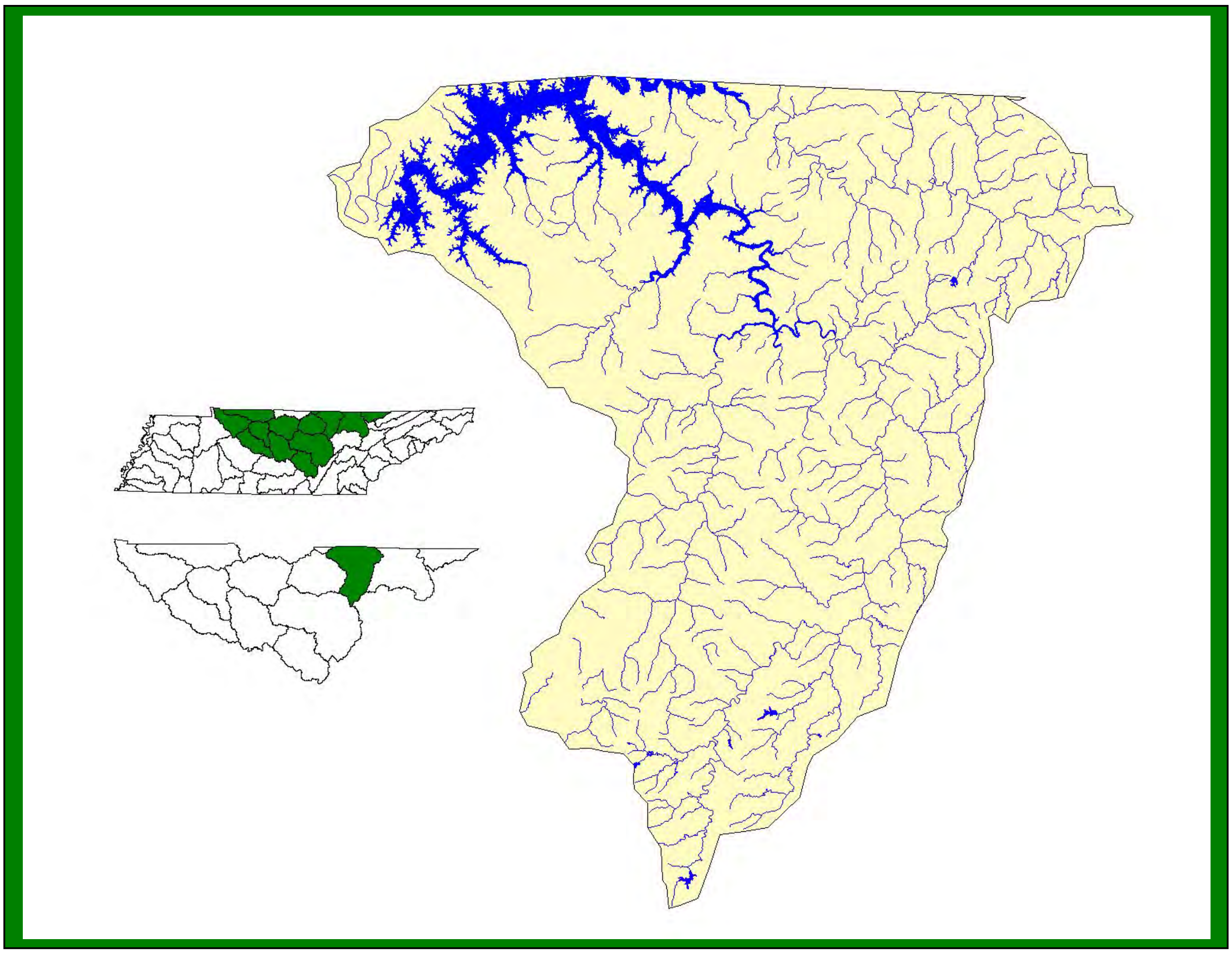
OBEY RIVER WATERSHED (05130105) OF THE CUMBERLAND RIVER BASIN

WATERSHED WATER QUALITY MANAGEMENT PLAN



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

Presented to the people of the Obey River Watershed by the Division of Water Pollution Control October 4, 2007.

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OBEY 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

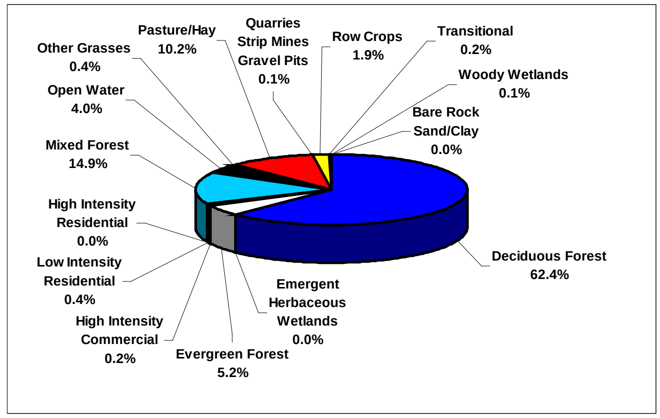
Summary – Obey River Watershed (05130105)

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 Obey 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.

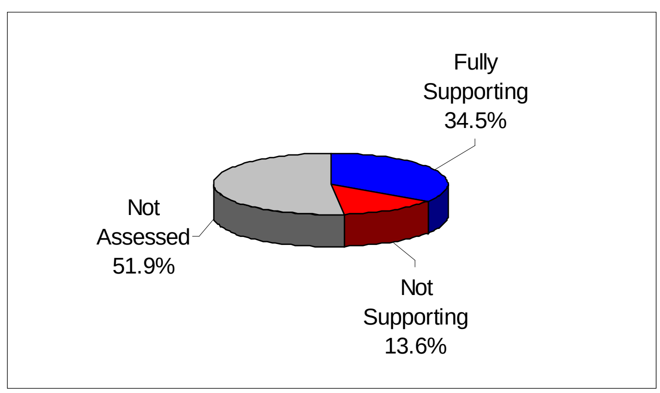
A detailed description of the watershed can be found in Chapter 2. The Obey River Watershed is approximately 961 square miles (775 mi^2 in Tennessee) and includes parts of six Tennessee counties. A part of the Cumberland River drainage basin, the watershed has 776.4 stream miles and 22,000 lake acres in Tennessee.



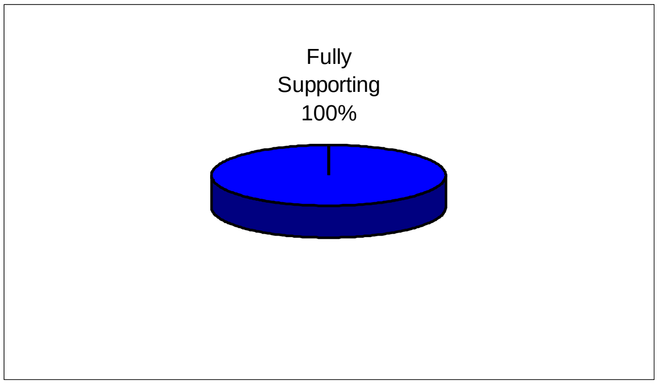
Land Use Distribution in the Tennessee Portion of the Obey River Watershed.

One state forest, one state historic area, and three wildlife management areas are located in the watershed. Sixty-two rare plant and animal species have been documented in the watershed, including six rare fish species, four rare mussel species, two rare snail species, three rare amphibian species, and four rare crustacean species. Portions of four streams in the Obey River Watershed are listed in the National Rivers Inventory as having one or more outstanding natural or cultural values.

A review of water quality sampling and assessment is presented in Chapter 3. Using the Watershed Approach to Water Quality, 145 sampling events occurred in the Obey River Watershed in 2000-2005. These were conducted at ambient, ecoregion or watershed monitoring sites. Monitoring results support the conclusion that 71.7% of stream miles and 100% of lake acres assessed fully support one or more designated uses.



Water Quality Assessment of Streams and Rivers in the Tennessee Portion of the Obey River Watershed. Assessment data are based on the 2004 Water Quality Assessment of 776.4 stream miles in the watershed.



Water Quality Assessment of Lakes in the Tennessee Portion of the Obey River Watershed. Assessment data are based on the 2004 Water Quality Assessment of 22,000 lake acres in the watershed.

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

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

HUC-10	HUC-12
0513010501	051301050101 (East Fork Obey River)
	051301050102 (East Fork Obey River)
	051301050103 (Hurricane Creek)
	051301050104 (East Fork Obey River)
	051301050105 Piney Creek)
	051301050106 (East Fork Obey River)
	051301050107 (Rockcastle Creek)
	051301050108 (Poplar Creek)
0513010502	051301050201 (West Fork Obey River)
	051301050202 (West Fork Obey River)
	051301050203 (West Fork Obey River)
0513010503	051301050301 (Obey River)
	051301050302 (Eagle Creek)
	051301050303 (Obey River)

HUC-10	HUC-12
0513010504	051301050401 (Wolf River)
	051301050402 (Rotten Fork Wolf River)
	051301050403 (Wolf River)
	051301050404 (Dale Hollow Lake)
	051301050405 (Spring Creek)
0513010505	051301050501 (Dale Hollow Lake)
	051301050502 (Sulpher Creek)
	051301050503 (Mitchell Creek)
	051301050504 (Obey River)

The Tennessee Portion of the Obey River Watershed is Composed of twenty-three USGS-Delineated Subwatersheds (12-Digit Subwatersheds).

Point source contributions to the Tennessee portion of the Obey River Watershed consist of nine individual NPDES-permitted facilities, six of which discharge into streams that have been listed on the 2004 303(d) list. Other point source permits in the watershed (as of October 4, 2007) are Mining Permits (11), Tennessee Multi-Sector Permits (9), and Concentrated Animal Feeding Operations (8). Agricultural operations include cattle, chicken, hog, and sheep farming. Maps illustrating the locations of permit sites and tables summarizing livestock practices are presented in each subwatershed.

Chapter 5 is entitled *Water Quality Partnerships in the Obey 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 U.S. Army Corps of Engineers), and state agencies (TDEC/State Revolving Fund, TDEC Division of Water Supply, Tennessee Department of Agriculture, and Kentucky Division of Water) are summarized. Local initiatives of organizations active in the watershed (Cumberland River Compact, The Nature Conservancy, and Hull-York Lakeland RC&D Council) are also described.

Point and Nonpoint source approaches to water quality problems in the Obey 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 Obey 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

1.2 Watershed Approach to Water Quality
1.2.A. Components of the Watershed Approach
1.2.B. Benefits of the Watershed Approach

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).

<u>1.2.A. Components of the Watershed Approach.</u> 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.

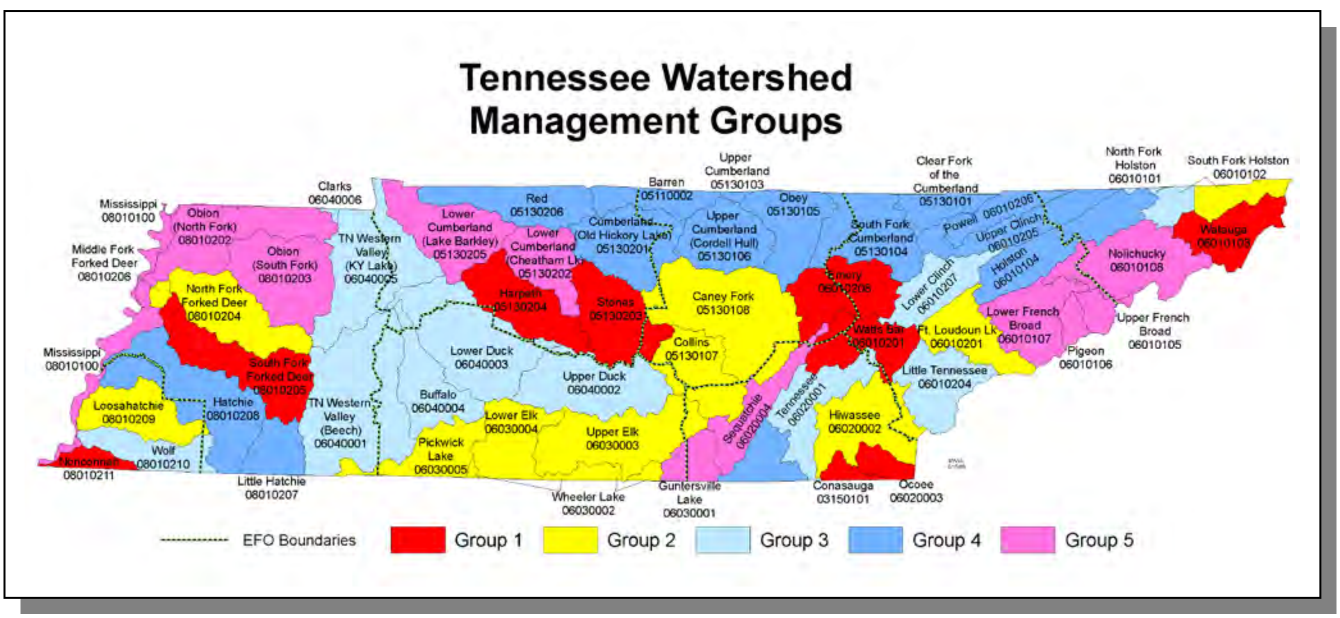


Figure 1-1. Watershed Groups in Tennessee's Watershed Approach to Water Quality.

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.

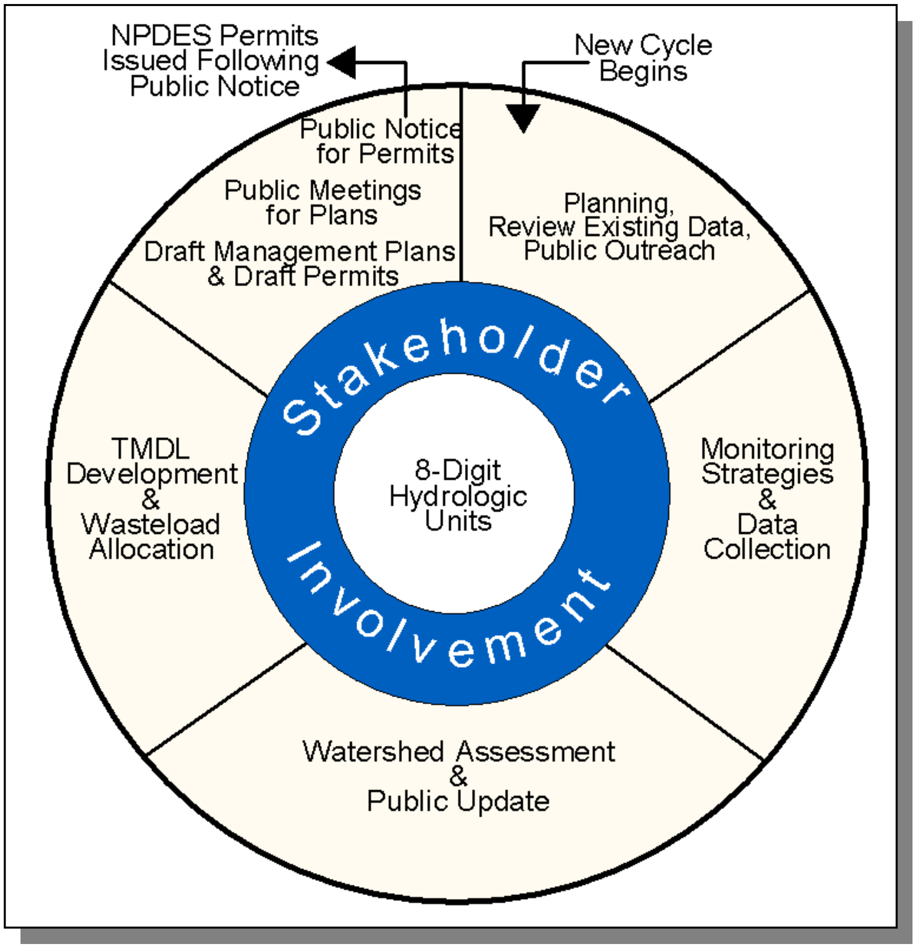


Figure 1-2. The Watershed Approach Cycle.

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 OBEY RIVER WATERSHED

2.1. Background

2.2. Description of the Watershed
2.2.A. General Location
2.2.B. Population Density Centers

2.3. General Hydrologic Description
2.3.A. Hydrology
2.3.B. Dams

2.4. Land Use

2.5. Ecoregions and Reference Streams

2.6. Natural Resources
2.6.A. Rare Plants and Animals
2.6.B. Wetlands

2.7. Cultural Resources
2.7.A. Nationwide Rivers Inventory
2.7.B. Public Lands

2.8. Tennessee Rivers Assessment Project

2.1. BACKGROUND.

The Obey River is a tributary of the Cumberland River which has its confluence with the larger stream near the town of Celina, Tennessee. Named for Obediah Terrill, its name has changed from Obed, to Obeds, and then to Obey. The Indian name prior to this naming was Oocooahustehee, meaning good hunting.

Near its mouth, the Obey River is impounded by the U.S. Army Corps of Engineers Dale Hollow Reservoir, site of a fish hatchery run by the federal government. This dam empounds the Obey River for essentially its entire length, causing slack water well up both major tributaries, the East and West Forks. This lake is relatively deep due to the height of the dam and the depth of the gorges through which the Obey River and its tributaries flowed; the empoundment also enters Kentucky in its Wolf River and Sulphur Creek embayments.

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

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. The Tennessee portion of the Obey River Watershed is located in Middle Tennessee and includes parts of Clay, Cumberland, Fentress, Overton, Pickett, and Putnam Counties.

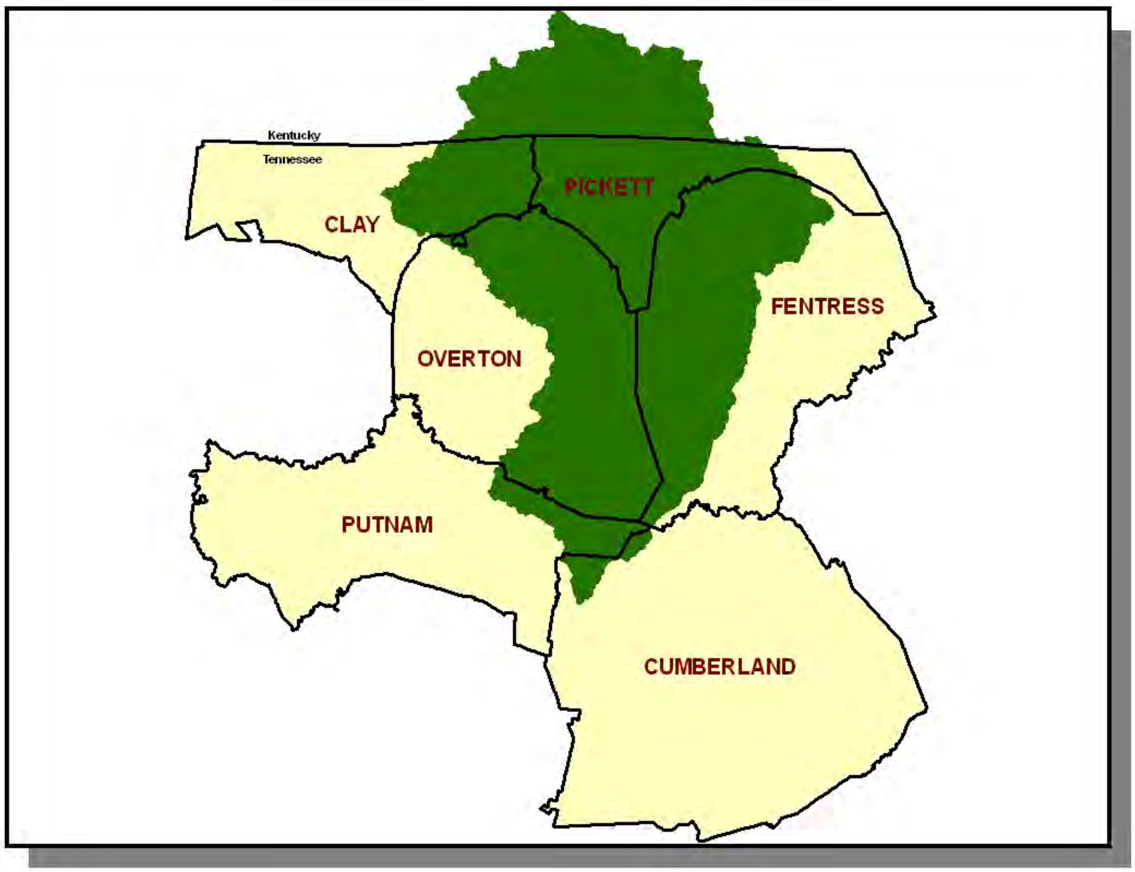


Figure 2-1. General Location of the Obey River Watershed.

COUNTY	% OF WATERSHED IN EACH COUNTY
Overton	32.7
Fentress	32.3
Pickett	18.4
Clay	10.5
Putnam	4.3
Cumberland	1.8

Table 2-1. The Tennessee Portion of the Obey River Watershed Includes Parts of Six Middle Tennessee Counties.

2.2.B. Population Density Centers. Twelve highways serve the major communities in the Tennessee portion of the Obey River Watershed.

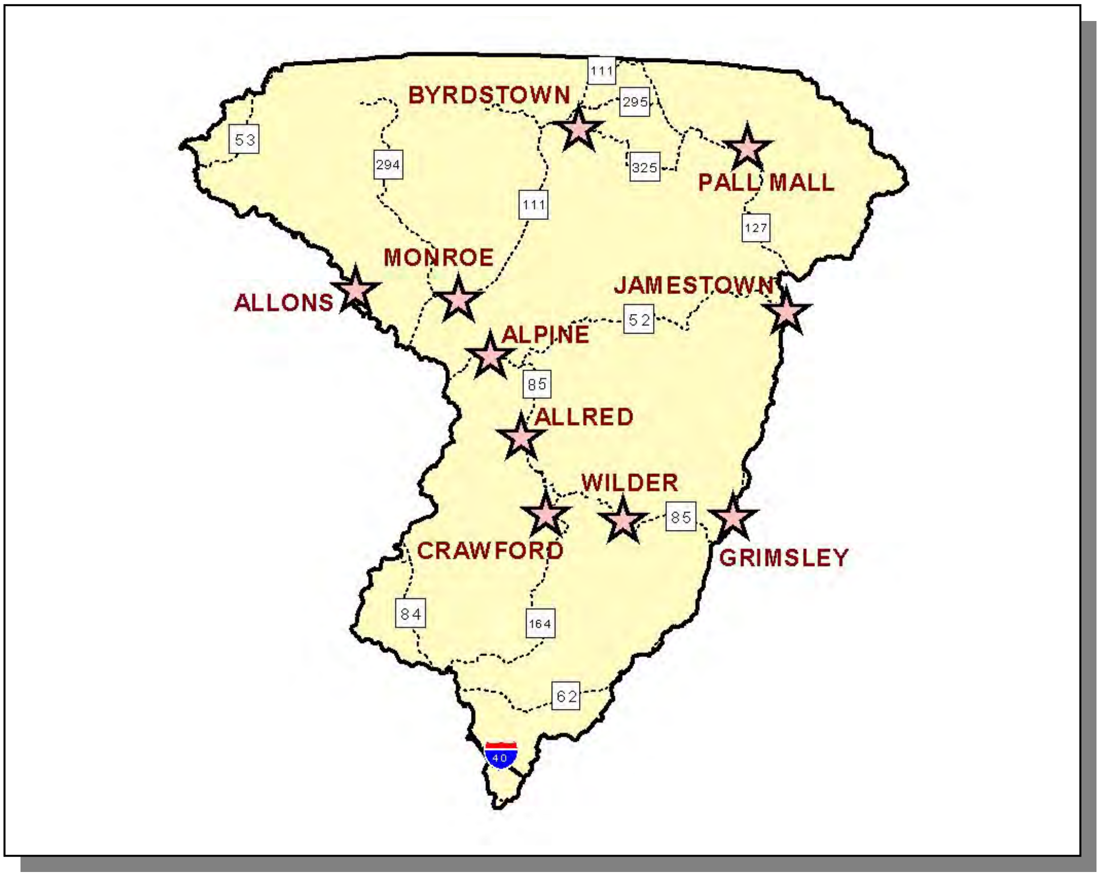


Figure 2-2. Communities and Roads in the Tennessee Portion of the Obey River Watershed.

MUNICIPALITY	POPULATION	COUNTY
Jamestown*	1,839	Fentress
Byrdstown*	903	Pickett

Table 2-2. Municipalities in the Tennessee Portion of the Obey 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. <u>Hydrology.</u> The Obey River Watershed, designated 05130105 by the USGS, is approximately 961 square miles (775 square miles in Tennessee) and drains to the Cumberland River.

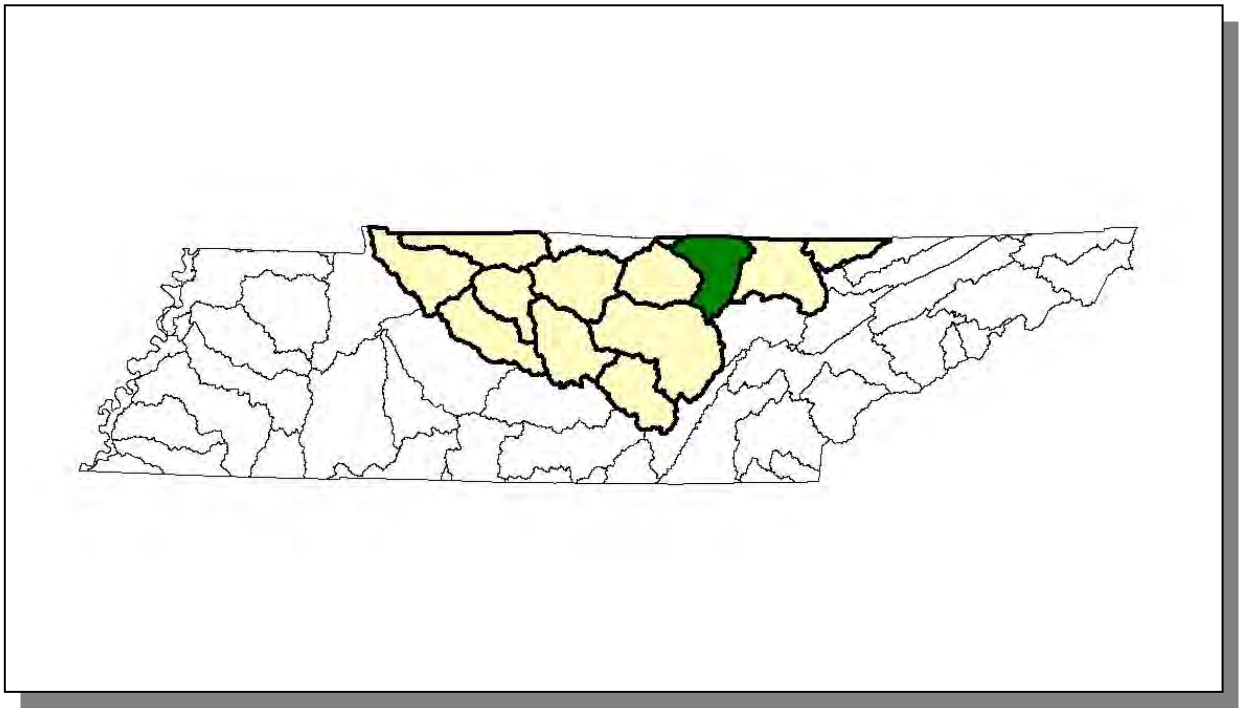


Figure 2-3. The Tennessee Portion of the Obey River Watershed is Part of the Cumberland River Basin.

Figure 2-4. Hydrology in the Tennessee Portion of the Obey River Watershed. *There are 776.4 stream miles and 22,000 lake acres recorded in River Reach File 3 in the Tennessee portion of the Obey River Watershed. Location of East Fork Obey River, West Fork Obey River, the Obey River including Dale Hollow Lake, and the cities of Allred and Byrdstwon are shown for reference.*

2.3.B. Dams. There are 15 dams inventoried by TDEC Division of Water Supply in the Tennessee portion of the Obey River Watershed. These dams either retain 30 acre-feet of water or have structures at least 20 feet high.

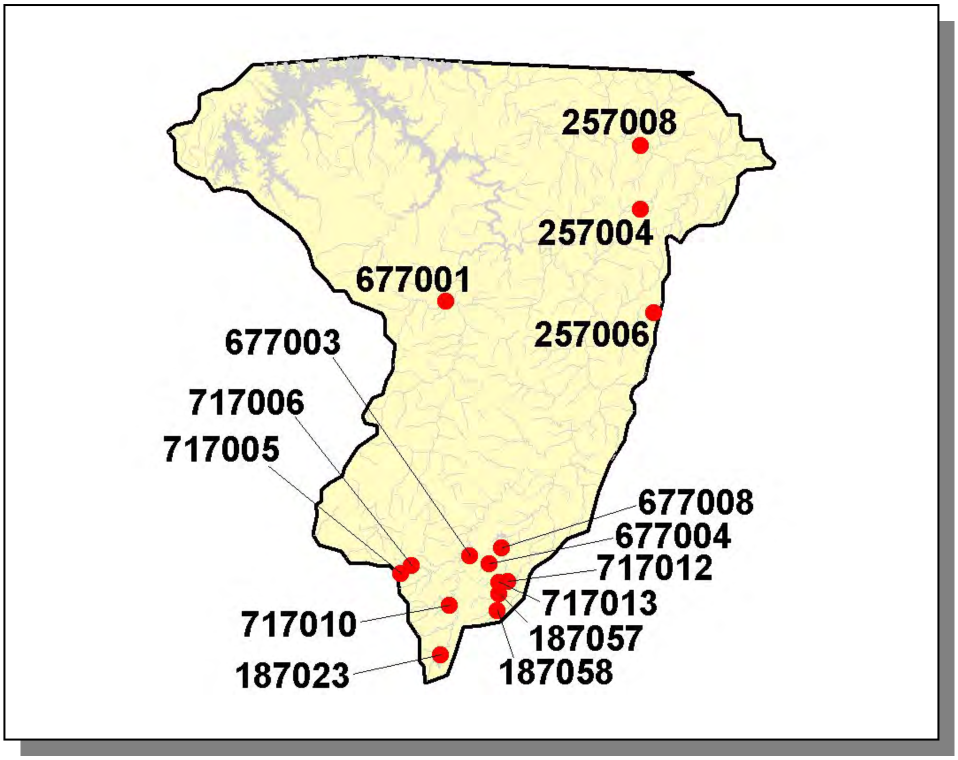


Figure 2-5. Location of Inventoried Dams in the Tennessee Portion of the Obey River Watershed. *More information, including identification of inventoried dams labeled, is provided in Appendix II and at http://gwidc.memphis.edu/website/dams/viewer.htm.*

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

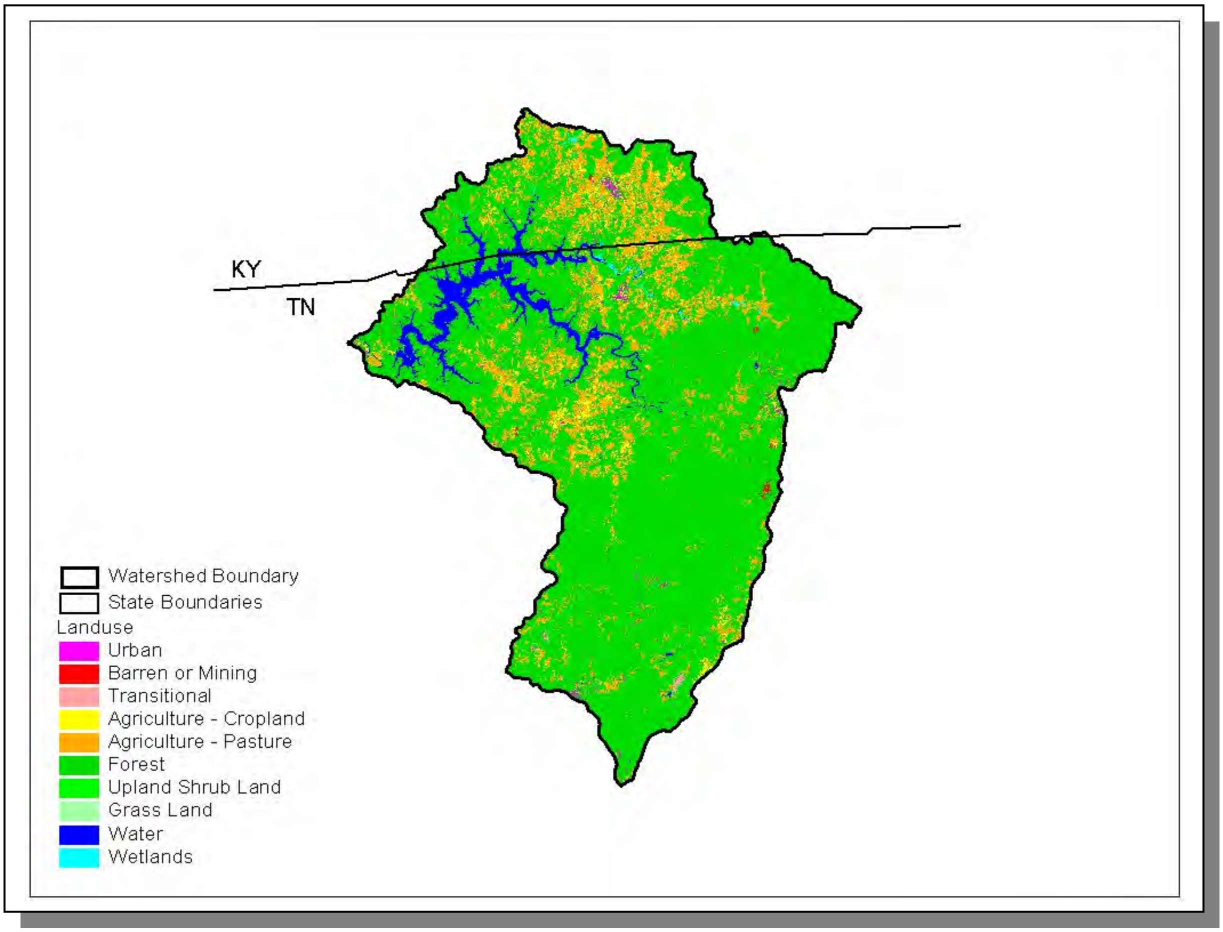


Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery.

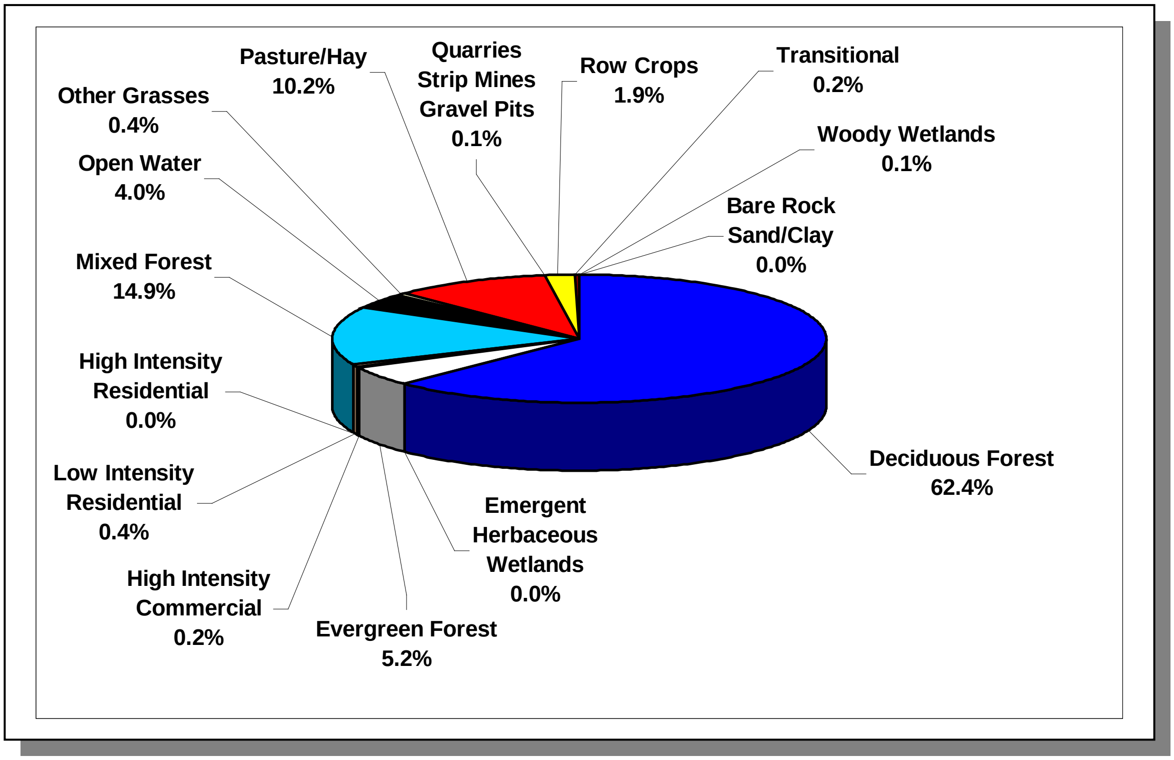


Figure 2-7. Land Use Distribution in the Tennessee Portion of the Obey River Watershed. *More information is provided in Appendix II.*

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.

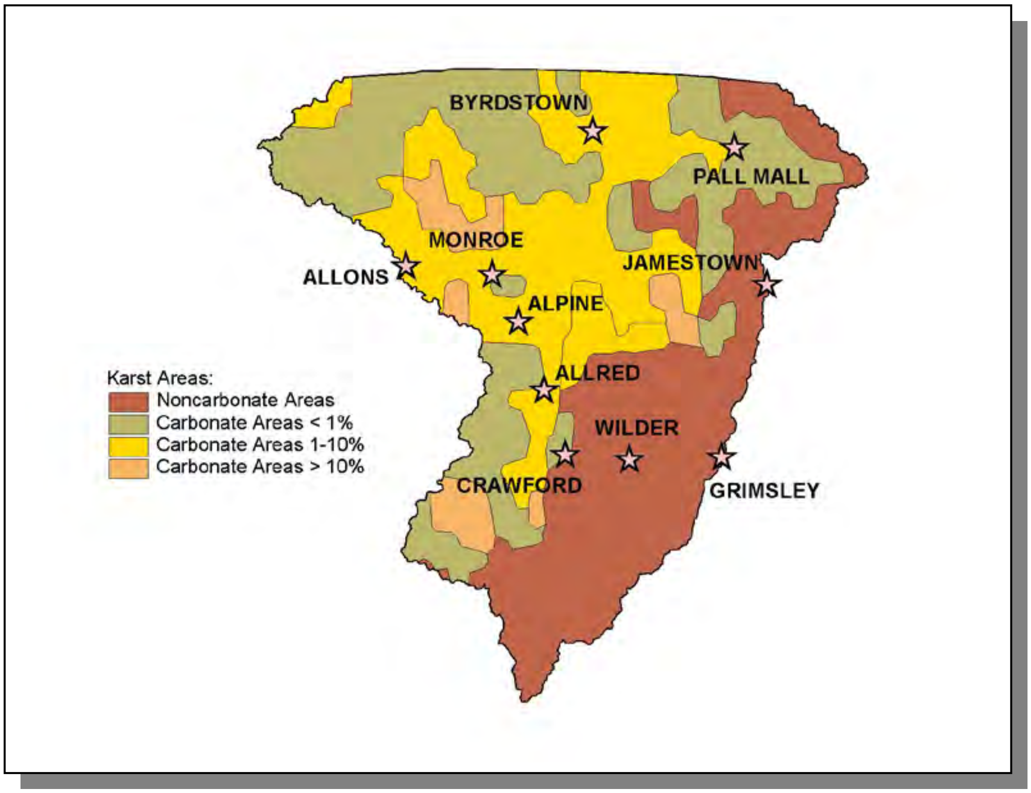


Figure 2-8. Illustration of Karst Areas in Tennessee Portion of the Obey River Watershed. *Locations of communities in the watershed are shown for reference.*

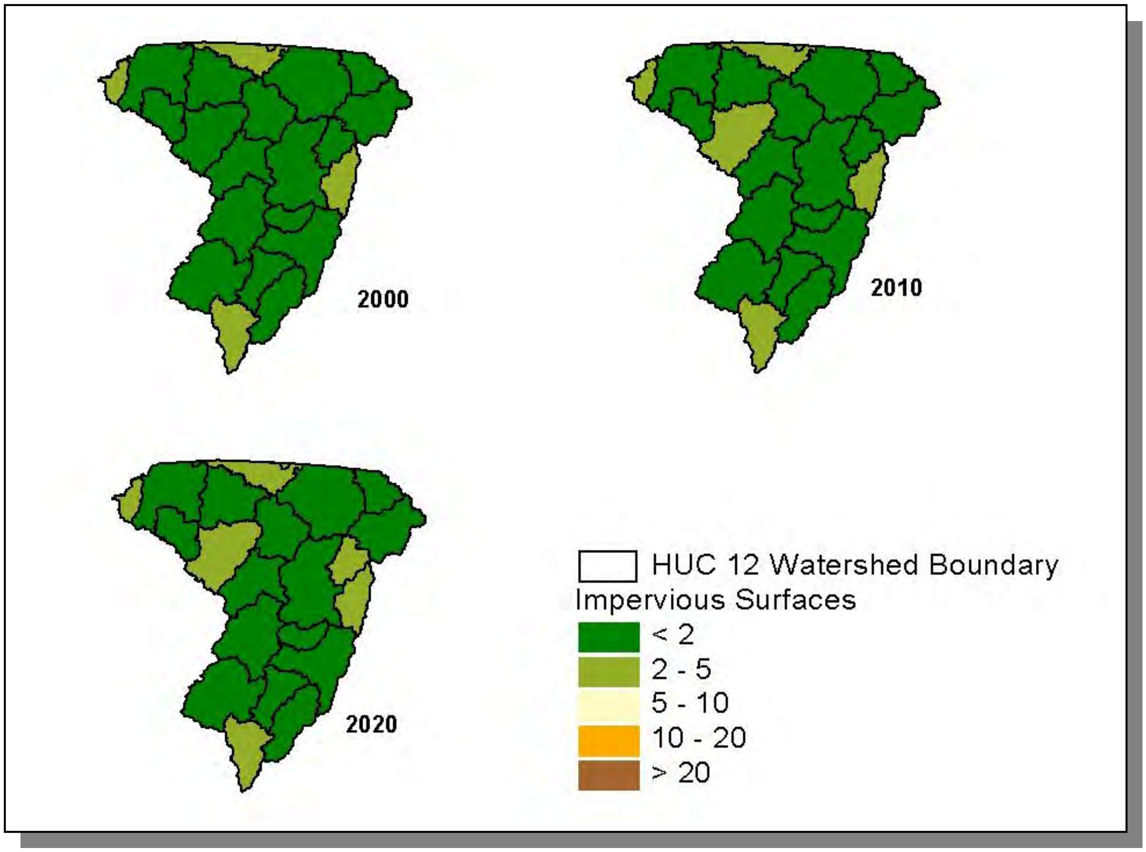


Figure 2-9. Illustration of Total Impervious Area in the Tennessee Portion of the Obey River Watershed. *All HUC-12 subwatersheds are shown. Current and projected total impervious cover (percent of total area) is provided by EPA Region 4. More information can be found at: http://www.epa.gov/ATHENS/research/impervious/*

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

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

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

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

- The **Eastern Highland Rim (71g)** has level terrain, with landforms characterized as tablelands of moderate relief and irregular plains. Mississippian-age limestone, chert, shale, and dolomite predominate, and karst terrain sinkholes and depressions are especially noticeable between Sparta and McMinnville. Numerous springs and spring-associated fish fauna also typify the region. Natural vegetation for the region is transitional between the oak-hickory type to the west and the mixed mesophytic forests of the Appalachian ecoregions (68, 69) to the east. Bottomland hardwood forest has been inundated by several large impoundments. Barrens and former prairie areas are now mostly oak thickets or pasture and cropland.

- **Outer Nashville Basin (71h)** is a more heterogeneous region than the Inner Nashville Basin, with more rolling and hilly topography and slightly higher elevations. The region encompasses most all of the outer areas of the generally non-cherty Ordovician limestone bedrock. The higher hills and knobs are capped by the more cherty Mississippian-age formations, and some Devonian-age Chattanooga shale, remnants of the Highland Rim. The region's limestone rocks and soils are high in phosphorus, and commercial phosphate is mined. Deciduous forests with pasture and cropland are the dominant land covers. Streams are low to moderate gradient, with productive nutrient-rich waters, resulting in algae, rooted vegetation, and occasionally high densities of fish. The Nashville Basin as a whole has a distinctive fish fauna, notable for fish that avoid the region, as well as those that are present.

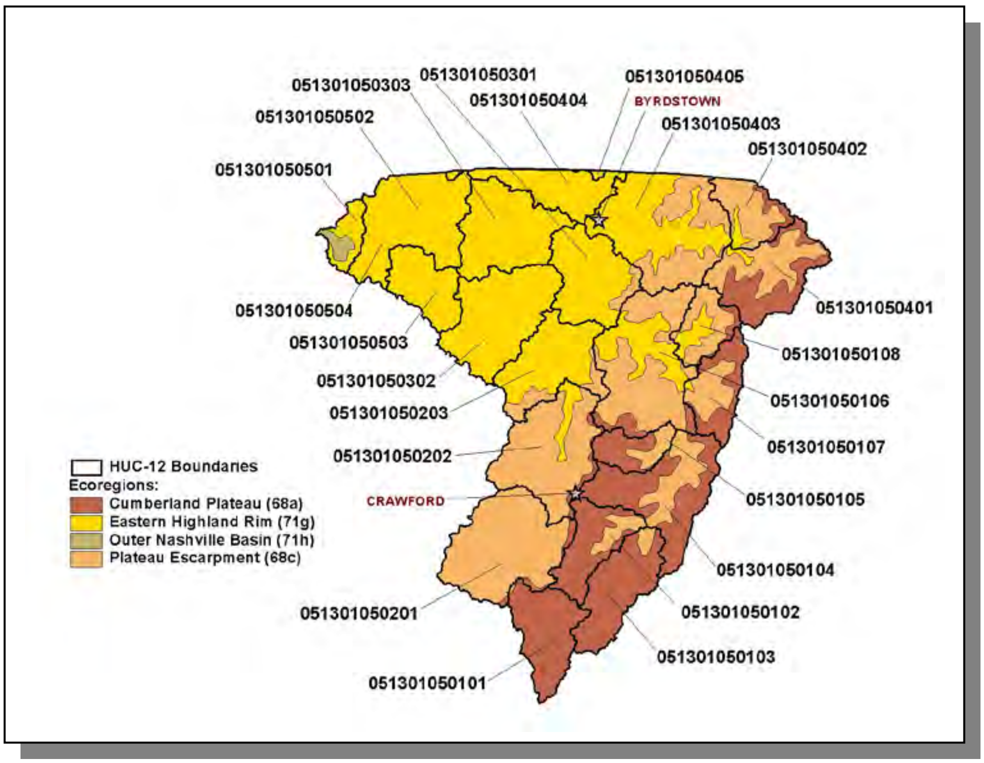


Figure 2-10. Level IV Ecoregions in the Tennessee Portion of the Obey River Watershed. *HUC-12 subwatershed boundaries and locations of Byrdstown and Crawford are shown for reference.*

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

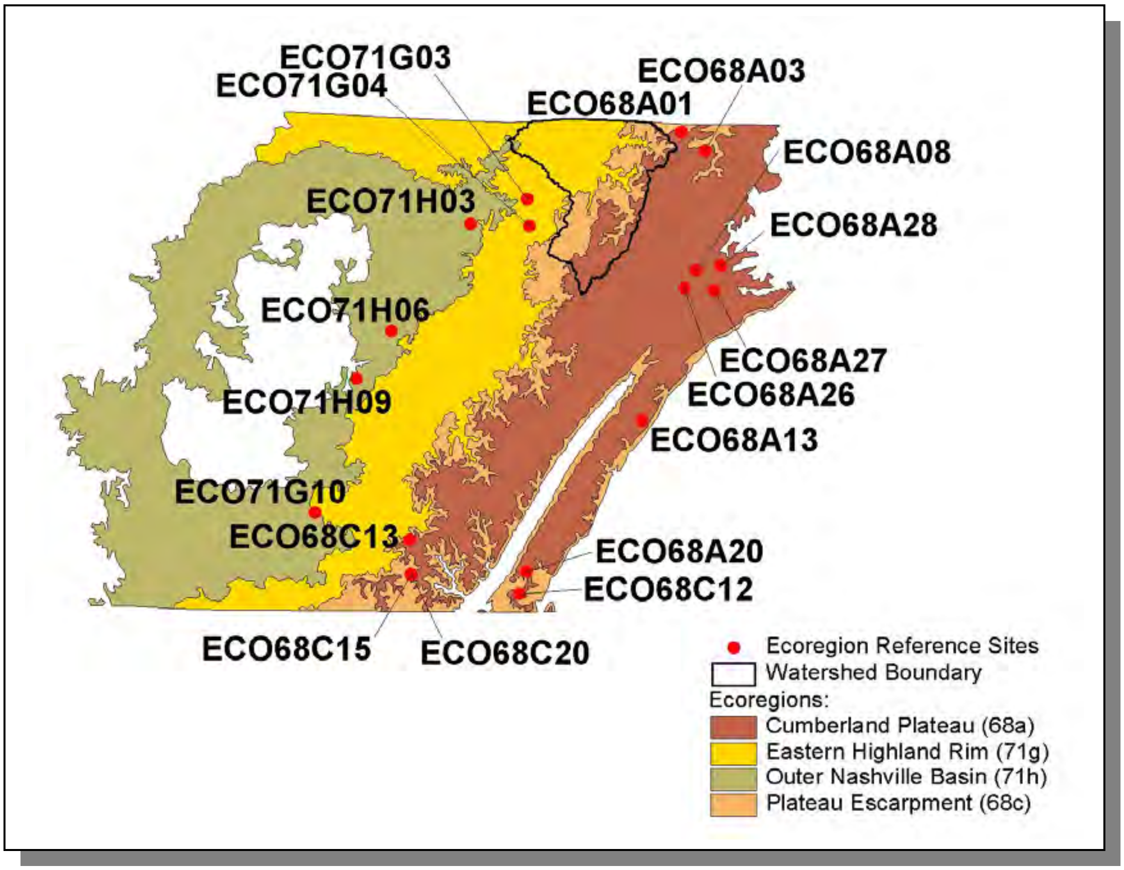


Figure 2-11. Ecoregion Monitoring Sites in Level IV Ecoregions 68a, 68c, 71g, and 71h. *The Tennessee portion of the Obey River Watershed is shown for reference. More information, including which ecoregion reference sites were inactive or dropped prior to 01/01/2006, is provided in Appendix II.*

2.6. NATURAL RESOURCES.

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

GROUPING	NUMBER OF RARE SPECIES
Crustaceans	4
Insects	6
Mussels	4
Snails	2
Amphibians	3
Birds	5
Fish	6
Mammals	7
Reptiles	1
Plants	23
Total	**61**

Table 2-3. There are 62 Known Rare Plant and Animal Species in the Tennessee Portion of the Obey River Watershed.

In the Tennessee portion of the Obey River Watershed, there are six known rare fish species, four known rare mussel species, two known rare snail species, three known rare amphibian species, and four known rare crustacean species.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
Carpiodes velifer	Highfin carpsucker		D
Etheostoma cinereum	Ashy darter		T
Percina burtoni	Blotchside darter		D
Percina macrocephala	Longhead darter		T
Percina phoxocephala	Slenderhead darter		D
Typhlichthys subterraneus	Southern cavefish		D
Dromas dromas	Dromadary pearlymussel	LE	E
Lampsilis abrupta	Pink mucket	LE	E
Pleurobema oviforme	Tennessee clubshell		
Villosa trabalis	Cumberland bean	LE	E
Lithasia armigera	Armored rocksnail		
Lithasia duttoniana	Helmet rocksnail		
Aneides aeneus	Green Salamander		
Desmognathus weleri	Black Mountain Dusky Salamander		D
Hemidactylium scutatum	Four-toed salamander		D
Apocrangonyx nortoni	Norton's cave amphipod		
Cambarus crinipes	Bouchard's crayfish		
Cambarus obeyensis	Obey crayfish		T
Orconectes australis	A crayfish		

Table 2-4. Rare Aquatic Species in the Obey River Watershed. *Federal Status: LE, Listed Endangered by the U.S. Fish and Wildlife Service, MC, Management Concern for 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.B. 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/

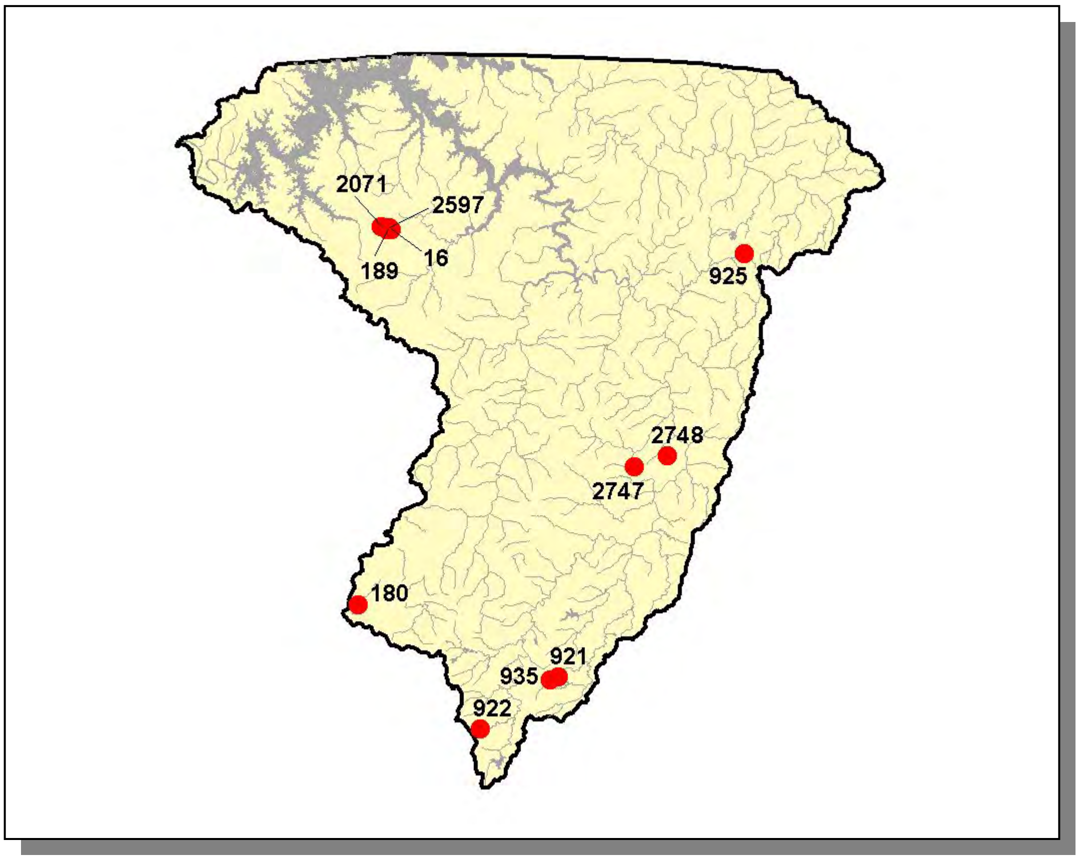


Figure 2-12. Location of Wetland Sites in TDEC Division of Natural Heritage Database in the Tennessee Portion of the Obey River Watershed. This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands. *There may be additional wetland sites 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 four streams in the Tennessee portion of the Obey River Watershed:

> East Fork Obey River (RM 12 to RM 38) is a dangerous, rugged stream with a wildly fluctuating gradient in a heavily forested gorge area.
>
> Obey River (RM 0 to RM 7) winds through a scenic valley with alternating pastoral settings and massive, wooded limestone bluffs and supports an excellent fishery.
>
> West Fork Obey River (RM 0 to RM 28) flows through a scenic narrow valley flanked by high, wooded hills in a shallow gorge area.
>
> Wolf River (RM 18 to RM 38) is a scenic stream of historical interest.

RIVER	SCENIC	RECREATION	GEOLOGIC	FISH	WILDLIFE	HISTORIC	CULTURAL
Obey River	X	X	X	X	X		
EF Obey River	X	X	X	X	X		
WF Obey River	X	X	X		X		
Wolf River	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:

- Alpine Mountain Wildlife Management Area is a 1,642-acre area managed by TWRA in Overton County.
- Celina Recreation Area (Dale Hollow Dam Recreation Area) is a campground operated by the U.S. Army Corps of Engineers on Dale Hollow Lake. More information may be found at http://www.tnvacation.com/vendors/dale_hollow_dam_recreation_area/.

- Jackson Swamp Wildlife Management Area is a 203-acre area managed by TWRA in Overton County.

- Jim Creek is a 1,541-acre tract located just west of the Pogue Creek tract. The Nature Conservancy bought the land and transferred it to Pickett State Forest. More information may be found at http://www.nature.org/wherewework/northamerica/states/tennessee/press/press1802.html.

- Pickett State Forest is an 18,085-acre tract designated as a state forest in 1935, after the Sterns Coal and Lumber Company donated the land in 1933. More information may be found at http://www.state.tn.us/agriculture/forestry/stateforests/10.html.

- Pickett State Forest Wildlife Management Area is an 11,000-acre area managed by TWRA in Pickett County.

- Pleasant Grove Recreation Area is a day use area located on Dale Hollow Lake.

- Pogue Creek is a 3,720-acre property adjacent to Pickett State Forest in Fentress County. The land is owned by The Nature Conservancy. More information may be found at: http://www.nature.org/wherewework/northamerica/states/tennessee/press/press1802.html.

- Sergeant York State Historic Area includes the York home and gristmill along the Wolf River in Pall Mall. More information may be found at http://www.state.tn.us/environment/parks/parks/SgtYork.

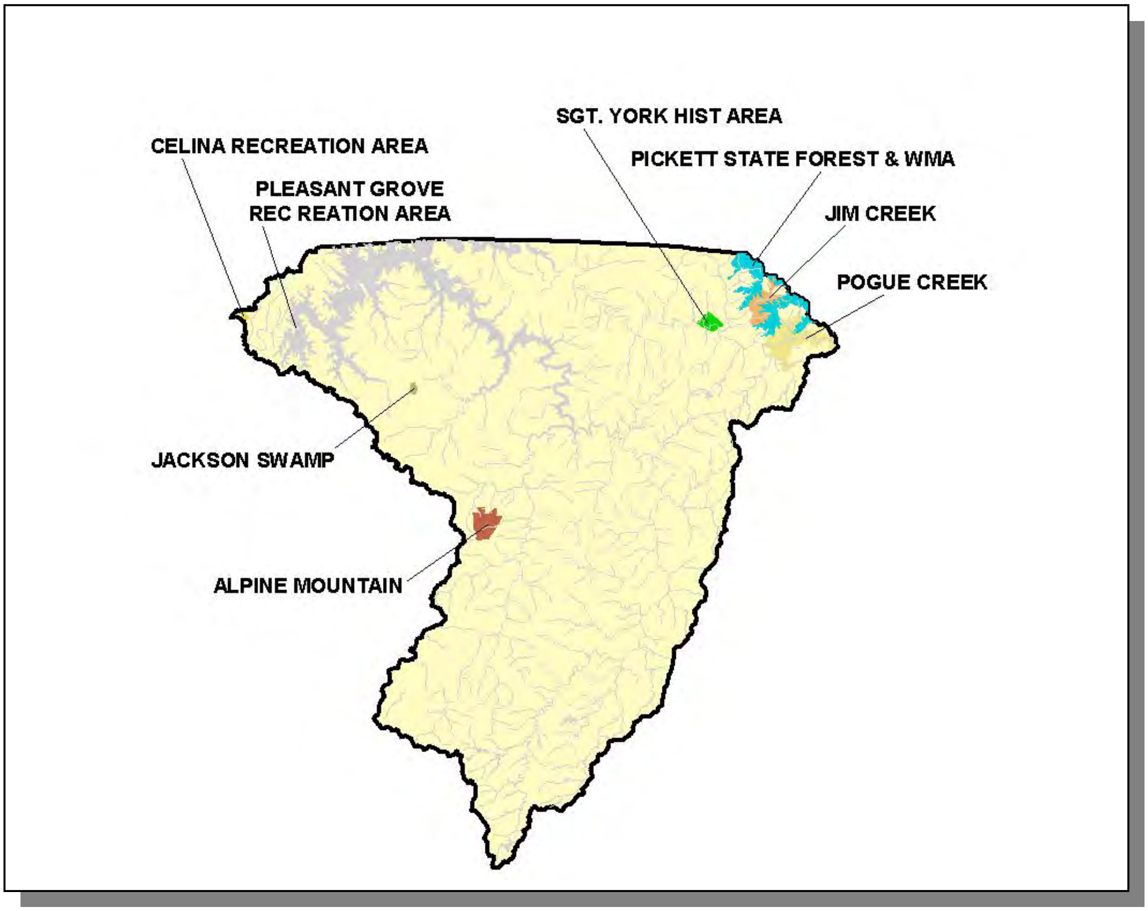


Figure 2-13. Public Lands in the Tennessee Portion of the Obey River Watershed. *Data are from Tennessee Wildlife Resources Agency. WMA, Wildlife Management Area.*

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
Ashburn Creek	2			Little Jack Creek	2		
Big Indian Creek	2			Meadow Creek	1	3	
Big Laurel Creek	1			Mitchell Creek	2		
Big Piney Creek	2			Neely Creek	3		
Bills Creek	2			Nettle Carrier Creek	3		
Buffalo Cove Creek	2			Obey River	3	2	1
Caney Creek	3		3	Pogue Williams Creek	2		
Carter Creek	2			Poor Branch Creek	3		
Cowan Branch Creek	2			Poplar Cove Creek	2		
Dry Creek	3			Puncheon Camp Creek	2		
Dry Hollow Fork creek	2			Slate Creek	2		
Eagle Creek	3		2	South Branch Lick Creek	3		
East Fork Obey River	1,2	2,3		Stewart Creek	2		
Hughes Creek	2			Stokes Creek	2		
Hurricane Creek	1	3		West Fork Obey River	1,2	2	3
Irons Creek	2			Wolf River	2,3	2	
Lick Creek	3		3				

Table 2-6. Tennessee Rivers Assessment Project Stream Scoring in the Obey 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 OBEY RIVER WATERSHED.

3.1 Background

3.2 Data Collection
- **3.2.A Ambient Monitoring Sites**
- **3.2.B Ecoregion Sites**
- **3.2.C Watershed Screening Sites**
- **3.2.D Special Surveys**

3.3 Status of Water Quality
- **3.3.A Assessment Summary**
- **3.3.B Use Impairment Summary**

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

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

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

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

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

1. Describe the water quality assessment process

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

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

4. Provide detailed information on each watershed

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

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

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

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

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

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

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

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

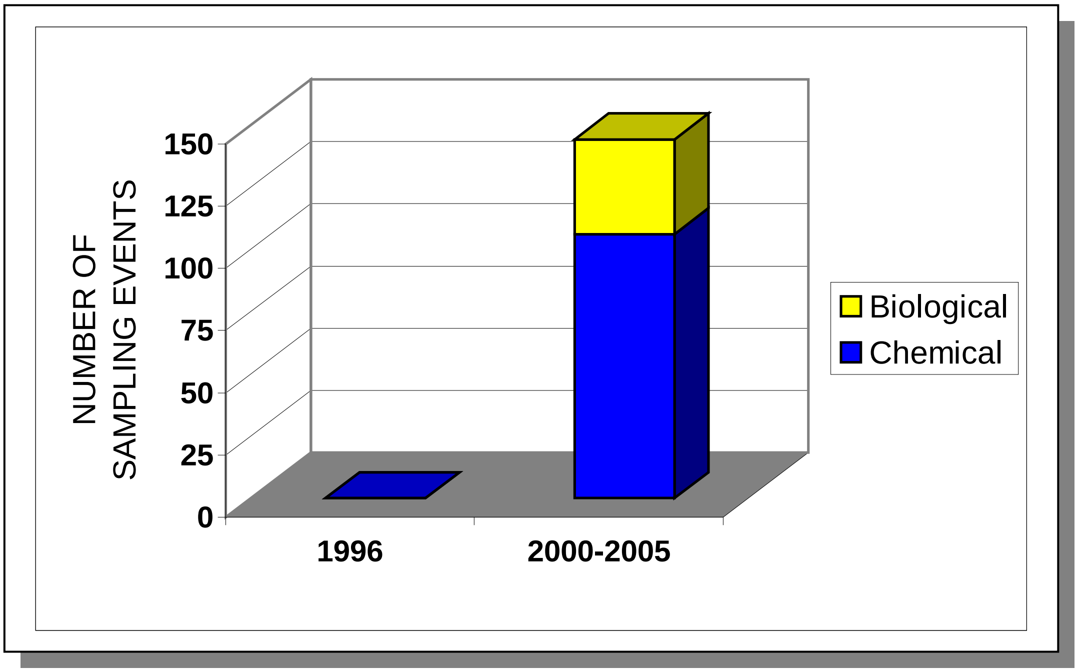


Figure 3-1. Number of Sampling Events Using the Traditional Approach (1996) and Watershed Approach (July 1, 2000 through June 30, 2005) in the Tennessee Portion of the Obey River Watershed.

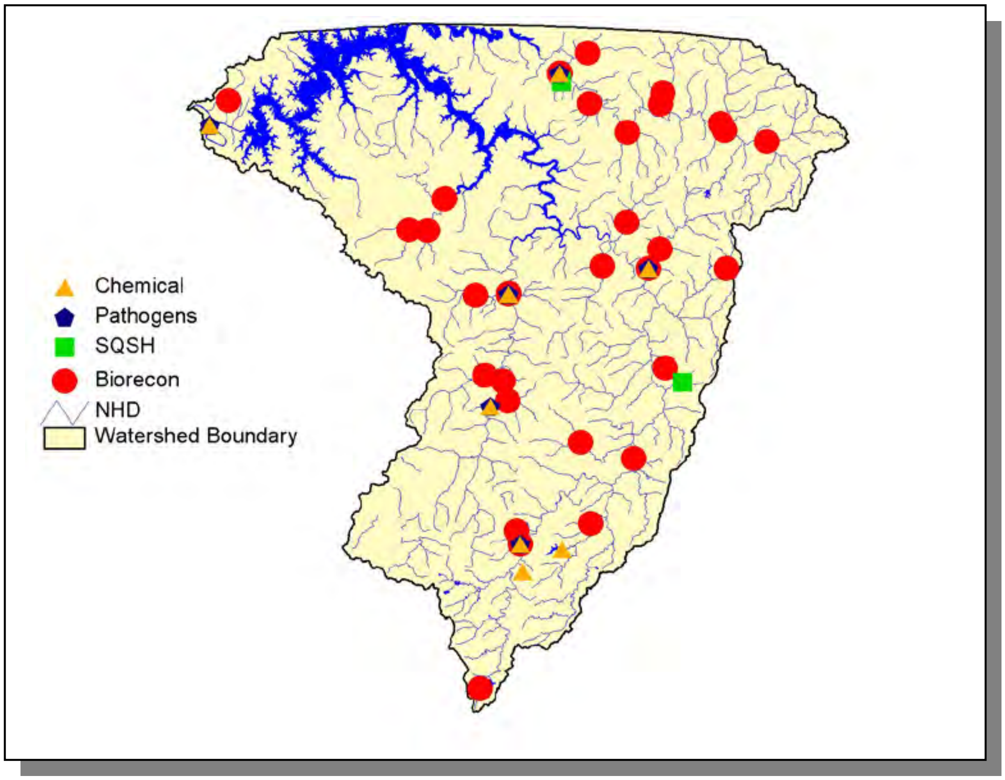


Figure 3-2. Location of Monitoring Sites in the Tennessee Portion of the Obey River Watershed (July 1, 2000 through June 30, 2005). *Pathogens include E. coli and fecal coliform; NHD, National Hydrography Dataset of Streams; SQSH, Semi-Quantitative Single Habitat Assessment.*

	1996	2000-2005
Biological	0	40
Chemical	0	105
Total	**0**	**145**

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

3.2.A. Ambient Monitoring Sites. These fixed-station chemical monitoring sites are sampled quarterly or monthly by the Environmental Field Office-Cookeville and Environmental Field Office-Nashville staff (this is in addition to samples collected by water and wastewater treatment plant operators). Samples are analyzed by the Tennessee Department of Health, Division of Environmental Laboratory Services. Ambient monitoring data are used to assess water quality in major bodies of water where there are NPDES facilities and to identify trends in water quality. Water quality parameters traditionally measured at ambient sites in the Tennessee portion of the Obey 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 Tennessee portion of the Obey River Watershed lies within 2 Level III ecoregions (Southwestern Appalachians and Interior Plateau) and contains 4 subecoregions (Level IV):

- Cumberland Plateau (68a)
- Plateau Escarpment (68c)
- Eastern Highland Rim (71g)
- Outer Nashville Basin (71h)

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

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

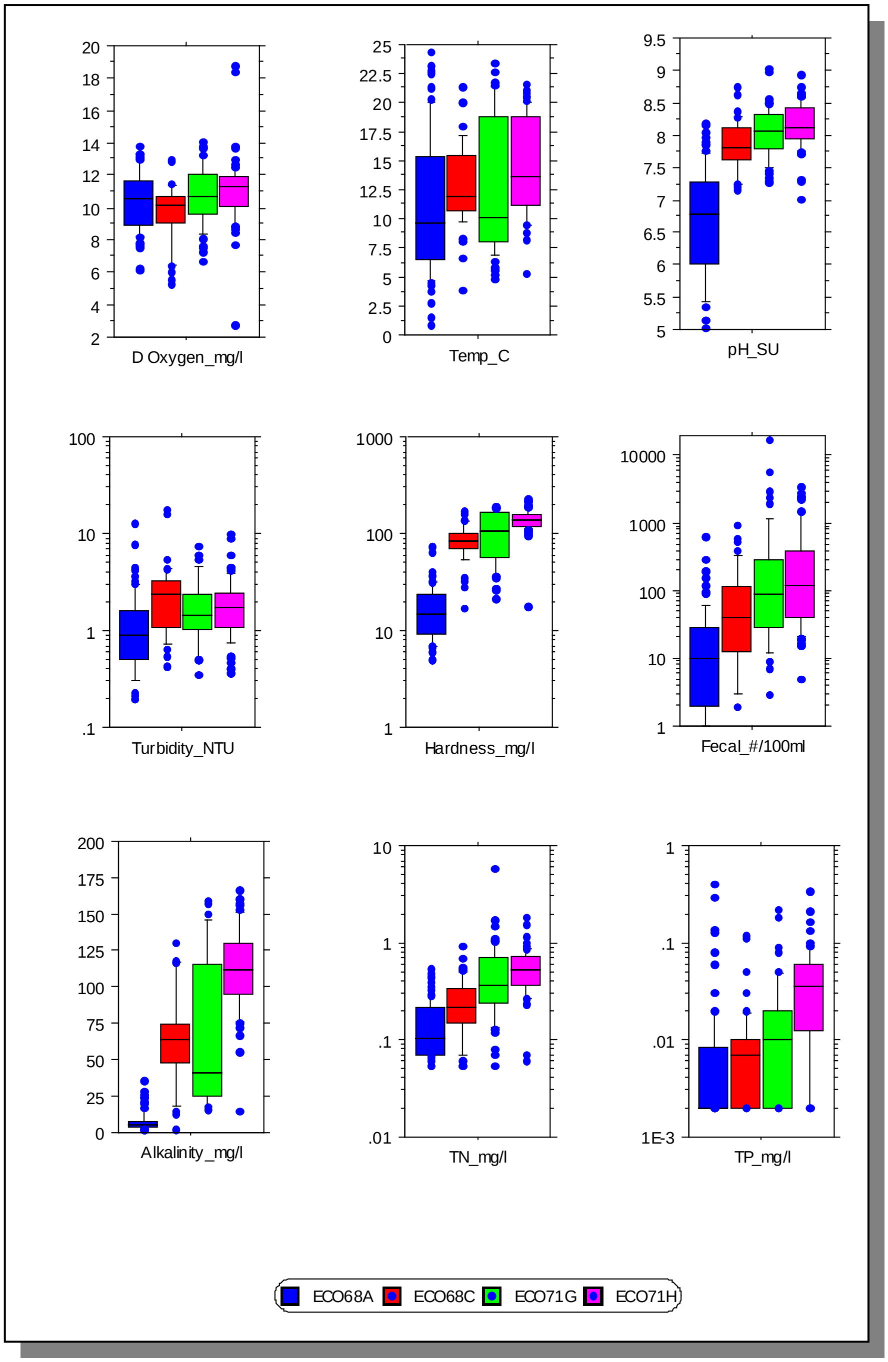


Figure 3-3. Select Chemical Data Collected in the Tennessee Portion of Obey River Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th percentiles. Extreme values are also shown as dots. Fecal, fecal coliform bacteria; TN, Total Nitrogen; TP, Total Phosphorus.*

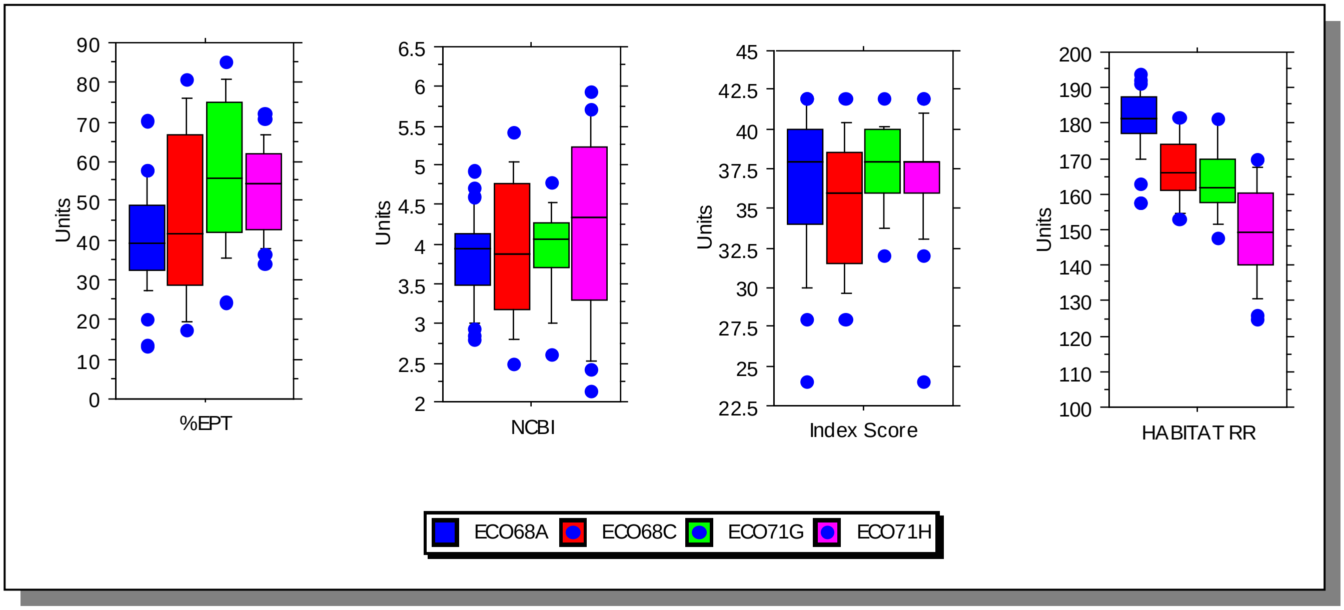


Figure 3-4. Benthic Macroinvertebrate and Habitat Scores for the Tennessee Portion of Obey River Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th percentiles. Extreme values are also shown as dots. NCBI, North Carolina Biotic Index. Index Score and Habitat Riffle/Run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

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

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

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

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

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

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

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

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

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

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

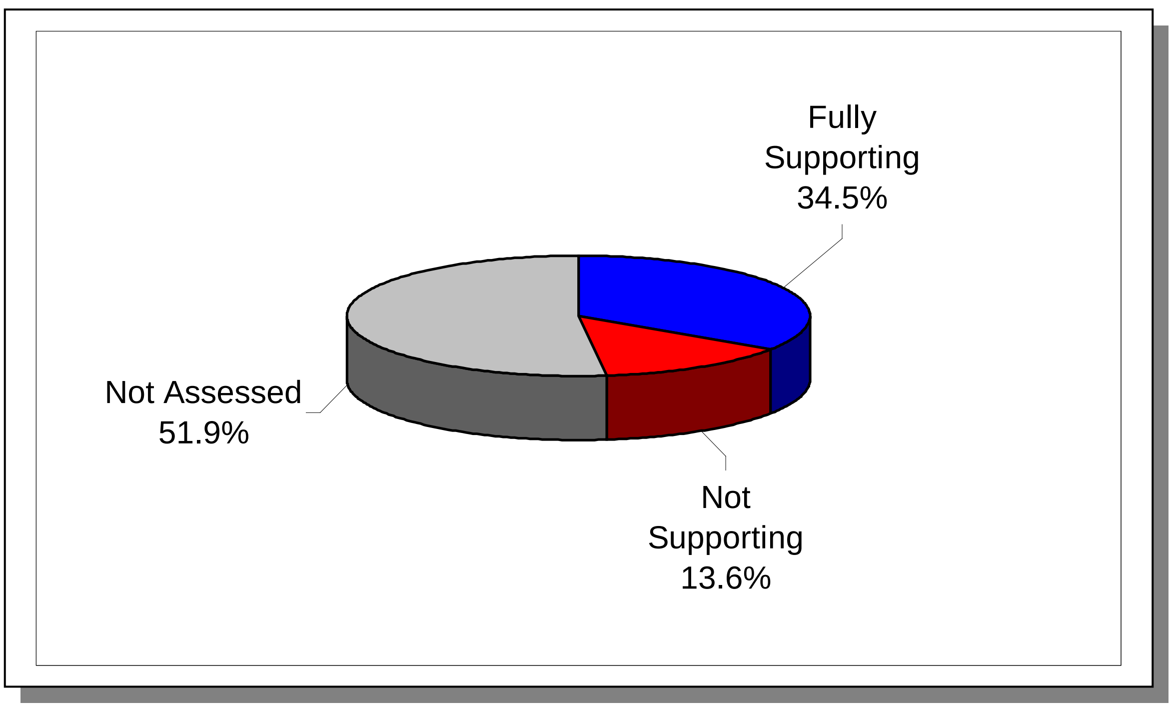


Figure 3-5. Water Quality Assessment of Streams in the Tennessee Portion of the Obey River Watershed. *Assessment data are based on the 2004 Water Quality Assessment of 776.4 stream miles in the watershed. More information is provided in Appendix III.*

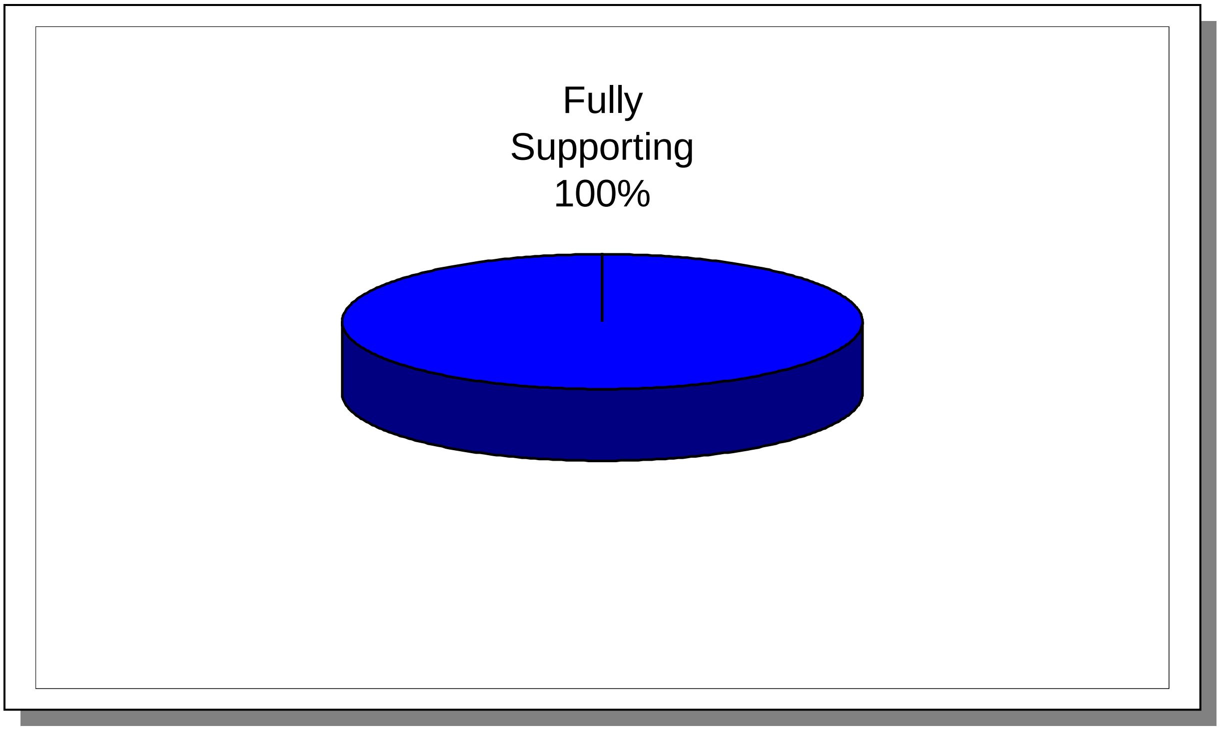


Figure 3-6. Water Quality Assessment of Lakes in the Tennessee Portion of the Obey River Watershed. *Assessment data are based on the 2004 Water Quality Assessment of 22,000 lake acres in the watershed. More information is provided in Appendix III.*

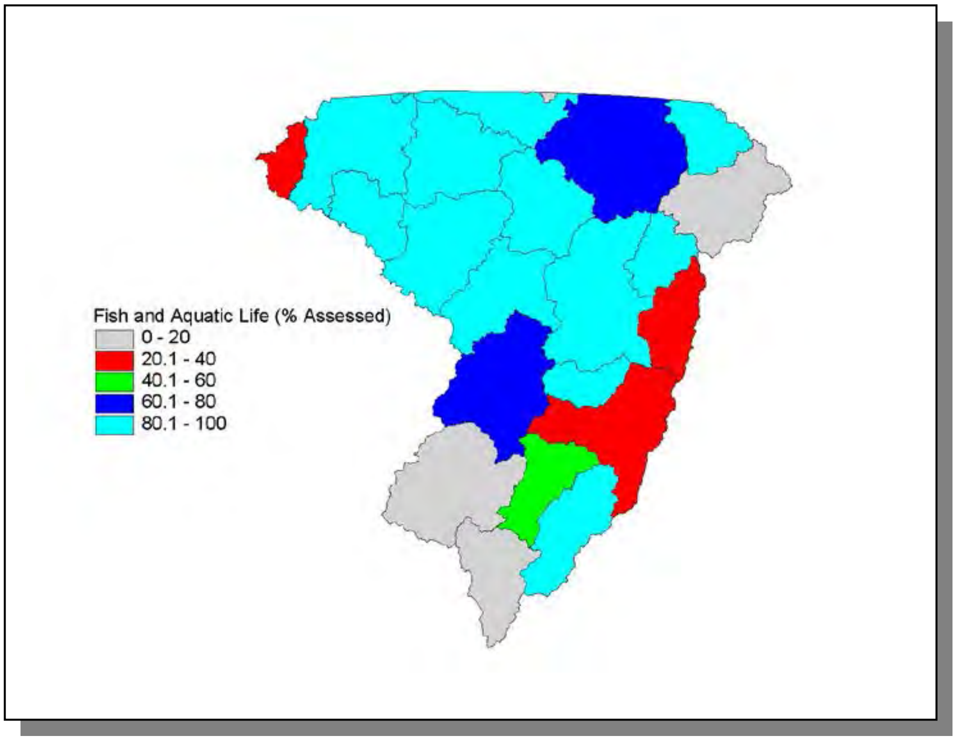


Figure 3-7. Percentage of Stream Miles Assessed for Support of Fish and Aquatic Life Designated Use in HUC-12 Subwatersheds.

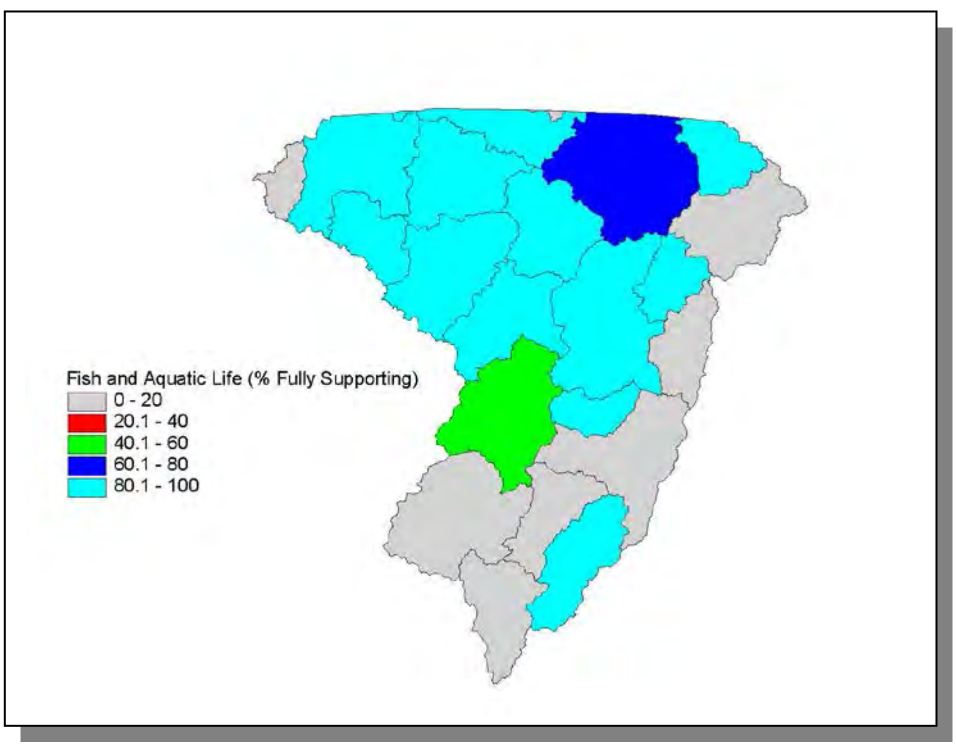


Figure 3-8. Percentage of Stream Miles Fully Supporting for Fish and Aquatic Life Designated Use in HUC-12 Subwatersheds.

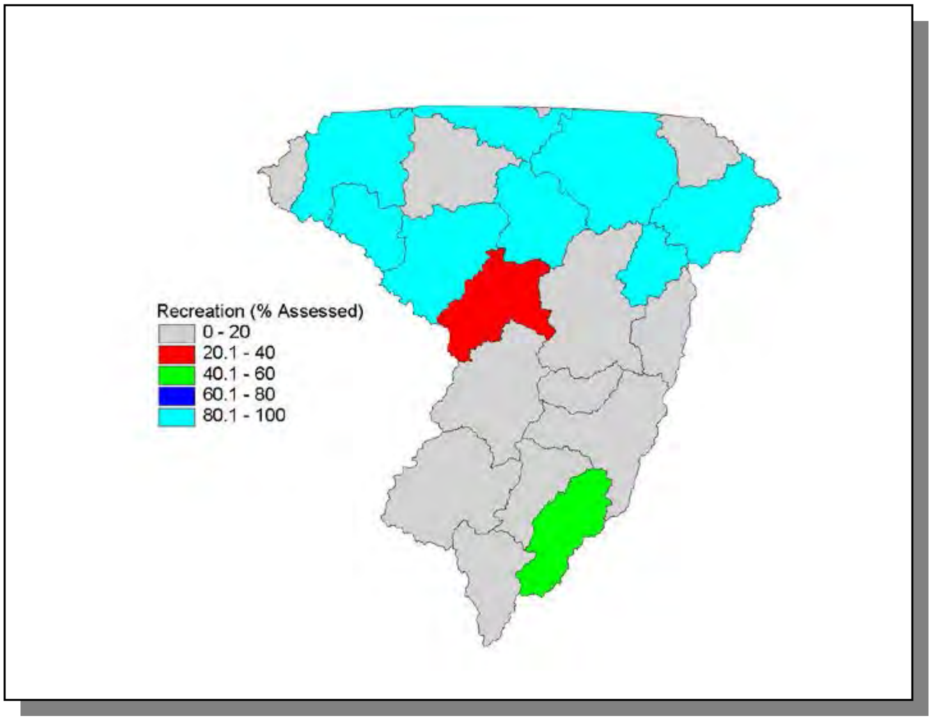


Figure 3-9. Percentage of Stream Miles Assessed for Support of Recreation Designated Use in HUC-12 Subwatersheds.

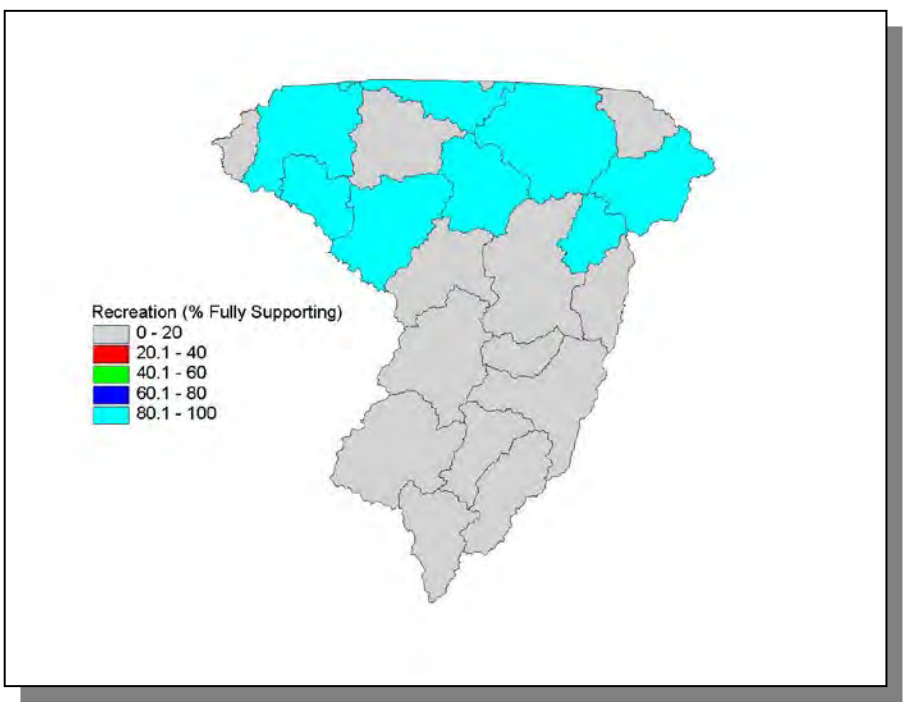


Figure 3-10. Percentage of Stream Miles Fully Supporting for Recreation Designated Use in HUC-12 Subwatersheds.

3.3.A. Assessment Summary.

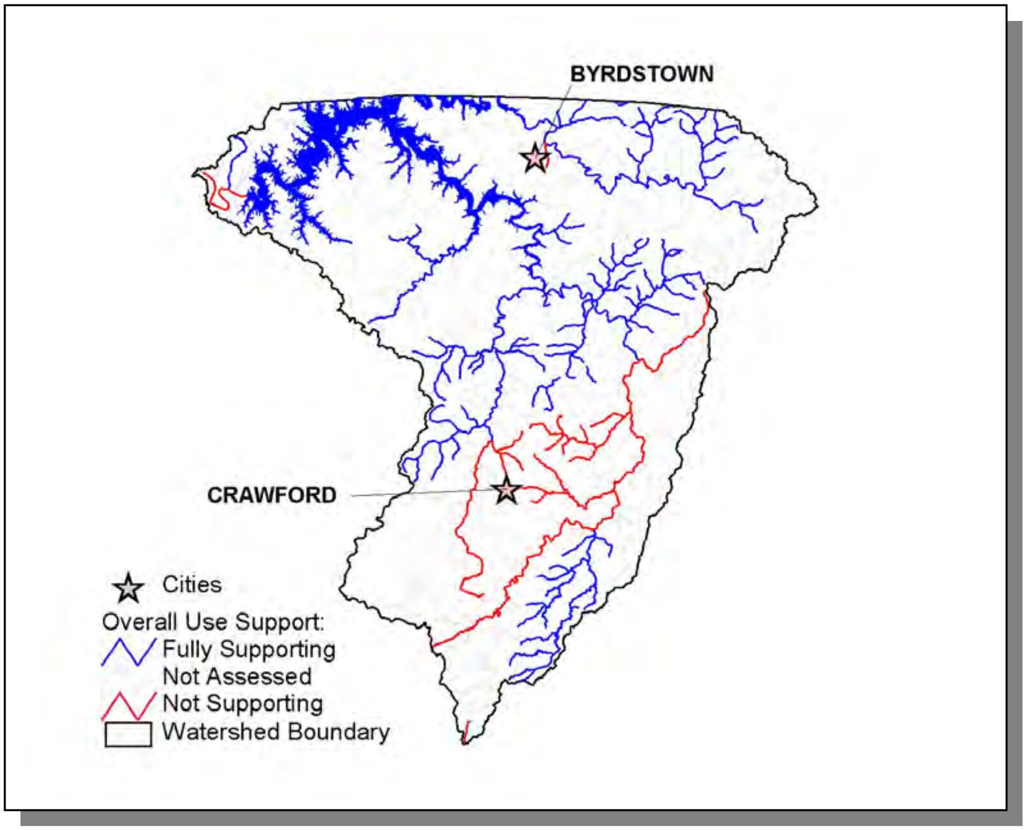


Figure 3-11. Overall Use Support Attainment in the Tennessee Portion of the Obey River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Byrdstown and Crawford are shown for reference. More information is provided in Appendix III.*

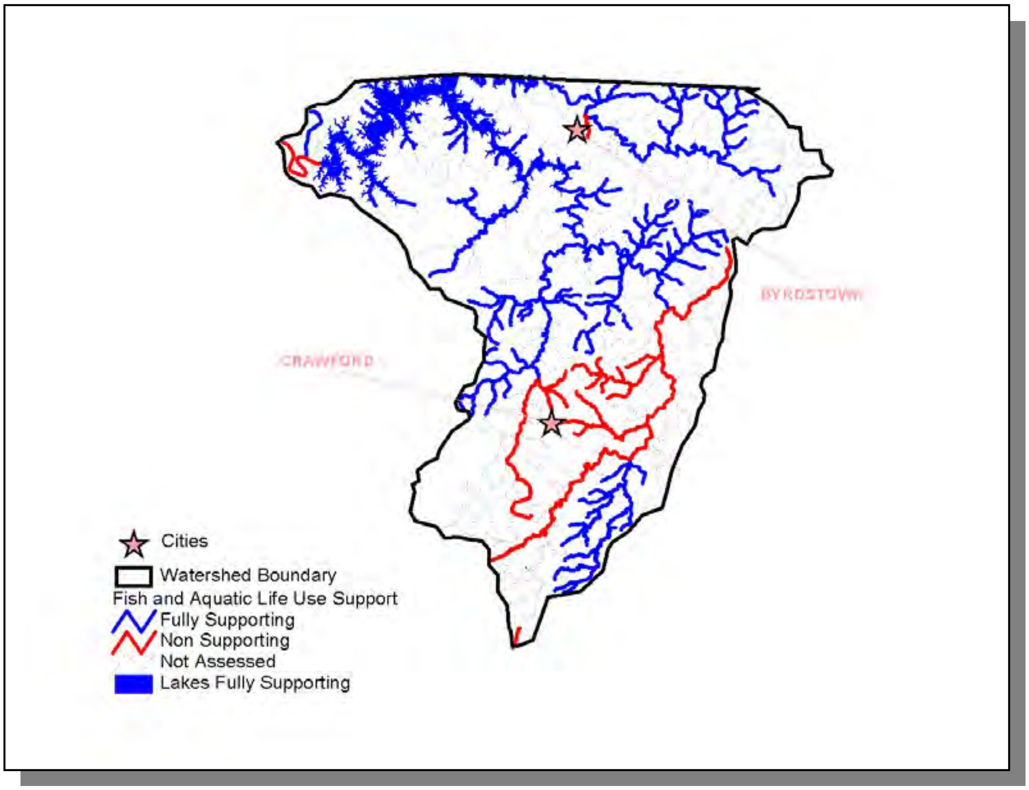


Figure 3-12. Fish and Aquatic Life Use Support Attainment in the Tennessee Portion of the Obey River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Byrdstown and Crawford are shown for reference. More information is provided in Appendix III.*

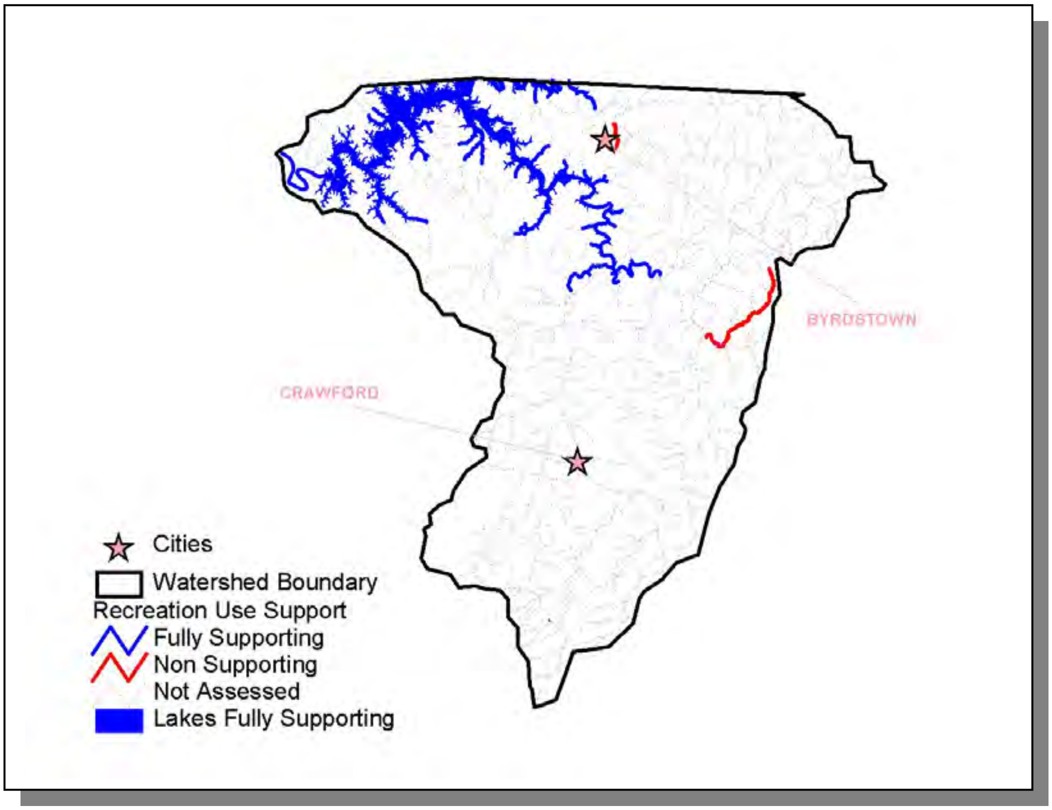


Figure 3-13. Recreation Use Support Attainment in the Tennessee Portion of the Obey River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Byrdstown and Crawford are shown for reference. More information is provided in Appendix III.*

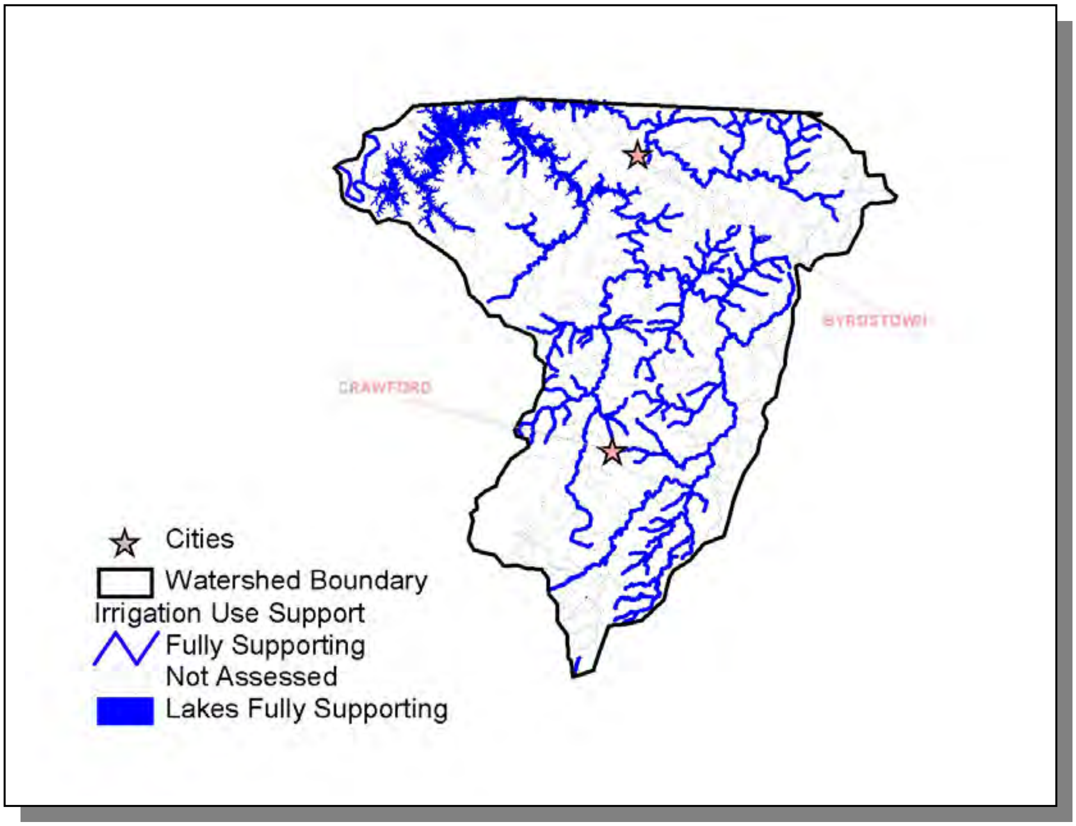


Figure 3-14. Irrigation Use Support Attainment in the Tennessee Portion of the Obey River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Byrdstown and Crawford are shown for reference. More information is provided in Appendix III.*

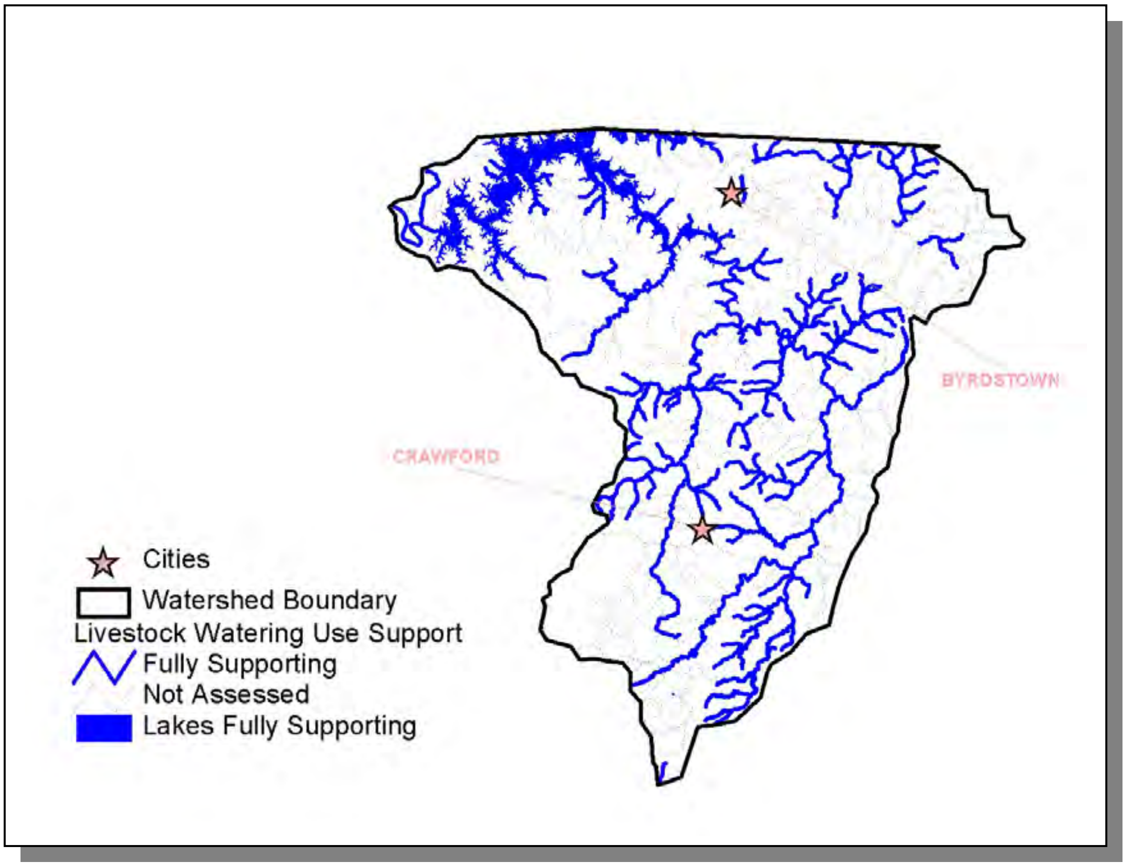


Figure 3-15. Livestock Watering and Wildlife Use Support Attainment in the Tennessee Portion of the Obey River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Byrdstown and Crawford are shown for reference. More information is provided in Appendix III.*

3.3.B. Use Impairment Summary.

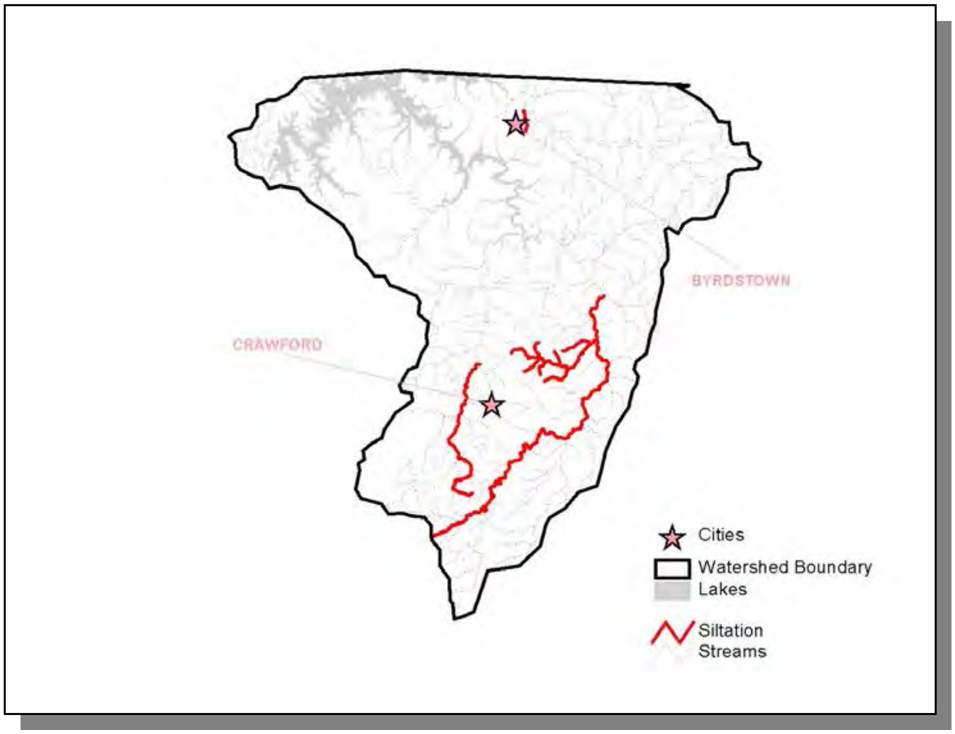


Figure 3-16. Impaired Streams Due to Siltation in the Tennessee Portion of the Obey River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Locations of Byrdstown and Crawford are shown for reference. More information is provided in Appendix III.*

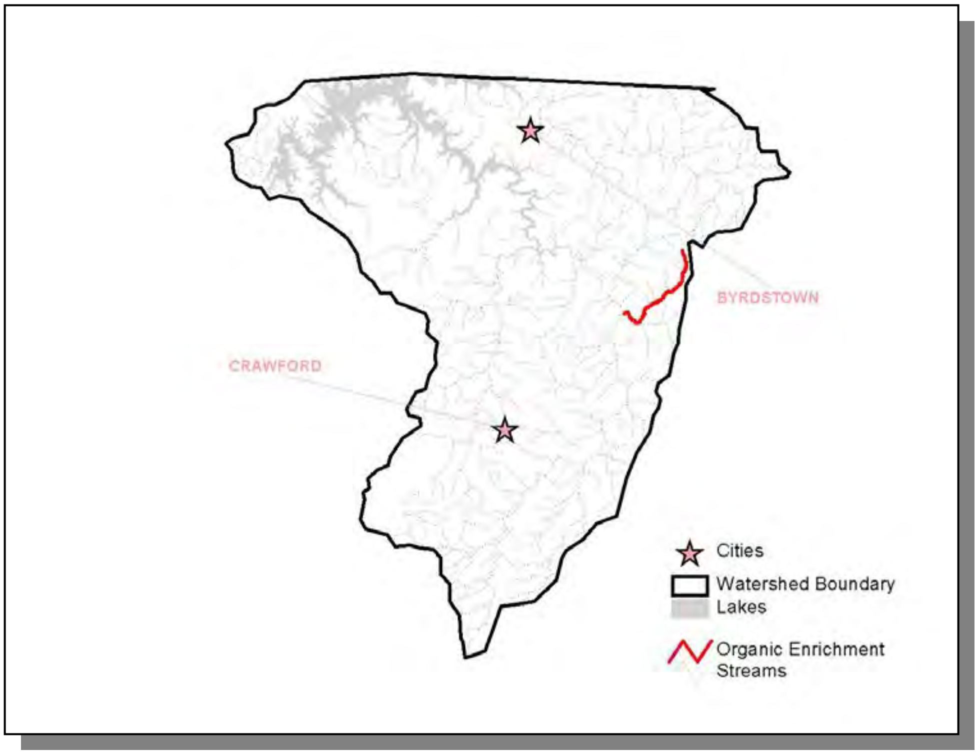


Figure 3-17. Impaired Streams Due to Organic Enrichment or Low Dissolved Oxygen in the Tennessee Portion of the Obey River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Locations of Byrdstown and Crawford are shown for reference. More information is provided in Appendix III.*

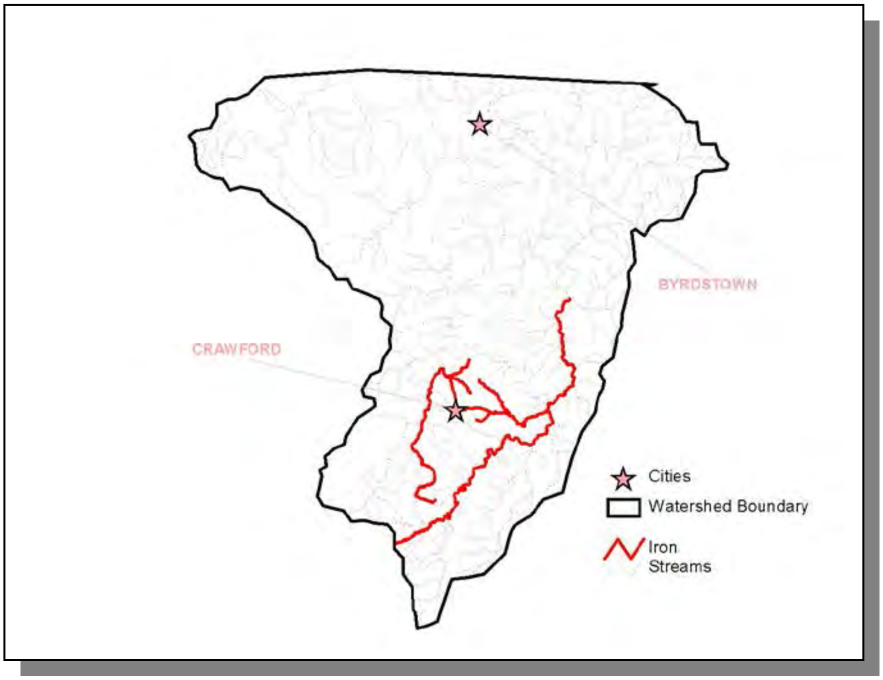


Figure 3-18. Impaired Streams Due to Iron in the Tennessee Portion of the Obey River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Locations of Byrdstown and Crawford are shown for reference. More information is provided in Appendix III.*

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

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

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

CHAPTER 4

POINT AND NONPOINT SOURCE CHARACTERIZATION OF THE OBEY RIVER WATERSHED

4.1 Background.

4.2. Characterization of HUC-10 Subwatersheds
4.2.A. 0513010501 (East Fork Obey River)
4.2.B. 0513010502 (West Fork Obey River)
4.2.C. 0513010503 (Obey River)
4.2.D. 0513010504 (Wolf River)
4.2.E. 0513010505 (Obey River)

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

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

The Tennessee portion of the Obey River Watershed (HUC 05130105) has been delineated into five HUC 10 (10-digit) subwatersheds, each of which is composed of three or more HUC-12 subwatersheds.

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

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

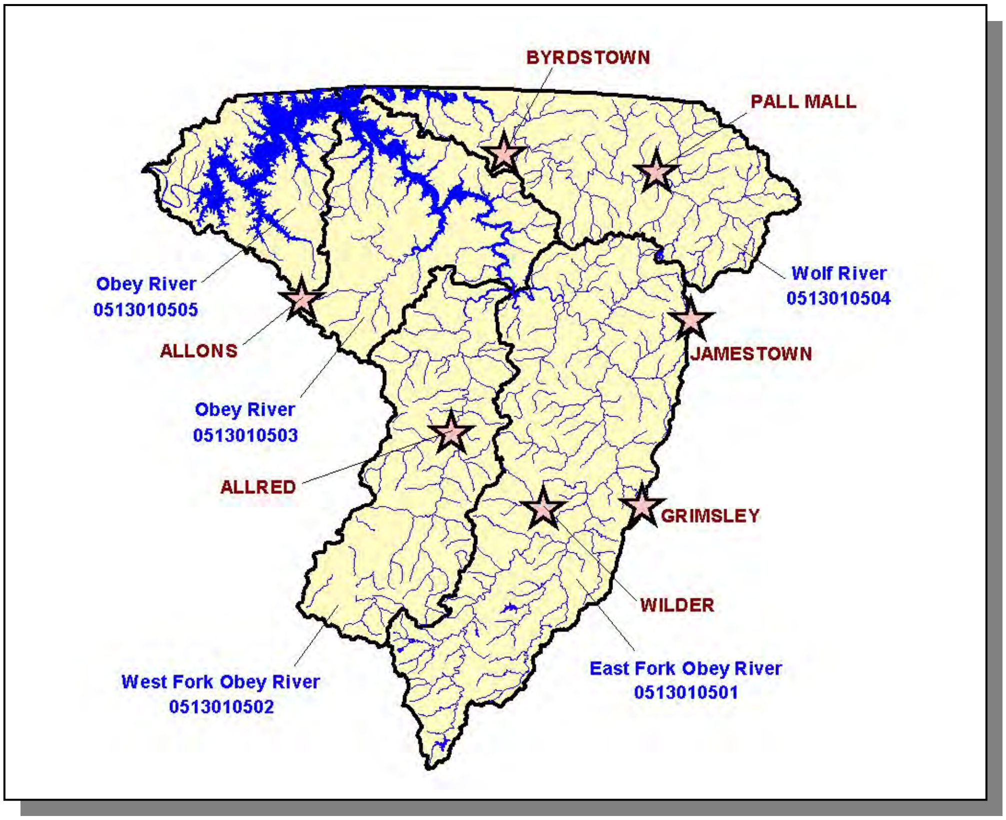


Figure 4-1. The Tennessee Portion of the Obey River Watershed is Composed of Five USGS-Delineated Subwatersheds (10-Digit Subwatersheds). *Locations of Allons, Allred, Byrdstown, Grimsley, Jamestown, Pall Mall, and Wilder are shown for reference.*

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

HUC-10	HUC-12
0513010501	051301050101 (East Fork Obey River)
	051301050102 (East Fork Obey River)
	051301050103 (Hurricane Creek)
	051301050104 (East Fork Obey River)
	051301050105 Piney Creek)
	051301050106 (East Fork Obey River)
	051301050107 (Rockcastle Creek)
	051301050108 (Poplar Creek)
0513010502	051301050201 (West Fork Obey River)
	051301050202 (West Fork Obey River)
	051301050203 (West Fork Obey River)
0513010503	051301050301 (Obey River)
	051301050302 (Eagle Creek)
	051301050303 (Obey River)
0513010504	051301050401 (Wolf River)
	051301050402 (Rotten Fork Wolf River)
	051301050403 (Wolf River)
	051301050404 (Dale Hollow Lake)
	051301050405 (Spring Creek)
0513010505	051301050501 (Dale Hollow Lake)
	051301050502 (Sulpher Creek)
	051301050503 (Mitchell Creek)
	051301050504 (Obey River)

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. 0513010501.

Figure 4-2. Location of Subwatershed 0513010501. *All Obey River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.A.i. 051301050101 (East Fork Obey River).

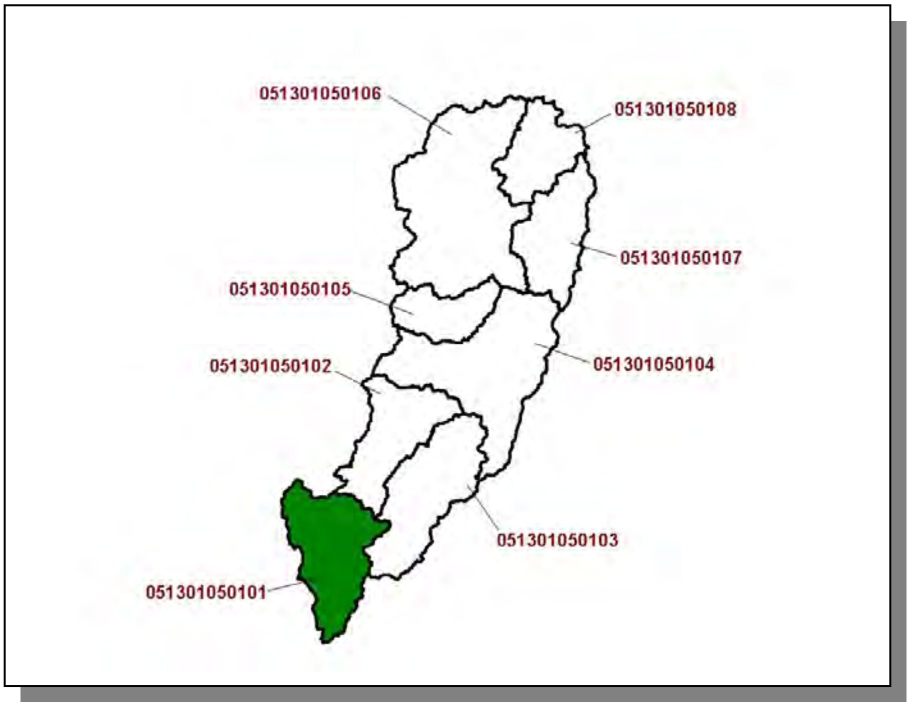


Figure 4-3. Location of Subwatershed 051301050101. *HUC-12 subwatershed are shown for reference.*

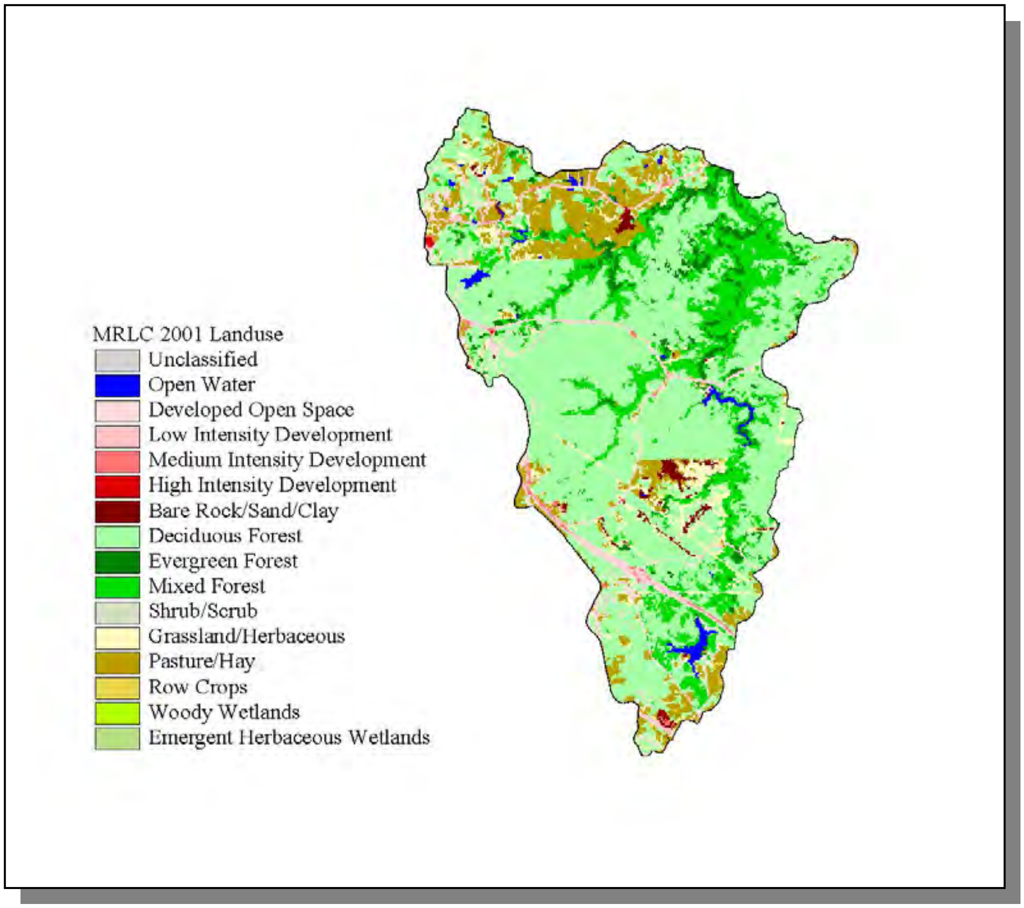


Figure 4-4. Illustration of Land Use Distribution in Subwatershed 051301050101.

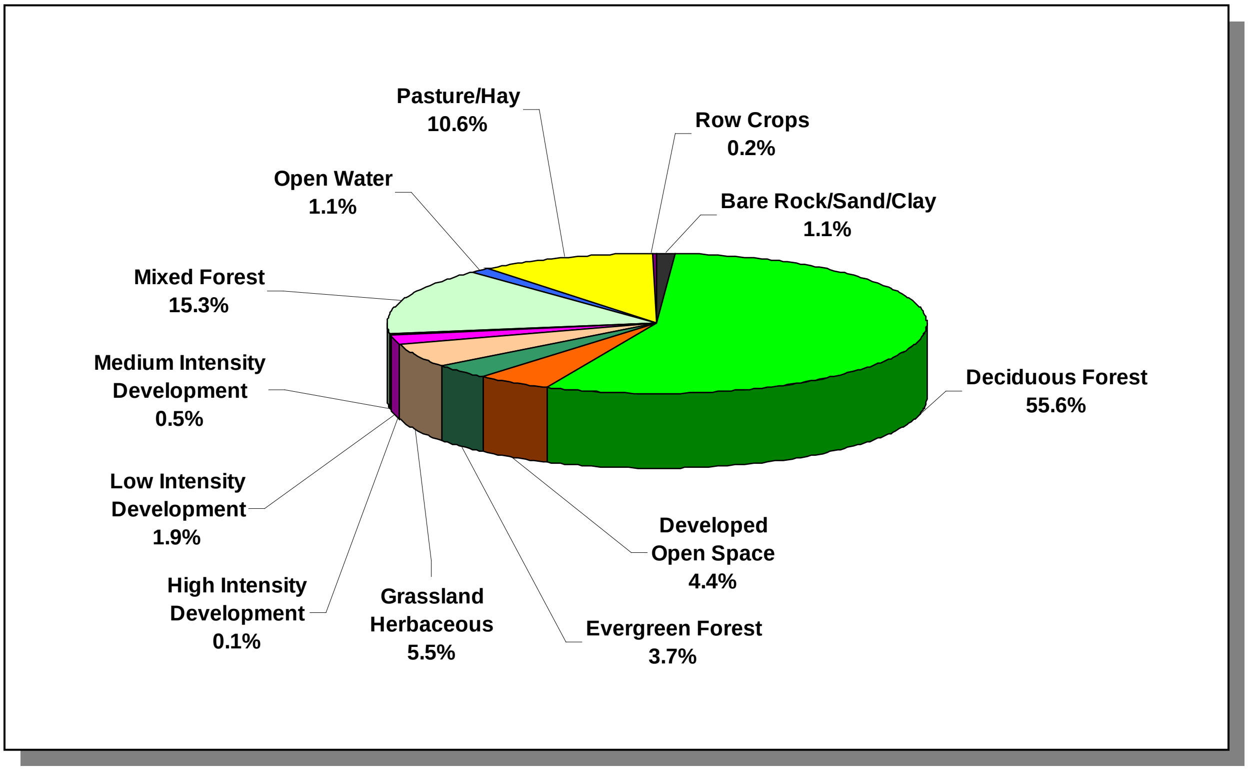


Figure 4-5. Land Use Distribution in Subwatershed 051301050101. *More information is provided in Appendix IV.*

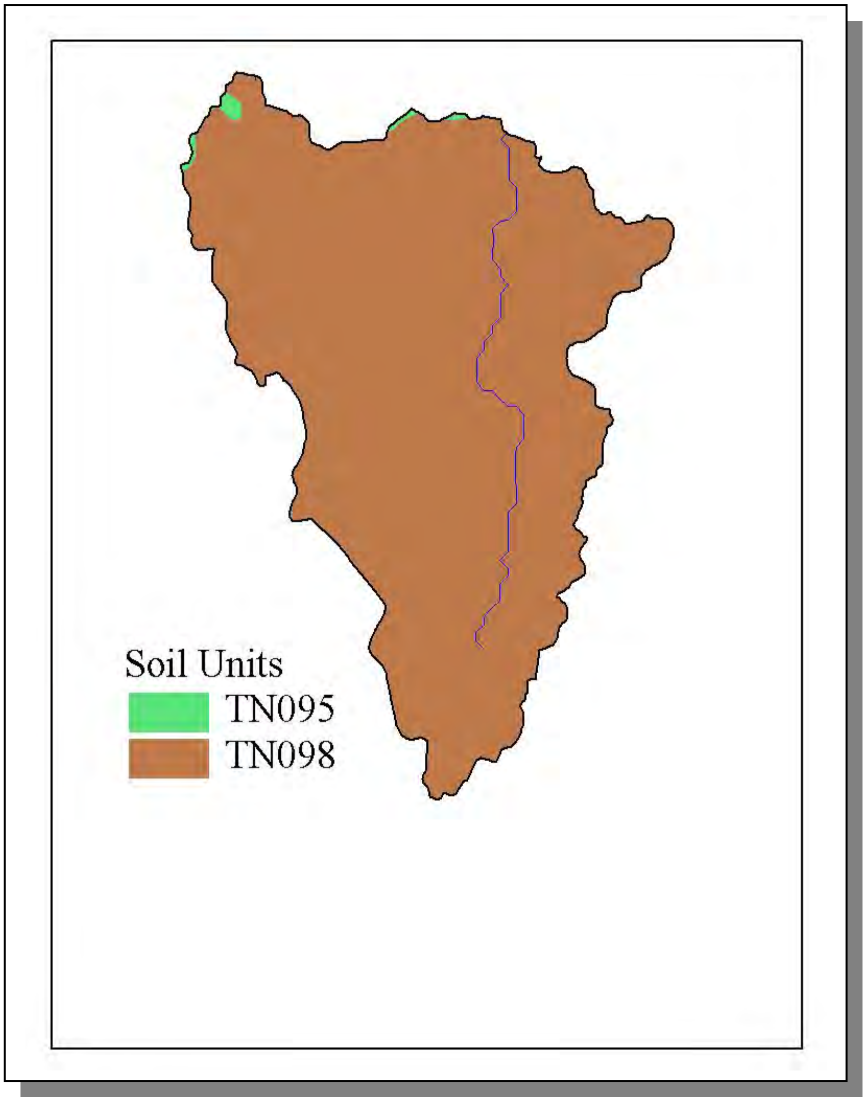


Figure 4-6. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050101.

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	2.98	4.82	Loam	0.32

Table 4-2. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050101. *The definition of "Hydrologic Group" is provided in Appendix IV.*

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	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Cumberland	34,736	43,217	46,802	1.63	566	705	763	34.8
Overton	17,636	19,171	20,118	0.24	43	46	49	14.0
Putnam	51,373	58,326	62,315	4.56	2,342	2,659	2,841	21.3
Total	**103,745**	**120,714**	**129,235**		**2,951**	**3,410**	**3,653**	**23.8**

Table 4-3. Population Estimates in Subwatershed 051301050101.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Monterey	Putnam	2,559	1,113	875	228	10

Table 4-4. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051301050101.

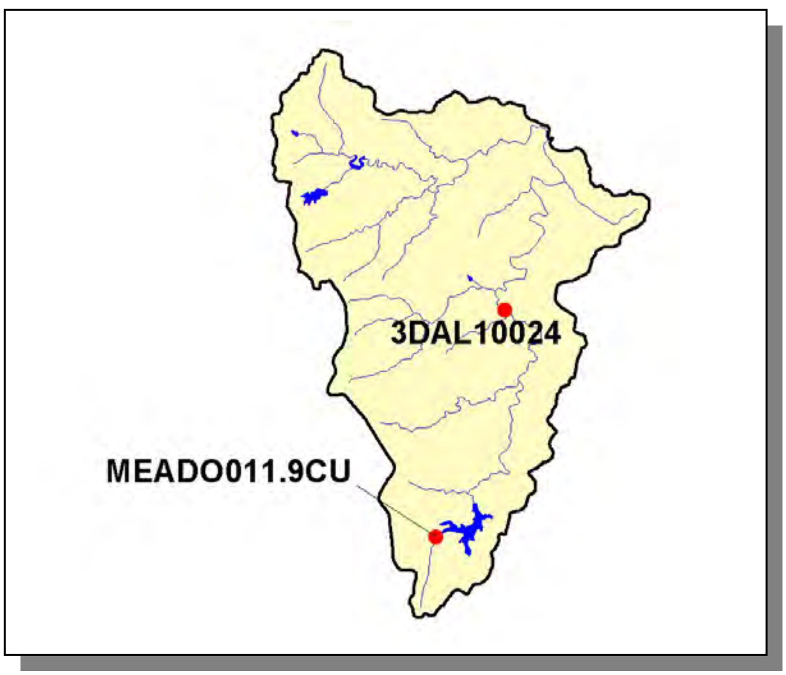

Figure 4-7. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301050101. *More information, including site names and locations, is provided in Appendix IV.*

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

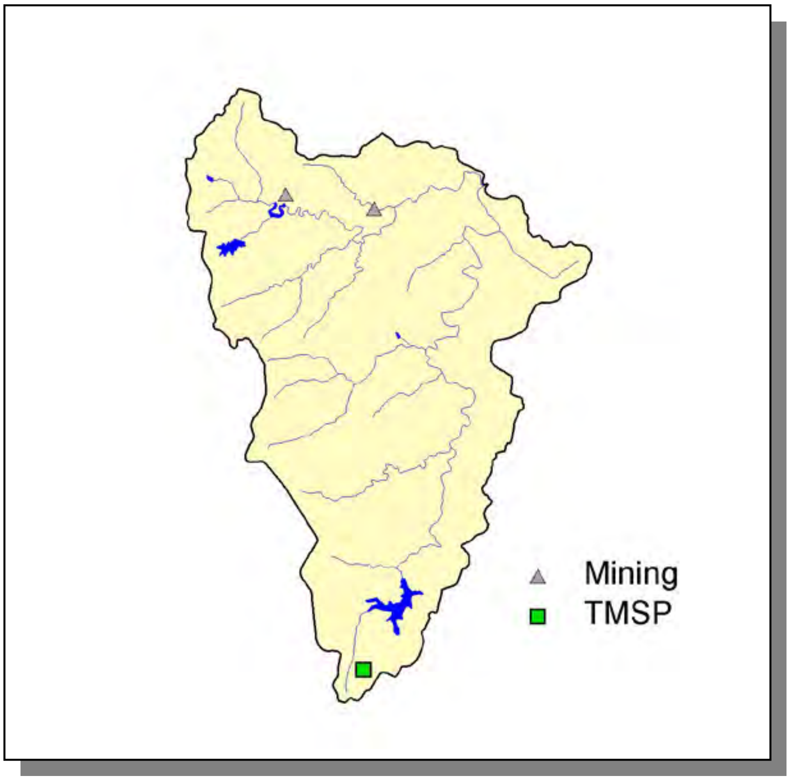

Figure 4-8. Location of Permits Issued in Subwatershed 051301050101. *More information, including the names of facilities, is provided in Appendix IV.*

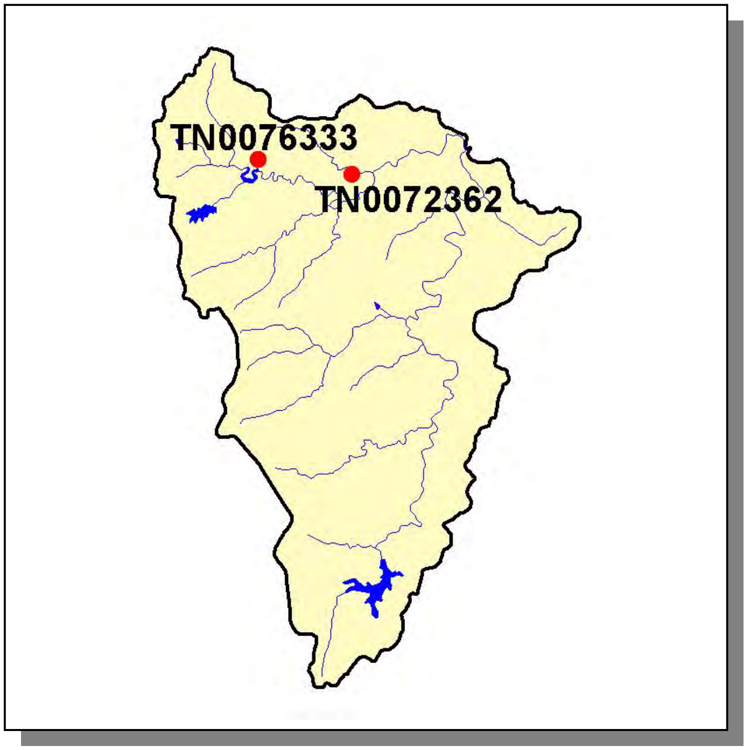

Figure 4-9. Location of Active Mining Sites in Subwatershed 051301050101. *More information, including the names of mining operations, is provided in Appendix IV.*

Figure 4-10. Location of TMSP Sites in Subwatershed 051301050101. *More information, including the names of facilities, is provided in Appendix IV.*

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
320	662	39	<5	66	5

Table 4-5. Summary of Livestock Count Estimates in Subwatershed 051301050101. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/),* **"***Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Cumberland	9,468	23,179	2,296	43	6,038	461
Overton	15,150	27,812	1,200	1,173	811	59
Putnam	12,592	24,817	1,095	1,025	1,070	66

Table 4-6. Summary of Livestock Count Estimates in Cumberland, Overton, and Putnam Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* **"***Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Cumberland	320.3	320.3	5.9	22.5
Overton	170.3	170.3	1.7	7.0
Putnam	152.5	152.5	3.6	16.4

Table 4-7. Forest Acreage and Annual Removal Rates (1987-1994) in Cumberland, Overton, and Putnam Counties.

CROPS	TONS/ACRE/YEAR
Legumes (Pastureland)	0.15
Grass (Pastureland)	1.30
Grass (Hayland)	2.10
Legumes, Grass (Hayland)	0.53
Legumes (Hayland)	0.23
Grass, Forbs, Legumes (Mixed Pasture)	0.70
Corn (Row Crops)	3.82
Soybeans (Row Crops)	6.65
Wheat (Close-Grown Cropland)	7.00
Tobacco (Row Crops)	12.38
Other Vegetable and Truck Crops	14.63
Conservation Reserve Program Lands	0.46
Farmsteads and Ranch Headquarters	0.23

Table 4-8. Annual Estimated Total Soil Loss in Subwatershed 051301050101.

4.2.A.ii. 051301050102 (East Fork Obey River).

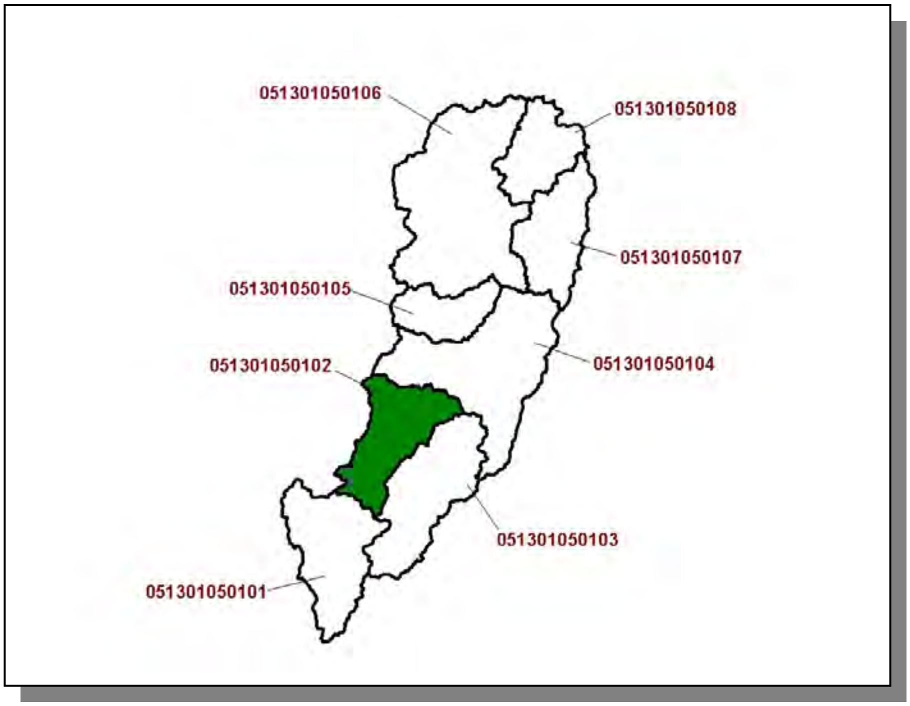

Figure 4-11. Location of Subwatershed 051301050102. *HUC-12 subwatershed boundaries are shown for reference.*

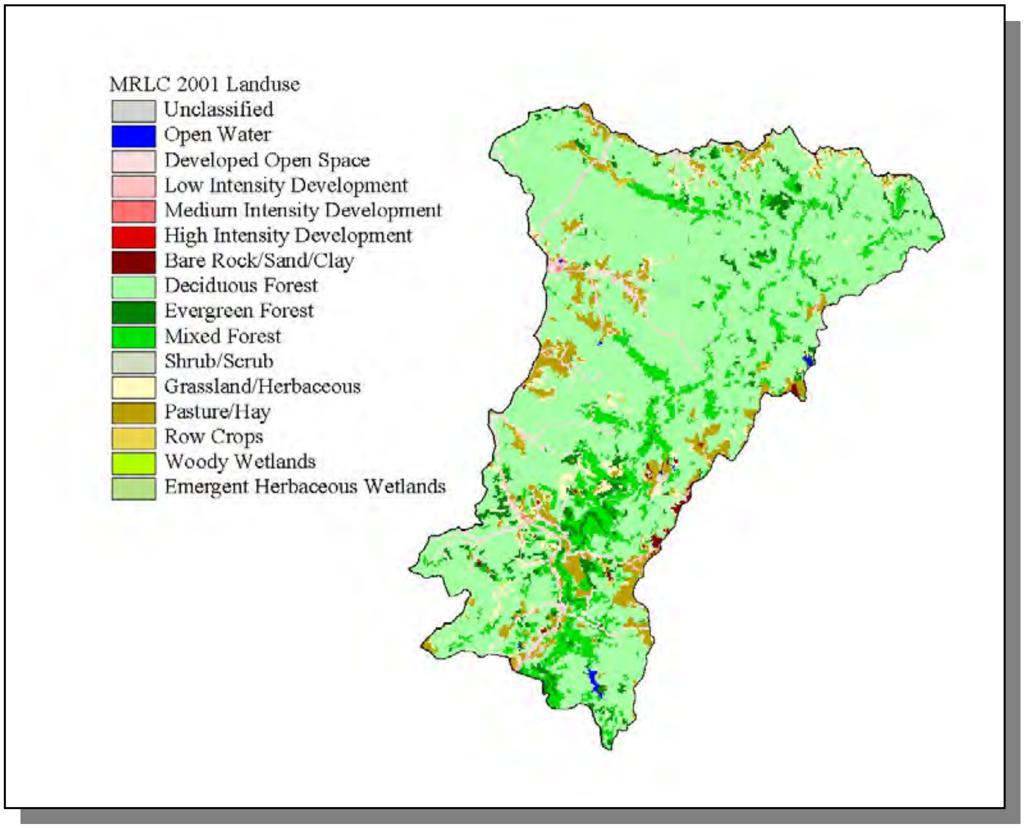

Figure 4-12. Illustration of Land Use Distribution in Subwatershed 051301050102.

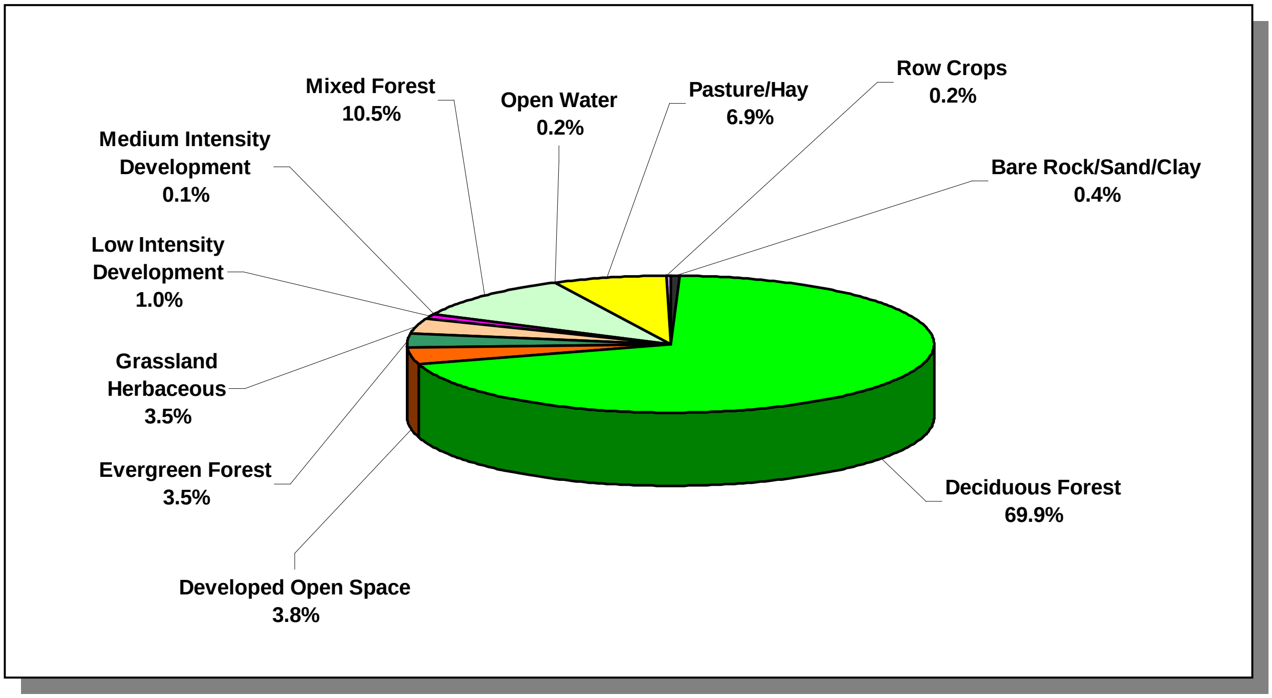

Figure 4-13. Land Use Distribution in Subwatershed 051301050102. *More information is provided in Appendix IV.*

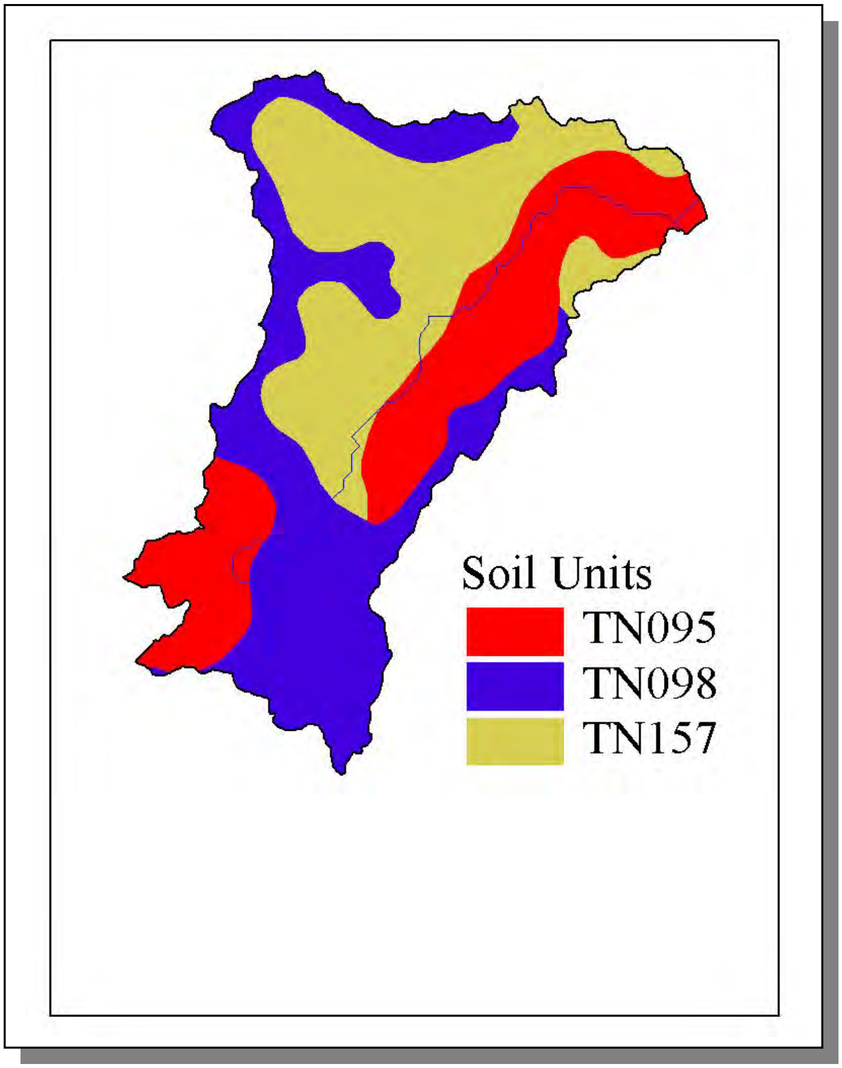

Figure 4-14. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050102.

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	2.98	4.82	Loam	0.32
TN157	0.00	B	2.38	4.62	Loam	0.28

Table 4-9. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050102. *The definition of "Hydrologic Group" is provided in Appendix IV.*

.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	0.3	45	48	50	11.1
Overton	17,636	19,171	20,118	5.6	988	1,074	1,128	14.2
Putnam	51,373	58,326	62,315	0.06	28	32	34	21.4
Total	**83,678**	**93,417**	**99,058**		**1,061**	**1,154**	**1,212**	**14.2**

Table 4-10. Population Estimates in Subwatershed 051301050102.

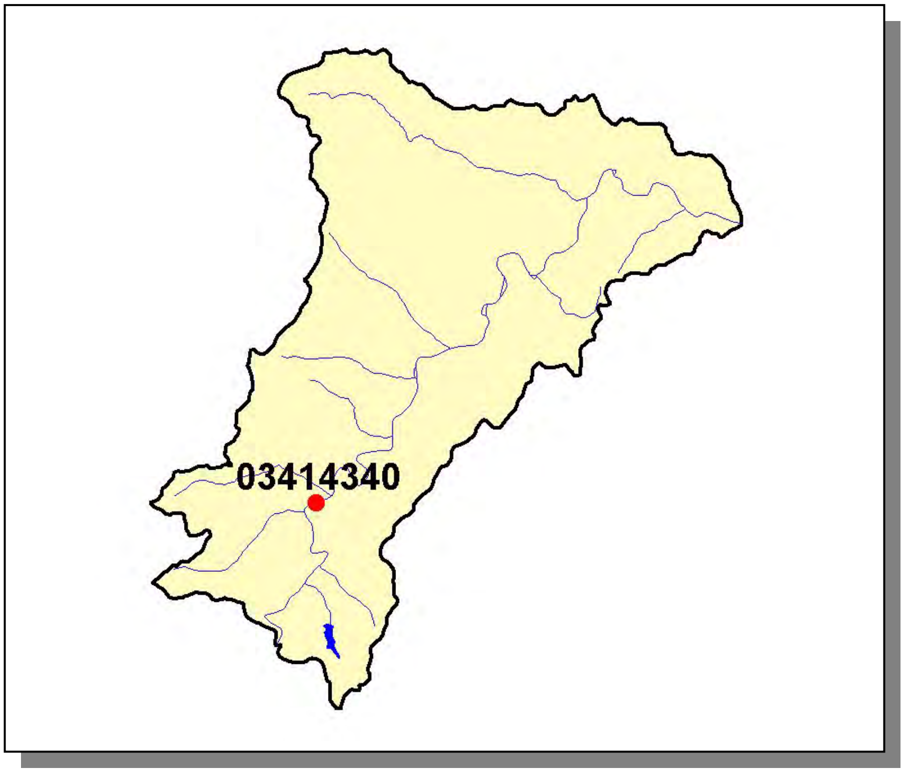

Figure 4-15. Location of Historical Streamflow Data Collection Sites in Subwatershed 051301050102. *More information is provided in Appendix IV.*

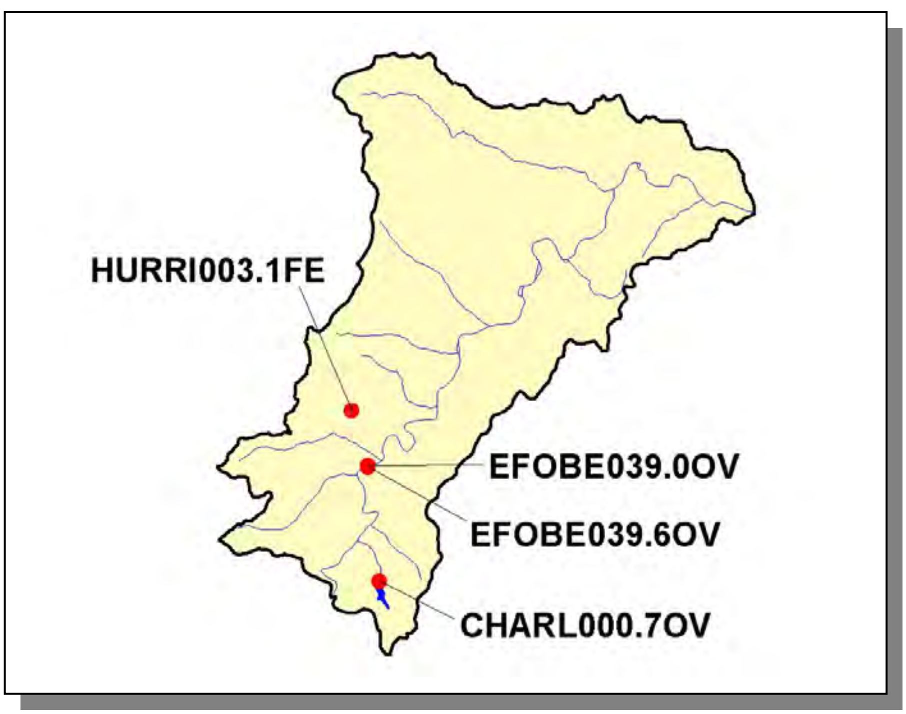

Figure 4-16. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301050102. *More information, including site names and locations, is provided in Appendix IV.*

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

There are no point source contributions in this subwatershed.

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

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
168	308	13	<5	515	9	<5

Table 4-11. Summary of Livestock Count Estimates in Subwatershed 051301050102. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Fentress	8,058	17,259	430	474	7,290,026	729	79
Overton	15,150	27,812	1,200	1,173	0	811	59
Putnam	12,592	24,817	1,095	1,025	0	1,070	66

Table 4-12. Summary of Livestock Count Estimates in Fentress, Overton, and Putnam Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Fentress	244.1	244.1	3.6	14.3
Overton	170.3	170.3	1.7	7.0
Putnam	152.5	152.5	3.6	16.4

Table 4-13. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress, Overton, and Putnam Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.30
Grass (Hayland)	0.32
Legumes, Grass (Hayland)	2.74
Legumes (Hayland)	0.23
Grass, Forbs, Legumes (Mixed Pasture)	0.64
Corn (Row Crops)	5.03
Soybeans (Row Crops)	10.51
Tobacco (Row Crops)	12.38
Wheat (Close-Grown Cropland)	9.11
Other Vegetable and Truck Crops	21.08
Conservation Reserve Program Lands	0.46
Farmsteads and Ranch Headquarters	0.57

Table 4-14. Annual Estimated Total Soil Loss in Subwatershed 051301050102.

4.2.A.iii. 051301050103 (Hurricane Creek).

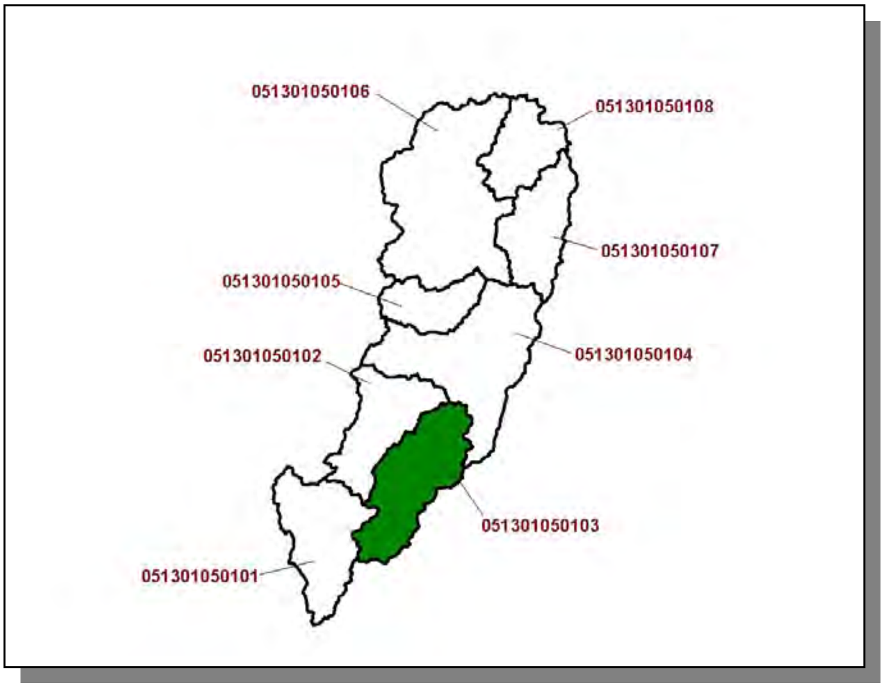

Figure 4-17. Location of Subwatershed 051301050103. *HUC-12 subwatershed boundaries are shown for reference.*

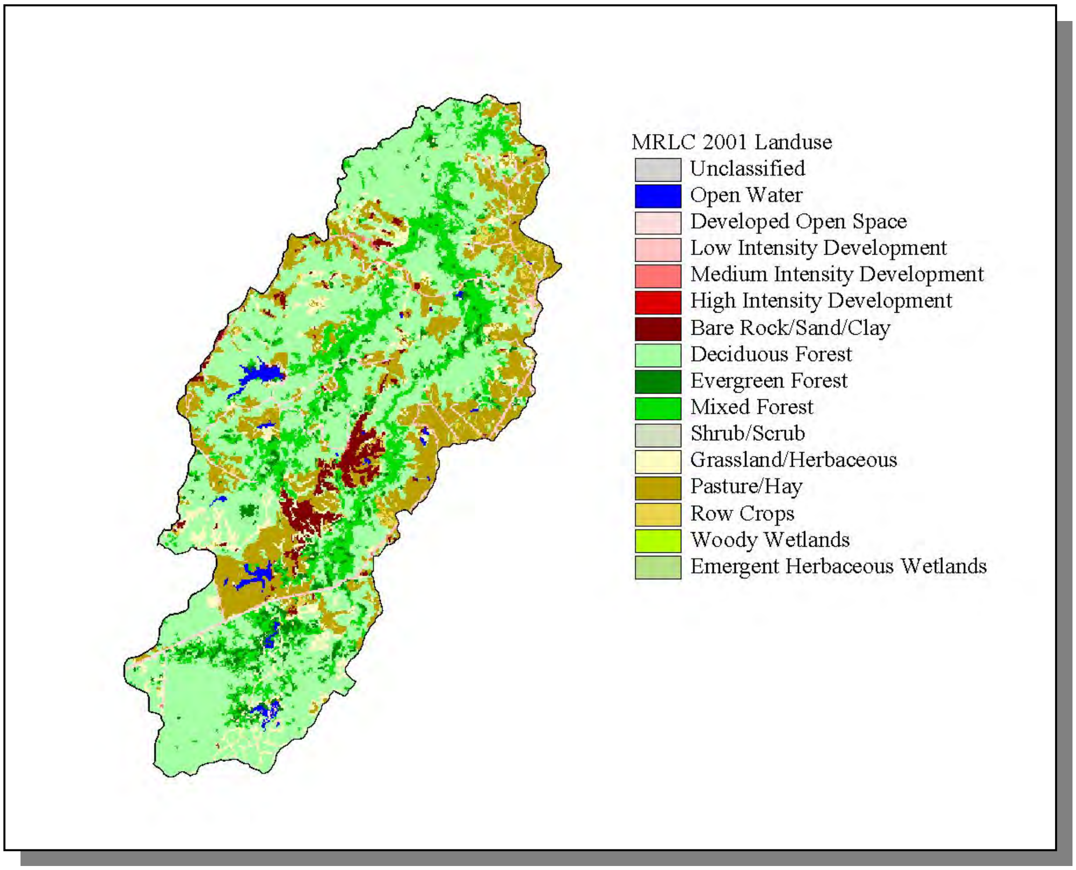

Figure 4-18. Illustration of Land Use Distribution in Subwatershed 051301050103.

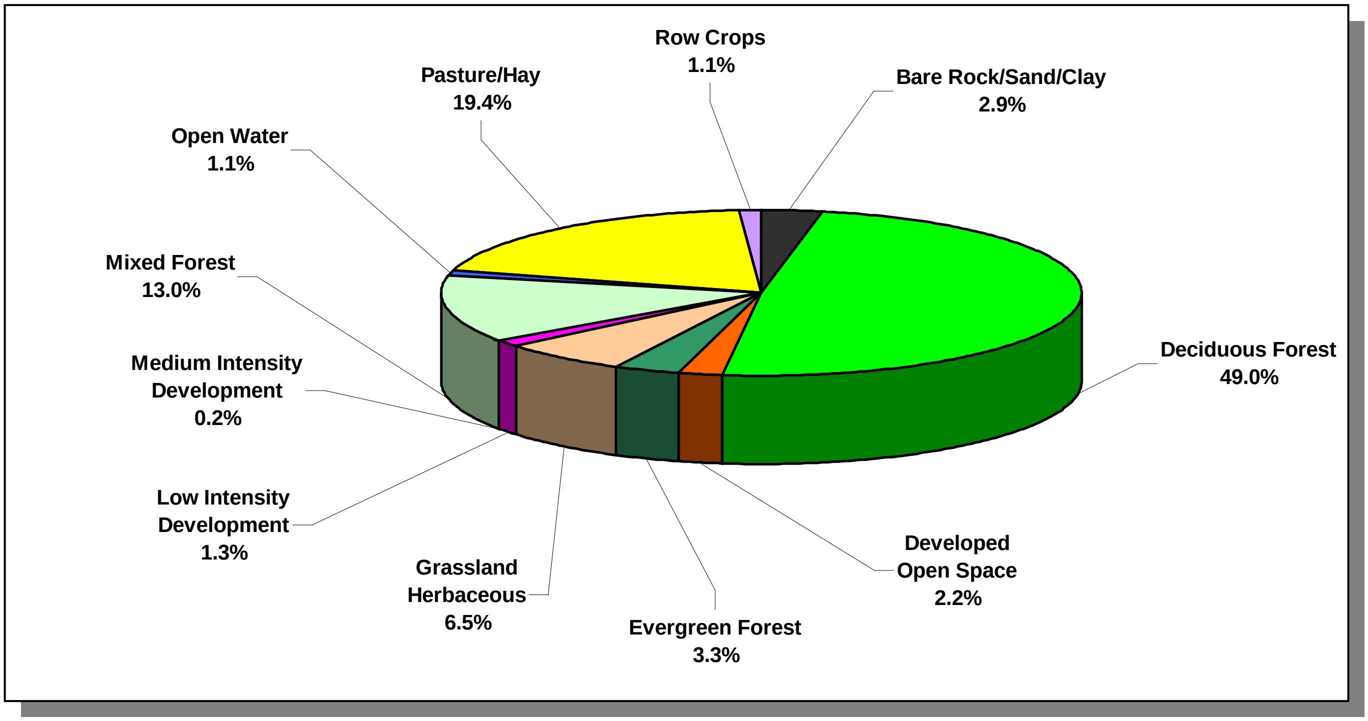

Figure 4-19. Land Use Distribution in Subwatershed 051301050103. *More information is provided in Appendix IV.*

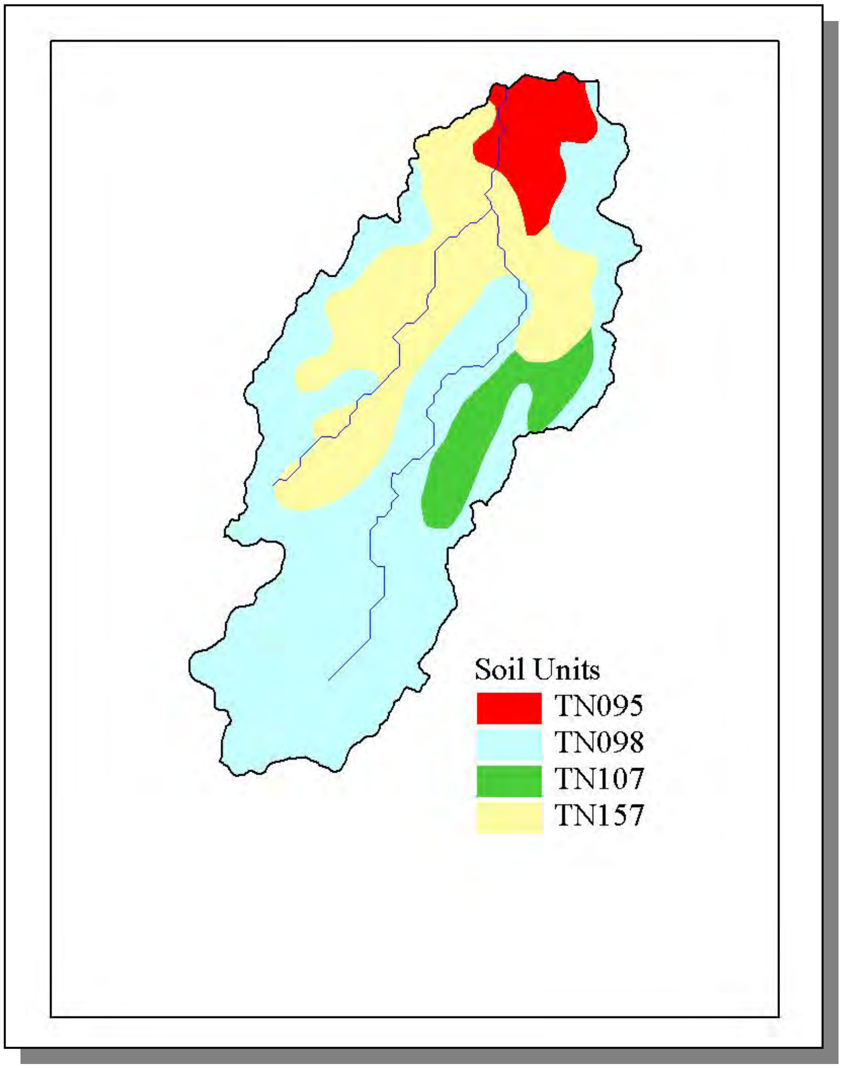

Figure 4-20. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050103.

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	2.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28
TN157	0.00	B	2.38	4.62	Loam	0.28

Table 4-15. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050103. *The definition of "Hydrologic Group" is provided in Appendix IV.*

.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Cumberland	34,736	43,217	46,802	0.65	227	283	306	34.8
Fentress	14,669	15,920	16,625	2.42	355	386	403	13.5
Overton	17,636	19,171	20,118	2.46	434	471	495	14.1
Putnam	51,373	58,326	62,315	1.63	837	950	1,015	21.3
Total	**118,414**	**136,634**	**145,860**		**1,853**	**2,090**	**2,219**	**19.8**

Table 4-16. Population Estimates in Subwatershed 051301050103.

Figure 4-21. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301050103. *More information, including site names and locations, is provided in Appendix IV.*

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

There are no point source contributions in this subwatershed.

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

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
602	1,229	42	<5	307,092	57	5

Table 4-17. Summary of Livestock Count Estimates in Subwatershed 051301050103. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Cumberland	9,468	23,179	2,296	43	0	6,038	461
Fentress	8,058	17,259	430	474	7,290,026	729	79
Overton	15,150	27,812	1,200	1,173	0	811	59
Putnam	12,592	24,817	1,095	1,025	0	1,070	66

Table 4-18. Summary of Livestock Count Estimates in Cumberland, Fentress, Overton, and Putnam Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Cumberland	320.3	320.3	5.9	22.5
Fentress	244.1	244.1	3.6	14.3
Overton	170.3	170.3	1.7	7.0
Putnam	152.5	152.3	3.6	16.4

Table 4-19. Forest Acreage and Annual Removal Rates (1987-1994) in Cumberland, Fentress, Overton, and Putnam Counties.

CROPS	TONS/ACRE/YEAR
Legumes (Pastureland)	0.15
Grass (Pastureland)	0.76
Grass (Hayland)	1.27
Legumes, Grass (Hayland)	1.26
Legumes (Hayland)	0.23
Grass, Forbs, Legumes (Mixed Pasture)	0.53
Corn (Row Crops)	9.47
Soybeans (Row Crops)	7.93
Tobacco (Row Crops)	12.38
Wheat (Close-Grown Cropland)	26.23
Other Vegetable and Truck Crops	17.18
Conservation Reserve Program Lands	0.46
Farmsteads and Ranch Headquarters	0.40

Table 4-20. Annual Estimated Total Soil Loss in Subwatershed 051301050103.

4.2.A.iv. 051301050104 (East Fork Obey River).

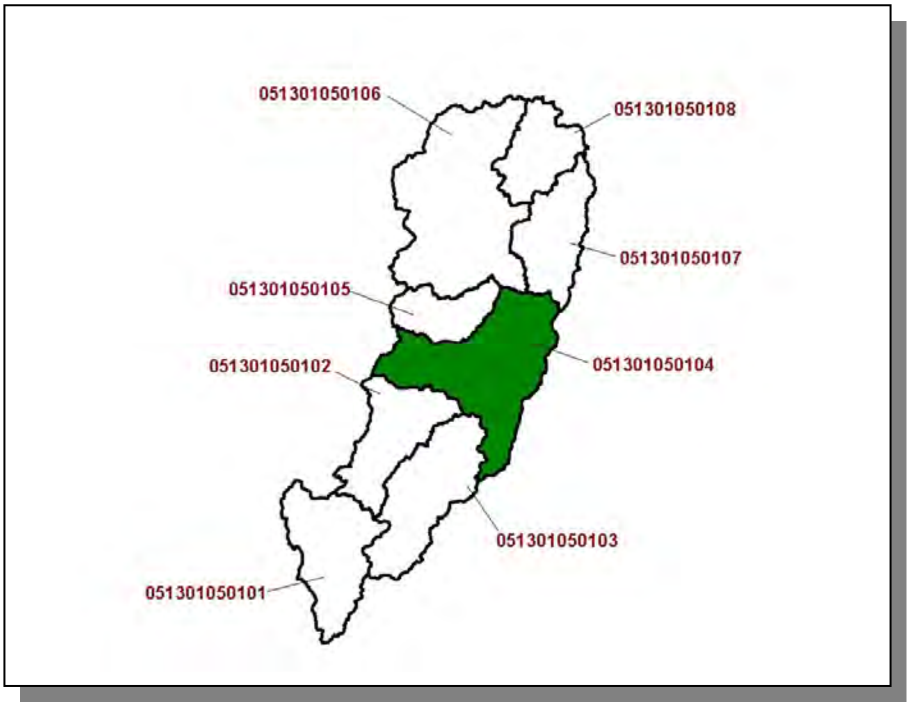

Figure 4-22. Location of Subwatershed 051301050104. *HUC-12 subwatershed are shown for reference.*

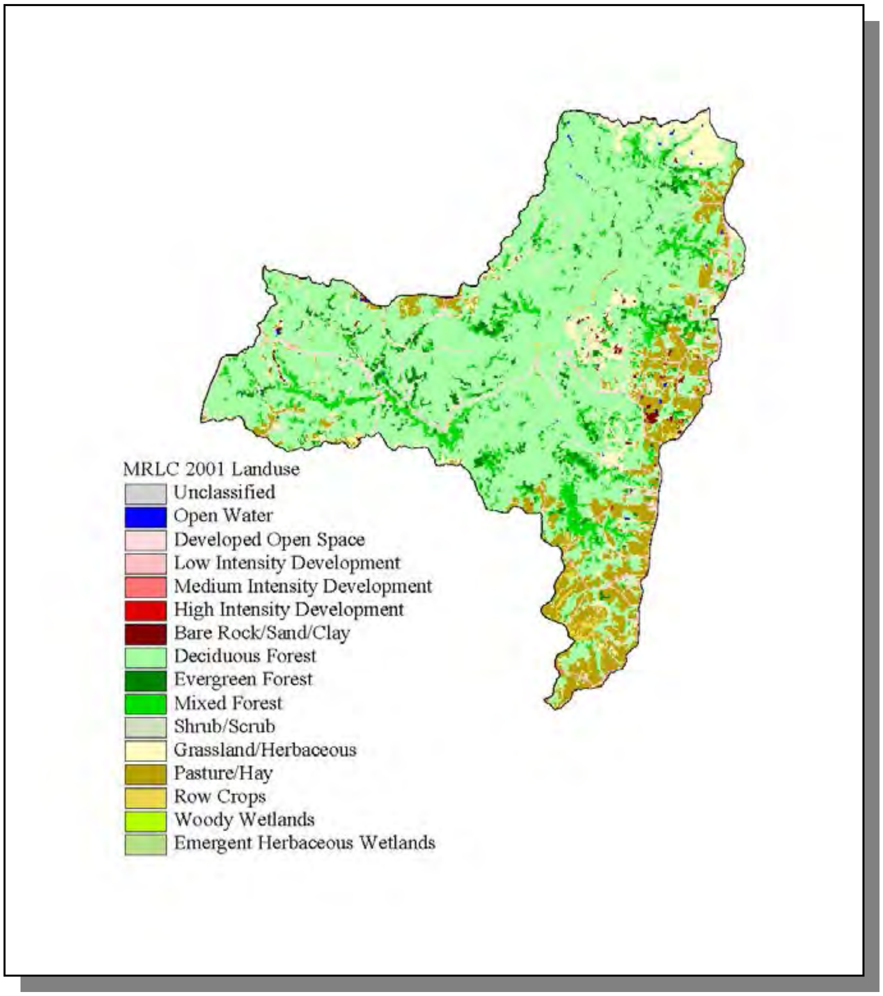

Figure 4-23. Illustration of Land Use Distribution in Subwatershed 051301050104.

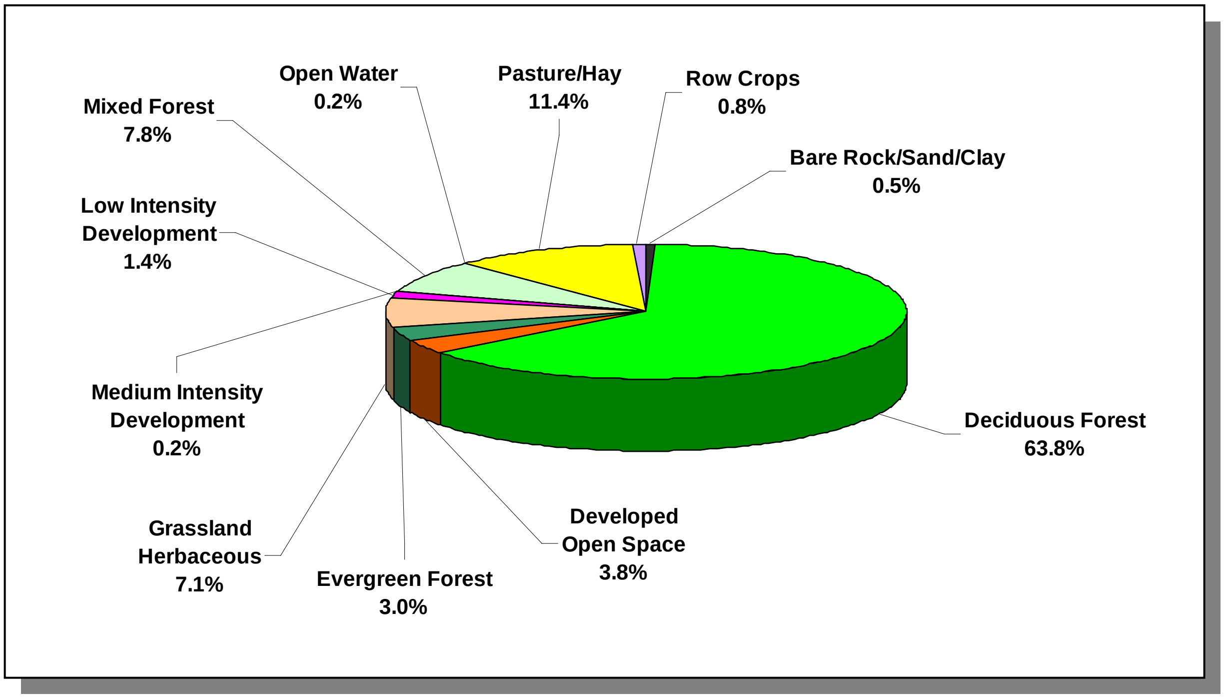

Figure 4-24. Land Use Distribution in Subwatershed 051301050104. *More information is provided in Appendix IV.*

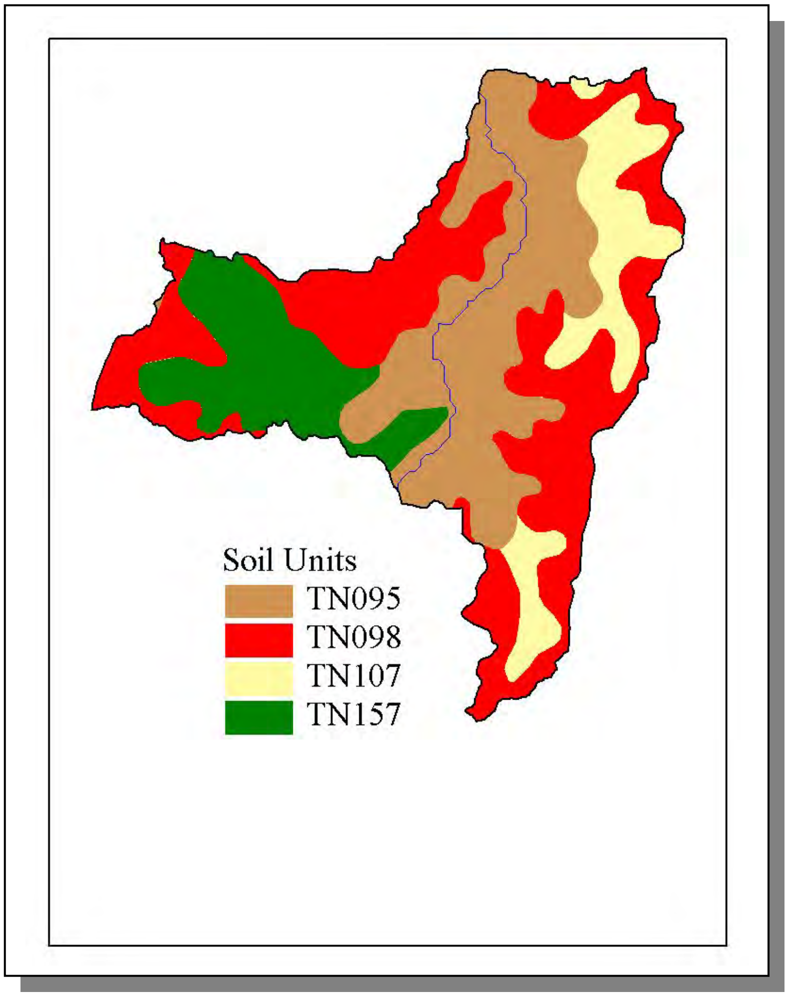

Figure 4-25. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050104.

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	2.98	4.82	Loam	0.32
TN107	1.00	C	6.34	4.84	Loam	0.28
TN157	0.00	B	2.38	4.62	Loam	0.28

Table 4-21. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050104. *The definition of "Hydrologic Group" is provided in Appendix IV.*

.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	8.65	1,269	1,377	1,438	13.3
Overton	17,636	19,171	20,118	1.67	295	320	336	13.9
Total	**32,305**	**35,091**	**36,743**		**1,564**	**1,697**	**1,774**	**13.4**

Table 4-22. Population Estimates in Subwatershed 051301050104.

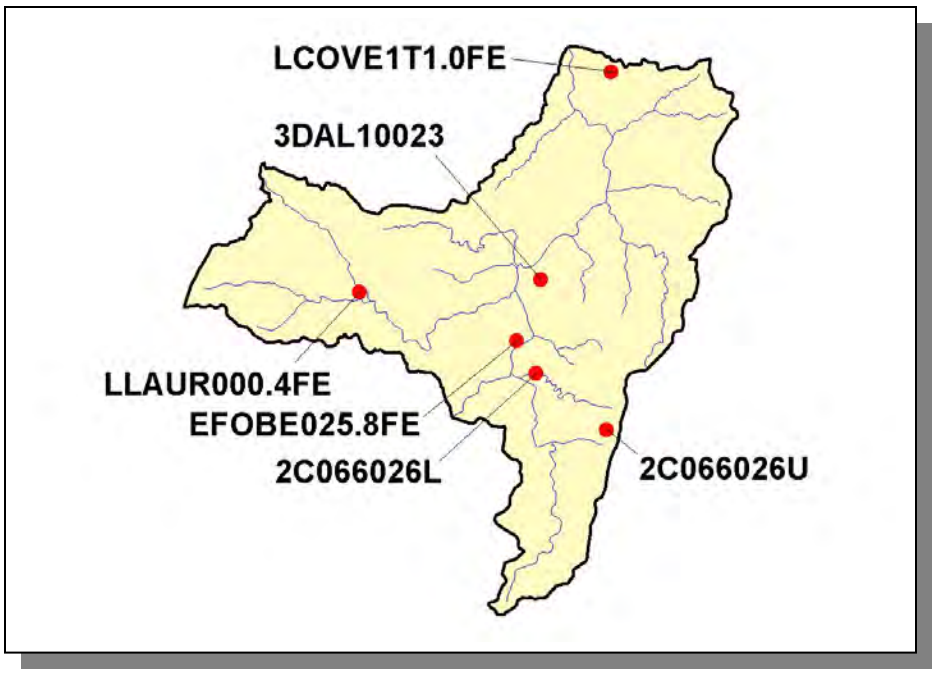

Figure 4-26. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301050104. *More information, including site names and locations, is provided in Appendix IV.*

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

Figure 4-27. Location of Permits Issued in Subwatershed 051301050104. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-28. Location of Active Mining Sites in Subwatershed 051301050104. *More information, including the names of mining operations, is provided in Appendix IV.*

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

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
591	1,257	32	<5	509,675	52	6

Table 4-23. Summary of Livestock Count Estimates in Subwatershed 051301050104. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* **"***Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Fentress	8,058	17,259	430	474	7,290,026	729	79
Overton	15,150	27,812	1,200	1,173	0	811	59

Table 4-24. Summary of Livestock Count Estimates in Fentress and Overton Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* **"***Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Fentress	244.1	244.1	3.6	14.3
Overton	170.3	170.3	1.7	7.0

Table 4-25. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress and Overton Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.65
Grass (Hayland)	0.31
Legumes, Grass (Hayland)	0.90
Grass, Forbs, Legumes (Mixed Pasture)	0.33
Corn (Row Crops)	14.46
Soybeans (Row Crops)	6.69
Wheat (Close-Grown Cropland)	38.11
Other Vegetable and Truck Crops	16.75
Conservation Reserve Program Lands	0.46
Farmsteads and Ranch Headquarters	0.42

Table 4-26. Annual Estimated Total Soil Loss in Subwatershed 051301050104.

4.2.A.v. 051301050105 (Piney Creek).

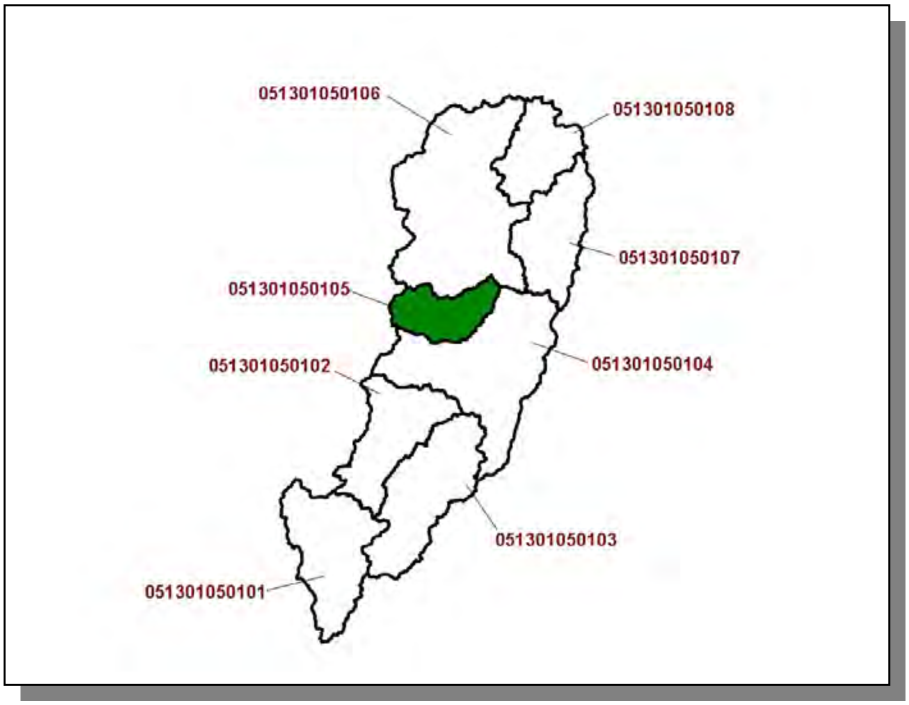

Figure 4-29. Location of Subwatershed 051301050105. *HUC-12 subwatershed boundaries are shown for reference.*

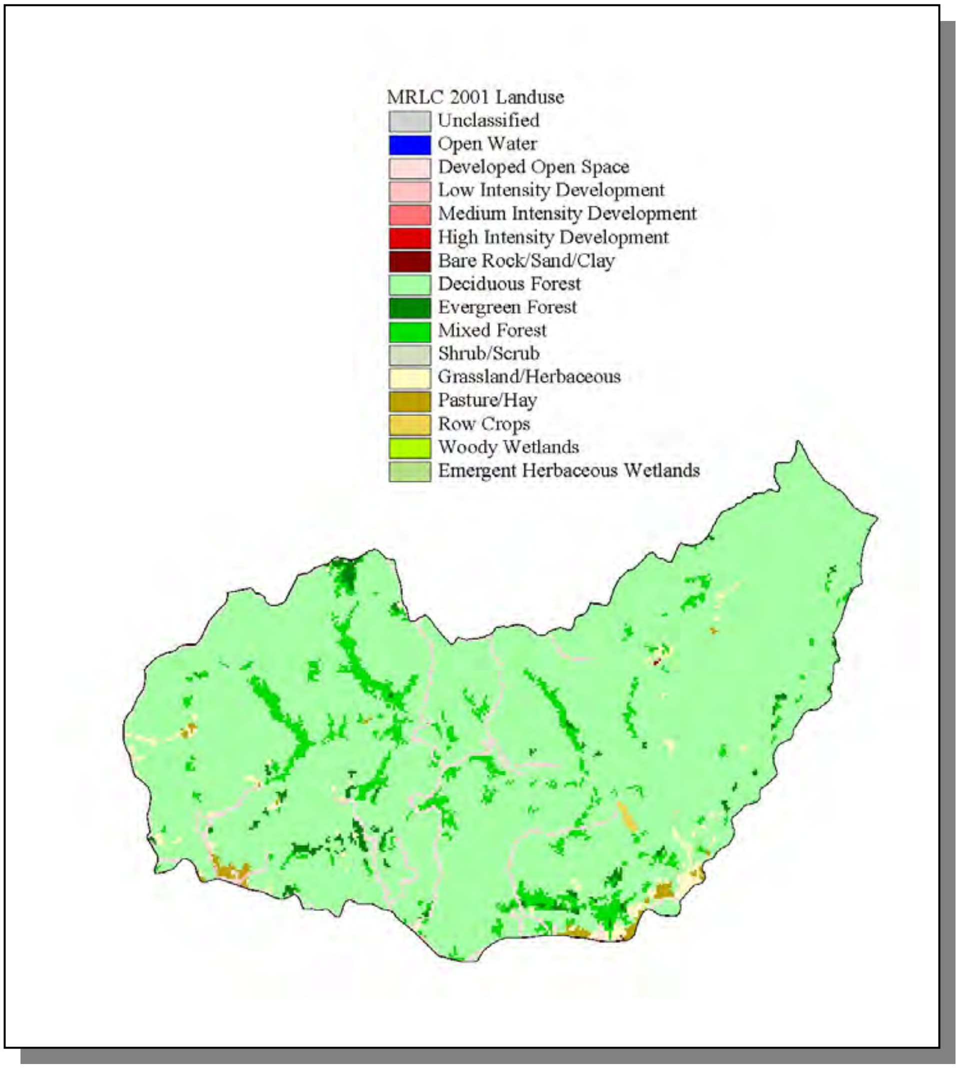

Figure 4-30. Illustration of Land Use Distribution in Subwatershed 051301050105.

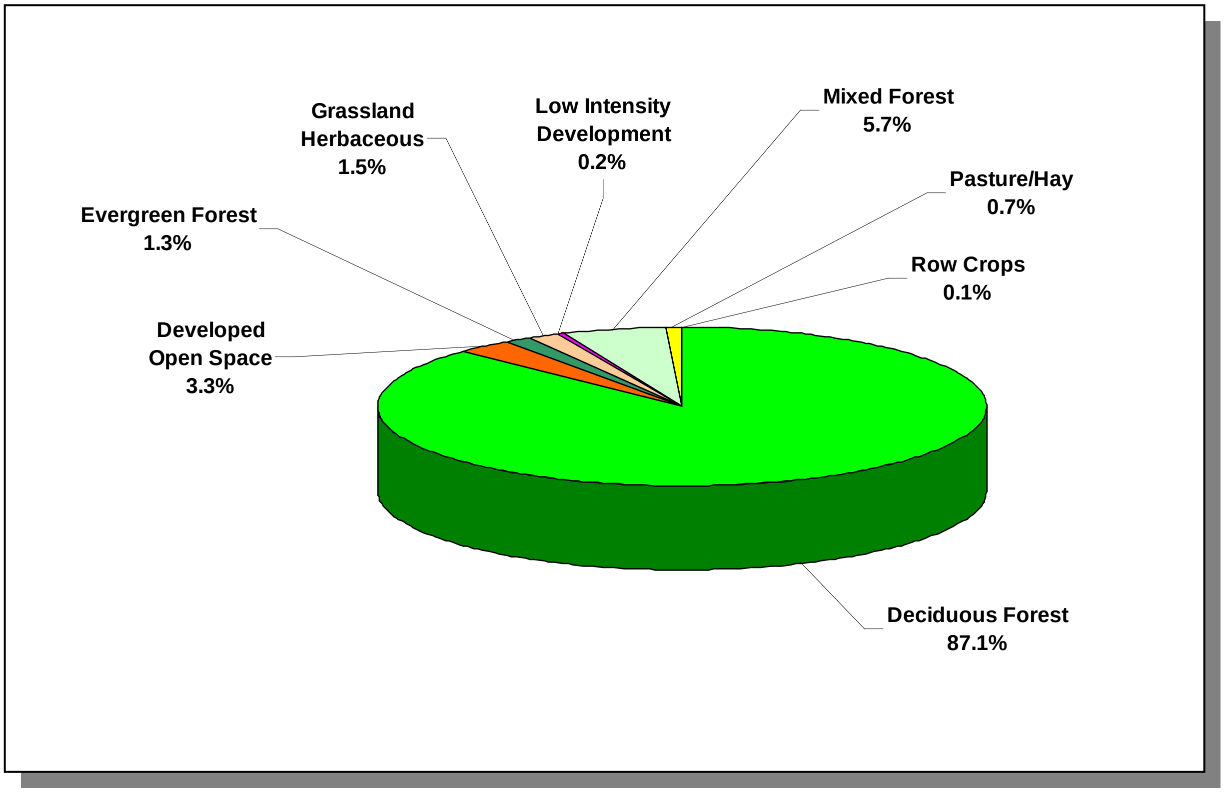

Figure 4-31. Land Use Distribution in Subwatershed 051301050105. *More information is provided in Appendix IV.*

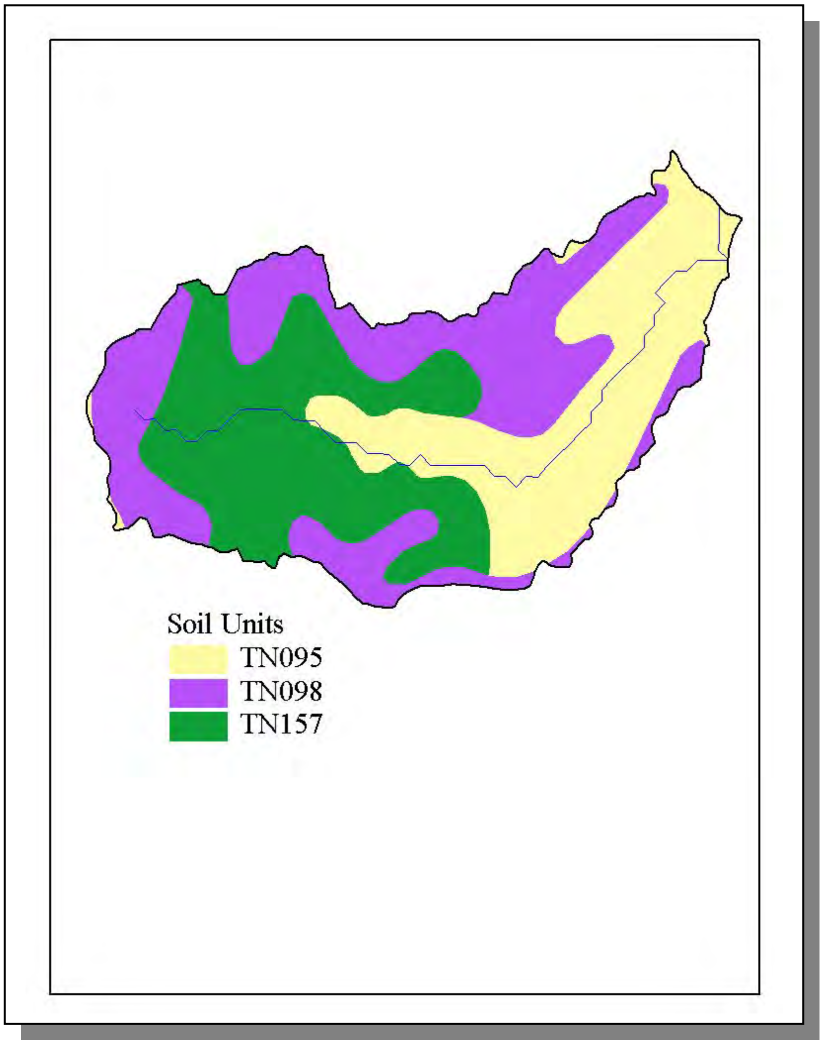

Figure 4-32. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050105.

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	2.98	4.82	Loam	0.32
TN157	0.00	B	2.38	4.62	Loam	0.28

Table 4-27. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050105. *The definition of "Hydrologic Group" is provided in Appendix IV.*

.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	2.47	362	393	410	13.3
Overton	17,636	19,171	20,118	0.66	117	127	133	13.7
Total	**32,305**	**35,091**	**36,743**		**479**	**520**	**543**	**13.4**

Table 4-28. Population Estimates in Subwatershed 051301050105.

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

There are no point source contributions in this subwatershed.

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

LIVESTOCK COUNTS				
Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Hogs
14	31	<5	12,356	<5

Table 4-29. Summary of Livestock Count Estimates in Subwatershed 051301050105. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Fentress	8,058	17,259	430	474	7,290,026	729	79
Overton	15,150	27,812	1,200	1,173	0	811	59

Table 4-30. Summary of Livestock Count Estimates in Fentress and Overton Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Fentress	244.1	244.1	3.6	14.3
Overton	170.3	170.3	1.7	7.0

Table 4-31. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress and Overton Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.63
Grass (Hayland)	0.31
Legumes, Grass (Hayland)	1.01
Forest Land (Not Grazed)	0.35
Corn (Row Crops)	13.91
Soybeans (Row Crops)	6.91
Wheat (Close-Grown Cropland)	36.43
Other Vegetable and Truck Crops	17.00
Conservation Reserve Program Lands	0.46
Farmsteads and Ranch Headquarters	0.43

Table 4-32. Annual Estimated Total Soil Loss in Subwatershed 051301050105.

4.2.A.vi. 051301050106 (East Fork Obey River).

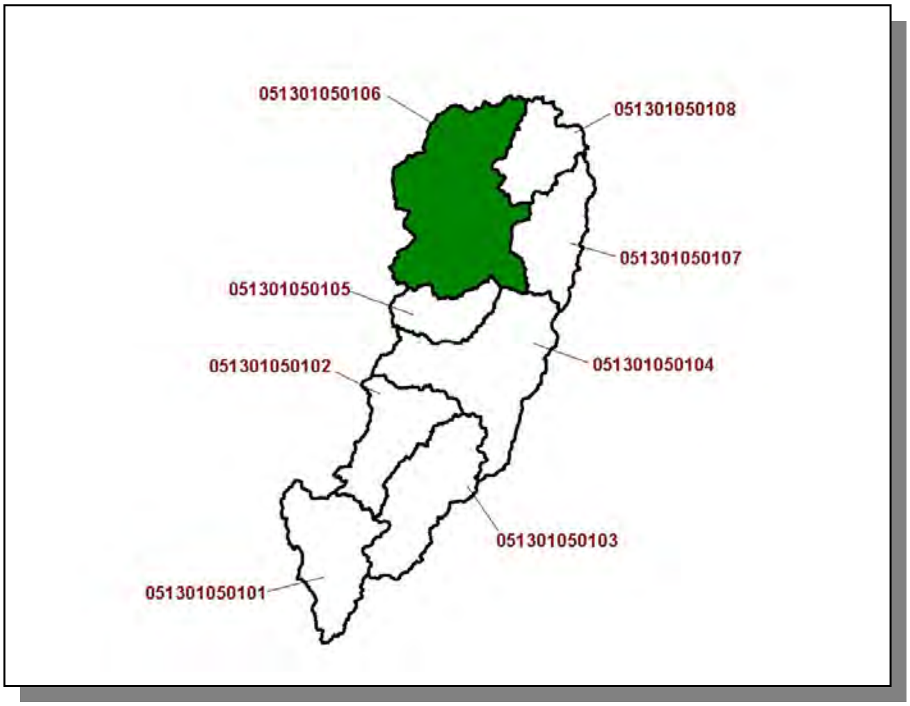

Figure 4-33. Location of Subwatershed 051301050106. *HUC-12 subwatershed boundaries are shown for reference.*

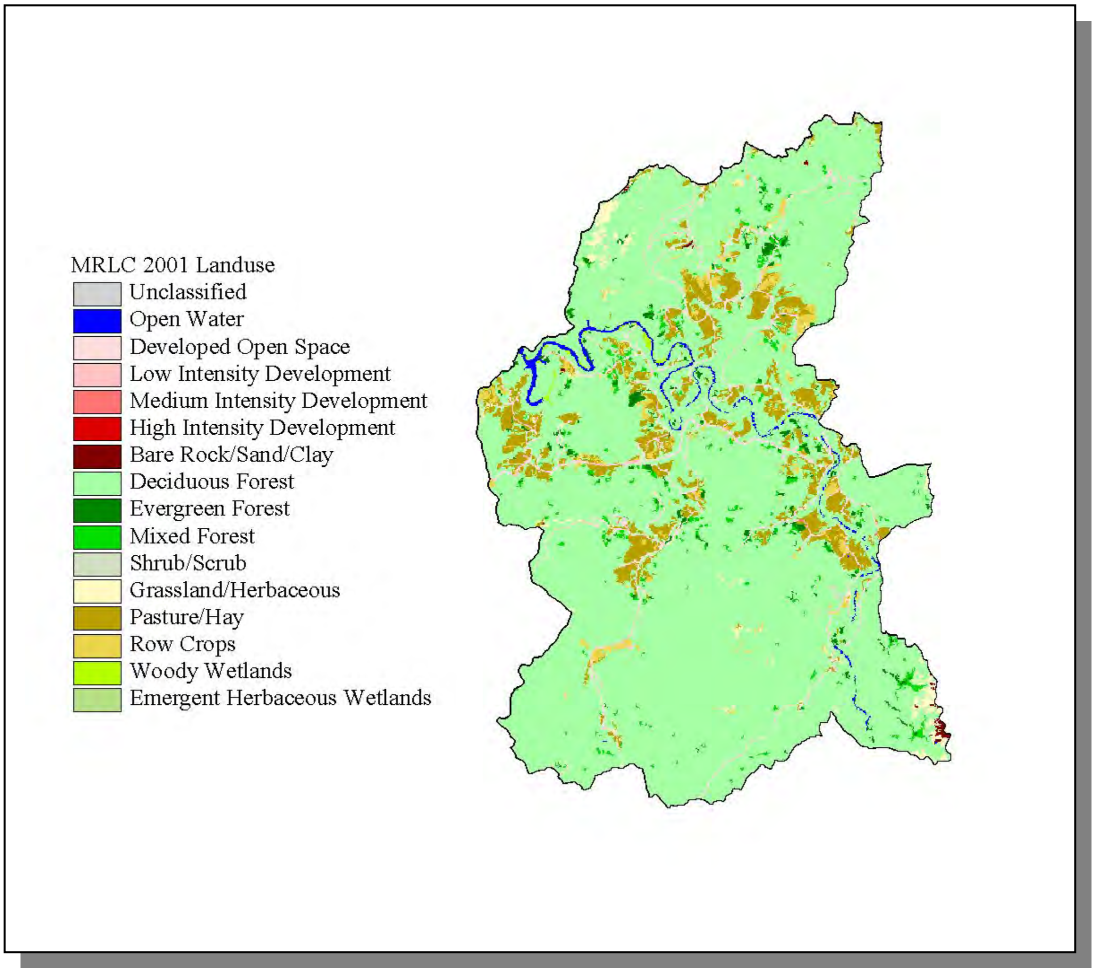

Figure 4-34. Illustration of Land Use Distribution in Subwatershed 051301050106.

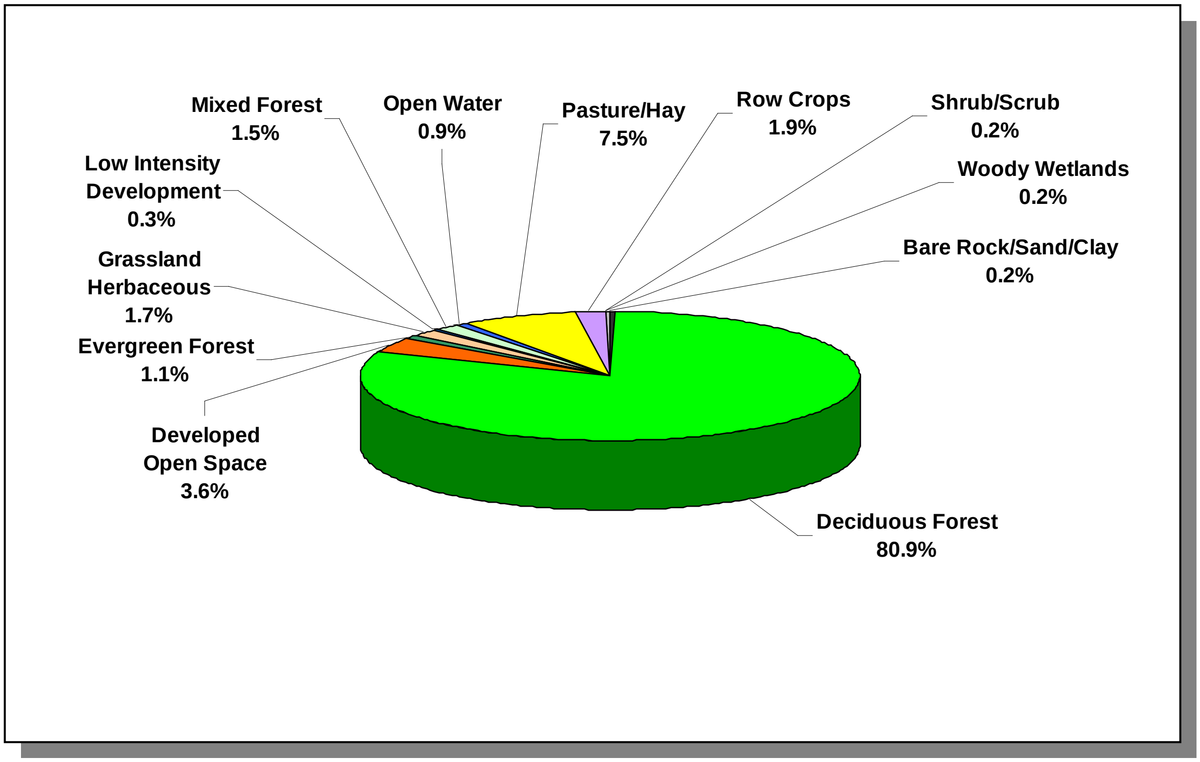

Figure 4-35. Land Use Distribution in Subwatershed 051301050106. *More information is provided in Appendix IV.*

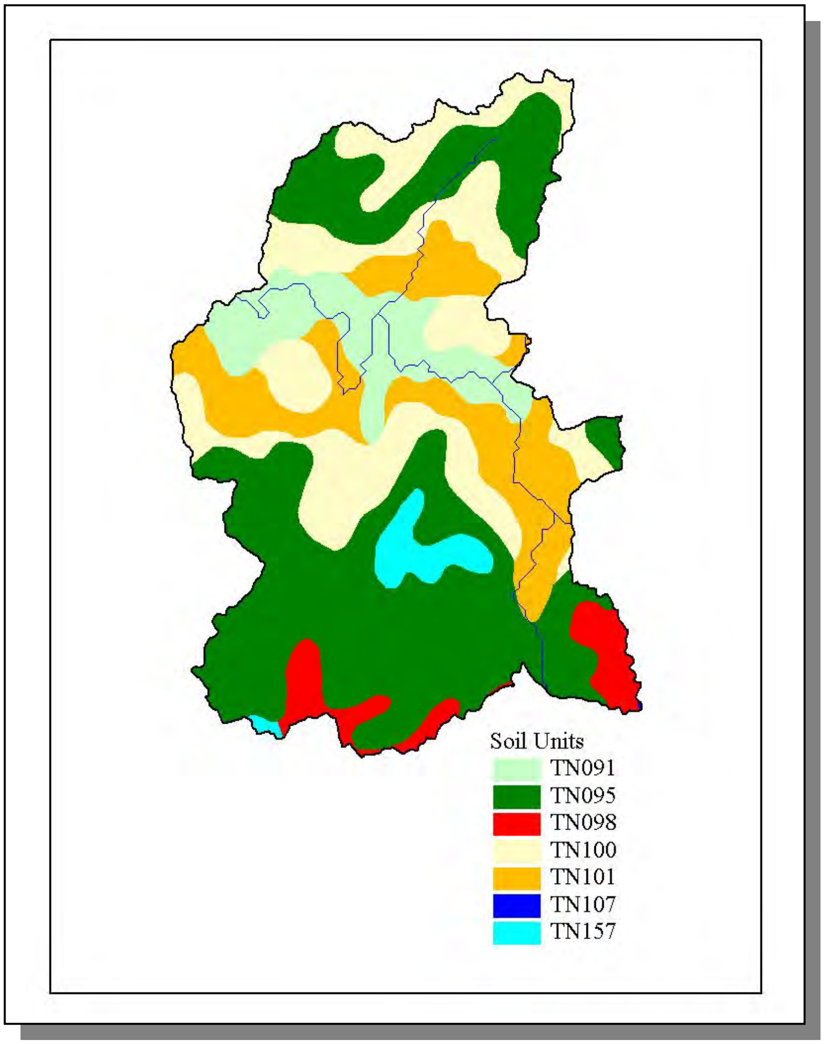

Figure 4-36. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050106.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN091	0.00	B	2.95	5.86	Loam	0.34
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	2.98	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
TN157	0.00	B	2.38	4.62	Loam	0.28

Table 4-33. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050106. *The definition of "Hydrologic Group" is provided in Appendix IV.*

.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	10.51	1,541	1,673	1,747	13.4
Overton	17,636	19,171	20,118	1.25	221	240	252	14.0
Pickett	4,548	4,631	4,945	4.35	198	201	215	8.6
Total	**36,853**	**39,722**	**41,688**		**1,960**	**2,114**	**2,214**	**13.0**

Table 4-34. Population Estimates in Subwatershed 051301050106.

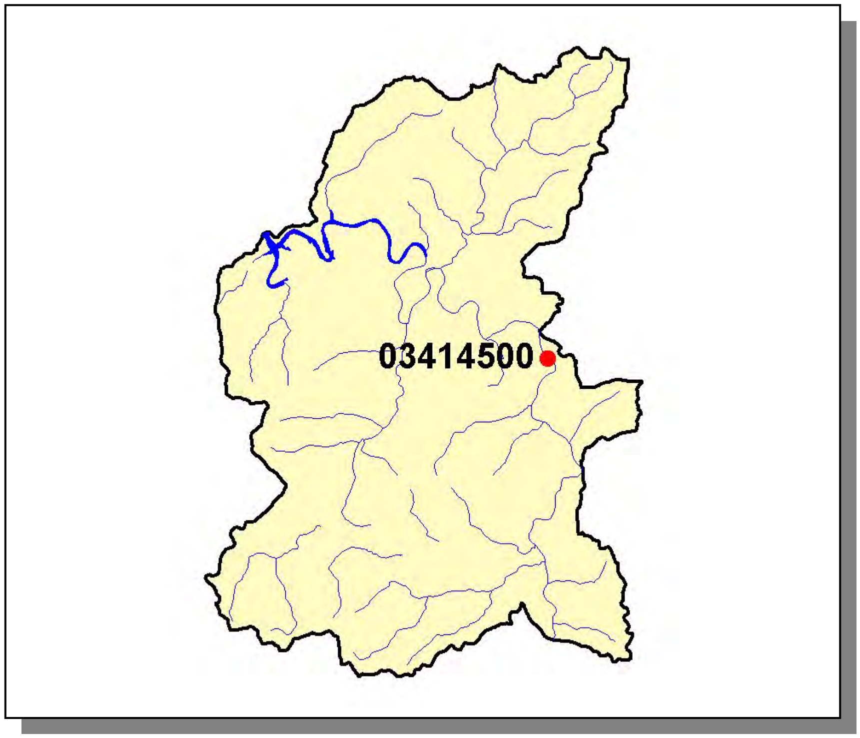

Figure 4-37. Location of Historical Streamflow Data Collection Sites in Subwatershed 051301050106. *More information is provided in Appendix IV.*

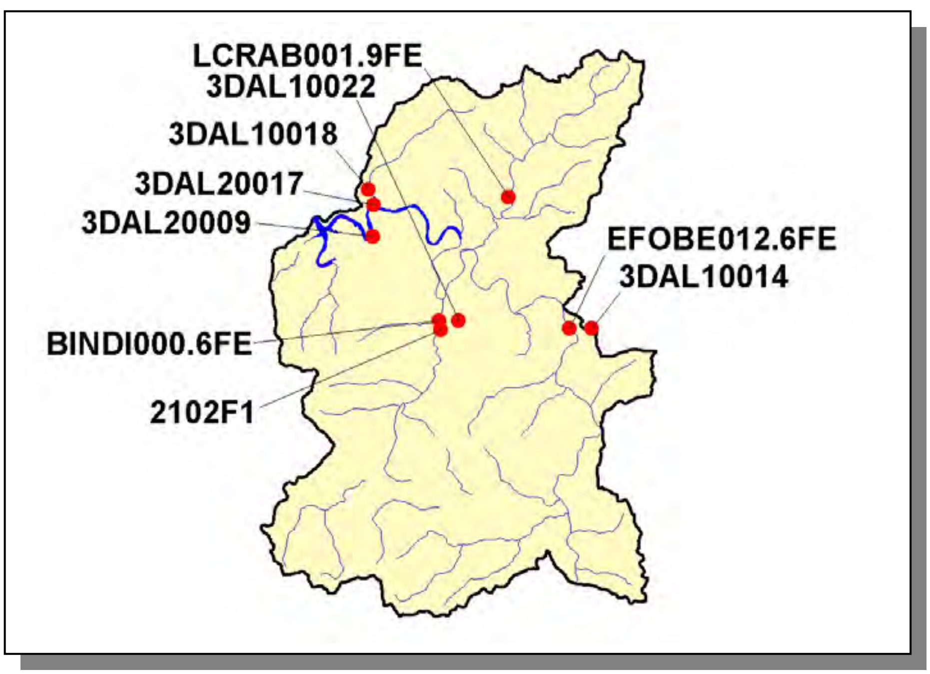

Figure 4-38. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301050106. *More information, including site names and locations, is provided in Appendix IV.*

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

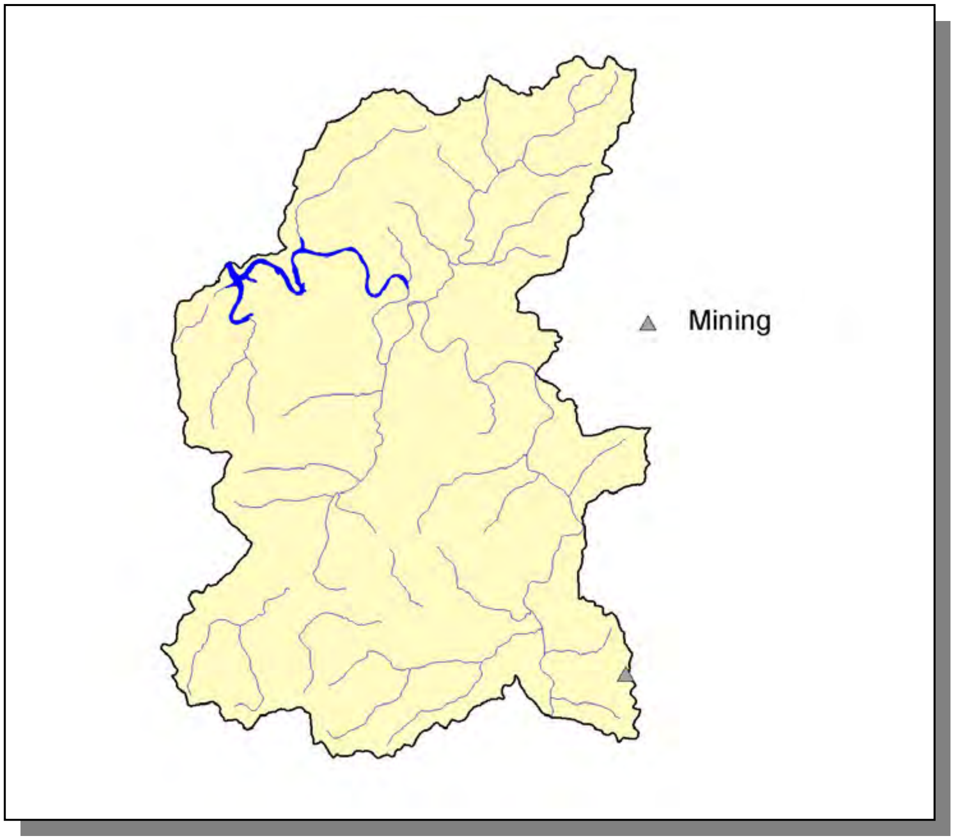

Figure 4-39. Location of Permits Issued in Subwatershed 051301050106. *More information, including the names of facilities, is provided in Appendix IV.*

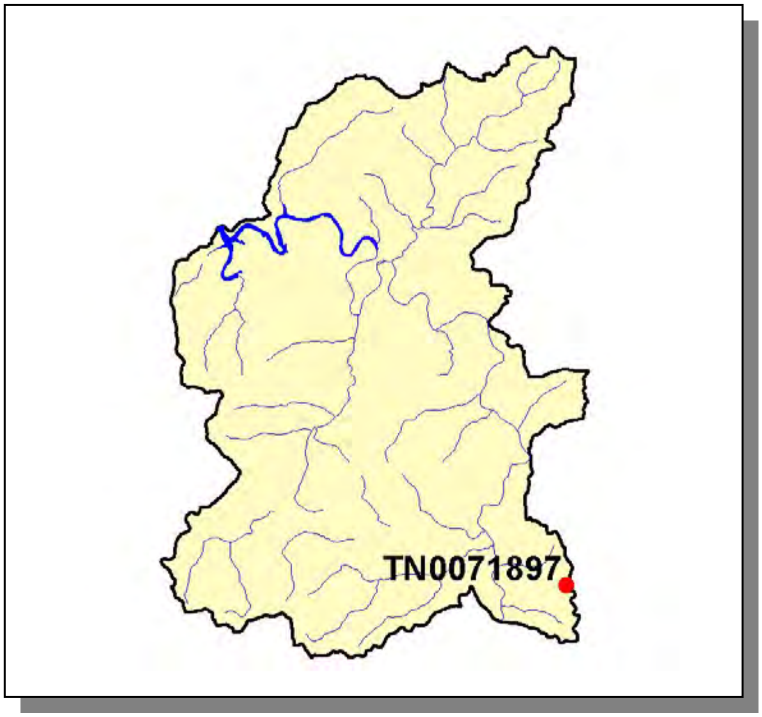

Figure 4-40. Location of Active Mining Sites in Subwatershed 051301050106. *More information, including the names of facilities, is provided in Appendix IV.*

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

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
692	1,430	29	<5	478,206	51	5

Table 4-35. Summary of Livestock Count Estimates in Subwatershed 051301050106. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Fentress	8,058	17,259	430	474	7,290,026	729	79
Overton	15,150	27,812	1,200	1,173	0	811	59
Pickett	5,986	10,864	19	285	0	99	0

Table 4-36. Summary of Livestock Count Estimates in Fentress, Overton, and Pickett Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Fentress	244.1	244.1	3.6	14.3
Overton	170.3	170.3	1.7	7.0
Pickett	68.4	68.4	0.2	0.6

Table 4-37. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress, Overton, and Pickett Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.73
Grass (Hayland)	0.19
Legumes, Grass (Hayland)	0.69
Grass, Forbs, Legumes (Mixed Pasture)	0.36
Corn (Row Crops)	15.06
Soybeans (Row Crops)	6.45
Tobacco (Row Crops)	23.18
Wheat (Close-Grown Cropland)	39.95
Other Vegetable and Truck Crops	16.47
Conservation Reserve Program Lands	0.46
Farmsteads and Ranch Headquarters	1.28

Table 4-38. Annual Estimated Total Soil Loss in Subwatershed 051301050106.

4.2.A.vii. 051301050107 (Rockcastle Creek).

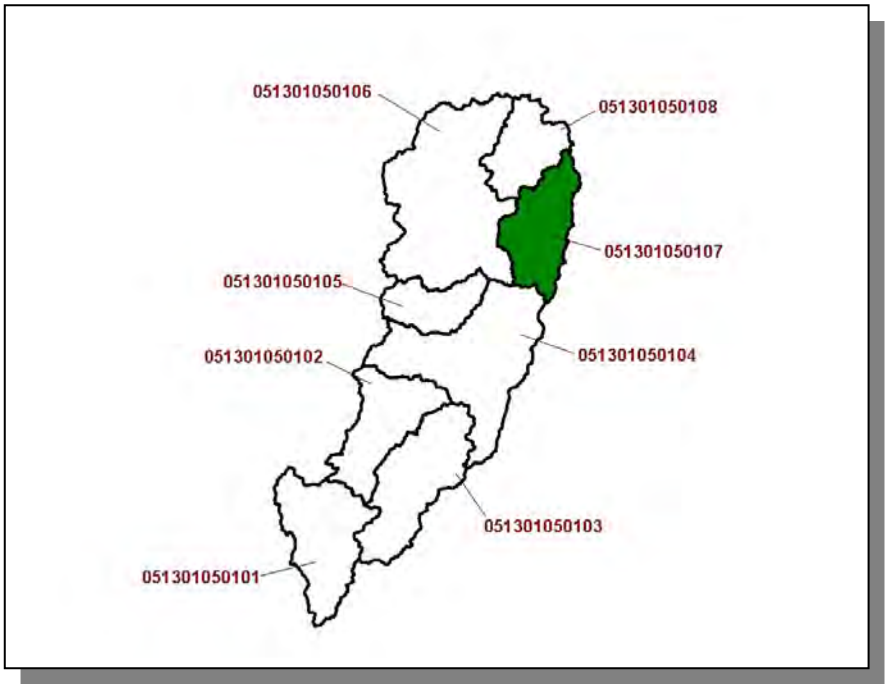

Figure 4-41. Location of Subwatershed 051301050107. *HUC-12 subwatershed boundaries are shown for reference.*

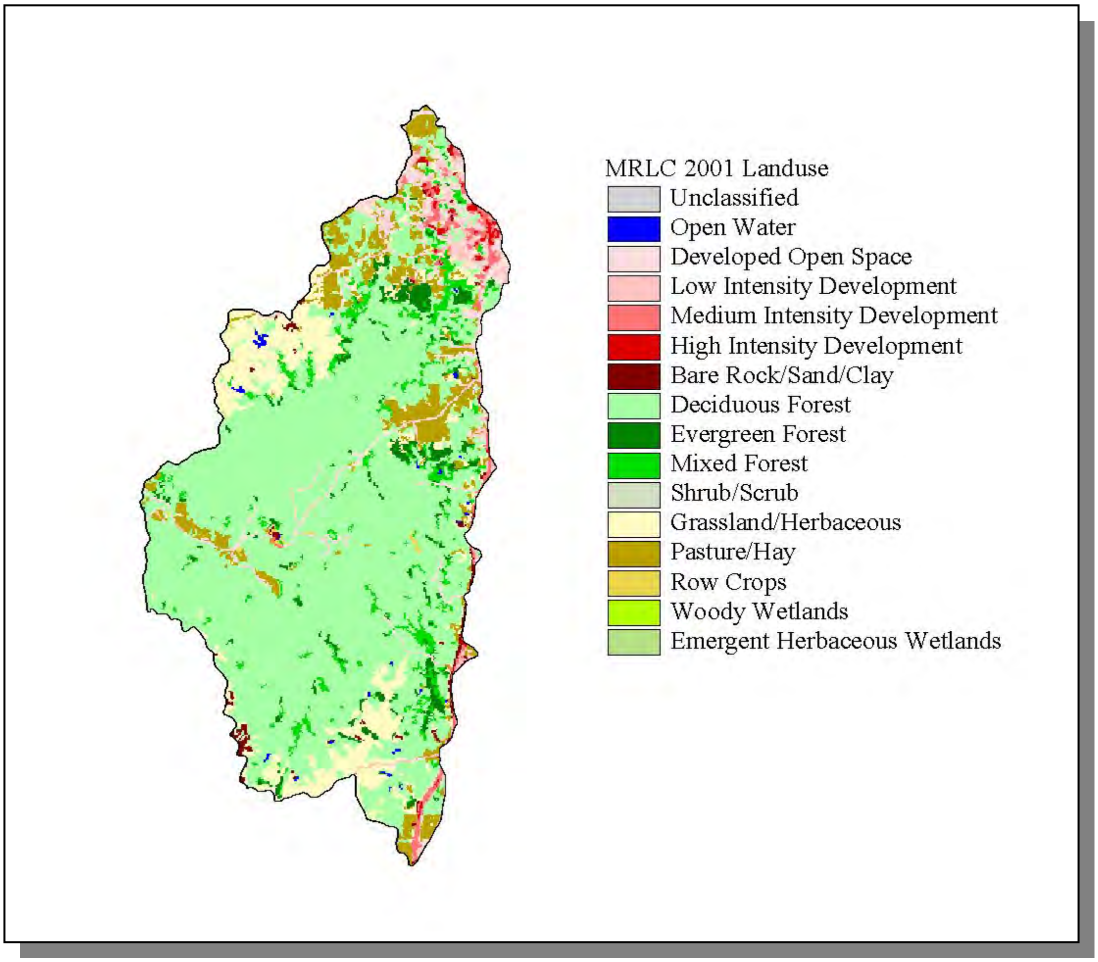

Figure 4-42. Illustration of Land Use Distribution in Subwatershed 051301050107.

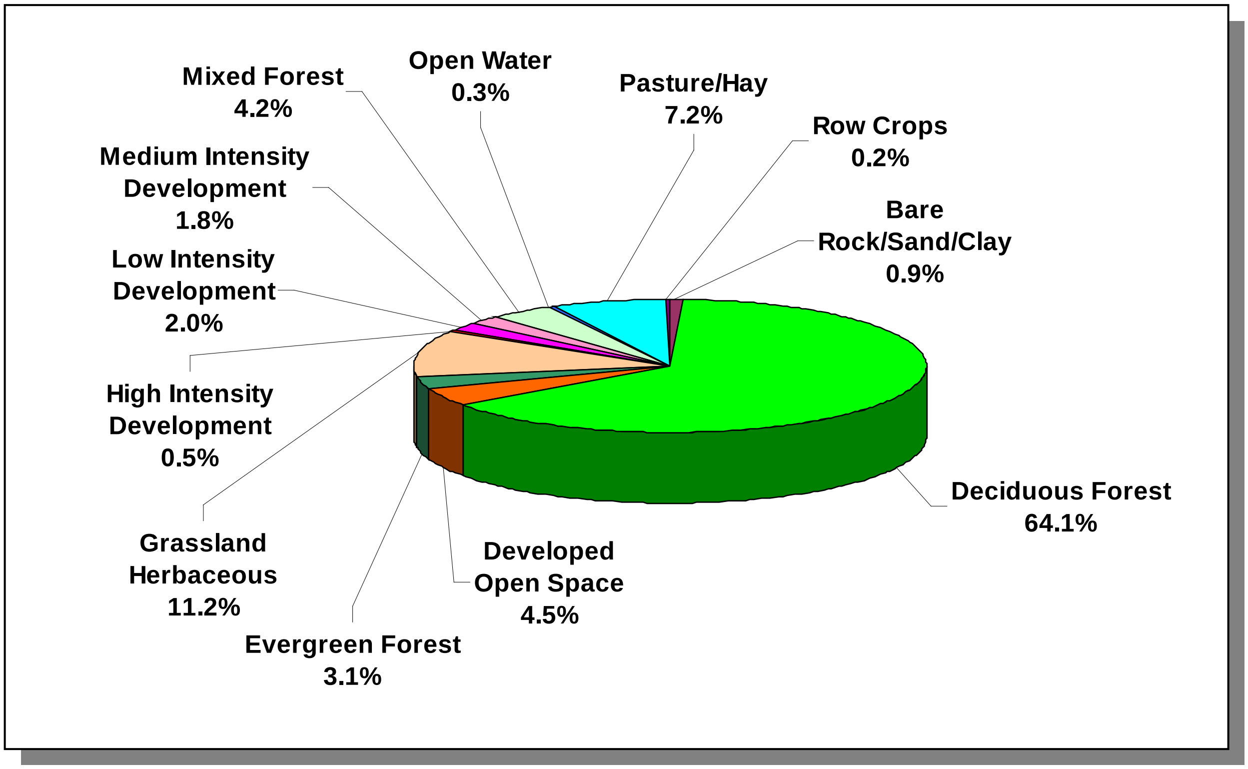

Figure 4-43. Land Use Distribution in Subwatershed 051301050107. *More information is provided in Appendix IV.*

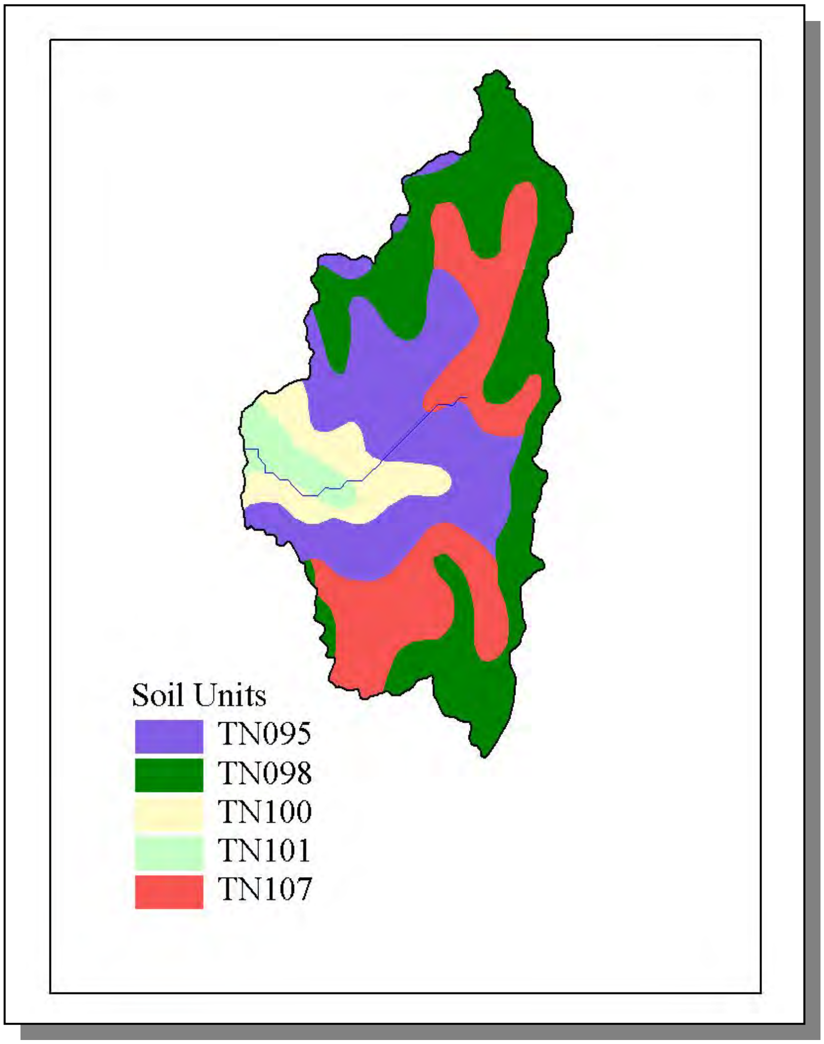

Figure 4-44. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050107.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN091	0.00	B	2.95	5.86	Loam	0.34
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	2.98	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
TN157	0.00	B	2.38	4.62	Loam	0.28

Table 4-39. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050107. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	4.87	714	775	809	13.3

Table 4-40. Population Estimates in Subwatershed 051301050107.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Jamestown	Fentress	1,862	904	635	243	26

Table 4-41. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051301050107.

Figure 4-45. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301050107. *More information, including site names and locations, is provided in Appendix IV.*

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

Figure 4-46. Location of Permits Issued in Subwatershed 051301050107. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-47. Location of Active NPDES Sites in Subwatershed 051301050107. *More information, including the names of facilities, is provided in Appendix IV.*

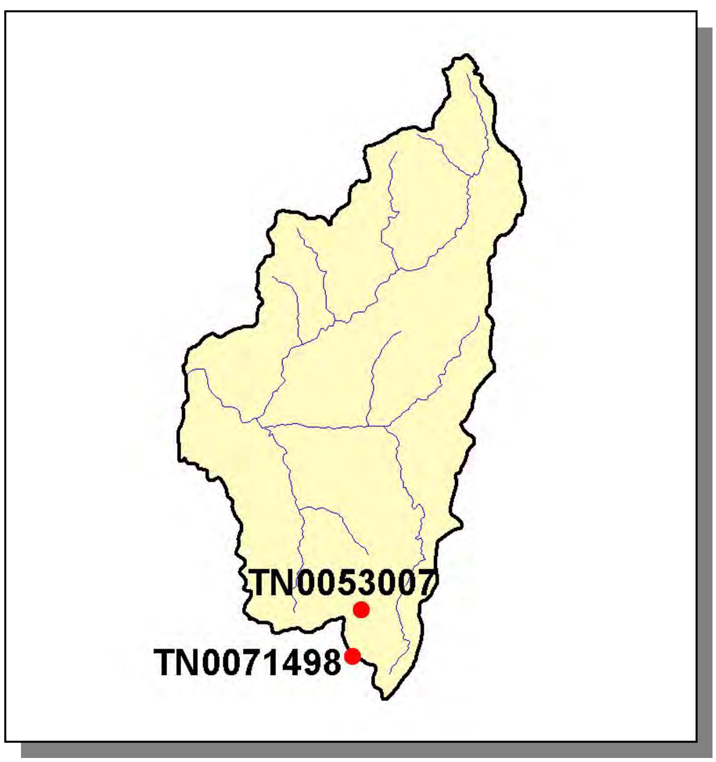

Figure 4-48. Location of Active Mining Sites in Subwatershed 051301050107. *More information, including the names of mining operations, is provided in Appendix IV.*

Figure 4-49. Location of Concentrated Animal Feding Operation (CAFO) in Subwatershed 051301050107. *More information, including the names of facilities, is provided in Appendix IV.*

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

There is one NPDES facility discharging to water bodies listed on the 2004 303(d) list in Subwatershed 051301050107:

- TN0062634 (Jamestown STP) discharges to Rockcastle Creek @ RM 4.75

Figure 4-50. Location of NPDES Dischargers to Water Bodies Listed on the 2004 303(d) List in Subwatershed 051301050107. *More information, including the names of facilities, is provided in Appendix IV.*

Permit #	3Q2	1Q10	3Q10	3Q20	7Q10
TN0067172	0.00	na	0.00	0.00	0.00

Table 4-42. Receiving Stream Low Flow Information for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301050107. *Data are in cubic feet per second (CFS). Data were obtained from the USGS web application StreamStats at http://water.usgs.gov/osw/streamstats/. (na, data not available)*

PERMIT #	P	NO_3+NO_2	FLOW
TN0062634	X	X	X

Table 4-43. Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301050107.

PERMIT #	WET	$CBOD_5$	NH_3	Hg	TRC	TSS	SETTLEABLE SOLIDS	DO	pH
TN0062634	X	X	X	X	X	X	X	X	X

Table 4-44. Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301050107. *WET, Whole Effluent Toxicity; $CBOD_5$, Carbonaceous Biochemical Oxygen Demand (5-Day); TRC, Total Residual Chlorine; TSS, Total Suspended Solids; DO, Dissolved Oxygen.*

PERMIT #	*E. coli*	FECAL COLIFORM
TN0062634	X	X

Table 4-45. Bacteria Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301050107.

4.2.A.vii.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
336	720	18	<5	303,939	30	<5

Table 4-46. Summary of Livestock Count Estimates in Subwatershed 051301050107. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Fentress	8,058	17,259	430	474	7,290,026	729	79

Table 4-47. Summary of Livestock Count Estimates in Fentress 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)
Fentress	244.1	244.1	3.6	14.3

Table 4-48. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.72
Legumes, Grass (Hayland)	0.56
Grass, Forbs, Legumes (Mixed Pasture)	0.27
Corn (Row Crops)	16.18
Soybeans (Row Crops)	6.00
Wheat (Close-Grown Cropland)	43.40
Other Vegetable and Truck Crops	15.94
Farmsteads and Ranch Headquarters	0.40

Table 4-49. Annual Estimated Total Soil Loss in Subwatershed 051301050107.

4.2.A.viii. 051301050108 (Poplar Creek).

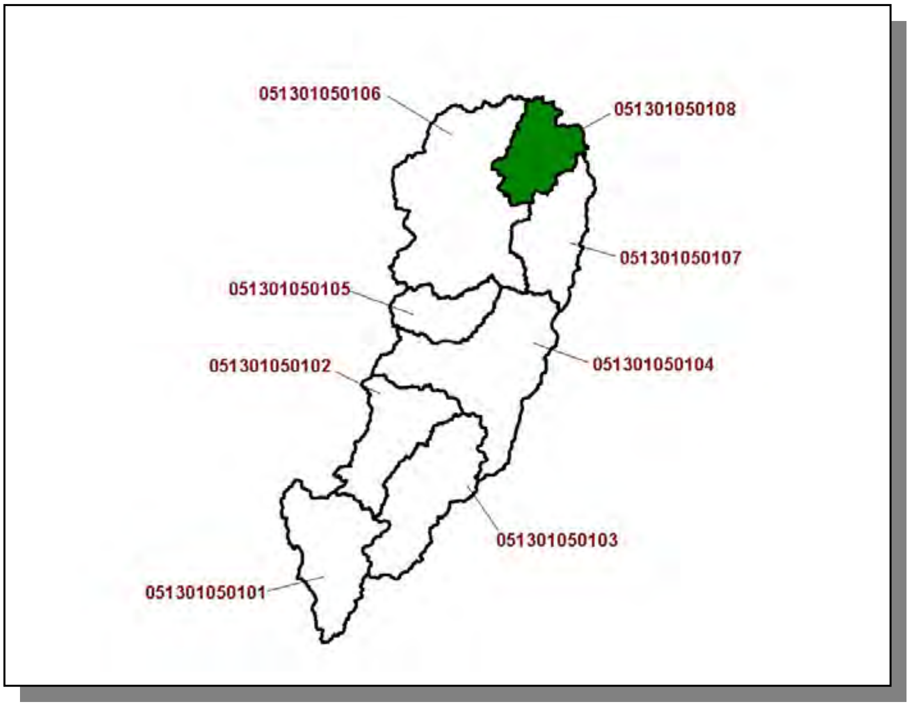

Figure 4-51. Location of Subwatershed 051301050108. *HUC-12 subwatershed boundaries are shown for reference.*

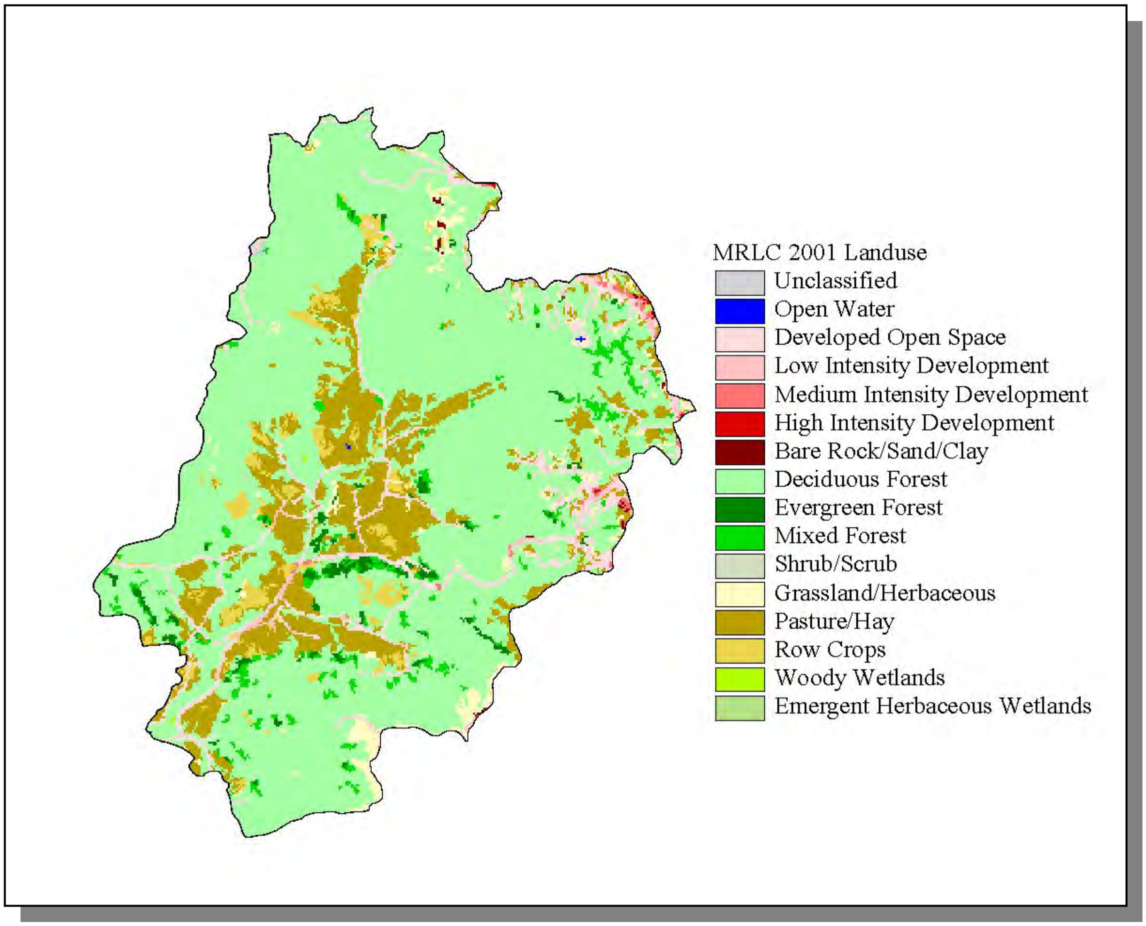

Figure 4-52. Illustration of Land Use Distribution in Subwatershed 051301050108.

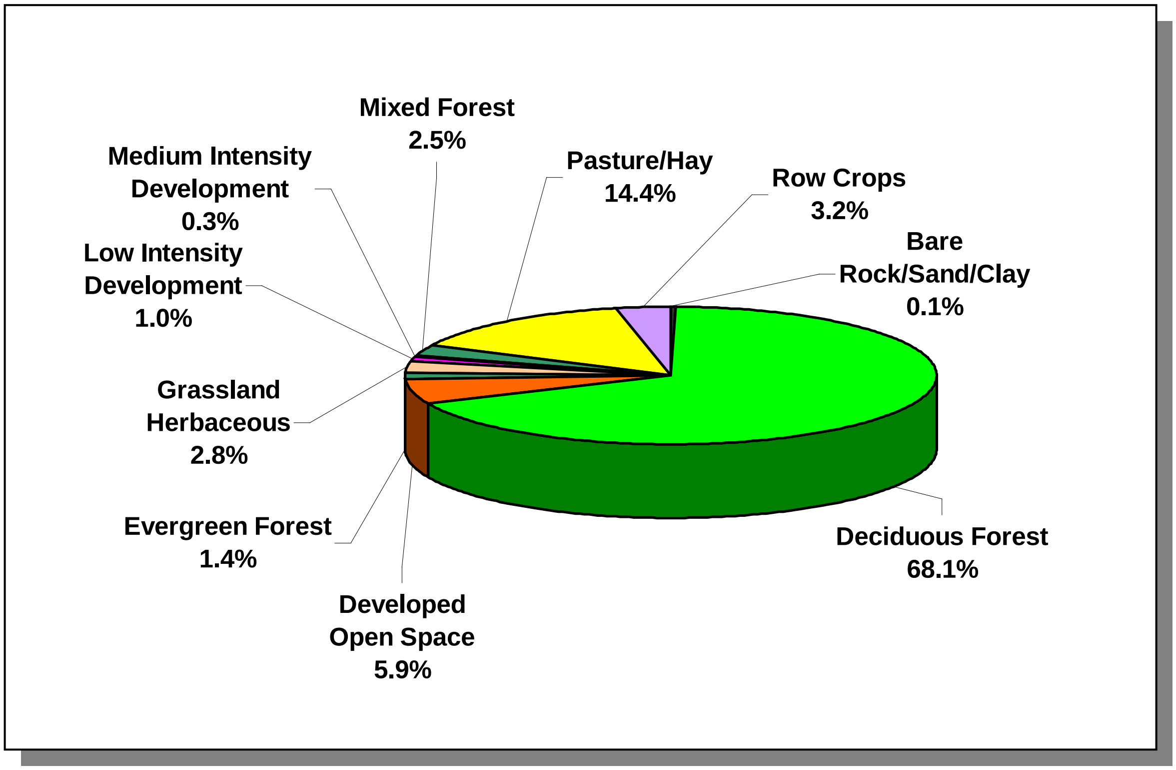

Figure 4-53. Land Use Distribution in Subwatershed 051301050108. *More information is provided in Appendix IV.*

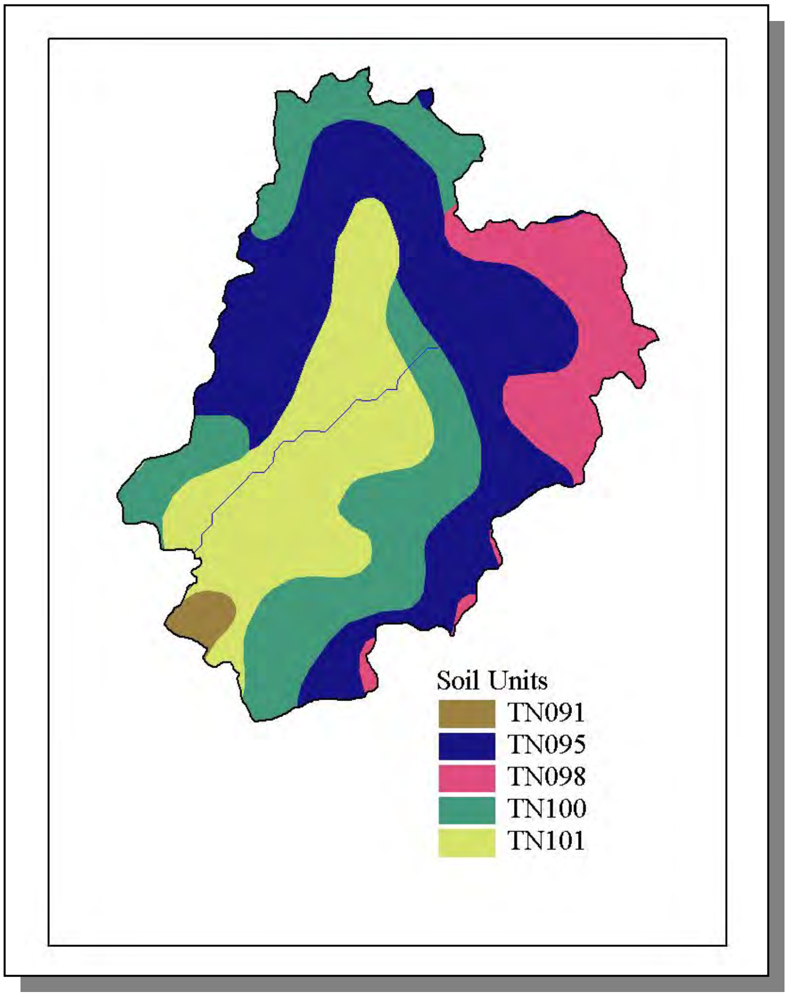

Figure 4-54. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050108.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN091	0.00	B	2.95	5.86	Loam	0.34
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	2.98	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

Table 4-50. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050108. *The definition of "Hydrologic Group" is provided in Appendix IV.*

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	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	3.82	560	608	635	13.4

Table 4-51. Population Estimates in Subwatershed 051301050108.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Jamestown	Fentress	1,862	904	635	243	26

Table 4-52. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051301050108.

Figure 4-55. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301050108. *More information, including site names and locations, is provided in Appendix IV.*

4.2.A.viii.a. Point Source Contributions.

Figure 4-56. Location of Permits Issued in Subwatershed 051301050108. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-57. Location of Concentrated Animal Feeding Operation (CAFO) in Subwatershed 051301050108. *More information, including the names of facilities, is provided in Appendix IV.*

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

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
435	933	23	<5	393,904	39	<5

Table 4-53. Summary of Livestock Count Estimates in Subwatershed 051301050108. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Fentress	8,058	17,259	430	474	7,290,026	729	79

Table 4-54. Summary of Livestock Count Estimates in Fentress 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)
Fentress	244.1	244.1	3.6	14.3

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

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.72
Legumes, Grass (Hayland)	0.56
Grass, Forbs, Legumes (Mixed Pasture)	0.27
Corn (Row Crops)	16.18
Soybeans (Row Crops)	6.00
Wheat (Close-Grown Cropland)	43.40
Other Vegetable and Truck Crops	15.94
Farmsteads and Ranch Headquarters	0.40

Table 4-56. Annual Estimated Total Soil Loss in Subwatershed 051301050108.

4.2.B. 0513010502.

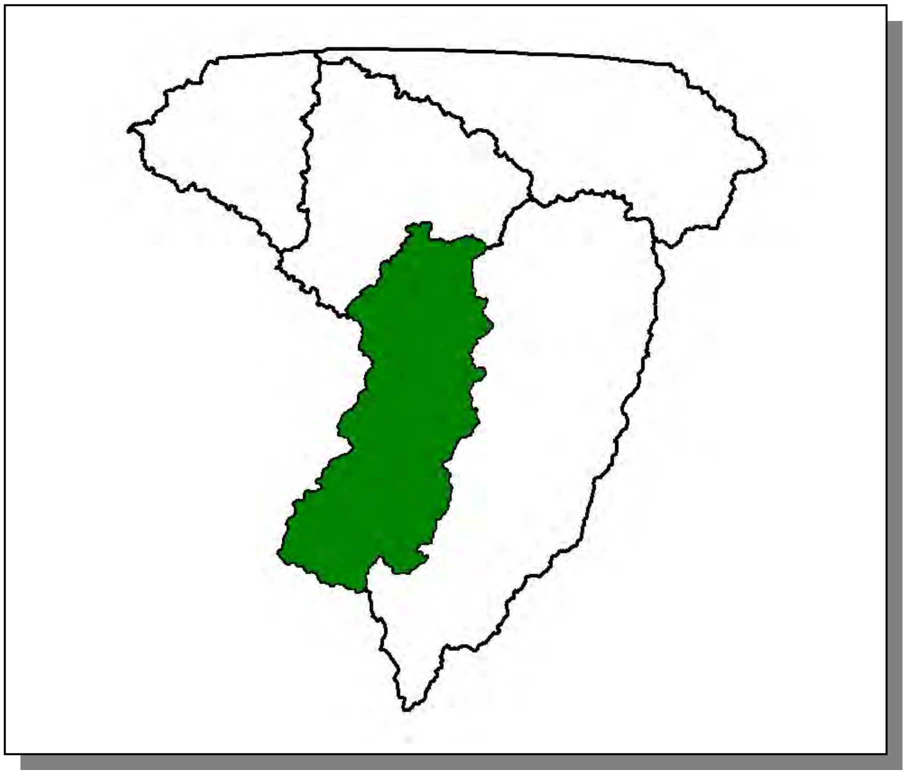

Figure 4-58. Location of Subwatershed 0513010502. *All Obey River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.B.i. 051301050201 (West Fork Obey River).

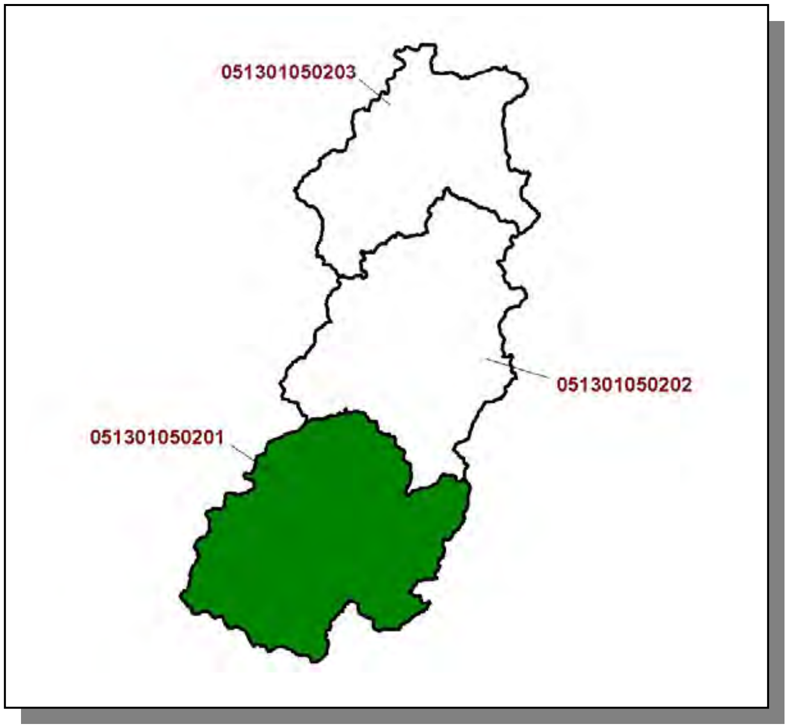

Figure 4-59. Location of Subwatershed 051301050201. *HUC-12 subwatershed boundaries are shown for reference.*

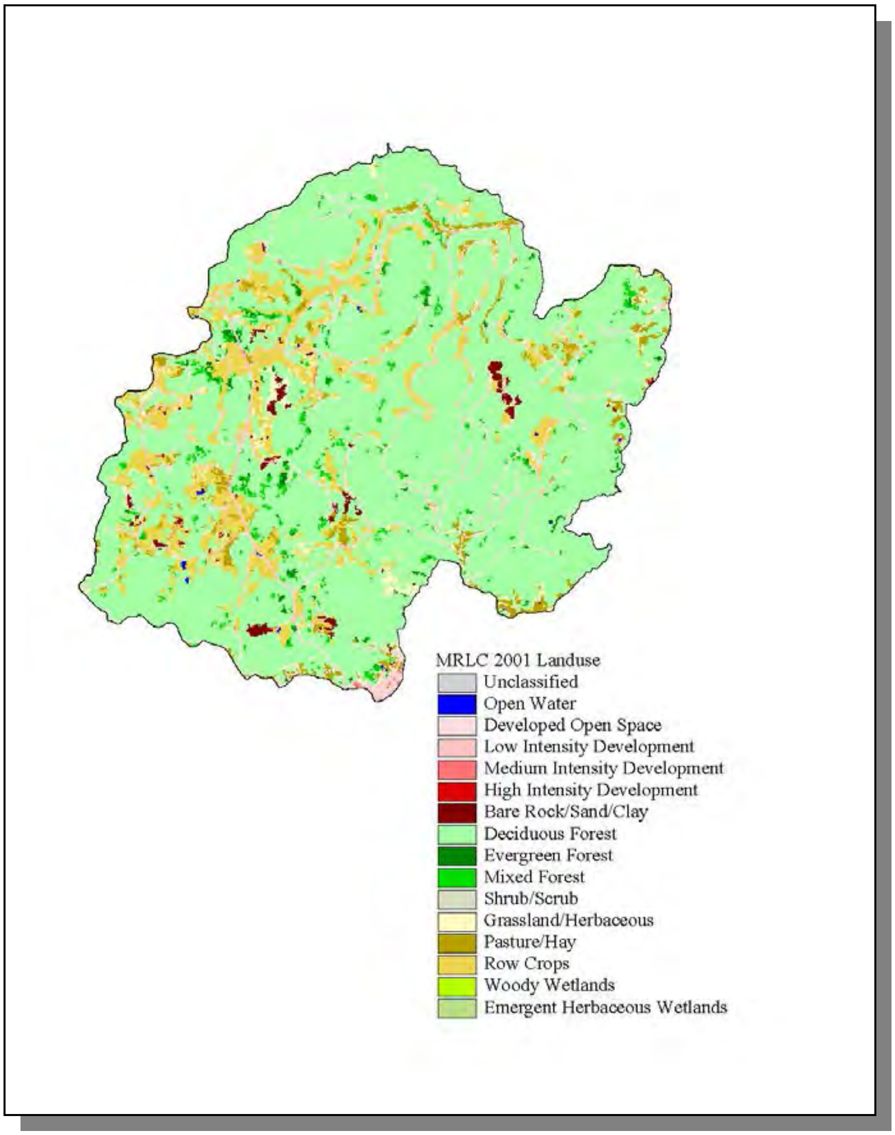

Figure 4-60. Illustration of Land Use Distribution in Subwatershed 051301050201.

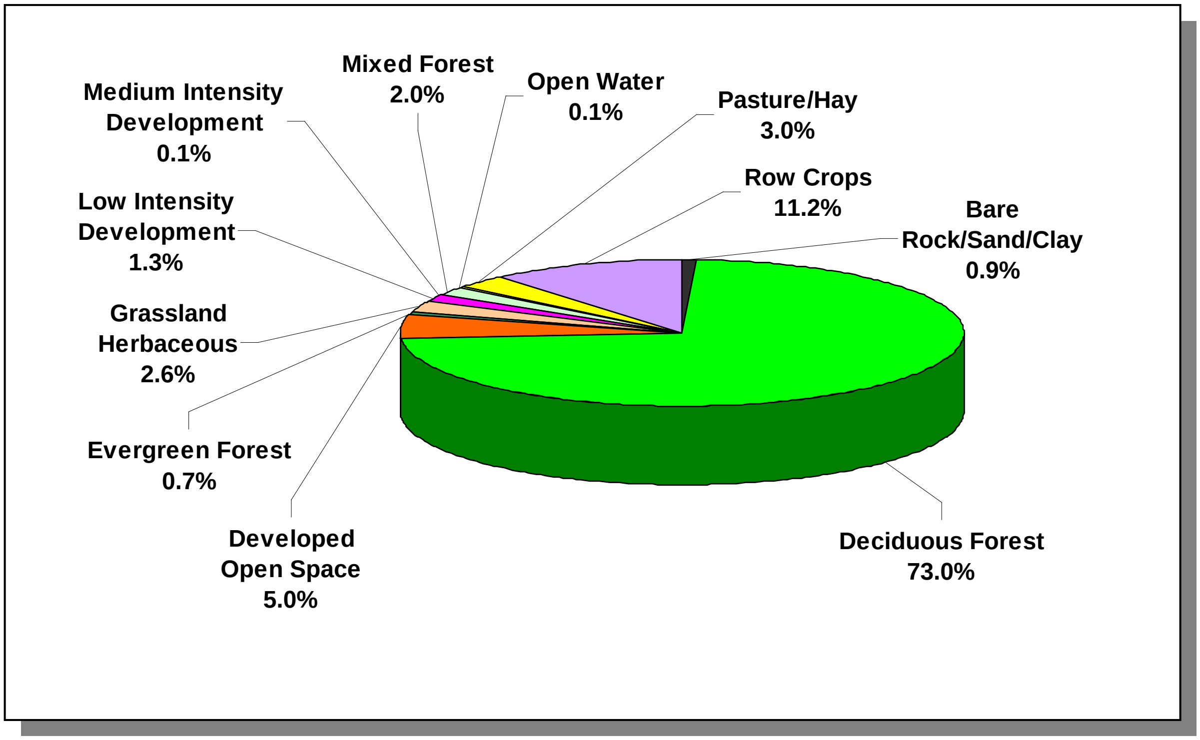

Figure 4-61. Land Use Distribution in Subwatershed 051301050201. *More information is provided in Appendix IV.*

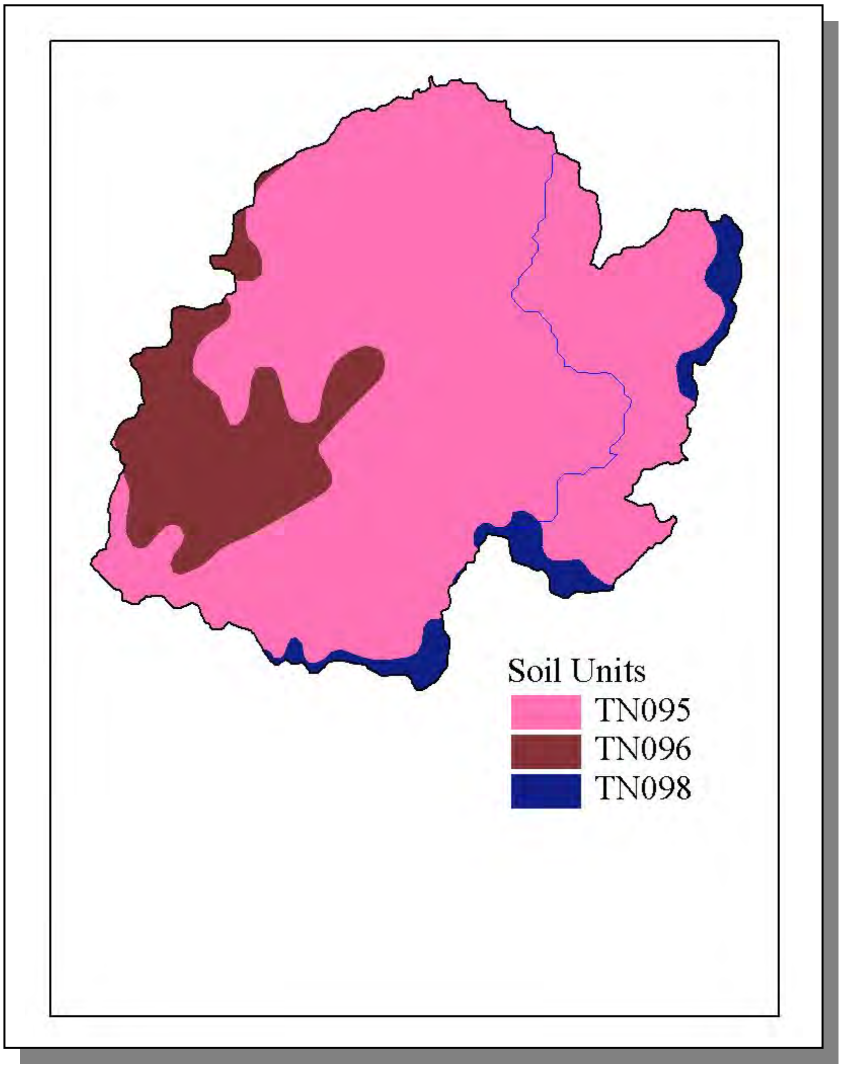

Figure 4-62. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050201.

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
TN096	10.00	C	1.22	5.16	Silty Loam	0.38
TN098	1.00	C	2.98	4.82	Loam	0.32

Table 4-57. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050201. *The definition of "Hydrologic Group" is provided in Appendix IV.*

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	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Overton	17,636	19,171	20,118	10.14	1,789	1,945	2,041	14.1
Putnam	51,373	58,326	62,315	3.41	1,753	1,990	2,127	21.3
Total	**69,009**	**77,497**	**82,433**		**3,542**	**3,935**	**4,168**	**17.7**

Table 4-58. Population Estimates in Subwatershed 051301050201.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Monterey	Putnam	2,559	1,113	875	228	10

Table 4-59. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051301050201.

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

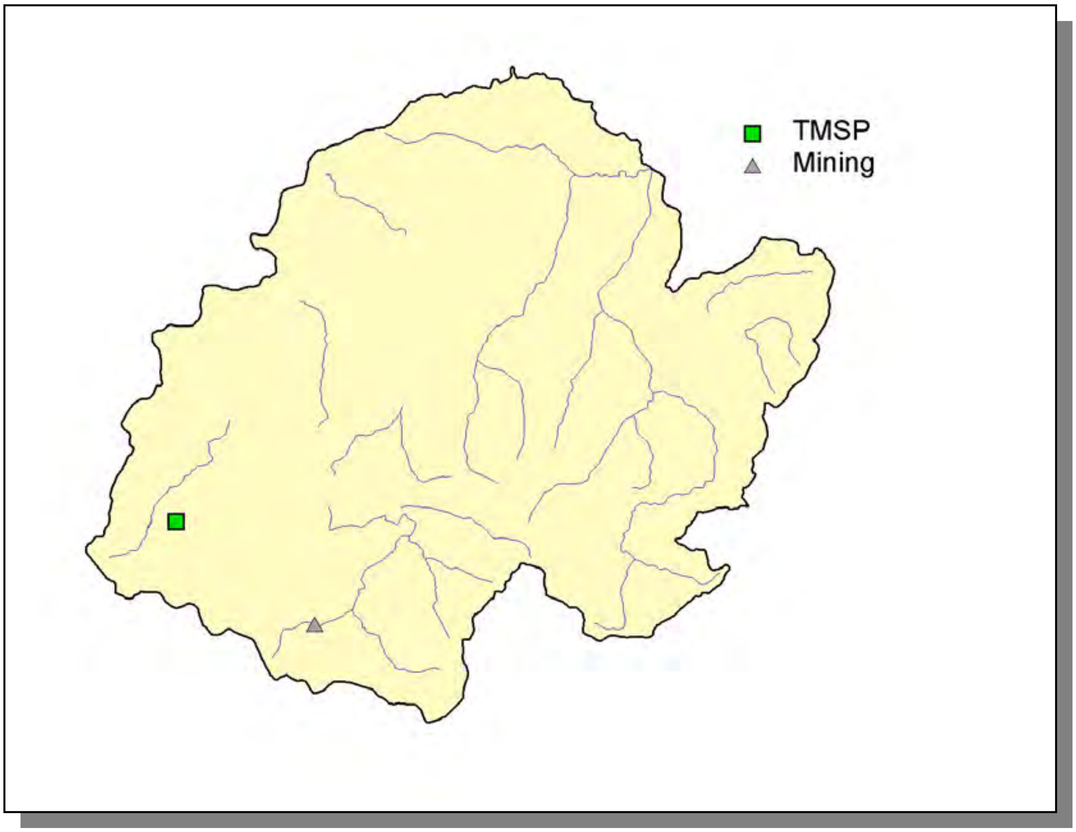

Figure 4-63. Location of Permits Issued in Subwatershed 051301050201. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-64. Location of Active Mining Sites in Subwatershed 051301050201. *More information, including the names of facilities, is provided in Appendix IV.*

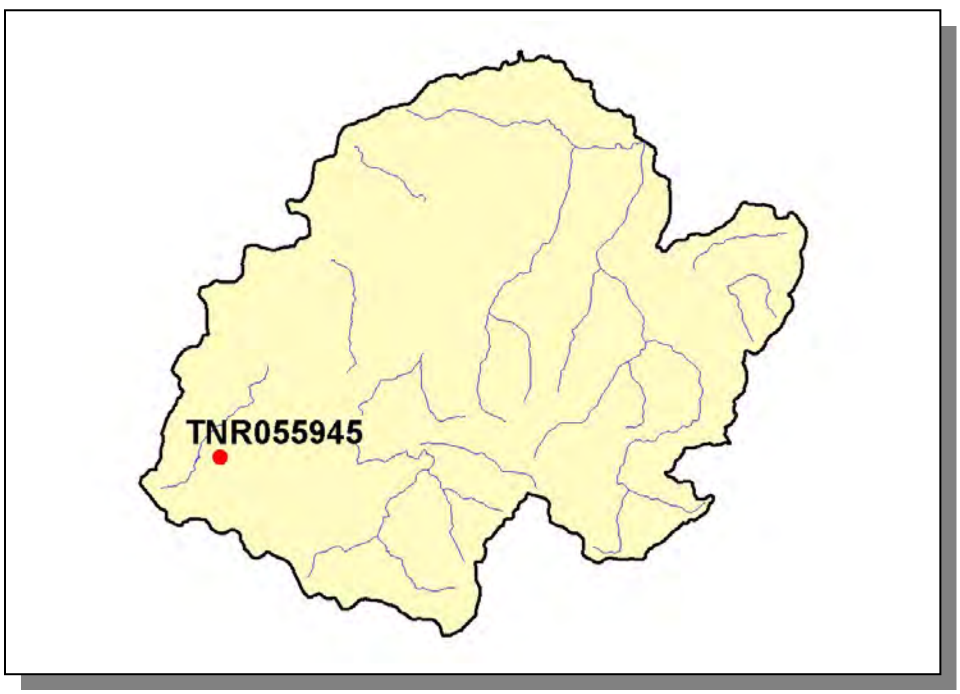

Figure 4-65. Location of TMSP Sites in Subwatershed 051301050201. *More information, including the names of facilities, is provided in Appendix IV.*

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
859	1,613	70	<5	54	<5

Table 4-60. Summary of Livestock Count Estimates in Subwatershed 051301050201. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Overton	15,150	27,812	1,200	1,173	811	59
Putnam	12,592	24,817	1,095	1,025	1,070	66

Table 4-61. Summary of Livestock Count Estimates in Overton and Putnam Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Overton	170.3	170.3	1.7	7.0
Putnam	152.5	152.3	3.6	16.4

Table 4-62. Forest Acreage and Annual Removal Rates (1987-1994) in Overton and Putnam Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.65
Grass (Hayland)	0.62
Legumes, Grass (Hayland)	2.35
Legumes (Hayland)	0.23
Grass, Forbs, Legumes (Mixed Pasture)	0.74
Corn (Row Crops)	4.35
Soybeans (Row Crops)	10.79
Tobacco (Row Crops)	12.38
Wheat (Close-Grown Cropland)	7.00
Other Vegetable and Truck Crops	19.82
Conservation Reserve Program Lands	0.46
Farmsteads and Ranch Headquarters	0.50

Table 4-63. Annual Estimated Total Soil Loss in Subwatershed 051301050201.

4.2.B.ii. 051301050202 (West Fork Obey River).

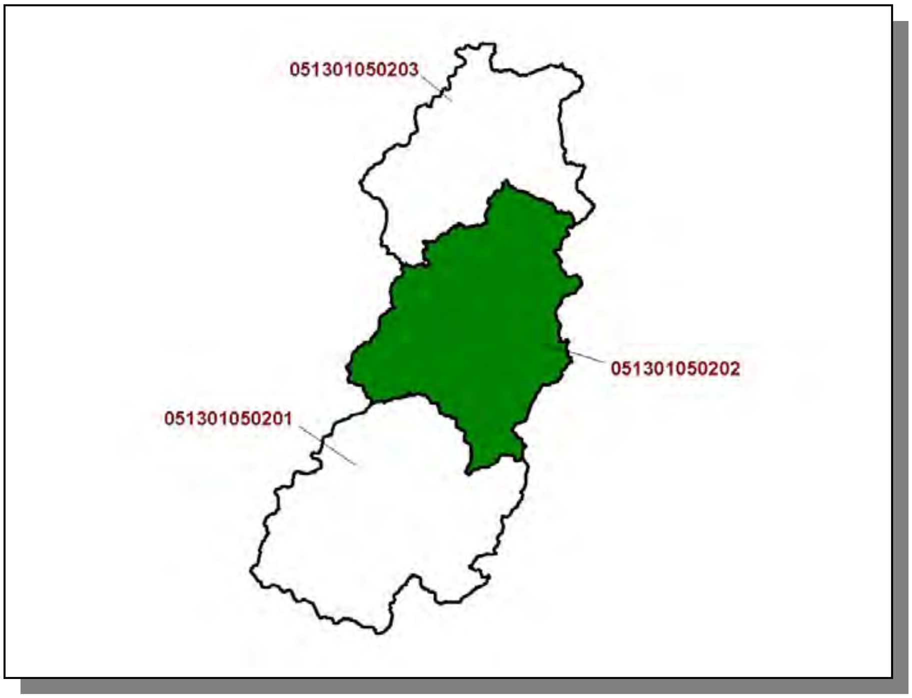

Figure 4-66. Location of Subwatershed 051301050202. *HUC-12 subwatershed boundaries are shown for reference.*

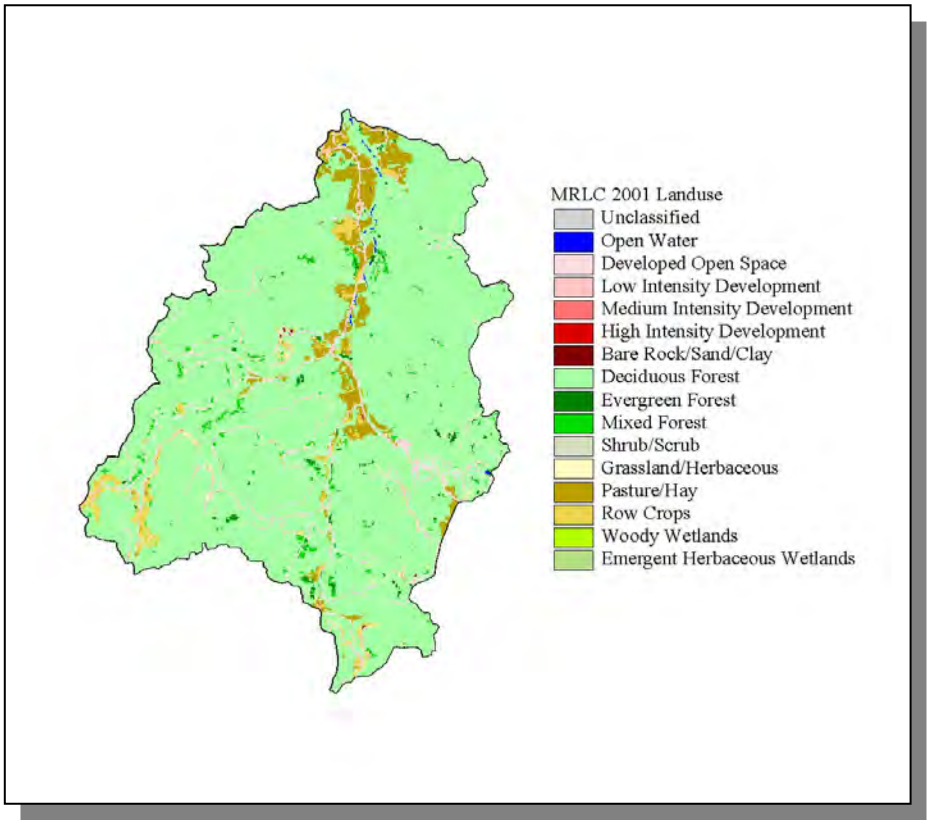

Figure 4-67. Illustration of Land Use Distribution in Subwatershed 051301050202.

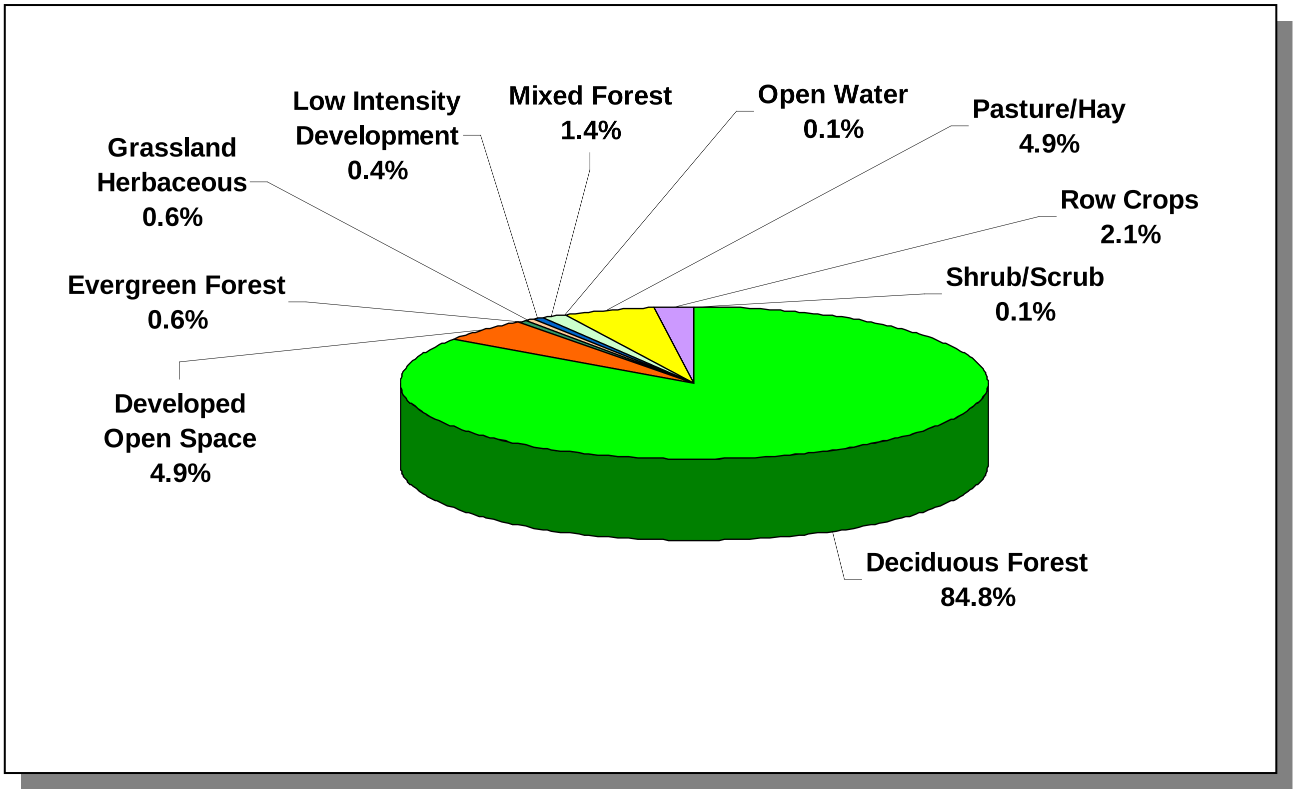

Figure 4-68. Land Use Distribution in Subwatershed 051301050202. *More information is provided in Appendix IV.*

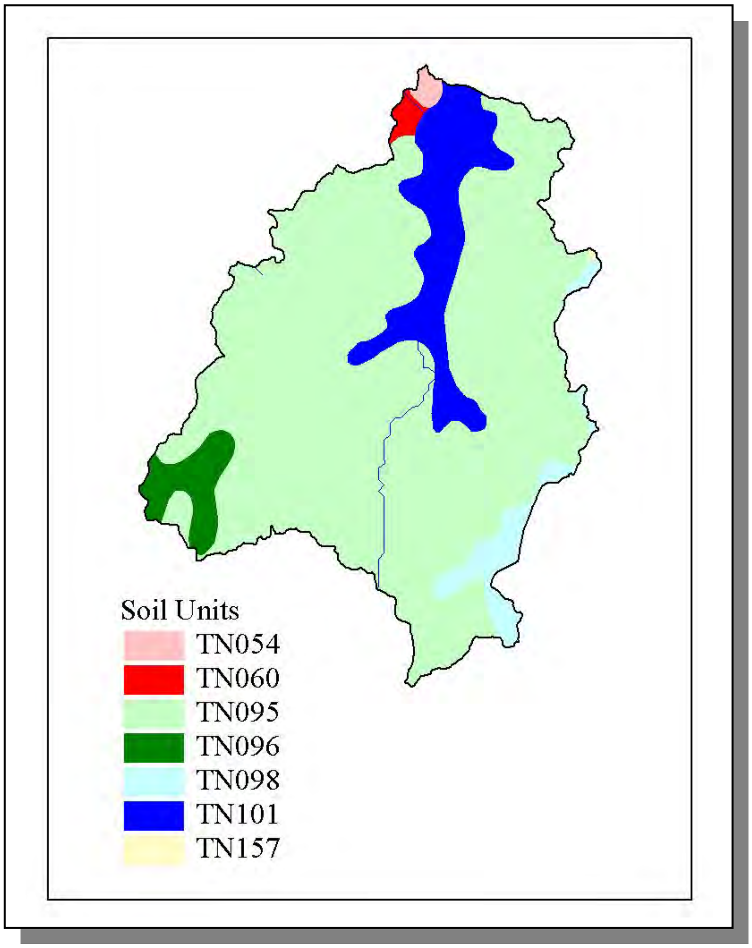

Figure 4-69. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050202.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN054	0.00	C	3.04	4.84	Loam	0.32
TN060	5.00	B	1.30	5.32	Silty Loam	0.39
TN095	0.00	B	2.35	5.12	Loam	0.31
TN096	10.00	C	1.22	5.16	Silty Loam	0.38
TN098	1.00	C	2.98	4.82	Loam	0.32
TN101	0.00	B	1.71	5.39	Loam	0.35
TN157	0.00	B	2.38	4.62	Loam	0.28

Table 4-64. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050202. *The definition of "Hydrologic Group" is provided in Appendix IV.*

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	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Overton	17,636	19,171	20,118	12.23	2,157	2,345	2,461	14.1

Table 4-65. Population Estimates in Subwatershed 051301050202.

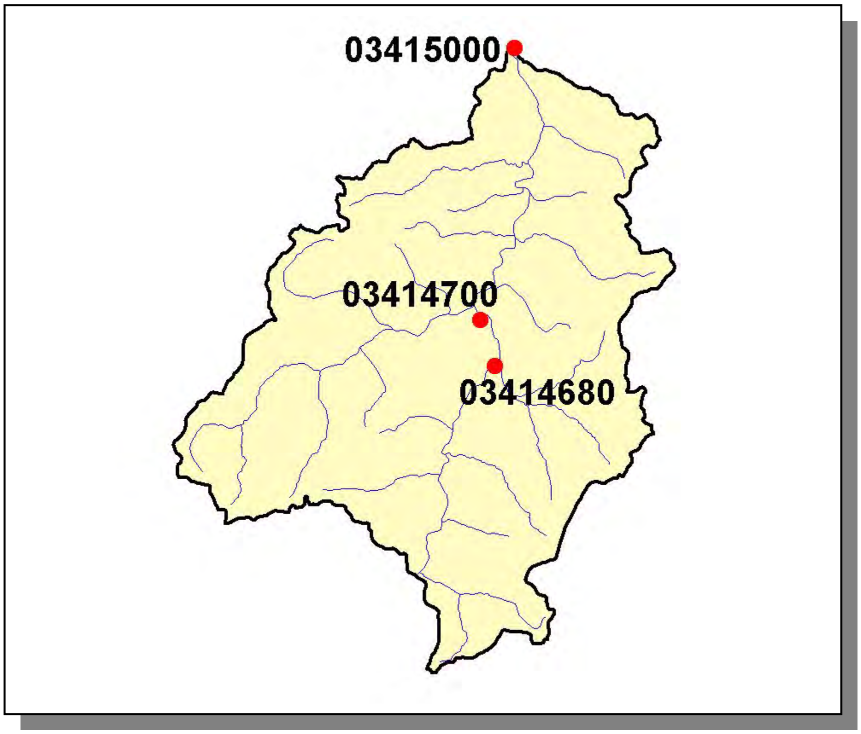

Figure 4-70. Location of Historical Streamflow Data Collection Sites in Subwatershed 051301050202. *More information is provided in Appendix IV.*

Figure 4-71. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301050202. *More information, including site names and locations, is provided in Appendix IV.*

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

There are no point source contributions in this subwatershed.

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
442	811	35	<5	24	<5

Table 4-66. Summary of Livestock Count Estimates in Subwatershed 051301050202. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Overton	15,150	27,812	1,200	1,173	0	811	59

Table 4-67. Summary of Livestock Count Estimates in Overton 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)
Overton	170.3	170.3	1.7	7.0

Table 4-68. Forest Acreage and Annual Removal Rates (1987-1994) in Overton County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.26
Grass (Hayland)	0.31
Legumes, Grass (Hayland)	2.89
Grass, Forbs, Legumes (Mixed Pasture)	0.67
Corn (Row Crops)	4.35
Soybeans (Row Crops)	10.79
Wheat (Close-Grown Cropland)	7.00
Other Vegetable and Truck Crops	21.46
Conservation Reserve Program Lands	0.46
Farmsteads and Ranch Headquarters	0.58

Table 4-69. Annual Estimated Total Soil Loss in Subwatershed 051301050202.

4.2.B.iii. 051301050203 (West Fork Obey River).

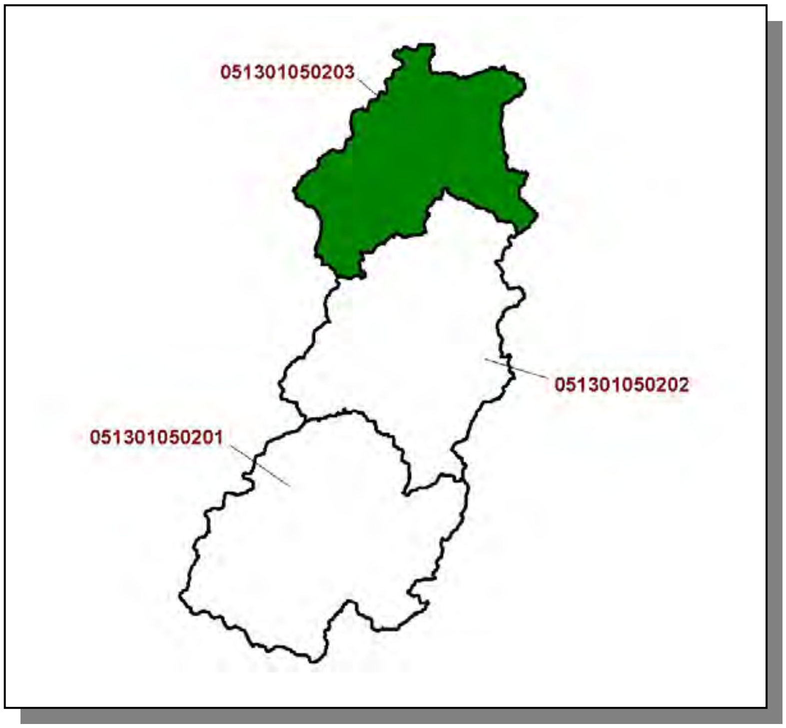

Figure 4-72. Location of Subwatershed 051301050203. *HUC-12 subwatershed boundaries Tennessee are shown for reference.*

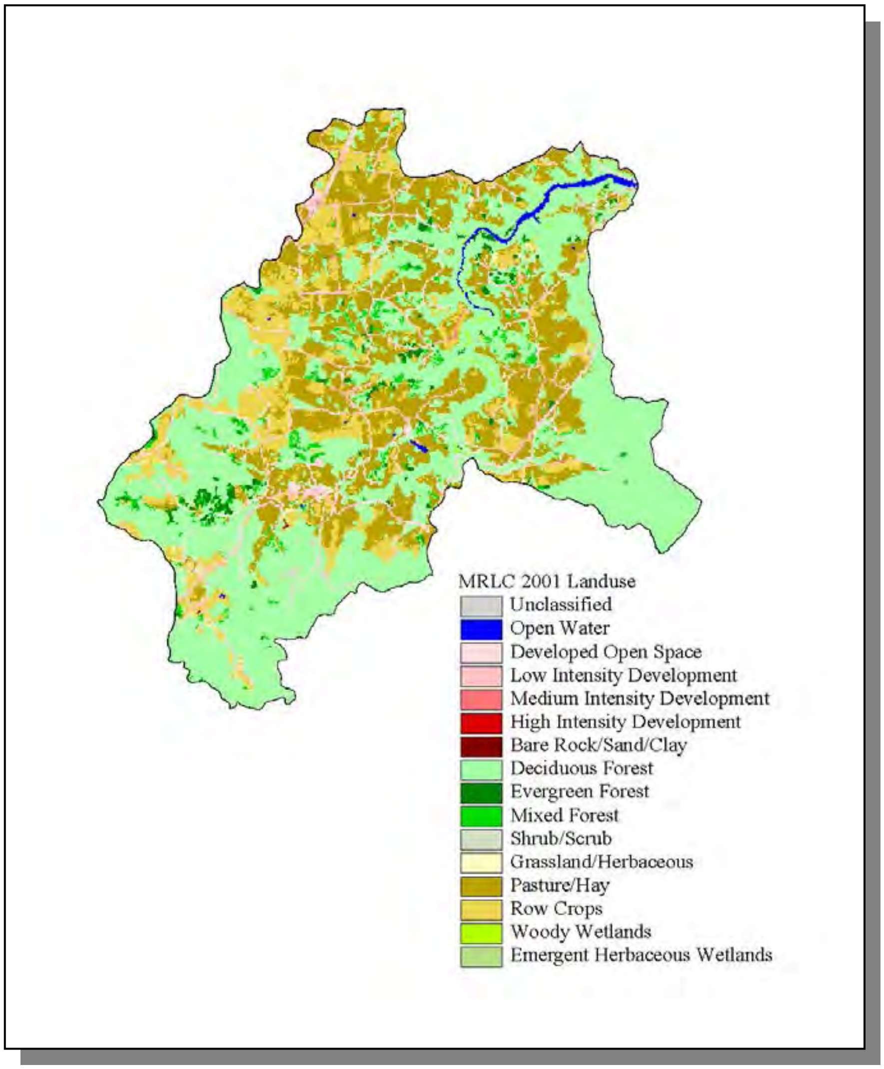

Figure 4-73. Illustration of Land Use Distribution in Subwatershed 051301050203.

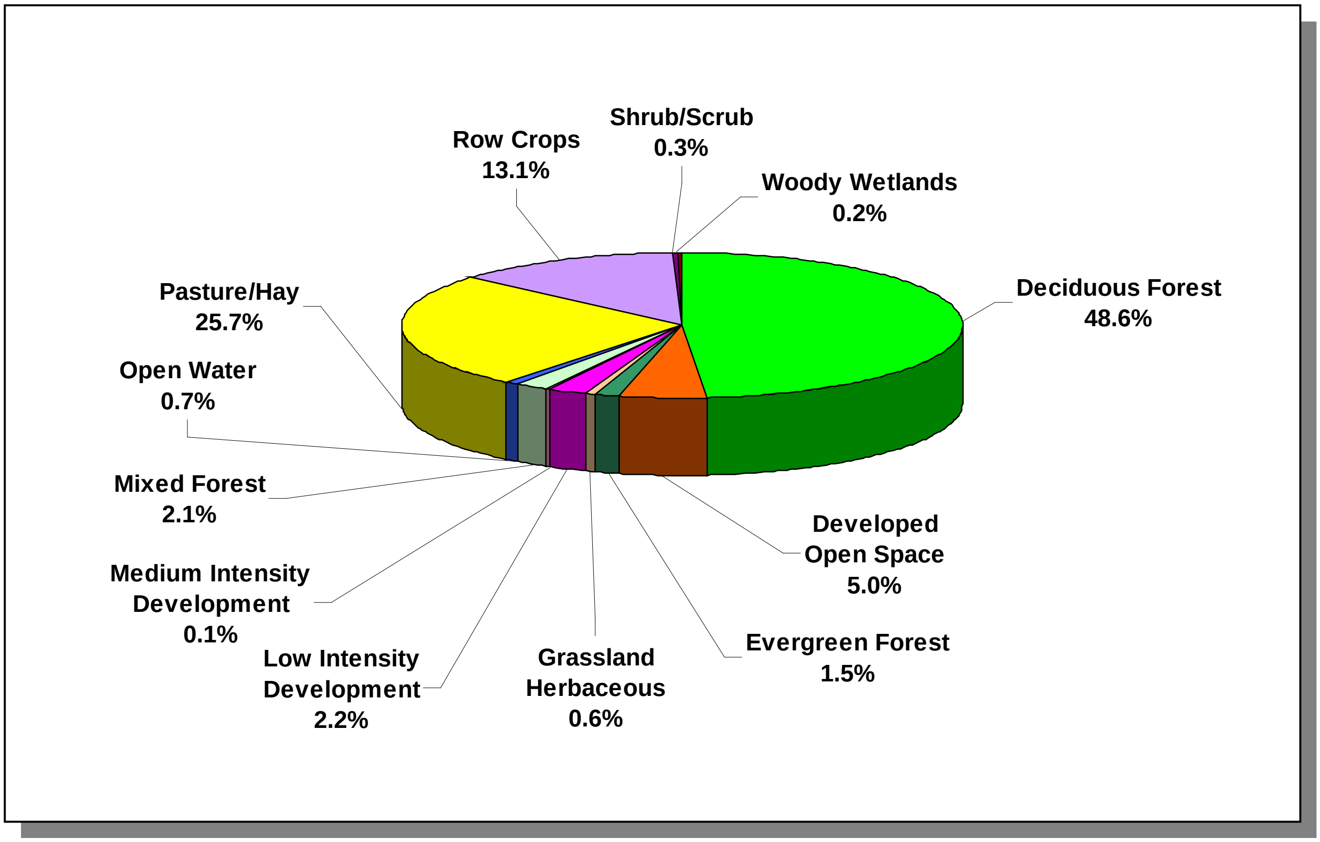

Figure 4-74. Land Use Distribution in Subwatershed 051301050203. *More information is provided in Appendix IV.*

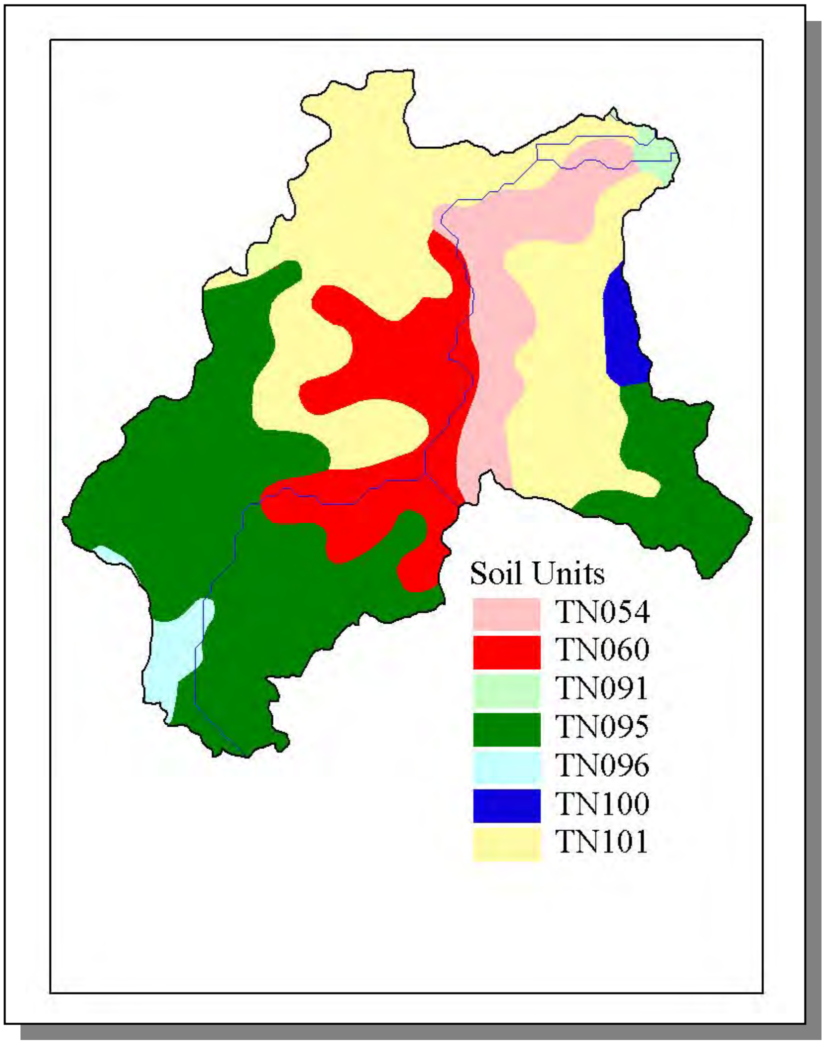

Figure 4-75. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050203.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN054	0.00	C	3.04	4.84	Loam	0.32
TN060	5.00	B	1.30	5.32	Silty Loam	0.39
TN091	0.00	B	2.95	5.86	Loam	0.34
TN095	0.00	B	2.35	5.12	Loam	0.31
TN096	10.00	C	1.22	5.16	Silty Loam	0.38
TN100	0.00	B	1.14	3.35	Silty Loam	0.21

Table 4-70. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050203. *The definition of "Hydrologic Group" is provided in Appendix IV.*

.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Overton	17,636	19,171	20,118	8.72	1,538	1,672	1,755	14.1
Pickett	4,548	4,631	4,945	0.51	23	23	25	8.7
Total	**22,184**	**23,802**	**25,063**		**1,561**	**1,695**	**1,780**	**14.0**

Table 4-71. Population Estimates in Subwatershed 051301050203.

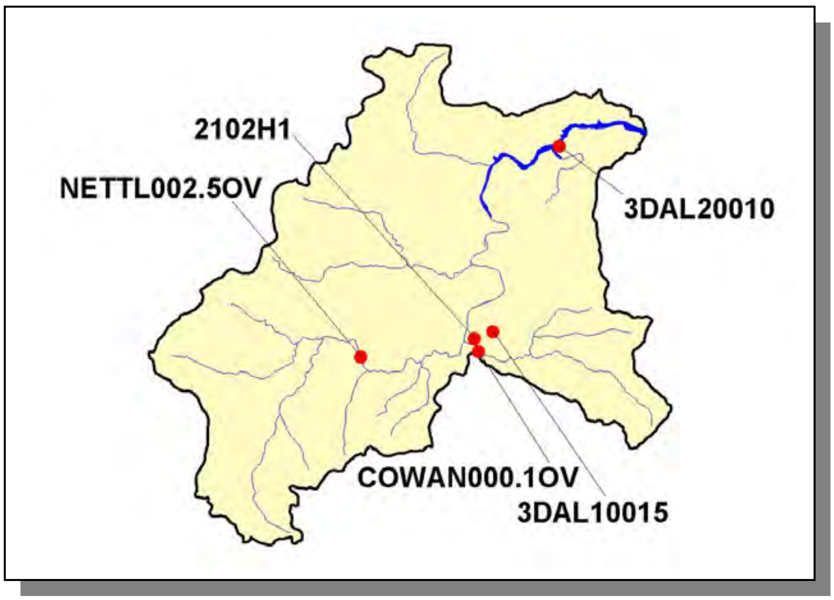

Figure 4-76. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301050203. *More information, including site names and locations, is provided in Appendix IV.*

4.2.B.iii.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.B.iii.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
1,824	3,347	142	6	96	7

Table 4-72. Summary of Livestock Count Estimates in Subwatershed 051301050203. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Overton	15,150	27,812	1,200	1,173	811	59
Pickett	5,986	10,864	19	284	99	0

Table 4-73. Summary of Livestock Count Estimates in Overton and Pickett Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Overton	170.3	170.3	1.7	7.0
Pickett	68.4	68.4	0.2	0.6

Table 4-74. Forest Acreage and Annual Removal Rates (1987-1994) in Overton and Pickett Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.28
Grass (Hayland)	0.31
Legumes, Grass (Hayland)	2.82
Grass, Forbs, Legumes (Mixed Pasture)	0.67
Corn (Row Crops)	4.35
Soybeans (Row Crops)	10.79
Tobacco (Row Crops)	23.18
Wheat (Close-Grown Cropland)	7.00
Other Vegetation and Truck Crops	21.46
Conservation Reserve Program Lands	0.46
Farmsteads and Ranch Headquarters	0.75

Table 4-75. Annual Estimated Total Soil Loss in Subwatershed 051301050203.

4.2.C. 0513010503.

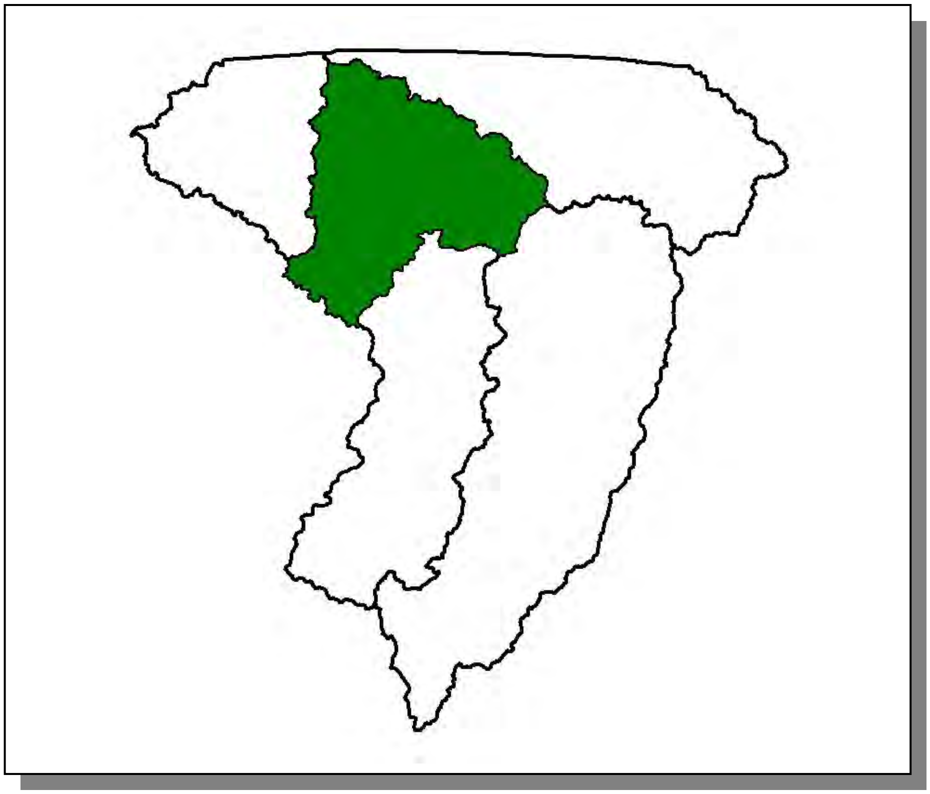

Figure 4-77. Location of Subwatershed 0513010503. *All Obey River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.C.i. 051301050301 (Obey River).

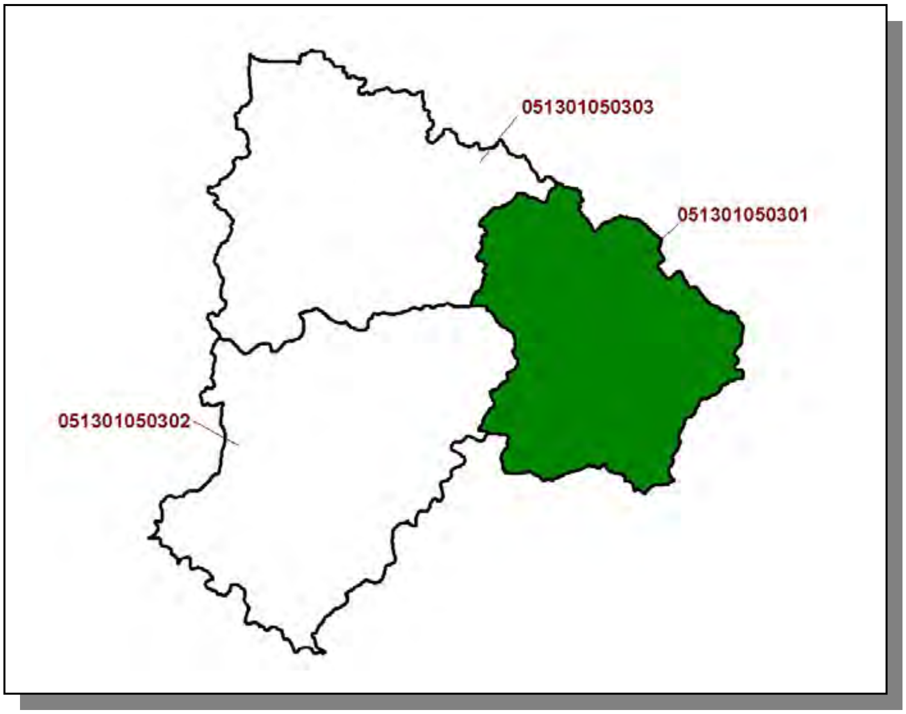

Figure 4-78. Location of Subwatershed 051301050301. *HUC-12 subwatershed boundaries are shown for reference.*

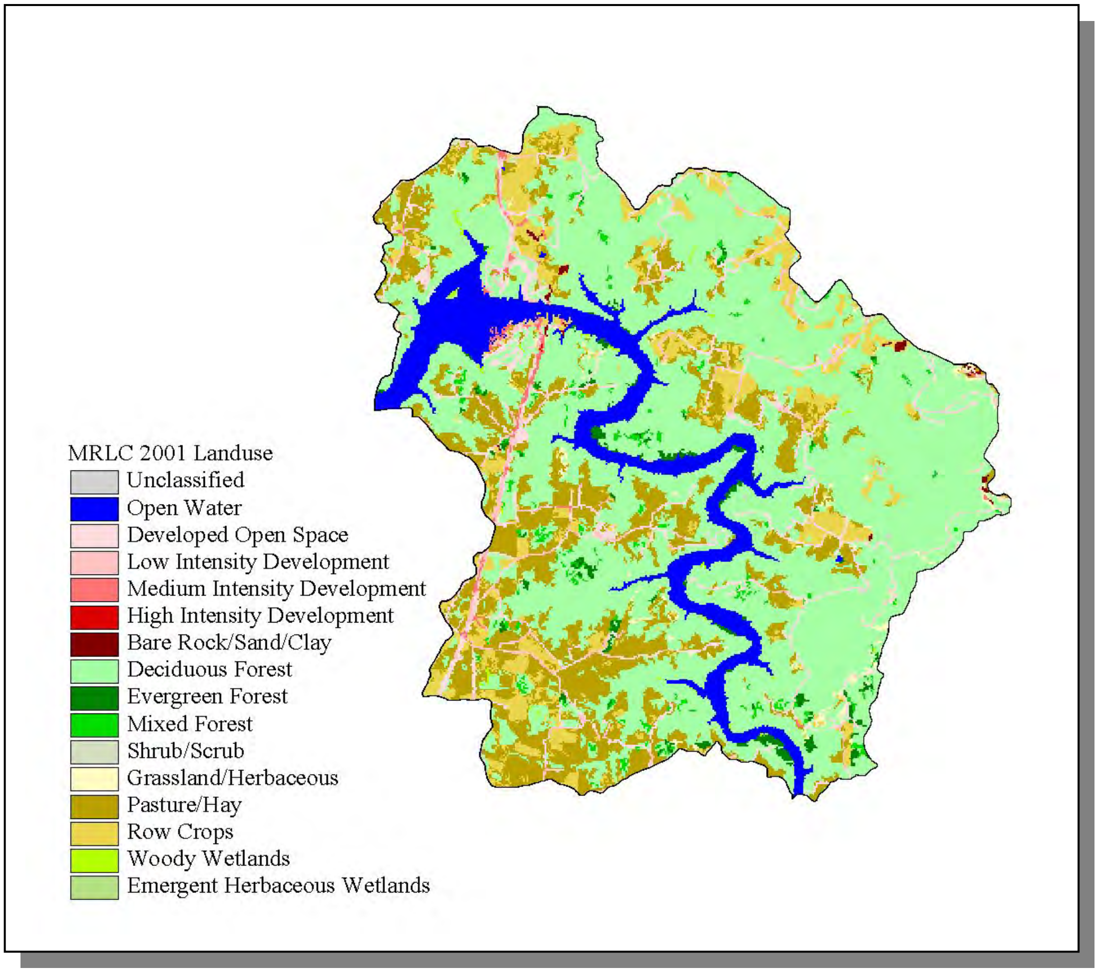

Figure 4-79. Illustration of Land Use Distribution in Subwatershed 051301050301.

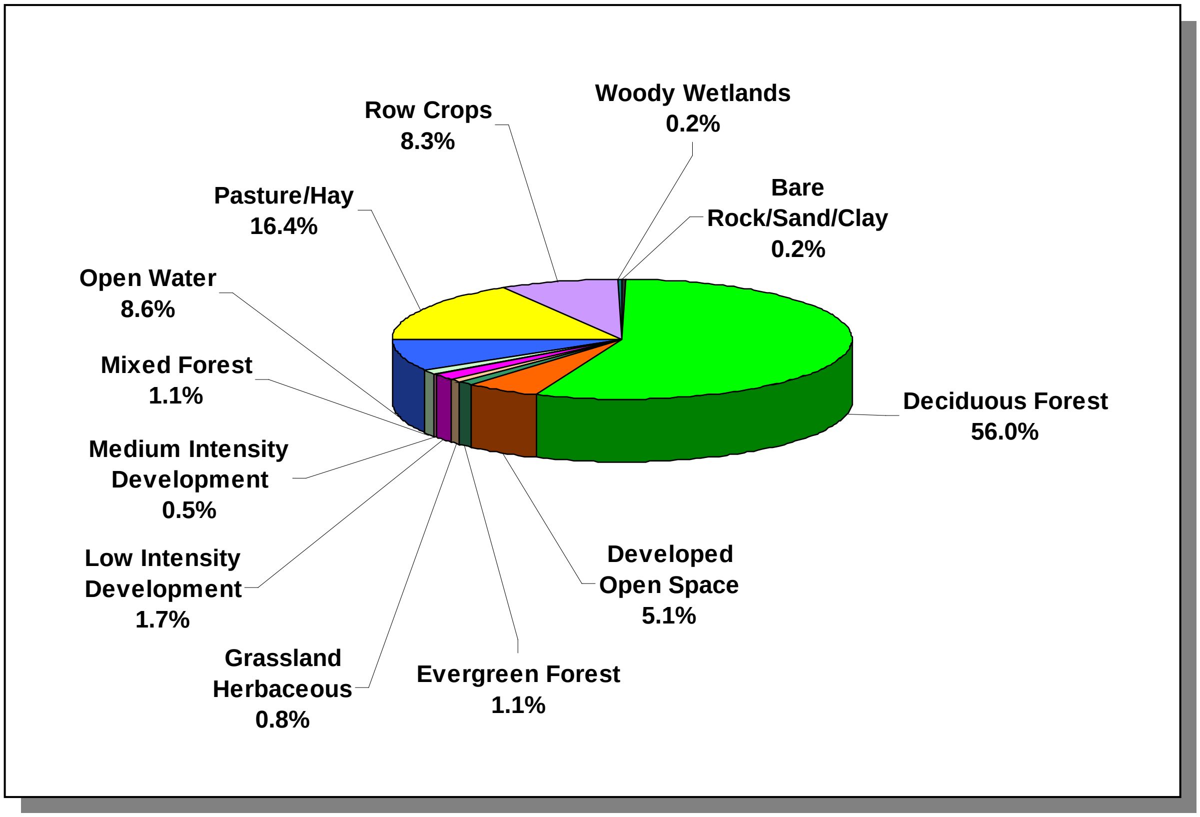

Figure 4-80. Land Use Distribution in Subwatershed 051301050301. More information is provided in Appendix IV.

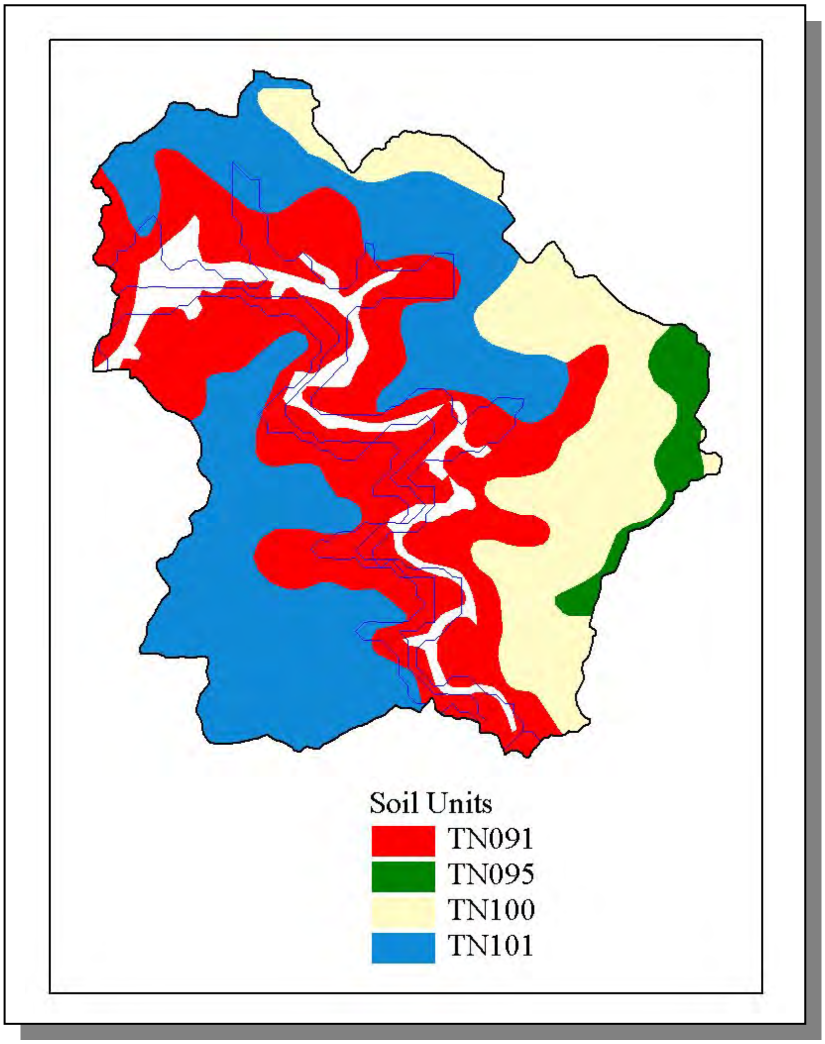

Figure 4-81. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050301.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN091	0.00	B	2.95	5.86	Loam	0.34
TN095	0.00	B	2.35	5.12	Loam	0.31
TN100	0.00	B	1.14	3.35	Silty Loam	0.21
TN101	0.00	B	1.71	5.39	Loam	0.35

Table 4-76. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050301. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	0.08	12	13	13	8.3
Overton	17,636	19,171	20,118	0.85	151	164	172	13.9
Pickett	4,548	4,631	4,945	17.8	810	824	880	8.6
Total	**36,853**	**39,722**	**41,688**		**973**	**1,001**	**1,065**	**9.5**

Table 4-77. Population Estimates in Subwatershed 051301050301.

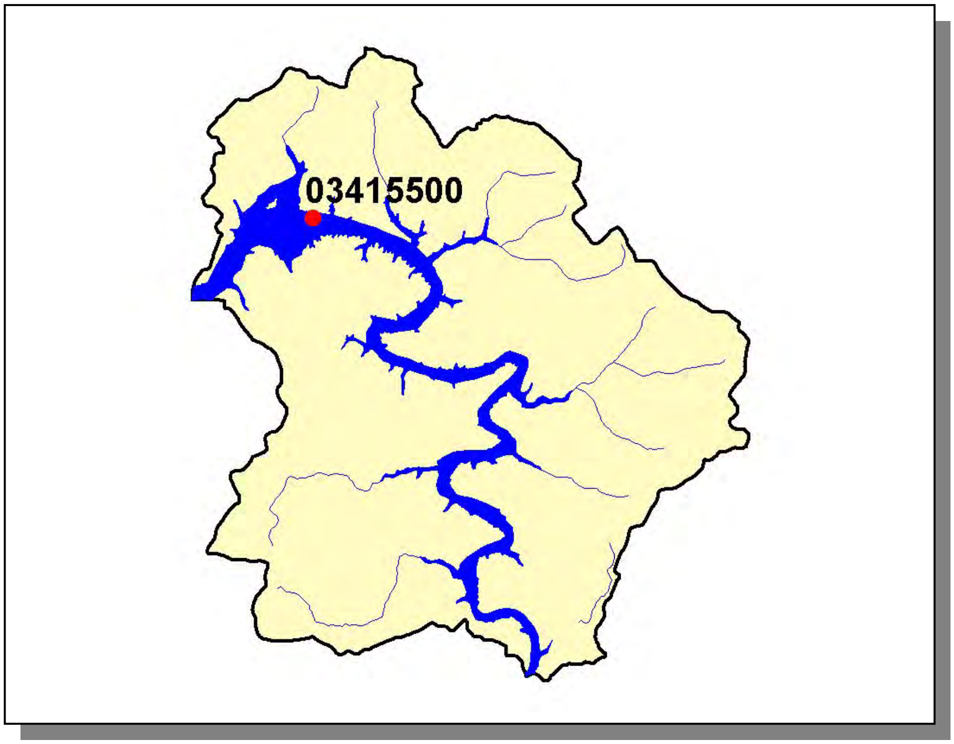

Figure 4-82. Location of Historical Streamflow Data Collection Sites in Subwatershed 051301050301. *More information is provided in Appendix IV.*

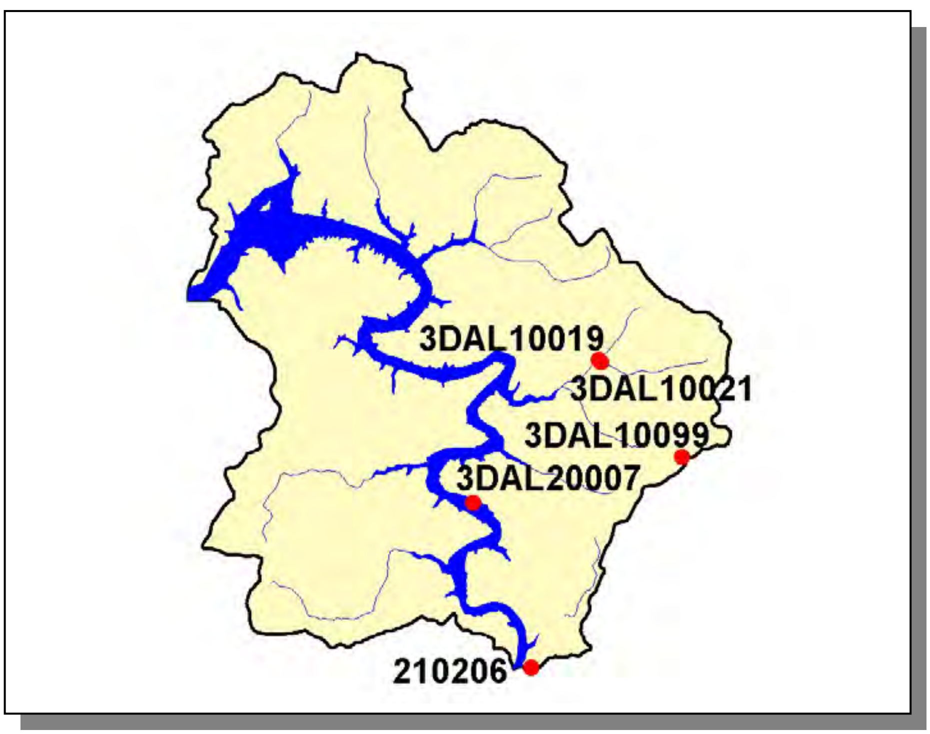

Figure 4-83. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301050301. *More information, including site names and locations, is provided in Appendix IV.*

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

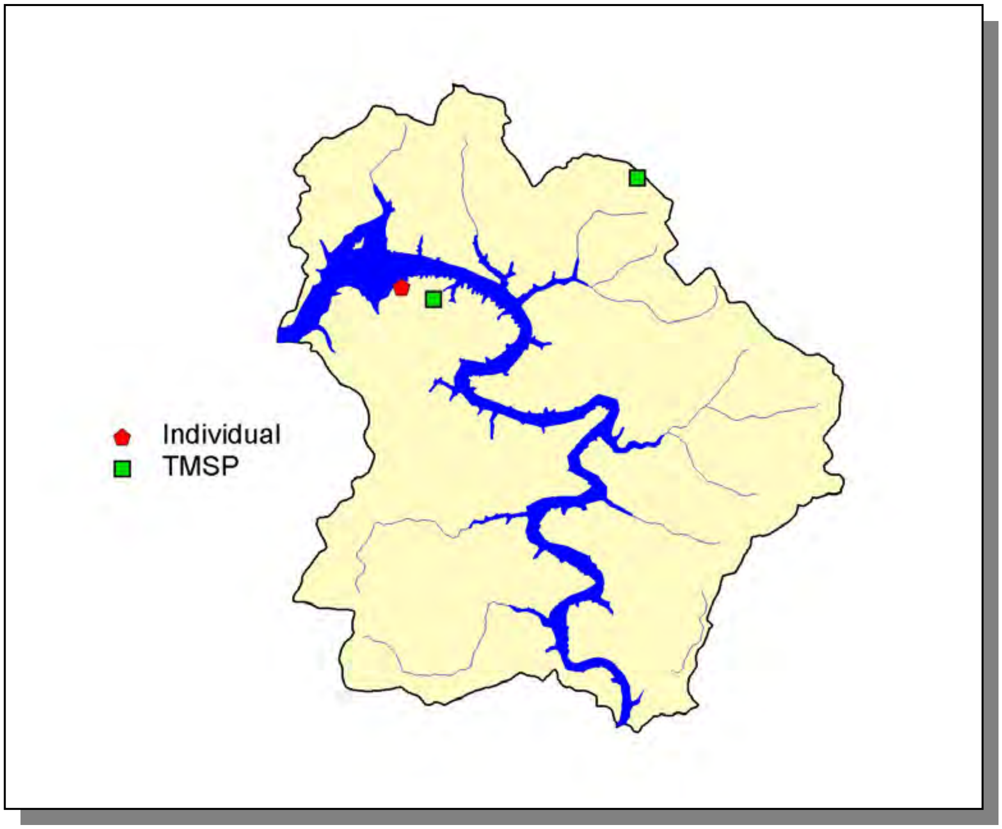

Figure 4-84. Location of Permits Issued in Subwatershed 051301050301. *More information, including the names of facilities, is provided in Appendix IV.*

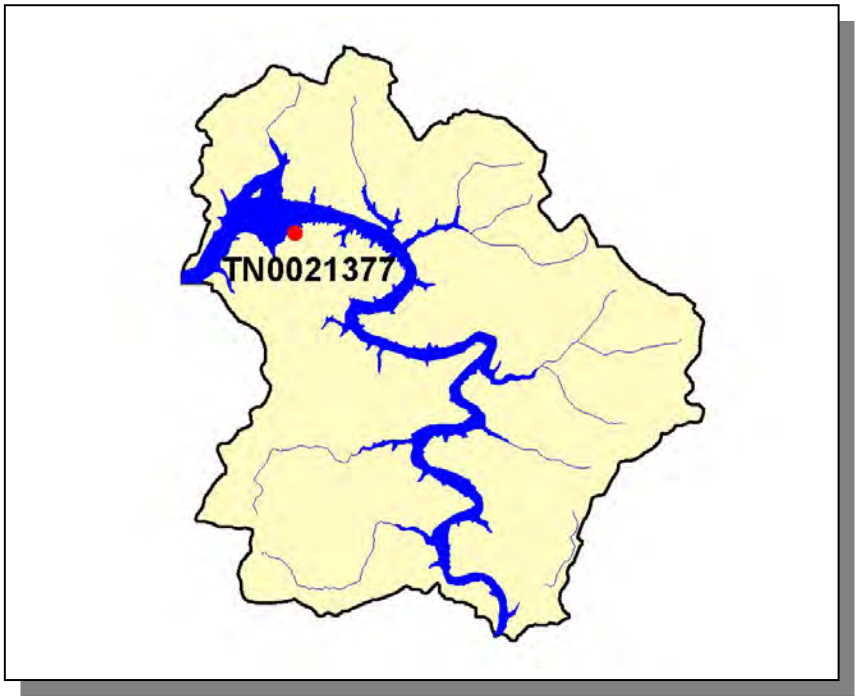

Figure 4-85. Location of Active NPDES Sites in Subwatershed 051301050301. *More information, including the names of facilities, is provided in Appendix IV.*

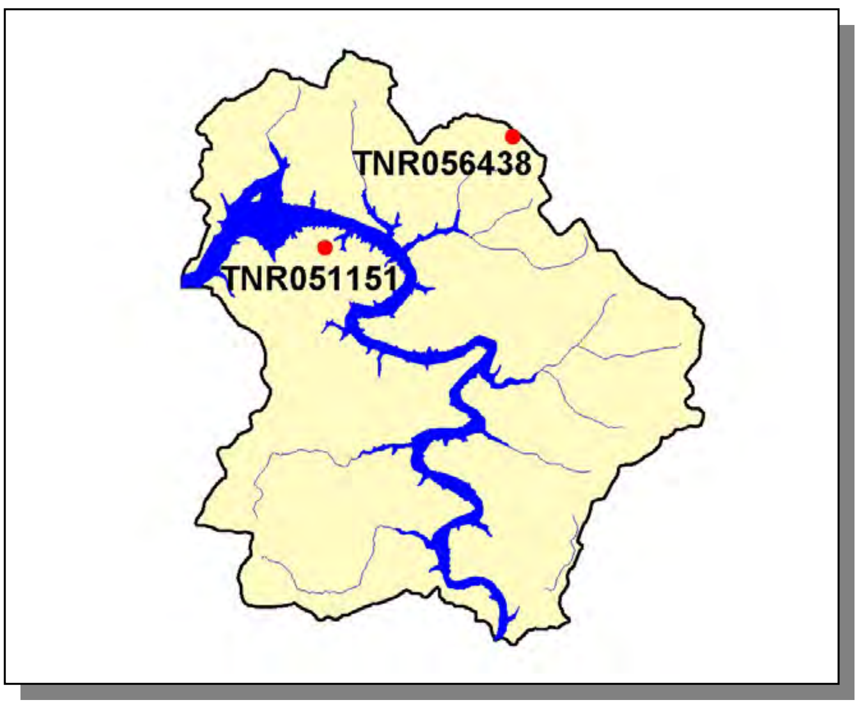

Figure 4-86. Location of TMSP Sites in Subwatershed 051301050301. *More information, including the names of facilities, is provided in Appendix IV.*

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

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
1,409	2,565	33	<5	644	37	<5

Table 4-78. Summary of Livestock Count Estimates in Subwatershed 051301050301. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Fentress	8,058	17,259	430	474	7,290,026	729	79
Overton	15,150	27,812	1,200	1,173	0	811	59
Pickett	5,986	10,864	19	285	0	99	0

Table 4-79. Summary of Livestock Count Estimates in Fentress, Overton, and Pickett Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Fentress	244.1	244.1	3.6	14.3
Overton	170.3	170.3	1.7	7.0
Pickett	68.4	68.4	0.2	0.6

Table 4-80. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress, Overton, and Pickett Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.01
Grass (Hayland)	0.13
Legumes, Grass (Hayland)	0.36
Grass, Forbs, Legumes (Mixed Pasture)	0.69
Corn (Row Crops)	5.49
Soybeans (Row Crops)	10.33
Tobacco (Row Crops)	23.18
Wheat (Close-Grown Cropland)	10.51
Other Vegetable and Truck Crops	20.93
Conservation Reserve Program Lands	0.46
Farmsteads and Ranch Headquarters	6.65

Table 4-81. Annual Estimated Total Soil Loss in Subwatershed 051301050301.

4.2.C.ii. 051301050302 (Eagle Creek).

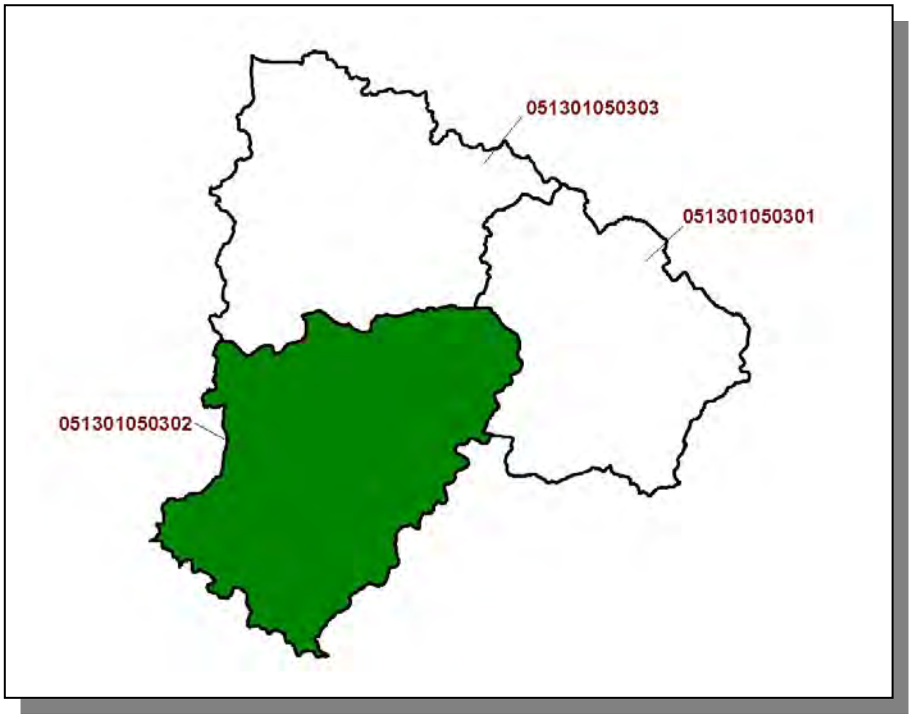

Figure 4-87. Location of Subwatershed 051301050302. *HUC-12 subwatershed boundaries are shown for reference.*

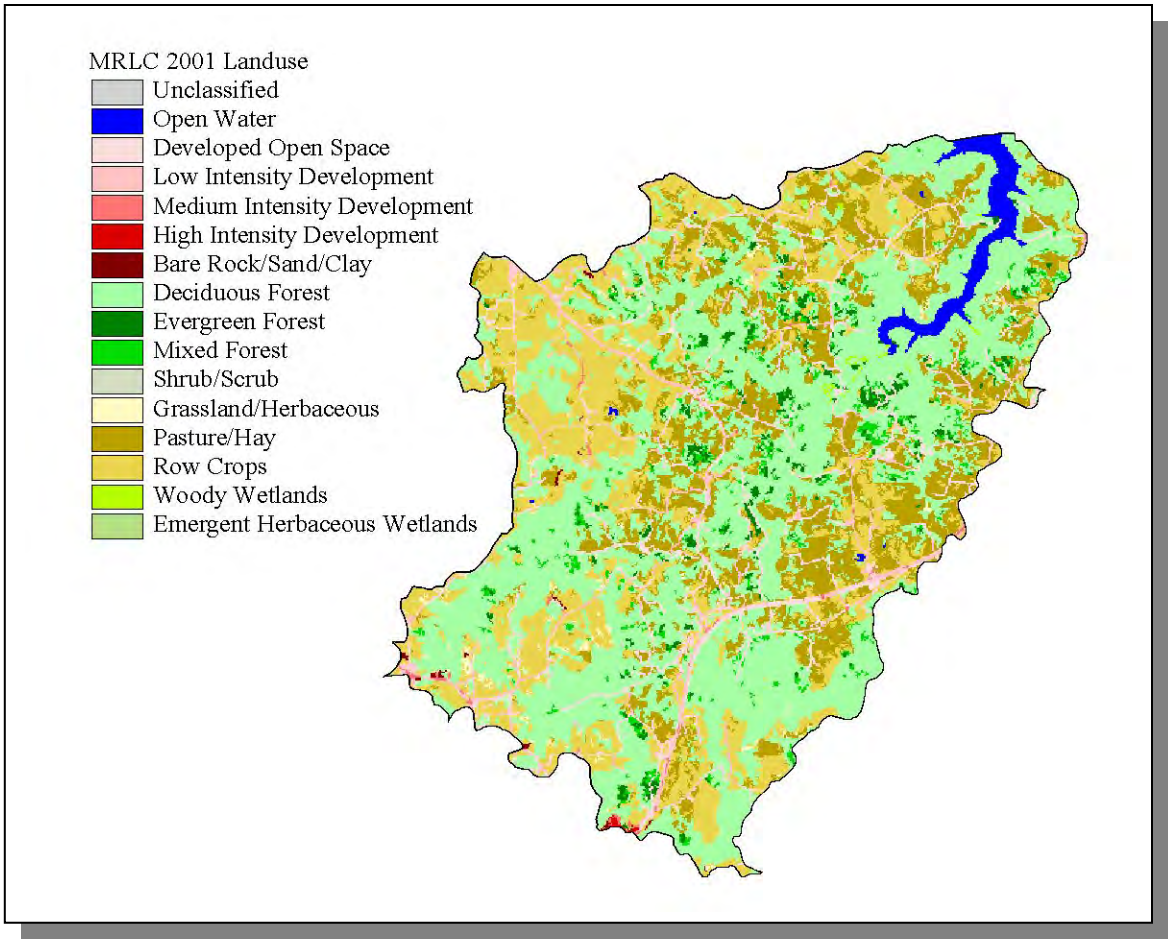

Figure 4-88. Illustration of Land Use Distribution in Subwatershed 051301050302.

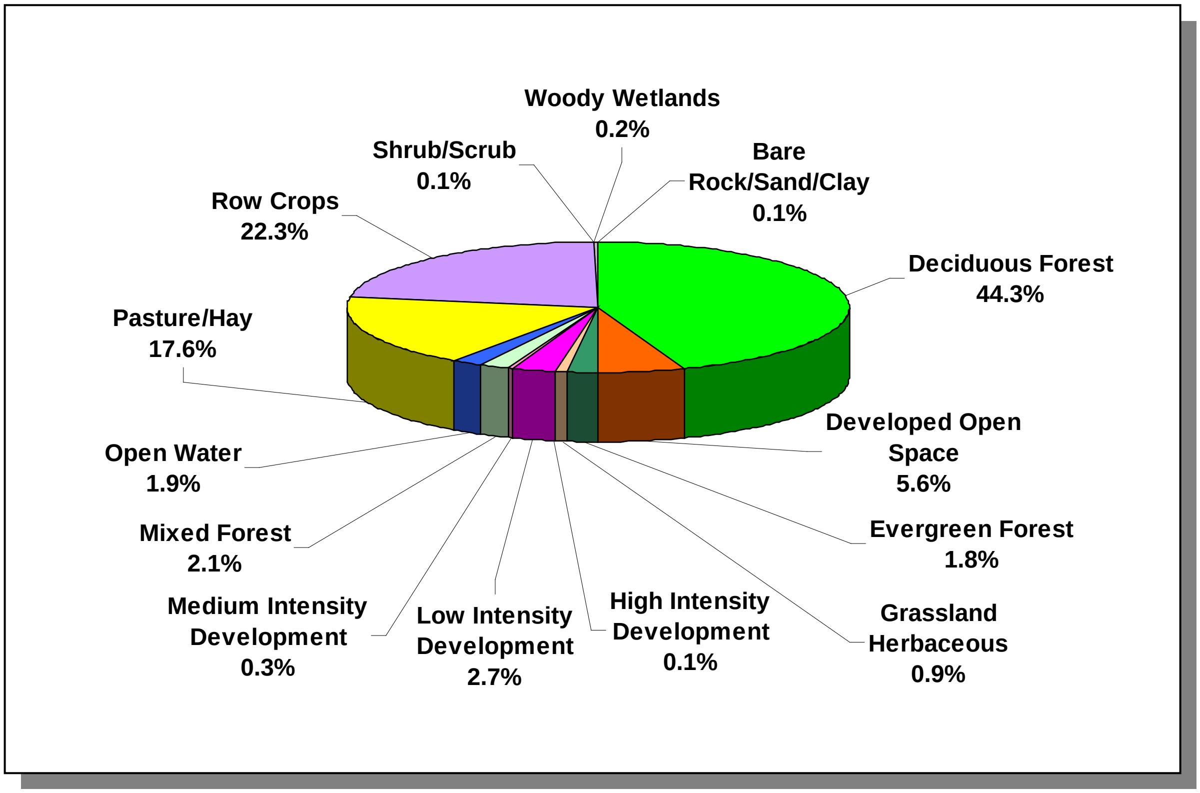

Figure 4-89. Land Use Distribution in Subwatershed 051301050302. *More information is provided in Appendix IV.*

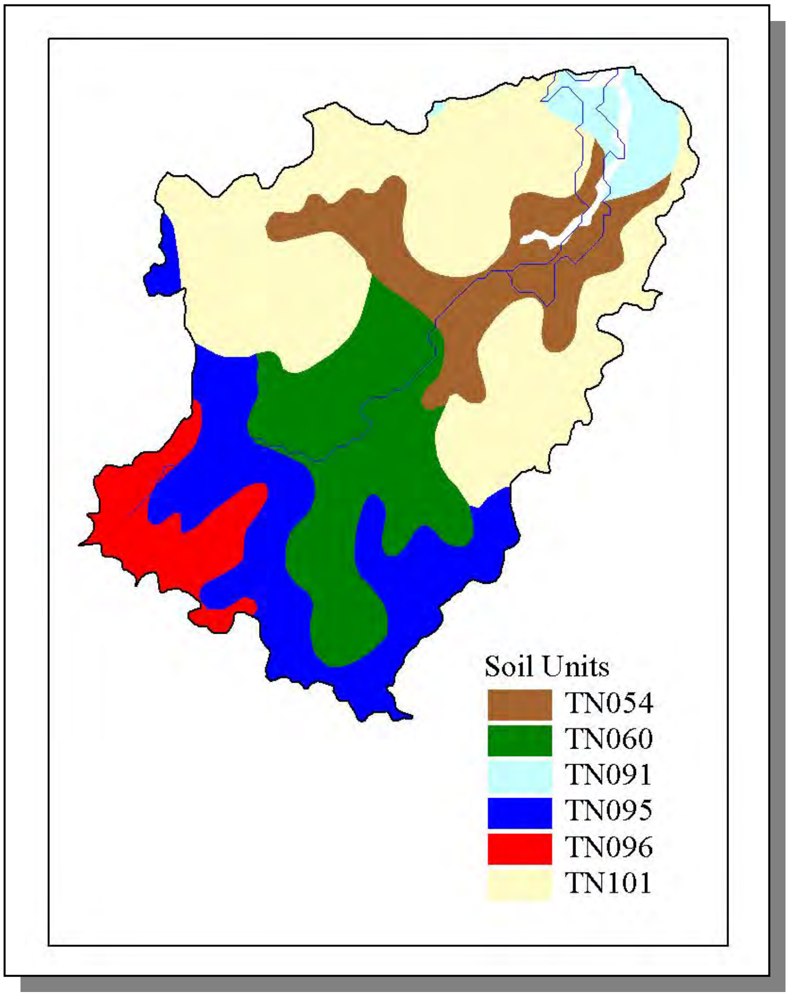

Figure 4-90. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050302.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN054	0.00	C	3.04	4.84	Loam	0.32
TN060	5.00	B	1.30	5.32	Silty Loam	0.39
TN091	0.00	B	2.95	5.86	Loam	0.34
TN095	0.00	B	2.35	5.12	Loam	0.31
TN096	10.00	C	1.22	5.16	Silty Loam	0.38
TN101	0.00	B	1.71	5.39	Loam	0.35

Table 4-82. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050302. *The definition of "Hydrologic Group" is provided in Appendix IV.*

.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Overton	17,636	19,171	20,118	10.98	1,936	2,104	2,208	14.0
Pickett	4,548	4,631	4,945	0.78	35	36	38	8.6
Total	**22,184**	**23,802**	**25,063**		**1,971**	**2,140**	**2,246**	**14.0**

Table 4-83. Population Estimates in Subwatershed 051301050302.

Figure 4-91. Location of Historical Streamflow Data Collection Sites in Subwatershed 051301050302. *More information is provided in Appendix IV.*

Figure 4-92. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301050302. *More information, including site names and locations, is provided in Appendix IV.*

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

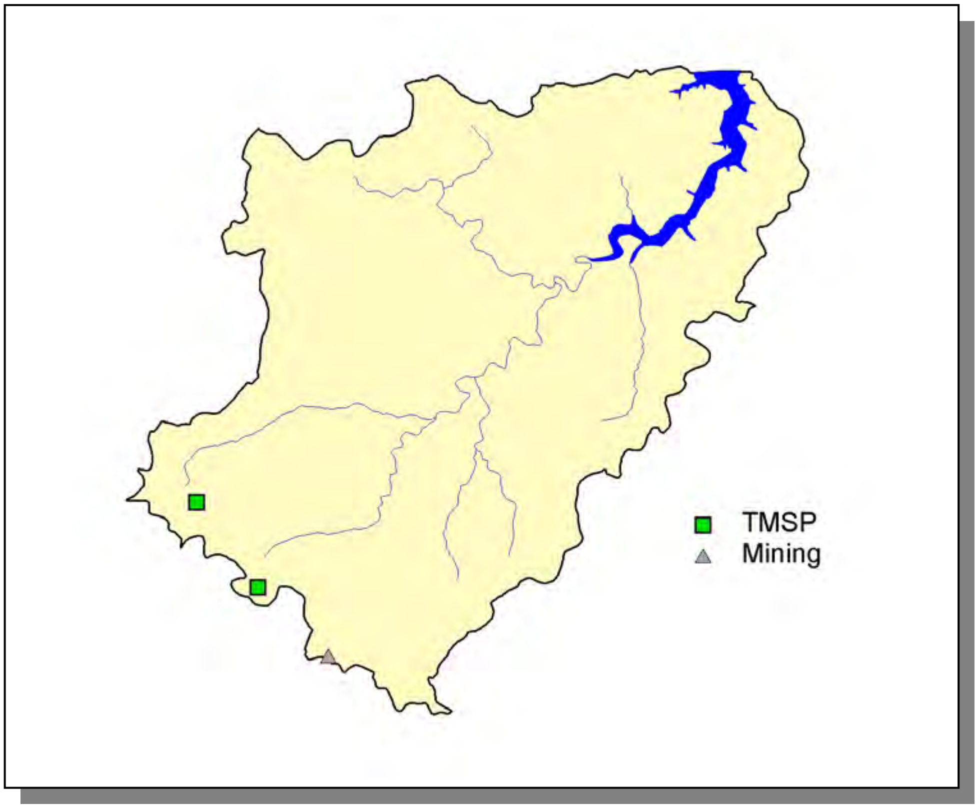

Figure 4-93. Location of Permits Issued in Subwatershed 051301050302. *More information, including the names of facilities, is provided in Appendix IV.*

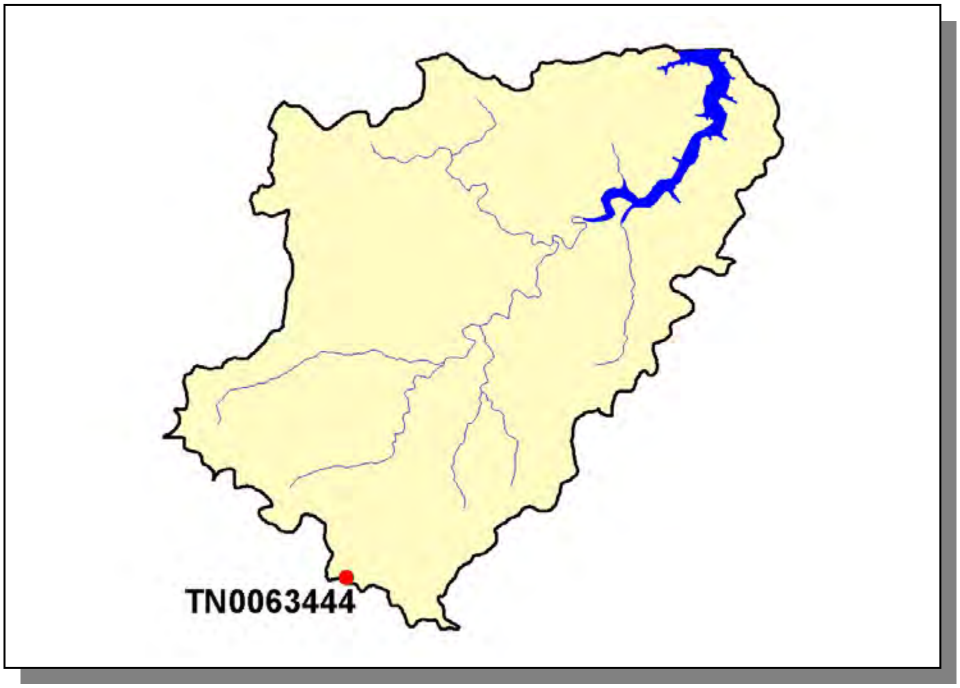

Figure 4-94. Location of Active Mining Sites in Subwatershed 051301050302. *More information, including the names of mining operations, is provided in Appendix IV.*

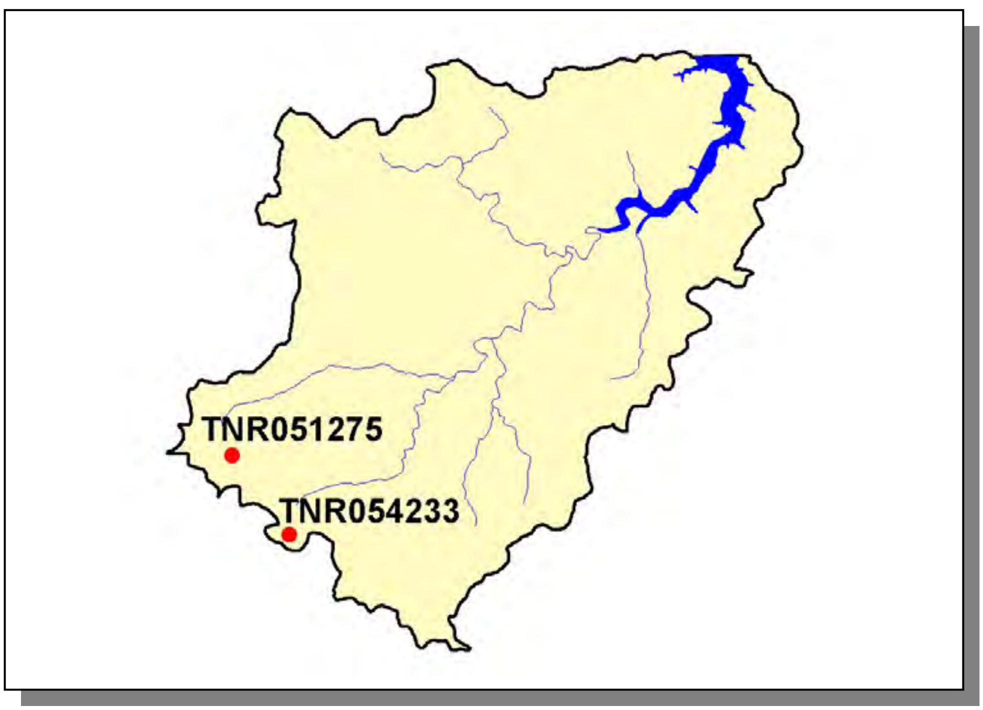

Figure 4-95. Location of TMSP Sites in Subwatershed 051301050302. *More information, including the names of facilities, is provided in Appendix IV.*

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
2,492	4,574	195	8	132	10

Table 4-84. Summary of Livestock Count Estimates in Subwatershed 051301050302. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Overton	15,150	27,812	1,200	1,173	811	59
Pickett	5,986	10,864	19	285	99	0

Table 4-85. Summary of Livestock Count Estimates in Overton and Pickett Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Overton	170.3	170.3	1.7	7.0
Pickett	68.4	68.4	0.2	0.6

Table 4-86. Forest Acreage and Annual Removal Rates (1987-1994) in Overton and Pickett Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.28
Grass (Hayland)	0.30
Legumes, Grass (Hayland)	2.81
Grass, Forbs, Legumes (Mixed Pasture)	0.67
Corn (Row Crops)	4.35
Soybeans (Row Crops)	10.79
Tobacco (Row Crops)	23.18
Wheat (Close-Grown Cropland)	7.00
Other Vegetable and Truck Crops	2.46
Conservation Reserve Program Lands	0.46
Farmsteads and Ranch Headquarters	0.79

Table 4-87. Annual Estimated Total Soil Loss in Subwatershed 051301050302.

4.2.C.iii. 051301050303 (Obey River).

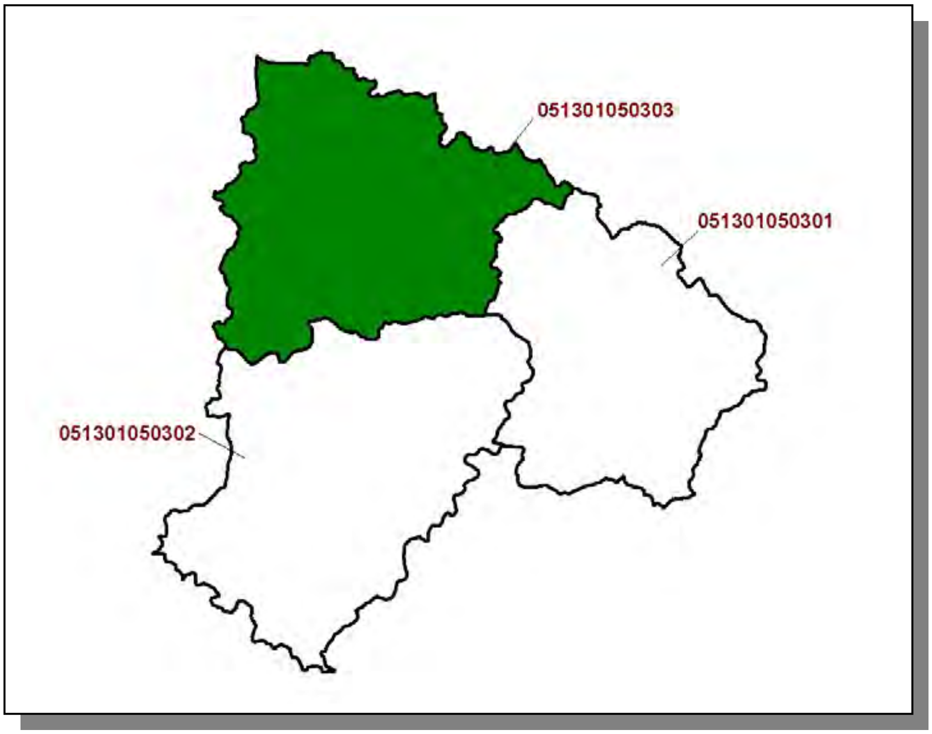

Figure 4-96. Location of Subwatershed 051301050303. *HUC-12 subwatershed boundaries are shown for reference.*

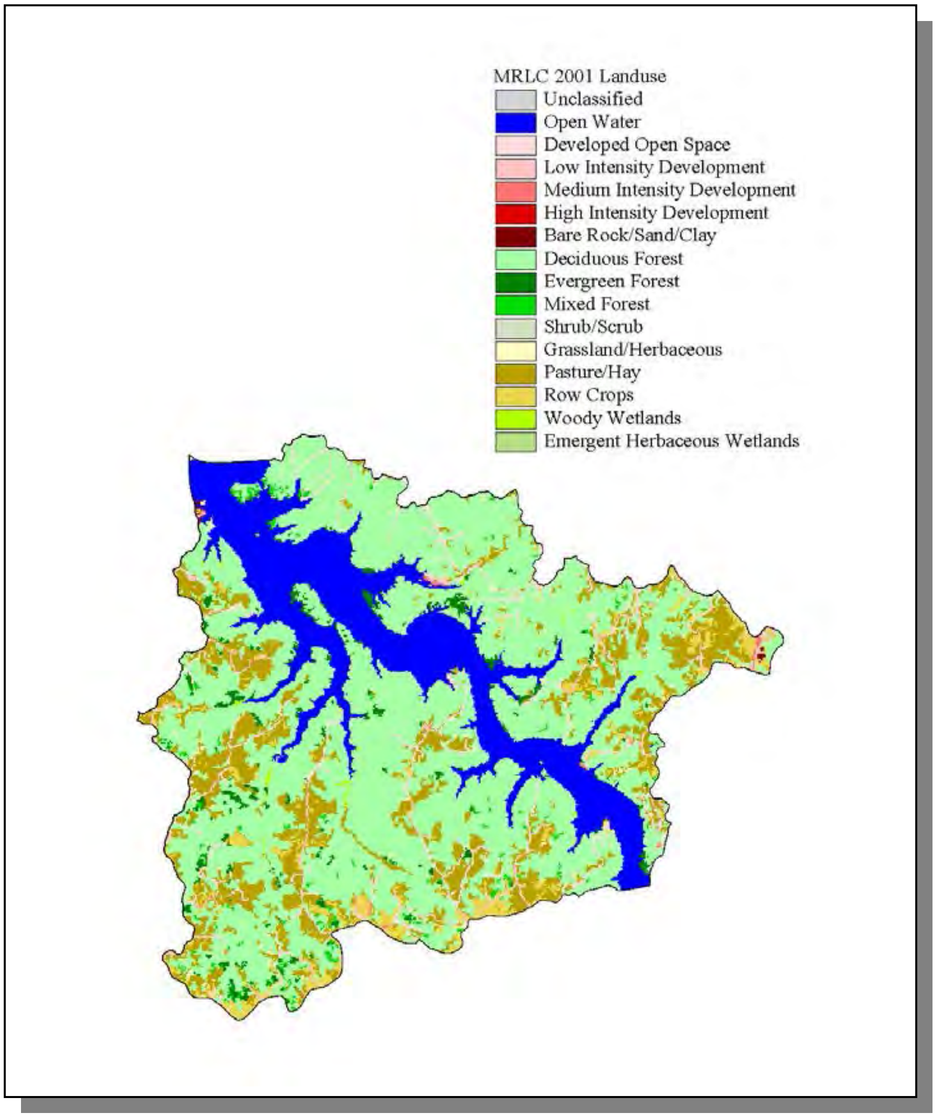

Figure 4-97. Illustration of Land Use Distribution in Subwatershed 051301050303.

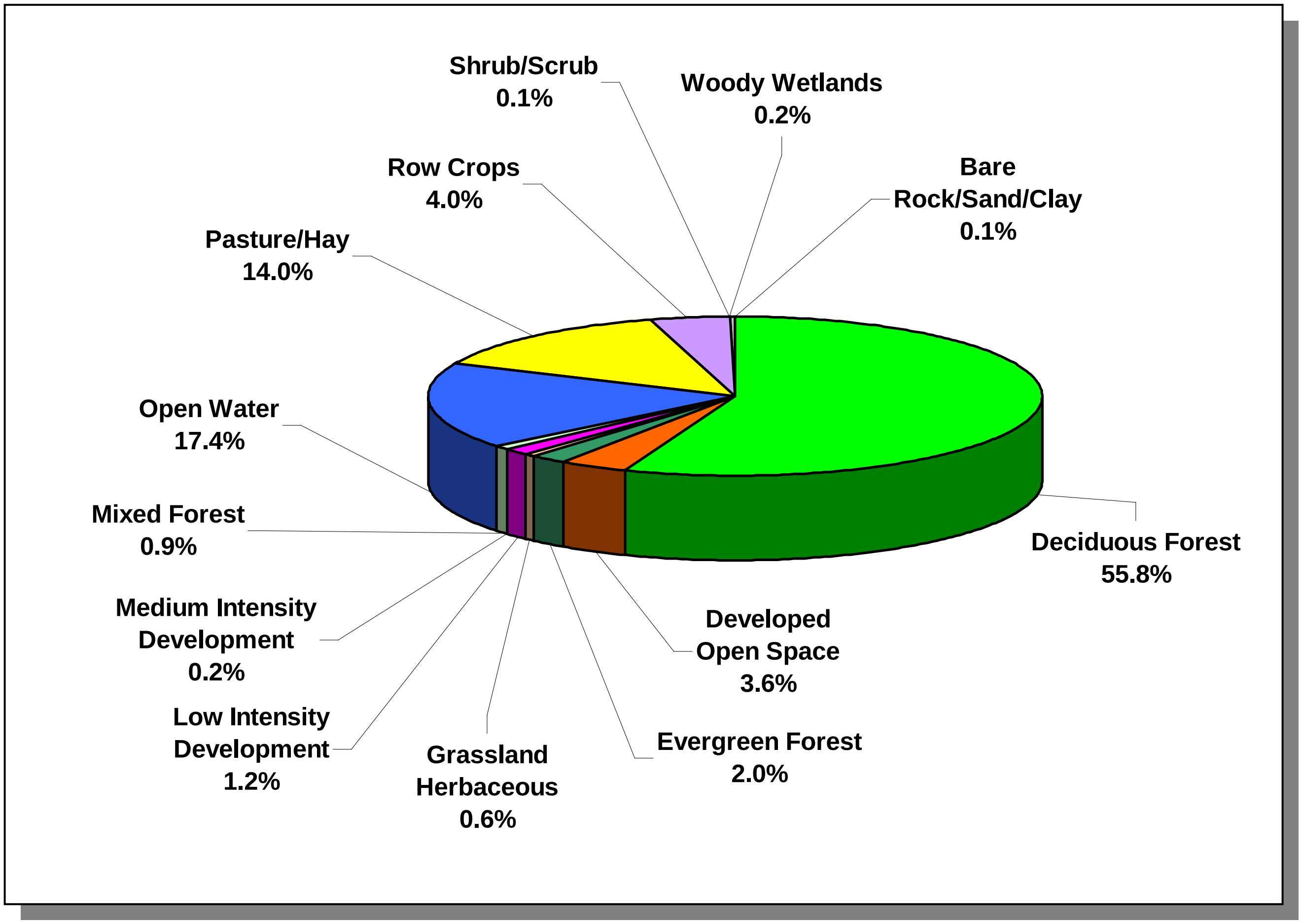

Figure 4-98. Land Use Distribution in Subwatershed 051301050303. *More information is provided in Appendix IV.*

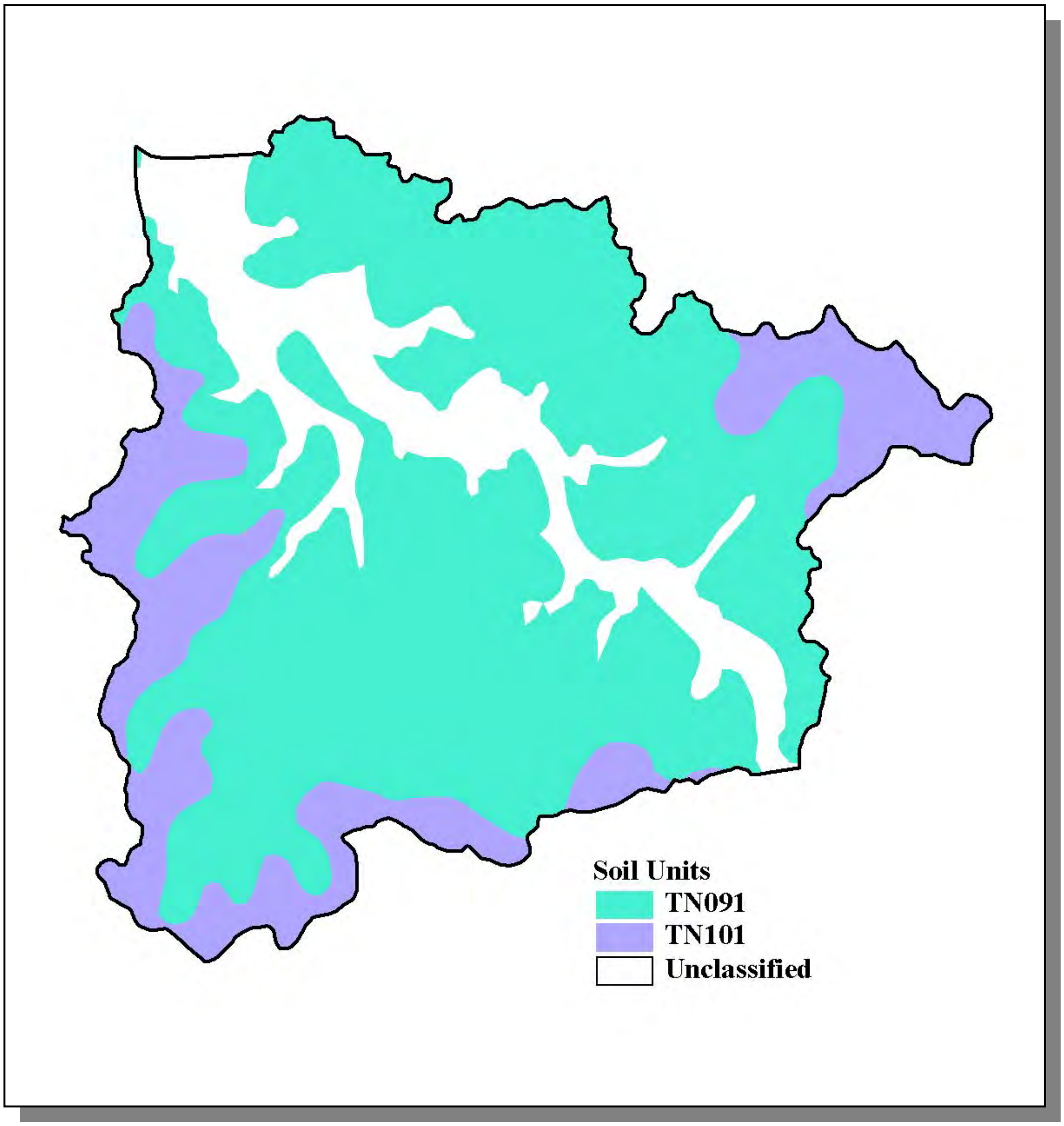

Figure 4-99. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050303.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN091	0.00	B	2.95	5.86	Loam	0.34
TN101	0.00	B	1.71	5.39	Loam	0.35

Table 4-88. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050303. *The definition of "Hydrologic Group" is provided in Appendix IV.*

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	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Clay	7,238	7,311	7,976	3.43	248	251	274	10.5
Overton	17,636	19,171	20,118	1.69	298	324	340	14.1
Pickett	4,548	4,631	4,945	14.21	646	658	703	8.8
Total	**29,422**	**31,113**	**33,039**		**1,192**	**1,233**	**1,317**	**10.5**

Table 4-89. Population Estimates in Subwatershed 051301050303.

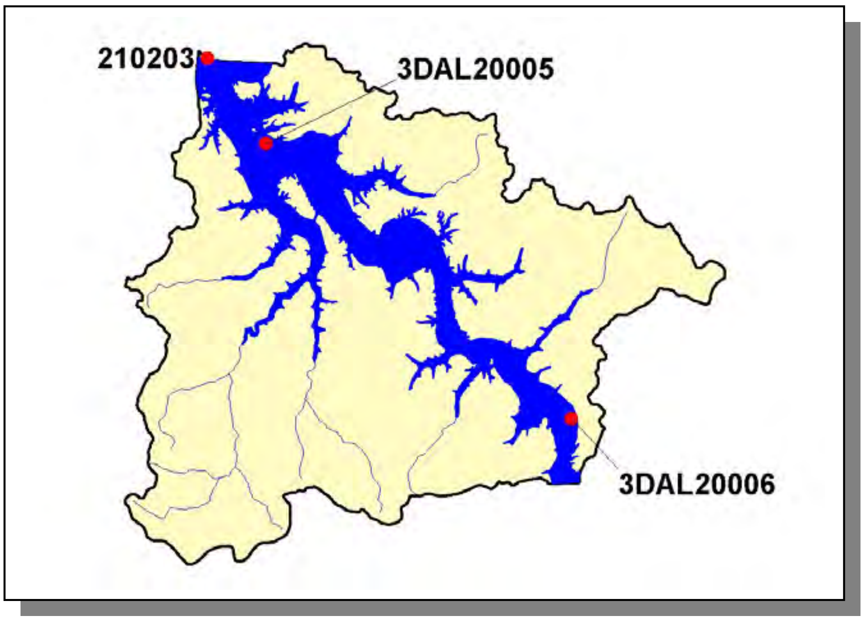

Figure 4-100. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301050303. *More information, including site names and locations, is provided in Appendix IV.*

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

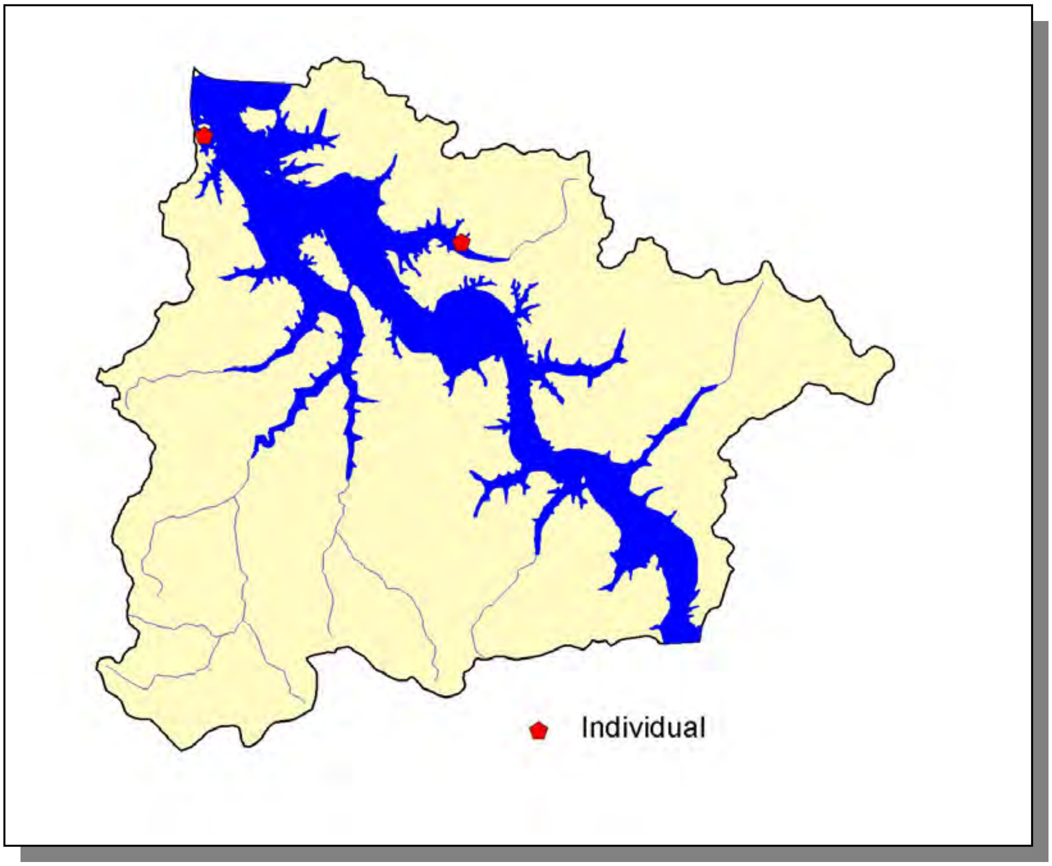

Figure 4-101. Location of Permits Issued in Subwatershed 051301050303. *More information, including the names of facilities, is provided in Appendix IV.*

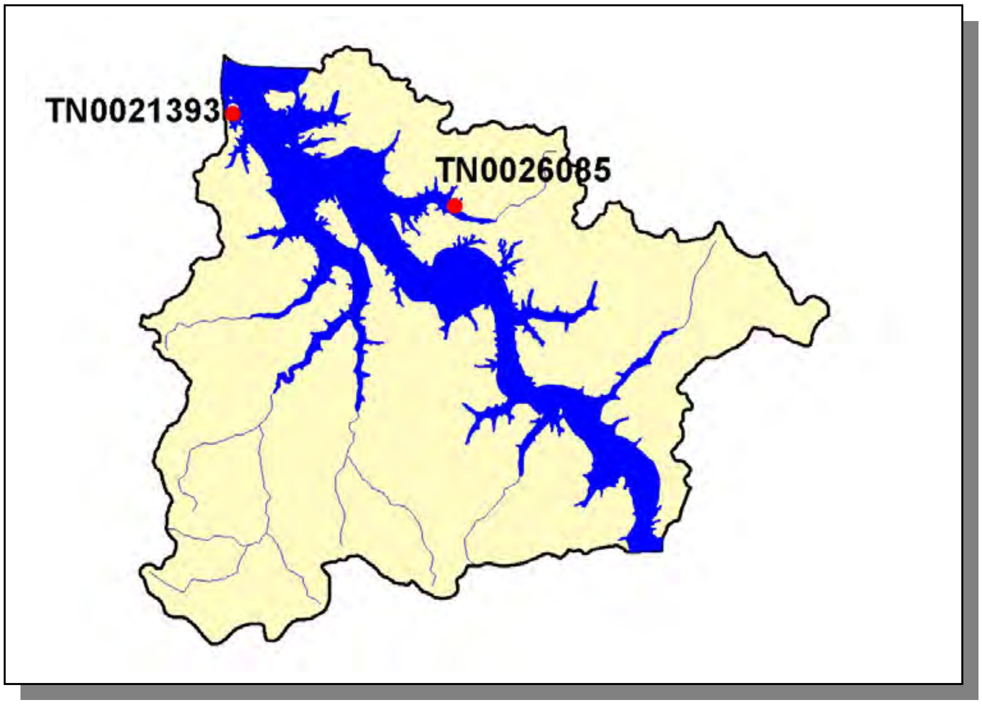

Figure 4-102. Location of Active NPDES Sites in Subwatershed 051301050303. *More information, including the names of facilities, is provided in Appendix IV.*

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
780	2,541	26	<5	38	<5

Table 4-90. Summary of Livestock Count Estimates in Subwatershed 051301050303. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Clay	0	14,574	0	18	174	23
Overton	15,150	27,812	1,200	1,173	811	59
Pickett	5,986	10,864	19	285	99	0

Table 4-91. Summary of Livestock Count Estimates in Clay, Overton, and Pickett Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Clay	105.1	105.1	2.3	10.1
Overton	170.3	170.3	1.7	7.0
Pickett	68.4	68.4	0.2	0.6

Table 4-92. Forest Acreage and Annual Removal Rates (1987-1994) in Clay, Overton, and Pickett Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.96
Grass (Hayland)	0.20
Legumes, Grass (Hayland)	0.65
Grass, Forbs, Legumes (Mixed Pasture)	0.84
Corn (Row Crops)	4.35
Soybeans (Row Crops)	10.79
Tobacco (Row Crops)	24.55
Wheat (Close-Grown Cropland)	7.00
Other Vegetable and Truck Crops	2.46
Conservation Reserve Program Lands	0.46
Farmsteads and Ranch Headquarters	5.00

Table 4-93. Annual Estimated Total Soil Loss in Subwatershed 051301050303.

4.2.D. 0513010504.

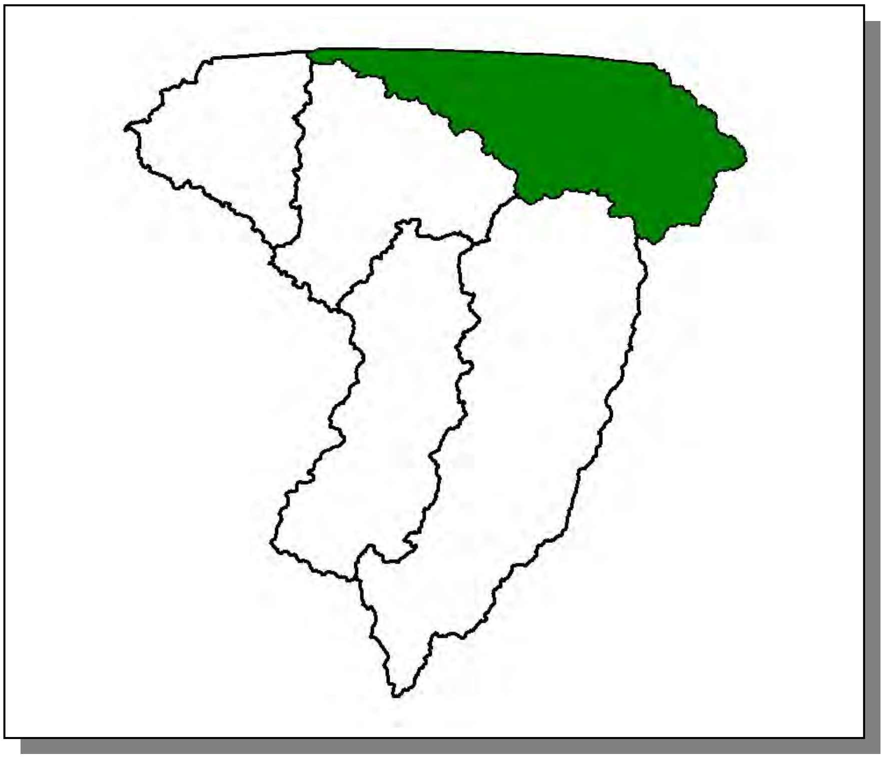

Figure 4-103. Location of Subwatershed 0513010504. *All Obey River HUC-10 subwatershed in Tennessee boundaries are shown for reference.*

4.2.D.i. 051301050401 (Wolf River).

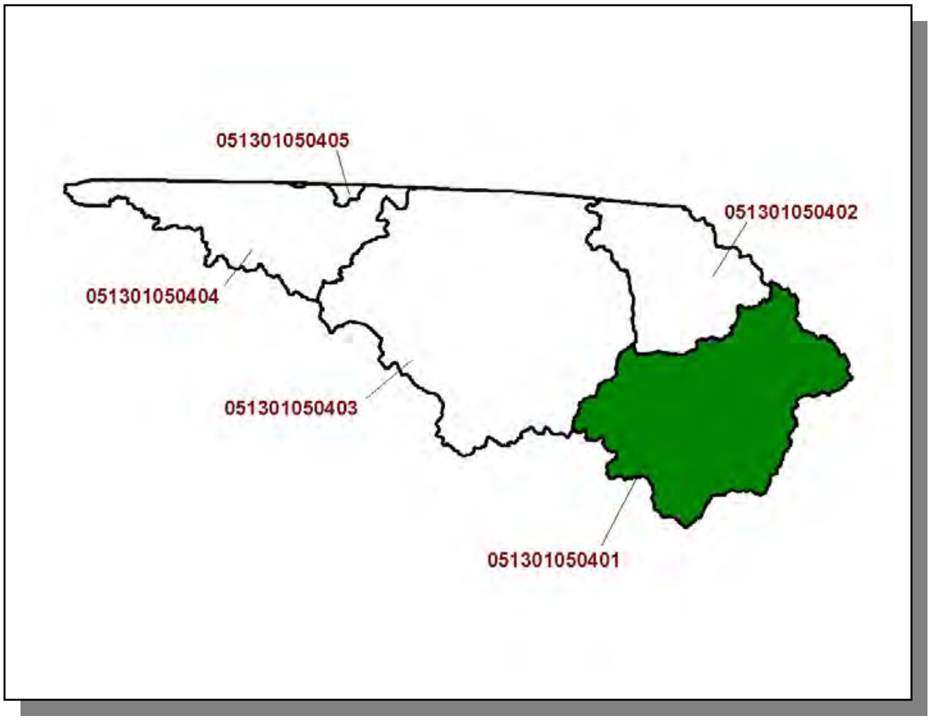

Figure 4-104. Location of Subwatershed 051301050401. *HUC-12 subwatershed boundaries are shown for reference.*

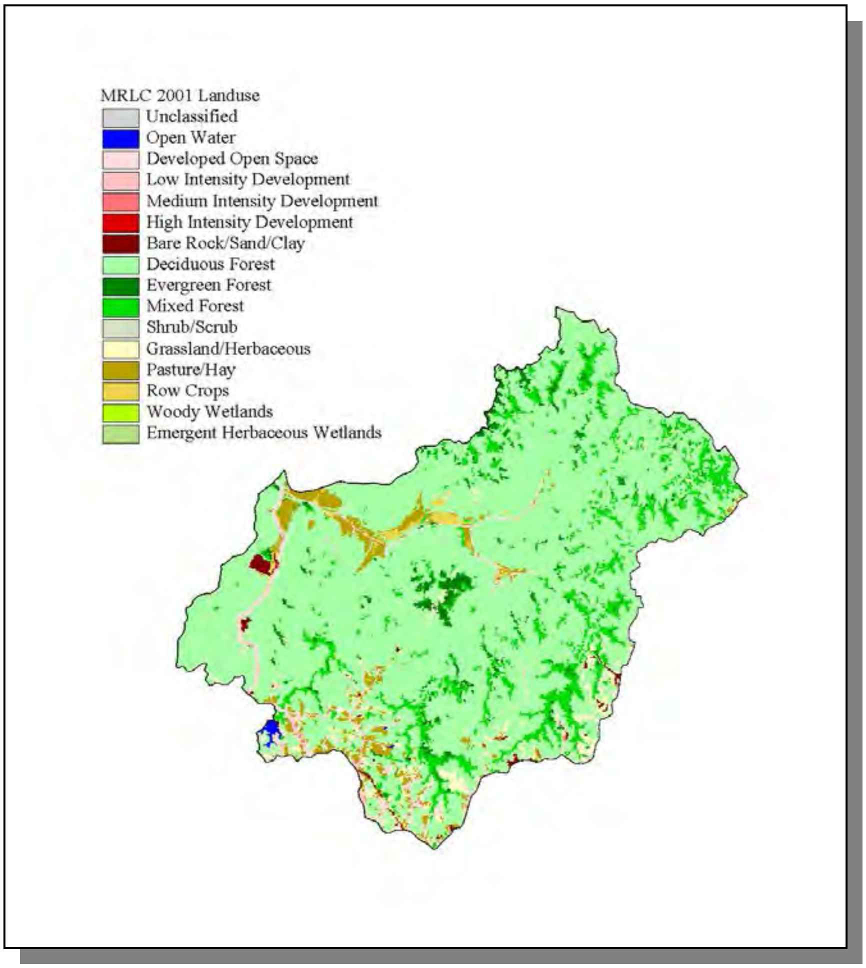

Figure 4-105. Illustration of Land Use Distribution in Subwatershed 051301050401.

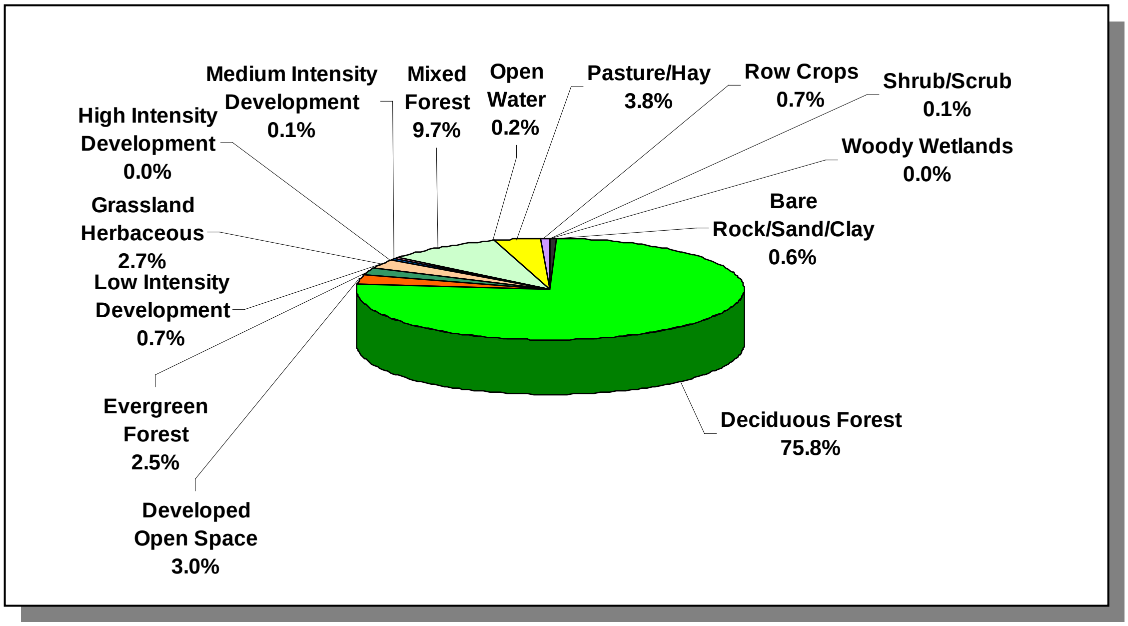

Figure 4-106. Land Use Distribution in Subwatershed 051301050401. *More information is provided in Appendix IV.*

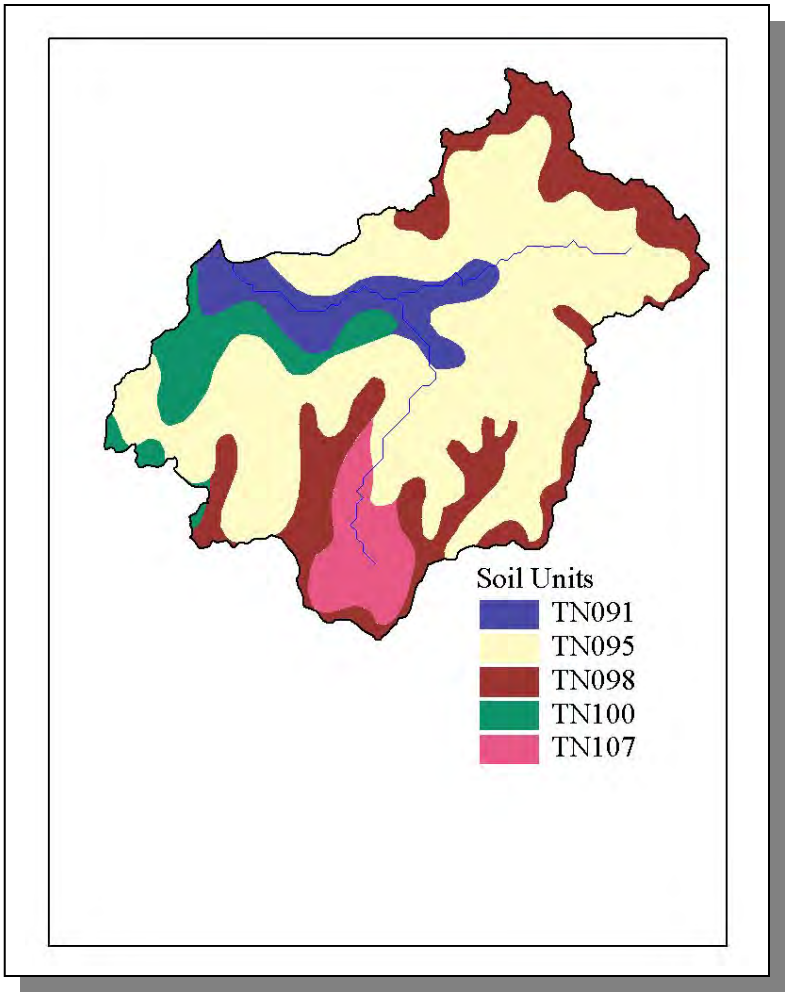

Figure 4-107. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050401.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN091	0.00	B	2.95	5.86	Loam	0.34
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
TN107	1.00	C	6.34	4.84	Loam	0.28

Table 4-94. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050401. *The definition of "Hydrologic Group" is provided in Appendix IV.*

.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	8.32	1,221	1,325	1,383	13.3

Table 4-95. Population Estimates in Subwatershed 051301050401.

Figure 4-108. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301050401. *More information, including site names and locations, is provided in Appendix IV.*

4.2.D.i.a. Point Source Contributions.

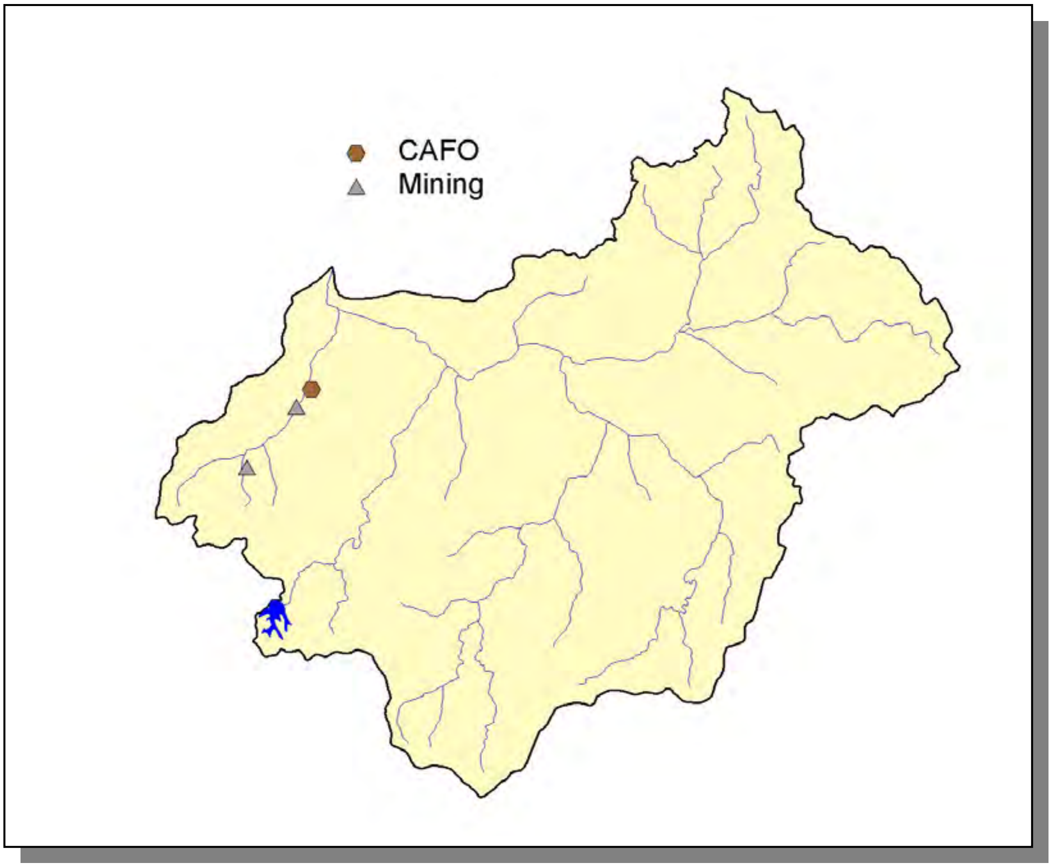

Figure 4-109. Location of Permits Issued in Subwatershed 051301050401. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-110. Location of Active Mining Sites in Subwatershed 051301050401. *More information, including the names of mining operations, is provided in Appendix IV.*

Figure 4-111. Location of Concentrated Animal Feeding Operations (CAFO) in Subwatershed 051301050401. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.D.i.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
225	483	12	<5	203,934	20	<5

Table 4-96. Summary of Livestock Count Estimates in Subwatershed 051301050401. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Fentress	8,058	17,259	430	474	7,290,026	729	79

Table 4-97. Summary of Livestock Count Estimates in Fentress County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Fentress	244.1	244.1	3.6	14.3

Table 4-98. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.72
Legumes, Grass (Hayland)	0.56
Grass, Forbs, Legumes (Mixed Pasture)	0.27
Corn (Row Crops)	16.18
Soybeans (Row Crops)	6.00
Wheat (Close-Grown Cropland)	43.40
Other Vegetable and Truck Crops	15.94
Farmsteads and Ranch Headquarters	0.40

Table 4-99. Annual Estimated Total Soil Loss in Subwatershed 051301050401.

4.2.D.ii. 051301050402 (Rotten Fork Wolf River).

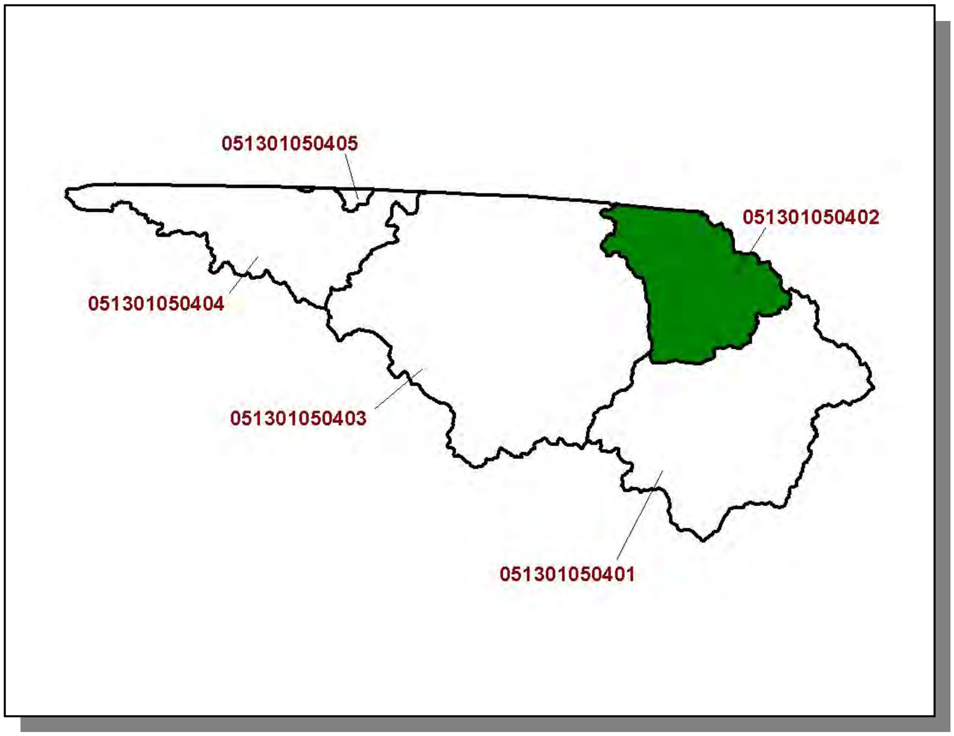

Figure 4-112. Location of Subwatershed 051301050402. *HUC-12 subwatershed boundaries are shown for reference.*

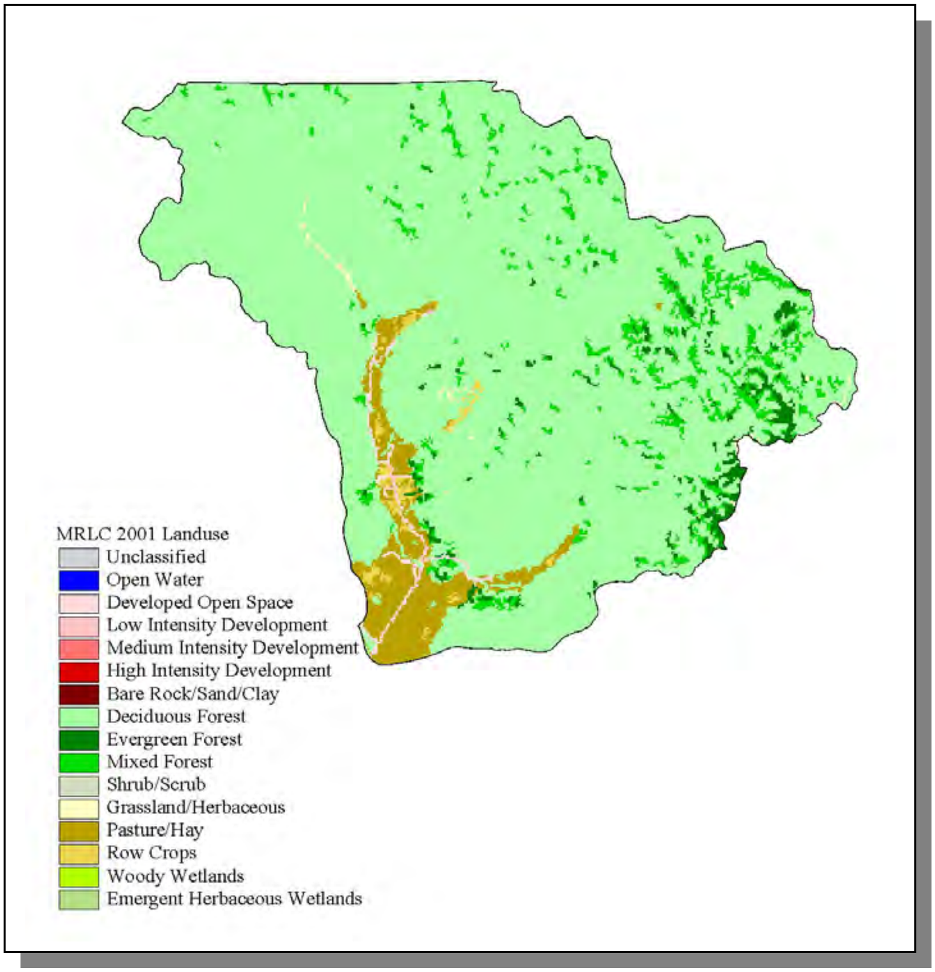

Figure 4-113. Illustration of Land Use Distribution in Subwatershed 051301050402.

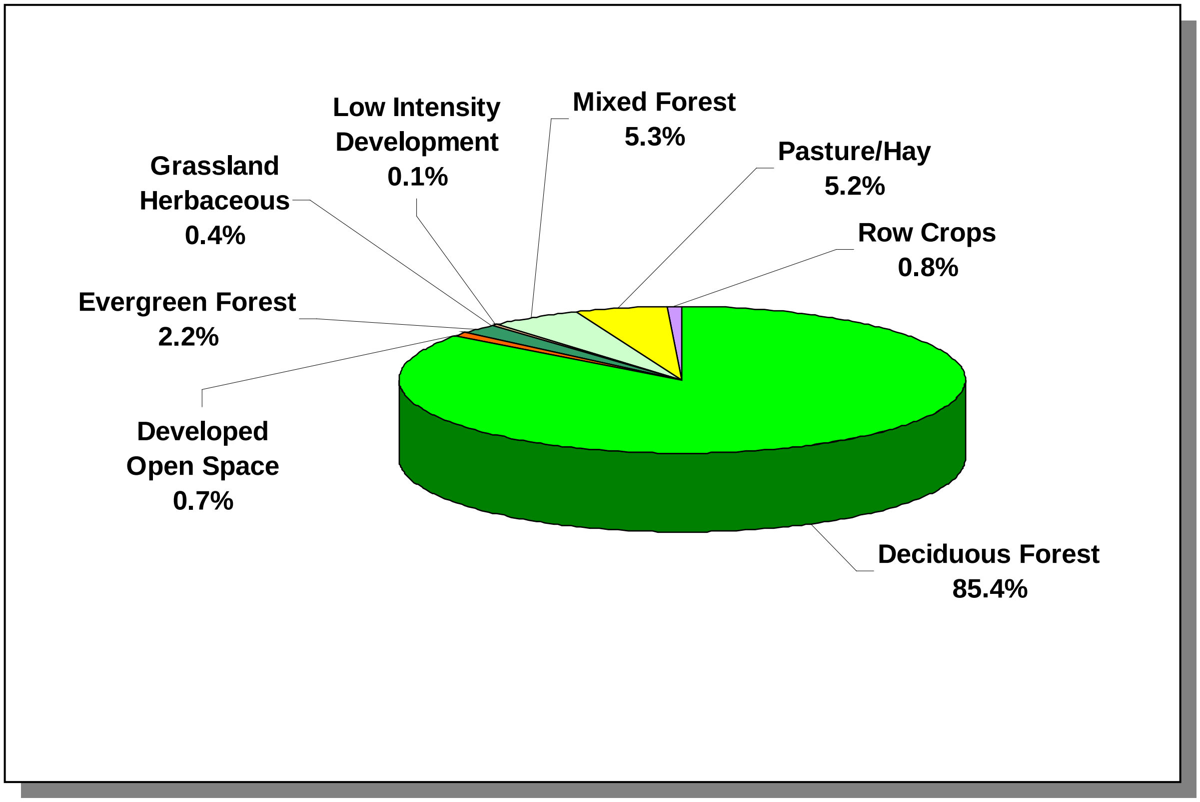

Figure 4-114. Land Use Distribution in Subwatershed 051301050402. *More information is provided in Appendix IV.*

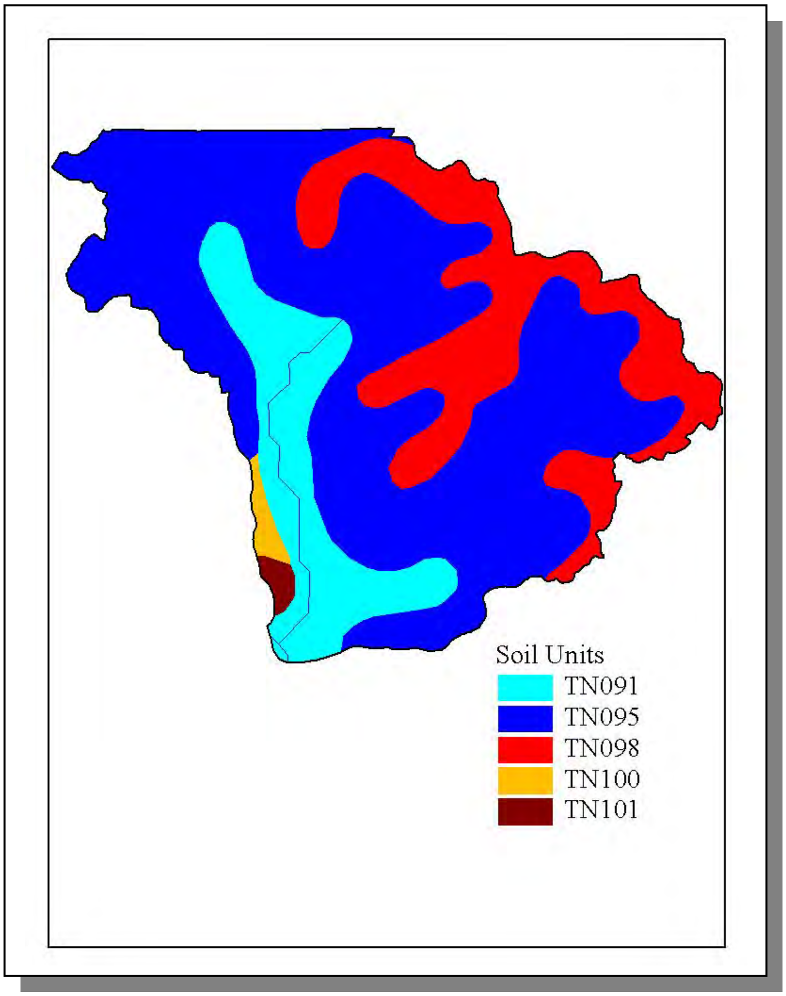

Figure 4-115. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050402.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN091	0.00	B	2.95	5.86	Loam	0.34
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

Table 4-100. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050402. *The definition of "Hydrologic Group" is provided in Appendix IV.*
.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	2.29	336	365	381	13.4
Pickett	4,548	4,631	4,945	5.04	229	233	249	8.7
Total	**19,217**	**20,551**	**21,570**		**565**	**598**	**630**	**11.5**

Table 4-101. Population Estimates in Subwatershed 051301050402.

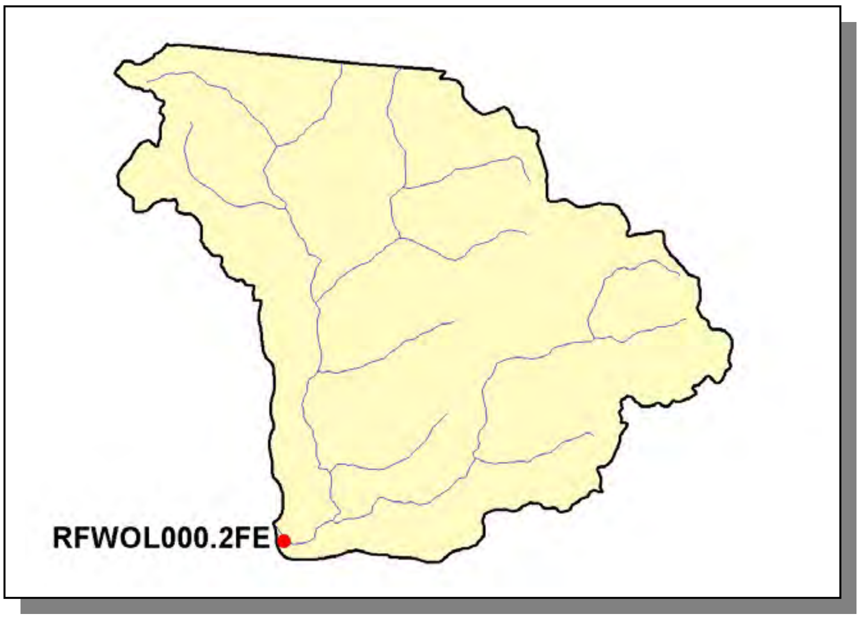

Figure 4-116. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301050402. *More information, including site names and locations, is provided in Appendix IV.*

4.2.D.ii.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.D.ii.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
218	464	11	<5	186,495	19	<5

Table 4-102. Summary of Livestock Count Estimates in Subwatershed 051301050402. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Fentress	8,058	17,259	430	474	7,290,026	729	79
Pickett	5,986	10,864	19	285	0	99	0

Table 4-103. Summary of Livestock Count Estimates in Fentress and Pickett Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat..*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Fentress	244.1	244.1	3.6	14.3
Pickett	68.4	68.4	0.2	0.6

Table 4-104. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress and Pickett Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.89
Grass (Hayland)	0.11
Legumes, Grass (Hayland)	0.34
Grass, Forbs, Legumes (Mixed Pasture)	0.46
Corn (Row Crops)	16.18
Soybeans (Row Crops)	6.00
Wheat (Close-Grown Cropland)	43.40
Tobacco (Row Crops)	23.18
Other Vegetable and Truck Crops	15.94
Farmsteads and Ranch Headquarters	3.57

Table 4-105. Annual Estimated Total Soil Loss in Subwatershed 051301050402.

4.2.D.iii. 051301050403 (Wolf River).

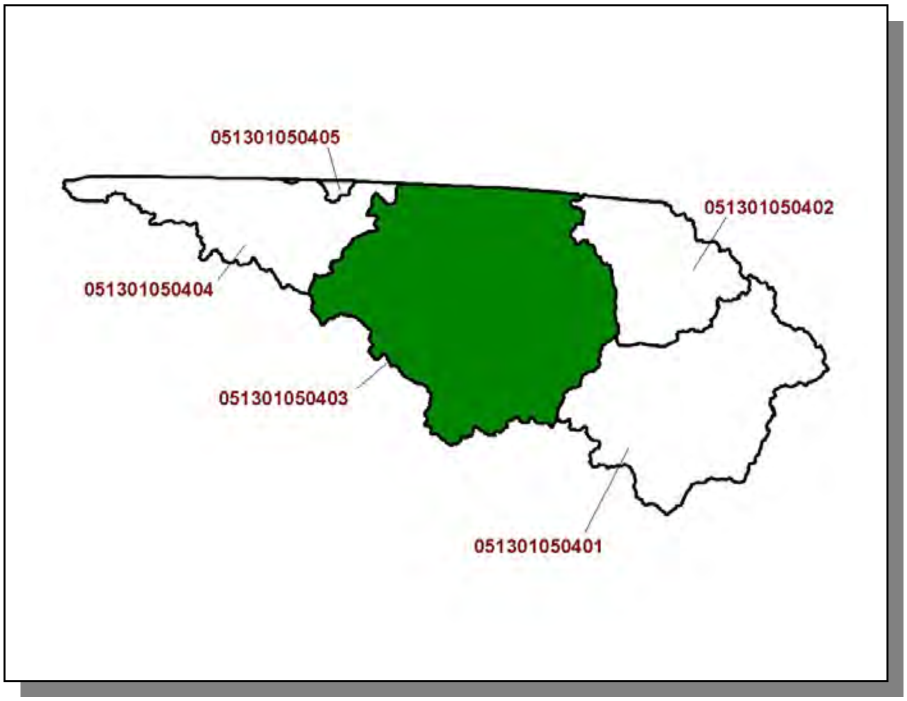

Figure 4-117. Location of Subwatershed 051301050403. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

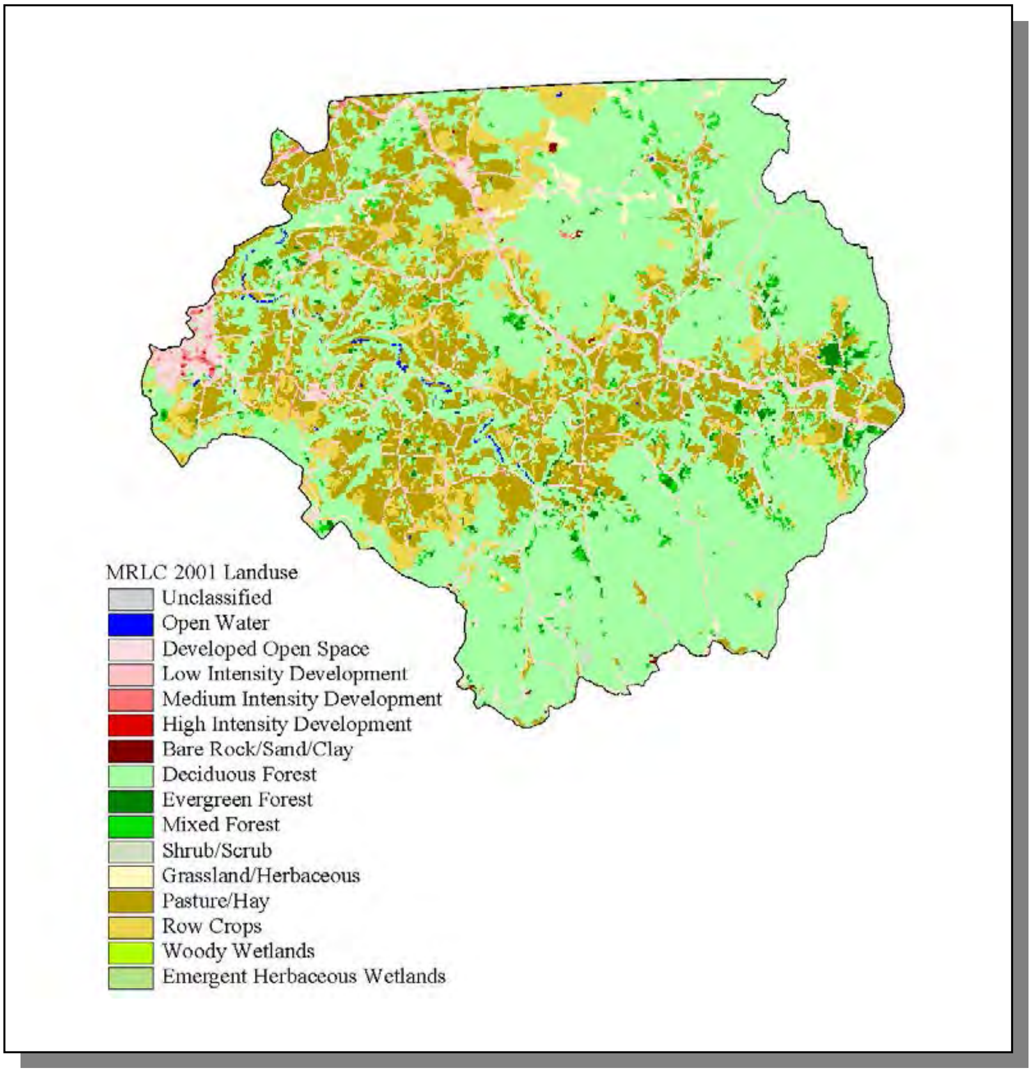

Figure 4-118. Illustration of Land Use Distribution in Subwatershed 051301050403.

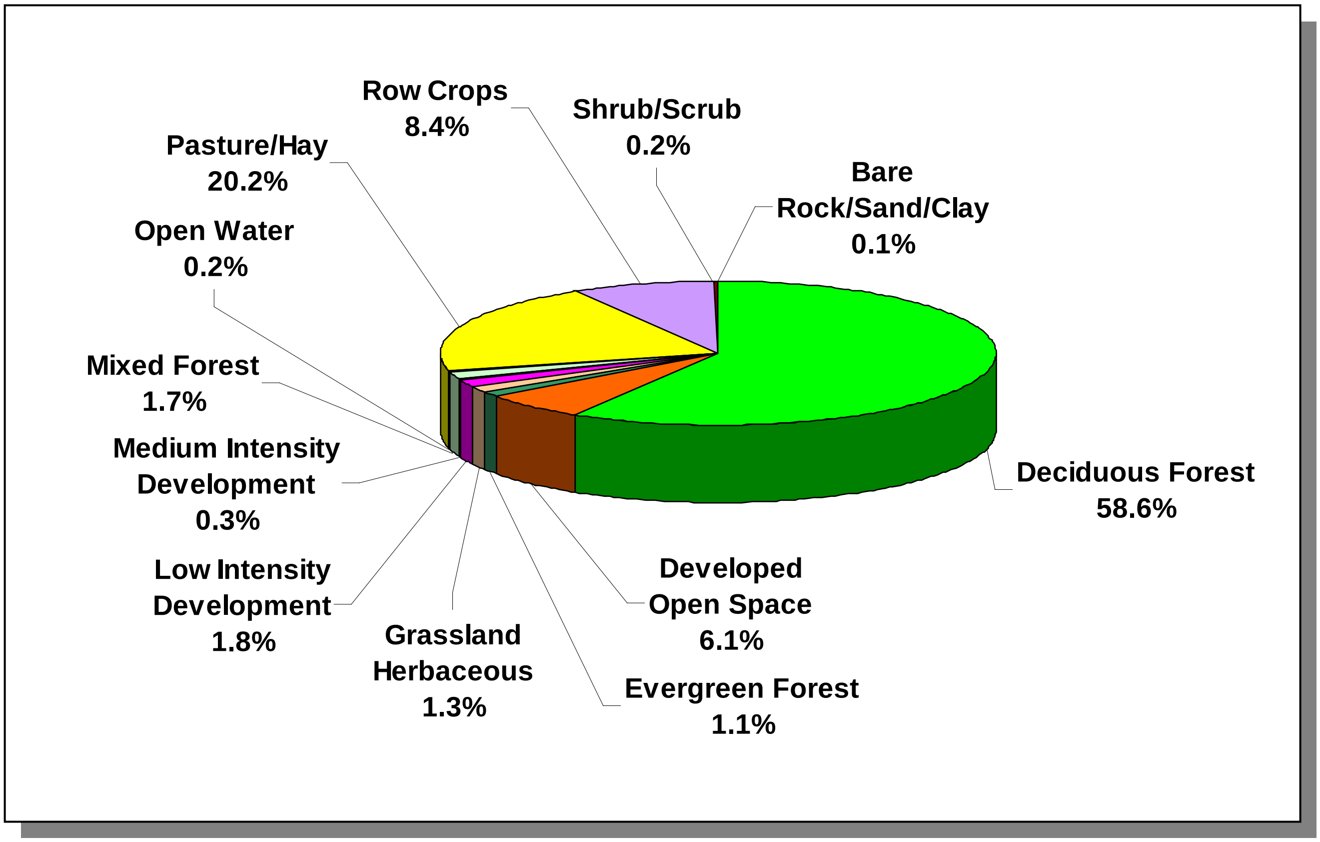

Figure 4-119. Land Use Distribution in Subwatershed 051301050403. *More information is provided in Appendix IV.*

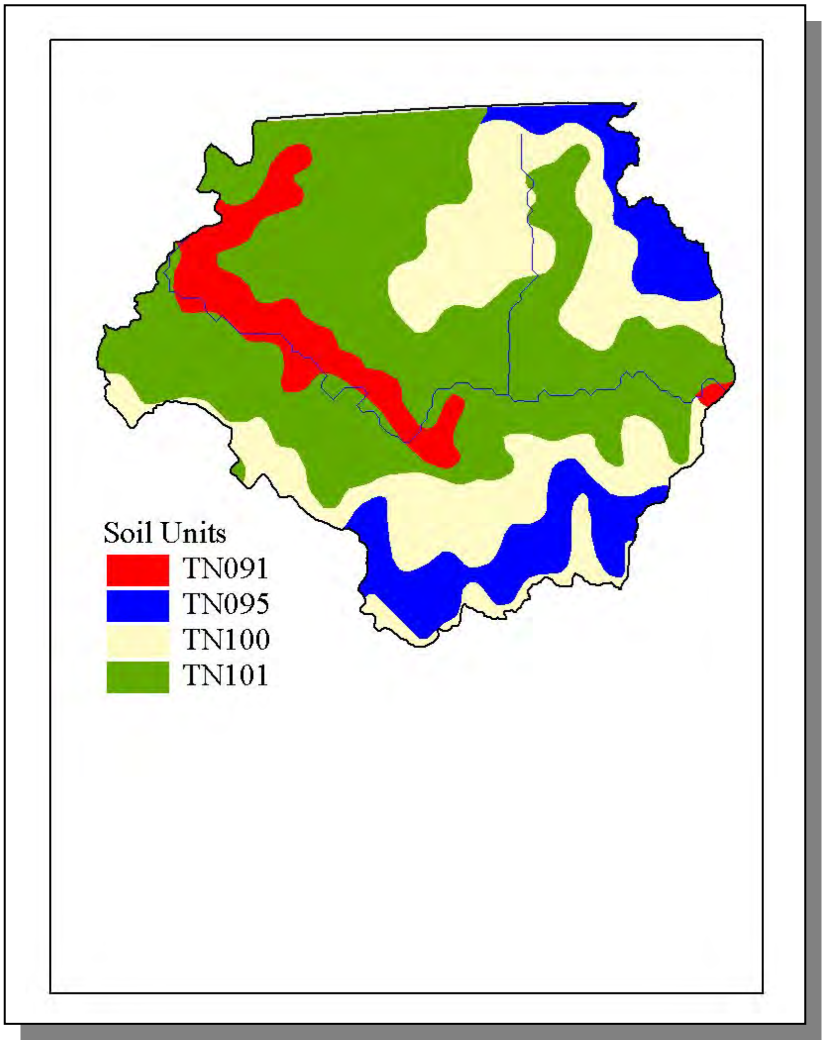

Figure 4-120. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050403.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN091	0.00	B	2.95	5.86	Loam	0.34
TN095	0.00	B	2.35	5.12	Loam	0.31
TN100	0.00	B	1.14	3.35	Silty Loam	0.21
TN101	0.00	B	1.71	5.39	Loam	0.35

Table 4-106. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050403. *The definition of "Hydrologic Group" is provided in Appendix IV.*

.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Fentress	14,669	15,920	16,625	4.65	683	741	774	13.3
Pickett	4,548	4,631	4,945	24.52	1,115	1,136	1,213	8.8
Total	**19,217**	**20,551**	**21,570**		**1,798**	**1,877**	**1,987**	**10.5**

Table 4-107. Population Estimates in Subwatershed 051301050403.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Byrdstown	Pickett	998	429	308	115	6

Table 4-108. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051301050403.

Figure 4-121. Location of Historical Streamflow Data Collection Sites in Subwatershed 051301050403. *More information is provided in Appendix IV.*

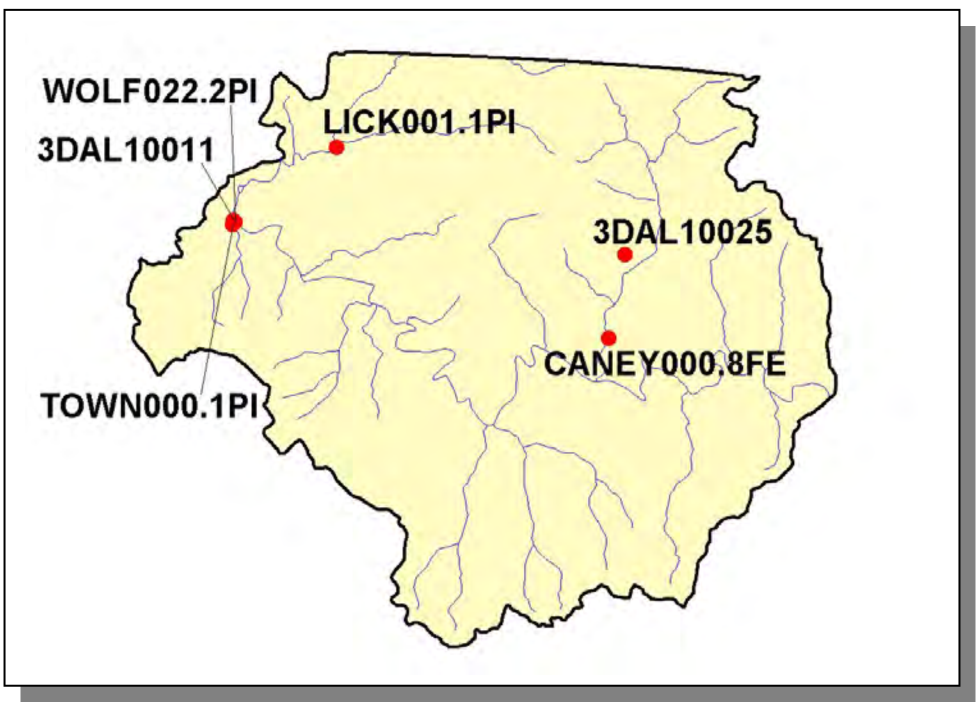

Figure 4-122. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301050403. *More information, including site names and locations, is provided in Appendix IV.*

4.2.D.iii.a. Point Source Contributions.

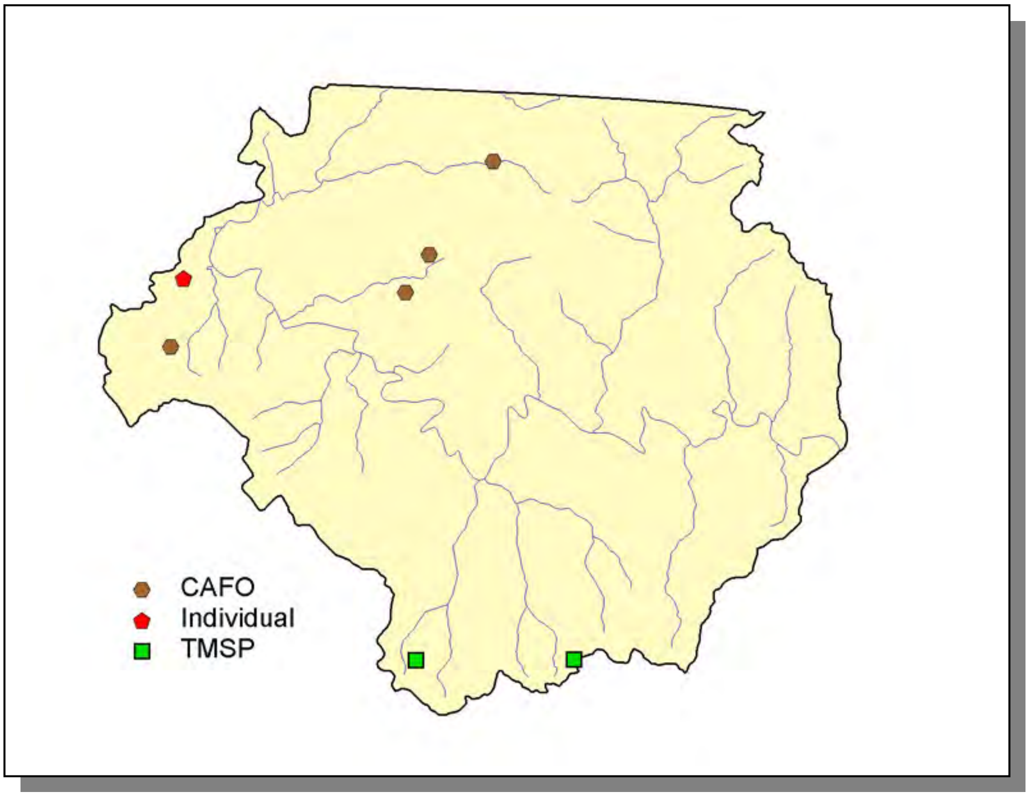

Figure 4-123. Location of Permits Issued in Subwatershed 051301050403. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-124. Location of Active NPDES Sites in Subwatershed 051301050403. *More information, including the names of facilities, is provided in Appendix IV.*

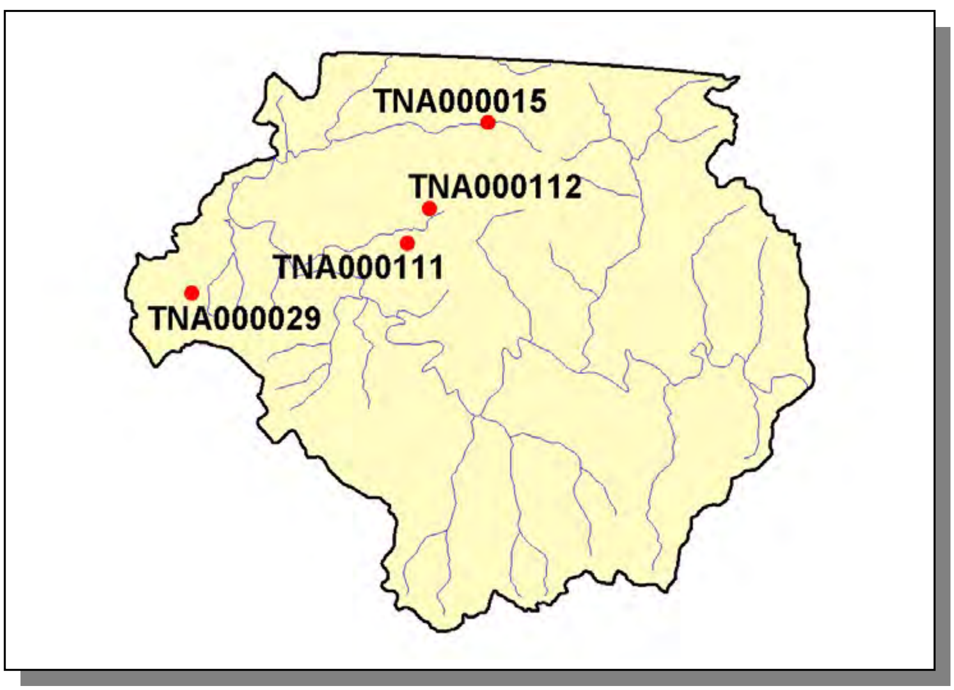

Figure 4-125. Location of Concentrated Animal Feeding Operation (CAFO) in Subwatershed 051301050403. *More information, including the names of facilities, is provided in Appendix IV.*

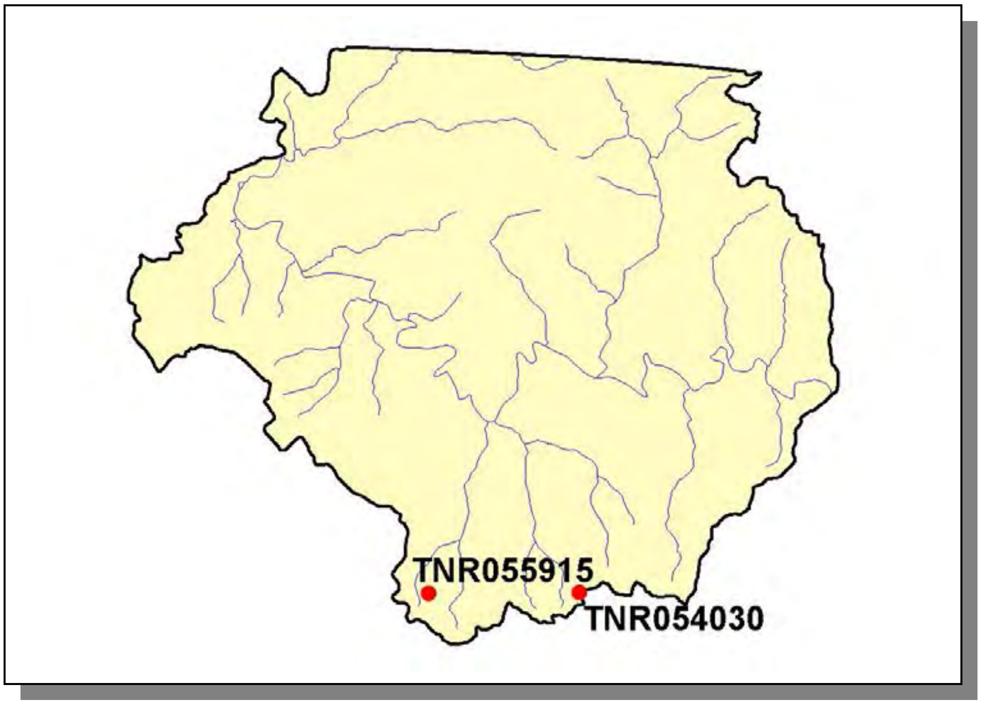

Figure 4-126. Location of TMSP Sites in Subwatershed 051301050403. *More information, including the names of facilities, is provided in Appendix IV.*

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

There is one NPDES facility discharging to water bodies listed on the 2004 303(d) list in Subwatershed 051301050403:

- TN0062626 (Byrdstown STP) discharges to an unnamed tributary @ RM 0.4 to Town Creek @ RM 0.1

Figure 4-127. Location of NPDES Dischargers to Water Bodies Listed on the 2004 303(d) List in Subwatershed 051301050403. *More information, including the names of facilities, is provided in Appendix IV.*

Permit #	3Q2	1Q10	3Q10	3Q20	7Q10
TN0062626	0.01	na	0.01	0.01	0.01

Table 4-109. Receiving Stream Low Flow Information for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301050403. *Data are in cubic feet per second (CFS). Data were obtained from the USGS web application StreamStats at http://water.usgs.gov/osw/streamstats/. (na, data not available)*

PERMIT #	P	FLOW
TN0062626	X	X

Table 4-110. Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301050403.

PERMIT #	WET	NH_3	N	Hg	TRC	TSS	SETTLEABLE SOLIDS	CN	DO	pH
TN0062626	X	X	X	X	X	X	X	X	X	X

Table 4-111. Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301050403. *WET, Whole Effluent Toxicity; $CBOD_5$, Carbonaceous Biochemical Oxygen Demand (5-Day); TRC, Total Residual Chlorine; TSS, Total Suspended Solids; DO, Dissolved Oxygen.*

PERMIT #	*E. coli*	FECAL COLIFORM
TN0062626	X	X

Table 4-112. Bacteria Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301050403.

4.2.D.iii.b. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
3,454	6,445	38	7	489,726	97	5

Table 4-113. Summary of Livestock Count Estimates in Subwatershed 051301050403. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS							
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
Fentress	8,058	17,259	430	474	7,290,026	729	79
Pickett	5,986	10,864	19	284	0	99	0

Table 4-114. Summary of Livestock Count Estimates in Fentress and Pickett Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Fentress	244.1	244.1	3.6	14.3
Pickett	68.4	68.4	0.2	0.6

Table 4-115. Forest Acreage and Annual Removal Rates (1987-1994) in Fentress and Pickett Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.97
Grass (Hayland)	0.11
Legumes, Grass (Hayland)	0.23
Grass, Forbs, Legumes (Mixed Pasture)	0.56
Corn (Row Crops)	16.18
Soybeans (Row Crops)	5.99
Tobacco (Row Crops)	23.18
Wheat (Close-Grown Cropland)	43.40
Other Vegetable and Truck Crops	15.94
Farmsteads and Ranch Headquarters	5.05

Table 4-116. Annual Estimated Total Soil Loss in Subwatershed 051301050403.

4.2.D.iv. 051301050404 (Dale Hollow Lake).

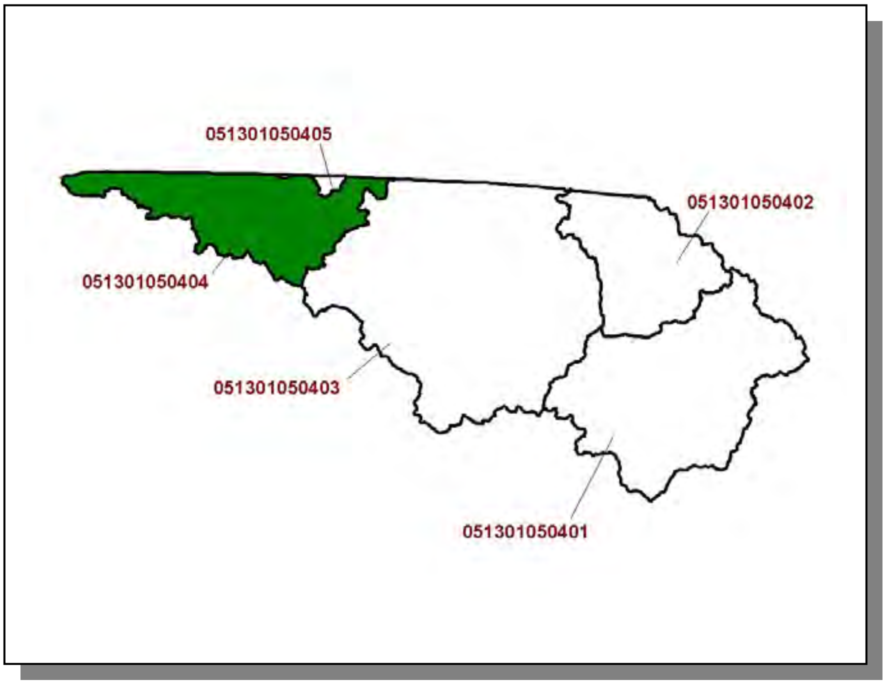

Figure 4-128. Location of Subwatershed 051301050404. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

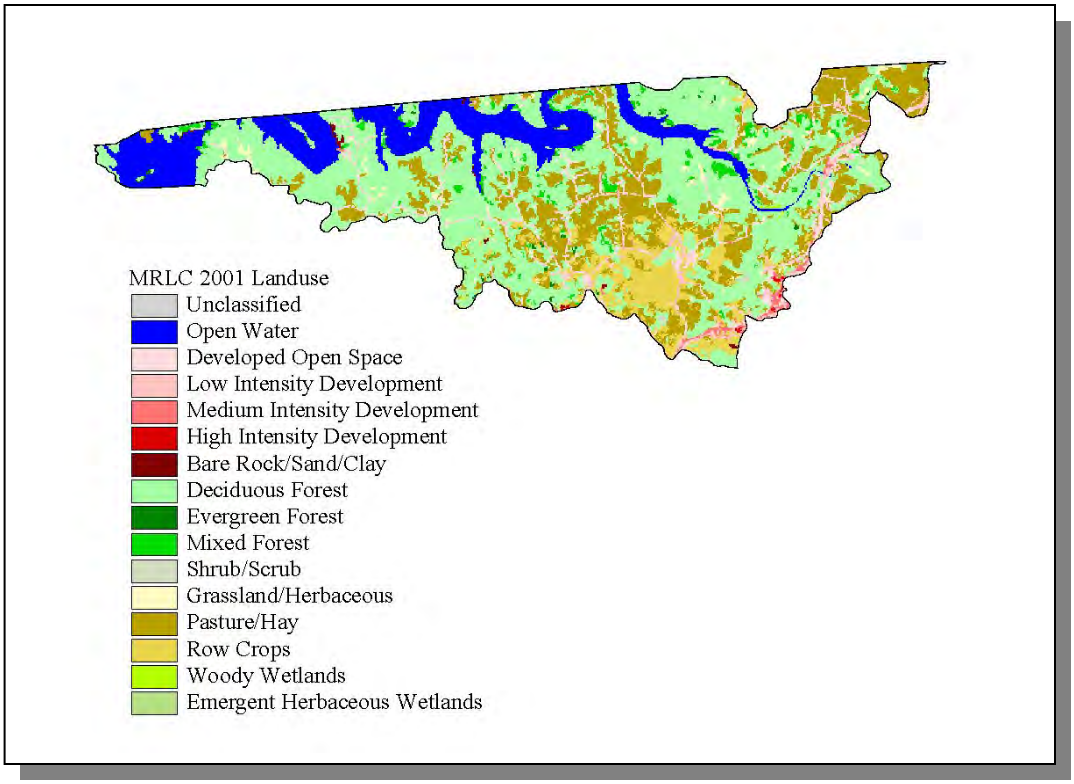

Figure 4-129. Illustration of Land Use Distribution in Subwatershed 051301050404.

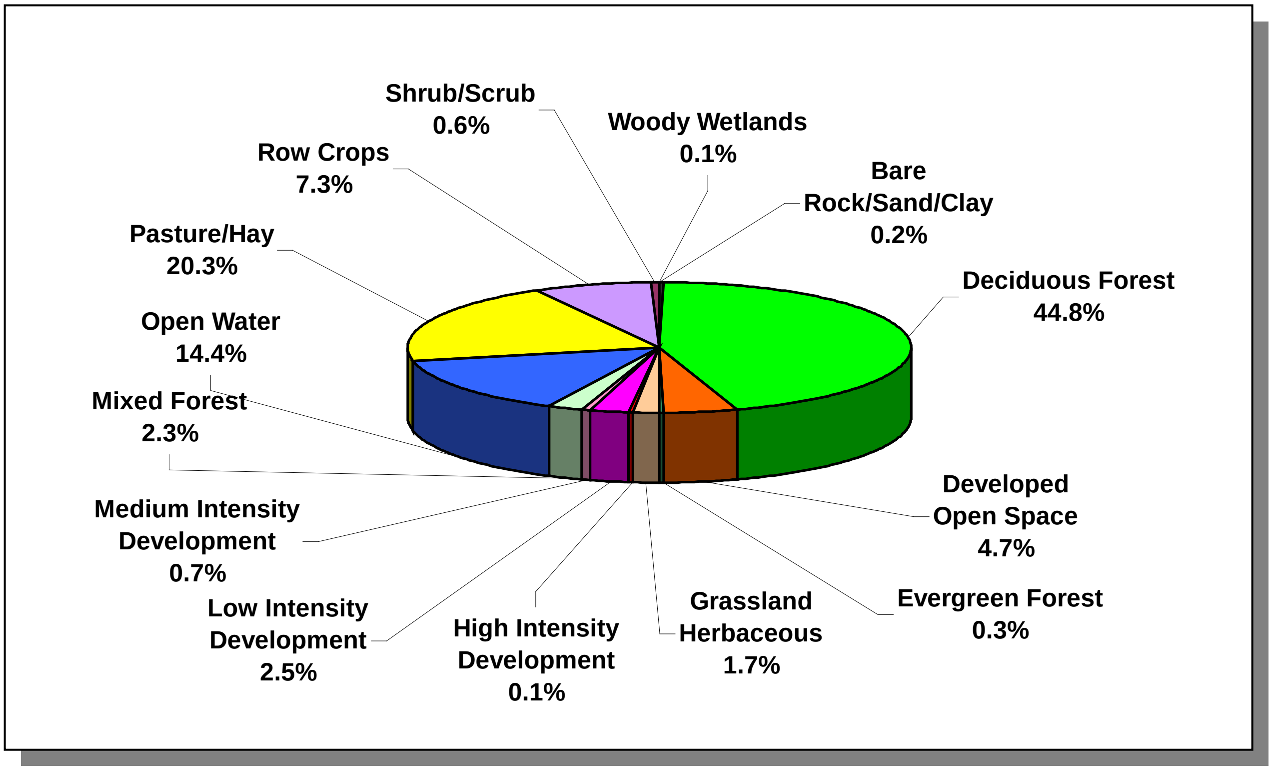

Figure 4-130. Land Use Distribution in Subwatershed 051301050404. *More information is provided in Appendix IV.*

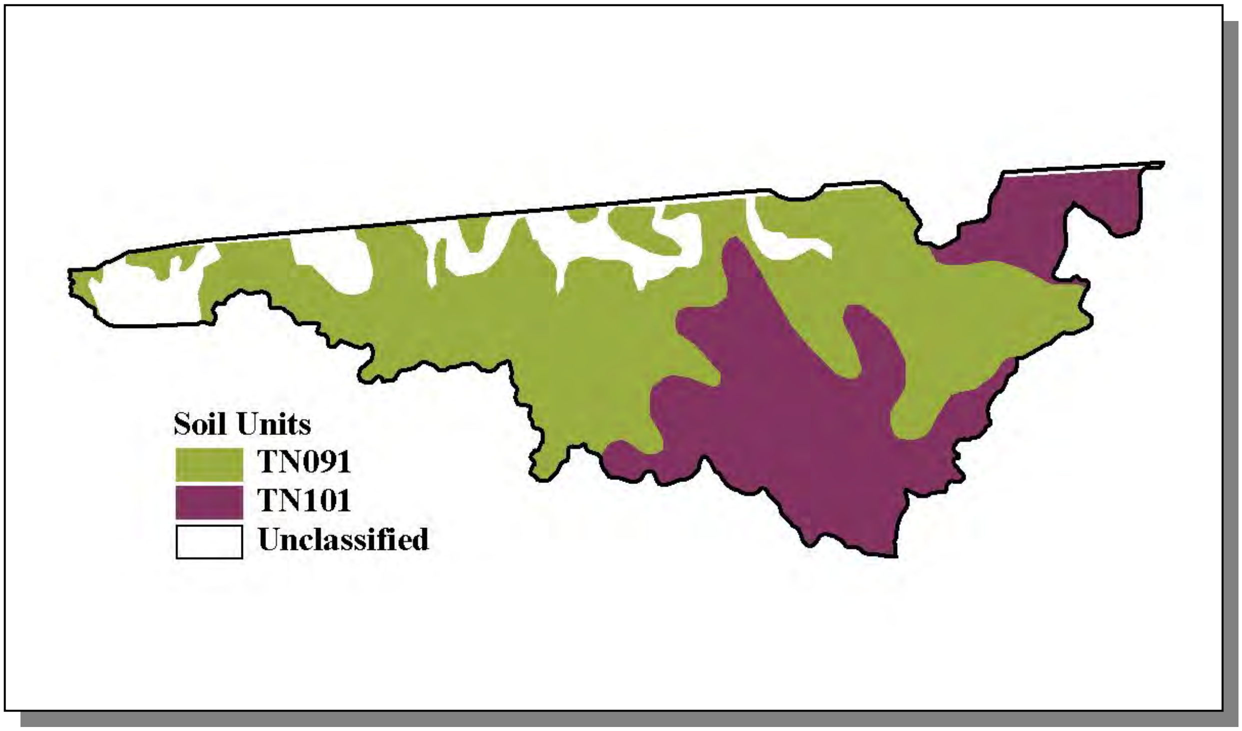

Figure 4-131. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050404.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN091	0.00	B	2.95	5.86	Loam	0.34
TN101	0.00	B	1.71	5.39	Loam	0.35

Table 4-117. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050404. *The definition of "Hydrologic Group" is provided in Appendix IV.*

.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Clay	7,238	7,311	7,976	0.5	36	37	40	11.1
Pickett	4,548	4,631	4,945	12.36	562	572	611	8.7
Total	**11,786**	**11,942**	**12,921**		**598**	**609**	**651**	**8.9**

Table 4-118. Population Estimates in Subwatershed 051301050404.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Byrdstown	Pickett	998	429	308	115	6

Table 4-119. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051301050404.

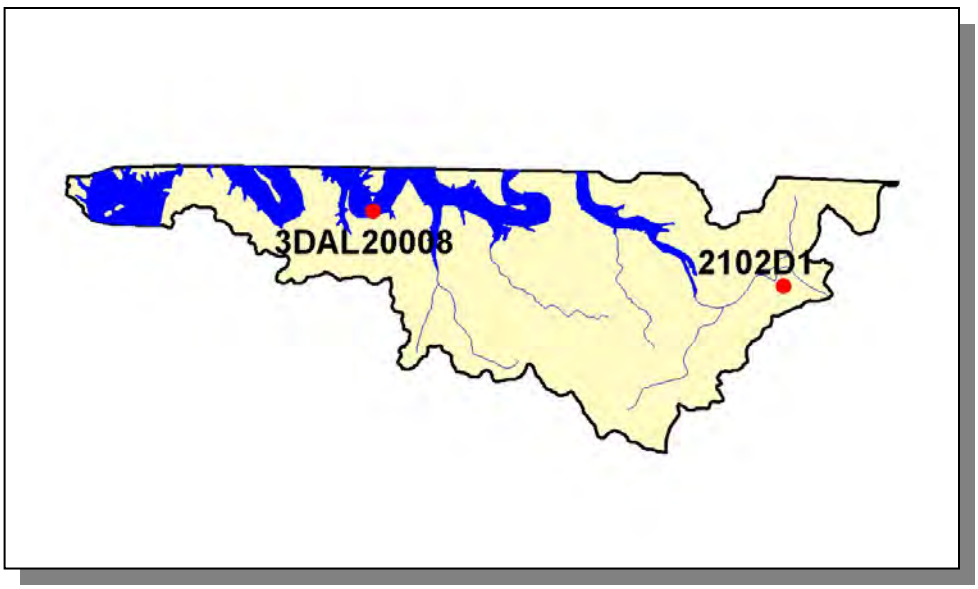

Figure 4-132. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301050404. *More information, including site names and locations, is provided in Appendix IV.*

4.2.D.iv.a. Point Source Contributions.

There are no known point sources in this subwatershed.

4.2.D.iv.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS				
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs
1,035	1,884	<5	<5	17

Table 4-120. Summary of Livestock Count Estimates in Subwatershed 051301050404. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Clay	0	14,574	0	18	174	23
Pickett	5,986	10,864	19	285	99	0

Table 4-121. Summary of Livestock Count Estimates in Clay and Pickett Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Clay	105.1	105.1	2.3	10.1
Pickett	68.4	68.4	0.2	0.6

Table 4-122. Forest Acreage and Annual Removal Rates (1987-1994) in Clay and Pickett Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.10
Grass (Hayland)	0.13
Legumes, Grass (Hayland)	0.09
Grass, Forbs, Legumes (Mixed Pasture)	0.74
Tobacco (Row Crops)	23.47
Farmsteads and Ranch Headquarters	7.09

Table 4-123. Annual Estimated Total Soil Loss in Subwatershed 051301050404.

4.2.D.v. 051301050405 (Spring Creek).

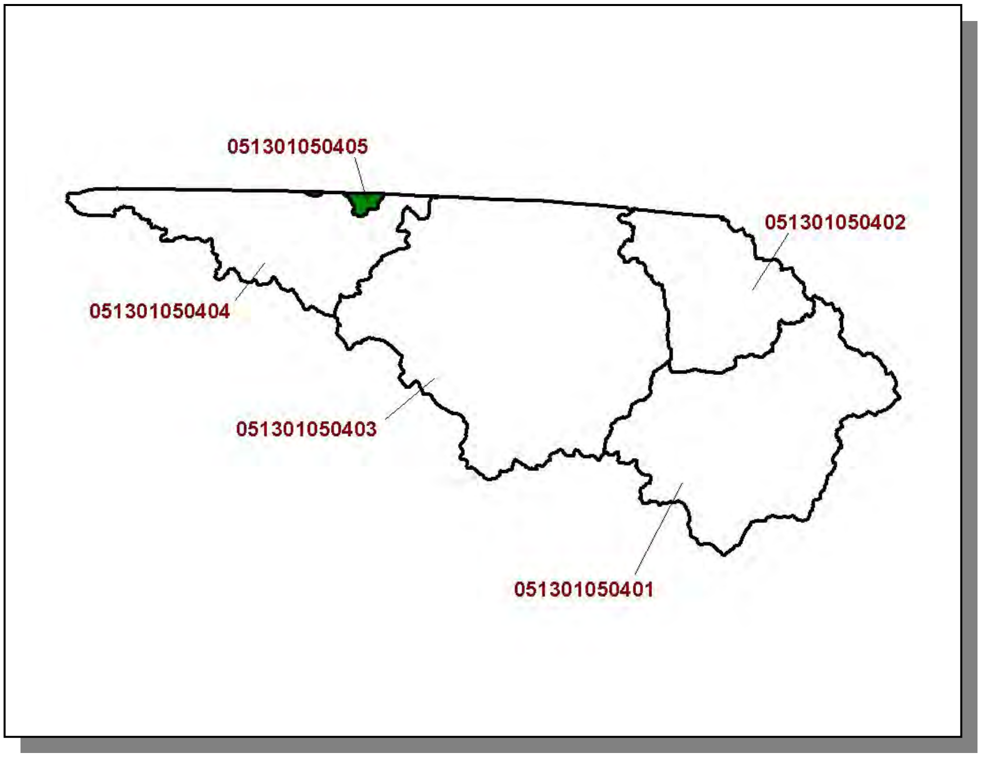

Figure 4-133. Location of Subwatershed 051301050405. HUC-12 subwatershed boundaries in Tennessee are shown for reference.

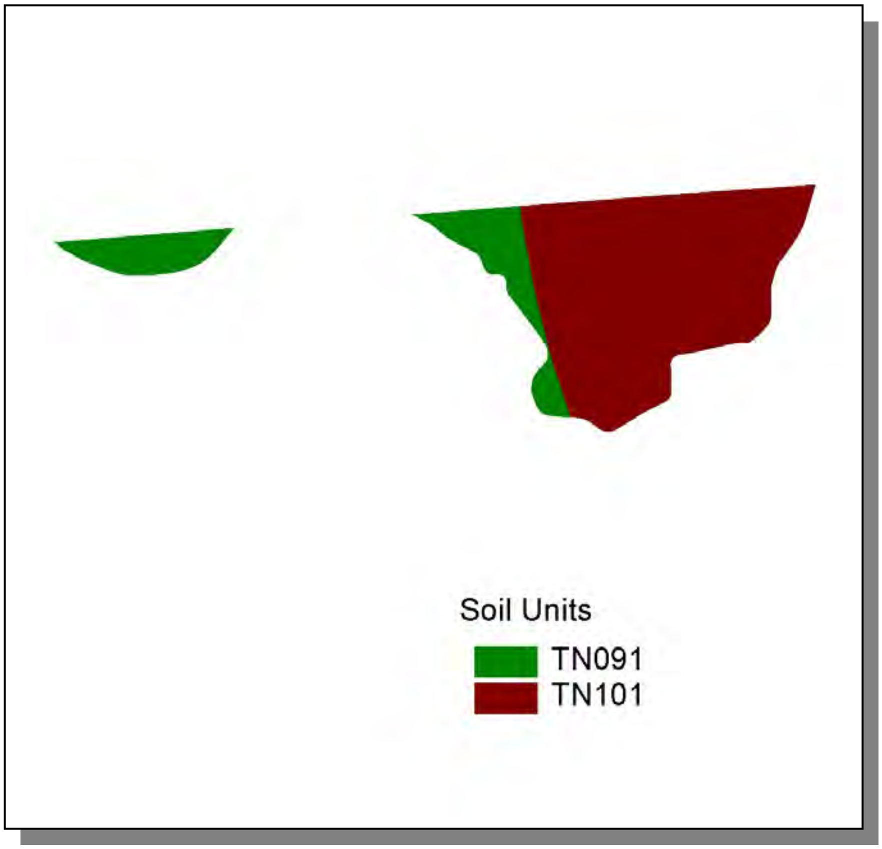

Figure 4-134. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050405.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN091	0.00	B	2.95	5.86	Loam	0.34
TN101	0.00	B	1.71	5.39	Loam	0.35

Table 4-124. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050405. *The definition of "Hydrologic Group" is provided in Appendix IV.*
.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Pickett	4,548	4,631	4,945	0.03	>5	>5	>5	NA

Table 4-125. Population Estimates in Subwatershed 051301050405. *NA, Not applicable.*

4.2.D.v.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.D.v.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS		
Beef Cow	Cattle	Hogs
90	163	<5

Table 4-126. Summary of Livestock Count Estimates in Subwatershed 051301050405. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS					
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs
Pickett	5,986	10,864	19	285	99

Table 4-127. Summary of Livestock Count Estimates in Pickett 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)
Pickett	68.4	68.4	0.2	0.6

Table 4-128. Forest Acreage and Annual Removal Rates (1987-1994) in Pickett County.

4.2.E. 0513010505.

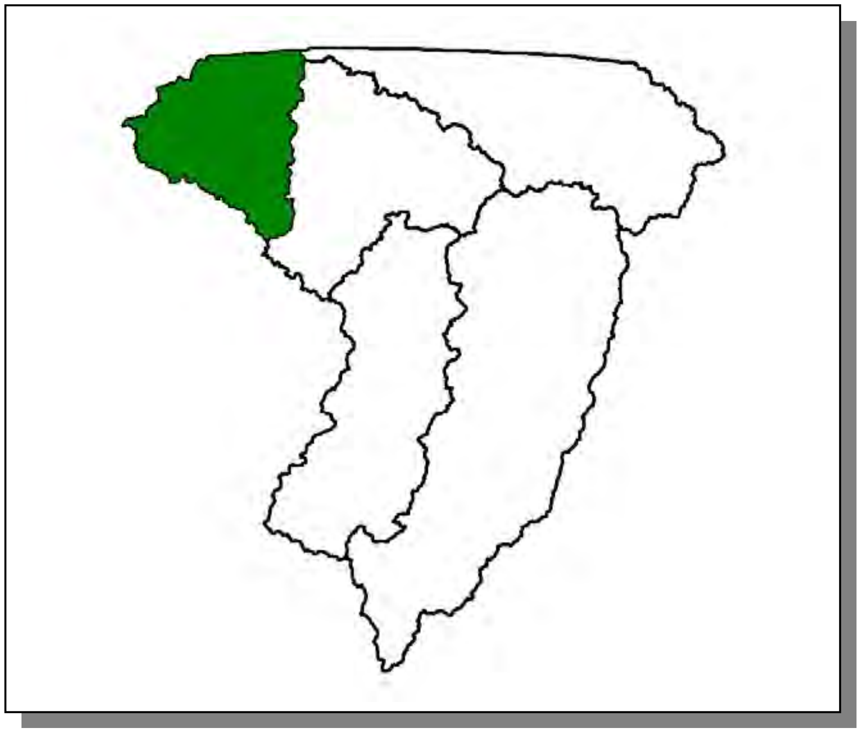

Figure 4-135. Location of Subwatershed 0513010505. *All Obey River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.E.i. 051301050501 (Dale Hollow Lake).

Figure 4-136. Location of Subwatershed 051301050501. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

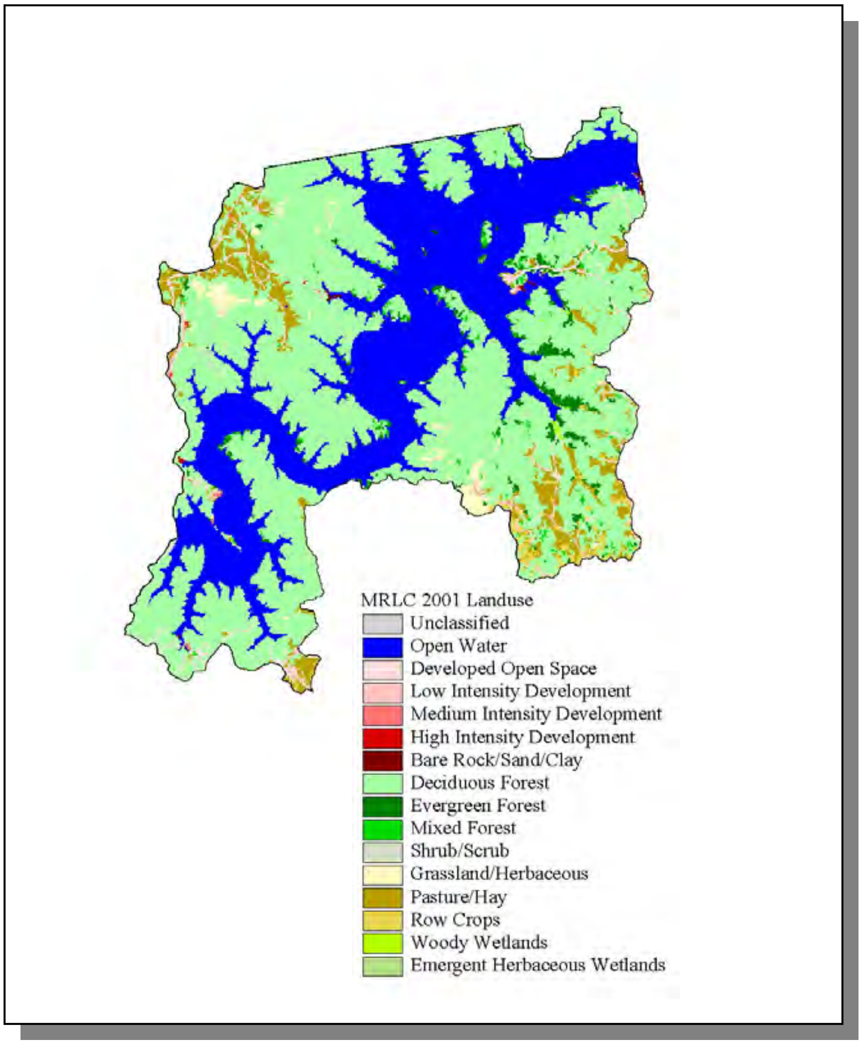

Figure 4-137. Illustration of Land Use Distribution in Subwatershed 051301050501.

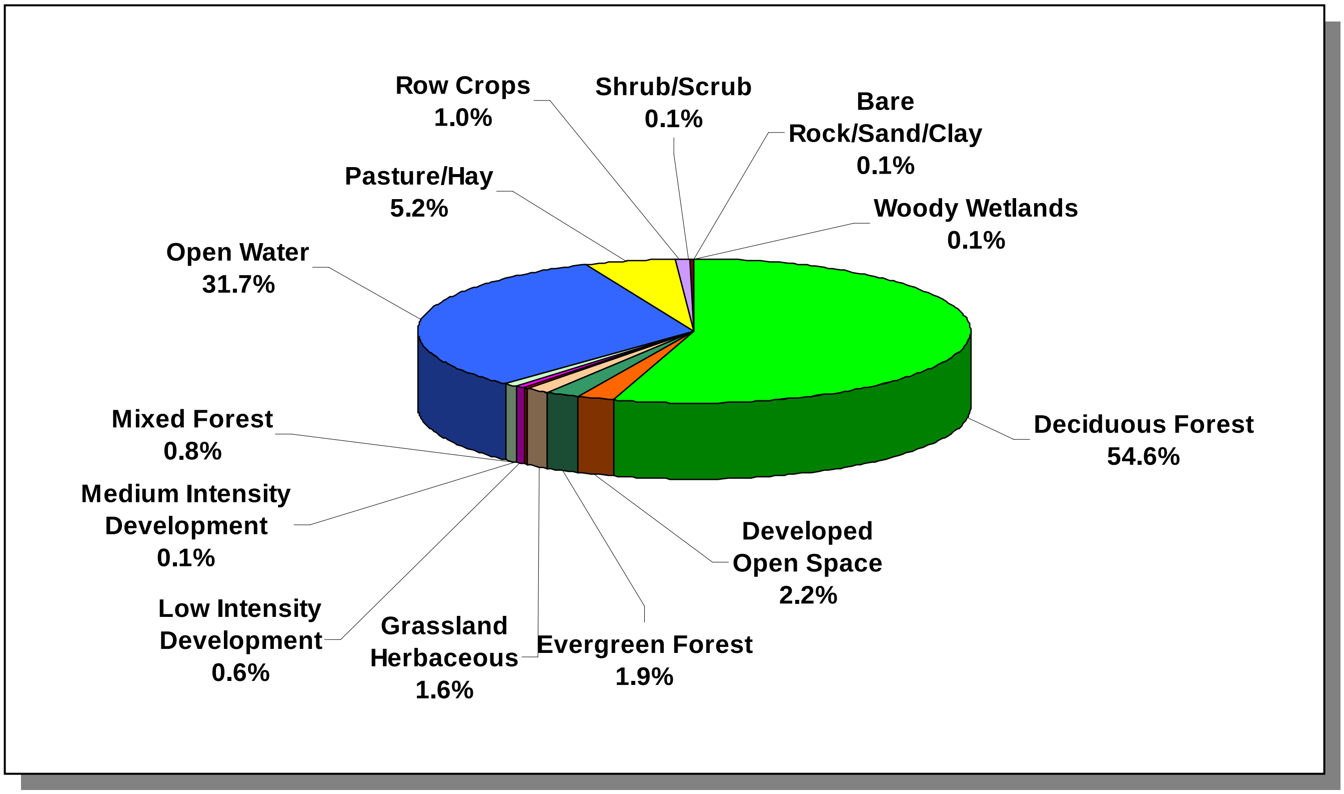

Figure 4-138. Land Use Distribution in Subwatershed 051301050501. *More information is provided in Appendix IV.*

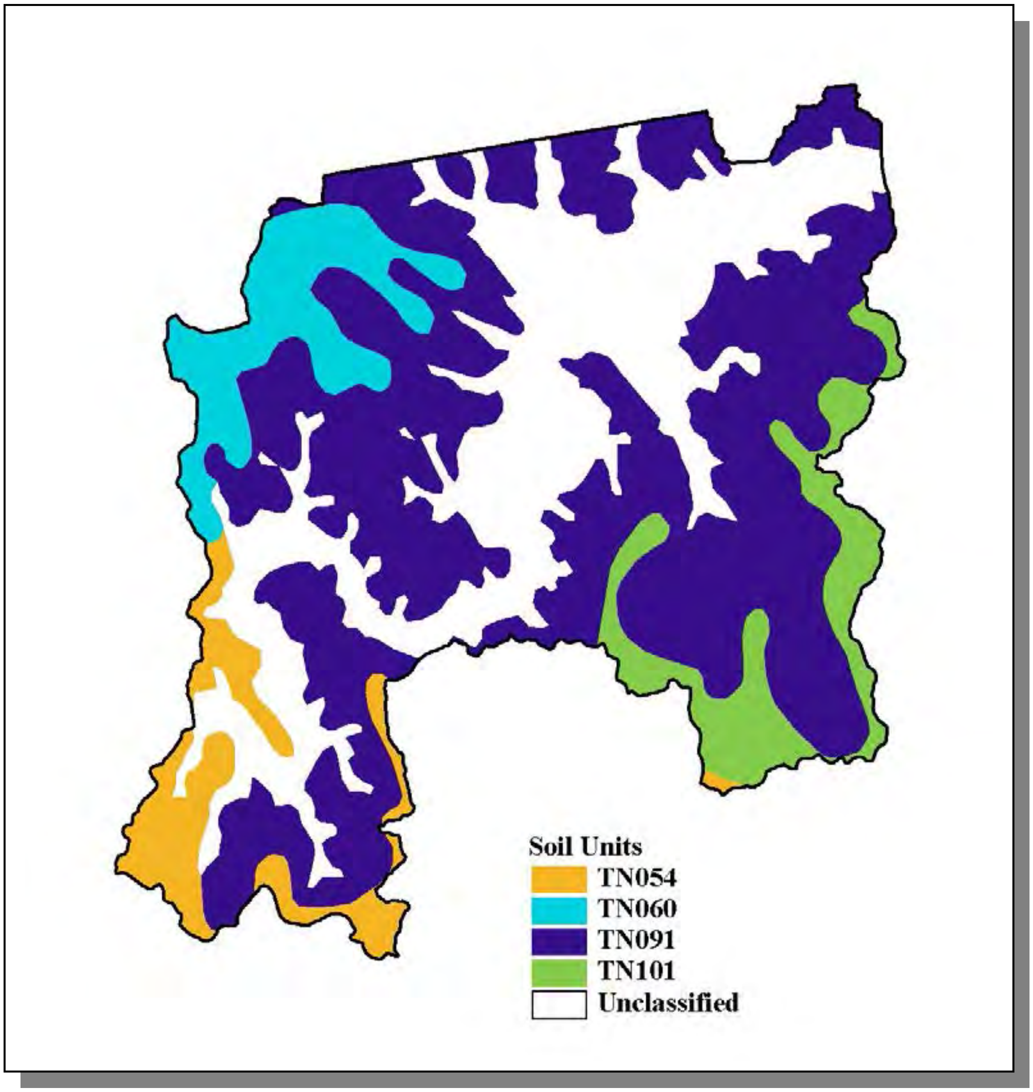

Figure 4-139. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050501.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN054	0.00	C	3.04	4.84	Loam	0.32
TN060	5.00	B	1.30	5.32	Silty Loam	0.39
TN091	0.00	B	2.95	5.86	Loam	0.34
TN101	0.00	B	1.71	5.39	Loam	0.35

Table 4-129. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050501. *The definition of "Hydrologic Group" is provided in Appendix IV.*

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	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Clay	7,238	7,311	7,976	18.72	1,355	1,369	1,493	10.2
Overton	17,636	19,171	20,118	0.34	59	65	68	15.3
Total	**24,874**	**26,482**	**28,094**		**1,414**	**1,434**	**1,561**	**10.4**

Table 4-130. Population Estimates in Subwatershed 051301050501.

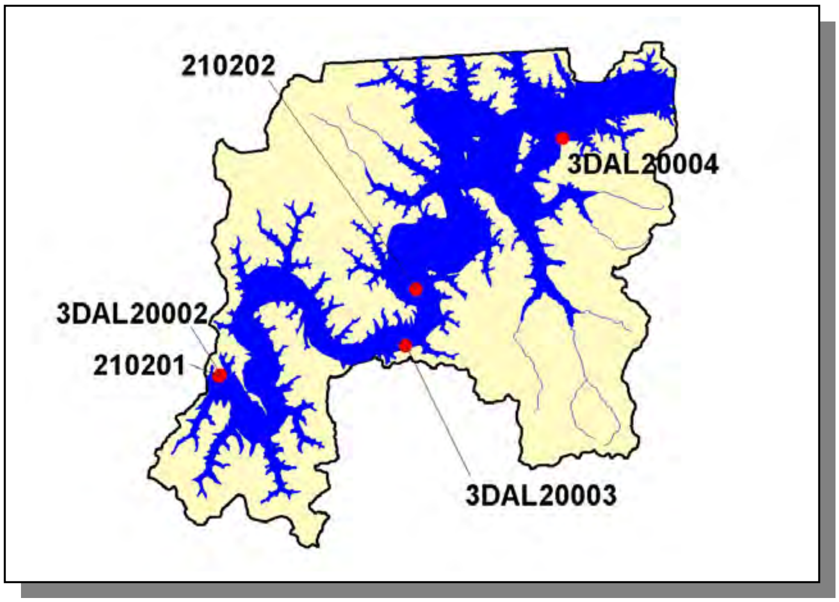

Figure 4-140. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301050501. *More information, including site names and locations, is provided in Appendix IV.*

4.2.E.i.a. Point Source Contributions.

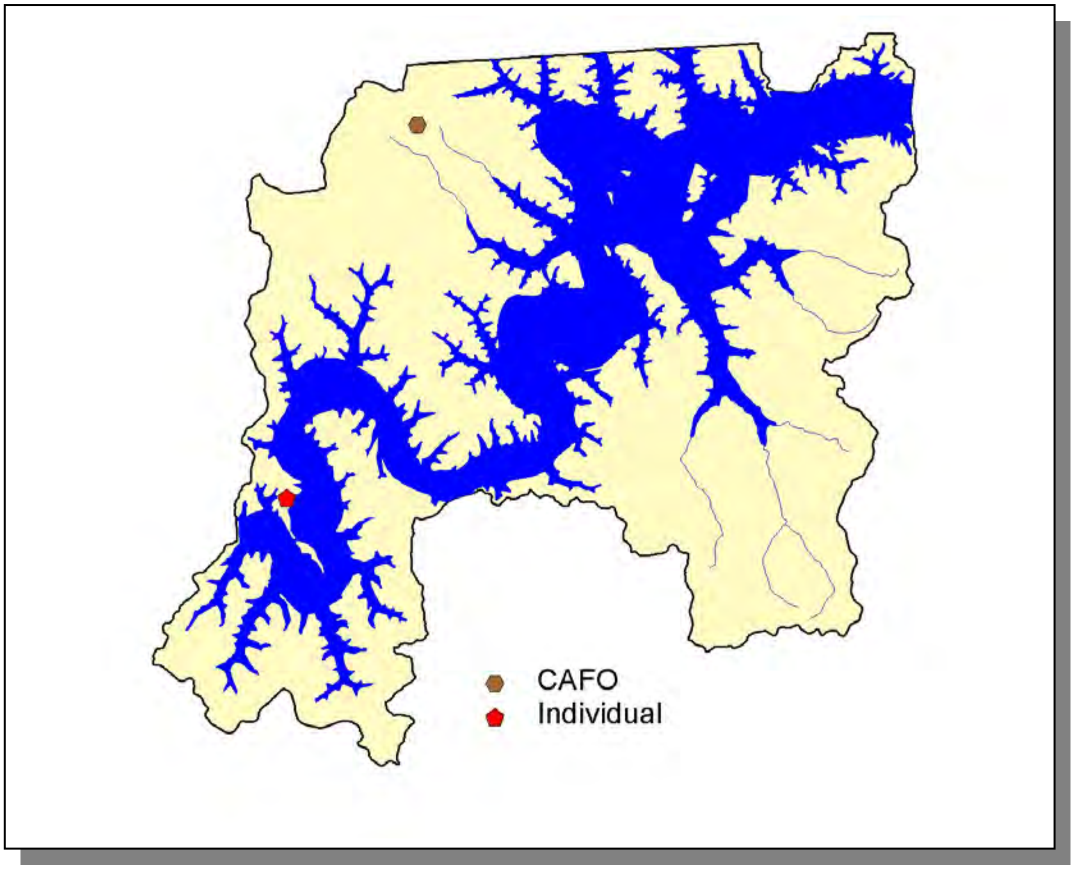

Figure 4-141. Location of Permits Issued in Subwatershed 051301050501. *More information, including the names of facilities, is provided in Appendix IV.*

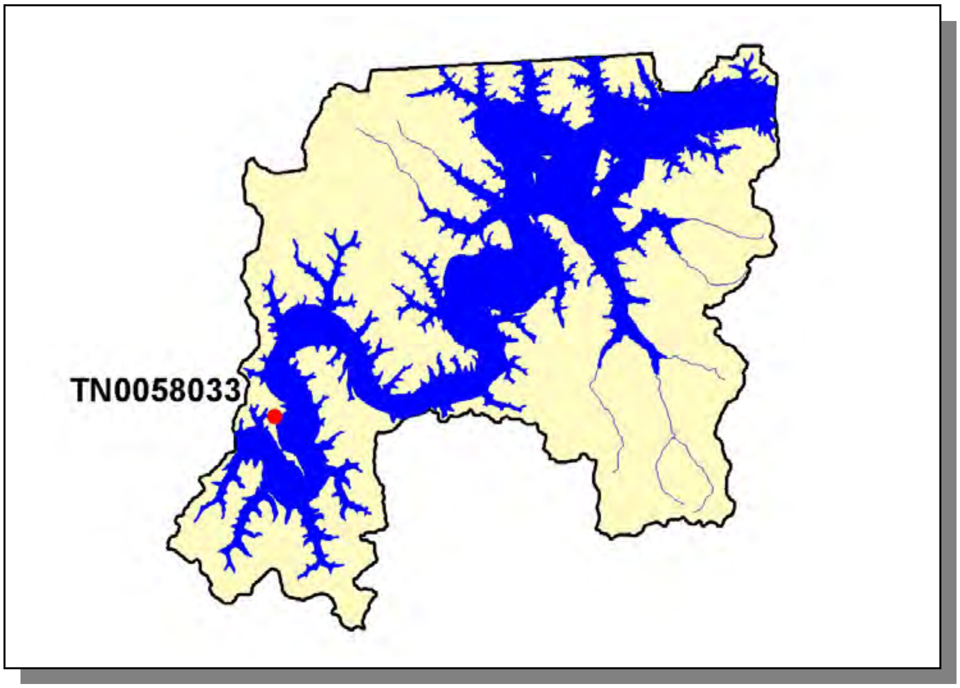

Figure 4-142. Location of Active NPDES Sites in Subwatershed 051301050501. *More information, including the names of facilities, is provided in Appendix IV.*

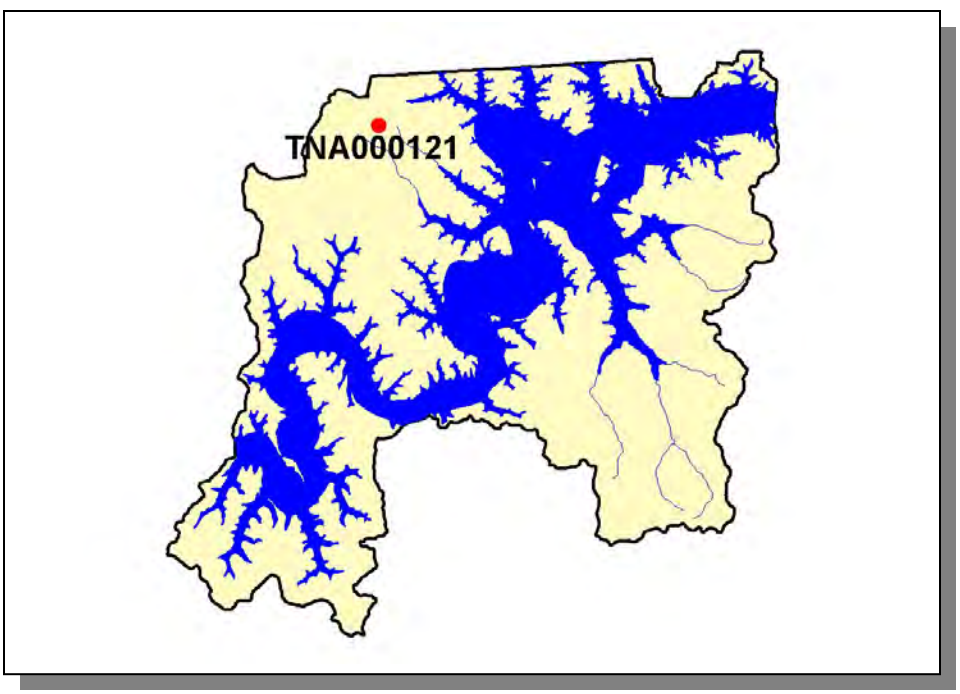

Figure 4-143. Location of Concentrated Animal Feeding Operation (CAFO) in Subwatershed 051301050501. *More information, including the names of facilities, is provided in Appendix IV.*

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

There is one NPDES facility discharging to water bodies listed on the 2004 303(d) list in Subwatershed 051301050501:

- TN0058033 (Cedar Hill Resort) discharges to Obey River @ RM 10.3

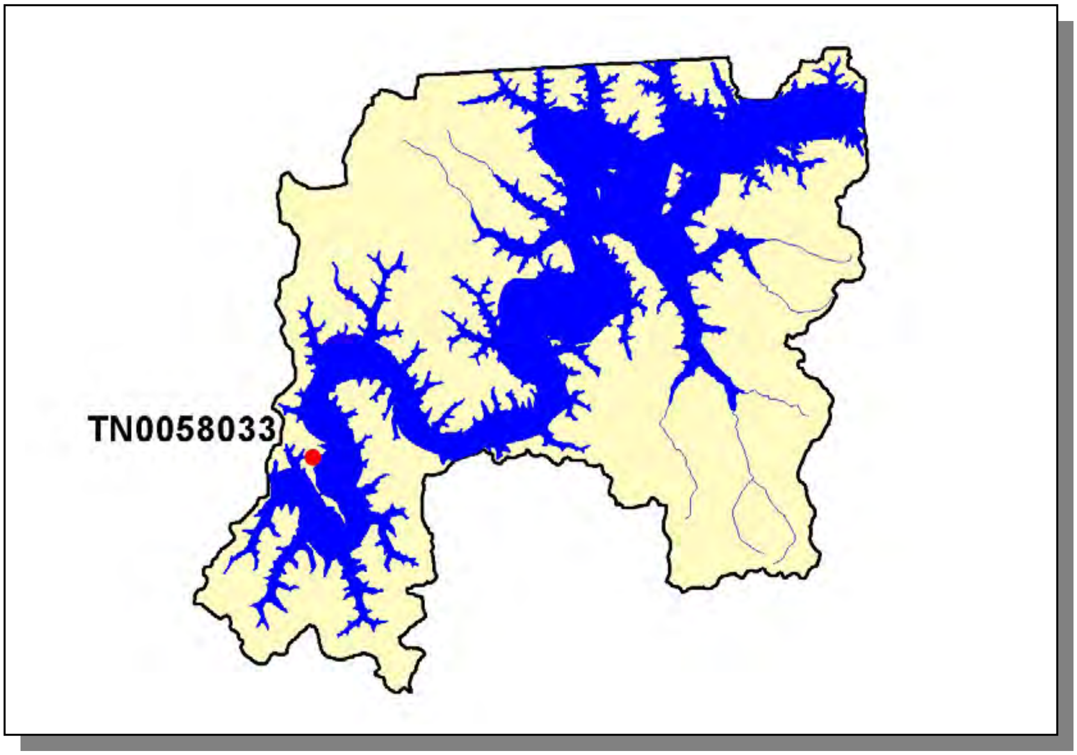

Figure 4-144. Location of NPDES Dischargers to Water Bodies Listed on the 2004 303(d) List in Subwatershed 051301050501. *More information, including the names of facilities, is provided in Appendix IV.*

Permit #	3Q2	1Q10	3Q10	3Q20	7Q10
TN0058033	67.40	na	35.70	28.20	37.70

Table 4-131. Receiving Stream Low Flow Information for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301050501. *Data are in cubic feet per second (CFS). Data were obtained from the USGS web application StreamStats at http://water.usgs.gov/osw/streamstats/. (na, data not available)*

PERMIT #	FLOW
TN0058033	X

Table 4-132. Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301050501.

PERMIT #	$CBOD_5$	NH_3	TRC	TSS	SETTLEABLE SOLIDS	DO	pH
TN0058033	X		X	X	X	X	X

Table 4-133. Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301050501. *$CBOD_5$, Carbonaceous Biochemical Oxygen Demand (5-Day); TRC, Total Residual Chlorine; TSS, Total Suspended Solids; DO, Dissolved Oxygen.*

PERMIT #	*E. coli*
TN0058033	X

Table 4-134. Bacteria Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301050501.

4.2.E.i.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
67	2,495	5	<5	32	<5

Table 4-135. Summary of Livestock Count Estimates in Subwatershed 051301050501. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Clay	0	14,574	0	18	174	23
Overton	15,150	27,812	1,200	1,173	811	59

Table 4-136. Summary of Livestock Count Estimates in Clay and Overton Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Clay	105.1	105.1	2.3	10.1
Overton	170.3	170.3	1.7	7.0

Table 4-137. Forest Acreage and Annual Removal Rates (1987-1994) in Clay and Overton Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.11
Grass (Hayland)	0.39
Legumes, Grass (Hayland)	0.59
Grass, Forbs, Legumes (Mixed Pasture)	1.36
Corn (Row Crops)	4.34
Soybeans (Row Crops)	10.79
Tobacco (Row Crops)	28.52
Wheat (Close-Grown Cropland)	7.00
Other Vegetable and Truck Crops	2.46
Conservation Reserve Program Lands	0.46
Farmsteads and Ranch Headquarters	1.53

Table 4-138. Annual Estimated Total Soil Loss in Subwatershed 051301050501.

4.2.E.ii. 051301050502 (Sulpher Creek).

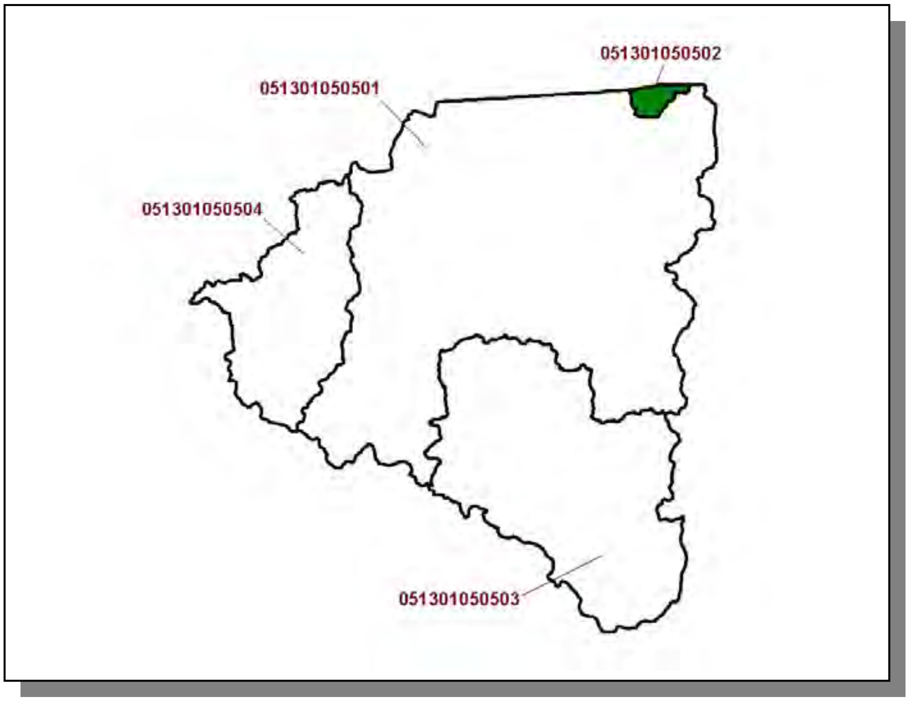

Figure 4-145. Location of Subwatershed 051301050502. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

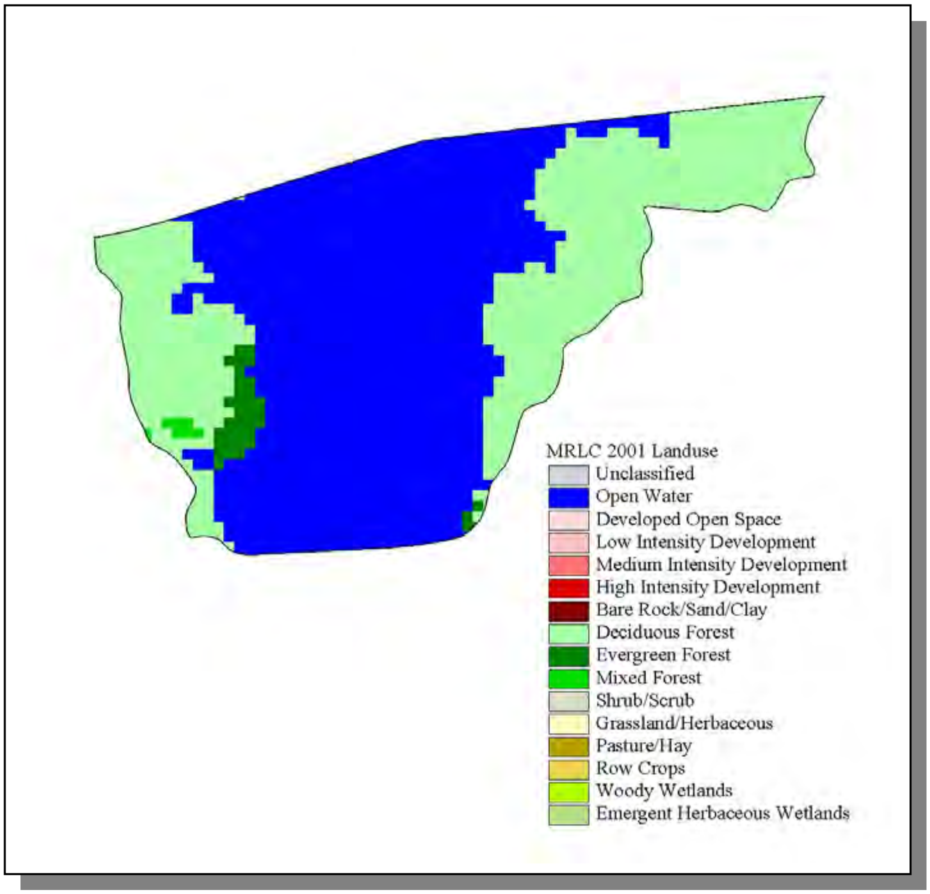

Figure 4-146. Illustration of Land Use Distribution in Subwatershed 051301050502.

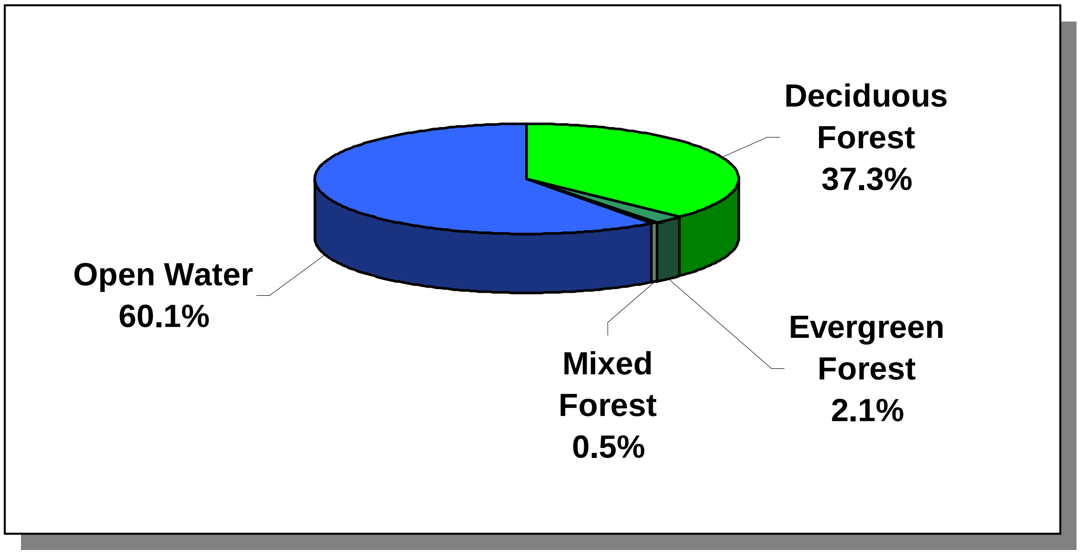

Figure 4-147. Land Use Distribution in Subwatershed 051301050502. *More information is provided in Appendix IV.*

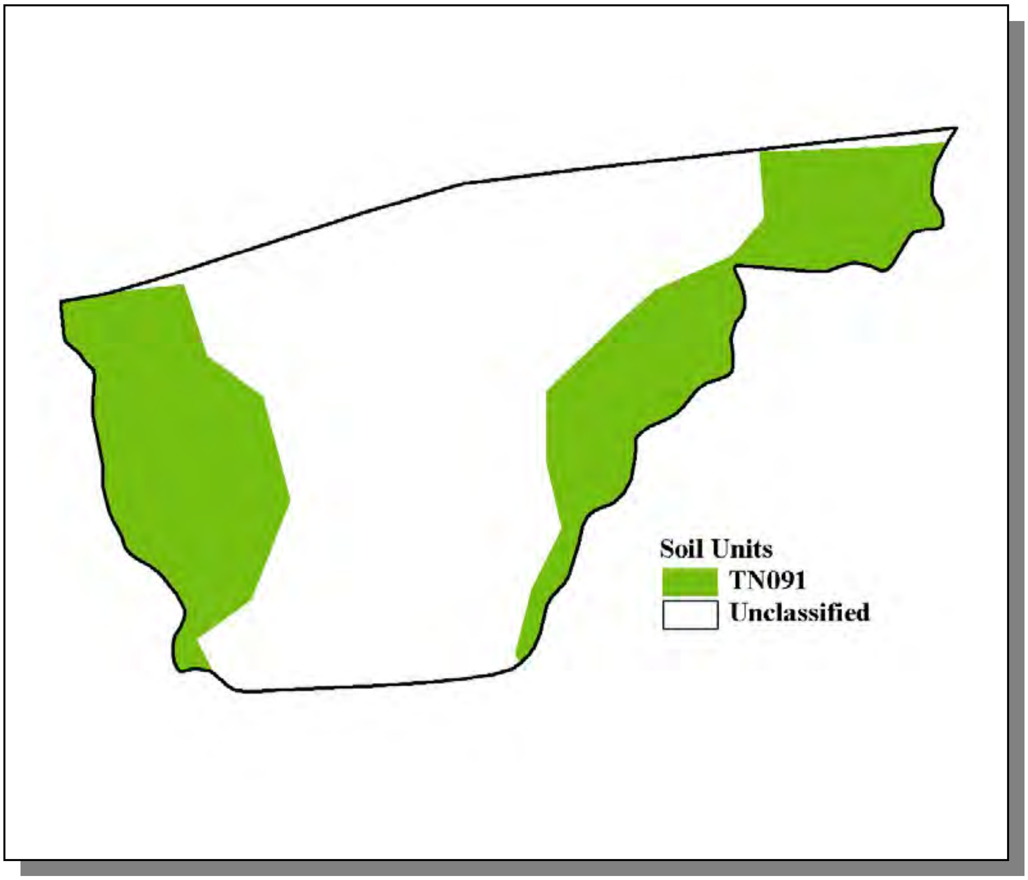

Figure 4-148. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050502.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN091	0.00	B	2.95	5.86	Loam	0.34

Table 4-139. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050502. *The definition of "Hydrologic Group" is provided in Appendix IV.*

.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Clay	7,238	7,311	7,976	0.23	16	17	18	12.5

Table 4-140. Population Estimates in Subwatershed 051301050502.

4.2.E.ii.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.E.ii.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS				
County	Cattle	Chickens (Layers)	Hogs	Sheep
Clay	14,574	18	174	23

Table 4-141. Summary of Livestock Count Estimates in Clay 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)
Clay	105.1	105.1	2.3	10.1

Table 4-142. Forest Acreage and Annual Removal Rates (1987-1994) in Clay County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.14
Grass (Hayland)	0.40
Legumes, Grass (Hayland)	0.53
Grass, Forbs, Legumes (Mixed Pasture)	1.38
Tobacco (Row Crops)	28.52
Farmsteads and Ranch Headquarters	1.56

Table 4-143. Annual Estimated Total Soil Loss in Subwatershed 051301050502.

4.2.E.iii. 051301050503 (Mitchell Creek).

Figure 4-149. Location of Subwatershed 051301050503. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

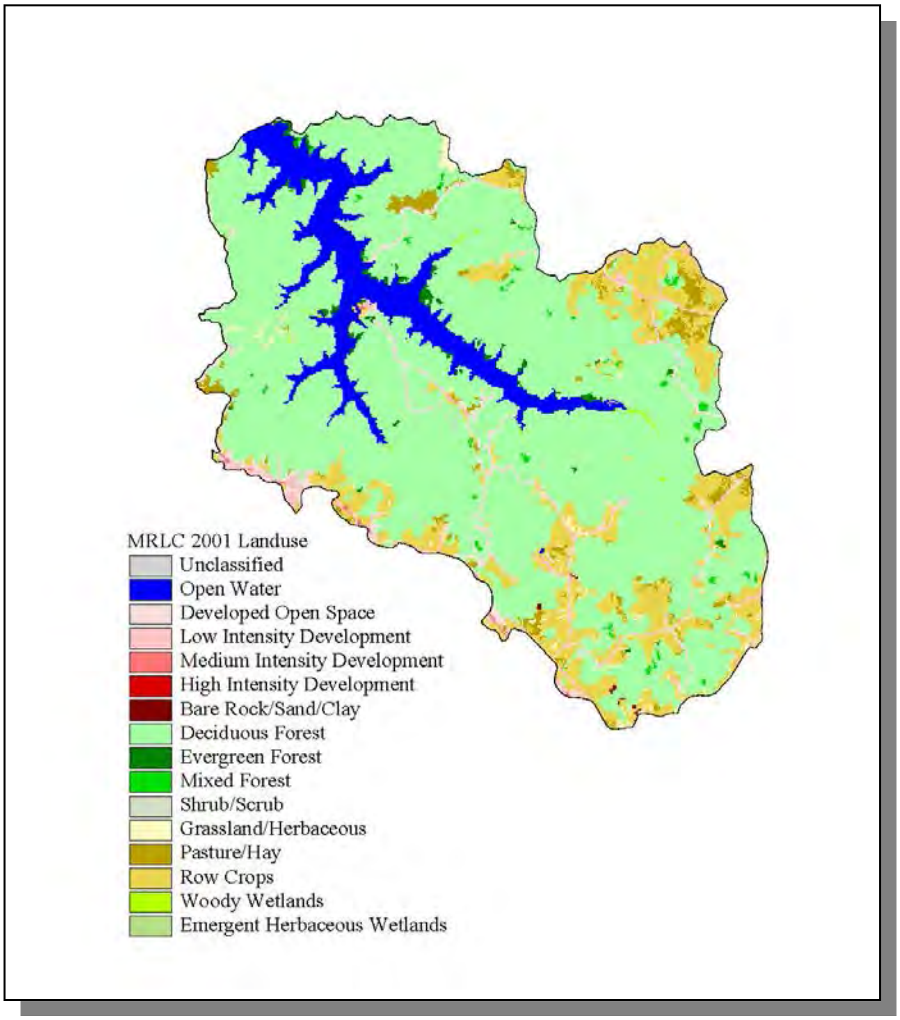

Figure 4-150. Illustration of Land Use Distribution in Subwatershed 051301050503.

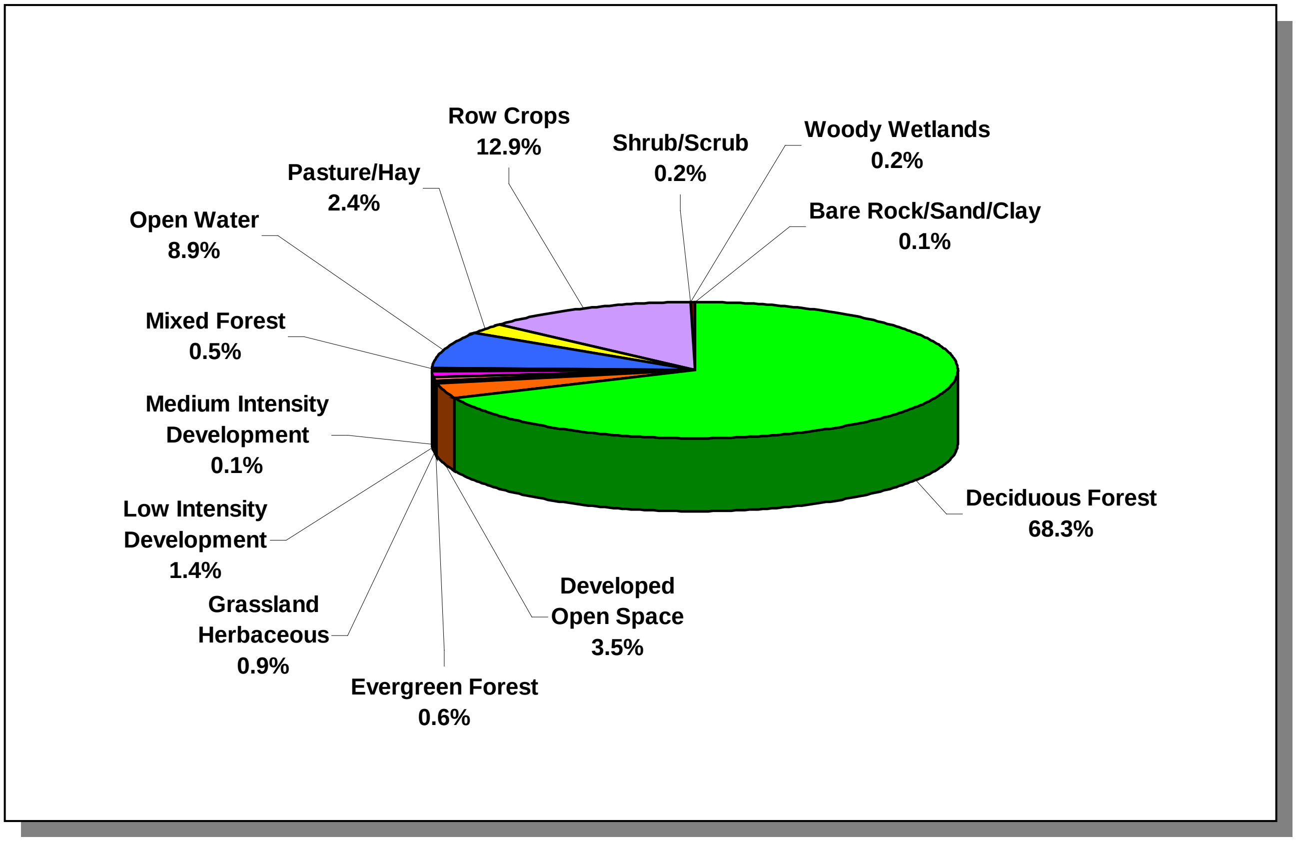

Figure 4-151. Land Use Distribution in Subwatershed 051301050503. *More information is provided in Appendix IV.*

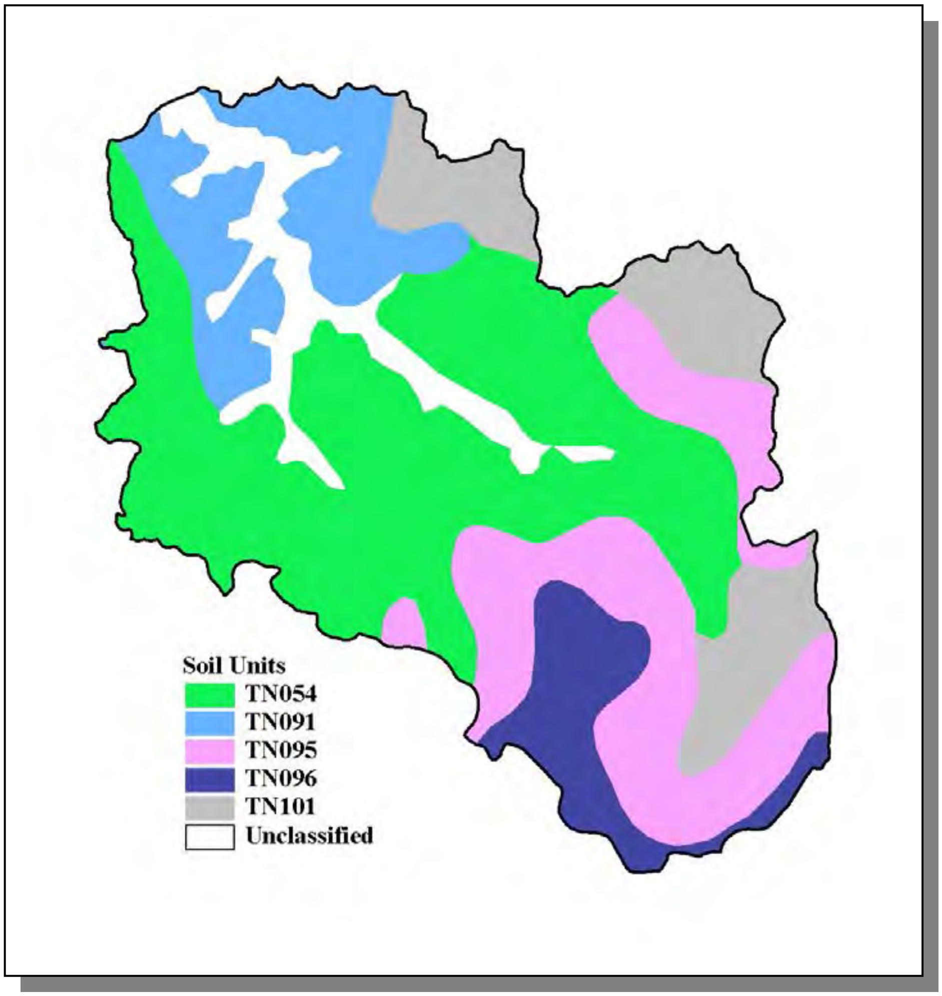

Figure 4-152. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050503.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN054	0.00	C	3.04	4.84	Loam	0.32
TN091	0.00	B	2.95	5.86	Loam	0.34
TN095	0.00	B	2.35	5.12	Loam	0.31
TN096	10.00	C	1.22	5.16	Silty Loam	0.38
TN101	0.00	B	1.71	5.39	Loam	0.35

Table 4-144. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050503. *The definition of "Hydrologic Group" is provided in Appendix IV.*

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	COUNTY POPULATION				**ESTIMATED POPULATION IN WATERSHED**			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Clay	7,238	7,311	7,976	2.94	213	215	234	9.9
Overton	17,636	19,171	20,118	3.6	635	690	724	14.0
Total	**24,874**	**26,482**	**28,094**		**848**	**905**	**958**	**13.0**

Table 4-145. Population Estimates in Subwatershed 051301050503.

4.2.E.iii.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.E.iii.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
432	1,044	34	<5	26	<5

Table 4-146. Summary of Livestock Count Estimates in Subwatershed 051301050503. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Clay	0	14,574	0	18	174	23
Overton	15,150	27,812	1,200	1,173	811	59

Table 4-147. Summary of Livestock Count Estimates in Clay and Overton Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Clay	105.1	105.1	2.3	10.1
Overton	170.3	170.3	1.7	7.0

Table 4-148. Forest Acreage and Annual Removal Rates (1987-1994) in Clay and Overton Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.55
Grass (Hayland)	0.34
Legumes, Grass (Hayland)	2.11
Grass, Forbs, Legumes (Mixed Pasture)	0.90
Corn (Row Crops)	4.35
Soybeans (Row Crops)	10.79
Tobacco (Row Crops)	28.52
Wheat (Close-Grown Cropland)	7.00
Other Vegetable and Truck Crops	21.46
Conservation Reserve Program Lands	0.46
Farmsteads and Ranch Headquarters	0.91

Table 4-149. Annual Estimated Total Soil Loss in Subwatershed 051301050503.

4.2.E.iv. 051301050504 (Obey River).

Figure 4-153. Location of Subwatershed 051301050504. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

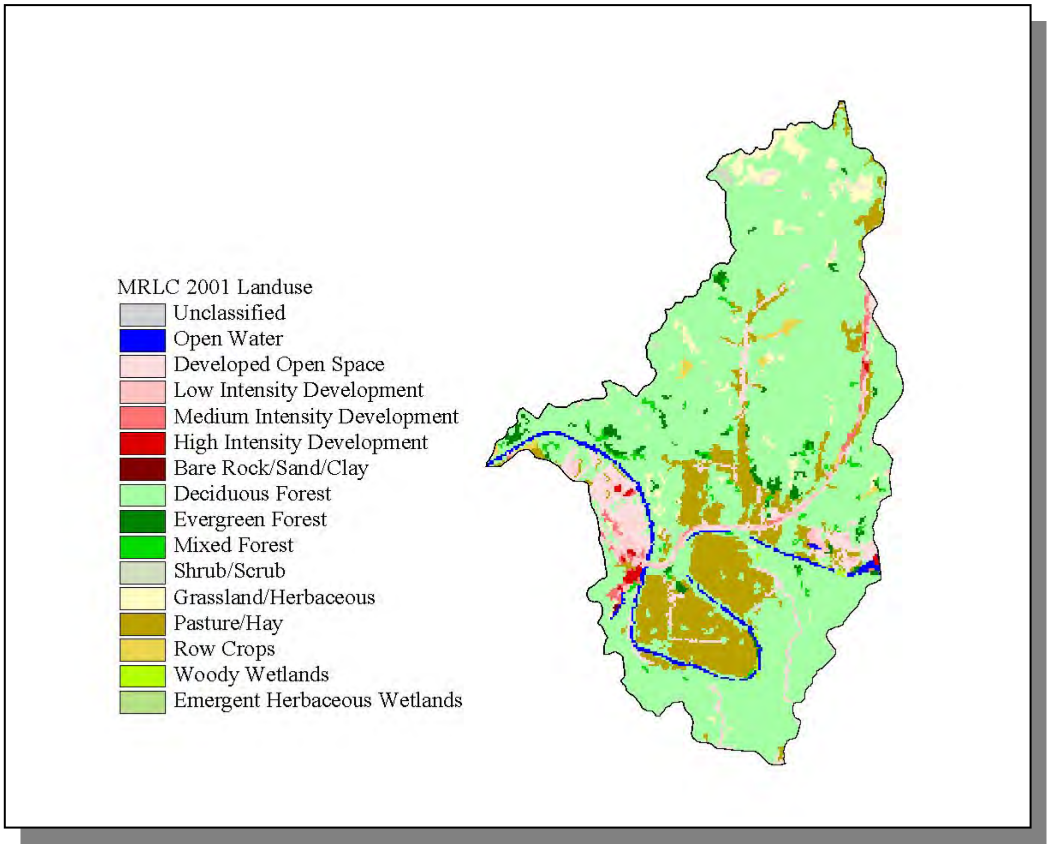

Figure 4-154. Illustration of Land Use Distribution in Subwatershed 051301050504.

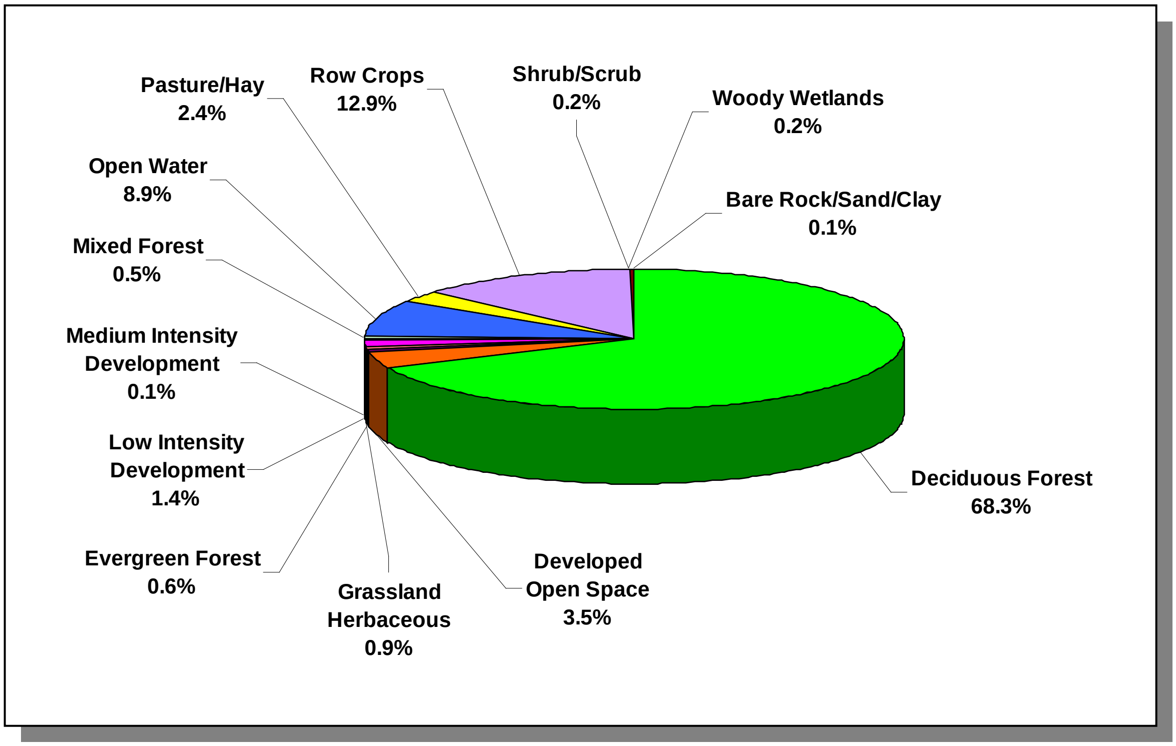

Figure 4-155. Land Use Distribution in Subwatershed 051301050504. *More information is provided in Appendix IV.*

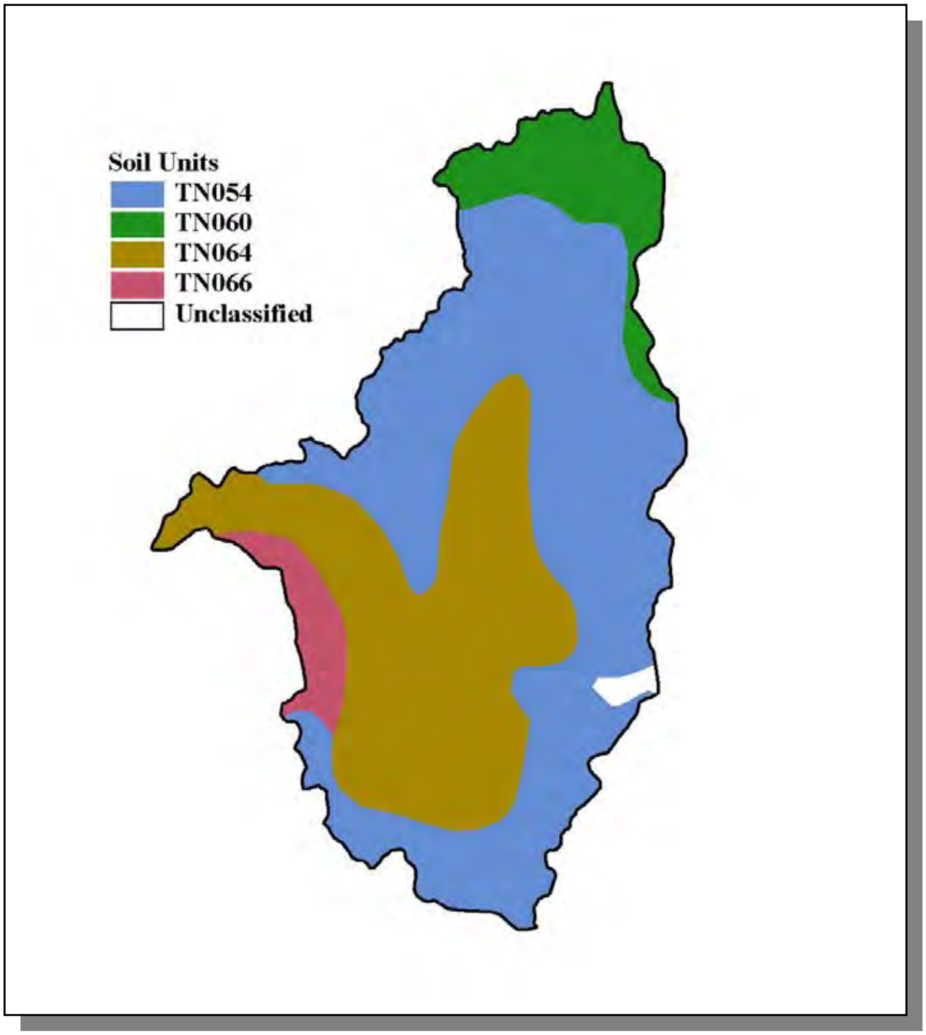

Figure 4-156. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050504.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN054	0.00	C	3.04	4.84	Loam	0.32
TN060	20.00	B	1.30	5.32	Silty Loam	0.39
TN064	14.00	C	1.19	5.82	Silty Loam	0.37
TN066	0.00	B	2.62	4.75	Loam	0.28

Table 4-150. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301050504. *The definition of "Hydrologic Group" is provided in Appendix IV.*

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	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Cumberland	34,736	43,217	46,802	1.63	566	705	763	34.8
Overton	17,636	19,171	20,118	0.24	43	46	49	14.0
Putnam	51,373	58,326	62,315	4.56	2,342	2,659	2,841	21.3
Total	**103,745**	**120,714**	**129,235**		**2,951**	**3,410**	**3,653**	**23.8**

Table 4-151. Population Estimates in Subwatershed 051301050504.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Monterey	Putnam	2,559	1,113	875	28	10

Table 4-152. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051301050504.

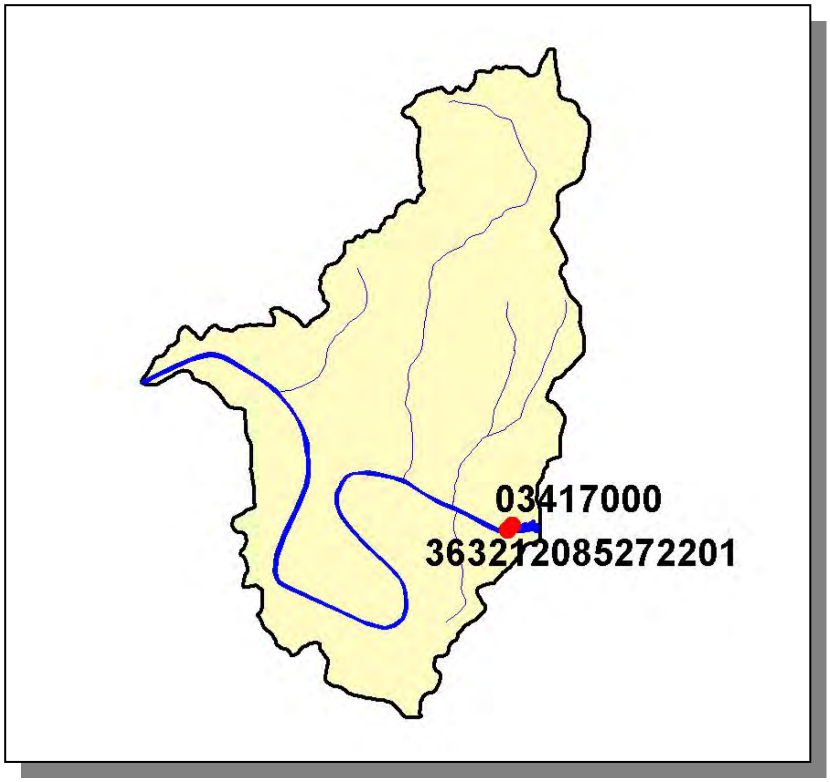

Figure 4-157. Location of Historical Streamflow Data Collection Sites in Subwatershed 051301050504. *More information is provided in Appendix IV.*

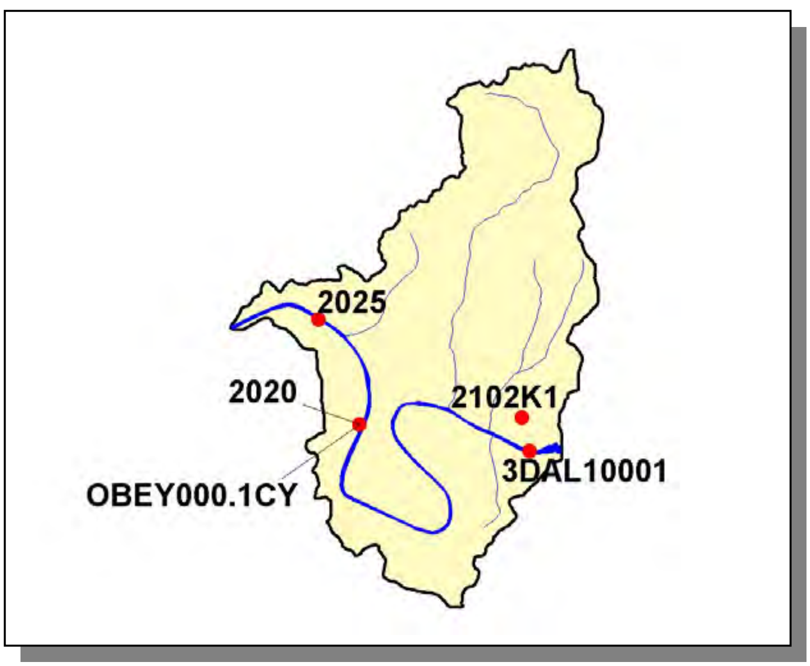

Figure 4-158. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301050504. *More information, including site names and locations, is provided in Appendix IV.*

4.2.E.iv.a. Point Source Contributions.

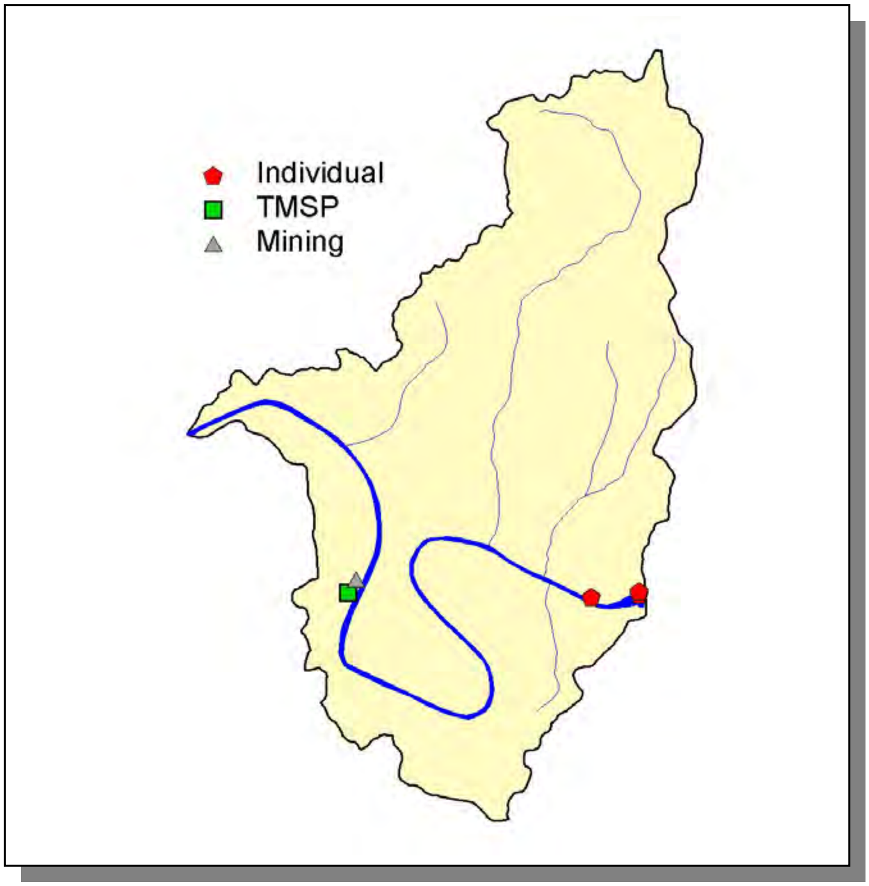

Figure 4-159. Location of Permits Issued in Subwatershed 051301050504. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-160. Location of Active NPDES Sites in Subwatershed 051301050504. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-161. Location of Active Mining Sites in Subwatershed 051301050504. *More information, including the names of mining operations, is provided in Appendix IV.*

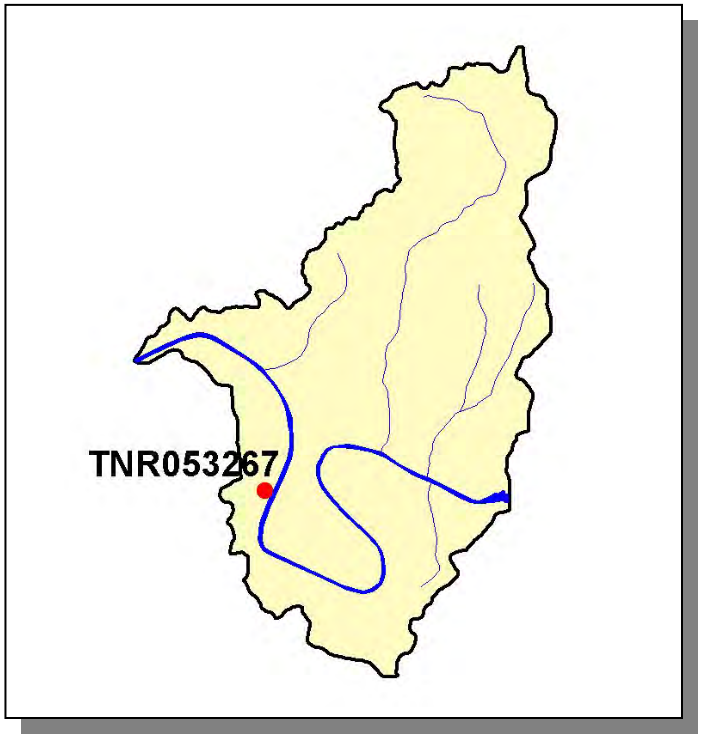

Figure 4-162. Location of TMSP Sites in Subwatershed 051301050504. *More information, including the names of facilities, is provided in Appendix IV.*

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

There are three NPDES facilities discharging to water bodies listed on the 2004 303(d) list in Subwatershed 051301050504:

- TN0004332 (USFWS Dale Hollow National Fish Hatchery) discharges to Dry Branch @ RM 0.1
- TN0021423 (USACOE Dale Hollow Dam Shop STP) discharges to Obey River @ RM 7.0 and @ RM 6.6
- TN0068098 (Dale Hollow Hydro Power Plant) discharges to the Obey River @ RM 7.3

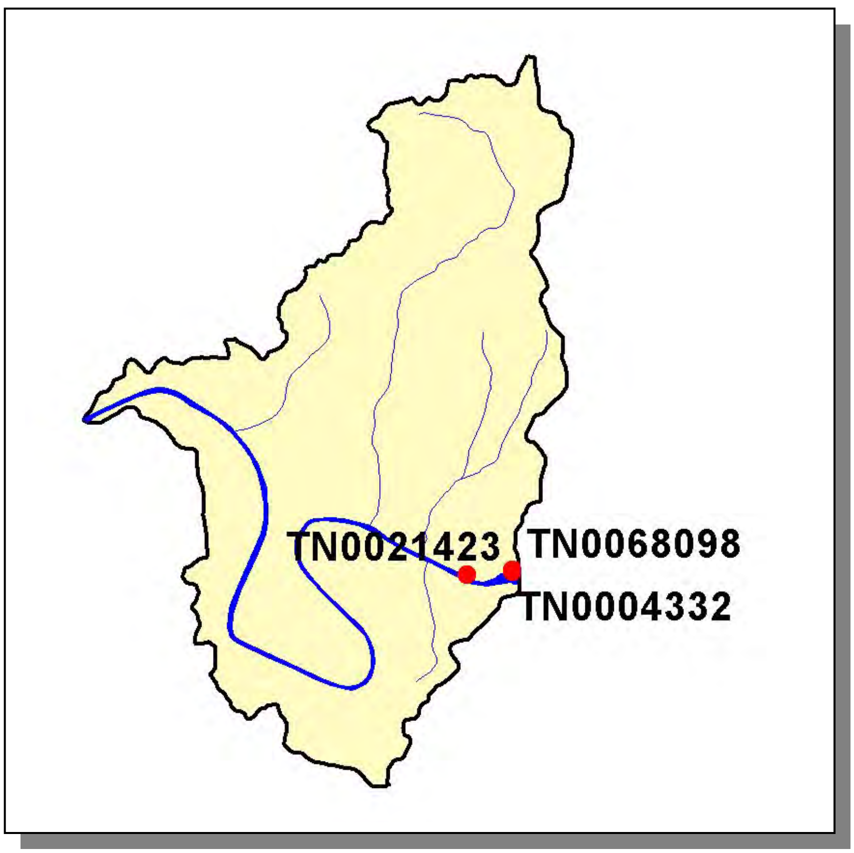

Figure 4-163. Location of NPDES Dischargers to Water Bodies Listed on the 2004 303(d) List in Subwatershed 051301050504. *More information, including the names of facilities, is provided in Appendix IV.*

Permit #	3Q2	1Q10	3Q10	3Q20	7Q10
TN0004332	0.08	na	0.03	0.03	0.04
TN0021423	68.00	na	36.00	28.50	38.00
TN0068098	67.90	na	36.00	28.50	38.00

Table 4-153. Receiving Stream Low Flow Information for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301050504. *Data are in cubic feet per second (CFS). Data were obtained from the USGS web application StreamStats at http://water.usgs.gov/osw/streamstats/. (na, data not available)*

PERMIT #	FLOW
TN0004332	X
TN0021423	X
TN0068098	X

Table 4-154. Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301050504.

PERMIT #	WET	$CBOD_5$	NH_3	TRC	TSS	SETTLEABLE SOLIDS	PCB	DO	pH
TN0004332	X		X		X	X		X	X
TN0021423		X		X		X		X	X
TN0068098						X	X		

Table 4-155. Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301050504. *WET, Whole Effluent Toxicity; $CBOD_5$, Carbonaceous Biochemical Oxygen Demand (5-Day); TRC, Total Residual Chlorine; TSS, Total Suspended Solids; DO, Dissolved Oxygen.*

PERMIT #	*E. coli*	FECAL COLIFORM
TN0021423	X	X

Table 4-156. Bacteria Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301050504.

4.2.E.iv.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
320	662	39	<5	66	5

Table 4-157. Summary of Livestock Count Estimates in Subwatershed 051301050504. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Cumberland	9,468	23,179	2,296	43	6,038	461
Overton	15,150	27,812	1,200	1,173	811	59
Putnam	12,592	24,817	1,095	1,025	1,070	66

Table 4-158. Summary of Livestock Count Estimates in Cumberland, Overton, and Putnam Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Cumberland	320.3	320.3	5.9	22.5
Overton	170.3	170.3	1.7	7.0
Putnam	152.5	152.3	3.6	16.4

Table 4-159. Forest Acreage and Annual Removal Rates (1987-1994) in Cumberland, Overton, and Putnam Counties.

CROPS	TONS/ACRE/YEAR
Legumes (Pastureland)	0.15
Grass (Pastureland)	1.30
Grass (Hayland)	2.10
Legumes, Grass (Hayland)	0.53
Legumes (Hayland)	0.23
Grass, Forbs, Legumes (Mixed Pasture)	0.70
Corn (Row Crops)	3.82
Soybeans (Row Crops)	6.65
Tobacco (Row Crops)	12.38
Wheat (Close-Grown Cropland)	7.00
Other Vegetable and Truck Crops	14.63
Conservation Reserve Program Lands	0.46
Farmsteads and Ranch Headquarters	0.23

Table 4-160. Annual Estimated Total Soil Loss in Subwatershed 051301050504.

CHAPTER 5

WATER QUALITY PARTNERSHIPS IN THE OBEY RIVER WATERSHED

5.1 Background

5.2 Federal Partnerships
- 5.2.A. Natural Resources Conservation Service
- 5.2.B. United States Geological Survey
- 5.2.C. United States Fish and Wildlife Service
- 5.2.D. United States Army Corps of Engineers

5.3 State Partnerships
- 5.3.A. TDEC Division of Water Supply
- 5.3.B. State Revolving Fund
- 5.3.C. Tennessee Department of Agriculture
- 5.3.D. Kentucky Division of Water

5.4 Local Initiatives
- 5.4.A. The Cumberland River Compact
- 5.4.B. The Nature Conservancy
- 5.4.C. Hull-York Lakeland RC&D Council

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 Obey River Watershed. The information presented is provided by the agencies and organizations described.

5.2. FEDERAL PARTNERSHIPS

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

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

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

Conservation Practice	Feet	Acres	Number
Conservation Buffers	52,439	18	
Erosion Control		3,033	
Irrigation Management		75	1
Nutrient Management		12,786	6
Pest Management		11,768	37
Grazing / Forages	68,829	9,150	
Tree and Shrub Practices		5,612	
Tillage and Cropping		2,020	
Waste Management Systems			14
Wildlife Habitat Management		6,820	
Water Supply		2,329	14

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

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

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

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

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

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

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

Endangered Species Program

Through the Endangered Species Program, the Service consults with other federal agencies concerning their program activities and their effects on endangered and threatened species. Other Service activities under the Endangered Species Program include the listing of rare species under the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended: 16 U.S.C. 1531 et seq.) and the recovery of listed species. Once listed, a species is afforded the full range of protections available under the ESA, including prohibitions on killing, harming or otherwise taking a species. In some instances, species listing can be avoided by the development of Candidate Conservation Agreements, which may remove threats facing the candidate species, and funding efforts such as the Private Stewardship Grant Program. The federally endangered gray bat (*Myotis grisescens*) and Indiana bat (*Myotis sodalis*), and the federally threatened bald eagle (*Haliaeetus leucocephalus*) occur in the Obey River Watershed. There were likely numerous federally listed mussel species present in the Obey River Watershed. The impoundment of the river has seriously degraded water quality and habitat for these species. For a complete listing of endangered and threatened species in Tennessee, please visit the Service's website at http://cookeville.fws.gov.

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

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

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

Partners for Fish and Wildlife Program

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

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

HOW TO PARTICIPATE ...

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

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

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

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

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

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

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

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

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

Regulatory Program

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

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

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

Section 404 of the Clean Water Act **-** requires approval prior to discharging dredged or fill material into the waters of the United States. Typical activities requiring Section 404 permits are:
• Depositing of fill or dredged material in waters of the U.S. or adjacent wetlands.
• Site development fill for residential, commercial, or recreational developments.
• Construction of revetments, groins, breakwaters, levees, dams, dikes, and weirs.
• Placement of riprap and road fills.

Civil Works Program

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

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

Nashville District Corps of Engineers Water Quality Program

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

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

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

Water Quality Issues and Actions In the Obey River Watershed

Background

Dale Hollow Dam is located at Obey River Mile 7.3 in Clay County, Tennessee. The impoundment formed by Dale Hollow Dam extends upstream for the entire length of the Obey River and impounds portions of the East Fork and West Fork of the Obey River, as well as a major reach of Wolf River. The lake's surface area is 27,700 acres at elevation 651.0, which is the top of the power pool. At elevation 651.0, Dale Hollow Lake averages 49 feet in depth. The project stores potentially damaging floodwaters that can be released gradually once the danger of downstream flooding has passed. Releases from the dam are typically through the three hydroturbines. The dam and lake are an integral part of the mature system of Corps of Engineers dams that regulate water within the Cumberland River Basin.

The water quality of Dale Hollow Lake is affected by several factors. Typical for a deep, southern, storage impoundment, Dale Hollow Lake develops strong, thermal stratification during the growing season that causes gradual depletion of dissolved oxygen in waters below the surface layer. Dissolved oxygen depletion is exacerbated by oxygen demanding pollutants and materials that enter the lake from the watershed. Even though the overall watershed is lightly populated and largely forested, activities both historical and current, affect the water quality of Dale Hollow Lake.

The watershed has seen a variety of increased development and resource extraction pressures in recent years. The devastating, negative effect of historical mining for coal resources in some watershed streams, particularly the East Fork Obey River watershed, has been somewhat alleviated by active restoration efforts and natural recovery. Unfortunately and more recently, within the East Fork Obey River watershed, significant deforestation and clearing of the rugged mountainous terrain and lands have occurred. The East Fork Obey River flows through a deep, remote gorge. In recent months, several thousand acres of forested lands have been timbered and mechanically cleared in the East Obey watershed near Wilder, Tennessee. The land clearing has occurred on the steep forested slopes immediately adjacent to the river as well as on the Cumberland Plateau escarpment. This deforestation has resulted in unstable slopes and has resulted in heavy siltation in what had been a steadily recovering aquatic ecosystem. The aesthetic impacts of these activities on the land are horrendous. These lands were once owned by large timber companies but have been divested and sold to private development interests. Many of these development companies operate out-of-state and seem to pay little attention to state or local environmental guidance and regulations. Sadly, these actions create a renewed threat to the water quality of Dale Hollow Lake and have damaged a beautiful river gorge. This type of activity demonstrates the difficult and tenuous nature maintaining a watershed’s integrity and achieving improvements in water quality on a watershed wide basis. Only through multi-agency involvement and enforcement of laws to protect water quality can real progress be made in advancing the cause of water quality.

Exploration and extraction of oil and natural gas is an ongoing activity on private lands in the watershed. These activities can cause localized negative water quality impacts if pollutants generated from these activities enter area streams. At one time this was a significant problem, however at present few reports of problems have arisen. When Dale Hollow Lake was impounded a number of oil wells were covered by its waters. These wells were plugged, but in some cases small seeps have developed as the plugs have deteriorated or fractures in rock strata have allowed crude oil to bubble to the surface. Plugging submerged oil wells is problematic. No major water quality related problems have been reported due to the old, submerged wells. One proactive approach to water quality protection accomplished by the lake’s resource management office and the Nashville District has been to gain a waiver of mineral exploration and development on Dale Hollow Lake lands and waters. The Assistant Secretary of the Army granted that waiver on July 12, 2001.

Impacts of houseboat sanitary waste discharges are a concern at Dale Hollow Lake. The Dale Hollow Lake Resource Management office is pursuing the reclassification of Dale Hollow Lake from “Discharge” status to “No Discharge”. Tennessee and Kentucky state agencies are on board as are the respective state governors concerning this proposed change. In addition the Dale Hollow Lake Marina Association is also in favor. This issue has been through a review and evaluation process with USEPA. The Federal Register comment period ended with little opposition. It appears that USEPA will agree with the reclassification request with the decision to be formally rendered soon. All existing houseboats with Coast Guard approved sanitation devices will likely be “grandfathered” and continue to operate in accordance with Coast Guard regulations. However, all new houseboats would have to be self-contained with no discharge of treated waste into the lake. There are over 1,200 houseboats on Dale Hollow (approximately one houseboat per 25 acres of water surface), and this number is expected to increase. The management of houseboat waste will be critical to the future of Dale Hollow Lake water quality. It will take a partnering effort of all federal and state agencies involved to wisely manage this issue.

Dale Hollow Lake Resource Management office has initiated a “Clean Marina Initiative” on Dale Hollow Lake. The purpose of the program is to encourage marina operators to use environmentally friendly management practices during their daily operations. Thus far, Willow Grove Marina is the first to earn a “Clean Marina” designation. Cedar Hill and Sunset Marinas have expressed interest in gaining similar designation. This will be a continuing program.

A general and increasing trend has been construction of many new homes near the lake. Many cleared areas are now visible from the lake, where there was previously forest. Runoff from newly cleared areas contributes sediment and probably other pollutants to the lake. This trend is likely to continue as the popularity of second and vacation homes increases.

Overall, it is still possible to state that the water quality of Dale Hollow Lake is good and supportive of current uses. In order for this to continue, and allow the enjoyment of the lake, better management and enforcement of environmental regulations is essential for improvement of watershed conditions.

The relatively short reach of tailwater below Dale Hollow is heavily affected by water releases from the dam. Tailwater conditions are radically different from pre-impoundment, natural stream conditions. The tailwater normally experiences daily water level fluctuations, mainly the result of cold, hydropower releases. These fluctuations cause alternate flooding and drying of habitat and have degraded gravel, shoal habitat. The result is reduced quality of habitat for the already limited aquatic biota that can survive in such a cold, tailwater environment. The tailwater is considered a coldwater fishery and is routinely stocked with trout. No continuous minimum flow is provided by the dam. Seasonally depressed dissolved oxygen (DO) levels in the hydropower releases negatively affect the tailwater. The length and severity of seasonal DO problems vary from year to year depending upon antecedent conditions found in Dale Hollow Lake and hydropower generation patterns. DO levels in the turbine discharges from Dale Hollow characteristically drop below the state minimum standard of 6.0 mg/l during late summer and early fall. DO concentrations recover naturally as the lake destratifies and vertically mixes with the approach of winter. Restoration measures have been taken to augment DO during the critical water quality season.

Restoration Initiatives at Dale Hollow Dam.

The recognition of problems caused by stressful DO levels below Dale Hollow Dam led to studies and then implementation of various turbine-venting measures to improve water quality conditions of the turbine discharges. Turbine venting has been implemented on all three generating units at Dale Hollow within recent years.

Turbine venting involves a combination of providing supplemental air supplies and installation of hub baffles on the hydropower units. Since the units at Dale Hollow are old, turbine venting was considered experimental at first. Following implementation, testing, and evaluation, turbine venting was deemed successful, at least as an interim measure to improve oxygen levels in hydropower releases.

The long-term solution to dissolved oxygen restoration at Dale Hollow Dam is eventual replacement of the 50 plus year old units with auto-venting turbines. Auto-venting turbines have the advantage of greatly improving dissolved oxygen conditions during times when augmentation is needed, without the loss of hydropower generating efficiency caused by hub baffles.

Cooperation with the Tennessee Department of Environment and Conservation, Division of Water Pollution Control

Extensive water quality data are provided to the TDEC, Division of Water Pollution Control to assist the watershed management program cycle. The water quality data provided by the Corps helps fill in gaps in the water quality record for area water bodies. Often Corps water quality data is the only information available that is collected on a systematic basis for the Corps' Cumberland River Basin lakes and reservoirs.

Environmental Education

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

Additional Information

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

5.3. STATE PARTNERSHIPS

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

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

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

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

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

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

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

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

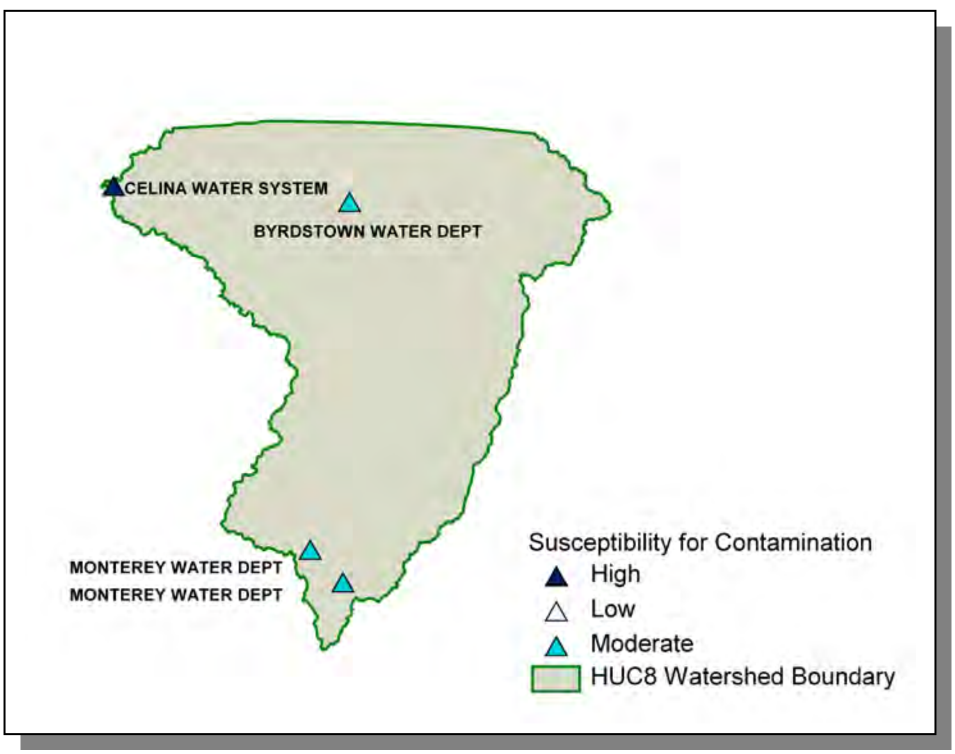

Figure 5-1. Susceptibility for Contamination in the Obey River Watershed.

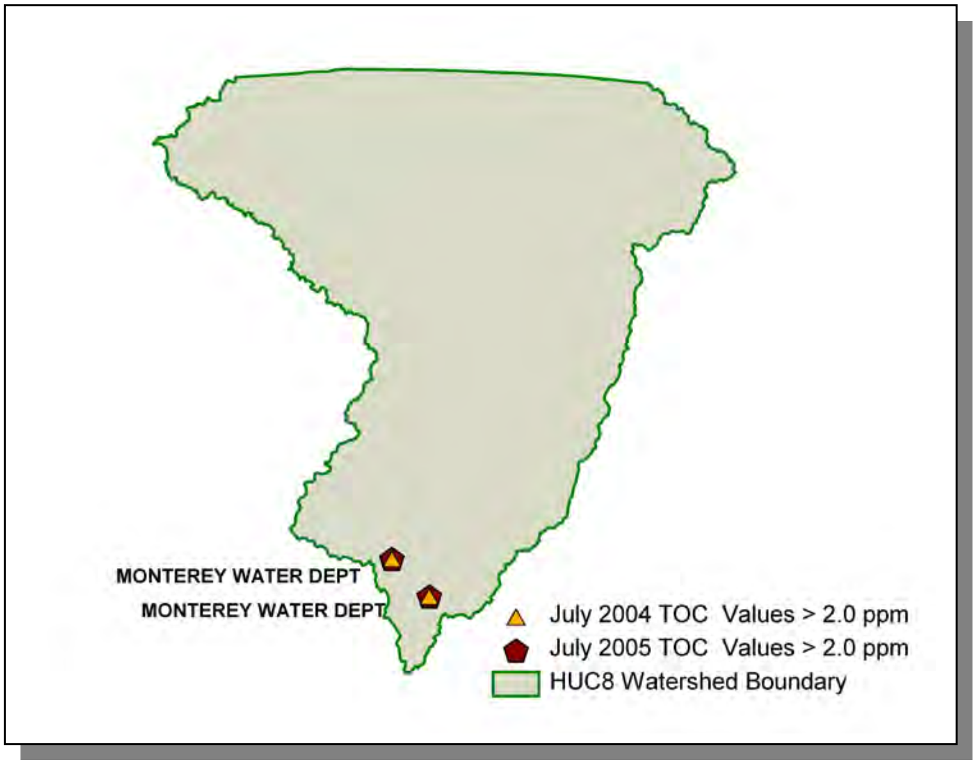

Figure 5-2. July 2004 and 2005 Raw Water Total Organic Carbon (TOC) Analysis in the Obey River Watershed.

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

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

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

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

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

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

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

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

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

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

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

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

The Tennessee Department of Agriculture Agricultural Resources Conservation Fund Program (TDA-ARCF) provides cost-share assistance to landowners across Tennessee to install BMPs that eliminate agricultural nonpoint source pollution. This assistance is provided through Soil Conservation Districts, Resource Conservation and Development Districts, Watershed Districts, universities, and other groups. Additionally, a portion of the TDA-ARCF is used to implement information and education projects statewide, with the focus on landowners, producers, and managers of Tennessee farms and forests.

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

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

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

The complaint form is available at:

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

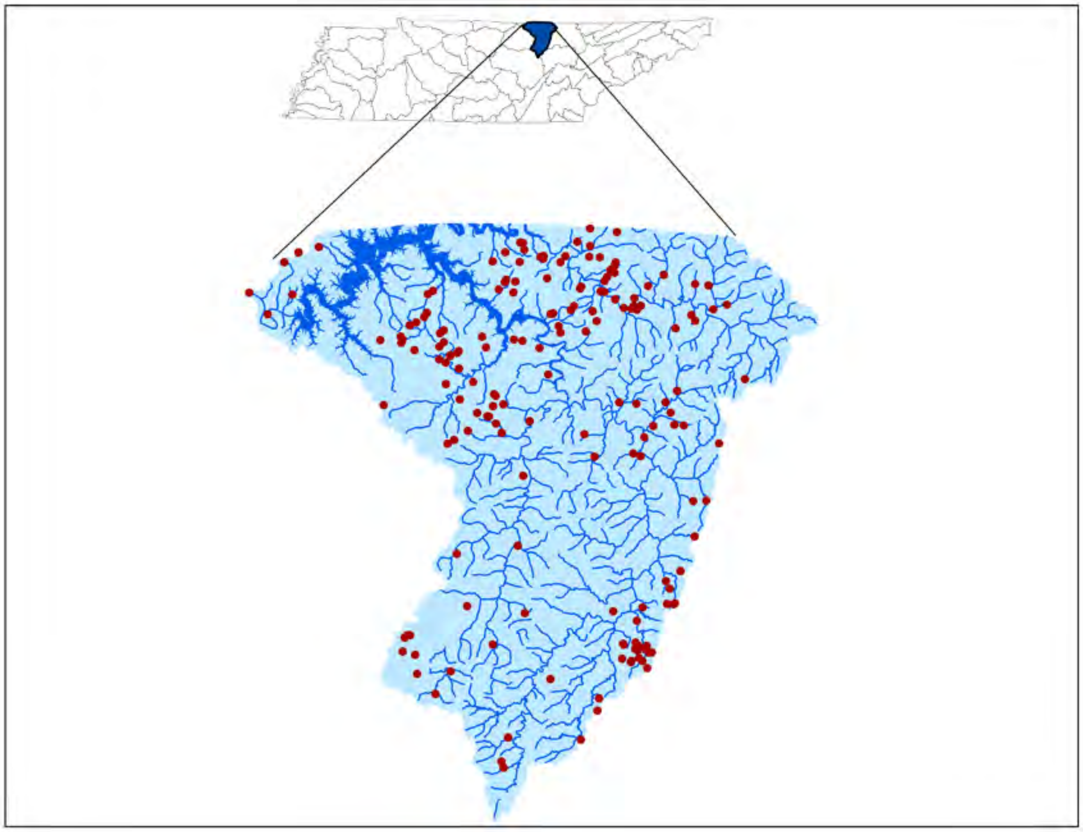

Figure 5-3. Location of BMPs installed from 1999 through 2005 in the Tennessee Portion of the Obey River Watershed with Financial Assistance from the Tennessee Department of Agriculture's Nonpoint Source and Agricultural Resources Conservation Fund Grant Programs. *More information is provided in Appendix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

5.3.D. Kentucky Division of Water- Kentucky Watershed Management Framework. The Kentucky Watershed Management Framework is a dynamic, flexible structure for coordinating watershed management across the Commonwealth of Kentucky.

The Watershed Management Framework is not a new program, but rather a way of coordinating existing programs and building new partnerships that will result in more effective and efficient management of the state's land and water resources. Inherent in the design of the Framework is the belief that many stakeholder groups and individuals must have ongoing opportunities to participate in the process of managing the abundant natural resources that characterize Kentucky's watersheds.

Benefits to the people of Kentucky include:

- Better information for decision making
- Increased ability to resolve complex water resource problems
- Improved coordination among governmental agencies
- More opportunities for citizens to get involved
- Increased ability to demonstrate results and benefits of environmental management
- More cost-effective use of public and private funds

Each major river basin in Kentucky is staffed with a Basin Coordinator. Basin Coordinators are staff assigned to serve as a liaison in a given basin management unit among the agencies, the local interests, and the resources concerns. Their job is to specialize in their watershed, to know what resources might be available to address the concerns, and facilitate the watershed process to implement plans that address the problems.

For more information about the KY Watershed Management Framework visit our website at http://www.watersheds.ky.gov/

Watershed Framework activities in the Obey River Watershed are coordinated through the Upper Cumberland River Basin Team. The Upper Cumberland River Basin Team is a multi-agency task force that meets regularly to help in development of monitoring strategies, education and outreach, prioritization of issues and watersheds within the basin, planning, and networking among technical staff and local leaders to apply agency resources to implement fixes. For more info about the Upper Cumberland River Basin Team contact Rob Miller, Upper Cumberland River Basin Coordinator at (606) 878-0157 or via email at **robert.l.miller@ky.gov**. The web address is http://www.watersheds.ky.gov/basins/upper_cumberland/.

Obey River

Spring Creek (05130105210)
Wolf River (05130105180)
Sulphur Creek, of Dale Hollow Lake (Clinton County) (05130105200)
Illwill Creek (05130105220)
Sulphur Creek, of Dale Hollow Lake (Cumberland County) (05130105230)

Geography. The Obey River Watershed in Kentucky is comprised of about 165 square miles. It consists of several tributaries that drain to Dale Hollow Lake. These include Spring Creek, Wolf River, Sulphur Creek (Clinton County), Sulphur Creek (Cumberland County), and Illwill Creek. The headwaters drain the slopes of the Pottsville Escarpment region of the Cumberland Plateau. The general topography of the Cumberland Plateau is steep with high ridges and low hollows. The terrain is mountainous with elevations exceeding 1700 feet on the higher mountains and knobs. The terrain is well-dissected and well-drained by deeply entrenched streams. Ridges are generally narrow and winding. Natural flat land is mainly restricted to flood plains of the main stem and major tributaries. Low-order streams are generally V-shaped and have no flood plains. The escarpment region is a transitional zone between the Cumberland Plateau and the Mississippian Plateau. Resistant sandstone and conglomerate have weathered to create sheer cliffs, steep-walled gorges, rock shelters, waterfalls, natural bridges and arches.

On the eastern side of the watershed the terrain changes quickly once it leaves the plateau region and enters the Eastern Pennyroyal region of the Mississippian Plateau. The valley is still narrow in many areas but rises only moderately to broad ridges and rolling hills. As the streams approach Dale Hollow Lake the terrain rises more sharply from the valley to the ridge tops. Karst geology is common throughout the watershed.

Waterways. There are over 220 miles of streams in the Kentucky portion of the watershed. Significant tributaries include Spring Creek, Illwill Creek, and two separate streams sharing the name Sulphur Creek. Surface water flow is limited in some areas due to extensive karst geology that drains water to underground flows. The lower portions of the larger tributaries are inundated by Dale Hollow Lake.

Land cover/land use. Much of the watershed is agricultural including dairy, poultry, swine and row crop production. A few areas in the northeastern portion of the watershed have been surface mined and stand as reclaimed land. Oil and gas wells are common in the watershed. The northern and western edges of the watershed are rugged and are mostly deciduous forest. As well are areas immediately around the lake, which are part of the Dale Hollow Lake Wildlife Management Area. Land around the city of Albany is a mix of residential, commercial, and industrial. A limestone quarry is located on Grider Mountain off of Highway 1590.

Agency Data Assessment. During the 2000 water quality assessment the following stream reaches were assessed.

- Spring Creek from Dale Hollow Lake up to Hays Creek was assessed and was judged fully supporting for aquatic life.
- A 1.0-mile segment of Clear Fork Branch was assessed using discharge monitoring report (DMR) data from the Albany sewage treatment plant. The segment was judged partially supporting for primary contact recreation.
- A 1.0-mile segment of Hays Creek was assessed and judged fully supporting for aquatic life.
- A 3.4-mile segment of Sulphur Creek upstream of Dale Hollow Lake was assessed for fish, macroinvertebrates and algae. The segment was judged fully supporting for aquatic life.
- A 2.6-mile segment of Howards Creek upstream of Dale Hollow Lake was assessed for fish, macroinvertebrates and algae. This stream was judged fully supporting for aquatic life.

Watershed Efforts in the Obey River. No sub watersheds in the Obey River Watershed were selected by the Upper Cumberland River Basin Team as a priority watershed for watershed planning.

5.4. LOCAL INITIATIVES.

5.4.A. The Cumberland River Compact. The mission of the Cumberland River Compact is to enhance the water quality of the Cumberland River and its tributaries through education and by promoting cooperation among citizens, businesses, and agencies in Kentucky and Tennessee.

We are a unique non-profit group that believes we can have both a strong economy and a healthy environment. The Compact is made up of businesses, individuals, community organizations and agencies working in the Cumberland River Watershed. Over 2 million people share this watershed. Compact members work with all interested organizations and individuals to help ensure that our rivers and streams continue to provide us with clean water,bountiful crops, healthy fisheries and abundant recreational opportunities.

Since 1997, the Compact has set out to create a Watershed Outreach Program in each of the 14 watersheds that make up the Cumberland Basin. Members and staff of the Compact work with local communities to develop watershed forums where citizens can come together to learn more about their watershed and participate in developing a shared vision for the future. We welcome your interest and participation in this challenging project.

For more information about the Cumberland River Compact and to learn more about your local watershed, contact us at info@cumberlandrivercompact.org ;615-837-1151 or join us on the web at http://www.cumberlandrivercompact.org.

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

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

5.4.C. Hull-York Lakeland Resource Conservation and Development (RC&D) Council. The RC&D Council mission is to *"Provide leadership to local communities to improve quality of life and conserve natural resources by organizing partners and facilitating technical and financial assistance resources".*

Hull-York Lakeland RC&D Council covers 14-counties of the Upper Cumberland area. These counties are: Macon, Clay, Pickett, Fentress, Overton, Jackson, Smith, DeKalb, Putnam, Cumberland, White, Van Buren, Warren and Cannon. Recreation in this area is dependant on a high standard of water quality. The main recreational attractions in the RC&D area are Dale Hollow Lake, Center Hill Lake, Cordell Hull Lake, and the scenic trout waters of the Caney Fork River. These resources attract large numbers of visitors to the area each year, and Hull-York Lakeland therefore has a vested interest in insuring the water quality of its watersheds.

Hull-York Lakeland RC&D Council has many local, state, federal and private partners with similar interests in the RC&D area. These partners join forces to engage in programs and projects that help individual land users and communities improve and conserve the natural resources, and engage in projects that enhance community and economic development activities. Hull-York Lakeland was the first RC&D area authorized by USDA in the state of Tennessee, and one of the first in the nation. Hull-York Lakeland was authorized in 1966.

Past projects have included Cane Creek Park and Lake in Putnam County, Camp Discovery in Jackson County, farmers markets is several counties, and emergency services consolidation projects. Current projects include a 319(h) grant for development of a watershed management plan in the Post Oak Creek Watershed. This watershed is 16,000+ acres and has been identified on the Tennessee 303(d) list of impaired waters as not meeting intended uses due to agriculture. The RC&D Council's goal is to develop a plan that identifies needs and problems in the watershed in order to have it removed from the 303(d) list, and then submit a project for funding practices that address those needs and problems.

Hull-York Lakeland RC&D Council has received a grant from the Tennessee Department of Agriculture – Agriculture Resources Conservation Fund (TDA – ARCF) with which they have purchased a tree planter in order to promote tree planting in riparian corridors to improve and enhance water quality. The Council has also received grants from TDA-ARCF, TWRA, and Quail Unlimited in order to purchase a Native Warm Season Grass No-Till Drill. This drill was purchased in May 2006 to promote the planting of Native Warm Season Grasses in the Upper Cumberland Area to create and enhance wildlife habitat, as well as establish buffers and field borders to improve water quality.

In 2006 Hull-York Lakeland has so far received $108,442 in direct grants, and has assisted communities in the receipt of $445,692. These funds are being used to address water quality and community development issues. For more information about Hull-York Lakeland RC&D Council contact Jeff Sanders at (931) 528-6472, ext. 110, or jeff.sanders@tn.usda.gov. You can also go to the council's website at: http://www.hylrcd.org.

CHAPTER 6

RESTORATION STRATEGIES IN THE OBEY RIVER WATERSHED

6.1. Background

6.2. Comments from Public Meetings
- **6.2.A. Year 1 Public Meeting**
- **6.2.B. Year 3 Public Meeting**
- **6.2.C. Special Meeting Held at Citizens' Request**
- **6.2.D. Year 5 Public Meeting**

6.3. Approaches Used
- **6.3.A. Point Sources**
- **6.3.B. Nonpoint Sources**

6.4. Permit Reissuance Planning
- **6.4.A. Municipal Permits**
- **6.4.B. Industrial Permits**

6.1. BACKGROUND.

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

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

This Chapter addresses point and nonpoint source approaches to water quality problems in the Tennessee portion of the Obey 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 Obey River Watershed public meeting was held as a joint meting with the Cordell Hull Lake Watershed September 7, 1999 at Tennessee Technological University. 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

- East and West Forks Obey River need protection
- Dale Hollow Lake is a discharge lake (from houseboats)
- Increased sediment from streams after a rain
- Water taste from tap has gotten worse
- Effects of unplanned growth
- Effects of factory chicken houses coming to the Dale Hollow area
- Effects of abandoned mines and wells
- Increased nutrients on West Fork Obey River from agricultural feedlots

6.2.B. Year 3 Public Meeting. The second Obey River Watershed public meeting was held as a joint meeting with the Cordell Hull Lake Watershed November 15, 2001 in the Livingston Chamber of Commerce building. 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

- Decreased dissolved oxygen in Dale Hollow Lake
- Gravel removal from lower Blackburn Fork and Roaring River
- Cumulative effects of non-BMP agricultural resources
- Agriculture (cattle) too close to Livingston water supply
- Roaring River state scenic river designation is not known or appreciated by landowners
- Silt in East Fork Obey River drainage where people go four-wheeling
- TDOT projects should trigger sites to be monitored because of construction and the ensuing development

6.2.C. Special Meeting Held at Citizens' Request. An additional meeting (East Fork Obey Summit) was held on September 25, 2007 in the Cookeville Environmental Field Office at the request of local citizens.

6.2.D. Year 5 Public Meeting. The third scheduled Obey River Watershed public meeting was held October 4, 2007 at the York Institute in Jamestown. The meeting was held jointly with the South Fork Cumberland River and Clear Fork Cumberland River Watersheds and featured seven educational components:

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

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

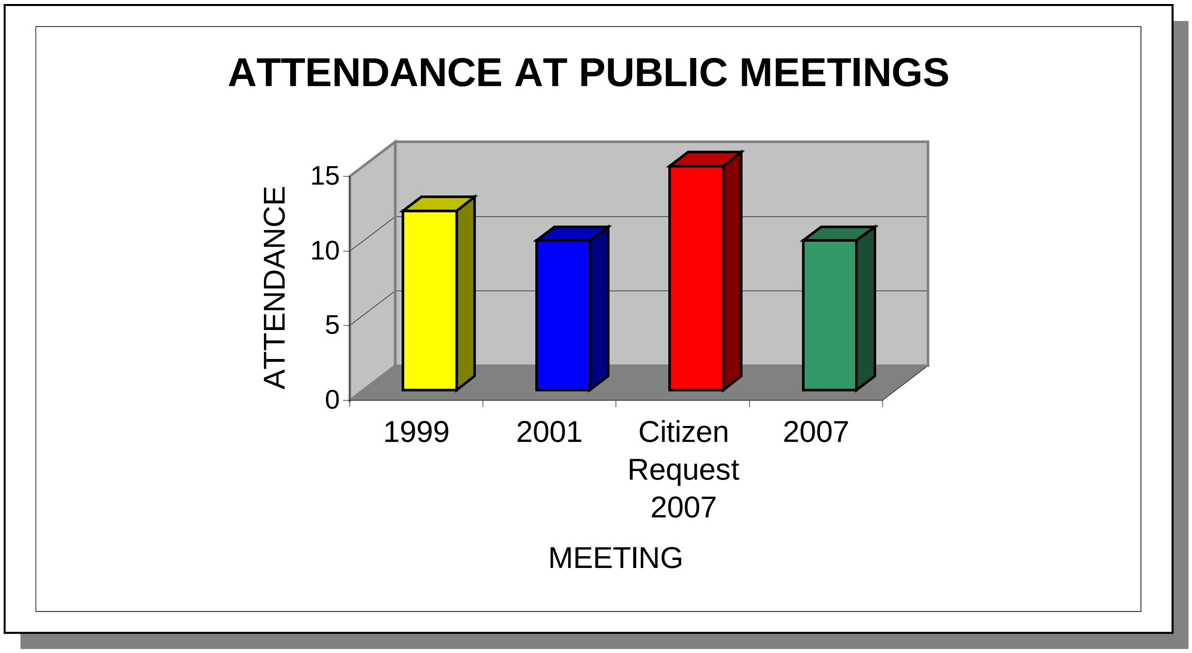

Figure 6-1. Attendance at the Obey Watershed Public Meetings. *Attendance numbers do not include TDEC personnel. Meetings in 1999 and 2001 represent Obey River and Cordell Hull Lake Watersheds joint public meetings. Citizen request 2007 meeting is East Fork Obey Summit (9/25/2007) requested by Tennessee Citizens for Wilderness Planning. Meeting in 2007 represents Obey River, South Fork Cumberland, and Clear Fork Cumberland River Watersheds joint public meeting.*

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/.

TMDLs are prioritized for development based on many factors.

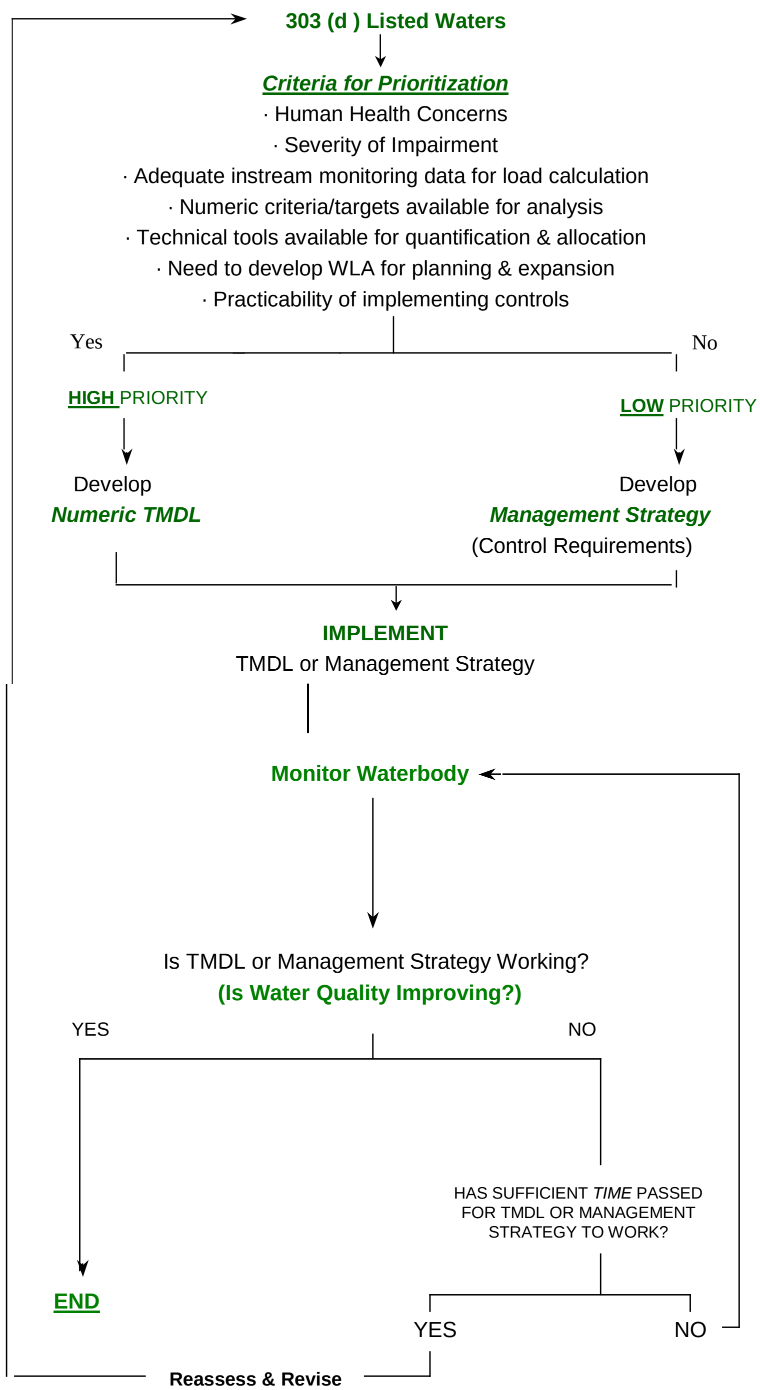

Figure 6-2. Prioritization Scheme for TMDL Development.

6.3.B. Nonpoint Sources

Common nonpoint sources of pollution in the Obey River Watershed include urban storm water runoff, riparian vegetation removal and other habitat alterations, as well as inappropriate land development, road construction, and agricultural practices. Since nonpoint pollution exists essentially everywhere rain falls, existing point source regulations can have only a limited effect. Other measures are, therefore, necessary.

There are several state and federal regulations that address contaminants impacting waters in the Obey 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. The general permit issued for such construction sites establishes conditions for maintenance of the sites to minimize pollution from storm water runoff, including requirements for installation and inspection of erosion prevention and sediment controls. Also, the general permit imposes more stringent inspection, design criteria, sediment control measures, and self-monitoring requirements on sites in the watershed of streams that are already impaired due to sedimentation or are considered high quality. Examples of streams impaired by sediment and land development in the Obey River Watershed are East Fork and West Fork Obey River. Regardless of the size, no construction site is allowed to cause a condition of pollution.

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

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

Some inappropriate agricultural practices and overzealous land development have impacted the hydrology and morphology of stream channels in this watershed, although none severely enough to cause a loss of use impairment at this time.

Several agencies such as the NRCS and TDA, as well as citizen watershed groups, are working to stabilize portions of stream banks using bioengineering and other techniques. Many of the affected streams, like East Fork and West Fork Obey River and Town Branch near Byrdstown, could benefit from these types of projects.

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

Voluntary Activities

- Re-establish bank vegetation.
- Establish off-channel watering areas for livestock by moving watering troughs and feeders back from stream banks, or at least limit cattle access to restricted areas with armored bank entry (tributaries to the East Fork Obey River, Town Branch).
- Limit cattle access to streams and bank vegetation (Wolf River and its tributaries in Fentress and Picket Counties).

Regulatory Strategies

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

Additional Strategies

- Better community planning for the impacts of development on small streams, especially development in growing areas (tributaries to East Fork and West Fork Obey River, Dale Hollow Lake).

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 any type of vegetated buffers along stream corridors is a major problem throughout the Obey River Watershed, due both to agricultural and residential/commercial land uses. Impacted streams that could benefit from the establishment of more extensive riparian buffer zones include tributaries to East Fork and West Fork Obey River and Town Branch near Byrdstown.

6.3.B.ii. Pathogen Contamination.

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

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

Currently, 2 stream systems in the Tennessee portion of the Obey River Watershed are known to have excessive pathogen contamination. Town Branch near Byrdstown and Rockcastle Creek near Jamestown are impacted by urban areas, with contributions of bacterial contamination coming from storm water runoff, sewage collection system leaks, and treatment plant operation failures.

Some measures that may be necessary to control pathogens are:

Voluntary Activities

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

Regulatory Strategies

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

Additional Strategies

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

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

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

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

Some sources of nutrients can be addressed by:

Voluntary Activities

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

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

- Maintain shade over a stream. Cooler water can hold more oxygen and retard the growth of algae. As a general rule, all stream channels suffer from some canopy removal. An intact riparian zone also acts as a buffer to filter out nutrient loads before they enter the water.
- Discourage impoundments. Ponds and lakes do not aerate water. Due to geologic concerns (sandstone), impoundments in the Obey River Watershed may create iron leachate in tail waters which would affect the East Fork and West Fork Obey River and their tributaries. *Note: Permits may be required for any work on a stream, including impoundments.*

Regulatory strategies.

- Strengthen enforcement of regulations governing on-site wastewater treatment.
- Impose more stringent permit limits for nutrients discharged from sewage treatment plants.
- Impose timely and appropriate enforcement for noncomplying sewage treatment plants, large and small, and their collection systems.
- Identify Concentrated Animal Feeding Operations (CAFO) not currently permitted.
- Identify any Animal Feeding Operations (AFO) that contribute to stream impacts and declare them as a CAFO requiring a permit.
- Require nutrient management plans for all golf courses.

Additional Strategies.

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

6.3.B.iv. Toxins and Other Materials.

Although some toxic substances are discharged directly into waters of the state from a point source, much of these materials are washed in during rainfalls from an upland location, or via improper waste disposal that contaminates groundwater. In the Tennesse portion of the Obey River Watershed, a relatively small number of streams are damaged by storm water runoff from industrial facilities or urban areas (Meadow Creek). In some areas, industrial activity related to historical coal mining, along with oil and gas drilling, has damaged tributaries to the East Fork and West Forks Obey River. More stringent inspection and regulation of permitted industrial facilities, and local storm water quality initiatives and regulations, could help reduce the amount of contaminated runoff reaching state waters.

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

Some of these problems can be addressed by:

Voluntary Activities

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

Regulatory Strategies

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

6.3.B.v. Habitat Alteration.

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

One large-scale stream habitat alteration that has created serious, long-term impacts is Dale Hollow dam, which impounds the Obey River. The dam causes unnatural temperature, dissolved oxygen, and flow fluctuations downstream.

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. Acid Mine Drainage (AMD).

Another source of pollution comes from abandoned and active mines. To a smaller extent, road cuts through certain types of shale layers can also contribute to the pollution of waters of the state. These streams are impacted by AMD, which causes the pH to drop to below 6.0.

Orange flock in the water and an oily film on the surface of the water characterize these streams. 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, then 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 AMD are Cub Creek, Big Laurel Creek, Little Laurel Creek, Big Piney Creek and the East and West Forks of the Obey River.

The means necessary to remove AMD from these streams is complicated and expensive. There are two types of treatment systems, Passive Treatment and Active Treatment. Passive Treatment uses man-made wetlands lined with limestone rock to precipitate the flocculants and stabilize the pH. Active Treatment systems collect the water or measure the flow of the water and actively drop lime into the water in order to stabilize the pH. Since these treatment systems will have to go on for many years, the most cost effective means to treat these streams is by Passive Treatment. In order to install these systems the landowners, stakeholders and Office of Surface Mining all have to work together. Most of the streams in the Obey watershed are receiving very little treatment.

Some of these problems can be addressed by:

Voluntary Activities

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

Regulatory Strategies

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

6.3.B.vii. Storm Water.

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

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

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

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

6.4. PERMIT REISSUANCE PLANNING

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

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

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

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

6.4.A. Municipal Permits

TN0062626 Byrdstown STP

Discharger rating:	Minor
City:	Byrdstown
County:	Pickett
EFO Name:	Cookeville
Issuance Date:	9/1/99
Expiration Date:	8/31/04
Receiving Stream(s):	Cumberland River Mile 158.2
HUC-12:	051301050403
Effluent Summary:	Treated municipal wastewater from Outfall 001
Treatment system:	Oxidation ditch activated sludge with chlorination

Segment	TN05130105033_1400
Name	Town Branch
Size	3.1
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Sedimentation/Siltation, Escherichia coli, Phosphate, Nitrates
Sources	Municipal Point Source Discharges, Source Unknown, Land Application of Wastewater Biosolids (Non-agricultural)

Table 6-1. Stream Segment Information for Byrdstown STP.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	All Year	2.6	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	4.2	lb/day	DMax Load	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	2	mg/L	MAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	1.3	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	2.7	lb/day	MAvg Load	3/Week	Composite	Effluent
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	30	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	All Year	20	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	All Year	31	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	All Year	15	mg/L	DMin Conc	3/Week	Composite	Effluent
CBOD5	All Year	42	lb/day	DMax Load	3/Week	Composite	Effluent
D.O.	All Year	5	mg/L	DMin Conc	Weekdays	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	3/Week	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
IC25 7day Ceriodaphnia dubia	All Year	100	Percent	DMin Conc	Quarterly	Composite	Effluent
IC25 7day Fathead Minnows	All Year	100	Percent	DMin Conc	Quarterly	Composite	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	3/Week	Composite	Effluent
TRC	All Year	0.02	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year	83	lb/day	DMax Load	3/Week	Composite	Effluent
TSS	All Year	30	mg/L	WAvg Conc	3/Week	Composite	Effluent
TSS	All Year	63	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year	40	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-2. Permit Limits for Byrdstown STP.

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

24 Overflows
8 Bypasses

Enforcement:
10/15/07 Notice of violation: The reported value of 0.085 mg/L resulted in a chronic and a technical review criteria (TRC) violation. Both, chronic and TRC violations constitute a significant non-compliance and require the pretreatment authority to publish the violation.

Comments:
10/2/07 Pretreatment Technical Assistance Visit.

The program received a preliminary approval for the revised plant Protection Criteria and Local Limits. Once Byrdstown completes the public notice process and submits the required documentation, the Division will issue final approval for the changes.

During a file review, an exceedance of Industrial User Cyanide standard was noted. The Monthly average of 0.058 mg/L was exceeded on May 23, 2007. The reported value of 0.085 mg/L resulted in a chronic and a technical review criteria (TRC) violation. Both, chronic and TRC violations constitute a significant non-compliance and require the pretreatment authority to publish the violation.

Re-sampling is required within 24 hours of receiving the sampling results. Due to a change in personnel at the industry and at the city, the result was overlooked during the report review and re-sampling was omitted. Hutchison Plant personnel Chris King, was notified during our pretreatment inspection of the need to re-sample and to review the monitoring reports more closely.

12/20/06 Compliance Evaluation Inspection: In compliance
Personnel from the Division of Water Pollution Control, (WPC), Cookeville Environmental Field office, conducted a compliance Evaluation Inspection of the City of Byrdstown Wastewater Treatment Plant, (12-20-06). The current permit allows the design flow (discharge) for 0.25 million gallons per day (MGD). Mr. Gerald Beaty, the licensed wastewater plant operator and the licensed collection system operator is the operator in charge. The application for the NPDES permit renewal has been received by the Division of Water Pollution Control. Issuance of the new NPDES permit is pending. A copy of the existing permit was on site.

The records at the plant were in good order. The information was being maintained for three years. The bench-sheets were in good order. The analytical bench-sheets were sampled and found to be consistent with the corresponding DMR/MOR. The head works grit removal was in working order. Flow measurement was operational. The SBR(s) were operational. The U.V. system was operational. Extra U.V. bulbs were available. Operation and Maintenance are adequate. Back up generator power and fuel were in order.

The discharge was clear. Some foam was present, possibly due to the highly aerated effluent. The foam was not excessive. The discharge at the receiving stream is inspected once per week. Flow measurement was in order and the instrumentation was operational.

TN0058033 Cedar Hill Resort

Discharger rating:	Minor
City:	Celina
County:	Clay
EFO Name:	Cookeville
Issuance Date:	1/1/05
Expiration Date:	11/30/09
Receiving Stream(s):	Obey River (Dale Hollow Reservoir) at mile 10.3
HUC-12:	051301050501
Effluent Summary:	Treated domestic wastewater from Outfall 001
Treatment system:	Extended aeration

Segment	TN05130105001_1000
Name	Obey River
Size	6.8
Unit	Miles
First Year on 303(d) List	1990
Designated Uses	Industrial Water Supply (Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting), Fish and Aquatic Life (Non-Supporting), Domestic Water Supply (Supporting), Recreation (Supporting)
Causes	Oxygen, Dissolved, Low flow alterations
Sources	Upstream Impoundments (e.g., Pl-566 NRCS Structures)

Table 6-3. Stream Segment Information for Cedar Hill Resort.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD5	All Year	45	mg/L	DMax Conc	Monthly	Grab	Effluent
BOD5	All Year	30	mg/L	MAvg Conc	Monthly	Grab	Effluent
D.O.	All Year	1	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Ari Mean	Monthly	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	Monthly	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	Monthly	Grab	Effluent
Flow	All Year		MGD	DMax Load	Weekdays	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Weekdays	Instantaneous	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Month	Grab	Effluent
TRC	All Year	0.5	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6	SU	DMin Conc	2/Week	Grab	Effluent

Table 6-4. Permit Limits for Cedar Hill Resort.

Comments:
None.

TN0062634 Jamestown STP

Discharger rating:	Major
City:	Jamestown
County:	Fentress
EFO Name:	Cookeville
Issuance Date:	4/1/06
Expiration Date:	2/27/09
Receiving Stream(s):	Rockcastle Creek at mile 4.75
HUC-12:	051301050107
Effluent Summary:	Treated domestic wastewater from Outfall 001
Treatment system:	Sequencing batch reactor biological treatment with chlorine disinfecting, dechlorination, and step re-aeration. Sludge is aerobically digested for land application.

Segment	TN05130105019_0300
Name	Rockcastle Creek
Size	8.9
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Recreation (Non-Supporting), Irrigation (Supporting), Fish and Aquatic Life (Non-Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Escherichia coli, Oxygen, Dissolved, Temperature, water, Nutrient/Eutrophication Biological Indicators
Sources	Municipal (Urbanized High Density Area), Municipal Point Source Discharges

Table 6-5. Stream Segment Information for Jamestown STP.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	Summer	2.2	mg/L	DMax Conc	Weekdays	Composite	Effluent
Ammonia as N (Total)	Summer	14	lb/day	DMax Load	Weekdays	Composite	Effluent
Ammonia as N (Total)	Summer	1.7	mg/L	MAvg Conc	Weekdays	Composite	Effluent
Ammonia as N (Total)	Summer	1.1	mg/L	WAvg Conc	Weekdays	Composite	Effluent
Ammonia as N (Total)	Summer	9	lb/day	MAvg Load	Weekdays	Composite	Effluent
Ammonia as N (Total)	Winter	4.2	mg/L	DMax Conc	Weekdays	Composite	Effluent
Ammonia as N (Total)	Winter	3.2	mg/L	MAvg Conc	Weekdays	Composite	Effluent
Ammonia as N (Total)	Winter	18	lb/day	MAvg Load	Weekdays	Composite	Effluent
Ammonia as N (Total)	Winter	2.1	mg/L	WAvg Conc	Weekdays	Composite	Effluent
Ammonia as N (Total)	Winter	27	lb/day	DMax Load	Weekdays	Composite	Effluent
Bypass of Treatment (occurrences)	All Year		Occurrences / Month	MAvg Load	Continuous	Visual	Wet Weather
CBOD % Removal	All Year	40	Percent	DMin % Removal	Weekdays	Calculated	% Removal
CBOD % Removal	All Year	85	Percent	MAvg % Removal	Weekdays	Calculated	% Removal
CBOD5	All Year	40	mg/L	DMax Conc	Weekdays	Composite	Effluent
CBOD5	All Year	25	mg/L	DMin Conc	Weekdays	Composite	Effluent
CBOD5	All Year	35	mg/L	MAvg Conc	Weekdays	Composite	Effluent
CBOD5	All Year	292	lb/day	DMax Load	Weekdays	Composite	Effluent
CBOD5	All Year		mg/L	DMax Conc	Weekdays	Composite	Influent (Raw Sewage)
CBOD5	All Year		mg/L	MAvg Conc	Weekdays	Composite	Influent (Raw Sewage)
CBOD5	All Year	209	lb/day	MAvg Load	Weekdays	Composite	Effluent
D.O.	All Year	6	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	3/Week	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Influent (Raw Sewage)
Hg (T)	All Year	4.6E-05	mg/L	DMax Conc	Annually	Composite	Effluent
IC25 7day Ceriodaphnia dubia	All Year	100	Percent	DMin Conc	Monthly	Composite	Effluent
IC25 7day Fathead Minnows	All Year	100	Percent	DMin Conc	Monthly	Composite	Effluent
NOEL 7day Ceriodaphnia dubia	All Year	100	Percent	DMin Conc	Continuous	Composite	Effluent
NOEL 7day Fathead Minnows	All Year	100	Percent	DMin Conc	Continuous	Composite	Effluent
Overflow Use Occurrences	All Year		Occurrences /Month	MAvg Load	Continuous	Visual	Wet Weather
Overflow Use Occurrences	All Year		Occurrences /Month	MAvg Load	Continuous	Visual	Non Wet Weather
Settleable Solids	All Year	1	mL/L	DMax Conc	3/Week	Composite	Effluent
TRC	All Year	0.02	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	Weekdays	Composite	Effluent
TSS	All Year		mg/L	DMax Conc	Weekdays	Composite	Influent (Raw Sewage)
TSS	All Year	334	lb/day	DMax Load	Weekdays	Composite	Effluent

Table 6-6a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
TSS	All Year	40	mg/L	MAvg Conc	Weekdays	Composite	Effluent
TSS	All Year	250	lb/day	MAvg Load	Weekdays	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	Weekdays	Composite	Influent (Raw Sewage)
TSS	All Year	30	mg/L	WAvg Conc	Weekdays	Composite	Effluent
TSS % Removal	All Year	40	Percent	DMin % Removal	Weekdays	Calculated	% Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	Weekdays	Calculated	% Removal
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-6b.

Tables 6-6a-b. Permit Limits for Jamestown STP.

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

2 Overflows
3 Bypasses
2 Total Suspended Solids
1 Ammonia

Comments:
11/30/06 Compliance Sampling Inspection:
Laboratory Bench Sheets need improvement. Filing system needs improvement. Technical Assist visits will follow to address the Bench Sheet set up & Laboratory Filing system.

6/1/06 Compliance Evaluation Inspection:
The city is in process of upgrading the electrical panels on the pump stations with a menu driven programmable system. Ammonia comparability study requested. Laboratory performance audit conducted. Recommendations noted.

TN0021377 Obey River Recreation Area "A", Recreation Area "B" and Recreation Area "C"

Discharger rating:	Minor
City:	Monroe
County:	Pickett
EFO Name:	Cookeville
Issuance Date:	10/1/04
Expiration Date:	8/31/10
Receiving Stream(s):	Obey River at mile 45.9, 45.9 and 45.5 (Outfalls 001, 002 and 003)
HUC-12:	051301050301
Effluent Summary:	Treated municipal wastewater from Outfall 001
Treatment system:	Oxidation ditch activated sludge with chlorination

Segment	TN05130105002_1000
Name	Dale Hollow Reservoir
Size	22000
Unit	Acres
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 6-7. Stream Segment Information for Obey River Recreation Areas A, B, & C.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD5	All Year	45	mg/L	DMax Conc	Monthly	Grab	Effluent
BOD5	All Year	30	mg/L	MAvg Conc	Monthly	Grab	Effluent
D.O.	All Year	1	mg/L	DMin Conc	2/Week	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	Monthly	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	Monthly	Grab	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Week	Grab	Effluent
TRC	All Year	2	mg/L	DMax Conc	2/Week	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6	SU	DMin Conc	2/Week	Grab	Effluent

Table 6-8. Permit Limits for Outfall 001 & 003 at Obey River Recreation Areas A, B, & C.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD5	All Year	45	mg/L	DMax Conc	Monthly	Grab	Effluent
BOD5	All Year	30	mg/L	MAvg Conc	Monthly	Grab	Effluent
D.O.	All Year	1	mg/L	DMin Conc	2/Week	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	Monthly	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	Monthly	Grab	Effluent
Settleable Solids	All Year	45	mL/L	DMax Conc	Monthly	Grab	Effluent
Settleable Solids	All Year	30	mL/L	MAvg Conc	Monthly	Grab	Effluent
TRC	All Year	0.5	mg/L	DMax Conc	2/Week	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6	SU	DMin Conc	2/Week	Grab	Effluent

Table 6-9. Permit Limits for Outfall 002 at Obey River Recreation Areas A, B, & C.

Comments:
None.

TN0026085 Star Point Resort

Discharger rating:	Minor
City:	Byrdstown
County:	Pickett
EFO Name:	Cookeville
Issuance Date:	4/1/04
Expiration Date:	2/28/09
Receiving Stream(s):	Jouette Creek Embayment at mile 1.4 to Dale Hollow Reservoir (Obey River) at mile 34.1
HUC-12:	051301050303
Effluent Summary:	Treated domestic wastewater from Outfall 001
Treatment system:	Activated sludge

Segment	TN05130105002_1000
Name	Dale Hollow Reservoir
Size	22000
Unit	Acres
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 6-10. Stream Segment Information for Star Point Resort.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	All Year	10	mg/L	DMax Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	All Year	5	mg/L	MAvg Conc	2/Month	Grab	Effluent
CBOD5	All Year	20	mg/L	DMax Conc	2/Month	Grab	Effluent
CBOD5	All Year	10	mg/L	MAvg Conc	2/Month	Grab	Effluent
D.O.	All Year	1	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	Weekly	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	2/Month	Grab	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Week	Grab	Effluent
TRC	All Year	0.5	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	2/Month	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	2/Month	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6	SU	DMin Conc	2/Week	Grab	Effluent

Table 6-11. Permit Limits for Star Point Resort.

Comments:
8/13/07 Compliance Evaluation Inspection: In compliance.
The facility was in excellent condition. Bio-solids are land applied. The restaurant is closed. Plans due not exist to re-open the restaurant.

TN0068802 TDEC Pickett State Park

Discharger rating:	Minor
City:	Jamestown
County:	Pickett
EFO Name:	Cookeville
Issuance Date:	10/1/04
Expiration Date:	8/31/09
Receiving Stream(s):	Thompson Creek at mile 5.2
HUC-12:	051301040408
Effluent Summary:	Treated domestic wastewater from Outfall 001
Treatment system:	Septic tank, recirculating sand filter and UV disinfection

Segment	TN05130104010_0100
Name	Thompson Creek
Size	12.2
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Fish and Aquatic Life (Supporting), Recreation (Not Assessed), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	N/A
Sources	N/A

Table 6-12. Stream Segment Information for TDEC Pickett State Park.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	Summer	3	mg/L	DMax Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	Summer	2	mg/L	MAvg Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	Winter	7.5	mg/L	DMax Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	Winter	5	mg/L	MAvg Conc	2/Month	Grab	Effluent
CBOD5	All Year	25	mg/L	DMax Conc	2/Month	Grab	Effluent
CBOD5	All Year	20	mg/L	MAvg Conc	2/Month	Grab	Effluent
D.O.	All Year	6	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	2/Month	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	2/Month	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	2/Month	Grab	Effluent
Flow	All Year		MGD	DMax Load	Weekdays	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Weekdays	Instantaneous	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Week	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	2/Month	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	2/Month	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	2/Week	Grab	Effluent

Table 6-13. Permit Limits for TDEC Pickett State Park.

Comments:
None.

TN0021393 USA COE Dale Hollow Lake - Lillydale Recreation Area

Discharger rating:	Minor
City:	Allons
County:	Clay
EFO Name:	Cookeville
Issuance Date:	10/1/04
Expiration Date:	8/31/10
Receiving Stream(s):	Obey River at mile 31.4
HUC-12:	051301050303
Effluent Summary:	Treated municipal wastewater from Outfall 001
Treatment system:	Septic tank, sand filter and post chlorination

Segment	TN05130105002_1000
Name	Dale Hollow Reservoir
Size	22000
Unit	Acres
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 6-14. Stream Segment Information for USA COE Dale Hollow Lake - Lillydale Recreation Area.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD5	All Year	45	mg/L	DMax Conc	Monthly	Grab	Effluent
BOD5	All Year	30	mg/L	MAvg Conc	Monthly	Grab	Effluent
D.O.	All Year	1	mg/L	DMin Conc	2/Week	Grab	Effluent
E. coli	All Year	941	#/100mL	DMax Conc	Monthly	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	Monthly	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	Monthly	Grab	Effluent
Flow	All Year		MGD	DMax Load	2/Week	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	2/Week	Instantaneous	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Week	Grab	Effluent
TRC	All Year	2	mg/L	DMax Conc	2/Week	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6	SU	DMin Conc	2/Week	Grab	Effluent

Table 6-15. Permit Limits for USA COE Dale Hollow Lake - Lillydale Recreation Area.

Comments:
None.

TN0021423 USA COE, Dale Hollow Dam Shop and Recreation Area

Discharger rating:	Minor
City:	Celina
County:	Clay
EFO Name:	Cookeville
Issuance Date:	10/1/04
Expiration Date:	8/31/09
Receiving Stream(s):	Obey River at mile 7.0 for Outfall 001 and at mile 6.6 for Outfall 002
HUC-12:	051301050504
Effluent Summary:	Treated domestic wastewater from Outfall 001
Treatment system:	Septic tank, sand filter and post chlorination

Segment	TN05130105001_1000
Name	Obey River
Size	6.8
Unit	Miles
First Year on 303(d) List	1990
Designated Uses	Industrial Water Supply (Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting), Fish and Aquatic Life (Non-Supporting), Domestic Water Supply (Supporting), Recreation (Supporting)
Causes	Oxygen, Dissolved, Low flow alterations
Sources	Upstream Impoundments (e.g., Pl-566 NRCS Structures)

Table 6-16. Stream Segment Information for USA COE, Dale Hollow Dam Shop and Recreation Area.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD5	All Year	45	mg/L	DMax Conc	Monthly	Grab	Effluent
BOD5	All Year	30	mg/L	MAvg Conc	Monthly	Grab	Effluent
D.O.	All Year	1	mg/L	DMin Conc	2/Week	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	Monthly	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	Monthly	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	Monthly	Grab	Effluent
Flow	All Year		MGD	DMax Load	2/Week	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	2/Week	Instantaneous	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Week	Grab	Effluent
TRC	All Year	2	mg/L	DMax Conc	2/Week	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6	SU	DMin Conc	2/Week	Grab	Effluent

Table 6-17. Permit Limits for USA COE, Dale Hollow Dam Shop and Recreation.

Comments:
None.

6.4.B. Industrial Permits

TN0004332 USDI - FWS Dale Hollow National Fish Hatchery

Discharger rating:	Minor
City:	Celina
County:	Clay
EFO Name:	Cookeville
Issuance Date:	3/1/05
Expiration Date:	1/30/09
Receiving Stream(s):	Dry Branch at mile 0.1 to the Obey River at mile 6.8
HUC-12:	051301050504
Effluent Summary:	Industrial wastewater (water from a fish farm operation) through Outfall 001
Treatment system:	None

Segment	TN05130105001_1000
Name	Obey River
Size	6.8
Unit	Miles
First Year on 303(d) List	1990
Designated Uses	Industrial Water Supply (Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting), Fish and Aquatic Life (Non-Supporting), Domestic Water Supply (Supporting), Recreation (Supporting)
Causes	Oxygen, Dissolved, Low flow alterations
Sources	Upstream Impoundments (e.g., Pl-566 NRCS Structures)

Table 6-18. Stream Segment Information for USDI - FWS Dale Hollow National Fish Hatchery.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
48hr LC50: Ceriodaphnia dubia	All Year	100	Percent	DMin Conc	Annually	Grab	Effluent
48hr LC50: Fathead Minnows	All Year	100	Percent	DMin Conc	Annually	Grab	Effluent
Ammonia as N (Total)	Summer	1.2	mg/L	MAvg Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	Winter	2.4	mg/L	MAvg Conc	2/Month	Grab	Effluent
D.O.	All Year	6	mg/L	DMin Conc	Weekly	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	mg/L	DMax Conc	2/Month	Grab	Effluent
TSS	All Year	15	mg/L	DMax Conc	2/Month	Calculated	Effluent
pH	All Year	9	SU	DMax Conc	Weekly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekly	Grab	Effluent

Table 6-19. Permit Limits for USDI - FWS Dale Hollow National Fish Hatchery.

Comments:
None.

TN0068098 Dale Hollow Hydro Power Plant

Discharger rating:	Minor
City:	Celina
County:	Clay
EFO Name:	Cookeville
Issuance Date:	2/1/05
Expiration Date:	12/31/09
Receiving Stream(s):	Obey River at mile 7.3
HUC-12:	051301050504
Effluent Summary:	Noncontact cooling waters, station sump wastewater from Outfall 001
Treatment system:	None

Segment	TN05130105001_1000
Name	Obey River
Size	6.8
Unit	Miles
First Year on 303(d) List	1990
Designated Uses	Industrial Water Supply (Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting), Fish and Aquatic Life (Non-Supporting), Domestic Water Supply (Supporting), Recreation (Supporting)
Causes	Oxygen, Dissolved, Low flow alterations
Sources	Upstream Impoundments (e.g., Pl-566 NRCS Structures)

Table 6-20. Stream Segment Information for Dale Hollow Hydro Power Plant.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Flow	All Year		MGD	DMax Load	Daily	Estimate	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Estimate	Effluent
PCB Total Scan Effluent	All Year	0.01	mg/L	DMax Conc	Annually	Grab	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Daily	Grab	Effluent

Table 6-21. Permit Limits for Dale Hollow Hydro Power Plant.

Comments:
None.

APPENDIX II

ID	NAME	HAZARD
187023	Holiday	3
257004	Old Jamestown Water Supply	2
257006	Rogers	L
677001	Thomas	L
677003	Pine Ridge Lake	3
677004	Lad	3
717005	Monterey Lake #2	L
717006	Jimmy Walker	2
257008	Annie Hamilton Farm	0
717010	Lewis Creek #2	1
187057	Rowe Creek	3
187058	Cumberland Lake #1	3
717012	Young Mill #1 Tailing	N
717013	Trotter	L
677008	Nelson Elam #2	L

Table A2-1. Inventoried Dams in the Tennessee Portion of the Obey River Watershed. *Hazard Codes: 1, High; 2, Significant; (L, 3), Low; 0, Too small to regulate; N, Not yet built. TDEC only regulates dams indicated by a numeric hazard score.*

LAND COVER/LAND USE	ACRES	% OF WATERSHED
Bare Rock/Sand/Clay	2,006	0.4
Deciduous Forest	320,628	64.1
Developed Open Space	21,098	4.2
Evergreen Forest	8,743	1.7
Grassland/Herbaceous	12,665	2.5
High Intensity Development	190	0.0
Low Intensity Development	6,511	1.3
Medium Intensity Development	1,228	0.2
Mixed Forest	19,829	4.0
Open Water	22,880	4.6
Pasture/Hay	56,462	11.3
Row Crops	27,369	5.5
Shrub/Scrub	588	0.1
Woody Wetlands	378	0.1
Total	**500,575**	**100.0**

Table A2-2. Land Use Distribution in the Tennessee Portion of the Obey 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)	SF Cumberland River	05130104
	Laurel Fork (68A03)	SF Cumberland River	05130104
	Clear Creek (68A08)	Emory River	06010208
	Piney Creek (68A13)	Ft Loudoun/Watts Bar	06010201
	Mullens Creek (68A20)	Lower Tennessee	06020001
	Daddys Creek (68A26)	Emory River	06010208
	Island Creek (68A27)	Emory River	06010208
	Rock Creek (68A28)	Emory River	06010208
Plateau Escarpment (68c)	Ellis Gap Branch (68C12)	Lower Tennessee	06020001
	Mud Creek (68C13)	Upper Elk River	06030003
	Crow Creek (68C15)	Guntersville Lake	06030001
	Crow Creek (68C20)	Guntersville lake	06030001
Eastern Highland Rim (71g)	Flat Creek (71G03)	Cordell Hull lake	05130106
	Spring Creek (71G04)	Cordell Hull Lake	05130106
	Hurricane Creek (71G10)	Upper Elk River	06030003
Outer Nashville Basin (71h)	Flynn Creek (71H03)	Cordell Hull Lake	05130106
	Clear Fork (71H06)	Caney Fork River	05130108
	Carson Fork (71H09)	Stones River	05130203

Table A2-3. Ecoregion Monitoring Sites in Ecoregions 68a, 68c, 71g, and 71h.

CODE	NAME	AGENCY	AGENCY ID
16	TDEC/DNA Jackson Swamp Site	TDEC/DNA	S.USTNHP 116
180	TDEC/DNA Stamps Cove Meadow Site	TDEC/DNA	Patrick Report
189	TDEC/DNA Robbins Swamp Site	TDEC/DNA	
921	TDEC/DNA Ron Jones Report: Putnam Co Hwy 62 Site 1	TDEC/DNA	Sourcecode F88JON01TNUS
922	TDEC/DNA Ron Jones Report: Dripping Springs Road Site 2	TDEC/DNA	Sourcecode F88JON01TNUS
925	TDEC/DNA Ron Jones Report: Fentress County Site 6	TDEC/DNA	Sourcecode F88JON01TNUS
935	TDEC/DNA Ron Jones Report: Putnam County Site 15a	TDEC/DNA	Sourcecode F88JON01TNUS
2071	TWRA Jackson Swamp Site	TWRA	
2597	TWRA Jackson Swamp Site	TWRA	
2747	TVA Pond 8	TDEC/DNA	
2748	TVA Pond 9	TDEC/DNA	

Table A2-4. Wetland Sites in the Obey River Watershed in TDEC Database. *TDEC, Tennessee Department of Environment and Conservation; DNA, Division of Natural Areas; TWRA, Tennessee Wildlife Resources Agency; TVA, Tennessee Valley Authority.* ***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)
Big Branch	TN05130105002T_0430	6.2
Big Eagle Creek	TN05130105002T_0400	9.2
Big Indian Creek	TN05130105019_1400	17.9
Caney Creek	TN05130105033_0200	12.2
Cowan Branch	TN05130105015_0100	7.1
Delk Creek	TN05130105033_0600	2.4
East Fork Obey River	TN05130105019_1000	10.4
Franklin Creek	TN05130105002T_0100	4.6
Hurricane Creek	TN05130105019_0600	30.7
Lick Creek	TN05130105033_0100	10.0
Little Crab Creek	TN05130105019_0100	16.3
Little Hurricane Creek	TN05130105019_0610	15.8
Neely Creek	TN05130105001_0100	4.3
Nettle Carrier Creek	TN05130105015_0800	18.0
Poplar Cove Creek	TN05130105019_0200	25.4
Puncheon Camp Creek	TN05130105015_0600	18.6
Rotten Fork Wolf River	TN05130105033_0300	19.7
West Fork Obey River	TN05130105015_1000	12.1
Wolf River	TN05130105033_1000	23.9
Wolf River	TN05130105033_2000	3.2

Table A3-1. Streams Fully Supporting Fish and Aquatic Life Designated Use in the Tennessee Portion of the Obey River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (ACRES)
Dale Hollow Reservoir	TN05130105002_1000	22,000

Table A3-2. Lakes Fully Supporting Fish and Aquatic Life Designated Use in the Tennessee Portion of the Obey River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Big Laurel Creek	TN05130105019_1100	9.2
Big Piney Creek	TN05130105019_1200	18.6
Cub Creek	TN05130105015_0300	7.2
East Fork Obey River	TN05130105019_2000	22.6
East Fork Obey River	TN05130105019_3000	11.1
Meadow Creek	TN05130105019_0750	1.4
Obey River	TN05130105001_1000	6.8
Rockcastle Creek	TN05130105019_0300	8.9
Town Branch	TN05130105033_1400	3.1
West Fork Obey River	TN05130105015_2000	13.1

Table A3-3. Streams Not Supporting Fish and Aquatic Life Designated Use in the Tennessee Portion of the Obey River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Ashburn Creek	TN05130105002T_0600	8.6
Big Dry Creek	TN05130105033_0700	5.6
Buffalo Cove Creek	TN05130105019_0310	15.1
Chapman Branch	TN05130105033_1100	8.7
Cobb Creek	TN05130105019_0400	6.4
Crickett Creek	TN05130105002T_0200	3.3
Dripping Springs	TN05130105019_0710	6.6
Dry Creek	TN05130105033_1200	5.0
Dry Hollow Creek	TN05130105015_0500	26.4
East Fork Ashburn Creek	TN05130105002T_0500	4.3
Garrison Branch	TN05130105019_0800	6.3
Jack Creek	TN05130105033_0310	8.1
Jesse Creek	TN05130105033_0620	12.9
Little Eagle Creek	TN05130105002T_0420	4.3
Little Indian Creek	TN05130105019_0900	4.3
Lost Cane Creek	TN05130105019_1300	11.4
Meadow Creek	TN05130105019_0700	19.0
Medlock Branch	TN05130105015_0700	3.7
Misc Tribs to Dale Hollow Reservoir	TN05130105002T_0999	55.3
Misc Tribs to East Fork Obey River	TN05130105019_0999	50.4
Misc Tribs to Obey River	TN05130105001_0999	5.9
Misc Tribs to Rockcastle Creek	TN05130105019_0399	6.1
Misc Tribs to West Fork Obey River	TN05130105015_0999	24.3
Misc Tribs to Wolf River	TN05130105033_0999	28.7

Table A3-4a

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Monroe Creek	TN05130105002T_0410	5.2
Moredock Branch	TN05130105015_0200	3.0
Poor Branch	TN05130105015_0900	6.6
Poque Creek	TN05130105033_0500	6.6
Reed Creek	TN05130105033_0900	3.5
Slate Creek	TN05130105019_0500	10.4
Stewart Creek	TN05130105033_0610	9.1
Sunk Cave Creek	TN05130105015_0400	8.6
Unnamed Trib to Wolf River	TN05130105033_0800	4.9
Whorely Branch	TN05130105002T_0300	3.4
Widow Creek	TN05130105033_1300	4.7
Williams Creek	TN05130105033_0400	6.1

Table A3-4b.

Table A3-4a-b. Streams Not Assessed for Fish and Aquatic Life Designated Use in the Tennessee Portion of the Obey River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Obey River	TN05130105001_1000	6.8

Table A3-5. Streams Fully Supporting Recreation Designated Use in the Tennessee Portion of the Obey River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (ACRES)
Dale Hollow Reservoir	TN05130105002_1000	22,000

Table A3-6. Lakes Fully Supporting Recreation Designated Use in the Tennessee Portion of the Obey River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Rockcastle Creek	TN05130105019_0300	8.9
Town Branch	TN05130105033_1400	3.1

Table A3-7. Streams Not Supporting Recreation Designated Use in the Tennessee Portion of the Obey River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Ashburn Creek	TN05130105002T_0600	8.6
Big Branch	TN05130105002T_0430	6.2
Big Dry Creek	TN05130105033_0700	5.6
Big Eagle Creek	TN05130105002T_0400	9.2
Big Indian Creek	TN05130105019_1400	17.9
Big Laurel Creek	TN05130105019_1100	9.2
Big Piney Creek	TN05130105019_1200	18.6
Buffalo Cove Creek	TN05130105019_0310	15.1
Caney Creek	TN05130105033_0200	12.2
Chapman Branch	TN05130105033_1100	8.7
Cobb Creek	TN05130105019_0400	6.4
Cowan Branch	TN05130105015_0100	7.1
Crickett Creek	TN05130105002T_0200	3.3
Cub Creek	TN05130105015_0300	7.2
Delk Creek	TN05130105033_0600	2.4
Dripping Springs	TN05130105019_0710	6.6
Dry Creek	TN05130105033_1200	5.0
Dry Hollow Creek	TN05130105015_0500	26.4
East Fork Ashburn Creek	TN05130105002T_0500	4.3
East Fork Obey River	TN05130105019_1000	10.4
East Fork Obey River	TN05130105019_3000	11.1
Franklin Creek	TN05130105002T_0100	4.6
Garrison Branch	TN05130105019_0800	6.3
Hurricane Creek	TN05130105019_0600	30.7
Jack Creek	TN05130105033_0310	8.1
Jesse Creek	TN05130105033_0620	12.9
Lick Creek	TN05130105033_0100	10.0
Little Eagle Creek	TN05130105002T_0420	4.3
Little Hurricane Creek	TN05130105019_0610	15.8
Little Indian Creek	TN05130105019_0900	4.3
Little Laurel Creek	TN05130105019_1110	3.6
Lost Cane Creek	TN05130105019_1300	11.4
Meadow Creek	TN05130105019_0700	19.0
Meadow Creek	TN05130105019_0750	1.4
Medlock Branch	TN05130105015_0700	3.7
Misc Tribs to Dale Hollow Reservoir	TN05130105002T_0999	55.3
Misc Tribs to East Fork Obey River	TN05130105019_0999	50.4
Misc Tribs to Obey River	TN05130105001_0999	5.9
Misc Tribs to Rockcastle Creek	TN05130105019_0399	6.1
Misc Tribs to West Fork Obey River	TN05130105015_0999	24.3
Misc Tribs to Wolf River	TN05130105033_0999	28.7
Monroe Creek	TN05130105002T_0410	5.2

Table A3-8a.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Moredock Branch	TN05130105015_0200	3.0
Neely Creek	TN05130105001_0100	4.3
Nettle Carrier Creek	TN05130105015_0800	18.0
Poor Branch	TN05130105015_0900	6.6
Poplar Cove Creek	TN05130105019_0200	25.4
Poque Creek	TN05130105033_0500	6.6
Puncheon Camp Creek	TN05130105015_0600	18.6
Reed Creek	TN05130105033_0900	3.5
Rotten Fork Wolf River	TN05130105033_0300	19.7
Slate Creek	TN05130105019_0500	10.4
Stewart Creek	TN05130105033_0610	9.1
Sunk Cave Creek	TN05130105015_0400	8.6
Unnamed Trib to Wolf River	TN05130105033_0800	4.9
West Fork Obey River	TN05130105015_1000	12.1
West Fork Obey River	TN05130105015_2000	13.1
Whorely Branch	TN05130105002T_0300	3.4
Widow Creek	TN05130105033_1300	4.7
Williams Creek	TN05130105033_0400	6.1
Wolf River	TN05130105033_1000	23.9
Wolf River	TN05130105033_2000	3.2

Table A3-8b.

Table A3-8a-b. Streams Not Assessed for Recreation Designated Use in the Tennessee Portion of the Obey River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Ashburn Creek	TN05130105002T_0600	8.6
Big Branch	TN05130105002T_0430	6.2
Big Dry Creek	TN05130105033_0700	5.6
Big Eagle Creek	TN05130105002T_0400	9.2
Big Indian Creek	TN05130105019_1400	17.9
Big Laurel Creek	TN05130105019_1100	9.2
Big Piney Creek	TN05130105019_1200	18.6
Buffalo Cove Creek	TN05130105019_0310	15.1
Caney Creek	TN05130105033_0200	12.2
Chapman Branch	TN05130105033_1100	8.7
Cobb Creek	TN05130105019_0400	6.4
Cowan Branch	TN05130105015_0100	7.1
Crickett Creek	TN05130105002T_0200	3.3
Cub Creek	TN05130105015_0300	7.2

Table A3-9a

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Delk Creek	TN05130105033_0600	2.4
Dripping Springs	TN05130105019_0710	6.6
Dry Creek	TN05130105033_1200	5.0
Dry Hollow Creek	TN05130105015_0500	26.4
East Fork Ashburn Creek	TN05130105002T_0500	4.3
East Fork Obey River	TN05130105019_1000	10.4
East Fork Obey River	TN05130105019_3000	11.1
East Fork Obey River	TN05130105019_2000	22.6
Franklin Creek	TN05130105002T_0100	4.6
Garrison Branch	TN05130105019_0800	6.3
Hurricane Creek	TN05130105019_0600	30.7
Jack Creek	TN05130105033_0310	8.1
Jesse Creek	TN05130105033_0620	12.9
Lick Creek	TN05130105033_0100	10.0
Little Crab Creek	TN05130105019_0100	16.3
Little Eagle Creek	TN05130105002T_0420	4.3
Little Hurricane Creek	TN05130105019_0610	15.8
Little Indian Creek	TN05130105019_0900	4.3
Lost Cane Creek	TN05130105019_1300	11.4
Meadow Creek	TN05130105019_0750	1.4
Meadow Creek	TN05130105019_0700	19.0
Medlock Branch	TN05130105015_0700	3.7
Misc Tribs to Dale Hollow Reservoir	TN05130105002T_0999	55.3
Misc Tribs to East Fork Obey River	TN05130105019_0999	50.4
Misc Tribs to Obey River	TN05130105001_0999	5.9
Misc Tribs to Rockcastle Creek	TN05130105019_0399	6.1
Misc Tribs to West Fork Obey River	TN05130105015_0999	24.3
Misc Tribs to Wolf River	TN05130105033_0999	28.7
Monroe Creek	TN05130105002T_0410	5.2
Moredock Branch	TN05130105015_0200	3.0
Neely Creek	TN05130105001_0100	4.3
Nettle Carrier Creek	TN05130105015_0800	18.0
Obey River	TN05130105001_1000	6.8
Poor Branch	TN05130105015_0900	6.6
Poplar Cove Creek	TN05130105019_0200	25.4
Poque Creek	TN05130105033_0500	6.6
Puncheon Camp Creek	TN05130105015_0600	18.6
Reed Creek	TN05130105033_0900	3.5
Rockcastle Creek	TN05130105019_0300	8.9
Rotten Fork Wolf River	TN05130105033_0300	19.7
Slate Creek	TN05130105019_0500	10.4
Stewart Creek	TN05130105033_0610	9.1
Sunk Cave Creek	TN05130105015_0400	8.6
Town Branch	TN05130105033_1400	3.1

Table A3-9b

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Unnamed Trib to Wolf River	TN05130105033_0800	4.9
West Fork Obey River	TN05130105015_1000	12.1
West Fork Obey River	TN05130105015_2000	13.1
Whorely Branch	TN05130105002T_0300	3.4
Widow Creek	TN05130105033_1300	4.7
Williams Creek	TN05130105033_0400	6.1
Wolf River	TN05130105033_2000	3.2
Wolf River	TN05130105033_1000	23.9

Table A3-9c.

Table A3-9a-c. Stream Impairment Due to Iron in the Tennessee Portion of the Obey River Watershed.

APPENDIX IV

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0101	0102	0103	0104	0105
Bare Rock/Sand/Clay	218	74	633	155	2
Deciduous Forest	10,898	11,640	10,553	20,372	8,386
Developed Open Space	858	628	478	1,204	314
Evergreen Forest	732	581	707	972	125
Grassland/Herbaceous	1,071	588	1,404	2,264	149
High Intensity Development	17			3	
Low Intensity Development	378	172	273	458	22
Medium Intensity Development	91	20	50	63	
Mixed Forest	3,006	1,743	2,799	2,494	552
Open Water	211	26	227	49	
Pasture/Hay	2,070	1,146	4,191	3,636	66
Row Crops	44	40	235	240	10
Shrub/Scrub			2	3	
Woody Wetlands	1	1		2	
Total	**19,595**	**16,660**	**21,553**	**31,916**	**9,627**

Table A4-1a.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0106	0107	0108	0201	0202
Bare Rock/Sand/Clay	64	131	17	340	10
Deciduous Forest	33,787	9,834	8,199	26,999	28,797
Developed Open Space	1,509	691	705	1,860	1,653
Evergreen Forest	465	469	166	249	214
Grassland/Herbaceous	706	1,721	343	962	218
High Intensity Development		75	6	5	
Low Intensity Development	139	310	125	476	137
Medium Intensity Development	8	280	40	39	2
Mixed Forest	641	640	305	753	467
Open Water	375	46	3	30	37
Pasture/Hay	3,141	1,112	1,733	1,121	1,670
Row Crops	789	36	391	4,138	725
Shrub/Scrub	72	4	4	14	23
Woody Wetlands	75	2	3		6
Total	**41,772**	**15,352**	**12,041**	**36,984**	**33,960**

Table A4-1b.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0203	0401	0402	0403	0404
Bare Rock/Sand/Clay	5	147		34	35
Deciduous Forest	12,055	19,910	11,268	25,608	6,935
Developed Open Space	1,229	789	93	2,677	731
Evergreen Forest	368	662	292	492	54
Grassland/Herbaceous	152	711	47	562	257
High Intensity Development		2		10	17
Low Intensity Development	555	194	11	776	391
Medium Intensity Development	24	28		129	109
Mixed Forest	516	2,554	699	741	356
Open Water	163	43		86	2,235
Pasture/Hay	6,369	997	688	8,848	3,141
Row Crops	3,258	180	104	3,654	1,130
Shrub/Scrub	83	30		101	92
Woody Wetlands	46	4		12	10
Total	**24,823**	**26,250**	**13,203**	**43,731**	**15,492**

Table A4-1c.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0405*	0501	0502	0503	0504
Bare Rock/Sand/Clay		29		9	2
Deciduous Forest		17,748	143	10,211	4,725
Developed Open Space		718		521	465
Evergreen Forest		605	8	96	106
Grassland/Herbaceous		517		137	231
High Intensity Development		10			24
Low Intensity Development		179		209	108
Medium Intensity Development		36		19	52
Mixed Forest		259	2	74	69
Open Water		10,282	230	1,326	125
Pasture/Hay		1,696		365	983
Row Crops		337		1,932	41
Shrub/Scrub		42		27	30
Woody Wetlands		23		23	8
Total		**32,481**	**382**	**14,949**	**6,968**

Table A4-1d.

Table A4-1a-d. Land Use Distribution in the Obey River Watershed by HUC-12. *Data are from 1992 Multi-Resolution Land Characterization (MRLC) derived by applying a generalized Anderson Level II system to mosaics of Landsat thematic mapper images collected every five years. *, No data available.*

HYDROLOGIC SOIL GROUPS
GROUP A SOILS have low runoff potential and high infiltration rates even when wet. They consist chiefly of sand and gravel and are well to excessively drained.
GROUP B SOILS have moderate infiltration rates when wet and consist chiefly of soils that are moderately deep to deep, moderately to well drained, and moderately coarse to coarse textures.
GROUP C SOILS have low infiltration rates when wet and consist chiefly of soils having a layer that impedes downward movement of water with moderately fine to fine texture.
GROUP D SOILS have high runoff potential, very low infiltration rates, and consist chiefly of clay soils.

Table A4-2. Hydrologic Soil Groups in Tennessee as Described in WCS. *Soils are grouped into four hydrologic soil groups that describe a soil's permeability and, therefore, its susceptibility to runoff.*

STATION	HUC 10	STREAM	DAILY FLOW			3Q2	1Q10	3Q10	7Q10	3Q20
			AVG	MAX	MIN					
3414500	0513010501	East Fork Obey River	419.5	23200.0	3.6	9.3	4.7	4.8	5.0	3.4
3415000	0513010502	West Fork Obey River	161.3	7810.0	2.6	4.3	2.9	2.9	3.1	2.7
3416000	0513010504	Wolf River	188.3	13400.0	2.1	8.3	4.0	4.4	5.2	3.6

Table A4-3. Stream Flow Data from USGS Gaging Stations in the Obey River Watershed. Data are in cubic feet per second (CFS). Data were obtained from the USGS web application StreamStats at http://water.usgs.gov/osw/streamstats. (na, data not available)

AGENCY	STATION	LOCATION	HUC-12
TDECWPC	MEADO011.9CU	Meadow Creek @ RM 11.9	051301050101
TDECWPC	CHARL000.7OV	Charlie Branch @ RM 0.7	051301050102
TDECWPC	EFOBE039.0OV	East Fork Obey River @ RM 39.0	051301050102
TDECWPC	EFOBE039.6OV	East Fork Obey River @ RM 39.6	051301050102
TDECWPC	HURRI003.1FE	Hurricane Creek @ RM 3.1	051301050102
TDECWPC	LHURR001.2OV	Little Hurricane @ RM 1.2	051301050103
TDECWPC	LOOPE001.0OV	Looper Branch @ RM 1.0	051301050103
TDECWPC	EFOBE025.8FE	East Fork Obey River @ RM 25.8	051301050104
TDECWPC	LCOVE1T1.0FE	UT to Lints Cove @ RM 1.0	051301050104
TDECWPC	LLAUR000.4FE	Little Laurel Creek @ RM 0.4	051301050104
TDECWPC	BINDI000.6FE	Big Indian Creek @ RM 0.6	051301050106
TDECWPC	EFOBE012.6FE	East Fork Obey River @ RM 12.6	051301050106
TDECWPC	LCRAB001.9FE	Little Crab Creek @ RM 1.9	051301050106
TDECWPC	ROCKC004.7FE	Rockcastle Creek @ RM 4.7	051301050107
TDECWPC	ROCKC04.75FE	Rockcastle Creek @ RM 4.75	051301050107
TDECWPC	POPLA001.3FE	Poplar Cove Creek @ RM 1.3	051301050108
TDECWPC	CUB000.7OV	Cub Creek @ RM 0.7	051301050202
TDECWPC	PCAMP000.7OV	Puncheon Camp Creek @ RM 0.7	051301050202
TDECWPC	WFOBE009.5OV	West Fk Obey River @ RM 9.5	051301050202
TDECWPC	WFOBE014.6OV	West Fork Obey @ RM 14.6	051301050202
TDECWPC	COWAN000.1OV	Cowan Branch @ RM 0.1	051301050203
TDECWPC	NETTL002.5OV	Nettlecarrier Creek @ RM 2.5	051301050203
TDECWPC	WFOBE008.0OV	West Fork Obey @ RM 8.0	051301050203
TDECWPC	BEAGL006.1OV	Big Eagle Creek @ RM 6.1	051301050302
TDECWPC	BIG000.1OV	Big Branch @ RM 0.1	051301050302
TDECWPC	DELK000.3FE	Delk Creek @ RM 0.3	051301050401
TDECWPC	WOLF040.7FE	Wolf River @ RM 40.7	051301050401
TDECWPC	RFWOL000.2FE	Rotten Fork Wolf River @ RM 0.2	051301050402
TDECWPC	CANEY000.8FE	Caney Creek @ RM 0.8	051301050403
TDECWPC	LICK001.1PI	Lick Creek @ RM 1.1	051301050403
TDECWPC	TOWN000.1PI	Town Branch @ RM 0.1	051301050403
TDECWPC	WOLF022.2PI	Wolf River @ RM 22.2	051301050403
TDECWPC	OBEY000.1CY	Obey River @ RM 0.1	051301050501

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

FACILITY NUMBER	FACILITY NAME	SIC	SIC NAME	MADI	WATERBODY	HUC-12
TN0062634	Jamestown STP	4952	Sewerage System	Major	Rockcastle Creek @ RM 4.75	051301050107
TN0021377	Obey River Rec Area “A”	4952	Sewerage System	Major	Obey River @ RM 45.9 and @ RM 45.5	051301050301
TN0021393	USACOE Dale Hollow Lake	4952	Sewerage System	Major	Obey River @ RM 31.4	051301050303
TN0026085	Star Point Resort	4952	Sewerage System	Major	Jouette Creek Embayment @ RM 1.4	051301050303
TN0062626	Byrdstown STP	4952	Sewerage System	Major	UT @ RM 0.4 to Town Creek @ RM 0.1	051301050403
TN0058033	Cedar Hill Resort	4952	Sewerage System	Major	Obey River @ RM 10.3	051301050501
TN0021423	USACOE Dale Hollow Dam Shop	4952	Sewerage System	Major	Obey River @ RM 7.0 and @ RM 6.6	051301050504
TN0004332	USFWS Dale Hollow National Fish Hatchery	0921	Fish Hatcheries and Preserves	Major	Dry Branch @ RM 0.1	051301050504
TN0068098	Dale Hollow Hydro Power Plant	4911	Electric Services	Major	Obey River @ RM 7.3	051301050504

Table A4-5. NPDES Permittees in the Obey River Watershed. *SIC, Standard Industrial Classification; MADI, Major Discharge Indicator; UT, Unnamed Tributary.*

FACILITY NUMBER	PERMITEE	COUNTY	LIVESTOCK	WATERBODY	HUC-12
TNA000008	Jams Threet	Fentress	Poultry	Poplar Cove Creek	051301050107
TNA000064	Franklin Jim Bledsoe	Fentress	Poultry	Poplar Cove Creek	051301050108
TNA000016	Rich’s Poultry	Pickett	Poultry	Lick Creek	051301050401
TNA000015	Koger Mountain Poultry	Pickett	Poultry	Lick Creek	051301050403
TNA000029	Mountain View Farm	Pickett	Poultry	Dale Hollow Lake	051301050403
TNA000111	Tim West Family Farms	Pickett	Poultry	Begley Branch	051301050403
TNA000112	West Farms	Pickett	Poultry	Begley Branch	051301050403
TNA000121	Daniels Poultry Farm	Clay	Poultry	Poor Branch	051301050501

Table A4-6. CAFO Sites in the Tennessee Portion of the Obey River Watershed.

FACILITY NUMBER	PERMITEE	SIC	SIC NAME	WATERBODY	HUC-12
TN072362	Sand Products, LLC (Mineral Springs Mine)	1442	Construction Sand and Gravel	Mineral Springs Branch	051301050101
TN071188	Tennessee Mining, Inc. (Cumberland Mine #1)	1221	Bituminous Coal Underground Mining	Lints Cove	051301050104
TN071897	Hood Coal Corporation (Tar Gap Mine)	1221	Bituminous Coal Underground Mining	UT to East Fork Obey River	051301050106
TN053007	Tennessee Mining, Inc. (Grimsley Tipple)	1221	Bituminous Coal Underground Mining	Fern camp Creek	051301050107
TN071498	Tennessee Mining, Inc. (Cumberland Mine #2)	1221	Bituminous Coal Underground Mining	Fern Camp Creek	051301050107
TN063487	Livingston Limestone Co. (Monterey Limestone)	1422	Crushed and Broken Limestone	UT to Sinking Cane Hollow	051301050201
TN063444	Livingston Limestone Co. (Quarry/Processing Facility)	1422	Crushed and Broken Limestone	Big Eagle Creek	051301050302
TN063525	Frogge and Williams Stone (Wright Quarry)	1422	Crushed and Broken Limestone	UT to Wolf River	051301050401
TN072401	Fentress Co. Highway Dept. (County Hwy Dept. Quarry)	1422	Crushed and Broken Limestone	Dry Branch	051301050401
TN076333	LoJac Enterprises (Monterey Sand)	1442	Construction Sand and Gravel Mining	Garrison Branch, UT to Garrison Branch	050113010501
TN063479	Rogers Group, Incorporated (Celina Quarry)	1422	Crushed and Broken Limestone	Obey River	051301050504

Table A4-7. Active Permitted Mining Sites in the Obey River Watershed. *SIC, Standard Industrial Classification; UT, Unnamed Tributary.*

FACILITY NUMBER	FACILITY NAME	SECTOR	RECEIVING STREAM	AREA*	HUC-12
TNR051151	Mullins Lumber Company	P	Dale Hollow Lake	15	051301050301
TNR054580	Royal Oak Enterprises, Inc.	C, A	Meadow Creek	51.57	051301050101
TNR055945	Perdue Farms	U	Monterey City Lake	10.617	051301050201
TNR056438	Pickett County Sanitary Landfill	L	UT to Town Branch	10.77	051301050301
TNR051275	Allons sawmills, Incorporated	A	Little eagle Creek	23.75	051301050302
TNR054233	Cooper Recycling, LLC	N	Big Eagle Creek	3.88	051301050302
TNR054030	Doubletop Storage Area	N, P	Chapman Branch	5.6	051301050403
TNR055915	Ronnie Smith	J	Day Creek	2	051301050403
TNR053267	APAC-Celina Plant	D	Obey River	3	051301050504

Table A4-8. Active Permitted TMSP Facilities in the Obey River Watershed. *Area, acres of property associated with industrial activity; UT, Unnamed Tributary. Sector details may be found in Table A4-11.*

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 A4-9. TMSP Sectors and Descriptions.

APPENDIX V

Land Treatment - Conservation Buffers				
	Field Borders (feet)	Filter Strip (feet)	Streambank / Shoreline Protection (feet)	Riparian Forest Buffer (acres)
FY 2001	20177		1000	2
FY 2002			2225	9
FY 2003			27536	2
FY 2004				
FY 2005		1	1500	5

Table A5-1a. Land Treatment Conservation Practices (Conservation Buffers), in Partnership with NRCS in the Tennessee Portion of the Obey River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Erosion Control		
	Est. soil saved (tons/year)	Land Treated with erosion control measures (acres)
FY 2001	19658	1070
FY 2002	12394	745
FY 2003	238264	1218
FY 2004		
FY 2005		

Table A5-1b. Erosion Control Conservation Practices, in Partnership with NRCS in the Tennessee Portion of the Obey River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Irrigation Management		
	Irrigation Mgmt. Systems (number)	Irrigation Mgmt. Systems (acres)
FY 2001	1	75
FY 2002		
FY 2003		
FY 2004		
FY 2005		

Table A5-1c. Irrigation Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Obey River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Nutrient Management				
	Waste Utilization (acres)	AFO Nutrient Mgmt Applied (acres)	Non-AFO Nutrient Mgmt. Applied (acres)	Total Applied (acres)
FY 2001			3252	3252
FY 2002		326	2045	2371
FY 2003		471	2516	2987
FY 2004		1229		1229
FY 2005	111	2836		2947

Table A5-1d. Nutrient Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Obey River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Comprehensive Nutrient Mgmt Plans			
	Planned Comprehensive Nutrient Mgmt Plans (number)	Applied Comprehensive Nutrient Mgmt Plans (number)	Total Comprehensive Nutrient Mgmt Plans (number)
FY 2001			
FY 2002	1		1
FY 2003	4	1	5
FY 2004			
FY 2005			

Table A5-1e. Comprehensive Nutrient Management plans, Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Obey River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Pest Management		
	Pest Mgmt. Systems (number)	Pest Mgmt. Systems (acres)
FY 2001	37	2256
FY 2002		2378
FY 2003		3127
FY 2004		1229
FY 2005		2778

Table A5-1f. Pest Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Obey River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Grazing / Forages			
	Prescribed Grazing (acres)	Fencing (feet)	Pasture and Hay Planting (acres)
FY 2001	1514		
FY 2002	2069		
FY 2003	2282		
FY 2004	1176	28383	48
FY 2005	1729	40446	332

Table A5-1g. Grazing/Forages Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Obey River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Tree & Shrub Practices				
	Land Improved through Forest Stand improvement (acres)	Total Tree & Shrub Estab. (acres)	Forestland Re-established or improved (acres)	Use Exclusion (acres)
FY 2001	702	54	756	
FY 2002	1300		1300	
FY 2003	1014		1014	
FY 2004	451		451	157
FY 2005	1843		1843	91

Table A5-1h. Tree and Shrub Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Obey River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Land Treatment - Tillage & Cropping					
	Residue Mgmt, No-till, Strip till (acres)	Tillage & Residue Mgmt Systems (acres)	Conservation Crop Rotation (acres)	Contour Farming (acres)	Cover Crop (acres)
FY 2001		329			
FY 2002					
FY 2003					
FY 2004			63		16
FY 2005	144	144	744	73	651

Table A5-1i. Land Treatment Conservation Practices (Tillage and Cropping), in Partnership with NRCS in the Tennessee Portion of the Obey River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Waste Systems		
	Waste Systems Planned (number)	Waste Systems Applied (number)
FY 2001	4	1
FY 2002		
FY 2003		
FY 2004		
FY 2005		

Table A5-1j.Waste System Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Obey River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Waste Management Facilities			
	Waste Storage Facility (number)	Composting Facility (number)	Total Facilities (number)
FY 2001		2	2
FY 2002	2	1	3
FY 2003	3	3	6
FY 2004	1	1	2
FY 2005	1		1

Table A5-1k.Waste Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Obey River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Wildlife Habitat Management			
	Upland Habitat Mgmt (acres)	Wetland Habitat Mgmt (acres)	Total Wildlife Habitat Mgmt Applied (acres)
FY 2001	1286	65	1351
FY 2002	1809		1809
FY 2003	1420		1420
FY 2004	285		285
FY 2005	1955		1955

Table A5-1l. Wildlife Habitat Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Obey River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Water Supply			
	Pipeline (ft)	Pond (number)	Watering Facility (number)
FY 2001			
FY 2002			
FY 2003			
FY 2004	2,229	1	5
FY 2005	100		8

Table A5-1m. Water Supply Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Obey River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

COMMUNITY	AWARD DATE	AWARD AMOUNT
Cookeville	9/25/90	$ 2,650,000
Cookeville	7/14/94	$ 9,700,000
Cookeville	3/15/91	$ 960,000
Cookeville	6/28/99	$ 2,300,000

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

PRACTICE	NRCS CODE	NUMBER OF BMPs
Waste Management System	312	4
Critical Area Planting	342	2
Sediment Basin	350	1
Pond	378	22
Fence	382	19
Use Exclusion	472	22
Pasture/Hay Planting	512	63
Pipeline	516	6
Prescribed Grazing	528	8
Heavy Use Area	561	29
Spring Development	574	7
Stream Crossing	576	1
Stream Crossing	578	4
Streambank Protection	580	2
Nutrient Management	590	1
Watering Facility	614	31
TOTAL BMPs	**-**	**222**

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