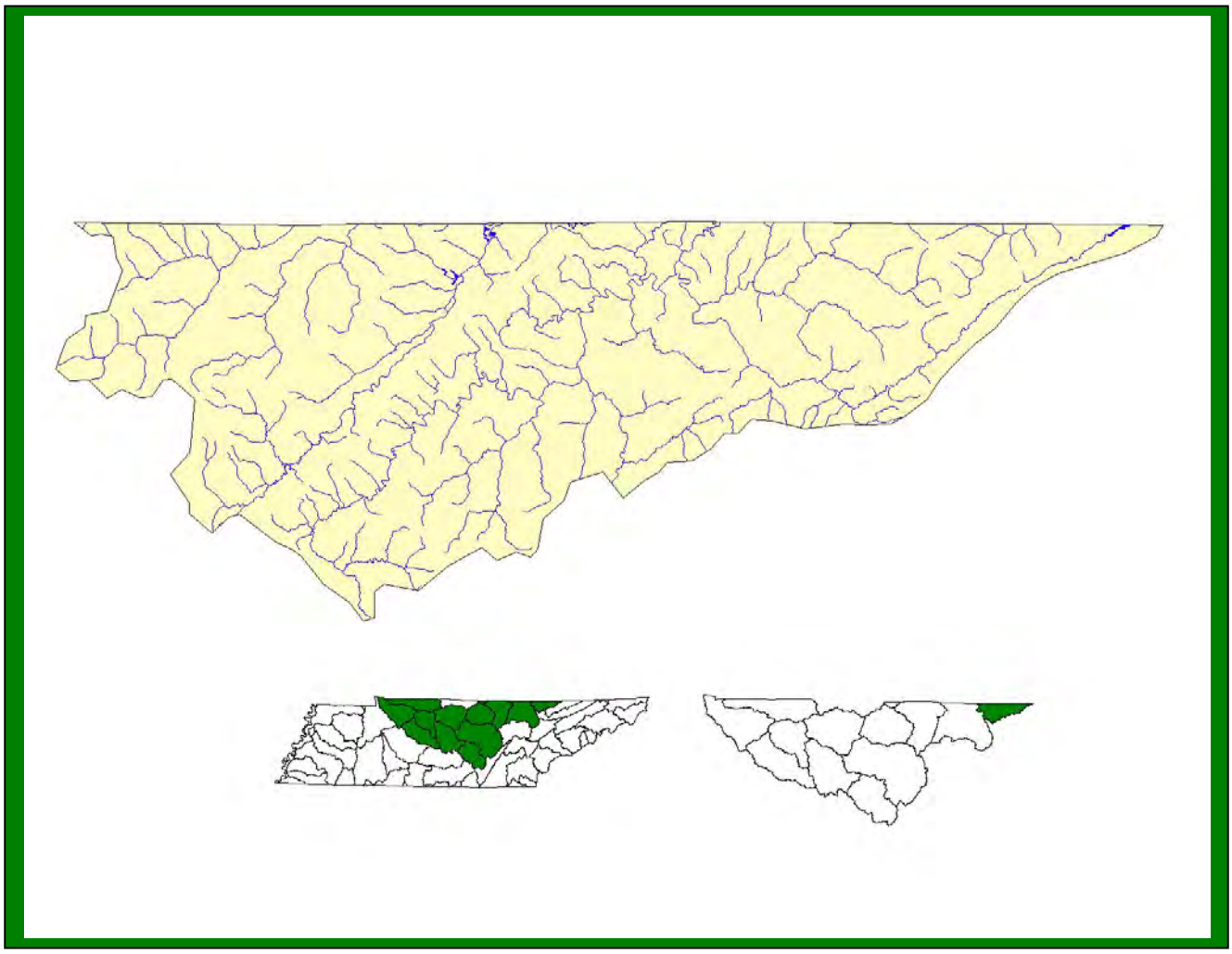
CLEAR FORK OF THE CUMBERLAND RIVER WATERSHED (05130101) OF THE CUMBERLAND RIVER BASIN

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 Clear Fork Cumberland River Watershed by the Division of Water Pollution Control October 4, 2007.

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CLEAR FORK OF THE CUMBERLAND 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

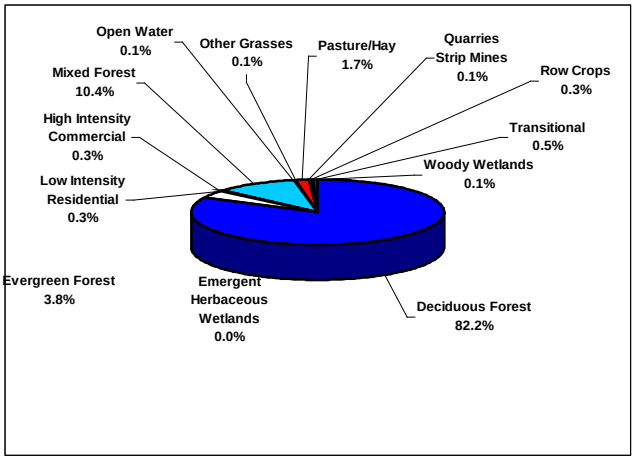
Summary – Clear Fork of the Cumberland River Watershed (05130101)

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 Clear Fork of the Cumberland 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.

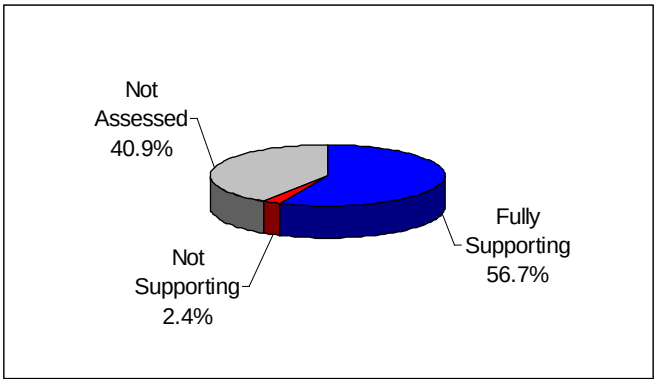
A detailed description of the watershed can be found in Chapter 2. The Clear Fork of the Cumberland River Watershed is approximately 2,282 square miles (329 mi^2 in Tennessee) and includes parts of three Tennessee counties. A part of the Cumberland River drainage basin, the watershed has 442.6 stream miles in Tennessee.



Land Use Distribution in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed.

One wildlife management area is located in the watershed. Thirty-four rare plant and animal species have been documented in the watershed including six rare fish species. Portions of one stream in the Clear Fork of the Cumberland River Watershed is listed in the National Rivers Inventory as having one or more outstanding natural or cultural values.

A review of water quality sampling and assessment is presented in Chapter 3. Using the Watershed Approach to Water Quality, 157 sampling events occurred in the Clear Fork of the Cumberland River Watershed in 2000-2005. These were conducted at ambient, ecoregion or watershed monitoring sites. Monitoring results support the conclusion that 74.2% of stream miles assessed fully support one or more designated uses.



Water Quality Assessment of Streams and Rivers in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed. Assessment data are based on the 2004 Water Quality Assessment of 442.6 stream miles 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).

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
0513010104	051301010401 (Yellow Creek)
0513010105	051301010501 (Clear Fork Creek)
	051301010502 (Tackett Creek)
	051301010503 (Clear Fork Creek)
	051301010504 (Laural Creek)
	051301010505 (Mud Creek)
	051301010506 (Elk Fork Creek)
0513010106	051301010601 (Hickory Creek)
	051301010602 (Stinking Creek)
	051301010603 (Hickory Creek)
0513010107	051301010701 (Jellico Creek)
0513010108	051301010801 (Marsh Creek)

The Tennessee Portion of the Clear Fork of the Cumberland River Watershed is Composed of twelve USGS-Delineated Subwatersheds (12-Digit Subwatersheds).

Point source contributions to the Tennessee portion of the Clear Fork of the Cumberland River Watershed consist of one individual NPDES-permitted facilities, one of which discharges 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 (44), Aquatic Resource Alteration Permits (1), and Water Treatment Plant Permits (1). Agricultural operations include cattle and chicken 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 Clear Fork of the Cumberland 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, Cumberland Mountain RC&D Council, and The Nature Conservancy) are also described.

Point and Nonpoint source approaches to water quality problems in the Clear Fork of the Cumberland 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 Clear Fork of the Cumberland River Watershed Water Quality Management Plan can be found at:
http://www.state.tn.us/environment/wpc/watershed/wsmplans/

CHAPTER 1

WATERSHED APPROACH TO WATER QUALITY

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

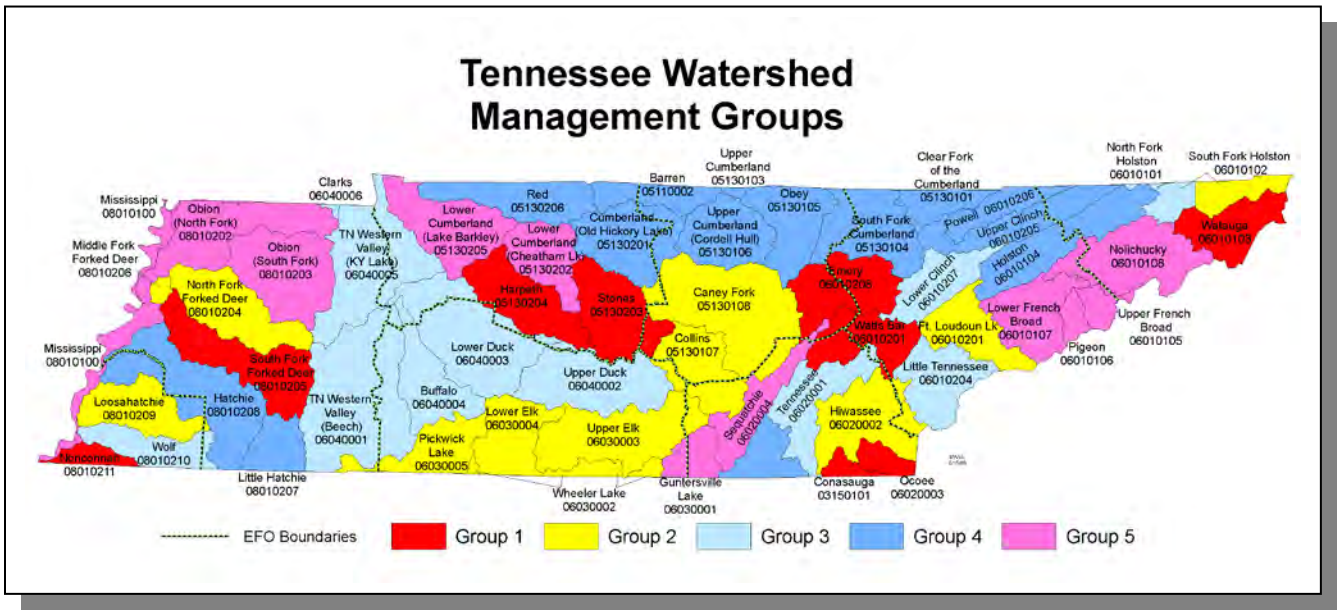


Figure 1-1. Watershed Groups in Tennessee's Watershed Approach to Water Quality.

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

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

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

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

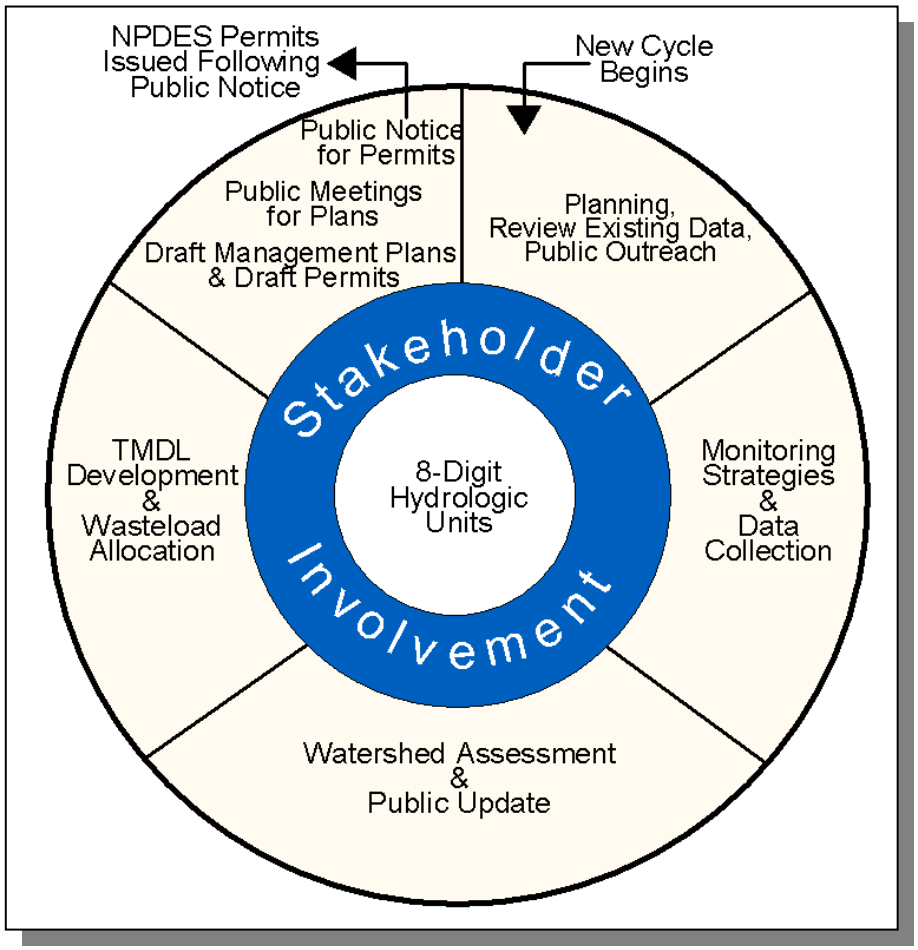


Figure 1-2. The Watershed Approach Cycle.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CHAPTER 2

DESCRIPTION OF THE CLEAR FORK OF THE CUMBERLAND RIVER WATERSHED

2.1. BACKGROUND. The Clear Fork of the Cumberland River and Watershed are named for the clear spring-fed headwaters that form Clear Fork in a narrow limestone gorge in Kentucky. Clear Fork originates in Bell County, Kentucky. It flows through sections of Claiborne and Campbell Counties, then flows north into Kentucky, joining the Cumberland River at Williamsburg, Kentucky. Clear Fork is fed by named and unnamed tributaries.

This Chapter describes the location and characteristics of the Tennessee portion of the Clear Fork of the Cumberland River Watershed.

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. The Tennessee portion of the Clear Fork of the Cumberland River Watershed is located in East Tennessee and includes parts of Campbell, Claiborne, and Scott Counties.

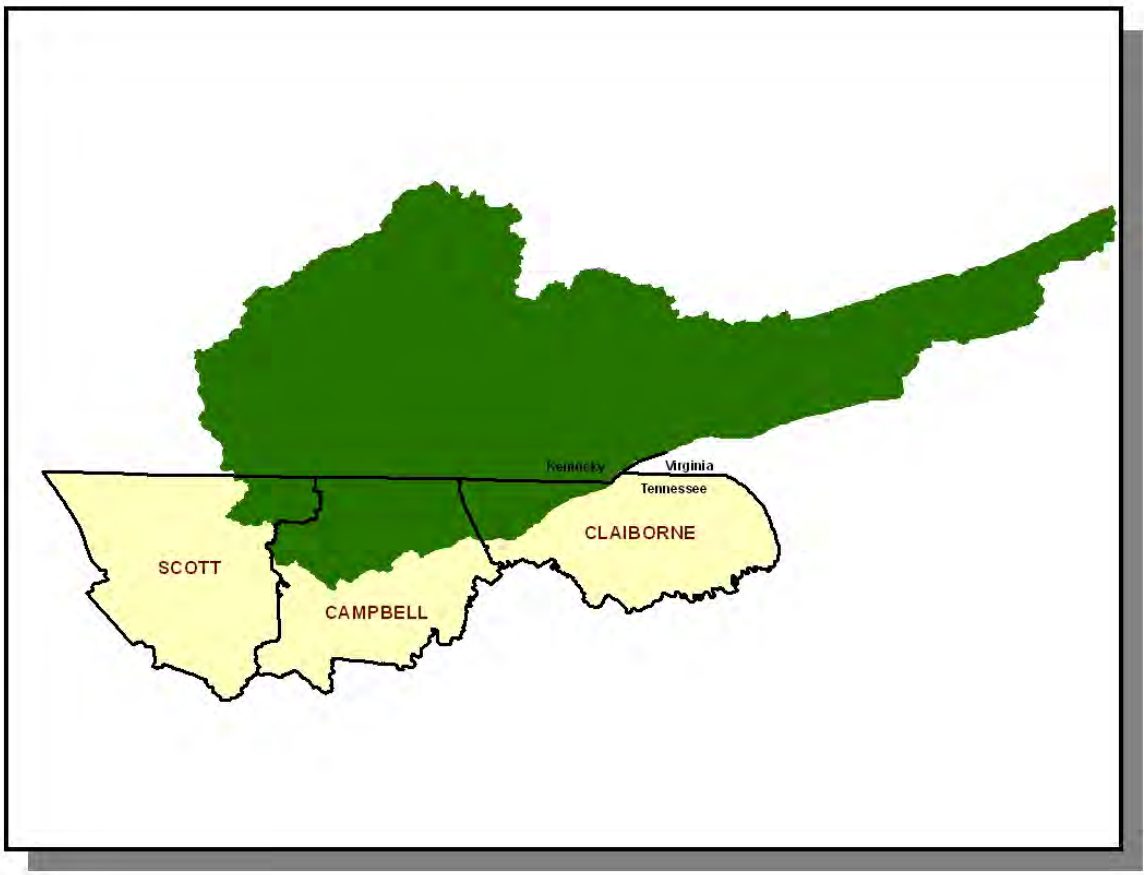


Figure 2-1. General Location of the Clear Fork of the Cumberland River Watershed.

COUNTY	% OF WATERSHED IN EACH COUNTY
Campbell	62.1
Claiborne	22.6
Scott	15.3

Table 2-1. The Clear Fork of the Cumberland River Watershed Includes Parts of Three East Tennessee Counties.

2.2.B. Population Density Centers. Four highways serve the major communities in the Tennessee portion of the Clear Fork of the Cumberland River Watershed.

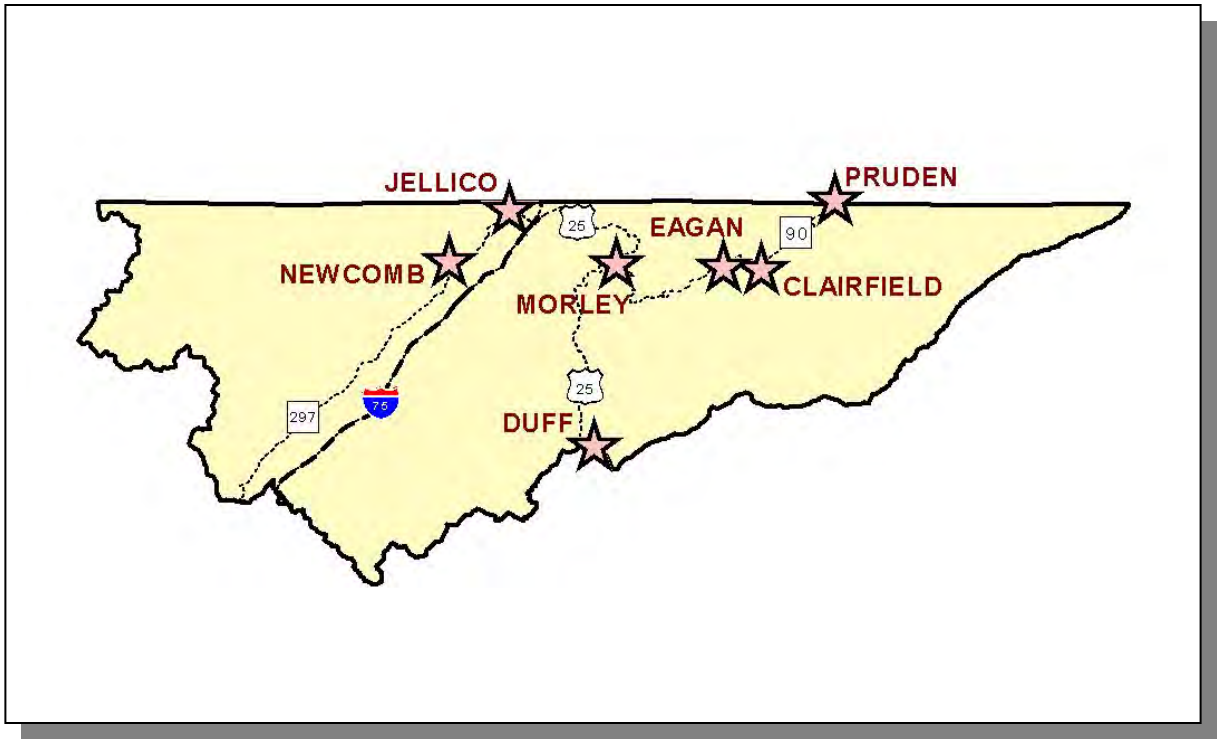


Figure 2-2. Communities and Roads in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed.

MUNICIPALITY	POPULATION	COUNTY
Jellico	2,448	Campbell

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

2.3. GENERAL HYDROLOGIC DESCRIPTION.

2.3.A. Hydrology. The Clear Fork of the Cumberland River Watershed, designated 05130101 by the USGS, is approximately 2,282 square miles (329 square miles in Tennessee) and drains to the Cumberland River.

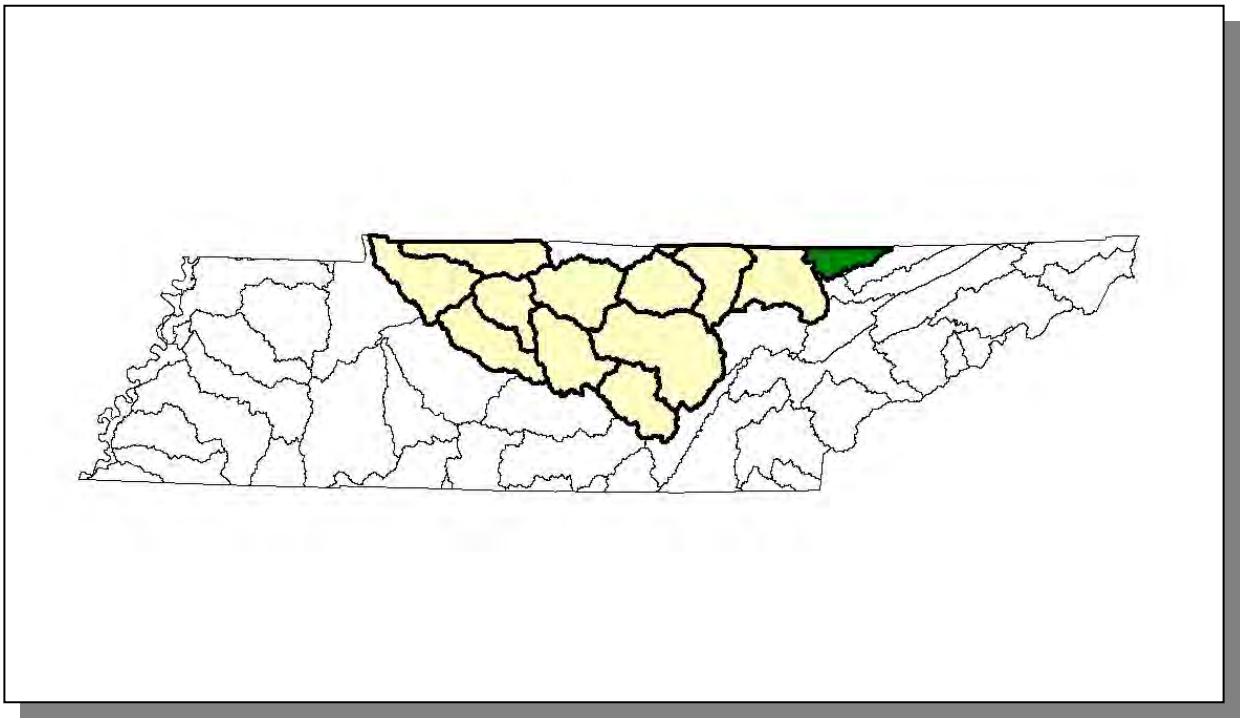


Figure 2-3. The Clear Fork of the Cumberland River Watershed is Part of the Cumberland River Basin.

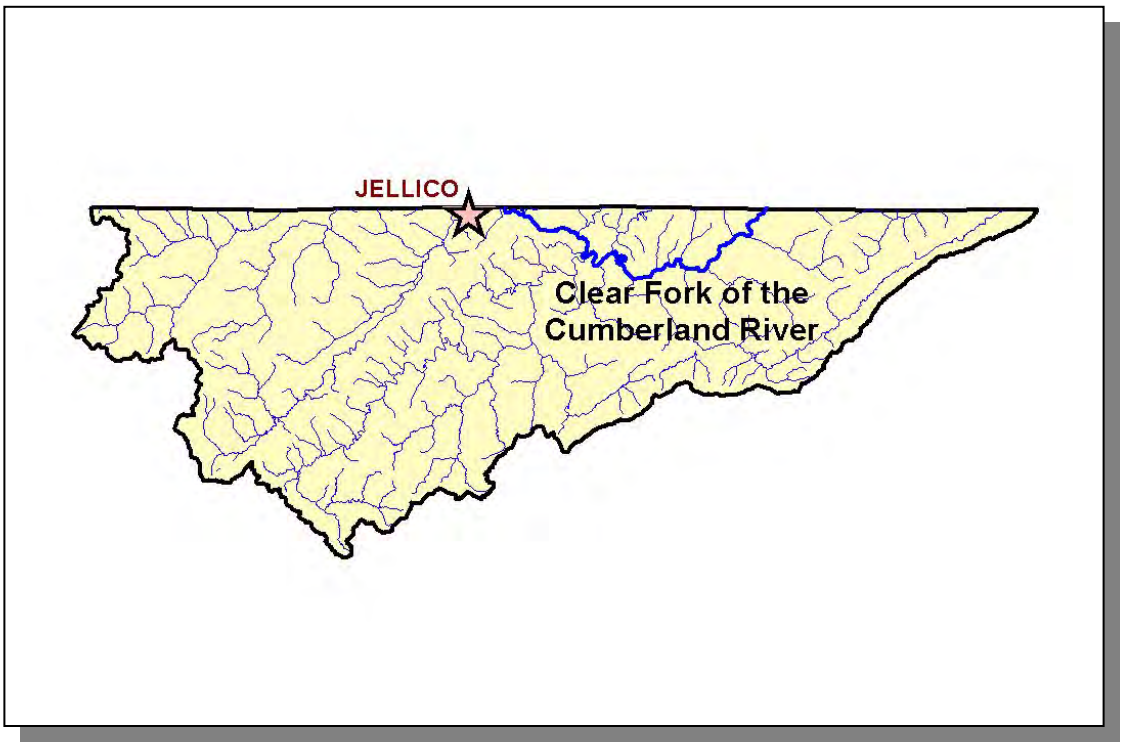


Figure 2-4. Hydrology in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed. *There are 442.6 stream miles recorded in River Reach File 3 in the Tennessee portion of the Clear Fork of the Cumberland River Watershed. Locations of the Clear Fork of the Cumberland River and Jellico are shown for reference.*

2.3.B. Dams. There are 2 dams inventoried by TDEC Division of Water Supply in the Tennessee portion of the Clear Fork of the Cumberland River Watershed. These dams either retain 30 acre-feet of water or have structures at least 20 feet high.

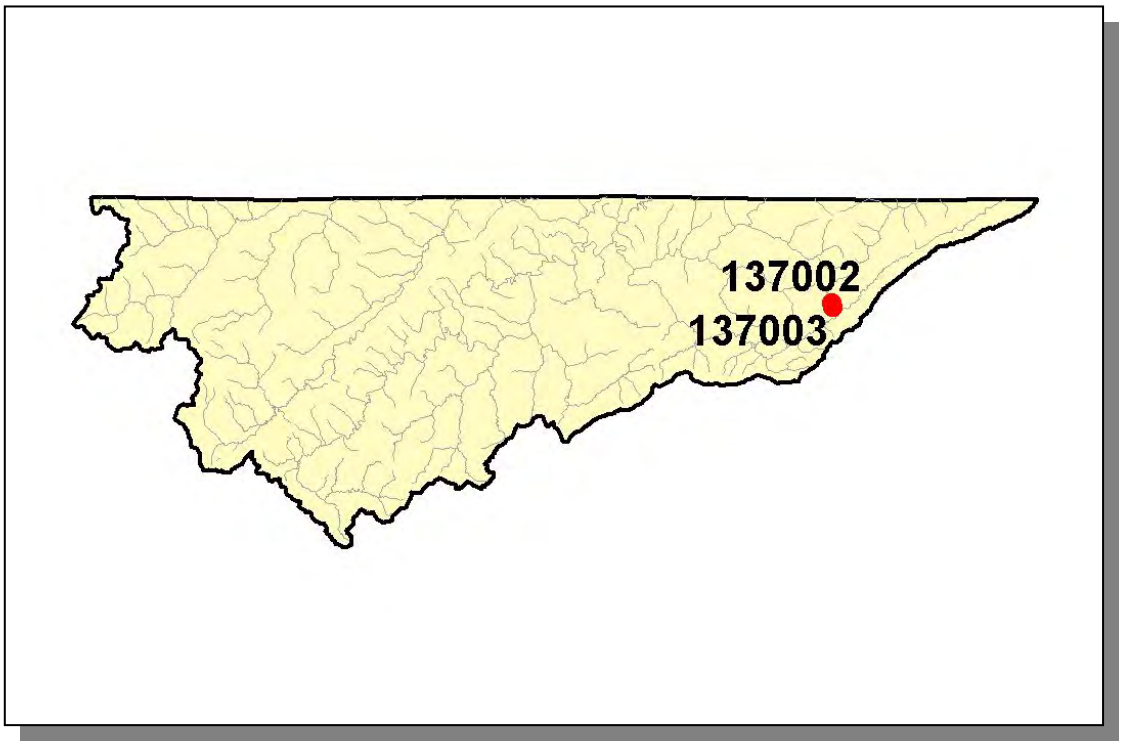


Figure 2-5. Location of Inventoried Dams in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed. *More information, including identification of inventoried dams labeled, is provided in Appendix II and at http://gwidc.memphis.edu/website/dams/viewer.htm.*

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.

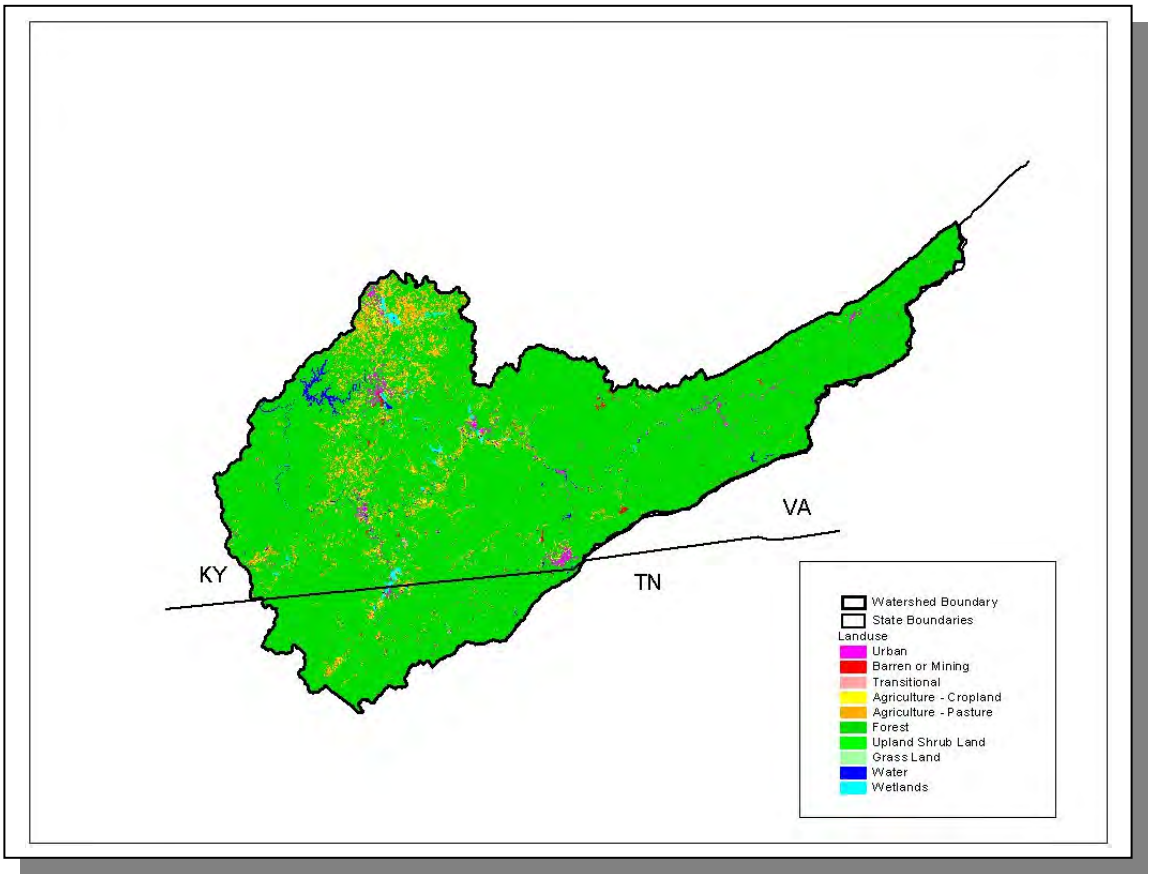


Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery.

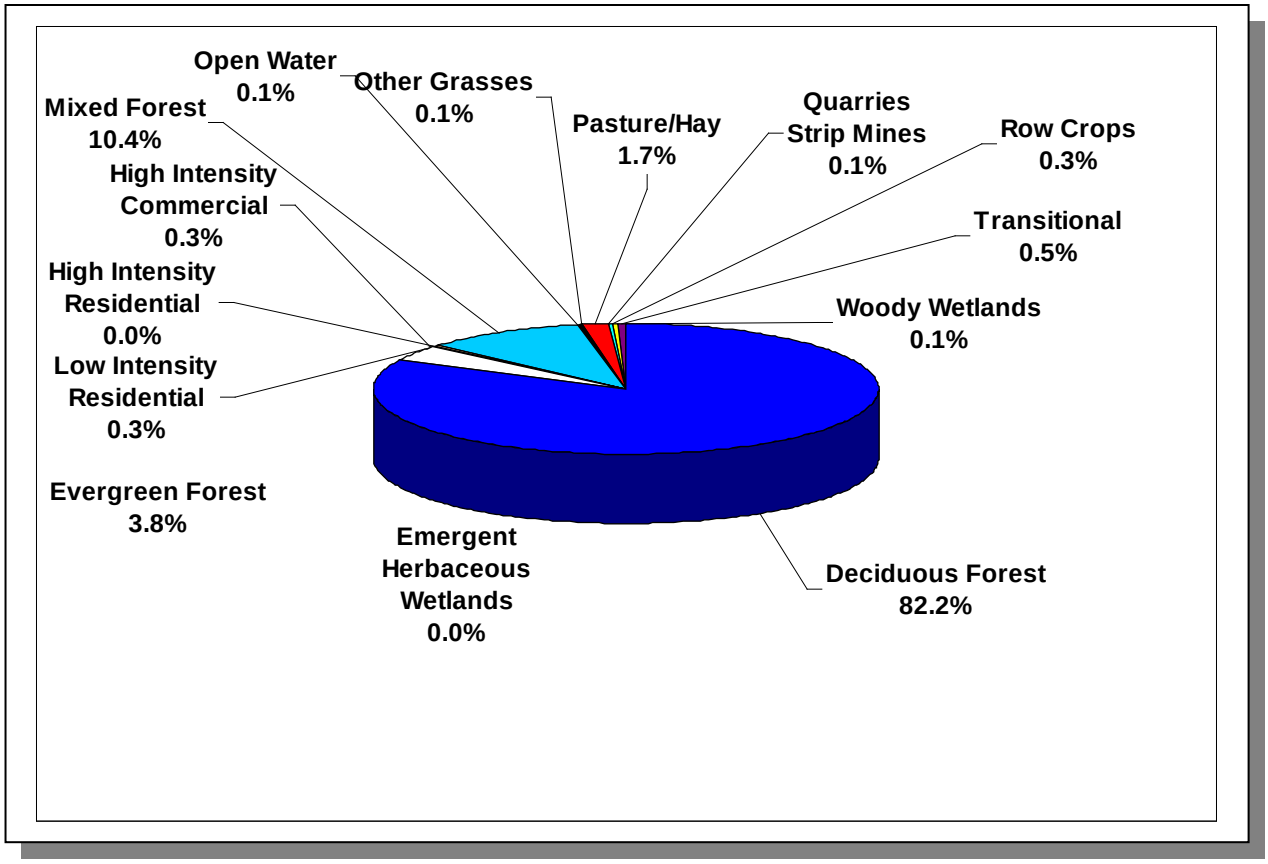


Figure 2-7. Land Use Distribution in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed. *More information is provided in Appendix II.*

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

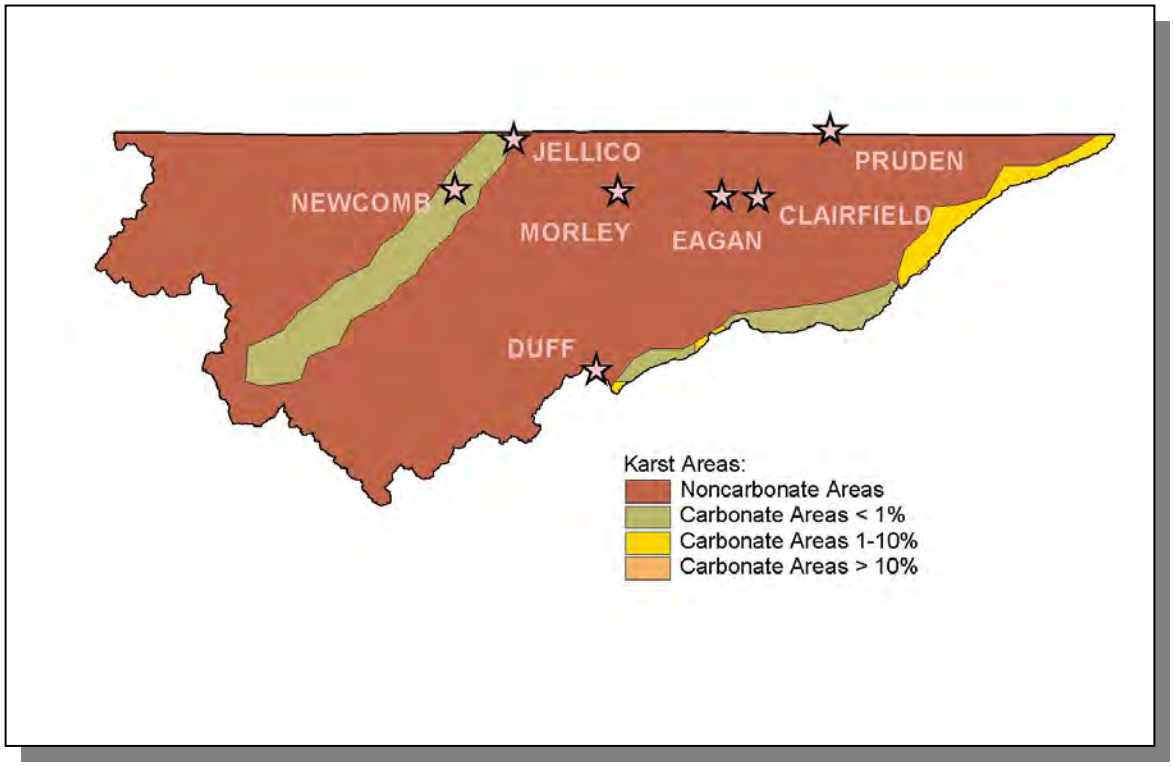


Figure 2-8. Illustration of Karst Areas in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed. *Locations of communities in the watershed are shown for reference.*

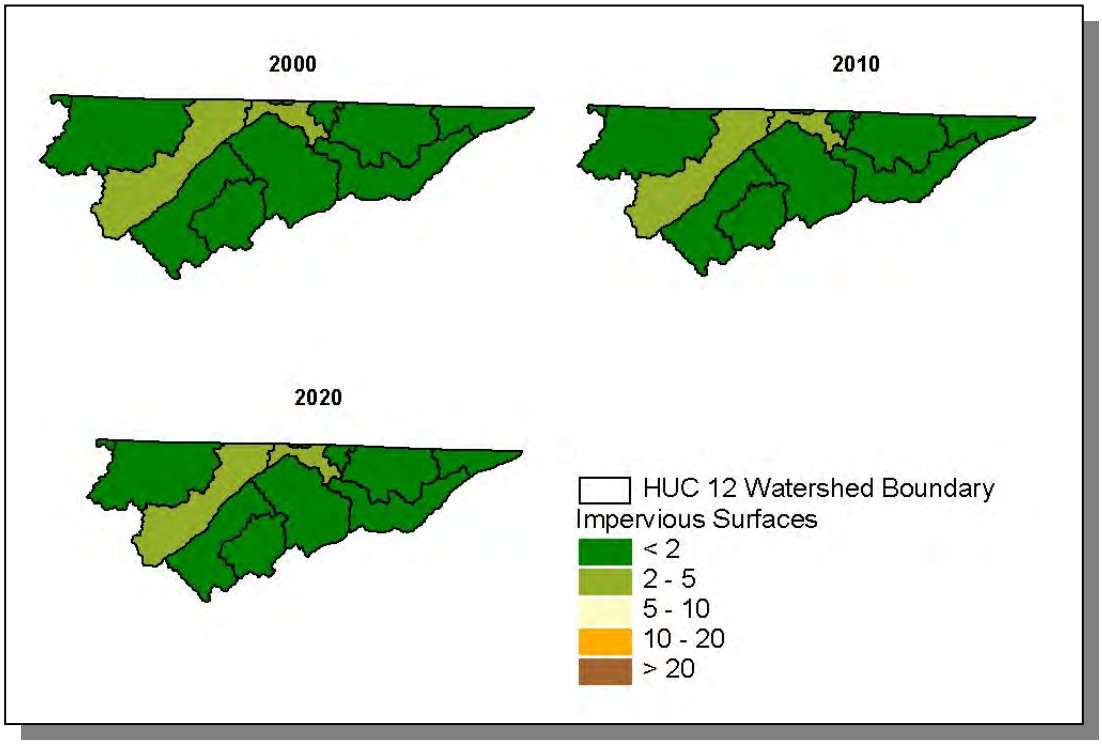


Figure 2-9. Illustration of Total Impervious Area in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed. *All HUC-12 subwatersheds are shown. Current and projected total impervious cover (percent of total area) is provided by EPA Region 4. More information can be found at: http://www.epa.gov/ATHENS/research/impervious/*

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 Clear Fork of The Cumberland River Watershed lies within 2 Level III ecoregions (Southwestern Appalachians and Central Appalachians) and contains 2 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 **Cumberland Mountains (69d)**, in contrast to the sandstone-dominated Cumberland Plateau (68a) to the west and southwest, are more highly dissected, with narrow-crested steep slopes, and younger Pennsylvanian-age shales, sandstones, siltstones, and coal. Narrow, winding valleys separate the mountain ridges, and relief is often 2000 feet. Cross Mountain, west of Lake City, reaches 3534 feet in elevation. Soils are generally well-drained, loamy, and acidic, with low fertility. The natural vegetation is a mixed mesophytic forest, although composition and abundance vary greatly depending on aspect, slope position, and degree of shading from adjacent land masses. Large tracts of land are owned by lumber and coal companies, and there are many areas of stripmining.

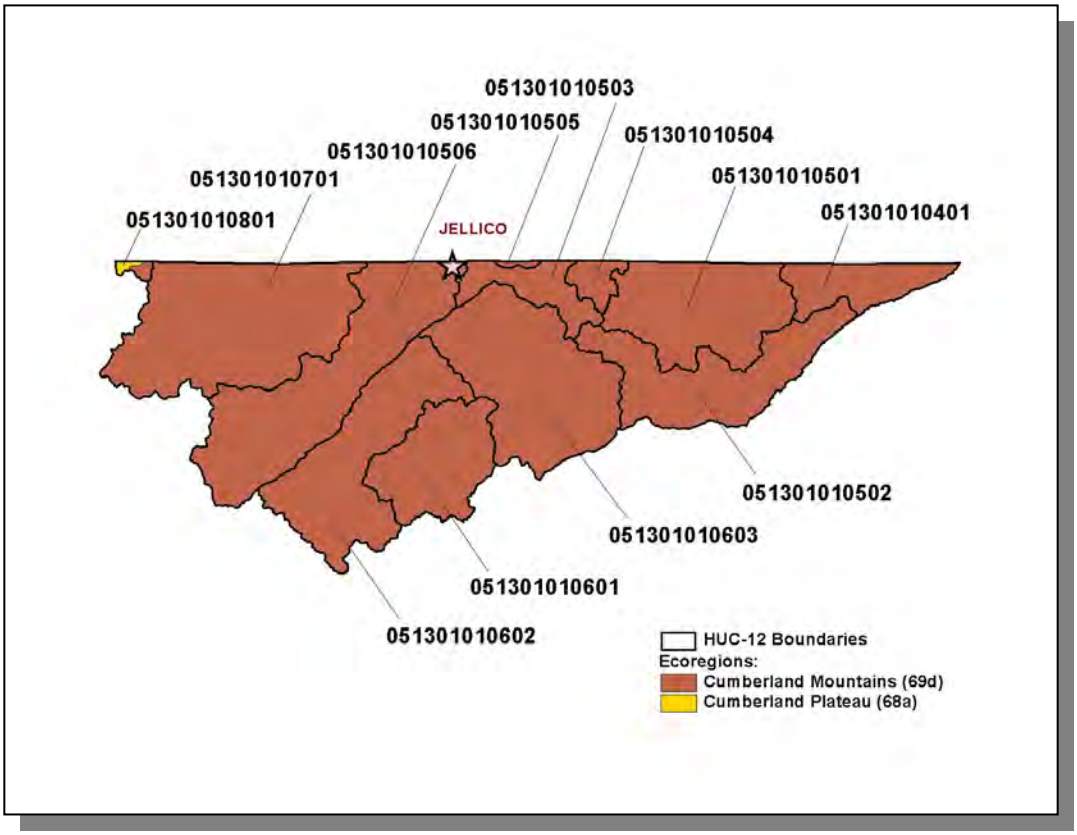


Figure 2-10. Level IV Ecoregions in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed. *HUC-12 subwatershed boundaries and location of Jellico is shown for reference.*

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.

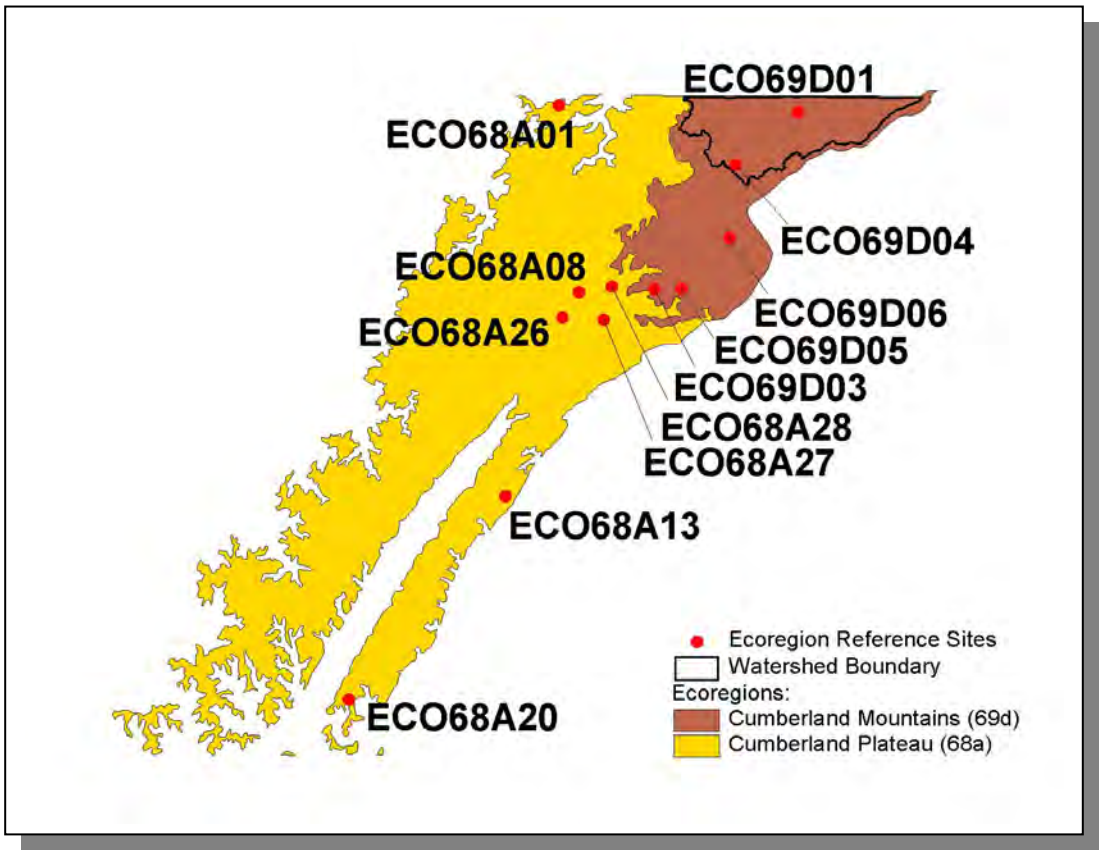


Figure 2-11. Ecoregion Monitoring Sites in Level IV Ecoregions 68a and 69d. *The Tennesse portion of the Clear Fork of the Cumberland River Watershed is shown for reference. More information, including which ecoregion reference sites were inactive or dropped prior to 01/01/2006, is provided in Appendix 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
Insects	1
Amphibians	3
Birds	3
Fish	6
Mammals	9
Plants	12
Total	**34**

Table 2-3. There are 34 Known Rare Plant and Animal Species in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed.

In the Tennessee portion of the Clear Fork of the Cumberland River Watershed, there are six known rare fish species.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
Etheostoma baileyi	Emerald darter		D
Etheostoma sagitta	Arrow darter		D
Etheostoma susanae	Cumberland Johnny darter		E
Notropis buccatus	Silverjaw minnow		T
Notropis rubellus rubellus	Rosyface shiner		D
Phoxinus cumberlandensis	Blackside dace		T

Table 2-4. Rare Aquatic Species in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed. *State Status: T, Listed Threatened by the U.S. Fish and Wildlife Service; 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/

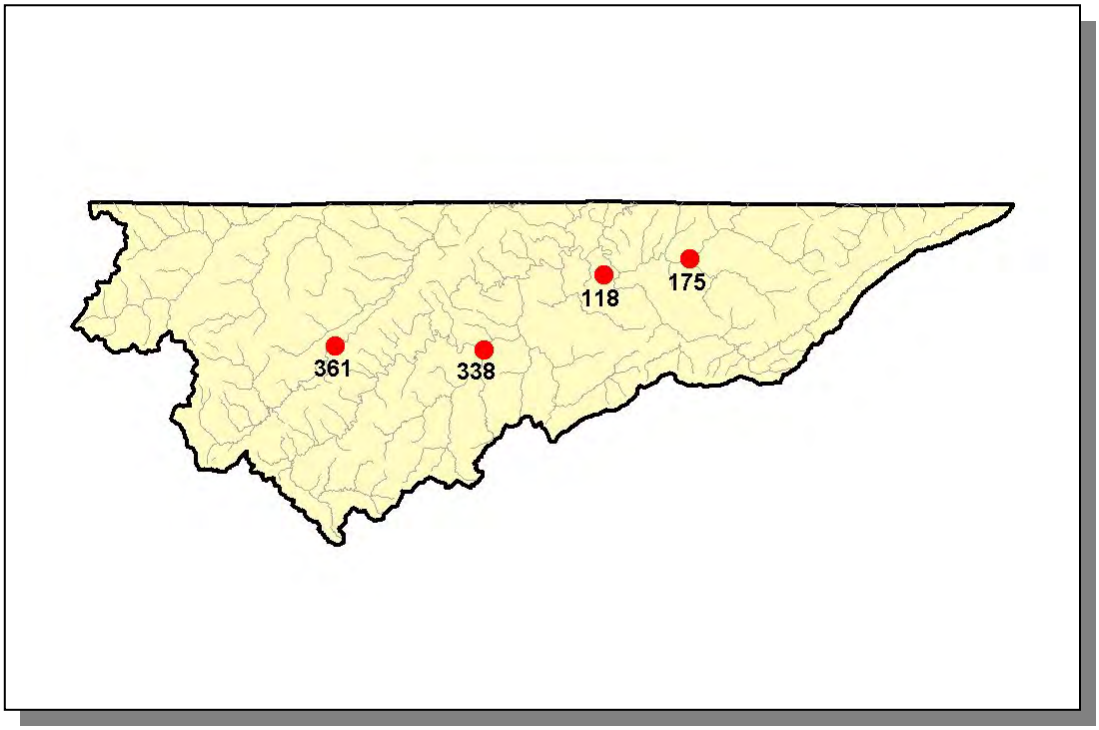


Figure 2-12. Location of Wetland Sites in TDEC Division of Natural Heritage Database in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed. This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands. *There may be additional wetland sites in the watershed. More information, including identification of wetland sites labeled, is provided in Appendix II.*

2.7. CULTURAL RESOURCES.

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

The most recent version of the Nationwide Rivers Inventory lists portions of one stream in the Tennessee portion of the Clear Fork of the Cumberland River Watershed:

> Stinking Creek (RM 0 to RM 29) is a rural scenic stream that flows through the unique Cumberland Black geologic formation.

RIVER	SCENIC	RECREATION	GEOLOGIC	FISH	WILDLIFE
Stinking Creek	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:

- Indian Mountain Campground State Recreation Area is a multi-use facility in Campbell County. The 200-acre park is built on reclaimed strip mines. More information may be found at: http://www.state.tn.us/environment/parks/parks/IndianMtn

- Royal Blue Wildlife Management Area is part of a 50,000-acre wilderness. More information my be found at: http://www.cs.utk.edu/~dunigan/mtnbike/royal.html

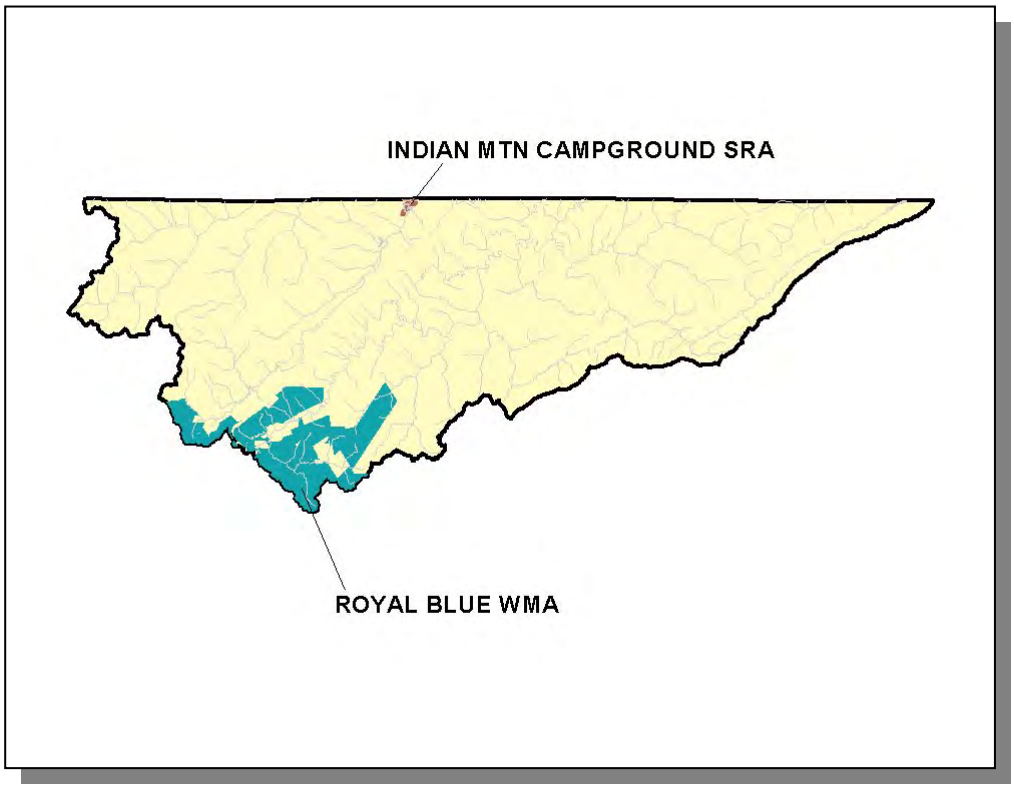


Figure 2-13. Public Lands in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed. *Data are from Tennessee Wildlife Resources Agency. SRA, State Recreation Area; WMA, Wildlife Management Area.*

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
Capuchin Creek	1			Laural Fork Creek	1		2
Clear Fork Creek	1,2	3	2,4	Little Elk Creek	3		
Davis Creek	3			Louse Creek	1		
Elk Fork Creek	3		2	Stinking Creek	3		1
Hickory Creek	2,3			Tackett Creek	1		3
Jellico Creek	2						

Table 2-6. Tennessee Rivers Assessment Project Stream Scoring in the Clear Fork of the Cumberland River Watershed.

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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 CLEAR FORK OF THE CUMBERLAND RIVER WATERSHED.

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

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

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

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

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

1. Describe the water quality assessment process

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

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

4. Provide detailed information on each watershed

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

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

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

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

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

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

This chapter provides a summary of water quality in the Tennessee portion of the Clear Fork of the Cumberland 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.

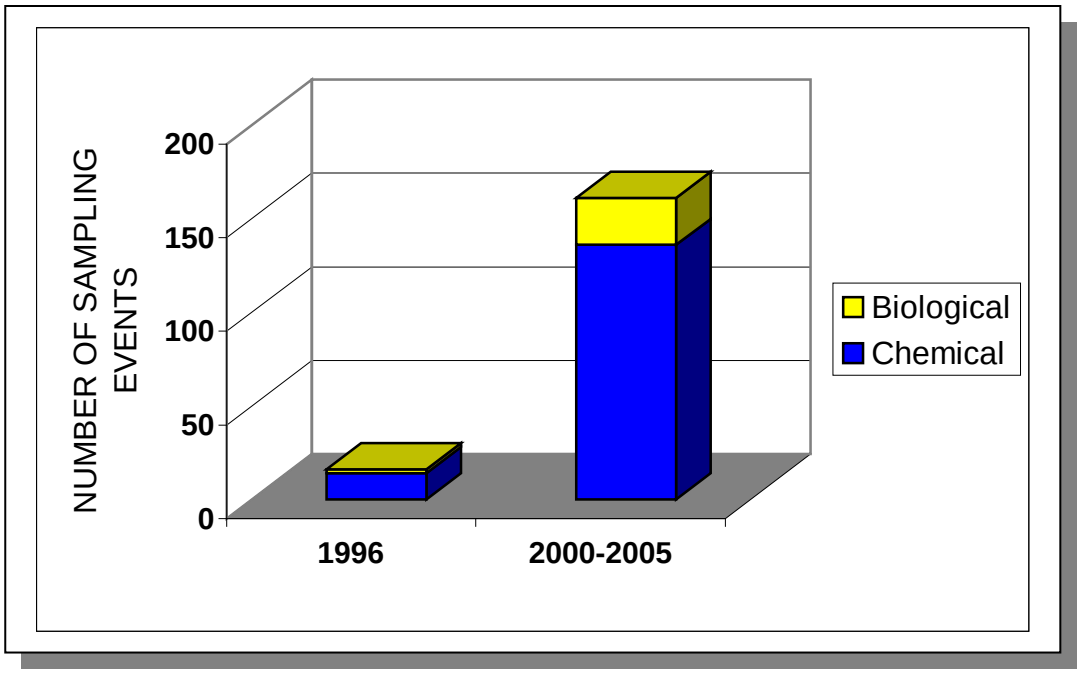

Figure 3-1. Number of Sampling Events Using the Traditional Approach (1996) and Watershed Approach (July 1, 2000 through June 30, 2005) in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed.

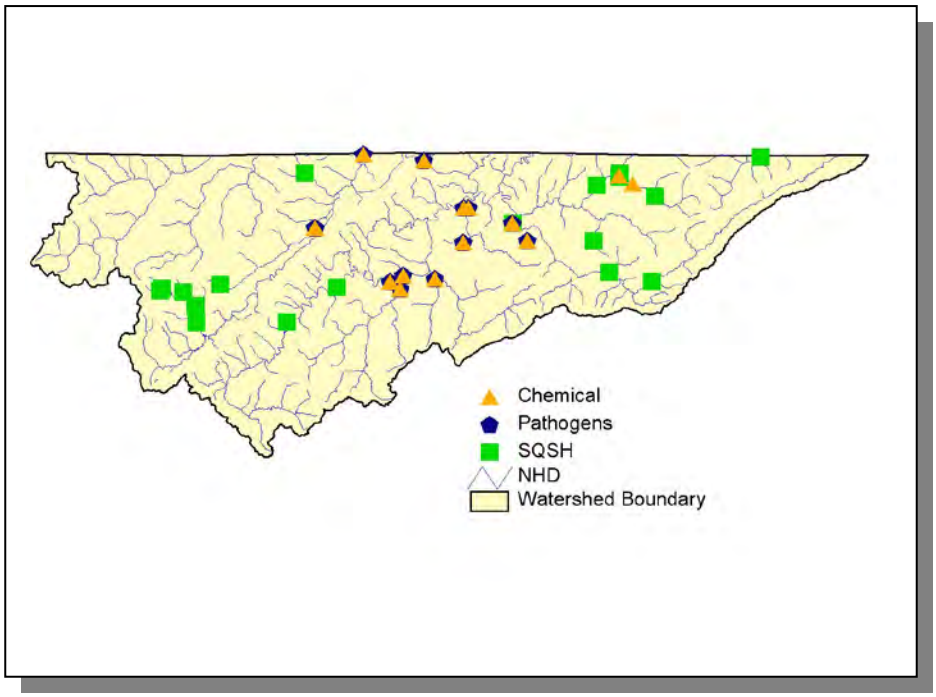

Figure 3-2. Location of Monitoring Sites in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed (July 1, 2000 through June 30, 2005). *Pathogens include E. coli and fecal coliform; NHD, National Hydrography Dataset of Streams; SQSH, Semi-Quantitative Single Habitat Assessment.*

	1996	**2000-2005**
Biological	2	25
Chemical	14	132
Total	**16**	**157**

Table 3-1. Number of Sampling Events in the Tennessee Portion of the Clear Fork of the Cumberland 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-Knoxville 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 Clear Fork of the Cumberland 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 Clear Fork of the Cumberland River Watershed lies within 1 Level III ecoregion (Central Appalachians) and contains 1 subecoregion (Level IV):

- Cumberland Mountains (69d)

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.

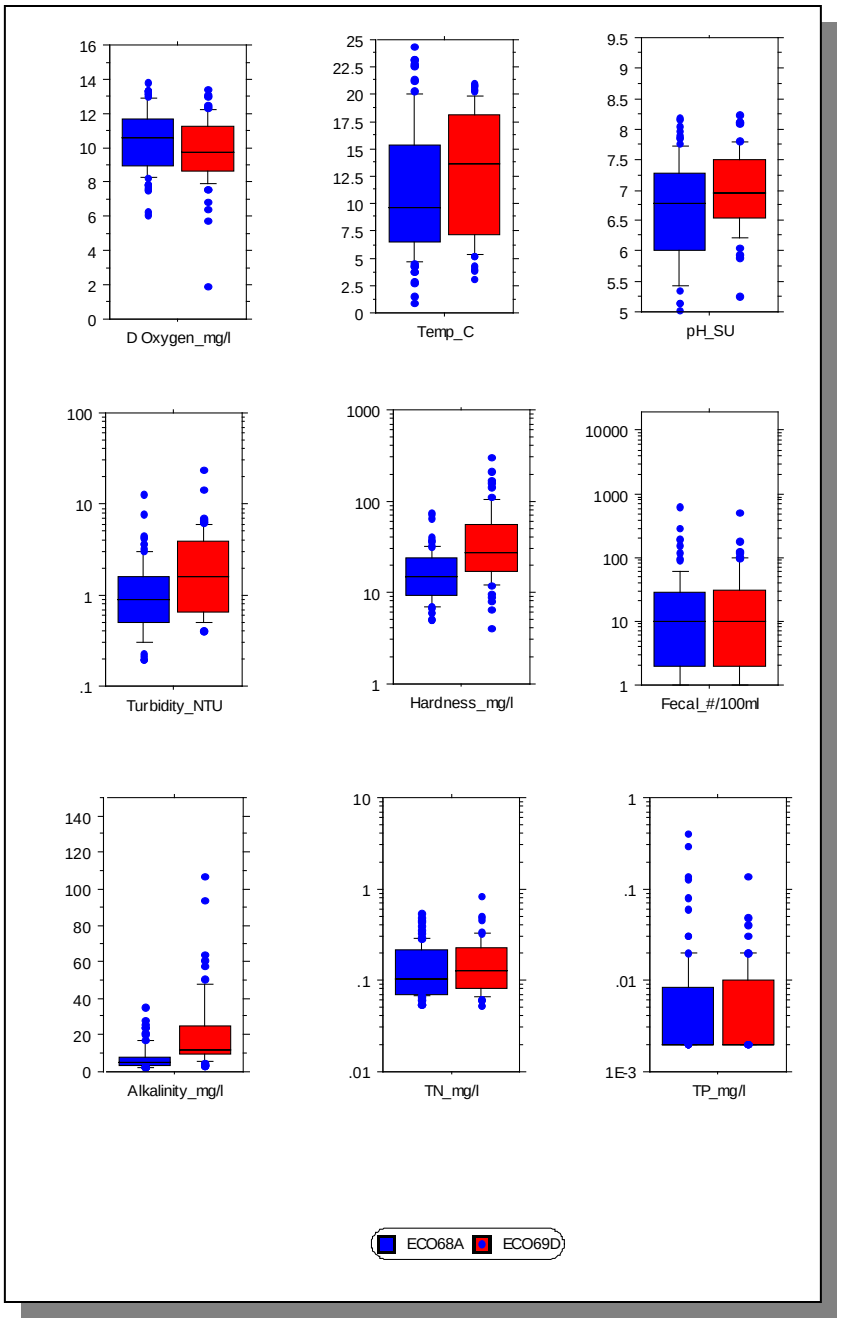

Figure 3-3. Select Chemical Data Collected in the Tennessee Portion of Clear Fork of the Cumberland River Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th percentiles. Extreme values are also shown as dots. Fecal, fecal coliform bacteria; TN, Total Nitrogen; TP,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

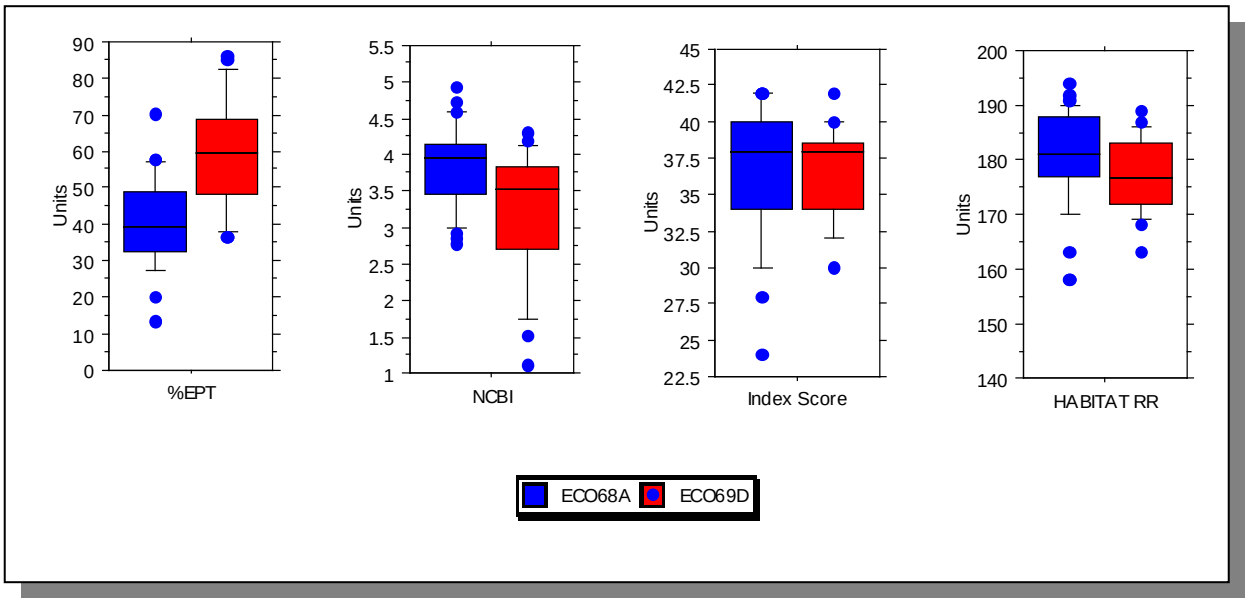

Figure 3-4. Benthic Macroinvertebrate and Habitat Scores for the Tennessee Portion of Clear Fork of the Cumberland River Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th percentiles. Extreme values are also shown as dots. NCBI, North Carolina Biotic Index. Index 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. 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.

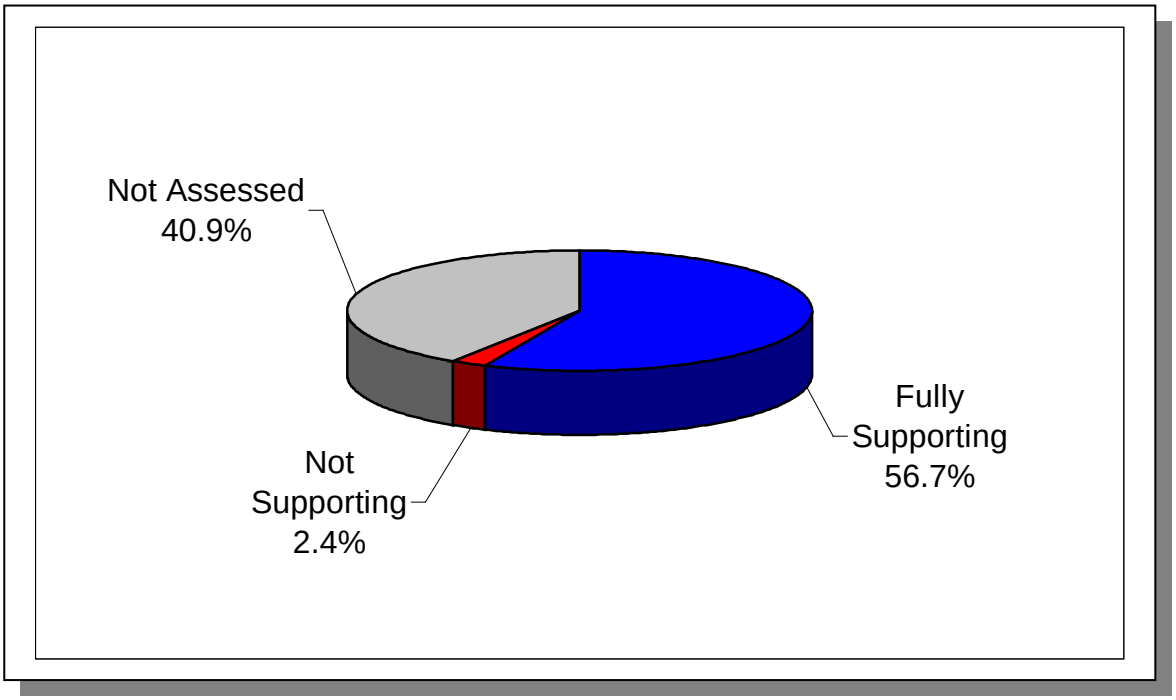

Figure 3-5. Water Quality Assessment of Streams in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed. *Assessment data are based on the 2004 Water Quality Assessment of 442.6 stream miles in the watershed. More information is provided in Appendix III.*

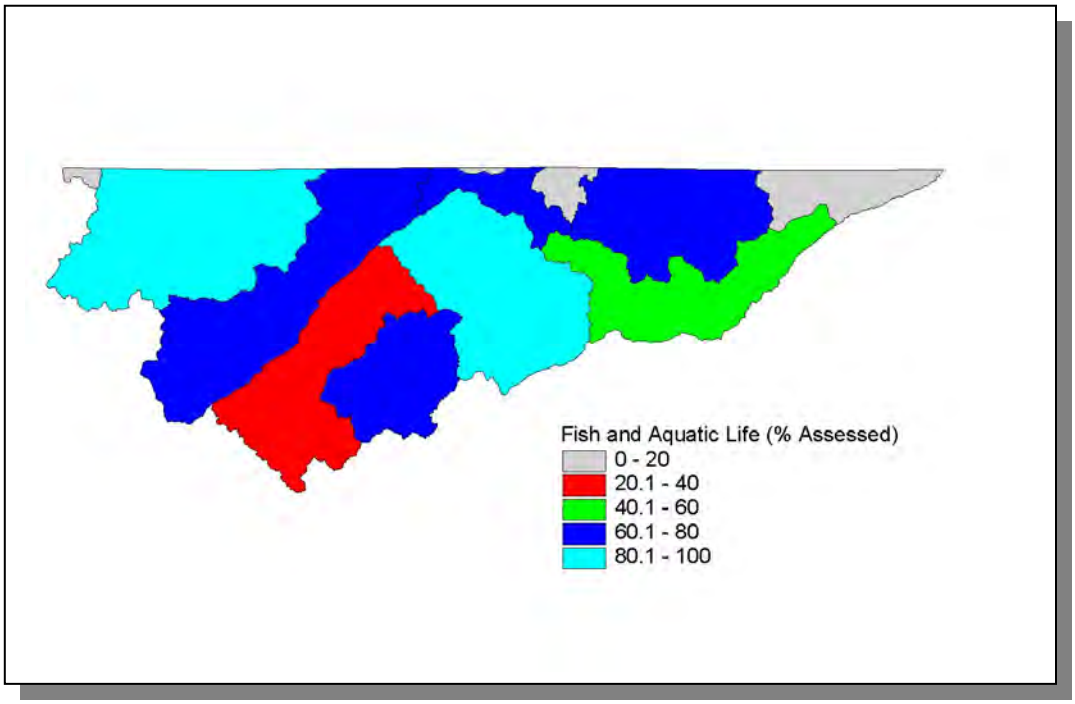

Figure 3-6. Percentage of Stream Miles Assessed for Support of Fish and Aquatic Life Designated Use in HUC-12 Subwatersheds.

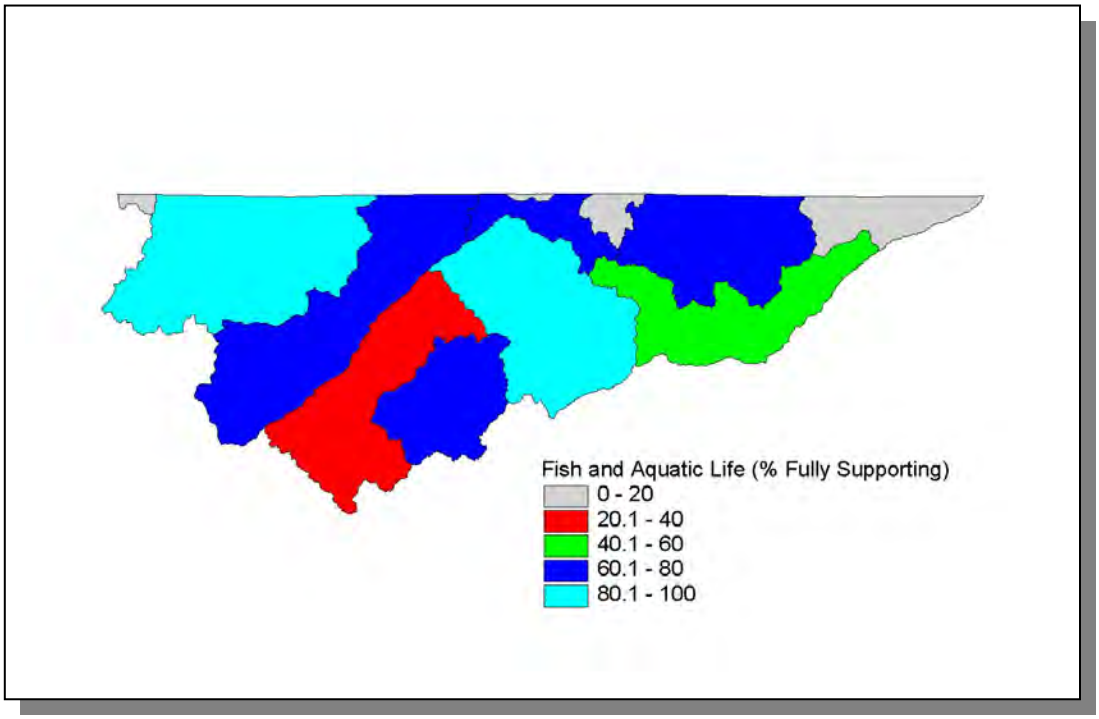

Figure 3-7. Percentage of Stream Miles Fully Supporting for Fish and Aquatic Life Designated Use in HUC-12 Subwatersheds.

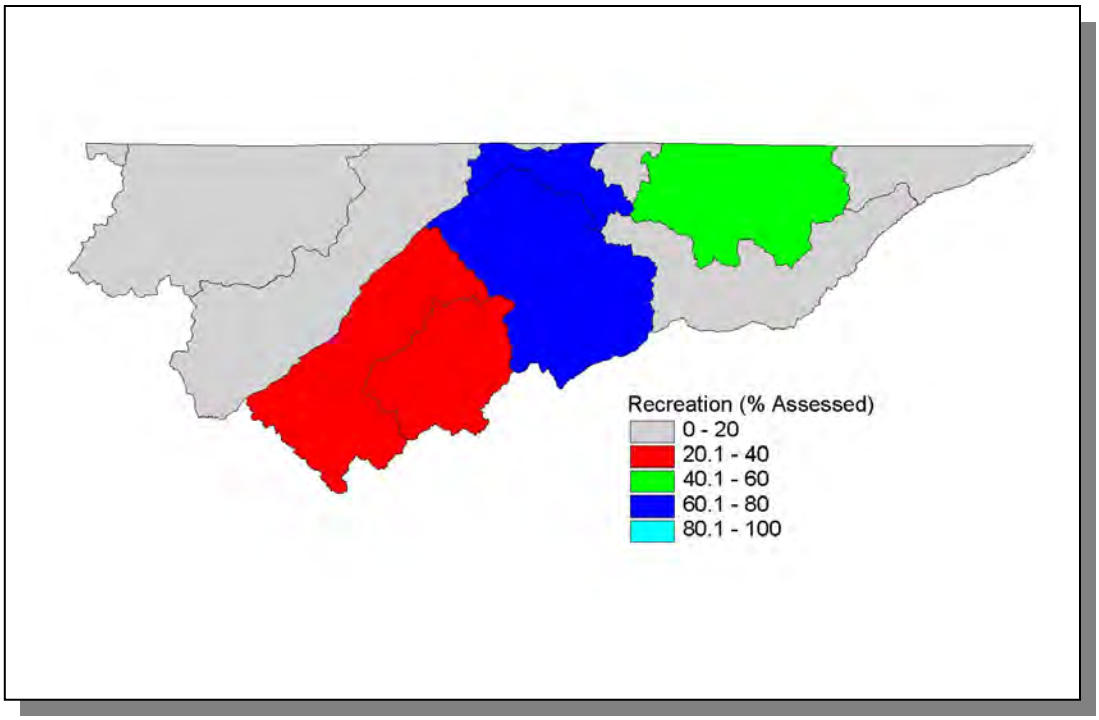

Figure 3-8. Percentage of Stream Miles Assessed for Support of Recreation Designated Use in HUC-12 Subwatersheds.

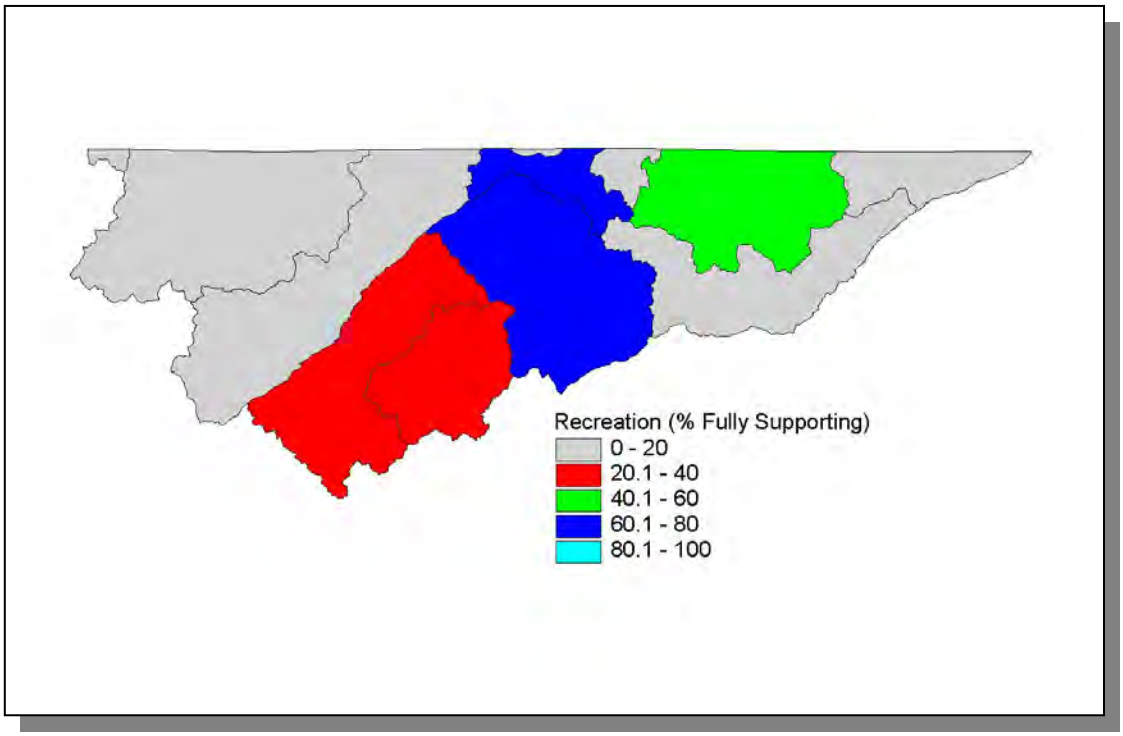

Figure 3-9. Percentage of Stream Miles Fully Supporting for Recreation Designated Use in HUC-12 Subwatersheds.

3.3.A. Assessment Summary.

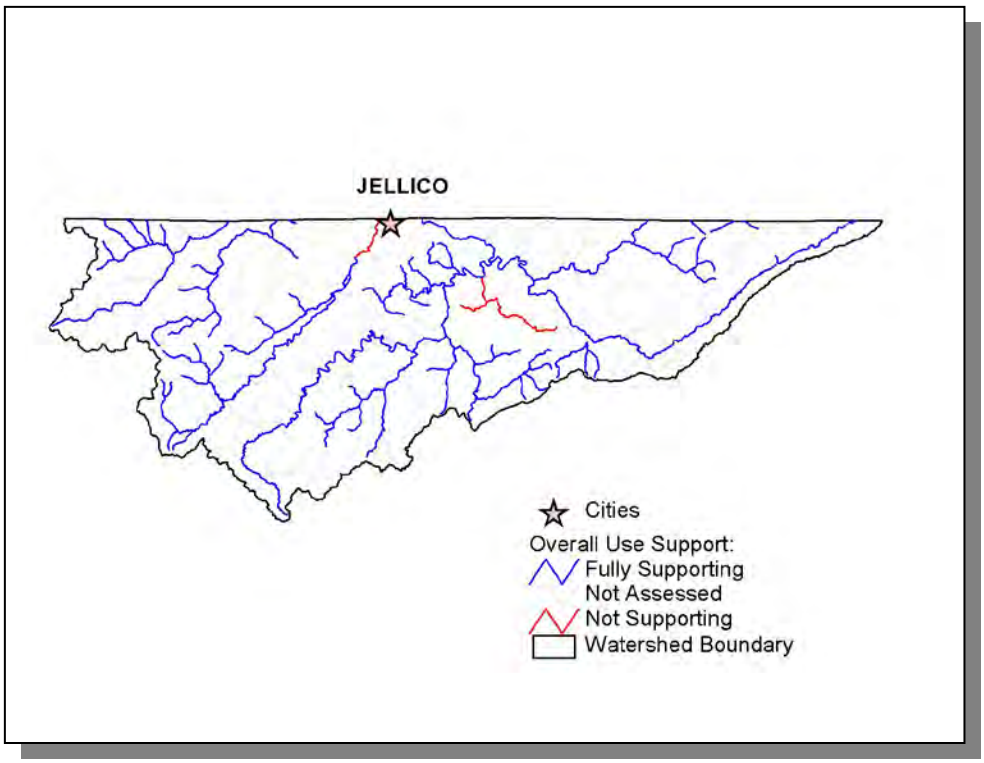

Figure 3-10. Overall Use Support Attainment in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Location of Jellico is shown for reference. More information is provided in Appendix III.*

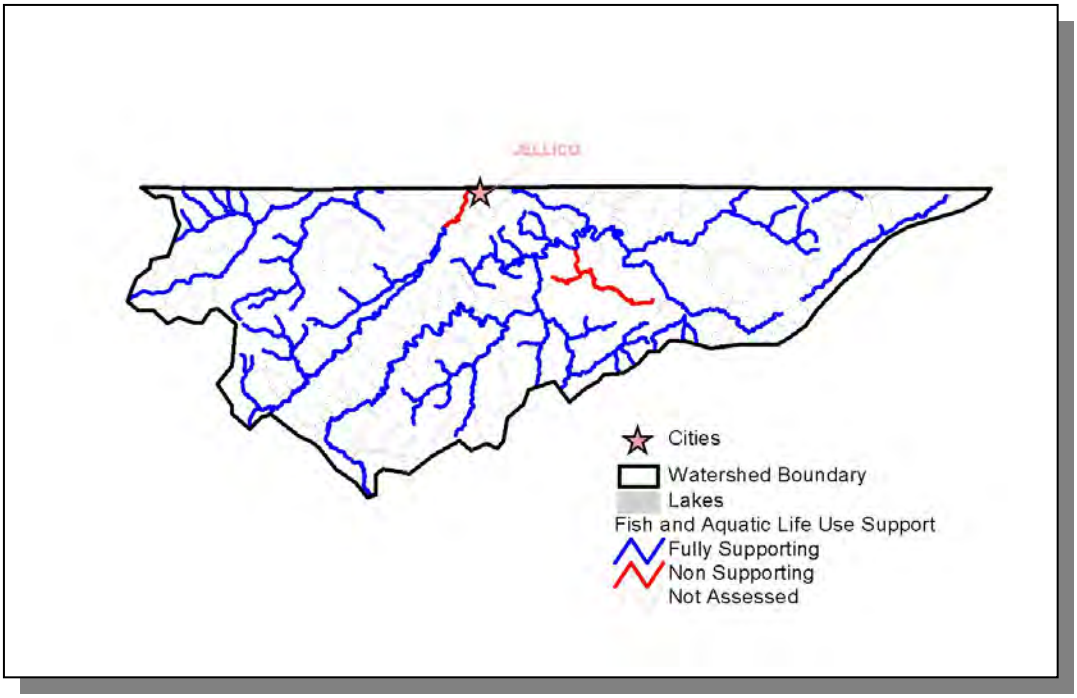

Figure 3-11. Fish and Aquatic Life Use Support Attainment in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Location of Jellico is shown for reference. More information is provided in Appendix III.*

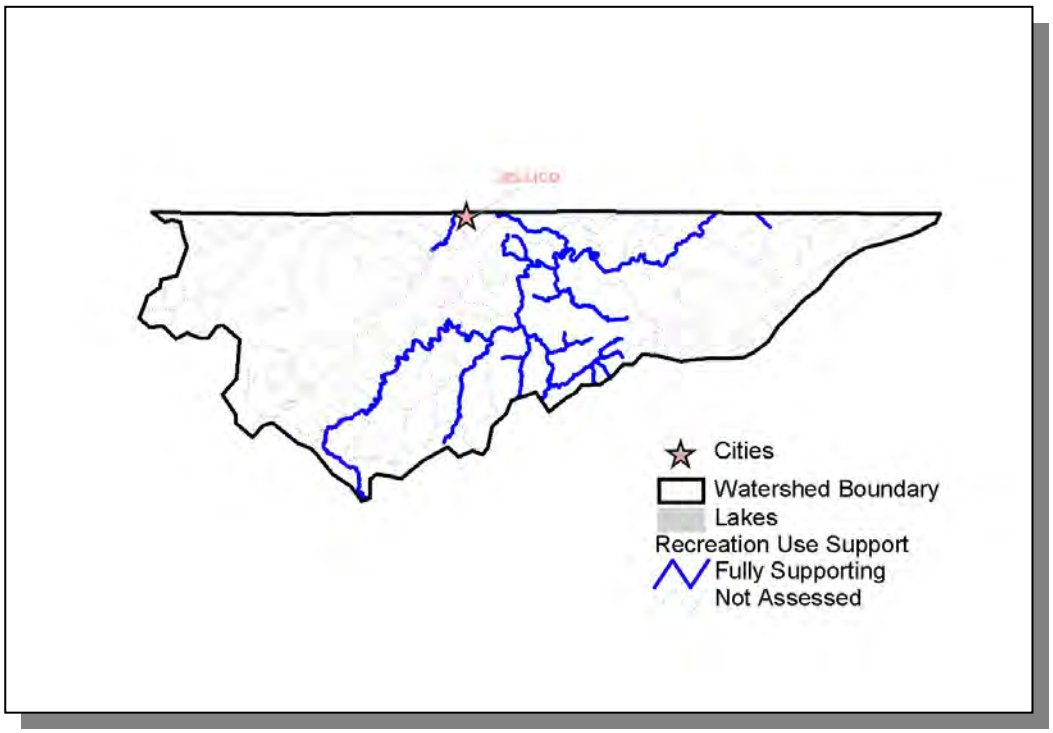

Figure 3-12. Recreation Use Support Attainment in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Location of Jellico is shown for reference. More information is provided in Appendix III.*

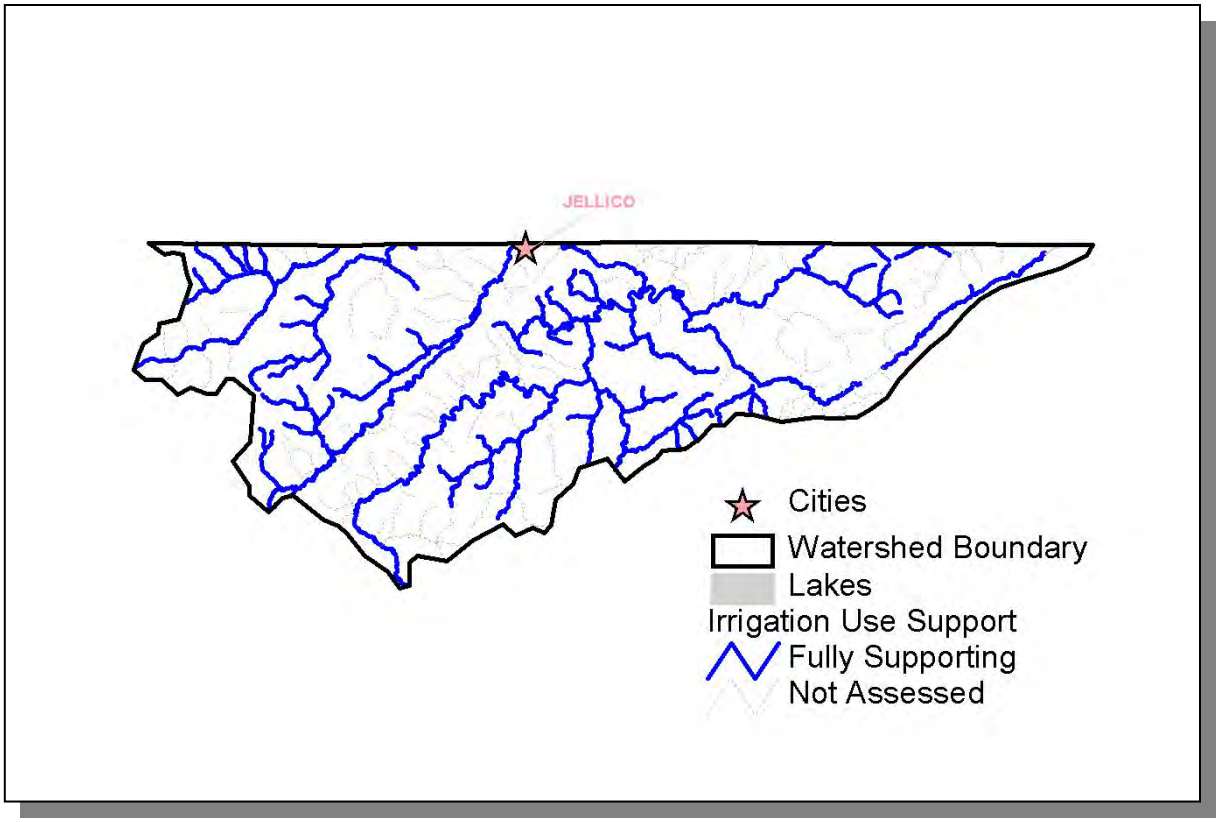

Figure 3-13. Irrigation Use Support Attainment in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Location of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

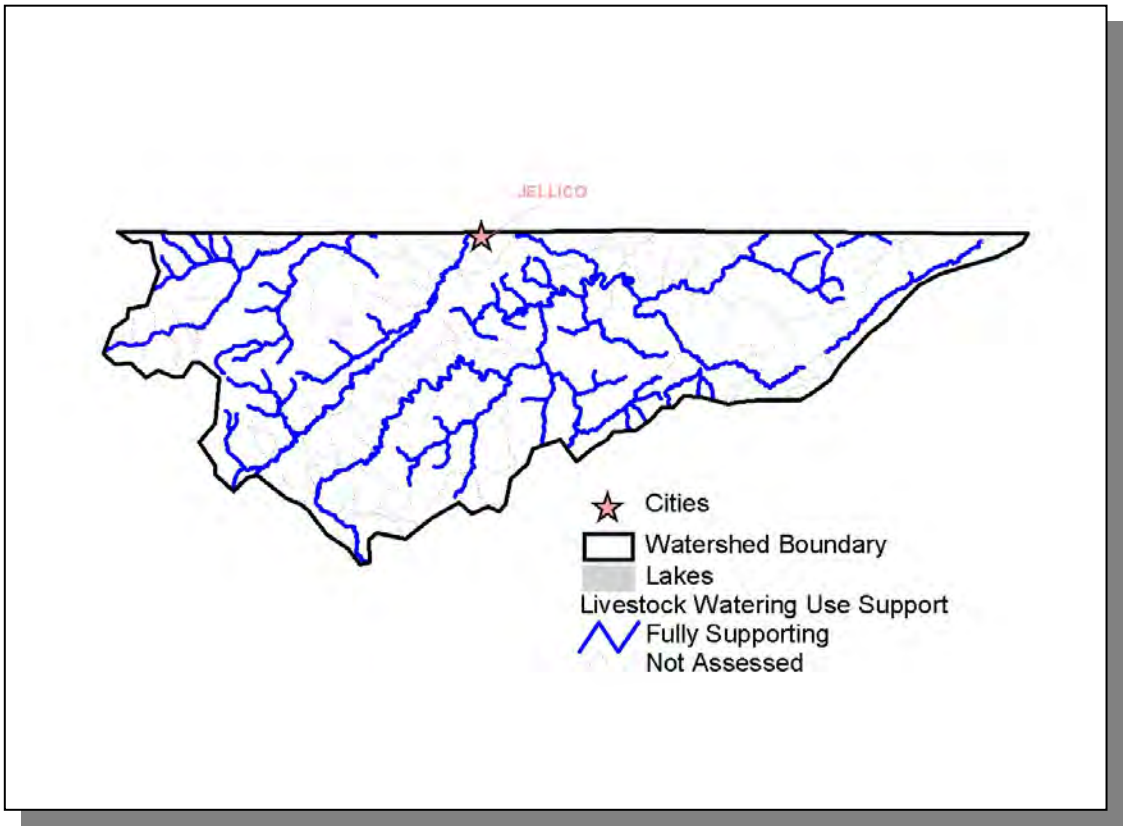

Figure 3-14. Livestock Watering and Wildlife Use Support Attainment in the Tennessee Portion of the Clear Fork Cumberland River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Location of Jellico is shown for reference. More information is provided in Appendix III.*

3.3.B. Use Impairment Summary.

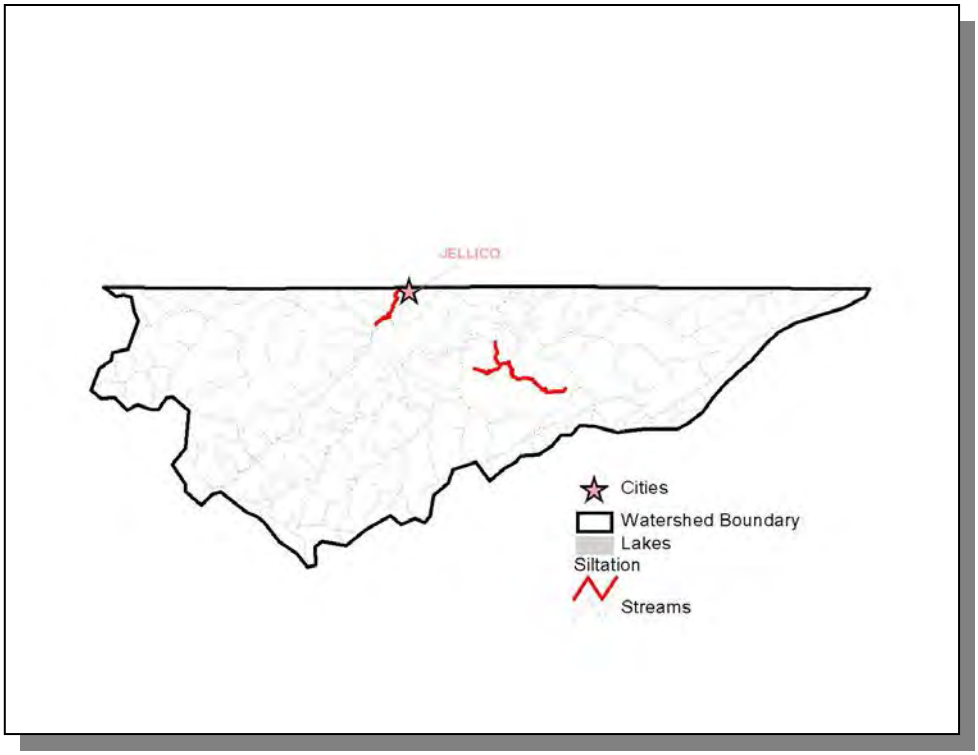

Figure 3-15. Impaired Streams Due to Siltation in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Location of Jellico is shown for reference. More information is provided in Appendix III.*

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 CLEAR FORK OF THE CUMBERLAND RIVER WATERSHED

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

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

The Tennessee portion of the Clear Fork of the Cumberland River Watershed (HUC 05130101) has been delineated into five HUC 10 (10-digit) subwatersheds, each of which is composed of one 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.

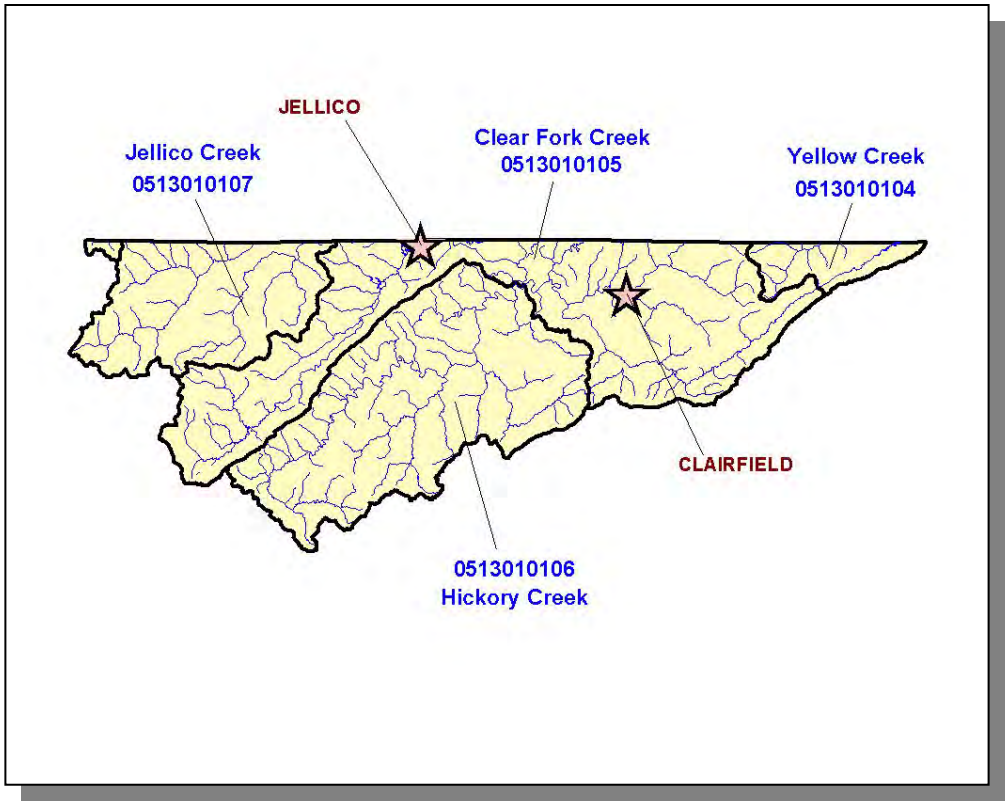

Figure 4-1. The Tennessee Portion of the Clear Fork of the Cumberland River Watershed is Composed of Five USGS-Delineated Subwatersheds (10-Digit Subwatersheds). *Locations of Clairfield and Jellico are shown for reference.*

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 Clear Fork of the Cumberland River Watershed.

HUC-10	HUC-12
0513010104	051301010401 (Yellow Creek)
0513010105	051301010501 (Clear Fork Creek)
	051301010502 (Tackett Creek)
	051301010503 (Clear Fork Creek)
	051301010504 (Laural Creek)
	051301010505 (Mud Creek)
	051301010506 (Elk Fork Creek)
0513010106	051301010601 (Hickory Creek)
	051301010602 (Stinking Creek)
	051301010603 (Hickory Creek)
0513010107	051301010701 (Jellico Creek)
0513010108	051301010801 (Marsh Creek)

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

4.2.A. 0513010104.

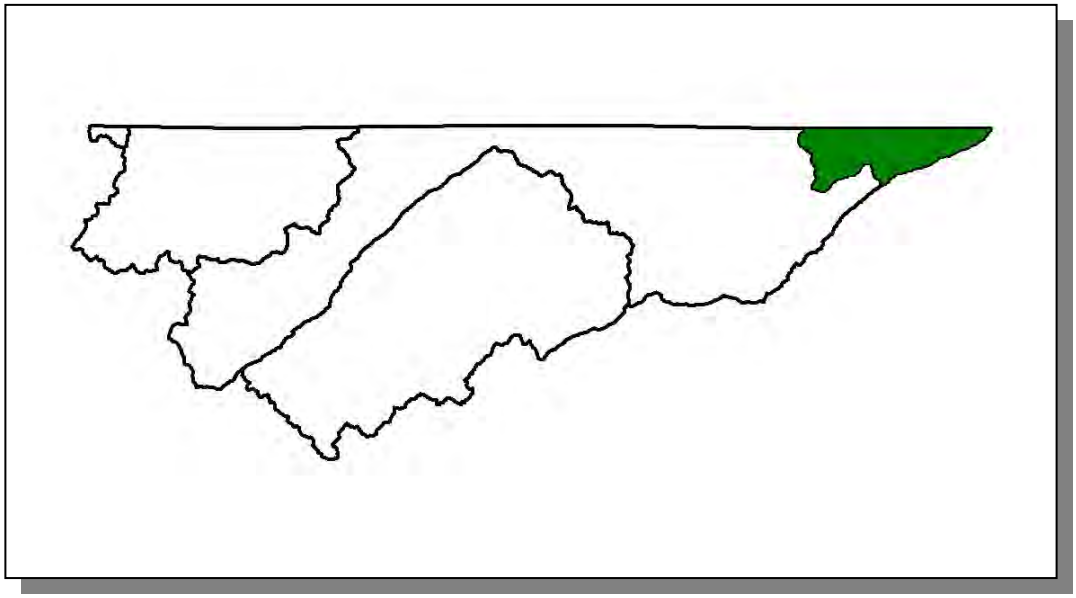

Figure 4-2. Location of Subwatershed 0513010104. *All Clear Fork of the Cumberland River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.A.i. 051301010401 (Yellow Creek).

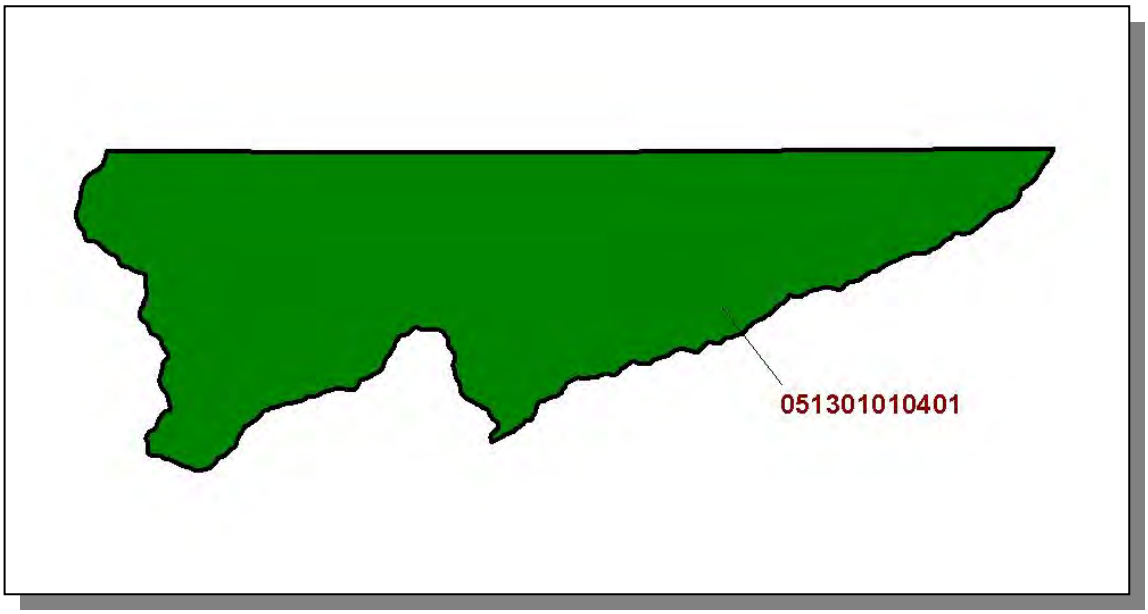

Figure 4-3. Location of Subwatershed 051301010401. *All Clear Fork of the Cumberland River Watershed HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

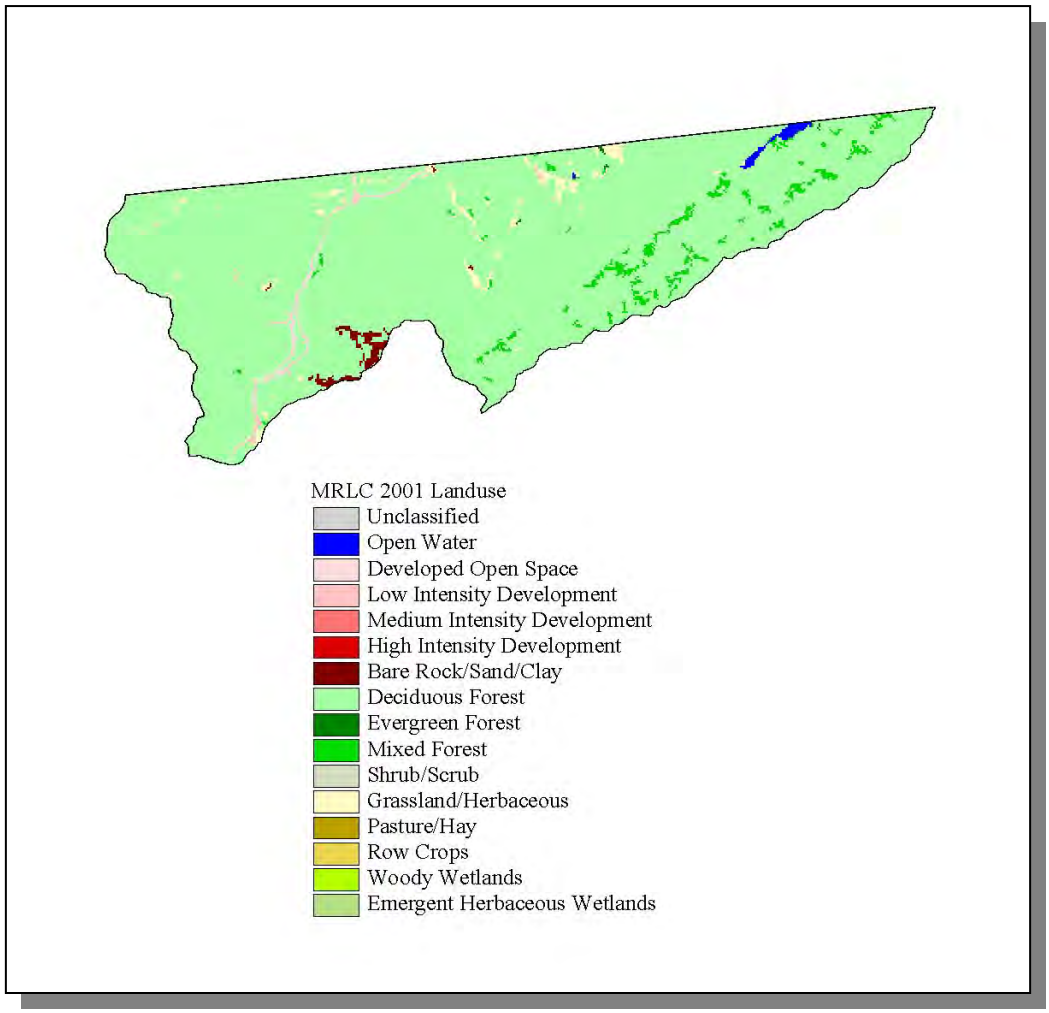

Figure 4-4. Illustration of Land Use Distribution in Subwatershed 051301010401.

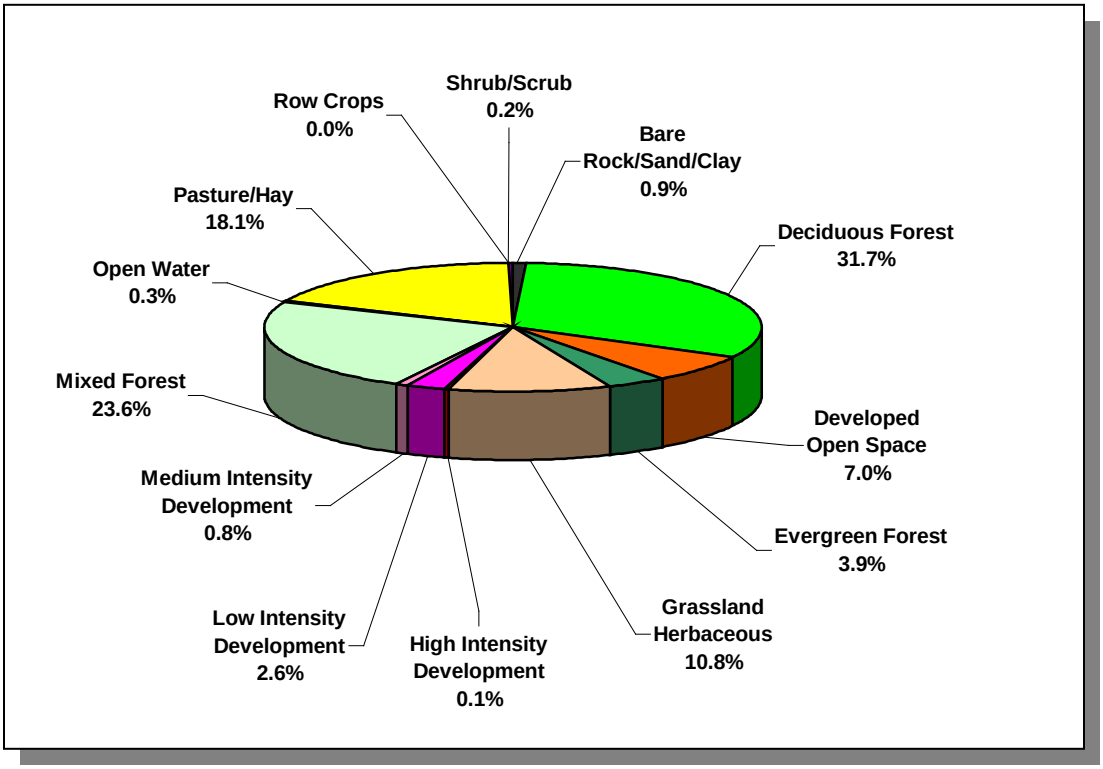

Figure 4-5. Land Use Distribution in Subwatershed 051301010401. *More information is provided in Appendix IV.*

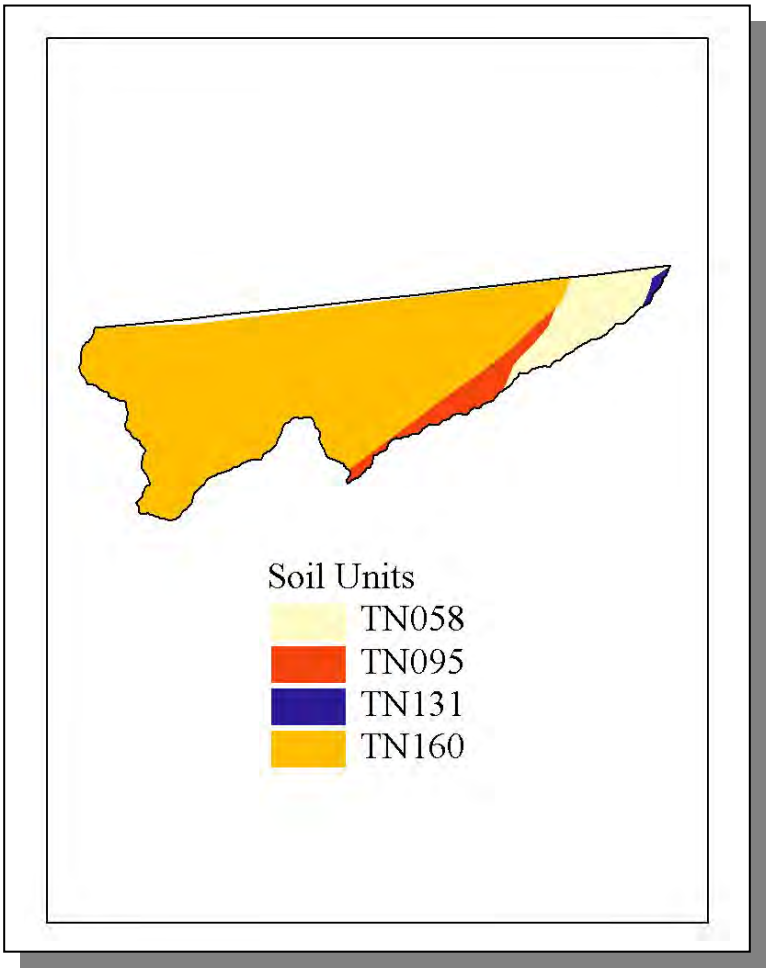

Figure 4-6. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010401.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN058	0.00	B	4.50	5.00	Loam	0.25
TN095	0.00	B	2.35	5.12	Loam	0.31
TN131	0.00	C	1.17	4.95	Silty Loam	0.33
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-2. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010401. *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)
Claiborne	26,137	28,963	29,862	3.06	801	887	915	14.2

Table 4-3. Population Estimates in Subwatershed 051301010401.

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

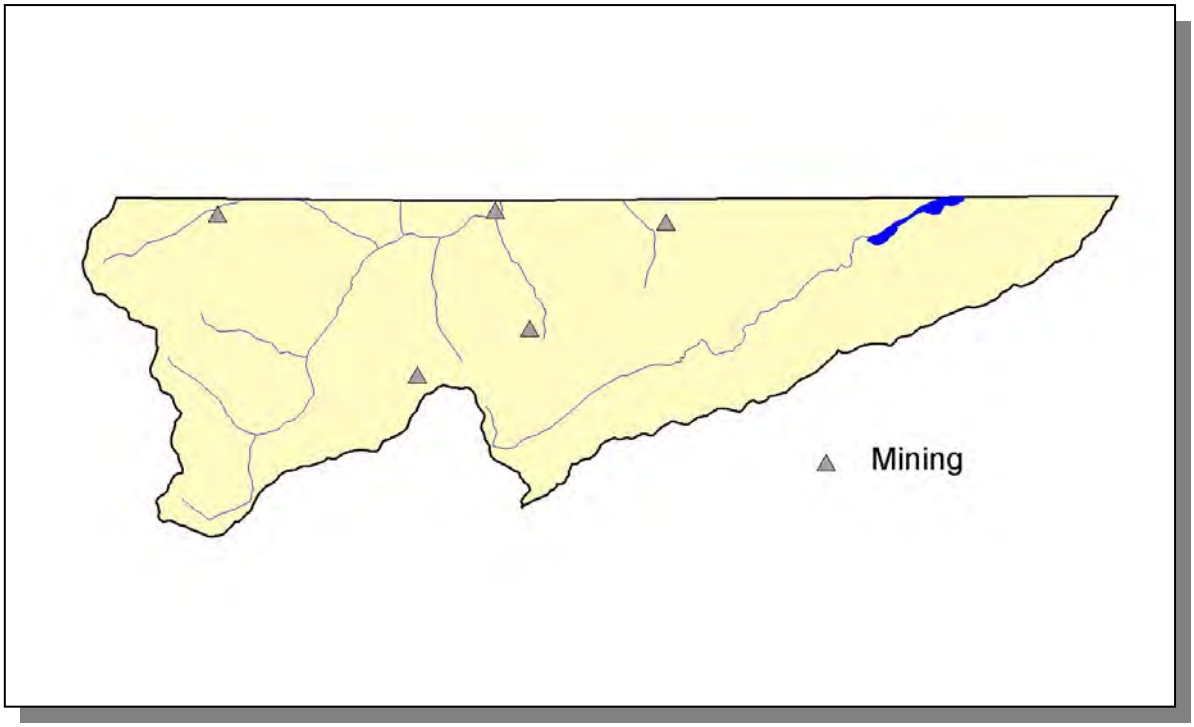

Figure 4-7. Location of Permits Issued in Subwatershed 051301010401. *More information, including the names of facilities, is provided in Appendix IV.*

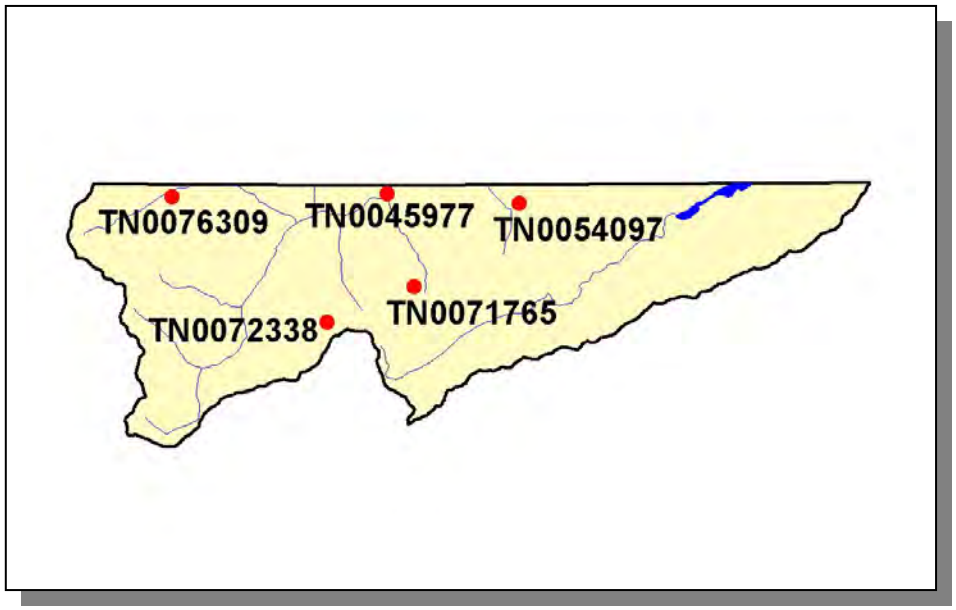

Figure 4-8. Location of Active Mining Sites in Subwatershed 051301010401. *More information, including the names of mining operations, is provided in Appendix IV.*

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

LIVESTOCK COUNT	
Beef Cow	Cattle
6	11

Table 4-4. Summary of Livestock Count Estimates in Subwatershed 051301010401. *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)	Sheep
Claiborne	18,697	36,566	1,082	420	165

Table 4-5. Summary of Livestock Count Estimates in Claiborne County. *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.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Claiborne	167.6	167.6	2.6	12.1

Table 4-6. Forest Acreage and Annual Removal Rates (1987-1994) in Subwatershed 051301010401.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.38
Grass, Forbs, Legumes (Mixed Pasture)	0.13
Farmsteads and Ranch Headquarters	0.43

Table 4-7. Annual Estimated Total Soil Loss in Subwatershed 051301010401.

4.2.B. 0513010105.

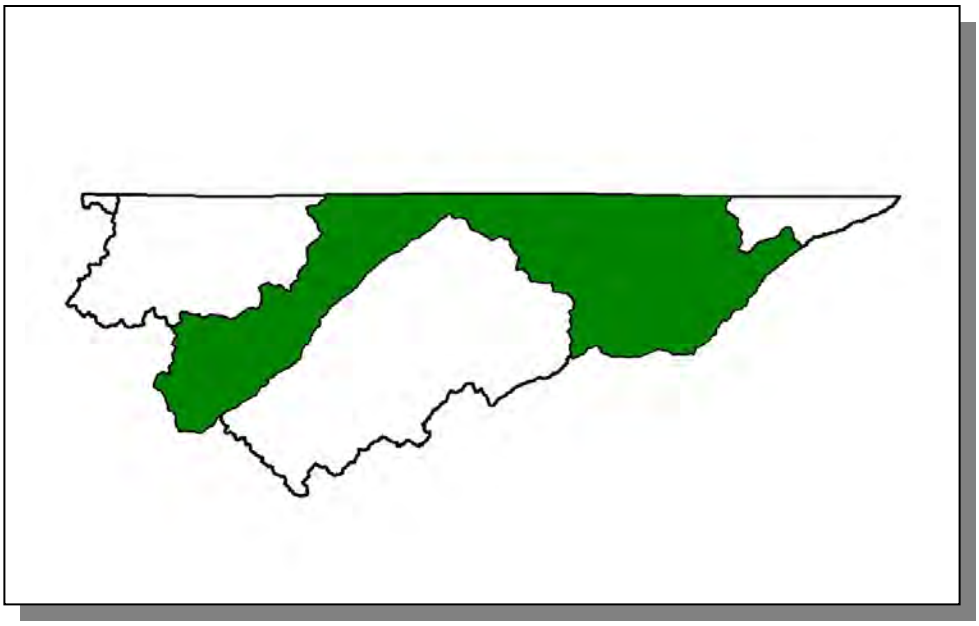

Figure 4-9. Location of Subwatershed 0513010105. *All Clear Fork of the Cumberland River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.B.i. 051301010501 (Clear Fork Creek).

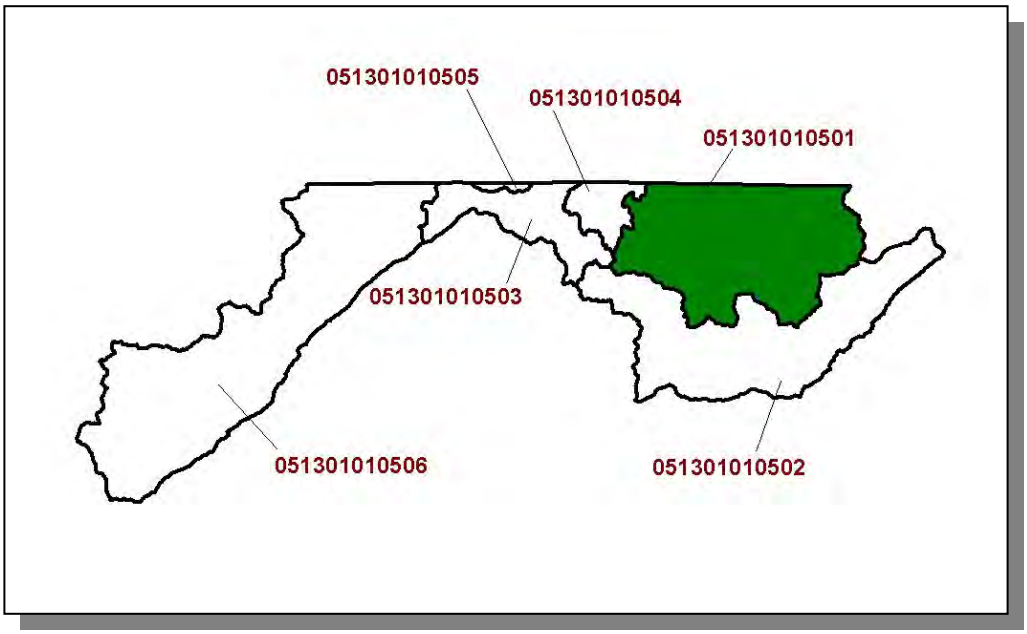

Figure 4-10. Location of Subwatershed 051301010501. *All Clear Fork of the Cumberland River Watershed HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

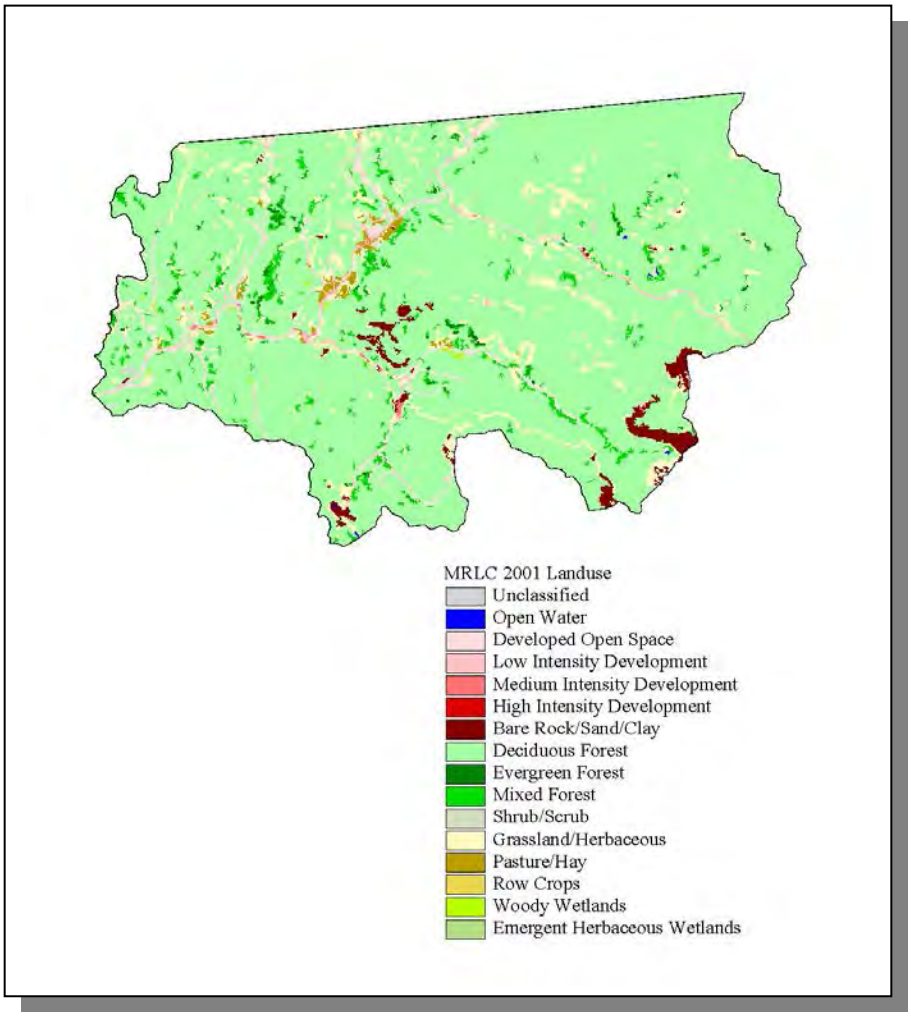

Figure 4-11. Illustration of Land Use Distribution in Subwatershed 051301010501.

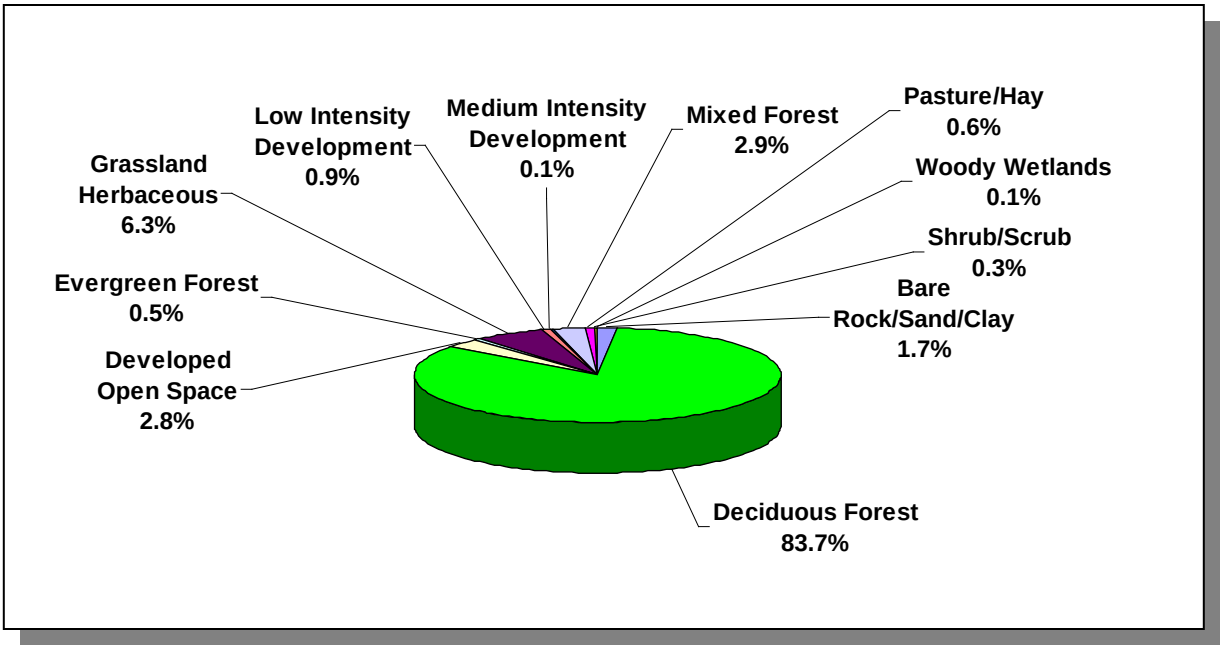

Figure 4-12. Land Use Distribution in Subwatershed 051301010501. *More information is provided in Appendix IV.*

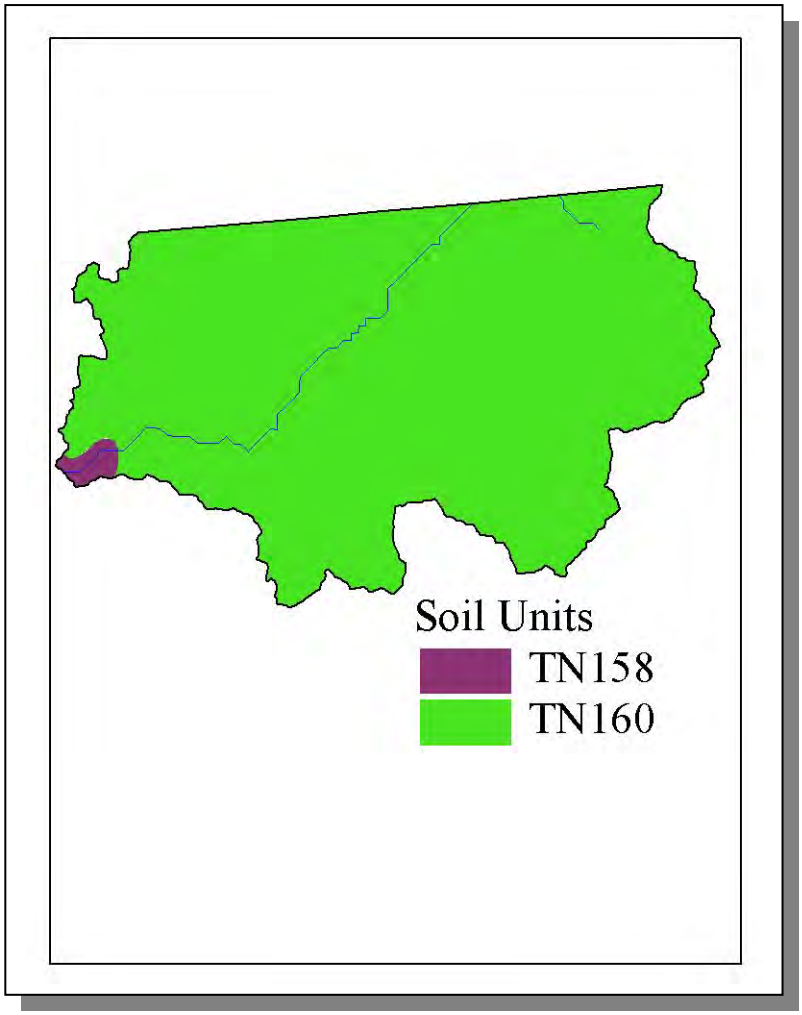

Figure 4-13. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010501.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN058	0.00	B	4.50	5.00	Loam	0.25
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-8. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010501. *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)
Campbell	35,079	37,878	39,854	0.21	74	80	84	13.5
Claiborne	26,137	28,963	29,862	7.63	1,995	2,211	2,279	14.2
Total	**61,216**	**66,841**	**69,716**		**2,069**	**2,291**	**2,363**	**14.2**

Table 4-9. Population Estimates in Subwatershed 051301010501.

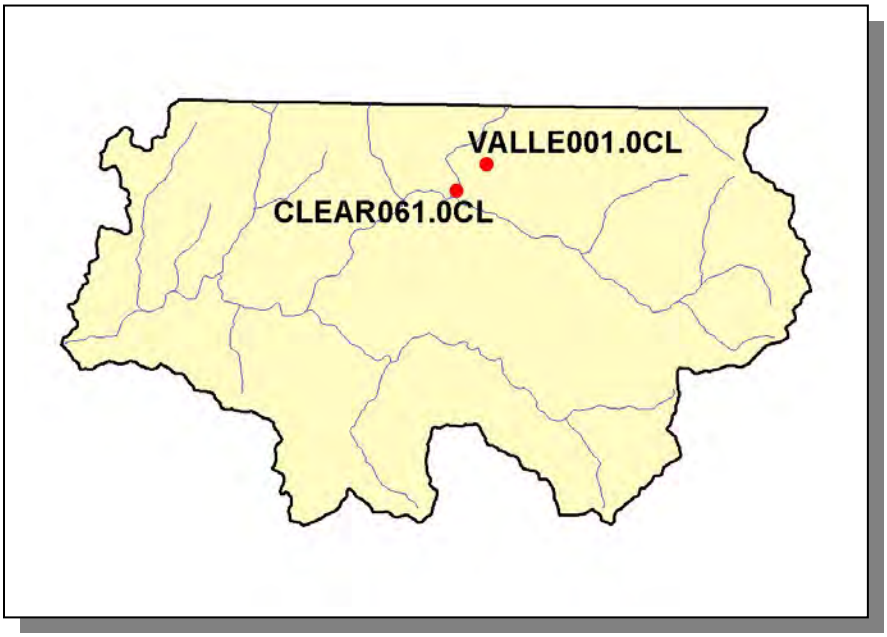

Figure 4-14. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301010501. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

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

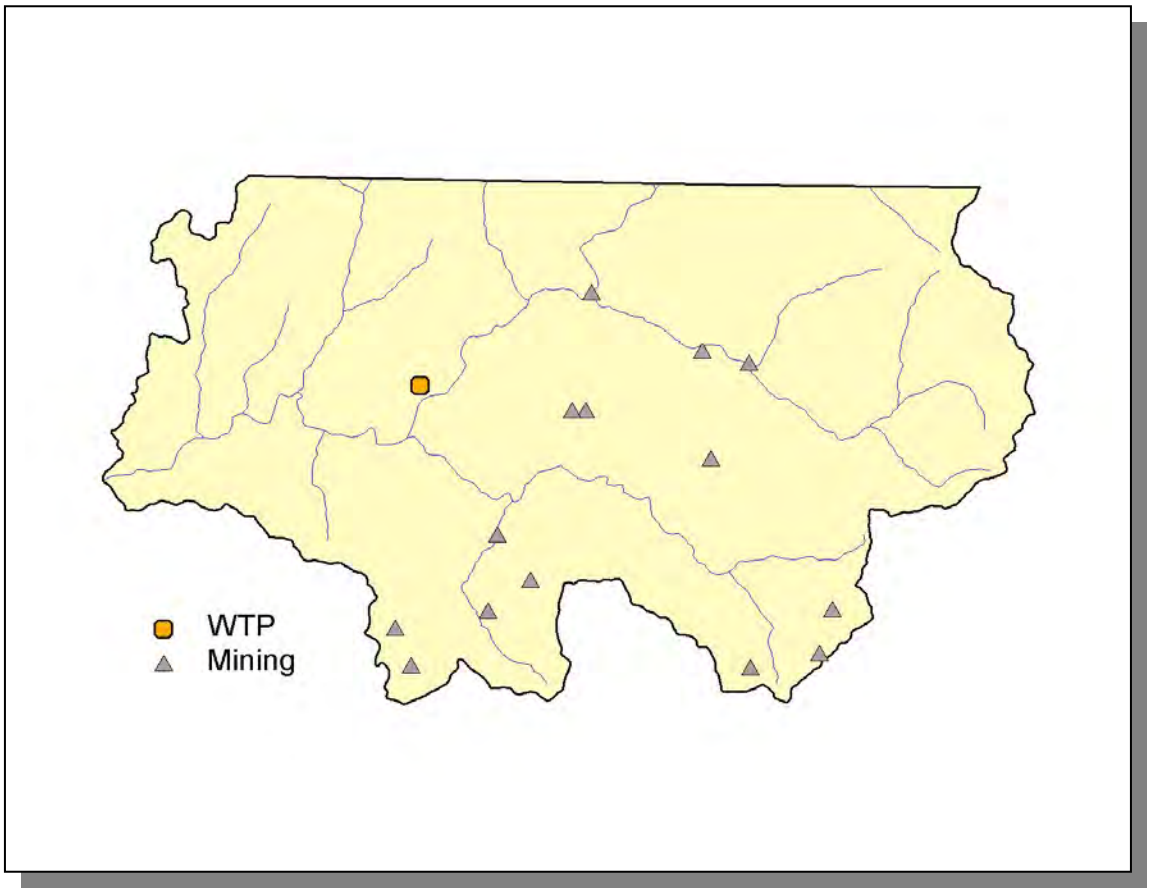

Figure 4-15. Location of Permits Issued in Subwatershed 051301010501. *More information, including the names of facilities, is provided in Appendix IV.*

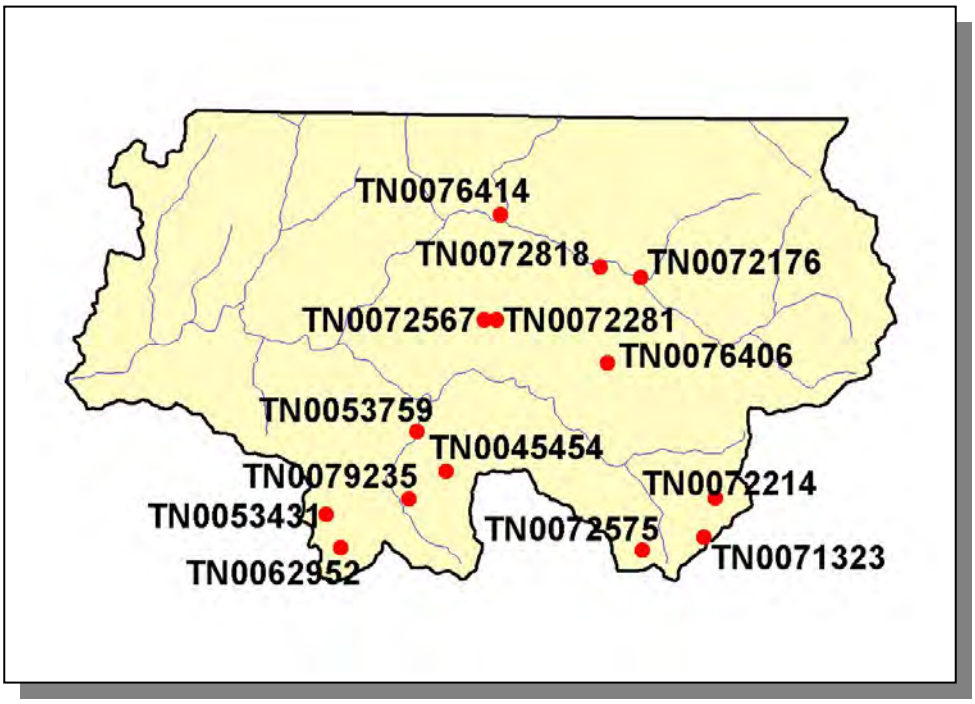

Figure 4-16. Location of Active Mining Sites in Subwatershed 051301010501. *More information, including the names of mining operations, is provided in Appendix IV.*

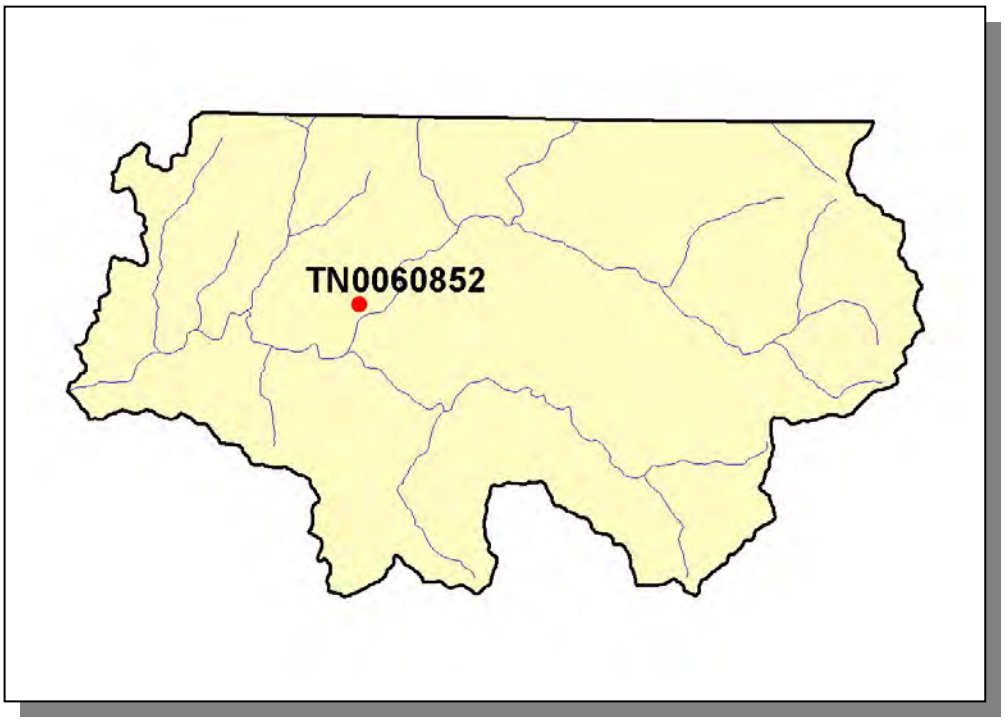

Figure 4-17. Location of Water Treatment Plants in Subwatershed 051301010501. *More information, including the names of facilities, is provided in Appendix IV.*

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

LIVESTOCK COUNTS		
Beef Cow	Cattle	Milk Cow
49	95	3

Table 4-10. Summary of Livestock Count Estimates in Subwatershed 051301010501. *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)	Hogs	Sheep
Campbell	4,083	7,684	66	8	14	0
Claiborne	18,697	36,566	1,082	420	0	165

Table 4-11. Summary of Livestock Count Estimates in Campbell and Claiborne Counties. *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.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Campbell	250.3	250.2	2.6	10.6
Claiborne	167.6	167.6	2.6	12.1

Table 4-12. Forest Acreage and Annual Removal Rates (1987-1994) in Campbell and Claiborne Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.42
Grass (Hayland)	1.78
Legumes, Grass (Hayland)	0.44
Grass, Forbs, Legumes (Mixed Pasture)	0.21
Tobacco (Row Crops)	15.11
Other Vegetable and Truck Crops	3.33
Farmsteads and Ranch Headquarters	0.42

Table 4-13. Annual Estimated Total Soil Loss in Subwatershed 051301010501.

4.2.B.ii. 051301010502 (Tackett Creek).

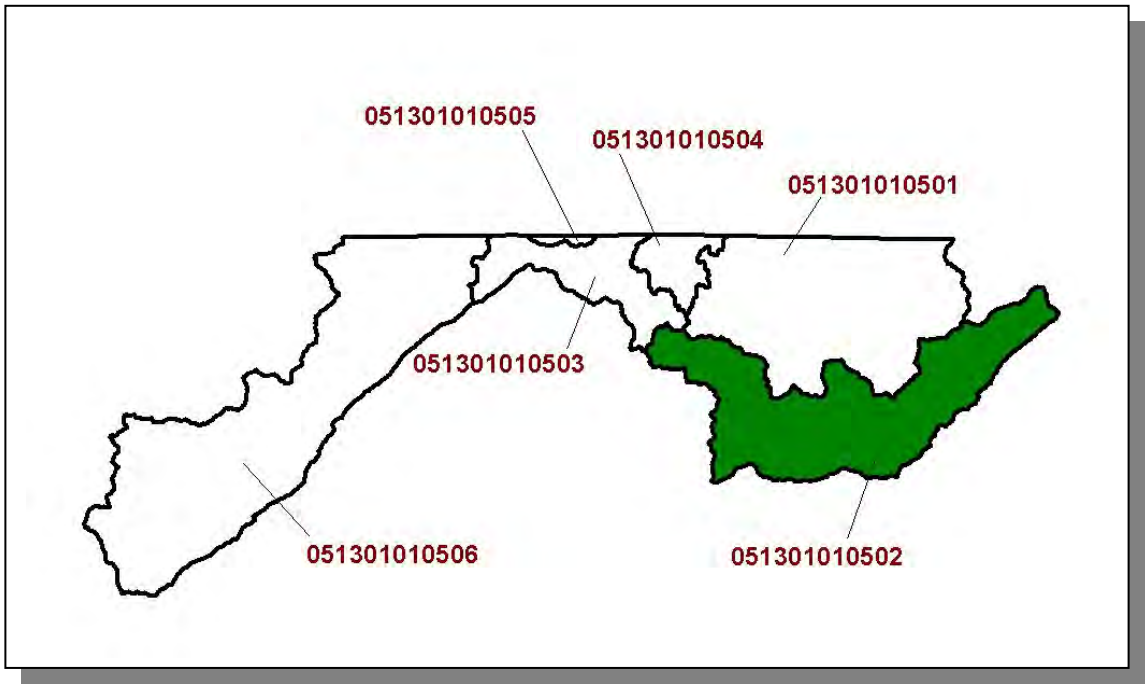

Figure 4-18. Location of Subwatershed 051301010502 *All Clear Fork of the Cumberland River Watershed HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

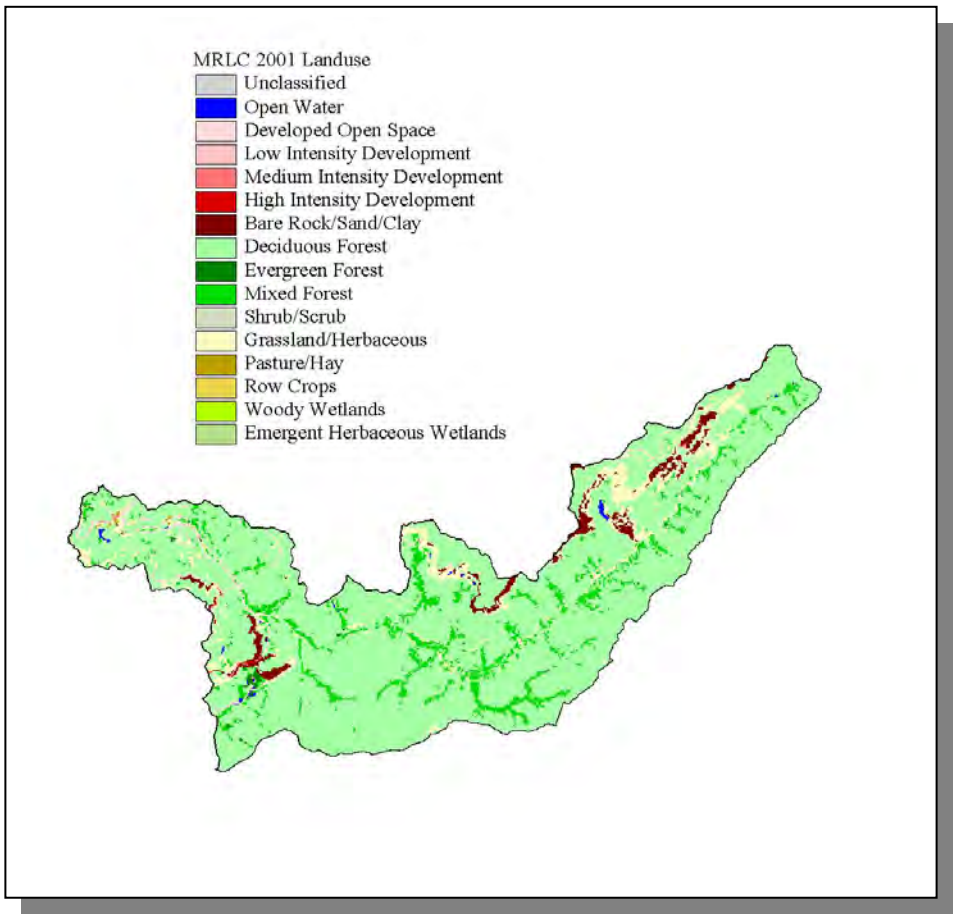

Figure 4-19. Illustration of Land Use Distribution in Subwatershed 051301010502.

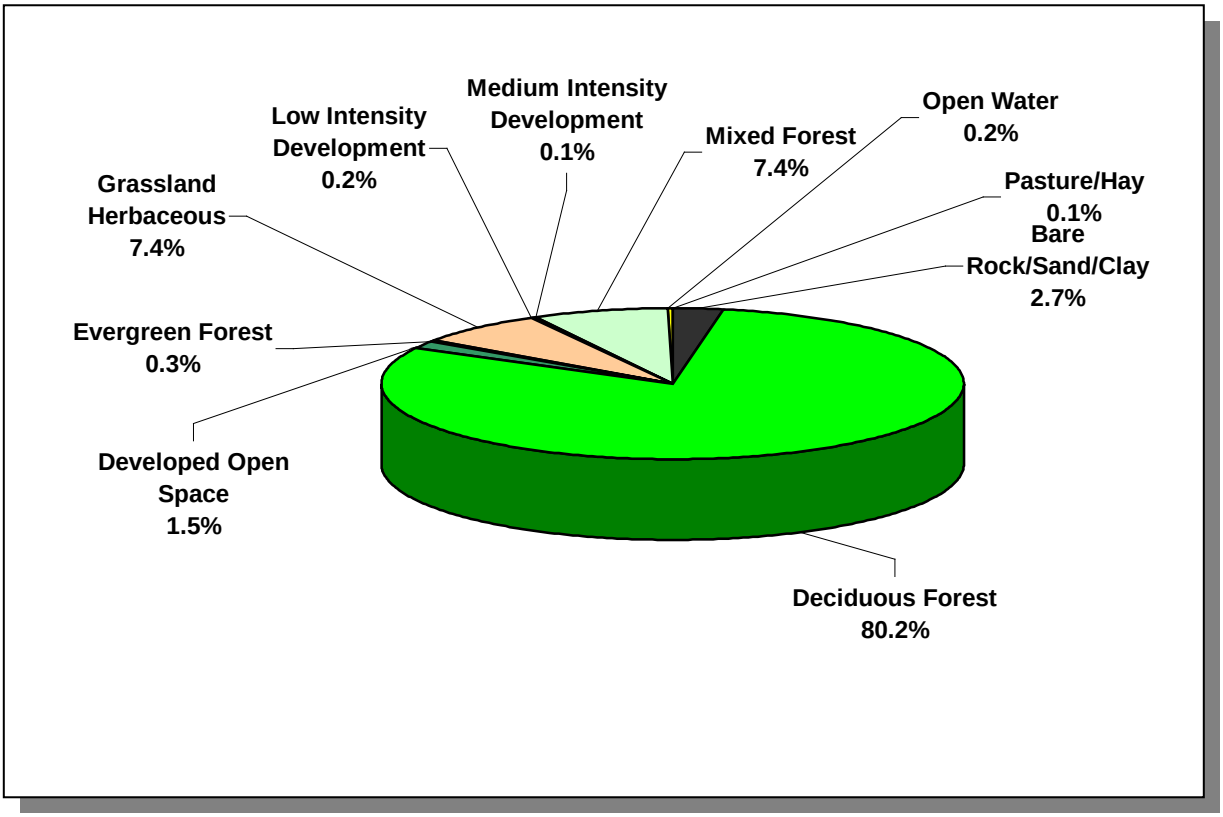

Figure 4-20. Land Use Distribution in Subwatershed 051301010502. *More information is provided in Appendix IV.*

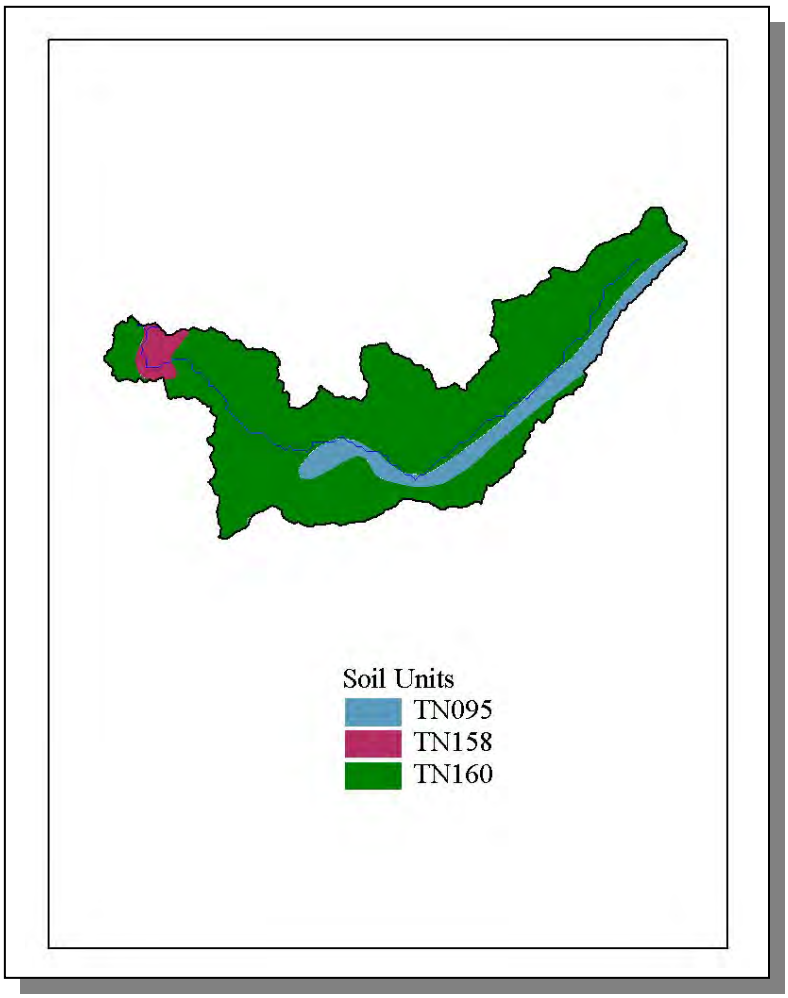

Figure 4-21. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010502.

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
TN158	22.00	C	1.89	5.14	Silty Loam	0.29
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-14. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010502. *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)
Campbell	35,079	37,878	39,854	1.75	612	661	696	13.7
Claiborne	26,137	28,963	29,862	5.61	1,467	1,626	1,677	14.3
Total	**61,216**	**66,841**	**69,716**		**2,079**	**2,287**	**2,373**	**14.1**

Table 4-15. Population Estimates in Subwatershed 051301010502.

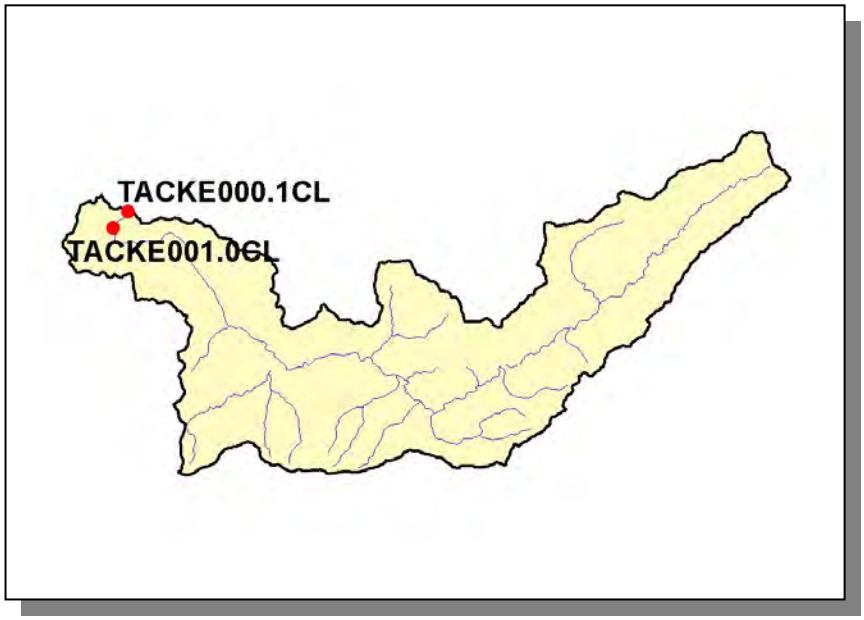

Figure 4-22. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301010502. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

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

Figure 4-23. Location of Permits Issued in Subwatershed 051301010502. *More information, including the names of facilities, is provided in Appendix IV.*

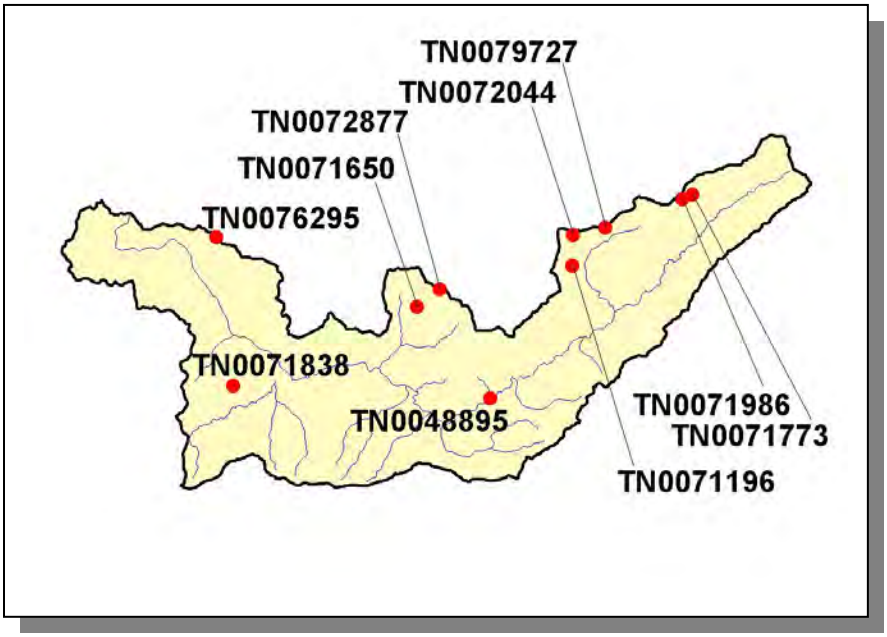

Figure 4-24. Location of Active Mining Sites in Subwatershed 051301010502. *More information, including the names of mining operations, is provided in Appendix IV.*

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

LIVESTOCK COUNTS		
Beef Cow	Cattle	Milk Cow
12	23	<5

Table 4-16. Summary of Livestock Count Estimates in Subwatershed 051301010502. *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	Chicken (Layers)	Hogs	Sheep
Campbell	4,083	7,684	66	8	14	0
Claiborne	18,697	36,566	1,082	420	0	165

Table 4-17. Summary of Livestock Count Estimates in Campbell and Claiborne Counties. *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.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Campbell	250.3	250.2	2.6	10.6
Claiborne	167.6	167.6	2.6	12.1

Table 4-18. Forest Acreage and Annual Removal Rates (1987-1994) in Campbell and Claiborne Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.72
Grass (Hayland)	1.78
Legumes, Grass (Hayland)	0.44
Grass, Forbs, Legumes (Mixed Pasture)	0.79
Tobacco (Row Crops)	15.11
Other Vegetable and Truck Crops	3.33
Farmsteads and Ranch Headquarters	0.34

Table 4-19. Annual Estimated Total Soil Loss in Subwatershed 051301010502.

4.2.B.iii. 051301010503 (Clear Fork Creek).

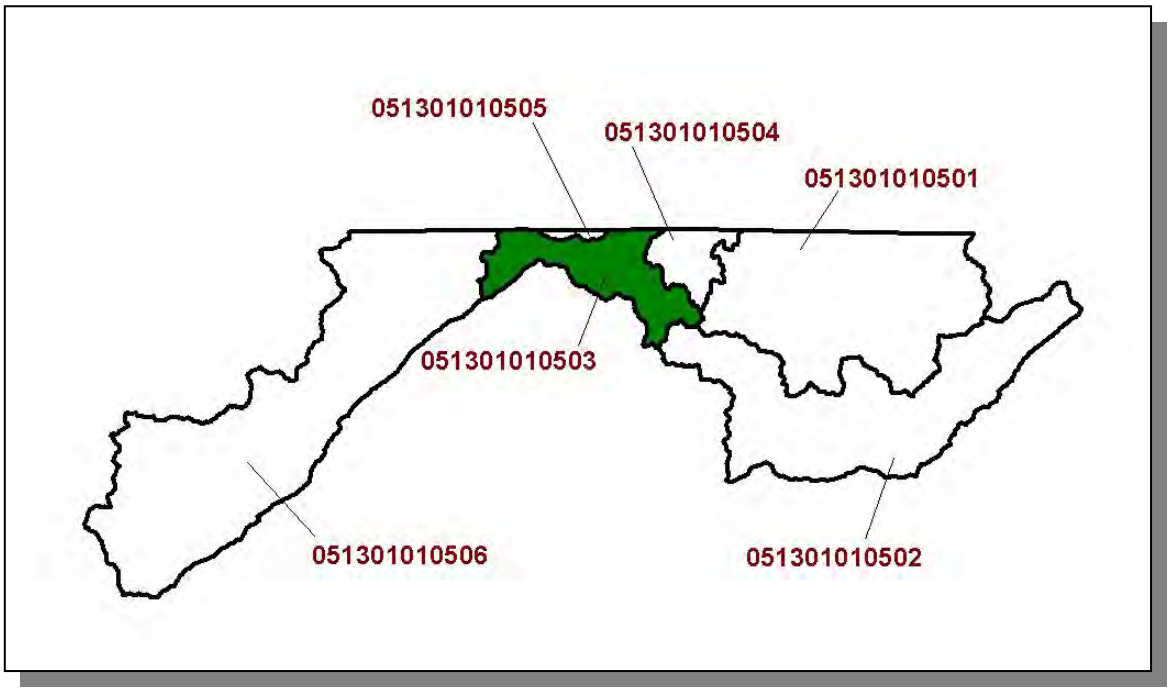

Figure 4-25. Location of Subwatershed 051301010503 *All Clear Fork of the Cumberland River Watershed HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

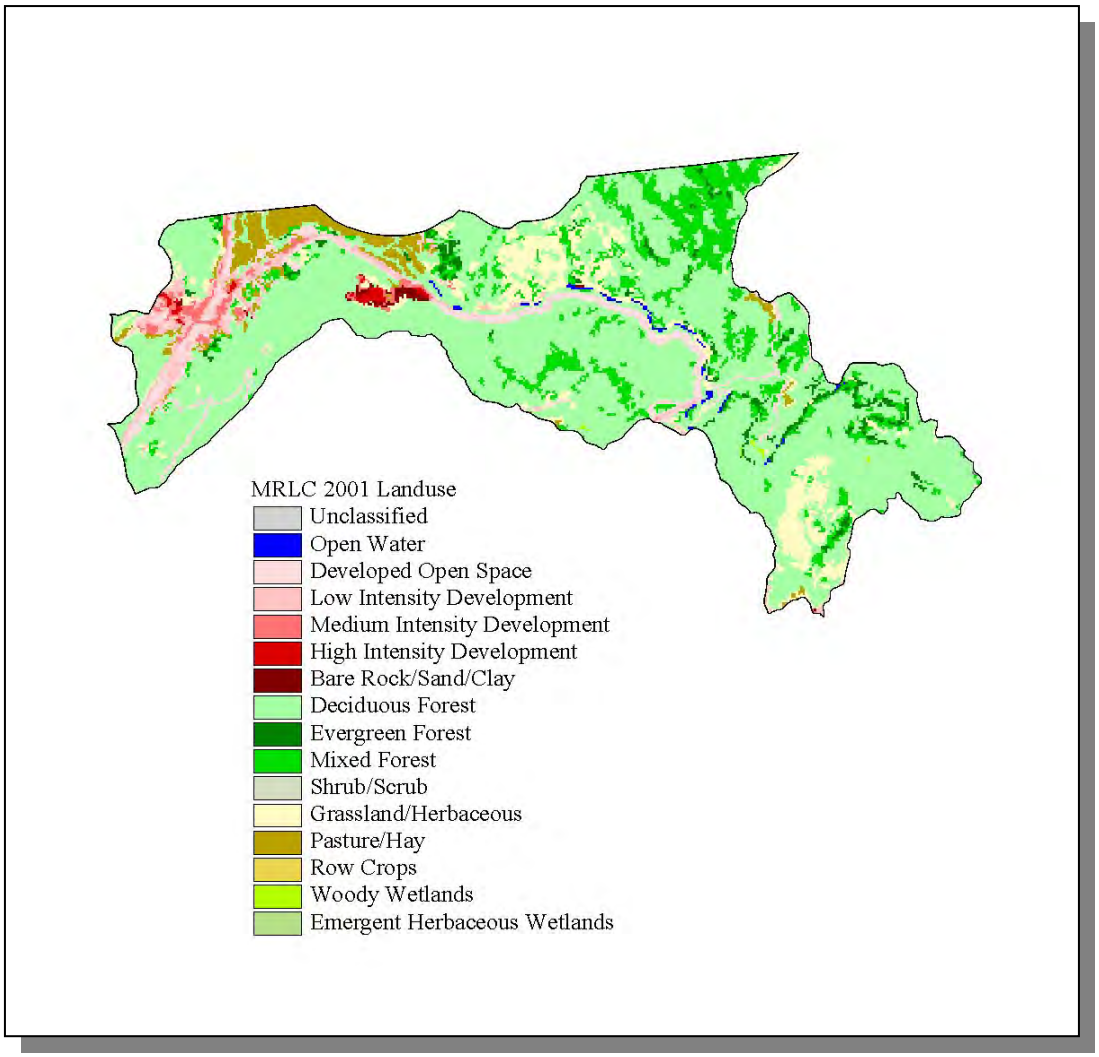

Figure 4-26. Illustration of Land Use Distribution in Subwatershed 051301010503.

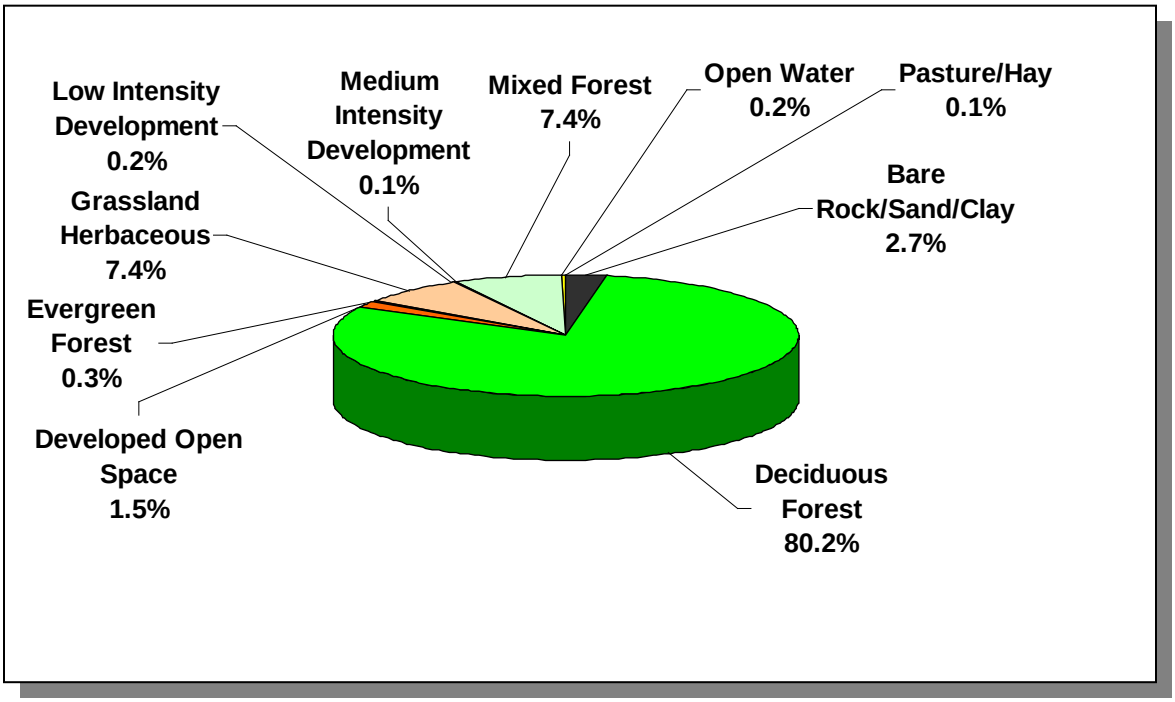

Figure 4-27. Land Use Distribution in Subwatershed 051301010503. *More information is provided in Appendix IV.*

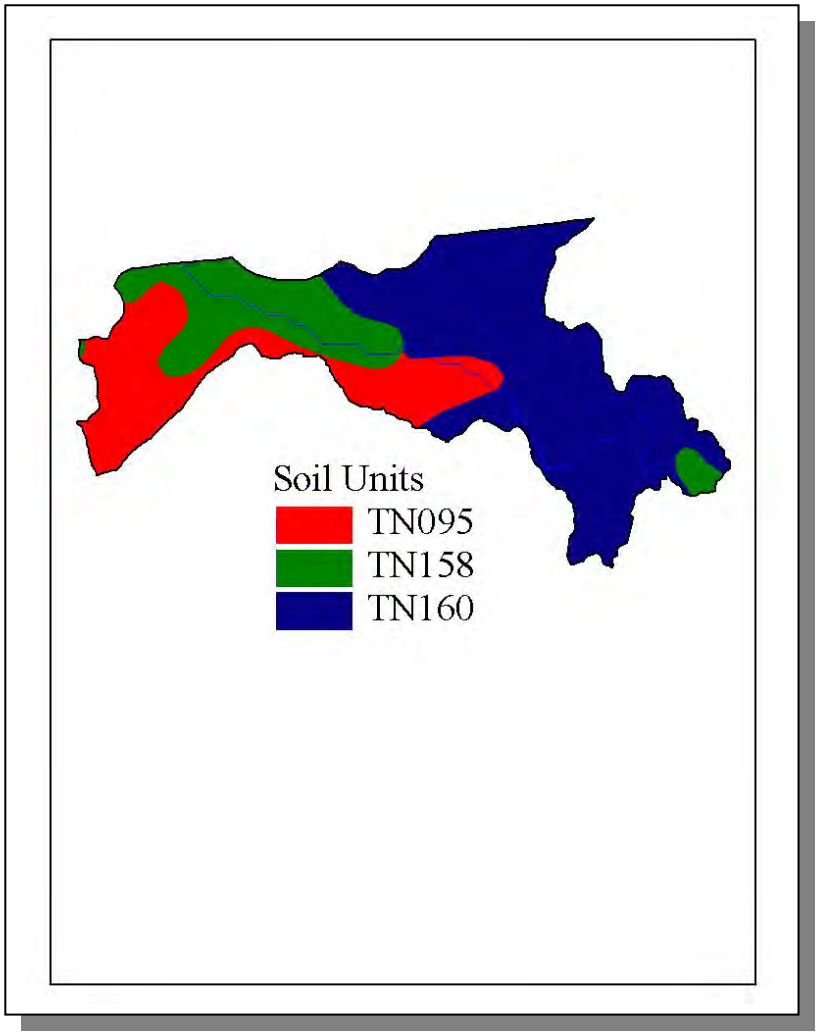

Figure 4-28. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010503.

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
TN158	22.0	C	1.89	5.14	Silty Loam	0.29
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-20. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010503. *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)
Campbell	35,079	37,878	39,854	2.26	791	854	899	13.7

Table 4-21. Population Estimates in Subwatershed 051301010503.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Jellico	Campbell	2,470	1,107	1,026	64	17

Table 4-22. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051301010503.

Figure 4-29. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301010503. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

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

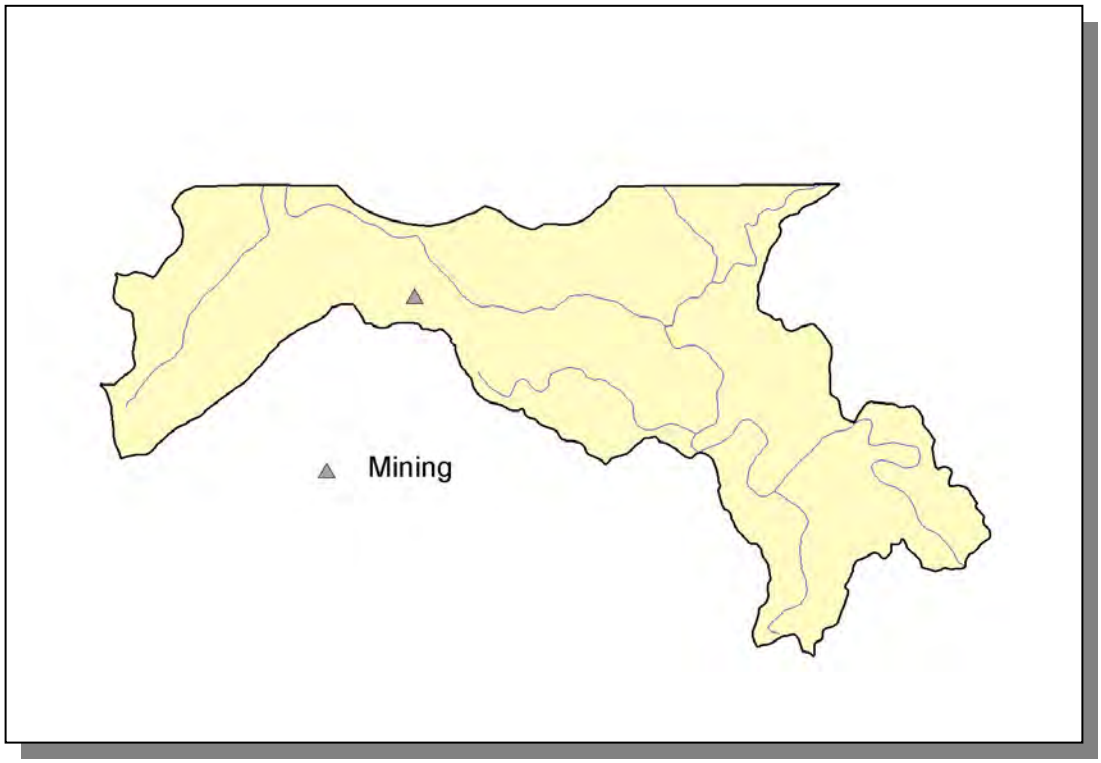

Figure 4-30. Location of Permits Issued in Subwatershed 051301010503. *More information, including the names of facilities, is provided in Appendix IV.*

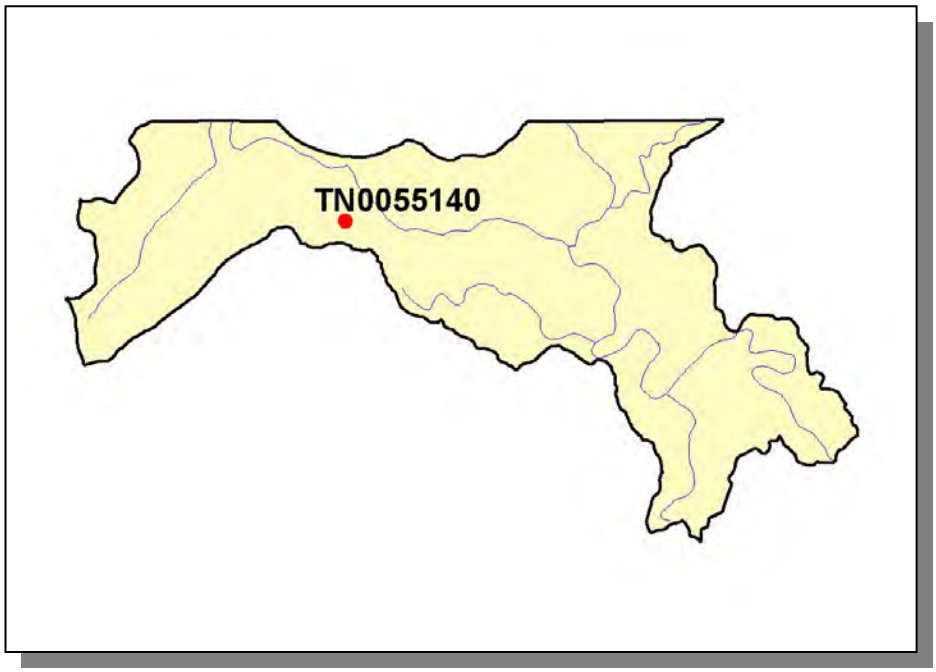

Figure 4-31. Location of Active Mining Sites in Subwatershed 051301010503. *More information, including the names of mining operations, is provided in Appendix IV.*

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

LIVESTOCK COUNTS	
Beef Cow	Cattle
27	51

Table 4-23. Summary of Livestock Count Estimates in Subwatershed 051301010503. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves.*

LIVESTOCK COUNTS					
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs
Campbell	4,083	7,684	66	8	14

Table 4-24. Summary of Livestock Count Estimates in Campbell County. *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.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Campbell	250.3	250.2	2.6	10.6

Table 4-25. Forest Acreage and Annual Removal Rates (1987-1994) in Subwatershed 051301010503.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.73
Grass (Hayland)	1.78
Legumes, Grass (Hayland)	0.44
Grass, Forbs, Legumes (Mixed Pasture)	2.74
Tobacco (Row Crops)	15.11
Other Vegetable and Truck Crops	3.33
Farmsteads and Ranch Headquarters	0.07

Table 4-26. Annual Estimated Total Soil Loss in Subwatershed 051301010503.

4.2.B.iv. 051301010504 (Laural Creek).

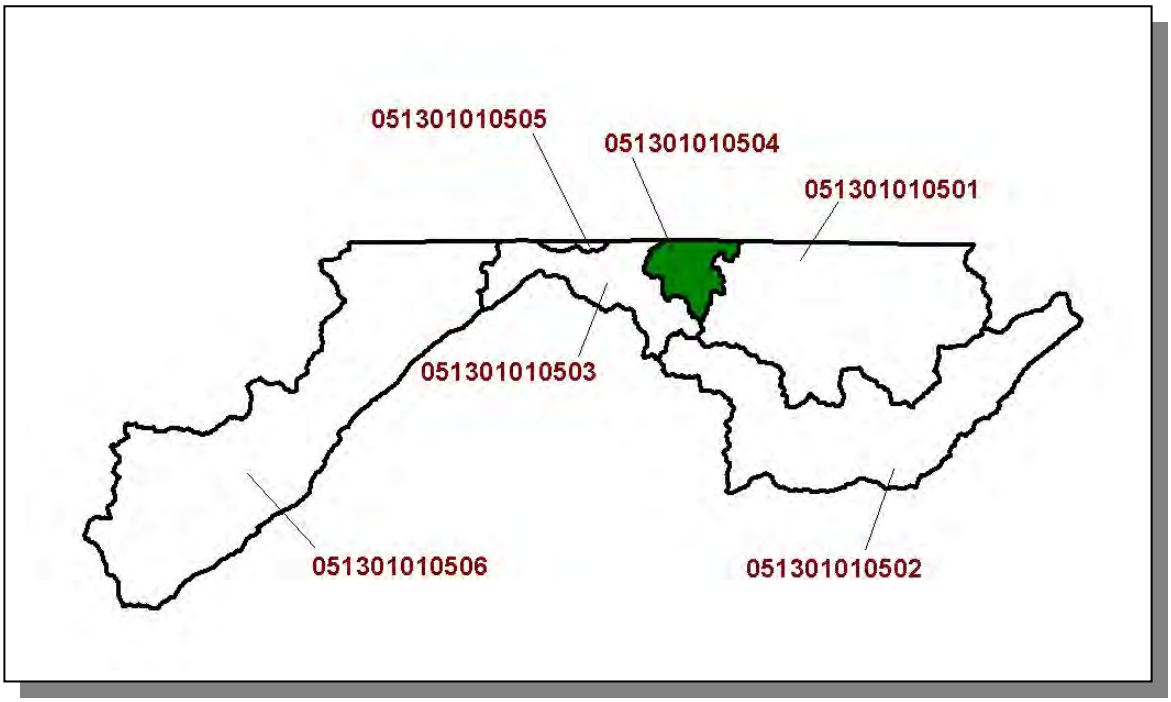

Figure 4-32. Location of Subwatershed 051301010504. *All Clear Fork of the Cumberland River Watershed HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

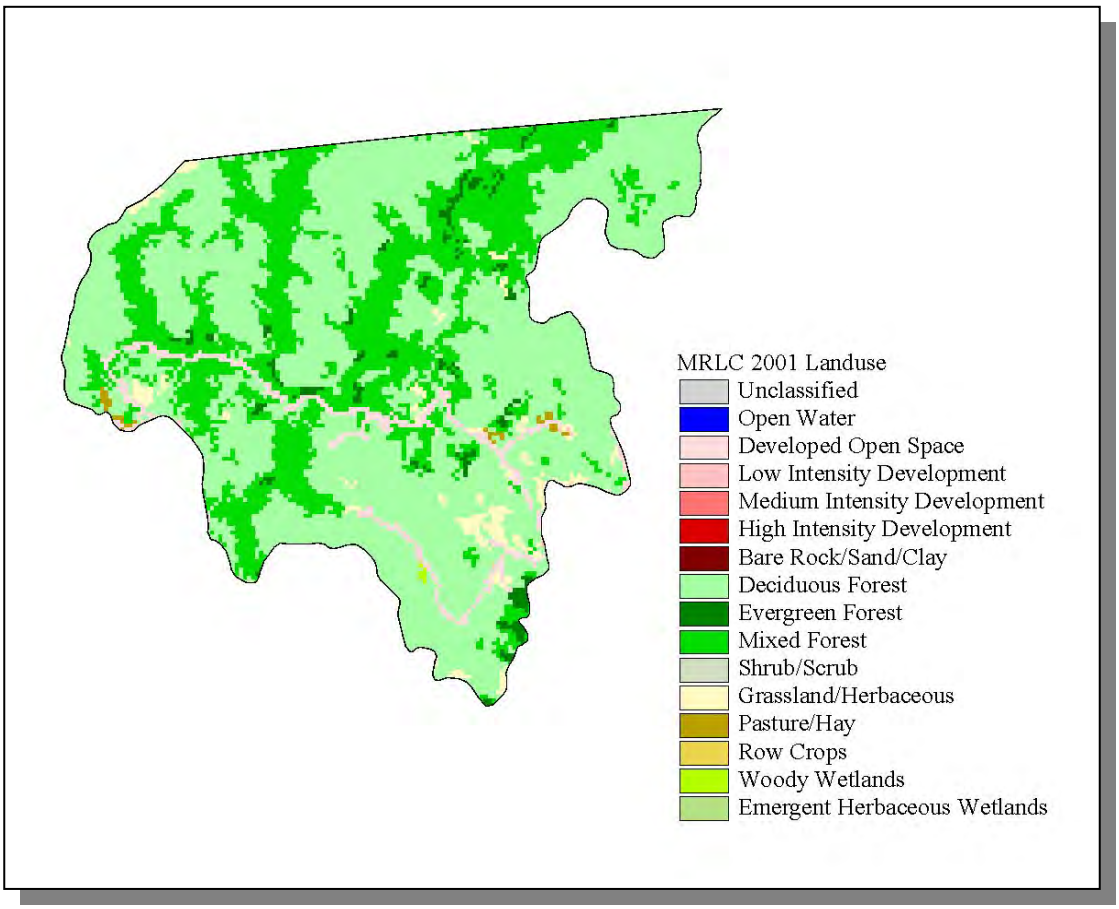

Figure 4-33. Illustration of Land Use Distribution in Subwatershed 051301010504.

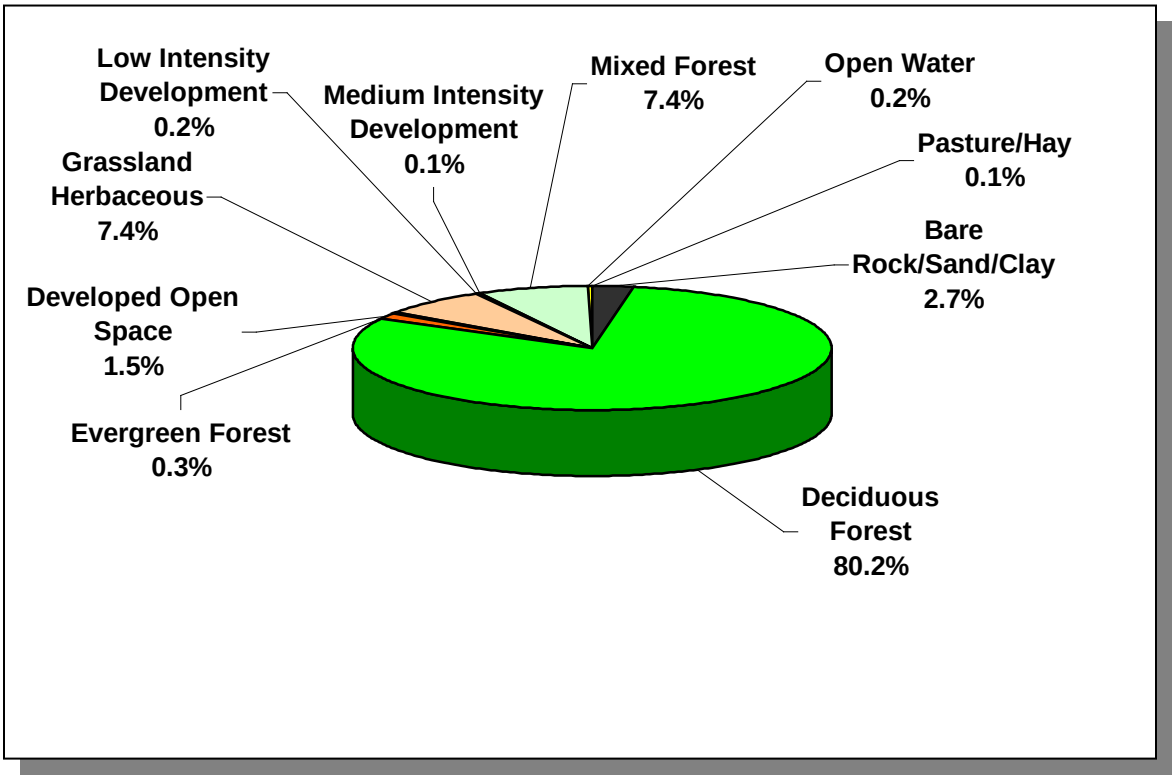

Figure 4-34. Land Use Distribution in Subwatershed 051301010504. *More information is provided in Appendix IV.*

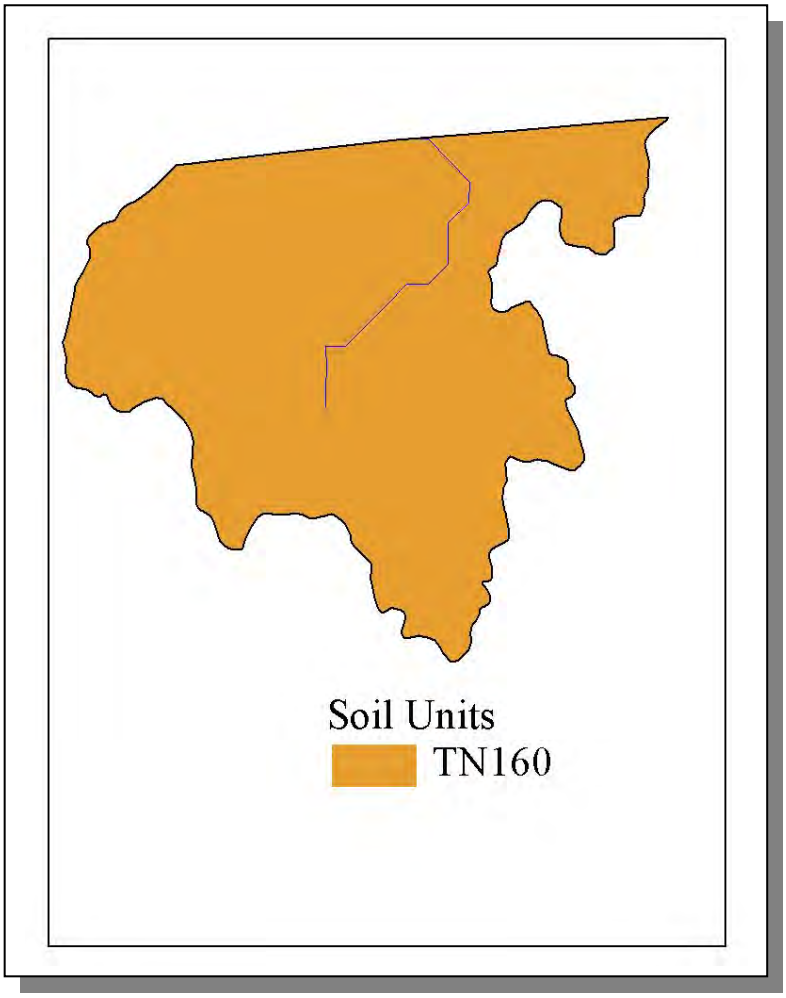

Figure 4-35. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010504.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-27. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010504. *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)
Campbell	35,079	37,878	39,854	0.62	218	235	247	13.3
Claiborne	26,137	28,963	29,862	0.3	78	87	89	14.1
Total	**61,216**	**66,841**	**69,716**		**296**	**322**	**336**	**13.5**

Table 4-28. Population Estimates in Subwatershed 051301010504.

4.2.B.iv.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.B.iv.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS	
Beef Cow	Cattle
<5	5

Table 4-29. Summary of Livestock Count Estimates in Subwatershed 051301010504. *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)	Hogs	Sheep
Campbell	4,083	7,684	66	8	14	0
Claiborne	18,697	36,566	1,082	420	0	165

Table 4-30. Summary of Livestock Count Estimates in Campbell and Claiborne Counties. *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.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Campbell	250.3	250.2	2.6	10.6
Claiborne	167.6	167.6	2.6	12.1

Table 4-31. Forest Acreage and Annual Removal Rates (1987-1994) in Campbell ande Claiborne Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.32
Grass (Hayland)	1.78
Legumes, Grass (Hayland)	0.44
Grass, Forbs, Legumes (Mixed Pasture)	1.93
Tobacco (Row Crops)	15.11
Other Vegetable and Truck Crop	3.33
Farmsteads and Ranch Headquarters	0.18

Table 4-32. Annual Estimated Total Soil Loss in Subwatershed 051301010504.

4.2.B.v. 051301010505 (Mud Creek).

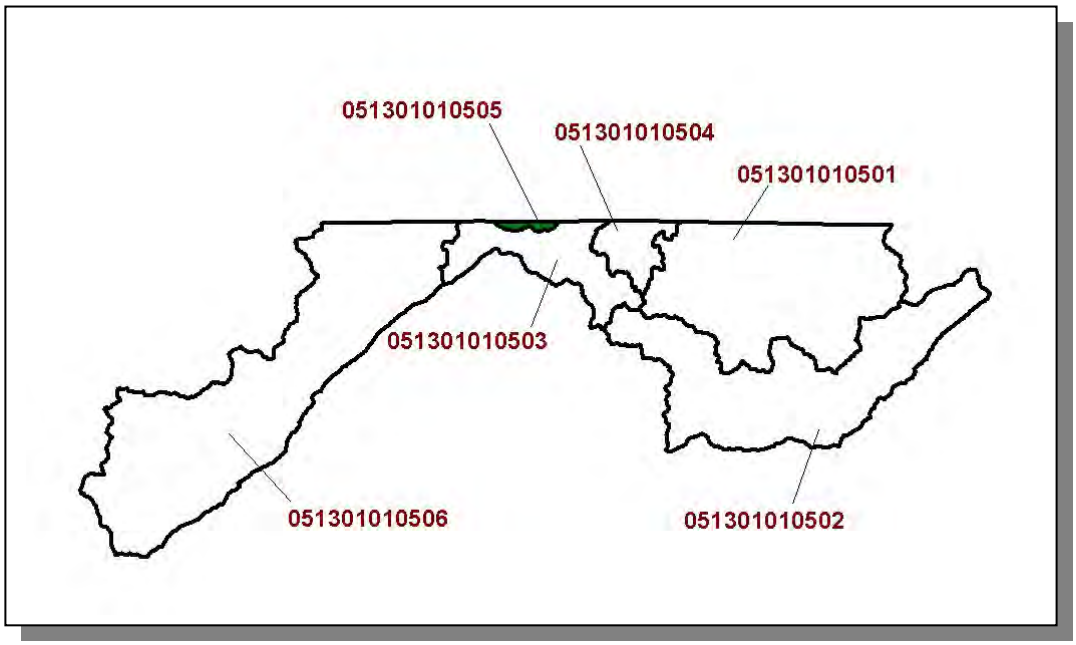

Figure 4-36. Location of Subwatershed 051301010505. *All Clear Fork of the Cumberland River Watershed HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

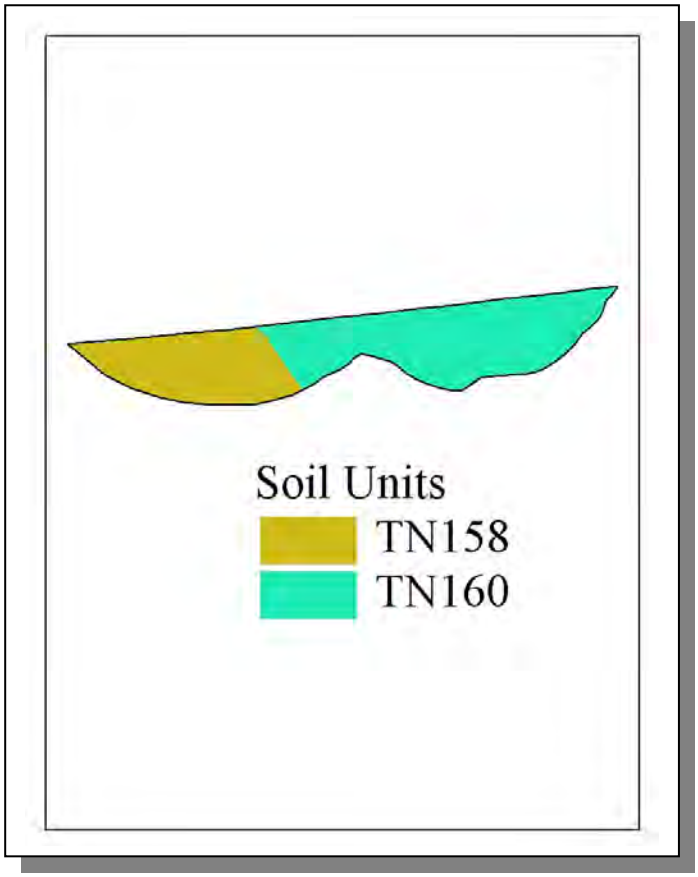

Figure 4-37. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010505.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN160	22.00	C	1.89	5.14	Silty Loam	0.29
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-33. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010505. *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)
Campbell	35,079	37,878	39,854	0.11	39	42	44	12.8

Table 4-34. Population Estimates in Subwatershed 051301010505.

4.2.v.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.B.v.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS	
Beef Cow	Cattle
12	23

Table 4-35. Summary of Livestock Count Estimates in Subwatershed 051301010505. *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)	Hogs
Campbell	4,083	7,684	66	8	14

Table 4-36. Summary of Livestock Count Estimates in Campbell County. *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.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Campbell	250.3	250.2	2.6	10.6

Table 4-37. Forest Acreage and Annual Removal Rates (1987-1994) in Subwatershed 051301010505.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.73
Grass (Hayland)	1.78
Legumes, Grass (Hayland)	0.44
Grass, Forbs, Legumes (Mixed Pasture)	2.74
Tobacco (Row Crops)	15.11
Other Vegetable and Truck Crops	3.33
Farmsteads and Ranch Headquarters	0.07

Table 4-38. Annual Estimated Total Soil Loss in Subwatershed 051301010505.

4.2.B.vi. 051301010506 (Elk Fork Creek).

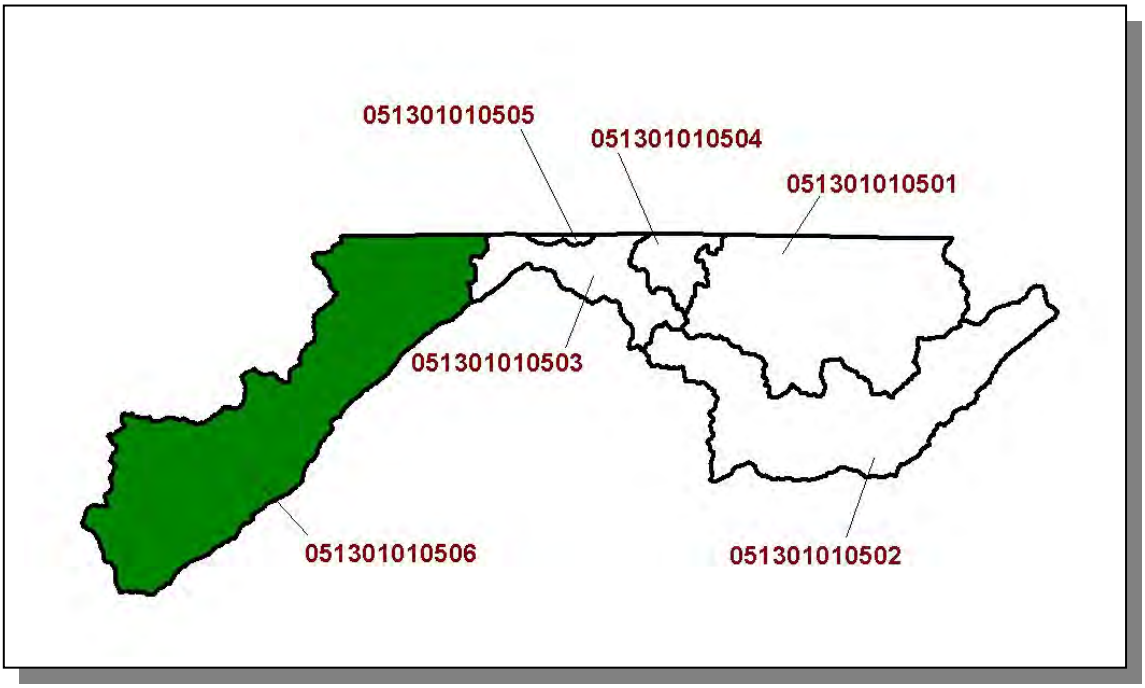

Figure 4-38. Location of Subwatershed 051301010506. *All Clear Fork of the Cumberland River Watershed HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

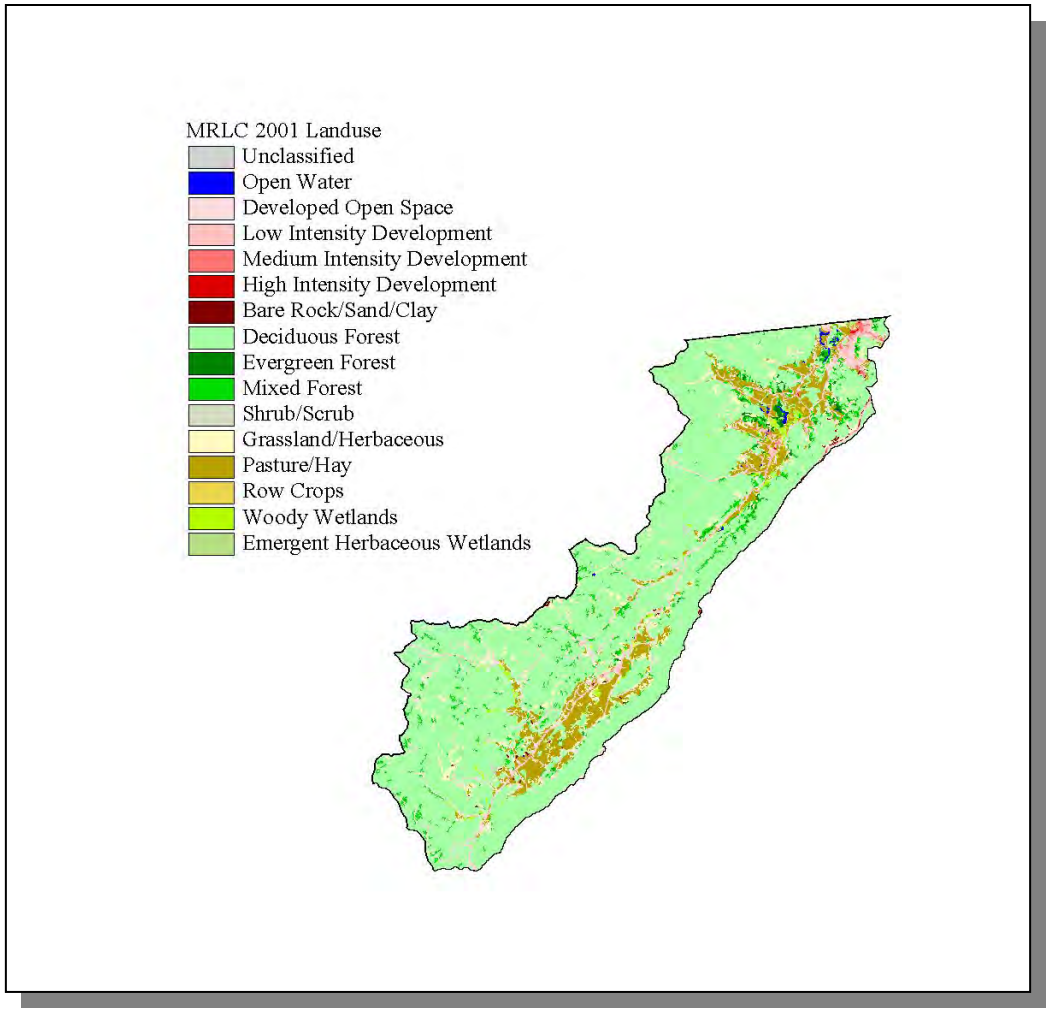

Figure 4-39. Illustration of Land Use Distribution in Subwatershed 051301010506.

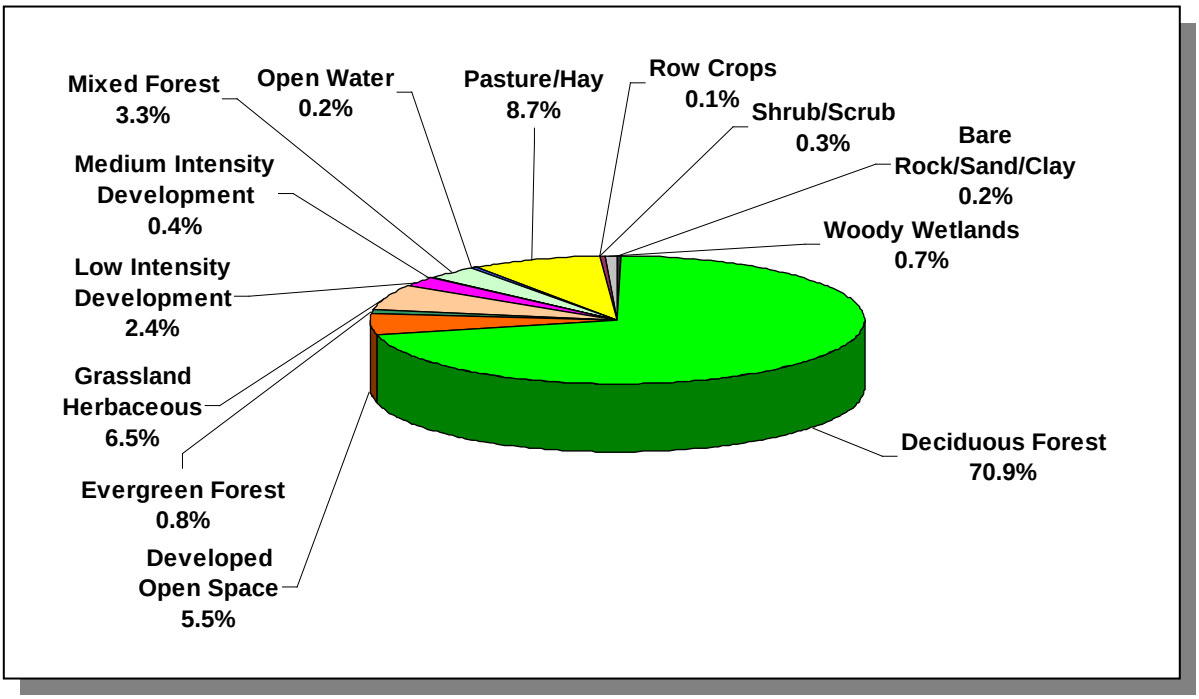

Figure 4-40. Land Use Distribution in Subwatershed 051301010506. *More information is provided in Appendix IV.*

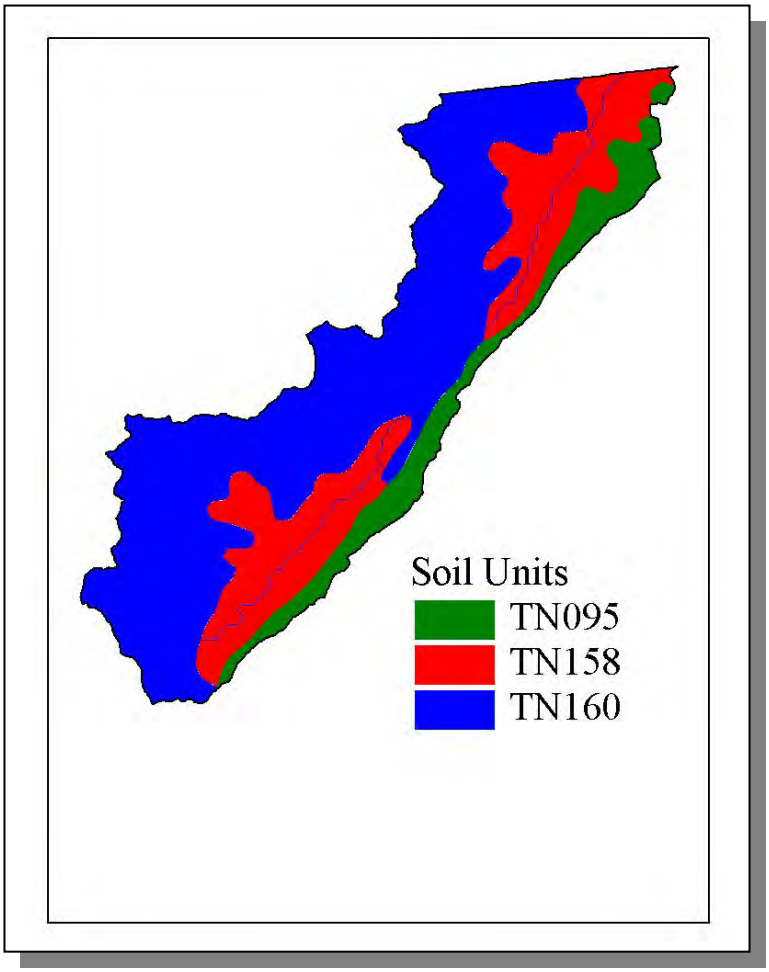

Figure 4-41. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010506.

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
TN158	22.00	C	1.89	5.14	Silty Loam	0.29
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-39. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010506. *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)
Campbell	35,079	37,878	39,854	10.5	3,684	3,978	4,186	13.6
Scott	18,358	19,816	21,127	0.3	55	59	63	14.5
Total	**53,437**	**57,694**	**60,981**		**3,739**	**4,037**	**4,249**	**13.6**

Table 4-40. Population Estimates in Subwatershed 051301010506.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Jellico	Campbell	2,470	1,107	1,026	64	17

Table 4-41. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051301010506.

Figure 4-42. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301010506. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.B.vi.a. Point Source Contributions.

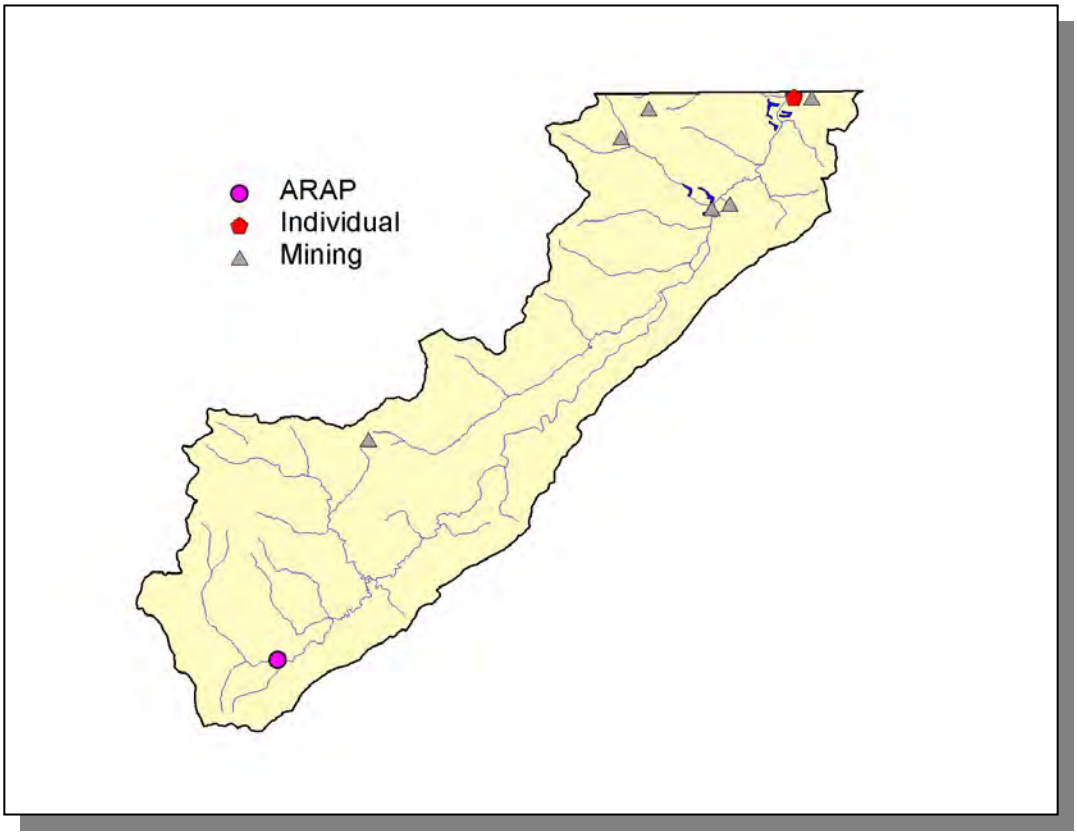

Figure 4-43. Location of Permits Issued in Subwatershed 051301010506. *More information, including the names of facilities, is provided in Appendix IV.*

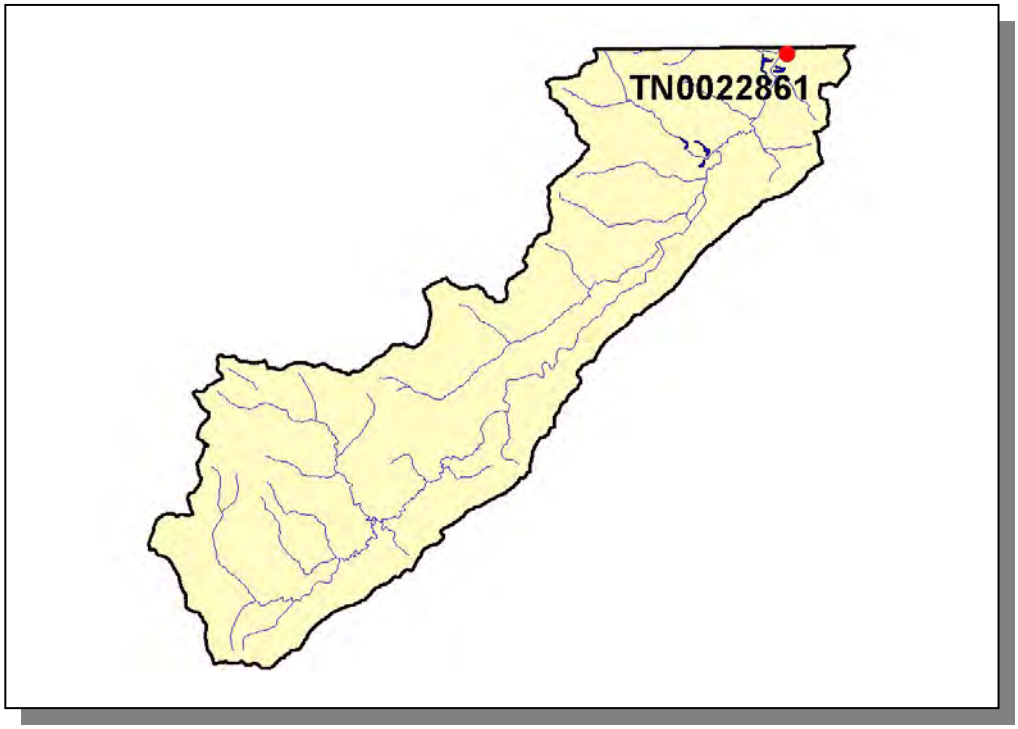

Figure 4-44. Location of Active NPDES Sites in Subwatershed 051301010506. *More information, including the names of facilities, is provided in Appendix IV.*

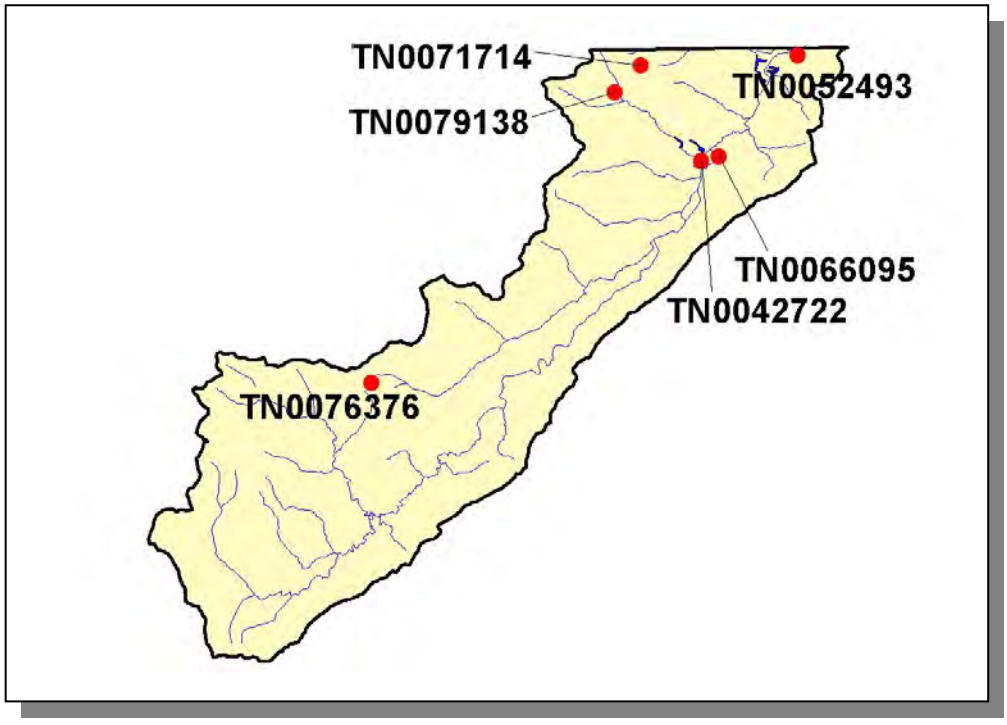

Figure 4-45. Location of Active Mining Sites in Subwatershed 051301010506. *More information, including the names of mining operations, is provided in Appendix IV.*

Figure 4-46. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051301010506. *More information is provided in Appendix IV.*

4.2.B.vi.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 051301010506:

- TN0022861 (Jellico STP) discharges to Elk Fork Creek @ RM 2.1

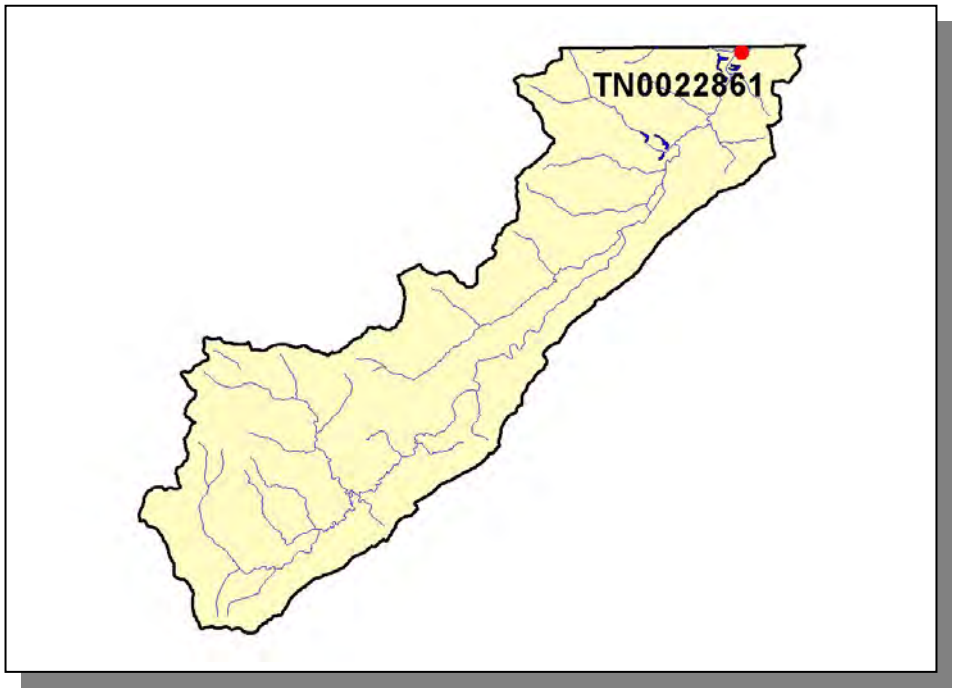

Figure 4-47. Location of NPDES Dischargers to Water Bodies Listed on the 2004 303(d) List in Subwatershed 051301010506. *More information, including the names of facilities, is provided in Appendix IV.*

Permit #	3Q2	1Q10	3Q10	3Q20	7Q10
TN0022861	0.30	na	0.07	0.05	0.09

Table 4-42. Receiving Stream Low Flow Information for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301010506. *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 #	$CBOD_5$	FECAL COLIFORM	TRC	TSS	SETTLEABLE SOLIDS	DO	pH
TN0022861	X	X	X	X	X	X	X

Table 4-43. Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051301010506. *$CBOD_5$, Carbonaceous Biochemical Oxygen Demand (5-Day); TRC, Total Residual Chlorine; TSS, Total Suspended Solids.*

4.2.B.vi.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs
503	948	8	1	2,768	2

Table 4-44. Summary of Livestock Count Estimates in Subwatershed 051301010506. *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
Campbell	4,083	7,684	66	8	0	14	0
Scott	2,177	4,447	216	196	1,989,506	17	74

Table 4-45. Summary of Livestock Count Estimates in Campbell and Scott Counties. *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.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Campbell	250.3	250.2	2.6	10.6
Scott	300.3	300.3	5.5	21.4

Table 4-46. Forest Acreage and Annual Removal Rates (1987-1994) in Campbell and Scott Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.69
Grass (Hayland)	1.78
Legumes, Grass (Hayland)	0.44
Grass, Forbs, Legumes (Mixed Pasture)	2.68
Tobacco (Row Crops)	15.11
Other Vegetable and Truck Crops	3.33
Farmsteads and Ranch Headquarters	0.07

Table 4-47. Annual Estimated Total Soil Loss in Subwatershed 051301010506.

4.2.C. 0513010106.

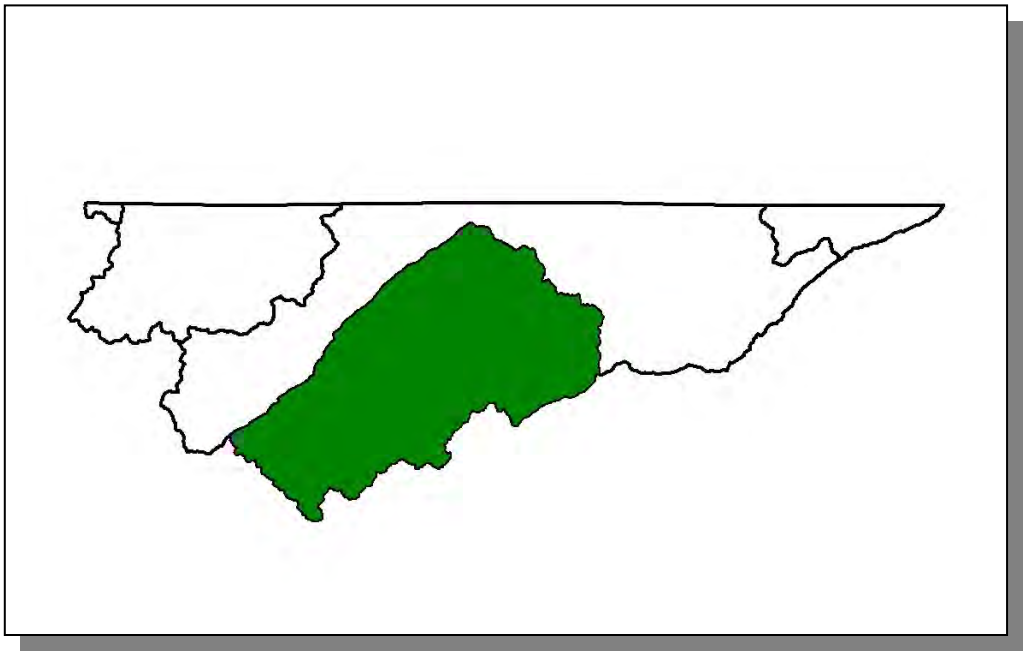

Figure 4-48. Location of Subwatershed 0513010106. *All Clear Fork of the Cumberland River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.C.i. 051301010601 (Hickory Creek).

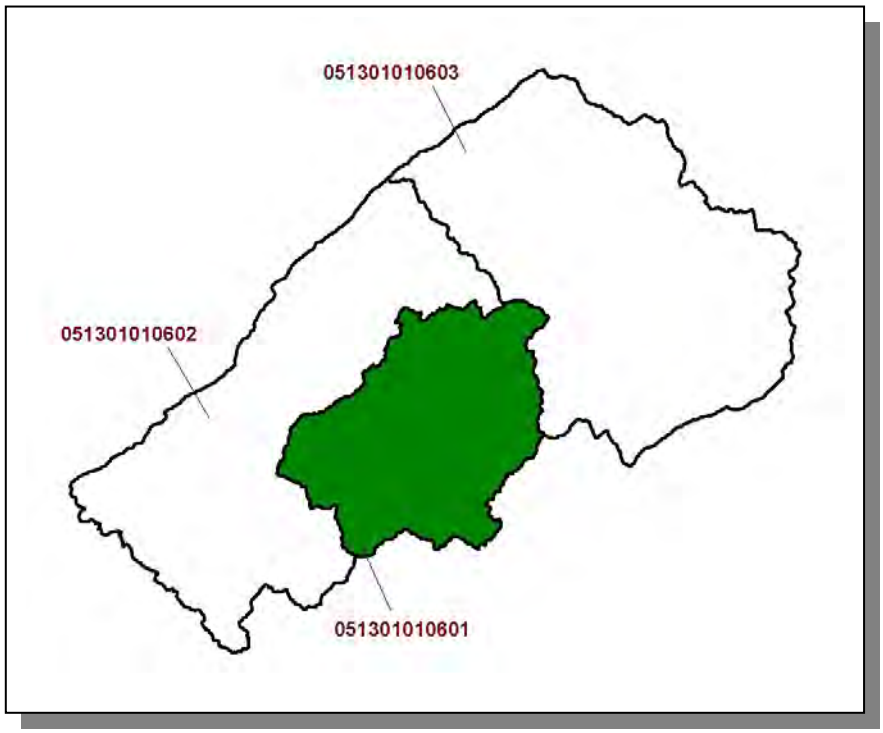

Figure 4-49. Location of Subwatershed 051301010601. *All Clear Fork of the Cumberland River Watershed HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

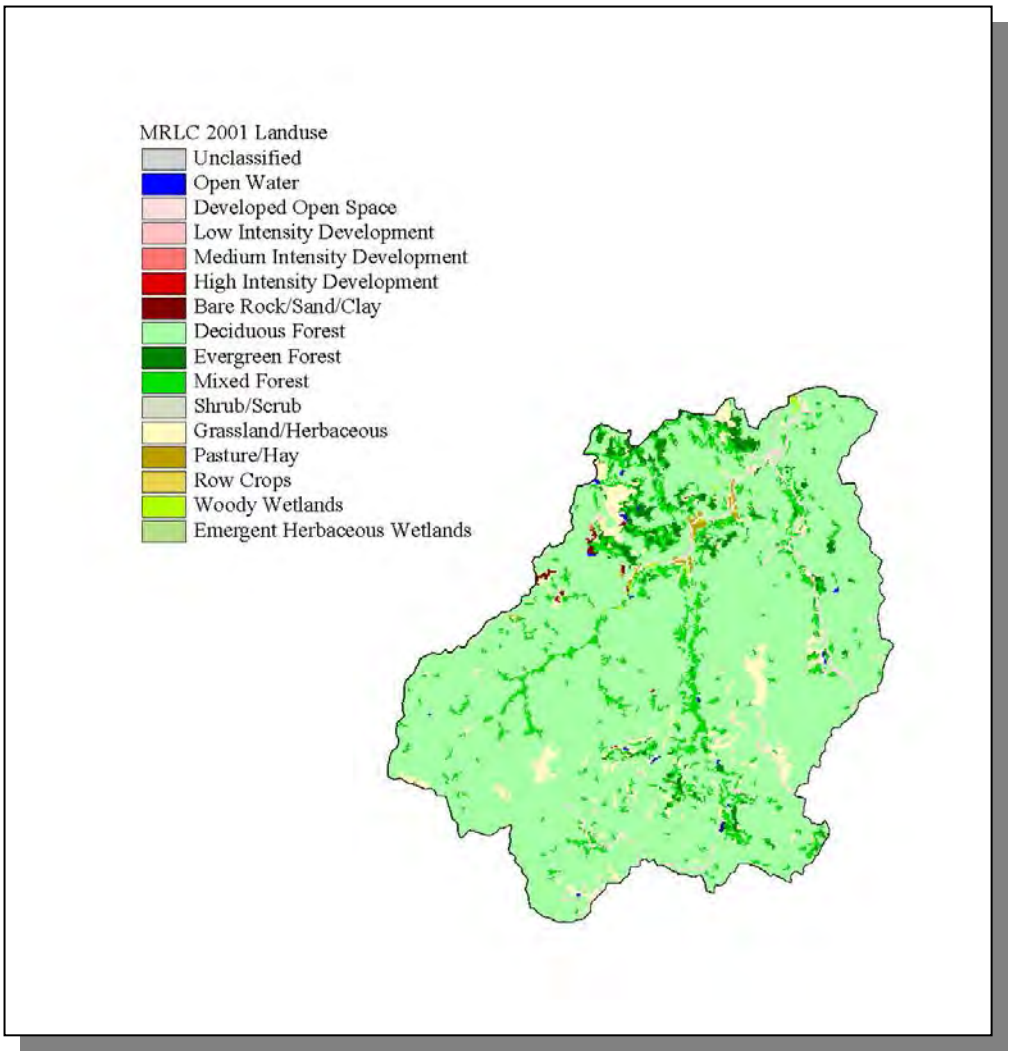

Figure 4-50. Illustration of Land Use Distribution in Subwatershed 051301010601.

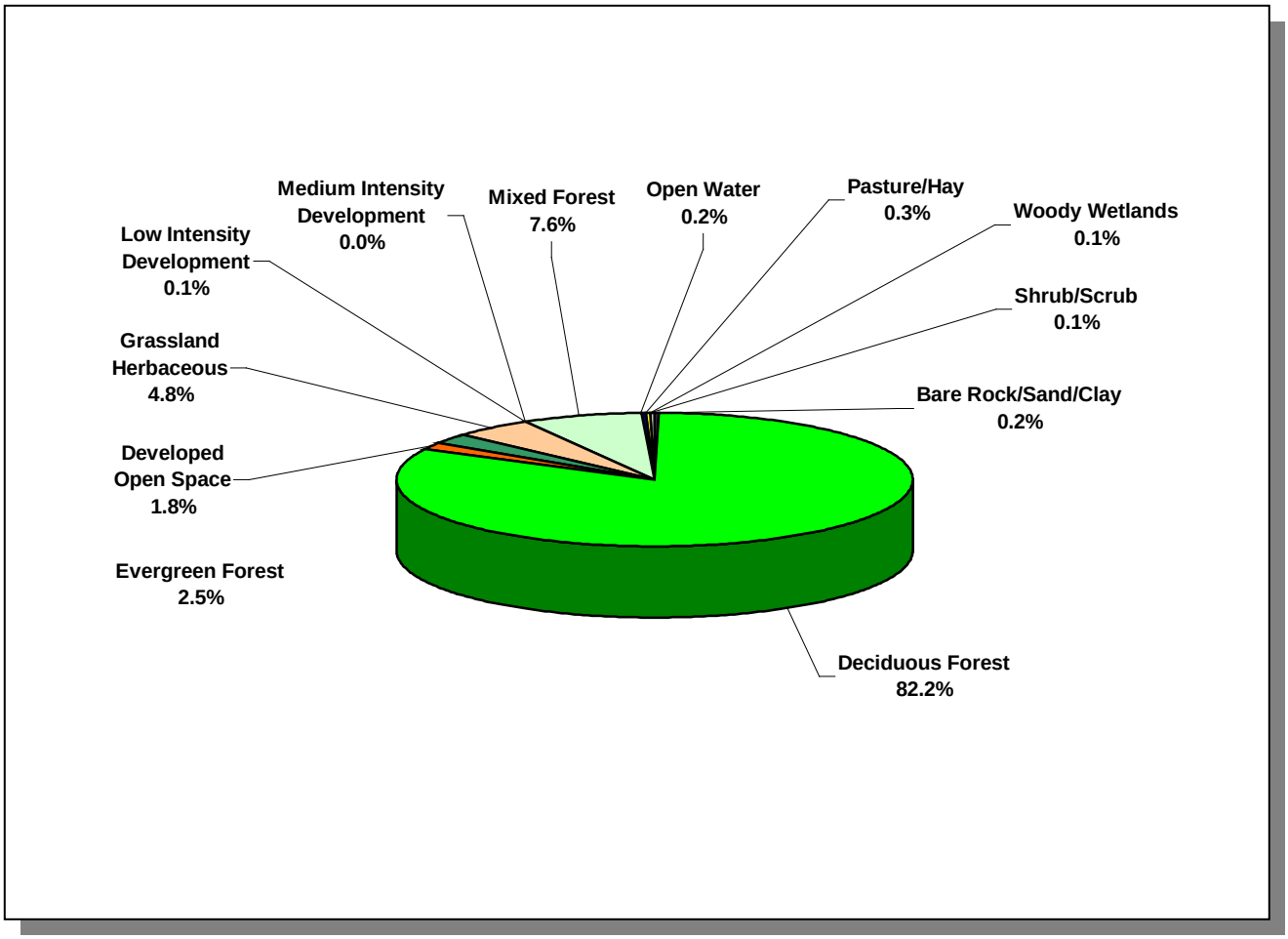

Figure 4-51. Land Use Distribution in Subwatershed 051301010601. *More information is provided in Appendix IV.*

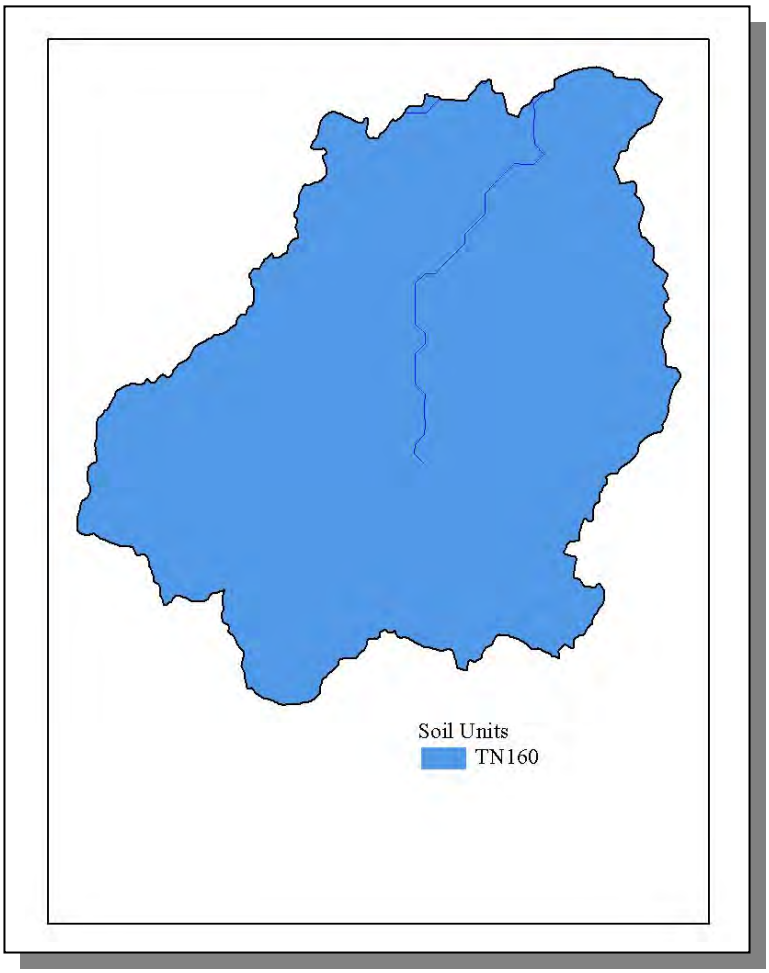

Figure 4-52. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010601.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-48. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010601. *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)
Campbell	35,079	37,878	39,854	5.13	1,800	1,944	2,045	13.6

Table 4-49. Population Estimates in Subwatershed 051301010601.

Figure 4-53. Location of Historical Streamflow Data Collection Sites in Subwatershed 051301010601. *More information is provided in Appendix IV.*

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

Figure 4-54. Location of Permits Issued in Subwatershed 051301010601. *More information, including the names of facilities, is provided in Appendix IV.*

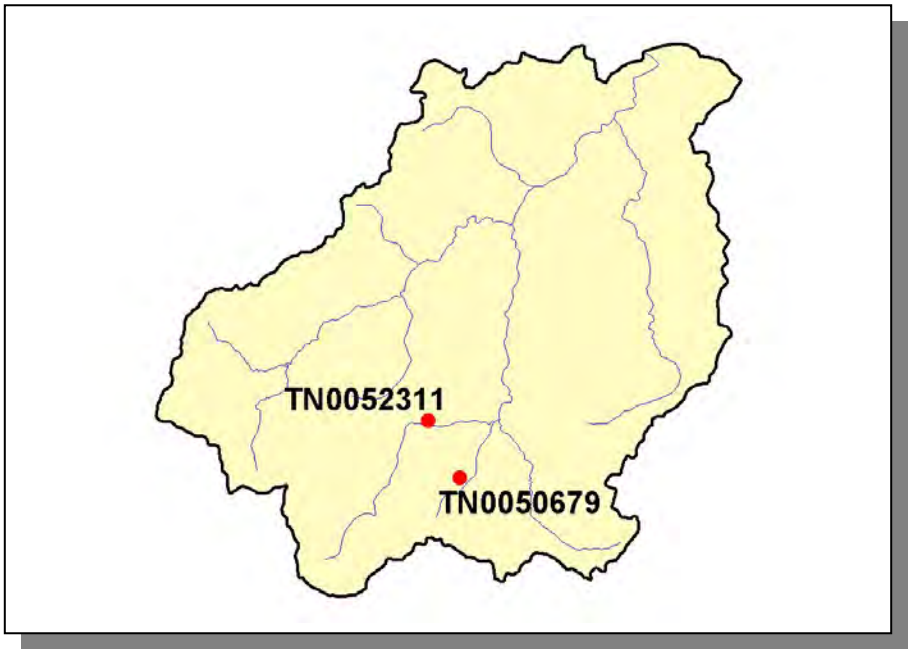

Figure 4-55. Location of Active Mining Sites in Subwatershed 051301010601. *More information, including the names of mining operations, is provided in Appendix IV.*

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

LIVESTOCK COUNTS	
Beef Cow	Cattle
17	32

Table 4-50. Summary of Livestock Count Estimates in Subwatershed 051301010601. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves.*

LIVESTOCK COUNTS					
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs
Campbell	4,083	7,684	66	8	14

Table 4-51. Summary of Livestock Count Estimates in Campbell County. *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.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Campbell	250.3	250.2	2.6	10.6

Table 4-52. Forest Acreage and Annual Removal Rates (1987-1994) in Subwatershed 051301010601.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.73
Grass (Hayland)	1.78
Legumes, Grass (Hayland)	0.44
Grass, Forbs, Legumes (Mixed Pasture)	2.74
Tobacco (Row Crops)	15.11
Other Vegetable and Truck Crops	3.33
Other Vegetable and Truck Crops	3.33
Farmsteads and Ranch Headquarters	0.07

Table 4-53. Annual Estimated Total Soil Loss in Subwatershed 051301010601.

4.2.C.ii. 051301010602 (Stinking Creek).

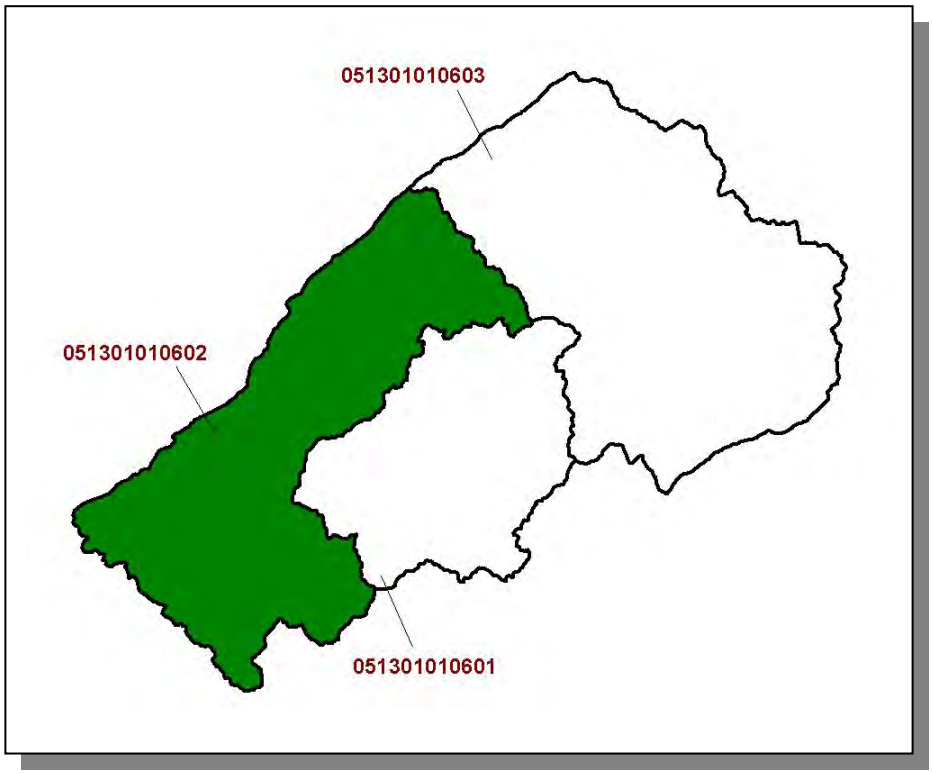

Figure 4-56. Location of Subwatershed 051301010602. *All Clear Fork of the Cumberland River Watershed HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

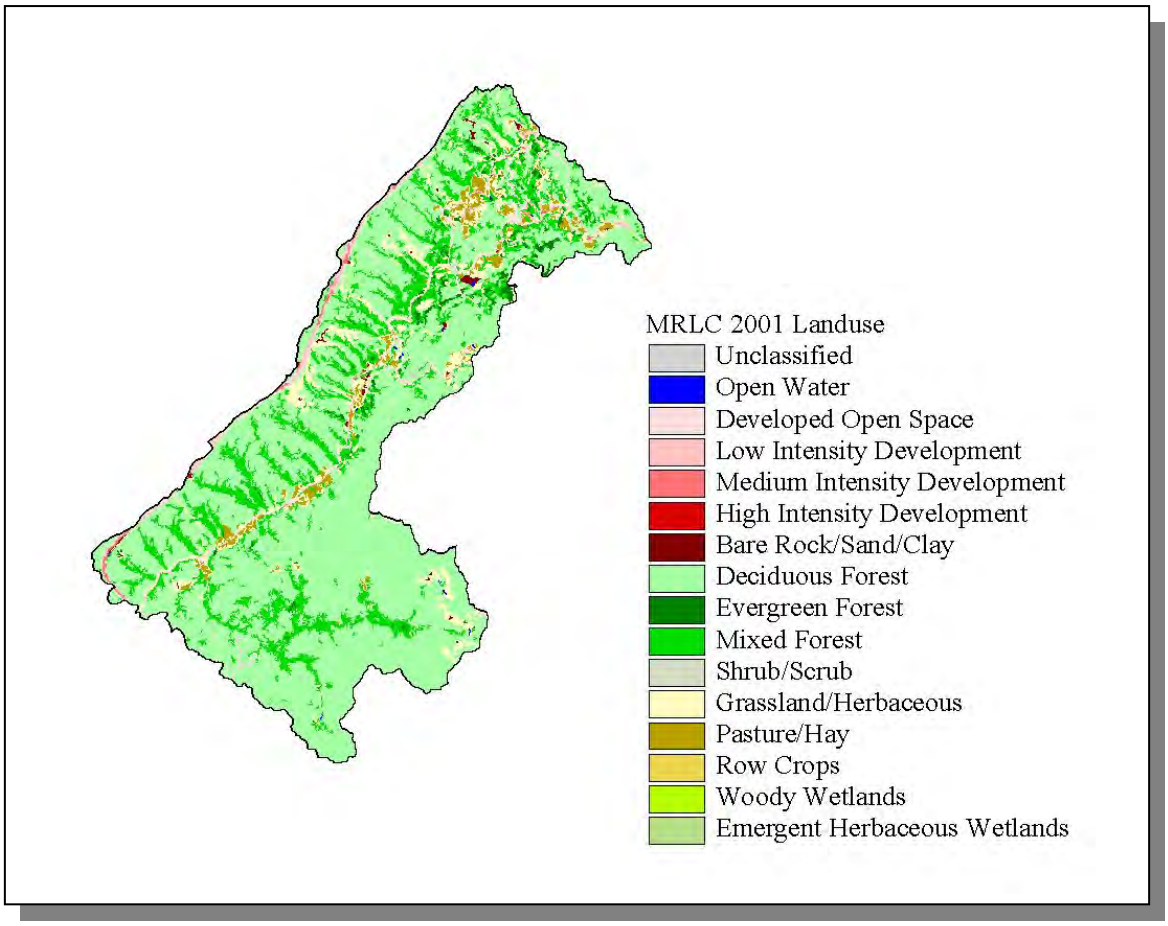

Figure 4-57. Illustration of Land Use Distribution in Subwatershed 051301010602.

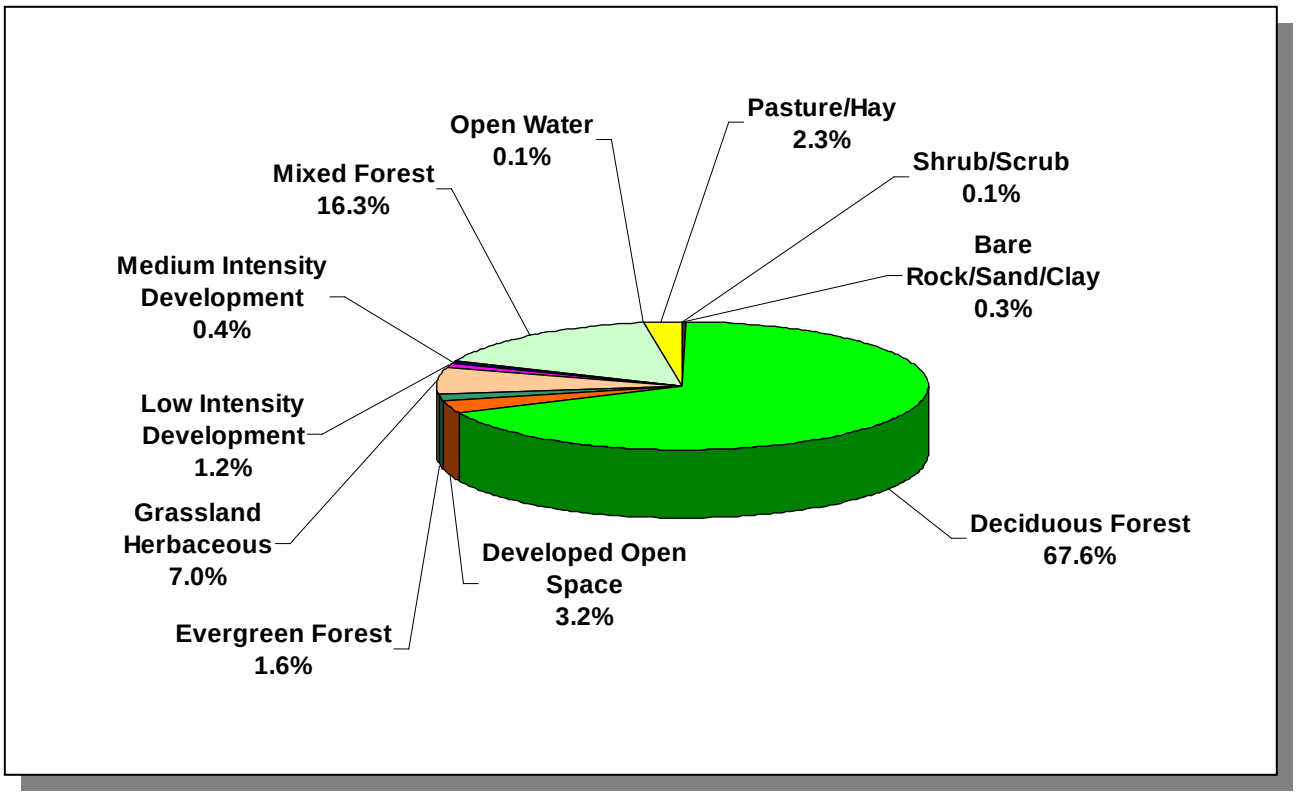

Figure 4-58. Land Use Distribution in Subwatershed 051301010602. *More information is provided in Appendix IV.*

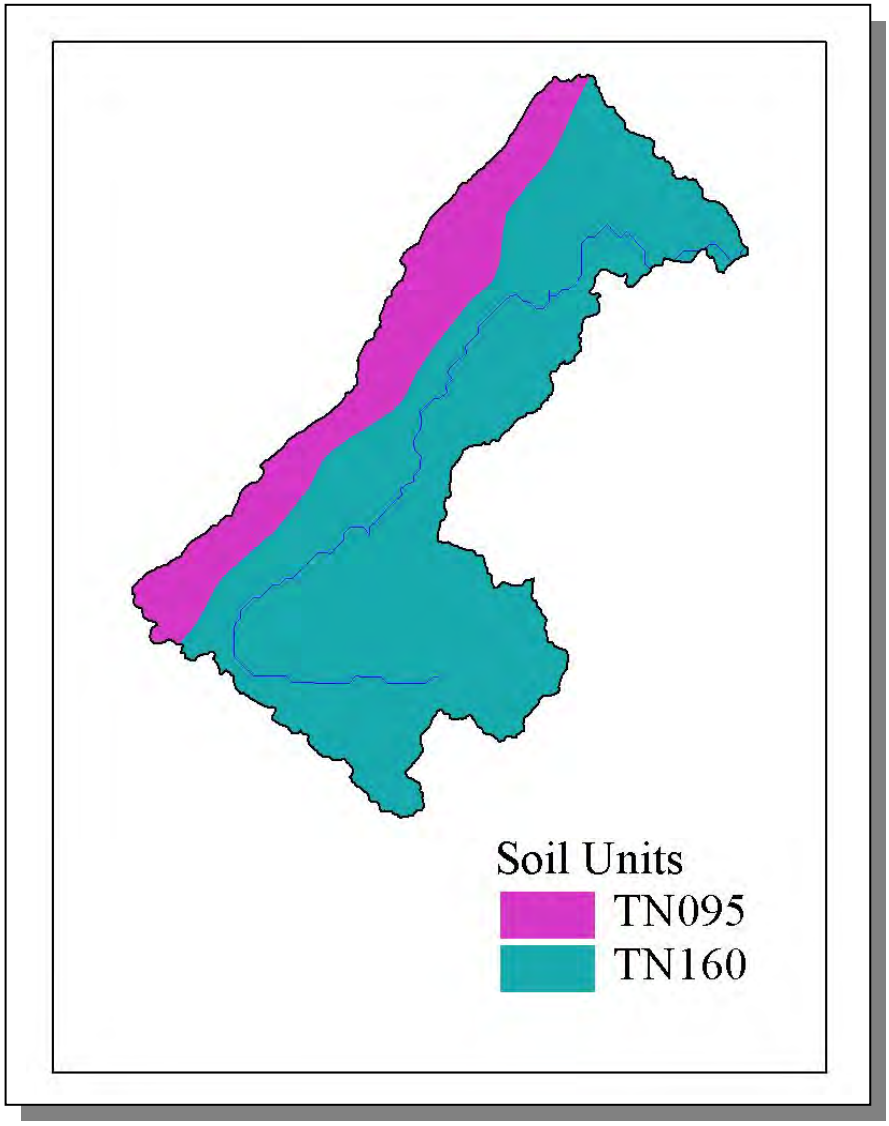

Figure 4-59. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010602.

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
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-54. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010602. *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)
Campbell	35,079	37,878	39,854	8.39	2,944	3,179	3,345	13.6

Table 4-55. Population Estimates in Subwatershed 051301010602.

Figure 4-60. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301010602. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

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

Figure 4-61. Location of Permits Issued in Subwatershed 051301010602. *More information, including the names of facilities, is provided in Appendix IV.*

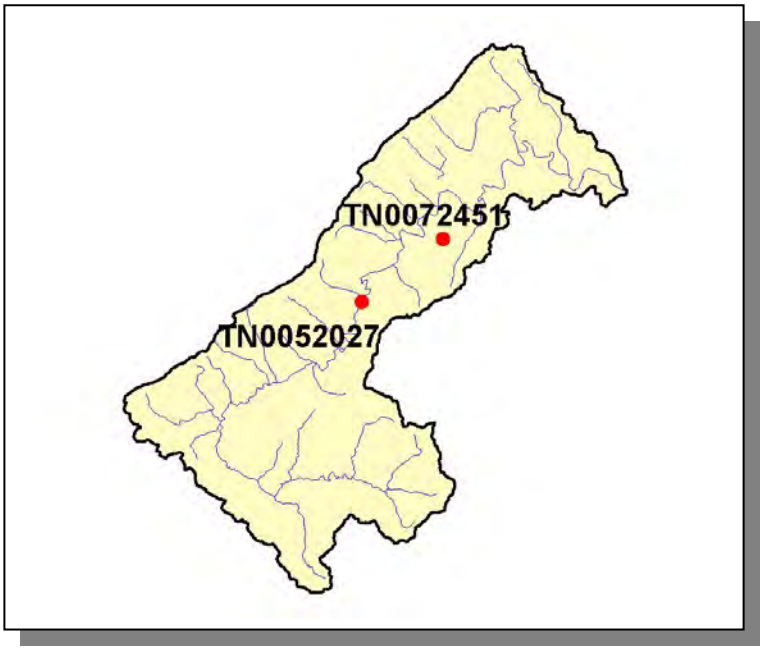

Figure 4-62. Location of Active Mining Sites in Subwatershed 051301010602. *More information, including the names of mining operations, is provided in Appendix IV.*

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

LIVESTOCK COUNTS			
Beef Cow	Cattle	Milk Cow	Hogs
152	286	<5	<5

Table 4-56. Summary of Livestock Count Estimates in Subwatershed 051301010602. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves.*

LIVESTOCK COUNTS					
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs
Campbell	4,083	7,684	66	8	14

Table 4-57. Summary of Livestock Count Estimates in Campbell County. *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.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Campbell	250.3	250.2	2.6	10.6

Table 4-58. Forest Acreage and Annual Removal Rates (1987-1994) in Subwatershed 051301010602.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.73
Grass (Hayland)	1.78
Legumes, Grass (Hayland)	0.44
Grass, Forbs, Legumes (Mixed Pasture)	2.74
Tobacco (Row Crops)	15.11
Other Vegetable and Truck Crops	3.33
Farmsteads and Ranch Headquarters	0.07

Table 4-59. Annual Estimated Total Soil Loss in Subwatershed 051301010602.

4.2.C.iii. 051301010603 (Hickory Creek).

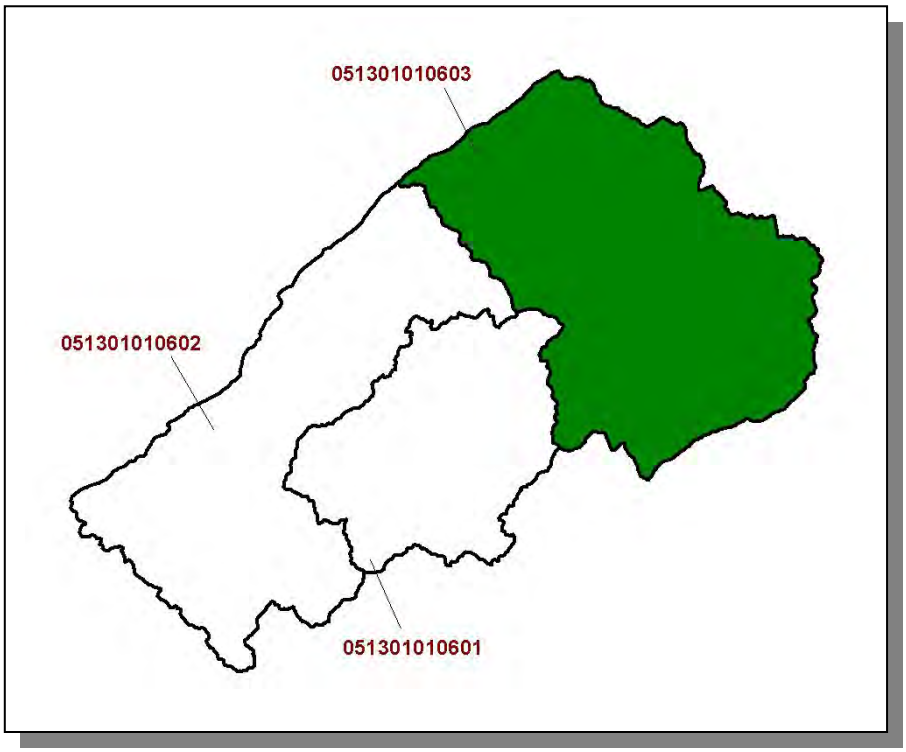

Figure 4-63. Location of Subwatershed 051301010603. *All Clear Fork of the Cumberland River Watershed HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

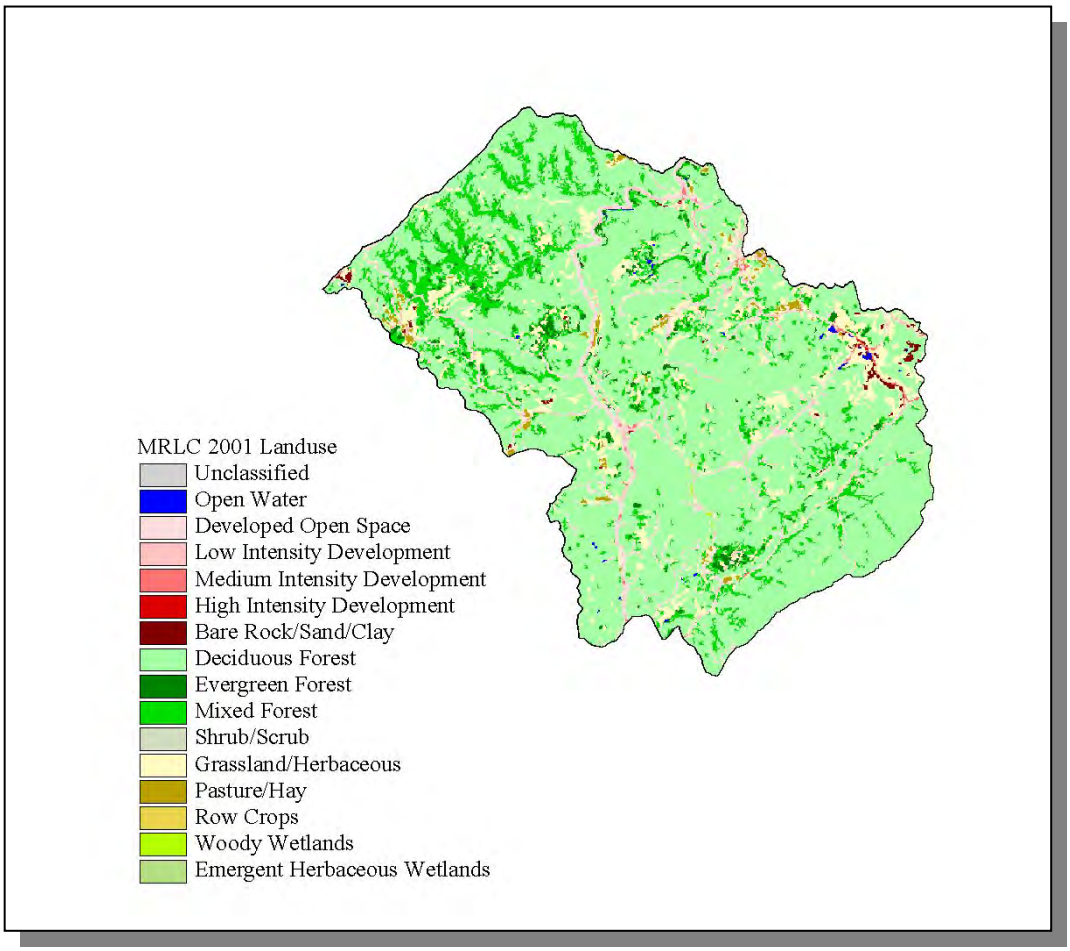

Figure 4-64. Illustration of Land Use Distribution in Subwatershed 051301010603.

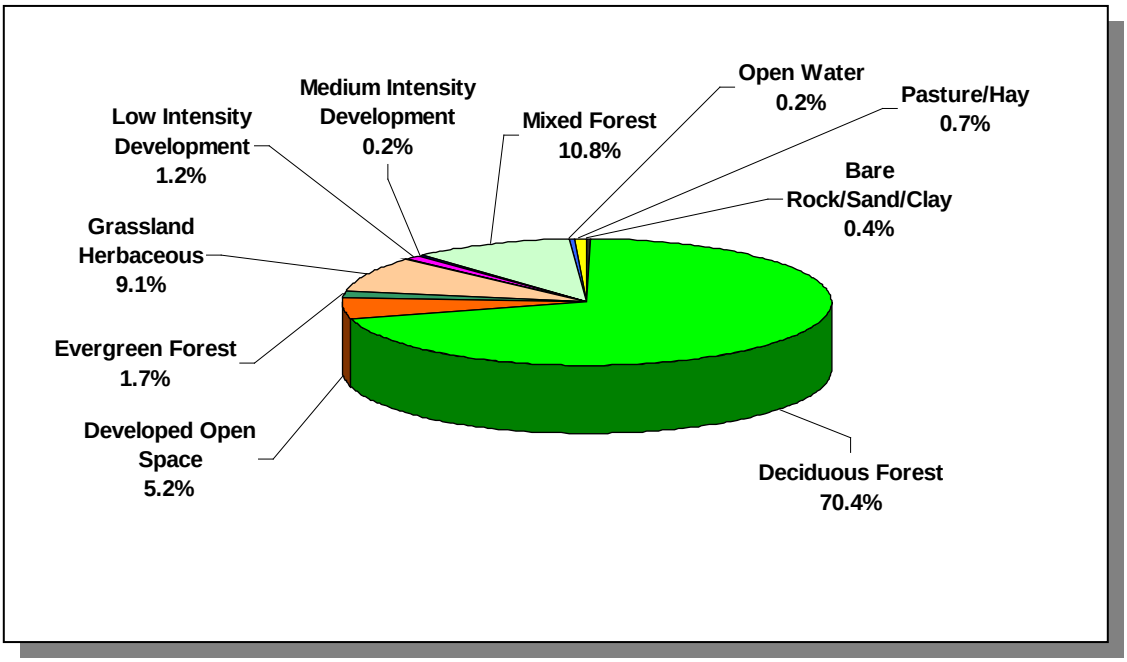

Figure 4-65. Land Use Distribution in Subwatershed 051301010603. *More information is provided in Appendix IV.*

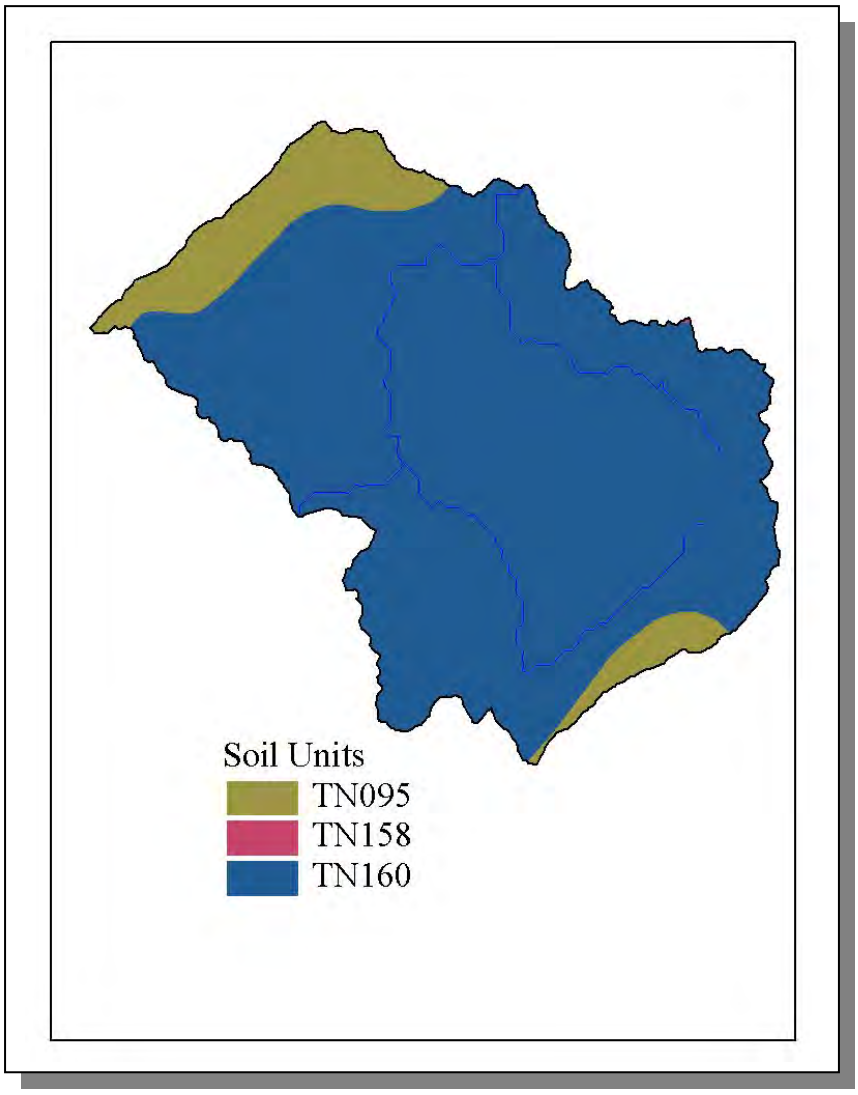

Figure 4-66. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010603.

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
TN158	22.00	C	1.89	5.14	Silty Loam	0.29
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-60. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010603. *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)
Campbell	35,079	37,878	39,854	10.15	3,561	3,845	4,046	13.6

Table 4-61. Population Estimates in Subwatershed 051301010603.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Jellico	Campbell	2,470	1,107	1,026	64	17

Table 4-62. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051301010603.

Figure 4-67. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301010603. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

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

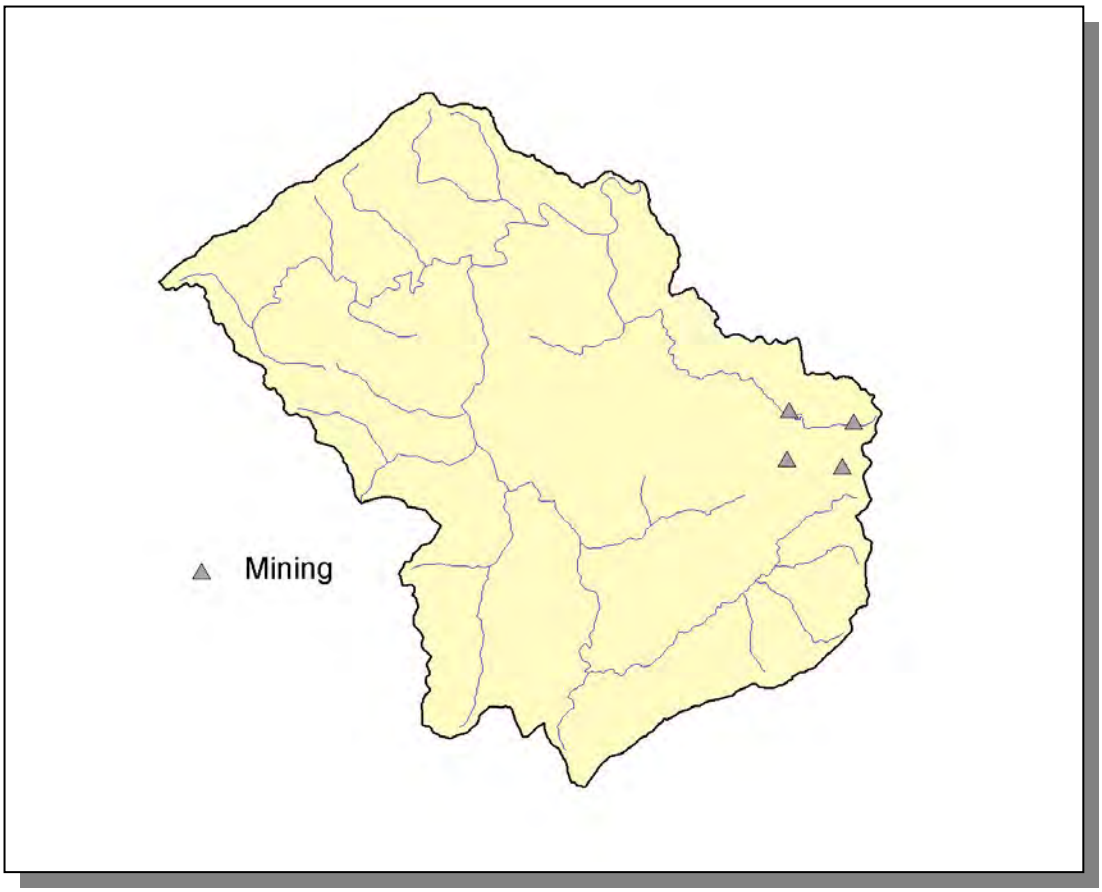

Figure 4-68. Location of Permits Issued in Subwatershed 051301010603. *More information, including the names of facilities, is provided in Appendix IV.*

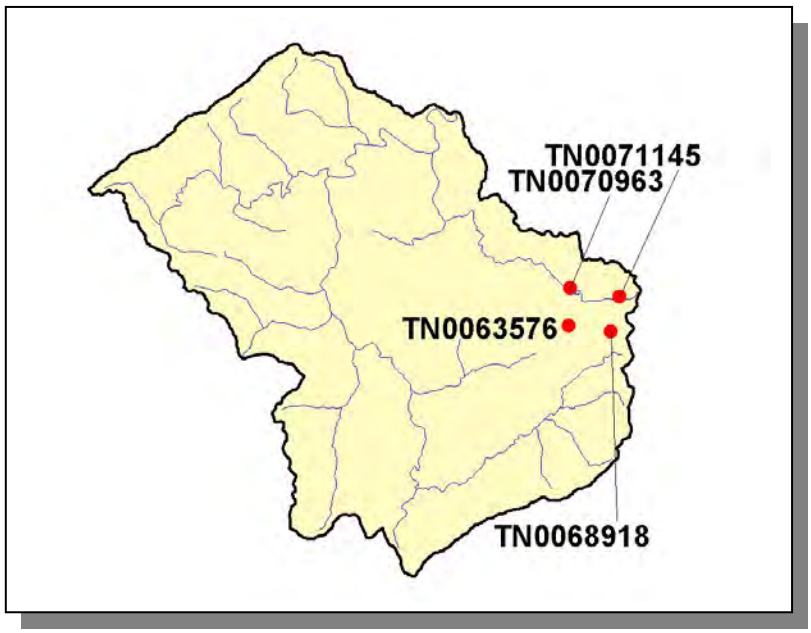

Figure 4-69. Location of Active Mining Sites in Subwatershed 051301010603. *More information, including the names of mining operations, is provided in Appendix IV.*

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

LIVESTOCK COUNTS		
Beef Cow	Cattle	Milk Cow
70	132	<5

Table 4-63. Summary of Livestock Count Estimates in Subwatershed 051301010603. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves.*

LIVESTOCK COUNTS					
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs
Campbell	4,083	7,684	66	8	14

Table 4-64. Summary of Livestock Count Estimates in Campbell County. *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.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Campbell	250.3	250.2	2.6	10.6

Table 4-65. Forest Acreage and Annual Removal Rates (1987-1994) in Subwatershed 051301010603.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.73
Grass (Hayland)	1.78
Legumes, Grass (Hayland)	0.44
Grass, Forbs, Legumes (Mixed Pasture)	2.74
Tobacco (Row Crops)	15.11
Other Vegetable and Truck Crops	3.33

Table 4-66. Annual Estimated Total Soil Loss in Subwatershed 051301010603.

4.2.D. 0513010107.

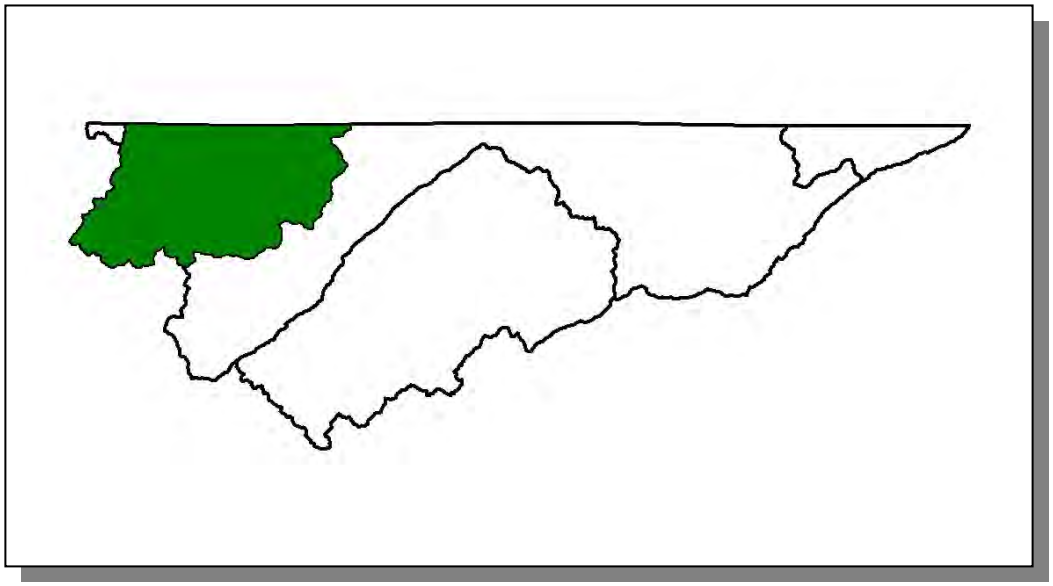

Figure 4-70. Location of Subwatershed 0513010107. *All Clear Fork of the Cumberland River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.D.i. 051301010701 (Jellico Creek).

Figure 4-71. Location of Subwatershed 051301010701. *All Clear Fork of the Cumberland River Watershed HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

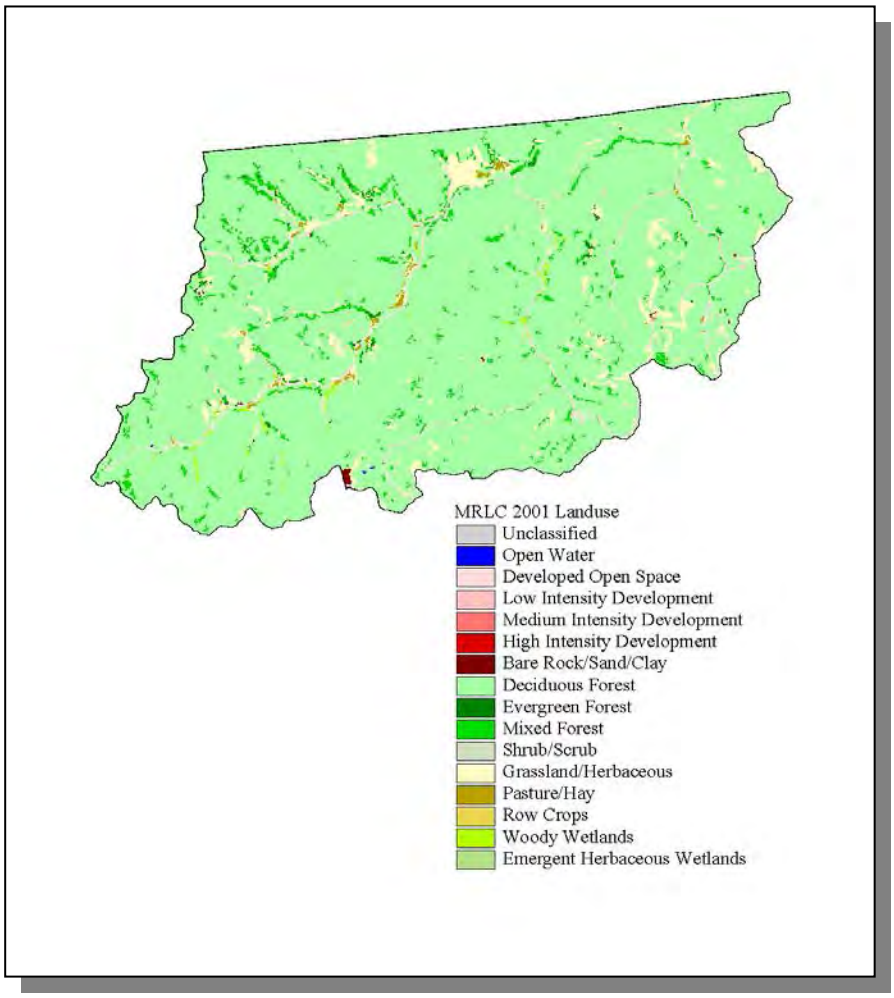

Figure 4-72. Illustration of Land Use Distribution in Subwatershed 051301010701.

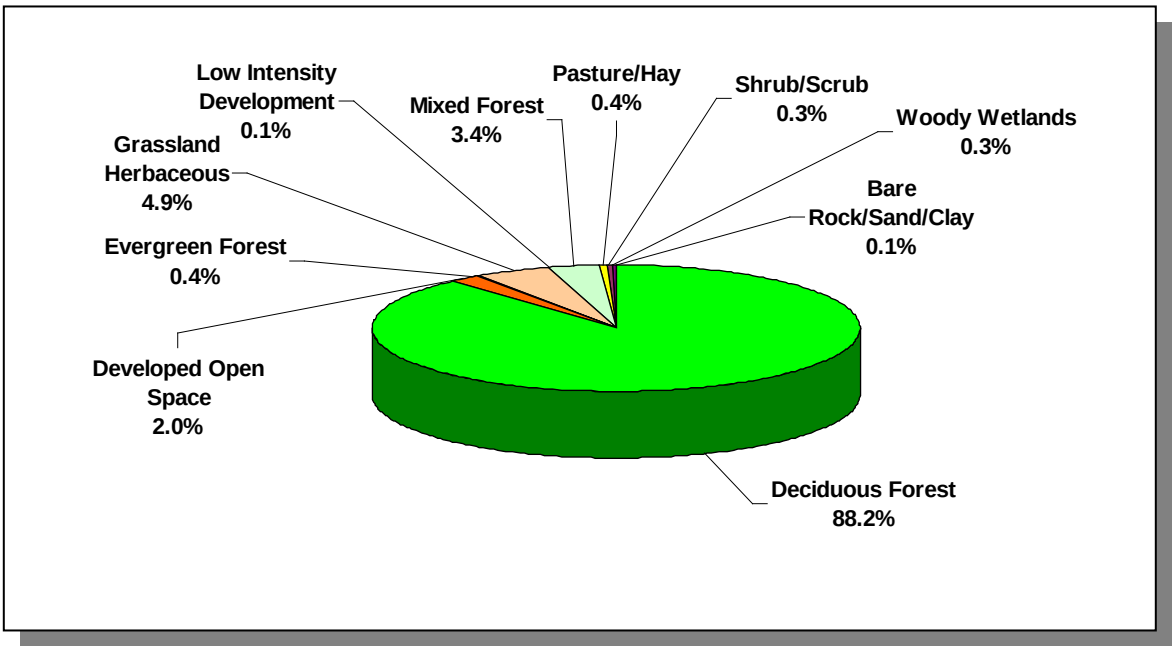

Figure 4-73. Land Use Distribution in Subwatershed 051301010701. *More information is provided in Appendix IV.*

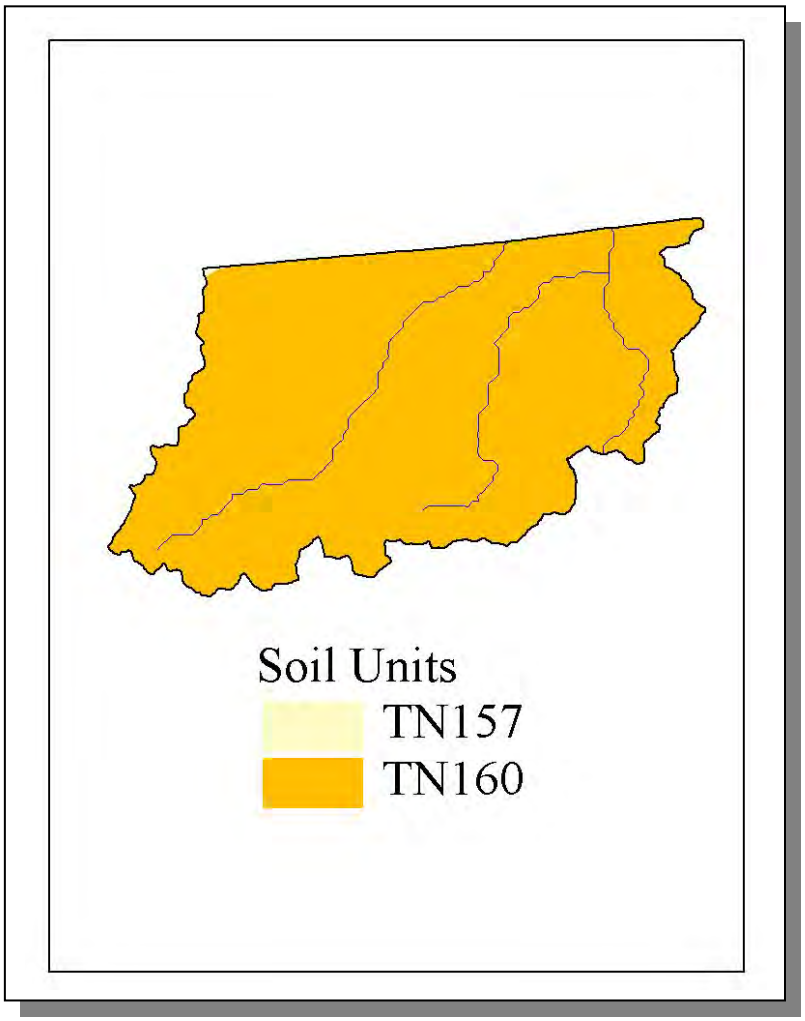

Figure 4-74. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010701.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN157	0.00	B	2.38	4.62	Loam	0.28
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-67. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010701. *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)
Campbell	35,079	37,878	39,864	1.88	659	711	748	13.5
Scott	18,358	19,816	21,127	9.36	1,718	1,854	1,977	15.1
Total	**53,437**	**57,694**	**60,981**		**2,377**	**2,565**	**2,725**	**14.6**

Table 4-68. Population Estimates in Subwatershed 051301010701.

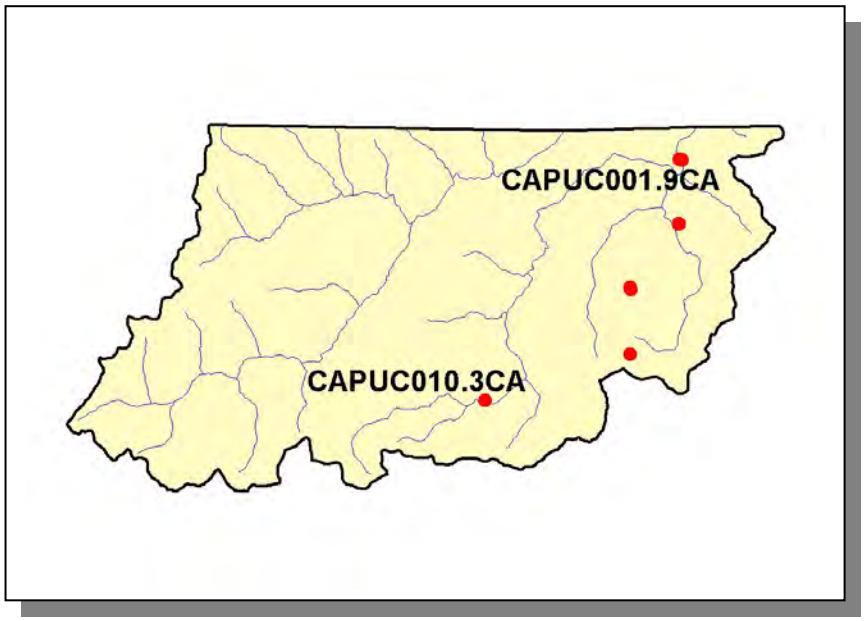

Figure 4-75. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051301010701. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

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

There are no point source contributions in this subwatershed.

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Broilers Sold)	Hogs	Sheep
72	146	7	61,097	<5	<5

Table 4-69. Summary of Livestock Count Estimates in Subwatershed 051301010701. *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
Campbell	4,083	7,684	66	8	0	14	0
Scott	2,177	4,447	216	196	1,989,506	17	74

Table 4-70. Summary of Livestock Count Estimates in Campbell and Scott Counties. *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.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Campbell	250.3	250.2	2.6	10.6
Scott	300.3	300.3	5.5	21.4

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

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.54
Grass (Hayland)	1.78
Legumes, Grass (Hayland)	0.44
Grass, Forbs, Legumes (Mixed Pasture)	0.92
Tobacco (Row Crops)	15.11
Other Vegetable and Truck Crops	3.33
Farmsteads and Ranch Headquarters	0.09

Table 4-72. Annual Estimated Total Soil Loss in Subwatershed 051301010701.

4.2.E. 0513010108.

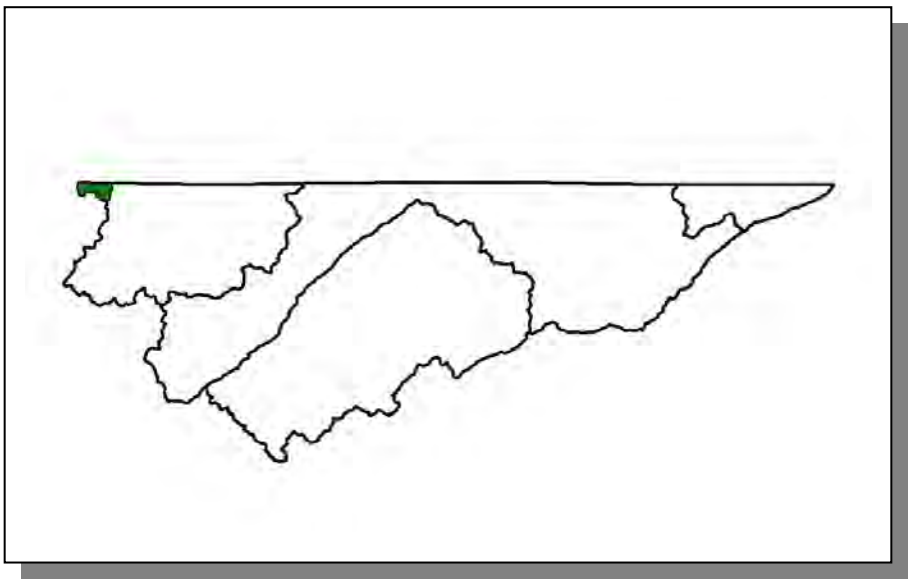

Figure 4-76. Location of Subwatershed 0513010108. *All Clear Fork of the Cumberland River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.E.i. 051301010801 (Marsh Creek).

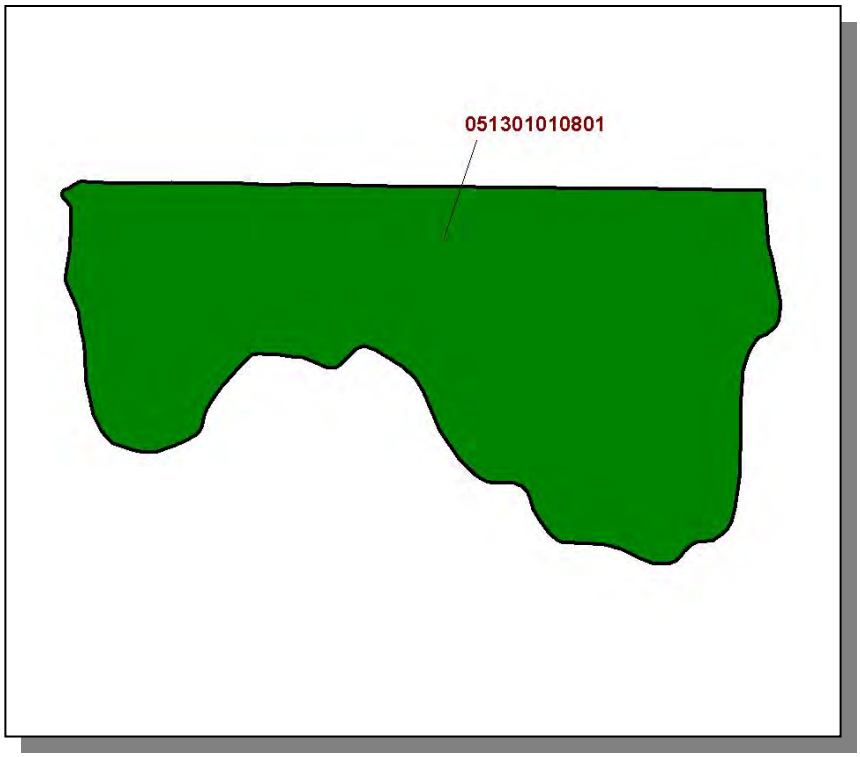

Figure 4-77. Location of Subwatershed 051301010801. *All Clear Fork of the Cumberland River Watershed HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

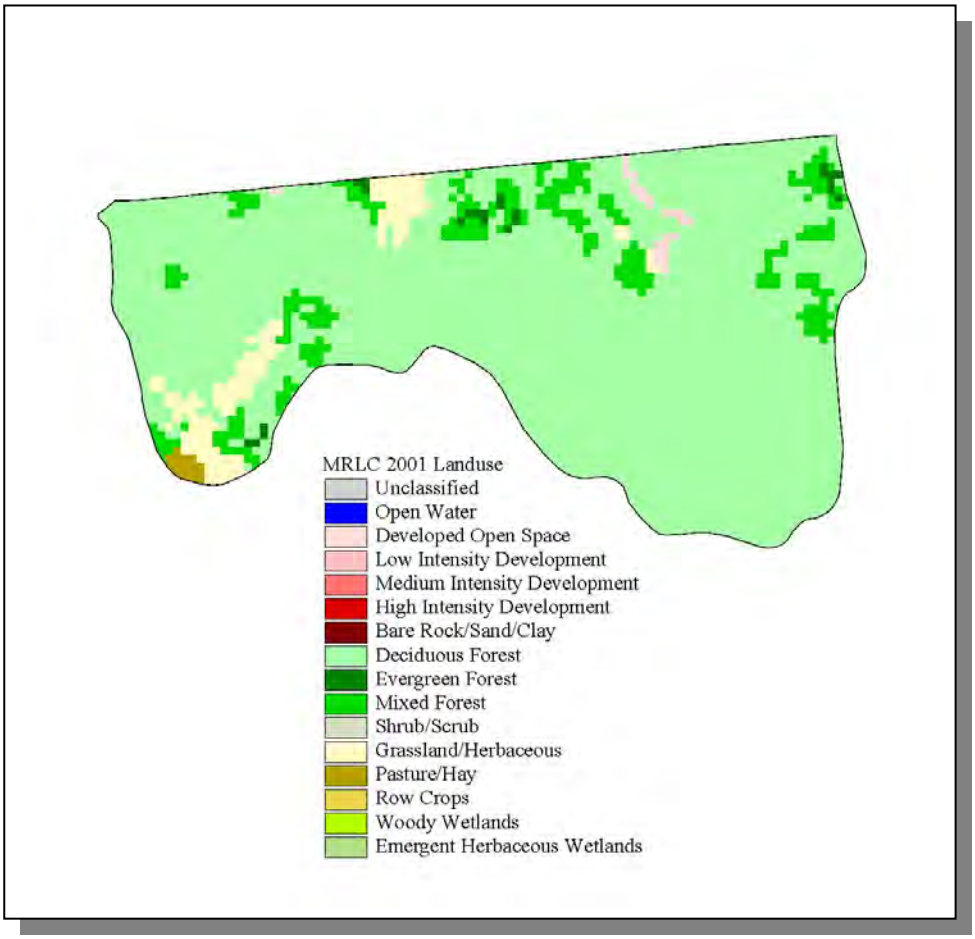

Figure 4-78. Illustration of Land Use Distribution in Subwatershed 051301010801.

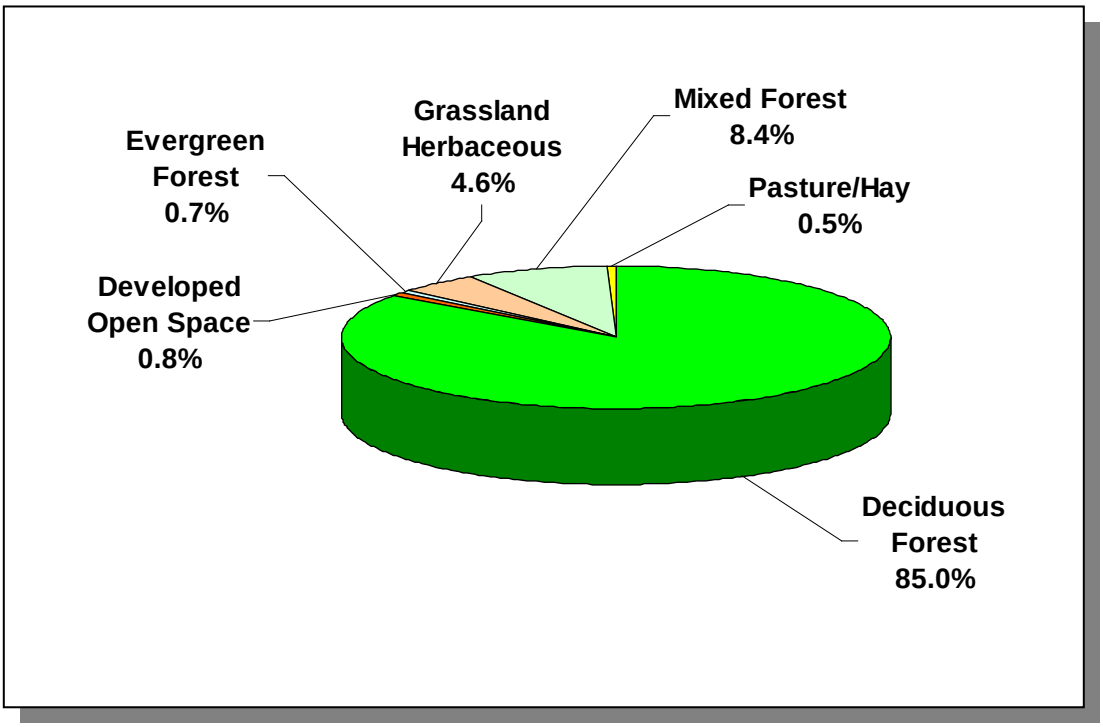

Figure 4-79. Land Use Distribution in Subwatershed 051301010801. *More information is provided in Appendix IV.*

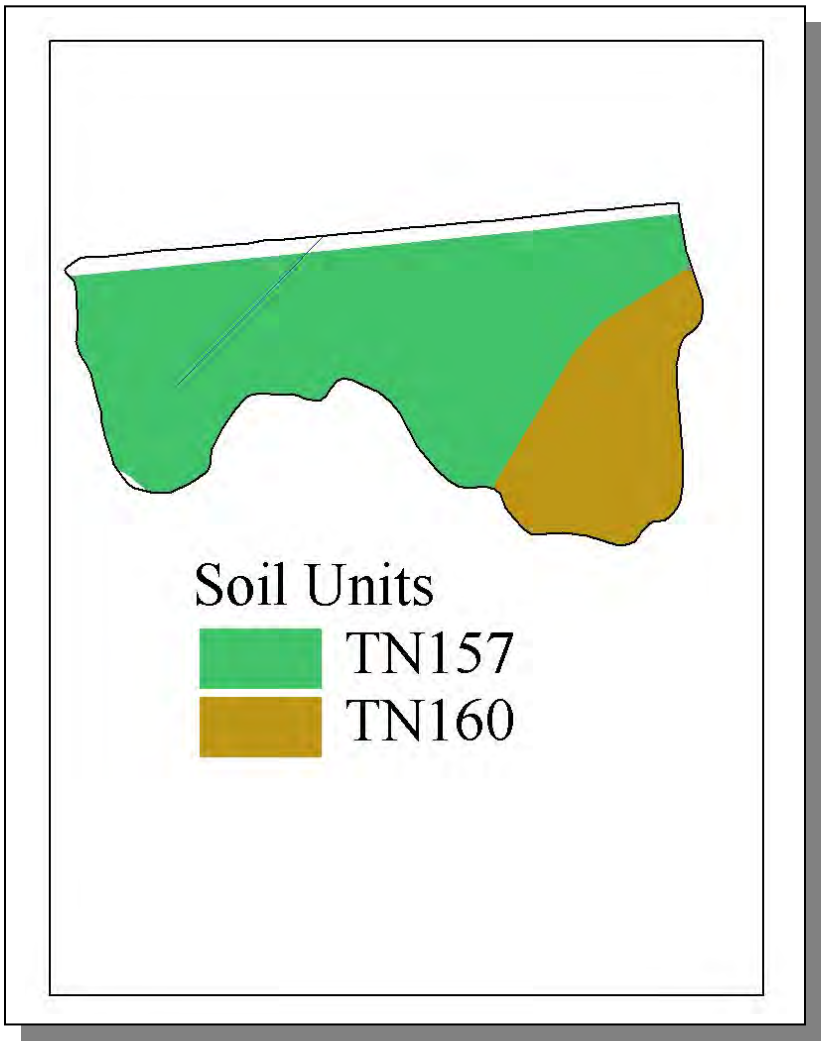

Figure 4-80. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010801.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN157	0.00	B	2.38	4.62	Loam	0.28
TN160	0.00	B	2.69	5.36	Loam	0.25

Table 4-73. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301010801. *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)
Scott	18,358	19,816	21,127	0.21	39	42	45	15.4

Table 4-74. Population Estimates in Subwatershed 051301010801.

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

There are no point source contributions in this subwatershed.

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

LIVESTOCK COUNTS		
Beef Cow	Cattle	Chickens (Broilers Sold)
<5	<5	1,097

Table 4-75. Summary of Livestock Count Estimates in Subwatershed 051301010801. *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
Scott	2,177	4,447	216	196	1,989,506	17	74

Table 4-76. Summary of Livestock Count Estimates in Scott County. *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.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Scott	300.3	300.3	5.5	21.4

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

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.33
Grass, Forbs, Legumes (Mixed Pasture)	0.58
Farmsteads and Ranch Headquarters	0.09

Table 4-78. Annual Estimated Total Soil Loss in Subwatershed 051301010801.

CHAPTER 5

WATER QUALITY PARTNERSHIPS IN THE CLEAR FORK OF THE CUMBERLAND RIVER WATERSHED

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

- Partnerships between agencies
- Partnerships between agencies and landowners

This chapter describes both types of partnerships in the Clear Fork of the Cumberland 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
Conservation Buffers	22,822	
Erosion Control		129
Nutrient Management		2,041
Pest Management		1,704
Grazing / Forages		736
Tree and Shrub Practices		447
Tillage and Cropping		18
Wildlife Habitat Management		1,257

Table 5-1. Landowner Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Clear Fork of the Cumberland 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 threatened blackside dace (*Phoxinus cumberlandensis*) occurs in the Clear Fork of the Cumberland River watershed. Although there are no current records for federally listed mussel species in the watershed, suitable habitat exists and surveys for these species are needed. 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 also 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*.

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/

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.

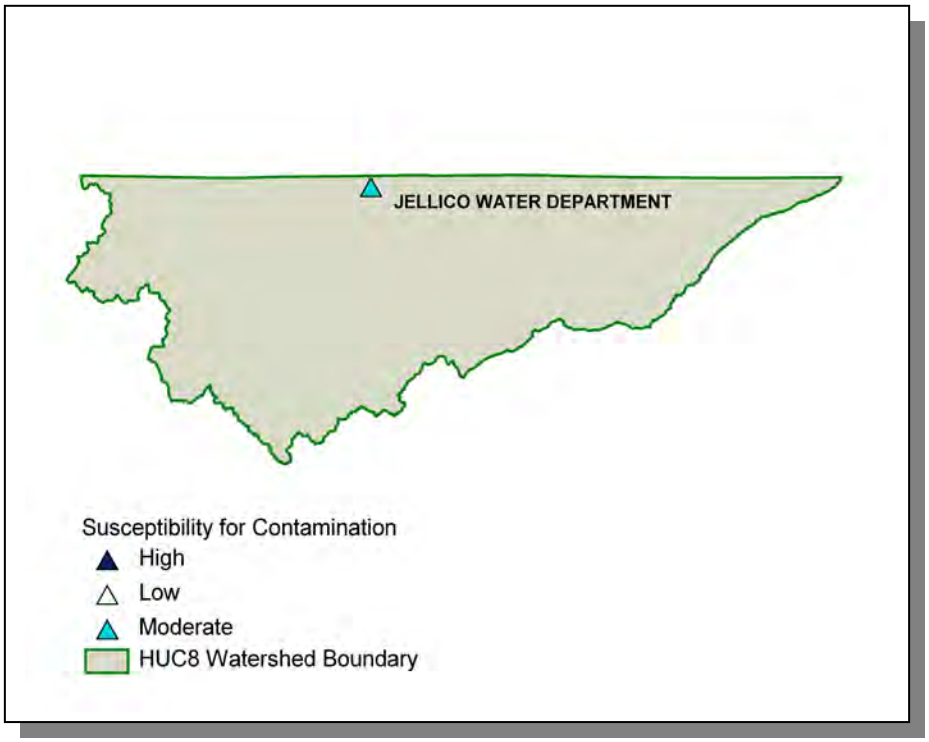

Figure 5-1. Susceptibility for Contamination in the Clear Fork of the Cumberland River Watershed.

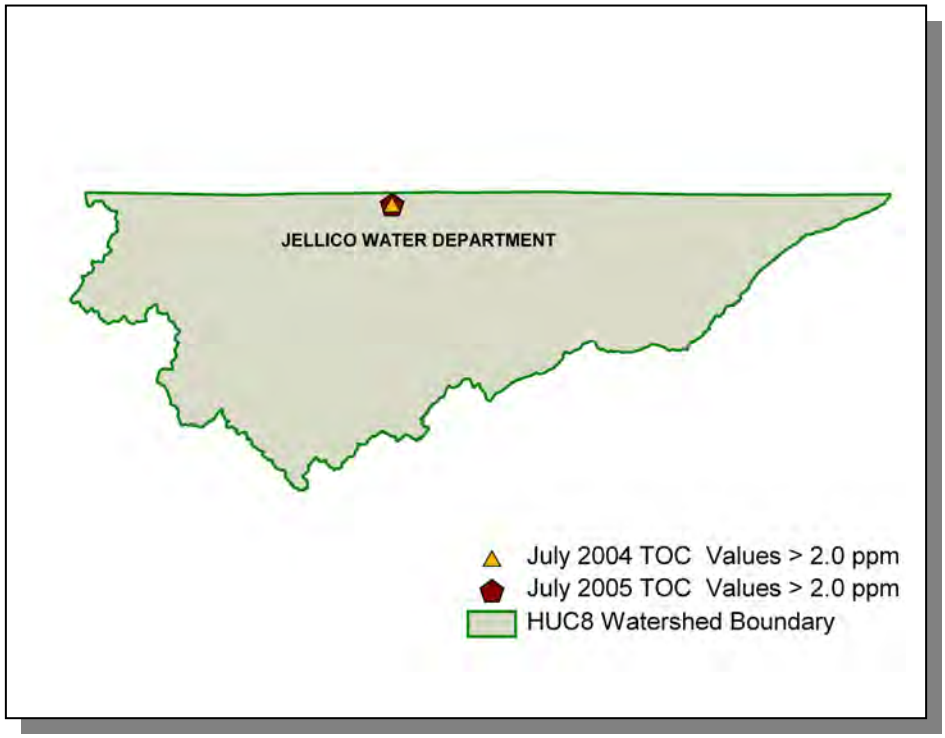

Figure 5-2. July 2004 and 2005 Raw Water Total Organic Carbon (TOC) Analysis in the Clear Fork of the Cumberland River Watershed.

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 Clear Fork of the Cumberland 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

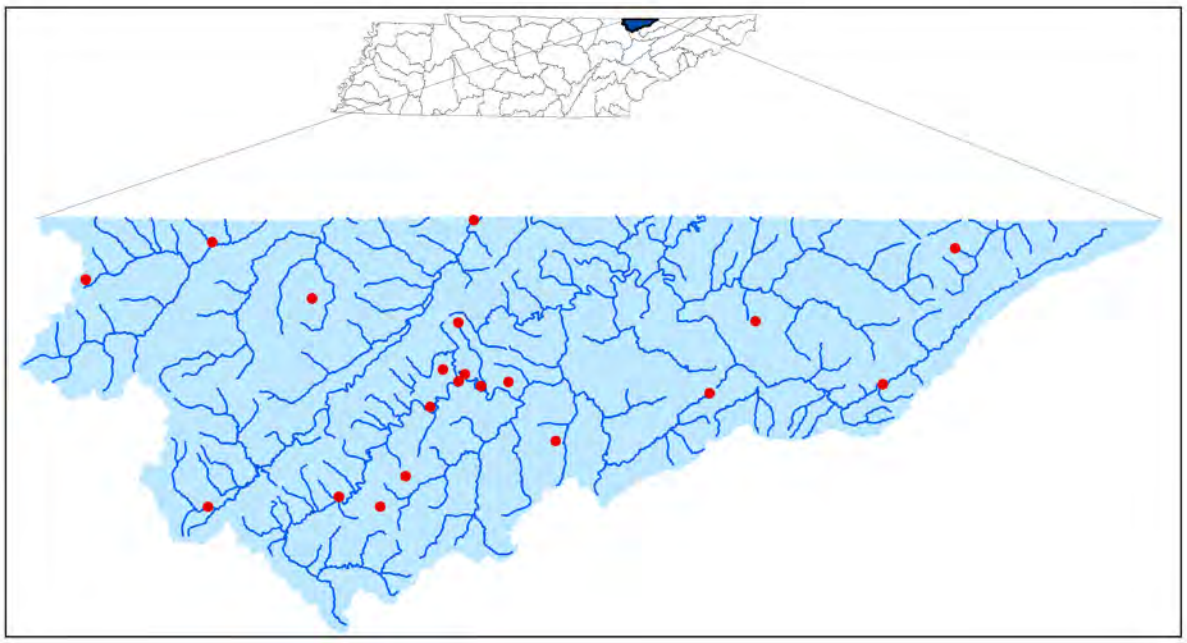

Figure 5-3. Location of BMPs installed from 1999 through 2005 in the Tennessee Portion of the Clear Fork of the Cumberland Watershed with Financial Assistance from the Tennessee Department of Agriculture's Nonpoint Source and Agricultural Resources Conservation Fund Grant Programs. *More information 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 Upper Cumberland 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/.

Clear Fork of Cumberland River

Mud Creek (05130101340)
Elk Fork Creek (05130101350)
Wolf Creek (05130101360)
Laurel Fork (05130101290)
Clear Fork near Fonde (05130101280)
Clear Fork of Cumberland River (05130101330)

Geography. The Clear Fork watershed in Kentucky is comprised of more than 110 square miles. The Clear Fork is a major tributary of the Upper Cumberland River that begins in Kentucky flows southwest into Tennessee before turning north back into Kentucky to it confluence with the Cumberland River near Williamsburg. Along this route the stream flows through one of only three natural “breaks” in the 125-mile Pine Mountain formation. The headwaters drain the slopes of Pine Mountain and the Log Mountains where elevations exceed 3000 feet at the watershed perimeter. Patterson and Jellico Mountains define the eastern and western boundaries of the watershed respectively. Elevations approach or slightly exceed 2000 feet on both mountains. The general topography of this watershed is steep with high ridges and low hollows. The terrain is typical of that of the Cumberland Plateau, 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.

Waterways. There are over 230 miles of streams in the Kentucky portion of the Clear Fork watershed. Significant tributaries include Laurel Fork, Elk Fork Creek, Mud Creek and Wolf Creek.

The upper 6.5 miles of Laurel Fork are Outstanding State Resource Water due to the presence of federally endangered blackside dace (*Phoxinus cumberlandensis*). The remaining flow in Kentucky is also Outstanding Resource Water due to the presence of federally endangered elktoe mussel (*Alasmidonta altropurpurea*).

There are also several small streams listed as Outstanding State Resource Waters due to the presence of federally endangered blackside dace (*Phoxinus cumberlandensis*). These include Mud Creek, Stevenson Creek, Buffalo Creek, Buck Creek and Adams Branch

The entire watershed in Kentucky is part of the Williamsburg water supply protection area including part of the "critical" protection zone.

Land use/land cover. The watershed is mostly rugged mountain terrain covered in deciduous or mixed forest with some agricultural land in the wider valleys; however, it is not intensively used. On the western side of the watershed a large portion lies within the proclamation boundary of the Daniel Boone National Forest, however most of the land remains in private holdings. In addition there are numerous areas of reclaimed strip mines as well as a few active mines in the watershed.

Due to the terrain, population is sparse in many areas, however in the valleys there are numerous small communities. These are primarily located along the Interstate 75 and US 25W highway corridors.

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

- The lower 5.1 miles of Mud Creek were assessed for fish and were judged partially supporting for aquatic life. An aquatic and riparian habitat survey on the segment yielded a score in the not supporting range due to poor bank stability and inadequate riparian vegetation.
- Wolf Creek was assessed from the mouth upstream to Little Wolf Creek. The segment was assessed for fish and was judged not supporting for aquatic life. An aquatic and riparian habitat survey yielded a score in the not supporting range due to poor bank stability, inadequate riparian vegetation and heavy sediment deposition.
- Laurel Fork was assessed in three segments for a total of 11.8 miles. All three segments were assessed for fish. The upper and lower segments assessed totaled 8.2 miles and were judged fully supporting for aquatic life. The middle segment assessed was 3.6 miles and was judged not supporting for aquatic life.
- The lower 2.9 miles of the Clear Fork were assessed for fish, macroinvertebrates, algae and water quality. This segment was judged fully supporting for aquatic life.
- The tributaries of Buck Creek and Adams Branch were also assessed and judged fully supporting for aquatic life.

Watershed Efforts in the Clear Fork. Although the Clear Fork watershed was not selected by the Upper Cumberland River Basin Team as a priority watershed for watershed planning there have been important activities occurring in the watershed.

- **The Pruden/Fonde Reclamation Project -** Located in the Back Creek watershed in Bell County, Kentucky, the Pruden/Fonde Reclamation Project was a 50-acre complex of abandoned coal refuse piles, slurry ponds, mine seeps and landslides. In 2001/2002 this area was reclaimed using funds from the Appalachian Clean Streams Initiative. For more info about the project go to http://www.aml.ky.gov/projects/Pruden_Fonde.htm
- **Joint Kentucky/Tennessee Water Quality Project -** The tributaries of Elk Fork Creek and Mud Creek were identified as priority areas by both states for coordination of restoration projects and monitoring efforts.
- **Upper Cumberland Watershed Watch –** The Upper Cumberland Watershed Watch volunteer monitoring program has recently recruited samplers in the Tennessee portion of the Clear Fork watershed.

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

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

The Cumberland Mountain RC&D council area includes five Tennessee counties: Anderson, Campbell, Morgan, Roane and Scott.

For more information please contact Alan Neal, coordinator, at alan.neal@tn.usda.gov.

CHAPTER 6

RESTORATION STRATEGIES IN THE CLEAR FORK OF THE CUMBERLAND RIVER WATERSHED

6.1. BACKGROUND.

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

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

This Chapter addresses point and nonpoint source approaches to water quality problems in the Tennessee portion of the Clear Fork of the Cumberland 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 Clear Fork of the Cumberland River Watershed public meeting was held September 14, 1999 as a joint meeting with the South Fork Cumberland River Watershed at the York Institute in Jamestown. 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

- Logging in remote areas and its effect on rivers and steams (sediment)
- Effects of abandoned mines on water quality
- Recreational abuse
- Water quality impacts on water quality (from small impoundments)
- Loss of biodiversity (fish and mussels)
- Effects of urbanization (water supply, nonpoint sources of pollution, wastewater treatment plants)
- Brine from oil and gas wells

6.2.B. Year 3 Public Meeting. The second Clear Fork of the Cumberland River Watershed public meeting was held November 27, 2001 as a joint meeting with the South Fork Cumberland River Watershed at the York Institute in Jamestown. 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

- Water quantity is also an issue. We need a plan that addresses that along with water quality
- Small steams at low flow cannot assimilate the load associated with discharges from other tributaries

6.2.C. Year 5 Public Meeting. The third scheduled Clear Fork of the Cumberland 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 Upper 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.

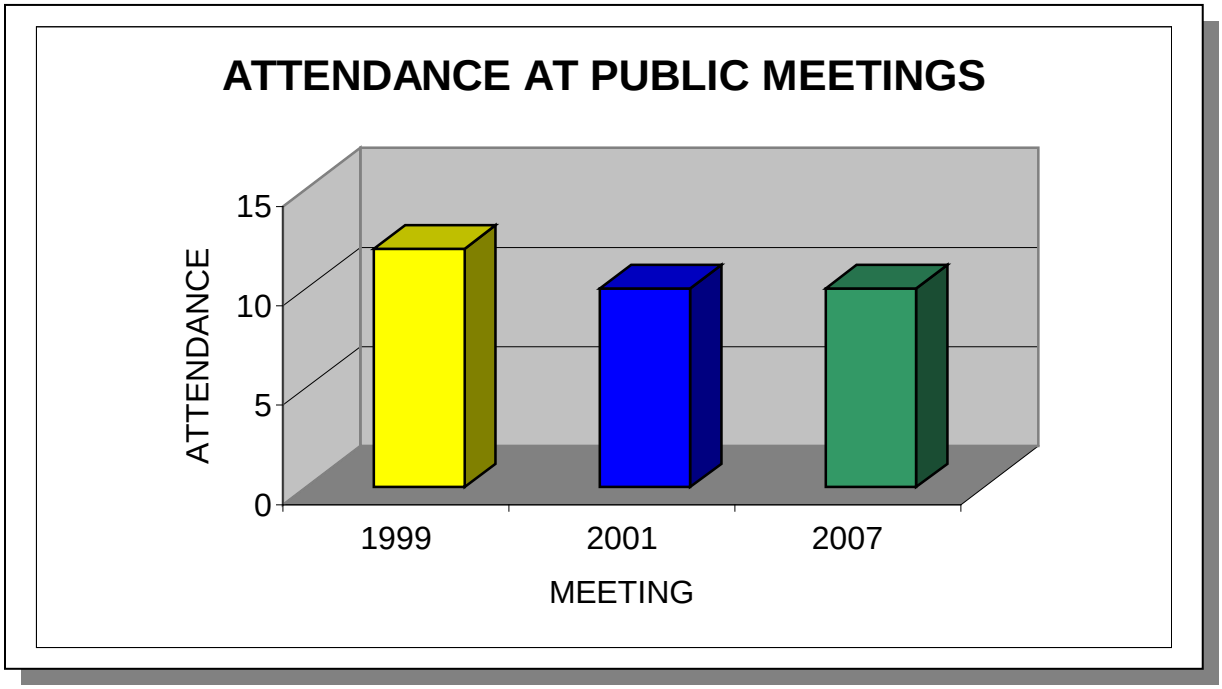

Figure 6-1. Attendance at the Clear Fork of the Cumberland River and South Fork Cumberland River Watershed Joint Public Meetings. *Attendance numbers do not include TDEC personnel. Meetings in 1999 and 2001 represent Clear Fork of the Cumberland River and South Fork Cumberland River joint public meetings. Meeting in 2007 represents Clear Fork of the Cumberland River, South Fork Cumberland River, and Obey 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.

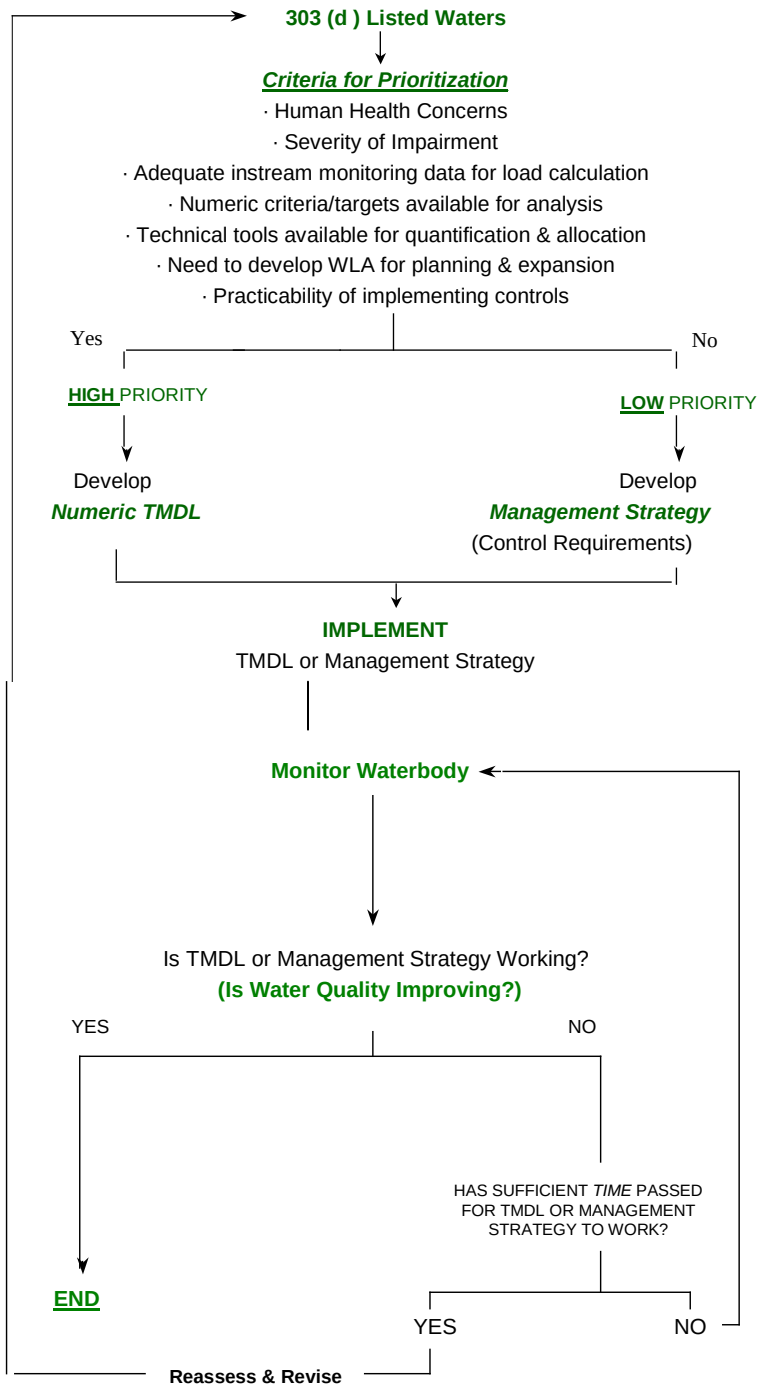

Figure 6-2. Prioritization Scheme for TMDL Development.

6.3.B. Nonpoint Sources

Common nonpoint sources of pollution in the Clear Fork of the Cumberland 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 Clear Fork of the Cumberland 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. Regardless of the size, no construction site is allowed to cause a condition of pollution. There are currently no waterbodies in the Tennessee portion of the Clear Fork of the Cumberland River Watershed that are listed as impaired by sedimentation from construction activities.

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. Some streams within the Clear Fork of the Cumberland 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 watershed citizen groups, are working to stabilize portions of stream banks using bioengineering and other techniques. Many of the affected streams could benefit from these types of projects.

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

Voluntary Activities

- Re-establish bank vegetation (examples: Lick Fork Creek and Elk Fork Creek).
- Establish off-channel watering areas for livestock by moving watering troughs and feeders back from stream banks, or at least limit cattle access to restricted areas with armored bank entry.
- Limit cattle access to streams and bank vegetation.

Regulatory Strategies

- Increase efforts in the Master Logger program to recognize impaired streams and require more effective management practices.
- Require post-construction run-off rates to be no greater than pre-construction rates in order to avoid in-channel erosion.
- Implement additional restrictions on logging in streamside management zones.
- Limit road and utility crossings of streams through better site design.
- Restrict the use of off-highway vehicles on stream banks and in stream channels.

Additional Strategies

- Better community planning for the impacts of development on small streams, especially development in growing areas.
- Encourage or require strong local buffer ordinances.
- Limit clearing of stream and ditch banks or other alterations. *Note: Permits may be required for any work along streams.*

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

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

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

Many sediment problems traceable to agricultural practices also involve riparian loss due to close row cropping or pasture clearing for grazing. Lack of vegetated buffers along stream corridors is an occasional problem in some areas of the Clear Fork of the Cumberland River Watershed, due both to agricultural and residential/commercial land uses. Many streams that could benefit from the establishment of more extensive riparian buffer zones include Lick Fork, Elk Fork Creek, and tributaries to Elk Fork Creek.

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 Knoxville 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, four stream systems in the Tennessee portion of the Clear Fork of the Cumberland River Watershed are known to have excessive pathogen contamination.

Clear Fork near Clairfield, Hickory Creek, Davis Creek, and Elk Fork Creek are impacted by bacterial contamination coming from storm water runoff and septic drainfield systems.

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.

Additional strategies

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

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

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

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

Some sources of nutrients can be addressed by:

Voluntary Activities

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

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

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

Regulatory Strategies.

- Strengthen enforcement of regulations governing on-site wastewater treatment.
- Impose more stringent permit limits for nutrients discharged from sewage treatment plants.
- Impose timely and appropriate enforcement for noncomplying sewage treatment plants, large and small, and their collection systems.
- Identify Concentrated Animal Feeding Operations (CAFO) not currently permitted.
- Identify any Animal Feeding Operations (AFO) that contribute to stream impacts and declare them as a CAFO requiring a permit.
- Require nutrient management plans for all golf courses.

Additional Strategies

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

6.3.B.iv. Toxins and Other Materials.

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

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

Some of these problems can be addressed by:

Voluntary Activities

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

Regulatory Strategies

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

6.3.B.v. Habitat Alteration.

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

Although large-scale public projects such as highway construction can alter significant portions of streams, individual landowners and developers are responsible for the vast majority of stream alterations. Some measures that can help address these problems are:

Voluntary Activities

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

Additional Strategies

- Increased enforcement may be needed when violations of current regulations occur, especially for illicit gravel dredging.

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

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

Streams may be impacted by chemical reactions that result in orange flocculant material in the water and on the bottom of streams. Seeps may develop an oily film on the surface of the water. The orange color comes from the iron in the water precipitating out when the water reaches the surface and starts to oxidize. Once the iron has precipitated out, other metals will start to precipitate, like manganese and aluminum (manganese forms a hard black coating on the substrate and aluminum a fine white chalky layer). Examples of streams affected by ARD in the Clear Fork of the Cumberland River Watershed are Pound Branch, Charlie's Branch, and Adams Hollow Branch.

The means necessary to remove ARD from these streams is complicated and expensive. There are two types of treatment systems, Passive Treatment and Active Treatment. Two examples of Passive Treatment facilities are anoxic limestone drains and constructed wetlands (alone or in some combination lined with limestone rock). These systems are used to precipitate the flocculants and stabilize the pH. Active Treatment systems collect the water at the source and actively drop neutralizing chemicals into the water in order to stabilize the pH and precipitate iron prior to discharging to a stream. Since these treatment systems will have to go on for many years, the most cost effective means to treat these streams is by Passive Treatment. In

order to install these systems the landowners, stakeholders and Office of Surface Mining all have to work together.

Some of these problems can be addressed by:

Voluntary Activities

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

Regulatory Strategies

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

Abandoned Coal Mines pose serious threats to public health, safety, and welfare as well as degrade the environment. The programs of Tennessee Land reclamation Section accomplish three important things: (1) They remove dangerous health and safety hazards that threaten the citizens of Tennessee, (2) They improve the environment, and (3) They restore resources to make them available for economic development, recreation, and other uses. Problems typically addressed by the Land reclamation Section include open or improperly filled mine shafts, dilapidated mine buildings and equipment, toxic mine refuse and drainage, landslides, mine fires, highwalls, and subsidence.

Projects on the ground:

- Indian Mountain State Park. A project to improve the reservoir for the city of Jellico's drinking water.

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 Clear Fork of the Cumberland River Watershed. Compliance information was obtained from EPA's Permit Compliance System (PCS). All data was queried for a five-year period between January 1, 2001 and December 31, 2006. PCS can be accessed publicly through EPA's Envirofacts website. This website provides access to several EPA databases to provide the public with information about environmental activities that may affect air, water, and land anywhere in the United States:

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

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

6.4.A. Municipal Permits

TN0022861 Jellico STP (c/o Jellico Electric and Water Systems)

Discharger rating: Minor
City: Jellico
County: Campbell
EFO Name: Knoxville
Issuance Date: 8/1/06
Expiration Date: 8/30/09
Receiving Stream(s): Elk Fork Creek mile 2.1
HUC-12: 051301010506
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: Oxidation ditch, biological treatment preceeded by mechanical screening and grit removal and followed by tertiary filtration, chlorination and dechlorination.

Segment	TN05130101091_1000
Name	Elk Fork Creek
Size	3.9
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Recreation (Non-Supporting), Irrigation (Supporting), Fish and Aquatic Life (Non-Supporting), Domestic Water Supply (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Alteration in stream-side or littoral vegetative covers, Sedimentation/Siltation, Escherichia coli
Sources	Impacts from Abandoned Mine Lands (Inactive), On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)

Table 6-1. Stream Segment Information for Jellico STP.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	Summer	2.4	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	1.8	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	1.2	mg/L	MAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	7.5	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	11	lb/day	WAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	21	lb/day	WAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	4.4	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	3.3	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	14	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	2.2	mg/L	MAvg Conc	3/Week	Composite	Effluent
Bypass of Treatment (occurrences)	All Year		Visual	MAvg Load	Continuous	Visual	
CBOD % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	%t Removal
CBOD % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
CBOD5	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	Summer	10	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	Summer	47	lb/day	WAvg Load	3/Week	Composite	Effluent
CBOD5	Summer	31	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	Summer	5	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	Summer	7.5	mg/L	WAvg Conc	3/Week	Composite	Effluent
CBOD5	Winter	15	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	Winter	69	lb/day	WAvg Load	3/Week	Composite	Effluent
CBOD5	Winter	7.5	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	Winter	47	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	Winter	10	mg/L	WAvg Conc	3/Week	Composite	Effluent
D.O.	All Year	6	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	941	#/100mL	DMax Conc	3/Week	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Overflow Use Occurences	All Year		Visual	MAvg Load	Continuous	Visual	Wet Weather
Overflow Use Occurences	All Year		Visual	MAvg Load	Continuous	Visual	Non Wet Weather
Settleable Solids	All Year	1	mL/L	DMax Conc	Weekdays	Grab	Effluent
TRC	All Year	0.02	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year						Effluent
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year	250	lb/day	WAvg Load	3/Week	Composite	Effluent
TSS	All Year	40	mg/L	WAvg Conc	3/Week	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year	187	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year	30	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal

Table 6-2a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-2b.

Tables 6-2a-b. Permit Limits for Jellico STP.

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

1 Bypass
21 Total Chlorine
1 Ammonia

Comments: *(TN0022861 Jellico STP (c/o Jellico Electric and Water Systems)):*
1/4/07 Compliance Evaluation Inspection. The following is a list of comments resulting from the inspection:

Jellico WWTP site overview consists of the following steps/stages of treatment: an oxidation ditch activated sludge plant preceded by mechanical screening and grit removal and followed with two clarifiers (which can operate individually, in parallel, and/or in series), tertiary filtration, chlorination, de-chlorination, and step aeration. Sludge is aerobically digested and pressed via a McNeill belt press for land-filling. This plant is designed for an average flow of 0.75 MGD.

The inspectors found no visible sheen, scum, or other visible material contained in the effluent.

The City of Jellico has reported that there was no bypass or overflow at the plant since the last inspection. This information was restated by the plant's operator.

A copy of the permit was available for review. Monitoring reports (DMRs and MORs), were available for review. However, some documents were not readily available. For example, laboratory bench sheets. This is a major deficiency. All documents should be made easily available for future inspection. Operators should expect an unannounced follow-up inspection at some point in the future to verify that laboratory sheets are in use and available for review.

Extremes in temperature in the laboratory can affect the performance of equipment and quality of analyses. The laboratory needs to be maintained at a consistent and reliable temperature. The laboratory currently has uninsulated exterior windows, which should be replaced with insulated windows to maintain appropriate climate control.

TN0055239 Wynn Habersham School

Discharger rating: Minor
City: Duff
County: Campbell
EFO Name: Knoxville
Issuance Date: 11/30/04
Expiration Date: 9/30/09
Receiving Stream(s): Davis Creek at mile 0.1
HUC-12: 060102050106
Effluent Summary: Treated domestic wastewater from Outfall 001
Treatment system: Septic tank, recirculating sand filter and ultraviolet disinfection

Segment	TN05130101016_0200
Name	Davis Creek
Size	24
Unit	Miles
First Year on 303(d) List	2006
Designated Uses	Recreation (Non-Supporting), Irrigation (Supporting), Fish and Aquatic Life (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Escherichia coli
Sources	On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems)

Table 6-3. Stream Segment Information for Wynn Habersham School.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	All Year	2.5	mg/L	DMax Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	All Year	1.5	mg/L	MAvg Conc	2/Month	Grab	Effluent
CBOD5	All Year	35	mg/L	DMax Conc	2/Month	Grab	Effluent
CBOD5	All Year	25	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 Ari 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
TRC	All Year	0.02	mg/L	DMax Load	Weekdays	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 6-4. Permit Limits for Wynn Habersham School.

Comments:
No comments.

APPENDIX II

ID	NAME	HAZARD
137002	Sigmond Farm	B
137003	Matthews Mine Tailing	B

Table A2-1. Inventoried Dams in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed. *Hazard Code: B, Breached. TDEC only regulates dams indicated by a numeric hazard score.*

LAND COVER/LAND USE	ACRES	% OF WATERSHED
Bare Rock/Sand/Clay	1,443	0.7
Deciduous Forest	164,859	77.3
Developed Open Space	7,032	3.3
Evergreen Forest	2,193	1.0
Grassland/Herbaceous	13,706	6.4
High Intensity Development	50	0.0
Low Intensity Development	2,043	1.0
Medium Intensity Development	470	0.2
Mixed Forest	15,670	7.4
Open Water	303	0.1
Pasture/Hay	4,563	2.1
Row Crops	44	0.0
Shrub/Scrub	329	0.2
Woody Wetlands	430	0.2
Total	**213,135**	**100.0**

Table A2-2. Land Use Distribution in the Tennessee Portion of the Clear Fork of the Cumberland 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 8)	
Cumberland Plateau (68a)	Rock Creek (68A01)	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
Cumberland Mountains (69d)	No Business Branch (69D01)	Clear Fork Cumberland	05130101
	Flat Fork (69D03)	Emory River	06010208
	Stinking Creek (69D04)	Clear Fork Cumberland	05130101
	New River (69D05)	SF Cumberland River	05130104
	Round Rock Creek (69D06)	SF Cumberland River	05130104

Table A2-3. Ecoregion Monitoring Sites in Ecoregions 68a and 69d.

CODE	NAME	AGENCY	AGENY ID
118	TDEC/DNA Tackett Creek Swamps Site	TDEC/DNA	Awl Report
175	TDEC/DNA Clairfield Marsh And Low Woods Site	TDEC/DNA	Patrick Report
338	TDOT Rock Creek Road Mitigation Site	TDOT	
361	TDOT Route A-102 Mitigation/Permit Site	TDOT	

Table A2-4. Wetland Sites in the Clear Fork of the Cumberland River Watershed in TDEC Database. *TDEC, Tennessee Department of Environment and Conservation; DNA, Division of Natural Areas; TDOT, Tennessee Department of Transportation.* ***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)
Cabin Hollow Creek	TN05130101046_0210	2.6
Capuchin Creek	TN05130101007_0100	21.8
Clear Fork	TN05130101015_1000	20.7
Davis Creek	TN05130101016_0200	24
Elk Fork Creek	TN05130101091_2000	18.4
Gum Fork	TN05130101007_0200	13.5
Hickory Creek	TN05130101016_1000	9.8
Hickory Creek	TN05130101016_2000	9.5
Jellico Creek	TN05130101007_1000	12.4
Laurel Fork	TN05130101016_0600	13
Lick Fork	TN05130101091_0200	9.3
Little Elk Creek	TN05130101091_0300	9.9
Little Tackett Creek	TN05130101015_0720	6.5
Little Yellow Creek	TN05130101046_0100	4.5
Louse Creek	TN05130101016_0400	14.2
No Business Branch	TN05130101016_0700	4.5
Stinking Creek	TN05130101016_0500	22.9
Tackett Creek	TN05130101015_0700	17.2
Terry Creek	TN05130101091_0100	6.1
Valley Creek	TN05130101015_0500	10.1

Table A3-1. Streams Fully Supporting Fish and Aquatic Life Designated Use in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Elk Fork Creek	TN05130101091_1000	3.9
White Oak Creek	TN05130101016_0100	6.7

Table A3-2. Streams Not Supporting Fish and Aquatic Life Designated Use in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Baird Creek	TN05130101007_0110	8.3
Bennett Fork	TN05130101046_0200	11.0
Buffalo Creek	TN05130101015_0400	5.4
Burnt Pone Creek	TN05130101091_0500	2.7
Crooked Creek	TN05130101091_0600	4.7
Jennings Creek	TN05130101016_0510	11.1
Laurel Fork	TN05130101015_0200	8.6
Meadow Branch	TN05130101015_0710	0.5
Misc Tribs to Clear Fork	TN05130101015_0999	10.5
Misc Tribs to Elk Fork Creek	TN05130101091_0999	15.9
Misc Tribs to Hickory Creek	TN05130101016_0999	11.2
Misc Tribs to Jellico Creek	TN05130101007_0999	12.9
Misc Tribs to Stinking Creek	TN05130101016_0599	34.1
Misc Tribs to Tackett Creek	TN05130101015_0799	20.4
Primroy Creek	TN05130101015_0100	3.5
Rock Creek	TN05130101016_0300	4.9
Rose Creek	TN05130101015_0300	2.7
Straight Creek	TN05130101015_0600	9.9
Whistle Creek	TN05130101091_0400	2.8

Table A3-3. Streams Not Assessed for Fish and Aquatic Life Designated Use in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Clear Fork	TN05130101015_1000	20.7
Davis Creek	TN05130101016_0200	24.0
Elk Fork Creek	TN05130101091_1000	3.9
Hickory Creek	TN05130101016_1000	9.8
Hickory Creek	TN05130101016_2000	9.5
No Business Branch	TN05130101016_0700	4.5
Stinking Creek	TN05130101016_0500	22.9
White Oak Creek	TN05130101016_0100	6.7

Table A3-4. Streams Fully Supporting Recreation Designated Use in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed.

APPENDIX IV

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0401	0501	0502	0503	0504
Bare Rock/Sand/Clay	185	389	588	27	
Deciduous Forest	6,524	19,338	17,676	4,490	1,800
Developed Open Space	1,429	650	324	405	100
Evergreen Forest	796	123	62	154	57
Grassland/Herbaceous	2,216	1,461	1,622	616	70
High Intensity Development	28		3	30	
Low Intensity Development	540	202	41	224	1
Medium Intensity Development	169	28	26	98	
Mixed Forest	4,842	667	1,620	812	813
Open Water	58	8	53	32	
Pasture/Hay	3,718	143	17	262	9
Row Crops	9				
Shrub/Scrub	37	64	4	2	
Woody Wetlands		23	3	6	2
Total	**20,550**	**23,095**	**22,038**	**7,158**	**2,851**

Table A4-1a.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0505*	0506	0601	0602	0603
Bare Rock/Sand/Clay		71	32	92	134
Deciduous Forest		24,378	13,384	18,004	22,675
Developed Open Space		1,885	297	846	1,676
Evergreen Forest		276	408	422	536
Grassland/Herbaceous		2,223	788	1,870	2,946
High Intensity Development		12		2	3
Low Intensity Development		826	18	317	375
Medium Intensity Development		139	3	104	72
Mixed Forest		1,119	1,236	4,337	3,486
Open Water		72	26	19	51
Pasture/Hay		2,989	51	610	240
Row Crops		42			2
Shrub/Scrub		93	20	19	12
Woody Wetlands		245	23	2	10
Total		**34,369**	**16,285**	**26,645**	**32,219**

Table A4-1b.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)	
	0701	0801
Bare Rock/Sand/Clay	43	
Deciduous Forest	33,835	630
Developed Open Space	757	6
Evergreen Forest	142	5
Grassland/Herbaceous	1,890	34
Low Intensity Development	21	
Medium Intensity Development	1	
Mixed Forest	1,304	62
Open Water	6	
Pasture/Hay	155	4
Shrub/Scrub	111	
Woody Wetlands	118	
Total	**38,383**	**741**

Table A4-1c.

Table A4-1a-c. Land Use Distribution in Clear Fork of the Cumberland 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.*

AGENCY	STATION	LOCATION	HUC-12
TDECWPC	CLEAR061.0CL	Clear Fork @ RM 61.0	051301010501
TDECWPC	TACKE000.1CL	Tackett Creek @ RM 0.1	051301010502
TDECWPC	CLEAR019.4CA	Clear Fork @ RM 19.4	051301010503
TDECWPC	HICKO001.5CA	Hickory Creek @ RM 1.5	051301010503
TDECWPC	DAN000.4CA	Dan Branch @ RM 0.4	051301010506
TDECWPC	DREW000.1CA	Drew Branch @ RM 0.1	051301010506
TDECWPC	GBARN000.2CA	Granny Barnes Branch @ RM 0.2	051301010506
TDECWPC	LELK006.2CA	Little Elk Fork @ RM 6.2	051301010506
TDECWPC	LICK000.9CA	Lick Fork @ RM 0.9	051301010506
TDECWPC	LICK003.8CA	Lick Fork @ RM 3.8	051301010506
TDECWPC	ECO69D04	Stinking Creek @ RM 15.1	051301010602
TDECWPC	ECO69D01	No Business Branch @ RM 0.2	051301010603
TDECWPC	STINK001.0CA	Stinking Creek @ RM 1.0	051301010603
TDECWPC	VALLE001.0CL	Valley Creek @ RM 1.0	051301010603
TDECWPC	WOAK000.7CA	White Oak Creek @ RM 0.7	051301010603
TDECWPC	CAPUC001.9CA	Capuchin Creek @ RM 1.9	051301010701
TDECWPC	CAPUC010.3CA	Capuchin Creek @ RM 10.3	051301010701
21KY	CRW014	Laurel River	Kentucky
21KY	CRW015	Marsh Creek Near Sand Hill	Kentucky
21KY	CRW016	Jellico Creek Near Duckrun	Kentucky
21KY	CRW017	Richland Creek Near Barbourville	Kentucky
21KY	CRW018	Straight Creek At Straight Creek	Kentucky
21KY	CRW019	Yellow Creek Near Ponza	Kentucky
21KY	CRW020	Poor Fork Cumberland River Near Rosspoint	Kentucky
21KY	CRW021	Clover Fork At Golden Ash	Kentucky
21KY	CRW022	Martins Fork Cumberland River At Harlan	Kentucky
11NPSWRD	CUGA_CMRC_DB10	Davis Branch North Of Little Yellow Creek	Kentucky
11NPSWRD	CUGA_CMRC_DB5	Davis Branch	Kentucky
11NPSWRD	CUGA_CMRC_DB8	Davis Branch At Confluence With Unnamed Stream	Kentucky
11NPSWRD	CUGA_CMRC_LYC1	Little Yellow Creek At Park Boundary	Kentucky
11NPSWRD	CUGA_CMRC_LYC10	Little Yellow Creek Upstream of 25 East	Kentucky
11NPSWRD	CUGA_CMRC_LYC5	Little Yellow Creek - South Of Tunnel Creek	Kentucky
11NPSWRD	CUGA_CMRC_SR10	Sugar Run Near Highway 988	Kentucky
11NPSWRD	CUGA_CPSU_988	Drainage Ditch at Hwy 988 And US 25e	Kentucky
11NPSWRD	CUGA_CPSU_DB10	Davis Branch Upstream Of Little Yellow Creek	Kentucky
11NPSWRD	CUGA_CPSU_DB5	Davis Branch (Upper Reaches)	Kentucky
11NPSWRD	CUGA_CPSU_DB6	Davis Branch 0.5 Mile North Of Unnamed Stream	Kentucky
11NPSWRD	CUGA_CPSU_DB7	Davis Branch North Of Unnamed Stream	Kentucky
11NPSWRD	CUGA_CPSU_DB8	Davis Branch at Confluence Of Unnamed Stream	Kentucky
11NPSWRD	CUGA_CPSU_DR9	Dark Ridge Creek Near Sugar Run	Kentucky
11NPSWRD	CUGA_CPSU_KY18	Drainage Ditch - Storage Area	Kentucky

Table A4-3a.

AGENCY	STATION	LOCATION	HUC-12
11NPSWRD	CUGA_CPSU_MF2	Martins Fork Adjacent To Picnic Area	Kentucky
11NPSWRD	CUGA_CPSU_MF5	Martins Fork: Downstream Limit Of Study Area	Kentucky
11NPSWRD	CUGA_CPSU_RR1	Drainage Ditch: Railroad Tunnel	Kentucky
11NPSWRD	CUGA_CPSU_SB8	Sediment Basin At Tunnel Creek	Kentucky
11NPSWRD	CUGA_CPSU_SB8W	Sediment Basin - West Side At Tunnel Creek	Kentucky
11NPSWRD	CUGA_CPSU_SR10	Sugar Run At Hwy 988 And Picnic Area	Kentucky
11NPSWRD	CUGA_CPSU_TC10	Tunnel Creek Near Little Yellow Creek Confluence	Kentucky
11NPSWRD	CUGA_CPSU_TC6	Tunnel Creek: 0.75 Miles east of Little Yellow Creek	Kentucky
11NPSWRD	CUGA_CPSU_TC7	Tunnel Creek - Midstream	Kentucky
11NPSWRD	CUGA_CPSU_TC7N	Tunnel Creek - North Tunnel Drainage	Kentucky
11NPSWRD	CUGA_CPSU_TC7NP	Tunnel Creek - Below Dam 2	Kentucky
11NPSWRD	CUGA_CPSU_TC8	Tunnel Creek: Southbound Tunnel Drainage	Kentucky
11NPSWRD	CUGA_CPSU_TUNEL	Tunnel - Kentucky Side	Kentucky
11NPSWRD	CUGA_CPSU_YC1	Little Yellow Creek	Kentucky
11NPSWRD	CUGA_CPSU_YC12	Little Yellow Creek At Park Boundary	Kentucky
11NPSWRD	CUGA_CPSU_YC5	Little Yellow Creek Upstream Of Tunnel Creek	Kentucky
11NPSWRD	CUGA_CPSU_YC5A	Little Yellow Creek: Downstream Of Tunnel Creek	Kentucky
11NPSWRD	CUGA_CPSU_YC6	Little Yellow Creek: 0.4 Miles From Station	Kentucky
11NPSWRD	CUGA_NURE_01	Kybe505r	Kentucky
11NPSWRD	CUGA_NURE_02	Kybe548r	Kentucky
11NPSWRD	CUGA_NURE_03	Kybe551r	Kentucky
TDECWPC	FALL007.6CU	Fall Creek @ RM 7.6	Kentucky
21KY	PRI009	Cumberland River At Cumberland Falls	Kentucky
21KY	PRI086	Cumberland River At Calvin	Kentucky
21KY	PRI087	Clear Fork Near Williamsburg	Kentucky
21KY	WRP001	Bad Branch	Kentucky

Table A4-3b.

Table A4-3a-b. STORET Water Quality Monitoring Stations in the Clear Fork of the Cumberland River Watershed*. NPSWRD, National Park Service Water Resources Division; TDECWPC, Tennessee Department of Environment and Conservation Division of Water Pollution Control; UT, Unnamed Tributary.*

FACILITY NUMBER	FACILITY NAME	SIC	SIC NAME	MADI	WATERBODY	HUC-12
TN0022861	Jellico STP	4952	Sewerage System	Minor	Elk Fork Creek @ RM 2.1	051301010506

Table A4-4. NPDES Permittees in the Clear Fork of the Cumberland River Watershed. *SIC, Standard Industrial Classification; MADI, Major Discharge Indicator.*

FACILITY NUMBER	PERMITEE	WATERBODY	HUC-12
TN0060852	Clearfork Utilty District WTP	UT to Clear Fork of the Cumberland River	051301010501

Table A4-5. Water Treatment Plants in the Clear Fork of the Cumberland River Watershed.

FACILITY NUMBER	PERMITEE	SIC	SIC NAME	WATERBODY	HUC-12
TN0045977	White Oak Coal Corporation (Motch Tipple)	1221	Bituminous Coal and Lignite Surface Mining	Bennetts Fork Creek	051301010401
TN0054097	Appolo Fuels, Incorporated (Deep Mines #1 and #3 and Surface Mine #2)	1221	Bituminous Coal and Lignite Surface Mining	Langley Branch	051301010401
TN0071765	Appolo Fuels, Incorporated (Buckeye Springs Mine #1)	1221	Bituminous Coal and Lignite Surface Mining	WWC to Watson Branch	051301010401
TN0072338	Appolo Fuels, Incorporated (Bennett's Fork)	1221	Bituminous Coal and Lignite Surface Mining	Bennetts Fork, Tackett Creek	051301010401
TN0076309	Bell County Coal Corporation (Cabin Hollow Mine #1)	1221	Bituminous Coal and Lignite Surface Mining	Cabin Hollow	051301010401
TN0045454	Kopper-Glo Fuel, Incorporated (Deep Mine #1)	1222	Bituminous Coal Underground Mining	Rock Creek	051301010501
TN0053431	Kopper-Glo Fuel, Incorporated (Deep Mine #3)	1222	Bituminous Coal Underground Mining	Rock Creek	051301010501
TN0053759	Kopper-Glo Fuel, Incorporated (Marion Tipple)	1221	Bituminous Coal Tipple and Loading Area	Rock Creek	051301010501
TN0062952	Kopper-Glo Fuel, Incorporated (Refuse Area #2)	1221	Bituminous Coal Refuse Area	UT to Tackett Creek	051301010501
TN0071323	Robert Clear Coal Company (Area #5)	1221	Bituminous Coal and Lignite Surface Mining	Straight Creek	051301010501
TN0072176	Appolo Fuels, Incorporated (Jellico North Deep Mine)	1222	Bituminous Coal Underground Mining	Bear Creek, Valley Creek	051301010501
TN0072214	Mountainside Coal Company (Double Mtn Surface Mine #2)	1221	Bituminous Coal and Lignite Surface Mining	Spruce Lick Branch, Straight Creek	051301010501
TN0072281	Mountainside Coal Company (Cooper Ridge Area #1)	1221	Bituminous Coal and Lignite Surface Mining	Straight Creek, Nolan Branch	051301010501
TN0072567	Mountainside Coal Company (Cooper Ridge Area #2)	1221	Bituminous Coal and Lignite Surface Mining	Spar Branch, Straight Creek, UT to Straight Creek	051301010501
TN0072575	Mountainside Coal Company (Leach Mountain Area 6A/6B)	1221	Bituminous Coal and Lignite Surface Mining	Straight Creek, Tackett Creek, White Oak Branch	051301010501
TN0072818	Appolo Fuels, Incorporated (Jellico South Deep Mine)	1222	Bituminous Coal Underground Mining	Valley Creek	051301010501

Table A4-6a.

FACILITY NUMBER	PERMITEE	SIC	SIC NAME	WATERBODY	HUC-12
TN0076406	Mountainside Coal Company (Cooper Ridge Area #3)	1221	Bituminous Coal and Lignite Surface Mining	UT to Bright Creek	051301010501
TN0076414	Appolo Fuels, Incorporated (Jellico Strip Mine)	1222	Bituminous Coal Underground Mining	Clear Fork, Valley Creek, Hurricane Creek, Pigeon Roost Branch, Unnamed Tributaries	051301010501
TN0079235	Mountainside Coal Company (Harris Branch Surface Mine)	1221	Bituminous Coal and Lignite Surface Mining	UT to Rock Creek	051301010501
TN0048895	Consolidate Coal Company (Matthews Mine Complex)	1222	Bituminous Coal Underground Mining	Tackett Creek and Spruce Lick Creek	051301010502
TN0071196	Tennessee Mining, Inc. (Claiborne Mine #2)	1221	Bituminous Coal and Lignite Surface Mining	Tackett Creek, Spruce Lick Branch	051301010502
TN0071650	Mountainside Coal Company (Leach Mtn Surface Area #2)	1221	Bituminous Coal and Lignite Surface Mining	Straight Creek, UT to Tackett Creek, White Oak Branch	051301010502
TN0071773	Appolo Fuels, Incorporated (Buckeye Springs Mine #2)	1221	Bituminous Coal and Lignite Surface Mining	UT to Tackett Creek	051301010502
TN0071838	Gatliff Coal Company (Tackett Creek Area #14)	1221	Bituminous Coal and Lignite Surface Mining	Tackett Creek, Little Tackett Creek	051301010502
TN0071986	Appolo Fuels, Incorporated (Tackett Creek Surface Mine)	1221	Bituminous Coal and Lignite Surface Mining	UT to Tackett Creek	051301010502
TN0072044	Appolo Fuels, Incorporated (Horseshoe Mtn Surface Mine)	1221	Bituminous Coal and Lignite Surface Mining	Spruce Lick Branch, Valley Creek, Straight Creek	051301010502
TN0072877	Mountainside Coal Company (Leach Mountain Area 6C/6D)	1221	Bituminous Coal and Lignite Surface Mining	Tackett Creek, Straight Creek	051301010502
TN0076295	Mountainside Coal Company (Eagan Mountain Surface) Mine	1221	Bituminous Coal and Lignite Surface Mining	Tackett Creek, Clear Fork	051301010502
TN0079727	Appolo Fuels, Incorporated (Buckeye Springs Horseshoe Mountain)	1222	Bituminous Coal Underground Mining	UT to Spruce Lick Creek, Valley Creek, Straight Creek	051301010502
TN0055140	Hinkle Contracting Corp. (Jellico Stone Quarry)	1422	Limestone Crushed and Broken	Clear Fork Creek	051301010503
TN0042722	Garcoal, Incorporated (Newcomb Tipple)	1221	Bituminous Coal Tipple and Loading Area	Elk Creek	051301010506
TN0052493	W.H. Bowlin Coal Company (Tipple #1)	1221	Bituminous Coal Tipple and Loading Area	Elk Creek	051301010506
TN0066095	Elk View Land and Gravel (Area #1)	1442	Construction Sand Mining	Elk Creek	051301010506

Table A4-6b.

FACILITY NUMBER	PERMITEE	SIC	SIC NAME	WATERBODY	HUC-12
TN0071714	DeWayne Rowe Logging and Coal Hauling (Area #1)	1221	Bituminous Coal and Lignite Surface Mining	Crooked Creek and Indian Creek	051301010506
TN0076376	Robert Clear Coal Company (Area #9)	1221	Bituminous Coal and Lignite Surface Mining	Unnamed Tributaries	051301010506
TN0079138	Rowe Logging, LLC (Auger Area #1)	1221	Bituminous Coal and Lignite Surface Mining	Crooked Creek	051301010506
TN0050679	Tennessee Mining, Inc. (Coal Wash Facility)	1221	Preparation Plants, Bituminous Coal or Lignite	John Barley Hollow	051301010601
TN0052311	Tennessee Mining, Inc. (Deep Mine #3)	1222	Bituminous Coal Underground Mining	Barley Creek	051301010601
TN0052027	Tennessee Mining, Inc. (Rex Mine #1)	1222	Bituminous Coal Underground Mining	Stinking Creek	051301010602
TN0072451	West Frk2, LLC (Charlie Hollow Deep Mine)	1222	Bituminous Coal Underground Mining	Charlie Hollow	051301010602
TN0063576	Gatliff Coal Company (White Oak Area #4)	1221	Bituminous Coal and Lignite Surface Mining	White Oak Creek	051301010603
TN0068918	Gatliff Coal Company (White Oak Area #11)	1221	Bituminous Coal and Lignite Surface Mining	White Oak Creek, Davis Creek	051301010603
TN0070963	Gatliff Coal Company (White Oak Area #15)	1221	Bituminous Coal and Lignite Surface Mining	White Oak Creek	051301010603
TN0071145	Gatliff Coal Company (White Oak Area #12)	1221	Bituminous Coal and Lignite Surface Mining	Tackett Creek, White Oak Creek	051301010603

Table A4-6c.

Table A4-6a-c. Active Permitted Mining Sites in the Clear Fork of the Cumberland River Watershed. *SIC, Standard Industrial Classification; UT, Unnamed Tributary; WWC, Wet Weather Conveyance.*

LOG NUMBER	COUNTY	DESCRIPTION	WATERBODY	HUC-12
NRS02.160	Campbell	Bridge Repairs	Terry Creek	051301010506

Table A4-7. Individual ARAP Permits Issued January 2000 Through June 2004 in the Clear Fork of the Cumberland River Watershed.

APPENDIX V

Land Treatment - Conservation Buffers	
	Field Borders (feet)
FY 2001	10672
FY 2002	
FY 2003	
FY 2004	
FY 2005	12150

Table A5-1a. Land Treatment Conservation Practices (Conservation Buffers), in Partnership with NRCS in the Tennessee Portion of the Clear Fork of the Cumberland 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		
FY 2002	3343	124
FY 2003	42	5
FY 2004		
FY 2005		

Table A5-1b. Erosion Control Conservation Practices, in Partnership with NRCS in the Tennessee Portion of the Clear Fork of the Cumberland 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			
	AFO Nutrient Mgmt Applied (acres)	Non-AFO Nutrient Mgmt. Applied (acres)	Total Applied (acres)
FY 2001		534	534
FY 2002		288	288
FY 2003		536	536
FY 2004			
FY 2005	683		683

Table A5-1c. Nutrient Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Clear Fork of the Cumberland 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 (acres)
FY 2001	534
FY 2002	288
FY 2003	199
FY 2004	
FY 2005	683

Table A5-1d. Pest Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Clear Fork of the Cumberland 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)	Pasture and Hay Planting (acres)
FY 2001		
FY 2002		
FY 2003	43	
FY 2004		
FY 2005	642	51

Table A5-1e. Grazing/Forages Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Clear Fork of the Cumberland 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)	Forestland Re-established or improved (acres)	Use Exclusion (acres)
FY 2001			
FY 2002	55	55	
FY 2003	225	225	
FY 2004			
FY 2005	154	154	13

Table A5-1f. Tree and Shrub Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Clear Fork of the Cumberland 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		
	Tillage & Residue Mgmt Systems (acres)	Conservation Crop Rotation (acres)
FY 2001		
FY 2002		
FY 2003		
FY 2004		
FY 2005	9	9

Table A5-1g. Land Treatment Conservation Practices (Tillage and Cropping), in Partnership with NRCS in the Tennessee Portion of the Clear Fork of the Cumberland 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	
	Total Wildlife Habitat Mgmt Applied (acres)
FY 2001	93
FY 2002	329
FY 2003	382
FY 2004	0
FY 2005	453

Table A5-1h. Wildlife Habitat Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Clear Fork of the Cumberland 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
JELLICO	$ 3,440,000	08/31/99

Table A5-2. Communities in the Tennessee Portion of the Clear Fork of the Cumberland 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
Cover Crop	340	1
Critical Area Planting	342	1
Pond	378	1
Fence	382	1
Use Exclusion	472	1
Pasture/Hay Planting	512	13
Pipeline	516	1
Heavy Use Area	561	2
Stream Crossing	576	1
Watering Facility	614	3
TOTAL BMPs	**-**	**25**

Table A5-3. Best Management Practices Installed by Tennessee Department of Agriculture and Partners in the Tennessee Portion of the Clear Fork of the Cumberland River Watershed.