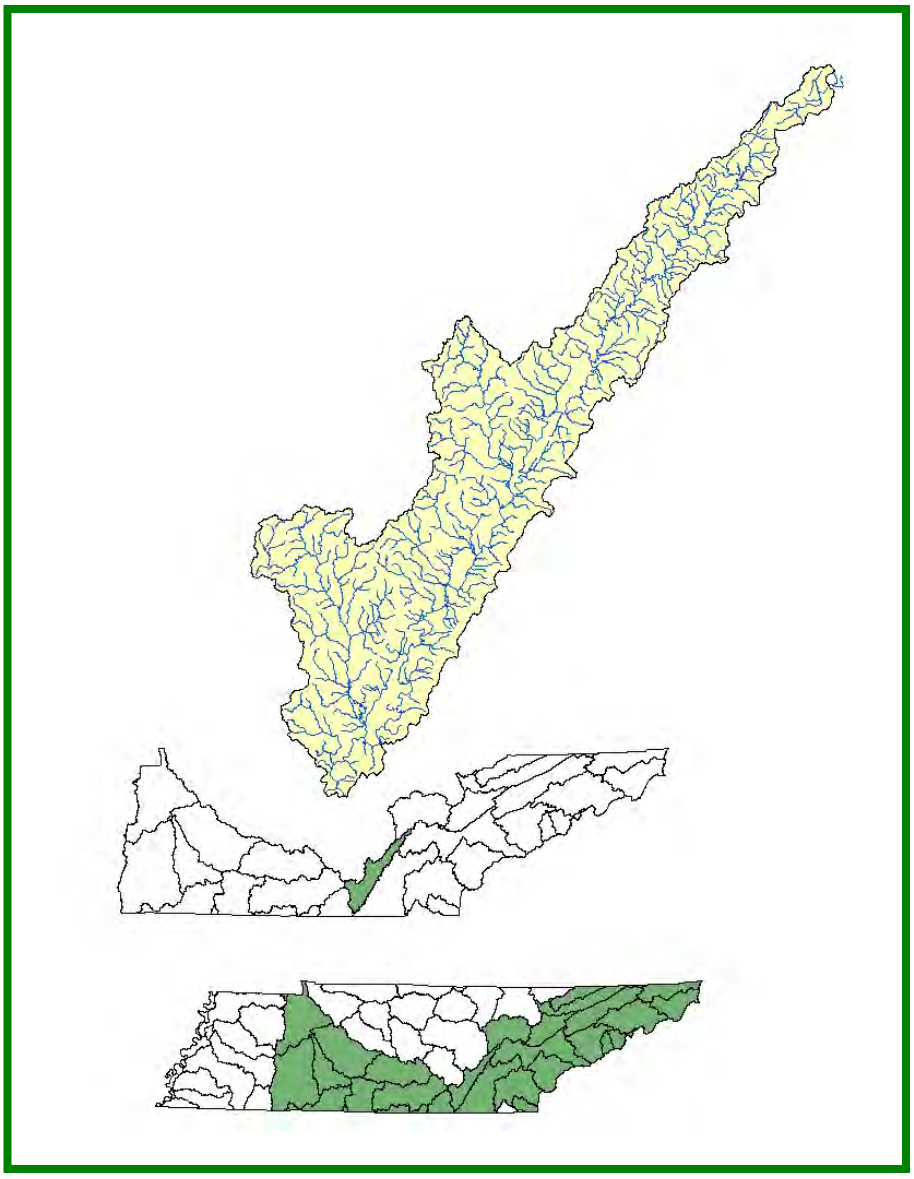
SEQUATCHIE RIVER WATERSHED (06020004) OF THE TENNESSEE RIVER BASIN

WATERSHED WATER QUALITY MANAGEMENT PLAN



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

SEQUATCHIE RIVER WATERSHED
WATER QUALITY MANAGEMENT PLAN

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GLOSSARY

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

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

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

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

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

AFO. Animal Feeding Operation.

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

ARAP. Aquatic Resource Alteration Permit.

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

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

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

Benthic. Bottom dwelling.

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

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

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

CAFO. Concentrated Animal Feeding Operation.

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

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

DO. Dissolved oxygen.

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

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

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

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

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

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

MRLC. Multi-Resolution Land Classification.

MS4. Municipal Separate Storm Sewer System.

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

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

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

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

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

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

SBR. Sequential Batch Reactor.

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

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

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

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

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

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

TMSP. Tennessee Multi-Sector Permit.

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

WAS. Waste Activated Sludge.

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

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

WET. Whole Effluent Toxicity.

WWTP. Waste Water Treatment Plant

Summary – Sequatchie River Watershed (06020004)

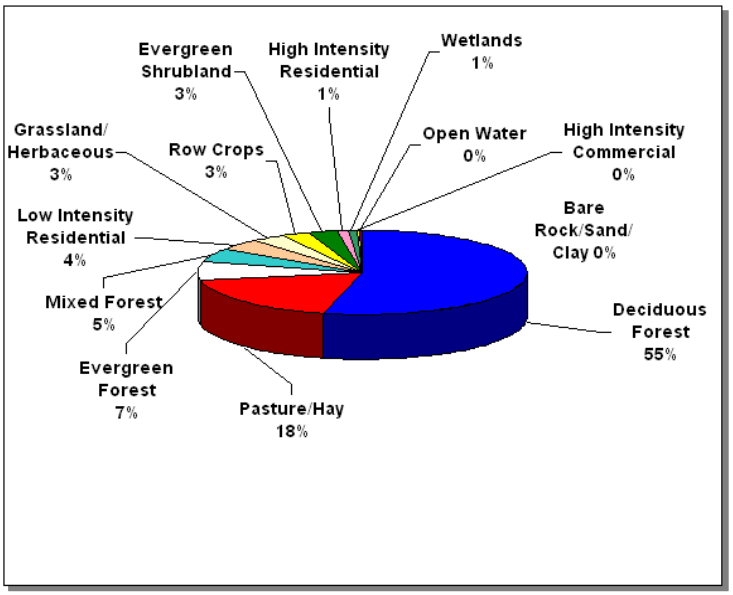
In 1996, the Tennessee Department of Environment and Conservation Division of Water Pollution Control adopted a watershed approach to water quality. This approach is based on the idea that many water quality problems, like the accumulation of point and nonpoint pollutants, are best addressed at the watershed 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 Sequatchie River Watershed Water Quality Management Plan discusses the Watershed Approach and emphasizes that the Watershed Approach is not a regulatory program or an EPA mandate; rather it is a decision-making process that reflects a common strategy for information collection and analysis as well as a common understanding of the roles, priorities, and responsibilities of all stakeholders within a watershed. Traditional activities like permitting, planning and monitoring are also coordinated in the Watershed Approach.

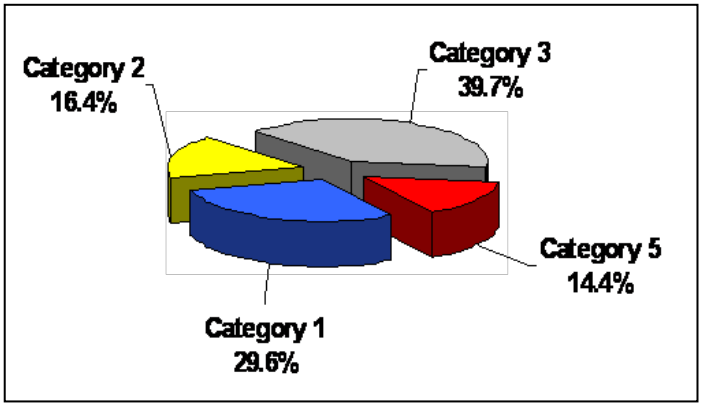
A detailed description of the watershed can be found in Chapter 2. The Sequatchie River Watershed is approximately 601 square miles and includes parts of six counties. A part of the Tennessee River drainage basin, the watershed has 909.3 stream miles.

One wildlife management area, one National Natural Landmark, one state forest, two Designated State Natural Areas, and six streams listed in the National Rivers Inventory are located in the watershed. Forty-six rare plant and animal species have been documented in the watershed, including five rare fish species, two rare crustacean species, and two rare mussel species.



Land Use Distribution in the Sequatchie River Watershed.

A review of water quality sampling and assessment is presented in Chapter 3. Using the Watershed Approach to Water Quality, 555 sampling events occurred in the Sequatchie River Watershed in 2000-2005. These were conducted at ambient, ecoregion, or watershed monitoring sites. Monitoring results support the conclusion that 76.2% of stream miles assessed fully support one or more designated uses.



Water Quality Assessment of Streams and Rivers in Sequatchie River Watershed. Assessment data are based on the 2006 Water Quality Assessment of 909.3 stream miles in 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. Additional maps illustrate streams that are listed for impairment by specific causes (siltation, 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.

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

HUC-8	HUC-10	HUC-12
06020004	0602000401	060200040101 Grassy Cove
		060200040102 Sequatchie River
		060200040103 Sequatchie River
		060200040104 Sequatchie River
		060200040105 Sequatchie River
		060200040106 Big Brush Creek
	0602000402	060200040201 Sequatchie River
		060200040202 Sequatchie River
		060200040203 Sequatchie River
		060200040204 Town Creek
	0602000403	060200040301 Little Sequatchie River, Upper
		060200040302 Pockett Creek
		060200040303 Little Sequatchie River, Lower

The Sequatchie River Watershed is Composed of thirteen USGS-Delineated Subwatersheds (12-Digit Subwatersheds).

Point source contributions to the Sequatchie River Watershed consist of 6 individual NPDES-permitted facilities. Other permits in the watershed (as of October 20, 2008) are Mining Permits (40), Aquatic Resource Alteration Permits (15), Tennessee Multi-Sector Permits (19), Construction General Permits (17), Water Treatment Plant Permits (3), CAFO Permits (7), and Ready Mix Concrete Plant Permits (3). 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.

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

The full Sequatchie River Watershed Water Quality Management Plan can be found at: http://www.state.tn.us/environment/wpc/watershed/wsmplans/

CHAPTER 1

WATERSHED APPROACH TO WATER QUALITY

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

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

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

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

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

Watersheds are appropriate as organizational units because they are readily identifiable landscape units with readily identifiable boundaries that integrate terrestrial, aquatic, and geologic processes. Focusing on the whole watershed helps reach the best balance among efforts to control point source pollution and polluted runoff as well as protect drinking water sources and sensitive natural resources such as wetlands (EPA-840-R-98-001).

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

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

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

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

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

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

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

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

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

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

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

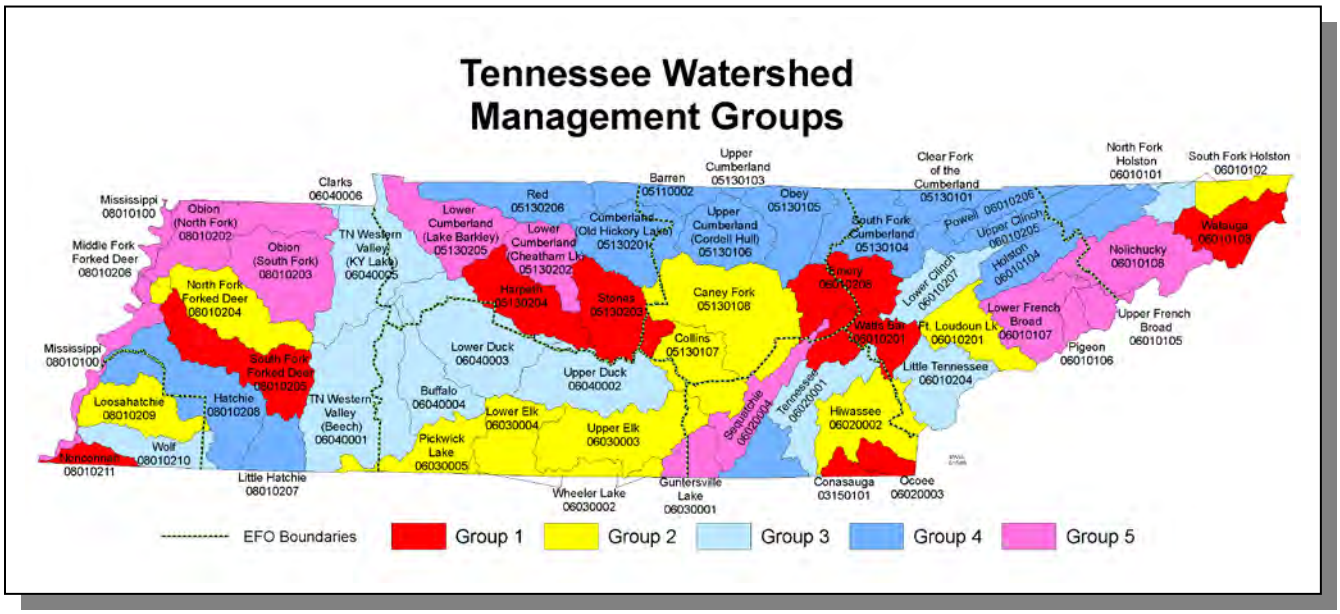


Figure 1-1. Watershed Groups in Tennessee's Watershed Approach to Water Quality.

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

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

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

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

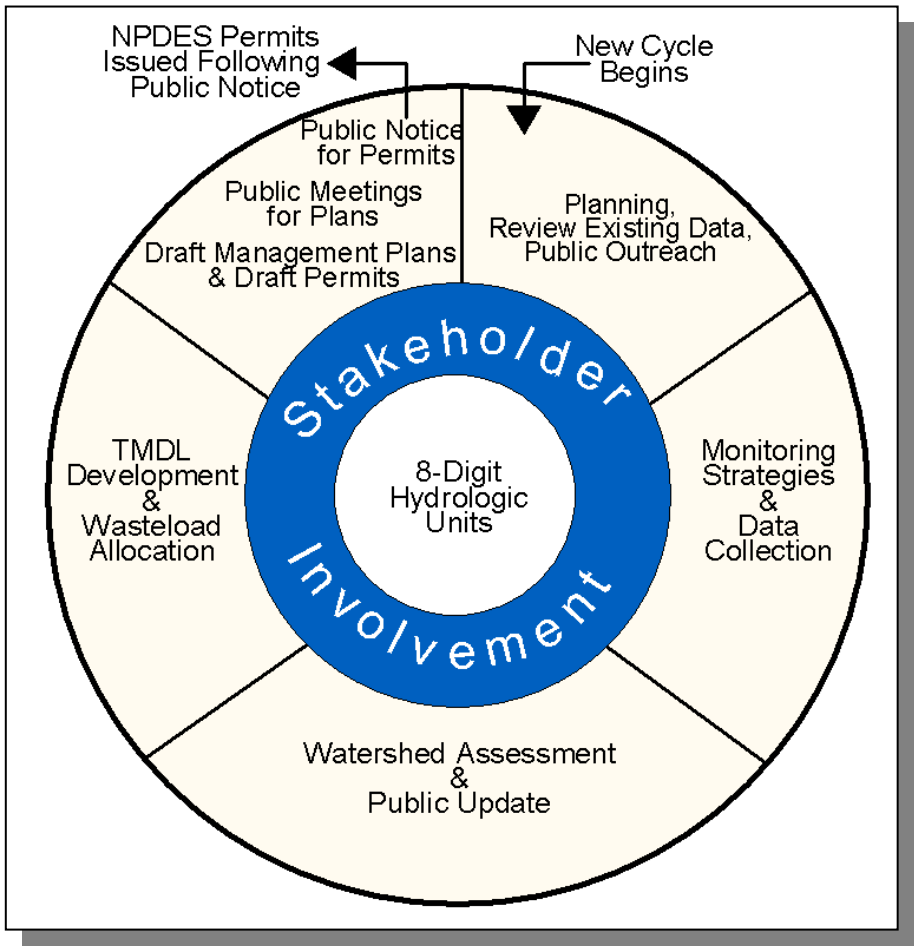


Figure 1-2. The Watershed Approach Cycle.

The six key activities that take place during the cycle are:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CHAPTER 2

DESCRIPTION OF THE SEQUATCHIE RIVER WATERSHED

2.1. BACKGROUND. The Sequatchie River drains the Sequatchie Valley, a large valley in the Cumberland Plateau in eastern Tennessee. The Sequatchie River was named after the Cherokee Chief, Sequachee, who signed a treaty with the colonial government of South Carolina. Sequachee means “opossum, he grins or runs,” in Cherokee. The Sequatchie's source is a massive spring which flows out of Devilstep Hollow Cave, a large limestone cavern. It receives the drainage of Grassy Cove, a pastoral limestone region several miles to the north from which the drainage has no surface outlet, but flows through a spectacular series of underground passages.

This Chapter describes the location and characteristics of the Sequatchie River Watershed.

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. The Sequatchie River Watershed is located in Middle Tennessee and includes parts of Bledsoe, Cumberland, Grundy, Marion, Sequatchie, and Van Buren Counties.

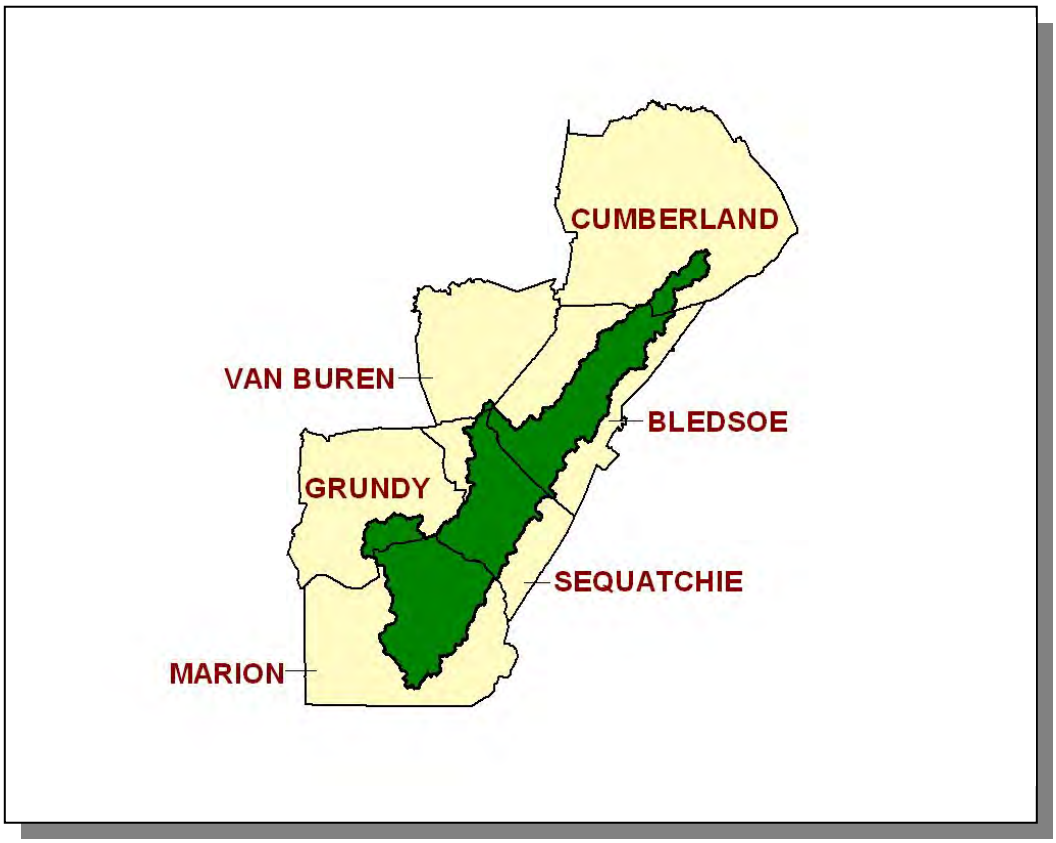


Figure 2-1. General Location of the Sequatchie River Watershed.

COUNTY	% OF WATERSHED IN EACH COUNTY
Marion	33.32
Bledsoe	31.38
Sequatchie	25.80
Grundy	4.93
Cumberland	4.35
Van Buren	0.23

Table 2-1. The Sequatchie River Watershed Includes Parts of Six Tennessee Counties.

2.2.B. Population Density Centers. One interstate and thirteen highways serve the major communities in the Sequatchie River Watershed.

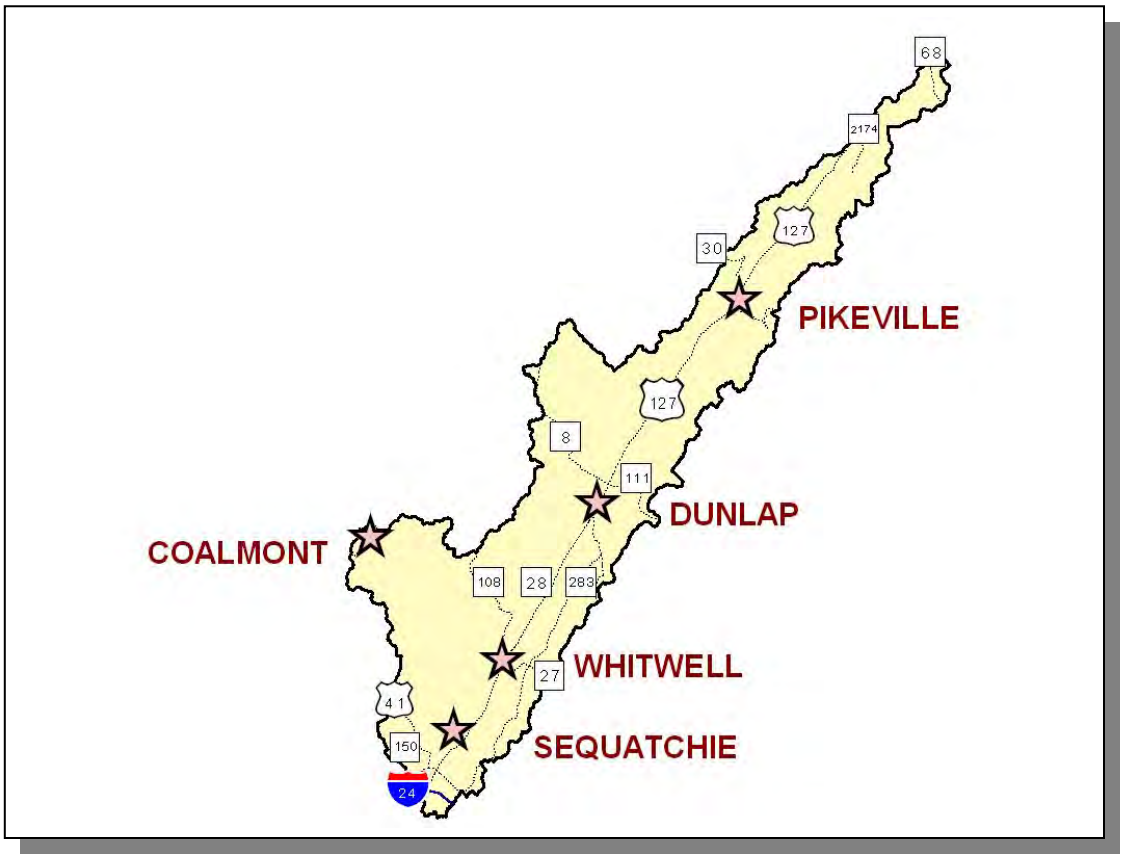


Figure 2-2. Communities and Roads in the Sequatchie River Watershed.

MUNICIPALITY	POPULATION	COUNTY
Dunlap*	4,173	Sequatchie
Sequatchie	1,783	Marion
Pikeville*	1,781	Bledsoe
Whitwell	1,660	Marion
Coalmont	948	Grundy

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

2.3. GENERAL HYDROLOGIC DESCRIPTION.

2.3.A. Hydrology. The Sequatchie River Watershed, designated 06020004 by the USGS, is approximately 601 square miles and drains to the Sequatchie River.

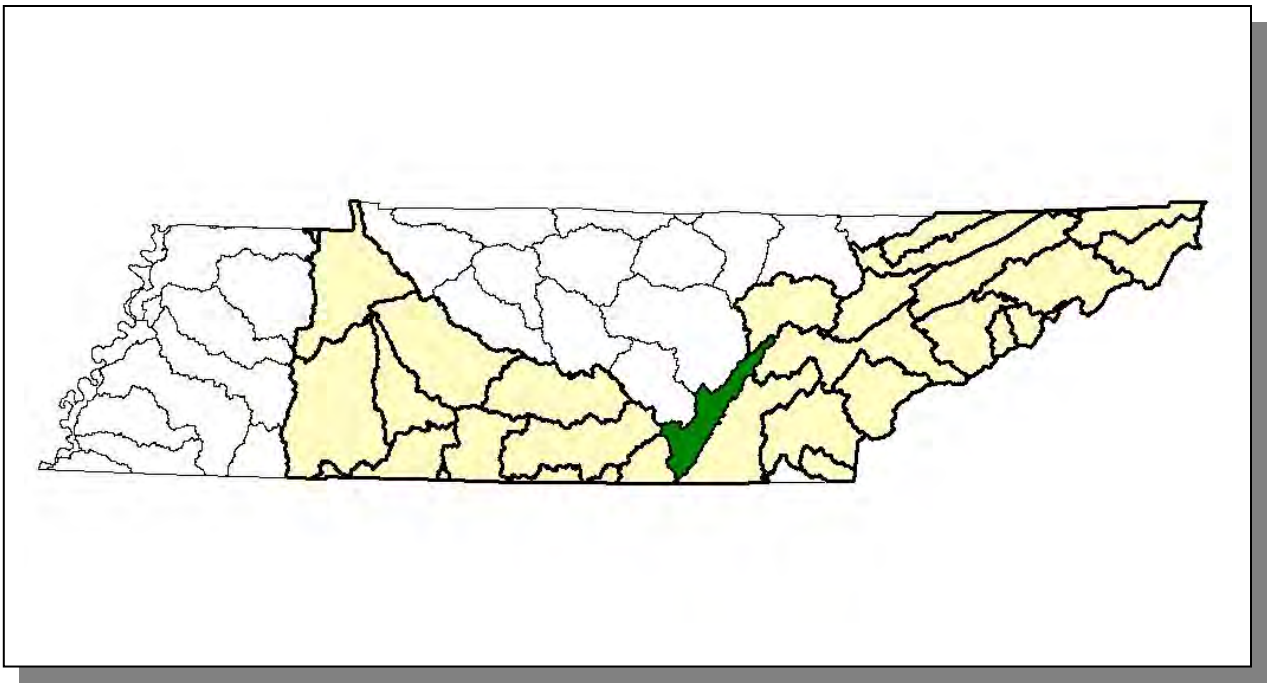


Figure 2-3. The Sequatchie River Watershed is Part of the Tennessee River Basin.

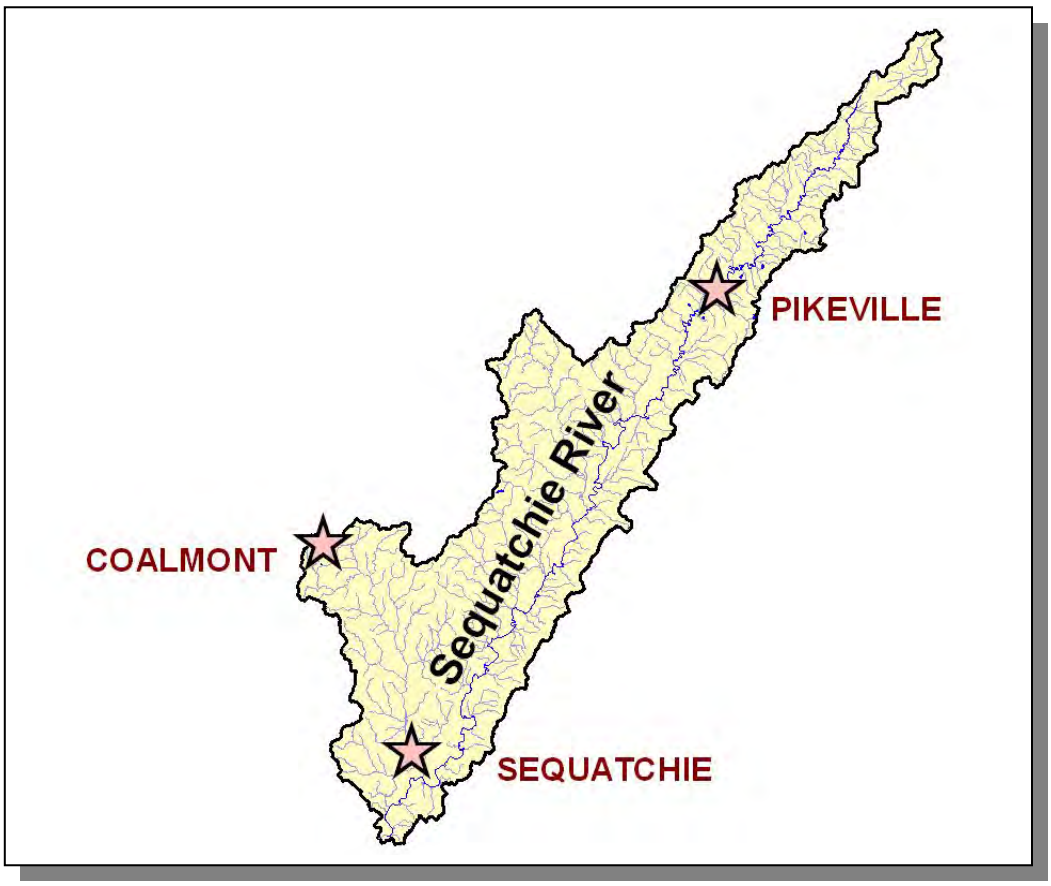


Figure 2-4. Hydrology in the Sequatchie River Watershed. *There are 909.3 stream recorded in River Reach File 3 in the Sequatchie River Watershed. Location of the Sequatchie River and the cities of Coalmont, Pikeville, and Sequatchie are shown for reference.*

2.3.B. Dams. There are 19 dams inventoried by TDEC Division of Water Supply in the Sequatchie River Watershed. These dams either retain 30 acre-feet of water or have structures at least 20 feet high.

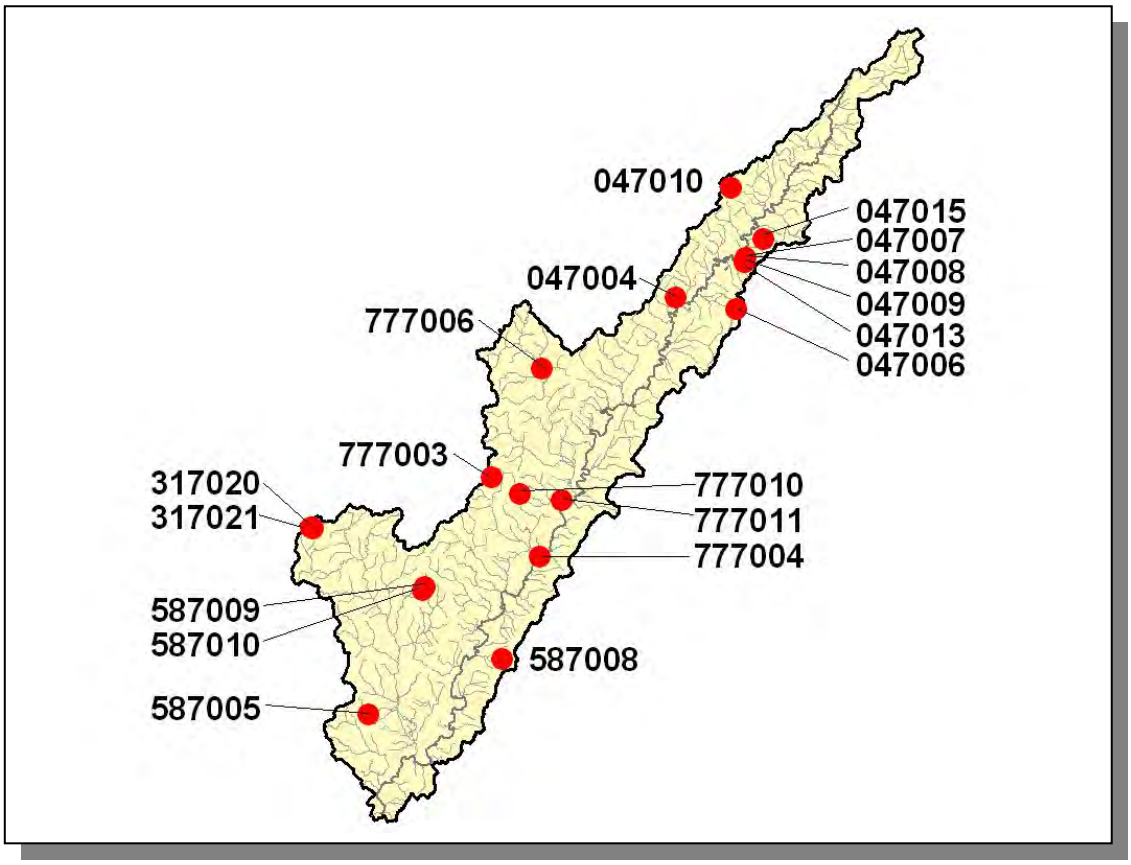


Figure 2-5. Location of Inventoried Dams in the Sequatchie River Watershed. *More information, including identification of inventoried dams labeled, is provided in Appendix II and at http://gwidc.memphis.edu/website/dams/viewer.htm.*

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

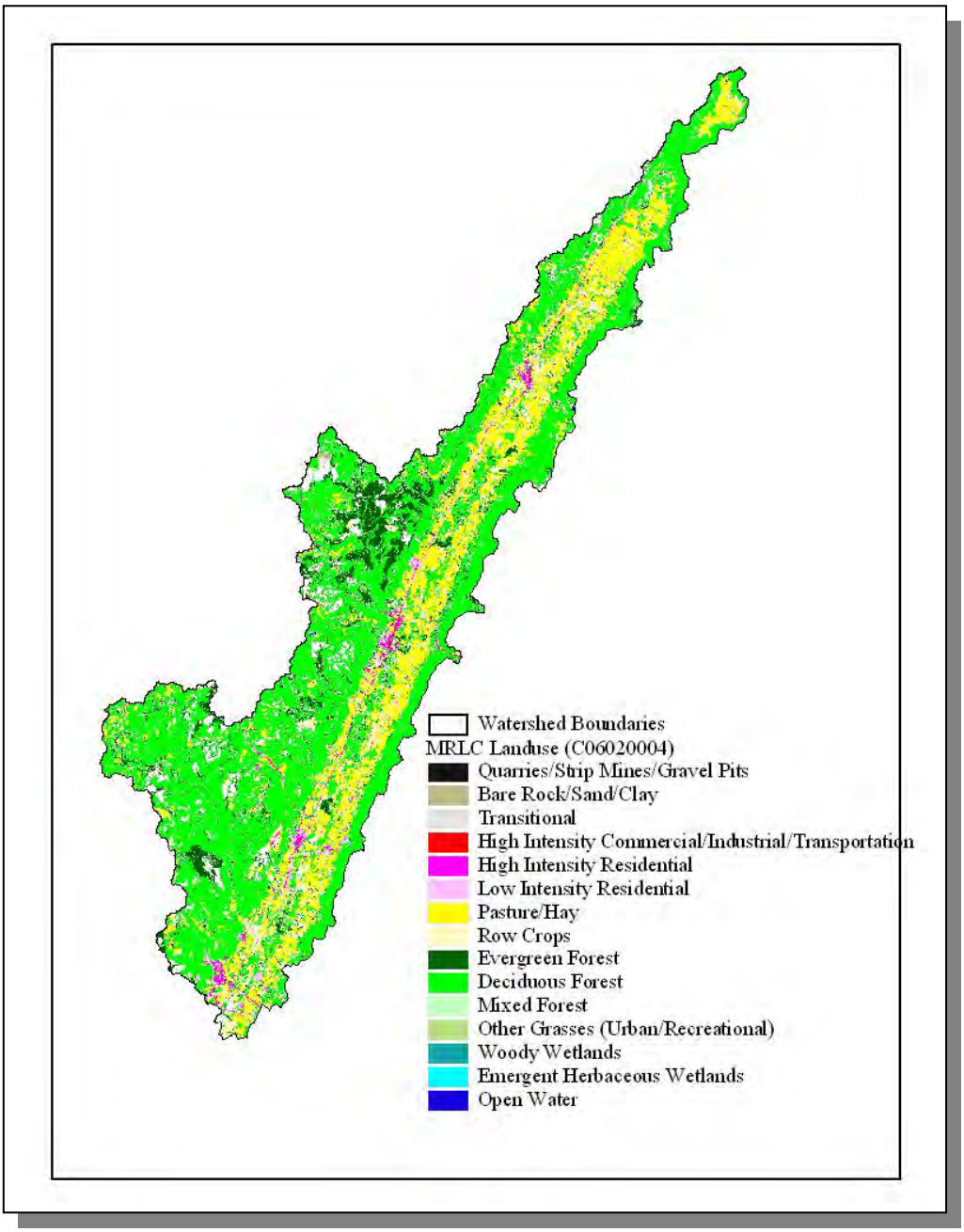


Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery.

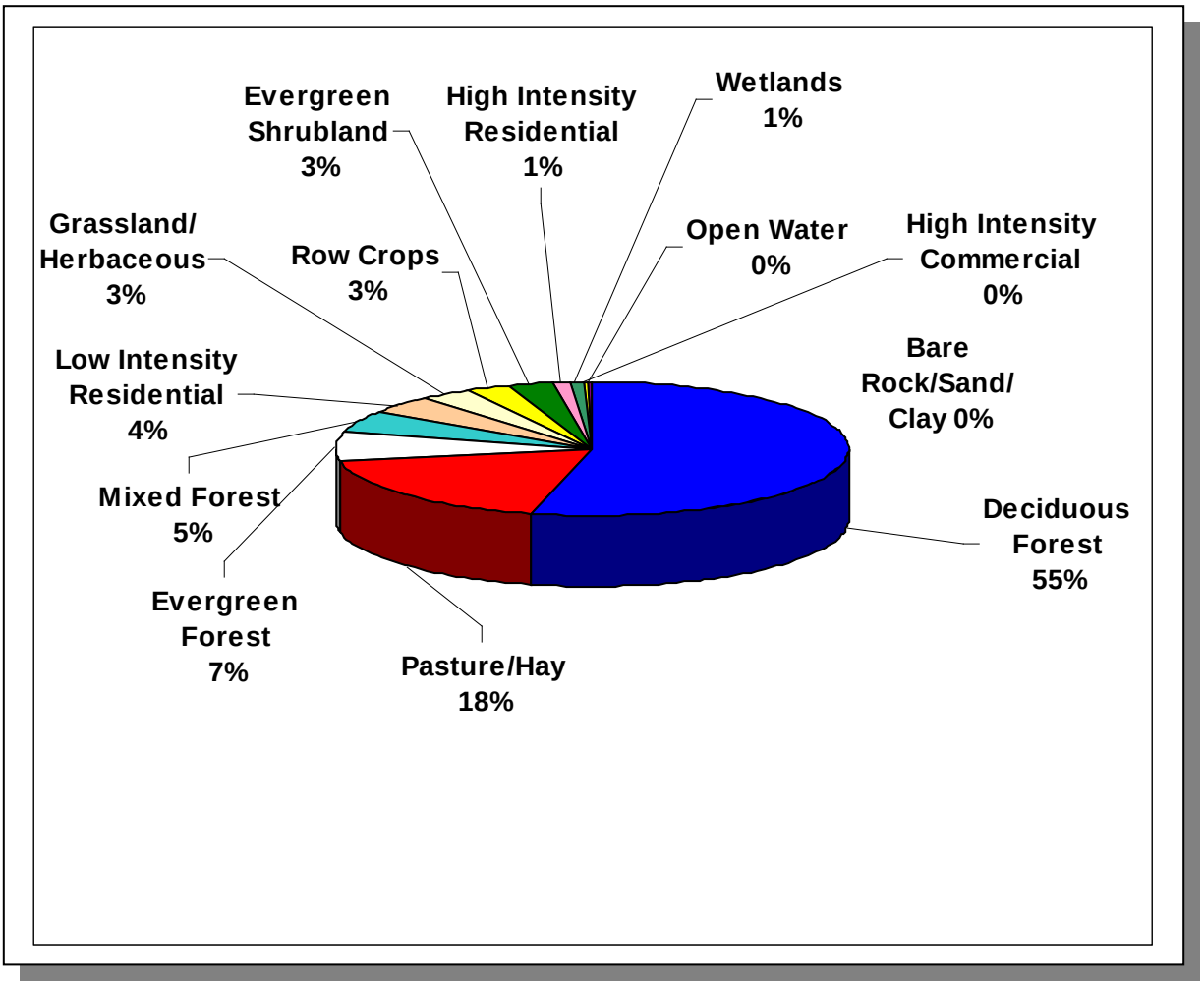


Figure 2-7. Land Use Distribution in the Sequatchie River Watershed. *More information is provided in Appendix II.*

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

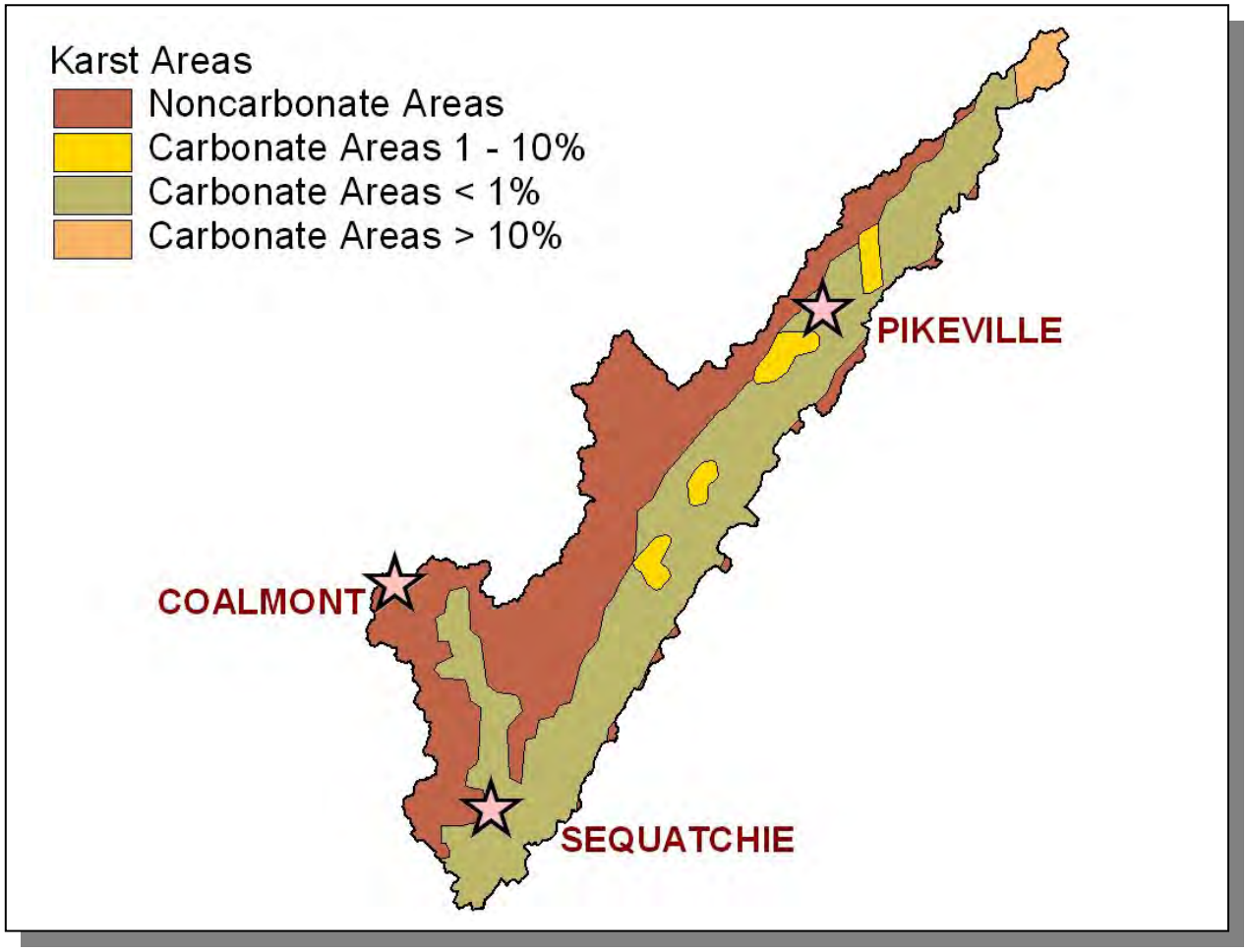


Figure 2-8. Illustration of Karst Areas in Sequatchie River Watershed. *Locations of communities in the watershed are shown for reference.*

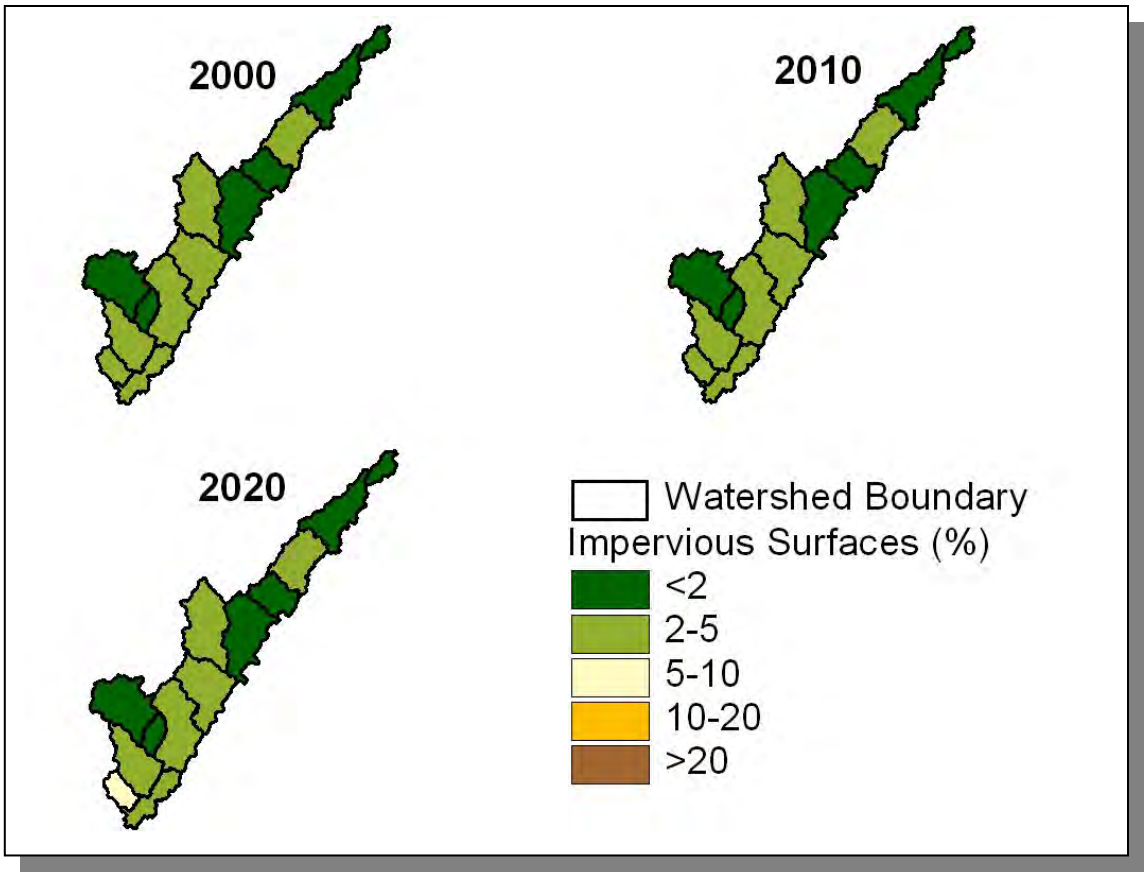


Figure 2-9. Illustration of Total Impervious Area in the Sequatchie River Watershed. *All HUC-12 subwatersheds are shown. Current estimates and projected total impervious cover calculated by HUC-12 are provided by EPA Region 4. More information can be found at:* *http://www.epa.gov/ATHENS/research/impervious/*

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 Sequatchie River 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.

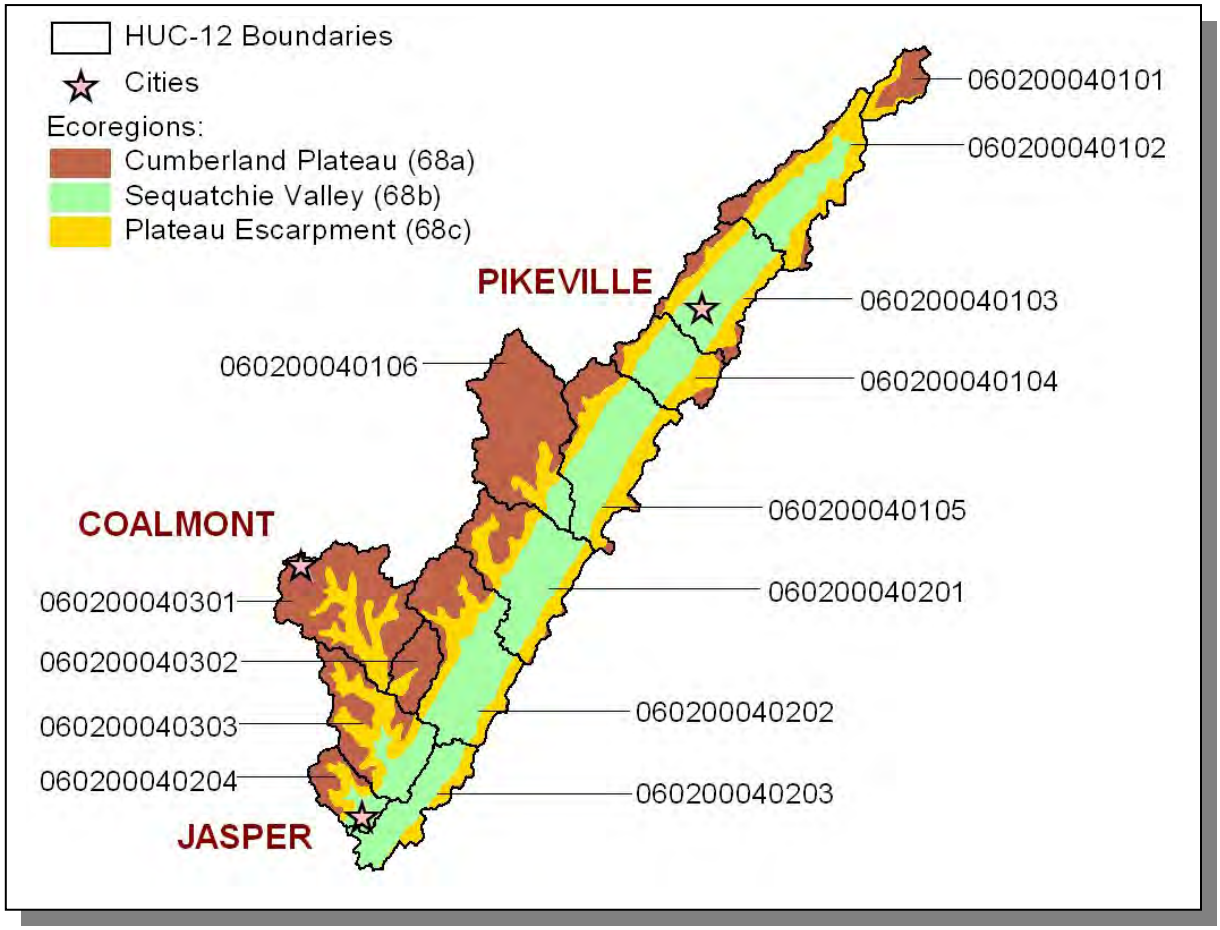


Figure 2-10. Level IV Ecoregions in the Sequatchie River Watershed. *HUC-12 subwatershed boundaries and locations of Coalmont, Jasper, and Pikeville are shown for reference.*

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.

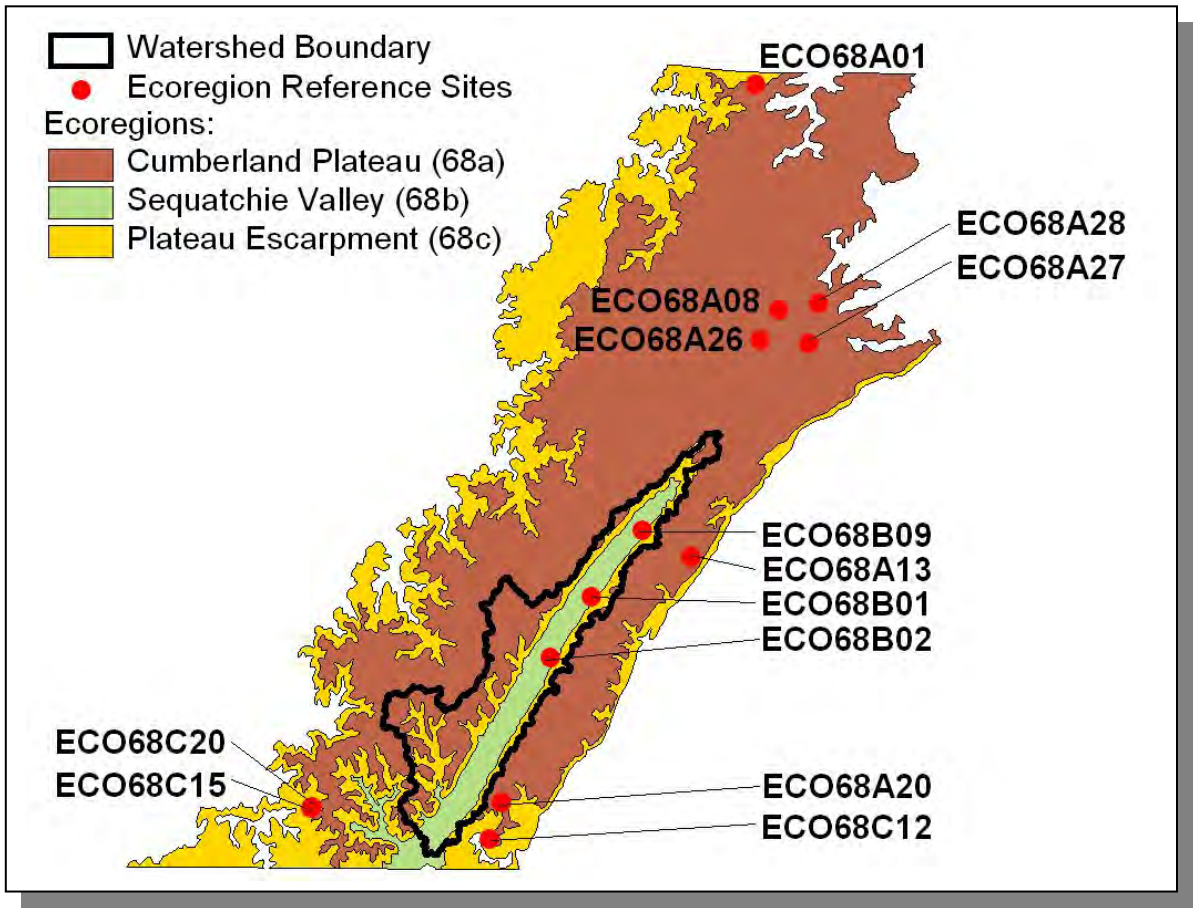


Figure 2-11. Ecoregion Monitoring Sites in Level IV Ecoregions 68a, 68b, and 68c. *The Sequatchie River Watershed is shown for reference. More information, including which ecoregion reference sites were inactive or dropped prior to 06/01/2006, is provided in Appendix II.*

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 Sequatchie River Watershed has two Designated State Natural Areas:

The Chimneys is a 33-acre natural area located in Marion County. It is located in what is commonly referred to as the Pocket Wilderness where Pocket Creek cuts through Cumberland Plateau sandstone forming Pocket Gorge. Pocket Creek has sculpted the impressive feature known as the Chimneys over vast geological time. They are two isolated, 200-feet high, towering pinnacles of Pennsylvanian Warren Point sandstone connected to a central base. A natural window forms at the base. The pinnacles and natural bridge rise from the gorge floor and are nearly as high as the surrounding bluff. The natural area is adjacent to the Chimneys Scenic Park. It was designated as a state natural area in 1999, the same year it was donated to the state by U.S. Steel Corporation, a subsidiary of Marathon Ashland Petroleum, LLC.

Sequatchie Cave is an eight-acre natural area located in Marion County. It is biologically significant area located where Owen Spring Branch flows from the mouth of the cave at Sequatchie Cave Park in Marion County. The cave and its cold spring water support three federally and state listed species, three species of state concern, and many other aquatic and cave species. This is one of two sites where the federally endangered Royal Snail (Pyrgulopsis ogmorphaphe) is known in the world. Both are in Marion County. This is also the site where the rare cadisfly (Glyphopsyche sequatchie) was first described, making it the type locality for this species from which the official description derives.

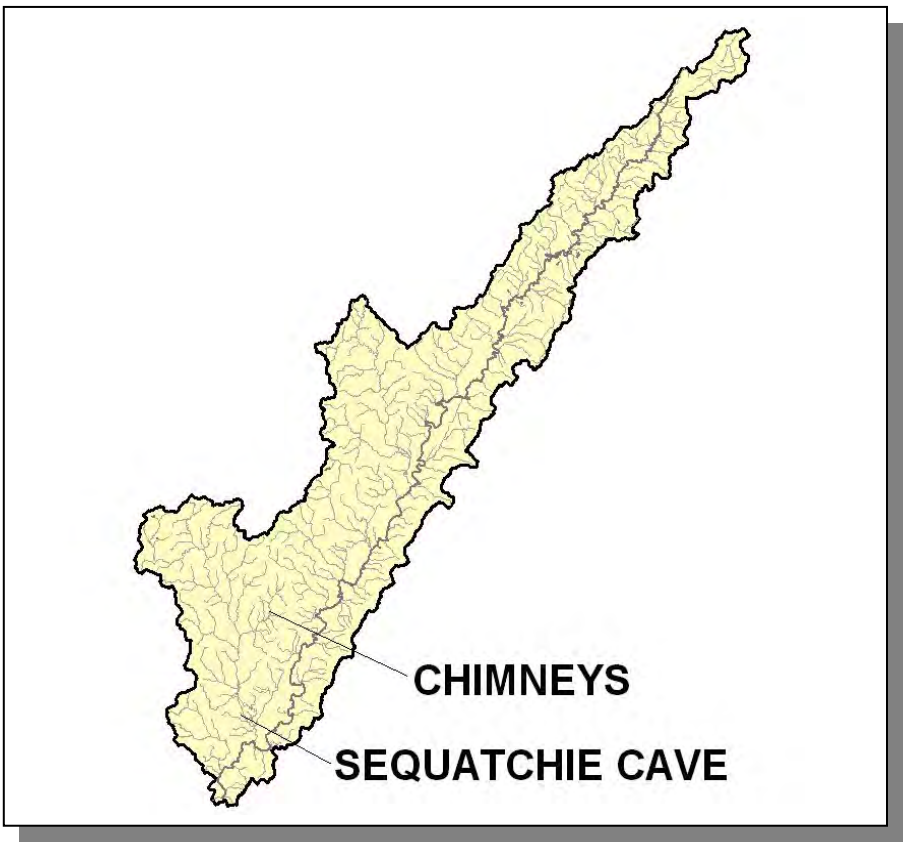


Figure 2-12. There are Two Designated State Natural Areas in the Sequatchie River Watershed.

2.6.B. Rare Plants and Animals. The Heritage 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	2
Insects	8
Mussels	2
Snails	4
Other	2
Amphibians	2
Fish	5
Mammals	3
Plants	18
Total	**46**

Table 2-3. There are 46 Known Rare Plant and Animal Species in the Sequatchie River Watershed.

In the Sequatchie River Watershed, there are five known rare fish species, two known rare amphibian species, two known rare crustacean species, two known rare mussel species, and four known rare snail species.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
Carpiodes velifer	Highfin Carpsucker		D
Etheostoma denoncourti	Golden Darter		
Hemitremia flammea	Flame Chub		D
Percina tanasi	Snail Darter	LT	T
Phoxinus tennesseensis	Tennessee Dace		D
Cryptobranchus alleganiensis	Hellbender	No Status	D
Hemidactylium scutatum	Four-toed Salamander		D
Cambarus pristinus	A Crayfish		E
Cambarus hamulatus	Cave Crayfish		
Toxolasma cylindrellus	Pale Lilliput	LE	E
Cumberlandia monodonta	Spectaclecase	C	
Marstonia ogmorhaphe	Royal Snail (Royal Marstonia)	LE	E
Helicodiscus hexodon	Toothy Coil		
Athearnia anthonyi	Anthony's River Snail	LE, XN	E
Vertigo pygmaea	Crested Vertigo		

Table 2-4. Rare Aquatic Species in the Sequatchie River Watershed. *Federal Status: LE, Listed Endangered by the U.S. Fish and Wildlife Service; C, Candidate for federal listing, information indicates that listing is justified by the U.S. Fish and Wildlife Service; XN, Non-essential experimental population by the U.S. Fish and Wildlife Service. State Status: 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/

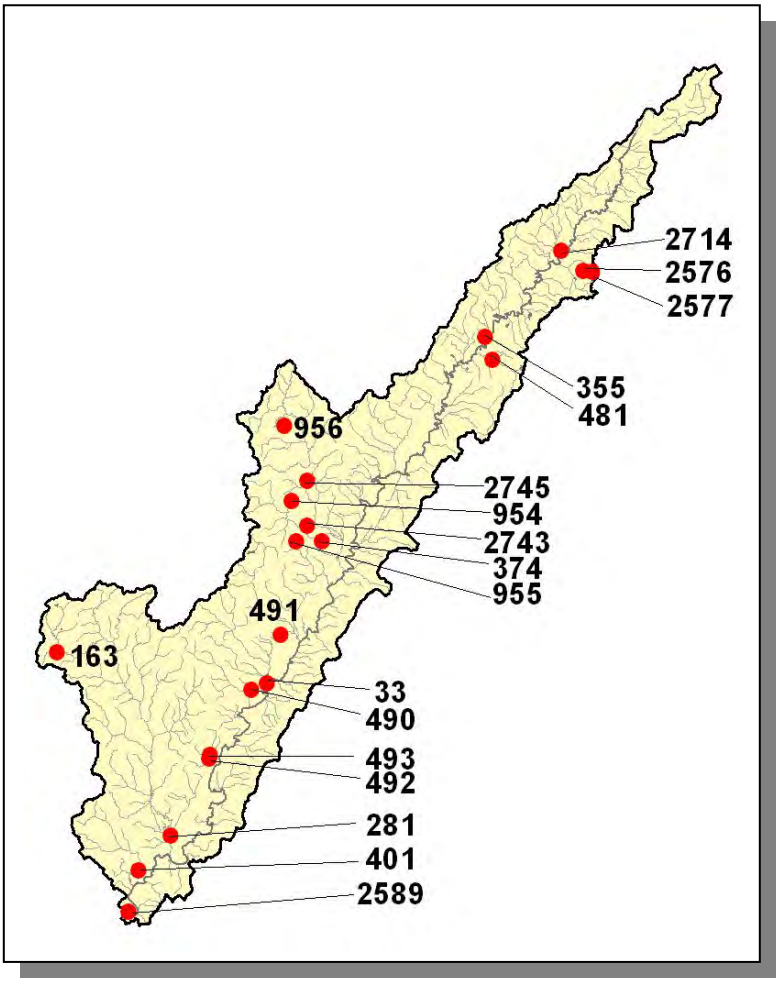


Figure 2-13. Location of Wetland Sites in TDEC Division of Natural Areas Database in Sequatchie River Watershed. This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands. *There may be additional wetland sites in the watershed. More information,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

2.7. CULTURAL RESOURCES.

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

The most recent version of the Nationwide Rivers Inventory lists portions of two streams in the Sequatchie River Watershed:

Little Sequatchie River (RM 0 to RM25) is a scenic stream that supports game fishery.

Sequatchie River (RM 0 to RM 109) is a clean, pastoral float stream that flows through a beautiful narrow scenic valley.

RIVER	SCENIC	RECREATION	GEOLOGIC	FISH	WILDLIFE
Little Sequatchie River	X	X		X	X
Sequatchie River	X	X	X	X	X

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

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

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

- Grassy Cove Karst Area is a 10,470-acre National Natural Landmark and managed by the National Park Service. More information may be found at: http://www.nature.nps.gov/nnl/Registry/USA_Map/States/Tennessee/NNL/GC/index.cfm

- Harp Wetland WMA is managed by TWRA in Bledsoe County.

- Prentice Cooper State forest covers 24,311-acres of forestland and is managed by the Tennessee Department of Agriculture (TDA). More information may be found at: http://www.state.tn.us/agriculture/forestry/stateforests/7.html

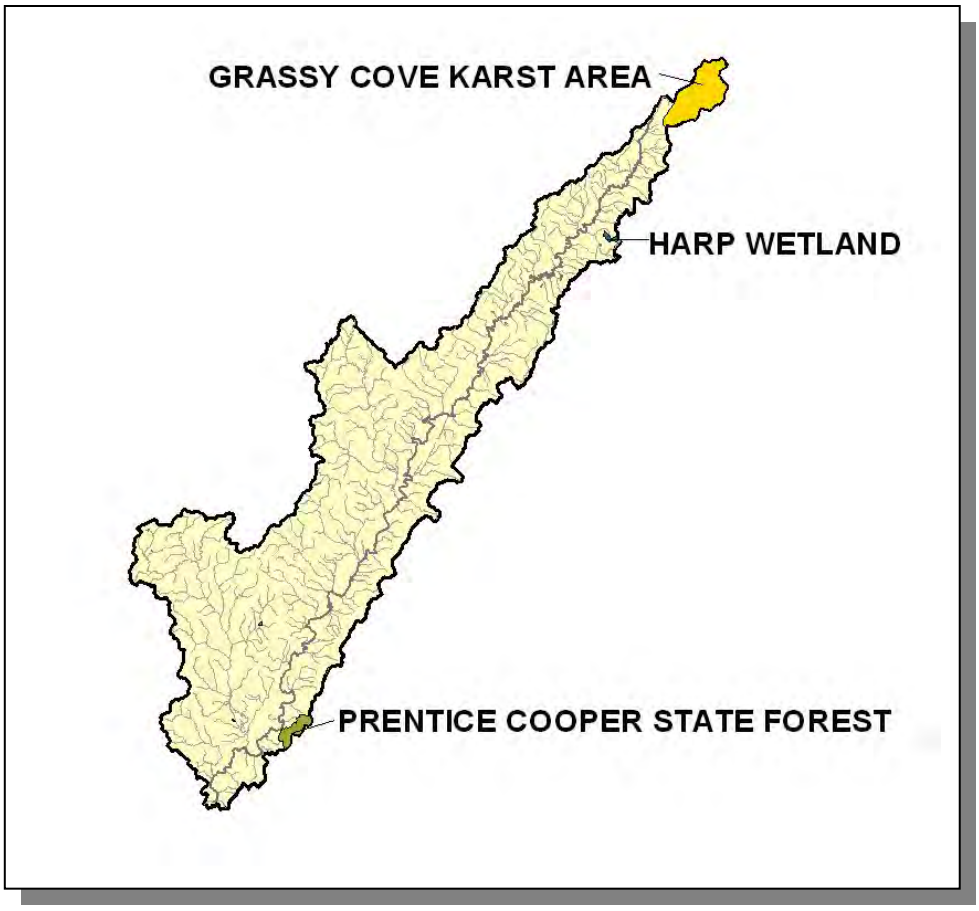


Figure 2-14. Public Lands in the Sequatchie River Watershed. *Data are from Tennessee Wildlife Resources Agency. WMA, Wildlife Management Area.*

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
Big Brush Creek	1,2	2,3		Little Brush Creek	3		
Cannon Creek				Little Sequatchie Rive	2	2	3,4
Clifty Creek	3			Mason Creek			
Crystal Creek	4			North Fork Pryor Cave Creek	2		
Dixon Creek	2			Peters Cave Creek	4		
Grays Creek	3			Pocket Creek	1		1
Griffith Creek	3			Scott Creek	2		3
Hicks Creek	2	3		Sequatchie River	2,3	1,2	1
Indian Creek				Skillern Creek	4		
Johnson Mill Creek	3			Stone Creek	2		
Laurel Creek	4			Woodcock Creek	2		

Table 2-6. Tennessee Rivers Assessment Project Stream Scoring in the Sequatchie River 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 SEQUATCHIE RIVER WATERSHED.

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

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

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

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

Tennessee uses the 305(b) Report to meet four goals (from 2008 305(b) Report):

1. Describe the water quality assessment process.

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

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

4. Provide detailed information on each watershed.

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

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

Once a stream is placed on the 303(d) list, it is considered a priority for water quality improvement efforts. These efforts not only include traditional regulatory approaches such as permit issuance, but also include efforts to control pollution sources that have historically been exempted from regulations, such as certain agricultural and forestry activities. If a stream is on the 303(d) list, the Division of Water Pollution Control cannot use its regulatory authority to allow additional sources of the same pollutant(s) for which it is listed.

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

The current 303(d) List is available on the TDEC homepage at:
http://tennessee.gov/environment/wpc/publications/303d2008.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 Sequatchie River 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.

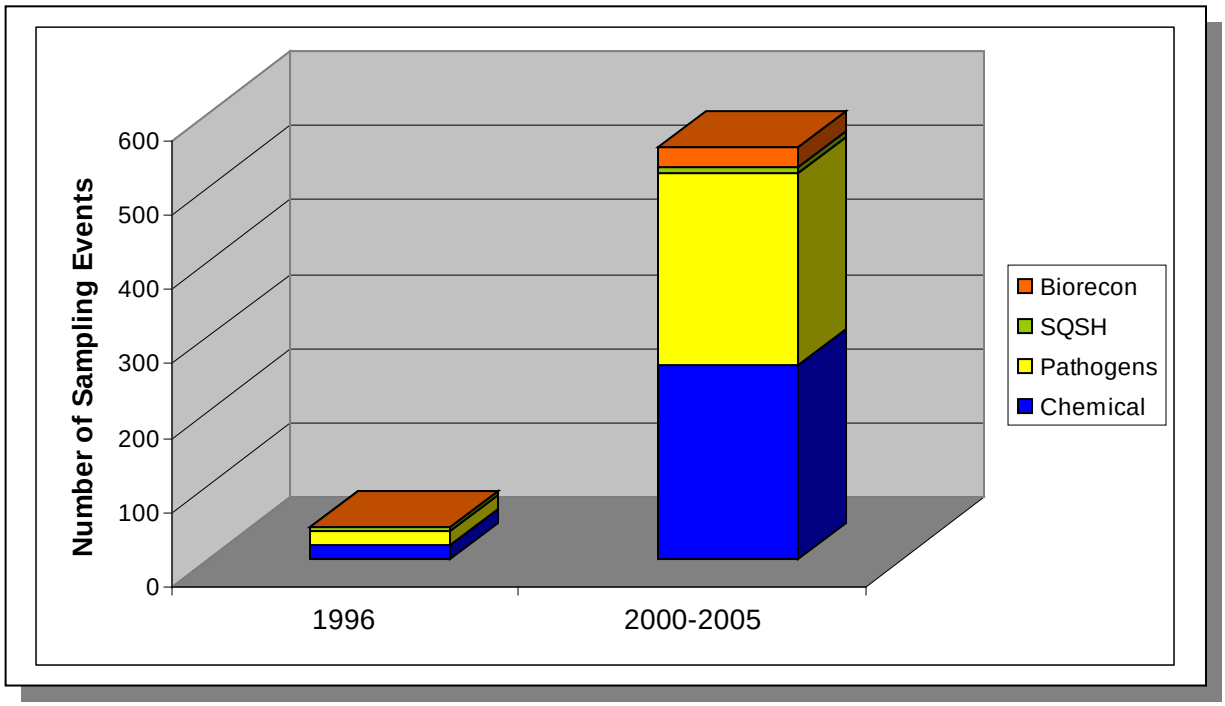


Figure 3-1. Number of Sampling Events Using the Traditional Approach (1996) and Watershed Approach (July 1, 2000 through June 30, 2005) in the Sequatchie River Watershed.

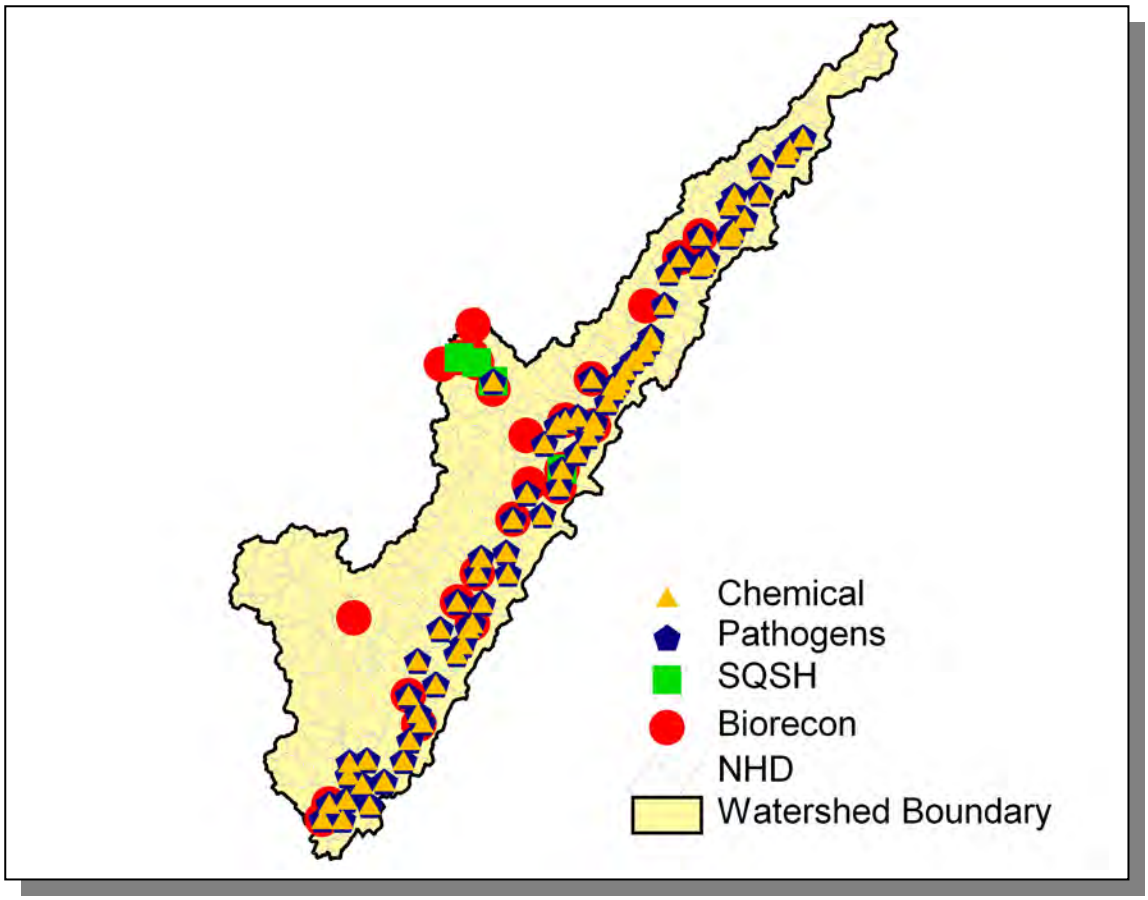


Figure 3-2. Location of Monitoring Sites in the Sequatchie River Watershed (July 1, 2000 through June 30, 2005). *Pathogens include E. coli and fecal coliform; NHD, National Hydrography Dataset of Streams; SQSH, Semi-Quantitative Single Habitat Assessment.*

	1996	2000-2005
Chemical	19	261
Pathogens	19	261
SQSH	5	7
Biorecon	0	26
Total	**43**	**555**

Table 3-1. Number of Sampling Events in the Sequatchie River 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 and Environmental Field Office-Cookeville staff (this is in addition to samples collected by water and wastewater treatment plant operators and MS4 permittees). 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 Sequatchie River Watershed are provided in Appendix IV.

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

3.2.B. Ecoregion Sites. Ecoregions are relatively homogeneous areas of similar geography, topography, climate and soils that support similar plants and animals. The delineation phase of the Tennessee Ecoregion Project was completed in 1997 when the ecoregions and subecoregions were mapped and summarized (EPA/600/R-97/022). There are eight Level III Ecoregions and twenty-five Level IV subecoregions in Tennessee (see Chapter 2 for more details). The Sequatchie River Watershed lies within 1 Level III ecoregions (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.

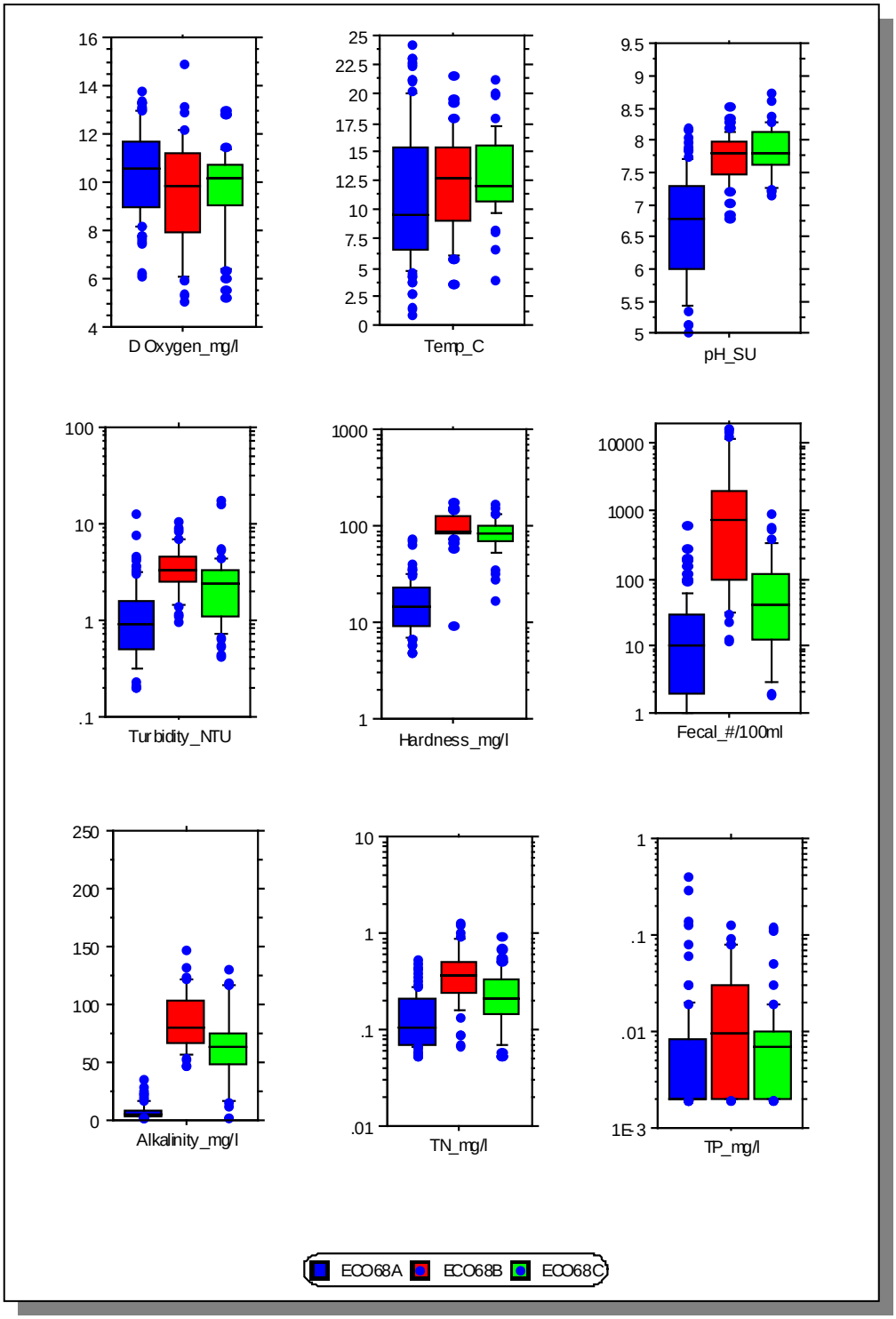


Figure 3-3. Select Chemical Data Collected in the Sequatchie River Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th percentiles. Extreme values are also shown as dots. Fecal, fecal coliform bacteria; TN, Total Nitrogen; TP, Total Phosphorus.*

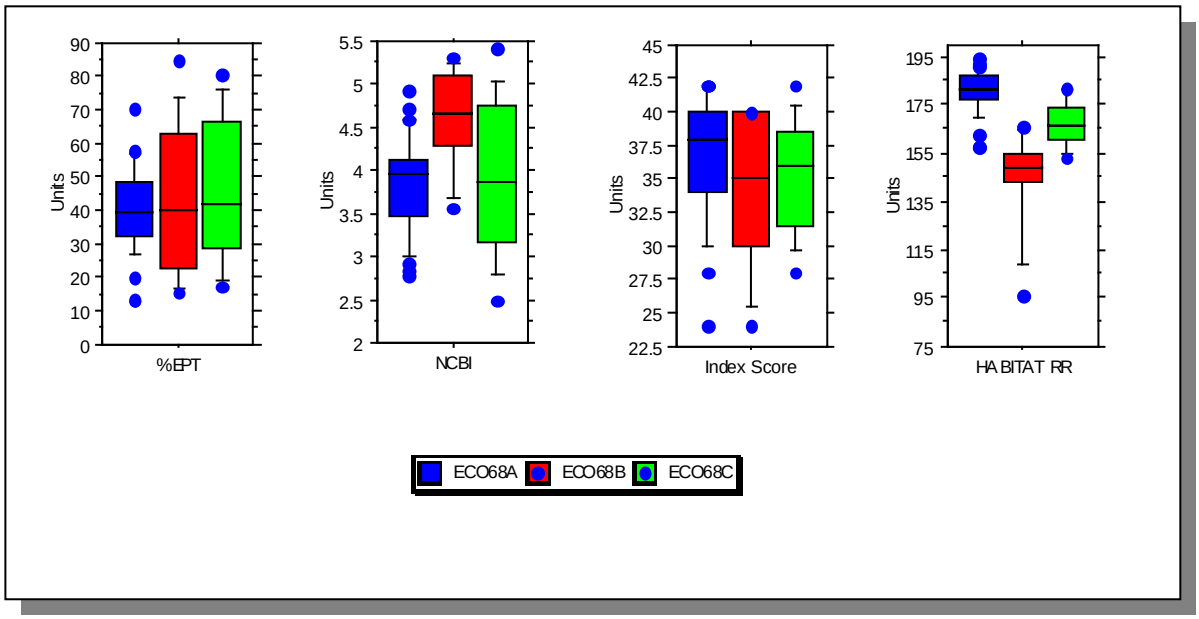


Figure 3-4. Benthic Macroinvertebrate and Habitat Scores for the Sequatchie River Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th percentiles. Extreme values are also shown as dots. NCBI, North Carolina Biotic Index. Index Score and Habitat Riffle/Run scoring system are described in TDEC's Quality System Standard Operating Procedure for Macroinvertebrate 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-12 maps (every HUC-12 is considered 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 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.

Category Assessment	Stream Miles	Reservoir Acres
Total	909.2	0
Assessed	548.6	0
Category 1	268.7	0
Category 2	149.1	0
Category 3	360.6	0
Category 4	0.0	0
Category 5	130.8	0

Table 3.2. Use Support Categories (Stream Miles and/or Reservoir Acres) in the Sequatchie River Watershed.

Use Support Categories: (from 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.

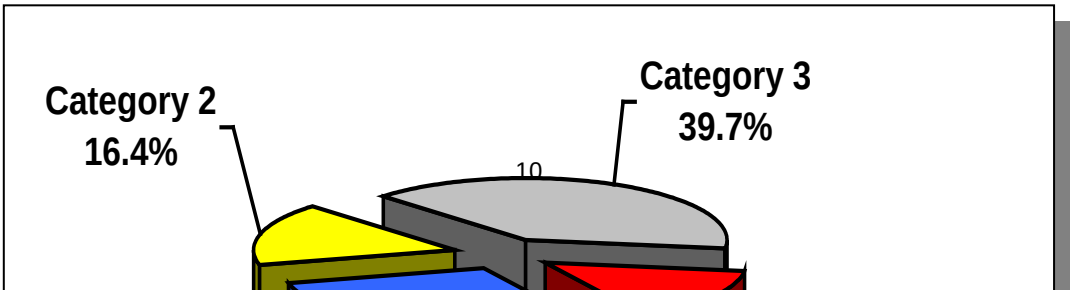


Figure 3-5. Water Quality Assessment of Streams in the Sequatchie River Watershed. *Assessment data are based on the 2006 Water Quality Assessment of 909.2 stream miles in the watershed.*

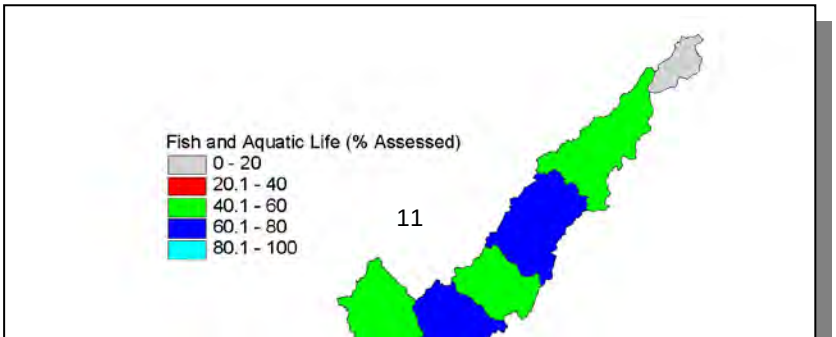


Figure 3-6. Percentage of Stream Miles Assessed for Support of Fish and Aquatic Life Designated Use in HUC-12 Subwatersheds.

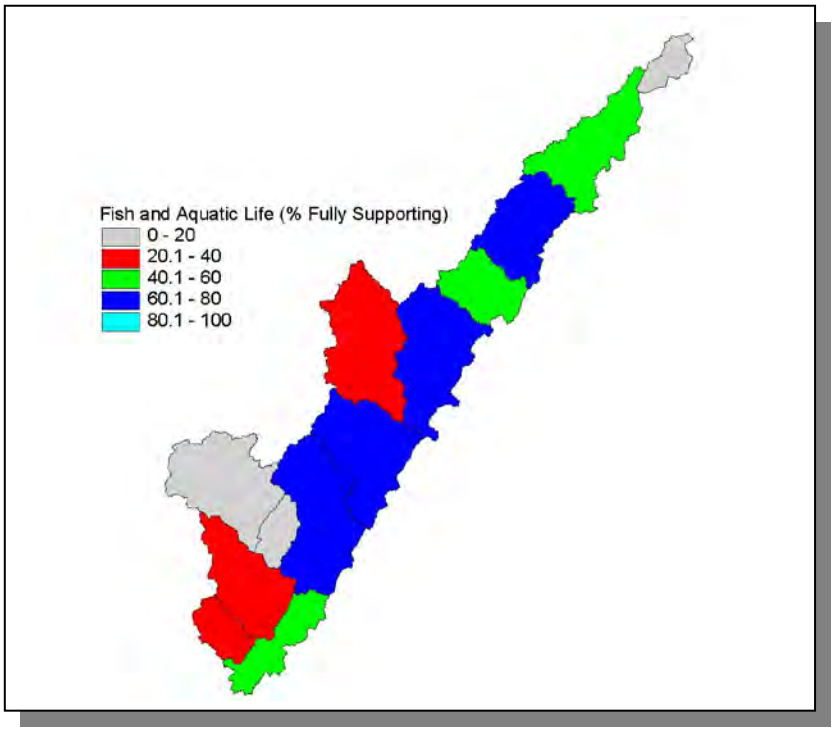


Figure 3-7. Percentage of Stream Miles Fully Supporting for Fish and Aquatic Life Designated Use in HUC-12 Subwatersheds.

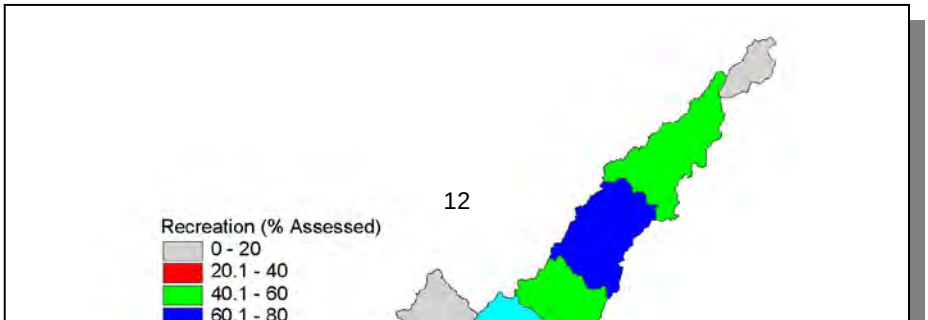


Figure 3-8. Percentage of Stream Miles Assessed for Support of Recreation Designated Use in HUC-12 Subwatersheds.

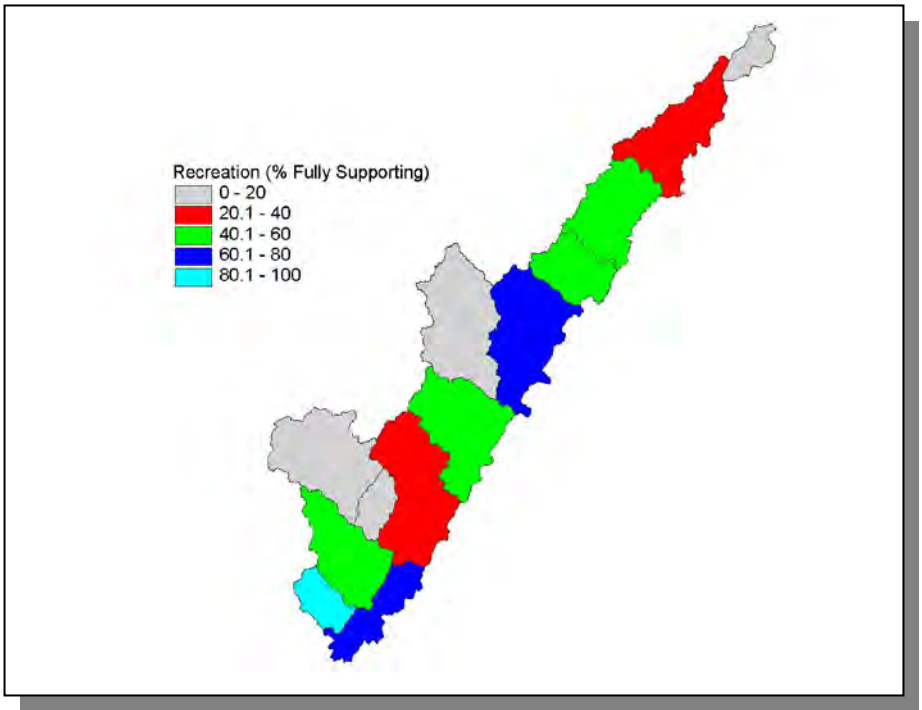


Figure 3-9. Percentage of Stream Miles Fully Supporting for Recreation Designated Use in HUC-12 Subwatersheds.

3.3.A. Assessment Summary.

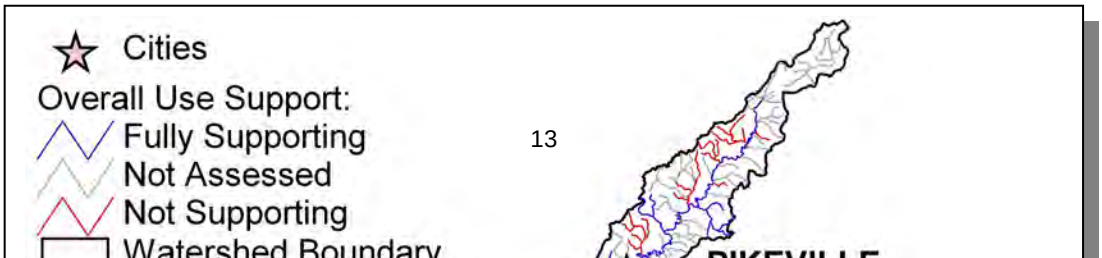


Figure 3-10. Overall Use Support Attainment in the Sequatchie River Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Dunlap, Jasper, Pikeville, and Sequatchie are shown for reference. More information is provided in Appendix III.*

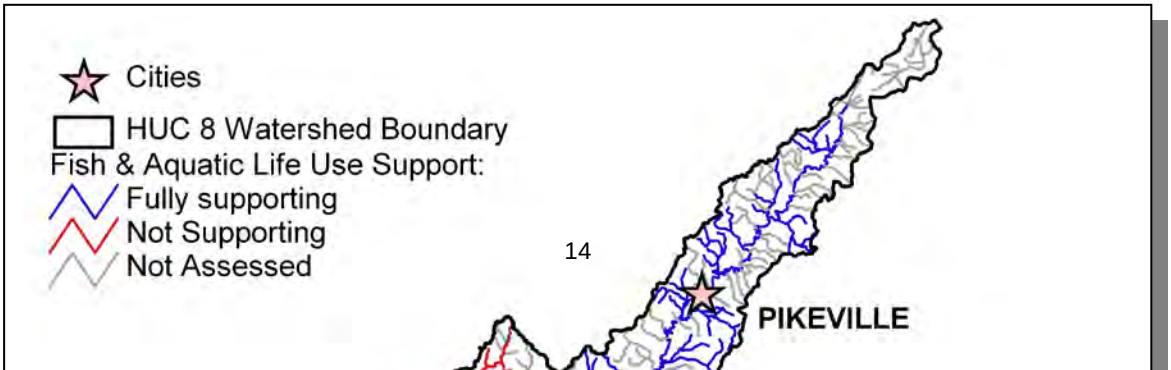


Figure 3-11. Fish and Aquatic Life Use Support Attainment in the Sequatchie River Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Dunlap, Jasper, Pikeville, and Sequatchie are shown for reference. More information is provided in Appendix III.*

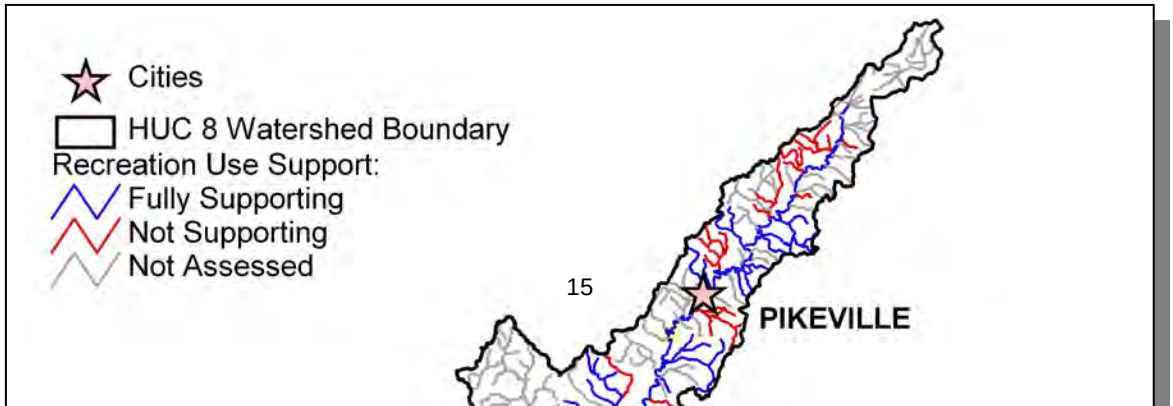


Figure 3-12. Recreation Use Support Attainment in the Sequatchie River Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Dunlap, Jasper, Pikeville, and Sequatchie are shown for reference. More information is provided in Appendix III.*

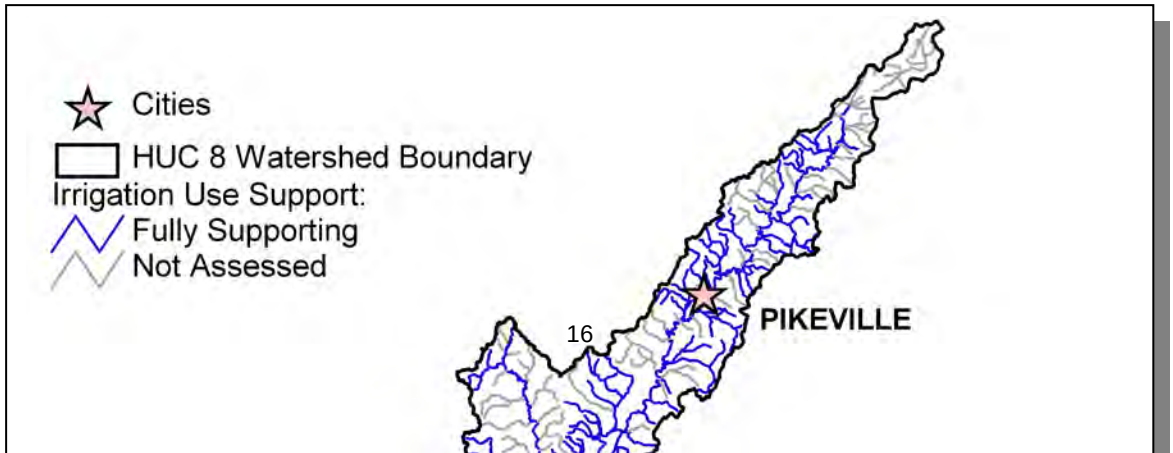


Figure 3-13. Irrigation Use Support Attainment in the Sequatchie River Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Dunlap, Jasper, Pikeville, and Sequatchie are shown for reference. More information is provided in Appendix III.*

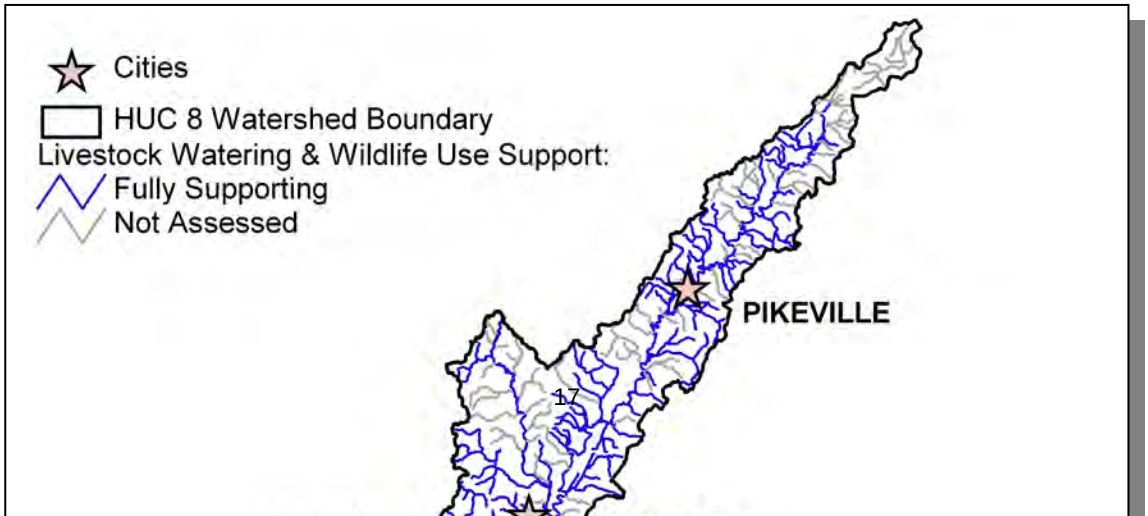


Figure 3-14. Livestock Watering and Wildlife Use Support Attainment in the Sequatchie River Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Dunlap, Jasper, Pikeville, and Sequatchie are shown for reference. More information is provided in Appendix III.*

3.3.B. Use Impairment Summary.

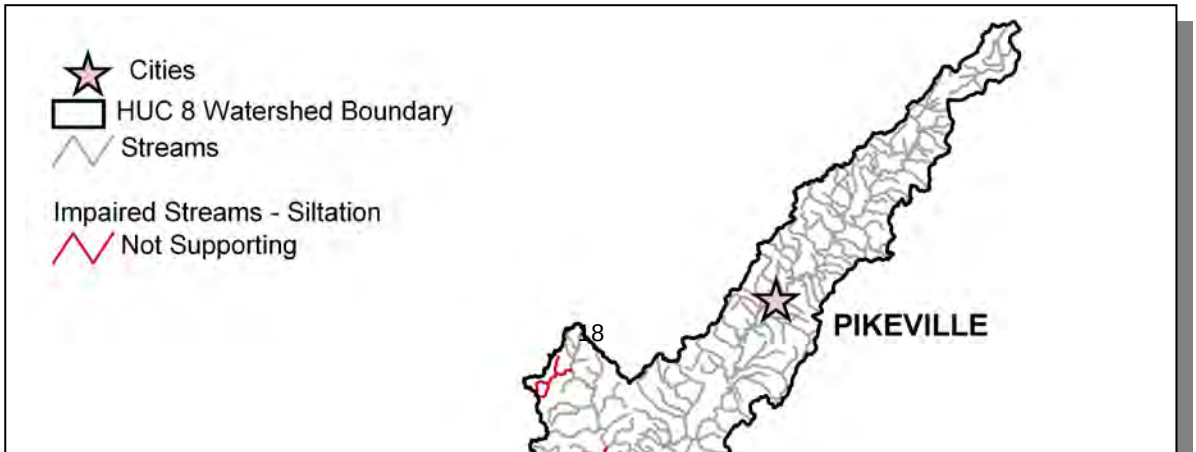


Figure 3-15. Impaired Streams Due to Siltation in the Sequatchie River Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Locations of Dunlap, Jasper, Pikeville, and Sequatchie are shown for reference. More information is provided in Appendix III.*

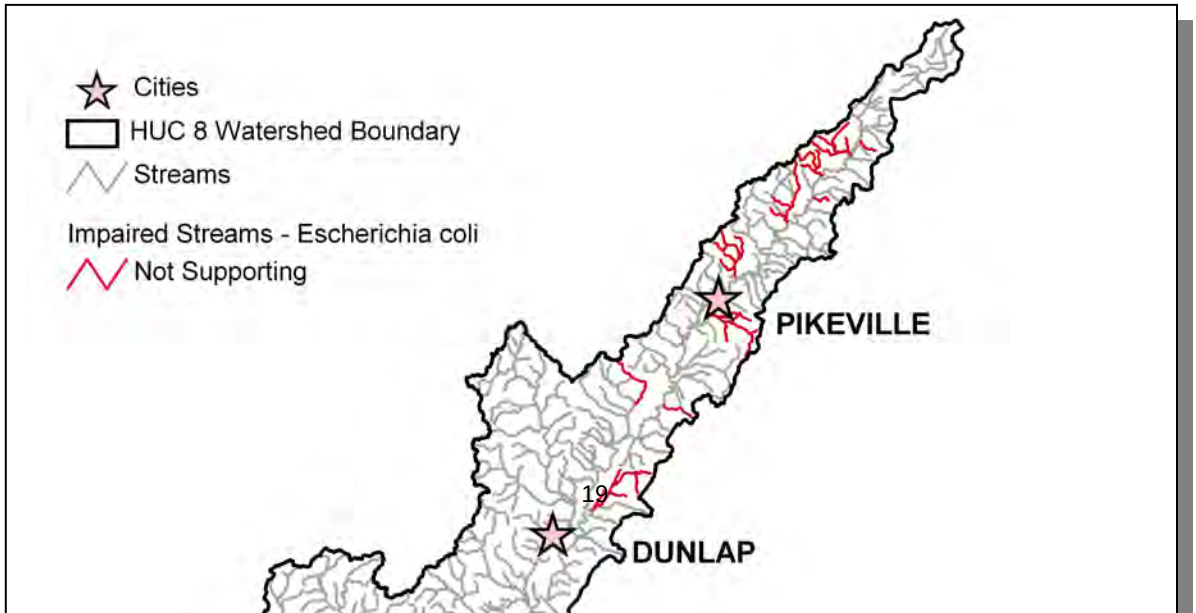


Figure 3-16. Impaired Streams Due to Escherichia coli in the Sequatchie River Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Locations of Dunlap, Jasper, Pikeville, and Sequatchie are shown for reference. More information is provided in Appendix III.*

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/.

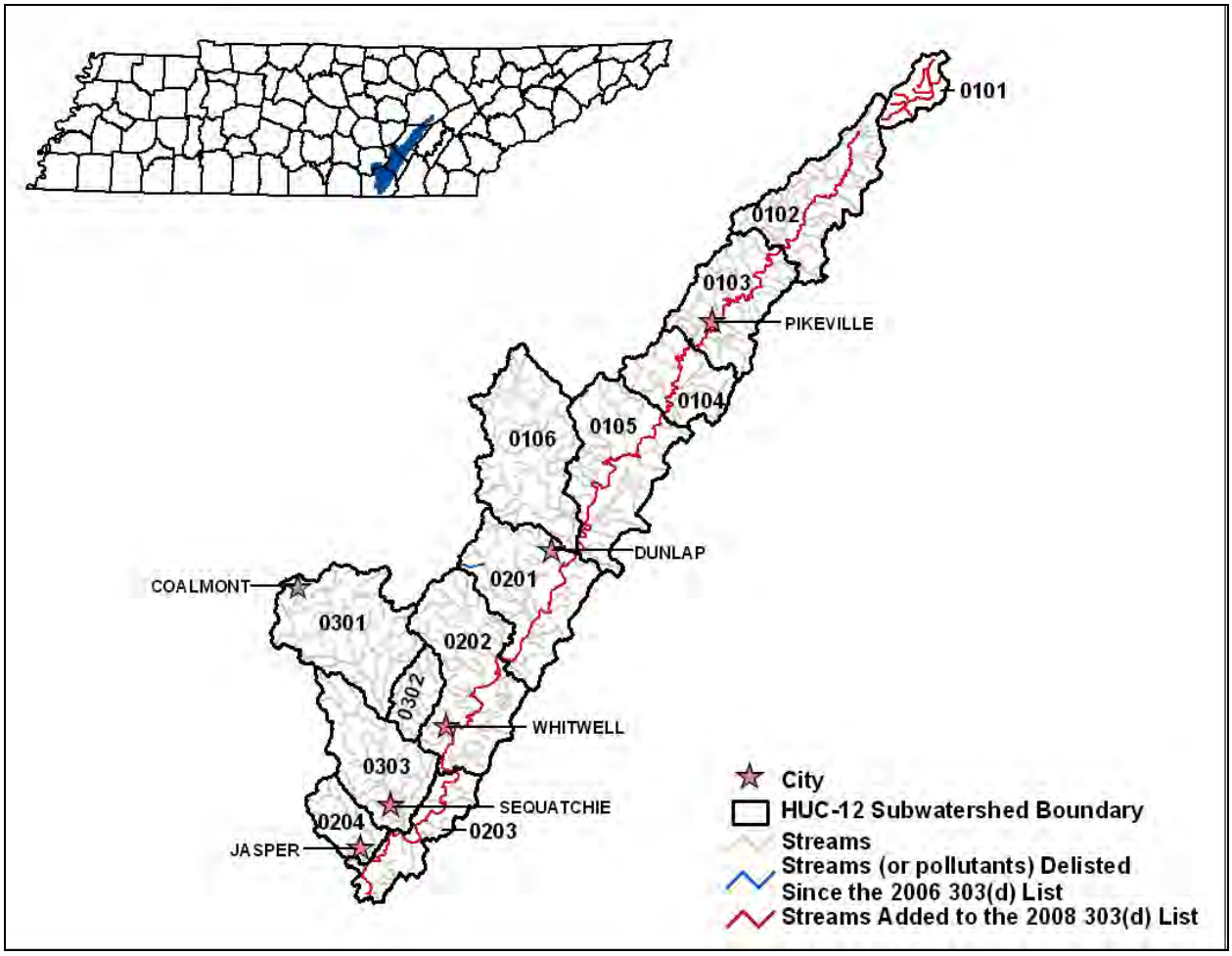


Figure 3-17. Changes to the 303(d) List of Impaired Waters in the Sequatchie River Watershed Since Approval of the 2006 List by EPA. *More information is provided in Appendix III.*

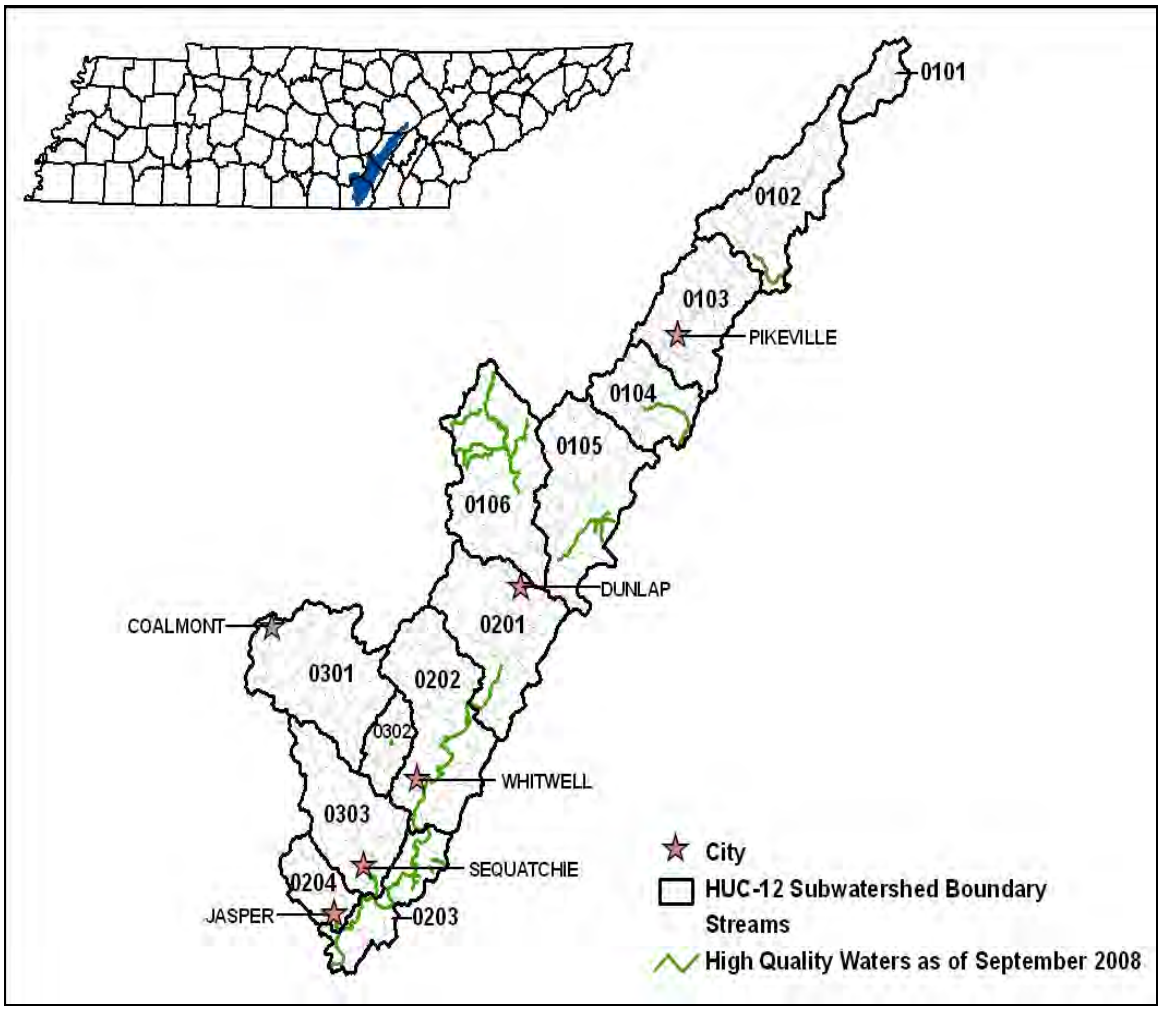


Figure 3-18. High Quality Waters Identified in the Sequatchie River Watershed. *More information is provided in Appendix III.*

CHAPTER 4

POINT AND NONPOINT SOURCE CHARACTERIZATION OF THE SEQUATCHIE RIVER WATERSHED

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

i. General description of the subwatershed
ii. 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 Sequatchie River Watershed (HUC 06020004) has been delineated into thirteen 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.

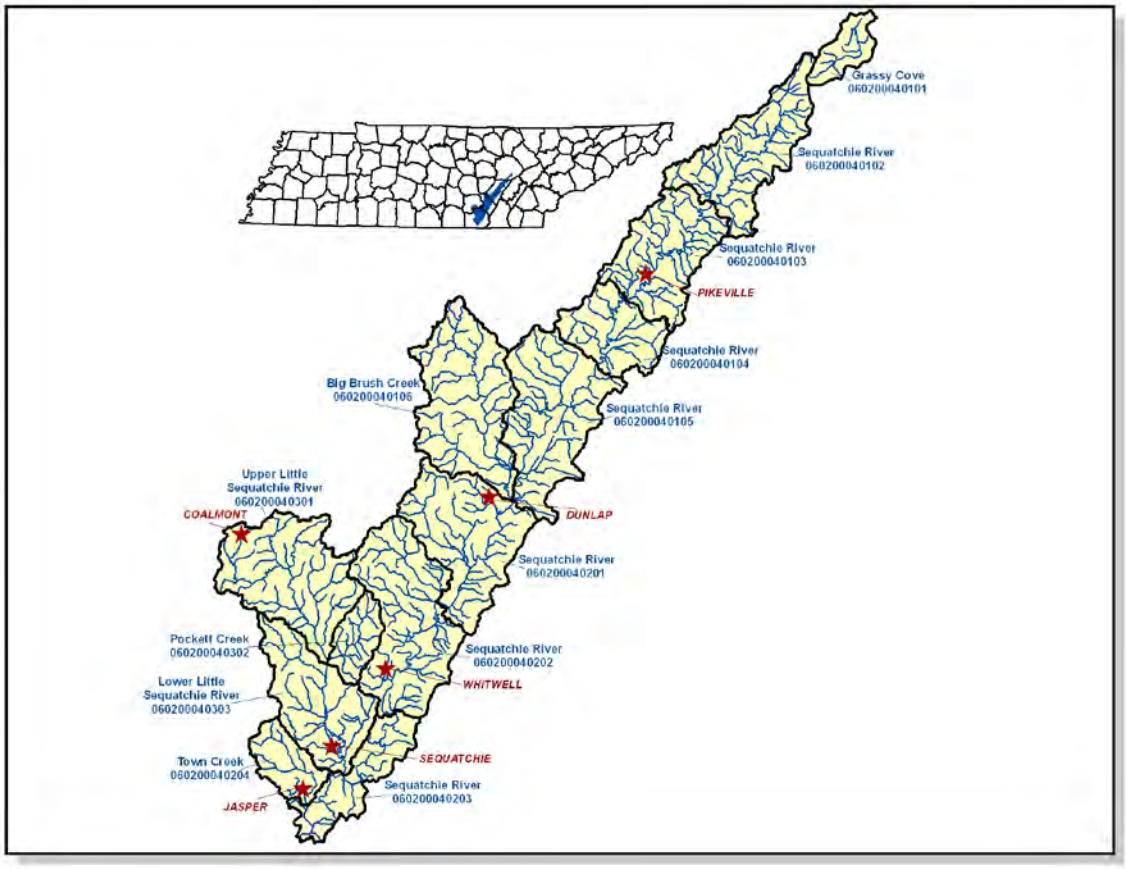


Figure 4-1. The Sequatchie River Watershed is Composed of thirteen USGS-Delineated Subwatersheds (12-Digit Subwatersheds).

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 Sequatchie River Watershed.

HUC-8	HUC-10	HUC-12
06020004	0602000401	060200040101 Grassy Cove
		060200040102 Sequatchie River
		060200040103 Sequatchie River
		060200040104 Sequatchie River
		060200040105 Sequatchie River
		060200040106 Big Brush Creek
	0602000402	060200040201 Sequatchie River
		060200040202 Sequatchie River
		060200040203 Sequatchie River
		060200040204 Town Creek
	0602000403	060200040301 Little Sequatchie River, Upper
		060200040302 Pockett Creek
		060200040303 Little Sequatchie River, Lower

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. 060200040101 (Grassy Cove).

4.2.A.i. General Description.

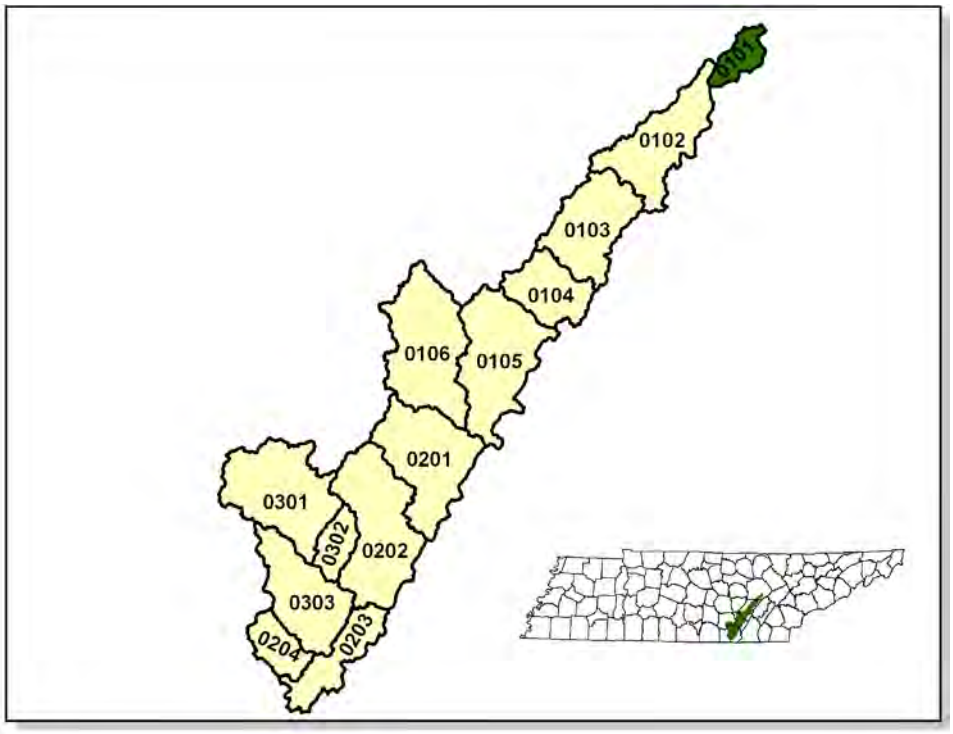


Figure 4-2. Location of Subwatershed 060200040101. *All Sequatchie River HUC-12 subwatershed boundaries are shown for reference.*

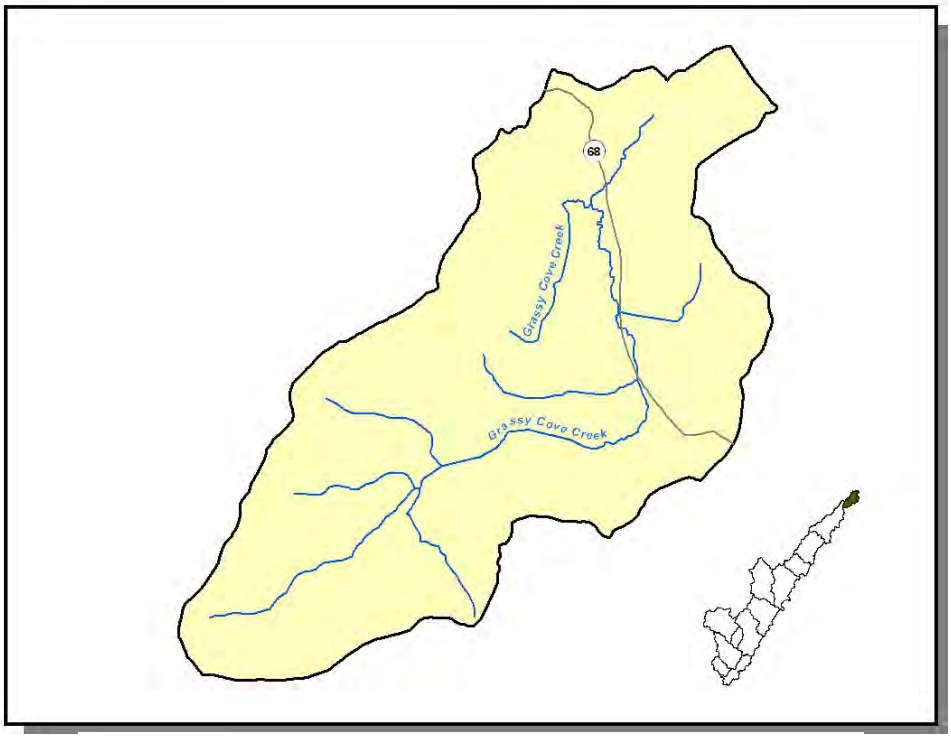


Figure 4-3. Locational Details of Subwatershed 060200040101.

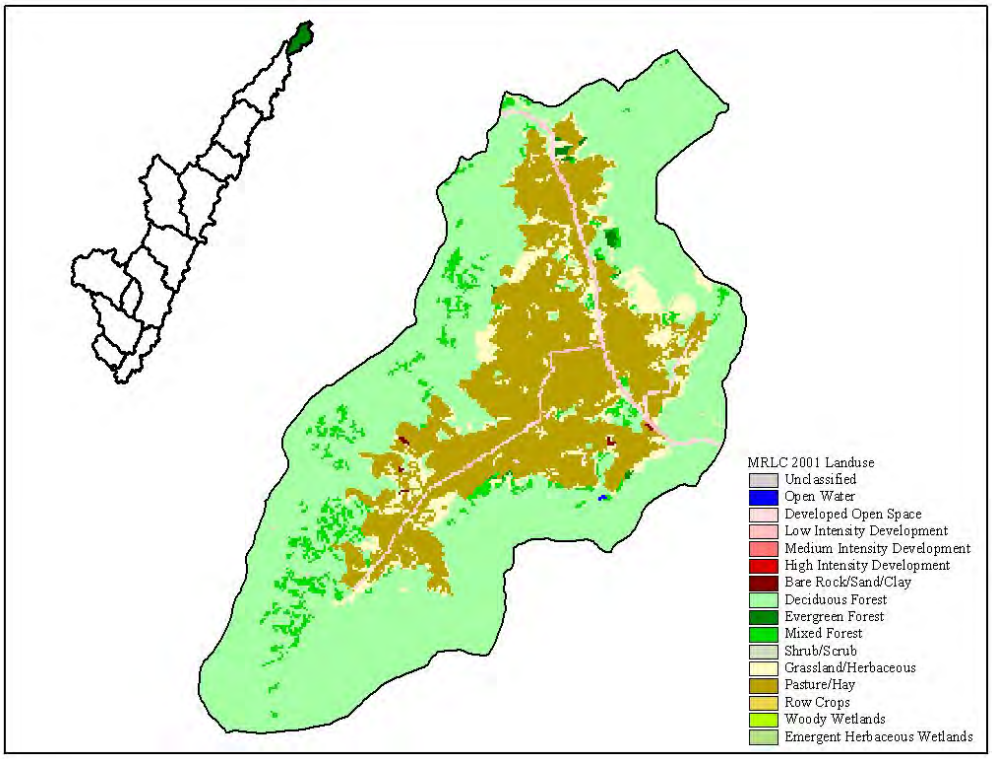


Figure 4-4. Illustration of Land Use Distribution in Subwatershed 060200040101.

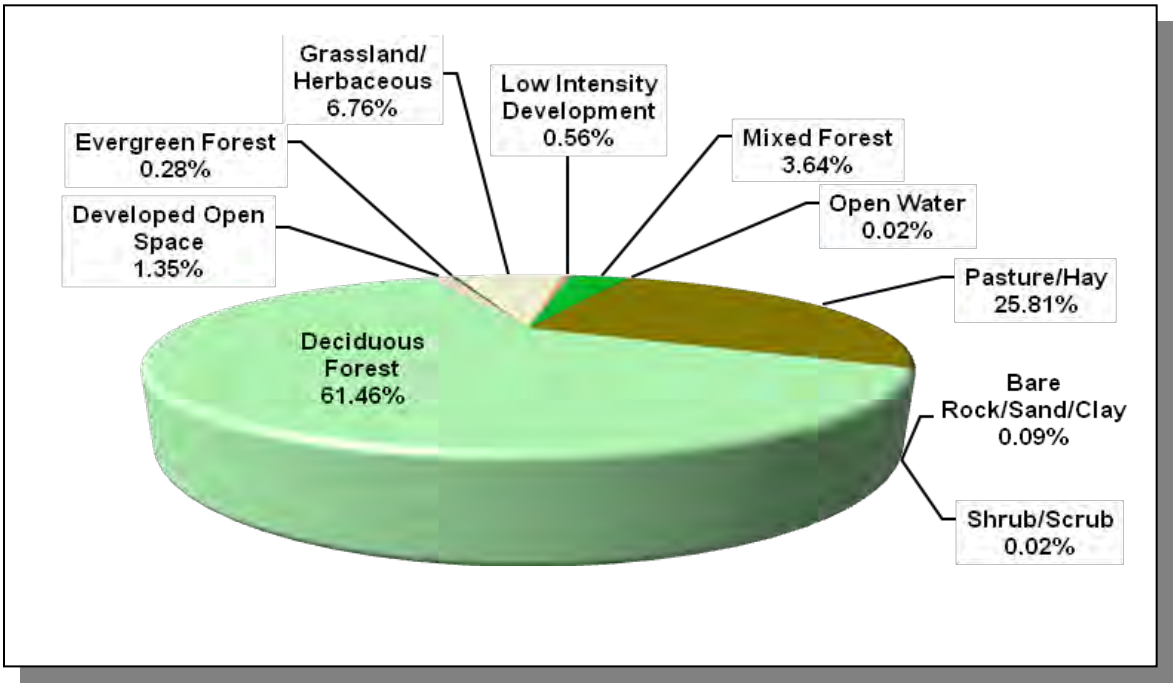


Figure 4-5. Land Use Distribution in Subwatershed 060200040101. *More information is provided in Appendix IV.*

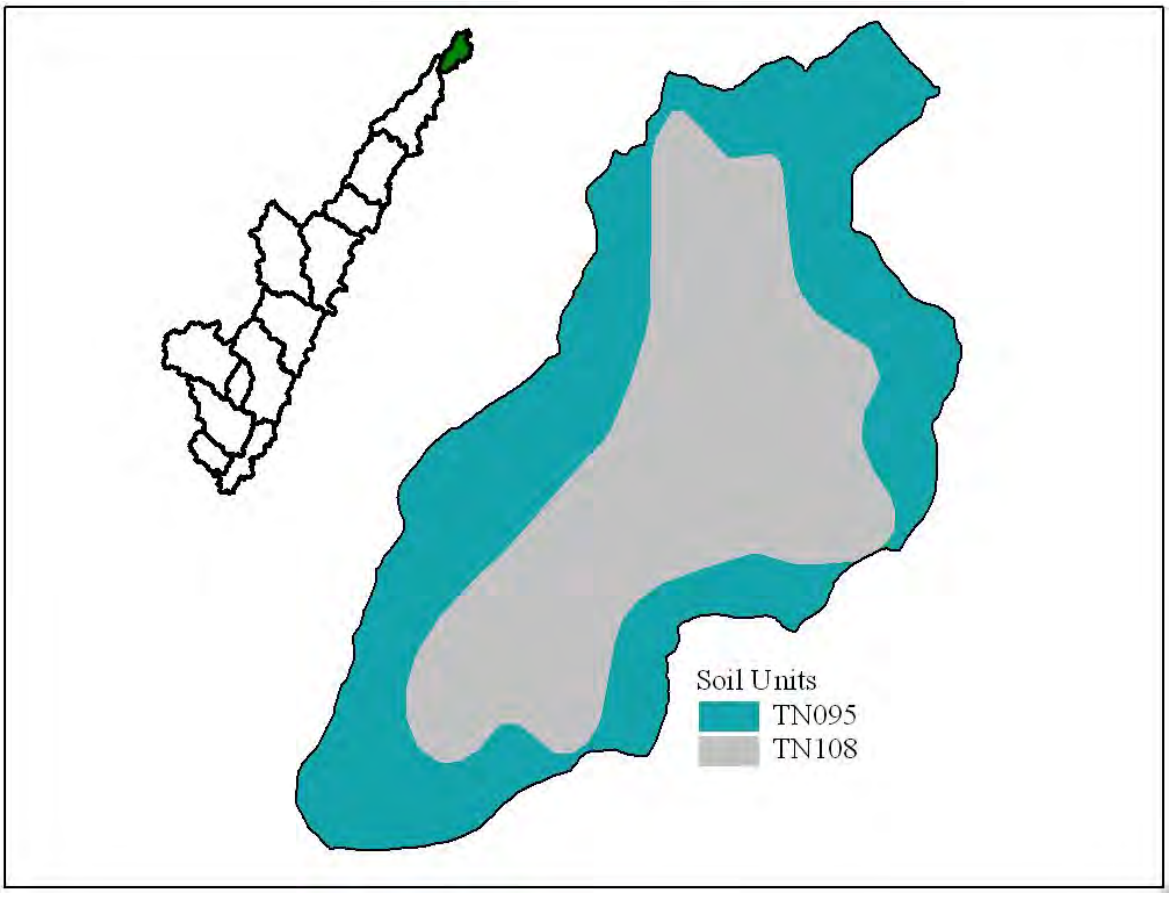


Figure 4-6. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040101.

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
TN108	9.00	C	2.46	4.93	Loam	0.31

Table 4-2. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040101. *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)
Cumberland	34,736	43,217	46,802	1.96	682	848	918	34.60

Table 4-3. Population Estimates in Subwatershed 060200040101.

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

There are no USGS continuous records gaging stations located in subwatershed 060200040101.

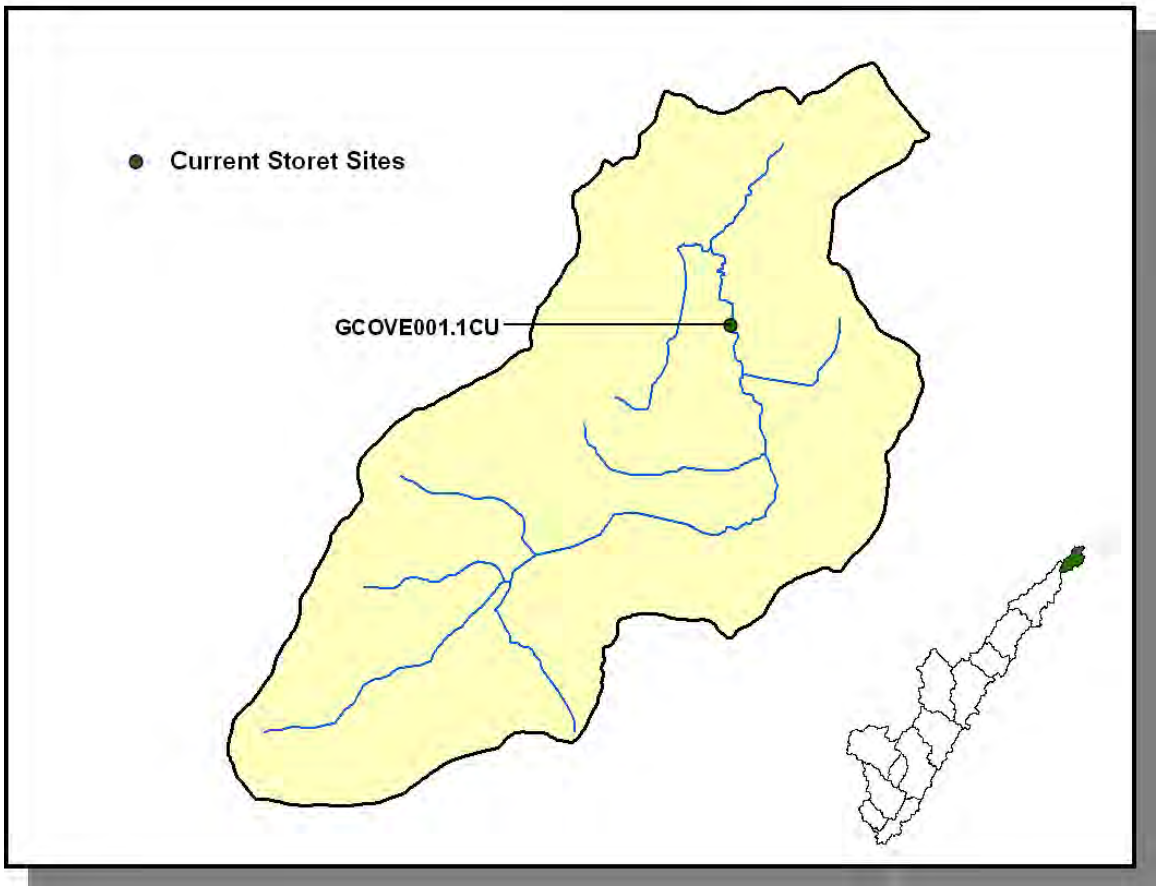


Figure 4-7. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200040101. *More information, including site names and locations, is provided in Appendix IV.*

4.2.A.iii. Permitted Activities.

There are no permitted activities located in subwatershed 060200040101 as of June 30th, 2007.

4.2.A.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Cumberland	9,468	23,179	2,296	43	6,038	461

Table 4-4. 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	14.05
Soybeans (Row Crops)	6.26
Corn (Row Crops)	3.77
Grass (Hayland)	3.05
Grass (Pastureland)	0.40
Grass Forbs Legumes Mixed (Pastureland)	0.26
Farmsteads and Ranch Headquarters	0.23
Legume Grass (Hayland)	0.16
Legume (Pastureland)	0.15

Table 4-5. Annual Estimated Total Soil Loss in Subwatershed 060200040101.

4.2.B. 060200040102 (Sequatchie River).

4.2.B.i. General Description.

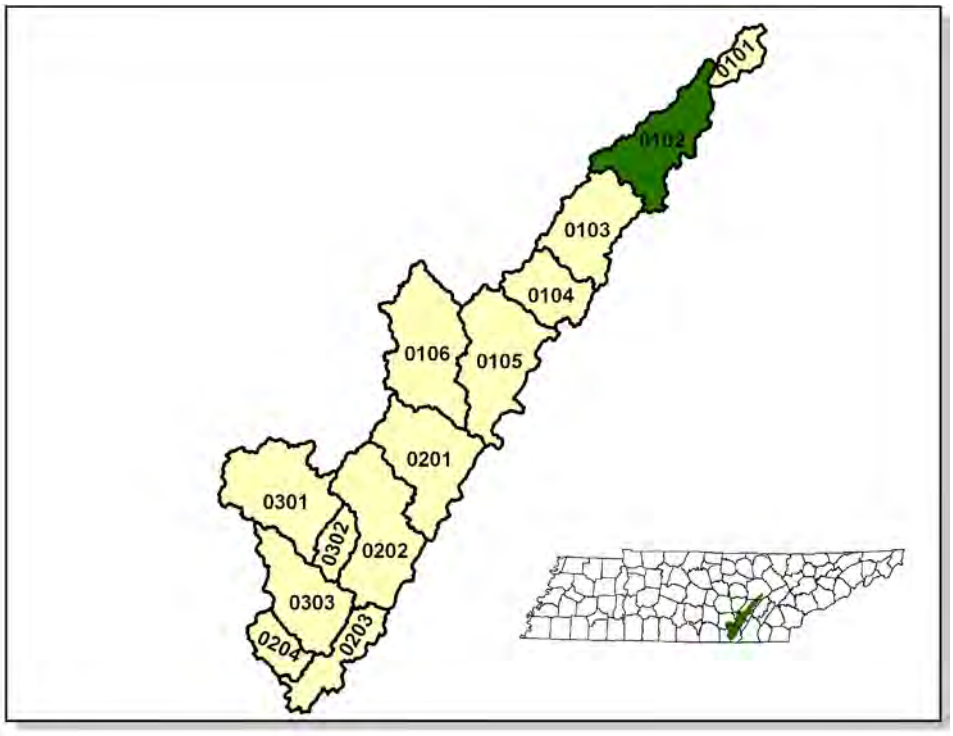


Figure 4-8. Location of Subwatershed 060200040102. *All Sequatchie River HUC-12 subwatershed boundaries are shown for reference.*

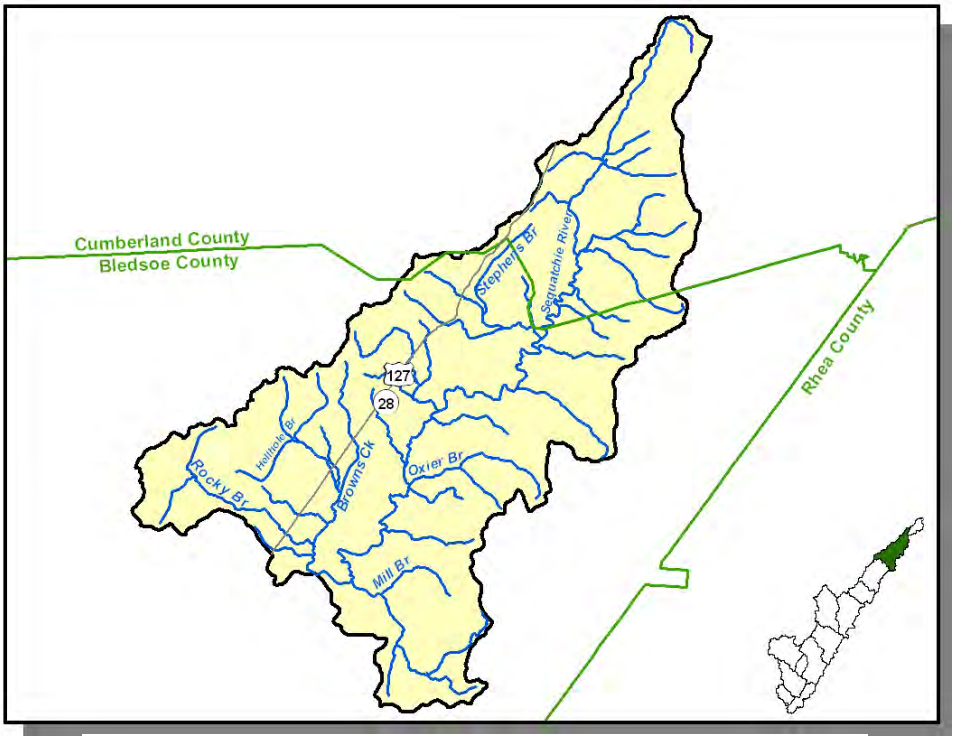


Figure 4-9. Locational Details of Subwatershed 060200040102.

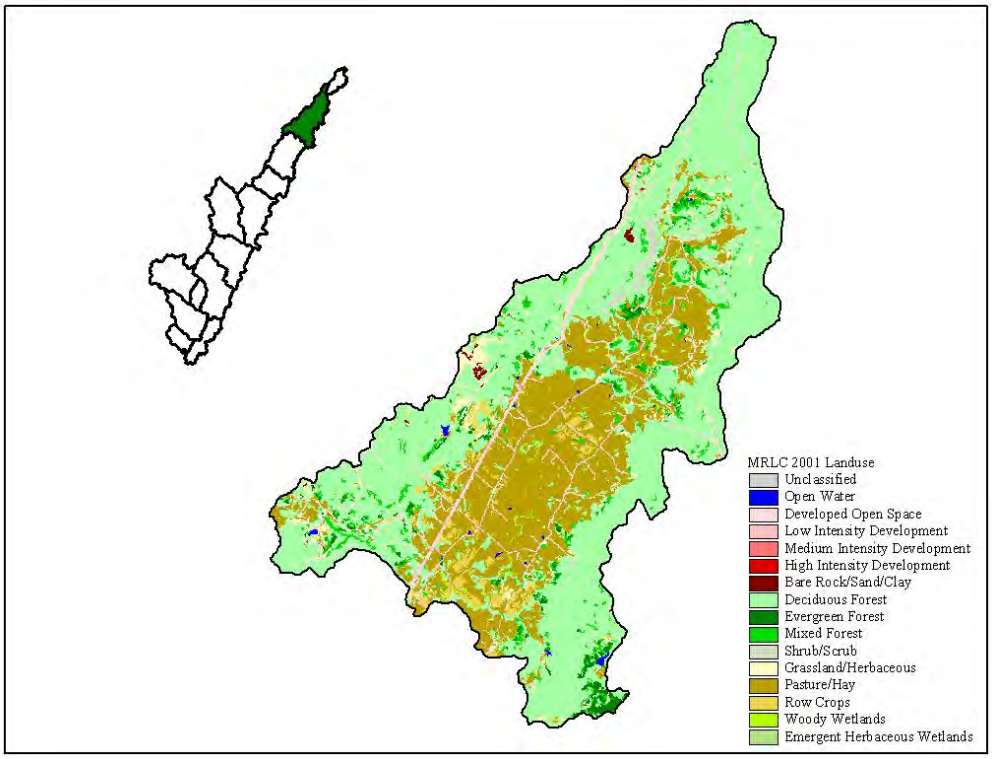


Figure 4-10. Illustration of Land Use Distribution in Subwatershed 060200040102.

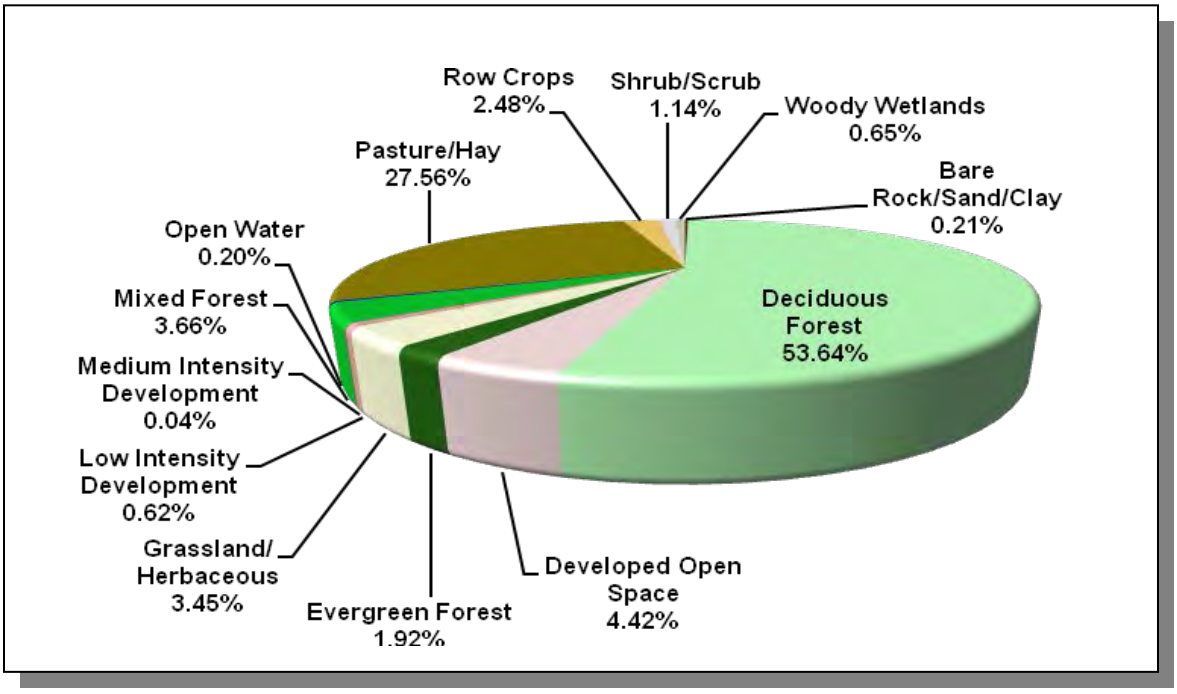


Figure 4-11. Land Use Distribution in Subwatershed 060200040102. *More information is provided in Appendix IV.*

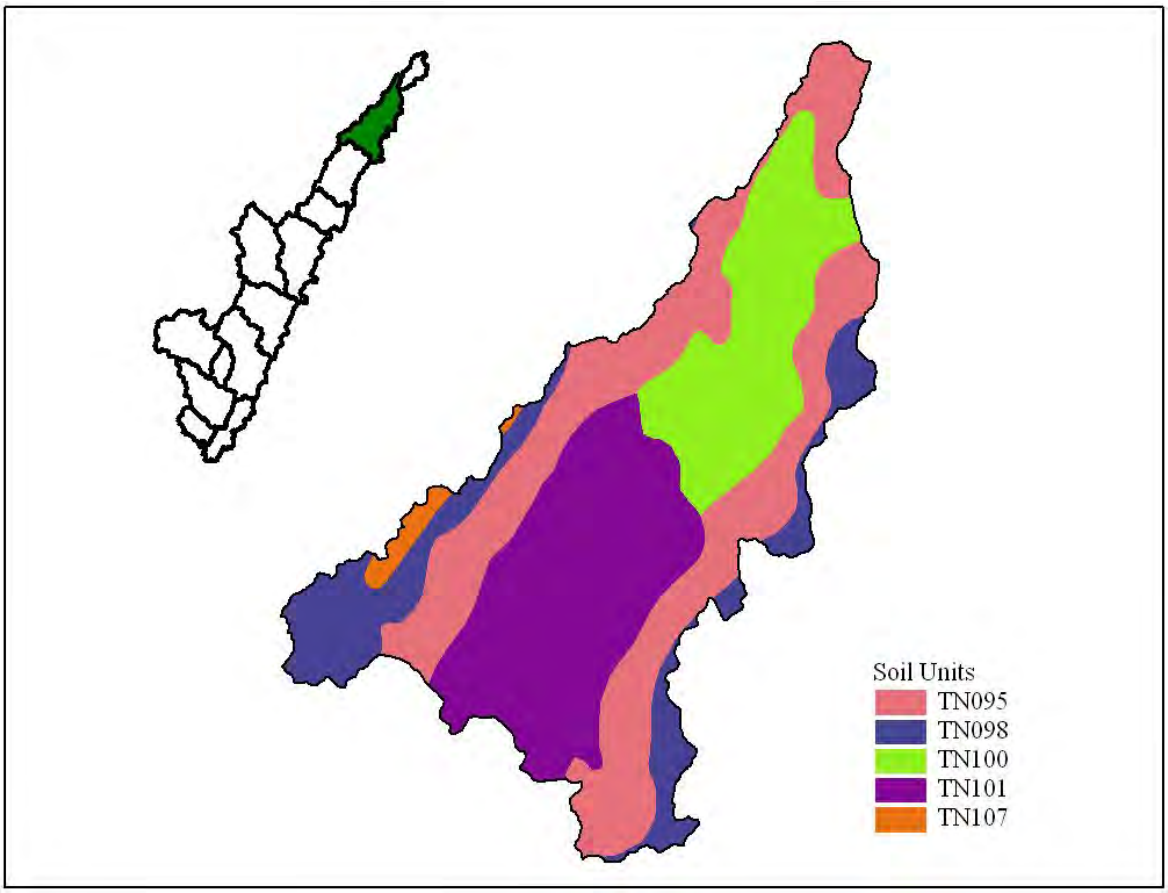


Figure 4-12. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040102.

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
TN100	0.00	B	1.14	3.35	Silty Loam	0.21
TN101	0.00	B	1.71	5.39	Loam	0.35
TN107	1.00	C	6.34	4.84	Loam	0.28

Table 4-6. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040102. *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)
Bledsoe	9,669	10,650	12,367	10.27	993	1,094	1,271	28.00
Cumberland	34,736	43,217	46,802	1.65	573	713	772	34.70
Totals	**44,405**	**53,867**	**59,169**		**1,566**	**1,807**	**2,043**	**30.50**

Table 4-7. Population Estimates in Subwatershed 060200040102.

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

There are no USGS continuous records gaging stations located in subwatershed 060200040102.

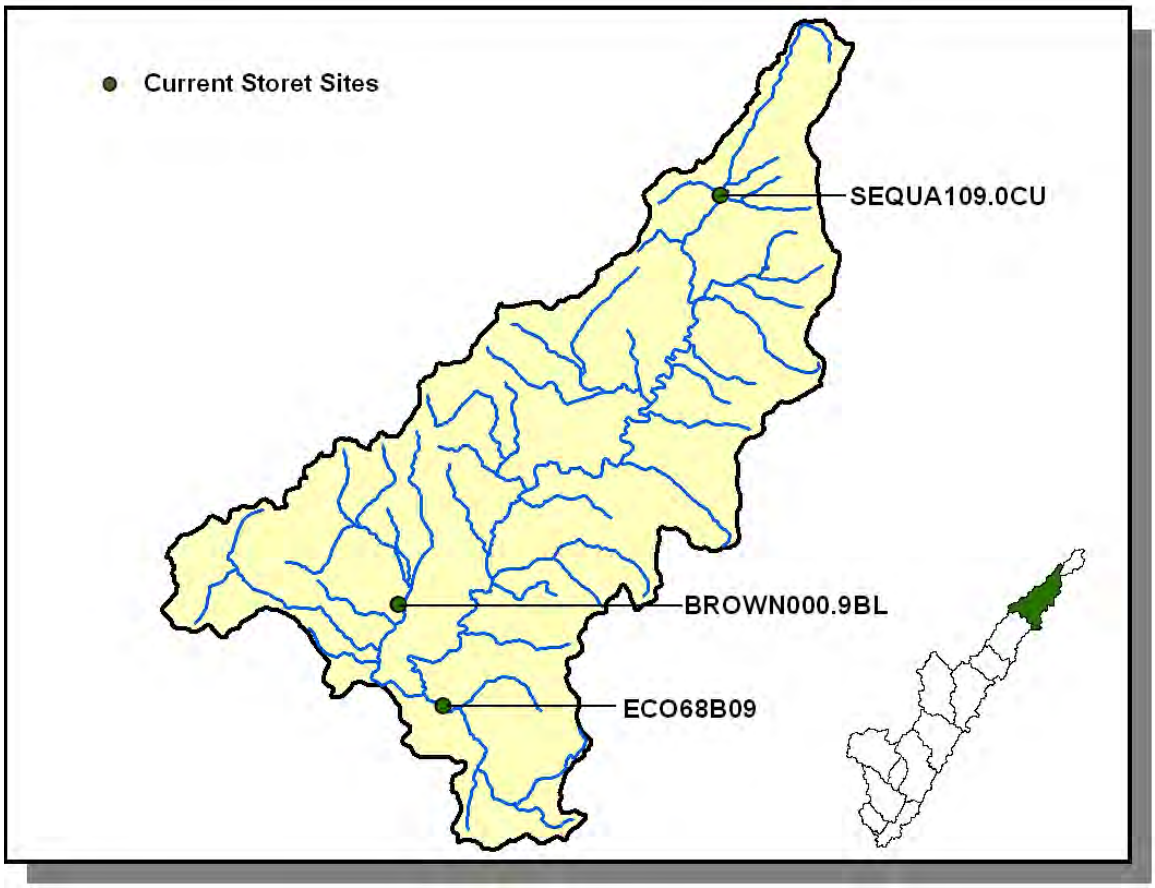


Figure 4-13. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200040102. *More information, including site names and locations, is provided in Appendix IV.*

4.2.B.iii. Permitted Activities.

There are no permitted activities located in subwatershed 060200040102 as of June 30th, 2007.

4.2.B.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Bledsoe	11,691	25,110	1,474	22	275	162
Cumberland	9,468	23,179	2,296	43	6,038	461

Table 4-8. 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)
Bledsoe	186.2	186.2	0.9	2.3

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

CROPS	TONS/ACRE/YEAR
Other Vegetable and Truck Crop	14.05
Corn (Row Crops)	9.64
Soybeans (Row Crops)	5.15
All Other Row Crops	4.45
Wheat (Close Grown Cropland)	2.81
Conservation Reserve Program Land	1.00
Farmsteads and Ranch Headquarters	0.99
Legume Grass (Hayland)	0.95
Grass (Hayland)	0.78
Grass (Pastureland)	0.62
Grass Forbs Legumes Mixed (Pastureland)	0.48
Legume (Pastureland)	0.15

Table 4-10. Annual Estimated Total Soil Loss in Subwatershed 060200040102.

4.2.C. 060200040103 (Sequatchie River).

4.2.C.i. General Description.

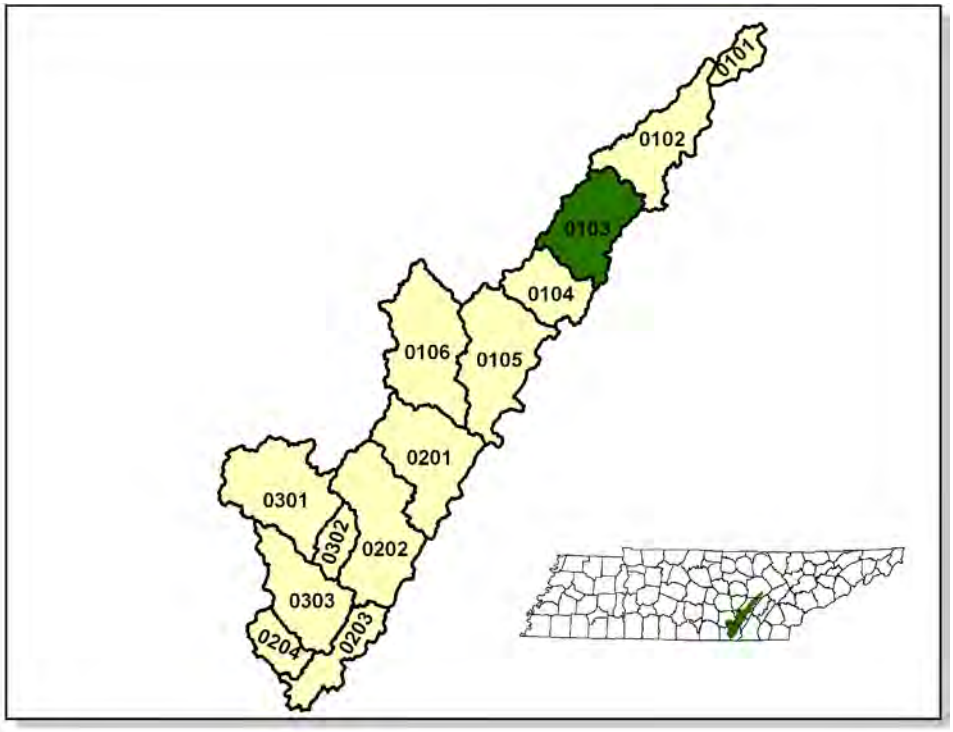


Figure 4-14. Location of Subwatershed 0602000400103. *All Sequatchie River HUC-12 subwatershed boundaries are shown for reference.*

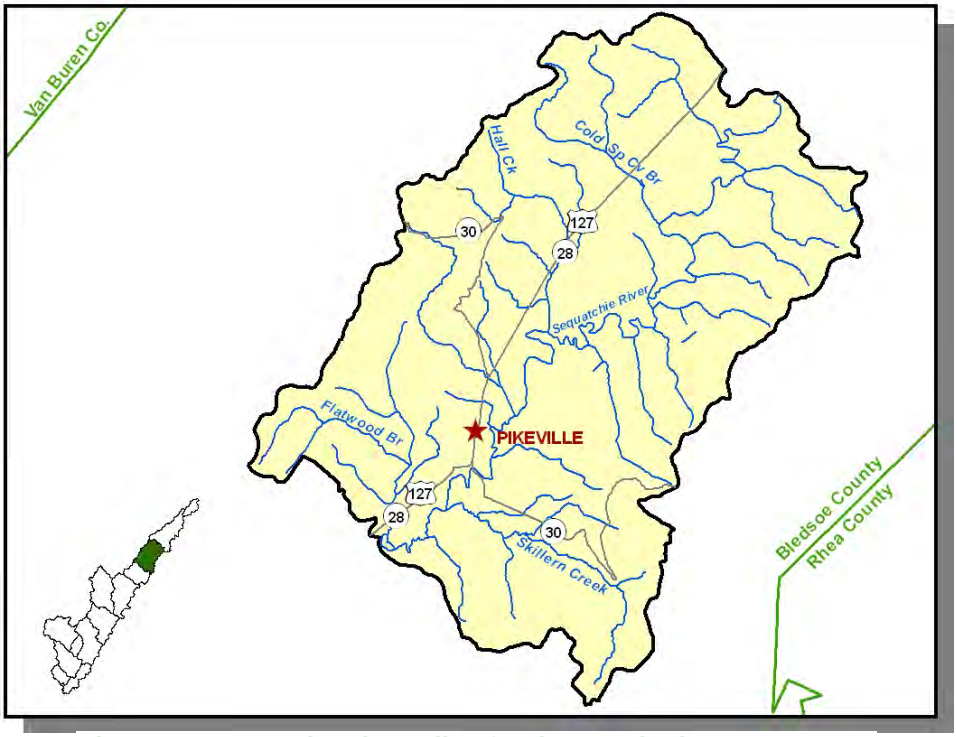


Figure 4-15. Locational Details of Subwatershed 060200040103.

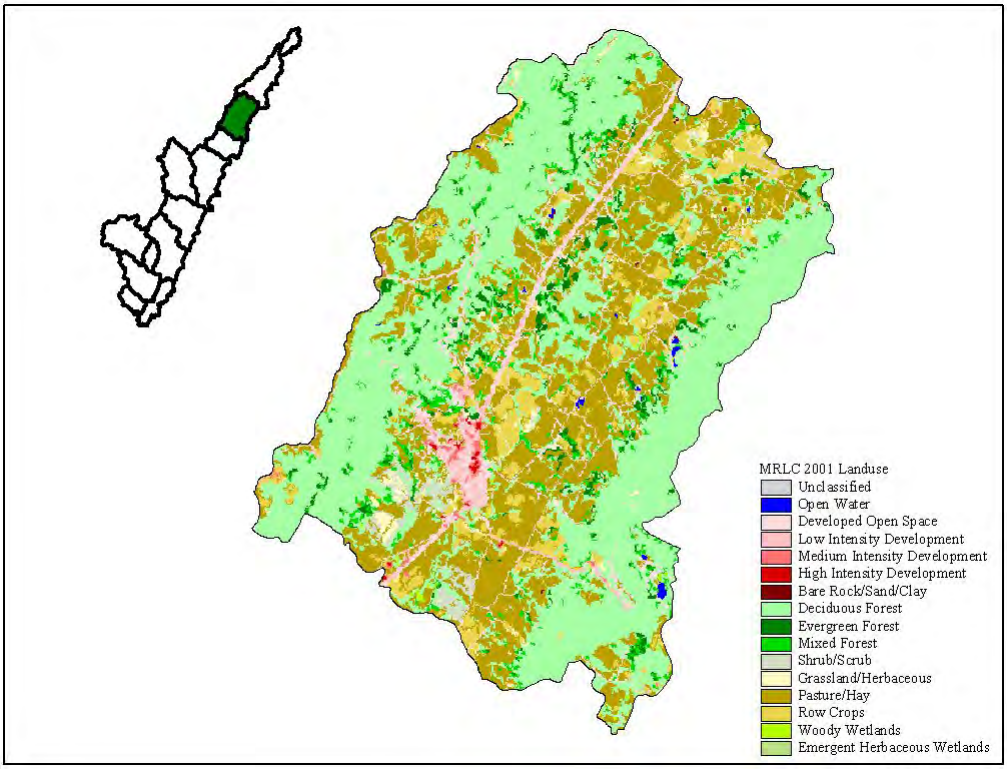


Figure 4-16. Illustration of Land Use Distribution in Subwatershed 060200040103.

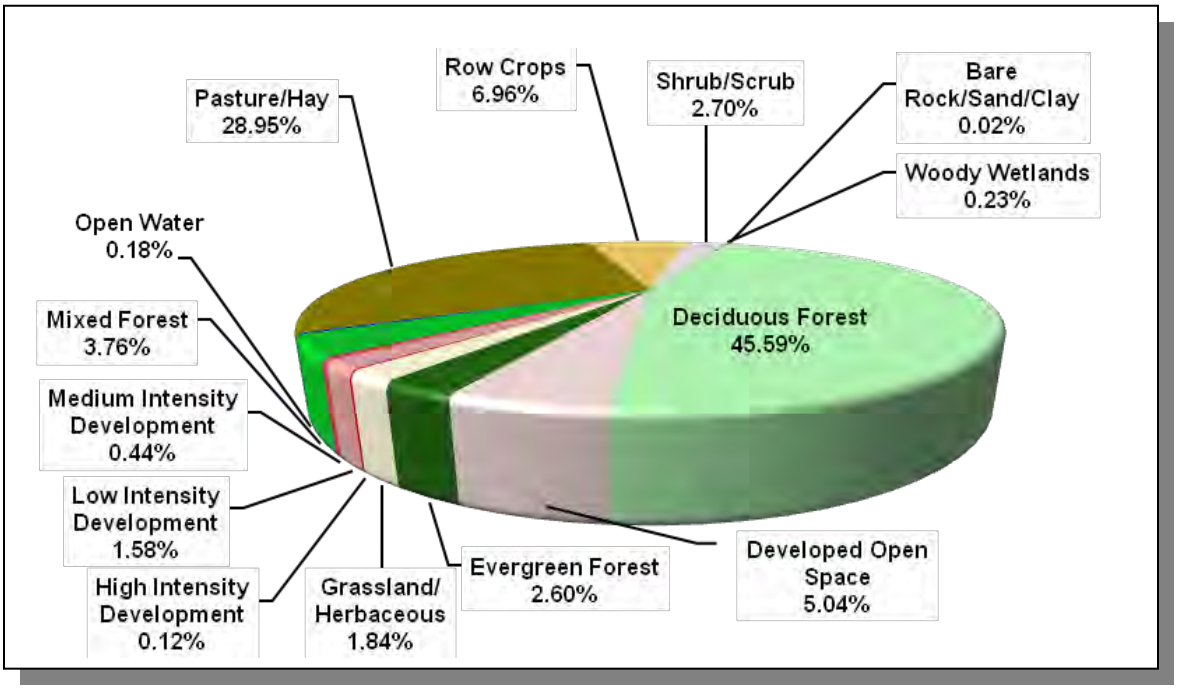


Figure 4-17. Land Use Distribution in Subwatershed 060200040103. *More information is provided in Appendix IV.*

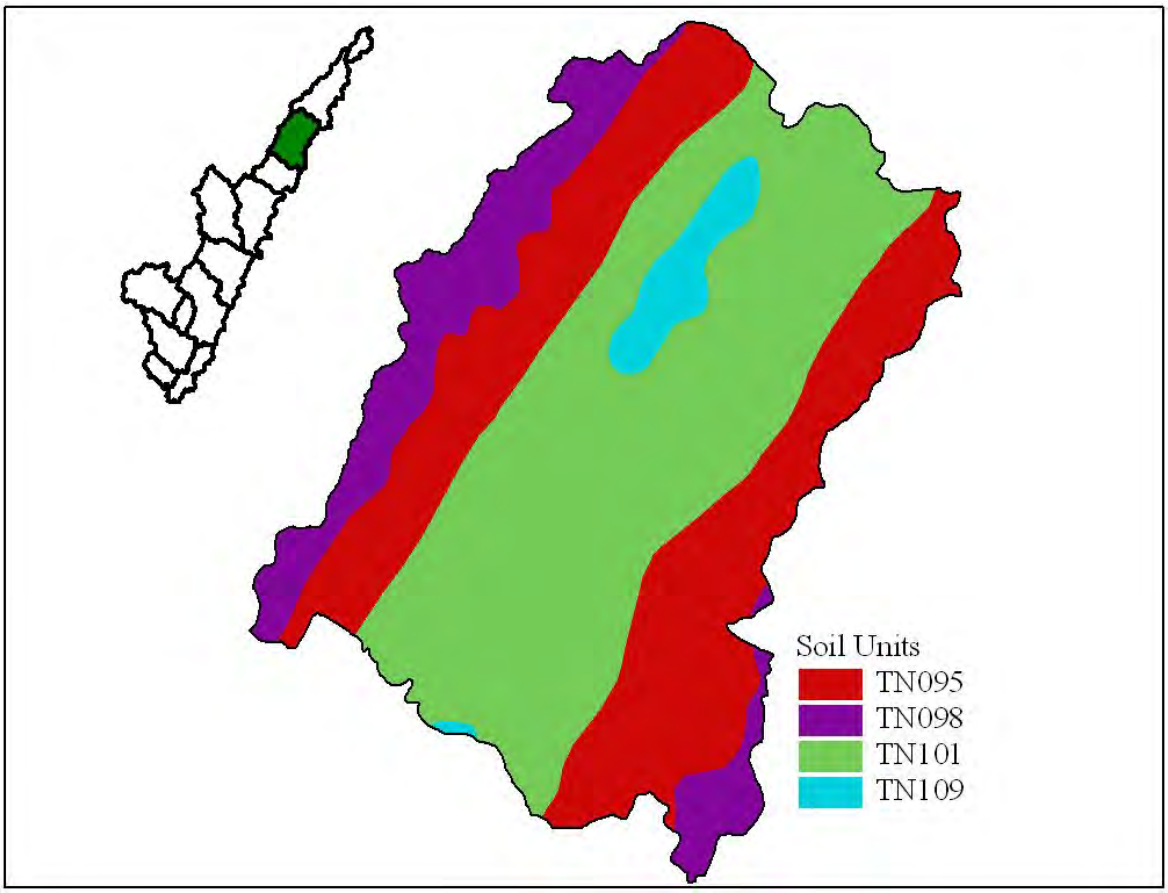


Figure 4-18. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040103.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN101	0.00	B	1.71	5.39	Loam	0.35
TN109	0.00	B	8.40	5.01	Sandy Loam	0.28

Table 4-11. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040103. *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)
Bledsoe	9,669	10,650	12,367	12.33	1,192	1,313	1,525	27.90

Table 4-12. Population Estimates in Subwatershed 060200040103.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Pikeville	Bledsoe	1,771	802	640	162	0

Table 4-13. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 060200040103.

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

There are no USGS continuous records gaging stations located in subwatershed 060200040103.

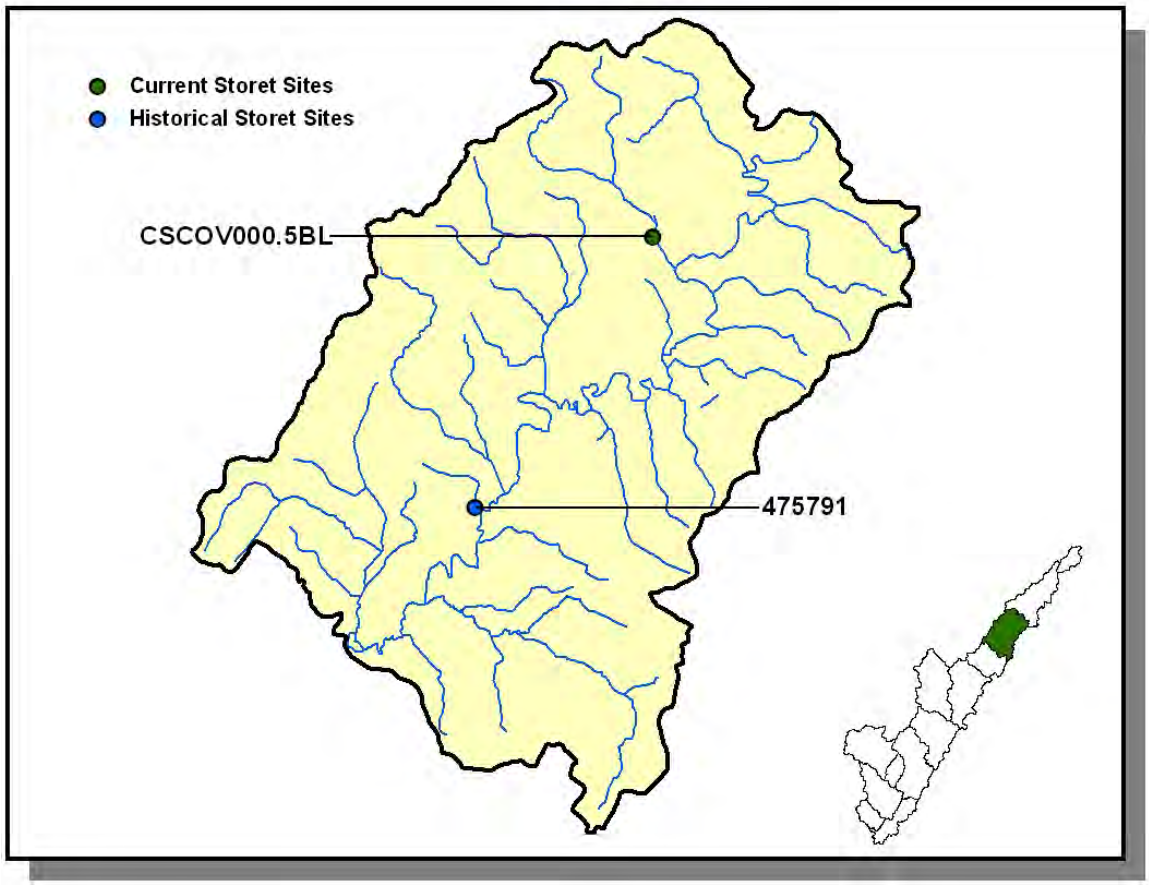


Figure 4-19. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200040103. *More information, including site names and locations, is provided in Appendix IV.*

4.2.C.iii. Permitted Activities.

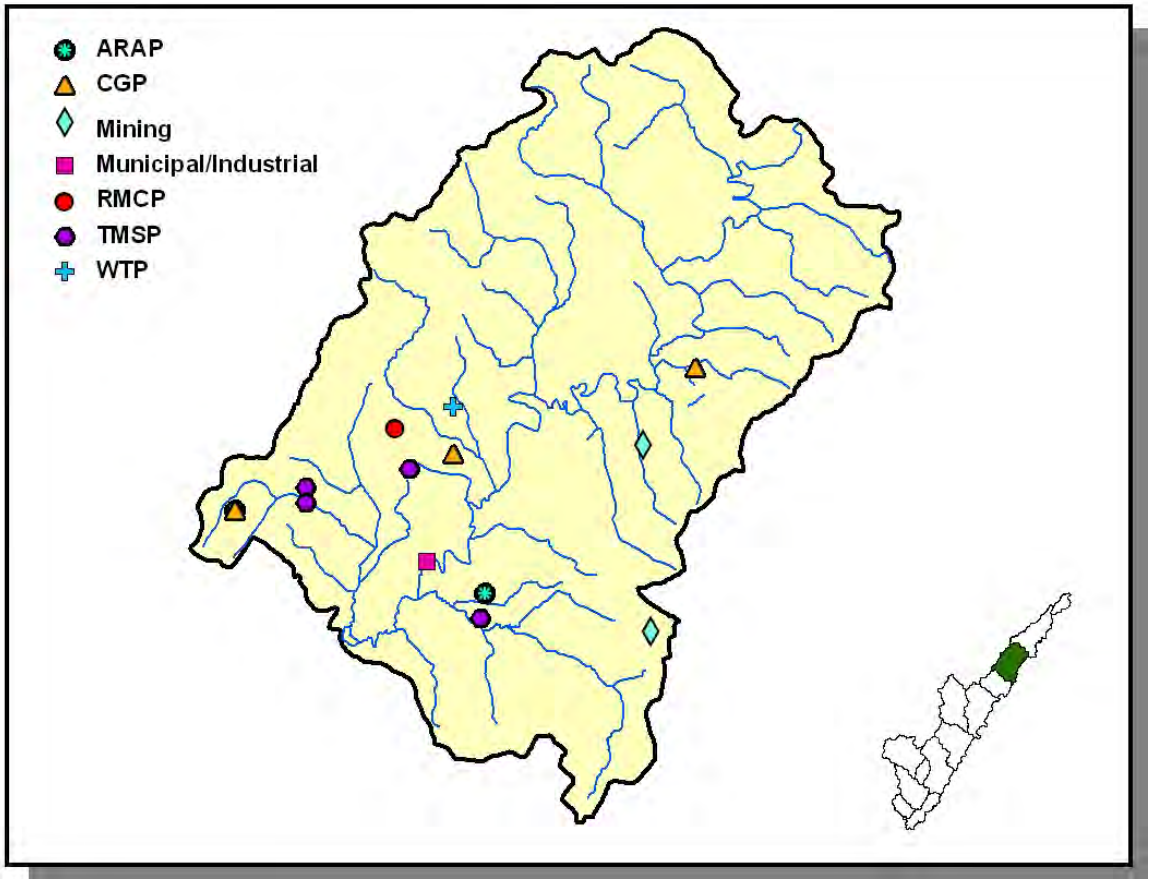


Figure 4-20. Location of Permits Issued in Subwatershed 060200040103. *More information, including the names of facilities, is provided in Appendix IV.*

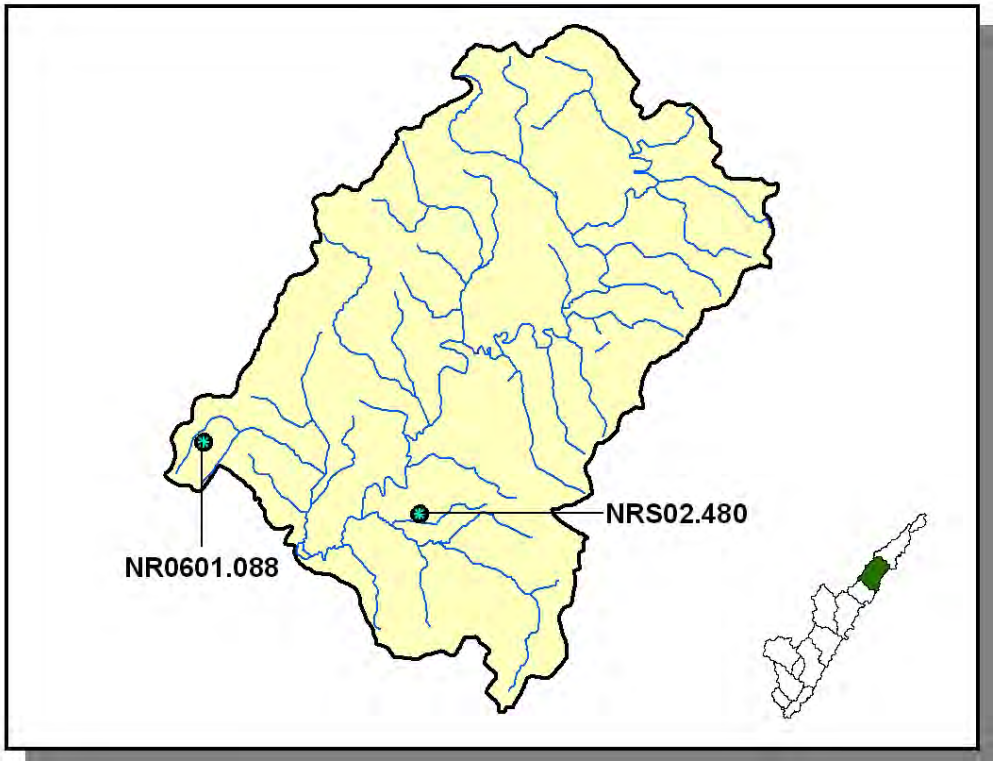


Figure 4-21. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 060300010103. *More information is provided in Appendix IV.*

Figure 4-22. Location of CGP (Construction General Permit) Sites in Subwatershed 060300010103. *More information is provided in Appendix IV.*

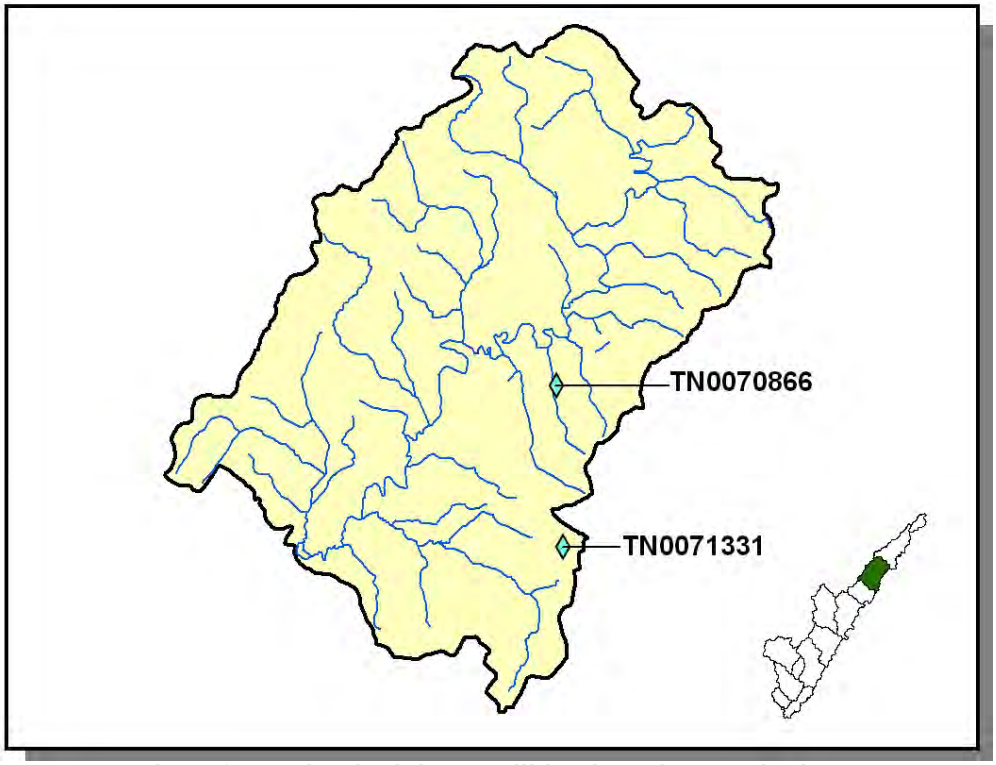


Figure 4-23. Location of Permitted Mining Facilities in Subwatershed 060300010103. *More information is provided in Appendix IV.*

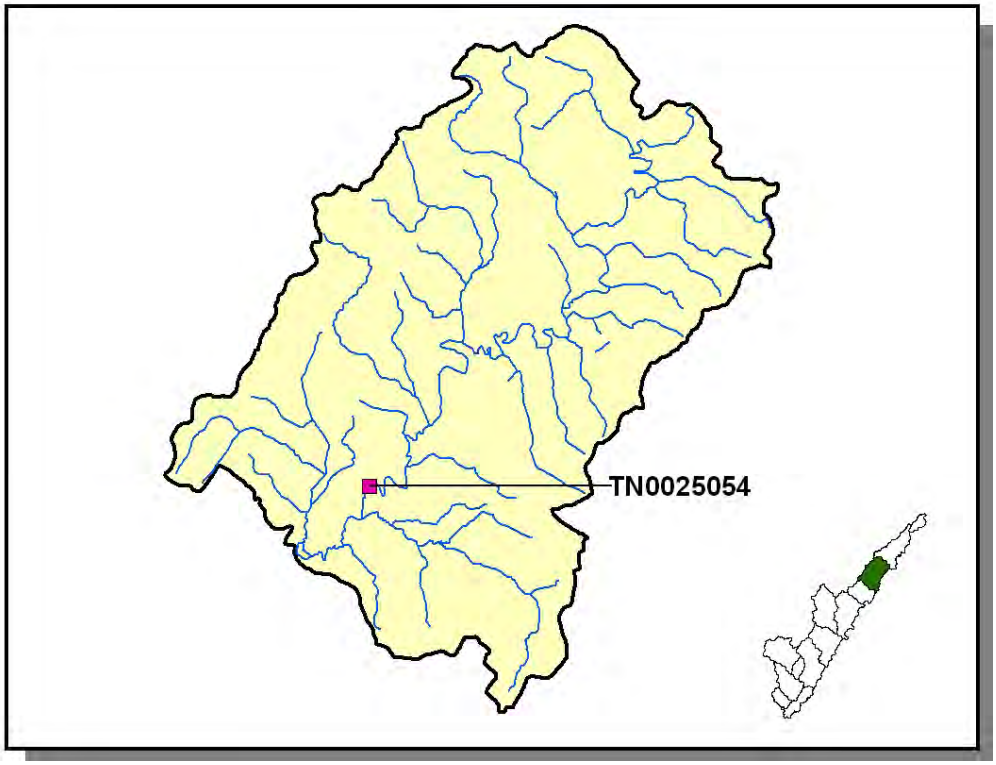


Figure 4-24. Location of Permitted Municipal and Industrial Facilities in Subwatershed 060300010103. *More information, including the name of the facility is provided in Appendix IV.*

Figure 4-25. Location of RMCP (Ready Mix Concrete Plant) facilities in Subwatershed 060300010103. *More information, including the names of facilities, is provided in Appendix IV.*

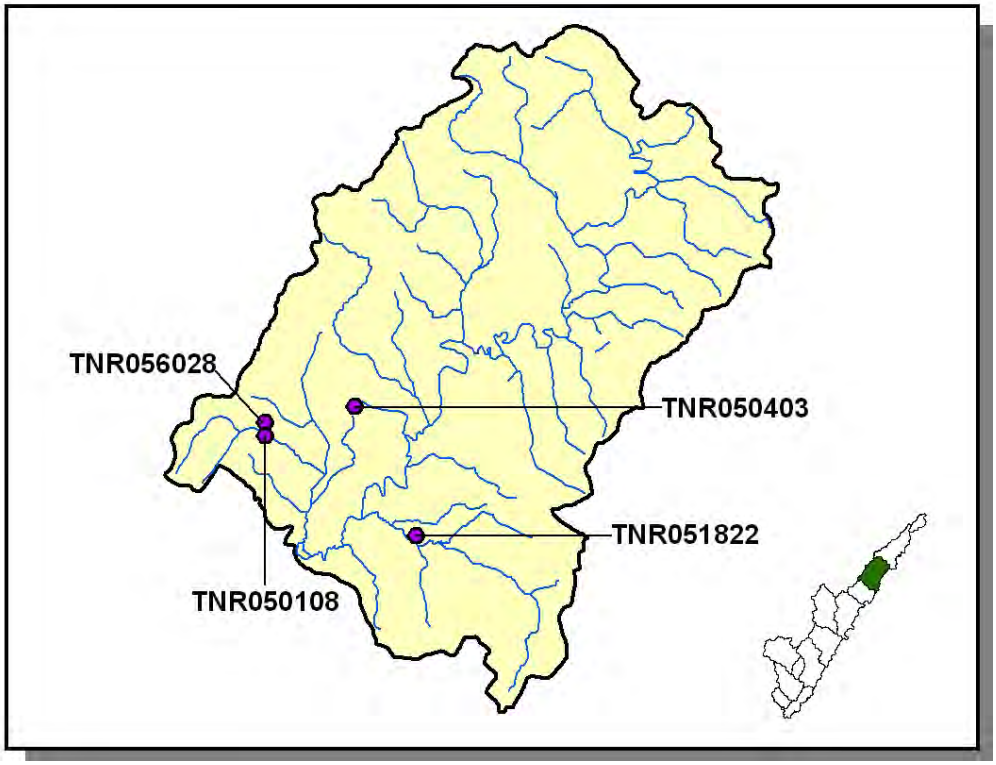


Figure 4-26. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 060300010103. *More information is provided in Appendix IV.*

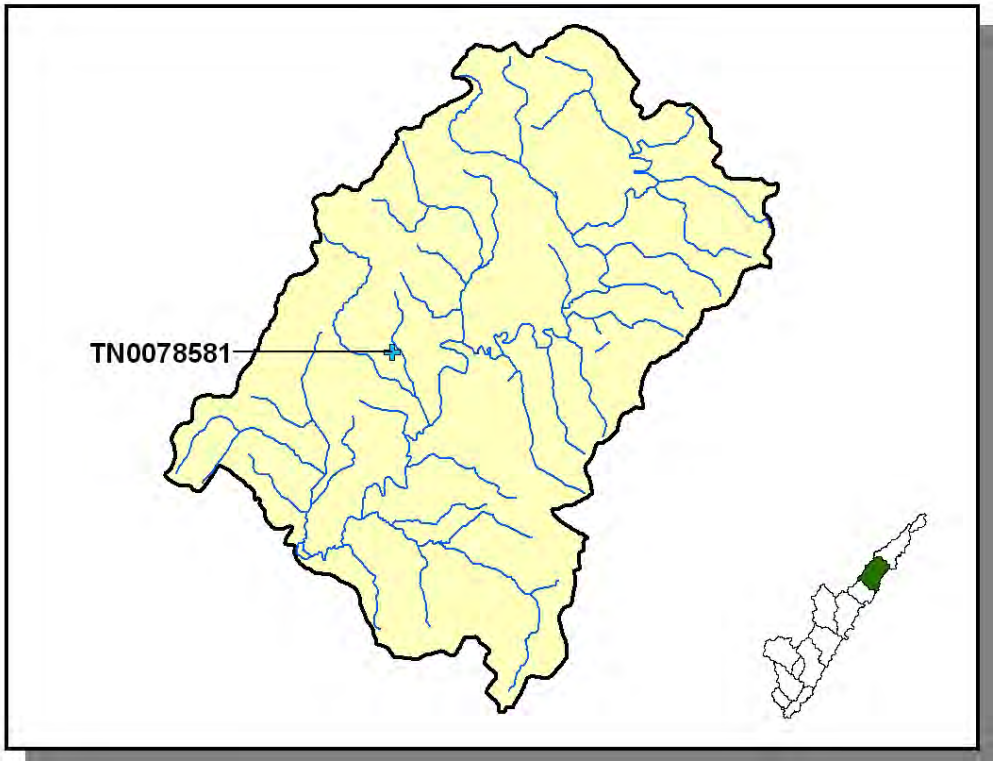


Figure 4-27. Location of Active WTP Facilities in Subwatershed 060300010103. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.C.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Bledsoe	11,691	25,110	1,474	22	275	162

Table 4-14. 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)
Bledsoe	186.2	186.2	0.9	2.3

Table 4-15. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Corn (Row Crops)	11.22
Soybeans (Row Crops)	4.85
All Other Row Crops	4.45
Wheat (Close Grown Cropland)	2.81
Farmsteads and Ranch Headquarters	1.19
Legume Grass (Hayland)	1.16
Conservation Reserve Program Land	1.00
Grass (Pastureland)	0.68
Grass Forbs Legumes Mixed (Pastureland)	0.54
Grass (Hayland)	0.17

Table 4-16. Annual Estimated Total Soil Loss in Subwatershed 060200040103.

4.2.D. 060200040104 (Sequatchie River).

4.2.D.i. General Description.

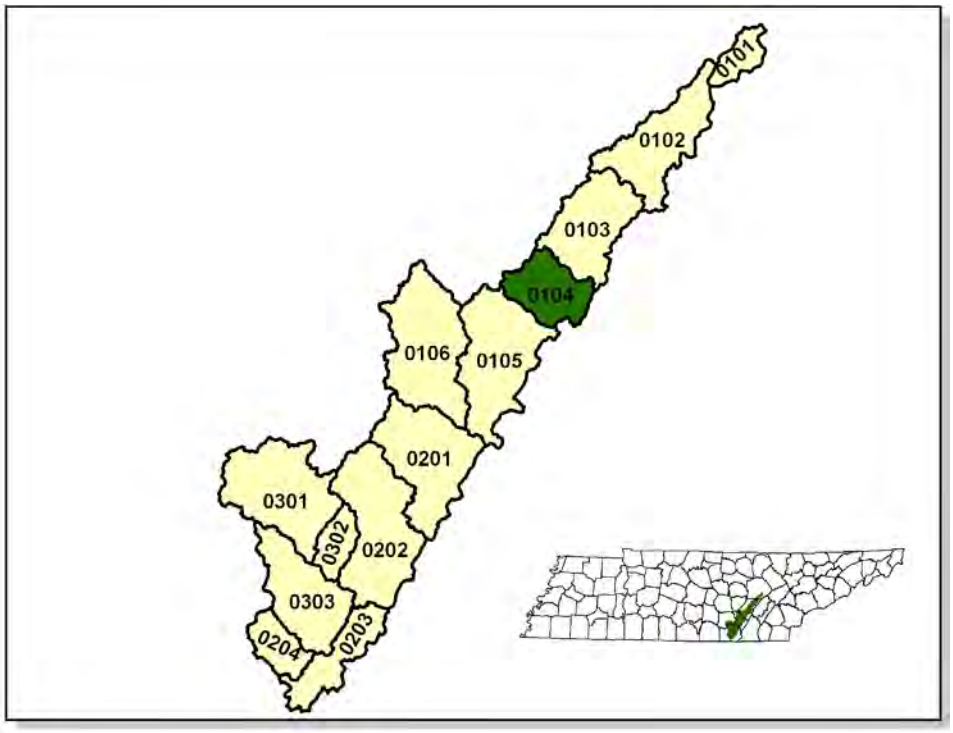


Figure 4-28. Location of Subwatershed 060200040104. *All Sequatchie River HUC-12 subwatershed boundaries are shown for reference.*

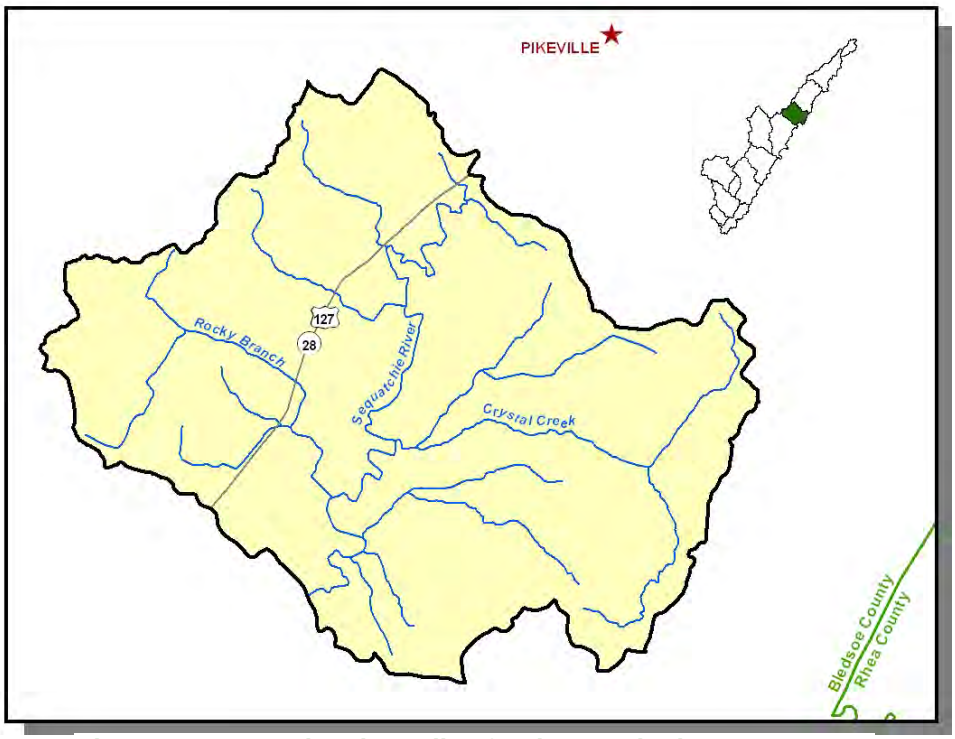


Figure 4-29. Locational Details of Subwatershed 060200040104.

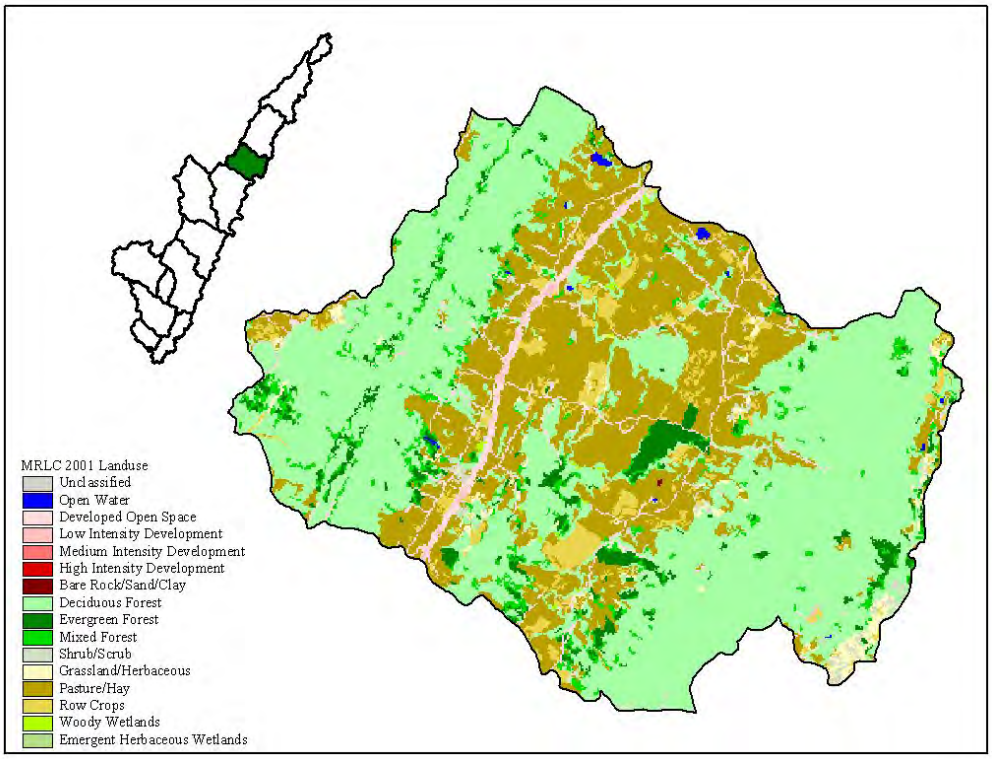


Figure 4-30. Illustration of Land Use Distribution in Subwatershed 060200040104.

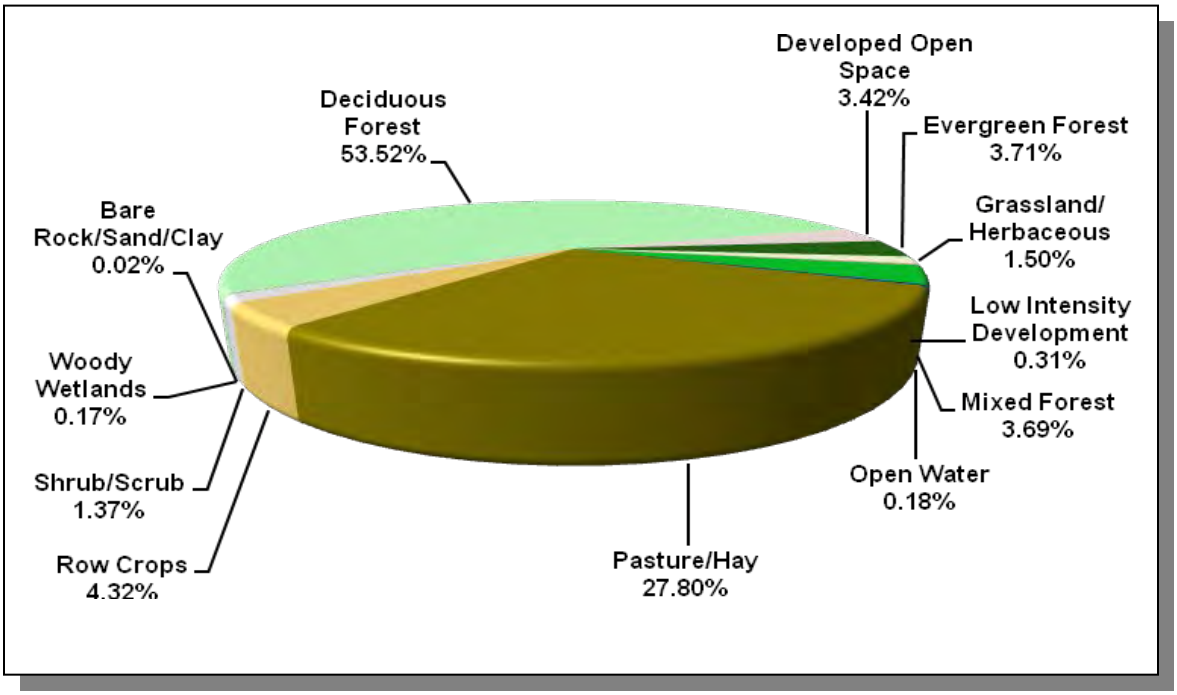


Figure 4-31. Land Use Distribution in Subwatershed 060200040104. *More information is provided in Appendix IV.*

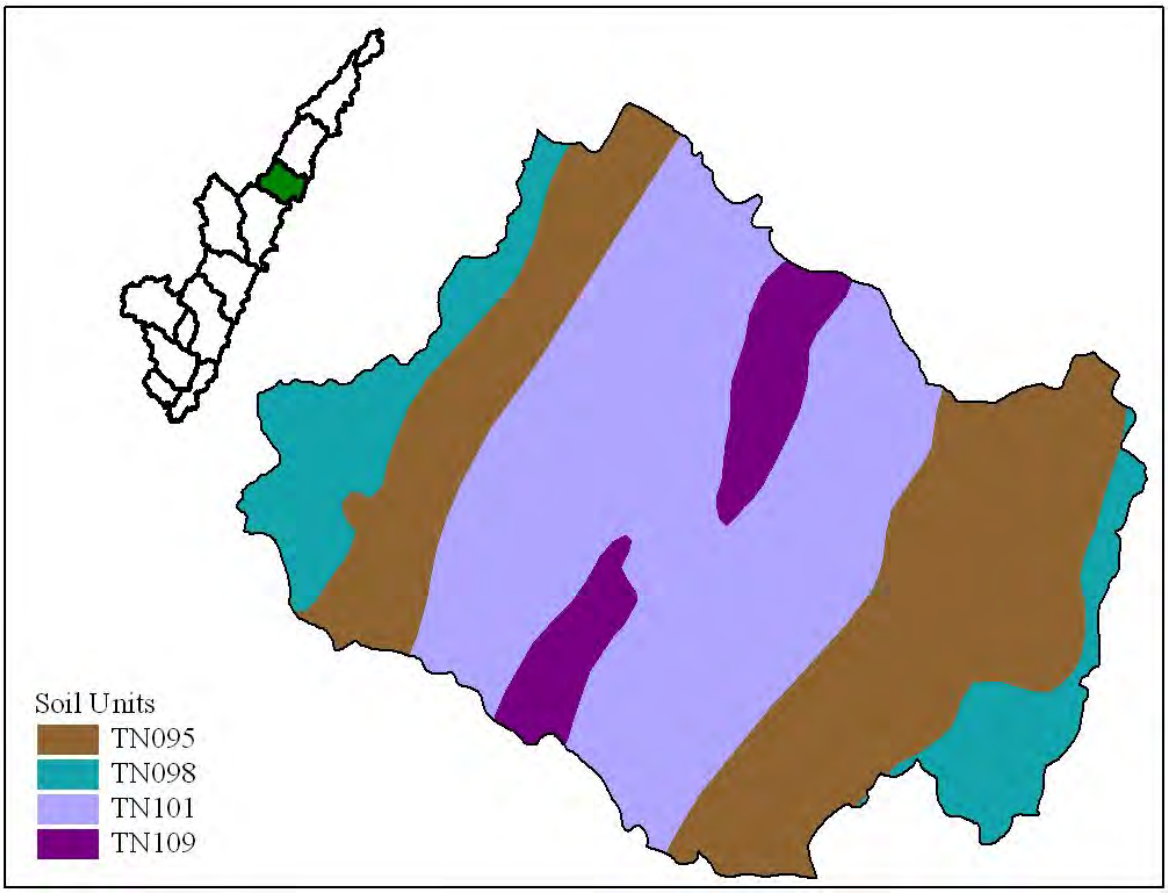


Figure 4-32. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040104.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32
TN101	0.00	B	1.71	5.39	Loam	0.35
TN109	0.00	B	8.40	5.01	Sandy Loam	0.28

Table 4-17. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040104. *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)
Bledsoe	9,669	10,650	12,367	8.04	777	856	994	27.90

Table 4-18. Population Estimates in Subwatershed 060200040104.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Pikeville	Bledsoe	1,771	802	640	162	0

Table 4-19. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 060200040104.

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

There are no USGS continuous records gaging stations located in subwatershed 060200040104.

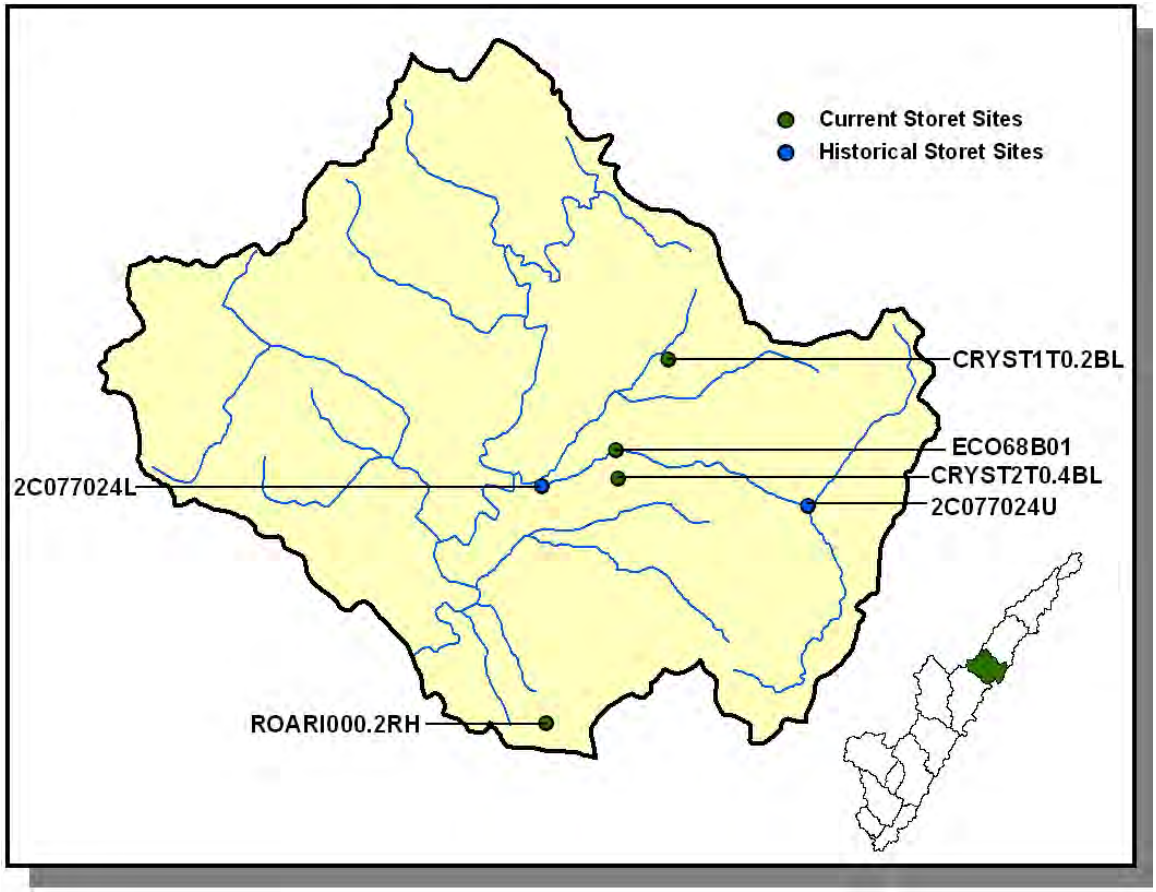


Figure 4-33. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200040104. *More information, including site names and locations, is provided in Appendix IV.*

4.2.D,iii. Permitted Activities.

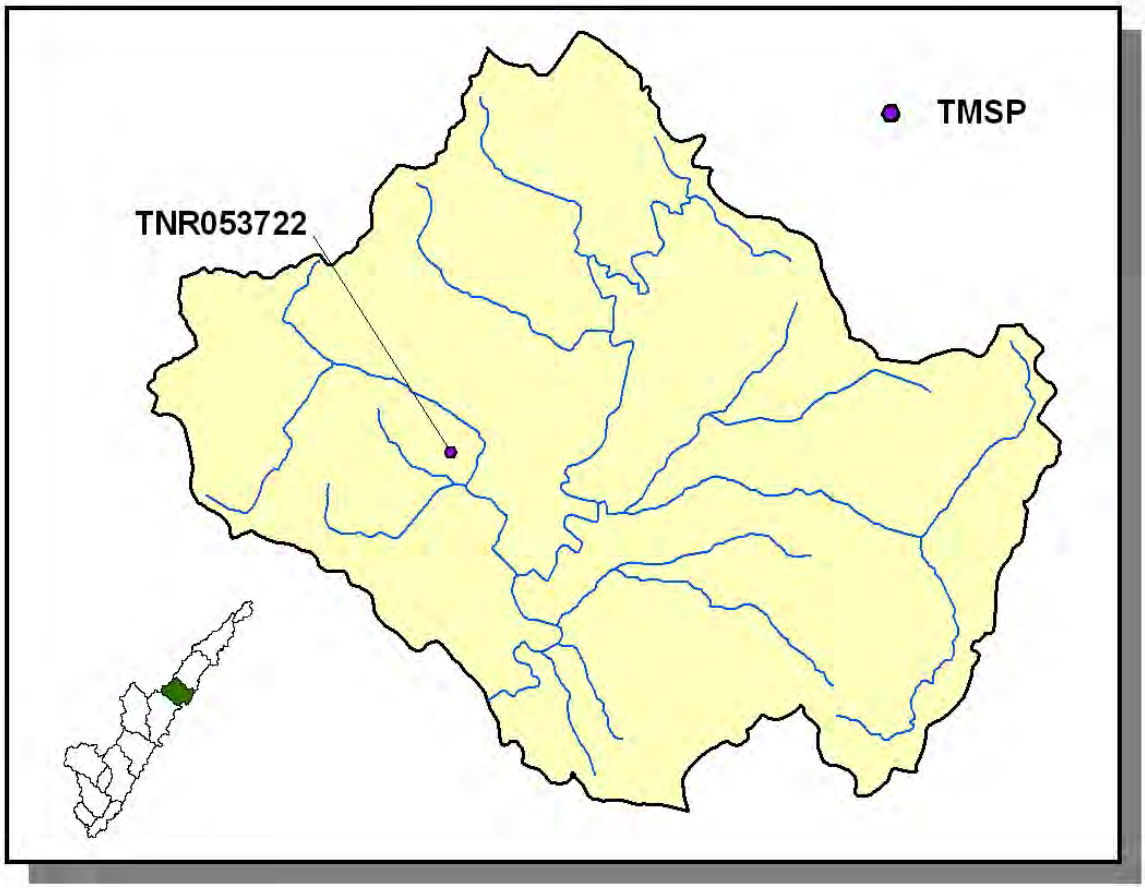


Figure 4-34. Location of Permits Issued in Subwatershed 060200040104. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.D.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Bledsoe	11,691	25,110	1,474	22	275	162

Table 4-20. 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)
Bledsoe	186.2	186.2	0.9	2.3

Table 4-21. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Corn (Row Crops)	11.22
Soybeans (Row Crops)	4.85
All Other Row Crops	4.45
Wheat (Close Grown Cropland)	2.81
Farmsteads and Ranch Headquarters	1.19
Legume Grass (Hayland)	1.16
Conservation Reserve Program Land	1.00
Grass (Pastureland)	0.68
Grass Forbs Legumes Mixed (Pastureland)	0.54
Grass (Hayland)	0.17

Table 4-22. Annual Estimated Total Soil Loss in Subwatershed 060200040104.

4.2.E. 060200040105 (Sequatchie River).

4.2.E.i. General Description.

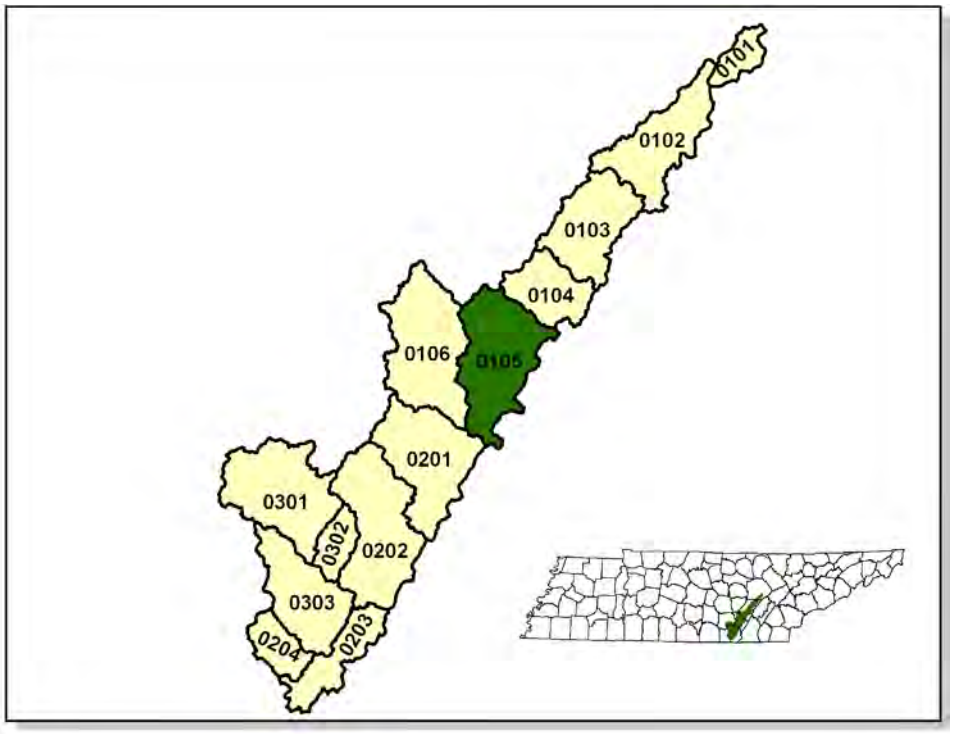


Figure 4-35. Location of Subwatershed 060200040105. *All Sequatchie River HUC-12 subwatershed boundaries are shown for reference.*

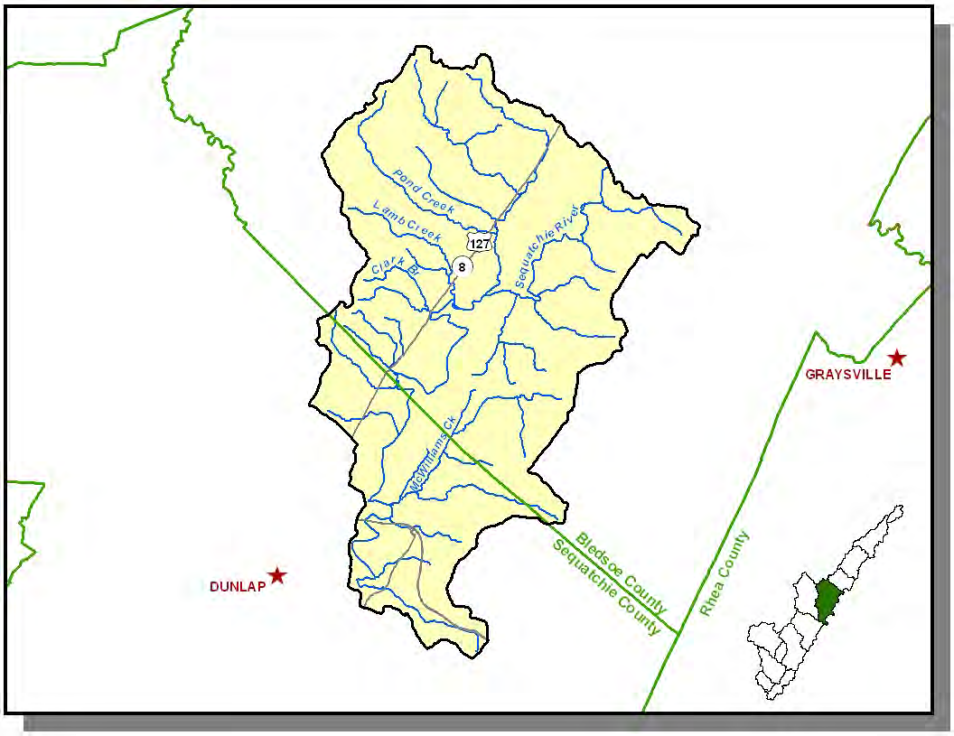


Figure 4-36. Locational Details of Subwatershed 060200040105.

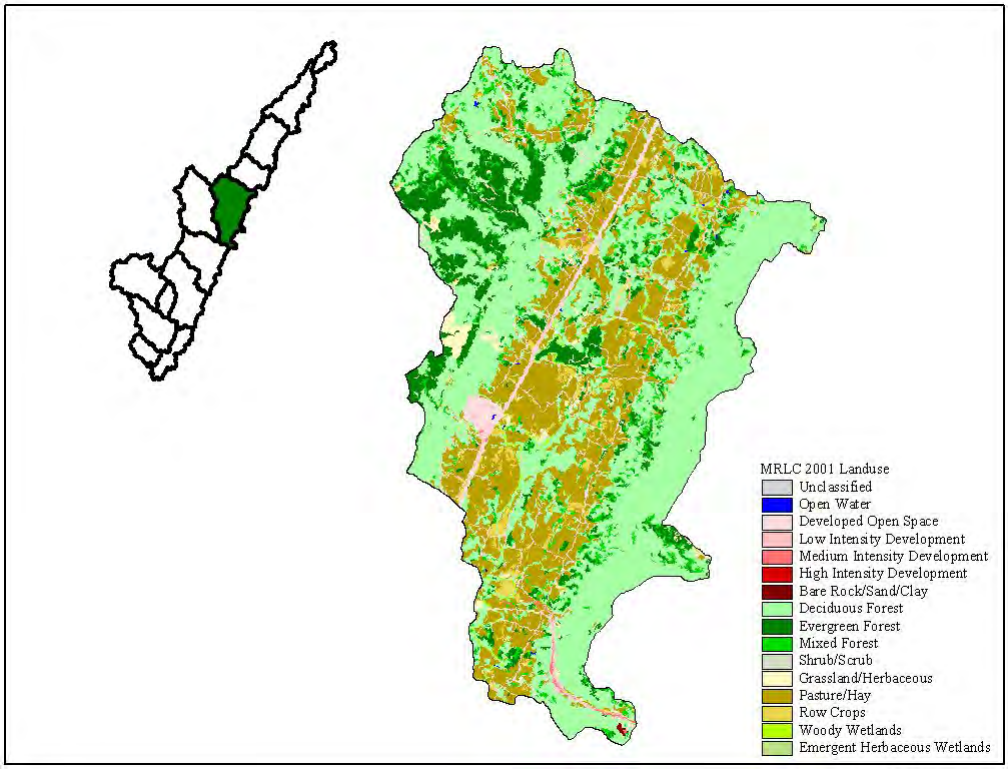


Figure 4-37. Illustration of Land Use Distribution in Subwatershed 060200040105.

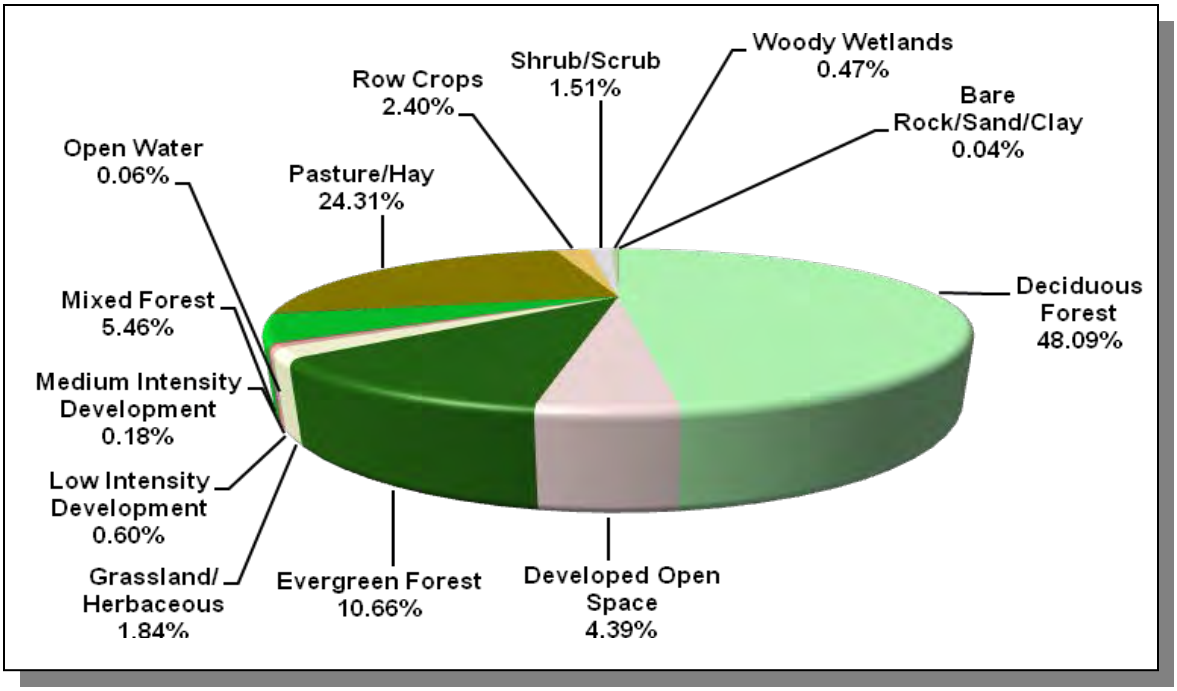


Figure 4-38. Land Use Distribution in Subwatershed 060200040105. *More information is provided in Appendix IV.*

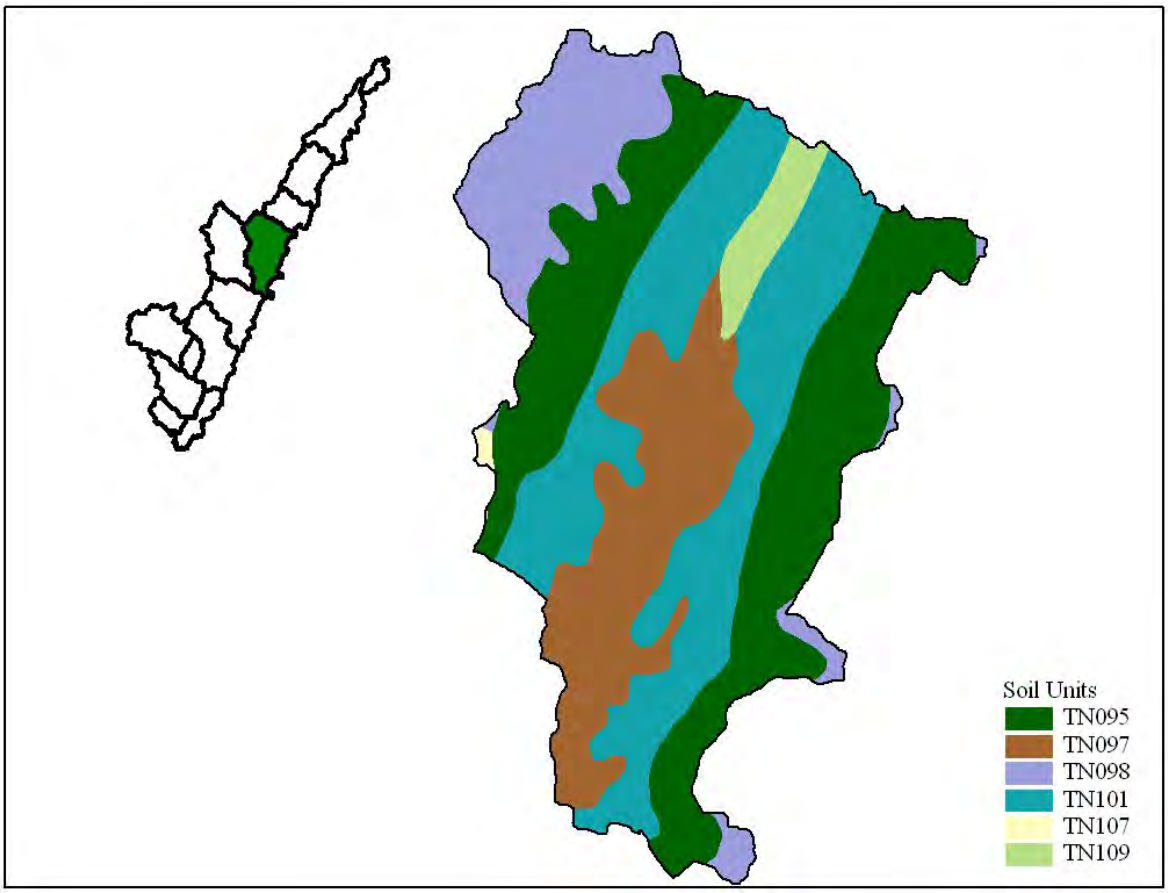


Figure 4-39. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040105.

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
TN097	0.00	B	1.62	5.55	Loam	0.32
TN098	1.00	C	3.98	4.82	Loam	0.32
TN101	0.00	B	1.71	5.39	Loam	0.35
TN107	1.00	C	6.34	4.84	Loam	0.28
TN109	0.00	B	8.40	5.01	Sandy Loam	0.28

Table 4-23. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040105. *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)
Bledsoe	9,669	10,650	12,367	11.51	1,113	1,226	1,424	27.90
Sequatchie	8,863	10,119	11,370	7.43	659	752	845	28.20
Totals	**18,532**	**20,769**	**23,737**		**1,772**	**1,978**	**2,269**	**28.00**

Table 4-24. Population Estimates in Subwatershed 060200040105.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Dunlap	Sequatchie	3,731	1,501	591	896	14

Table 4-25. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 060200040105.

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

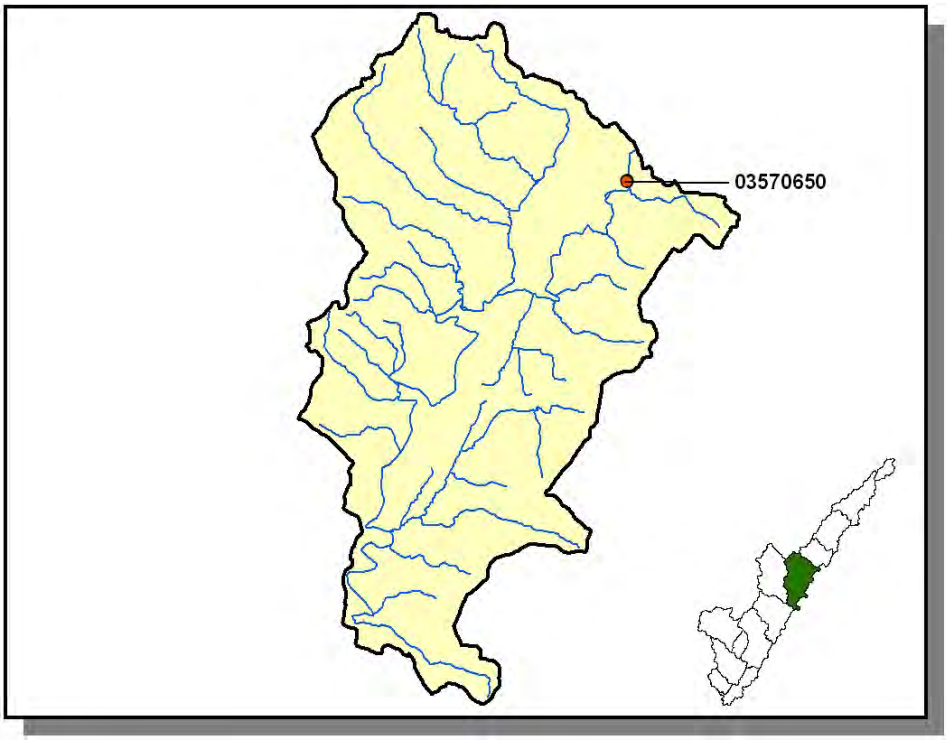


Figure 4-40. Location of USGS Continuous Record Gaging Stations in Subwatershed 060200040105. *More information is provided in Appendix IV.*

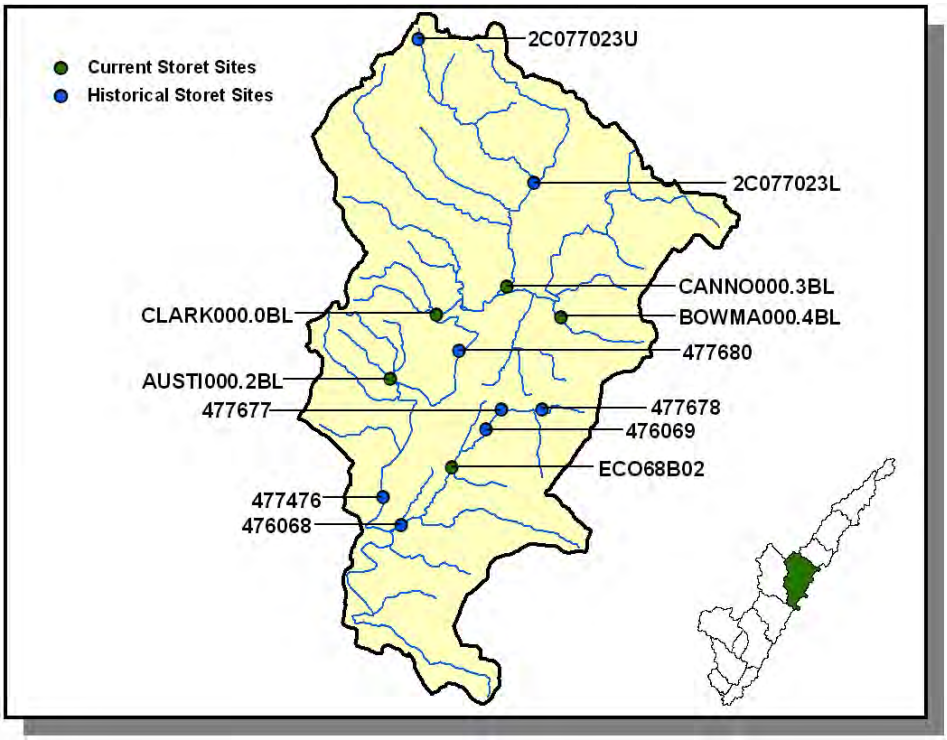


Figure 4-41. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200040105. *More information, including site names and locations, is provided in Appendix IV.*

4.2.E.iii. Permitted Activities.

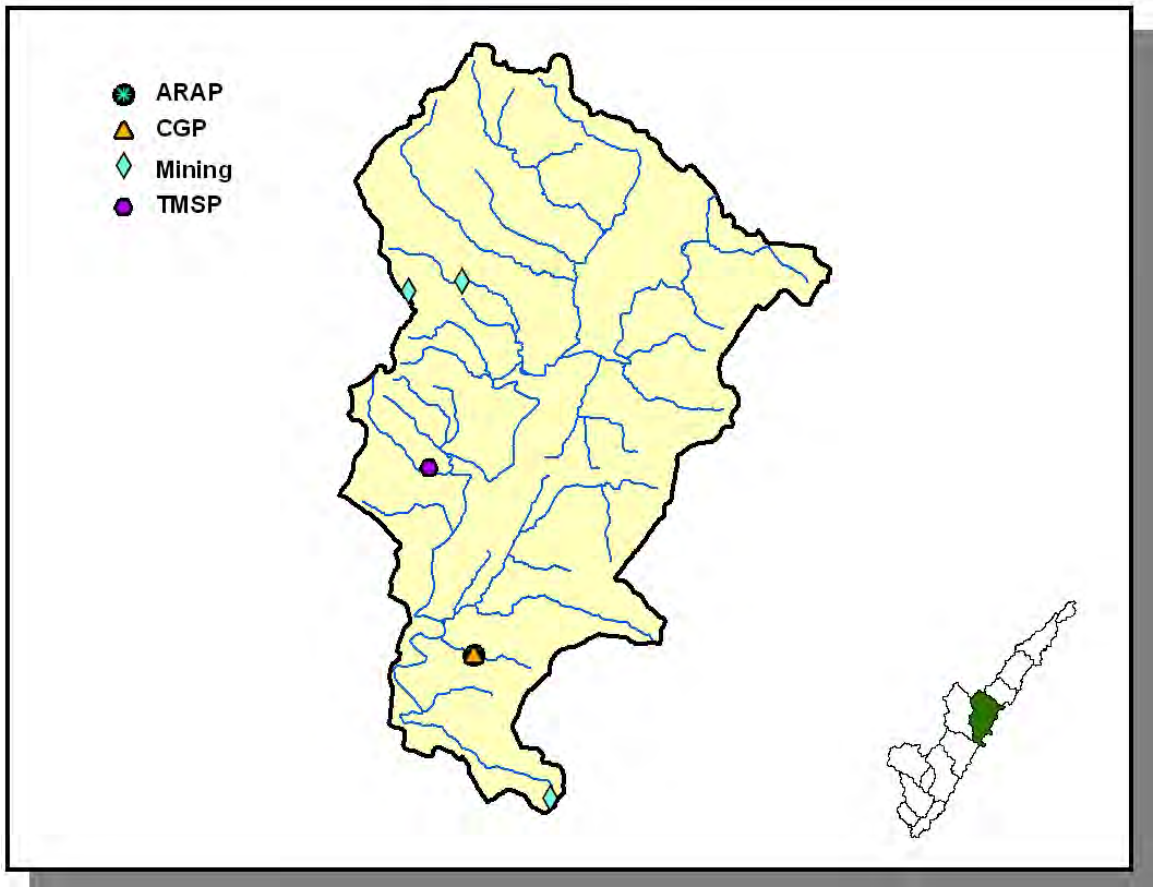


Figure 4-42. Location of Permits Issued in Subwatershed 060200040105. *More information, including the names of facilities, is provided in Appendix IV.*

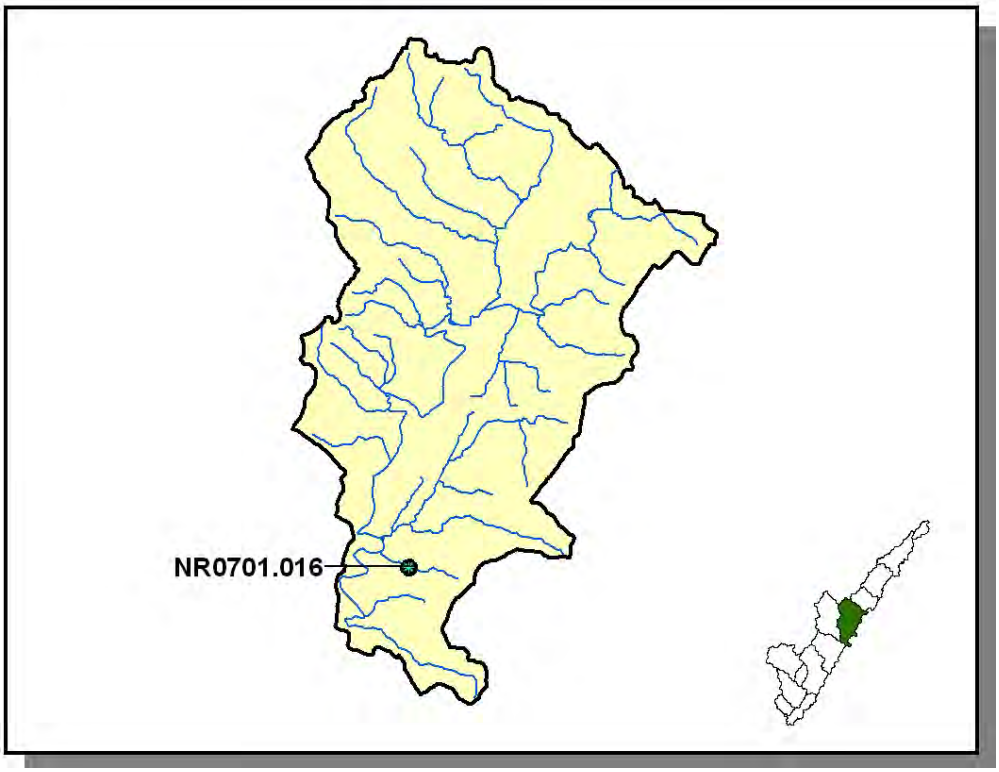


Figure 4-43. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 060200040105. *More information is provided in Appendix IV.*

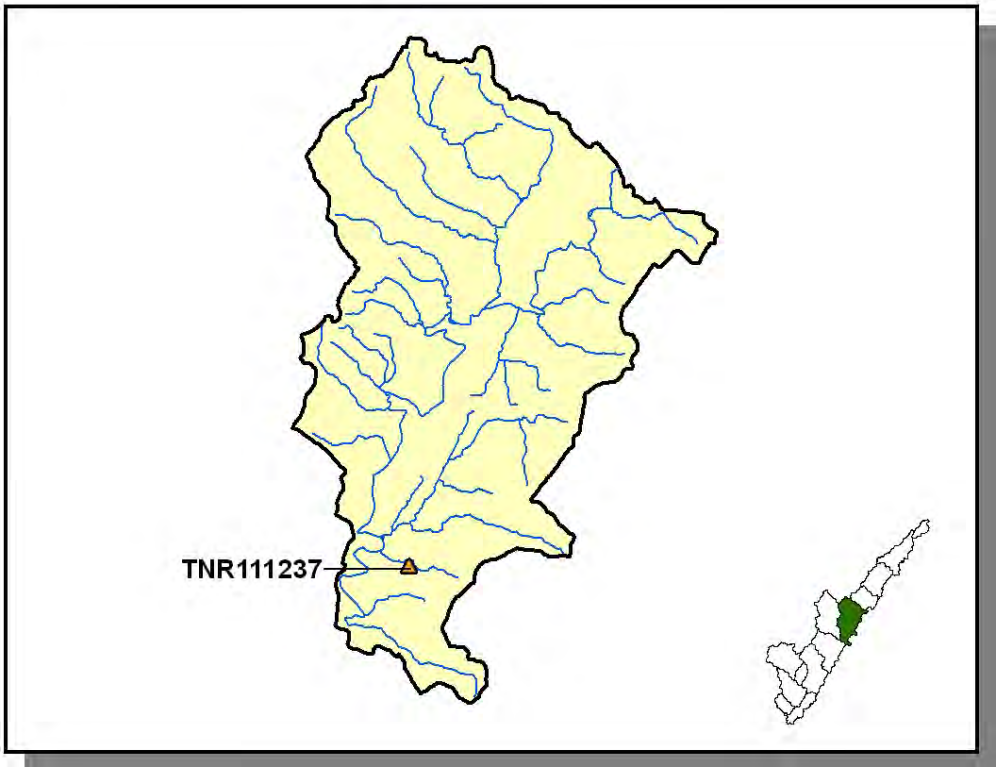


Figure 4-44. Location of CGP (Construction General Permit) Sites in Subwatershed 060200040105. *More information is provided in Appendix IV.*

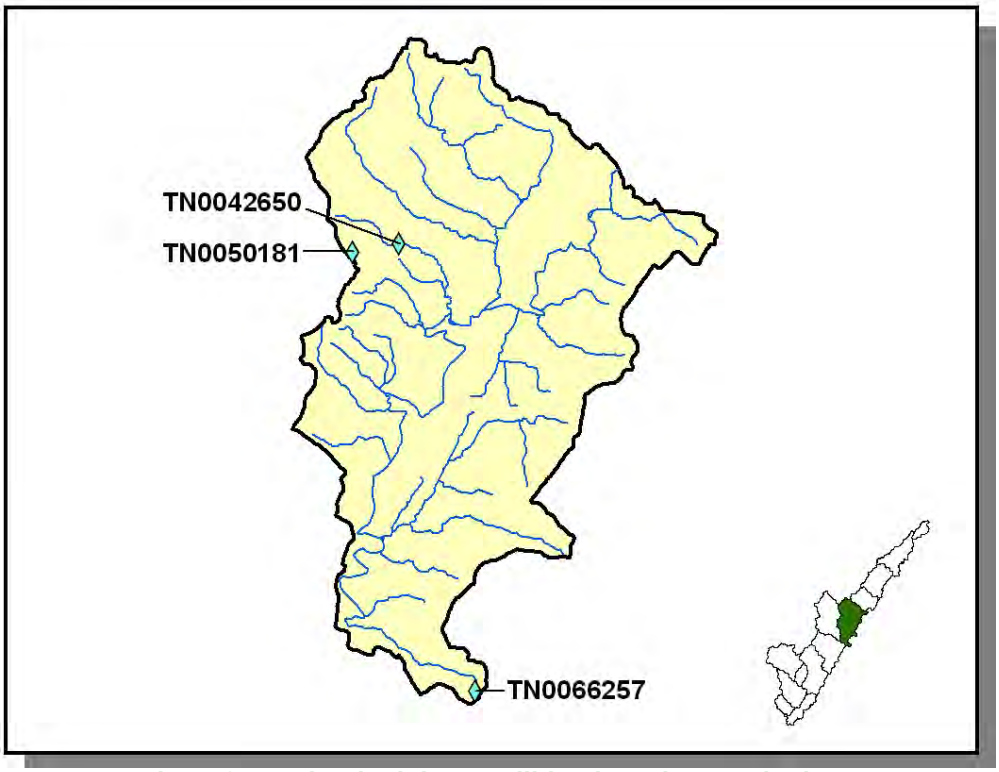


Figure 4-45. Location of Permitted Mining Facilities in Subwatershed 060200040105. *More information is provided in Appendix IV.*

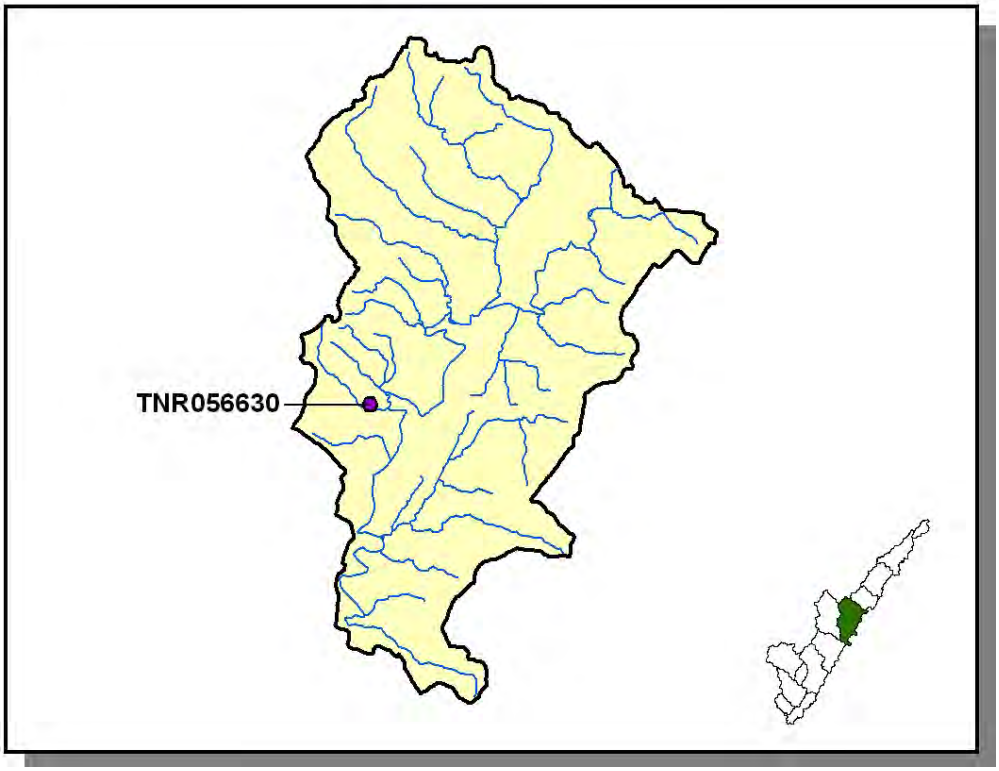


Figure 4-46. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 060200040105. *More information is provided in Appendix IV.*

4.2.E.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Bledsoe	11,691	25,110	1,474	22	275	162
Sequatchie	2,763	6,739	221	6		

Table 4-26. 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)
Bledsoe	186.2	186.2	0.9	2.3

Table 4-27. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Corn (Row Crops)	8.64
Soybeans (Row Crops)	4.85
All Other Row Crops	4.45
Wheat (Close Grown Cropland)	2.81
Conservation Reserve Program Land	1.00
Legume Grass (Hayland)	0.88
Farmsteads and Ranch Headquarters	0.87
Grass (Pastureland)	0.80
Grass Forbs Legumes Mixed (Pastureland)	0.72
Grass (Hayland)	0.26

Table 4-28. Annual Estimated Total Soil Loss in Subwatershed 060200040105.

4.2.F. 060200040106 (Big Brush Creek).

4.2.F.i. General Description.

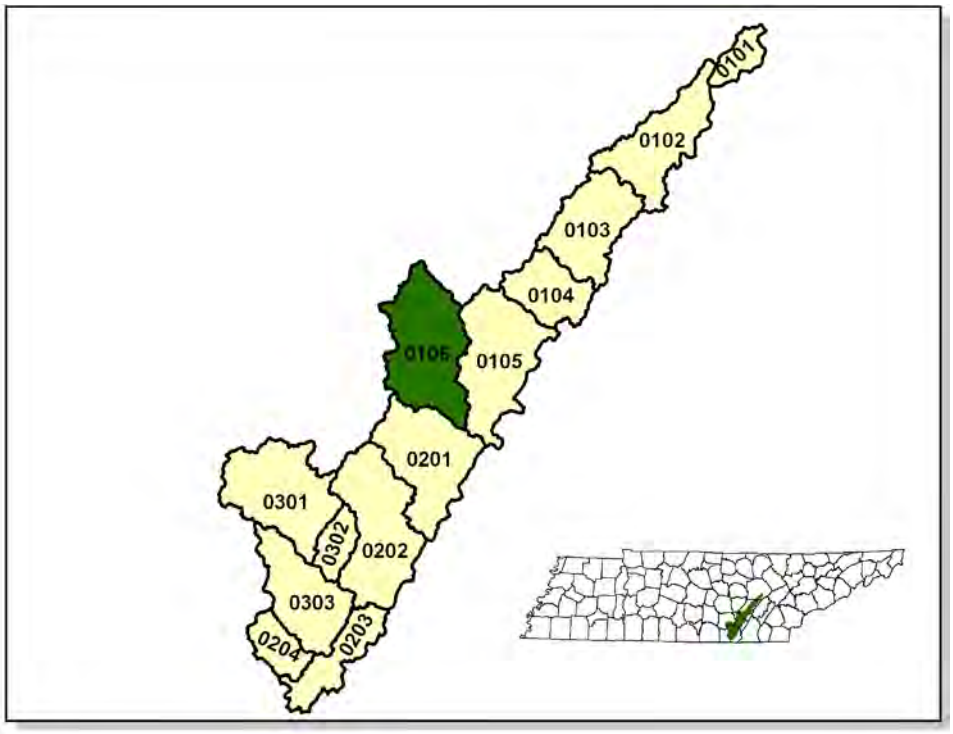


Figure 4-47. Location of Subwatershed 060200040106. *All Sequatchie River HUC-12 subwatershed boundaries are shown for reference.*

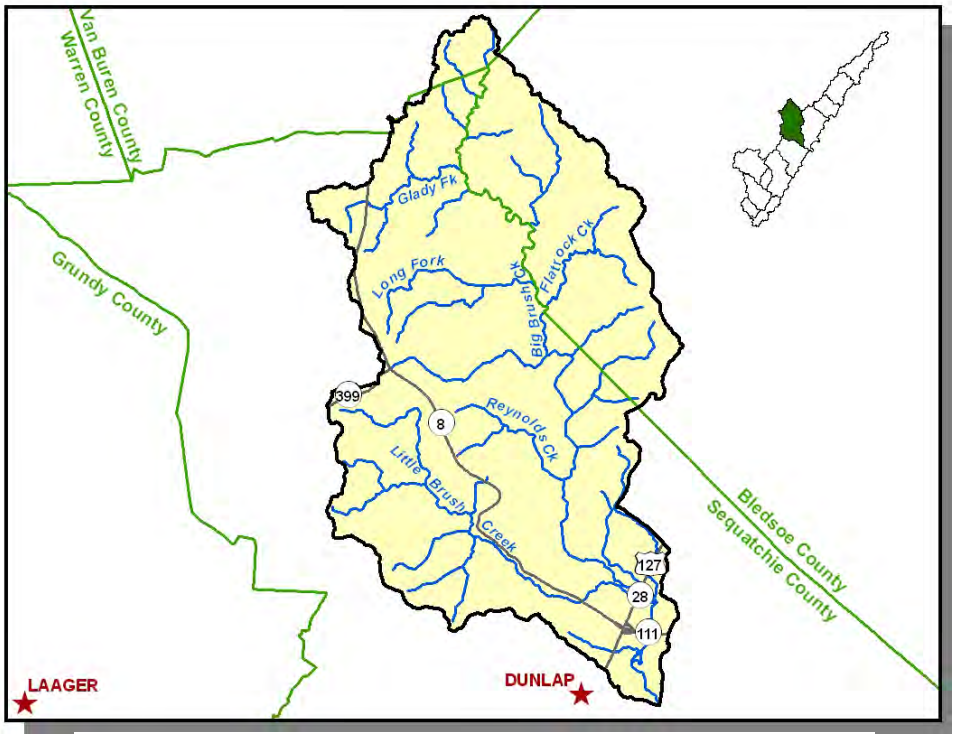


Figure 4-48. Locational Details of Subwatershed 060200040106.

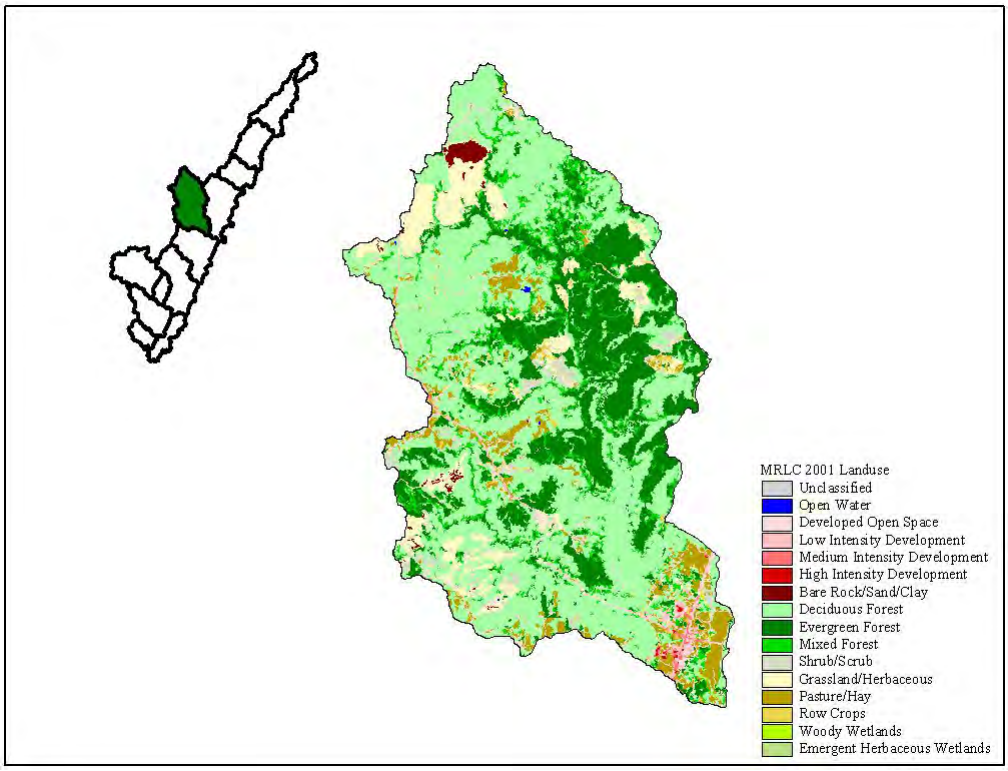


Figure 4-49. Illustration of Land Use Distribution in Subwatershed 060200040106.

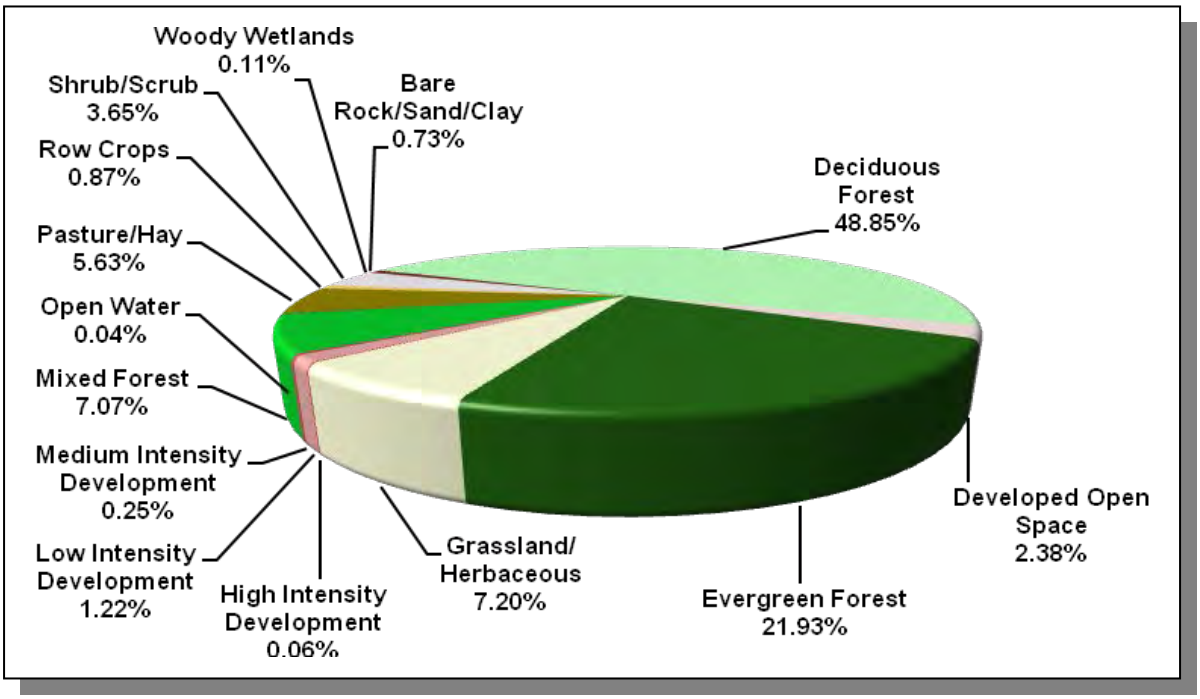


Figure 4-50. Land Use Distribution in Subwatershed 060200040106. *More information is provided in Appendix IV.*

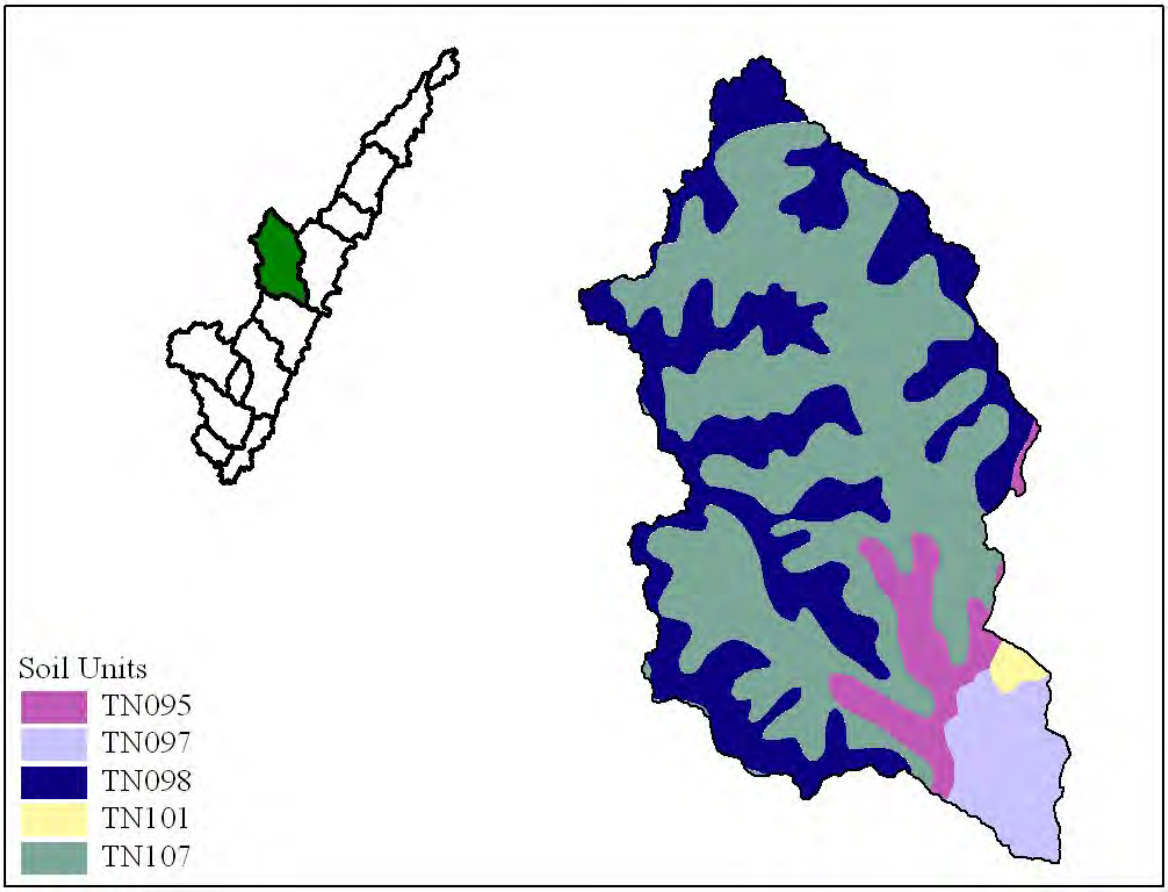


Figure 4-51. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040106.

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
TN097	0.00	B	1.62	5.55	Loam	0.32
TN098	1.00	C	3.98	4.82	Loam	0.32
TN101	0.00	B	1.71	5.39	Loam	0.35
TN107	1.00	C	6.34	4.84	Loam	0.28

Table 4-29. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040106. *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)
Bledsoe	9,669	10,650	12,367	3.23	312	344	399	27.9
Sequatchie	8,863	10,119	11,370	21.09	1,869	2,134	2,398	28.3
Van Buren	4,846	5,060	5,508	0.34	17	17	19	11.8
Totals	**23,378**	**25,829**	**29,245**		**2,198**	**2,495**	**2,816**	**28.1**

Table 4-30. Population Estimates in Subwatershed 0602000400106

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Dunlap	Sequatchie	3,731	1,501	591	896	14

Table 4-31. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 060200040106.

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

There are no USGS continuous record gaging stations located in subwatershed 060200040106.

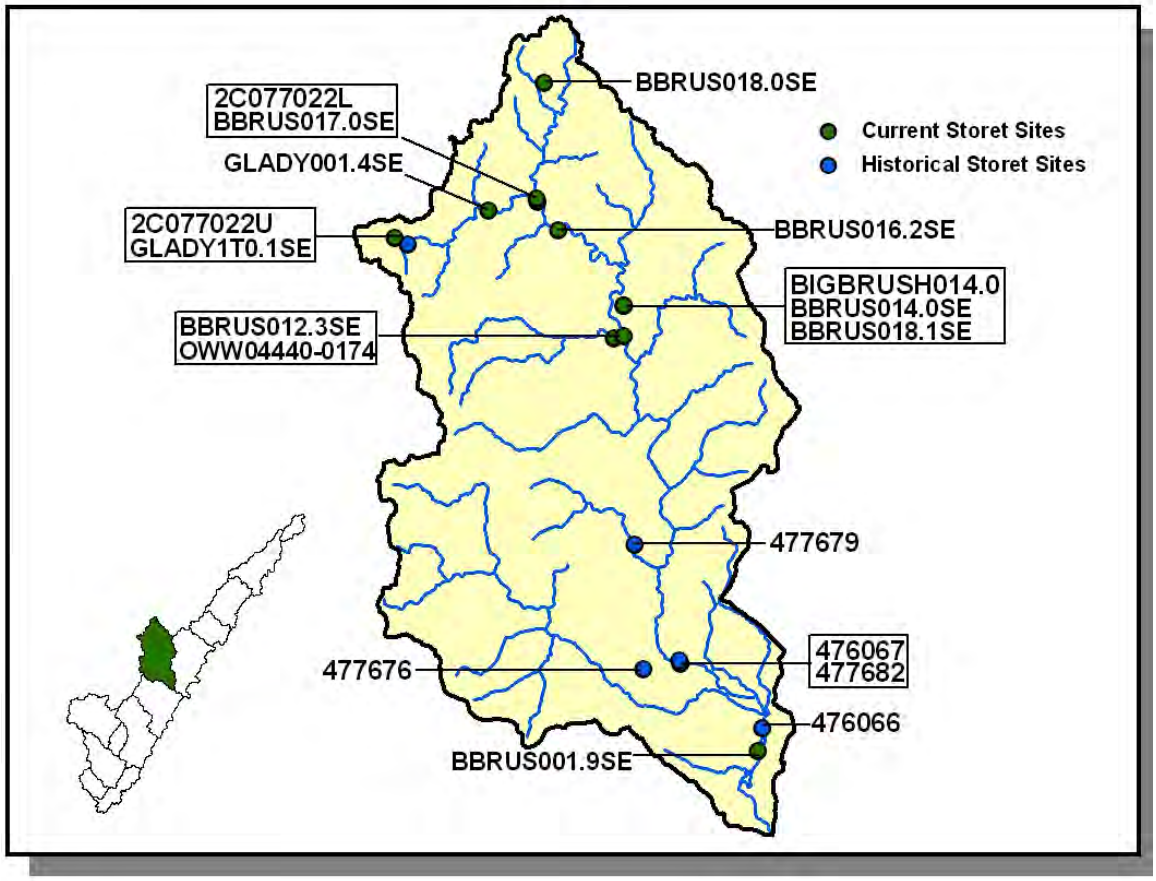


Figure 4-52. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200040106. *More information, including site names and locations, is provided in Appendix IV.*

4.2.F.iii. Permitted Activities.

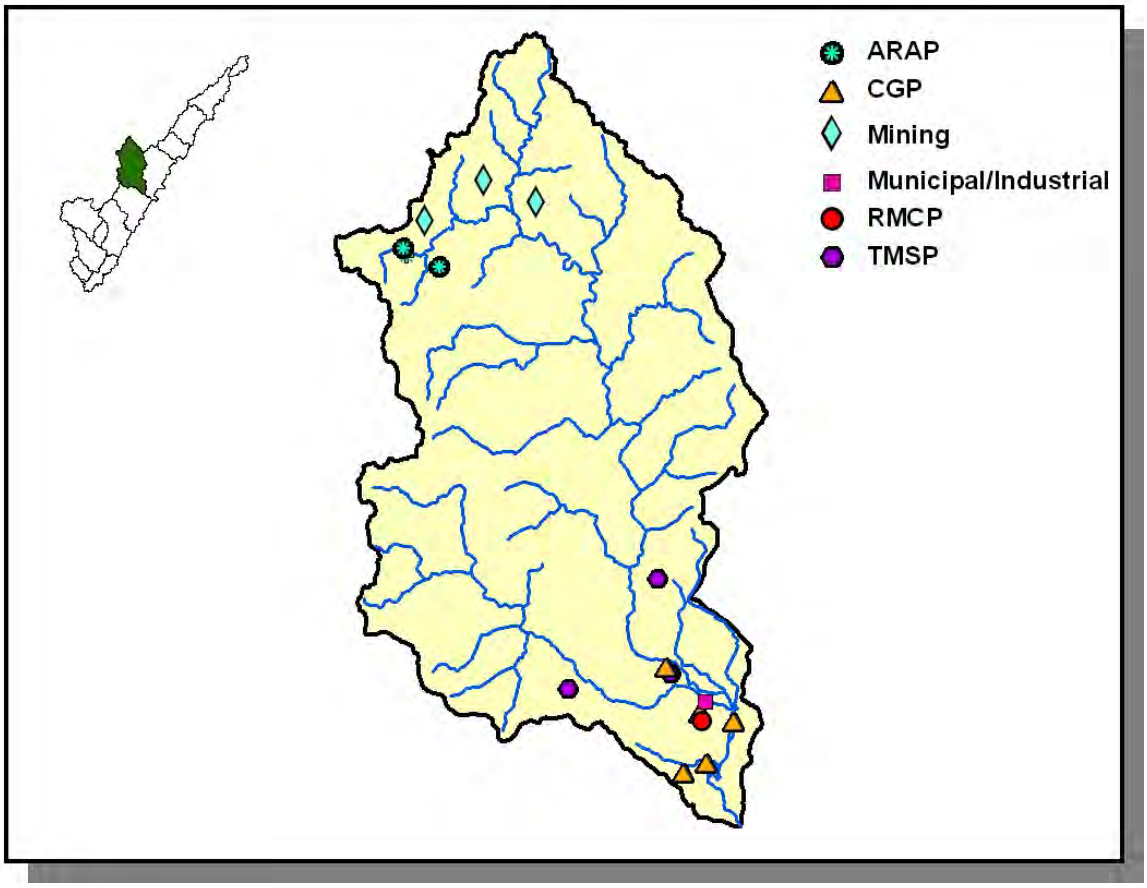


Figure 4-53. Location of Permits Issued in Subwatershed 060200040106. *More information, including the names of facilities, is provided in Appendix IV.*

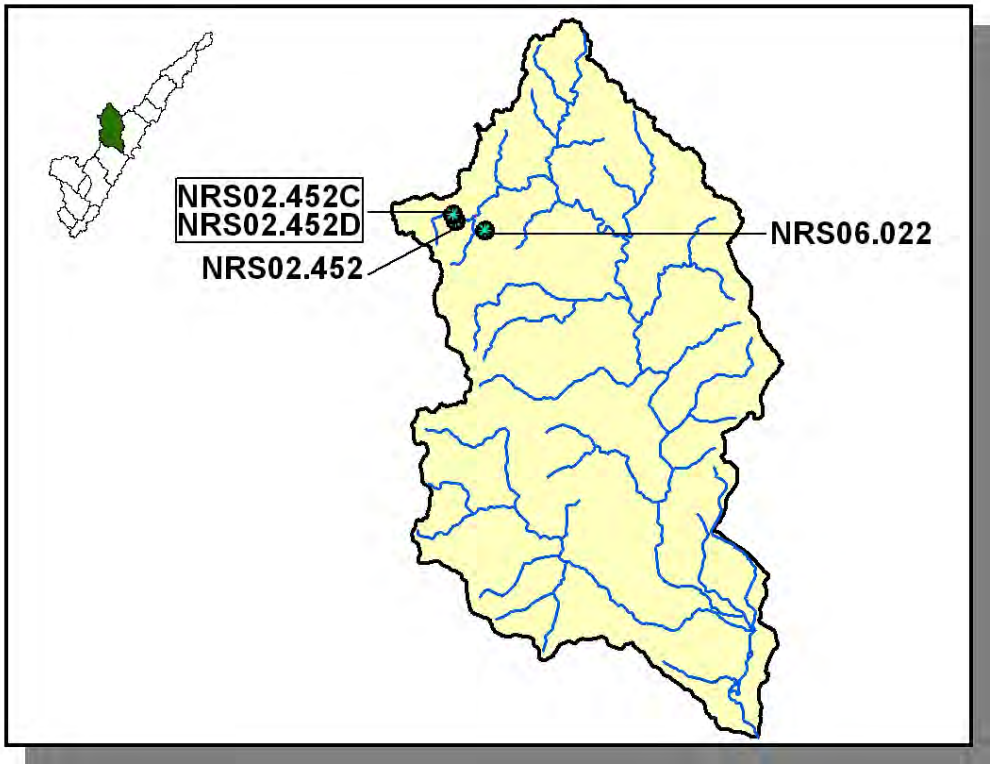


Figure 4-54. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 060200040106. *More information is provided in Appendix IV.*

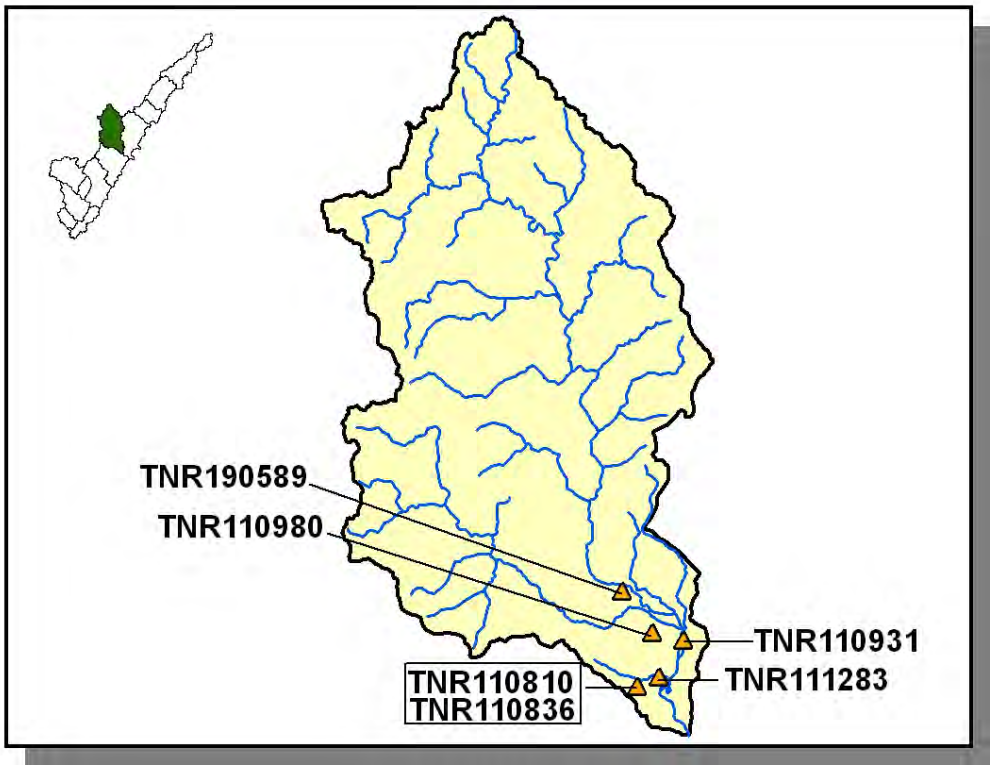


Figure 4-55. Location of CGP (Construction General Permit) Sites in Subwatershed 060200040106. *More information is provided in Appendix IV.*

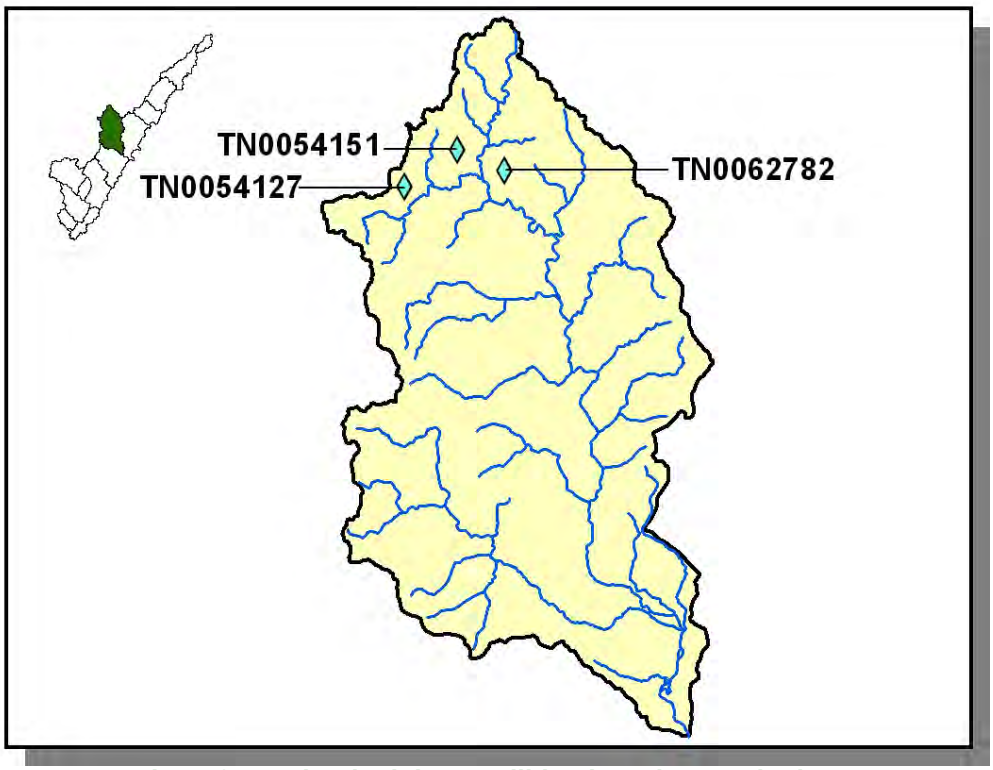


Figure 4-56. Location of Permitted Mining Facilities in Subwatershed 060200040106. *More information is provided in Appendix IV.*

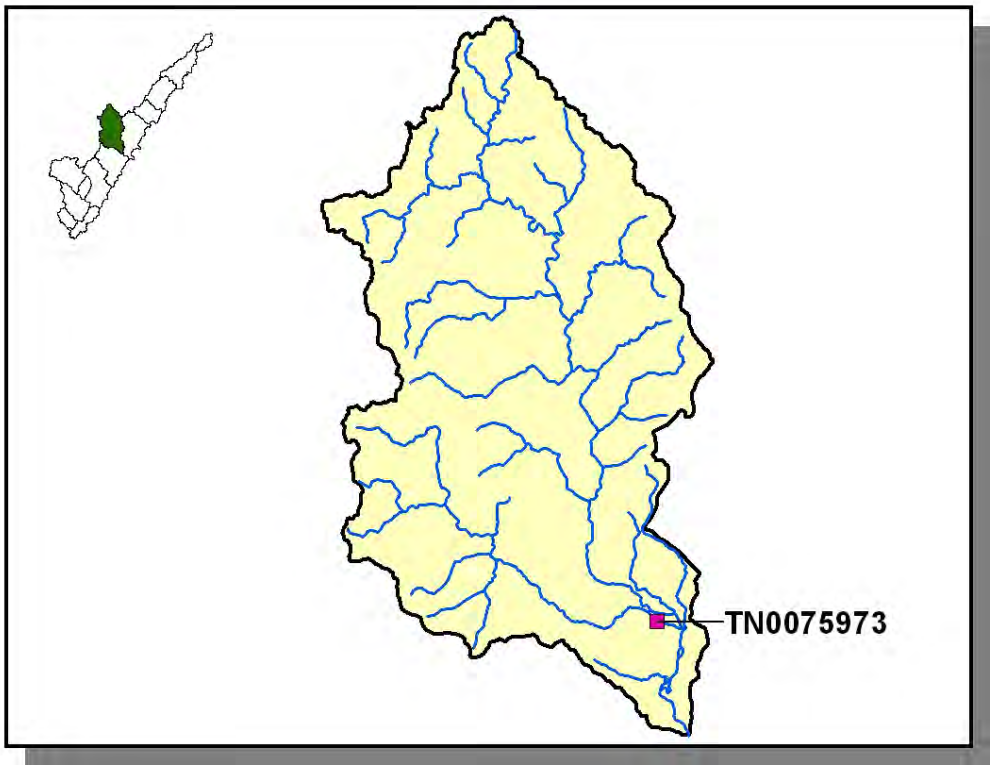


Figure 4-57. Location of Permitted Municipal and Industrial Facilities in Subwatershed 060200040106. *More information, including the name of the facility is provided in Appendix IV.*

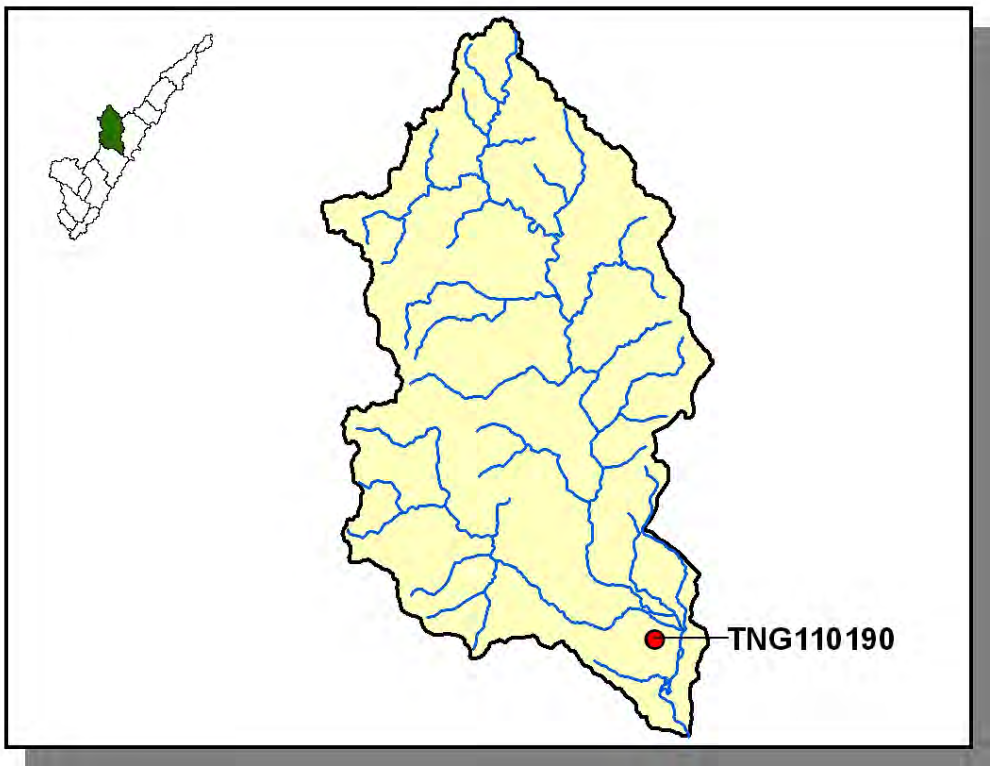


Figure 4-58. Location of RMCP (Ready Mix Concrete Plant) facilities in Subwatershed 060200040106. *More information, including the names of facilities, is provided in Appendix IV.*

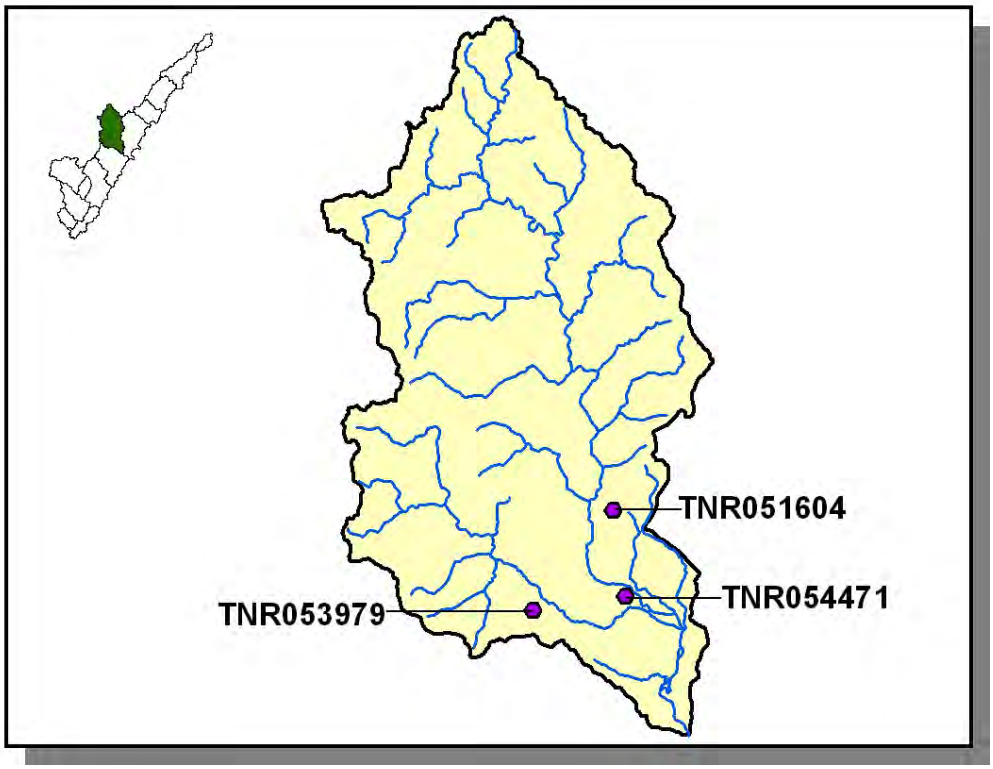


Figure 4-59. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 060200040106. *More information is provided in Appendix IV.*

4.2.F.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Bledsoe	11,691	25,110	1,474	22	275	162
Sequatchie	2,763	6,739	221	6		
Van Buren	3,669	7,876	412	7		

Table 4-32. 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)
Bledsoe	186.2	186.2	0.9	2.3
Van Buren	145.0	135.4	2.3	9.5

Table 4-33. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Soybeans (Row Crops)	4.85
All Other Row Crops	4.45
Corn (Row Crops)	4.15
Other (Horticultural)	3.72
Wheat (Close Grown Cropland)	2.81
Grass Forbs Legumes Mixed (Pastureland)	1.02
Grass (Pastureland)	1.01
Conservation Reserve Program Land	1.00
Grass (Hayland)	0.41
Legume Grass (Hayland)	0.40
Farmsteads and Ranch Headquarters	0.32

Table 4-34. Annual Estimated Total Soil Loss in Subwatershed 060200040106.

4.2.G. 060200040201 (Sequatchie River).

4.2.G.i. General Description.

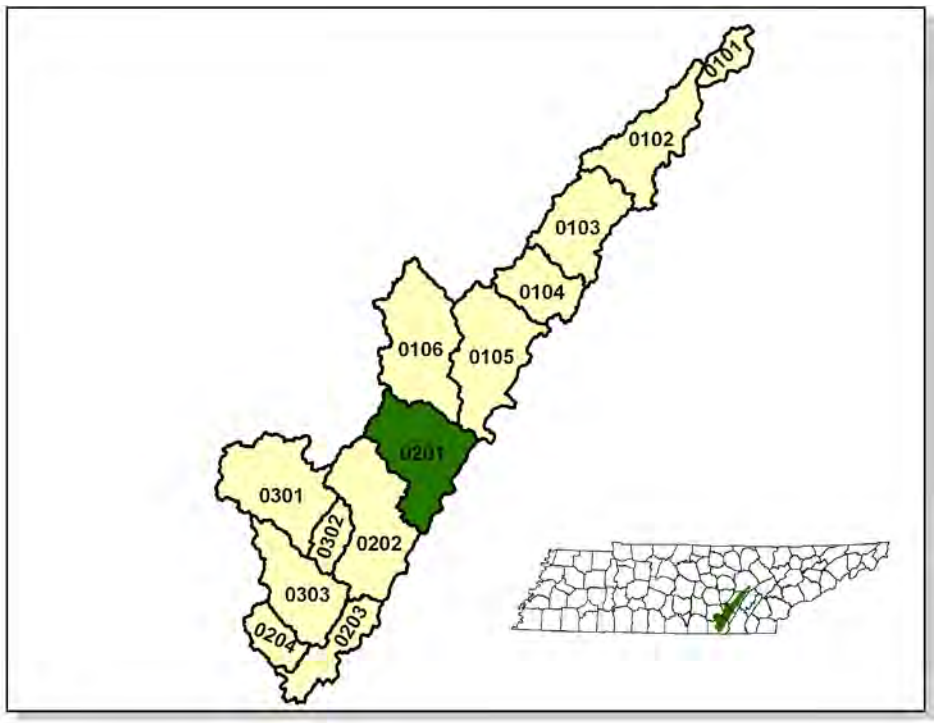


Figure 4-60. Location of Subwatershed 060200040201. *All Sequatchie River HUC-12 subwatershed boundaries are shown for reference.*

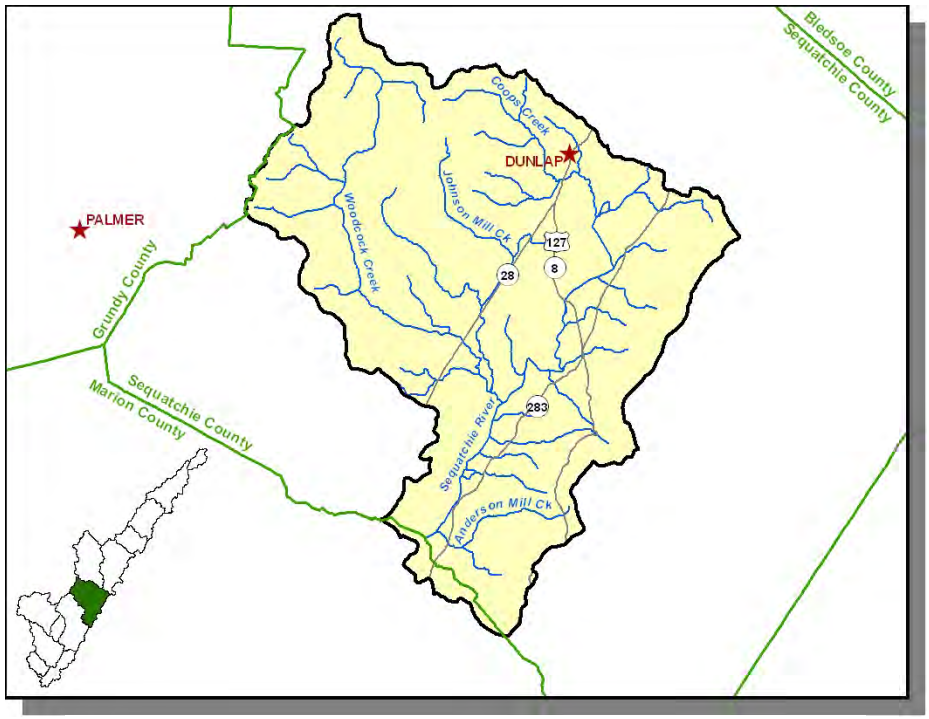


Figure 4-61. Locational Details of Subwatershed 060200040201.

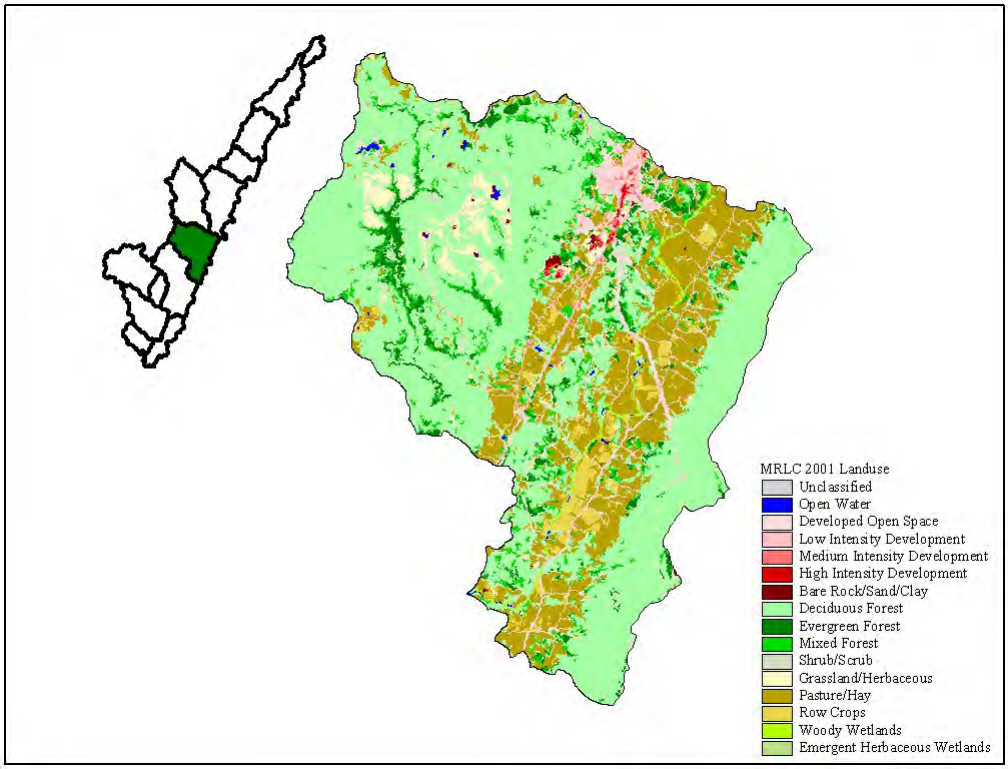


Figure 4-62. Illustration of Land Use Distribution in Subwatershed 060200040201.

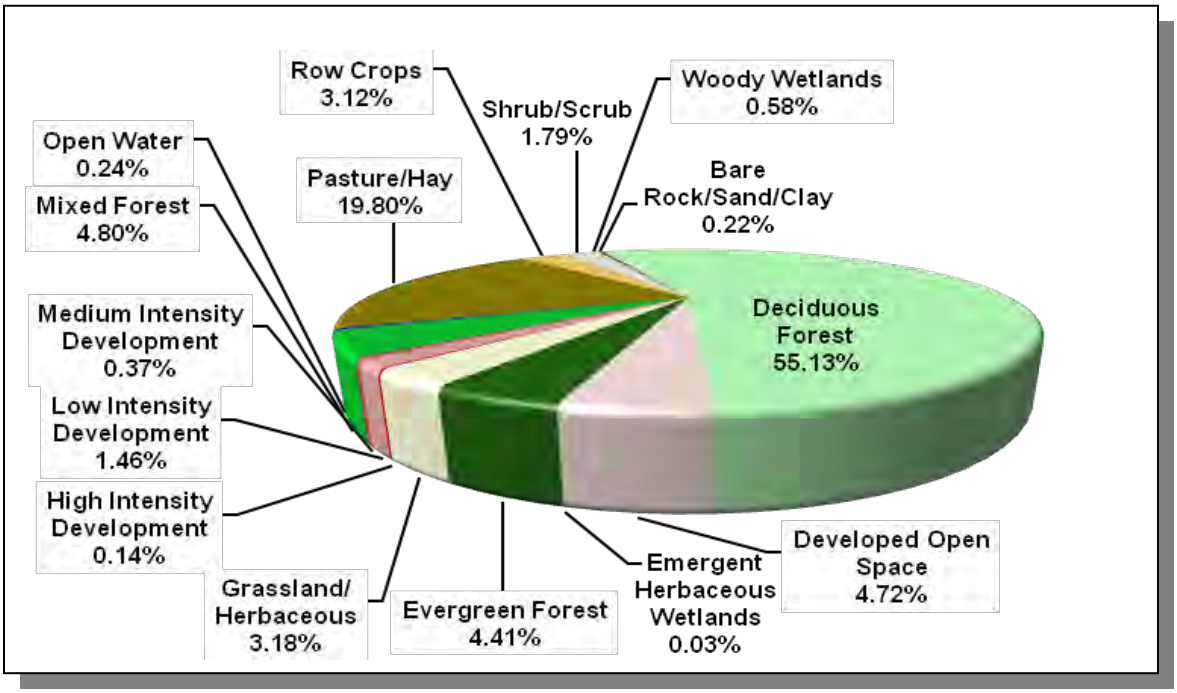


Figure 4-63. Land Use Distribution in Subwatershed 060200040201. *More information is provided in Appendix IV.*

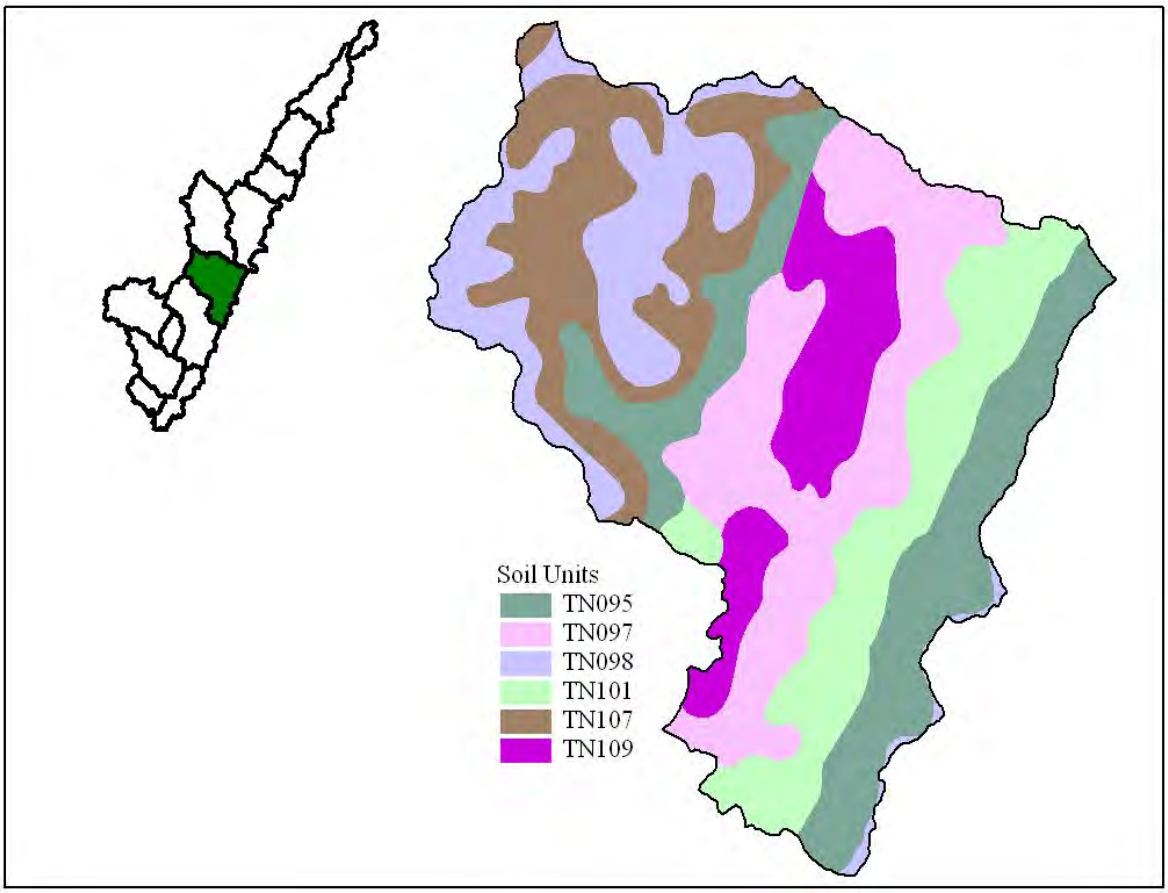


Figure 4-64. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040201.

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
TN097	0.00	B	1.62	5.55	Loam	0.32
TN098	1.00	C	3.98	4.82	Loam	0.32
TN101	0.00	B	1.71	5.39	Loam	0.35
TN107	1.00	C	6.34	4.84	Loam	0.28
TN109	0.00	B	8.40	5.01	Sandy Loam	0.28

Table 4-35. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040201. *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	0.50	125	134	139	11.20
Sequatchie	8,863	10,119	11,370	22.69	2,011	2,296	2,580	28.30
Totals	**33,723**	**36,793**	**39,146**		**2,136**	**2,430**	**2,719**	**27.30**

Table 4-36. Population Estimates in Subwatershed 060200040201.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Dunlap	Sequatchie	3,731	1,501	591	896	14

Table 4-37. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 060200040201.

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

There are no USGS continuous record gaging stations located in subwatershed 060200040201.

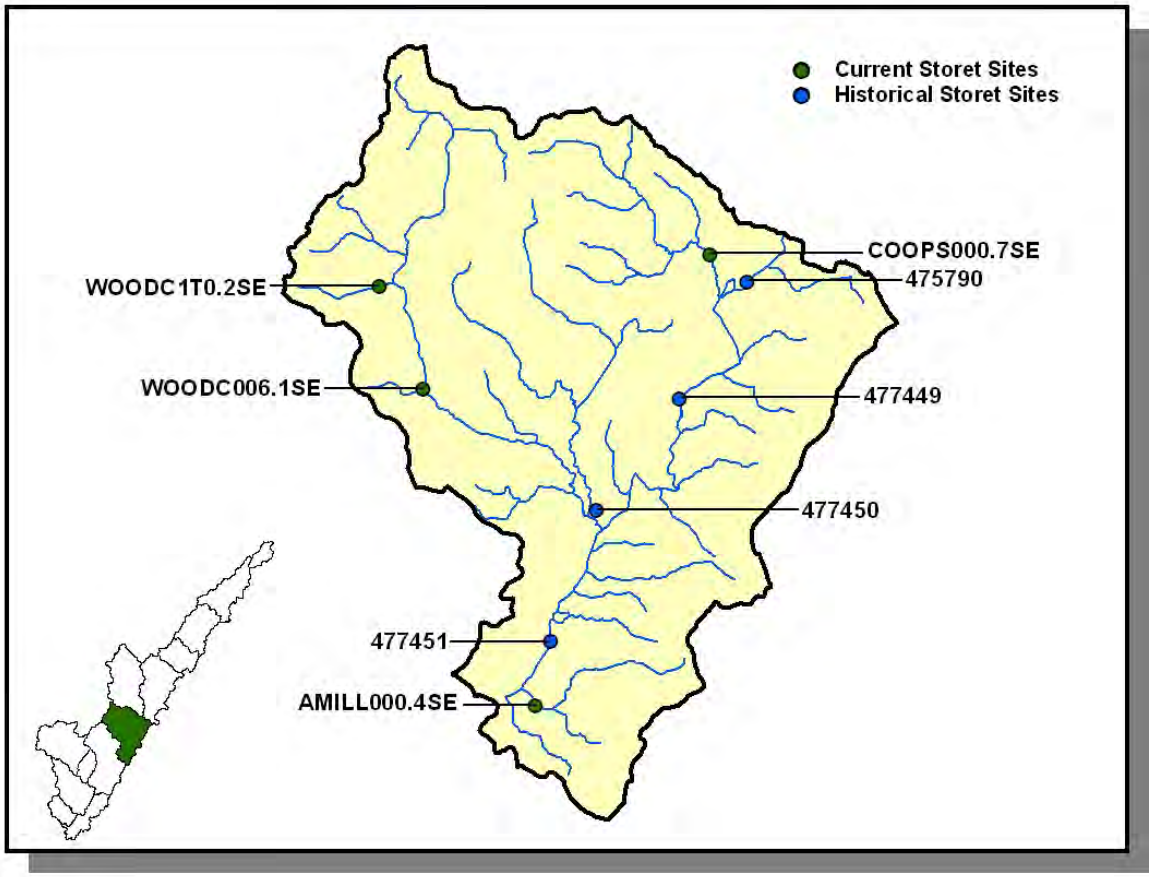


Figure 4-65. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200040201. *More information, including site names and locations, is provided in Appendix IV.*

4.2.G.iii. Permitted Activities.

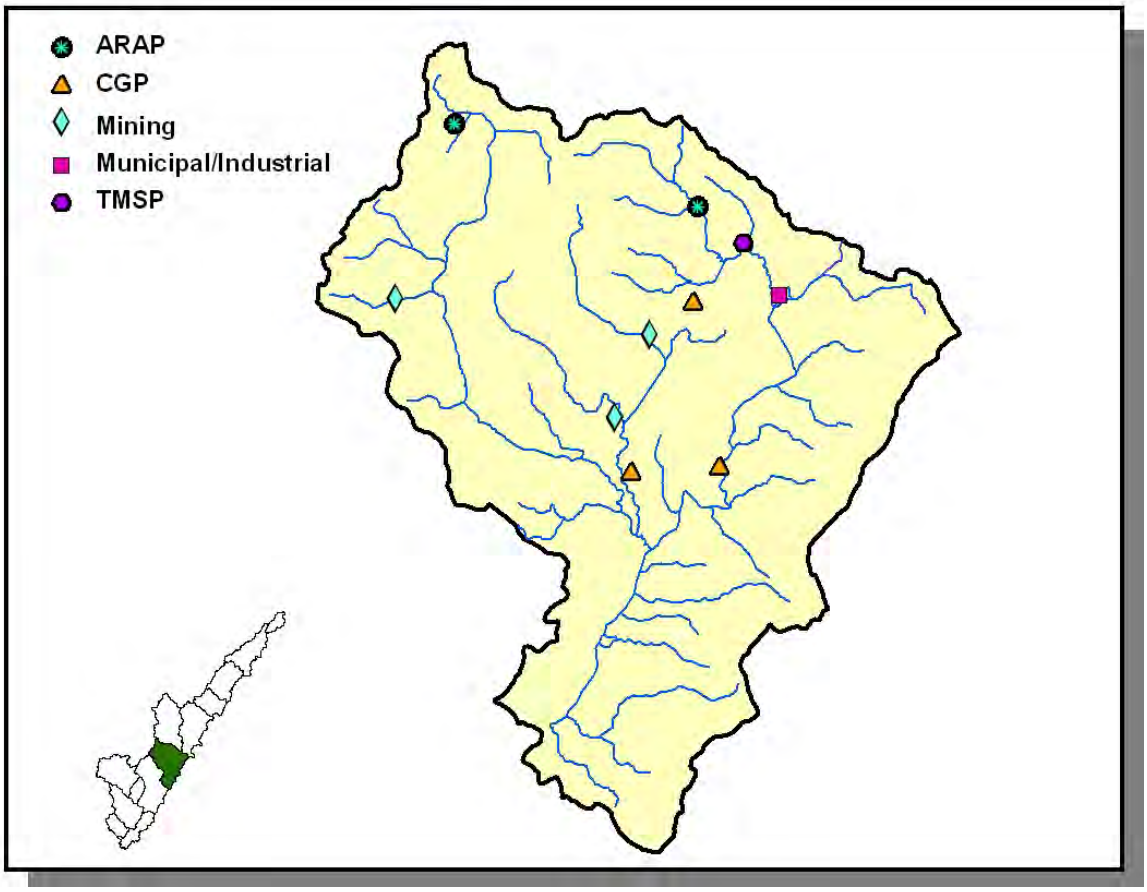


Figure 4-66. Location of Permits Issued in Subwatershed 060200040201. *More information, including the names of facilities, is provided in Appendix IV.*

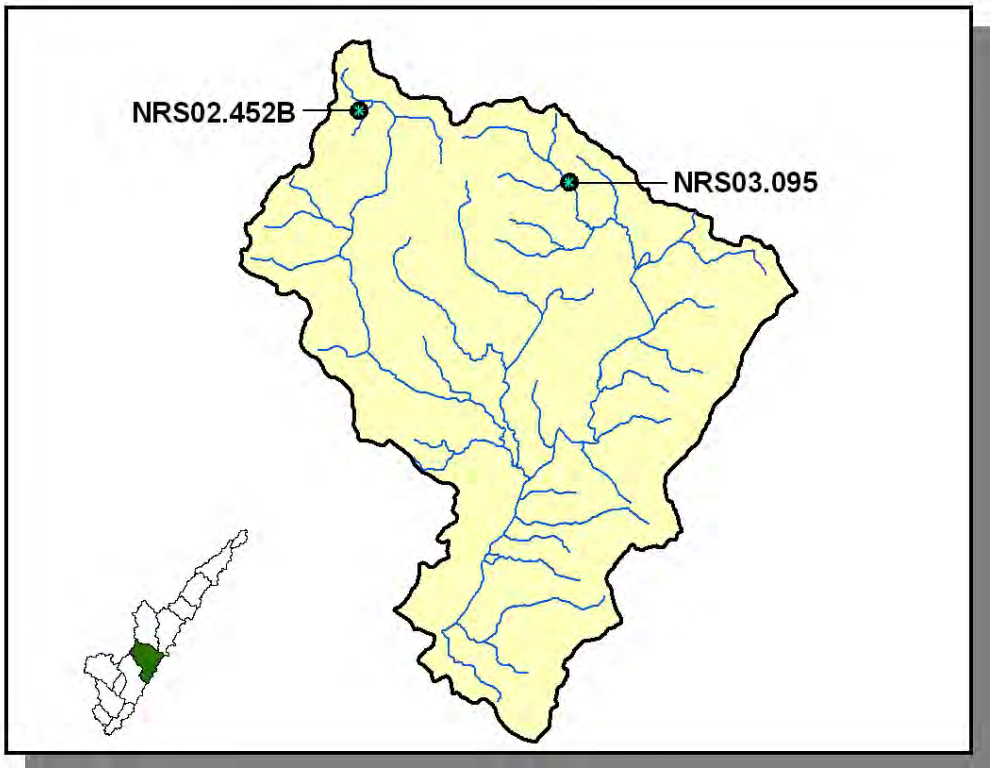


Figure 4-67. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 060200040201. *More information is provided in Appendix IV.*

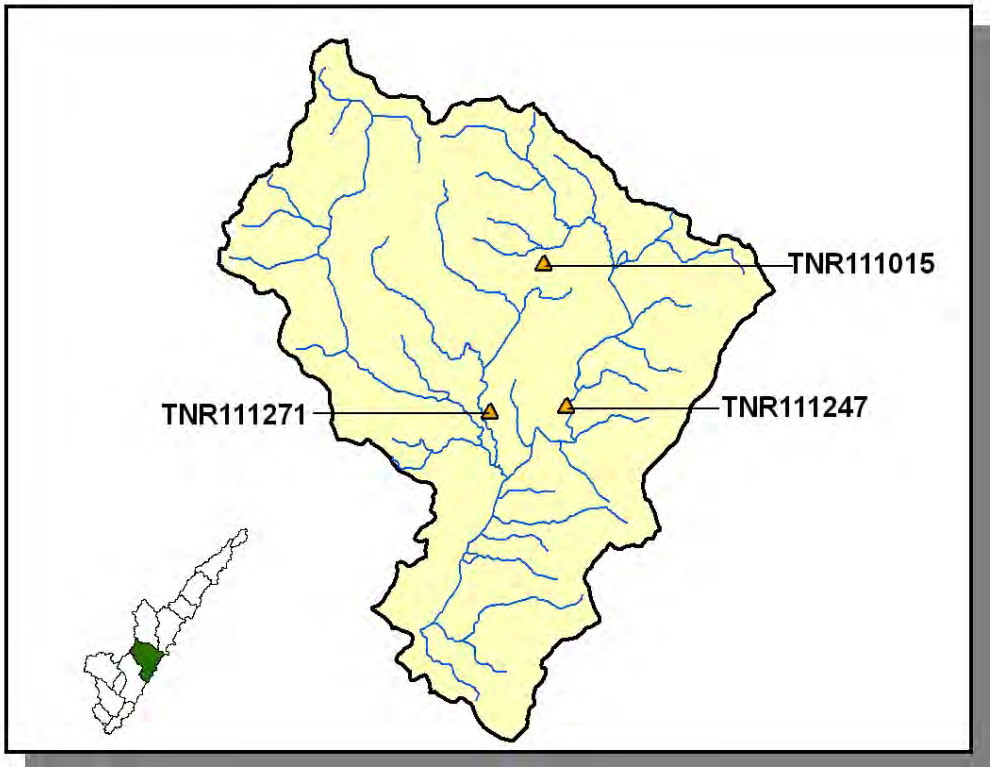


Figure 4-68. Location of CGP (Construction General Permit) Sites in Subwatershed 060200040201. *More information is provided in Appendix IV.*

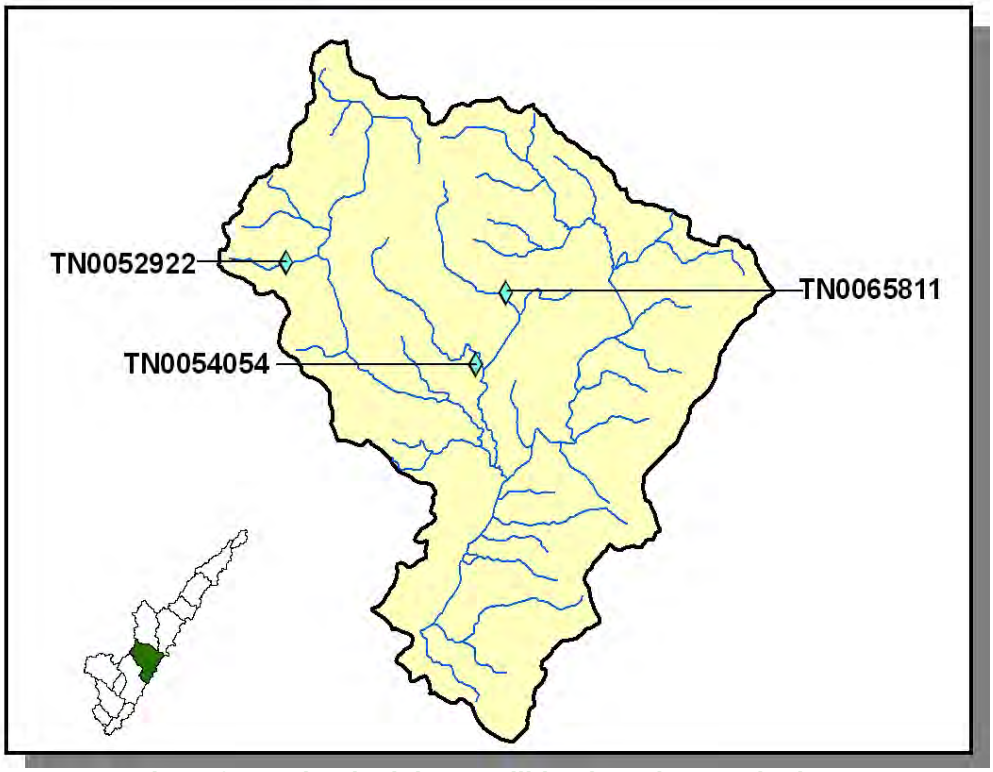


Figure 4-69. Location of Permitted Mining Facilities in Subwatershed 060200040201. *More information is provided in Appendix IV.*

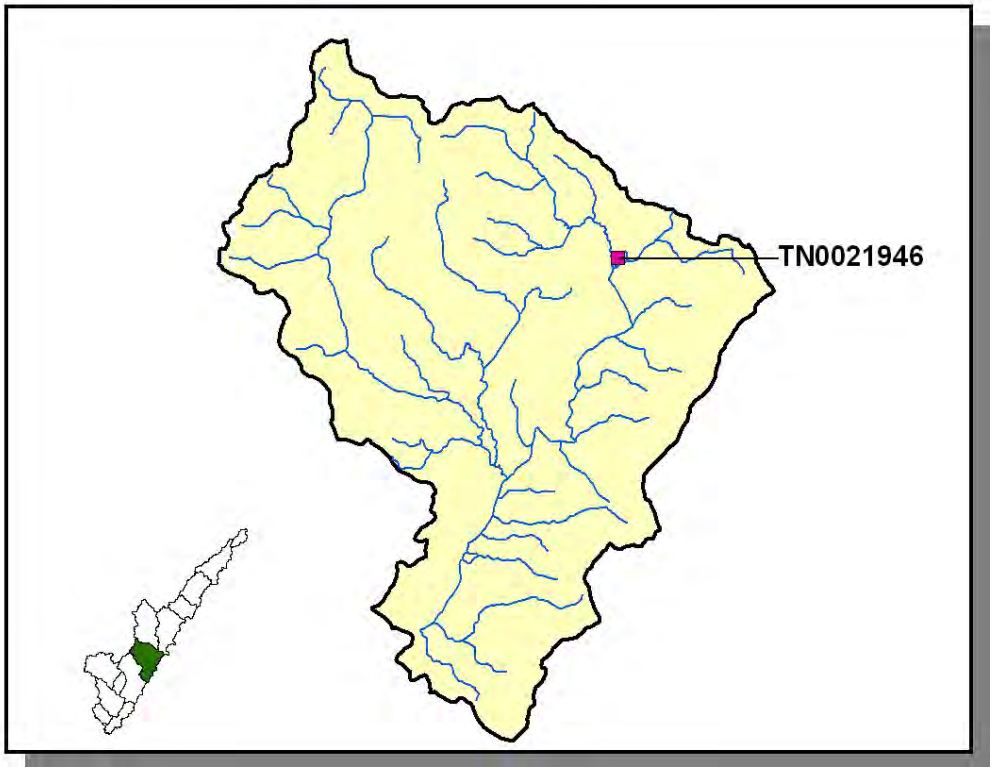


Figure 4-70. Location of Permitted Municipal and Industrial Facilities in Subwatershed 060200040201. *More information, including the name of the facility is provided in Appendix IV.*

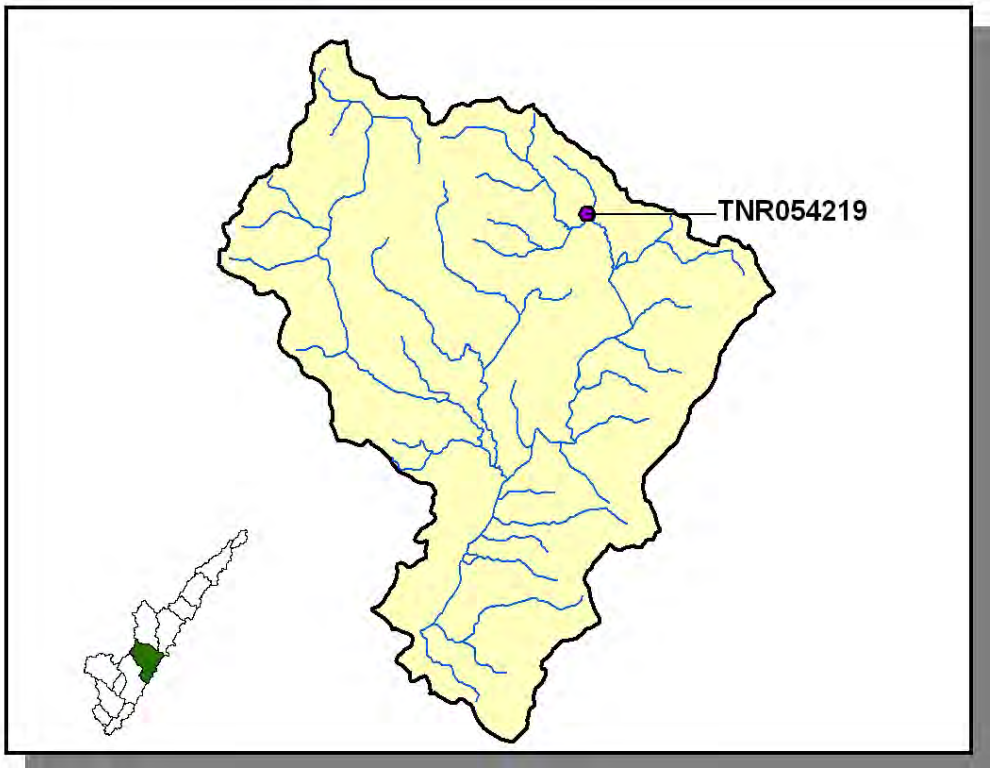


Figure 4-71. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 060200040201. *More information is provided in Appendix IV.*

4.2.G.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Marion	4,424	8,939	311	246	279	
Sequatchie	2,763	6,739	221	6		

Table 4-38. 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)	2.52
Grass Forbs Legumes Mixed (Pastureland)	1.10
Grass (Pastureland)	1.07
Grass (Hayland)	0.47
Other (Horticultural)	0.29
Legume Grass (Hayland)	0.22
Farmsteads and Ranch Headquarters	0.11

Table 4-39. Annual Estimated Total Soil Loss in Subwatershed 060200040201.

4.2.H. 060200040202 (Sequatchie River).

4.2.H.i. General Description.

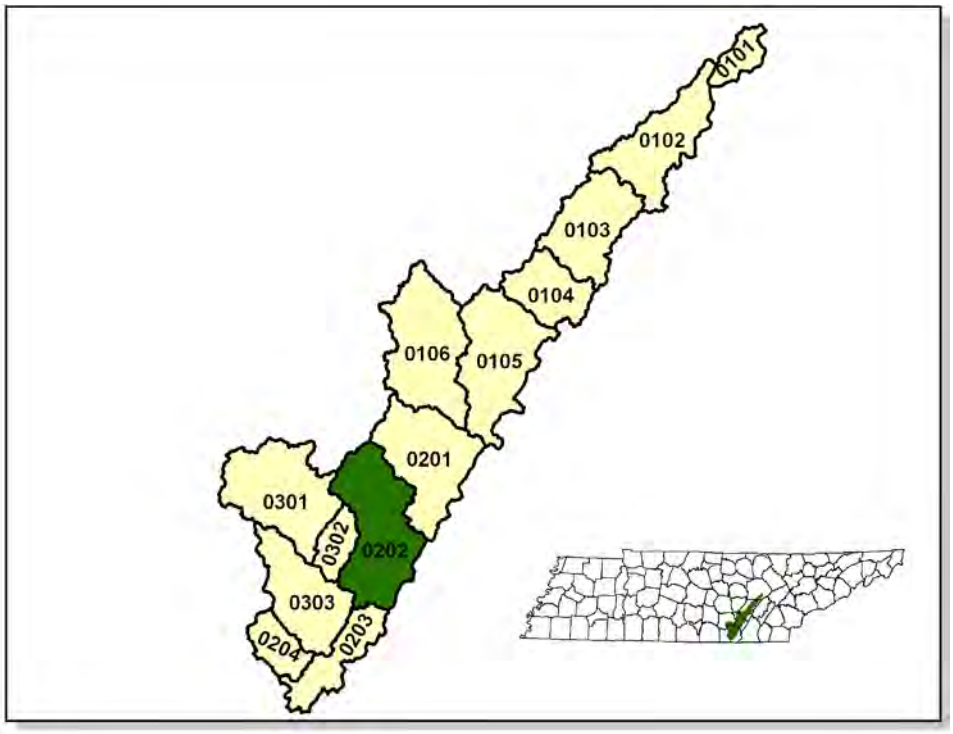


Figure 4-72. Location of Subwatershed 060200040202. *All Sequatchie River HUC-12 subwatershed boundaries are shown for reference.*

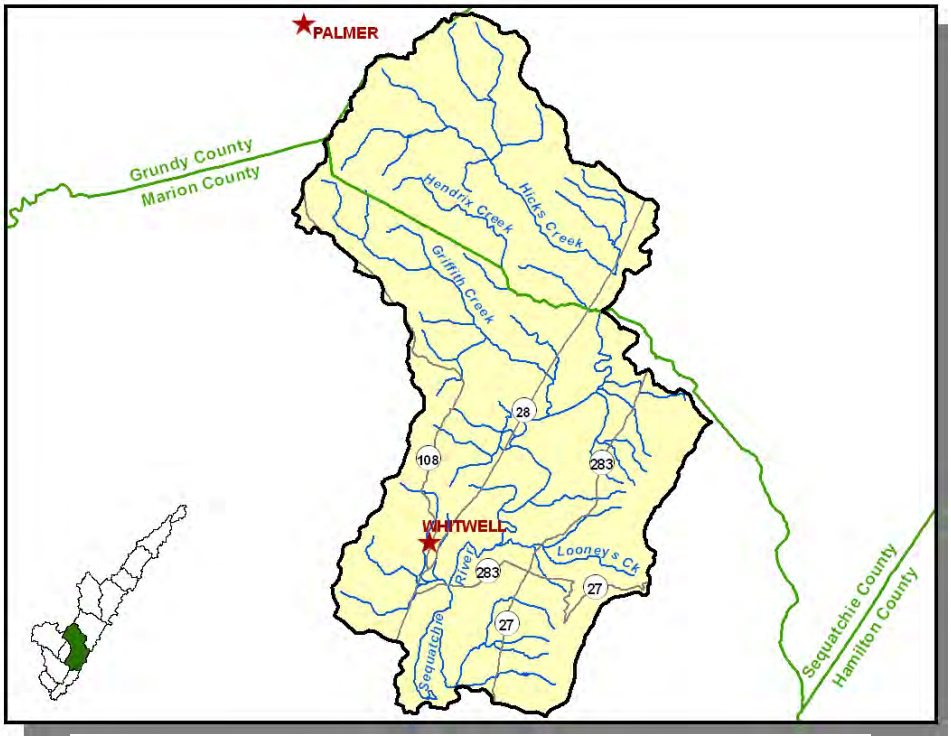


Figure 4-73. Locational Details of Subwatershed 060200040202.

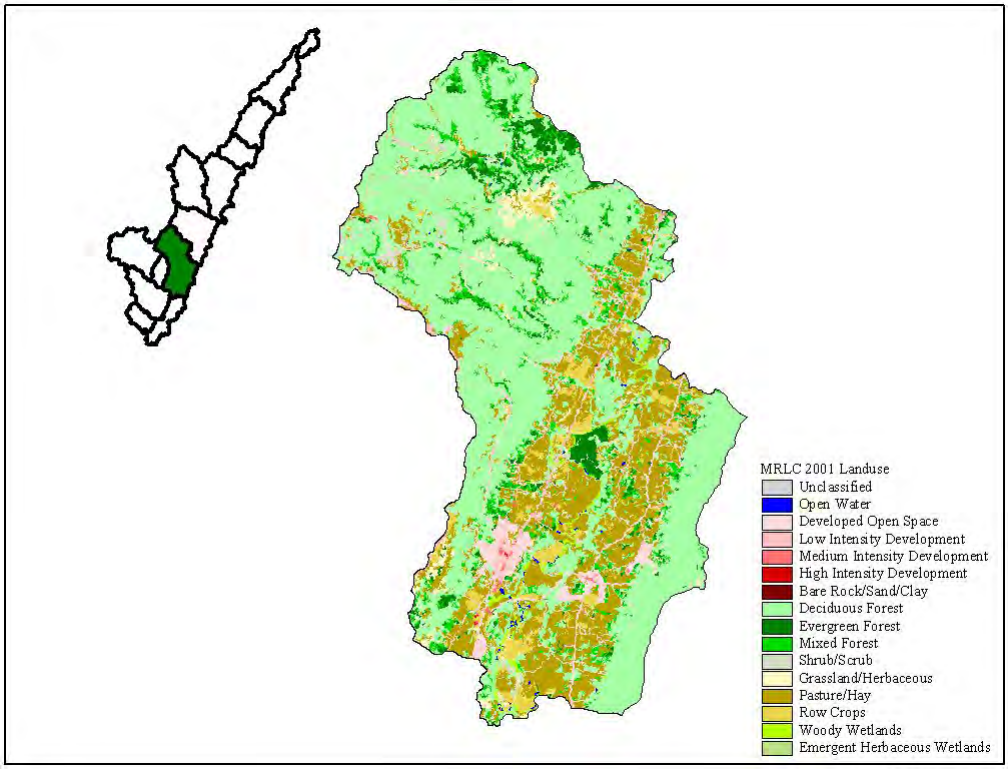


Figure 4-74. Illustration of Land Use Distribution in Subwatershed 060200040202.

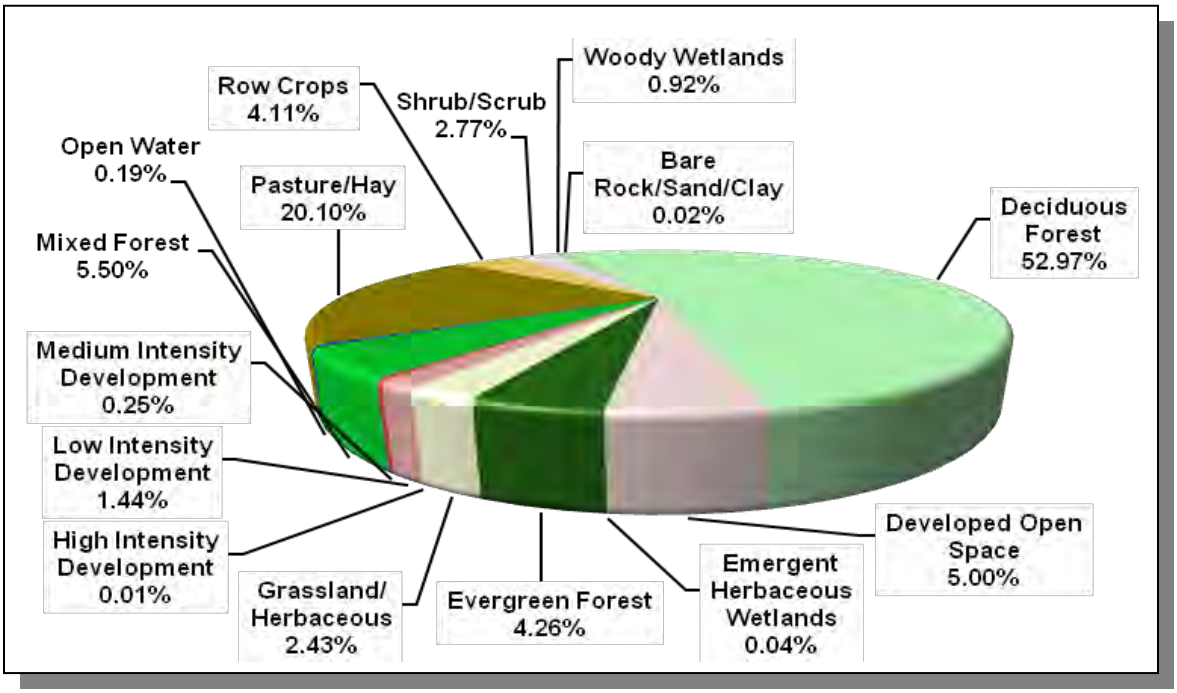


Figure 4-75. Land Use Distribution in Subwatershed 060200040202. *More information is provided in Appendix IV.*

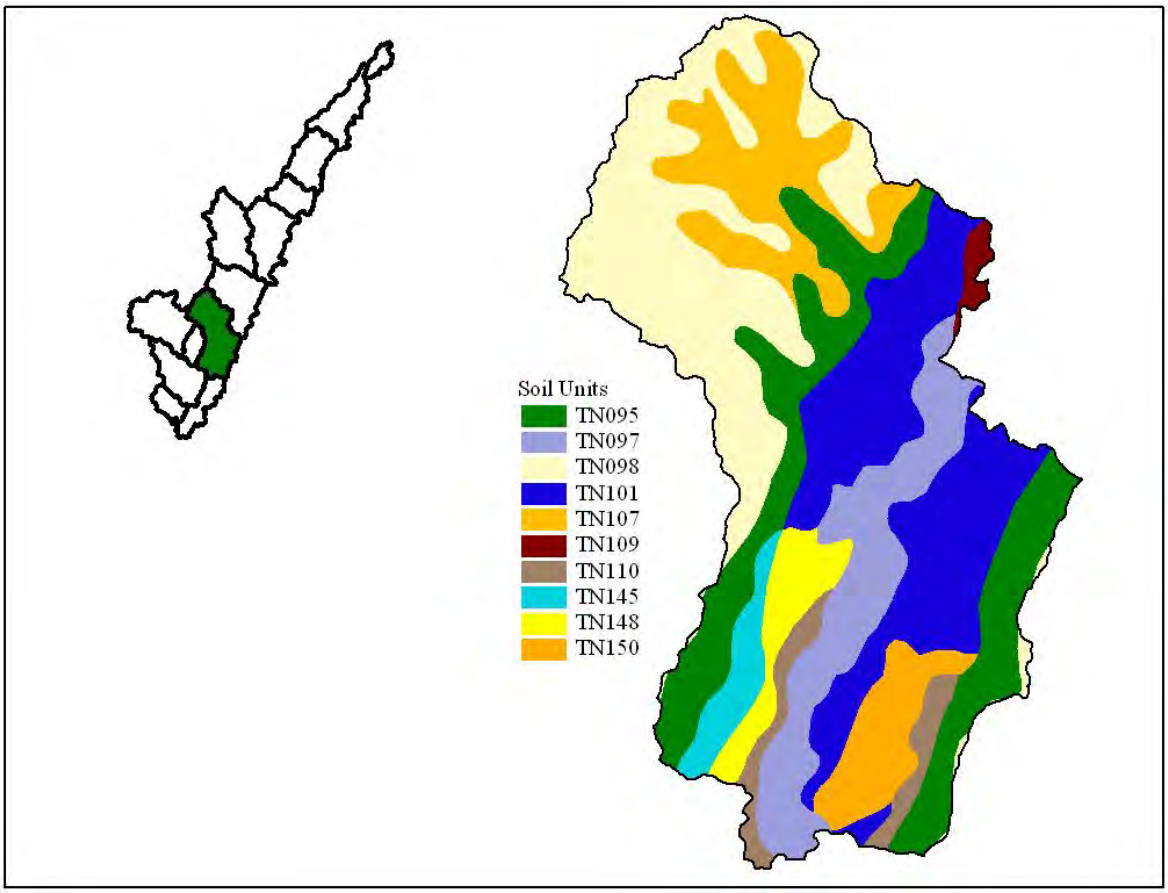


Figure 4-76. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040202.

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
TN097	0.00	B	1.62	5.55	Loam	0.32
TN098	1.00	C	3.98	4.82	Loam	0.32
TN101	0.00	B	1.71	5.39	Loam	0.35
TN107	1.00	C	6.34	4.84	Loam	0.28
TN109	0.00	B	8.40	5.01	Sandy Loam	0.28
TN110	0.00	B	2.22	4.96	Loam	0.31
TN145	0.00	B	1.84	4.83	Loam	0.27
TN148	5.00	B	1.37	4.84	Loam	0.28
TN150	6.00	C	1.68	5.63	Silty Loam	0.32

Table 4-40. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040202. *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	10.22	2,540	2,725	2,838	11.70
Sequatchie	8,863	10,119	11,370	6.79	602	687	772	28.20
Totals	**33,723**	**36,793**	**39,146**		**3,142**	**3,412**	**3,610**	**14.90**

Table 4-41. Population Estimates in Subwatershed 060200040202.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Powells Crossroads	Marion	1,098	395	9	380	6
Whitwell	Marion	1,622	689	62	625	2

Table 4-42. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 060200040202.

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

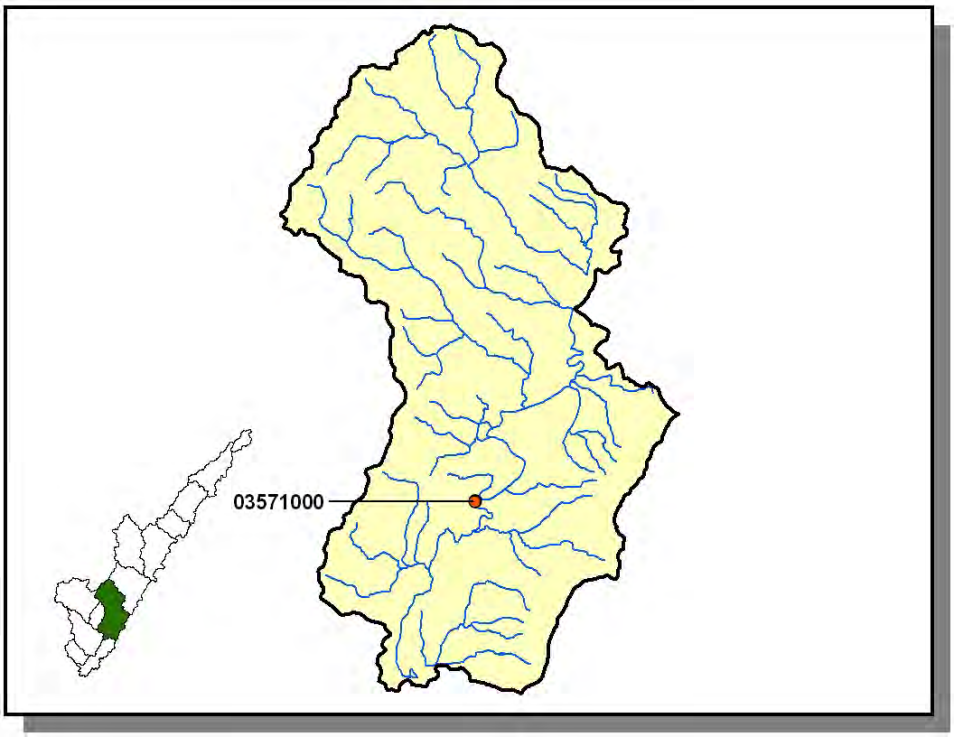


Figure 4-77. Location of USGS Continuous Record Gaging Stations in Subwatershed 060200040202. *More information is provided in Appendix IV.*

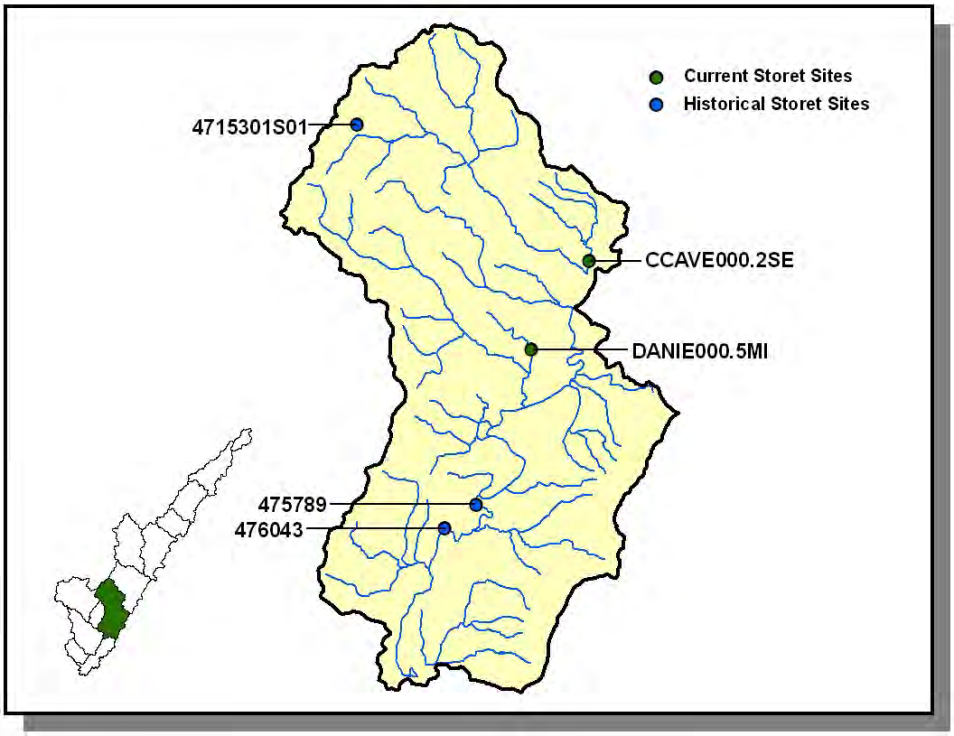


Figure 4-78. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200040202. *More information, including site names and locations, is provided in Appendix IV.*

4.2.H.iii. Permitted Activities.

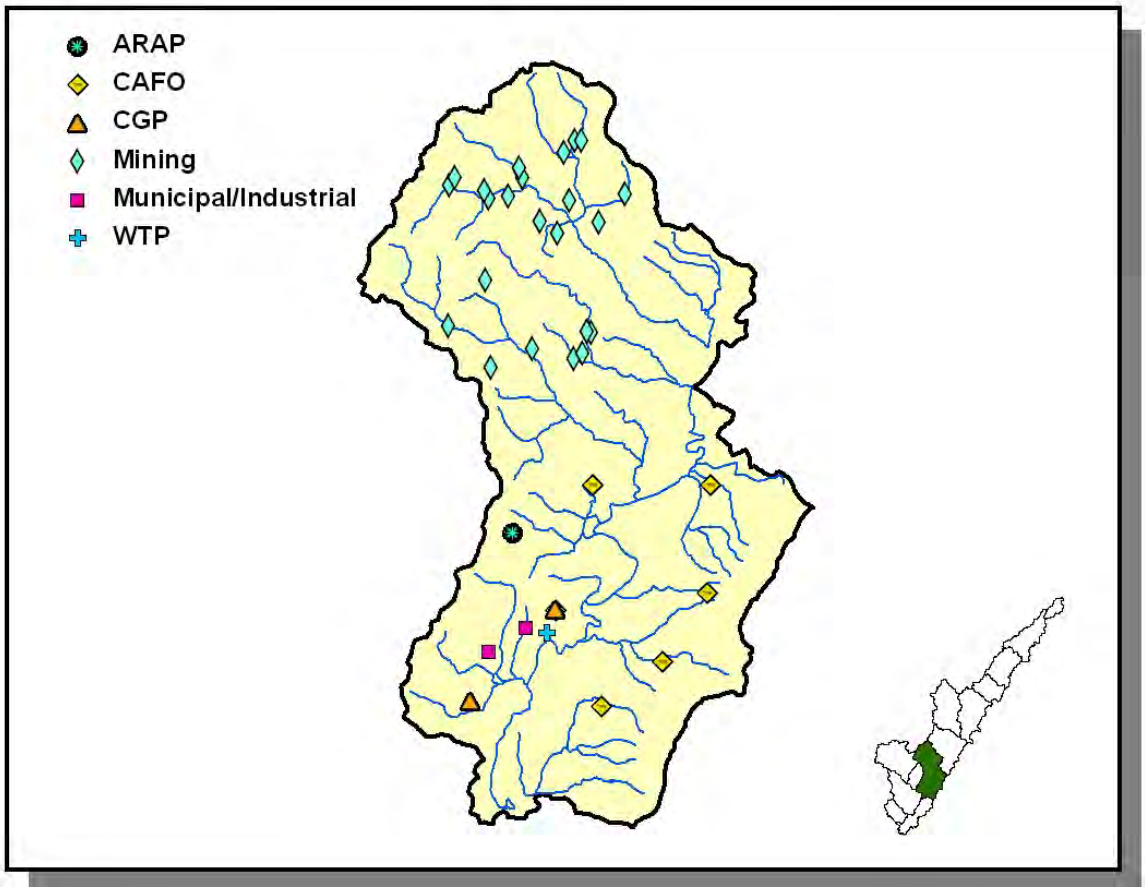


Figure 4-79. Location of Permits Issued in Subwatershed 060200040202. *More information, including the names of facilities, is provided in Appendix IV.*

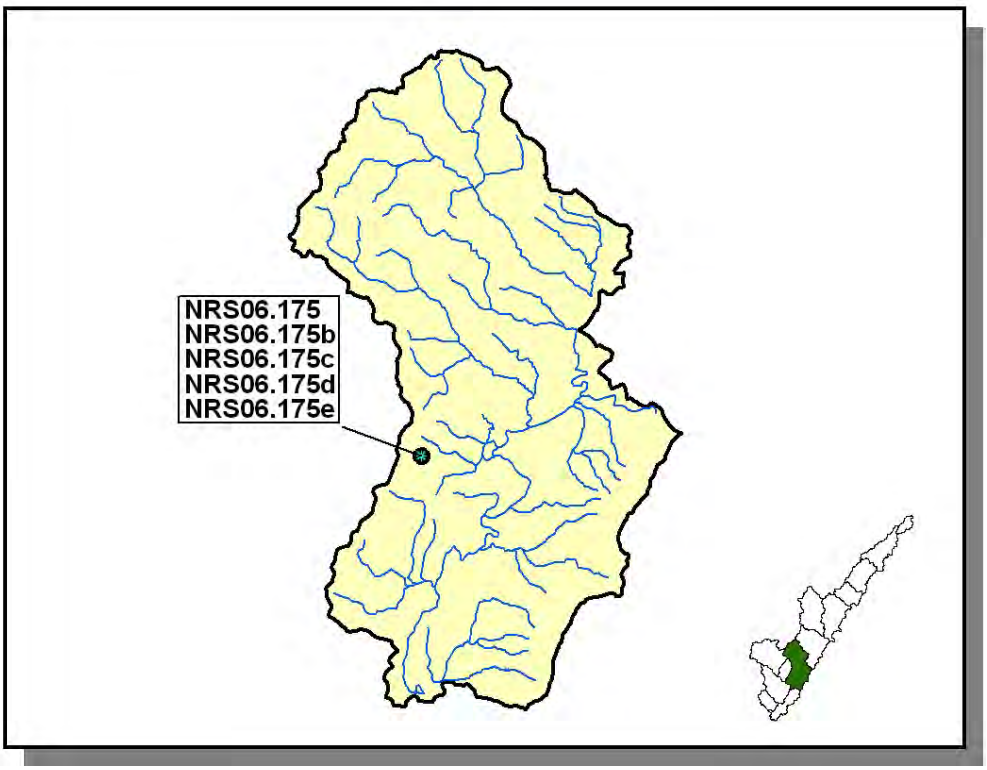


Figure 4-80. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 060200040202. *More information is provided in Appendix IV.*

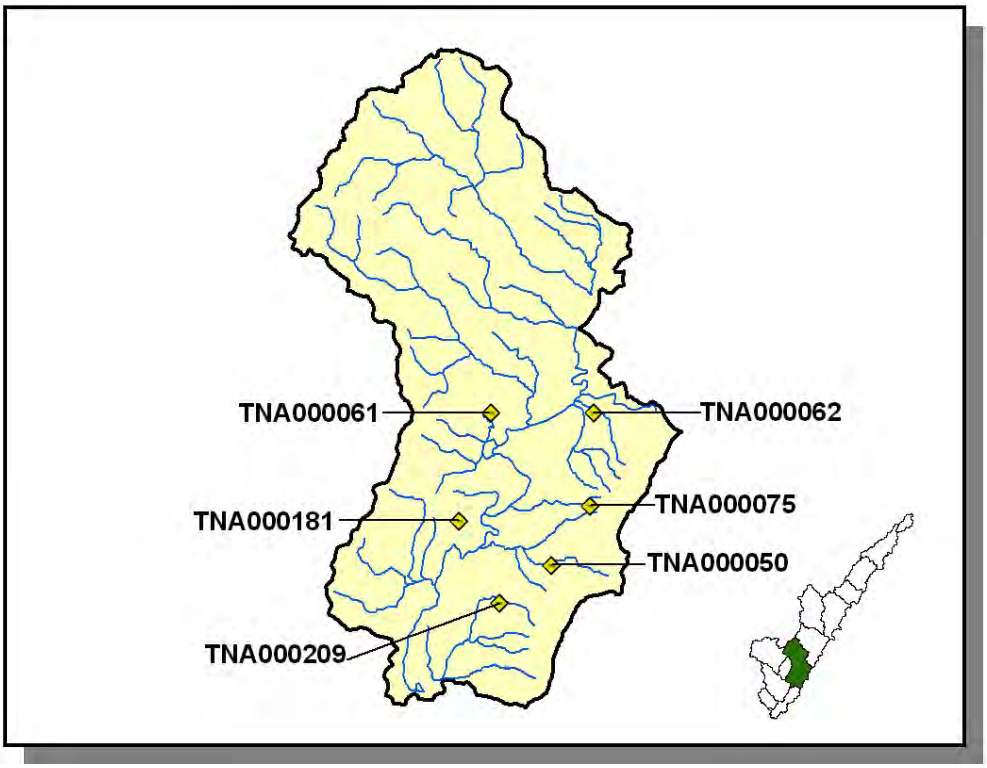


Figure 4-81. Location of CAFO (Concentrated Animal Feel Operation) Permit Sites in Subwatershed 060200040202. *More information, including the names of facilities, is provided in Appendix IV.*

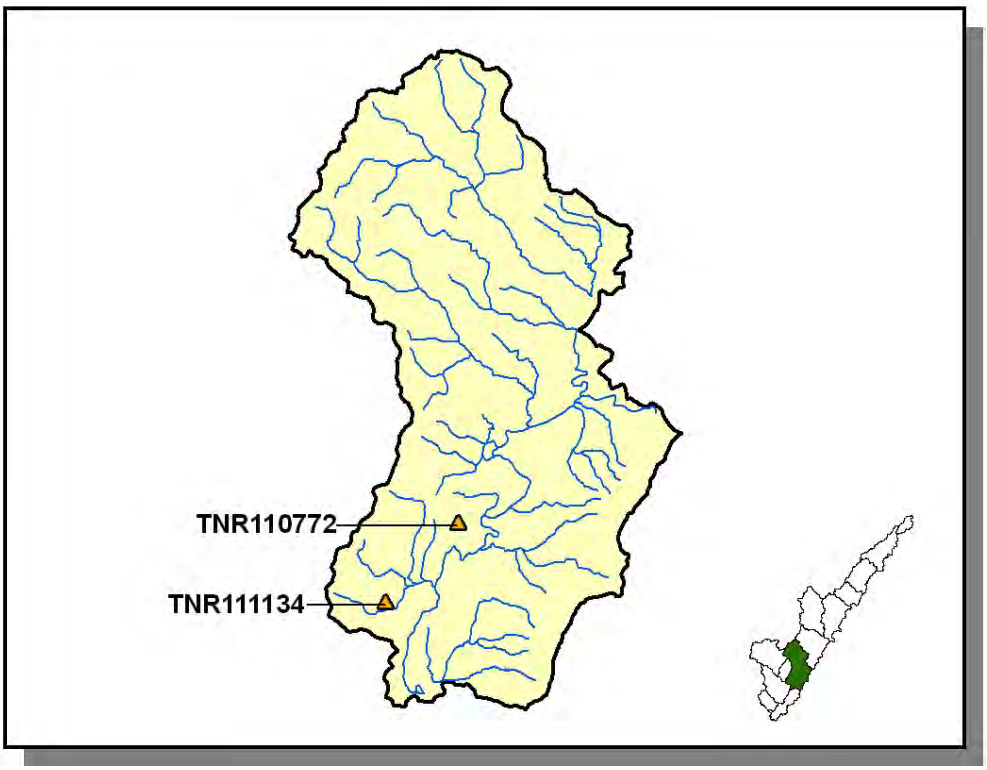


Figure 4-82. Location of CGP (Construction General Permit) Sites in Subwatershed 060200040202. *More information is provided in Appendix IV.*

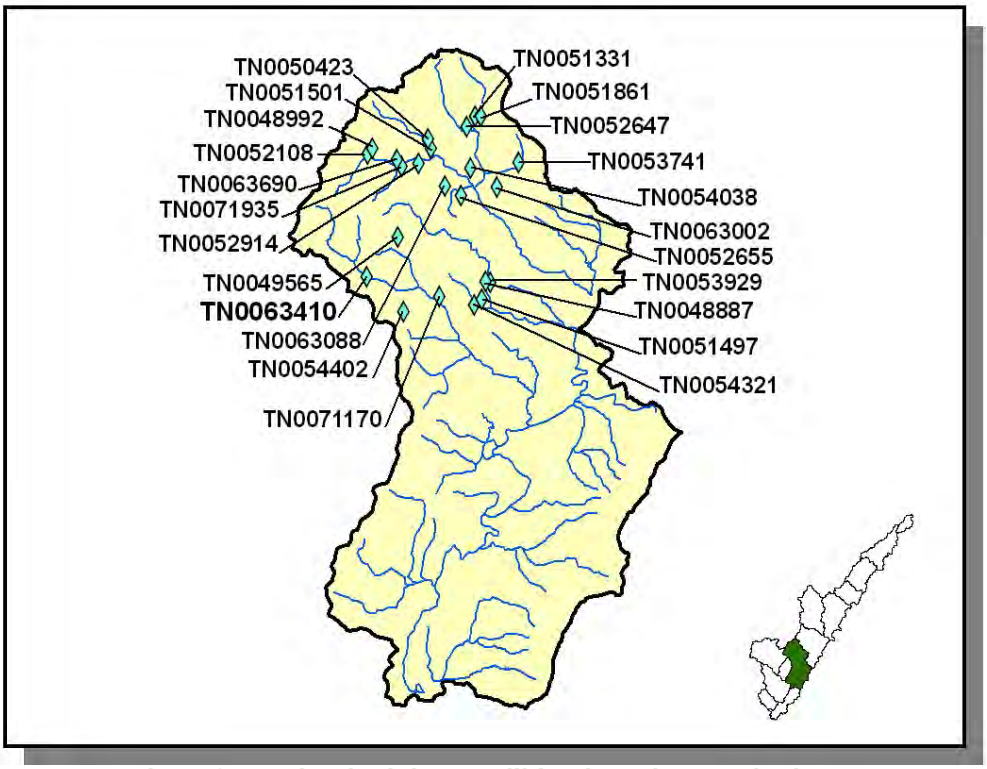


Figure 4-83. Location of Permitted Mining Facilities in Subwatershed 060200040202. *More information is provided in Appendix IV.*

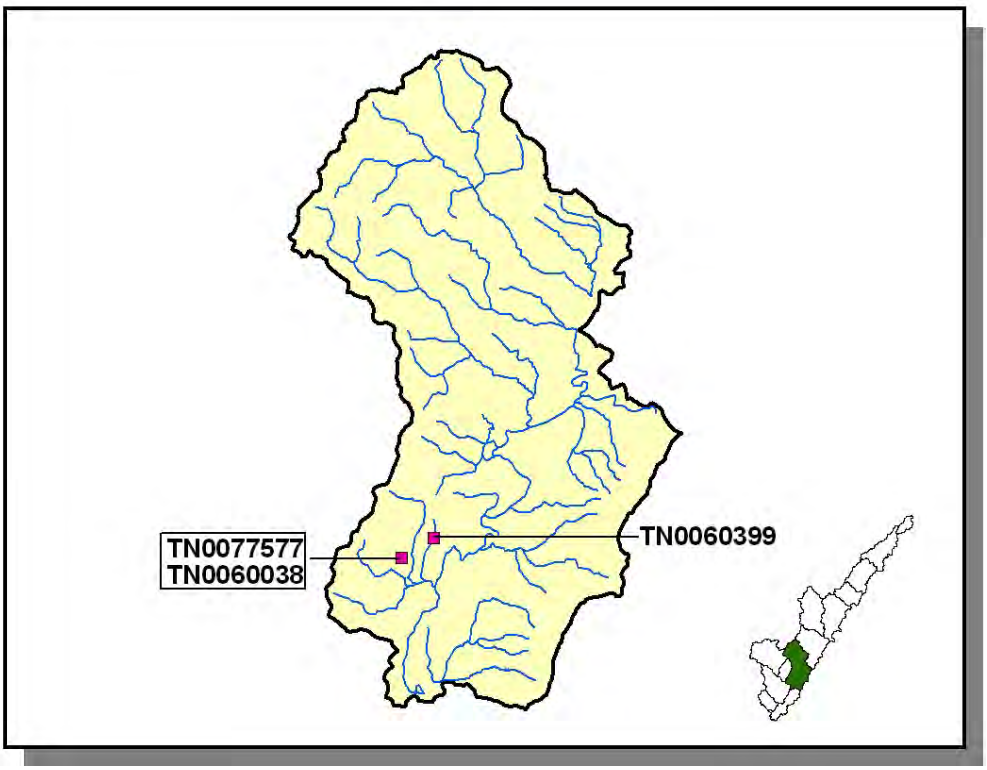


Figure 4-84. Location of Permitted Municipal and Industrial Facilities in Subwatershed 060200040202. *More information, including the name of the facility is provided in Appendix IV.*

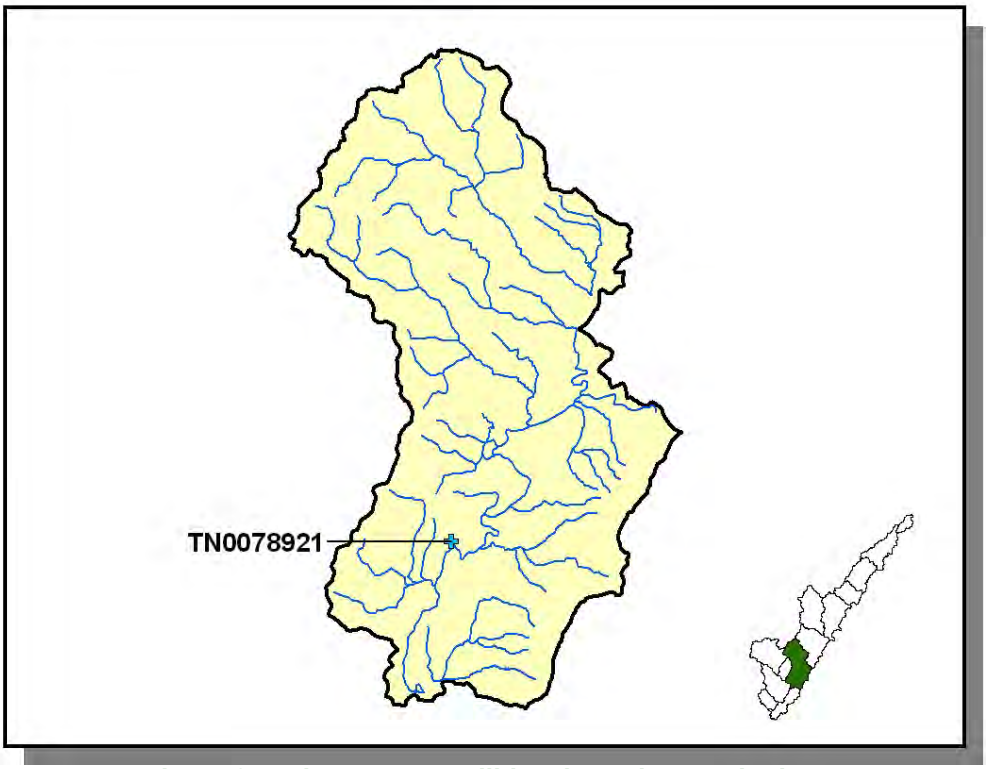


Figure 4-85. Location of Active WTP Facilities in Subwatershed 060200040202. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.H.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Marion	4,424	8,939	311	246	279	
Sequatchie	2,763	6,739	221	6		

Table 4-43. 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)	3.28
Grass (Pastureland)	0.74
Grass Forbs Legumes Mixed (Pastureland)	0.51
Grass (Hayland)	0.47
Other (Horticultural)	0.29
Legume Grass (Hayland)	0.22
Farmsteads and Ranch Headquarters	0.17

Table 4-44. Annual Estimated Total Soil Loss in Subwatershed 060200040202.

4.2.I. 060200040203 (Sequatchie River).

4.2.I.i. General Description.

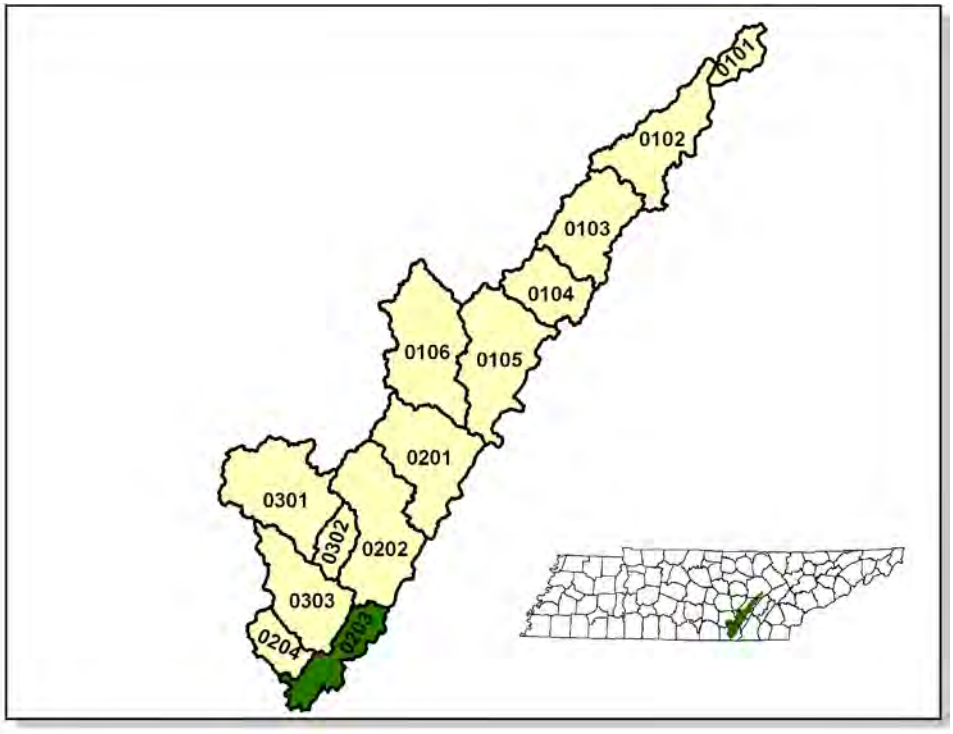


Figure 4-86. Location of Subwatershed 060200040203. *All Sequatchie River HUC-12 subwatershed boundaries are shown for reference.*

Figure 4-87. Locational Details of Subwatershed 060200040203.

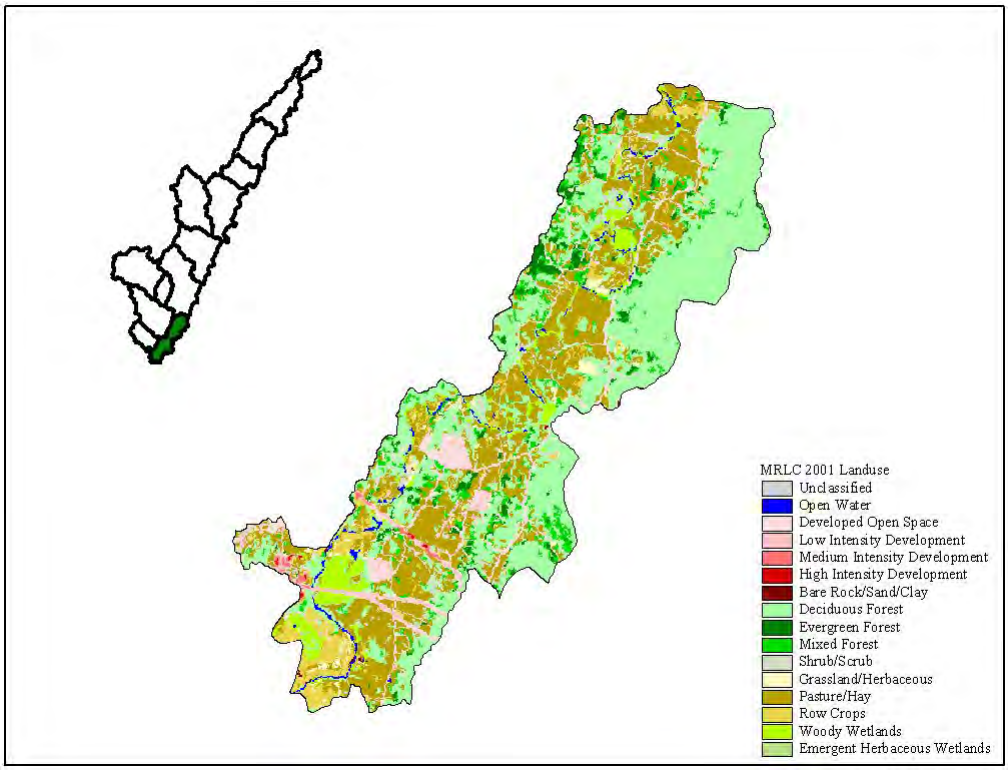


Figure 4-88. Illustration of Land Use Distribution in Subwatershed 060200040203.

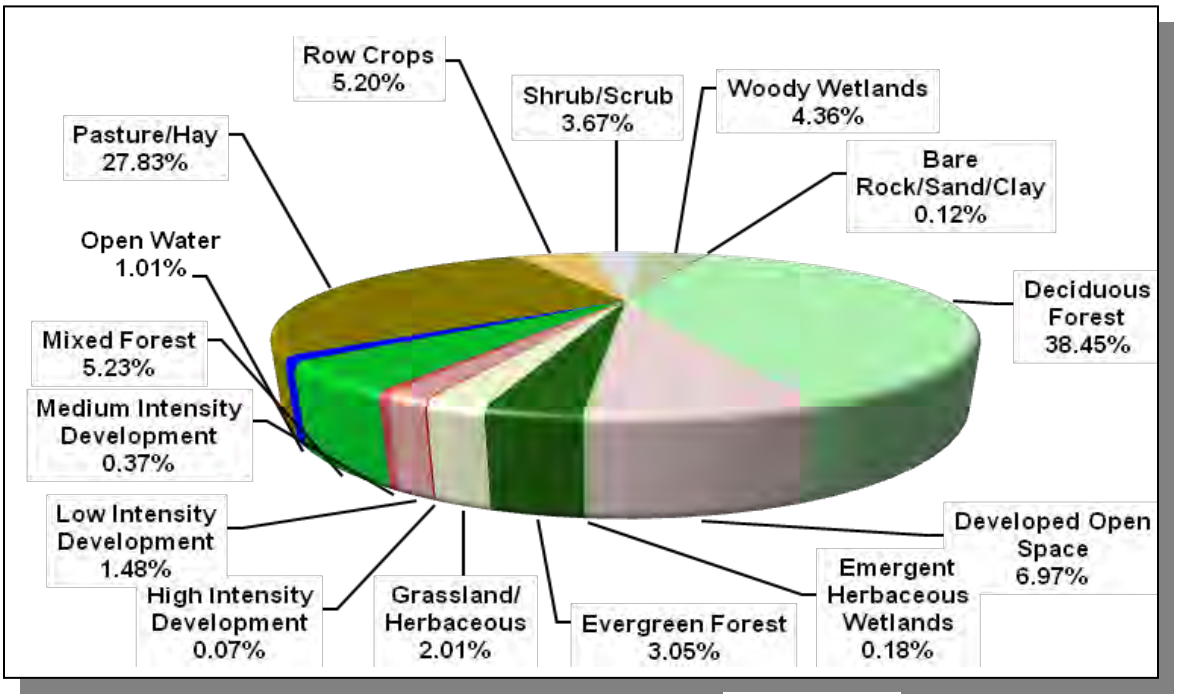


Figure 4-89. Land Use Distribution in Subwatershed 060200040203. *More information is provided in Appendix IV.*

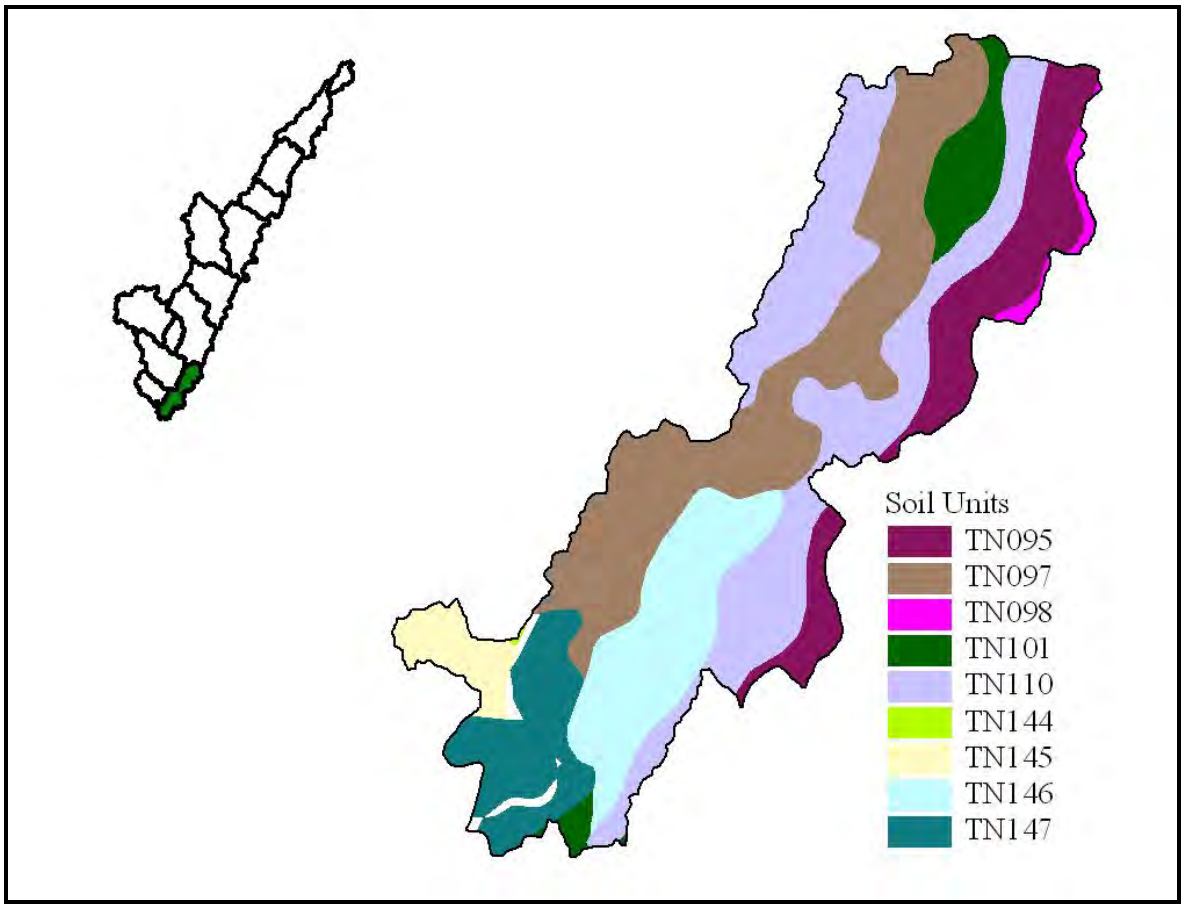


Figure 4-90. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040203.

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
TN097	0.00	B	1.62	5.55	Loam	0.32
TN098	1.00	C	3.98	4.82	Loam	0.32
TN101	0.00	B	1.71	5.39	Loam	0.35
TN110	0.00	B	2.22	4.96	Loam	0.31
TN144	0.00	B	2.43	5.43	Loam	0.31
TN145	0.00	B	1.84	4.83	Loam	0.27
TN146	7.00	C	1.30	5.39	Silty Loam	0.37
TN147	41.00	C	1.30	5.95	Silty Loam	0.38

Table 4-45. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040203. *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	5.76	1,433	1,538	1,601	11.70

Table 4-46. Population Estimates in Subwatershed 060200040203.

			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
Total		**4,023**	**1,706**	**1,020**	**673**	**13**

Table 4-47. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 060200040203.

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

There are no USGS continuous record gaging stations located in subwatershed 060200040203.

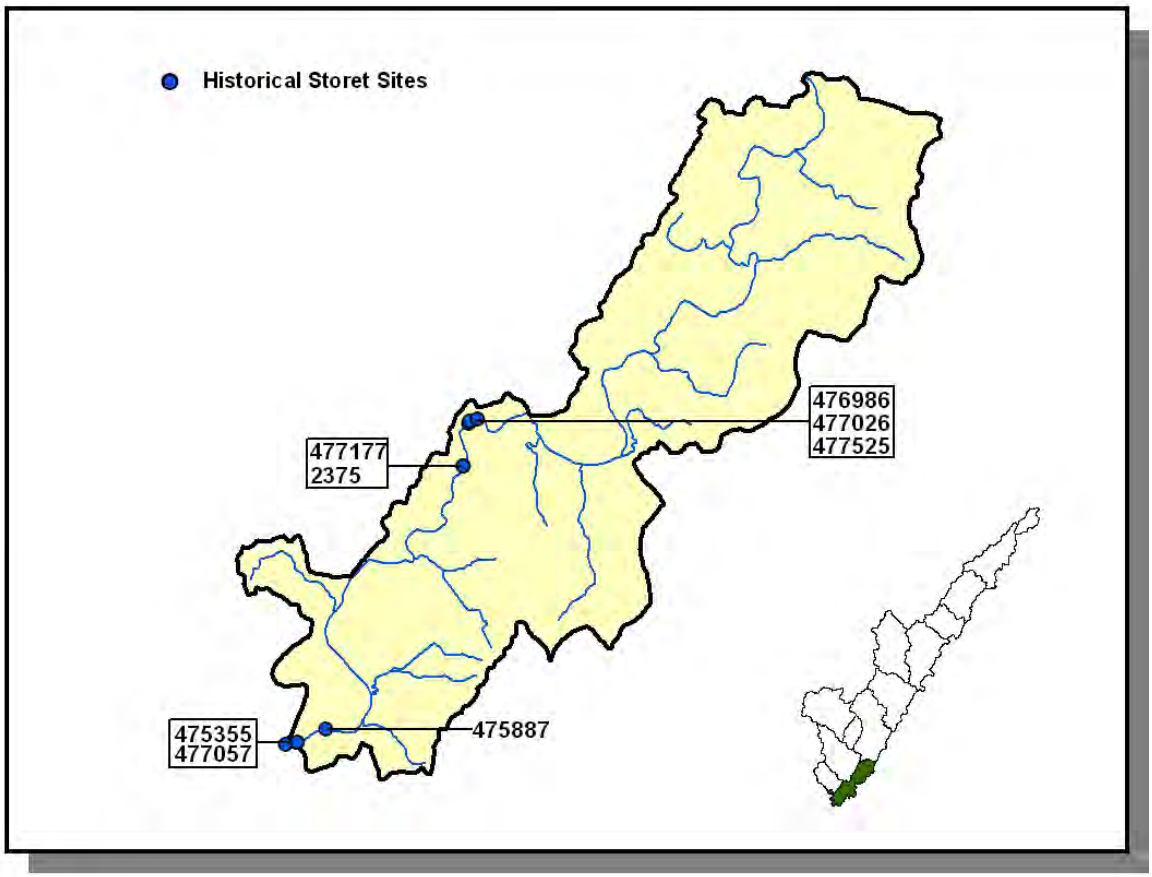


Figure 4-91. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200040203. *More information, including site names and locations, is provided in Appendix IV.*

4.2.I.iii. Permitted Activities.

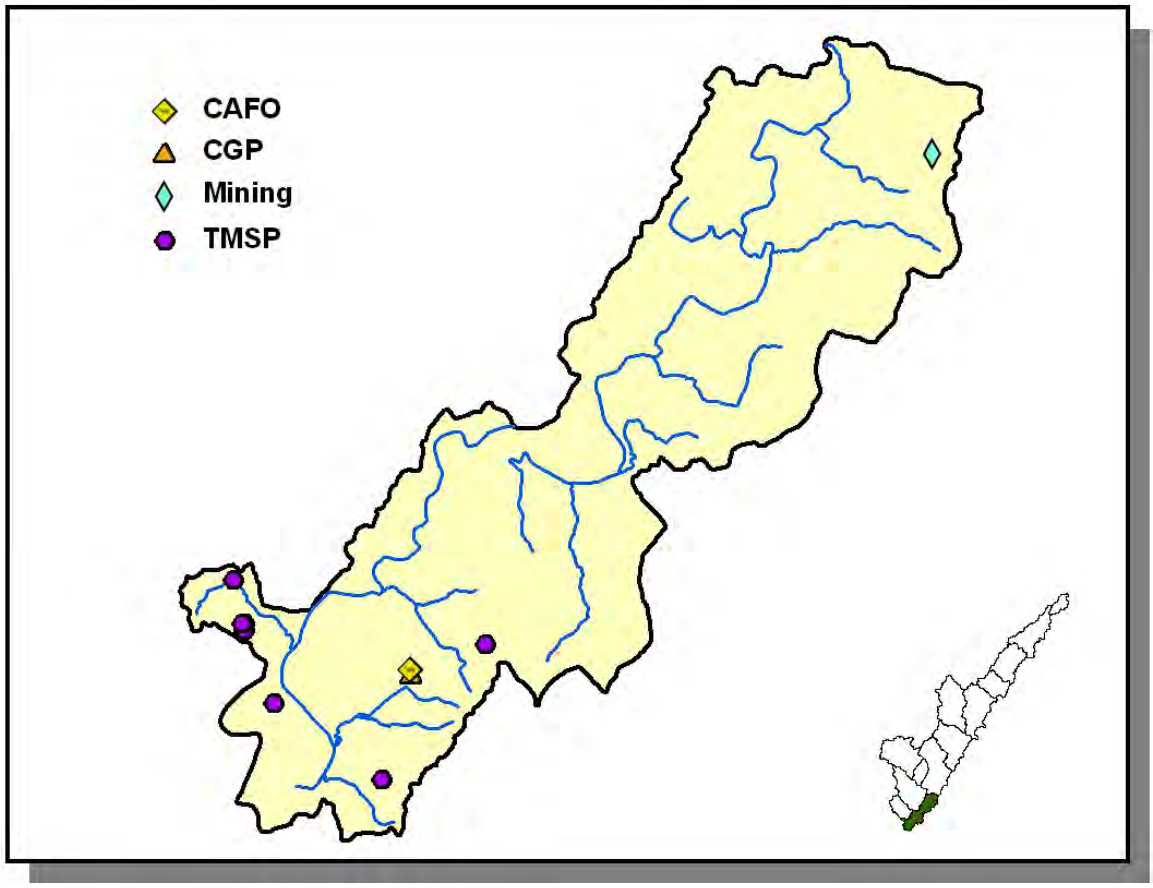


Figure 4-92. Location of Permits Issued in Subwatershed 060200040203. *More information, including the names of facilities, is provided in Appendix IV.*

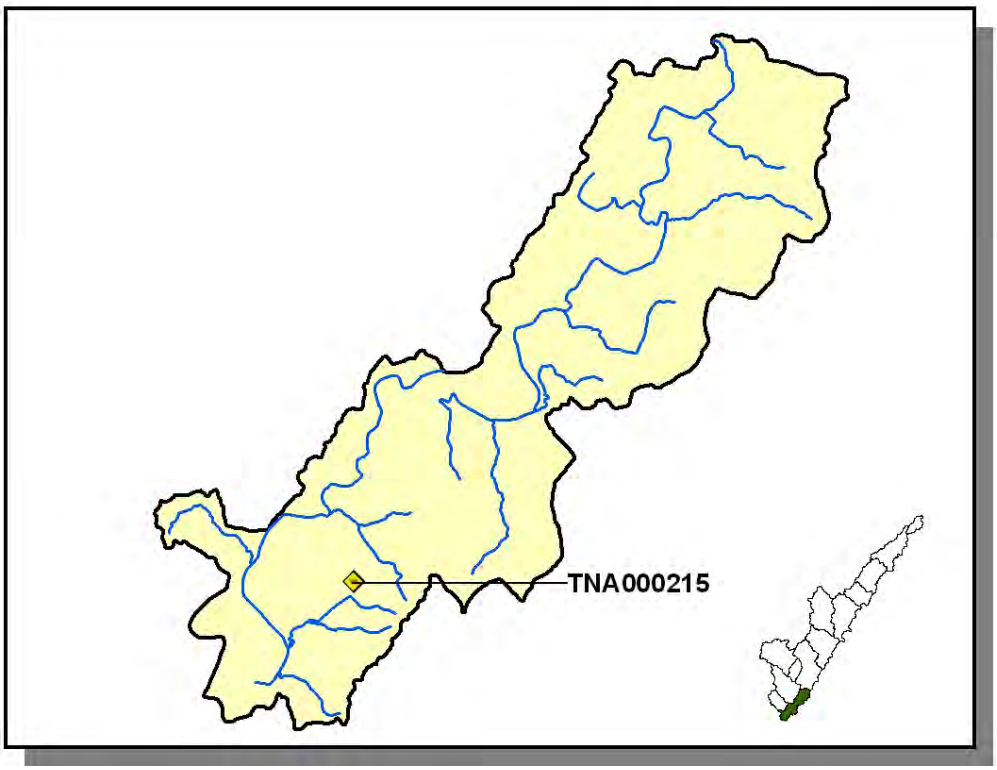


Figure 4-93. Location of CAFO (Concentrated Animal Feel Operation) Permit Sites in Subwatershed 060200040203. *More information, including the names of facilities, is provided in Appendix IV.*

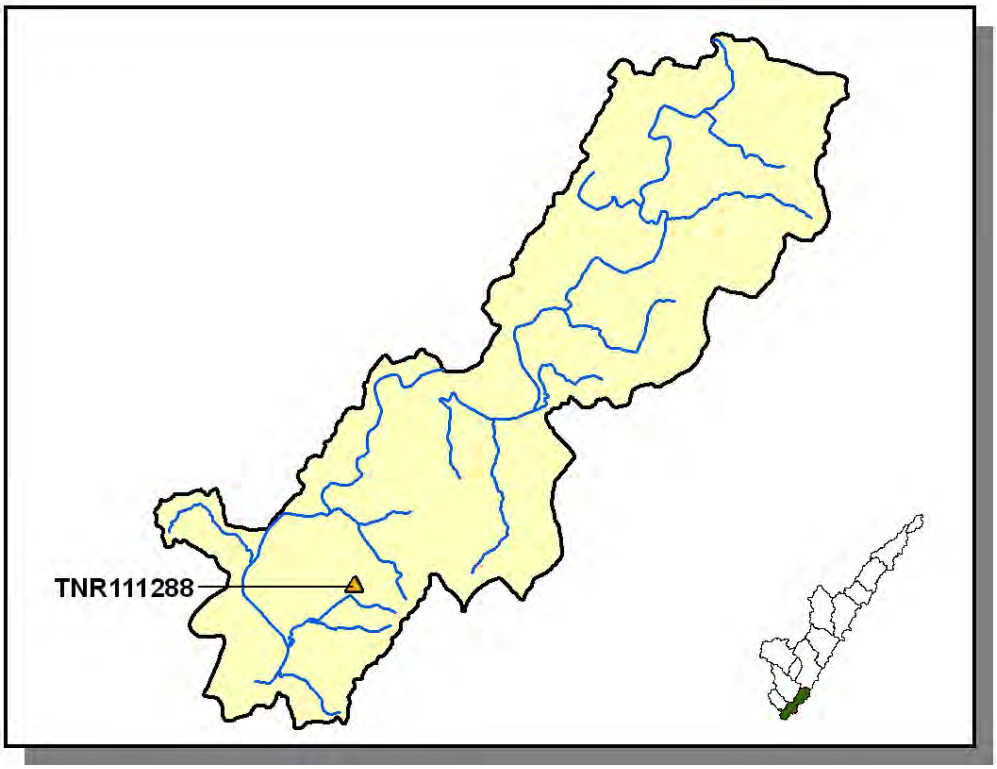


Figure 4-94. Location of CGP (Construction General Permit) Sites in Subwatershed 060200040203. *More information is provided in Appendix IV.*

Figure 4-95. Location of Permitted Mining Facilities in Subwatershed 060200040203. *More information is provided in Appendix IV.*

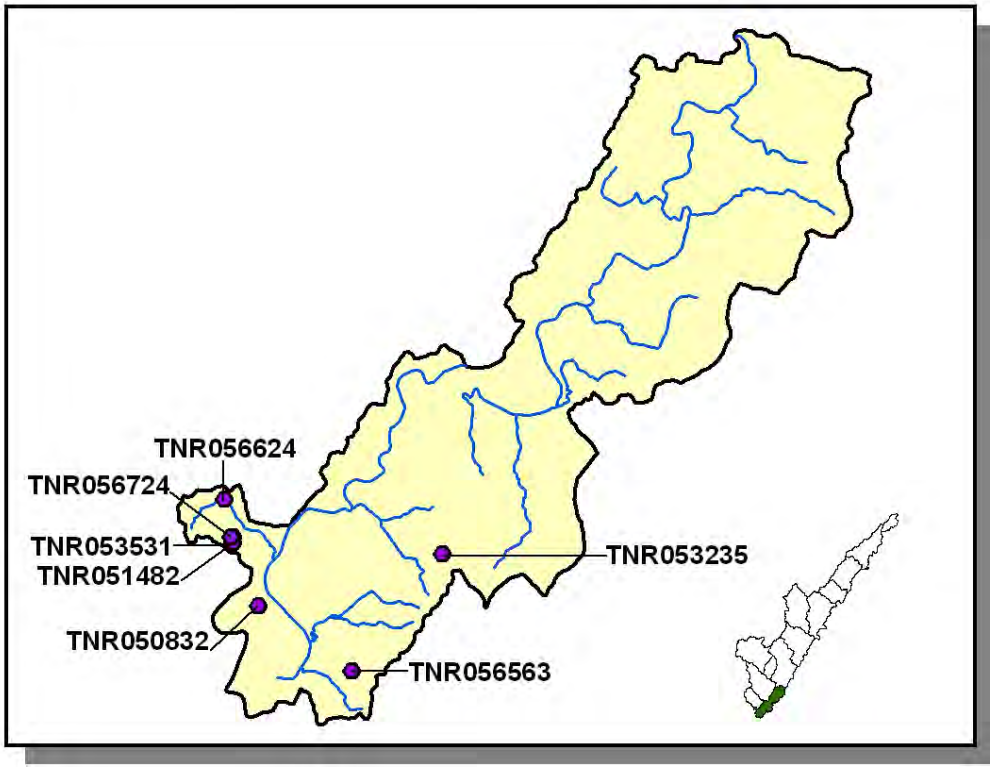


Figure 4-96. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 060200040203. *More information is provided in Appendix IV.*

4.2.I.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 4-48. 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
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 4-49. Annual Estimated Total Soil Loss in Subwatershed 060200040203.

4.2.J. 060200040204 (Town Creek).

4.2.J.i. General Description.

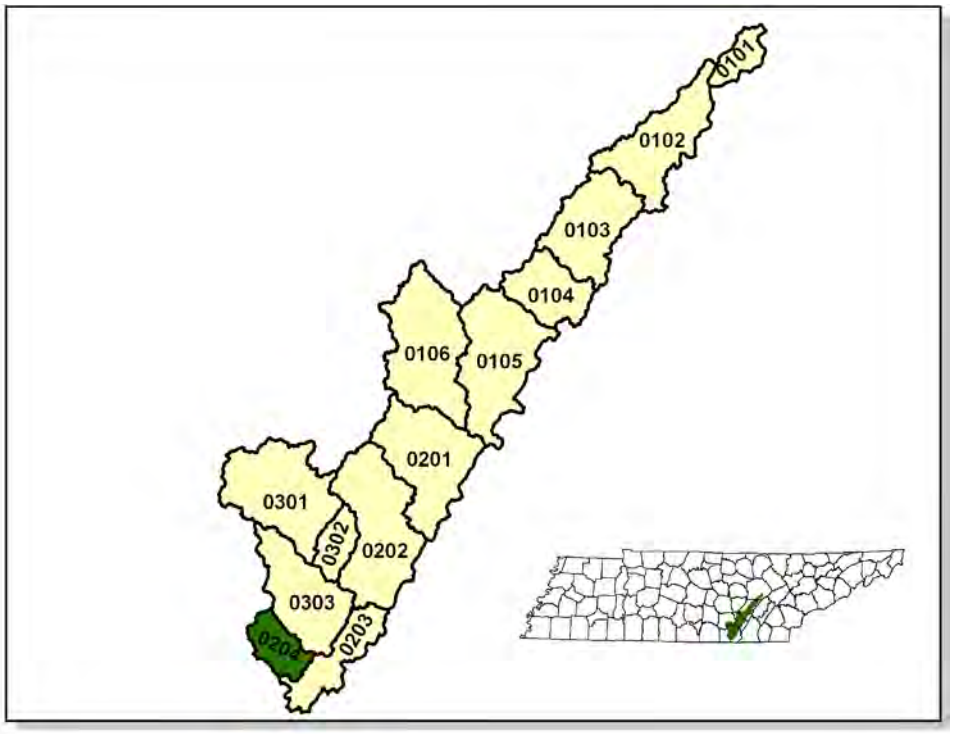


Figure 4-97. Location of Subwatershed 060200040204. *All Sequatchie River HUC-12 subwatershed boundaries are shown for reference.*

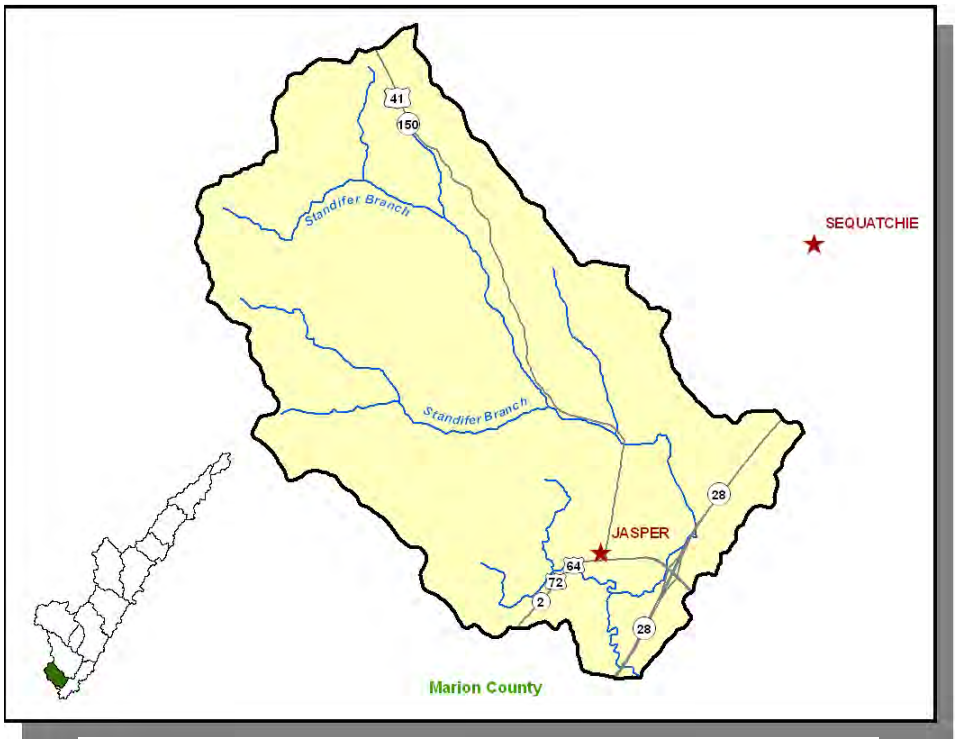


Figure 4-98. Locational Details of Subwatershed 060200040204.

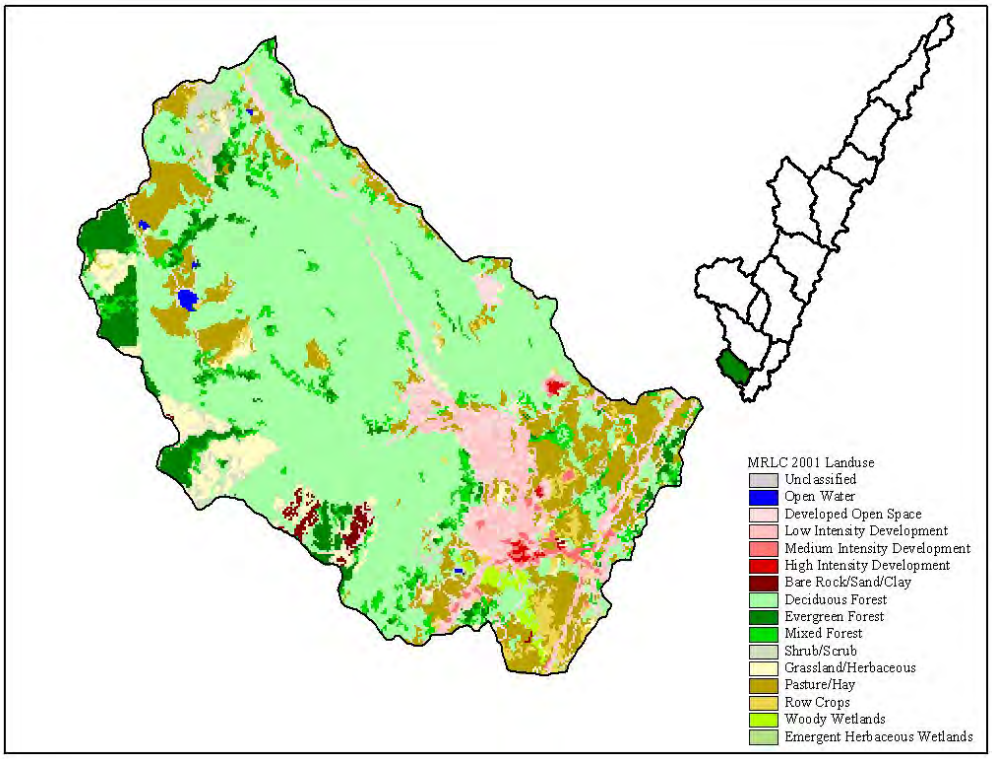


Figure 4-99. Illustration of Land Use Distribution in Subwatershed 060200040204.

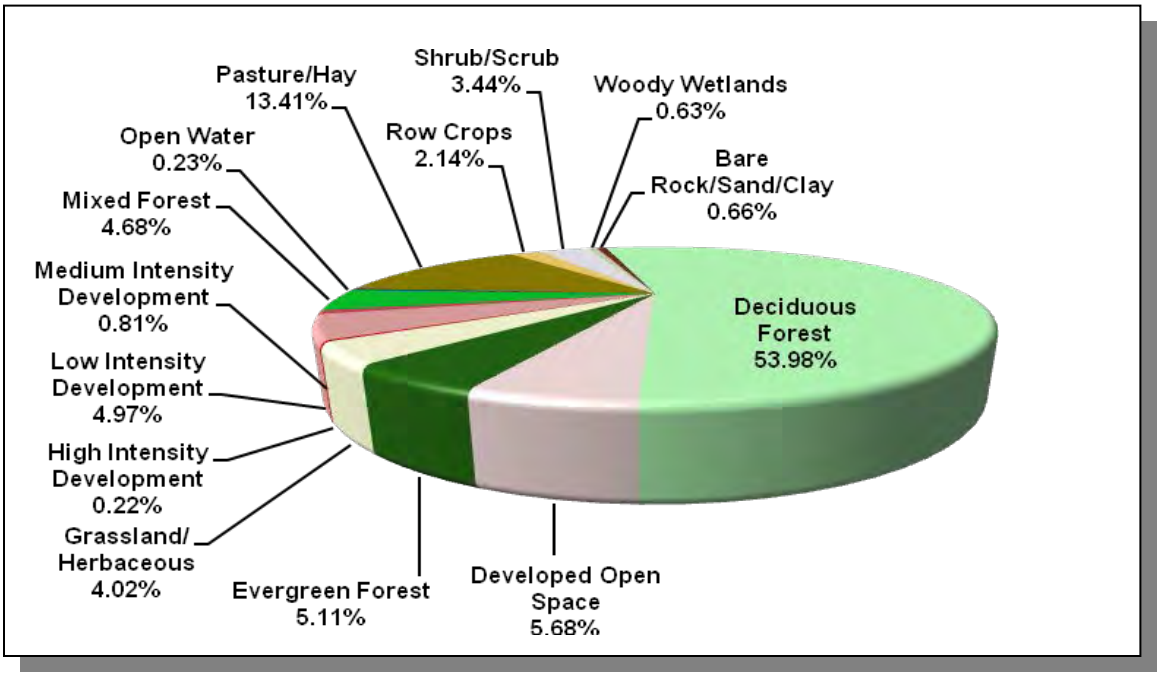


Figure 4-100. Land Use Distribution in Subwatershed 060200040204. *More information is provided in Appendix IV.*

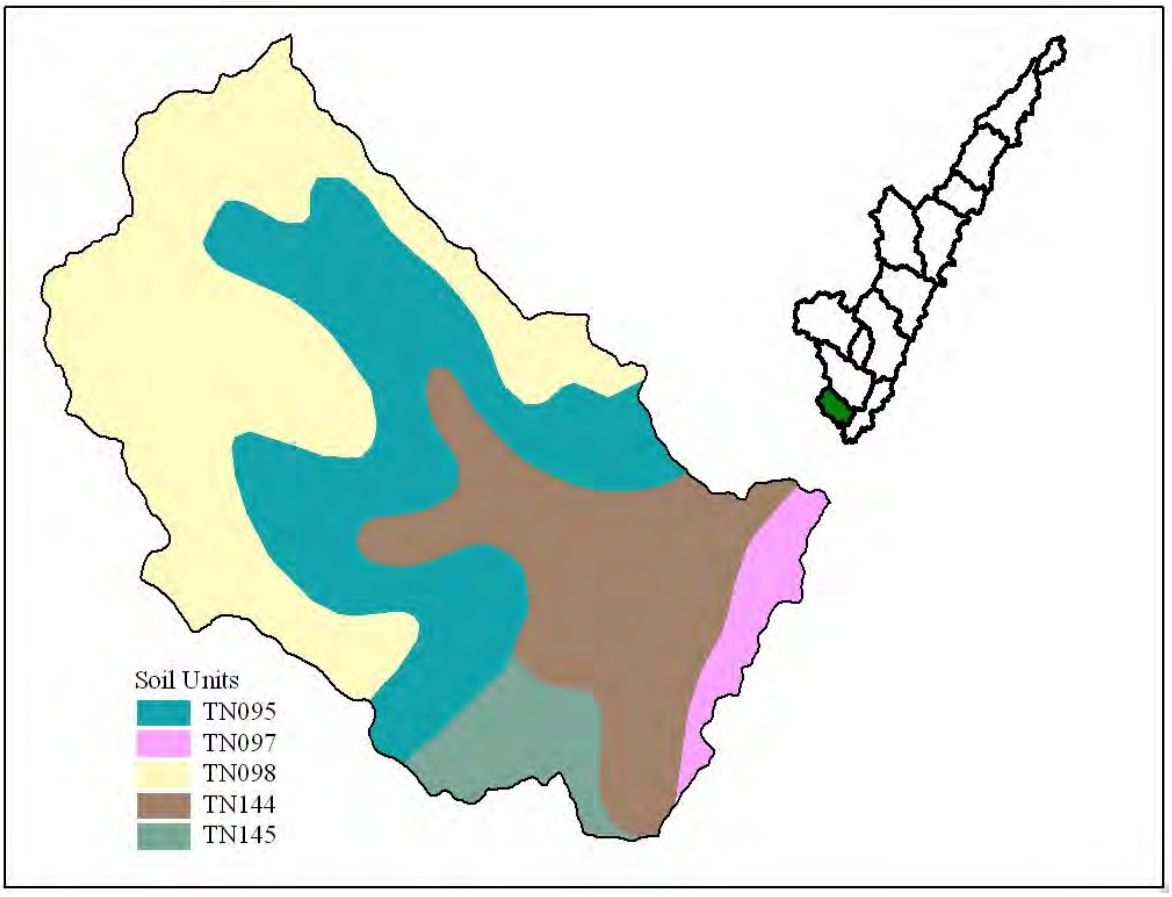


Figure 4-101. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040204.

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
TN097	0.00	B	1.62	5.55	Loam	0.32
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

Table 4-50. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040204. *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	3.6	894	960	999	11.7

Table 4-51. Population Estimates in Subwatershed 060200040204.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Jasper	Marion	2,780	1,199	966	225	8

Table 4-52. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 060200040204.

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

There are no USGS continuous record gaging stations or STORET sites located in subwatershed 060200040204.

4.2.J.iii. Permitted Activities.

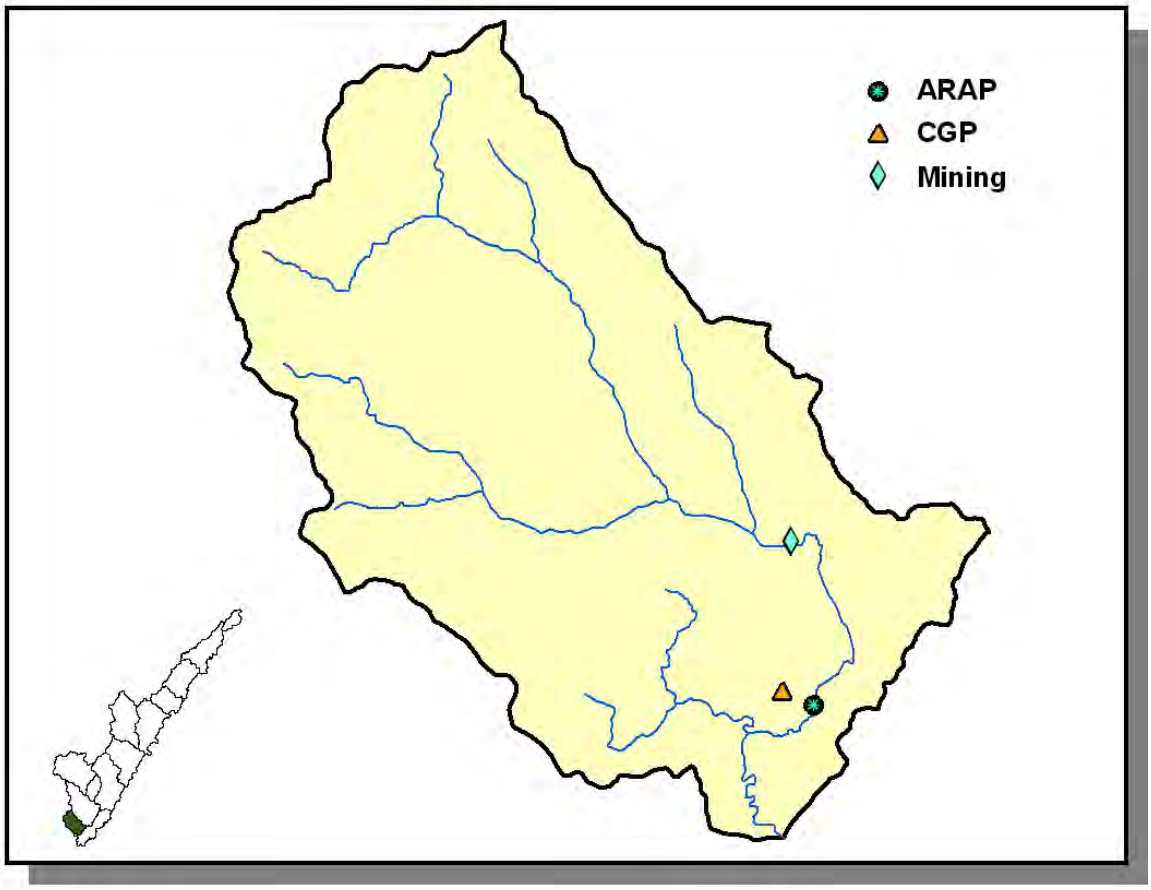


Figure 4-102. Location of Permits Issued in Subwatershed 060200040204. *More information, including the names of facilities, is provided in Appendix IV.*

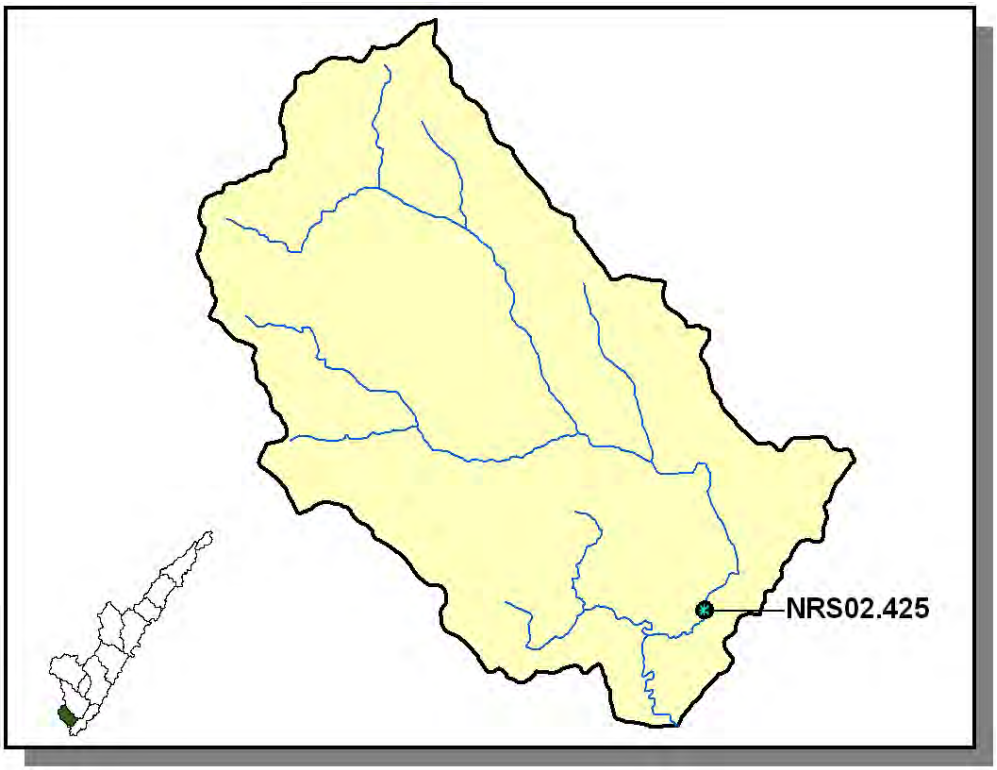


Figure 4-103. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 060200040204. *More information is provided in Appendix IV.*

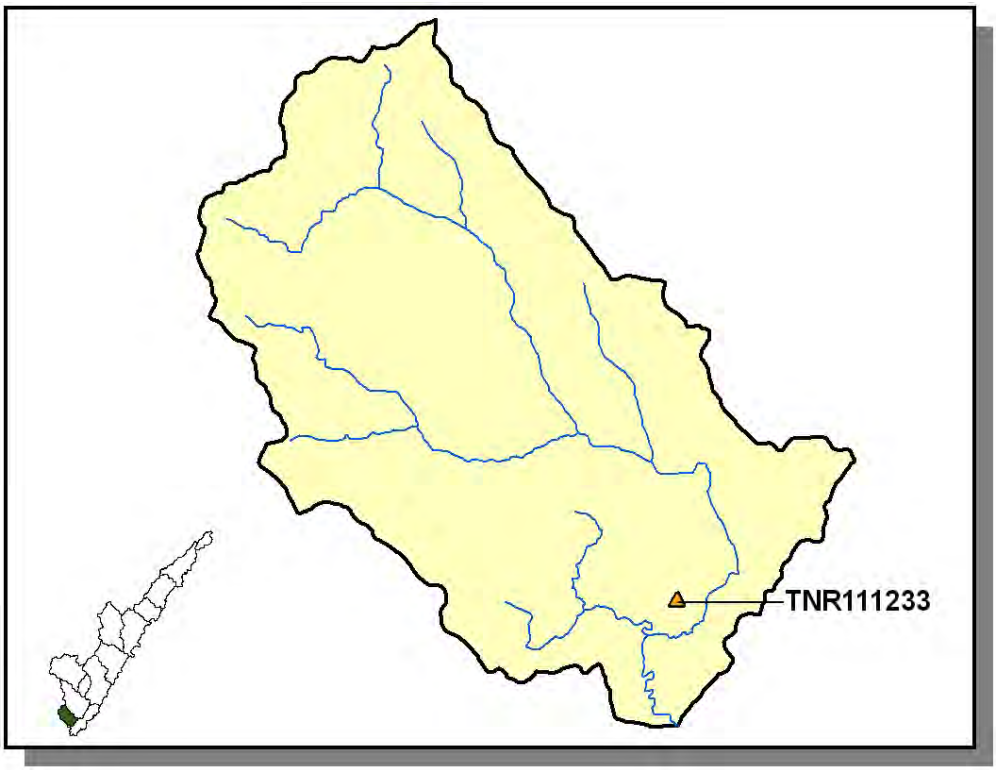


Figure 4-104. Location of CGP (Construction General Permit) Sites in Subwatershed 060200040204. *More information is provided in Appendix IV.*

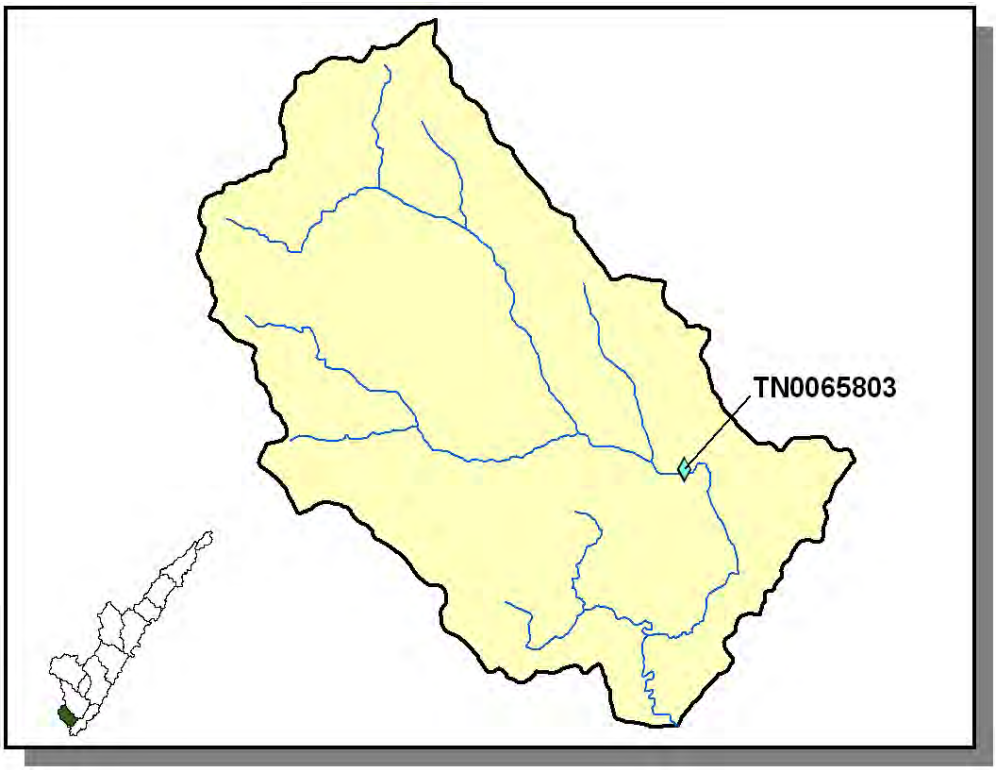


Figure 4-105. Location of Permitted Mining Facilities in Subwatershed 060200040204. *More information is provided in Appendix IV.*

4.2.J.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 4-53. 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
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 4-54. Annual Estimated Total Soil Loss in Subwatershed 060200040204.

4.2.K. 060200040301 (Little Sequatchie River, Upper).

4.2.K.i. General Description.

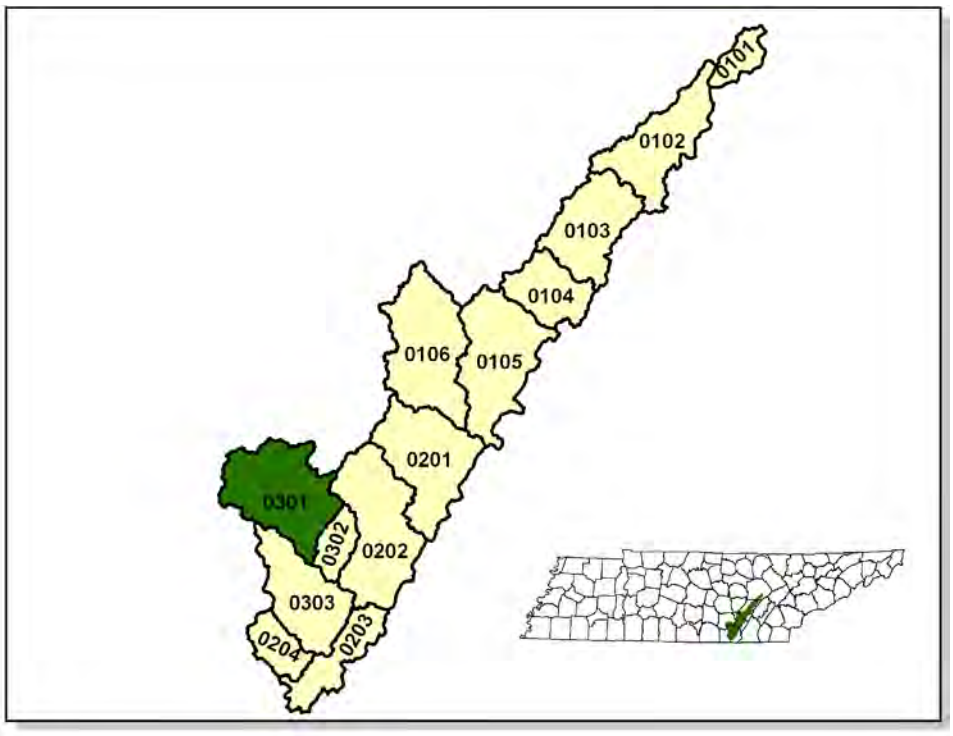


Figure 4-106. Location of Subwatershed 060200040301. *All Sequatchie River HUC-12 subwatershed boundaries are shown for reference.*

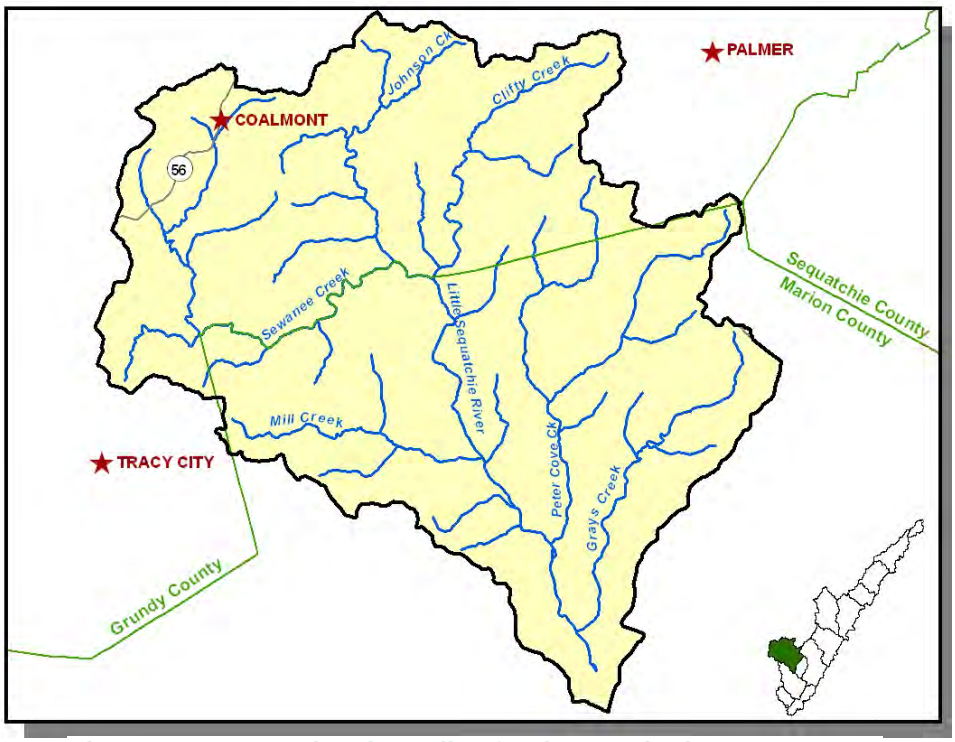


Figure 4-107. Locational Details of Subwatershed 060200040301.

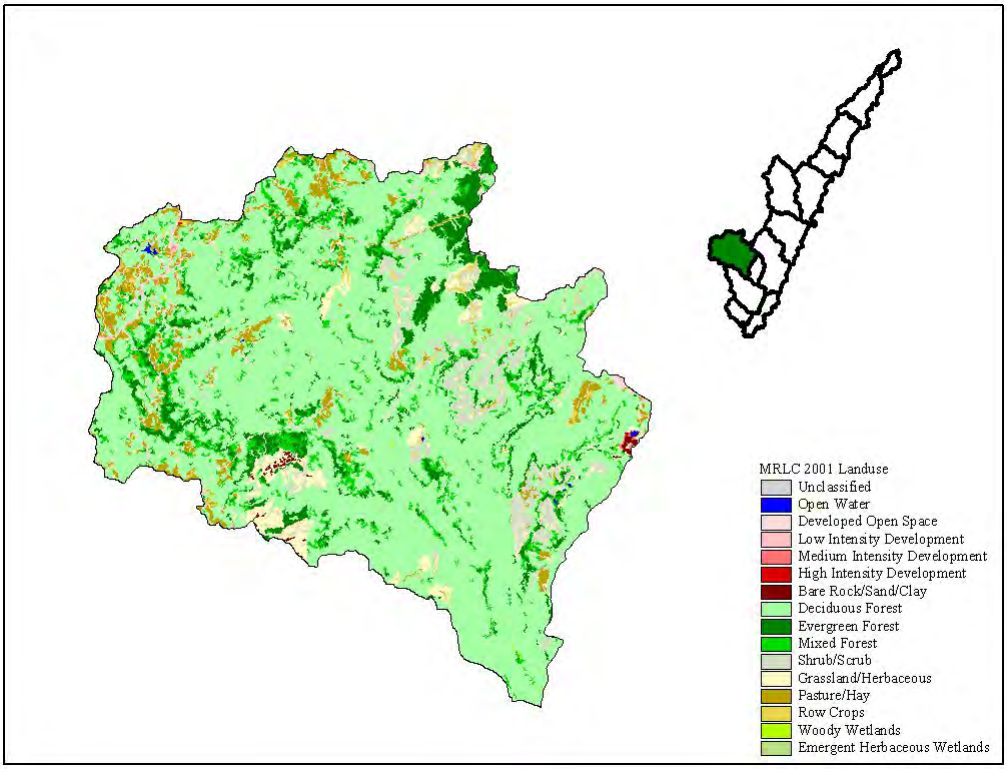


Figure 4-108. Illustration of Land Use Distribution in Subwatershed 060200040301.

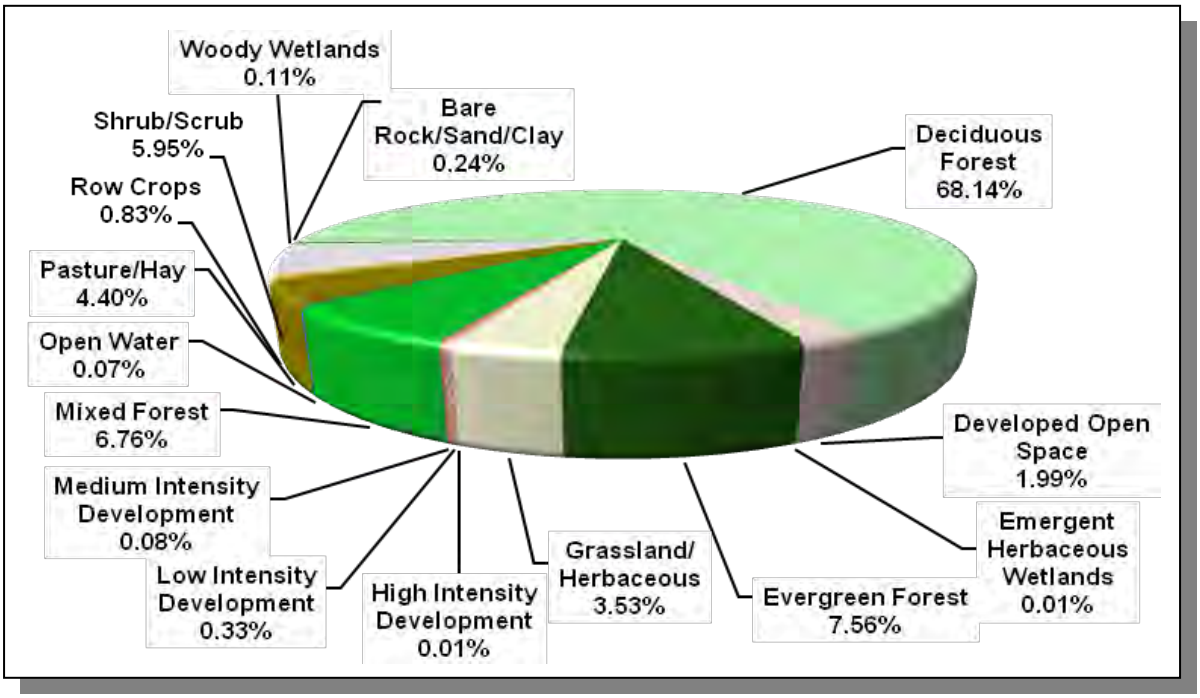


Figure 4-109. Land Use Distribution in Subwatershed 060200040301. *More information is provided in Appendix IV.*

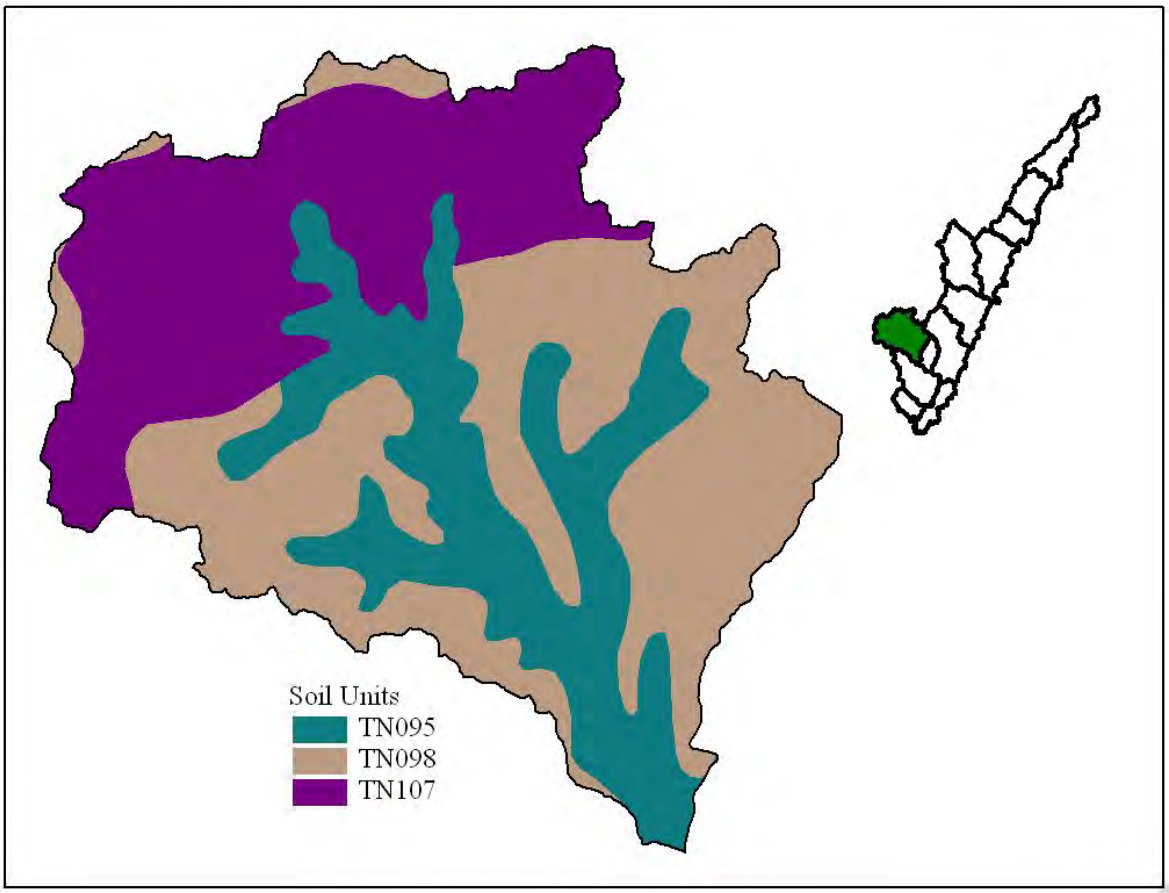


Figure 4-110. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040301.

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

Table 4-55. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040301. *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	7.08	946	992	1,015	7.30
Marion	24,860	26,674	27,776	7.57	1,881	2,018	2,102	11.70

Table 4-56. Population Estimates in Subwatershed 060200040301.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Coalmont	Grundy	857	300	4	268	28
Gruetli-Laager	Grundy	1810	680	15	633	32
Total		**2,667**	**980**	**19**	**901**	**60**

Table 4-57. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 060200040301.

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

There are no USGS continuous record gaging stations located in subwatershed 060200040301.

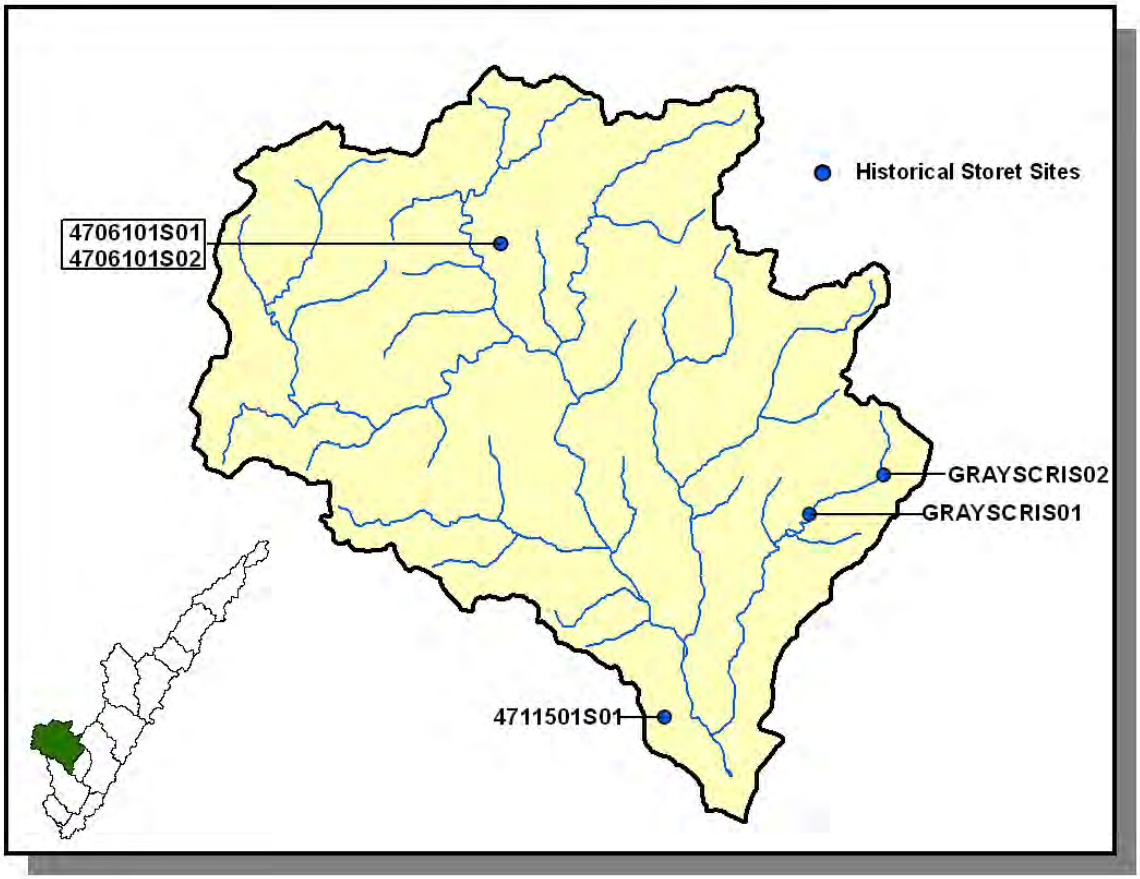


Figure 4-111. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200040301. *More information, including site names and locations, is provided in Appendix IV.*

4.2.K.iii. Permitted Activities.

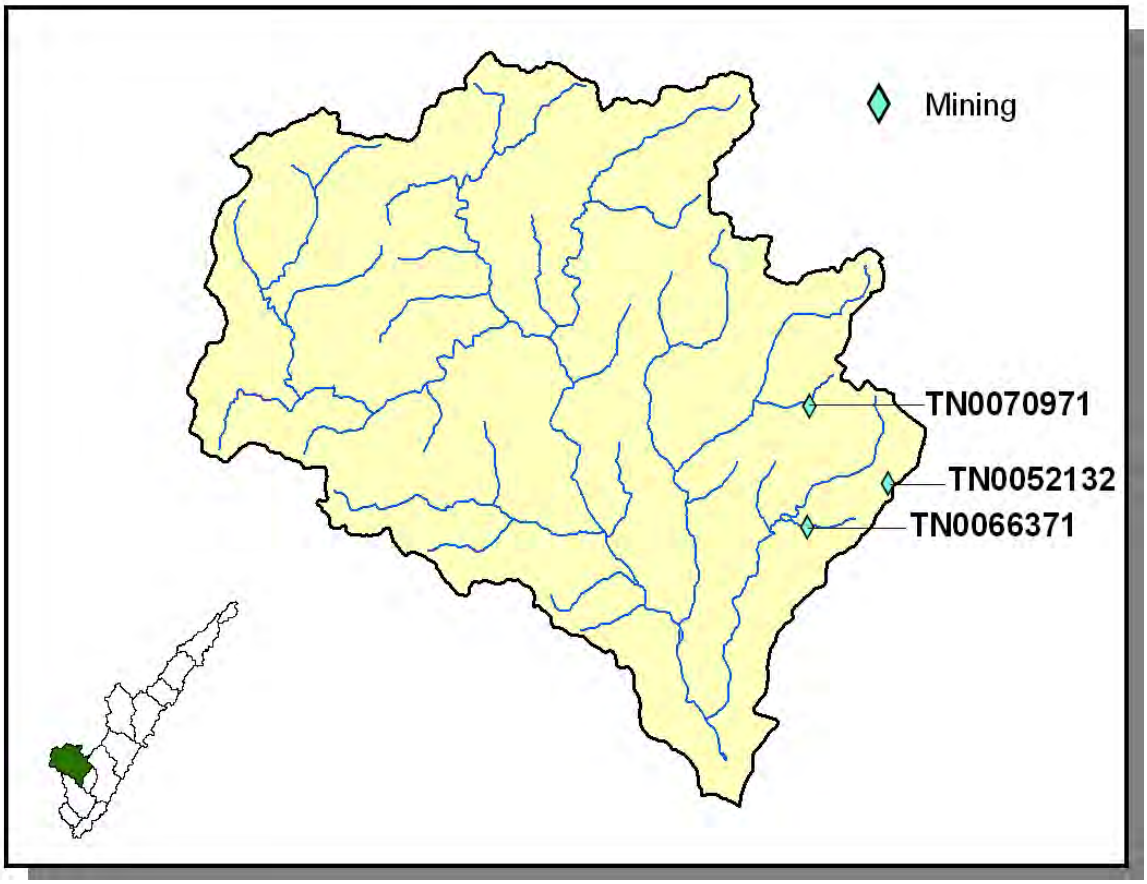


Figure 4-112. Location of Permits Issued in Subwatershed 060200040301. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.K.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 4-58. 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 4-59. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Other Vegetable and Truck Crop	7.28
Soybeans (Row Crops)	4.60
Corn (Row Crops)	4.17
Other (Horticultural)	2.01
Grass (Pastureland)	0.62
Grass (Hayland)	0.39
Grass Forbs Legumes Mixed (Pas	0.32
Farmsteads and Ranch Headquart	0.23
Legume Grass (Hayland)	0.19

Table 4-60. Annual Estimated Total Soil Loss in Subwatershed 060200040301

4.2.L. 060200040302 (Pockett Creek).

4.2.L.i. General Description.

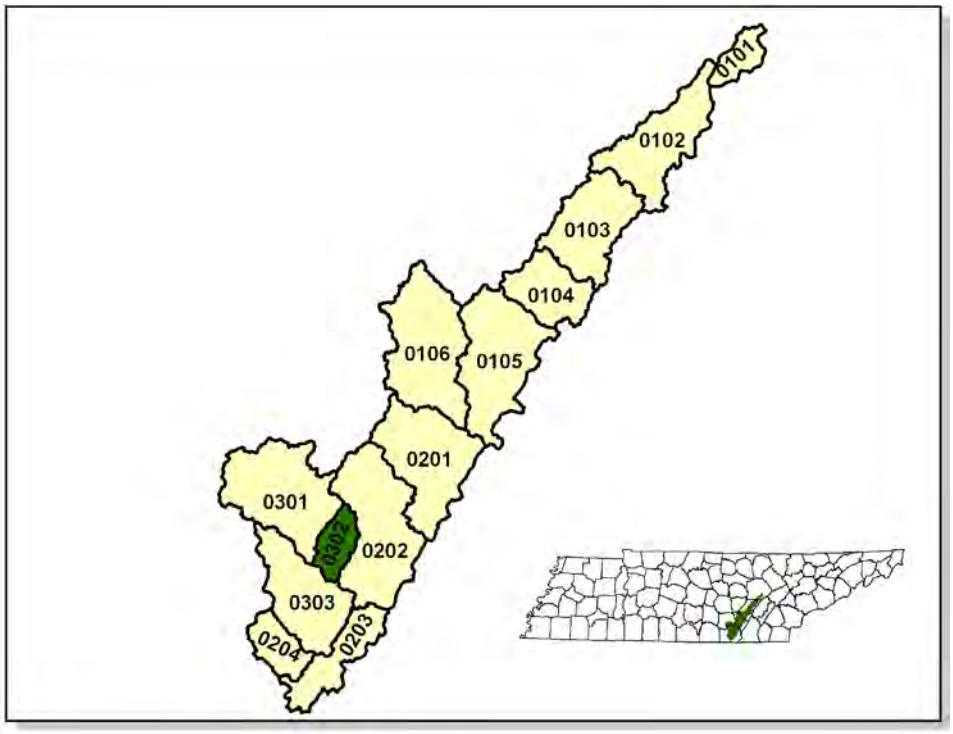


Figure 4-113. Location of Subwatershed 060200040302. *All Sequatchie River HUC-12 subwatershed boundaries are shown for reference.*

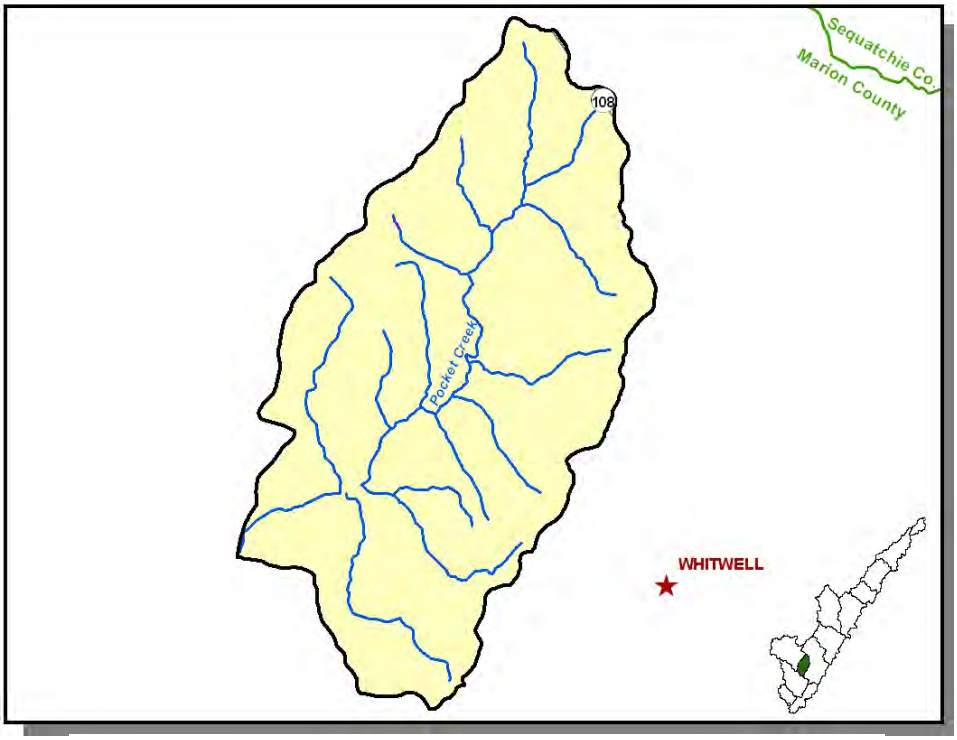


Figure 4-114. Locational Details of Subwatershed 060200040302.

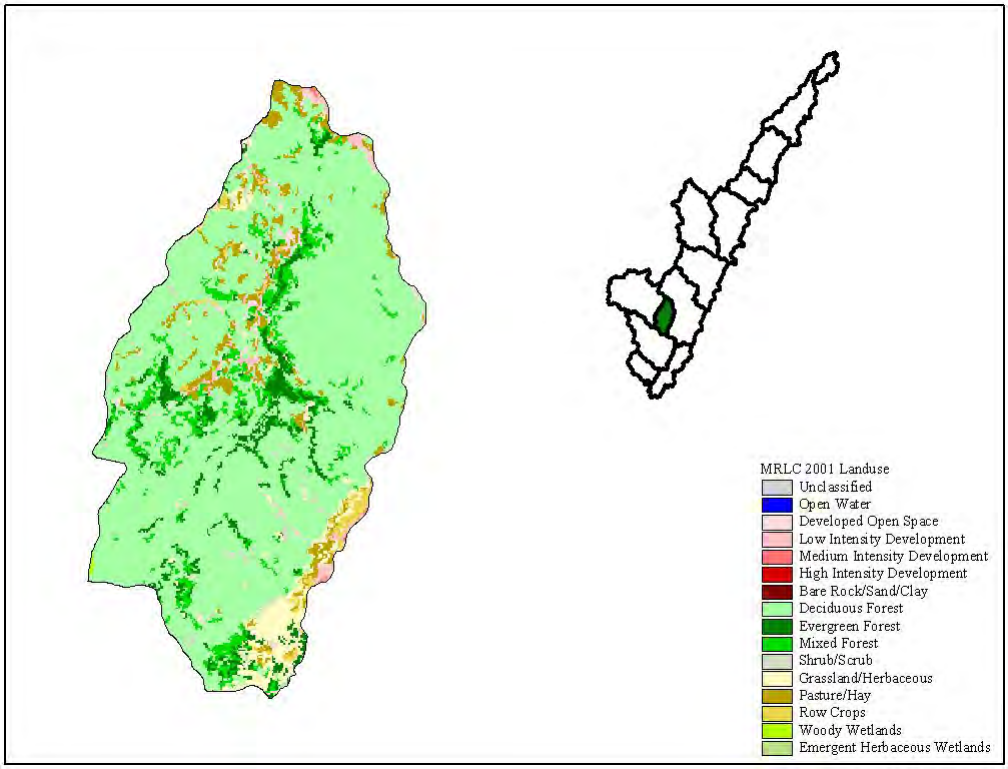


Figure 4-115. Illustration of Land Use Distribution in Subwatershed 060200040302.

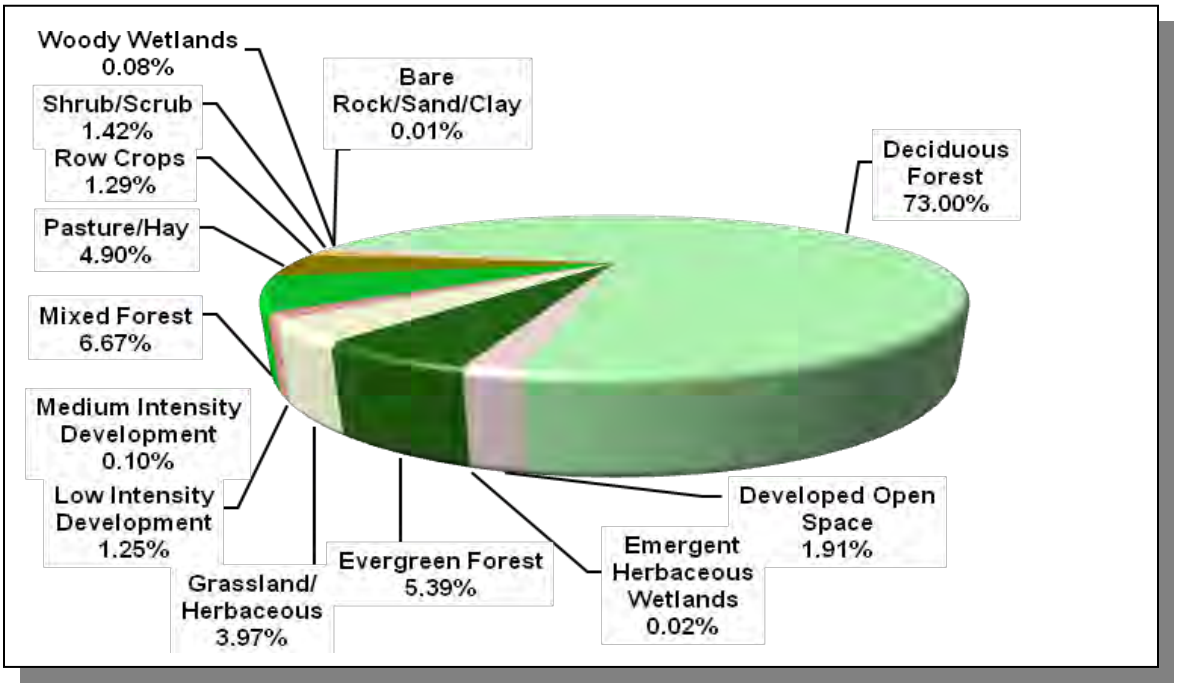


Figure 4-116. Land Use Distribution in Subwatershed 060200040302. *More information is provided in Appendix IV.*

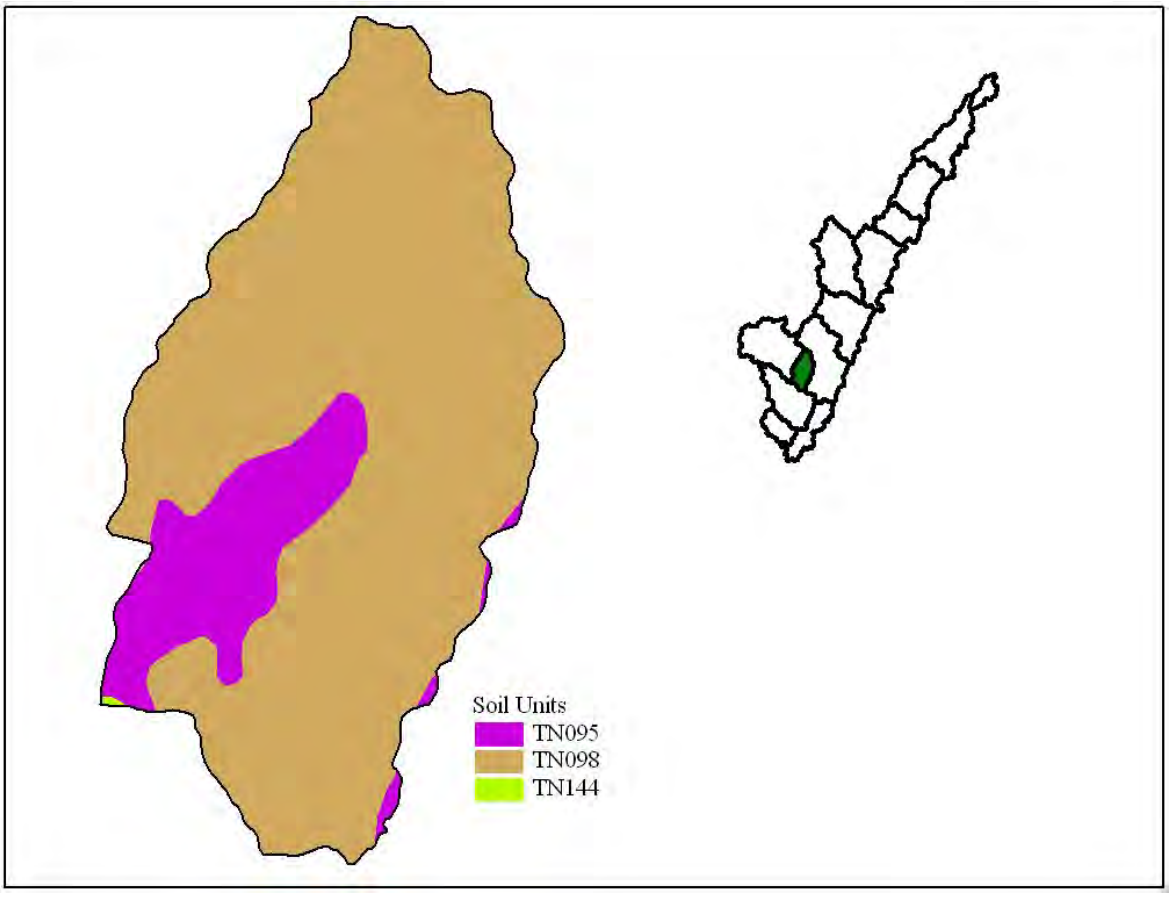


Figure 4-117. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040302.

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 4-61. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040302. *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	3.02	750	805	838	11.70

Table 4-62. Population Estimates in Subwatershed 060200040302.

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

There are no USGS continuous record gaging stations located in subwatershed 060200040302.

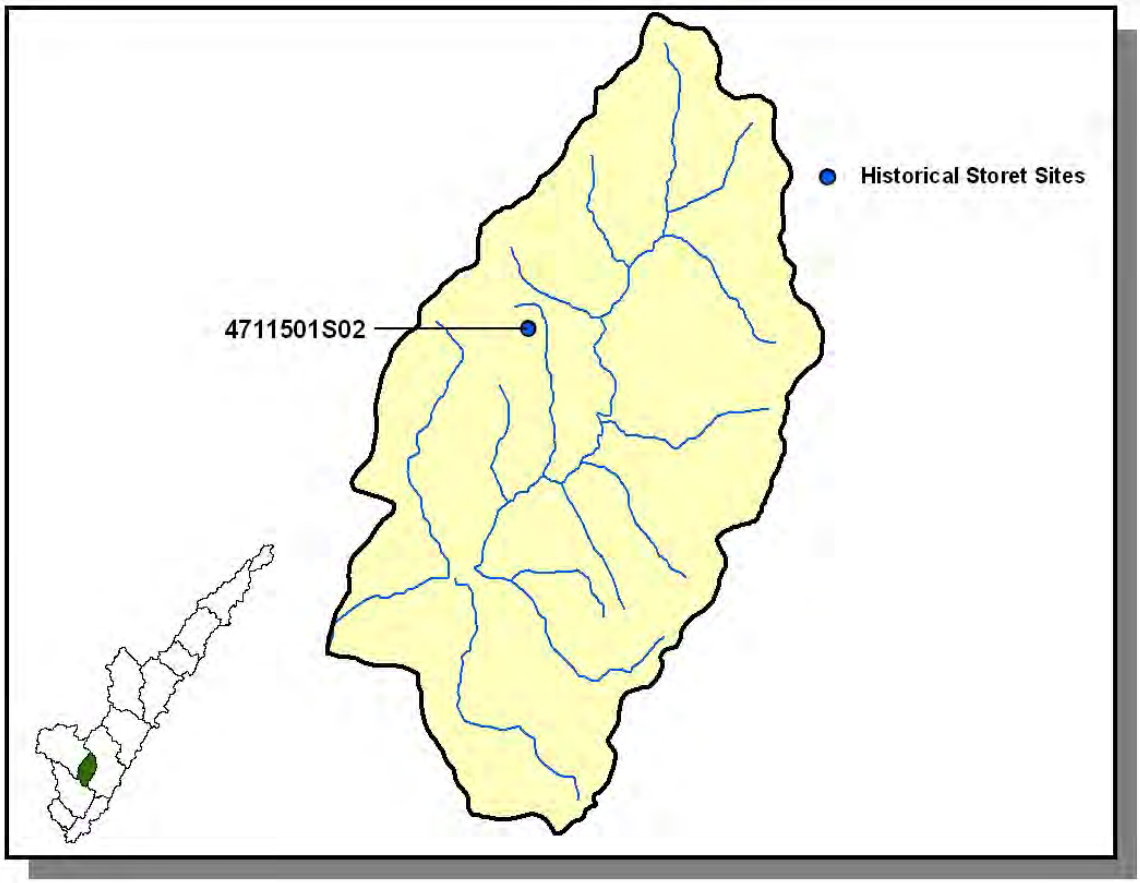


Figure 4-118. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200040302. *More information, including site names and locations, is provided in Appendix IV.*

4.2.L.iii. Permitted Activities.

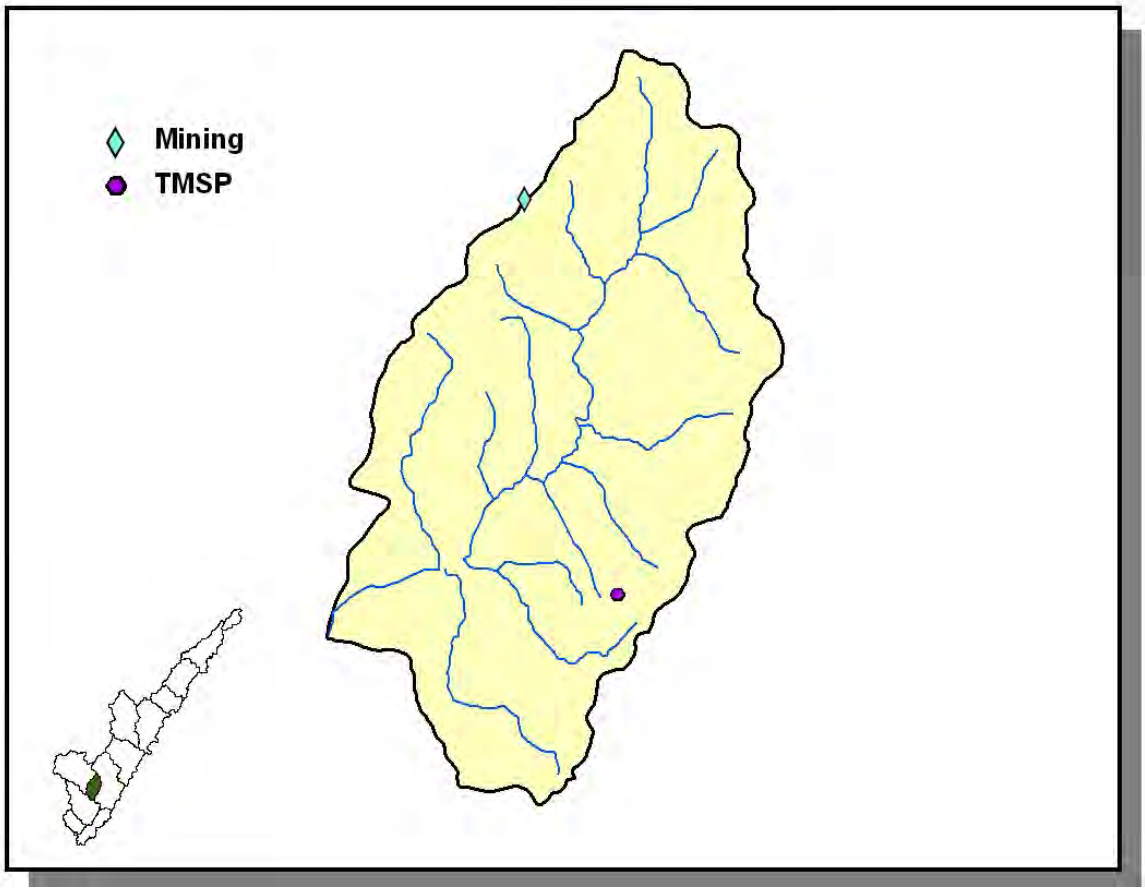


Figure 4-119. Location of Permits Issued in Subwatershed 060200040302. *More information, including the names of facilities, is provided in Appendix IV.*

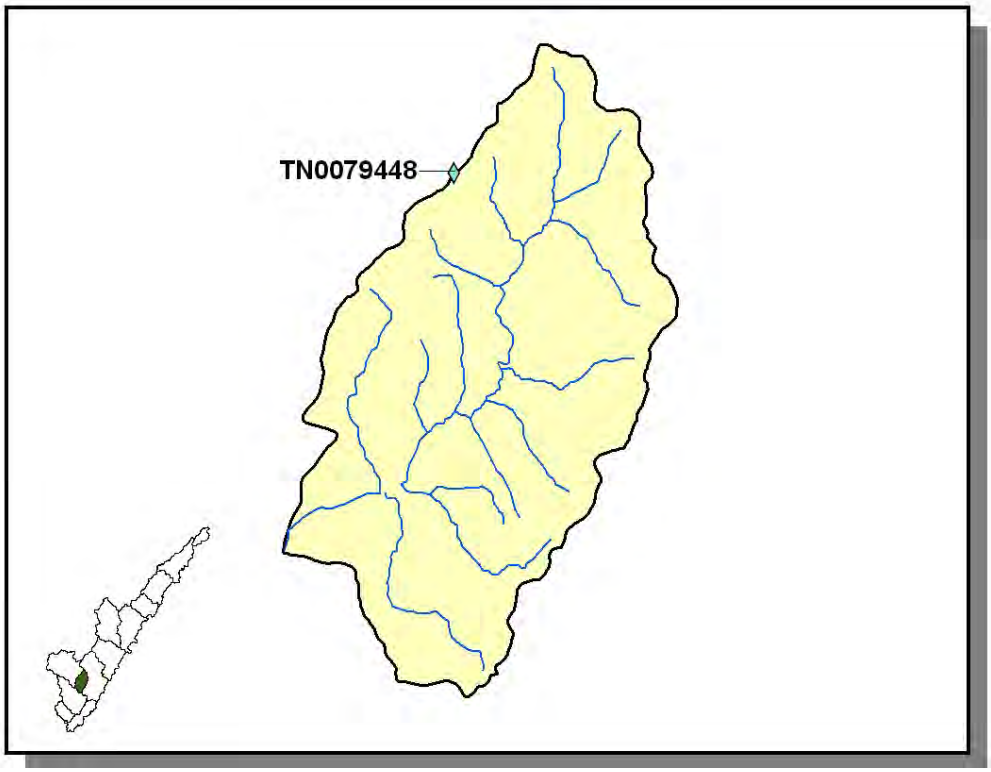


Figure 4-120. Location of Permitted Mining Facilities in Subwatershed 060200040302. *More information is provided in Appendix IV.*

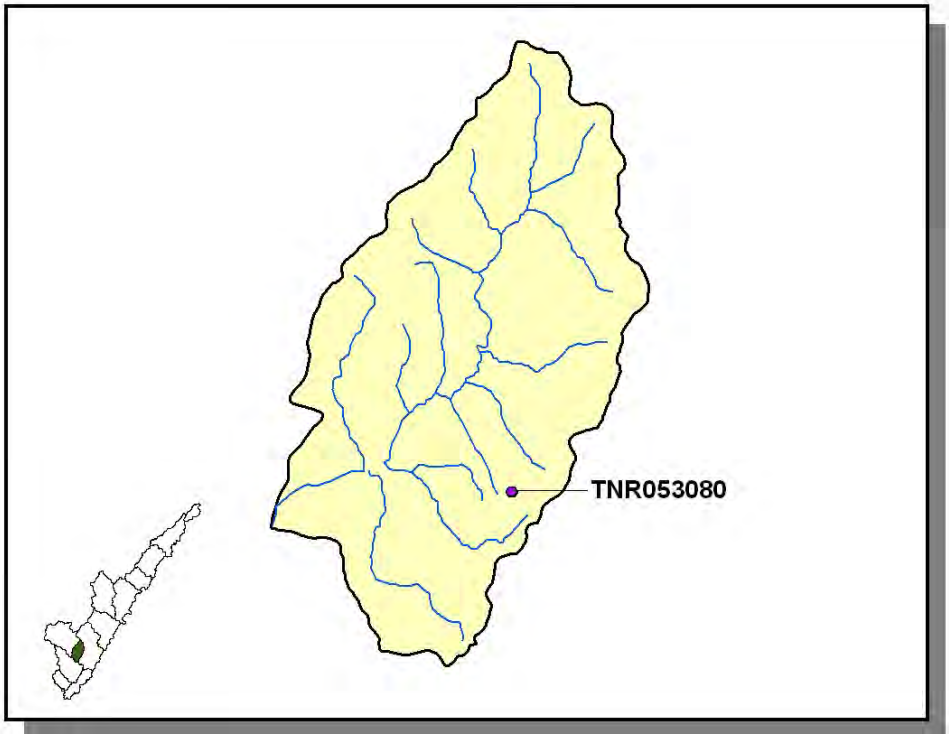


Figure 4-121. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 060200040302. *More information is provided in Appendix IV.*

4.2.L.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 4-63. 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 4-64. Annual Estimated Total Soil Loss in Subwatershed 060200040302.

4.2.M. 060200040303 (Little Sequatchie River, Lower).

4.2.M.i. General Description.

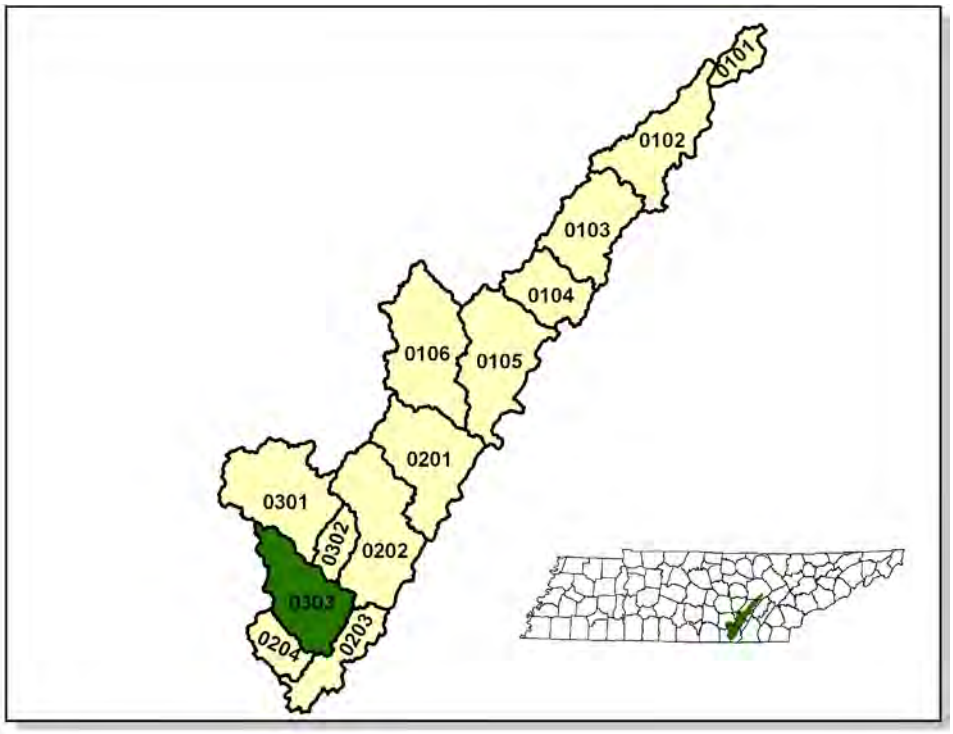


Figure 4-122. Location of Subwatershed 060200040303. *All Sequatchie River HUC-12 subwatershed boundaries are shown for reference.*

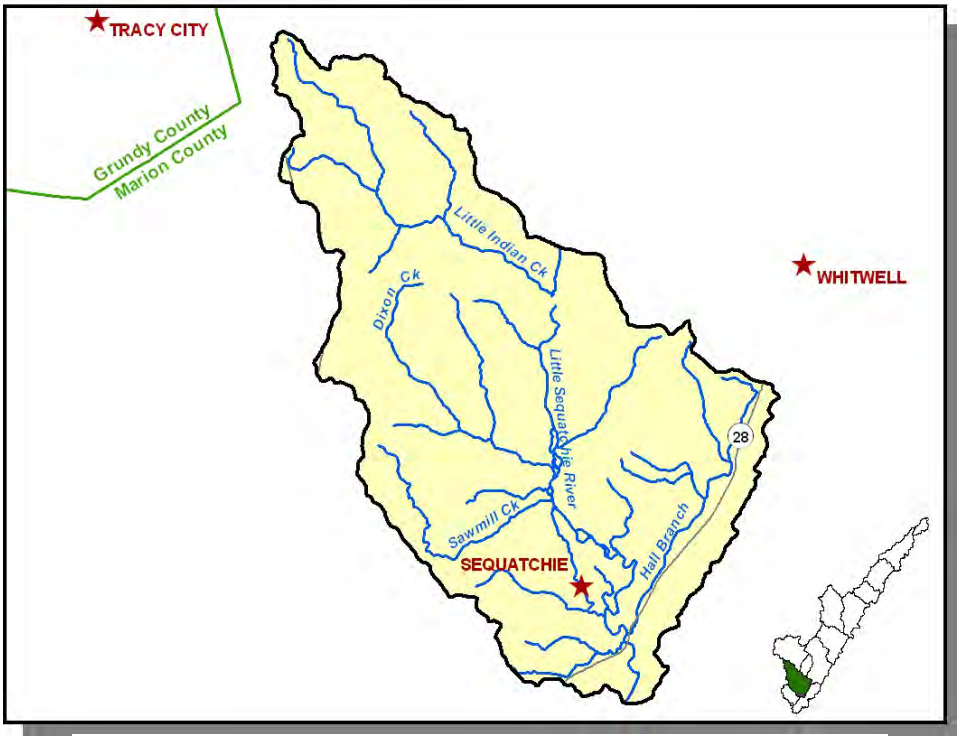


Figure 4-123. Locational Details of Subwatershed 060200040303.

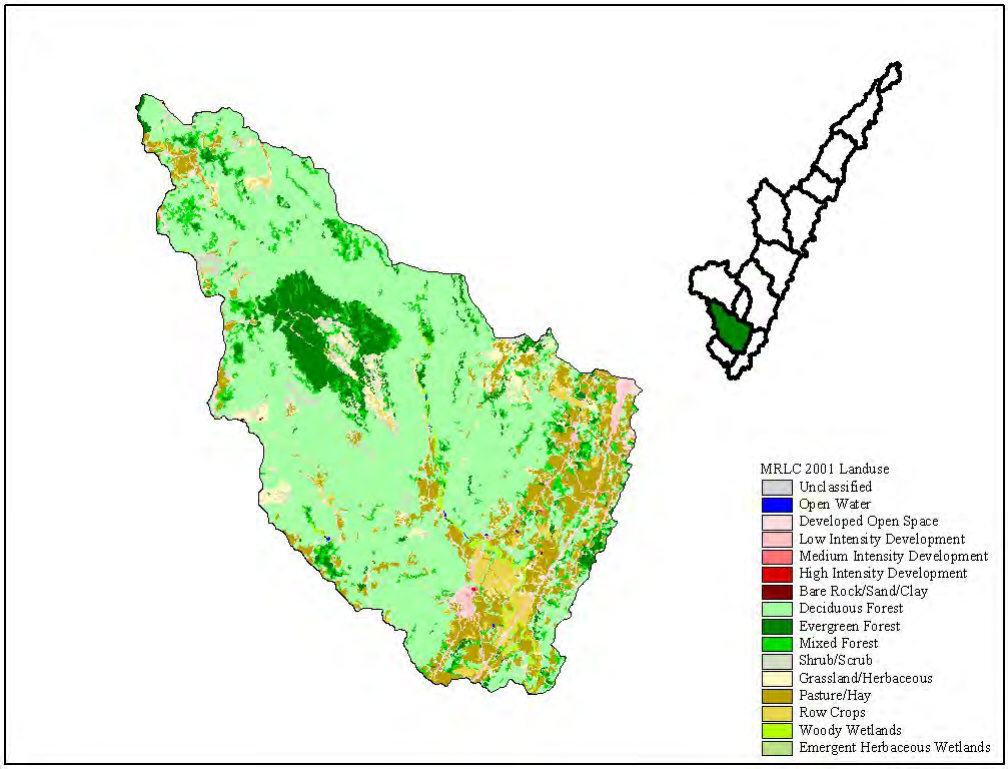


Figure 4-124. Illustration of Land Use Distribution in Subwatershed 060200040303.

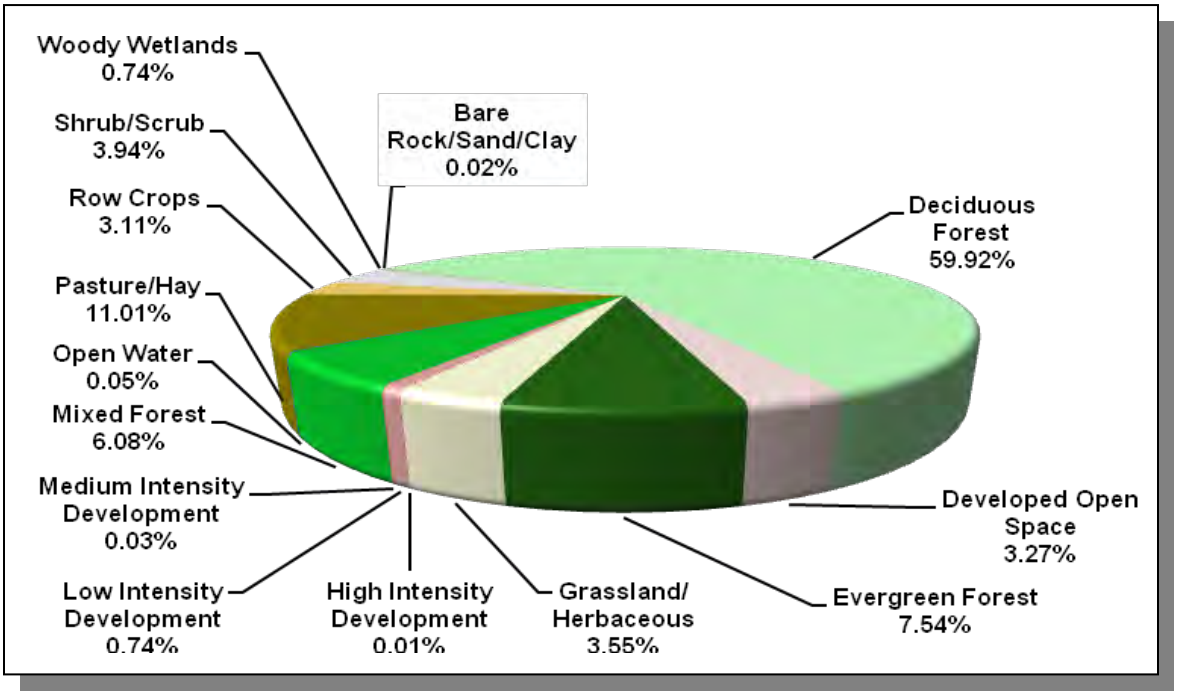


Figure 4-125. Land Use Distribution in Subwatershed 060200040303. *More information is provided in Appendix IV.*

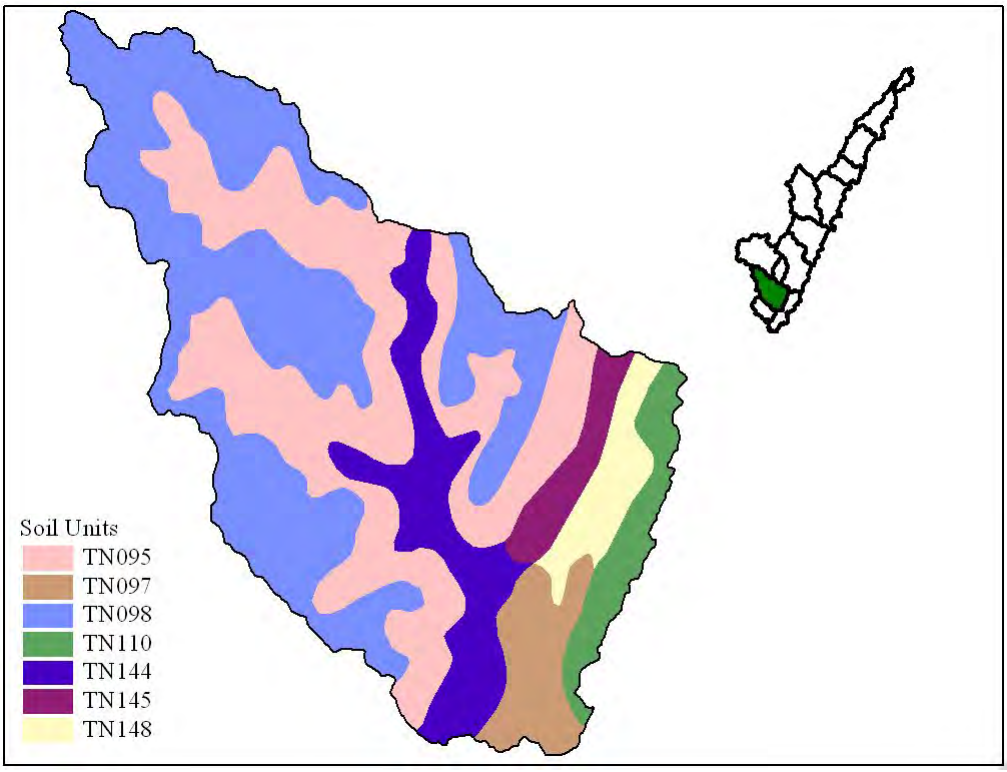


Figure 4-126. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040303.

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
TN097	0.00	B	1.62	5.55	Loam	0.32
TN098	1.00	C	3.98	4.82	Loam	0.32
TN110	0.00	B	2.22	4.96	Loam	0.31
TN144	0.00	B	2.43	5.43	Loam	0.31
TN145	0.00	B	1.84	4.83	Loam	0.27
TN148	5.00	B	1.37	4.84	Loam	0.28

Table 4-65. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060200040303. *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	9.58	2,382	2,556	2,662	11.80

Table 4-66. Population Estimates in Subwatershed 060200040303.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Jasper	Marion	2,780	1,199	966	225	8

Table 4-67. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 060200040303.

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

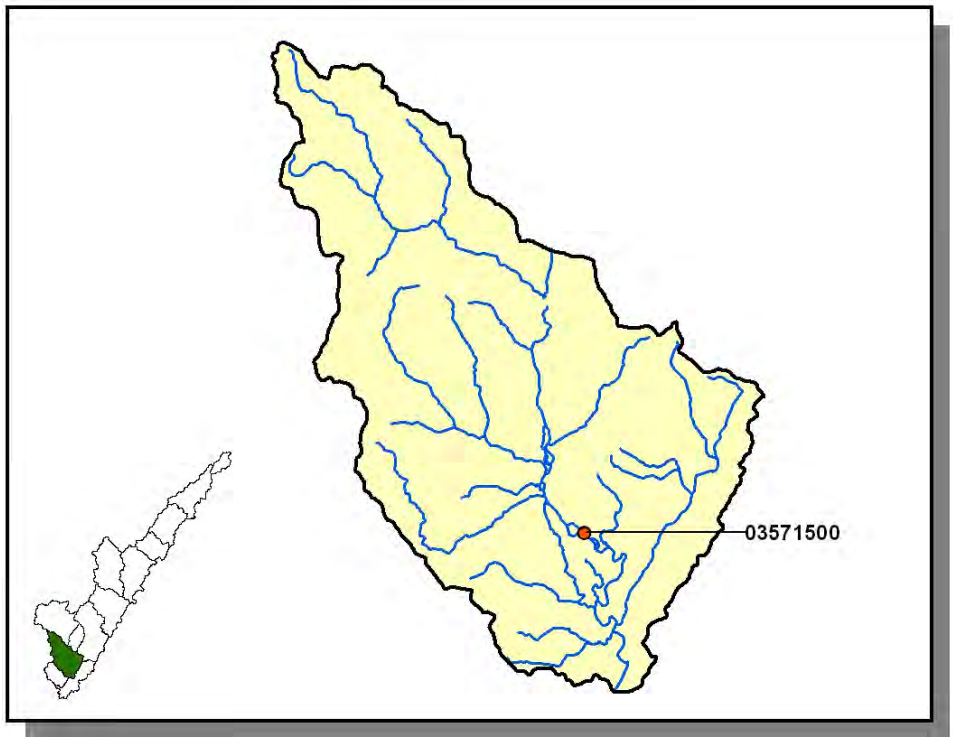


Figure 4-127. Location of USGS Continuous Record Gaging Stations in Subwatershed 060200040303. *More information is provided in Appendix IV.*

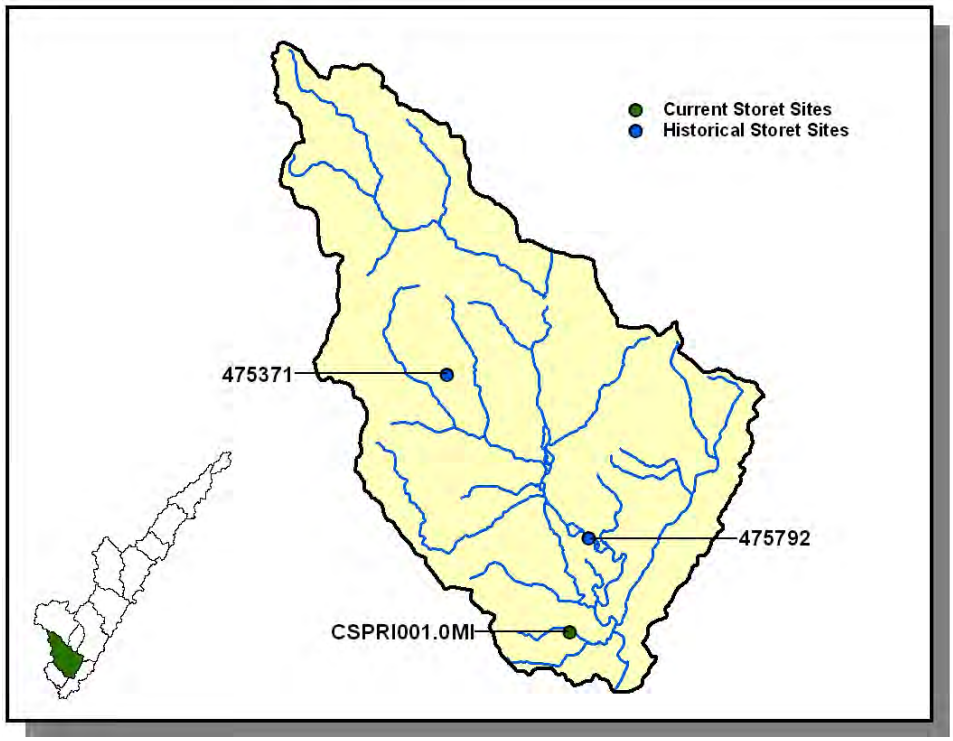


Figure 4-128. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 060200040303. *More information, including site names and locations, is provided in Appendix IV.*

4.2.M.iii. Permitted Activities.

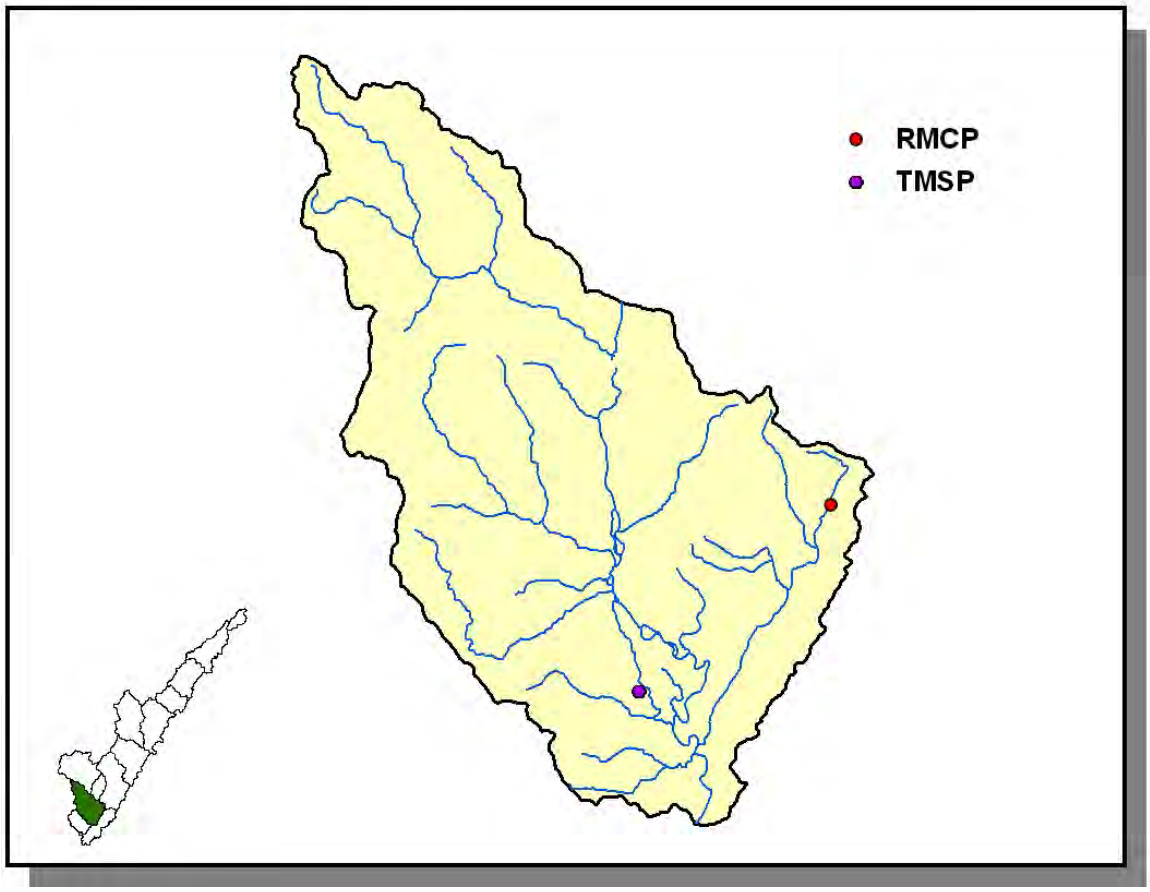


Figure 4-129. Location of Permits Issued in Subwatershed 060200040303. *More information, including the names of facilities, is provided in Appendix IV.*

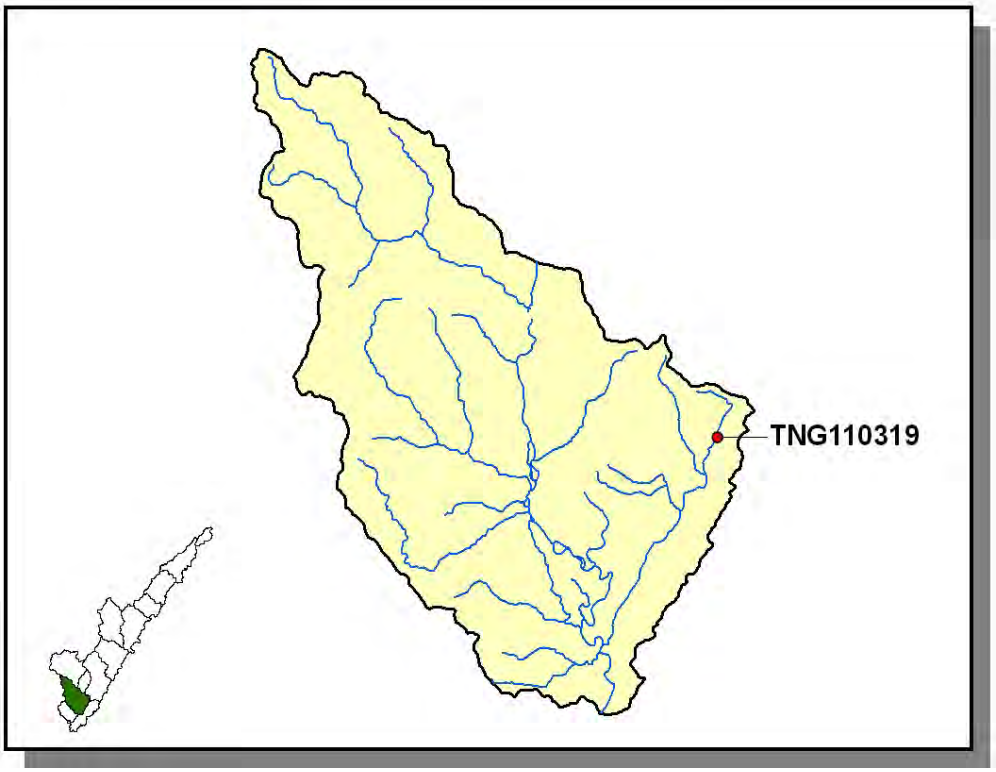


Figure 4-130. Location of RMCP (Ready Mix Concrete Plant) facilities in Subwatershed 060200040303. *More information, including the names of facilities, is provided in Appendix IV.*

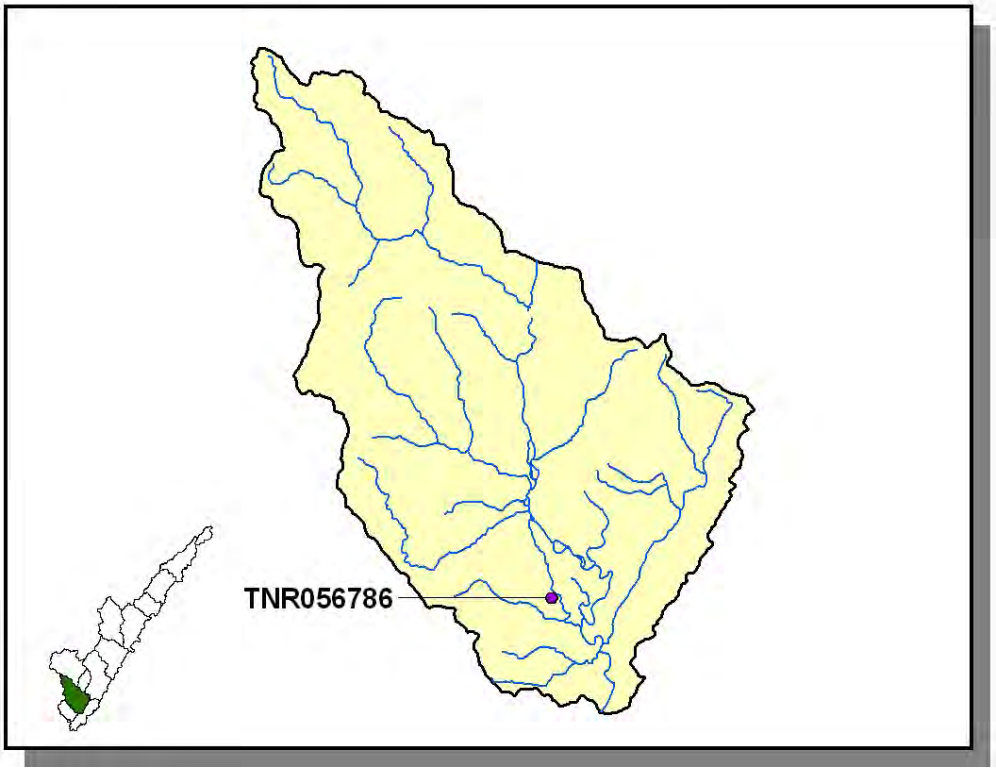


Figure 4-131. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 060200040303. *More information is provided in Appendix IV.*

4.2.M.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 4-68. 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 4-69. Annual Estimated Total Soil Loss in Subwatershed 060200040303.

CHAPTER 5

WATER QUALITY PARTNERSHIPS IN THE SEQUATCHIE RIVER WATERSHED

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

- Partnerships between agencies
- Partnerships between agencies and landowners

This chapter describes both types of partnerships in the Sequatchie River Watershed. The information presented is provided by the agencies and organizations described.

5.2. FEDERAL PARTNERSHIPS.

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

Performance Results System (PRS) is a Web-based database application providing USDA Natural Resources Conservation Service, conservation partners, and the public fast and easy access to accomplishments and progress toward strategies and performance. The PRS may be viewed at http://prms.nrcs.usda.gov/prs. From the opening menu, select "Reports" in the top tool bar. You will select the time period that you are interested in and the conservation treatment of interest on the page 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	Feet	Acres	Number
Conservation Buffers	6,225	19	
Erosion Control		608	
Nutrient Management		4,653	
Pest Management		7,496	
Grazing / Forages	36,320	2,421	
Tree and Shrub Practices		824	
Tillage and Cropping		342	
Waste Management Systems			5
Wildlife Habitat Management		2,286	
Water Supply	7,606		15

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

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

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

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

Utilizing funding provided through the Service's Landowner Incentives Program (LIP), the Tennessee Wildlife Resources Agency (TWRA), and The Nature Conservancy (TNC), are working with private landowners to implement habitat restoration activities for rare species in the Sequatchie River watershed. This relatively new program targets the restoration of suitable habitat for federally listed species as well as state listed rare species, many of which occur within this watershed.

In a partnership with the Tennessee Nature Conservancy (TNC), Tennessee Wildlife Resources Agency (TWRA), and Tennessee Department of Environment and Conservation (TDEC) Division of Natural 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 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 Sequatchie River Watershed: gray bat (*Myotis grisescens*) (E); Anthony's river snail (*Athearnia anthonyi*) (E); Royal Marstonia (*Pyrgulopsis ogmorhaphe*) (E); Sequatchie caddisfly (*Glyphopsyche sequatchie*) (C); snail darter (*Percina tanasi*) (T); Price's potato-bean (*Apios priceana*) (T); white fringeless orchid (*Platanthera integrilabia*) (C); pale lilliput (*Toxolasma cylindrellus*) (E); and spectaclecase (*Cumberlandia monodonta*) (C). 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).

The Service is also providing funding to the Cumberland County Soil Conservation District to restore habitat for federally listed species by installing sediment control practices that improve water quality within the watershed.

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

The Service is actively involved with the Natural Resources Conservation Service and private landowners in the Sequatchie River Watershed to restore and protect riparian habitats. Specific projects have included the installation of livestock exclusion fencing, alternate water sources, heavy use feeding pads, and hardened stream crossings.

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 Sequatchie River Watershed.

Stream Monitoring

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.

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.

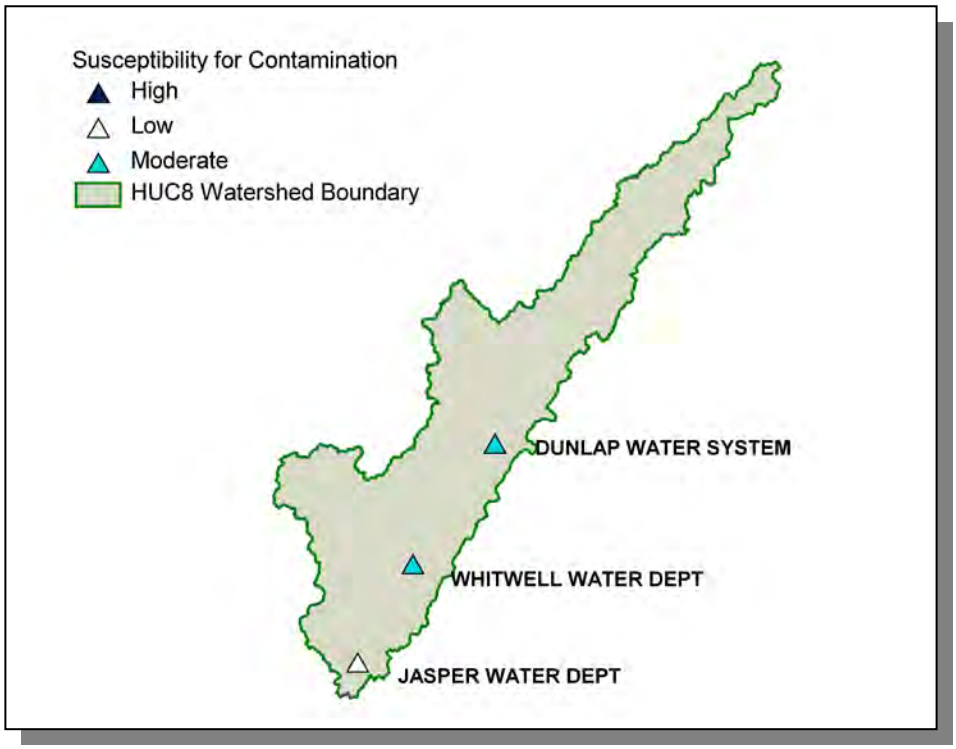


Figure 5-1. Public Water Systems Susceptible to Contamination in the Sequatchie River Watershed.

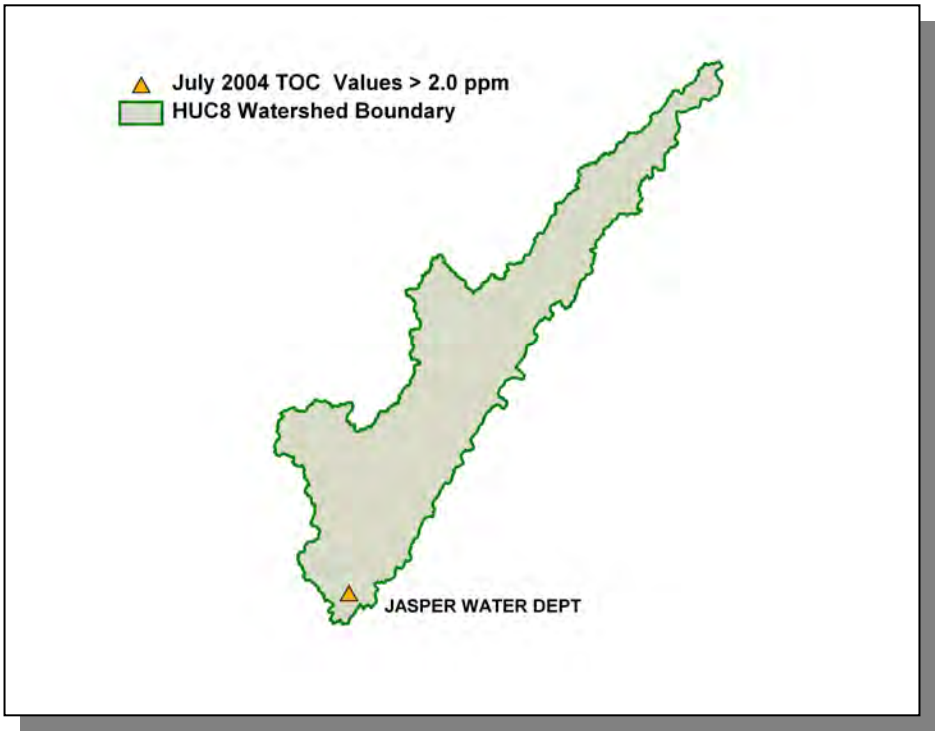


Figure 5-2. July 2004 Raw Water Total Organic Carbon (TOC) Analysis in the Sequatchie River Watershed.

For further discussion on ground water issues in Tennessee, the reader is referred to the Ground Water Section of the 305(b) Water Quality Report at:

http://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.

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 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.

- 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

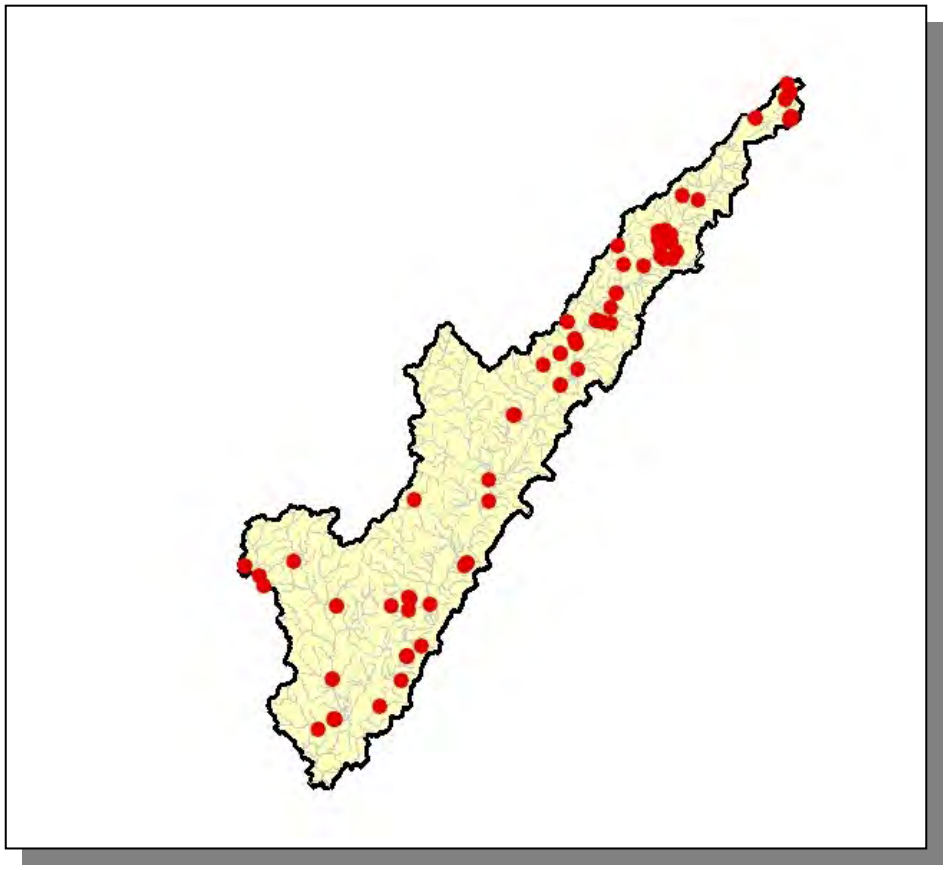


Figure 5-3. Location of BMPs installed from 2002 through 2006 in the Sequatchie River Watershed with Financial Assistance from the Tennessee Department of Agriculture's Nonpoint Source and Agricultural Resources Conservation Fund Grant Programs. *More information is provided in Appendix V.*

5.3.D. 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.

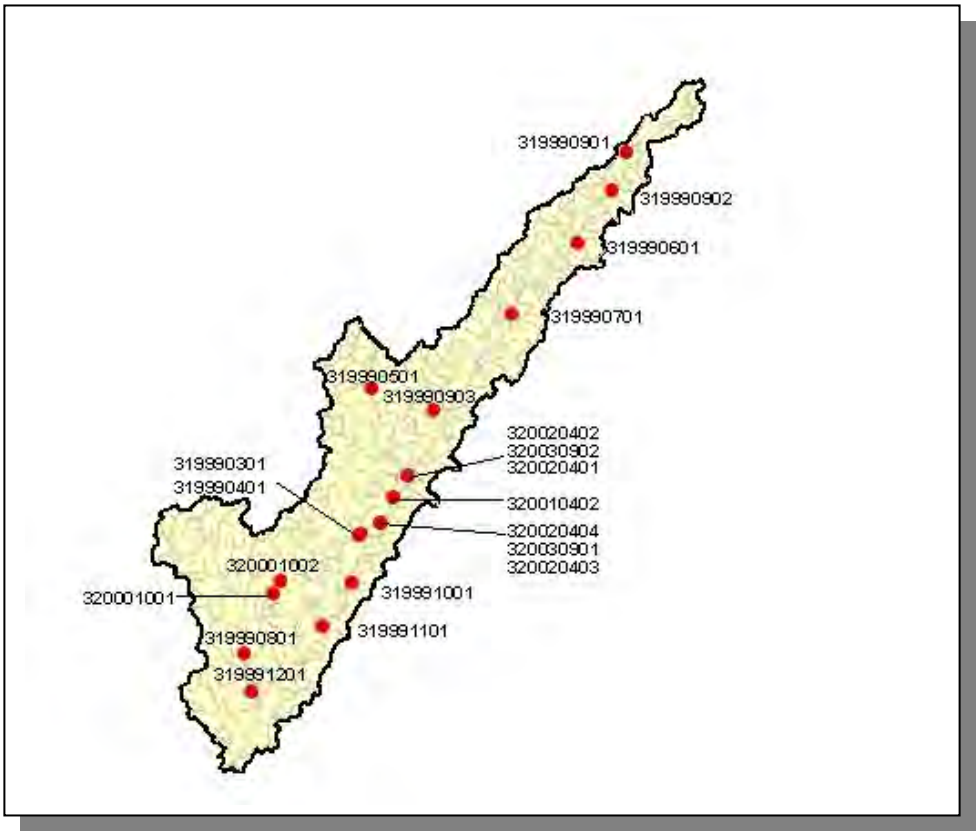


Figure 5-4. Location of TWRA TADS Sampling Sites in the Sequatchie River Watershed from 1987-2005. *More information is provided in Appendix V.*

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.

5.4. 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 ground water 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.

CHAPTER 6

RESTORATION STRATEGIES IN THE SEQUATCHIE RIVER WATERSHED

6.1. BACKGROUND.

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

In addition to the NPDES program, some state and federal regulations, such as the TMDL and ARAP programs, address point and nonpoint issues. Construction and MS4 stormwater rules (implemented under the NPDES program) have transitioned from Phase 1 to Phase 2. More information on stormwater 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 Sequatchie River Watershed.

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

6.2.A. Year 1 Public Meeting. The first Sequatchie River Watershed public meeting was held jointly with the Guntersville Lake 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 Sequatchie River Watershed public meeting was held jointly with the Guntersville Lake Watershed 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.

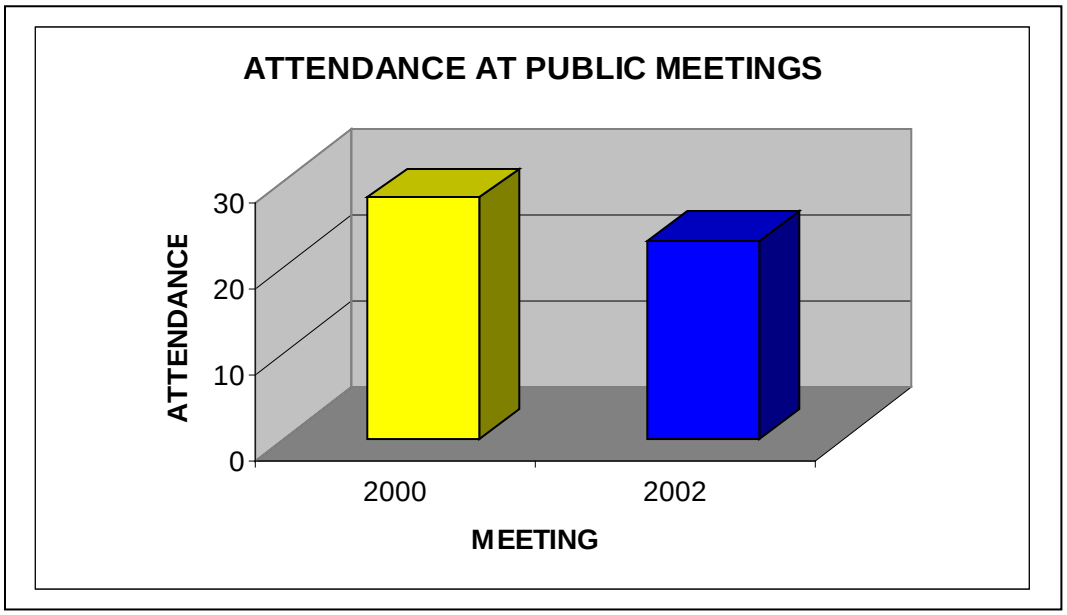


Figure 6-1. Attendance at the Sequatchie River and Guntersville Lake Watershed Joint Public Meetings. *Attendance numbers do not include TDEC personnel.*

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 TMDLs:

> **Sequatchie River** – Total Maximum Daily Load for E. Coli in the Sequatchie River Watershed in Bledsoe, Cumberland, Grundy, Marion, Sequatchie and Van Buren Counties. Approved 12/18/2008.
>
> http://www.state.tn.us/environment/wpc/tmdl/approvedtmdl/SequatchieEcoli.pdf

TMDLs are prioritized for development based on many factors.

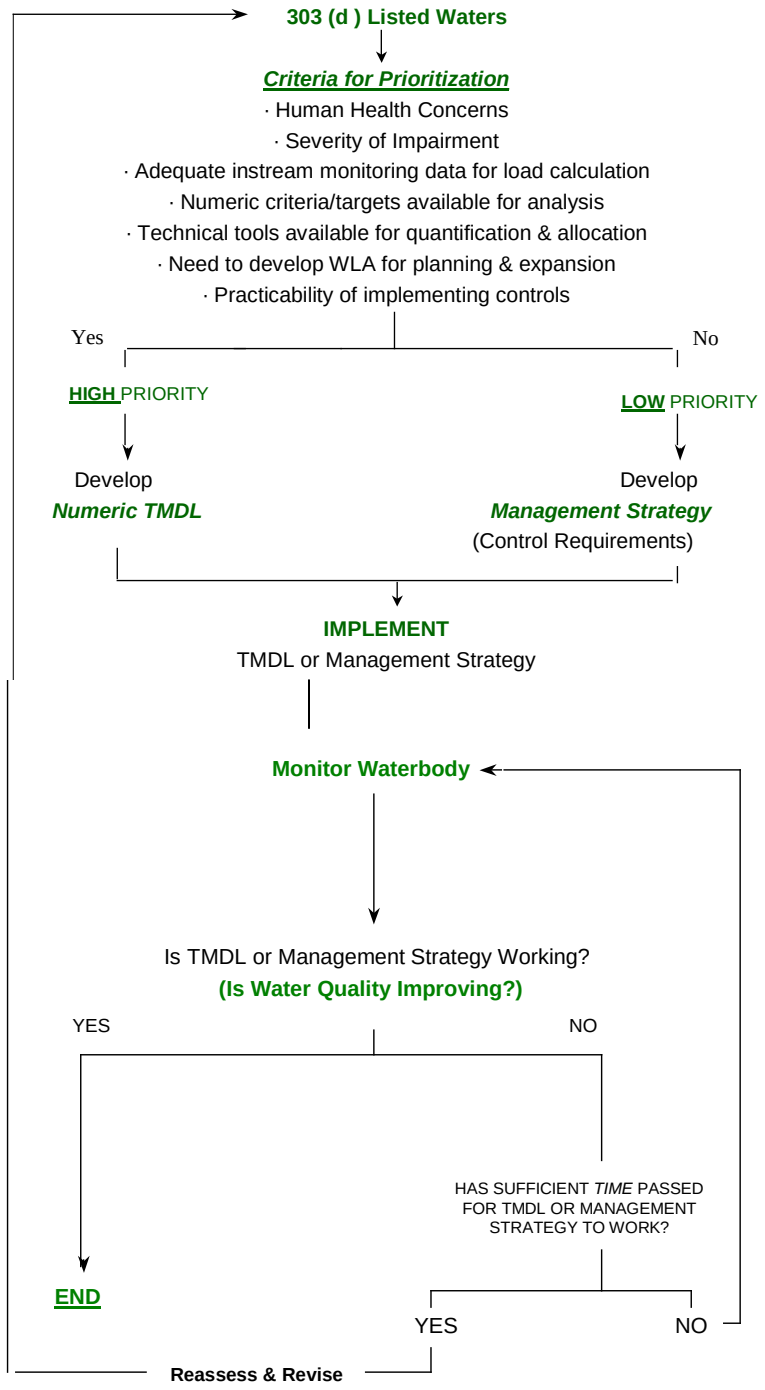


Figure 6-2. Prioritization Scheme for TMDL Development.

Several permitted discharges within the Sequatchie River (Dunlap STP, Pikeville STP) 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. Dunlap STP has limits with solids restrictions.

6.3.B. Nonpoint Sources

Common nonpoint sources of pollution in the Sequatchie River Watershed include agricultural practices, riparian vegetation removal and other habitat alterations, inappropriate land development, urban stormwater runoff, and road construction. 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 Sequatchie River 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 stormwater 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 stormwater 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, no portion of the Sequatchie River Watershed in Tennessee is currently covered by an active 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 Sequatchie River 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 stormwater runoff can also overwhelm channel and bank integrity because destabilized banks contribute to sediment loadings and to the loss of beneficial riparian vegetation.

Some improper agricultural practices and overzealous land development have impacted the hydrology and morphology of stream channels in Sequatchie River watershed.

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

Several agencies such as the NRCS, TVA, and TDA, are working to stabilize portions of stream banks using bioengineering and other techniques. Many of the affected streams, Hicks Creek, Cove Branch and Big Brush Creek, would benefit from these types of projects.

Another form of Channel and Bank erosion is coming from a new source of concern. Off-road and All-terrain vehicle clubs are becoming increasingly popular. Many of the routes the vehicles take are directly in the stream channels or cross streams. The areas where the vehicles routinely go in and out of the streams are heavily eroded and due to the lack of a stable bank, continue to erode during storm events and in some cases during normal flows. The most extensive habitat damage occurs in the areas where the vehicles are crossing frequently as well as the areas of extended channel use (Little Sequatchie River, Pocket Creek).

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

Voluntary Activities

- Re-establish bank vegetation. (Unnamed Tributary to the Sequatchie River in Marion County, Unnamed Tributary to Shelton Creek, Second Unnamed Tributary to Sequatchie River in Marion County, Peck Branch, McWilliams Creek, Hall Creek, Little Creek, Brown Creek, Swafford Branch, Stephens Branch,

Manning Springs, Unnamed Tributary to Sequatchie River in Bledsoe County, Skillern Creek, Second Unnamed Tributary to Sequatchie River in Bledsoe County, Maise Creek, Daniel Creek, and Grassy Cove Creek*).*

- Establish off-channel watering areas for livestock by moving watering troughs and feeders back from stream banks, or at least limit cattle access to restricted areas with armored banks entry *(*Unnamed Tributary to the Sequatchie River in Marion County, Unnamed Tributary to Shelton Creek, Second Unnamed Tributary to Sequatchie River in Marion County, Peck Branch, McWilliams Creek, Hall Creek, Little Creek, Brown Creek, Swafford Branch, Stephens Branch, Manning Springs, Unnamed Tributary to Sequatchie River in Bledsoe County, Skillern Creek, Second Unnamed Tributary to Sequatchie River in Bledsoe County, Maise Creek, Daniel Creek, and Grassy Cove Creek*).*
- Limit cattle access to streams and bank vegetation *(*Unnamed Tributary to the Sequatchie River in Marion County, Unnamed Tributary to Shelton Creek, Second Unnamed Tributary to Sequatchie River in Marion County, Peck Branch, McWilliams Creek, Hall Creek, Little Creek, Brown Creek, Swafford Branch, Stephens Branch, Manning Springs, Unnamed Tributary to Sequatchie River in Bledsoe County, Skillern Creek, Second Unnamed Tributary to Sequatchie River in Bledsoe County, Maise Creek, Daniel Creek, and Grassy Cove Creek*).*
- Limit vehicle access to streams (Little Sequatchie River, Pocket Creek).
- Stabilize fords and stream crossings (Little Sequatchie River, Pocket Creek).
- Move trails out of stream channel and stabilize trails near streams (Little Sequatchie, Pocket Creek)
- Educate Off road enthusiast of the damaging effects they cause to streams.

Regulatory Strategies

- Increase efforts in the Master Logger program to recognize impaired streams and require more effective management practices. (Tributary to Glady Fork)
- Require post-construction run-off rates to be no greater than pre-construction rates in order to avoid in-channel erosion. (Little Sequatchie River, Pocket Creek)
- Implement additional restrictions on logging in streamside management zones. (Tibutary to Glady Fork)
- Limit road and utility crossings of streams through better site design. (Little Sequatchie River, Pocket Creek)
- Restrict the use of off-highway vehicles on stream banks and in stream channels. (Little Sequatchie River, Pocket Creek)
- 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. (Pocket Creek, Hicks Creek, Woodcock Creek, Brush Creek)
- Require established Clubs to get appropriate permitting.

Additional Strategies

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

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 most areas of the Sequatchie River Watershed, due both to agricultural and residential/commercial land uses. Many streams, like Unnamed Tributary to the Sequatchie River in Marion County, Unnamed Tributary to Shelton Creek, Second Unnamed Tributary to Sequatchie River in Marion County, Peck Branch, McWilliams Creek, Hall Creek, Little Creek, Brown Creek, Swafford Branch, Stephens Branch, Manning Springs, Unnamed Tributary to Sequatchie River in Bledsoe County, Skillern Creek, Second Unnamed Tributary to Sequatchie River in Bledsoe County, Maise Creek, and Daniel Creek, 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 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, 17 stream systems in the Sequatchie River Watershed are known to have excessive pathogen contamination. Streams in the watersheds that show elevated bacterial levels include, Unnamed Tributary to the Sequatchie River in Marion County, Unnamed Tributary to Shelton Creek, Second Unnamed Tributary to Sequatchie River in Marion County, Peck Branch, McWilliams Creek, Hall Creek, Little Creek, Brown Creek, Swafford Branch, Stephens Branch, Manning Springs, Unnamed Tributary to Sequatchie River in Bledsoe County, Skillern Creek, Second Unnamed Tributary to Sequatchie River in Bledsoe County, Maise Creek, Daniel Creek and Grassy Cove Creek.

Some measures that may be necessary to control pathogens are:

Voluntary Activities

- Repair failed septic systems.
- Establish off-channel watering of livestock (Unnamed Tributary to the Sequatchie River in Marion County, Unnamed Tributary to Shelton Creek, Second Unnamed Tributary to Sequatchie River in Marion County, Peck Branch, McWilliams Creek, Hall Creek, Little Creek, Brown Creek, Swafford Branch, Stephens Branch, Manning Springs, Unnamed Tributary to Sequatchie River in Bledsoe County, Skillern Creek, Second Unnamed Tributary to Sequatchie River in Bledsoe County, Maise Creek, Daniel Creek and Grassy Cove Creek)
- Limit livestock access to streams *(*Unnamed Tributary to the Sequatchie River in Marion County, Unnamed Tributary to Shelton Creek, Second Unnamed Tributary to Sequatchie River in Marion County, Peck Branch, McWilliams Creek, Hall Creek, Little Creek, Brown Creek, Swafford Branch, Stephens Branch, Manning Springs, Unnamed Tributary to Sequatchie River in Bledsoe County, Skillern Creek, Second Unnamed Tributary to Sequatchie River in Bledsoe County, Maise Creek, Daniel Creek and Grassy Cove Creek)
- Improve and educate on the proper management of animal waste from confined feeding operations.

Regulatory Strategies

- Strengthen enforcement of regulations governing on-site wastewater treatment.
- Determine timely and appropriate enforcement for non-complying sewage treatment plants, large and small, and their collection systems. (Dunlap STP, Pikeville STP)
- Identify Concentrated Animal Feeding Operations not currently permitted.

Additional Strategies

- Develop intensive planning in areas where sewer is not available and treatment by subsurface disposal is not an option due to poor soils, floodplains, or high water tables.
- Greater efforts by sewer utilities to identify leaking lines or overflowing manholes.
- Review the pathogen limits in discharge permits to determine the need for further restriction.

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 Sequatchie River Watershed within agricultural areas would benefit from additional riparian buffers.
- 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 stormwater management in urban and residential areas, including retrofitting existing commercial lots, homes, and roadways with stormwater 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 *(Dunlap STP, Pikeville STP)*
- Impose timely and appropriate enforcement for noncomplying sewage treatment plants, large and small, and their collection systems *(Dunlap STP, Pikeville STP)*.
- 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.
- Require nutrient management plans for all golf courses. (Mount Airy Golf Club)

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 Sequatchie River Watershed, a relatively small number of streams are damaged by toxins in stormwater runoff from industrial facilities or urban areas. More stringent inspection and regulation of permitted industrial facilities, and local stormwater quality initiatives and regulations, could help reduce the amount of contaminated runoff reaching state waters.

Individuals may also cause contaminants to enter streams by activities that may be attributed to apathy or the lack of knowledge or civility. Litter in roadside ditches, garbage bags tossed over bridge railings, paint brushes washed off over storm drains, and oil drained into ditches are all blatant examples of pollution in streams. 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 stormwater 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 Sequatchie River 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 and bank disturbances from agricultural practices include (Unnamed Tributary to the Sequatchie River in Marion County, Unnamed Tributary to Shelton Creek, Second Unnamed Tributary to Sequatchie River in Marion County, Peck Branch, McWilliams Creek, Hall Creek, Little Creek, Brown Creek, Swafford Branch, Stephens Branch, Manning Springs, Unnamed Tributary to Sequatchie River in Bledsoe County, Skillern Creek, Second Unnamed Tributary to Sequatchie River in Bledsoe County, Maise Creek, Daniel Creek and Grassy Cove Creek).

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, especially for illicit gravel dredging.

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.

Projects on the ground:

- Studer Mines associated with Skyline Coal Co.
- Sequatchie Valley Coal Co.

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. Fore example, roads cuts through certain types of rock layers can also contribute to the pollution of waters of the state. These streams are impacted by ARD, which causes the pH to drop to below 6.0.

Streams may be impacted by chemical reactions that result in orange flocculent 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 are the Big Brush Creek, Glady Fork Creek, Caney Creek, a tributary to Woodcock Creek, Coal Stonebank Creek, Kelly Creek, and Greys Creek.

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.
- Skyline Coal Co. and Sequatchie Valley Coal Co. and Tennessee Consolidated Coal Co. have taken voluntary measures to remove ARD from the watersheds they previously mined.

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.vi. Stormwater.

MS4 discharges are regulated through the Phase I or II NPDES-MS4 permits. These permits require the development and implementation of a Stormwater 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 stormwater 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 in these urban areas include adapting Tennessee Growth Readiness Program (TGRP) educational materials to the watershed. TGRP is a statewide program built on existing best management practices from the Nonpoint Education for Municipal Officials program and the Center for Watershed Protection. TGRP developed the program to provide communities and counties with tools to design economically viable and watershed friendly developments. The program assists community leaders in reviewing current land use practices, determining impacts of imperviousness on watershed functions, and allowing them to understand the economics of good watershed management and site design.

6.4. PERMIT REISSUANCE PLANNING

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

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

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

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

6.4.A. Municipal Permits

TN0025054 Pikeville STP

Discharger rating: Minor
City: Pikeville
County: Bledsoe
EFO Name: Chattanooga
Issuance Date: 10/31/05
Expiration Date: 10/31/10
Receiving Stream(s): Sequatchie River Mile 78.4
HUC-12: 060200040103
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: Waste Activated Sludge to aerobic digester to drybeds to landfill

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	All Year	22.5	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	37	lb/day	WAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	17.5	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	12.5	mg/L	MAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	26	lb/day	MAvg Load	3/Week	Composite	Effluent
Bypass of Treatment (occurrences)	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
CBOD % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
CBOD % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
CBOD5	All Year	40	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	All Year	35	mg/L	WAvg Conc	3/Week	Composite	Effluent
CBOD5	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year	53	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	All Year	25	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	All Year	74	lb/day	WAvg Load	3/Week	Composite	Effluent
D.O.	All Year	1	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	941	#/100mL	DMax Conc	3/Week	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	3/Week	Grab	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	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Influent (Raw Sewage)

Table 6-1a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
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	0.4	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year	85	lb/day	WAvg Load	3/Week	Composite	Effluent
TSS	All Year	30	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS	All Year	64	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
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 6-1b.

Tables 6-1.a-b. Permit Limits for Pikeville STP.

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

- 4 Total Chlorine
- 18 Carbonaceous Biological Oxygen Demand (CBOD)
- 22 Settleable Solids
- 4 Ammonia
- 24 Total Suspended Solids
- 16 Suspended Solids % Removal
- 6 Carbonaceous Oxygen demand (COD)
- 1 Dissolved Oxygen
- 26 overflows
- 4 bypasses

Comments:
Operational problems due to power surges. Pretreatment Compliance Evaluation Inspection on 2/1/07: In Compliance

TN0077577 Valley View of Whitwell STP

Discharger rating: Minor
City: Whitwell
County: Marion
EFO Name: Chattanooga
Issuance Date: 5/31/06
Expiration Date: 10/31/10
Receiving Stream(s): Sequatchie River at mile 23.0
HUC-12: 060200040202
Effluent Summary: Treated domestic wastewater from Outfall 001
Treatment system: Septic tank, recirculating sand filter

SEGMENT	TN06020004001_1000
Name	Sequatchie River
Size	38.1
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Domestic Water Supply (Supporting), Industrial Water Supply (Supporting), Fish and Aquatic Life (Supporting), Recreation (Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	N/A
Sources	N/A

Table 6-2. Stream Segment Information for Valley View of Whitwell STP.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD5	All Year	30	mg/L	MAvg Conc	2/Month	Grab	Effluent
BOD5	All Year	45	mg/L	DMax Conc	2/Month	Grab	Effluent
D.O.	All Year	1	mg/L	DMin Conc	Weekly	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	2/Month	Grab	Effluent
E. coli	All Year	941	#/100mL	MAvg Ari Mean	2/Month	Grab	Effluent
Flow	All Year		MGD	MAvg Load	Weekdays	Instantaneous	Effluent
Flow	All Year		MGD	DMax Load	Weekdays	Instantaneous	Effluent
TRC	All Year	2	mg/L	DMax Conc	Weekly	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	2/Month	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	2/Month	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Weekly	Grab	Effluent

Table 6-3. Permit Limits for Valley View of Whitwell STP.

Enforcement:
NOV for late application on 9/7/05.

Comments: None

TN0021946 Dunlap STP

Discharger rating: Minor
City: Dunlap
County: Sequatchie
EFO Name: Chattanooga
Issuance Date: 3/1/06
Expiration Date: 10/31/10
Receiving Stream(s): Sequatchie River at mile 43.9
HUC-12: 060200040201
Effluent Summary: Treatment of municipal sewage from Outfall #001
Treatment system: Waste Activated Sludge to aerobic digester to land application or to dry beds to landfill

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	All Year	20	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	117	lb/day	WAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	10	mg/L	MAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	15	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	78	lb/day	MAvg Load	3/Week	Composite	Effluent
Bypass of Treatment (occurrences)	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
CBOD % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
CBOD % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
CBOD5	All Year	40	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	All Year	25	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year	194	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	All Year	35	mg/L	WAvg Conc	3/Week	Composite	Effluent
CBOD5	All Year	273	lb/day	WAvg Load	3/Week	Composite	Effluent
D.O.	All Year	1	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	941	#/100mL	DMax Conc	3/Week	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Influent (Raw Sewage)
IC25 7day *Ceriodaphnia Dubia*	All Year	8	Percent	DMin Conc	Quarterly	Composite	Effluent
IC25 7day Fathead Minnows	All Year	8	Percent	DMin Conc	Quarterly	Composite	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

Table 6-4a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
TRC	All Year	0.2	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year	312	lb/day	WAvg Load	3/Week	Composite	Effluent
TSS	All Year	40	mg/L	WAvg Conc	3/Week	Composite	Effluent
TSS	All Year	234	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year	30	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekdays	Grab	Effluent

***Table 6-4b**.*

Tables 6-4a-b. Permit Limits for Dunlap STP.

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

- 1 Total Suspended Solids
- 1 Ammonia
- 1 Settleable Solids
- 35 overflows
- 1 bypass

Enforcement:
NOV issued on June 15, 2007, for failure to meet the sampling requirements of NPDES permit.

Comments:
3/1/07 Pretreatment Compliance Evaluation Inspection: Minor deficiency.

6.4.B. Industrial Permits

TN0060399 Castle's Coin Laundry

Discharger rating: Minor
City: Whitwell
County: Marion
EFO Name: Chattanooga
Issuance Date: 5/31/05
Expiration Date: 5/31/10
Receiving Stream(s): Unnamed tributary at mile 0.9 to Big Spring Branch at mile 0.2 to the Sequatchie River at mile 22.1
HUC-12: 060200040202
Effluent Summary: Laundry wastewater through Outfall 001
Treatment system: Sand Filter

SEGMENT	TN06020004001_0200
Name	Unnamed Trib to Sequatchie River
Size	9.3
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Recreation (Supporting), Irrigation (Supporting), Fish and Aquatic Life (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	N/A
Sources	N/A

Table 6-5. Stream Segment Information for Castle's Coin Laundry.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
CBOD5	All Year	15	mg/L	DMax Conc	Quarterly	Grab	Effluent
CBOD5	All Year	10	mg/L	MAvg Conc	Quarterly	Grab	Effluent
E. coli	All Year	941	#/100mL	DMax Conc	2/Month	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	2/Month	Grab	Effluent
Flow	All Year		MGD	DMax Load	Weekly	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Weekly	Instantaneous	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Quarterly	Grab	Effluent
TRC	All Year	0.019	mg/L	DMax Conc	Weekly	Grab	Effluent
TRC	All Year	0.011	mg/L	MAvg Conc	Weekly	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Quarterly	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	Quarterly	Grab	Effluent
Temperature (°C)	All Year		°C	DMax Load	2/Month	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Month	Grab	Effluent
pH	All Year	6	SU	DMin Conc	2/Month	Grab	Effluent

Table 6-6. Permit Limits for Castle's Coin Laundry.

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

- 3 Total Chlorine

Comments:
None.

6.4.C. Water Treatment Permits

TN0078581 Pikeville Water Treatment Plant

Discharger rating: Minor
City: Pikeville
County: Bledsoe
EFO Name: Chattanooga
Issuance Date: 3/18/05
Expiration Date: 9/27/09
Receiving Stream(s): Unnamed ditch which ultimately discharges to the Sequatchie River
HUC-12: 060200040103
Effluent Summary: Filter backwash and/or sedimentation basin washdown from Outfall 001
Treatment system: Raw water pumping, polymer feed, filtration, post chlorination and high service pumping. Sludge is land applied on property approved to accept WWTP sludge.

SEGMENT	TN06020004007_1000
Name	Sequatchie River
Size	53.1
Unit	Miles
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 6-7. Stream Segment Information for Pikeville Water Treatment Plant.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Flow	All Year		MGD	DMax Load	Monthly	Instantaneous	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Monthly	Grab	Effluent
TRC	All Year	0.019	mg/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Monthly	Grab	Effluent

Table 6-8. Permit Limits for Pikeville Water Treatment Plant.

Comments:
Pikeville WTP has serious backwash filter issues.

TN0078921 Whitwell Water Plant

Discharger rating: Minor
City: Whitwell
County: Marion
EFO Name: Chattanooga
Issuance Date: 2/15/06
Expiration Date: 9/27/09
Receiving Stream(s): Sequatchie River at approximate mile 23.0
HUC-12: 060200040202
Effluent Summary: Filter backwash and/or sedimentation basin washdown from Outfall 001
Treatment system:

SEGMENT	TN06020004001_1000
Name	Sequatchie River
Size	38.1
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Domestic Water Supply (Supporting), Industrial Water Supply (Supporting), Fish and Aquatic Life (Supporting), Recreation (Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	N/A
Sources	N/A

Table 6-9. Stream Segment Information for Whitwell Water Plant.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Al (T)	All Year	10	mg/L	DMax Conc	Monthly	Grab	Effluent
Flow	All Year		MGD	DMax Load	Monthly	Instantaneous	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Monthly	Grab	Effluent
TRC	All Year	1	mg/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent

Table 6-10. Permit Limits for Whitwell Water Plant.

Comments:
None.

APPENDIX II

ID	NAME	Hazard		ID	NAME	Hazard
47004	MEADOW CREEK	S		777004	DEERHEAD	L
47006	CARMACK	2		777006	STUDER	L
47007	ABC LAKE	2		587010	MONTEREY RESERVOIR	3
47008	TWIN LAKES #1	2		587009	TN CONSOLIDATED COAL	3
47009	TWIN LAKES #2	S		317020	MURFF LAKE	S
47010	KELLEY	L		317021	B LAKE #1	S
47013	BEECHER SMITH	2		777010	HURRICANE CREEK #9	3
587005	FOSTER	3		47015	BELLE MEADE	S
587008	BUFORD MCKEE	0		777011	HAWKINS	1
777003	TAYLOR	3				

Table A2-1. Inventoried Dams in the Sequatchie River 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	207500	53.9%
Pasture/Hay	69731	18.1%
Evergreen Forest	27748	7.2%
Mixed Forest	20526	5.3%
Low Intensity Residential	15207	3.9%
Grassland/Herbaceous	12967	3.4%
Row Crops	11289	2.9%
Evergreen Shrubland	10843	2.8%
High Intensity Residential	4269	1.1%
Wetlands	2444	0.6%
High Intensity Commercial/Industrial/Transportation	1005	0.3%
Bare Rock/Sand/Clay	742	0.2%
Open Water	658	0.2%
Total	385037	100%

Table A2-2. Land Use Distribution in Sequatchie River Watershed. *Data are from Multi-Resolution Land Characterization (MRLC) derived by applying a generalized Anderson level II system to mosaics of Landsat thematic mapper images collected every five years.*

ECOREGION	REFERENCE STREAM	WATERSHED (HUC)	
Cumberland Plateau (68a)	Rock Creek (68A01)	South Fork Cumberland River	5130104
	Clear Creek (68A08)	Emory River	6010208
	Piney Creek (68A13)	Watts Bar Lake	6010201
	Mullens Creek (68A20)	Watts Bar Lake	6020001
	Daddy's Creek (68A26)	Emory River	6010208
	Island Creek (68A27)	Emory River	6010208
	Rock Creek (68A28)	Emory River	6010208
Sequatchie Valley (68b)	Crystal Creek (68B01)	Sequatchie River	6020004
	McWilliams Creek (68B02)	Sequatchie River	6020004
	Mil Branch (68B09)	Sequatchie River	6020004
Plateau Escarpment (68c)	Ellis Gap (68C12)	Middle Tennessee River (Chickamauga Lake)	6020001
	Crow Creek (68C15)	Guntersville Lake	6030001
	Crow Creek (68C20)	Guntersville Lake	6030001

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

CODE	NAME	AGENCY	AGENCY ID
33	TDEC/DNH CONDRA SWAMPS SITE	TDEC/DNH	
163	TDEC/DNH SCOTT CREEK SITE	TDEC/DNH	S.USTNHP 343
281	TDOT HALL BRANCH MITIGATION/PERMIT SITE	TDOT	
355	TDOT SR 30 MITIGATION SITE	TDOT	
374	TDOT S1A TRAM TRAIL ROAD MITIGATION/PERMIT SITE	TDOT	
401	TDOT STANDIFER BRANCH PERMIT SITE	TDOT	
481	TDOT UNNAMED TRIB TO SKILLERN CREEK PERMIT SITE	TDOT	
490	TDEC/WPC THURMAN CREEK PERMIT/MITIGATION SITE	TDEC/WPC	
491	TDEC/WPC THURMAN CREEK PERMIT/MITIGATION SITE	TDEC/WPC	
492	TDEC/WPC THURMAN CREEK PERMIT/MITIGATION SITE	TDEC/WPC	
493	TDEC/WPC THURMAN CREEK PERMIT/MITIGATION SITE	TDEC/WPC	
954	TDEC/DNH RON JONES REPORT: SEQUATCHIE CO SITE 46	TDEC/DNH	SOURCECODE F88JON01TNUS
955	TDEC/DNH RON JONES REPORT: SEQUATCHIE CO SITE 47	TDEC/DNH	SOURCECODE F88JON01TNUS
956	TDEC/DNH RON JONES REPORT: SEQUATCHIE CO SITE 48	TDEC/DNH	SOURCECODE F88JON01TNUS
2576	TWRA WALDENS RIDGE SITE	TWRA	
2577	TWRA WALDENS RIDGE SITE	TWRA	
2589	TWRA SITE	TWRA	
2714	TWRA SWAFFORD SWAMP SITE	TWRA	
2743	TVA POND 2	TDEC/DNH	
2745	TVA POND 4	TDEC/DNH	

Table A2-4. Wetland Sites in the Sequatchie River Watershed in TDEC Database. *TDEC, Tennessee Department of Environment and Conservation; 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)
Anderson Mill Creek	TN06020004001_0500	4.6
Austin Branch	TN06020004005_0200	5.3
Bowman Branch	TN06020004007_3200	2.4
Cannon Creek	TN06020004008_1000	12.8
Clark Branch	TN06020004005_0300	4.6
Clear Spring Branch	TN06020004015_0100	3.9
Cold Spring Cove Branch	TN06020004007_0500	6.4
Cookston Cave Creek	TN06020004013_0300	6.4
Coops Creek	TN06020004005_0100	12.9
Crystal Creek	TN06020004007_2300	13.4
Grayson Branch	TN06020004001_0700	5.2
Hall Branch	TN06020004015_1300	11.7
Hoge Branch	TN06020004001_1400	2.5
Lamb Creek	TN06020004005_0400	5.6
Little Sequatchie River	TN06020004015_1000	27.1
Looneys Creek	TN06020004001_0800	6.6
Mill Branch	TN06020004007_1500	8.8
Owens Spring Branch	TN06020004015_0200	2.4
Sequatchie River	TN06020004001_1000	38.1
Sequatchie River	TN06020004005_1000	23.1
Sequatchie River	TN06020004007_1000	53.1
Shelton Creek	TN06020004001_0900	4.1
Shiloh Branch	TN06020004001_1200	2.3
Standifer Branch	TN06020004001_0110	18.0
Stone Creek	TN06020004012_0200	6.5
Thurman Creek	TN06020004012_0300	2.0
Town Creek	TN06020004001_0100	4.8
Unnamed Trib to Sequatchie River	TN06020004001_0200	9.3
Unnamed Trib to Sequatchie River	TN06020004001_0300	2.0
Unnamed Trib to Sequatchie River	TN06020004001_1500	2.6
Unnamed Trib to Sequatchie River	TN06020004007_0300	6.4
Unnamed Trib to Sequatchie River	TN06020004007_1600	2.1
Unnamed Trib to Sequatchie River	TN06020004007_1700	2.4
Unnamed Trib to Sequatchie River	TN06020004007_1800	2.4
Unnamed Trib to Sequatchie River	TN06020004007_1900	2.1
Unnamed Trib to Sequatchie River	TN06020004007_2100	1.9
Unnamed Trib to Sequatchie River	TN06020004007_2500	1.1
Unnamed Trib to Sequatchie River	TN06020004007_2600	1.0

Table A3-1a.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Unnamed Trib to Sequatchie River	TN06020004007_2700	1.0
Unnamed Trib to Sequatchie River	TN06020004007_2900	1.2
Unnamed Trib to Sequatchie River	TN06020004007_3100	1.0
Unnamed Trib to Sequatchie River	TN06020004007_3300	5.1
Welch Branch	TN06020004005_0510	3.8

Table A3-1b.

Table A3-1a-b. Streams Fully Supporting the Designated Use of Recreation in the Sequatchie River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Browns Creek	TN06020004007_0630	2.8
Daniel Creek	TN06020004014_0100	2.2
Hall Creek	TN06020004007_0400	10.0
Little Creek	TN06020004007_0600	8.7
Maise Creek	TN06020004008_0200	4.7
Manning Springs	TN06020004007_1200	1.4
McWilliams Creek	TN06020004005_0500	11.2
Peck Branch	TN06020004001_1300	2.4
Skillern Creek	TN06020004007_2200	10.6
Stephens Branch	TN06020004007_0900	8.8
Swafford Branch	TN06020004007_0800	6.5
Unnamed Trib to Sequatchie River	TN06020004001_1100	1.7
Unnamed Trib to Sequatchie River	TN06020004007_1400	1.4
Unnamed Trib to Sequatchie River	TN06020004007_2800	2.3
Unnamed Trib to Shelton Creek	TN06020004001_0910	6.3
Unnamed Trib. To Sequatchie River	TN06020004001_0600	2.0

Table A3-2. Streams Not Supporting the Designated Use of Recreation in the Sequatchie River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Big Brush Creek	TN06020004009_1000	9.3
Big Brush Creek	TN06020004009_2000	12.4
Blair Creek	TN06020004009_0600	4.4
Clifty Creek	TN06020004015_0800	7.9
Dixon Creek	TN06020004015_0400	9.6
Flatrock Creek	TN06020004009_0700	4.9
Flatwood Branch	TN06020004007_0200	12.4
Glady Fork	TN06020004009_0500	5.0
Grassy Cove Creek	TN06020004007_1100	16.0
Grays Creek	TN06020004015_1100	9.0
Griffith Creek	TN06020004014_1000	15.3
Hellhole Branch	TN06020004007_0620	7.3
Hendrix Creek	TN06020004001_0400	9.7
Hicks Creek	TN06020004013_1000	6.0
Johnson Creek	TN06020004015_0700	12.6
Johnson Mill Creek	TN06020004012_0210	6.2
Kelley Creek	TN06020004013_0100	7.0
Kelly Creek	TN06020004009_0300	4.1
Little Brush Creek	TN06020004009_0100	20.9
Little Indian Creek	TN06020004015_0500	13.3
Long Branch	TN06020004009_0800	4.2
Long Fork	TN06020004009_0400	7.5
Mill Creek	TN06020004015_0600	7.4
Misc Trib to Sequatchie River	TN06020004001_0999	33.3
Misc Tribs to Big Brush Creek	TN06020004009_0999	13.0
Misc Tribs to Little Sequatchie River	TN06020004015_0999	14.8
Misc Tribs to Sequatchie River	TN06020004005_0999	23.5
Misc Tribs to Sequatchie River	TN06020004007_0999	48.5
Oxier Branch	TN06020004007_1300	4.3
Peter Cove Creek	TN06020004015_0900	15.9
Pocket Creek	TN06020004015_1200	27.3
Pond Creek	TN06020004008_0100	5.8
Reynolds Creek	TN06020004009_0200	4.6
Rocky Branch	TN06020004007_0100	9.6
Rocky Branch	TN06020004007_0610	5.4
Rogers Branch	TN06020004009_0900	4.3
Sawmill Creek	TN06020004015_0300	5.2
Sewanee Creek	TN06020004015_0710	18.9
Stone Coalbank Creek	TN06020004013_0200	5.6
Rocky Branch	TN06020004007_0610	5.4
Rogers Branch	TN06020004009_0900	4.3

Table A3-3a.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Sawmill Creek	TN06020004015_0300	5.2
Sewanee Creek	TN06020004015_0710	18.9
Stone Coalbank Creek	TN06020004013_0200	5.6
Taylor Branch	TN06020004007_0700	1.8
Unnamed Trib to Glady Fork	TN06020004009_0510	1.5
Unnamed Trib to Sequatchie River	TN06020004007_2400	5.2
Unnamed Trib to Stone Coalbank Creek	TN06020004013_0210	1.6
Unnamed Trib to Woodcock Creek	TN06020004012_0100	1.7
Woodcock Creek	TN06020004012_1000	22.1

Table A3-3b.

Table A3-3a-b. Streams Not Assessed for the Designated Use of Recreation in the Sequatchie River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Anderson Mill Creek	TN06020004001_0500	4.6
Bowman Branch	TN06020004007_3200	2.4
Browns Creek	TN06020004007_0630	2.8
Cannon Creek	TN06020004008_1000	12.8
Cold Spring Cove Branch	TN06020004007_0500	6.4
Cookston Cave Creek	TN06020004013_0300	6.4
Coops Creek	TN06020004005_0100	12.9
Crystal Creek	TN06020004007_2300	13.4
Flatwood Branch	TN06020004007_0200	12.4
Grayson Branch	TN06020004001_0700	5.2
Griffith Creek	TN06020004014_1000	15.3
Hall Branch	TN06020004015_1300	11.7
Hall Creek	TN06020004007_0400	10.0
Hicks Creek	TN06020004013_1000	6.0
Johnson Mill Creek	TN06020004012_0210	6.2
Kelley Creek	TN06020004013_0100	7.0
Lamb Creek	TN06020004005_0400	5.6
Little Brush Creek	TN06020004009_0100	20.9
Little Creek	TN06020004007_0600	8.7
Little Sequatchie River	TN06020004015_1000	27.1
Looneys Creek	TN06020004001_0800	6.6
Maise Creek	TN06020004008_0200	4.7
McWilliams Creek	TN06020004005_0500	11.2
Mill Branch	TN06020004007_1500	8.8
Rogers Branch	TN06020004009_0900	4.3

Table A3-4a.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Sequatchie River	TN06020004001_1000	38.1
Sequatchie River	TN06020004005_1000	23.1
Sequatchie River	TN06020004007_1000	53.1
Shelton Creek	TN06020004001_0900	4.1
Skillern Creek	TN06020004007_2200	10.6
Stephens Branch	TN06020004007_0900	8.8
Stone Creek	TN06020004012_0200	6.5
Thurman Creek	TN06020004012_0300	2.0
Town Creek	TN06020004001_0100	4.8
Unnamed Trib to Sequatchie River	TN06020004001_0200	9.3
Unnamed Trib to Stone Coalbank Creek	TN06020004013_0210	1.6
Welch Branch	TN06020004005_0510	3.8
Woodcock Creek	TN06020004012_1000	22.1

Table A3-4b.

Tables A3-4a-b. Streams Fully Supporting the Designated Use of Fish & Aquatic life in the Sequatchie River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Big Brush Creek	TN06020004009_1000	9.3
Big Brush Creek	TN06020004009_2000	12.4
Glady Fork	TN06020004009_0500	5.0
Standifer Branch	TN06020004001_0110	18.0
Unnamed Trib to Glady Fork	TN06020004009_0510	1.5
Unnamed Trib to Woodcock Creek	TN06020004012_0100	1.7

Table A3-5. Streams Not Supporting the Designated Use of Fish & Aquatic life in the Sequatchie River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Austin Branch	TN06020004005_0200	5.3
Blair Creek	TN06020004009_0600	4.4
Clark Branch	TN06020004005_0300	4.6
Clear Spring Branch	TN06020004015_0100	3.9
Clifty Creek	TN06020004015_0800	7.9
Daniel Creek	TN06020004014_0100	2.2
Dixon Creek	TN06020004015_0400	9.6
Flatrock Creek	TN06020004009_0700	4.9
Grassy Cove Creek	TN06020004007_1100	16.0
Grays Creek	TN06020004015_1100	9.0

Table A3-6a.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Hellhole Branch	TN06020004007_0620	7.3
Hendrix Creek	TN06020004001_0400	9.7
Hoge Branch	TN06020004001_1400	2.5
Johnson Creek	TN06020004015_0700	12.6
Kelly Creek	TN06020004009_0300	4.1
Little Indian Creek	TN06020004015_0500	13.3
Long Branch	TN06020004009_0800	4.2
Long Fork	TN06020004009_0400	7.5
Manning Springs	TN06020004007_1200	1.4
Mill Creek	TN06020004015_0600	7.4
Misc Trib to Sequatchie River	TN06020004001_0999	33.3
Misc Tribs to Big Brush Creek	TN06020004009_0999	13.0
Misc Tribs to Little Sequatchie River	TN06020004015_0999	14.8
Misc Tribs to Sequatchie River	TN06020004005_0999	23.5
Misc Tribs to Sequatchie River	TN06020004007_0999	48.5
Owens Spring Branch	TN06020004015_0200	2.4
Oxier Branch	TN06020004007_1300	4.3
Peck Branch	TN06020004001_1300	2.4
Peter Cove Creek	TN06020004015_0900	15.9
Pocket Creek	TN06020004015_1200	27.3
Pond Creek	TN06020004008_0100	5.8
Reynolds Creek	TN06020004009_0200	4.6
Rocky Branch	TN06020004007_0100	9.6
Rocky Branch	TN06020004007_0610	5.4
Sawmill Creek	TN06020004015_0300	5.2
Sewanee Creek	TN06020004015_0710	18.9
Shiloh Branch	TN06020004001_1200	2.3
Stone Coalbank Creek	TN06020004013_0200	5.6
Swafford Branch	TN06020004007_0800	6.5
Taylor Branch	TN06020004007_0700	1.8
Unnamed Trib to Sequatchie River	TN06020004001_0300	2.0
Unnamed Trib to Sequatchie River	TN06020004001_1100	1.7
Unnamed Trib to Sequatchie River	TN06020004001_1500	2.6
Unnamed Trib to Sequatchie River	TN06020004007_0300	6.4
Unnamed Trib to Sequatchie River	TN06020004007_1400	1.4
Unnamed Trib to Sequatchie River	TN06020004007_1600	2.1
Unnamed Trib to Sequatchie River	TN06020004007_1700	2.4
Unnamed Trib to Sequatchie River	TN06020004007_1800	2.4
Unnamed Trib to Sequatchie River	TN06020004007_1900	2.1
Unnamed Trib to Sequatchie River	TN06020004007_2100	1.9
Unnamed Trib to Sequatchie River	TN06020004007_2400	5.2
Unnamed Trib to Sequatchie River	TN06020004007_2500	1.1

Table A3-6b.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Unnamed Trib to Sequatchie River	TN06020004007_2600	1.0
Unnamed Trib to Sequatchie River	TN06020004007_2700	1.0
Unnamed Trib to Sequatchie River	TN06020004007_2800	2.3
Unnamed Trib to Sequatchie River	TN06020004007_2900	1.2
Unnamed Trib to Sequatchie River	TN06020004007_3100	1.0
Unnamed Trib to Sequatchie River	TN06020004007_3300	5.1
Unnamed Trib to Shelton Creek	TN06020004001_0910	6.3
Unnamed Trib. To Sequatchie River	TN06020004001_0600	2.0

Table A3-6c.

Tables A3-6a-c. Streams Not Assessed for the Designated Use of Fish & Aquatic Life in the Sequatchie River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Browns Creek	TN06020004007_0630	2.8
Daniel Creek	TN06020004014_0100	2.2
Hall Creek	TN06020004007_0400	10.0
Little Creek	TN06020004007_0600	8.7
Maise Creek	TN06020004008_0200	4.7
Manning Springs	TN06020004007_1200	1.4
McWilliams Creek	TN06020004005_0500	11.2
Peck Branch	TN06020004001_1300	2.4
Skillern Creek	TN06020004007_2200	10.6
Stephens Branch	TN06020004007_0900	8.8
Swafford Branch	TN06020004007_0800	6.5
Unnamed Trib to Sequatchie River	TN06020004001_1100	1.7
Unnamed Trib to Sequatchie River	TN06020004007_1400	1.4
Unnamed Trib to Sequatchie River	TN06020004007_2800	2.3
Unnamed Trib to Shelton Creek	TN06020004001_0910	6.3
Unnamed Trib. To Sequatchie River	TN06020004001_0600	2.0

Table A3-7. Stream Segments Impaired Due to Escherichia coli in the Sequatchie River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Big Brush Creek	TN06020004009_1000	9.3
Big Brush Creek	TN06020004009_2000	12.4
Glady Fork	TN06020004009_0500	5.0
Standifer Branch	TN06020004001_0110	18.0
Unnamed Trib to Glady Fork	TN06020004009_0510	1.5

Table A3-8. Stream Segments Impaired Due to Siltation in the Sequatchie River Watershed.

WATERBODY ID	WATERBODY NAME	TOTAL SEGMENT MILES IMPAIRED	HUC-12
TN06020004007_1100	Grassy Cove Creek	16.00	060200040101
TN06020004007_1000	Sequatchie River	53.10	060200040102
TN06020004007_1000	Sequatchie River	53.10	060200040103
TN06020004007_1000	Sequatchie River	53.10	060200040104
TN06020004005_1000	Sequatchie River	23.10	060200040105
TN06020004007_1000	Sequatchie River	53.10	060200040105
TN06020004001_2000	Sequatchie River	15.16	060200040201
TN06020004005_1000	Sequatchie River	23.10	060200040201
TN06020004001_2000	Sequatchie River	15.16	060200040202
TN06020004001_1000	Sequatchie River	22.70	060200040203

Table A3-9. Streams Added to the 2008 303(d) List in the Sequatchie River Watershed. *For more information see Tennessee's 2008 303(d) List at: http://www.state.tn.us/environment/wpc/publications/2008_303d.pdf .*

WATERBODY ID	WATERBODY NAME	TOTAL SEGMENT MILES IMPAIRED	CAUSE/POLLUTANT	HUC-12
TN06020004012_0100	UT to Woodcock Creek	1.7	Iron, pH	060200040201

Table A3-10. Streams (or pollutants) Delisted Since the 2006 303(d) List in the Sequatchie River Watershed*. For more information see Tennessee's 2008 303(d) List at: http://www.state.tn.us/environment/wpc/publications/2008_303d.pdf .*

WATERBODY	DESCRIPTION	BASIS FOR	HUC-12
Big Brush Creek	From Long Branch to headwaters.	State endangered crayfish, Cambarus pristinus.	060200040106
Bird Fork	From Long Fork to headwaters.	State endangered crayfish, Cambarus pristinus.	060200040106
Bridge Creek	Portion in Chimneys State Natural Area.	Chimneys State Natural Area, state threatened Roundleaf Shadbush.	060200040302
Crystal Creek	From Sequatchie River to headwaters.	Exceptional biological diversity. WPC ecoregion reference stream for 68b.	060200040104
Flatrock Branch	From Big Brush Creek to headwaters.	State endangered crayfish, Cambarus pristinus.	060200040106
Glady Fork	From UT at RM 2.3 to headwaters.	State endangered crayfish, Cambarus pristinus.	060200040106
Haley Branch	Portion in Prentice Cooper State Forest.	Prentice Cooper State Forest	060200040203
Little Sequatchie River	From Sequatchie River to Owen Spring Branch	State endangered Anthony's River Snail	060200040303
Long Fork	From Big Brush Creek to headwaters.	State endangered crayfish, Cambarus pristinus.	060200040106
Long Fork UT	Headwater tributary from Long Fork to origin.	State endangered Rose Pogonia and White Fringeless Orchid.	060200040106
McWilliams Creek	From Sequatchie River to origin including headwaters.	Exceptional biological diversity. WPC ecoregion reference stream for 68b. State threatened Roundleaf Shadbush.	060200040105
Mill Branch	From Sequatchie River to headwaters.	WPC ecoregion reference stream for 68b.	060200040102
Owens Spring UT	From Owen Spring Branch to origin.	Federal endangered Royal Snail. Sequatchie Cave Natural Area.	060200040303
Pocket Creek	Portion in Chimneys State Natural Area.	Chimneys State Natural Area. State threatened Roundleaf Shadbush.	060200040302
Prentice Cooper SF UT*	Portion in Prentice Cooper State Forest.	Prentice Cooper State Forest	060200040203
Sequatchie River	From Guntersville Lake to confluence of Woodcock Creek.	Federal endangered Anthony's River Snail and threatened Snail Darter.	060200040201
Sequatchie River	From Guntersville Lake to confluence of Woodcock Creek.	Federal endangered Anthony's River Snail and threatened Snail Darter.	060200040202
Sequatchie River	From Guntersville Lake to confluence of Woodcock Creek.	Federal endangered Anthony's River Snail and threatened Snail Darter.	060200040203
Shiloh Branch	Portion in Prentice Cooper State Forest.	Prentice Cooper State Forest	060200040203
Town Creek	From Sequatchie River to headwaters.	Federal endangered Royal Snail.	060200040203

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

APPENDIX IV

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0101	0102	0103	0104	0105
Bare Rock/Sand/Clay	8	73	8	4	16
Deciduous Forest	5,281	18,282	14,697	11,252	20,558
Developed Open Space	116	1,506	1,625	718	1,876
Emergent Herbaceous Wetlands					2
Evergreen Forest	24	655	837	779	4,556
Grassland/Herbaceous	581	1,176	593	316	788
High Intensity Development		1	38		
Low Intensity Development	48	211	509	65	258
Medium Intensity Development		15	141		77
Mixed Forest	313	1,246	1,212	776	2,334
Open Water	2	68	59	37	24
Pasture/Hay	2,218	9,394	9,332	5,844	10,392
Row Crops		846	2,243	908	1,026
Shrub/Scrub	2	389	870	288	644
Woody Wetlands		220	73	35	202
Total	8,593	34,082	32,237	21,022	42,753

Table A4-1a.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0106	0201	0202	0203	0204
Bare Rock/Sand/Clay	326	89	7	23	80
Deciduous Forest	21,903	22,180	24,243	7,424	6,506
Developed Open Space	1,069	1,898	2,289	1,346	685
Emergent Herbaceous Wetlands	1	13	19	35	
Evergreen Forest	9,834	1,775	1,948	589	616
Grassland/Herbaceous	3,229	1,281	1,111	389	485
High Intensity Development	28	55	4	14	27
Low Intensity Development	547	588	661	285	599
Medium Intensity Development	113	150	114	71	98
Mixed Forest	3,168	1,930	2,517	1,009	564
Open Water	18	95	88	195	28
Pasture/Hay	2,526	7,967	9,197	5,373	1,616
Row Crops	392	1,257	1,879	1,005	258
Shrub/Scrub	1,636	722	1,268	709	415
Woody Wetlands	48	234	421	842	76
Total	44,838	40,234	45,766	19,309	12,053

Table A4-1b.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)		
	0301	0302	0303
Bare Rock/Sand/Clay	101	1	6
Deciduous Forest	28,562	7,377	19,234
Developed Open Space	836	193	1,051
Emergent Herbaceous Wetlands	3	2	
Evergreen Forest	3,169	545	2,420
Grassland/Herbaceous	1,478	401	1,140
High Intensity Development	4		4
Low Intensity Development	137	126	236
Medium Intensity Development	32	10	9
Mixed Forest	2,832	674	1,951
Open Water	30		16
Pasture/Hay	1,844	495	3,533
Row Crops	347	130	997
Shrub/Scrub	2,494	143	1,264
Woody Wetlands	46	8	239
Total	41,915	10,105	32,100

Table A4-1c.

Tables A4-1a-c. Land Use Distribution in the Sequatchie River 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
03570650	Sequatchie River	060200040105				
03571000	Sequatchie River	060200040202	402.00	29.29	32.15	26.74
03571500	Little Sequatchie River	060200040303				

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

AGENCY	STATION	LOCATION	HUC 12
TDEC	GCOVE001.1CU	Grassy Cove Creek	060200040101
TDEC	BROWN000.9BL	Browns Creek @ RM 0.9	060200040102
TDEC	ECO68B09	Mill Branch	060200040102
TDEC	SEQUA109.0CU	Sequatchie River @ RM 109.0	060200040102
TVA	475791	Sequatchie River @ RM 80.3	060200040103
TDEC	CSCOV000.5BL	Cold Spring Cove Branch @ RM 0.5	060200040103
EPA Environmental Resource Lab	2C077024L	Crystal Creek	060200040104
EPA Environmental Resource Lab	2C077024U	Crystal Creek	060200040104
TDEC	CRYST1T0.2BL	UT @ RM 0.2 to Crystal Creek	060200040104
TDEC	CRYST2T0.4BL	UT @ RM 0.4 to Crystal Creek	060200040104
TDEC	ECO68B01	Crystal Creek	060200040104
TDEC	ROARI000.2RH	Roaring Creek @ RM 0.2	060200040104
EPA Environmental Resource Lab	2C077023L	Cannon Creek	060200040105
EPA Environmental Resource Lab	2C077023U	Cannon Creek	060200040105
TVA	476068	McWilliams Creek @ RM 0.40	060200040105
TVA	476069	McWilliams Creek @ RM 3.86	060200040105
TVA	477476	Sequatchie River @ RM 51.2	060200040105
TVA	477677	McWilliams Creek	060200040105
TVA	477678	McWilliams Creek	060200040105
TVA	477680	Sequatchie River @ RM 56.3	060200040105
TDEC	AUSTI000.2BL	Austin Branch @ RM 0.2	060200040105
TDEC	BOWMA000.4BL	Bowman Branch @ RM 0.4	060200040105
TDEC	CANNO000.3BL	Cannon Creek @ RM 0.3	060200040105
TDEC	CLARK000.0BL	Clark Creek	060200040105
TDEC	ECO68B02	McWilliams Creek	060200040105
EPA Environmental Resource Lab	2C077022L	Glady Fork	060200040106
EPA Environmental Resource Lab	2C077022U	Glady Fork	060200040106
TVA	476066	Big Brush Creek @ RM 2.40	060200040106
TVA	476067	Big Brush Creek @ RM 4.18	060200040106
TVA	477676	Horn Branch	060200040106
TVA	477679	Reynolds Creek	060200040106
TVA	477682	Big Brush Creek	060200040106
TDEC	BBRUS001.9SE	Big Brush Creek @ RM 1.9	060200040106
TDEC	BBRUS012.3SE	Big Brush Creek @ RM 12.3	060200040106
TDEC	BBRUS014.0SE	Big Brush Creek @ RM 14.0	060200040106
TDEC	BBRUS016.2SE	Big Brush Creek @ RM 16.2	060200040106
TDEC	BBRUS017.0SE	Big Brush Creek @ RM 17.0	060200040106

Table A4-4a.

AGENCY	STATION	LOCATION	HUC 12
TDEC	BBRUS018.0SE	Big Brush Creek @ RM 18.0	060200040106
TDEC	BBRUS018.1SE	Big Brush Creek @ RM 18.1	060200040106
TDEC	BIGBRUSH014.0	Big Brush Creek @ RM 14.0	060200040106
TDEC	GLADY001.4SE	Glady Fork @ RM 1.4	060200040106
TDEC	GLADY1T0.1SE	UT @ RM 0.1 to Glady Fork	060200040106
EPA National Aquatic Resource Survey	OWW04440-0174	Long Fork	060200040106
TVA	475790	Sequatchie River @ RM 44.7	060200040201
TVA	477449	Sequatchie River @ RM 41.65	060200040201
TVA	477450	Sequatchie River @ RM 37.95	060200040201
TVA	477451	Sequatchie River @ RM 35.6	060200040201
TDEC	AMILL000.4SE	Anderson Mill Creek @ RM 0.4	060200040201
TDEC	COOPS000.7SE	Coops Creek @ 0.7	060200040201
TDEC	WOODC006.1SE	Woodcock Creek @ RM 6.1	060200040201
TDEC	WOODC1T0.2SE	UT to Woodcock Creek	060200040201
Office of Surface Mining	4715301S01	UT to Kelly Creek	060200040202
TVA	475789	Sequatchie River @ RM 25.1	060200040202
TVA	476043	Sequatchie River @ RM 23.1	060200040202
TDEC	CCAVE000.2SE	Cookston Cave Creek @ RM 0.2	060200040202
TDEC	DANIE000.5MI	Daniel Creek @ RM 0.5	060200040202
TDEC	2375	Sequatchie River @ RM 6.3	060200040203
TVA	475355	Sequatchie River @ RM 0.01	060200040203
TVA	475887	Sequatchie River @ RM 0.6	060200040203
TVA	476986	Sequatchie River @ RM 7.0	060200040203
TVA	477026	Sequatchie River @ RM 7.1	060200040203
TVA	477057	Sequatchie River @ RM 0.2	060200040203
TVA	477177	Sequatchie River @ RM 6.3	060200040203
TVA	477525	Sequatchie River @ RM 6.9	060200040203
Office of Surface Mining	4706101S01	UT to Denny Cove Creek	060200040301
Office of Surface Mining	4706101S02	UT to Denny Cove Creek	060200040301
Office of Surface Mining	4711501S01	Bee Branch	060200040301
TDEC	GRAYSCRIS01	Grays Creek @ RM 4.4	060200040301
TDEC	GRAYSCRIS02	Grays Creek @ RM 5.4	060200040301
Office of Surface Mining	4711501S02	Johns Branch	060200040302
TVA	475371	Tennessee River @ RM 431.5	060200040303
TVA	475792	Little Sequatchie River @ RM 4.9	060200040303
TDEC	CSPRI001.0MI	Clear Spring Branch @ RM 1.0	060200040303

Table A4-4b.

Tables A4-4a-b. STORET Water Quality Monitoring Stations in the Sequatchie River Watershed*. TDECWPC, Tennessee Department of Environment and Conservation Division of Water Pollution Control; UT, Unnamed Tributary.*

PERMIT NUMBER	COUNTY	DESCRIPTION	WATERBODY	HUC-12
NR0601.088	Bledsoe	Minor Road Crossings	Flatwood Branch	060200040103
NRS02.480	Bledsoe	Proposed Gas Pipeline	Sequatchie River, Skillern Creek, Cove Branch, & Hall Creek	060200040103
NR0701.016	Sequatchie	Stream Crossing	UT to Sequatchie River	060200040105
NRS02.452	Van Buren	Culvert Extension	Rocky River	060200040106
NRS02.452C	Van Buren	Culvert Extension	Wetland	060200040106
NRS02.452D	Van Buren	Culvert Extension	Glady Fork Creek	060200040106
NRS06.022	Sequatchie	Pond Construction	Glady Fork	060200040106
NRS02.452B	Van Buren	Culvert Extension	Samples Fork	060200040201
NRS03.095	Sequatchie	Bridges and Approaches	Coops Creek	060200040201
NRS06.175	Marion	Stream Encapsulation	UT to Sequatchie River	060200040202
NRS06.175b	Marion	Stream Encapsulation	UT to Sequatchie River	060200040202
NRS06.175c	Marion	Stream Encapsulation	UT	060200040202
NRS06.175d	Marion	Stream Encapsulation	UT	060200040202
NRS06.175e	Marion	Stream Encapsulation	UT	060200040202
NRS02.425	Marion	Water Line Crossing	Sequatchie River, Standifer Branch, & UTs	060200040204

Table A4-5. ARAPs (Aquatic Resource Alteration Permit) issued June 20002 through June 2007 in the Sequatchie River Watershed. UT, Unnamed Tributary.

PERMIT NUMBER	PERMITTEE	COUNTY	LIVESTOCK	WATERBODY	HUC-12
TNA000050	A & L Farms - South	Marion	Poultry	Looney's Creek to Sequatchie River	060200040202
TNA000061	B & W Taylor Farms	Marion	Poultry	Sequatchie River	060200040202
TNA000062	Hudson Poultry Farm	Marion	Poultry	UT & Grayson Branch to Sequatchie River	060200040202
TNA000075	A & L Farm	Marion	Poultry	UT to Looneys Creek to Sequatchie River	060200040202
TNA000181	Steven O'Neal	Marion	Poultry	Sequatchie River	060200040202
TNA000209	Thomas E. Richards	Marion	Poultry	UT to Sequatchie River	060200040202
TNA000215	Greg Taylor Poultry Farm	Marion	Poultry	UT to Sequatchie River	060200040203

Table A4-6. CAFO (Concentrated Animal Feed Operation) Permittees in the Sequatchie River Watershed. UT, Unnamed Tributary

PERMIT NUMBER	COUNTY	PERMITTEE:DESCRIPTION	AREA	WATERYBODY	HUC-12
TNR110872	Bledsoe	AutoZone, Inc.: Building and Parking Area	1.25	UT to Sequatchie River	060200040103
TNR111042	Bledsoe	North Bledsoe Utility District: Water Line Installation	5.00	UT to Sequatchie River	060200040103
TNR111048	Bledsoe	JDL Realty: Hawk's Bluff Subdivision	2.00	Flatwood Branch, Glade Creek, & Cane Creek	060200040103
TNR111237	Sequatchie	City of Dunlap: Water Line Extension	40.00	Sequatchie River & UTs	060200040105
TNR110810	Sequatchie	Wolford Development, Inc.: Wal Mart	16.75	Big Brush Creek	060200040106
TNR110836	Sequatchie	Wolford Development Inc.: Wal Mart	16.75	Big Brush Creek	060200040106
TNR110931	Sequatchie	Rusty Grant: Grant Farm	4.00	Big Brush Creek	060200040106
TNR110980	Sequatchie	Cooperative Response Center, Inc.: Cooperative Response Center	2.62	Big Brush Creek	060200040106
TNR111283	Sequatchie	James Mosley: Brush Creek Acres Subdivision	50.00	Big Brush Creek	060200040106
TNR190589	Sequatchie	TVA: Switching Station	3.00	Little Brush Creek	060200040106
TNR111015	Sequatchie	Sequatchie County Board of Education: School Renovations	2.75	Cordell Lane Branch	060200040201
TNR111247	Sequatchie	Gerald Gann: Rivers Edge Estates	32.00	Sequatchie River	060200040201
TNR111271	Sequatchie	Outpost Centers, International: Subdivision	16.50	Woodcock Creek	060200040201
TNR110772	Marion	Steven O'Neal: Steven O'Neal Farm	4.90	UT to Sequatchie River	060200040202
TNR111134	Hamilton	Marion County Board of Education: Whitwell Midddle School	16.85	UT to Sequatchie River	060200040202
TNR111288	Marion	Greg Taylor: Poultry Farm	4.00	UT to Sequatchie River	060200040203
TNR111233	Marion	Robert Van Sant: Jasper CVS	2.50	Standifer Branch	060200040204

Table A4-7. CGPs (Construction General Permit) issued June 2002 through June 2007 in the Sequatchie River Watershed. Area, acres of property associated with construction activity; UT, Unnamed Tributary.

PERMIT NUMBER	PERMITTEE	SIC	SIC NAME	WATERBODY	HUC-12
TN0070866	Bledsoe County Hwy. Dept. (County Quarry)	1422	Crushed & Broken Limestone	UT to Sequatchie River	060200040103
TN0071331	Dunlap Stone, Inc. (Plant #3)	1422	Crushed & Broken Limestone	UT to Skillern Creek	060200040103
TN0042650	TN Consolidated Coal Company (Lamb Gulf #1)	1222	Bituminous Coal Underground Mining	Lamb Creek	060200040105
TN0050181	TN Consolidated Coal Company (Lamb Gulf Rock Disposal)	1221	Bituminous Coal & Lignite Surface Mining	Lamb Creek	060200040105
TN0066257	Dunlap Stone, Inc. (Plateau Sand Site)	1442	Construction Sand &Gravel	UT to Henson Creek	060200040105
TN0054127	LCC Tennessee, LLC (Glady Fork Mine)	1221	Bituminous Coal & Lignite Surface Mining	Glady Fork, WWC to Spring Branch, WWC to UT to Rocky River	060200040106
TN0054151	LCC Tennessee, LLC (Big Brush Creek Mine Areas 1 & 2)	1221	Bituminous Coal & Lignite Surface Mining	Glady Fork & Big Brush Creek	060200040106
TN0062782	LCC Tennessee, LLC (Pine Ridge East Mine)	1221	Bituminous Coal & Lignite Surface Mining	Big Brush Creek	060200040106
TN0052922	TN Consolidated Coal Company (Mine # 50)	1222	Bituminous Coal Underground Mining	Mosley Creek	060200040201
TN0054054	LCC Tennessee, LLC (Tipple 1)	1221	Bituminous Coal & Lignite Surface Mining	Stone Creek	060200040201
TN0065811	Dunlap Stone, Inc. (Quarry #1)	1422	Crushed & Broken Limestone	Johnson Mill Creek	060200040201
TN0048887	TN Consolidated Coal Company (Mine #34)	1222	Bituminous Coal Underground Mining	Hendrix Creek	060200040202
TN0048992	TN Consolidated Coal Company (Kelley Creek Rock Disposal Area)	1221	Bituminous Coal & Lignite Surface Mining	Kelley Creek	060200040202
TN0049565	TN Consolidated Coal Company (Morganville Rock Disposal Area)	1221	Bituminous Coal & Lignite Surface Mining	Hendrix Creek	060200040202
TN0050423	TN Consolidated Coal Company (Poor Fork Surface Mine 1)	1221	Bituminous Coal & Lignite Surface Mining	Poor Fork & Kelley Creek	060200040202
TN0051331	TN Consolidated Coal Company (Deep Mine #42)	1222	Bituminous Coal Underground Mining	Stone Coalbank Creek	060200040202

Table A4-8a.

PERMIT NUMBER	PERMITTEE	SIC	SIC NAME	WATERBODY	HUC-12
TN0051497	TN Consolidated Coal Company (Mine #45)	1222	Bituminous Coal Underground Mining	Hendrix Creek	060200040202
TN0051501	TN Consolidated Coal Company (Daus Mountain Strip Mine #1)	1221	Bituminous Coal & Lignite Surface Mining	Kelley Creek	060200040202
TN0051861	TN Consolidated Coal Company (Mine #15)	1222	Bituminous Coal Underground Mining	Stone Coalbank Creek	060200040202
TN0052108	TN Consolidated Coal Company (Mine #23)	1222	Bituminous Coal Underground Mining	Kelley Creek	060200040202
TN0052647	TN Consolidated Coal Company (Mine #41)	1221	Bituminous Coal & Lignite Surface Mining	Sourwood Creek	060200040202
TN0052655	TN Consolidated Coal Company (Mine #47)	1222	Bituminous Coal Underground Mining	Kelley Creek	060200040202
TN0052914	TN Consolidated Coal Company (Kelley Creek #1)	1221	Bituminous Coal & Lignite Surface Mining	Kelley Creek	060200040202
TN0053741	TN Consolidated Coal Company (Deep Mine #79)	1222	Bituminous Coal Underground Mining	UT to Stone Coalbank Creek	060200040202
TN0053929	TN Consolidated Coal Company (Morganville Strip Mine #2)	1221 & 1222	Bituminous Coal & Lignite Surface Mining & Bituminous Coal Underground Mining	Hendrix Creek	060200040202
TN0054038	TN Consolidated Coal Company Daus Mountain Strip Mine #2)	1221	Bituminous Coal & Lignite Surface Mining	Kelley Creek	060200040202
TN0054321	TN Consolidated Coal Company (Morganville Strip Mine 3)	1221	Bituminous Coal & Lignite Surface Mining	Robinson Branch	060200040202
TN0054402	TN Consolidated Coal Company (Mines #44 & 52)	1221	Bituminous Coal & Lignite Surface Mining	Griffith Creek	060200040202
TN0063002	TN Consolidated Coal Company (Lane Cove Strip Mine 1)	1221	Bituminous Coal & Lignite Surface Mining	Stone Coalbank Ceek and Hicks Creek	060200040202
TN0063088	TN Consolidated Coal Company (Mine #46)	1222	Bituminous Coal Underground Mining	Kelley Creek	060200040202
TN0063410	TN Consolidated Coal Company (Mine #26)	1222	Bituminous Coal Underground Mining	Griffith Creek	060200040202

Table A4-8b.

PERMIT NUMBER	PERMITTEE	SIC	SIC NAME	WATERBODY	HUC-12
TN0063690	TN Consolidated Coal Company (Kelley Creek Strip Mine #2)	1221	Bituminous Coal & Lignite Surface Mining	Kelley Creek and Poor Fork	060200040202
TN0071170	TN Consolidated Coal Company (Morganville Strip Mine #4)	1221	Bituminous Coal & Lignite Surface Mining	Griffith Creek	060200040202
TN0071935	TN Consolidated Coal Company (Kelley Creek Strip Mine #3)	1221	Bituminous Coal & Lignite Surface Mining	Kelley Creek	060200040202
TN0076228	Monteagle Sand, LLC (Sand Processing Plant & Quarry)	1442	Construction Sand & Gravel	UT to Cove Creek	060200040203
TN0065803	Dunlap Stone, Inc. (Quarry #2)	1422	Crushed & Broken Limestone	Standifer Branch	060200040204
TN0052132	TN Consolidated Coal Company (Preparation Plant)	1221	Bituminous Coal & Lignite Surface Mining	UT to Gray's Creek & Gray's Creek	060200040301
TN0066371	TN Consolidated Coal Company (Grays Creek Strip Mine #1)	1221	Bituminous Coal & Lignite Surface Mining	Grays Creek	060200040301
TN0070971	TN Consolidated Coal Company (Bearpen Strip Mine #1)	1221	Bituminous Coal & Lignite Surface Mining	UT to Laurel Creek	060200040301
TN0079448	Custom Stone, LLC (Lusk Gap Quarry)	1422	Crushed & Broken Limestone	UT to Bradley Creek	060200040302

Table A4-8c.

Tables A4-8a-c. Permitted Mining Facilities in the Sequatchie River Watershed. SIC, Standard Industrial Code; WWC Wet Weather Conveyance; UT, Unnamed Tributary.

PERMIT NUMBER	PERMITTEE	SIC	SIC NAME	MADI	WATERBODY	HUC-12
TN0025054	Pikeville STP	4952	Sewerage Systems	Minor	Sequatchie River @ RM 78.4	060200040103
TN0021946	Dunlap STP	4952	Sewerage Systems	Minor	Sequatchie River @ RM 43.9	060200040201
TN0060399	Castle's Coin Laundry	7215	Coin Operated Laundry and Dry Cleaning	Minor	UT @ RM 0.9 to Big Spring Branch @ RM 0.2 to Sequatchie River @ RM 22.1	060200040202
TN0077577	Valley View of Whitwell STP	4952	Sewerage Systems	Minor	Sequatchie River @ RM 23.0	060200040202

Table A4-9. Municipal and Industrial Permittees in the Sequatchie River Watershed.
SIC, Standard Industrial Code; MADI, Major Discharge Indicator; UT, Unnamed Tributary.

PERMIT NUMBER	PERMITTEE	WATERBODY	HUC_12
TNG110187	Angel Bros. Redi - Mix	UT to Sequatchie River	060200040103
TNG110190	Sequatchie Concrete Service-Dunlap	Brush Creek	060200040106
TNG110319	Tri - State Concrete, LLC	Hall Branch to Little Sequatchie River	060200040303

Table A4-10. RMCP (Ready Mix Concrete Plant) Permittees in the Sequatchie River Watershed. UT, Unnamed Tributary.

PERMIT NUMBER	PERMITTEE	SECTOR	RECEIVING STREAM	AREA	HUC-12
TNR050108	Eclipse Manufacturing Company	AA	Rockford Branch	10.00	060200040103
TNR050403	Dura Automotive Systems, Inc	AB	Sequatchie River	2.80	060200040103
TNR051822	Sequatchie Handle Works, Inc.	A	Rocky Branch to Sequatchie River	6.55	060200040103
TNR056028	Ault's Used Parts	M	Not Identified	30.00	060200040103
TNR053722	Smurfit-Stone Container Pikeville Wood Yard	A	Rocky Branch	9.00	060200040104
TNR056630	Rolling Frito-Lay Sales, LP Dunlap Bin	P	Sequatchie River @ RM 55	0.20	060200040105
TNR051604	C & D Technologies, Inc.	AC	Town Creek	2.85	060200040106
TNR053979	Cagle Mountain Stone	J	Hester Branch & Little Brush Creek	55.00	060200040106
TNR054471	Brush Creek Stone	J	Big Brush Creek	25.00	060200040106
TNR054219	Dunlap Machine Shop	AB	Coops Creek	0.14	060200040201
TNR050832	Marion County Landfill	L	Tennessee River @ RM 422	2.11	060200040203
TNR051482	Sequatchie Valley Folding	B	Guntersville Lake	23.00	060200040203
TNR053235	Marion County Brown Field	S	Sequatchie River & Tennessee River	0.20	060200040203
TNR053531	O'Neil Color & Compounding Corporation	C	UT to Sequatchie River	7.50	060200040203
TNR056563	Owen Barnes	M	Sequatchie River	6.00	060200040203
TNR056624	Rolling Frito-Lay Sales, LP Jasper Bin	P	UT to Sequatchie River	0.10	060200040203
TNR056724	Universal Form Clamp	AA	UT to Tennessee River (Guntersville Reservoir)	5.00	060200040203
TNR053080	United States Steel Corporation	H	UT to Sequatchie River & Little Sequatchie River	1.88	060200040302
TNR056786	Link Handle Division Seymour Manufacturing	A	Owens Spring Branch to Little Sequatchie River	11.50	060200040303

Table A4-11. TMSPs (Tennessee Multi Sector Permit) issued in the Sequatchie River Watershed. Area, acres of property associated with industrial activity; UT Unnamed Tributary. See Table A4-13 for Sector Details.

PERMIT NUMBER	PERMITTEE	WATERBODY	HUC-12
TN0078581	Pikeville Water Treatment Plant	Unnamed Ditch to Sequatchie River	060200040103
TN0078921	Whitwell Water Plant	Sequatchie River @ RM 23	060200040202

Table A4-12. WTP (Water Treatment Plant) Permittees in the Sequatchie River 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			
	Field Borders (feet)	Streambank / Shoreline Protection (feet)	Riparian Forest Buffer (acres)
FY 2002	2625		12
FY 2003	3400		7
FY 2006		200	

Table A5-1a. Land Treatment Conservation Practices (Conservation Buffers), in Partnership with NRCS in the Sequatchie River 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	838	195
FY 2003	16976	413

Table A5-1b. Erosion Control Conservation Practices, in Partnership with NRCS in the Sequatchie River 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 2002		590	581	1171
FY 2003			905	905
FY 2004		1005		1005
FY 2006		548		548
FY 2006	18	1006		1024

Table A5-c. Nutrient Management Conservation Practices in Partnership with NRCS in the Sequatchie River 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	1484
FY 2003	888
FY 2004	1419
FY 2005	2962
FY 2006	743

Table A5-1d. Pest Management Conservation Practices in Partnership with NRCS in the Sequatchie River 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)	Fencing (feet)	Pasture and Hay Planting (acres)
FY 2002	441		
FY 2003	672		
FY 2004	694	7148	100
FY 2005	302	9250	107
FY 2006	13	19922	92

Table A5-1e. Grazing/Forages Conservation Practices in Partnership with NRCS in the Sequatchie River 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 Improved through Forest Stand improvement (acres)	Total Tree & Shrub Estab. (acres)	Forestland Re-established or improved (acres)
FY 2002	9		
FY 2003		396	
FY 2004	85		85
FY 2005	334		334

Table A5-1f. Tree and Shrub Conservation Practices in Partnership with NRCS in the Sequatchie River 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	78	78	201	6

Table A5-1g. Land Treatment Conservation Practices (Tillage and Cropping), in Partnership with NRCS in the Sequatchie River 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	98	98
FY 2004	117	117
FY 2005	1243	1243
FY 2006	828	828

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

WATER SUPPLY			
	Pipeline (ft)	Pond (number)	Watering Facility (number)
FY 2004	1560		2
FY 2005	4,355	1	7
FY 2006	1691		5

Table A5-1i. Water Supply Conservation Practices in Partnership with NRCS in the Sequatchie River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2002 to 2006.*

WASTE MANAGEMENT FACILITIES			
	Waste Storage Facility (number)	Composting Facility (number)	Total Facilities (number)
FY 2005	1	1	2
FY 2006	3		3

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

PRACTICE	NRCS CODE	NUMBER OF BMPs
Fence	382	5
Pasture & Hayland Establishment	512	11
Pipeline	516	1
Heavy Use Area	561	3
Spring Development	574	1
Well	642	2
Total BMPs		**23**

Table A5-2. Best Management Practices Installed by Tennessee Department of Agriculture and Partners in the Sequatchie River Watershed.

SITE ID	WATER BODY	YEAR
320010401	Sequatchie River	2001
320010402	Sequatchie River	2001
319990801	Little Sequatchie River	1999
319990901	Sequatchie River	1999
319990902	Sequatchie River	1999
319990903	Sequatchie River	1999
319990301	Stone Creek	1999
319990401	Thurman Creek	1999
319990501	Big Brush Creek	1999
319990601	Mill Branch	1999
319990701	Skillern Creek	1999
319991201	Owens Branch	1999
319991001	Grayson Mill	1999
319991101	Looney's Creek	1999
320001001	Pocket Creek	2000
320001002	Pocket Creek	2000
320020401	Sequatchie River	2002
320020402	Sequatchie River	2002
320020403	Sequatchie River	2002
320020404	Sequatchie River	2002
320030901	Sequatchie River	2003
320030902	Sequatchie River	2003

Table A5-3. TWRA TADS Sampling Sites in the Sequatchie River Watershed.