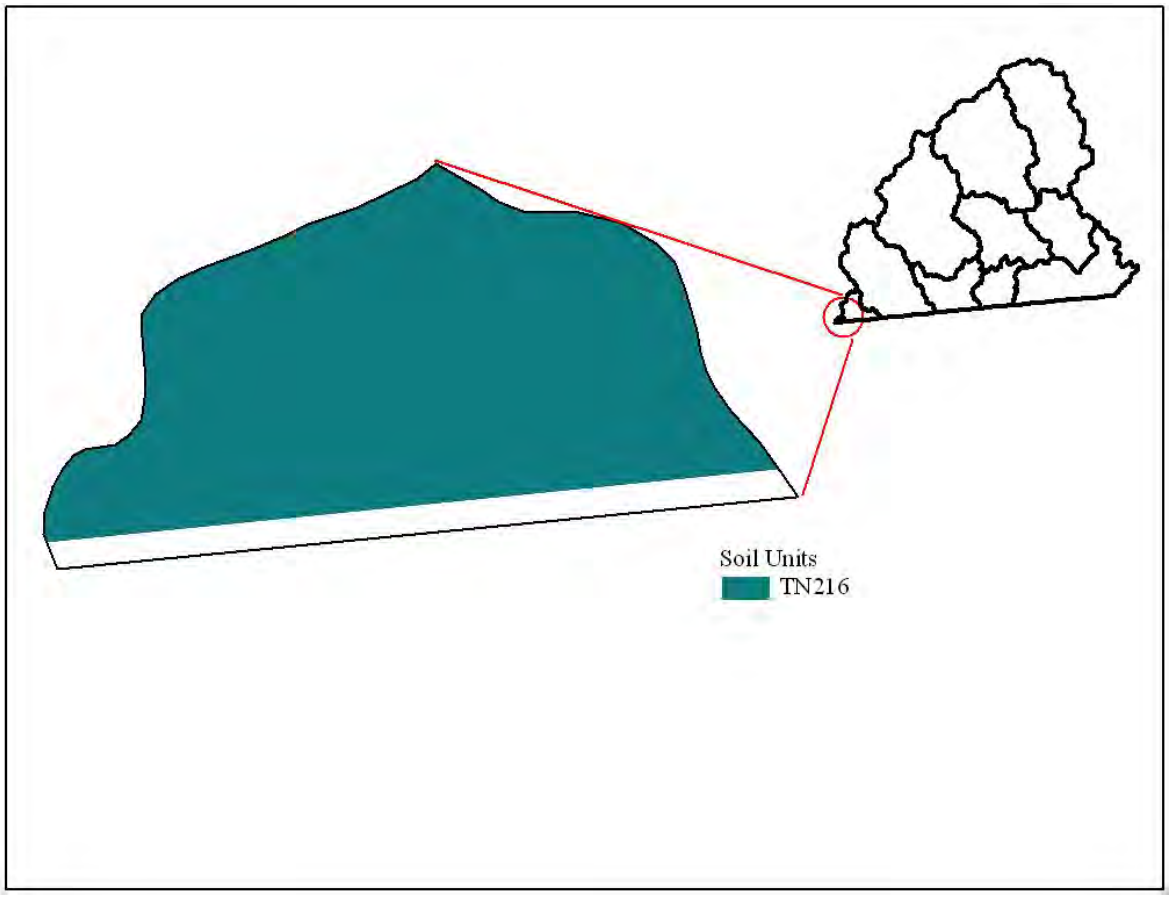


Figure 4-89. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010602.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN216	0.00	C	2.51	4.59	Loam	0.25

Table 4-57. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060300010602. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Franklin	34,725	37,152	39,270	<1	<25	<25	<25	0.0

Table 4-58. Population Estimates in Subwatershed 060300010602.

4.2.K.ii. USGS Gaging Stations and STORET Sites.

There are no USGS continuous record gaging stations or STORET sites located in subwatershed 060300010602.

4.2.K.iii. Permitted Activities.

There are no permitted activities located in subwatershed 060300010602 as of June 30th, 2007.

4.2.K.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Franklin	13,877	30,702	2,999	28	19,333	105

Table 4-59. Summary of Livestock Count Estimates by 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.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Franklin	183.4	183	6	28.7

Table 4-60. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
All Other Close Grown Cropland	5.82
Corn (Row Crops)	5.57
Wheat (Close Grown Cropland)	5.55
Soybeans (Row Crops)	3.88
Other Cropland not Planted	2.04
Other (Horticultural)	1.92
Legume (Hayland)	1.64
Grass Forbs Legumes Mixed (Pastureland)	0.52
Grass (Pastureland)	0.32
Farmsteads and Ranch Headquarters	0.13
Conservation Reserve Program Land	0.09

Table 4-61. Annual Estimated Total Soil Loss in Subwatershed 060300010602.

CHAPTER 5

WATER QUALITY PARTNERSHIPS IN THE GUNTERSVILLE LAKE 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 Tennessee portion of the Guntersville Lake 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 the 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	Acres
Conservation Buffers	3
Erosion Control	280
Nutrient Management	585
Pest Management	758
Grazing / Forages	688
Tree and Shrub Practices	1445
Tillage and Cropping	144
Wildlife Habitat Management	1068

Table 5-1. Landowner Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Guntersville Lake Watershed. *Data are from PRMS for October 1, 2002 through September 30, 2006 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.

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,
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 partners 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.

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 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 also other rare species that are under threat. Early intervention preserves management options and minimizes the cost of recovery.

In a partnership with The Nature Conservancy (TNC), Tennessee Wildlife Resources Agency (TWRA), and Tennessee Department of Environment and Conservation (TDEC) Division of Natural Areas, 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.

The following federally endangered (E), threatened (T), and candidate (C) species occur in the Tennessee portion of the Guntersville Lake Watershed: painted snake coiled forest snail (painted disc) (*Anguispira picta*) (T); Sequatchie caddisfly (*Glyphopsyche*

sequatchie) (C); snail darter (*Percina tanasi*) (T); pink mucket (*Lampsilis abrupta*) (E); American hart's-tongue fern (*Asplenium scolopendrium var. americanum*) (T); Price's potato-bean (*Apios priceana*) (T); and white fringeless orchid (*Platanthera integrilabia*) (C). Eggert's sunflower (*Helianthus eggertii*) (T) was formally removed from the list of federally endangered and threatened species in September 2005. Populations will be monitored for five years. For a complete listing of endangered and threatened species in Tennessee, please visit the Service's website at *http://www.fws.gov/cookeville/*

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, stream bank 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 Cookeville Ecological Services Field Office at 931/528-6481 or visit their website at *http://www.fws.gov/cookeville/*

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 7 multidisciplinary Watershed Teams located throughout the Valley. These 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. These teams work in partnership with business, industry, government agencies, and community groups to manage, protect, and improve the quality of the Tennessee River and its tributaries. TVA also operates a comprehensive monitoring program to provide real-time information to the Watershed Teams and other entities about the conditions of these resources.

The following is a summary of TVA's resource stewardship activities in the Guntersville Lake Watershed.

Monitoring

Reservoir Monitoring

Reservoir Ecological Health - TVA's Reservoir Ecological Health Monitoring program is designed to provide the necessary information from five key ecological indicators (dissolved oxygen, chlorophyll, fish community, benthic macroinvertebrates, and sediment contaminants) to evaluate the current "health" or integrity of Tennessee Valley reservoirs and provide data for comparing future water quality conditions. These data support decision-making by water resource managers inside and outside TVA and help inform the public and increase their involvement in water resource improvement activities.

A part of this monitoring program has been to communicate the data in an easily understandable format. TVA's approach has been to use a Reservoir Ecological Health Score. The ecological health scoring process is designed such that 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). To arrive at an overall health evaluation for a reservoir, the sum of the ratings from all sites are totaled, divided by the maximum possible rating for that reservoir, and expressed as a percentage.

TVA monitors ecological conditions at 69 sites on 31 reservoirs. Samples are taken at up to four locations, depending on the reservoir's size. Physical and chemical monitoring is conducted on an annual basis while biological and sediment indicators are monitored every other year unless a substantial change is detected. If a substantial

change is detected, the indicators on that reservoir are monitored the next year to determine if the change was temporary.

Public and Industrial Water Supplies - Adequate water of good quality is essential for sustained population growth and economic development. In conjunction with routine water quality monitoring efforts conducted as part of Reservoir Ecological Health Monitoring, TVA collects additional water samples to be analyzed for parameters of interest to public and industrial water supplies. The purpose of these additional collections is to provide data for use in citing new water supply facilities and determining appropriate design for treatment components. Also, data are available to domestic water suppliers to assist in water treatment operations and diagnosis of abnormal conditions. By combining with routine monitoring, TVA can make these valuable data available to others and incur only the incremental cost associated with laboratory analyses.

More information about TVA's Reservoir Ecological Health Monitoring can be obtained by visiting TVA's website at http://www.tva.gov/environment/ecohealth/ or by writing Tyler Baker at tfbaker@tva.gov.

Bacteriological Monitoring - Recreation is one of TVA's major objectives of the integrated river resource management system. TVA develops, maintains, and promotes public use of several recreational sites. Increased public knowledge about bacterial contamination has heightened the interest in bacteriological levels in recreational waters by both TVA and our stakeholders. Each summer, TVA tests about 250 swimming areas and informal water contact recreational sites throughout the Tennessee Valley for *Escherichia coli* (*E. coli*) bacteria. These sites include those operated by TVA and many operated by other agencies. The site list is reexamined annually by the appropriate watershed teams and other TVA organizations to ensure the most heavily used sites are monitored. Bacteriological water sampling is conducted between Memorial Day and Labor Day when people are most likely to be recreating. Data from this sampling effort is shared with states agencies.

More information about bacteriological monitoring can be obtained by visiting TVA's website at http://www.tva.gov/environment/ecohealth or by writing Kristy Gottfried at kgottfri@tva.gov.

Fish Flesh Toxic Contaminants - State agencies are responsible for advising the public of health risks from eating contaminated fish. TVA assists the states by collecting fish from TVA reservoirs and major tributary streams and checking the tissue for metals, pesticides, PCBs, and other chemicals that could affect human health.

More information on fish tissue monitoring can be obtained by visiting TVA's website at http://www.tva.gov/environment/ecohealth/ or by writing Jason Yarbrough at jyarbrough@tva.gov.

Spring Sport Fish Survey - TVA conducts its annual Spring (March through early June) Sport Fish Survey to help determine the number, age, and general health of black bass and crappie populations in TVA reservoirs. Survey results are used by TVA and state agencies to protect and improve sport fisheries in TVA reservoirs. The survey includes twelve 30-minute electrofishing runs covering the various habitat types present. The fish are temporarily stunned, netted, weighed, measured, and then released.

Additionally, TVA invites media and private citizens to participate in the annual surveys. It provides the public a chance to interact with resource managers and learn how and why this work is conducted. The annual schedule for the Spring Sport Fish Survey is posted on TVA's external website and published in regional media sources in February each year. Participants sign up for specific reservoirs of interest. Most participants gain a better understanding and appreciation of the science involved in managing fisheries as well as the opportunity to see various types of fish that exist in these reservoirs. A summary of data collected each year, organized by reservoir, is available to the public on TVA's website.

More information about TVA's Spring Sportfish Survey can be obtained by visiting TVA's website at http://www.tva.gov/environment/water/catchfaq.htm or by writing Donny Lowery at drlowery@tva.gov.

Sport Fishing Index Ratings - To help anglers decide where they have the best chance of catching their favorite types of fish, TVA and state fisheries agencies have created a Sport Fishing Index that reflects fishing quality for different species in TVA reservoirs.

The Sport Fishing Index scores for different species are based both on population measures (the size and health of 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 Sport Fishing Index score ranges from a high of 60 (excellent) to a low of 20 (very poor).

Scores for specific TVA reservoirs can be viewed at:
http://www.tva.gov/environment/water/sportfish.htm. For additional questions, email Greg Shaffer at gshaffer@tva.gov.

Stream Bioassessment

Conditions of water resources in streams are measured using three independent methods; Index of Biotic Integrity (IBI), number of mayfly, stonefly, and caddisfly taxa (EPT), and Habitat Assessment. Not all of these tools are used at each stream sample site.

Stream assessments support TVA's Watershed Operations that consists of seven watershed teams charged with protecting and restoring water quality in the Tennessee Valley. TVA's objective is to characterize the quality of water resources within a watershed, which is referenced by its 11-digit Hydrologic Unit Code (HUC). Assessments are used to prioritize HUCs for stream restoration projects, monitor stream restoration project success and measure TVA's Resource Stewardship's environmental performance.

Sites are typically located in the lower end of sub-watersheds and at intervals on the mainstem to integrate the effects of land use. Eight hundred and sixty-nine stream stations are sampled to assess ecological condition of 547 eleven digit HUCs of the Tennessee Valley. Sites are typically sampled every five years to keep a current picture of watershed condition.

IBI - The index of biotic integrity (IBI) assesses the quality of water resources in flowing water by examining a stream's fish assemblage. Fish are useful in determining long-term (several years) effects and broad habitat conditions because they are relatively long-lived and mobile. 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 reference streams in the region known to be of very high quality. 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. Unlike fish, aquatic insects are useful in determining short-term and localized impacts because they are short-lived and have limited mobility. The method TVA uses involves only qualitative sampling and field identification of (Ephemeroptera (mayflies), (Plecoptera, (stoneflies), and (Trichoptera (caddisflies) to the family taxonomic level. The score for each site is simply the number of EPT families. 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 affect 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 instream, channel, and bank characteristics at a sample site to those expected

at a similar high-quality stream in the region. Each of the stream attributes listed below is given a score of 1 (poorest condition) to 4 (best condition). The habitat score for the sample site is simply the sum of these attributes. Scores can range from a low of 10 to a high of 40.

1. Instream cover (fish)
2. Epifaunal substrate
3. Embeddedness
4. Channel Alteration
5. Sediment Deposition
6. Frequency of Riffle
7. Channel Flow Status
8. Bank vegetation protection - Left bank and right bank, separately
9. Bank stability - Left bank and right bank, separately
10. Riparian vegetation zone width - Left bank and right bank, separately

Details about Stream Bioassessment (sites and scores) can be obtained by writing Charles Saylor at Tennessee Valley Authority, PO Box 920, Ridge Way Road, Norris, TN 37828 or calling him at 865-632-1779. Email him at cfsaylor@tva.gov.

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 springs), 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.

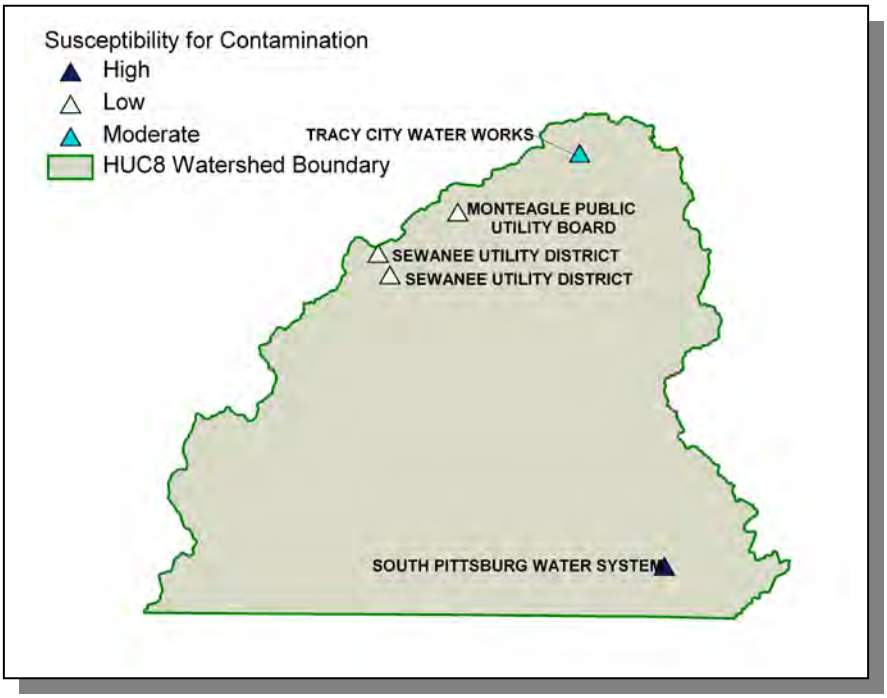


Figure 5-1. Public Water Systems Susceptible to Contamination in the Tennessee Portion of the Guntersville Lake Watershed.

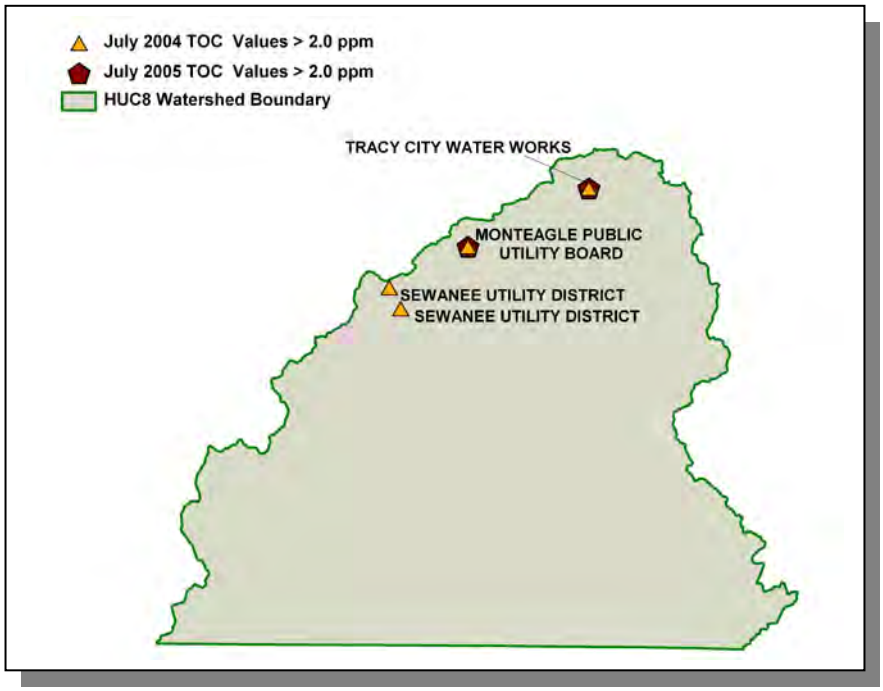


Figure 5-2. July 2004 and 2005 Raw Water Total Organic Carbon (TOC) Analysis in the Tennessee Portion of the Guntersville Lake Watershed.

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://state.tn.us/environment/dws/pdf/2006gw305b.pdf

5.3.B. TDEC Clean Water State Revolving Fund Program. The Division of Water Pollution Control and the Division of Water Supply jointly administer 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 over $675 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.

The SRF Program 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.

Communities in the Tennessee Portion of the Guntersville Lake Watershed that have received Clean Water State Revolving Fund Grants or Loans since the inception of the program are listed in Appendix V. For further information about Tennessee's Clean Water SRF Loan Program, contact the Clean Water SRF Loan Program by telephone at (615) 532-0445 or visit their Web site at http://tennessee.gov/environment/srf.

5.3.C. Tennessee Department of Agriculture. The Tennessee Department of Agriculture's Water Resources Section administers 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 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 Guntersville Lake 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 and C99944674-05-0).

- 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

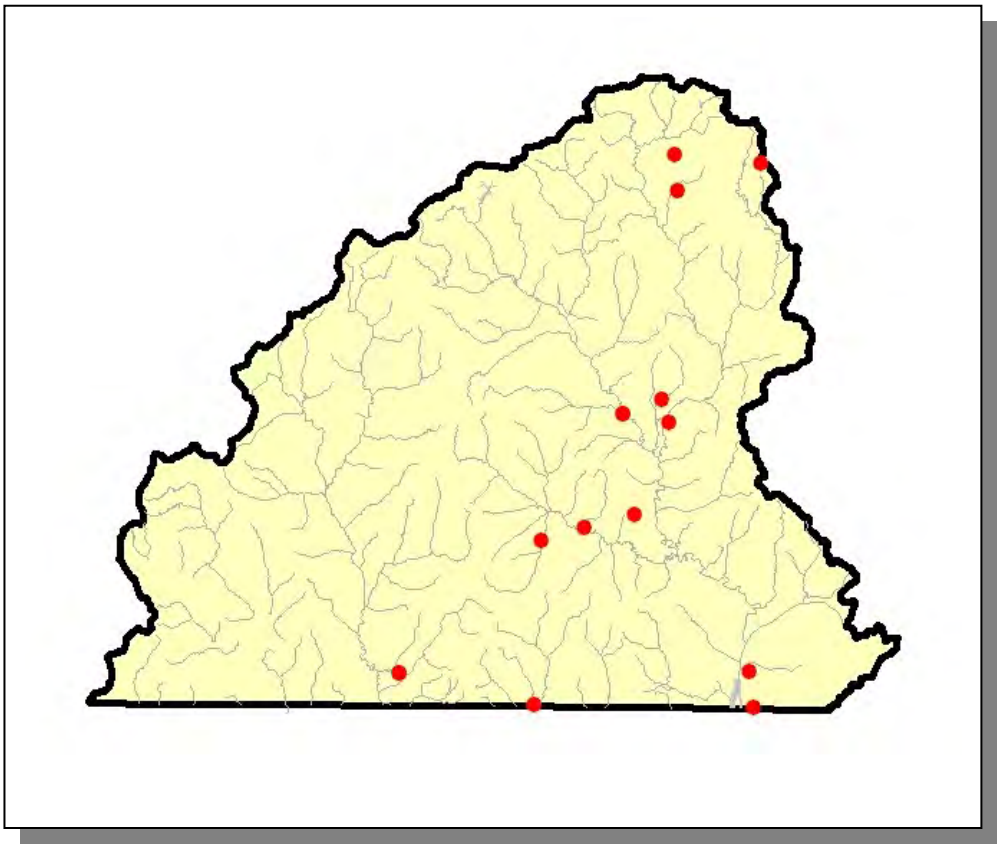


Figure 5-3. Location of BMPs installed from 2002 through 2006 in the Tennessee Portion of the Guntersville Lake Watershed with Financial Assistance from the Tennessee Department of Agriculture's Nonpoint Source and Agricultural Resources Conservation Fund Grant Programs. *More information is provided in Appendix V.*

5.3.D. Tennessee Wildlife Resources Agency. The Tennessee Wildlife Resources Agency (TWRA) conducts a variety of activities related to watershed conservation and management. Fish management activities include documentation of fish and aquatic life through stream sampling and stocking of both warm water and coldwater sportfish. Fish data are managed in the Geographic Information System (GIS) project called Tennessee Aquatic Database System (TADS). TWRA nongame and endangered species projects include restoration of special status fish, aquatic life, and riparian wildlife. The Agency conducts a variety of freshwater mussel management, conservation, and restoration projects including the propagation and reintroduction of species once common in Tennessee streams. TWRA has been involved in riparian conservation projects since 1991 in partnership with state and federal agencies and conservation groups.

The Tennessee Aquatic Database System (TADS)

The Tennessee Aquatic Database System (TADS) originated in the mid-1980's as a geographically referenced fisheries database maintained with ESRI's GIS Arc/Info software. It consists of mapping coverages of streams, rivers and reservoirs along with relatable fisheries data files. These database files include stream and river fish distributions, sample site data, and Index of Biotic Integrity (IBI) data. The fish inventory

data file contains over 15,000 records of fish occurrences from over 3,600 sample sites across the state. Fish data is referenced by river reach and a point coverage generated by latitude and longitude. Physical and chemical data and habitat evaluations from most of the sample sites have been entered into a database.

TWRA Fisheries stream survey data were consolidated, updated and entered into a Microsoft Access database to create the Tennessee Aquatic Database System 07 (TADS07), an updated version of the TADS. TADS07 contains fisheries stream survey data from 1987 to 2005.

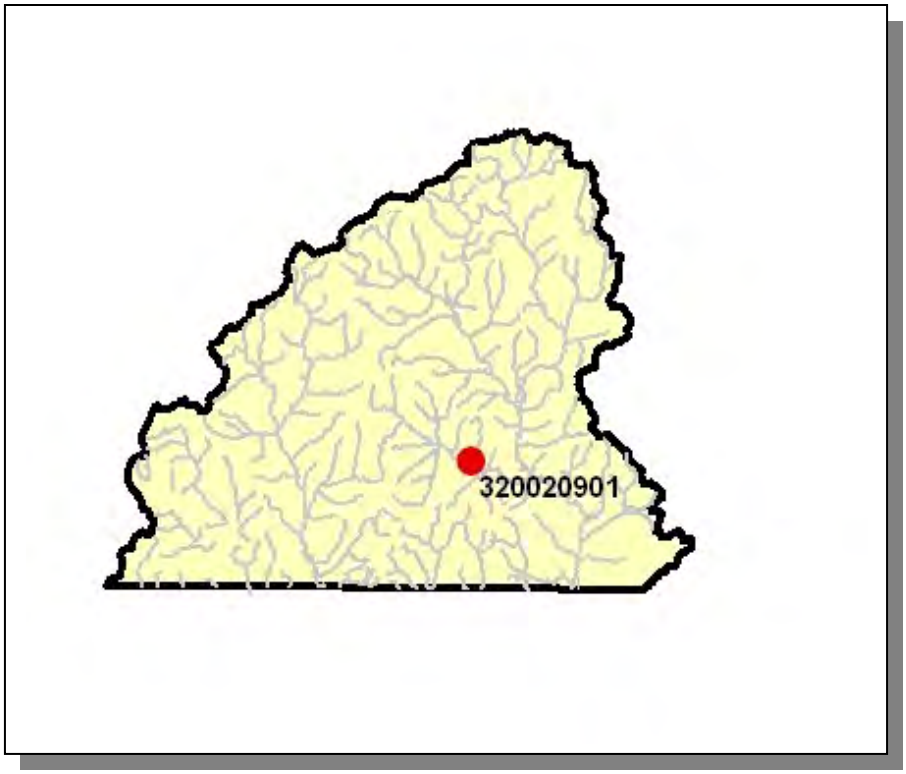


Figure 5-4. Location of TWRA TADS Sampling Sites in the Tennessee Portion of the Guntersville Lake Watershed from 1987-2005. *More information is provided in Appendix V.*

Tennessee State Wildlife Action Plan (SWAP)

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.

For information on these and other water resources related activities, please contact your Regional TWRA office at the following phone numbers:

West Tennessee (Region I)	1-800-372-3928
Middle Tennessee (Region II)	1-800-624-7406
Cumberland Plateau (Region III)	1-800-262-6704
East Tennessee (Region IV)	1-800-332-0900

TDD services are available at 615-781-6691.
TWRA's website is http://www.state.tn.us/twra.

5.3.E. Alabama Department of Environmental Management. The Alabama Department of Environmental Management (ADEM) has been actively pursuing the development of watershed management plans for over ten years. The development of these watershed management plans supports the Department's effort to implement a "holistic" approach to watershed management by identifying, and addressing, water quality issues across an entire watershed. This holistic approach to watershed management also encourages local citizens who live, work, and recreate in the watershed to become active in protecting and preserving their local water resources.

At this time, watershed management plans have been developed for all of the major river basins in Alabama including the Tennessee River, the Black Warrior River, the Cahaba River, the Tombigbee River, the Tallapoosa River, the Coosa River, the Alabama River, the Chattahoochee River, the Choctawhatchee/Pea/Yellow Rivers, the Conecuh/Sepulga Rivers, and the Coastal Rivers. Each of these watershed management plans has been developed with valued input from local citizens, industries, municipalities, and other stakeholders who have a vested interest in their local water resources. In addition, these watershed management plans are designed to be dynamic documents that can be changed/updated at any given time based upon changes in the watershed. All of these watershed management plans can all be viewed on the ADEM website (www.adem.gov) by clicking on Watershed Management and then Resource Materials.

The Department is currently utilizing the information contained in these large, river basin watershed management plans as the foundation for developing watershed management plans for smaller watersheds. The development of these small-scale watershed management plans is targeted to waterways that are identified on Alabama's 303(d) List

of Impaired Waters. This approach allows the Department to identify the local practices that are impacting water quality and then implement on-the-ground best management practices that are designed to enhance water quality. Ultimately, the goal of this effort is to facilitate the removal of the waterway from the 303(d) List of Impaired Waters. The Department currently has over twenty (20) of these small-scale watershed management plans that are in various stages of development/implementation.

Specifically to Tennessee, ADEM conducts intensive watershed sampling in the Tennessee River basin on a 5-year cycle. The Tennessee River basin will be the focus basin for sampling in 2008. In addition, Alabama has established reservoir nutrient criteria for the main stem Tennessee River reservoirs in Alabama, including Guntersville Reservoir, Wheeler Reservoir, Wilson Reservoir, and Pickwick Reservoir. ADEM is currently working cooperatively with TDEC's TMDL Program to study nutrient issues in the Elk River watershed. The Department has also established TMDLs for many waters in the Tennessee River basin in Alabama and a list of approved TMDLs can be found on the Department's web page at:

www.adem.state.al.us/WaterDivision/WQuality/TMDL/WQTMDLInfo.htm

If you would like additional information on the Department’s efforts to develop watershed management plans and implement a holistic approach to watershed management you may contact Scott Hughes at (334) 271-7955.

5.4. LOCAL INITIATIVES.

5.4.A. 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.B. Alabama Wildlife Federation

The Alabama Wildlife Federation (AWF) formed a partnership with the Alabama Forestry Commission, US Forest Service (USFS), and the Alabama TREASURE Forest Association (ATFA) in 1999, to hire wildlife biologists to provide technical assistance and information to private, non-industrial landowners. Since the inception of the Landowner Assistance Program (LAP), three wildlife biologists have provided assistance to over 1,000 landowners in Alabama.

The focus of technical assistance is land stewardship. The technical guidance that AWF provides for accomplishing land-use goals includes environmental protection. For example, for forest landowners AWF provides recommendations for firebreak management, access road management, wetland protection, streamside management zone establishment, enhancement, or protection, and other recommendations for the protection of soil and water resources. For agricultural landowners, recommendations may include field borders, grass waterways, wetland restoration, and other conservation practices to protect water quality, prevent soil erosion, and establish wildlife habitat.

For more information, please visit http://alabamawildlife.org/ or contact Mr. Claude L. Jenkins, Certified Wildlife Biologist, Alabama Wildlife Federation, 3050 Lanark Road, Millbrook, Alabama 36054
email: cjenkins@alabamawildlife.org
PH: 334.285.4550

CHAPTER 6

RESTORATION STRATEGIES IN THE GUNTERSVILLE LAKE 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 Tennessee portion of the Guntersville Lake 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 Guntersville Lake Watershed public meeting was held jointly with the Sequatchie River Watershed on November 9, 2000, at the National Guard Armory in Dunlap. 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 Voiced at Public Meeting

- How can the watershed approach be a coordinated effort when so many agencies are involved?
- Do all agencies use the same tests so that data can be directly compared?
- Agriculture is unfairly shouldering the blame for nonpoint source problems that timberharvesting, mining, and construction are causing.
- Geologic mapping should be used as an indicator for metals and acidity.
- TDOT is the worst polluter in the Sequatchie valley.
- Deforestation causes increases in siltation.
- There is a need for a watershed group that can act as an advocate for rivers without the burden of issuing permits.
- Some farmers alleged that complying with pollution controls will put them out of business.
- Water withdrawal from residential and industrial growth.

6.2.B. Year 3 Public Meeting. The second Guntersville Lake Watershed public meeting was held jointly with the Sequatchie River Watershed on November 18, 2002 at The Sequatchie Valley Co-Op in Dunlap. 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 Voiced at Public Meeting

- *Illegal dumping of garbage off bridges and along stream banks*
- Public access areas for public to launch canoes and small boats
- Allocation of limited water resources before it becomes a problem
- Loss of freshwater mussels
- Release of zebra mussels in upper reaches of Sequatchie River
- Feasibility of water line from Tennessee River to head of Sequatchie Valley
- Watershed Plan/Strategy will become a regulatory document
- Agriculture gets blamed for homeowner origins of nonpoint source pollution.
- If buffer strips become mandated then farmers need to be compensated.
- Wetlands protection is backdoor zoning
- How soon after a fish kill can fresh fit be eaten?

6.2.C. Year 5 Public Meeting. Not scheduled.

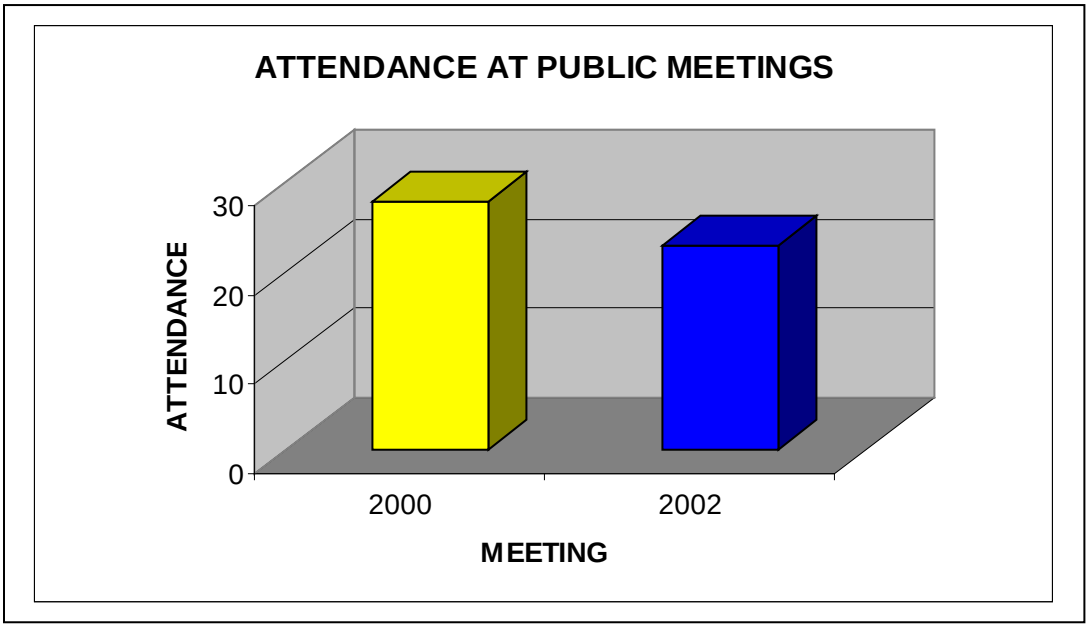


Figure 6-1. Attendance at the Guntersville Lake and Sequatchie River Watershed Joint Public Meetings. *Attendance numbers do not include TDEC personnel.*

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:

Guntersville Lake Watershed - Total Maximum Daily Load for E. Coli in the Guntersville Lake Watershed in Franklin, Grundy and Marion Counties. Approved 03/12/2008.

http://state.tn.us/environment/wpc/tmdl/approvedtmdl/GuntersvilleEcoli.pdf

TMDLs are prioritized for development based on many factors.

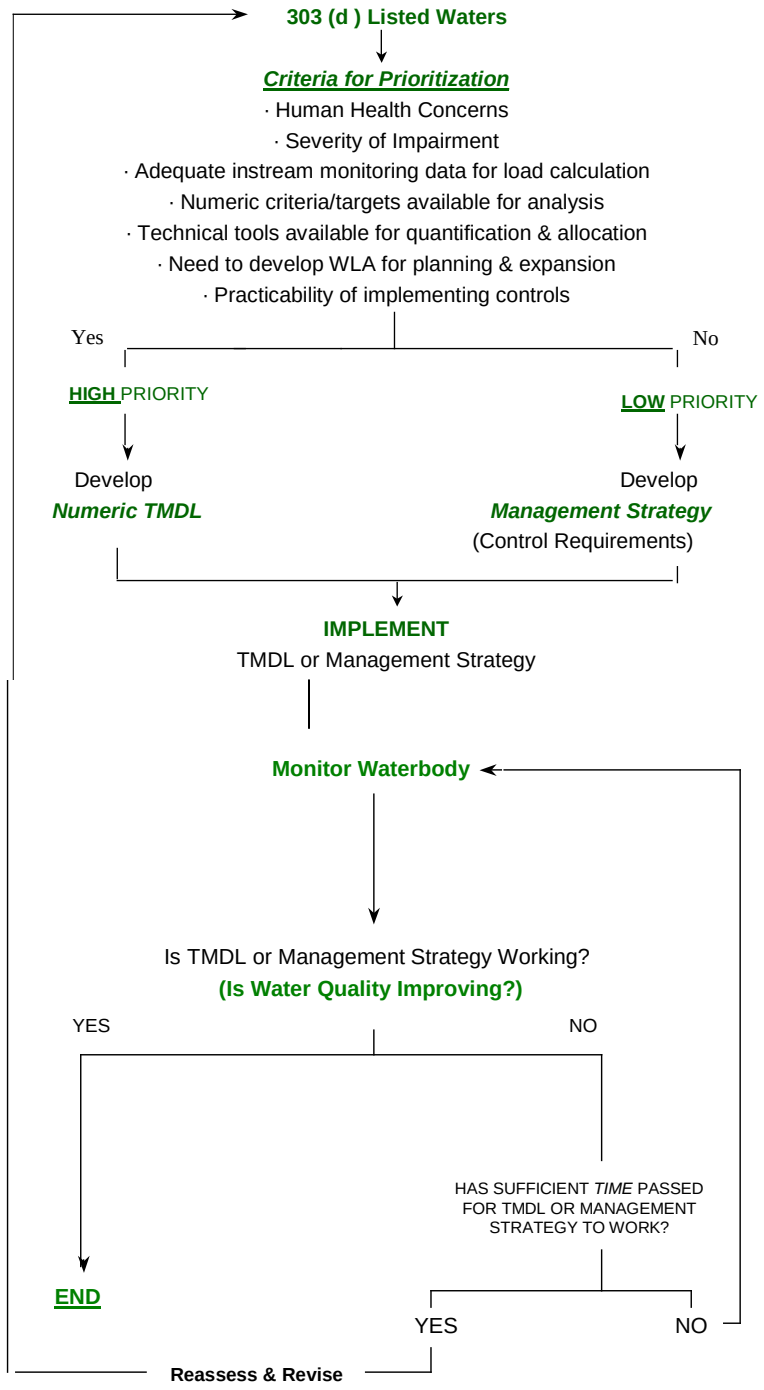


Figure 6-2. Prioritization Scheme for TMDL Development.

Several permitted discharges within the Tennessee Portion of the Guntersville Reservior Watershed discharge suspended solids under the conditions of an NPDES permit and are reviewed during the watershed cycle for reissuance. A few will also have limits on settleable solids. Those facilities with solids restrictions are Jasper STP, South Pittsburg STP and the TN DOT Marion County Rest Area.

6.3.B. Nonpoint Sources

Common nonpoint sources of pollution in the Tennessee Portion of the Guntersville Lake Watershed include urban storm water runoff, riparian vegetation removal and other habitat alterations, and inappropriate land development, road construction, and 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 Guntersville Lake Watershed. 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.

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 or less than 1 acre if it’s part of a larger development. 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 and sediment control measures on sites in the watershed of streams that are already impaired due to siltation or are considered high quality. Regardless of the size, no construction site is allowed to cause a condition of pollution.

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. Due to the rural nature of much of the area, and lack of large high density population centers, there are no portions of the Tennessee Portion of the Guntersville Lake Watershed that have an MS4 Program.

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 Tennessee Portion of the Guntersville Lake Watershed suffer from varying degrees of stream bank erosion. When stream 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.

Numerous land developments have severely impacted the hydrology and morphology of stream channels in Guntersville Lake watershed. Examples include Cluck Cove Creek, Holly Flat Cove Creek, and a tributary to Gordneck Creek, Tate Cove Creek, a tributary to Cross Creek, McKoy Branch, and Beene Cove Creek.

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.

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

Voluntary Activities

- Re-establish bank vegetation.
- 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 banks entry.
- Limit cattle access to streams and bank vegetation.

Regulatory Strategies

- Increase efforts in the Master Logger program to recognize impaired streams and require more effective management practices.
- Require post-construction run-off rates to be no greater than pre-construction rates in order to avoid in-channel erosion.
- Implement additional restrictions on logging in streamside management zones.
- Limit road and utility crossings of streams through better site design.
- Restrict the use of off-highway vehicles on stream banks and in stream channels.
- Limit clearing of stream and roadside ditch banks or other alterations. *Note: Permits may be required for any work along streams.*
- Encourage or require strong local buffer ordinances.
- Restrict rock harvesting to permitted sites.

Additional Strategies

- Better community planning and MS4 oversight for the impacts of development on small streams, especially development in growing areas.

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, 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 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, six stream systems in the Tennessee portion of the Guntersville Lake Watershed are known to have excessive pathogen contamination. An unnamed tributary to Laurel Lake, Heddon Branch, Clouse Hill Branch and Little Fiery Gizzard Creek are impacted by urban areas, with contributions of bacterial contamination possibly coming from storm water runoff, sewage collection system leaks, or treatment plant operation failures. Two streams in agricultural areas show elevated bacterial levels, Sweden Creek and Graham Branch.

Some measures that may be necessary to control pathogens are:

Voluntary Activities

- Clean up pet waste.
- Repair failed septic systems (Unnamed Tributary to Laurel Lake, Heddon Branch, Clouse Hill Branch and Little Fiery Gizzard Creek).
- Establish off-channel watering of livestock (Sweden Creek and Graham Branch)
- Limit livestock access to streams and restrict stream crossings (Sweden Creek and Graham Branch)
- Improve and educate on the proper management of animal waste from confined feeding operations.
- Repair failing sewage lines.
- Make efforts to prevent overflows.

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. (Monteagle)
- Identify Concentrated Animal Feeding Operations not currently permitted.
- Develop and enforce leash laws and controls on pet fecal material.

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.
- Develop and enforce leash laws and controls on pet fecal material (Monteagle and Tracy City).
- Greater efforts by sewer utilities to identify leaking lines or overflowing manholes (Monteagle)
- Review the pathogen limits in discharge permits to determine the need for further restriction. (Monteagle)

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. Many streams in the Guntersville Lake Watershed within agricultural areas would benefit from additional riparian buffers (Sweden Creek, Graham Branch and Battle Creek).
- Use grassed drainage ways that can remove fertilizer and sediment 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 and sediment 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 and instead encourage filtration basins/constructed wetlands. Ponds and lakes do not aerate water, and cause many water quality problems downstream. *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 (Monteagle)
- Impose timely and appropriate enforcement for noncomplying sewage treatment plants, large and small, and their collection systems (Monteagle).
- 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 Tennessee portion of the Guntersville Lake Watershed, a relatively small number of streams are damaged by toxins in 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. Examples of streams that would benefit from these measures are (Unnamed Tributary to Laurel Lake).

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.

Misapplication of chemicals, on agricultural and suburban areas, is another source of toxins.

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.

Many streams within the Tennessee Portion of the Guntersville Lake Watershed suffer from some degree of habitat alteration, especially riparian loss and bank disturbances from agricultural practices. Some notable streams in the watershed that have suffered significant harm from riparian loss include Sweden Creek, Graham Branch, Tate Cave Branch, Beene Cove Branch, Tate Cove Branch, and Crow Creek. Graham Branch has also suffered from an adjacent impoundment.

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
- Encourage developers to avoid extensive use of culverts in streams.

Regulatory Strategies

- Restrict modification of streams by means such as culverting, lining, or impounding.
- 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.

6.3.B.vi. Tennessee Land Reclamation.

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.

6.3.B.vii. 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. For 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 Tennessee Portion of the Guntersville Lake Watershed are Heddon Branch, Big Fiery Gizzard Creek, Little Fiery Gizzard Creek, Laurel Lake, Big Fiery Gizzard Creek Impoundment, and the Grundy Lakes system.

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.

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.

6.3.B.viii. 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 exceedences 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 are encouraged to develop and implement appropriate monitoring programs by the designated date.

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.

6.3.B.ix High Quality Tier Development in the Tennessee Portion of the Guntersville Lake Watershed

At this time the Chattanooga Environmental Field Office is currently working on a study to have the upper portions of Battle Creek listed as High Quality Waters. The study has shown that the upper portion of Battle Creek is high quality water as well as Jumpoff Creek from Jumpoff Spring to its confluence with Battle Creek and Big Fiery Gizzard Creek from Denny Cove Spring to its confluence with Battle Creek. This is due to the high quality of the stream habitats in the study reaches as well as the benthic invertebrate communities that inhabited these creeks. The next portion of the study will determine the length of high quality waters downstream from the confluence of Big Fiery Gizzard Creek.

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 Tennessee Portion of the Guntersville Lake Watershed. Compliance information was obtained from EPA's Permit Compliance System (PCS). All data was queried for a five-year period between January 1, 2001 and December 31, 2006. 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 Tennessee Portion of the Guntersville Lake Watershed.*

6.4.A. Municipal Permits

TN0059331 Grundy County - Tracy Mfg. Co.

Discharger rating: Minor
City: Tracy City
County: Grundy
EFO Name: Chattanooga
Issuance Date: 6/30/05
Expiration Date: 6/30/07
Receiving Stream(s): Dry ditch at mile 0.08 to an unnamed tributary at mile 0.04 to Little Fiery Gizzard Creek at mile 2.6
HUC-12: 060300010202
Effluent Summary: Treated domestic wastewater from Outfall 001
Treatment system: Package plant

Segment	TN06030001057_0815
Name	Little Fiery Gizzard Creek
Size	3.7
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Irrigation (Supporting), Livestock Watering and Wildlife (Supporting), Recreation (Non-Supporting), Fish and Aquatic Life (Not Assessed)
Causes	Escherichia coli
Sources	Grazing in Riparian or Shoreline Zones, On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems)

Table 6-1. Stream Segment Information for Grundy County – Tracy Mfg. Co.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	Summer	4	mg/L	DMax Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	Summer	2	mg/L	MAvg Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	Winter	8.4	mg/L	DMax Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	Winter	4.2	mg/L	MAvg Conc	2/Month	Grab	Effluent
BOD5	All Year	20	mg/L	DMax Conc	2/Month	Grab	Effluent
BOD5	All Year	10	mg/L	MAvg Conc	2/Month	Grab	Effluent
E. coli	All Year	941	#/100mL	DMax Conc	2/Month	Grab	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Week	Grab	Effluent
TRC	All Year	0.019	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 6-2. Permit Limits for Grundy County – Tracy Mfg. Co.

TN0024295 South Pittsburg STP

Discharger rating: Minor
City: South Pittsburg
County: Marion
EFO Name: Chattanooga
Issuance Date: 5/31/05
Expiration Date: 5/30/10
Receiving Stream(s): Tennessee River Mile 417.3
HUC-12: 060300010101
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: WAS to vacuum beds to storage to landfill

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	30	mg/L	MAvg Conc	3/Week	Composite	Effluent
BOD5	All Year	358	lb/day	MAvg Load	3/Week	Composite	Effluent
BOD5	All Year	477	lb/day	WAvg Load	3/Week	Composite	Effluent
BOD5	All Year	40	mg/L	WAvg Conc	3/Week	Composite	Effluent
Bypass of Treatment (occurrences)	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
D.O.	All Year	1	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	487	#/100mL	DMax Conc	3/Week	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Influent (Raw Sewage)
Overflow Use Occurences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
Overflow Use Occurences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Non Wet Weather
Settleable Solids	All Year	1	mL/L	DMax Conc	Weekdays	Grab	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	477	lb/day	WAvg Load	3/Week	Composite	Effluent
TSS	All Year	30	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS	All Year	358	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year	40	mg/L	WAvg 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 6-3. Permit Limits for South Pittsburg STP.

Enforcement:
1/29/07 Notice of Violation/Compliance Evaluation Inspection for the failure to collect representative samples (a violation of Part 1 B. of Permit NPDES Permit TN0024295).

Comments:
06/20/06 - WPC received from James C. Hailey & Co P&S's construction plans for a new 1.5 MGD aerated lagoon STP to replace the 1.43 MGD "antiquated" activated sludge process. South Pittsburg STP will be upgraded to a lagoon system. Plans have been approved.

TN0054585 Jasper STP

Discharger rating: Minor
City: Jasper
County: Marion
EFO Name: Chattanooga
Issuance Date: 8/31/05
Expiration Date: 8/31/10
Receiving Stream(s): Tennessee River Mile 421.5 (Guntersville Lake)
HUC-12: 060300010101
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: Screen, comminutor, pump station, two-stage aerated lagoons, secondary clarifier (with sludge recycle) and chlorine contact chamber

Segment	TN06030001055_1000
Name	Guntersville Lake
Size	1390
Unit	Acres
First Year on 303(d) List	-
Designated Uses	Recreation (Supporting), Livestock Watering and Wildlife (Supporting), Irrigation (Supporting), Industrial Water Supply (Supporting), Domestic Water Supply (Supporting), Fish and Aquatic Life (Supporting)
Causes	N/A
Sources	N/A

Table 6-4. Stream Segment Information for Jasper STP.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
48hr LC50: Ceriodaphnia Dubia	All Year		Percent	DMax Conc	Annually	Grab	Effluent
48hr LC50: Fathead Minnows	All Year		Percent	DMax Conc	Annually	Grab	Effluent
BOD % removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
BOD % removal	All Year	65	Percent	MAvg % Removal	3/Week	Calculated	% Removal
BOD5	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
BOD5	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
BOD5	All Year	293	lb/day	DMax Load	3/Week	Composite	Effluent
BOD5	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
BOD5	All Year	40	mg/L	WAvg Conc	3/Week	Composite	Effluent
BOD5	All Year	260	lb/day	WAvg Load	3/Week	Composite	Effluent
BOD5	All Year	195	lb/day	MAvg Load	3/Week	Composite	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
Overflow Use Occurences	All Year		Occurences /Month	MAvg Load	Continuous	Visual	Wet Weather
Overflow Use Occurences	All Year		Occurences /Month	MAvg Load	Continuous	Visual	Non Wet Weather
Settleable Solids	All Year	1	mL/L	DMax Conc	Weekdays	Grab	Effluent
TRC	All Year	2	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	293	lb/day	DMax Load	3/Week	Composite	Effluent
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year	30	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS	All Year	195	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year	260	lb/day	WAvg Load	3/Week	Composite	Effluent
TSS	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year	40	mg/L	WAvg Conc	3/Week	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
TSS % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
TSS % Removal	All Year	65	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
BOD5	All Year	30	mg/L	MAvg Conc	3/Week	Composite	Effluent
Bypass of Treatment (occurrences)	All Year		Occurences /Month	MAvg Load	Continuous	Visual	Wet Weather
D.O.	All Year	1	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	487	#/100mL	DMax Conc	3/Week	Grab	Effluent

Table 6-5. Permit Limits for Jasper STP

Compliance History:

The following numbers of exceedences were noted in PCS:

- 13 BOD
- 6 pH
- 2 % of Suspended Solids Removal
- 9 Escherichia Coli
- 20 Chlorine
- 24 Total Suspended Solids
- 13 Overflows
- 3 Bypasses

Enforcement:
NOV issued 6/25/07 for failure to adequately implement pretreatment program.

Comments:
Serious operational problems, pretreatments chronic violations, near capacity.

APPENDIX II

ID	NAME	HAZARD	ID	NAME	HAZARD
587014	HOLLIDAY #2	H	317001	MILKY WAY	2
587002	PAN GAP	1	317004	HIGHLANDER	S
587003	LAKE DIMMICK	1	317008	CUMBERLAND MTN. LAKE	S
267001	UPPER LAKE DAM	1	317010	BIG CREEK	0
267002	JACKSON	1	317016	CUMBERLAND MTN. LAKE	L
317006	LAKEVIEW	1	587011	RAINBOW LAKE	L
317007	GRUNDY #2	1	317018	BOONDOCK	0
317014	RAMSEY	0	317019	LITTELL #2	2
587001	SWEETWATER CREEK #16	L	317024	BURROUGHS-ROSS-COLVIL	1
587006	MCCOLLOUGH	L	267012	COOLEY'S RIFT	3
587007	TOM MCBEE	L	587012	LAKE EVA	S
267005	CHESTON LAKE	0	267013	VICK VARALLO LAKE	L
267009	LAKEVIEW #2	2			

Table A2-1. Inventoried Dams in the Tennessee Portion of the Guntersville Lake Watershed. *Hazard Codes: (H, 1), High; (S, 2), Significant; (L, 3), Low. TDEC only regulates dams indicated by a numeric hazard score.*

LAND COVER/LAND USE	ACRES	% OF WATERSHED
Deciduous Forest	161665	75.00%
Pasture/Hay	13333	6.20%
Mixed Forest	8631	4.00%
Low Intensity Residential	6205	2.90%
Evergreen Shrubland	5735	2.70%
Evergreen Forest	5627	2.60%
Row Crops	4668	2.20%
Grassland/Herbaceous	3002	1.40%
High Intensity Residential	2875	1.30%
Open Water	1867	0.90%
Wetlands	948	0.40%
High Intensity Commercial/Industrial/Transportation	835	0.40%
Bare Rock/Sand/Clay	277	0.10%
Emergent Herbaceous Wetlands	22	0.00%
Total	**215690**	**100.00%**

Table A2-2. Land Use Distribution in the Tennessee Portion of the Guntersville Lake 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)	
Cumberland Plateau (68a)	Rock Creek (68A01)	South Fork Cumberland River	05130104
	Clear Creek (68A08)	Emory River	06010208
	Piney Creek (68A13)	Watts Bar Lake	06010201
	Mullens Creek (68A20)	Watts Bar Lake	06020001
	Daddy's 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
	Mil Branch (68B09)	Sequatchie River	06020004
Plateau Escarpment (68c)	Ellis Gap (68C12)	Middle Tennessee River (Chickamauga Lake)	06020001
	Crow Creek (68C15)	Guntersville Lake	06030001
	Crow Creek (68C20)	Guntersville Lake	06030001

Table A2-3. Ecoregion Monitoring Sites in Ecoregions 68a, 68b, and 68c.

CODE	NAME	AGENCY	AGENCY ID
107	TDEC/DNH GRUNDY FOREST STATE NATURAL AREA SITE	TDEC/DNH	M.USTNHP 54
109	TDEC/DNH CARTER CAVES STATE NATURAL AREA SITE	TDEC/DNH	M.USTNHP 133
110	TDEC/DNH NATURAL BRIDGE STATE NATURAL AREA SITE	TDEC/DNH	M.USTNHP 2021
111	TDEC/DNH GRUNDY LAKES RECREATION AREA SITE	TDEC/DNH	M.USTNHP 2019
112	TDEC/DNH SOUTH CUMBERLAND RECREATION AREA SITE	TDEC/DNH	M.USTNHP 1158
144	TDEC/DNH MARION COUNTY SINKHOLE SITE	TDEC/DNH	S.USTNHP 34
165	TDEC/DNH SHERWOOD ROAD SWAMP SITE	TDEC/DNH	S.OSTNHP 339
222	USACOE-NASHVILLE CLIENT SITE	USACOE-NASHVILLE	
292	TDOT SR 27 MITIGATION SITE	TDOT	
324	TDOT I-24 MITIGATION/PERMIT SITE	TDOT	
386	TDOT SR 27 PERMIT SITE	TDOT	
397	TDOT SR 27 PERMIT SITE	TDOT	
853	USFWS JACK ESTES WETLAND DETERMINATION SITE	USFWS	
965	TDEC/DNH RON JONES REPORT: FRANKLIN CO SITE 58	TDEC/DNH	SOURCECODE F88JON01TNUS
966	TDEC/DNH RON JONES REPORT: MARION CO SITE 59	TDEC/DNH	SOURCECODE F88JON01TNUS
967	TDEC/DNH RON JONES REPORT: MARION CO SITE 60	TDEC/DNH	SOURCECODE F88JON01TNUS
1906	TWRA BATTLE CREEK SITE	TWRA	
1907	TWRA BATTLE CREEK SITE	TWRA	
2604	TWRA BATTLE CREEK SITE	TWRA	
2605	TWRA BATTLE CREEK SITE	TWRA	
2762	TVA POND 24	TDEC/DNH	
2763	TVA POND 25	TDEC/DNH	

Table A2-4. Wetland Sites in the Tennessee Portion of the Guntersville Lake Watershed in TDEC Database. *TDEC, Tennessee Department of Environment and Conservation; USACOE-Nashville, United States Army Corps of Engineers-Nashville District; TDOT, Tennessee Department of Transportation; TWRA, Tennessee Wildlife Resources Agency; DNH, Division of Natural Heritage.* ***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)
Battle Creek	TN06030001057_1000	12.4
Big Fiery Gizzard Creek	TN06030001057_0800	39.6
Crow Creek	TN06030001067_1000	27.1
Little Fiery Gizzard Creek	TN06030001057_0810	0.8

Table A3-1. Streams Fully Supporting the Designated Use of Recreation in the Tennessee Portion of the Guntersville Lake Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Clouse Hill Branch	TN06030001057_0812	1.9
Hedden Branch	TN06030001057_0811	1.5
Little Fiery Gizzard Creek	TN06030001057_0815	3.7
Unnamed trib to Laurel Lake	TN06030001057_0511	0.5

Table A3-2. Streams Not Supporting the Designated Use of Recreation in the Tennessee Portion of the Guntersville Lake Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Battle Creek	TN06030001057_2000	11.9
Buck Creek	TN06030001067_0100	2.8
Cave Cove Branch	TN06030001057_0600	21
Cross Creek	TN06030001067_0500	15.6
Custard Hollow Creek	TN06030001110_0200	18.1
Dripping Springs Cove Branch	TN06030001057_0500	4.7
Dry Creek	TN06030001067_0200	9.0
Dry Creek	TN06030001065_1000	16.1
Gaines Cove Branch	TN06030001057_0200	7.8
Gourdneck Cove Creek	TN06030001057_0110	8.1
Guntersville Reservoir Misc Tribs	TN06030001055T_1000	11.4
Hargiss Cove Creek	TN06030001057_0700	8.3
Holly Flat Creek	TN06030001067_0600	7.9
Jumpoff Cove Branch	TN06030001057_0300	5.4
Kelley Cove Branch	TN06030001057_0900	5.6
Laurel Branch	TN06030001057_0510	0.9
Little Coon Creek	TN06030001069_1000	4.4
Little Crow Creek	TN06030001110_1000	14.5
Little Gizzard	TN06030001057_0820	17.2
Lost Creek	TN06030001067_0400	19.9
Misc. tribs to Battle Creek	TN06030001057_0999	24.9
Mitchell Cove Branch	TN06030001057_0400	6.0
Nancy Winn Cove Creek	TN06030001057_0120	6.6
Poplar Spring Branch	TN06030001112_1000	10.4
Raulston Branch	TN06030001057_1100	4.1
Rexton Hollow Creek	TN06030001064_1000	8.4
Rush Creek	TN06030001067_0300	15.7
Salt River	TN06030001110_0100	8.8
Sweeten (Sweden) Creek	TN06030001057_0100	30.9
Unnamed trib to Battle Creek	TN06030001057_1200	4.3
Willis Branch	TN06030001067_0700	6.1

Table A3-3. Streams Not Assessed for the Designated Use of Recreation in the Tennessee Portion of the Guntersville Lake Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Battle Creek	TN06030001057_2000	11.9
Battle Creek	TN06030001057_1000	12.4
Big Fiery Gizzard Creek	TN06030001057_0800	39.6
Crow Creek	TN06030001067_1000	27.1
Little Fiery Gizzard Creek	TN06030001057_0810	0.8
Poplar Spring Branch	TN06030001112_1000	10.4
Sweeten (Sweden) Creek	TN06030001057_0100	30.9

Table A3-4. Streams Fully Supporting the Designated Use of Fish & Aquatic life in the Tennessee Portion of the Guntersville Lake Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Unnamed trib to Laurel Lake	TN06030001057_0511	0.5

Table A3-5. Stream Not Supporting the Designated Use of Fish & Aquatic life in the Tennessee Portion of the Guntersville Lake Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Buck Creek	TN06030001067_0100	2.8
Cave Cove Branch	TN06030001057_0600	21
Clouse Hill Branch	TN06030001057_0812	1.9
Cross Creek	TN06030001067_0500	15.6
Custard Hollow Creek	TN06030001110_0200	18.1
Dripping Springs Cove Branch	TN06030001057_0500	4.7
Dry Creek	TN06030001067_0200	9.0
Dry Creek	TN06030001065_1000	16.1
Gaines Cove Branch	TN06030001057_0200	7.8
Gourdneck Cove Creek	TN06030001057_0110	8.1
Guntersville Reservoir Misc Tribs	TN06030001055T_1000	11.4
Hargiss Cove Creek	TN06030001057_0700	8.3
Hedden Branch	TN06030001057_0811	1.5
Holly Flat Creek	TN06030001067_0600	7.9
Jumpoff Cove Branch	TN06030001057_0300	5.4
Kelley Cove Branch	TN06030001057_0900	5.6
Laurel Branch	TN06030001057_0510	0.9
Little Coon Creek	TN06030001069_1000	4.4
Little Crow Creek	TN06030001110_1000	14.5
Little Fiery Gizzard Creek	TN06030001057_0815	3.7
Little Gizzard	TN06030001057_0820	17.2
Lost Creek	TN06030001067_0400	19.9
Misc. tribs to Battle Creek	TN06030001057_0999	24.9
Mitchell Cove Branch	TN06030001057_0400	6.0
Nancy Winn Cove Creek	TN06030001057_0120	6.6
Raulston Branch	TN06030001057_1100	4.1
Rexton Hollow Creek	TN06030001064_1000	8.4
Rush Creek	TN06030001067_0300	15.7
Salt River	TN06030001110_0100	8.8
Unnamed trib to Battle Creek	TN06030001057_1200	4.3
Willis Branch	TN06030001067_0700	6.1

Table A3-6. Streams Not Assessed for the Designated Use of Fish & Aquatic Life in the Tennessee Portion of the Guntersville Lake Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (ACRES)
Big Grundy Lake	TN06030001GRUNDY1_1000	16
Guntersville Reservoir	TN06030001055_1000	1390
Laurel Lake	TN06030001LAURELLK_1000	73

Table A3-7. Lakes Fully Supporting the Designated Use of Recreation in the Tennessee Portion of the Guntersville Lake Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (ACRES)
Big Grundy Lake	TN06030001GRUNDY1_1000	16
Guntersville Reservoir	TN06030001055_1000	1390
Laurel Lake	TN06030001LAURELLK_1000	73

Table A3-8. Lakes Fully Supporting the Designated Use of Fish & Aquatic life in the Tennessee Portion of the Guntersville Lake Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Clouse Hill Branch	TN06030001057_0812	1.9
Hedden Branch	TN06030001057_0811	1.5
Little Fiery Gizzard Creek	TN06030001057_0815	3.7
Unnamed trib to Laurel Lake	TN06030001057_0511	0.5

Table A3-9. Stream Segments Impaired Due to Escherichia coli in the Tennessee Portion of the Guntersville Lake Watershed.

WATERBODY ID	WATERBODY NAME	TOTAL SEGMENT MILES/ACRES IMPAIRED	HUC-12
TN06020001001_1000	Nickajack Reservoir	10370.0ac	060300010101
TN06030001055T_0100	Graham Branch	4.89	060300010101
TN06030001065_0100	Cluck Cove Creek	4.32	060300010103
TN06030001057_0200	Tate Cove Creek	3.72	060300010201
TN06030001057_0950	Big Fiery Gizzard Creek	5.10	060300010202
TN06030001057_0100	Sweeten (Sweden) Creek	28.94	060300010204
TN06030001057_0121	Wildcat Branch	1.13	060300010204
TN06030001057_0140	Beene Cove Creek	1.84	060300010204
TN06030001067_0410	Barnes Branch	4.08	060300010501
TN06030001067_0600	Holly Flat Cove Creek	7.90	060300010502

Table A3-10. Streams Added to the 2008 303(d) List in the Tennessee Portion of the Guntersville Lake Watershed. *For more information see Tennessee's 2008 303(d) List at http://www.state.tn.us/environment/wpc/publications/2008_303d.pdf . Ac, acres.*

WATERBODY	DESCRIPTION	BASIS FOR	HUC-12
Battle Creek	From Fish Trap Road to headwaters.	Exceptional Biological Diversity.	060300010201
Battle Creek	From Fish Trap Road to headwaters.	Exceptional Biological Diversity.	060300010203
Big Branch Inc Headwater Tribs	From Lost Creek to headwaters.	State endangered White Fringeless Orchid.	060300010501
Big Fiery Gizzard Creek	From confluence with Battle Creek to origin.	Grundy Forest State Natural Area, state endangered White Fringeless Orchid. and Sharp's Lejeuna, state threatened Ornate Cololejeuna.	060300010202
Big Fiery Gizzard Creek UT	From Big Fiery Gizzard near Pyburn Place to origin.	State endangered Whtie Fringeless Orchid.	060300010202
Brush Creek	From Rush Creek to orign.	State endangered Heart-Leaved Plantain.	060300010501
Cave Cove UT	From Cave Cove (headwaters of Little Crow Creek) to origin.	State Threatened Bristle-fern.	060300010503
Cross Creek	From Crow Creek to headwaters.	Franklin State Forest.	060300010501
Cross Creek UT*	From Crow Creek to headwaters.	Franklin State Forest.	060300010501
Crow Creek	From Alabama state line to headwaters.	Exceptional biological diversity. WPC ecoregion reference stream for 68c. Franklin-Marion State Forest and Carter State Natural Area.	060300010501
Crow Creek	From Alabama state line to headwaters.	Exceptional biological diversity. WPC ecoregion reference stream for 68c. Franklin-Marion State Forest and Carter State Natural Area.	060300010502
Crow Creek UT*	From Alabama state line to headwaters.	Exceptional biological diversity. WPC ecoregion reference stream for 68c. Franklin-Marion State Forest and Carter State Natural Area.	060300010501
Custard Hollow Creek	From UT near Pesey Field to origin.	State endangered White Fringeless Orchid.	060300010503
Custard Hollow Creek UT	From UT to Custard Hollow Branch to origin at Cold Spring.	State endangered White Fringeless Orchid.	060300010503
Guntersville Lake	From Poplar Spring Branch to Nickajack Dam.	Federal endangered Anthony's River Snail and Pink Mucket and federal threatened Snail Darter.	060300010101
Guntersville Reservoir	From Poplar Spring Branch to Nickajack Dam.	Federal endangered Anthony's River Snail and Pink Mucket and federal threatened Snail Darter.	060300010101
Jumpoff Cove Branch	From Battle Creek to origin.	Exceptional Biological Diversity	060300010201
Laurel Branch	From (35.1404/-85.8788) to origin.	State threatened Tawny Cotton-grass	060300010501
Laurel Creek Inc UTs	From Little Gizzard Creek to headwaters.	State endangered White Fringeless Orchid.	060300010202
Little Fiery Gizzard Creek	Portion in Grundy Lakes State Recreation Area	Grundy Lakes State Recreation Area.	060300010202
Little Fiery Gizzard Creek UT	Portion in Grundy Lakes State Recreation Area.	Grundy Lakes State Recreation Area.	060300010202
Little Gizzard Creek	From Big Fiery Gizzard through Foster Falls Natural Area.	Foster Falls Natural Area, state endangered White Fringeless Orchid.	060300010202

Table A3-11a.

WATERBODY	DESCRIPTION	BASIS FOR	HUC-12
Little Gizzard Creek UT	From Little Gizzard Creek to origin.	State endangered White Fringeless Orchid	060300010202
Little Gizzard Creek UT	UT in Sugarcamp Hollow from Little Gizzard Creek to origin.	State endangered White Fringeless Orchid.	060300010202
Lost Creek	From Depot Branch to origin.	State endangered White Fringeless Orchid.	060300010501
Nickajack Reservoir	From Hwy 41 (River Mile 429.7) upstream to tip of Williams Island (River Mile 454.6)	Prentice Cooper State Forest and Tennessee River Gorge Trust.. State endangered Creeping St John's-Wort.	060300010101
Sequatchie River	From Guntersville Lake to confluence of Woodcock Creek.	Federal endangered Anthony's River Snail and threatened Snail Darter.	060300010101
Sinking Cove UT	From subsidence point to origin.	Federal and state endangered Morefield's Leatherflower.	060300010503
Straight Cove Branch	Portion in Franklin State Forest.	Franklin State Forest	060300010204
Straight Cove Branch UT*	Portion in Franklin State Forest.	Franklin State Forest	060300010204
Sweden Creek	Portion in Franklin-Marion SF.	Franklin-Marion State Forest	060300010204
Sweden Creek UT	From Sweden Creek upstream of Collins Cove to origin.	State endangered White Fringeless Orchid, protion is in Franklin Marion State Forest.	060300010204
Sweden Creek UT*	Portion in Franklin-Marion SF.	Franklin-Marion State Forest	060300010204
Two Mile Branch	From Lost Creek to headwaters.	State threatened Bristle-fern	060300010501
Youngs Creek	Portion in Franklin State Forest	Franklin State Forest	060300010501
Youngs Creek UT*	Portion in Franklin State Forest	Franklin State Forest	060300010501

Table A3-11b.

Table A3-11a-b. Known High Quality Waters in the Tennessee Portion of the Guntersville Lake Watershed as of September 2008. *The most recently published list is available at www.state.tn.us/environment/wpc/publications/hqwlist.mht. UT, Unnamed Tributary; WPC, Water Pollution Control; *Located within state or federally protected lands.*

APPENDIX IV

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)			
	0101	0103	0201	0202
Bare Rock/Sand/Clay	29	1	89	102
Deciduous Forest	10,722	5,748	30,839	22,748
Developed Open Space	1,165	124	1,299	1,417
Emergent Herbaceous Wetlands	6		7	3
Evergreen Forest	757	36	441	1,326
Grassland/Herbaceous	412	74	297	837
High Intensity Development	118		20	13
Low Intensity Development	993	22	675	360
Medium Intensity Development	297	5	130	69
Mixed Forest	1,232	259	1,377	2,401
Open Water	1,333	5	213	135
Pasture/Hay	2,869	310	2,259	2,645
Row Crops	1,282	152	726	352
Shrub/Scrub	487	572	706	958
Woody Wetlands	147		159	50
Total	**21,849**	**7,308**	**39,337**	**33,416**

Table A4-1a.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)			
	0203	0204	0501	0502
Bare Rock/Sand/Clay	53	1		1
Deciduous Forest	7,949	16,161	35,502	7,805
Developed Open Space	687	291	884	153
Emergent Herbaceous Wetlands	6			
Evergreen Forest	2,204	228	304	104
Grassland/Herbaceous	474	151	349	154
High Intensity Development	37			2
Low Intensity Development	611	3	158	22
Medium Intensity Development	106		20	18
Mixed Forest	938	644	918	401
Open Water	116	6	58	
Pasture/Hay	829	1,516	1,467	649
Row Crops	794	408	247	491
Shrub/Scrub	435	449	1,100	736
Woody Wetlands	476	13	84	12
Total	**15,715**	**19,871**	**41,091**	**10,548**

Table A4-1b.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)		
	0503	0601	0602
Bare Rock/Sand/Clay			
Deciduous Forest	21,280	2,790	120
Developed Open Space	138	38	8
Emergent Herbaceous Wetlands			
Evergreen Forest	228		
Grassland/Herbaceous	209	45	
High Intensity Development			
Low Intensity Development	4	18	9
Medium Intensity Development			
Mixed Forest	451	10	1
Open Water	2		
Pasture/Hay	755	27	8
Row Crops	196	19	1
Shrub/Scrub	226	48	17
Woody Wetlands	8		
Total	**23,497**	**2,995**	**164**

Table A4-1c.

Table A4-1a-c. Land Use Distribution in the Tennessee Portion of the Guntersville Lake Watershed by HUC-12. *Data are from 2001 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	LOCATION	HUC-12	AREA (SQ MILES)	LOW FLOW (CFS)		
				1Q10	7Q10	3Q20
03571850	Tennessee River	060300010101	22,640	7,850	12,500	9,560

Table A4-3. United States Geological Survey Continuous Record Gaging Stations in the Tennessee Portion of the Guntersville Lake Watershed. *Additional information may be found at:* http://water.usgs.gov/osw/streamstats/

AGENCY	STATION	LOCATION	HUC 12
TDEC	3340	Tennessee River @ RM @ RM 422.0	060300010101
TVA	475034	Tennessee River @ RM @ RM 419.0	060300010101
TVA	475524	Tennessee River @ RM @ RM 424.68	060300010101
TVA	475817	Tennessee River @ RM 424.0	060300010101
TVA	476661	Tennessee River @ RM 418.6	060300010101
TVA	477054	Tennessee River @ RM 417.5	060300010101
TVA	477055	Tennessee River @ RM 418.3	060300010101
TVA	477056	Tennessee River @ RM 420.35	060300010101
TVA	477073	Tennessee River @ RM 422.0	060300010101
TDEC	BATTL015.0MI	Battle Creek @ RM 15.0	060300010201
TDEC	FALLS1T0.5MI	UT to Falls Branch	060300010201
TDEC	MARTI000.1MI	Martin Spring @ RM 0.1	060300010201
TDEC	TCAVE000.1MI	Tate Cave Spring @ RM 0.1	060300010201
TDEC	TCAVE000.2MI	Tate Cave Spring @ RM 0.2	060300010201
TDEC	TCAVE000.3MI	Tate Cave Spring @ RM 0.3	060300010201
TDEC	TCAVE000.4MI	Tate Cave Spring @ RM 0.4	060300010201
TDEC	TCAVE000.5MI	Tate Cave Spring @ RM 0.5	060300010201
TDEC	TCAVE000.6MI	Tate Cave Spring @ RM 0.6	060300010201
TDEC	BFGIZ000.6MI	Big Fiery Gizzard @ RM 0.6	060300010202
TDEC	BIGGRUNDY	Big Grundy Lake	060300010202
TDEC	CHILL000.1GY	Clouse Hill Branch @ RM 0.1	060300010202
TDEC	LFGIZ003.4GY	Little Fiery Gizzard @ RM 3.4	060300010202
TDEC	LONEROCK	Lone Rock Lake	060300010202
TVA	475251	Battle Creek @ RM 8.8	060300010203
TVA	475886	Battle Creek @ RM 0.1	060300010203
TDEC	BATTL005.4MI	Battle Creek @ RM 5.4	060300010203
TDEC	GILLI000.1MI	Gilliam Creek @ RM 0.1	060300010203
EPA National Aquatic Resource Survey	OWW04440-0118	Straight Cove	060300010204
TDEC	SWEDE1T0.1MI	UT to Sweden Creek	060300010204
TDEC	BARNE002.4FR	Lost Creek	060300010501
TDEC	DEPOTCRIS01	Depot Branch @ RM 0.84	060300010501
TDEC	DEPOTCRIS02	Depot Branch @ RM 0.99	060300010501
TDEC	DEPOTCRIS03	Depot Branch @ RM 1.1	060300010501
TDEC	ECO68C15	Crow Creek	060300010501
TDEC	ECO68C20	Crow Creek	060300010501
TDEC	TMILE1T0.2FR	UT to Two Mile Branch	060300010501
TDEC	CROOK000.2MY	Crooked Creek @ RM 0.2	060300010503

Table A4-4. STORET Water Quality Monitoring Stations in the Guntersville Lake Watershed*. TDECWPC, Tennessee Department of Environment and Conservation Division of Water Pollution Control; UT, Unnamed Tributary.*

PERMIT NUMBER	COUNTY	DESCRIPTION	WATERBODY	HUC-12
NRS05.102	Grundy	Stream Relocation	UT to Cave Cove Branch	060300010201
NR0601.011	Grundy	Bridges and Approaches	Little Fiery Gizzard Creek	060300010202
NRS04.401	Grundy	Gravity Sewer Line Additions	Little Fiery Gizzard Creek	060300010202

Table 4-5. ARAPs (Aquatic Resource Alteration Permit) issued June 2002 through June 2007 in the Tennessee Portion of the Guntersville Lake Watershed. UT, Unnamed Tributary.

PERMIT NUMBER	PERMITTEE	COUNTY	LIVESTOCK	WATERBODY	HUC-12
TNA000086	Pace's Poultry	Marion	Poultry	Battle Creek	060300010501

Table 4-6. CAFO (Concentrated Animal Feed Operation) Permittees in the Tennessee Portion of the Guntersville Lake Watershed.

PERMIT NUMBER	COUNTY	PERMITTEE: DESCRIPTION	AREA	WATERBODY	HUC-12
TNR111152	Marion	Jasper TSC, LLC: Retail and Parking Area Construction	5.70	Kimball Cove Branch	060300010203
TNR180503	Franklin	Parson's Green, LLC: Parson's Green Subdivision	4.53	Depot Branch	060300010501

Table 4-7. CGPs (Construction General Permit) issued June 2002 through June 2007 in the Tennessee Portion of the Guntersville Lake Watershed. Area, acres of property associated with construction activity.

PERMIT NUMBER	PERMITTEE	SIC	SIC NAME	WATERBODY	HUC-12
TN0061697	Vulcan Construction Materials Richard City Quarry	1422	Crushed and Broken Limestone	UT to Poplar Spring Branch	060300010101
TN0071340	Bradley Stone And Sand, Inc. South Pittsburg Pit #4	1442	Construction Sand & Gravel	Rexton Hollow	060300010101
TN0063291	Bradley Stone And Sand, Inc. South Pittsburg Pit #1 & #2	1442	Construction Sand & Gravel	Gilliam Cove & Old Shop Hollow	060300010103
TN0063304	Bradley Stone And Sand, Inc. South Pittsburg Processing Plant	1442	Construction Sand & Gravel	Clayton Camp Branch	060300010103
TN0065897	Sequatchie Concrete Service Sand Switch Mine	1442	Construction Sand & Gravel	Wildcat Branch	060300010201
TN0066281	Bradley Stone And Sand, Inc. Jasper Sand	1442	Construction Sand & Gravel	Laurel Branch & Little Gizzard Creek	060300010202
TN0071161	Bradley Stone And Sand, Inc. South Pittsburg Pit #3	1442	Construction Sand & Gravel	Gilliam Cove	060300010204
TN0063151	Franklin Industrial Minerals Anderson Plant	1422	Crushed and Broken Limestone	Crow Creek	060300010502

Table 4-8. Permitted Mining Facilities in the Tennessee Portion of the Guntersville Lake Watershed. SIC, Standard Industrial Code; UT, Unnamed Tributary

PERMIT NUMBER	PERMITTEE	SIC	SIC NAME	MADI	WATERBODY	HUC-12
TN0024295	South Pittsburg STP	4952	Sewerage Systems	Major	Tennessee River @ RM 417.3	060300010101
TN0027472	TVA Nickajack Hydro Plant	4911	Electric Services	Minor	Tennessee River	060300010101
TN0054585	Jasper STP	4952	Sewerage Systems	Minor	Tennessee River @ RM 421.5	060300010101
TN0059331	Grundy County Tracy Mfg. Company	4952	Sewerage Systems	Minor	Dry Ditch @ Mile 0.08 to UT @ Mile 0.04 to Little Fiery Gizzard Creek @ RM 2.6	060300010202

Table 4-9. Municipal and Industrial Permittees in the Tennessee Portion of the Guntersville Lake Watershed. SIC, Standard Industrial Code; MADI, Major Discharge Indicator; UT, Unnamed Tributary.

PERMIT NUMBER	PERMITTEE	WATERBODY	HUC-12
TNG110191	Sequatchie Concrete Services South Pittsburg	UT to Tennessee River	060300010101
TNG110102	John W. Greeter Building Center, Inc.	Gilliam Creek	060300010201

Table 4-10. RMCP (Ready Mix Concrete Plant) Permittees in the Tennessee Portion of the Guntersville Lake Watershed. UT, Unnamed Tributary.

PERMIT NUMBER	PERMITTEE	SECTOR	RECEIVING STREAM	AREA	HUC-12
TNR050180	Tennessee Galvanizing, Inc.	AA	UT to Glover Branch	1.10	060300010101
TNR051416	VARIFORM, Inc.	Y	Tennessee River to Guntersville Lake	27.40	060300010101
TNR051676	Lodge Manufacturing Company	F	Unnamed Storm Ditch to Tennessee River	13.80	060300010101
TNR053295	Shaw Industries, Inc. South Pittsburgh	V	Tennessee River	13.70	060300010101
TNR054089	Valmont Jasper, Industries	AA	Unnamed Ditch to Glover Branch	20.00	060300010101
TNR054424	Taylor's Machine & Welding Co	AB	Long Hollow Branch	1.45	060300010101
TNR054522	ASAP, Inc	AB	Sinkhole to Ground Water	2.50	060300010101
TNR055070	Nickajack Metal Reclamation Facility	N	Guntersville Lake	4.62	060300010101
TNR056523	Tinsley Asphalt, LLC	D	WWC to UT to Poplar Springs Branch	1.00	060300010101
TNR056823	C&D Recycling	N	Poplar Spring Branch	1.00	060300010101
TNR050130	Wiggins Auto Parts	M	WWC to Gizzard Creek to Grundy Lake	6.00	060300010202
TNR050610	Davis Auto Sales & Salvage	M	Fiery Creek to Battle Creek	2.50	060300010202
TNR056442	Monteagle Truck & Car Parts	M	Ditch to Gizzard Creek to Grundy Lake	3.60	060300010202
TNR053909	Cardin Forest Products, LLC	A	Gilliam Branch to Battle Creek	6.00	060300010203
TNR055068	Mohawk/Aladdin South Pittsburg Plant	V	Tennessee River	8.32	060300010203
TNR056431	Cardin Forest Products, LLC	A	Battle Creek	12.00	060300010203
TNR053368	TKA Plastics, Inc.	Y	Tims Ford Reservoir	10.00	060300010501

Table 4-11. TMSPs (Tennessee Multi Sector Permit) issued in the Tennessee Portion of the Guntersville Lake Watershed. Area, acres of property associated with Industrial Activity; UT Unnamed Tributary, WWC, Wet Weather Conveyance. See Table 4-13 for Sector Details.

PERMIT NUMBER	PERMITTEE	WATERBODY	HUC-12
TN0073521	Big Fiery Gizzard WTP	Big Fiery Gizzard Creek	060300010202

Table 4-12. WTP (Water Treatment Plant) Permittees in the Tennessee Portion of the Guntersville Lake Watershed.

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 A4-13. TMSP Sectors and Descriptions.

APPENDIX V

LAND TREATMENT – CONSERVATION BUFFERS	
	Riparian Forest Buffer (acres)
FY 2003	3

Table A5-1a. Land Treatment Conservation Practices (Conservation Buffers), in Partnership with NRCS in the Tennessee Portion of the Guntersville Lake Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2002 to 2006.*

EROSION CONTROL		
	Est. soil saved (tons/year)	Land Treated with erosion control measures (acres)
FY 2002	180	180
FY 2003	538	100

Table A5-1b. Erosion Control Conservation Practices, in Partnership with NRCS in the Tennessee Portion of the Guntersville Lake Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2002 to 2006.*

NUTRIENT MANAGEMENT				
	Waste Utilization (acres)	AFO Nutrient Mgmt Applied (acres)	Non-AFO Nutrient Mgmt. Applied (acres)	Total Applied (acres)
FY 2003		128	14	142
FY 2004		193		193
FY 2005		190		190
FY 2006		60		60

Table A5-c. Nutrient Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Guntersville Lake Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2002 to 2006.*

PEST MANAGEMENT	
	Pest Mgmt. Systems (acres)
FY 2002	177
FY 2003	141
FY 2004	193
FY 2005	247

Table A5-1d. Pest Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Guntersville Lake Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2002 to 2006.*

GRAZING/FORAGES		
	Prescribed Grazing (acres)	Pasture and Hay Planting (acres)
FY 2002	177	
FY 2003	128	
FY 2004	193	
FY 2005	116	33
FY 2006		41

Table A5-1e. Grazing/Forages Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Guntersville Lake Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2002 to 2006.*

TREE AND SHRUB PRACTICES			
	Land Prepared for revegetation of Forest (acres)	Land Improved through Forest Stand improvement (acres)	Forestland Re-established or improved (acres)
FY 2003	60	485	
FY 2006		450	450

Table A5-1f. Tree and Shrub Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Guntersville Lake Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2002 to 2006.*

LAND TREATMENT – TILLAGE AND CROPPING				
	Residue Mgmt, No-till, Strip till (acres)	Tillage & Residue Mgmt Systems (acres)	Conservation Crop Rotation (acres)	Cover Crop (acres)
FY 2004			39	18
FY 2005	13	13	74	

Table A5-1g. Land Treatment Conservation Practices (Tillage and Cropping), in Partnership with NRCS in the Tennessee Portion of the Guntersville Lake Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2002 to 2006.*

WILDLIFE HABITAT MANAGEMENT		
	Upland Habitat Mgmt (acres)	Total Wildlife Habitat Mgmt Applied (acres)
FY 2003	485	485
FY 2006	583	583

Table A5-1h. Wildlife Habitat Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Guntersville Lake Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2002 to 2006.*

COMMUNITY	AWARD DATE	AWARD AMOUNT
Sewanee Utility District	03/21/07	$ $2,127,000

Table A5-2. Communities in the Tennessee Portion of the Guntersville Lake Watershed that have received Clean Water State Revolving Fund Grants or Loans since the inception of the program.

PRACTICE	NRCS CODE	NUMBER OF BMPs
No-Till	329	1
Cover Crop	340	130
Critical Area Planting	342	2
Well Decommissioning	351	1
Dike	356	4
Diversion	362	12
Pond	378	11
Fence	382	2
Grade Stabilization Structure	410	72
Grassed Waterway	412	11
Pasture/Hay Planting	512	76
Pipeline	516	1
Heavy Use Area	561	3
Stream Crossing	576	1
Terrace	600	114
Water/Sediment Control Basin	638	45
Restoration and Management of Declining Habitats	643	1
Upland Wildlife Habitat Management	645	1
Total BMPs		**488**

Table A5-3. Best Management Practices Installed by Tennessee Department of Agriculture and Partners in the Tennessee Portion of the Guntersville Lake Watershed.

SITE ID	WATER BODY	YEAR
320020901	Sweenten Creek	2002

Table A5-4. TWRA TADS Sampling Sites in the Guntersville Lake Watershed.