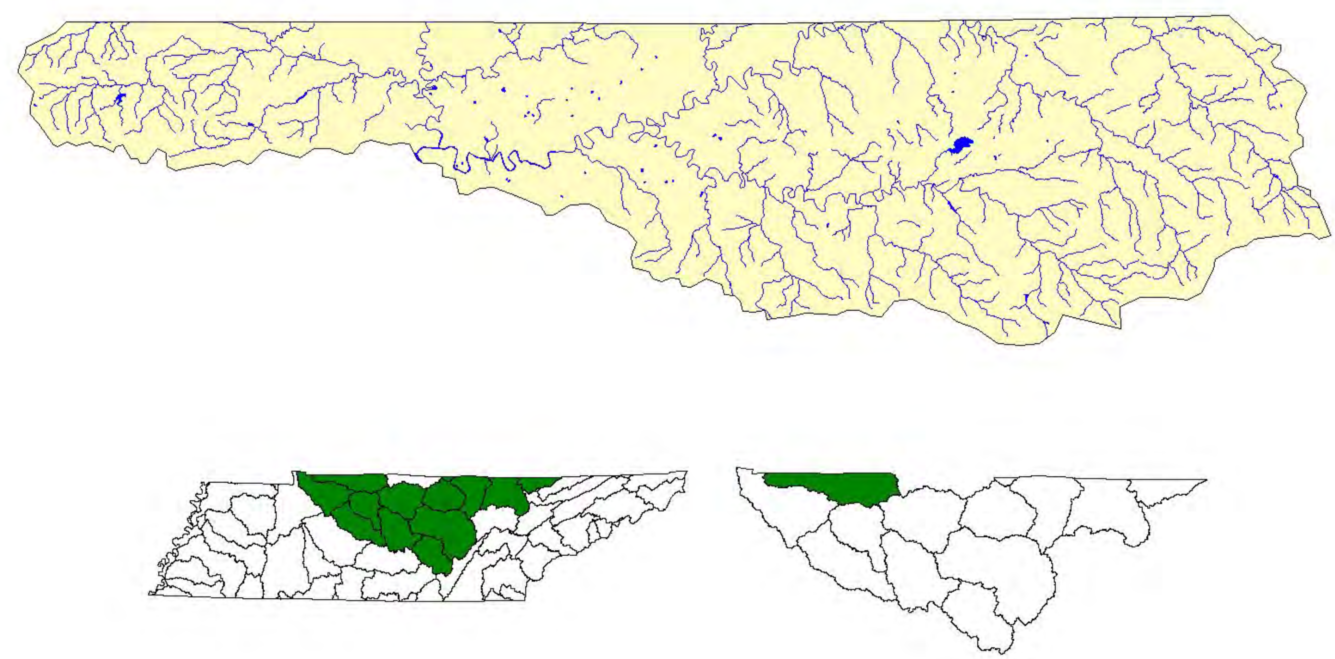
RED RIVER WATERSHED (05130206)
OF THE CUMBERLAND RIVER BASIN

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 Red River Watershed by the Division of Water Pollution Control October 15, 2007.

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RED 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

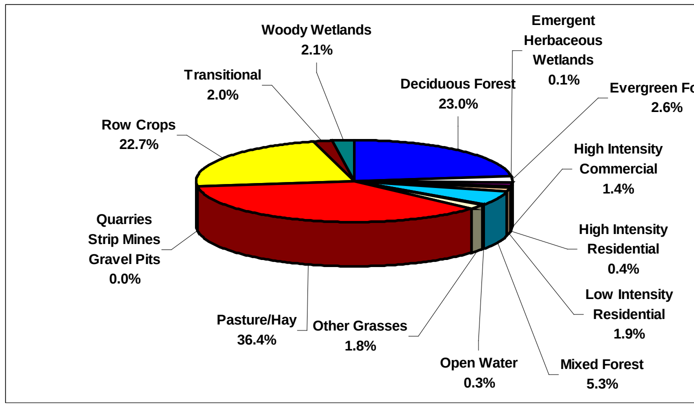
Summary – Red River Watershed (05130206)

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 Red 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.

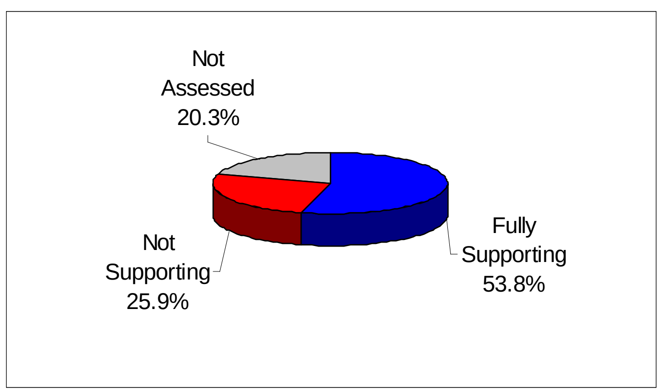
A detailed description of the watershed can be found in Chapter 2. The Red River Watershed is approximately 1,444 square miles (801 mi^2 in Tennessee) and includes parts of five Tennessee counties. A part of the Cumberland River drainage basin, the watershed has 788.7 stream miles and 15 lake acres in Tennessee.



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

One designated state natural area is located in the watershed. Fifty-seven rare plant and animal species have been documented in the watershed, including five rare fish species, one rare snail species, three rare amphibian species, and two rare crustacean species. Portions of four streams in the Red River Watershed are listed in the National Rivers Inventory as having one or more outstanding natural or cultural values.

A review of water quality sampling and assessment is presented in Chapter 3. Using the Watershed Approach to Water Quality, 511 sampling events occurred in the Red River Watershed in 2000-2005. These were conducted at ambient, ecoregion or watershed monitoring sites. Monitoring results support the conclusion that 67.5% of stream miles (and 0% of lake acres) assessed fully support one or more designated uses.



Water Quality Assessment of Streams and Rivers in the Tennessee Portion of the Red River Watershed. Assessment data are based on the 2004 Water Quality Assessment of 788.7 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, pathogens, organic enrichment or low dissolved oxygen).

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
0513020601	051302060101 (Red River)
	051302060102 (Red River)
0513020602	051302060201 (South Fork Red River)
	051302060202 (South Fork Red River)
0513020604	051302060401 (Red River)
	051302060402 (Spring Creek)
	051302060403 (Red River)
	051302060404 (Elk Fork Creek)
	051302060405 (Red River)
	051302060406 (Passenger Creek)
	051302060407 (Red River)
0513020605	051302060501 (Sulphur Fork Creek)
	051302060502 (Sulphur Fork Creek)
	051302060503 (Carr Creek)
	051302060504 (Sulphur Fork Creek)
	051302060505 (Millers Creek)
	051302060506 (Sulphur Fork Creek)
0513020606	051302060603 (West Fork Red River)
	051302060604 (Spring Creek)
	051302060605 (West Fork Red River)
0513020607	051302060701 (Noahs Springs Branch)
	051302060702 (Piney Fork Creek)
	051302060703 (Little West Fork Red River)
	051302060704 (Fletchers Fork)
	051302060705 (Little West Fork Red River)

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

Point source contributions to the Tennessee portion of the Red River Watershed consist of twelve individual NPDES-permitted facilities, six of which discharge into streams that have been listed on the 2004 303(d) list. Other point source permits in the watershed (as of October 15, 2007) are Aquatic Resource Alteration Permits (119), Tennessee Multi-Sector Permits (98), Ready Mix Concrete Plant Permits (10), Mining Permits (4), and Water Treatment Plant Permits (1). Agricultural operations include cattle, hog, and sheep farming. Maps illustrating the locations of permit sites and tables summarizing livestock practices are presented in each subwatershed.

Chapter 5 is entitled *Water Quality Partnerships in the Red 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, Red River Watershed Association, The Nature Conservancy, and Five Rivers RC&D Council) are also described.

Point and Nonpoint source approaches to water quality problems in the Red 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 Red 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. <u>Components of the Watershed Approach.</u> Tennessee is composed of fifty-five watersheds corresponding to the 8-digit USGS Hydrologic Unit Codes (HUC-8). These watersheds, which serve as geographic management units, are combined in five groups according to year of implementation.

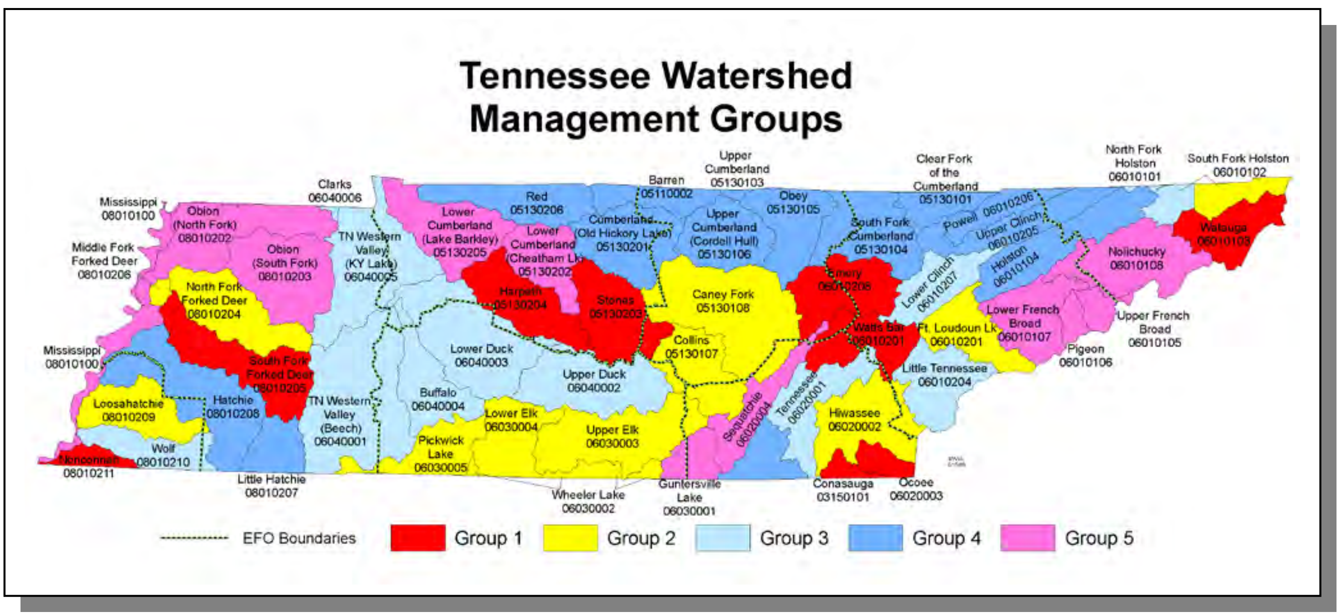


Figure 1-1. Watershed Groups in Tennessee's Watershed Approach to Water Quality.

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

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

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

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

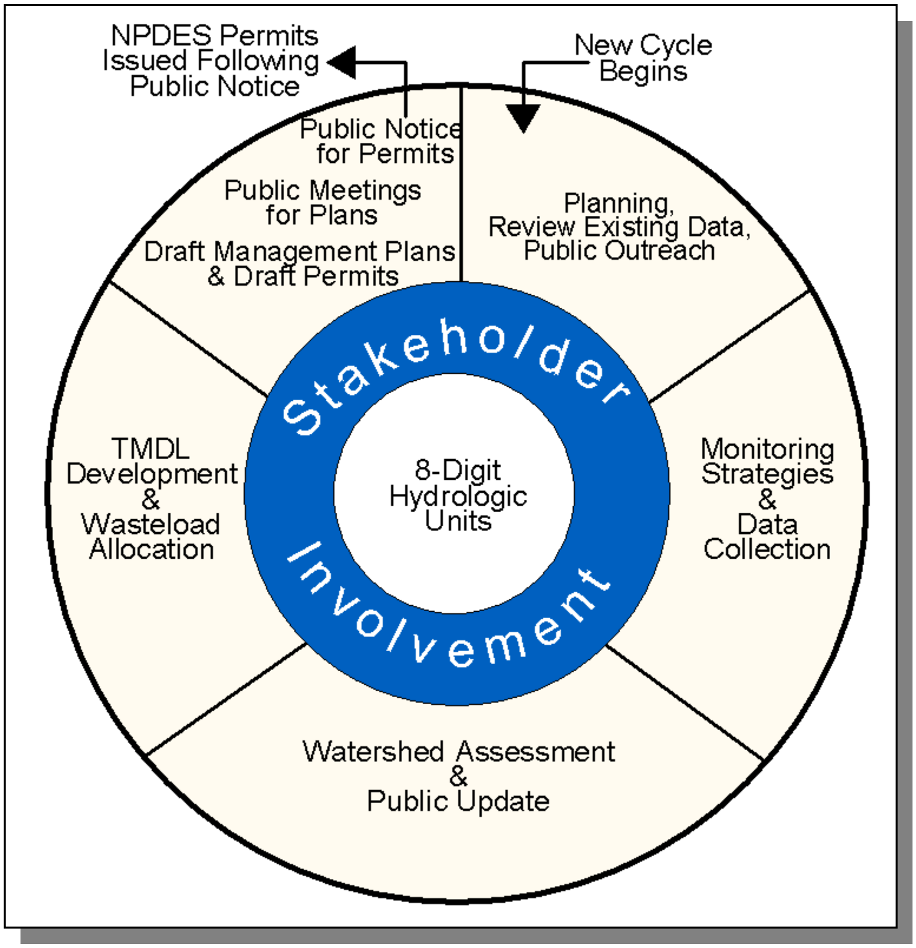


Figure 1-2. The Watershed Approach Cycle.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CHAPTER 2

DESCRIPTION OF THE RED RIVER WATERSHED

2.1. BACKGROUND. The Red River is a major stream of north-central Tennessee and south-central Kentucky and is a major tributary of the Cumberland River. The stream's name derives from its typical water color. This is caused by a large load of clay and silt which contains iron oxides.

It rises in Sumner County, TN, south of Portland, and trends generally northwest. A major tributary, South Fork, forms nearby and runs parallel and south of the main river for several miles. For almost its entire length, it drains the northern Highland Rim of Tennessee and the adjacent (and analgous) Pennyroyal Plateau of Kentucky.

The Red River crosses briefly into Simpson County, KY and then enters Logan County, KY. The South Fork also crosses into Logan County, coming from Robertson County, TN and joining the Red west of Adairville. Crossing the state line into Robertson County, the Red continues to flow primarily westward but with minor meanders. Near Adams, TN, it is joined by an important tributary, Sulphur Fork, at the historic site of Port Royal, now a designated State Historic Area of the State of Tennessee. About a mile and a half above its mouth into the Cumberland, the Red River is joined by the West Fork of the Red River, its last tributary, which drains eastern Christian County and western Todd County, KY.

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

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. The Tennessee portion of the Red River Watershed is located in Middle Tennessee and includes parts of Cheatham, Davidson, Montgomery, Robertson, Sumner, and Stewart Counties.

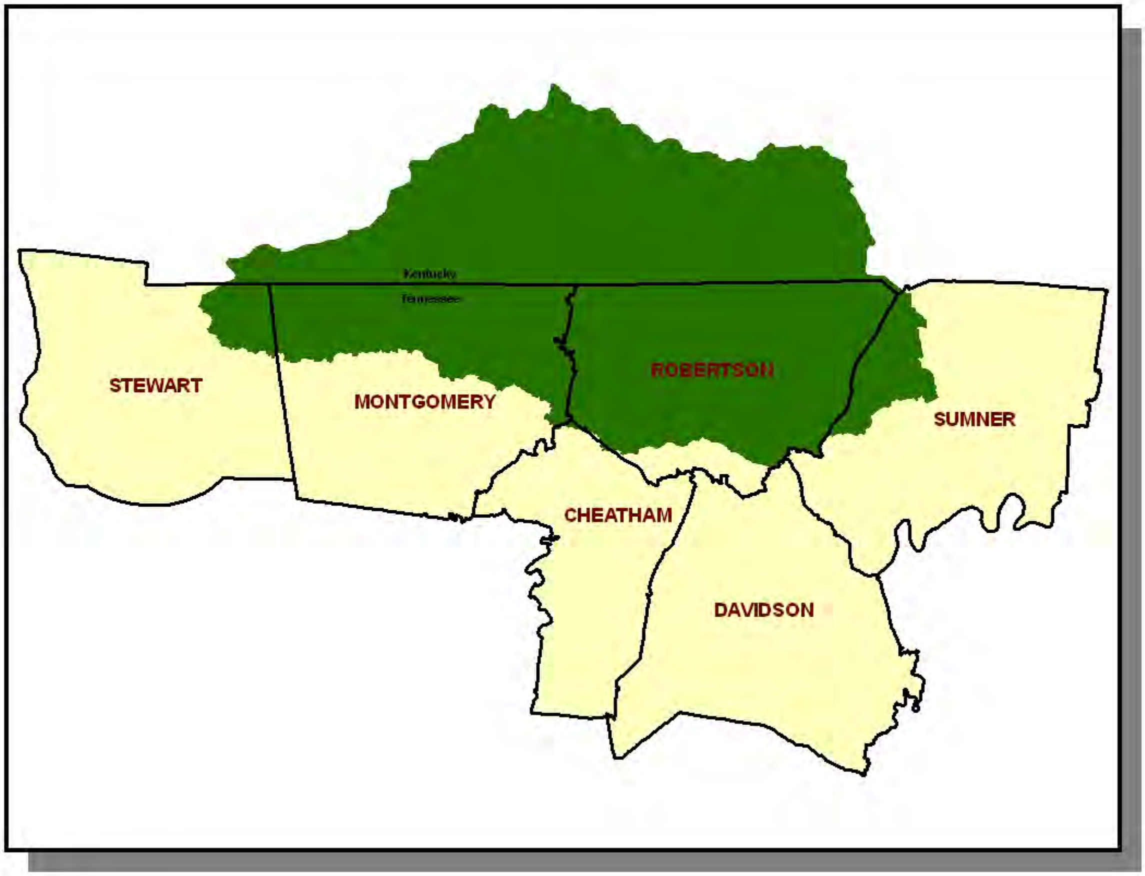


Figure 2-1. General Location of the Red River Watershed.

COUNTY	% OF WATERSHED IN EACH COUNTY
Robertson	55.6
Montgomery	30.6
Sumner	8.5
Stewart	5.1
Cheatham	0.2
Davidson	<0.1

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

2.2.B. Population Density Centers. Twenty-seven highways serve the major communities in the Tennessee portion of the Red River Watershed.

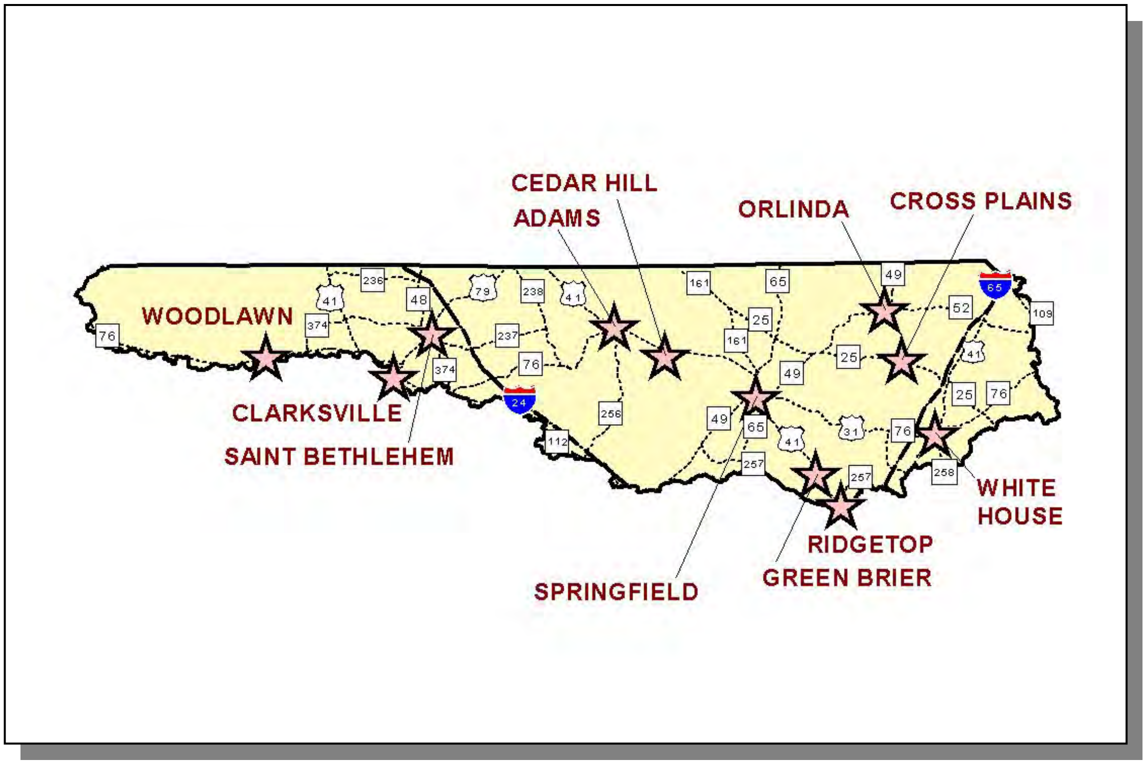


Figure 2-2. Communities and Roads in the Tennessee Portion of the Red River Watershed.

MUNICIPALITY	POPULATION	COUNTY
Clarksville	103,455	Montgomery
Springfield*	14,332	Robertson
White House	7,220	Sumner / Robertson
Green Brier	4,940	Robertson
Cross Plains	1,381	Robertson
Ridgetop	1,083	Robertson / Davidson
Orlinda	594	Robertson
Adams	566	Robertson
Cedar Hill	289	Robertson

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

2.3. GENERAL HYDROLOGIC DESCRIPTION.

2.3.A. Hydrology. The Red River Watershed, designated 05130206 by the USGS, is approximately 1,444 square miles (801 square miles in Tennessee) and drains to the Cumberland River.

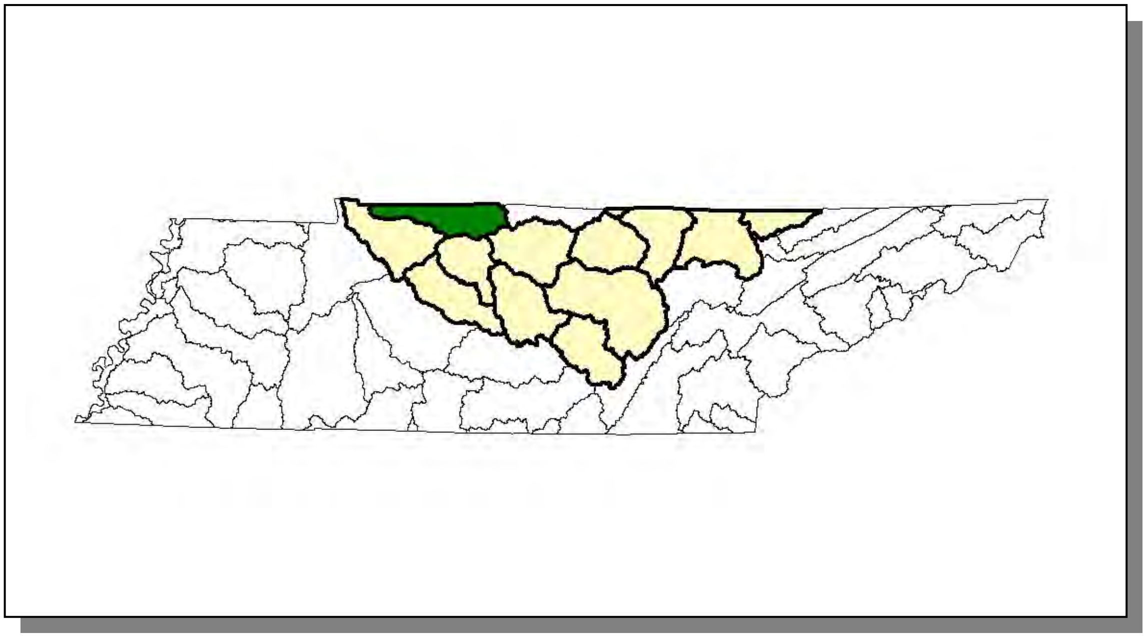


Figure 2-3. The Red River Watershed is Part of the Cumberland River Basin.

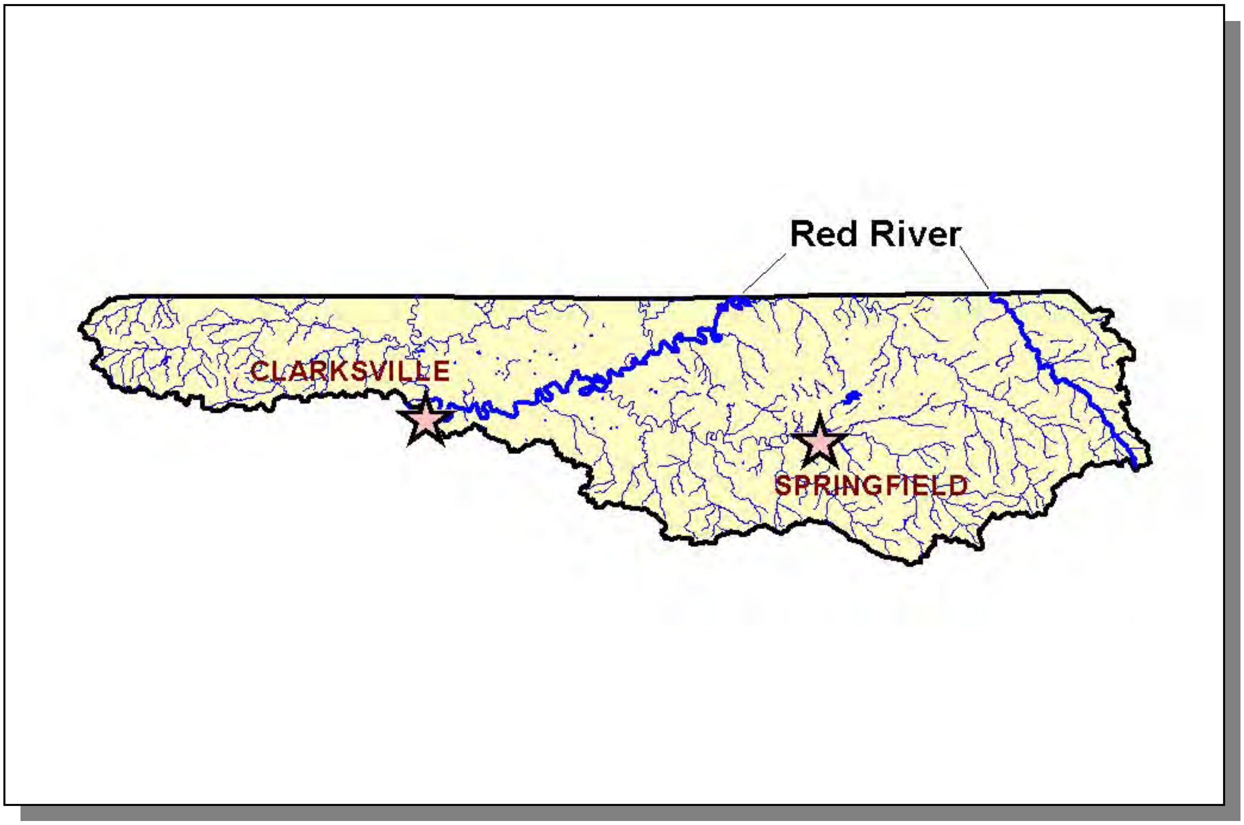


Figure 2-4. Hydrology in the Tennessee Portion of the Red River Watershed. *There are 788.7 stream miles and 15 lake acres recorded in River Reach File 3 in the Tennessee portion of the Red River Watershed. Location of the Red River, and the cities of Clarksville and Springfield are shown for reference.*

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

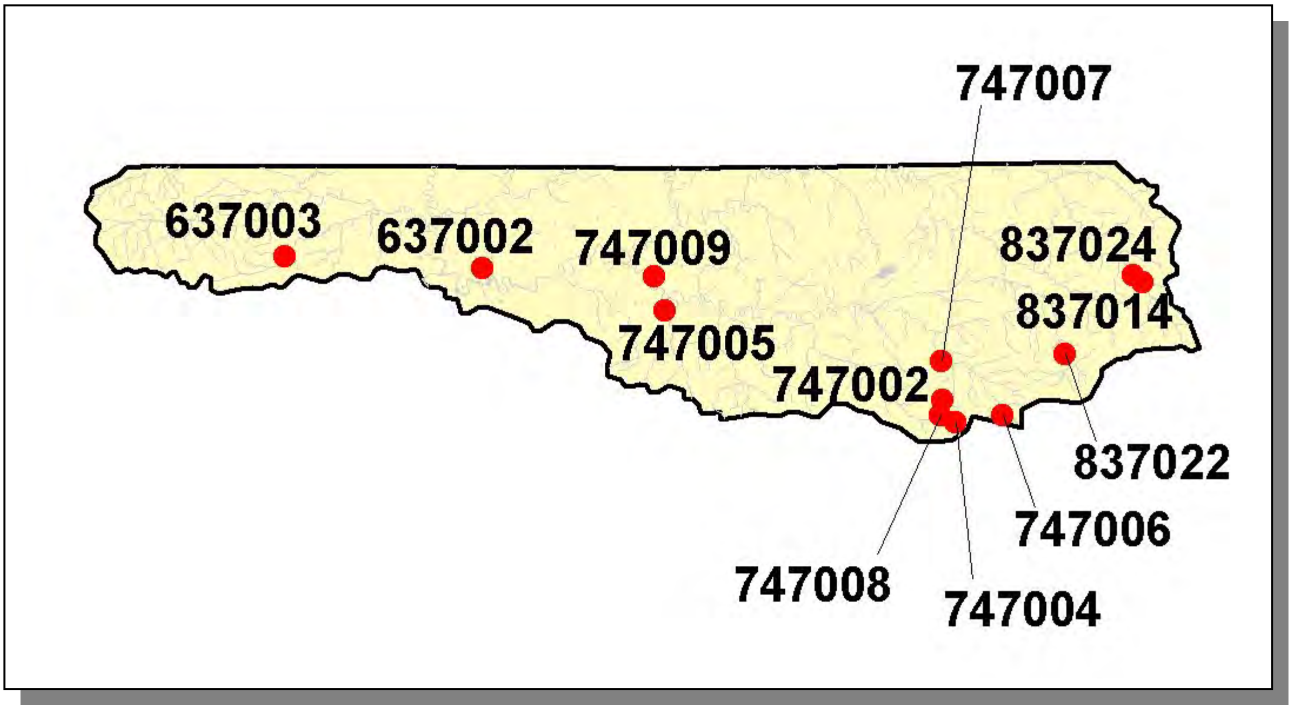


Figure 2-5. Location of Inventoried Dams in the Tennessee Portion of the Red River Watershed. *More information, including identification of inventoried dams labeled, is provided in Appendix II and at http://gwidc.memphis.edu/website/dams/viewer.htm.*

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.

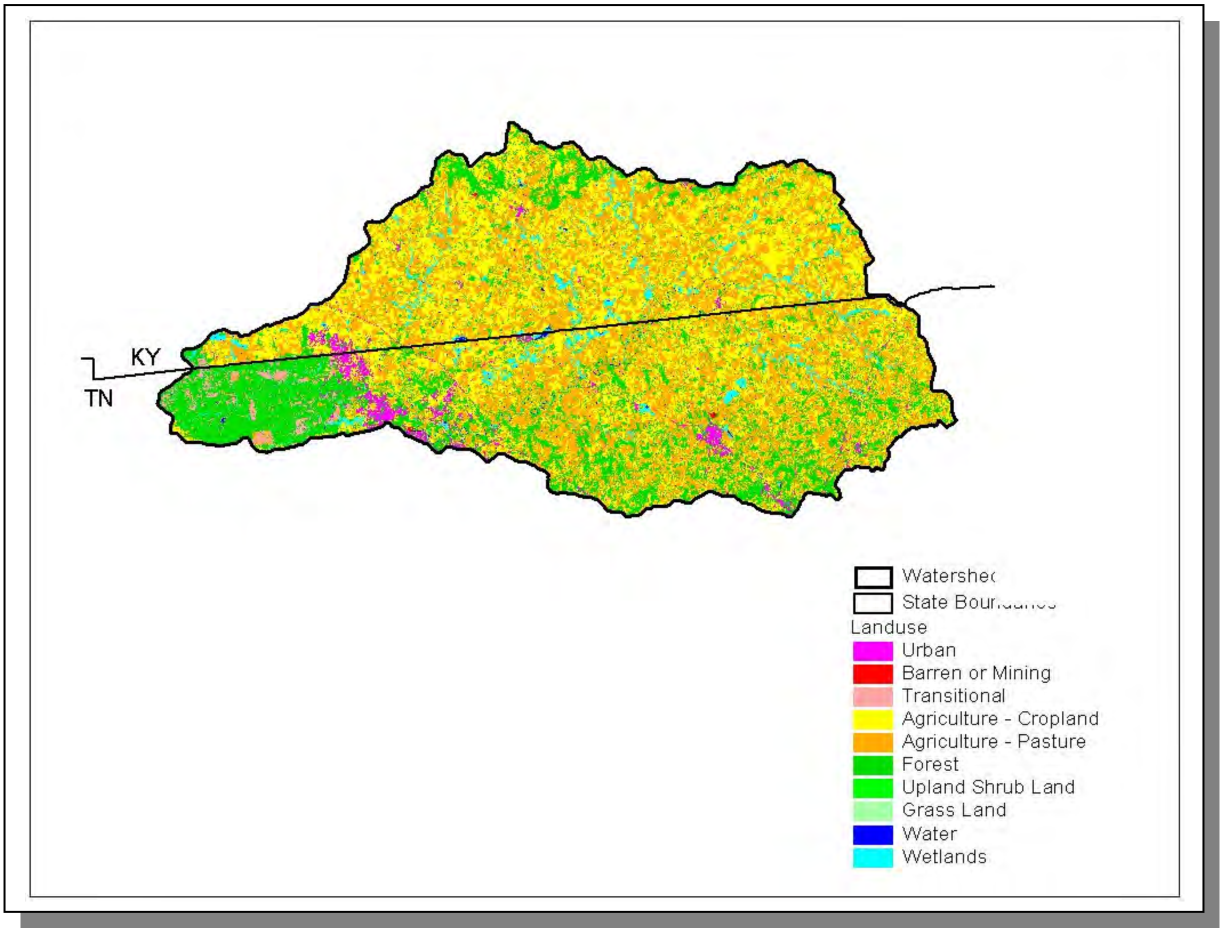


Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery.

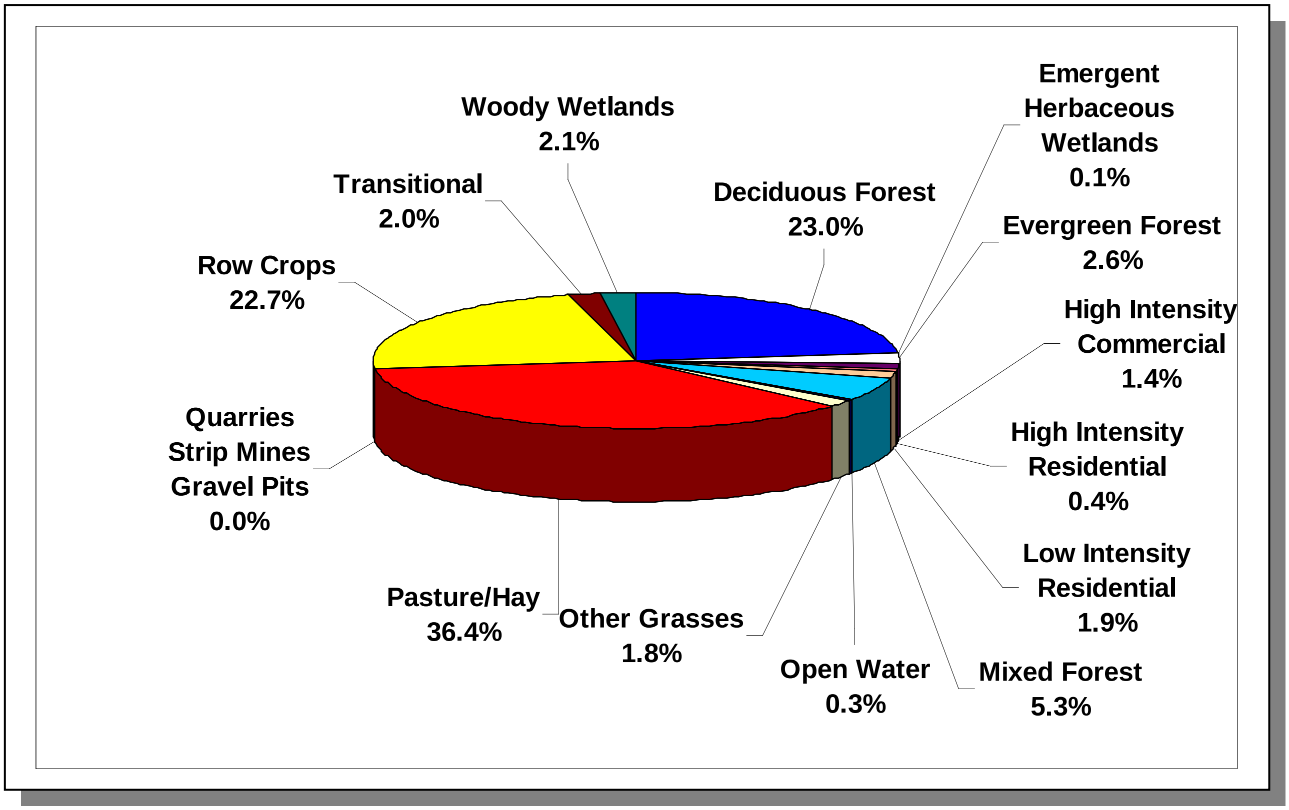


Figure 2-7. Land Use Distribution in the Tennessee Portion of the Red River Watershed. *More information is provided in Appendix II.*

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.

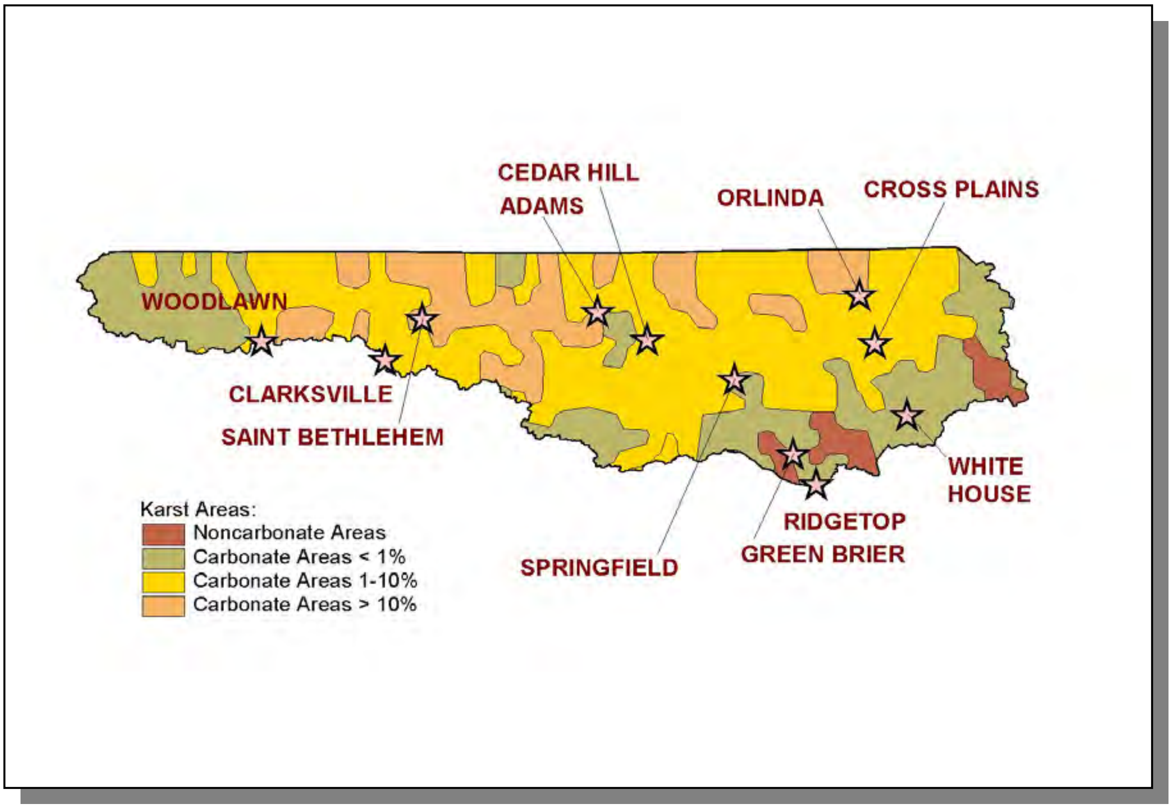


Figure 2-8. Illustration of Karst Areas in the Tennessee Portion of the Red River Watershed. *Locations of communities in the watershed are shown for reference.*

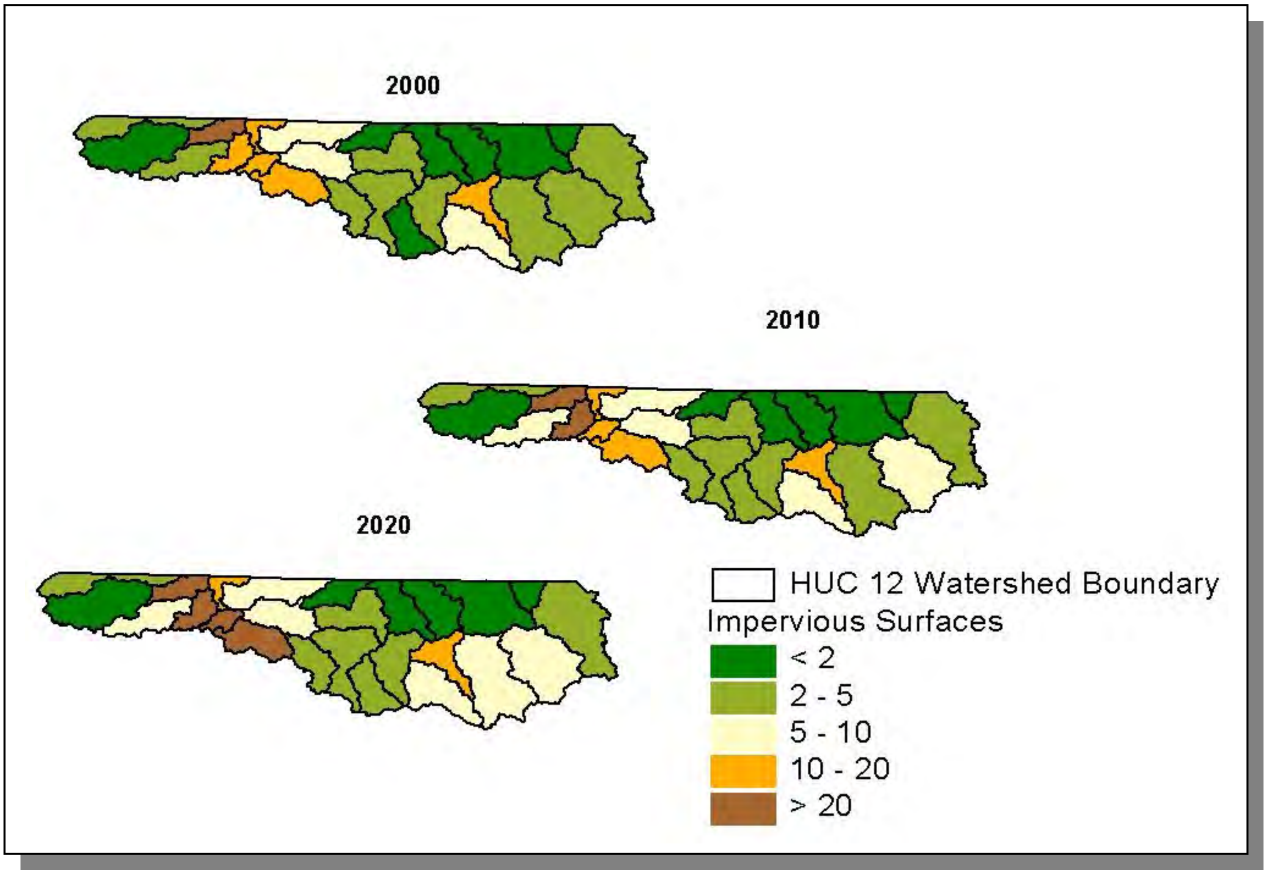


Figure 2-9. Illustration of Total Impervious Area in the Tennessee Portion of the Red River Watershed. *All HUC-12 subwatersheds are shown. Current and projected total impervious cover (percent of total area) is provided by EPA Region 4. More information can be found at: http://www.epa.gov/ATHENS/research/impervious/*

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 Red River Watershed lies within 1 Level III ecoregion (Interior Plateau) and contains 3 Level IV subecoregions:

- The **Western Pennyroyal Karst (71e)** is a flatter area of irregular plains, with fewer perennial streams, compared to the open hills of the Western Highland Rim (71f). Small sinkholes and depressions are common. The productive soils of this notable agricultural area are formed mostly from a thin loess mantle over residuum of Mississippian-age limestones. Most of the region is cultivated or in pasture; tobacco and livestock are the principal agricultural products, with some corn, soybeans, and small grains. The natural vegetation consisted of oak-hickory forest with mosaics of bluestem prairie. The barrens of Kentucky that extended south into Stewart, Montgomery, and Robertson counties, were once some of the largest natural grasslands in Tennessee.

- The **Western Highland Rim (71f)** is characterized by dissected, rolling terrain of open hills, with elevations of 400-1000 feet. The geologic base of Mississippian-age limestone, chert, and shale is covered by soils that tend to be cherty, acid, and low to moderate in fertility. Streams are characterized by coarse chert gravel and sand substrates with areas of bedrock, moderate gradients, and relatively clear water. The oak-hickory natural vegetation was mostly deforested in the mid to late 1800's, in conjunction with the iron-ore related mining and smelting of the mineral limonite, but now the region is again heavily forested. Some agriculture occurs on the flatter interfluves and in the stream and river valleys: mostly hay, pasture, and cattle, with some cultivation of corn and tobacco.

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

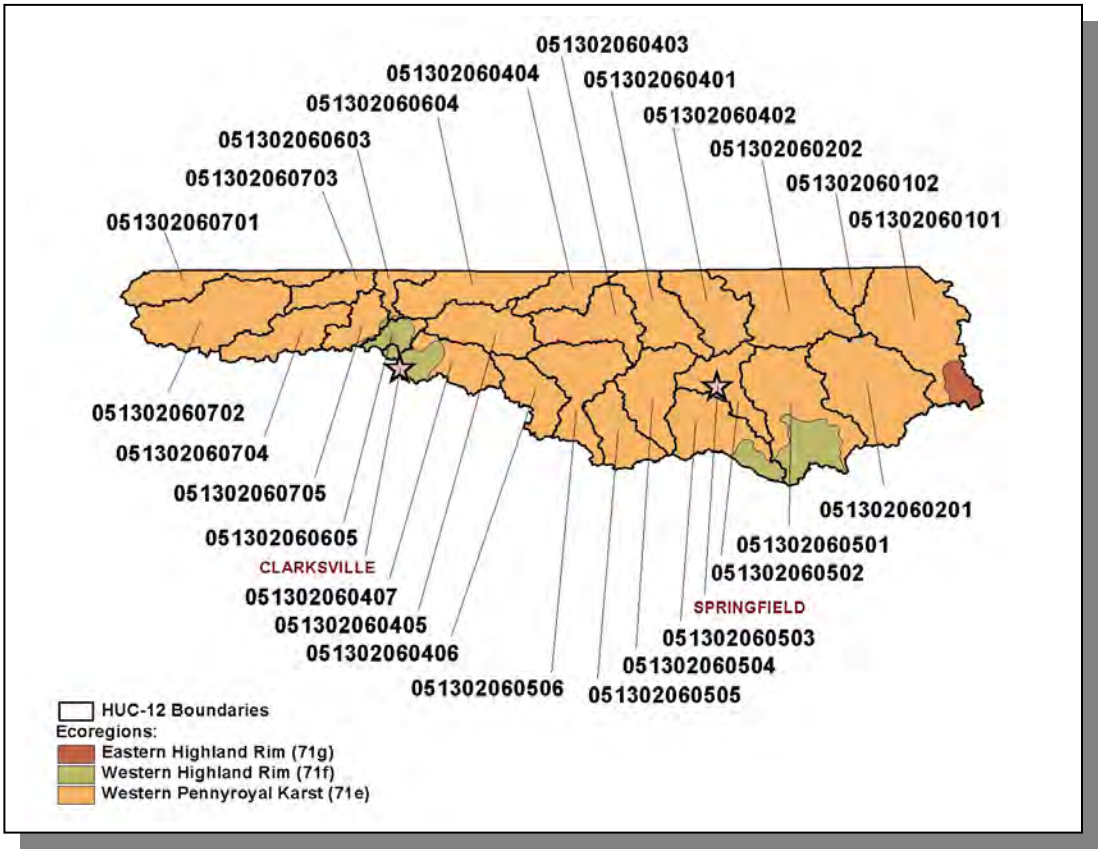


Figure 2-10. Level IV Ecoregions in the Tennessee Portion of the Red River Watershed. *HUC-12 subwatershed boundaries and locations of Clarksville and Springfield are shown for reference.*

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

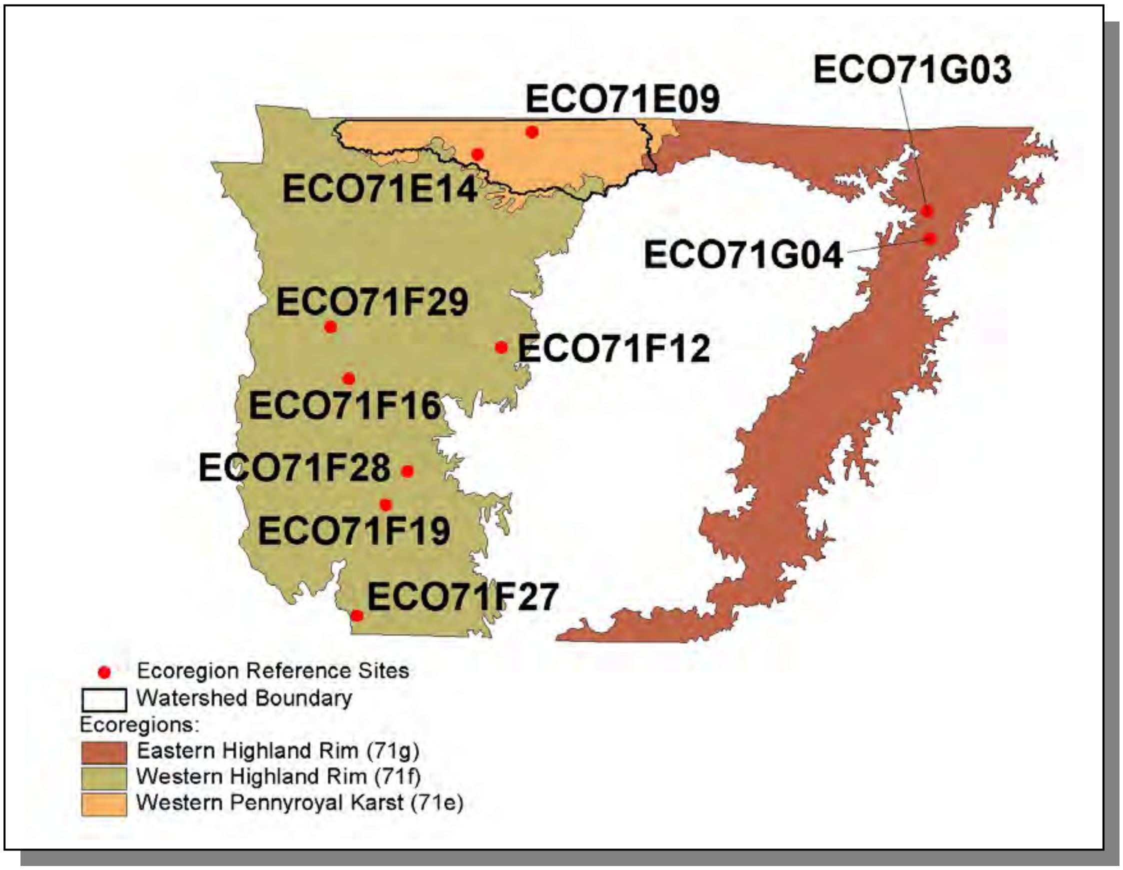


Figure 2-11. Ecoregion Monitoring Sites in Level IV Ecoregions 71e, 71f, and 71g. The Tennessee portion of the Red River Watershed is shown for reference. *More information, including which ecoregion reference sites were inactive or dropped prior to 01/01/2006, is provided in Appendix II.*

2.6. NATURAL RESOURCES.

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

The Tennessee portion of the Red River Watershed has one Designated State Natural Area:

> **Dunbar Cave Class I Scenic-Recreational State Natural Area** is a 115-acre natural area in Montgomery County. Its significant feature is a well-explored scenic and historic cave, which above ground is surrounded by an upland hardwood forest. A stream exits the cave and has been impounded to form a small lake that is inhabited by many fish, turtles, and other wildlife. Humans have been attracted to Dunbar Cave for thousands of years with its constant stream flow and natural air conditioning. There have been recent excavations near the entrance that reveal it to be an important archeological site. One projectile point found at Dunbar Cave dates back as much as 10,000 years to the Paleo-Indian culture.

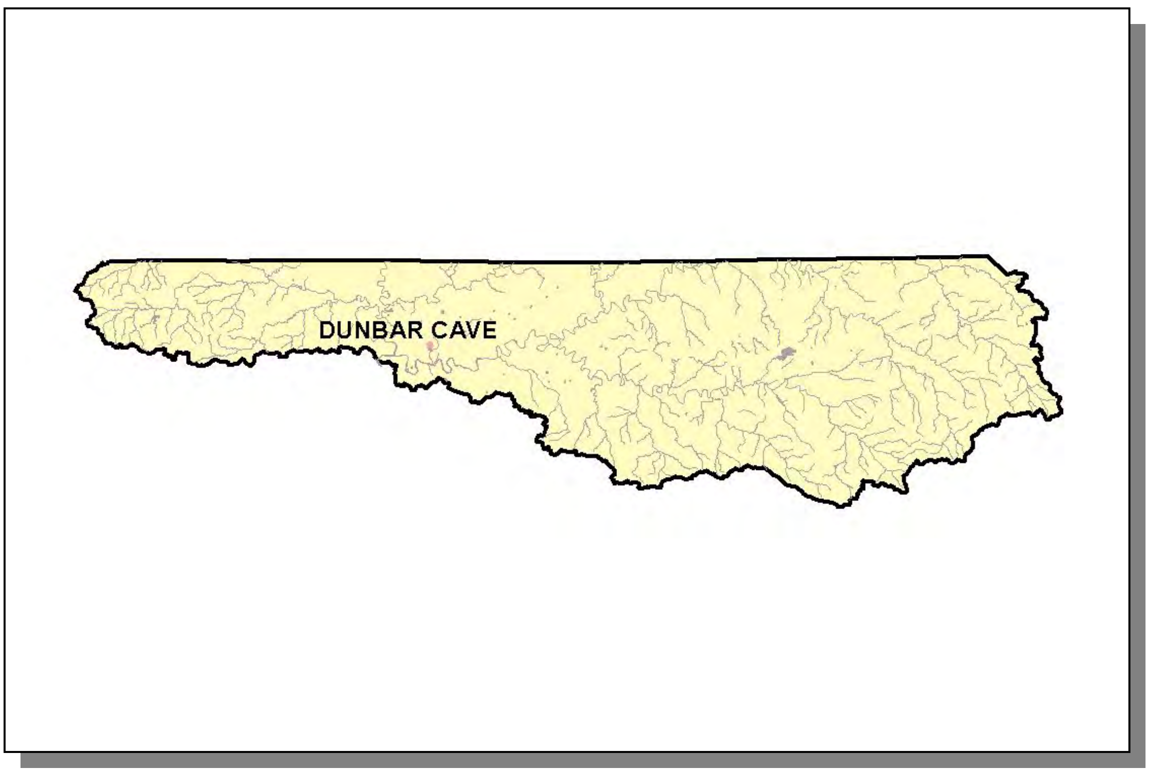


Figure 2-12. There is One Designated State Natural Area in the Tennessee Portion of the Red River Watershed.

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

GROUPING	NUMBER OF RARE SPECIES
Crustaceans	2
Insects	1
Snails	1
Amphibians	3
Birds	8
Fish	5
Mammals	6
Reptiles	2
Plants	29
Total	**57**

Table 2-3. There are 57 Known Rare Plant and Animal Species in the Tennessee Portion of the Red River Watershed.

In the Tennessee portion of the Red River Watershed, there are five known rare fish species, three known rare amphibian species, two known rare crustacean species, and one known rare snail species.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
Etheostoma cinereum	Ashy darter		T
Etheostoma microlepidum	Finescale darter		D
Etheostoma tippecanoe	Tippecanoe darter		D
Percina phoxacephala	Slenderhead darter		D
Typhlichthys subterraneus	Souhern cavefish		D
Cryptobranchus alleganiensis	Hellbender		D
Hemidactylium scutatum	Four-toed salamander		D
Hyla gratiosa	Barking treefrog		D
Orconectes pellucidus	Eyeless crayfish		
Stygobromus vitreus	An amphipod		
Lithasia salebrosa	Rustic rocksnail		

Table 2-4. Rare Aquatic Species in the Tennessee Portion of the Red River Watershed. *State Status: T, Listed Threatened by the Tennessee Wildlife Resources Agency; D, Deemed in Need of Management by the Tennessee Wildlife Resources Agency. More information may be found at http://www.state.tn.us/environment/na/.*

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

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

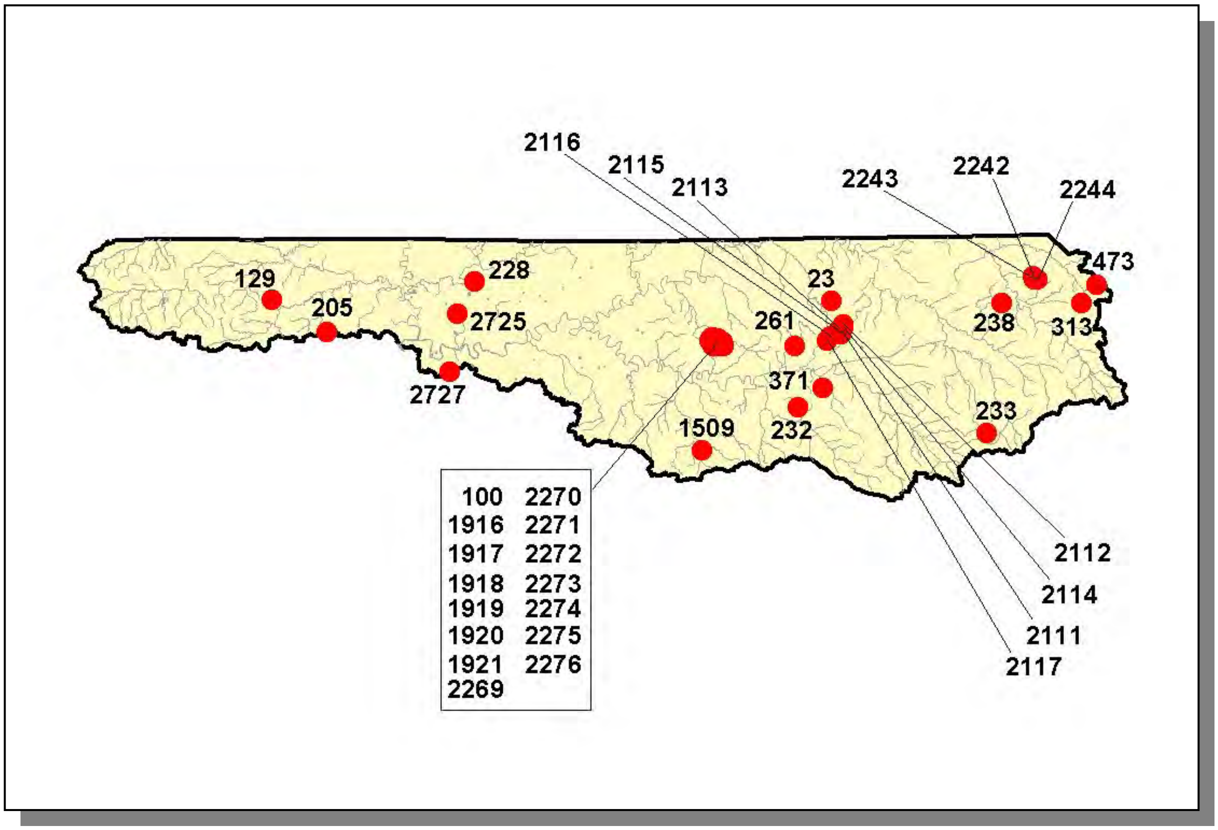


Figure 2-13. Location of Wetland Sites in TDEC Division of Natural Heritage Database in the Tennessee Portion of the Red River Watershed. This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands. *There may be additional wetland sites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

2.7. CULTURAL RESOURCES.

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

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

> Elk Fork Red River (RM 0 to RM 8) flows through a karst area with exceptional geologic features including numerous sinkholes and caves and supports a significant black bass fishery and unique wildlife.
>
> Red River (RM 9 to RM 50 and RM 79 to RM 98) is a pastoral float stream with numerous sinkholes and caves, and heavily wooded bluffs with limestone outcroppings.
>
> South Fork Red River (RM 8 to RM 29) is a pastoral stream with low bluffs, numerous gravel bars and riffles, and banks lined with hardwoods.
>
> Sulphur Fork Red River (RM 0 to RM 27) is a natural springs area with wooded banks.

RIVER	SCENIC	RECREATION	GEOLOGIC	FISH	WILDLIFE	HISTORIC	CULTURAL
Elk Fork	X	X	X	X	X		
Red River	X	X	X	X	X	X	X
South Fork Red River	X	X	X	X	X		
Sulphur Fork	X	X	X	X			

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

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

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

- Austin Peay State University Farm is owned and operated by Austin Peay State University for educational purposes. More information about this Environmental Education Center may be obtained by contacting Dr. Jack Caldwell at caldwellj@apsu.edu.

- Cedar Hill Swamp is a 200-acre area managed by TWRA in Robertson County.

- Dunbar Cave State Park is a State Natural Area located in Montgomery County. More information may be found at http://www.state.tn.us/environment/na/natareas/dunbar/.

- Fort Campbell Military Reservation is located in both Tennessee and Kentucky (most of the reservation is located in Tennessee). More information may be found at http://www.campbell.army.mil/overview.htm.

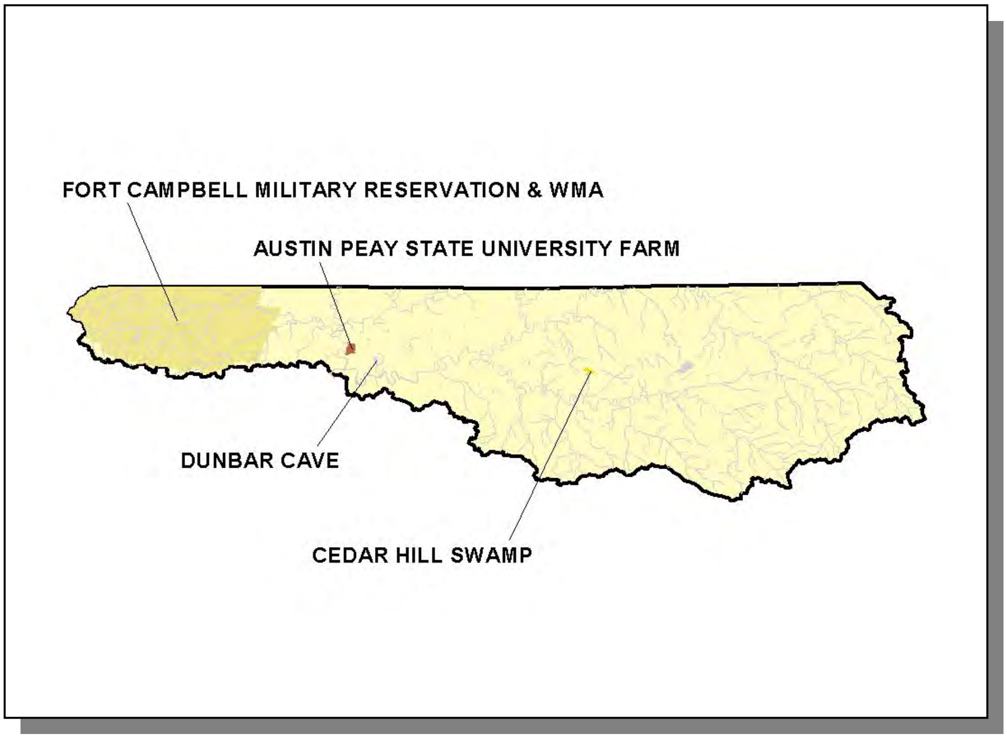


Figure 2-14. Public Lands in the Tennessee Portion of the Red River Watershed. *Data are from Tennessee Wildlife Resources Agency. WMA, Wildlife Management Area.*

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

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

STREAM	NSQ	RB	RF	STREAM	NSQ	RB	RF
Beaverdam Creek	3			Millers Creek	2		
Brush Creek	2			Passenger Creek	2		
Buzzard Creek	2			Piney Fork Creek	2		
Calebs Creek	3			Red River	2,3	2,3	
Carr Creek	3			South Fork Red River	3		
Elk Fork Creek	3	3		Spring Creek	2	3	
Dry Fork				Sulphur Fork	2,3	2	
Empson Frey Branch	2			Summers Branch	2		
Fletchers Creek	3			Valley Branch	3		
Honey Run Creek	2		2	Wartrace Creek	2		
Little West Fork Red River	3			Weavers Creek			
Long Branch Sulphur Fork				West Fork Red River	3	3	

Table 2-6. Tennessee Rivers Assessment Project Stream Scoring in the Red River Watershed.

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

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

CHAPTER 3

WATER QUALITY ASSESSMENT OF THE RED 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 Red 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.

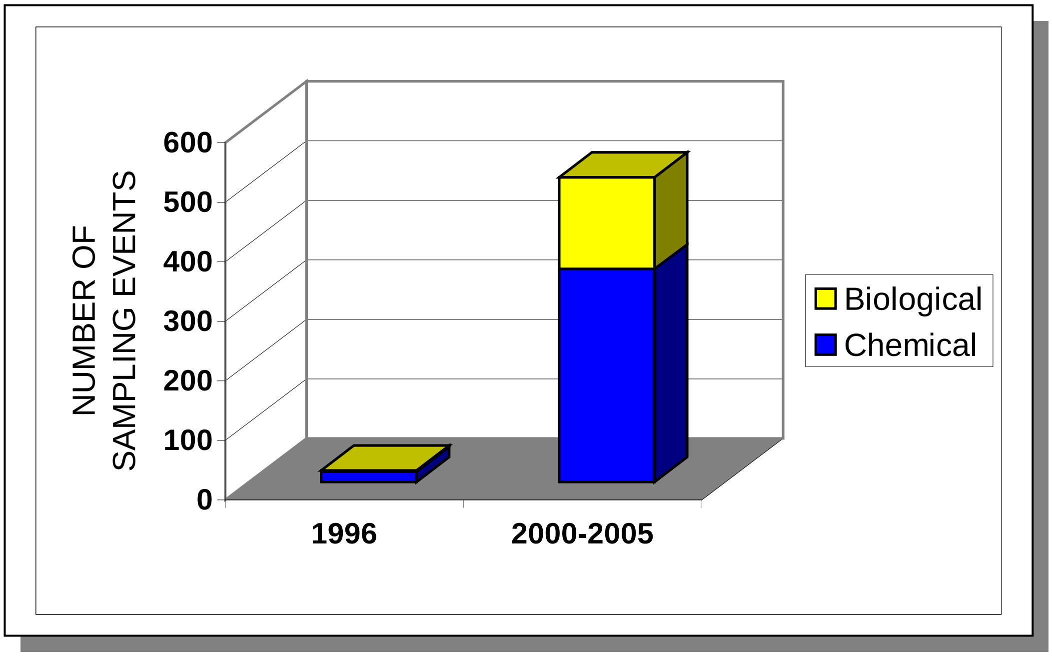


Figure 3-1. Number of Sampling Events Using the Traditional Approach (1996) and Watershed Approach (July 1, 2000 through June 30, 2005) in the Tennessee Portion of the Red River Watershed.

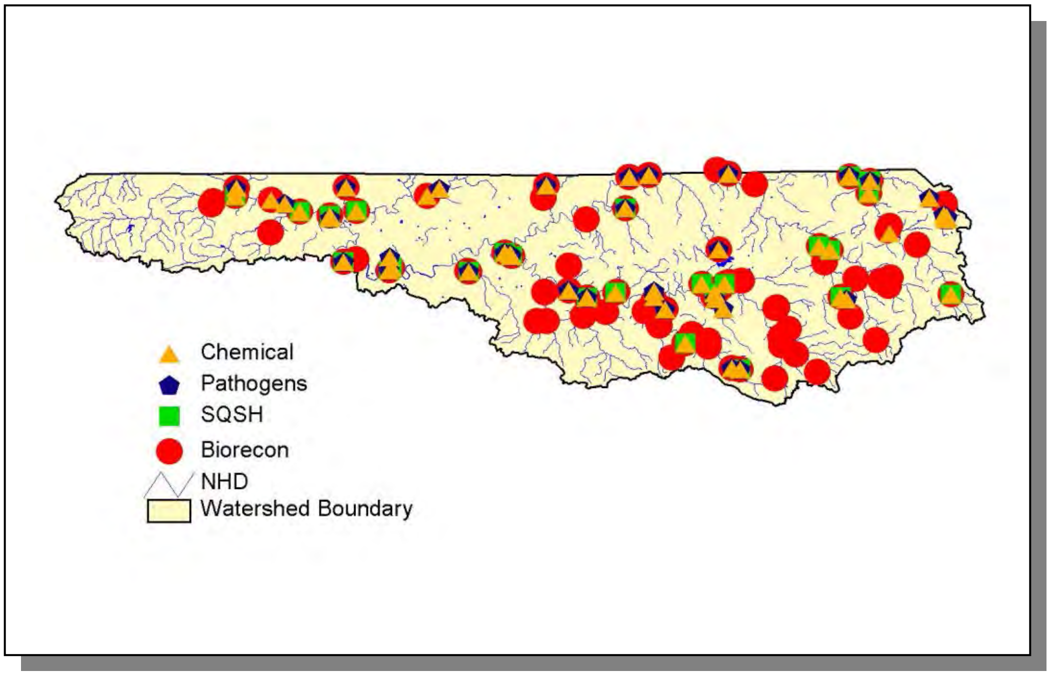


Figure 3-2. Location of Monitoring Sites in the Tennessee Portion of the Red River Watershed (July 1, 2000 through June 30, 2005). *Pathogens include E. coli and fecal coliform; NHD, National Hydrography Dataset of Streams; SQSH, Semi-Quantitative Single Habitat Assessment.*

	1996	**2000-2005**
Biological	2	154
Chemical	17	356
Total	**19**	**511**

Table 3-1. Number of Sampling Events in the Tennessee Portion of the Red 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-Nashville staff (this is in addition to samples collected by water and wastewater treatment plant operators). Samples are analyzed by the Tennessee Department of Health, Division of Environmental Laboratory Services. Ambient monitoring data are used to assess water quality in major bodies of water where there are NPDES facilities and to identify trends in water quality. Water quality parameters traditionally measured at ambient sites in the Tennessee portion of the Red 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 Red River Watershed lies within 1 Level III ecoregion (Interior Plateau) and contains 3 subecoregions (Level IV):

- Western Pennyroyal Karst (71e)
- Western Highland Rim (71f)
- Eastern Highland Rim (71g)

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.

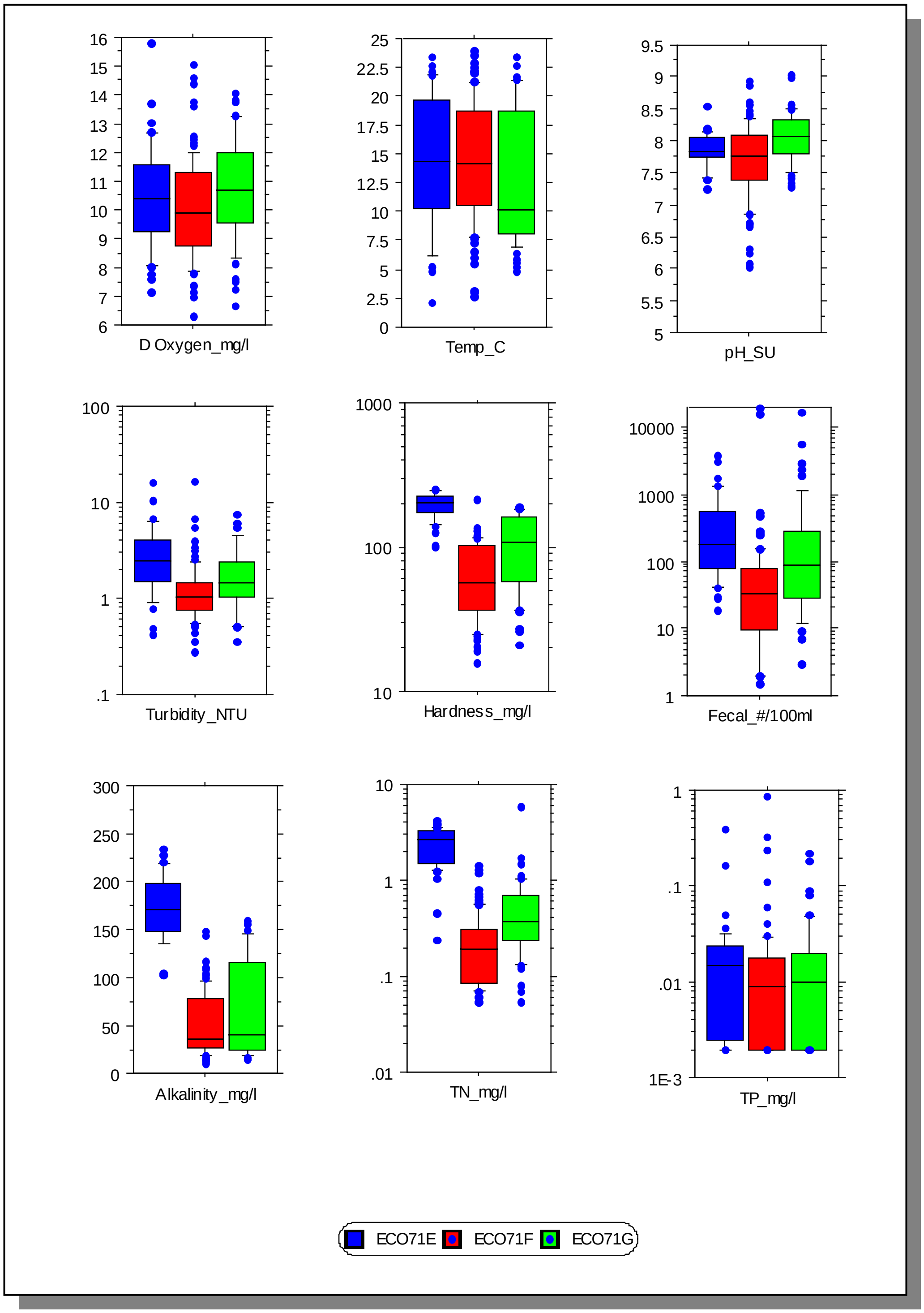


Figure 3-3. Select Chemical Data Collected in the Tennessee Portion of Red River Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th percentiles. Extreme values are also shown as dots. Fecal, fecal coliform bacteria; TN, Total Nitrogen; TP, Total Phosphorus.*

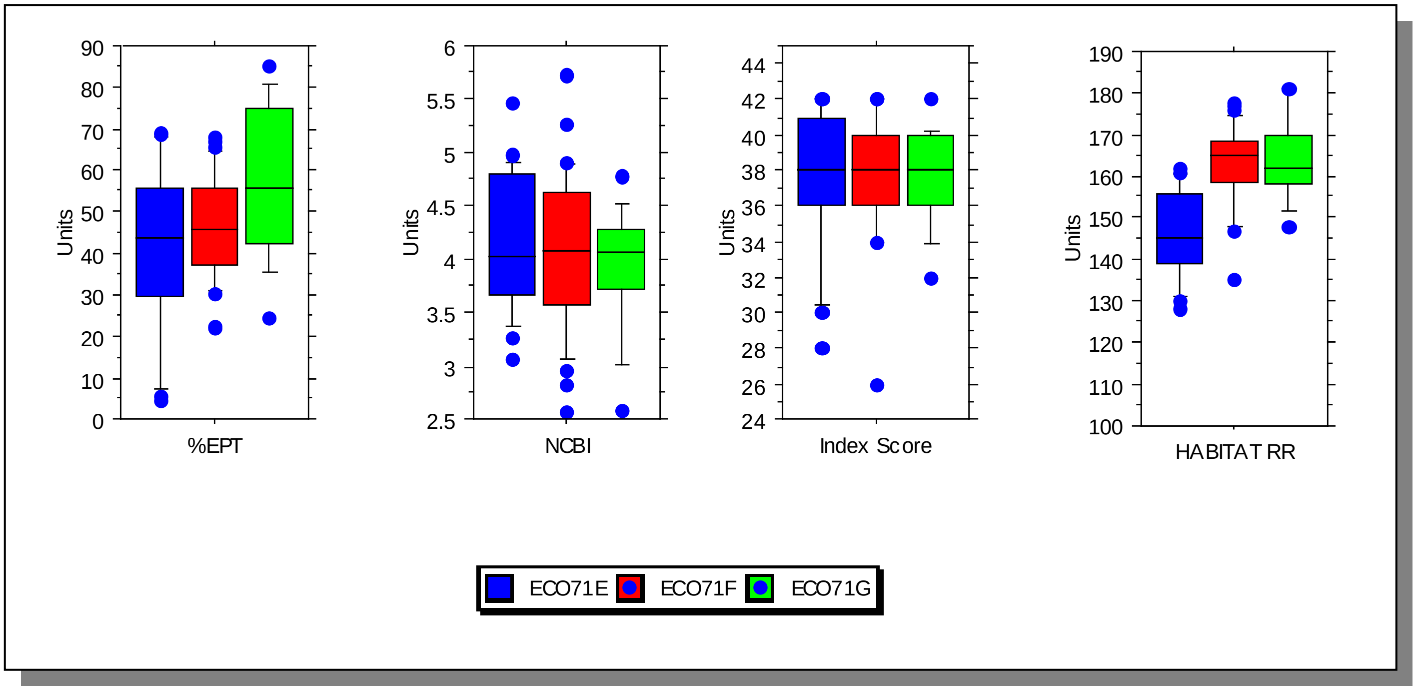


Figure 3-4. Benthic Macroinvertebrate and Habitat Scores for the Tennessee Portion of Red River Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th percentiles. Extreme values are also shown as dots. NCBI, North Carolina Biotic Index. Index Score and Habitat Riffle/Run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

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

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

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

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

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

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

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

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

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

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

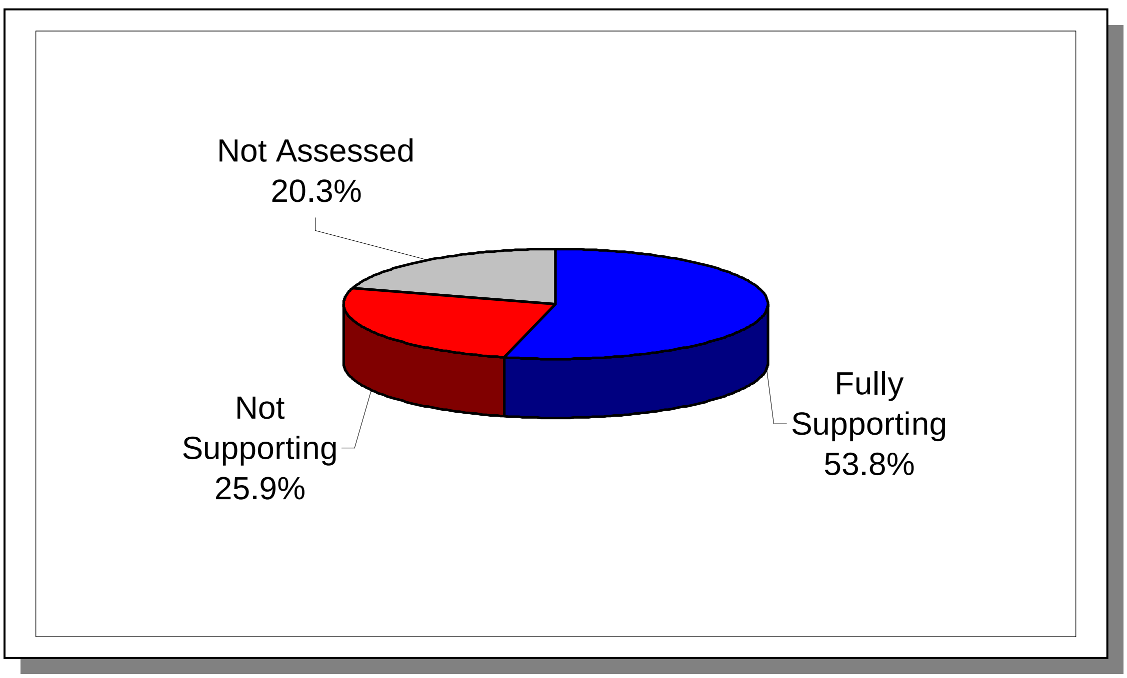


Figure 3-5. Water Quality Assessment of Streams in the Tennessee Portion of the Red River Watershed. *Assessment data are based on the 2004 Water Quality Assessment of 788.7 stream miles in the watershed. More information is provided in Appendix III.*

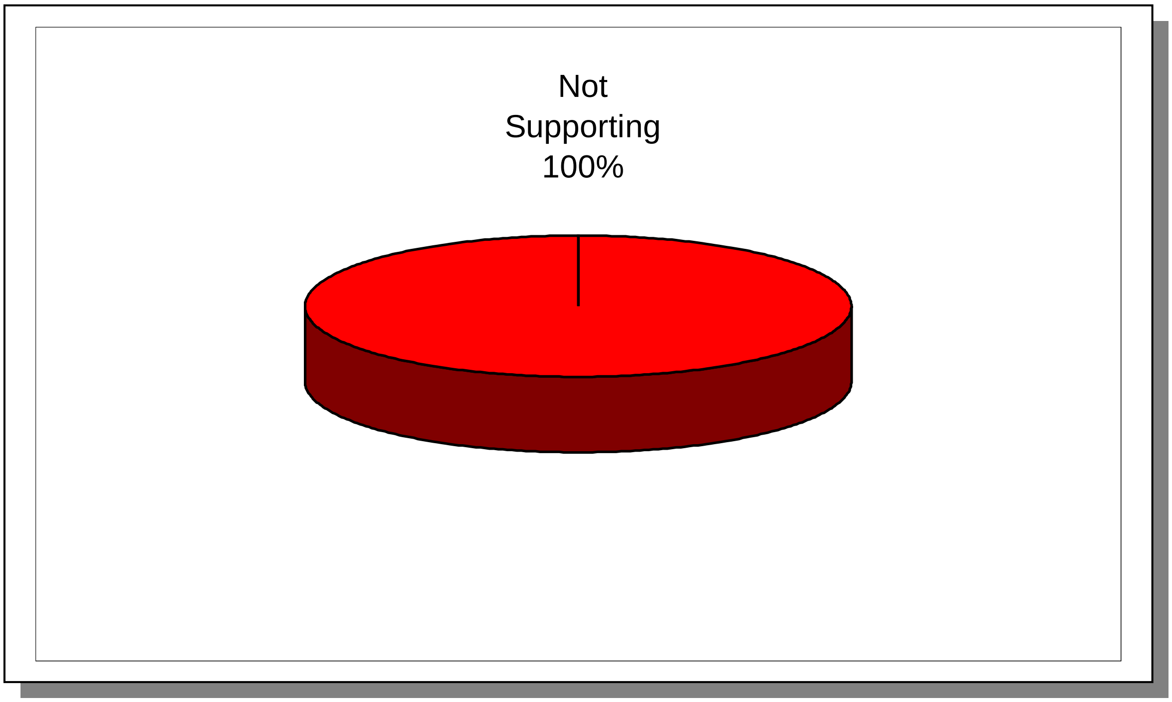


Figure 3-6. Water Quality Assessment of Lakes in the Tennessee Portion of the Red River Watershed. *Assessment data are based on the 2004 Water Quality Assessment of 15 lake acres in the watershed. More information is provided in Appendix III.*

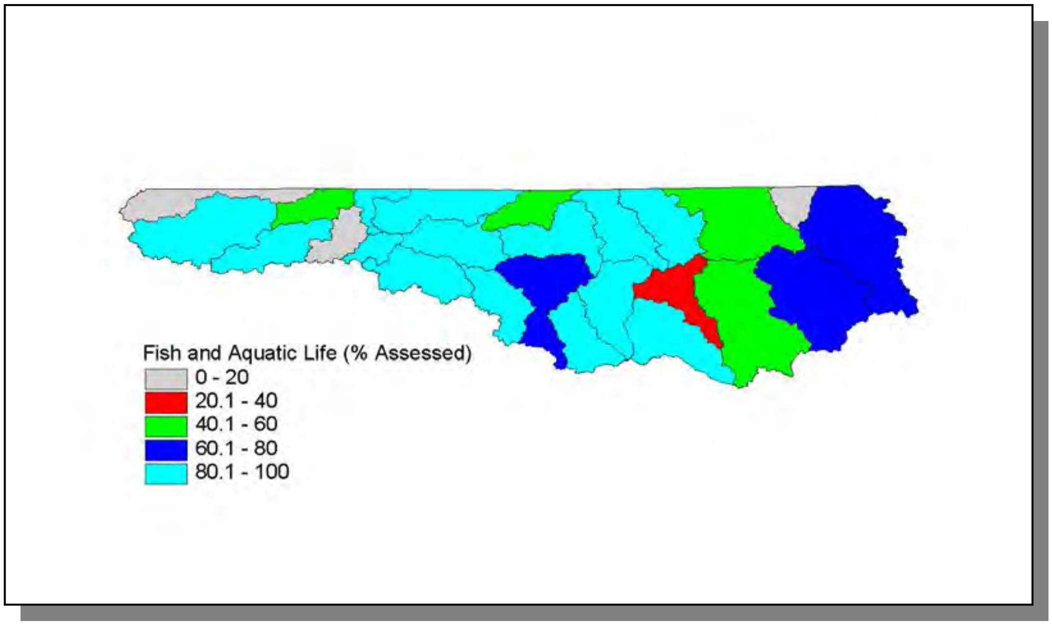


Figure 3-7. Percentage of Stream Miles Assessed for Support of Fish and Aquatic Life Designated Use in HUC-12 Subwatersheds.

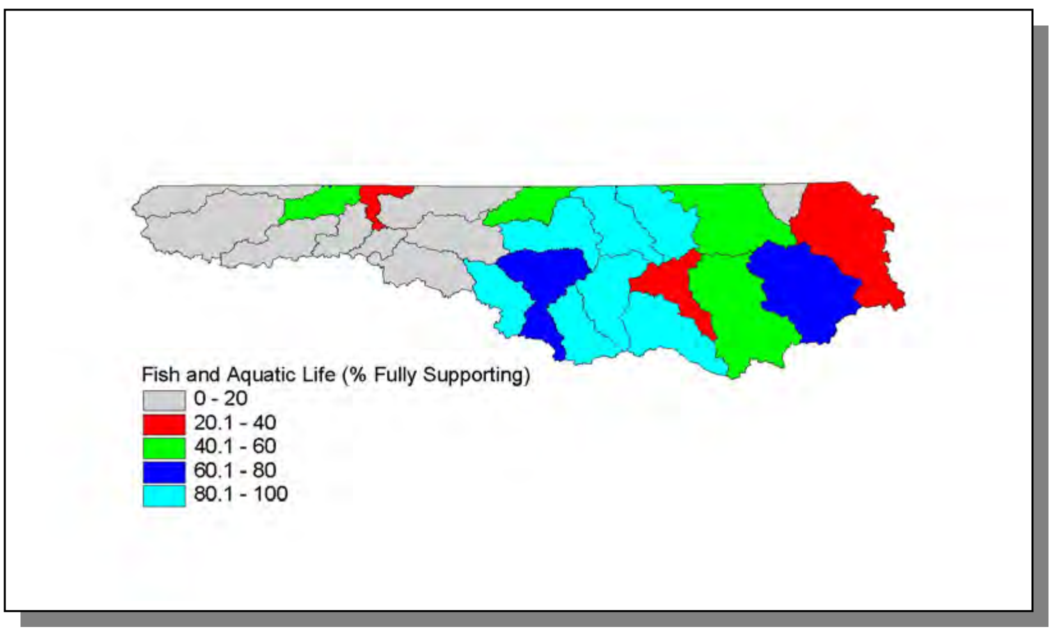


Figure 3-8. Percentage of Stream Miles Fully Supporting for Fish and Aquatic Life Designated Use in HUC-12 Subwatersheds.

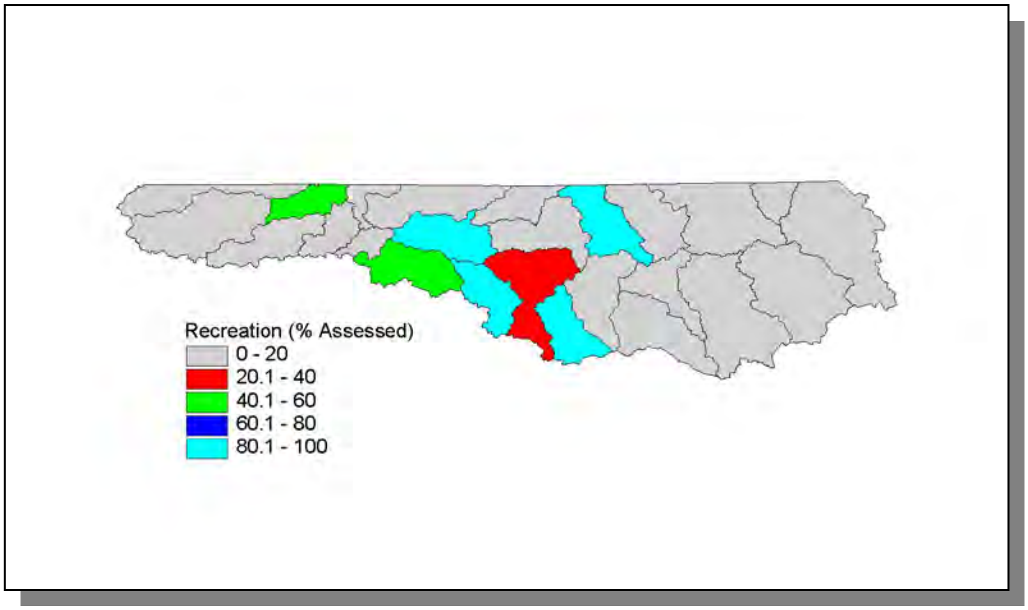


Figure 3-9. Percentage of Stream Miles Assessed for Support of Recreation Designated Use in HUC-12 Subwatersheds.

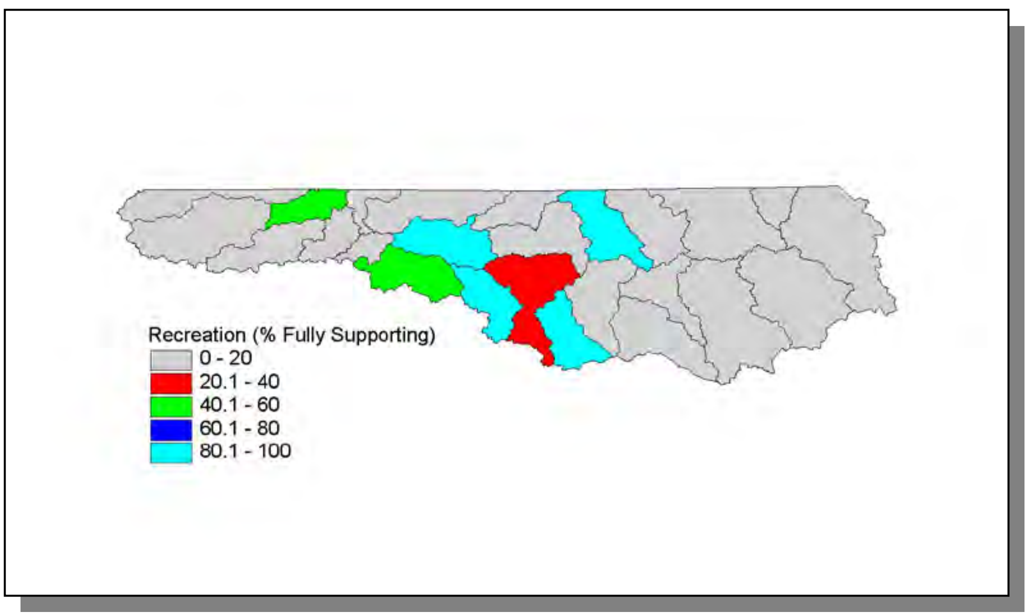


Figure 3-10. Percentage of Stream Miles Fully Supporting for Recreation Designated Use in HUC-12 Subwatersheds.

3.3.A. Assessment Summary.

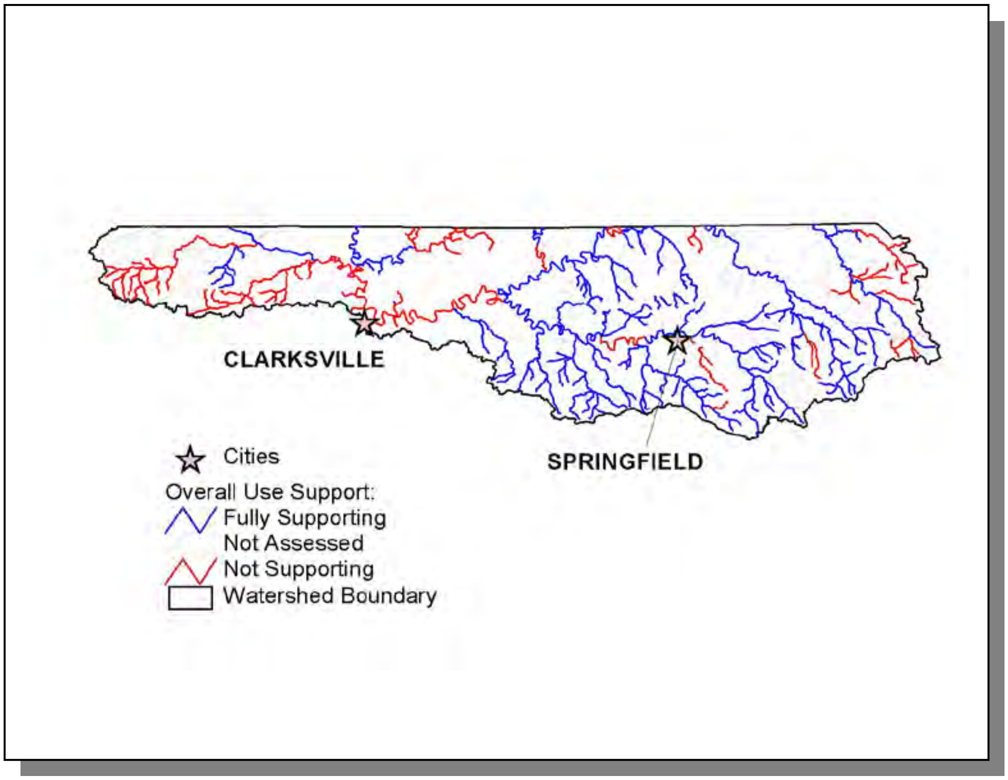


Figure 3-11. Overall Use Support Attainment in the Tennessee Portion of the Red River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Clarksville and Springfield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

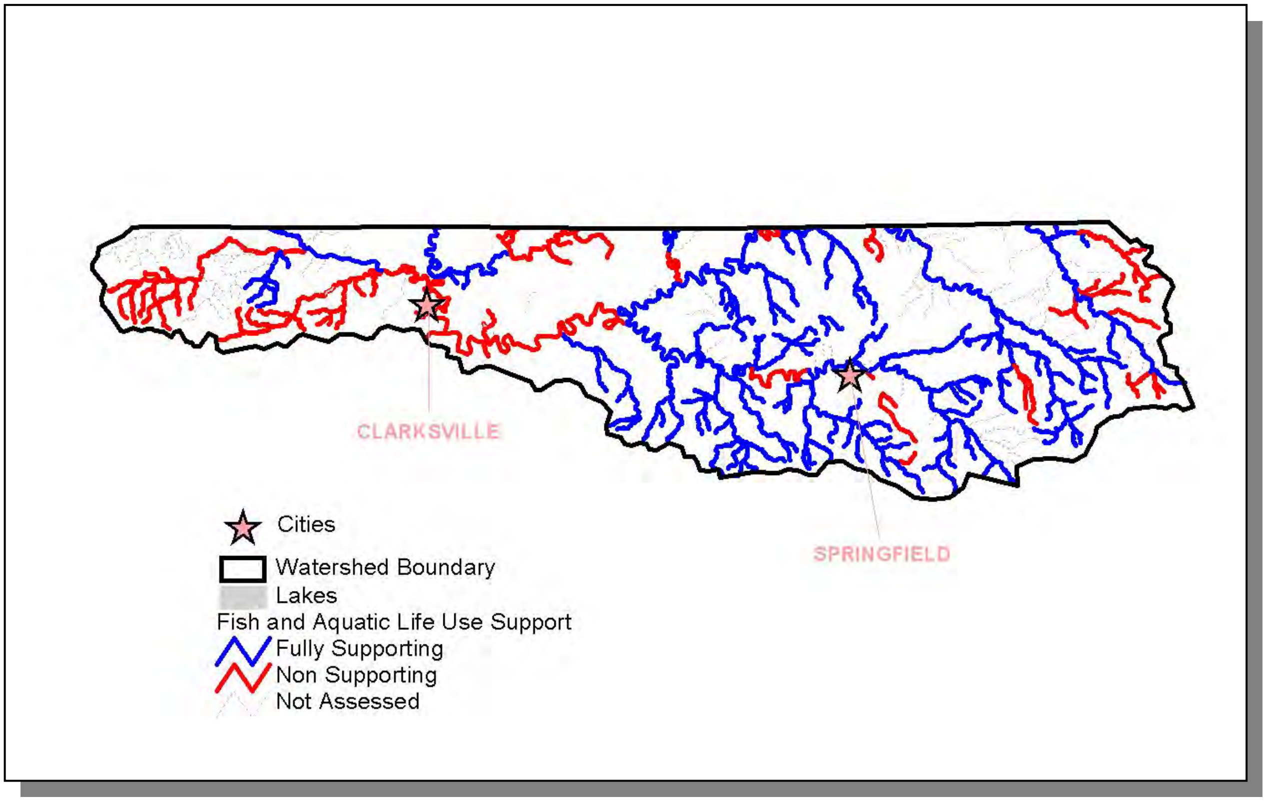


Figure 3-12. Fish and Aquatic Life Use Support Attainment in the Tennessee Portion of the Red River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Clarksville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

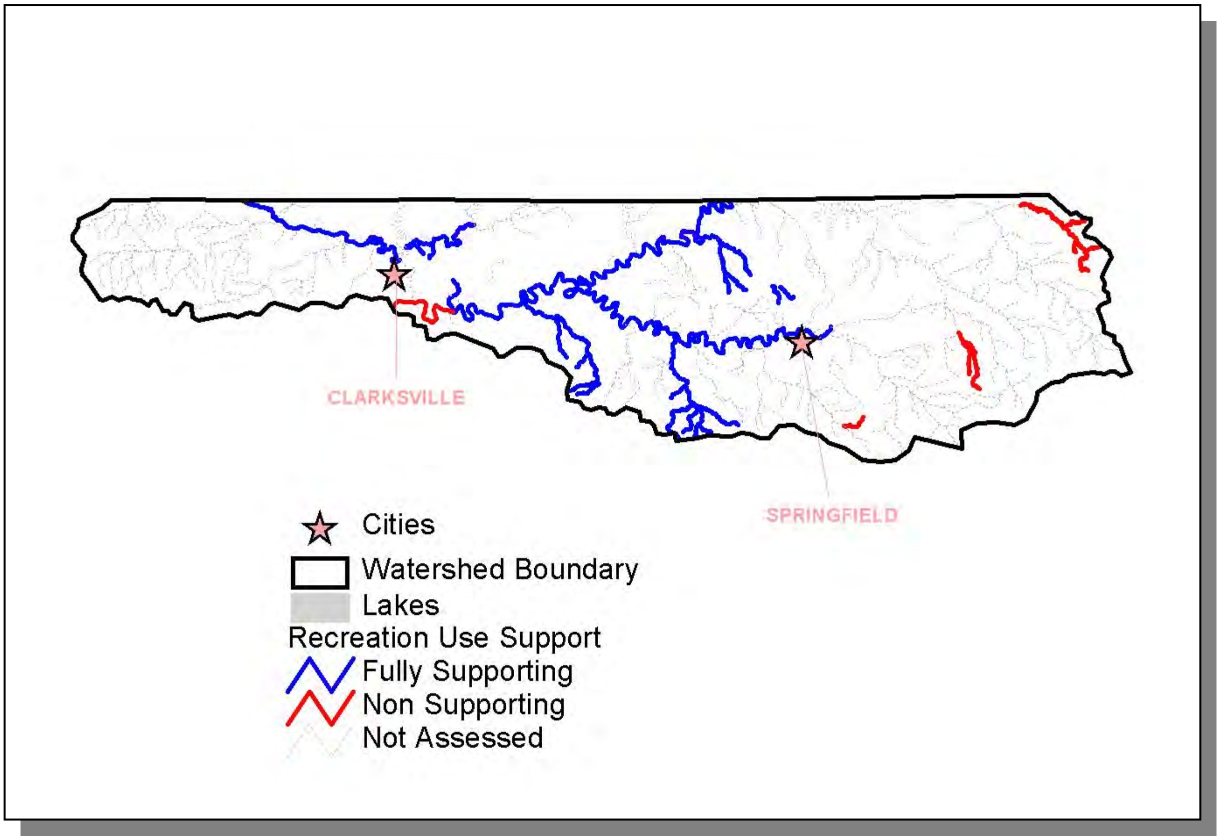


Figure 3-13. Recreation Use Support Attainment in the Tennessee Portion of the Tennessee Portion of the Red River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of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

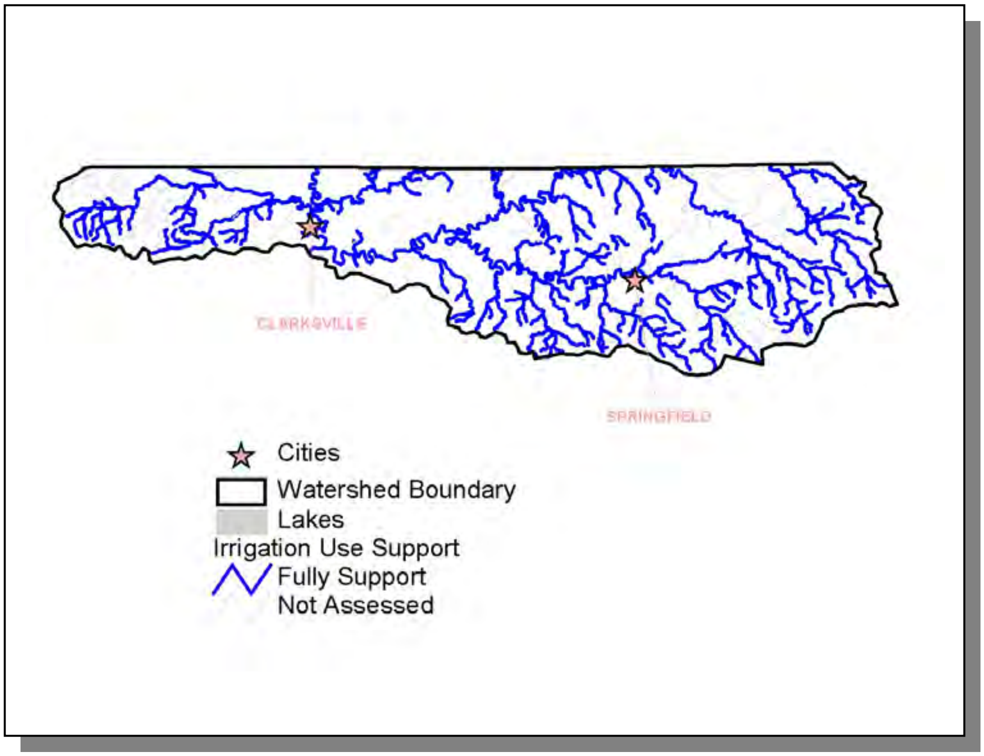


Figure 3-14. Irrigation Use Support Attainment in the Tennessee Portion of the Red River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Clarksville and Savannah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

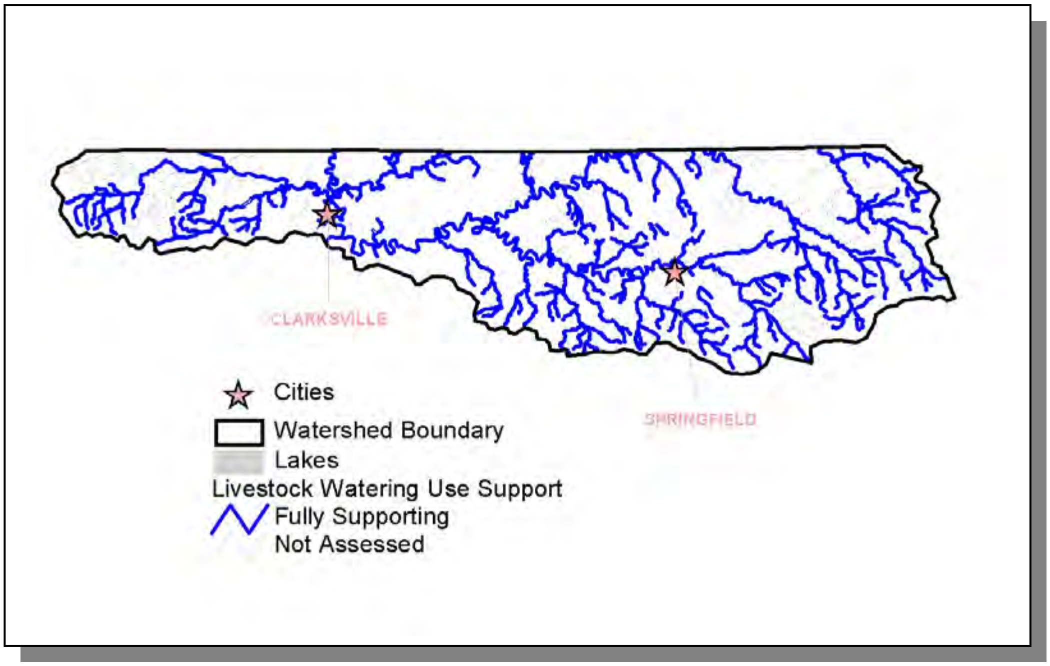


Figure 3-15. Livestock Watering and Wildlife Use Support Attainment in the Tennessee Portion of the Red River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Clarksville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

3.3.B. Use Impairment Summary.

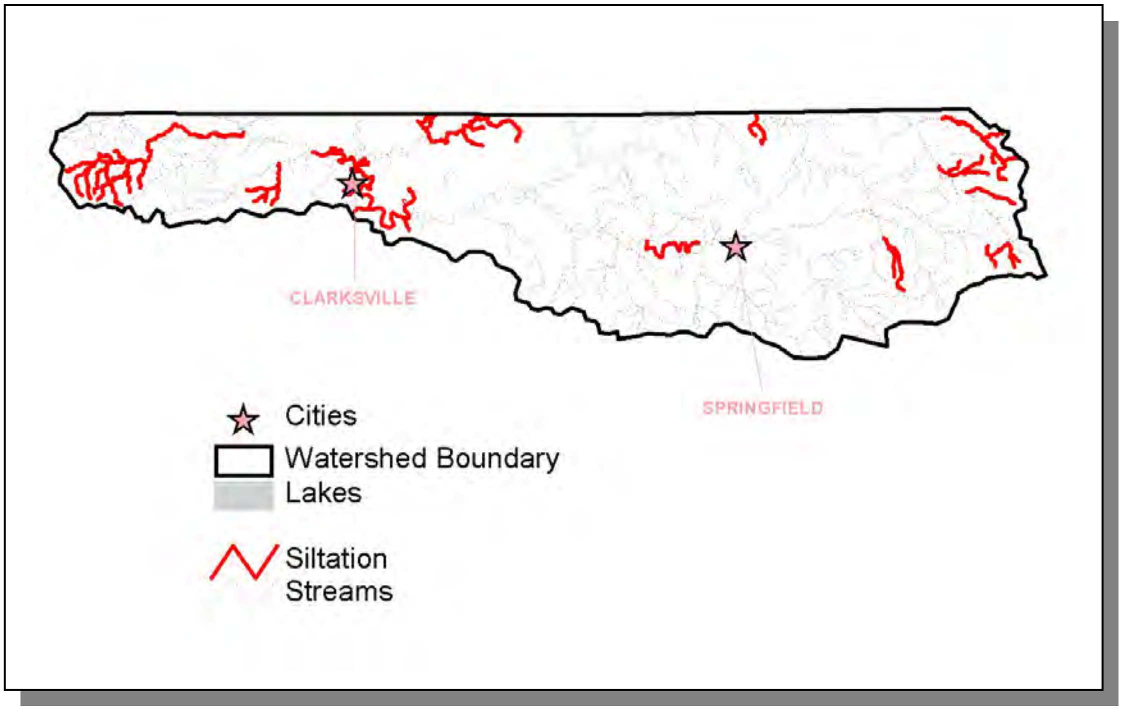


Figure 3-16. Impaired Streams Due to Siltation in the Tennessee Portion of the Red River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Locations of Clarksville and Springfield are shown for reference. More information is provided in Appendix III.*

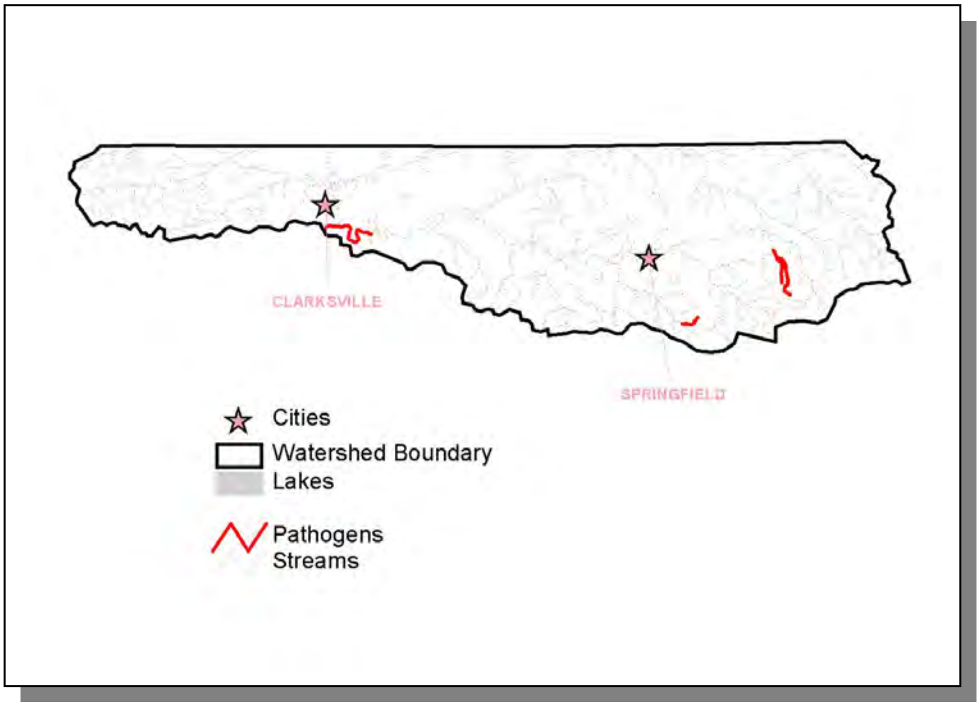


Figure 3-17. Impaired Streams Due to Pathogens in the Tennessee Portion of the Red River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Pathogens represent E. Coli and total fecal coliform data. Locations of Clarksville and Springfield are shown for reference. More information is provided in Appendix III.*

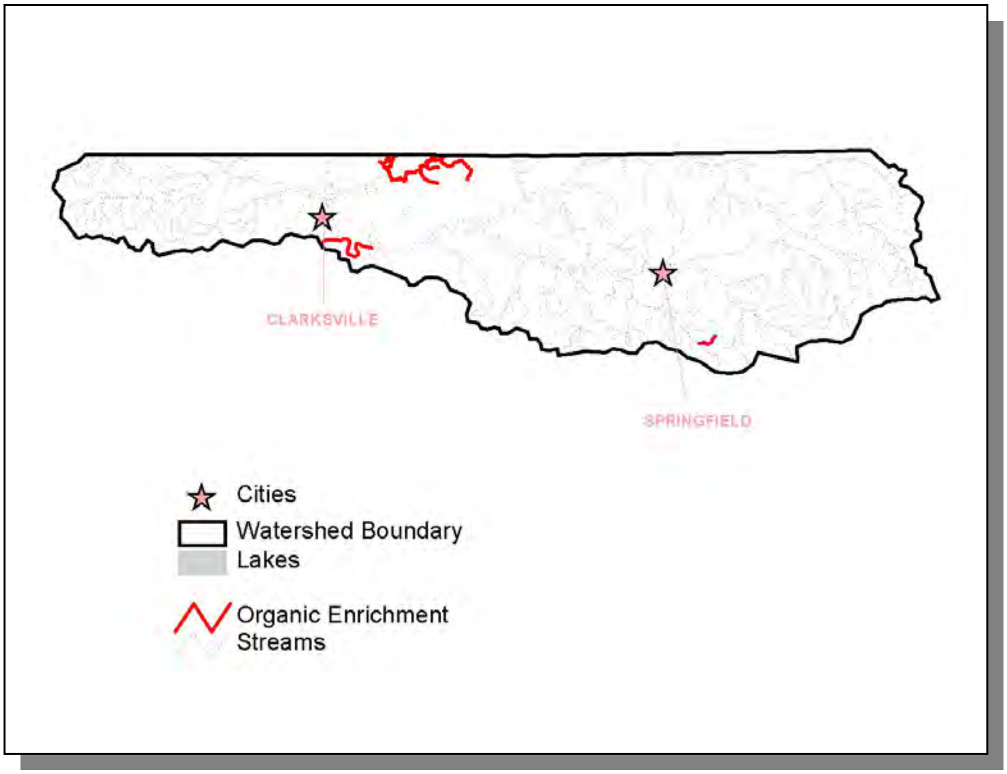


Figure 3-18. Impaired Streams Due to Organic Enrichment or Low Dissolved Oxygen in the Tennessee Portion of the Red River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Locations of White House and Woodlawn are shown for reference. More information is provided in Appendix III.*

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

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

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

CHAPTER 4

POINT AND NONPOINT SOURCE CHARACTERIZATION OF THE RED 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 Red River Watershed (HUC 05130206) has been delineated into six 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.

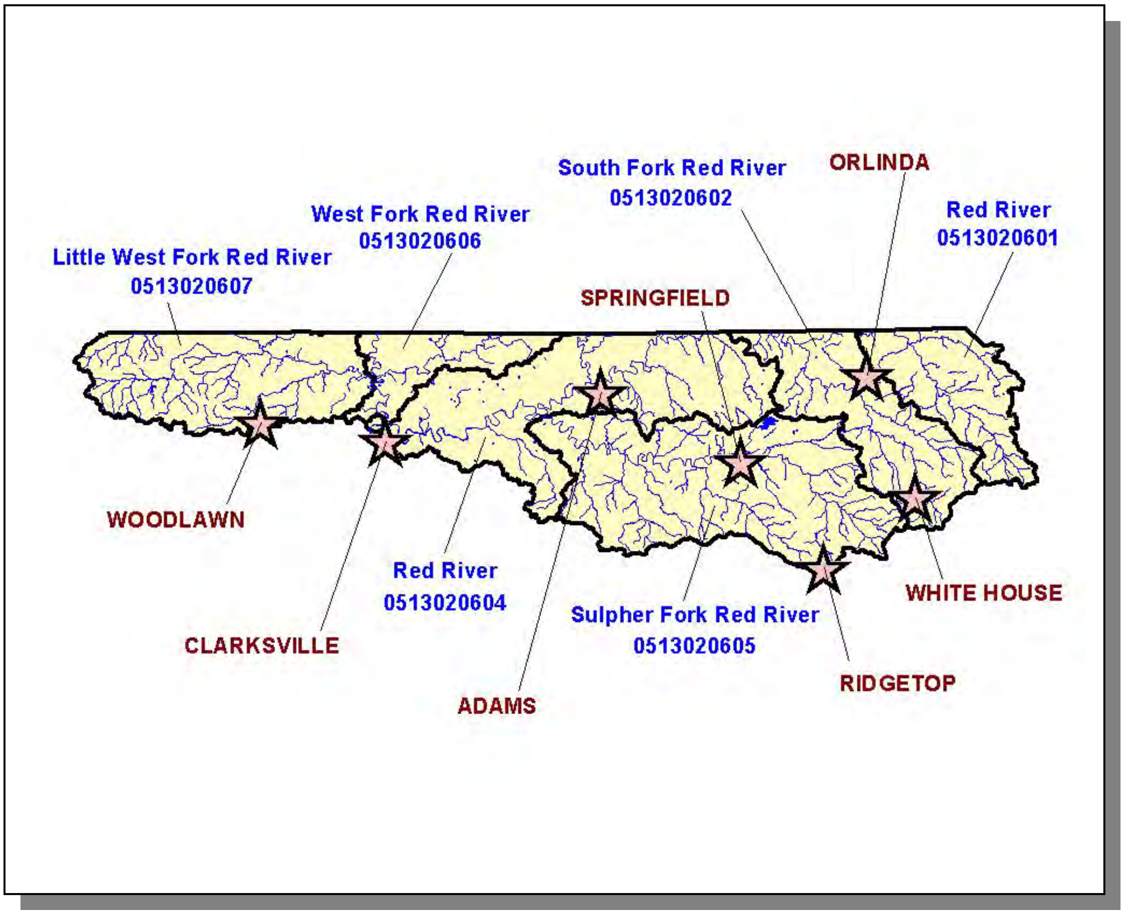


Figure 4-1. The Tennessee Portion of the Red River Watershed is Composed of Six USGS-Delineated Subwatersheds (10-Digit Subwatersheds). *Locations of Adams, Clarksville, Orlinda, Ridgetop, Springfield, White House, and Woodlawn are shown for reference.*

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 Red River Watershed.

HUC-10	HUC-12
0513020601	051302060101 (Red River)
	051302060102 (Red River)
0513020602	051302060201 (South Fork Red River)
	051302060202 (South Fork Red River)
0513020604	051302060401 (Red River)
	051302060402 (Spring Creek)
	051302060403 (Red River)
	051302060404 (Elk Fork Creek)
	051302060405 (Red River)
	051302060406 (Passenger Creek)
	051302060407 (Red River)
0513020605	051302060501 (Sulphur Fork Creek)
	051302060502 (Sulphur Fork Creek)
	051302060503 (Carr Creek)
	051302060504 (Sulphur Fork Creek)
	051302060505 (Millers Creek)
	051302060506 (Sulphur Fork Creek)
0513020606	051302060603 (West Fork Red River)
	051302060604 (Spring Creek)
	051302060605 (West Fork Red River)
0513020607	051302060701 (Noahs Springs Branch)
	051302060702 (Piney Fork Creek)
	051302060703 (Little West Fork Red River)
	051302060704 (Fletchers Fork)
	051302060705 (Little West Fork Red River)

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

4.2.A. 0513020601.

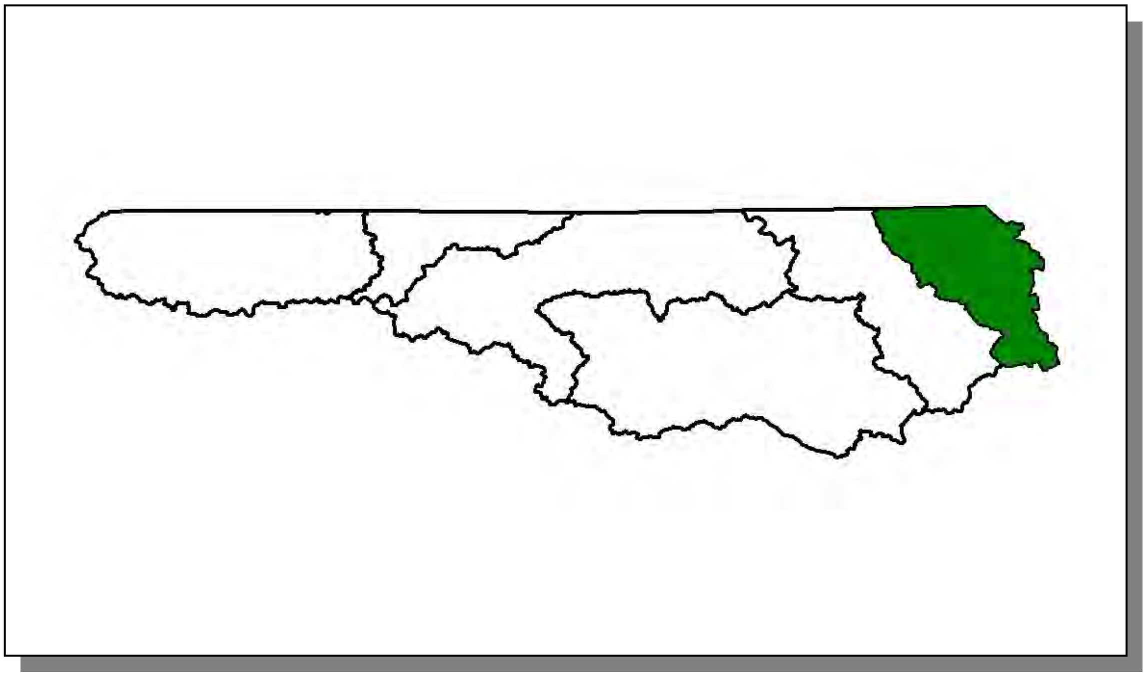


Figure 4-2. Location of Subwatershed 0513020601. *All Red River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.A.i. 051302060101 (Red River).

Figure 4-3. Location of Subwatershed 051302060101. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

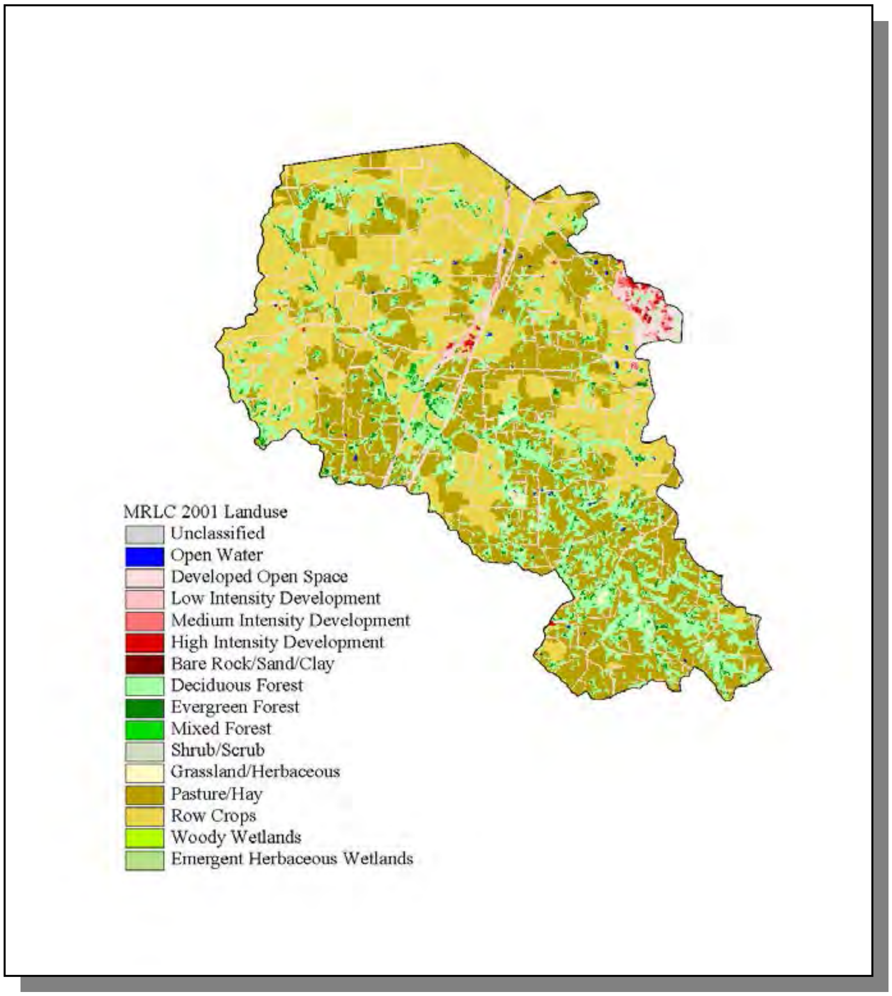


Figure 4-4. Illustration of Land Use Distribution in Subwatershed 051302060101.

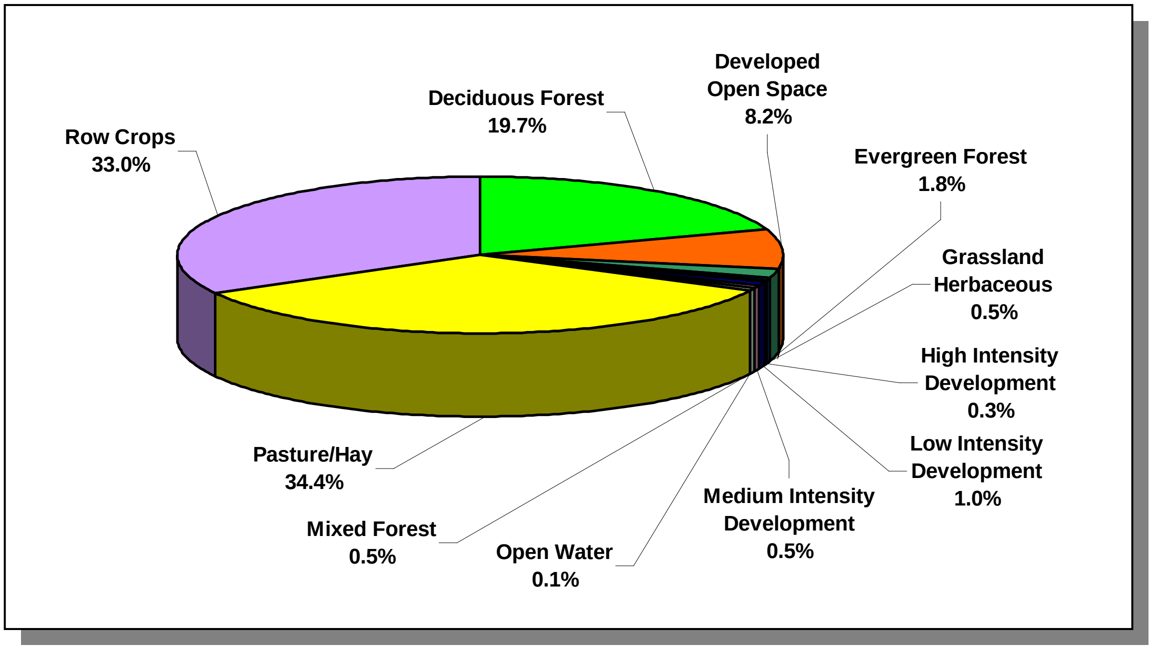


Figure 4-5. Land Use Distribution in Subwatershed 051302060101. *More information is provided in Appendix IV.*

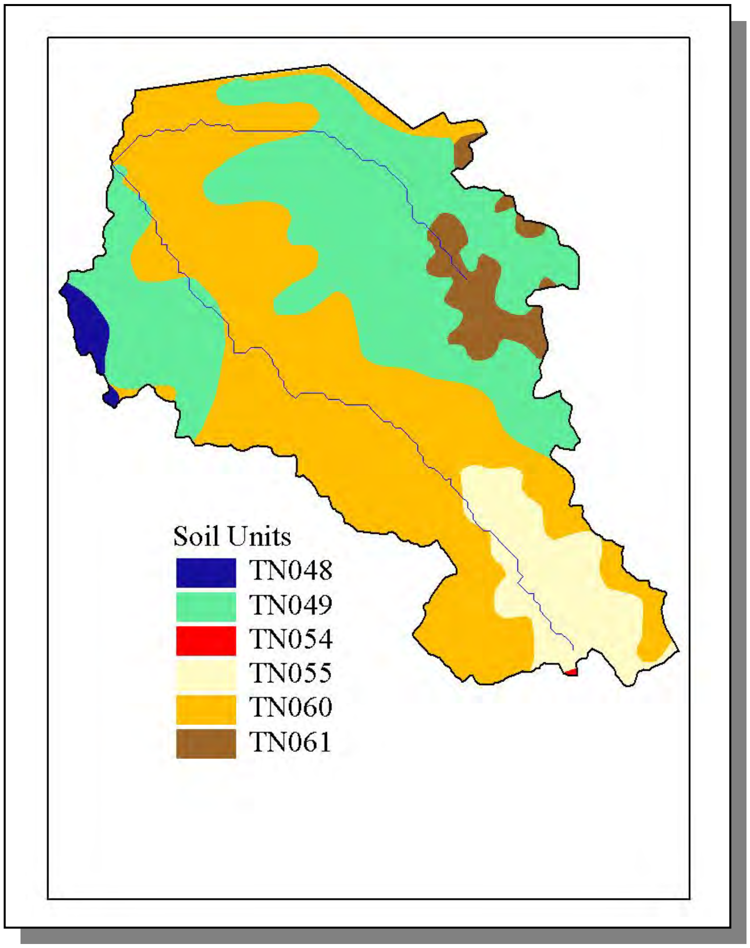


Figure 4-6. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060101.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN048	8.00	B	1.38	5.06	Silty Loam	0.42
TN049	0.00	C	1.30	5.94	Silty Loam	0.34
TN054	0.00	B	3.04	4.84	Loam	0.32
TN055	3.00	C	2.45	5.24	Loam	0.34
TN060	5.00	C	1.30	5.32	Silty Loam	0.39
TN061	50.00	B	1.30	5.09	Silty Loam	0.42

Table 4-2. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060101. *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)
Robertson	41,494	51,533	54,433	6.25	2,592	3,219	3,400	31.2
Sumner	103,281	121,936	130,449	6.39	6,599	7,791	8,334	26.3
Total	**144,775**	**173,469**	**184,882**		**9,191**	**11,010**	**11,734**	**27.7**

Table 4-3. Population Estimates in Subwatershed 051302060101.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Mitchellville	Sumner	198	96	2	94	0
Orlinda	Robertson	476	199	2	194	3
Portland	Sumner	5,165	2,101	1,382	705	14
Total		**5,839**	**2,396**	**1,386**	**993**	**17**

Table 4-4. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302060101.

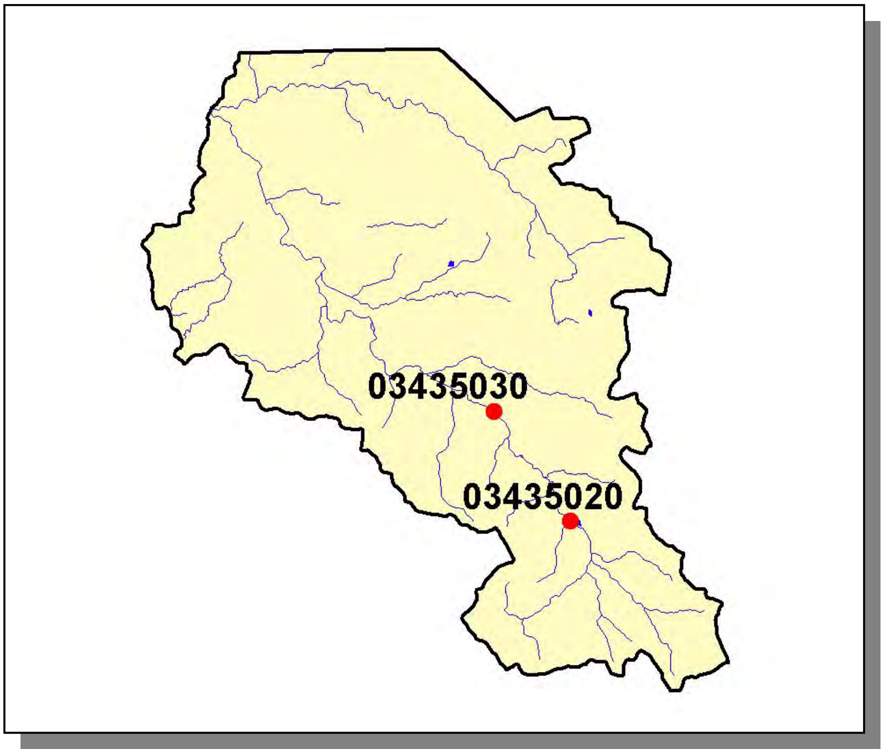


Figure 4-7. Location of Historical Streamflow Data Collection Sites in Subwatershed 051302060101. *More information is provided in Appendix IV.*

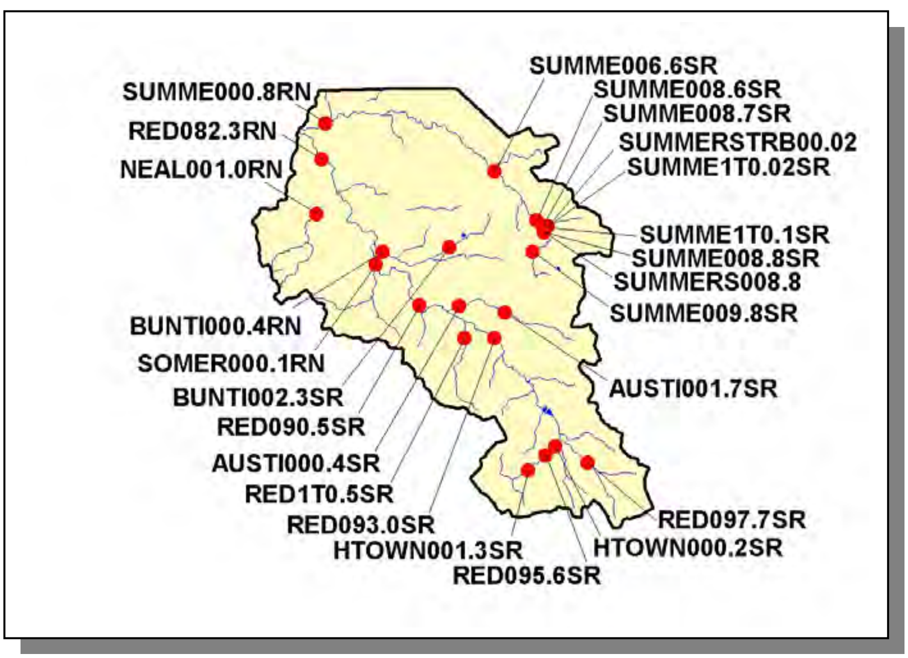


Figure 4-8. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060101. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

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

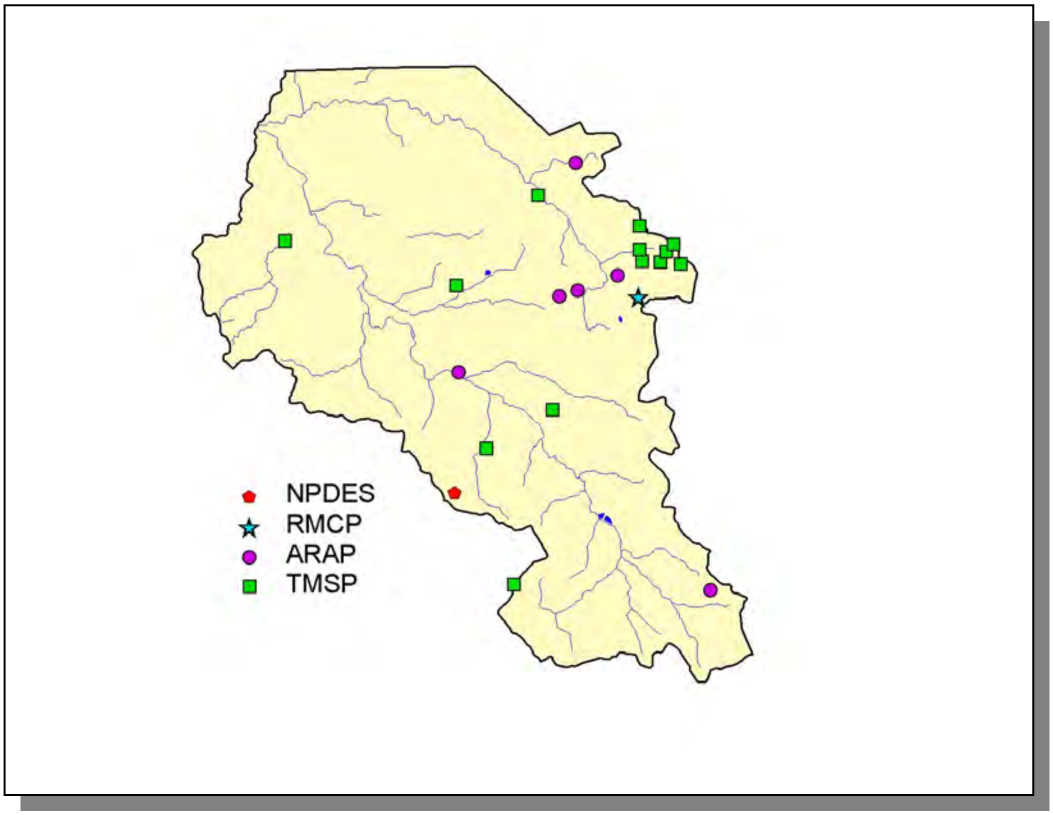


Figure 4-9. Location of Permits Issued in Subwatershed 051302060101. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-10. Location of Active NPDES Sites in Subwatershed 051302060101. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-11. Location of Ready Mix Concrete Plants (RMCP) in Subwatershed 051302060101. *More information is provided in Appendix IV.*

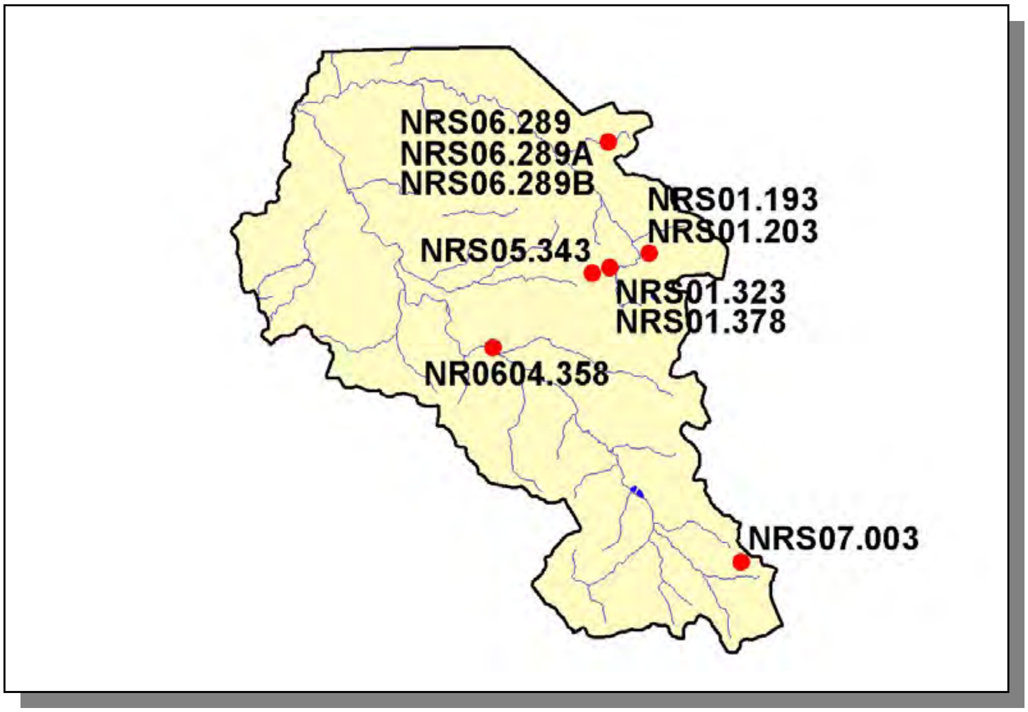


Figure 4-12. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051302060101. *More information is provided in Appendix IV.*

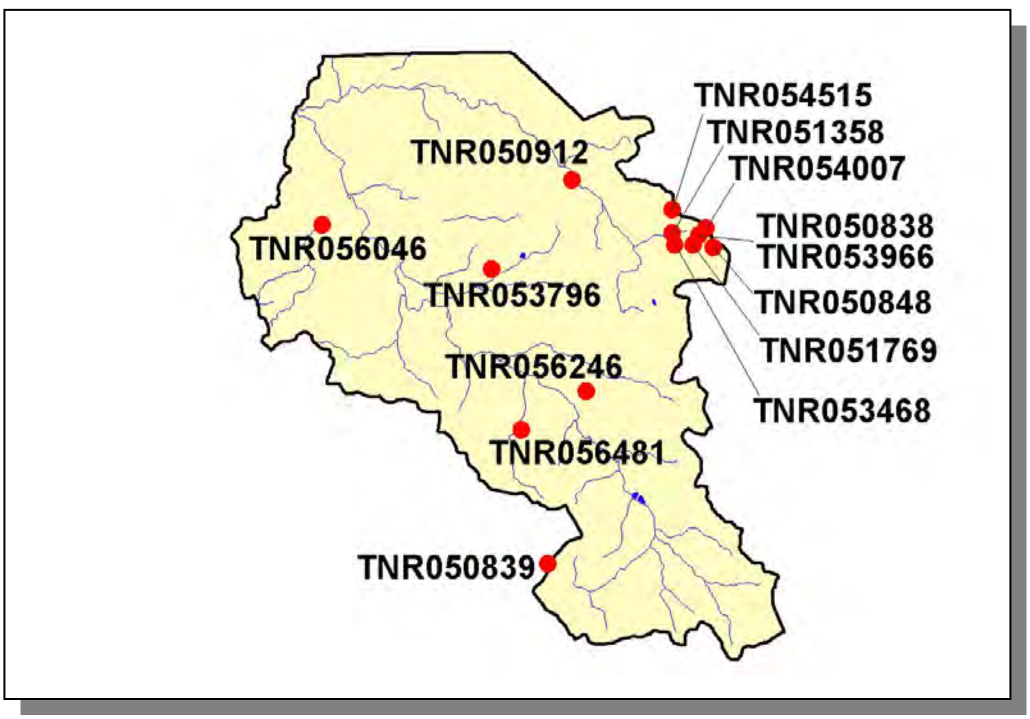


Figure 4-13. Location of TMSP Sites in Subwatershed 051302060101. *More information, including the names of facilities, is provided in Appendix IV.*

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
4,880	10,030	459	10	839	47

Table 4-5. Summary of Livestock Count Estimates in Subwatershed 051302060101. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Robertson	22,502	47,887	3,478	31	6,982	279
Sumner	22,296	45,116	1,515	50	2,500	189

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

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Robertson	53.0	53.0	2.2	9.7
Sumner	88.2	88.2	2.0	6.3

Table 4-7. Forest Acreage and Annual Removal Rates (1987-1994) in Robertson and Sumner Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.56
Grass (Hayland)	0.34
Legumes, Grass (Hayland)	0.37
Legumes (Hayland)	0.40
Grass, Forbs, Legumes (Mixed Pasture)	0.48
Corn (Row Crops)	8.99
Soybeans (Row Crops)	10.69
Tobacco (Row Crops)	11.87
Wheat (Close-Grown Cropland)	1.68
Other Cropland not Planted	14.75
Conservation Reserve Program Lands	0.31
Other Land in Farms	0.27
Farmsteads and Ranch Headquarters	0.62

Table 4-8. Annual Estimated Total Soil Loss in Subwatershed 051302060101.

4.2.A.ii. 051302060102 (Red River).

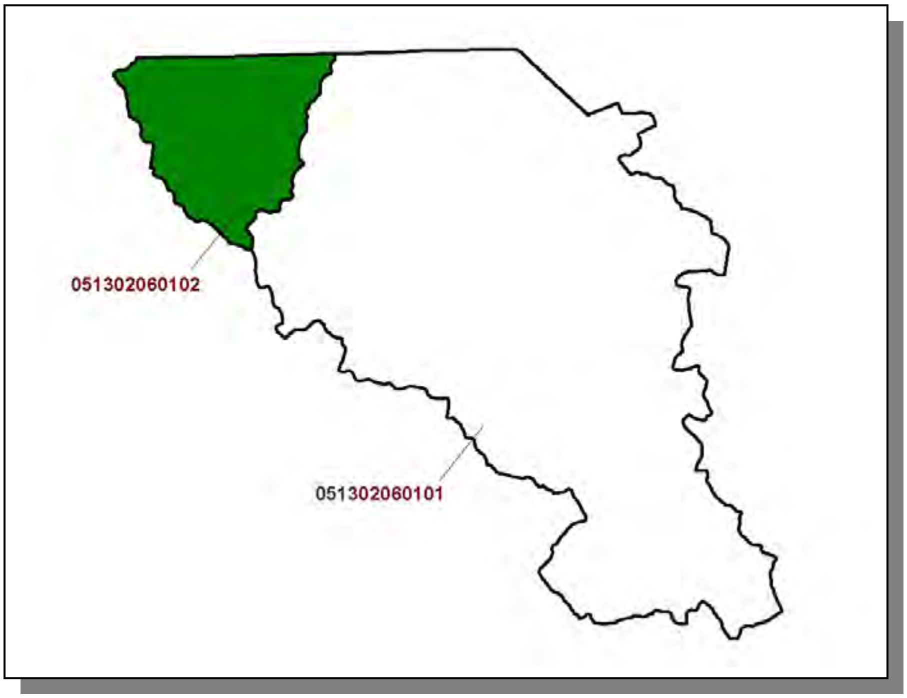


Figure 4-14. Location of Subwatershed 051302060102. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

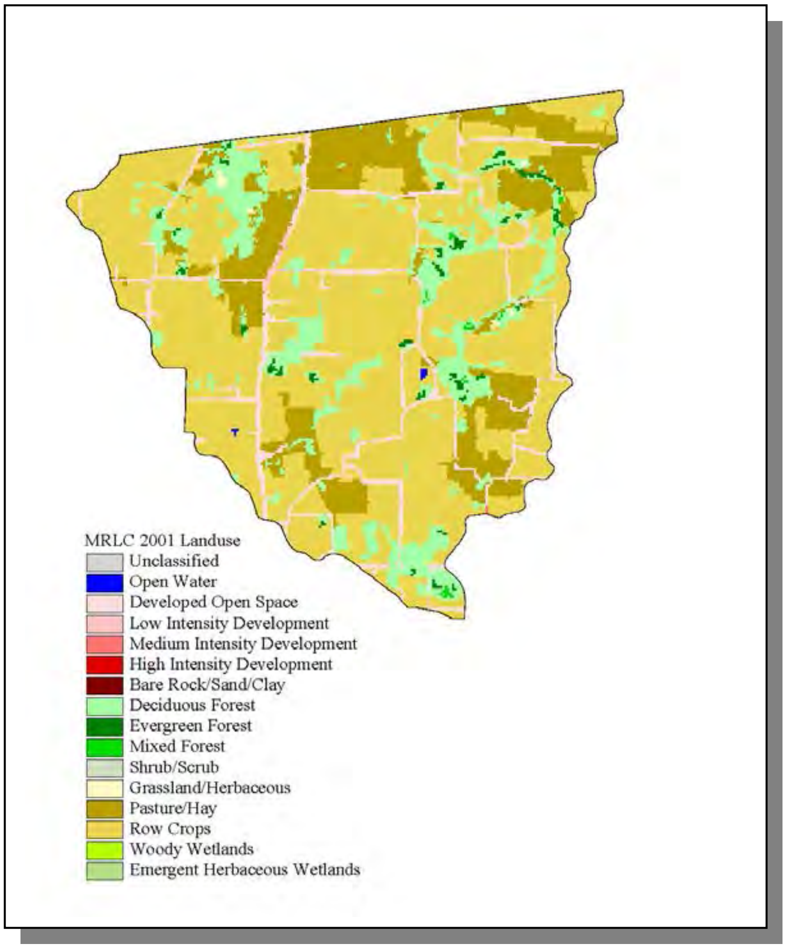


Figure 4-15. Illustration of Land Use Distribution in Subwatershed 051302060102.

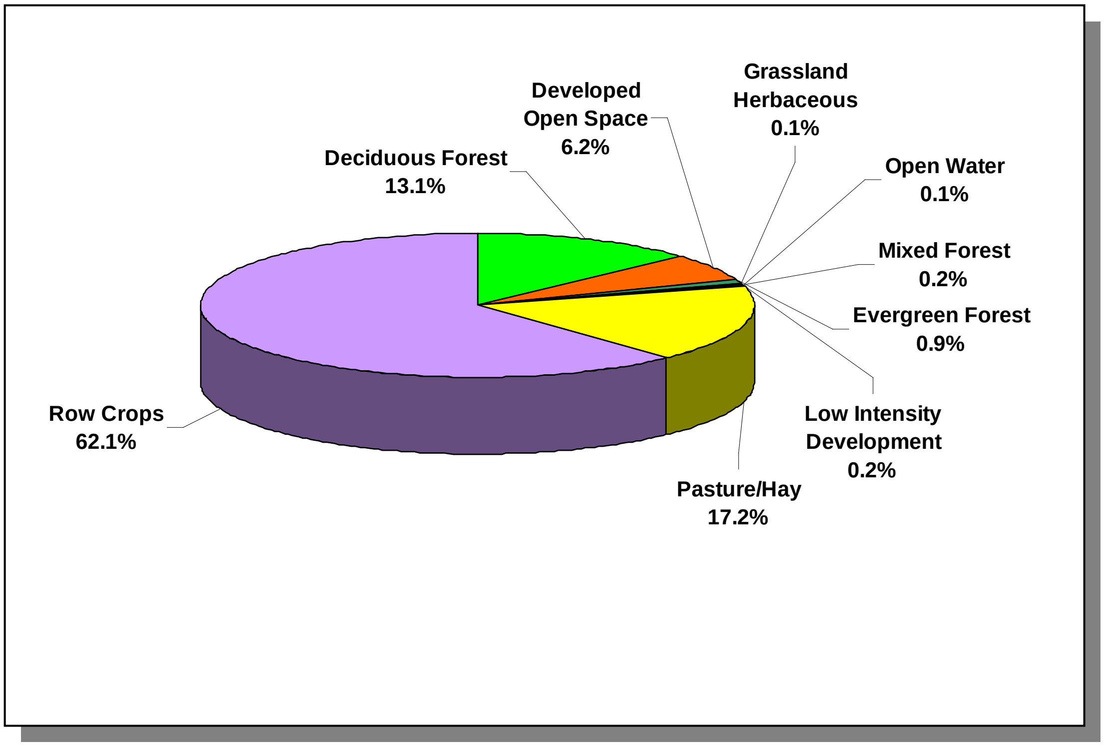


Figure 4-16. Land Use Distribution in Subwatershed 051302060102. *More information is provided in Appendix IV.*

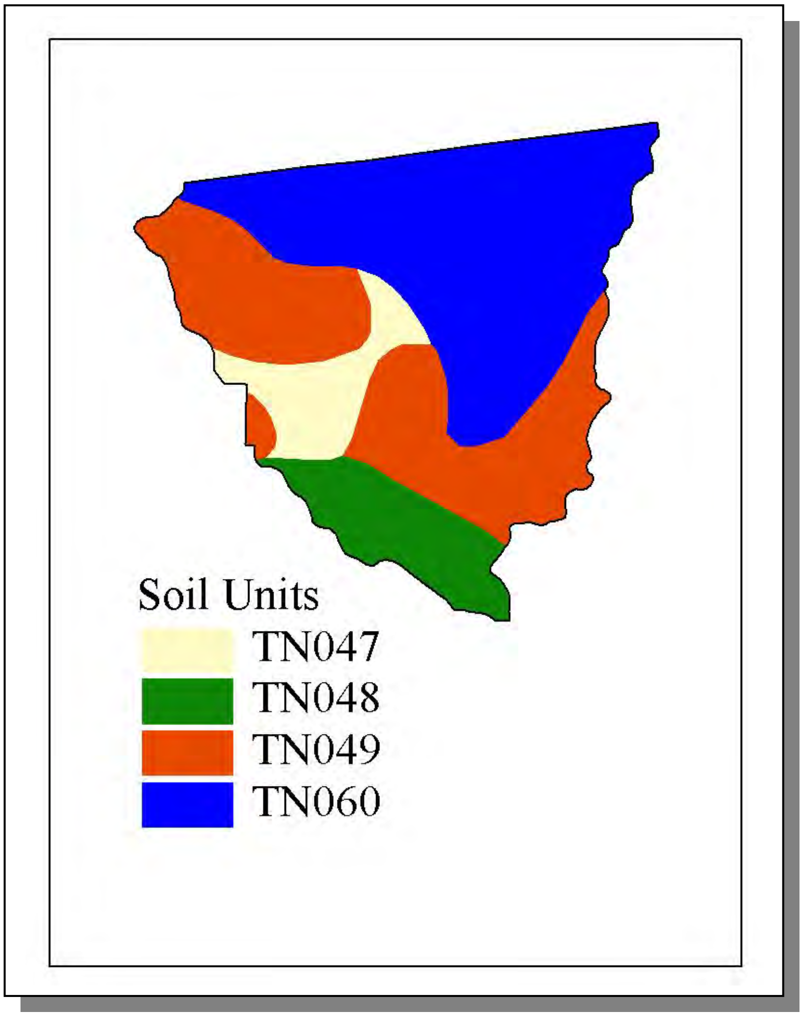


Figure 4-17. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060102.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN047	21.00	C	1.62	5.73	Silty Loam	0.37
TN048	8.00	B	1.38	5.06	Silty Loam	0.42
TN049	0.00	C	1.30	5.94	Silty Loam	0.34
TN060	5.00	C	1.30	5.32	Silty Loam	0.39

Table 4-9. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060102. *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)
Robertson	41,494	51,533	54,433	2.11	875	1,087	1,148	31.2

Table 4-10. Population Estimates in Subwatershed 051302060102.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Orlinda	Robertson	476	199	2	194	3

Table 4-11. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302060102.

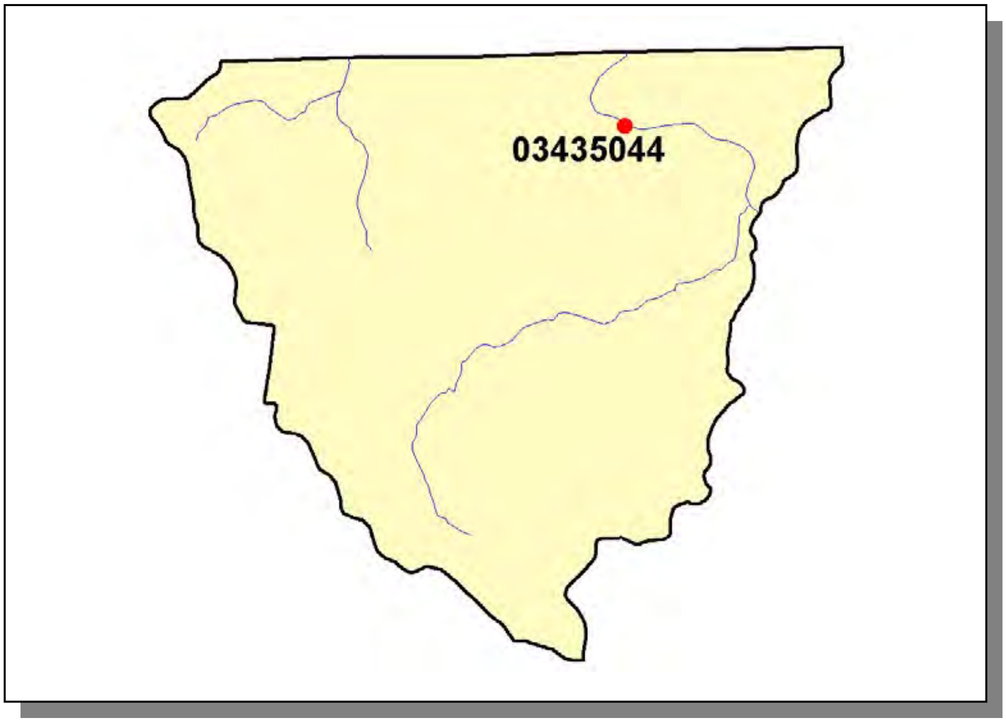


Figure 4-18. Location of Historical Streamflow Data Collection Sites in Subwatershed 051302060102. *More information is provided in Appendix IV.*

Figure 4-19. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060102. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

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

There are no point sources in this subwatershed.

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
609	1,297	94	<5	189	8

Table 4-12. Summary of Livestock Count Estimates in Subwatershed 051302060102. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Robertson	22,502	47,887	3,478	31	6,982	279

Table 4-13. Summary of Livestock Count Estimates in Robertson County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Robertson	53.0	53.0	2.2	9.7

Table 4-14. Forest Acreage and Annual Removal Rates (1987-1994) in Robertson County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.67
Grass (Hayland)	0.37
Legumes, Grass (Hayland)	0.53
Legumes (Hayland)	0.73
Grass, Forbs, Legumes (Mixed Pasture)	0.42
Corn (Row Crops)	5.15
Soybeans (Row Crops)	10.03
Wheat (Close-Grown Cropland)	1.68
Tobacco (Row Crops)	11.87
Other Cropland not Planted	9.59
Conservation Reserve Program Lands	0.36
Other Land in Farms	0.27
Farmsteads and Ranch Headquarters	0.95

Table 4-15. Annual Estimated Total Soil Loss in Subwatershed 051302060102.

4.2.B. 0513020602.

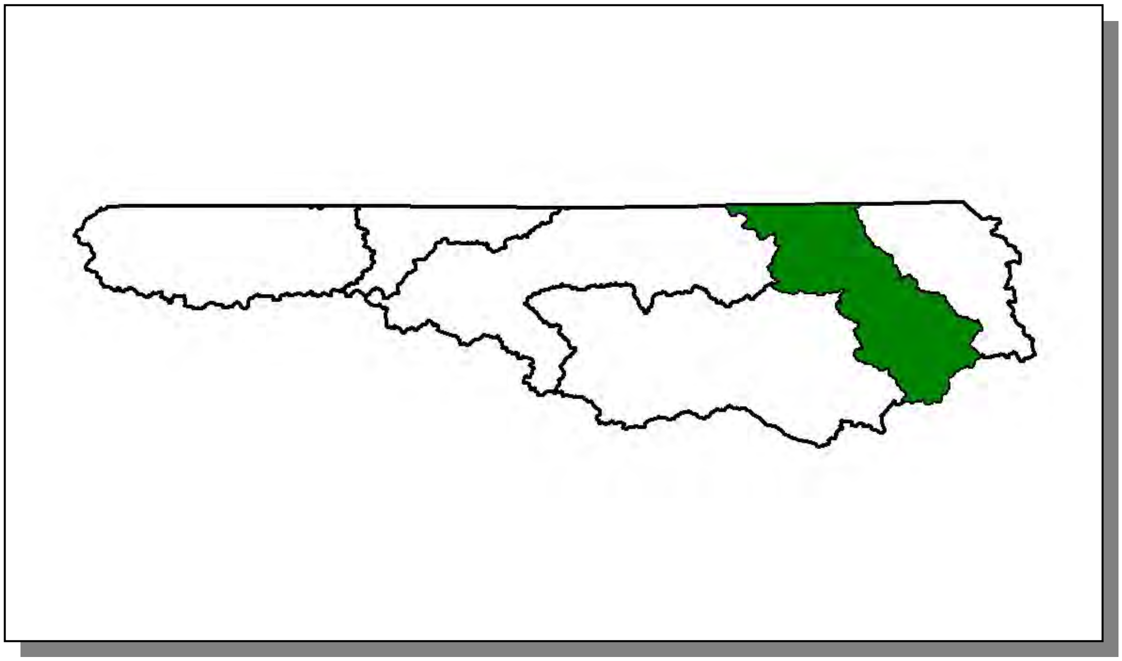


Figure 4-20. Location of Subwatershed 0513020602. *All Red River HUC-10 subwatershed boundaries In Tennessee are shown for reference.*

4.2.B.i. 051302060201 (South Fork Red River).

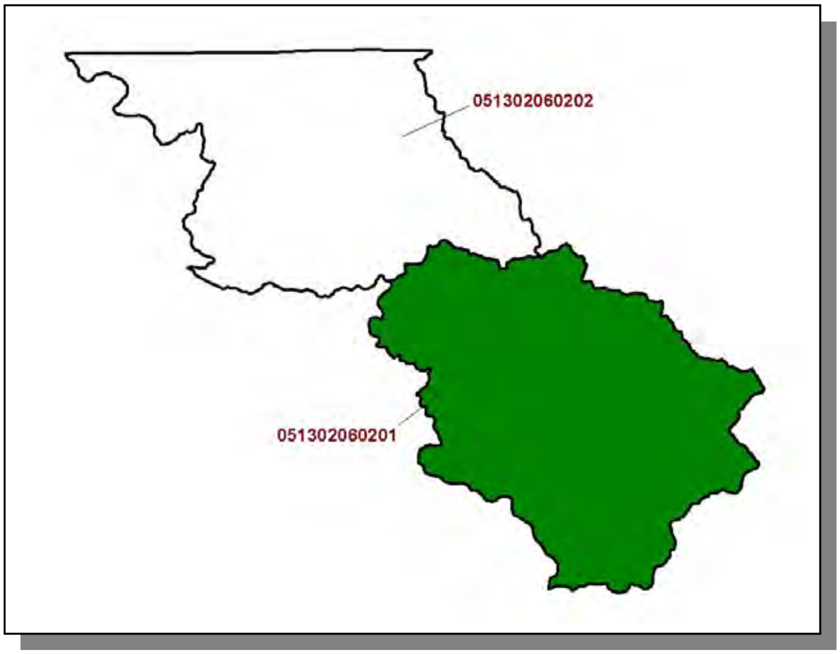


Figure 4-21. Location of Subwatershed 051302060201. *All Red River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

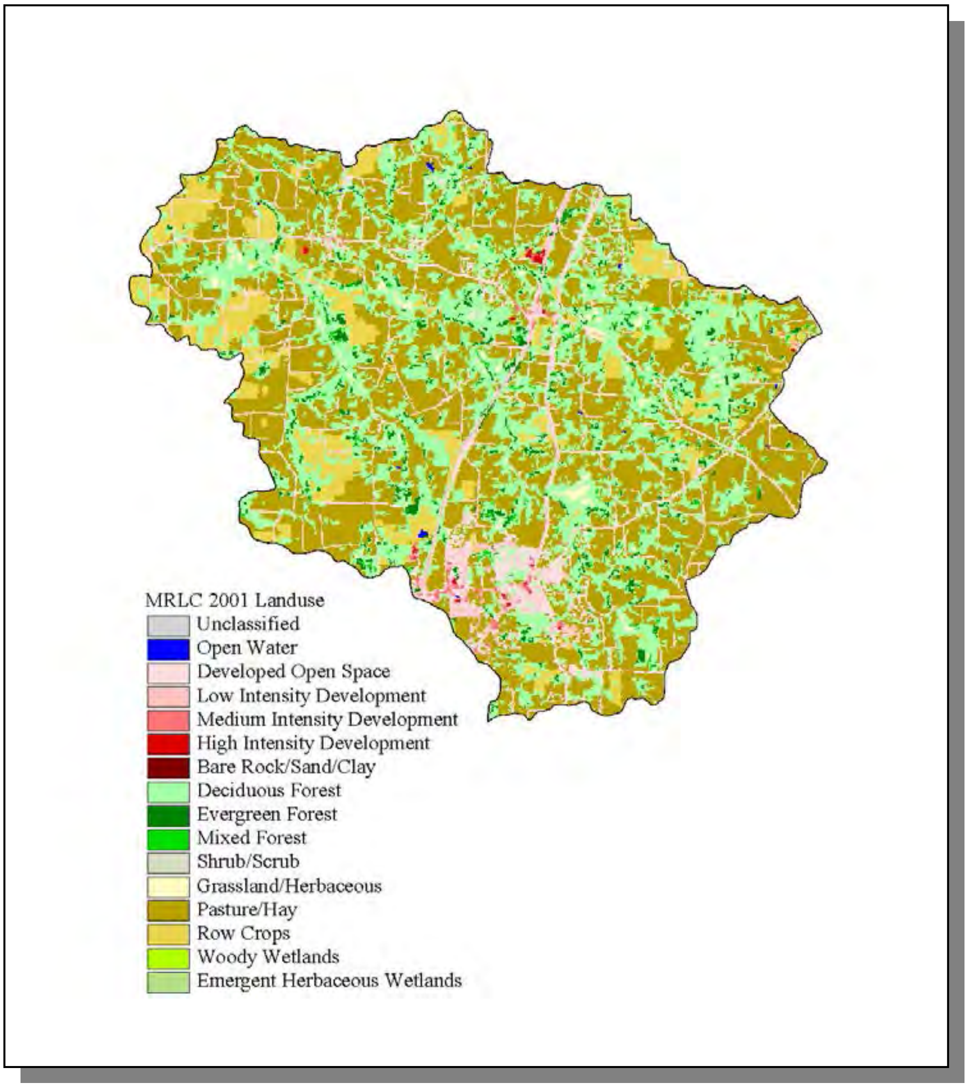


Figure 4-22. Illustration of Land Use Distribution in Subwatershed 051302060201.

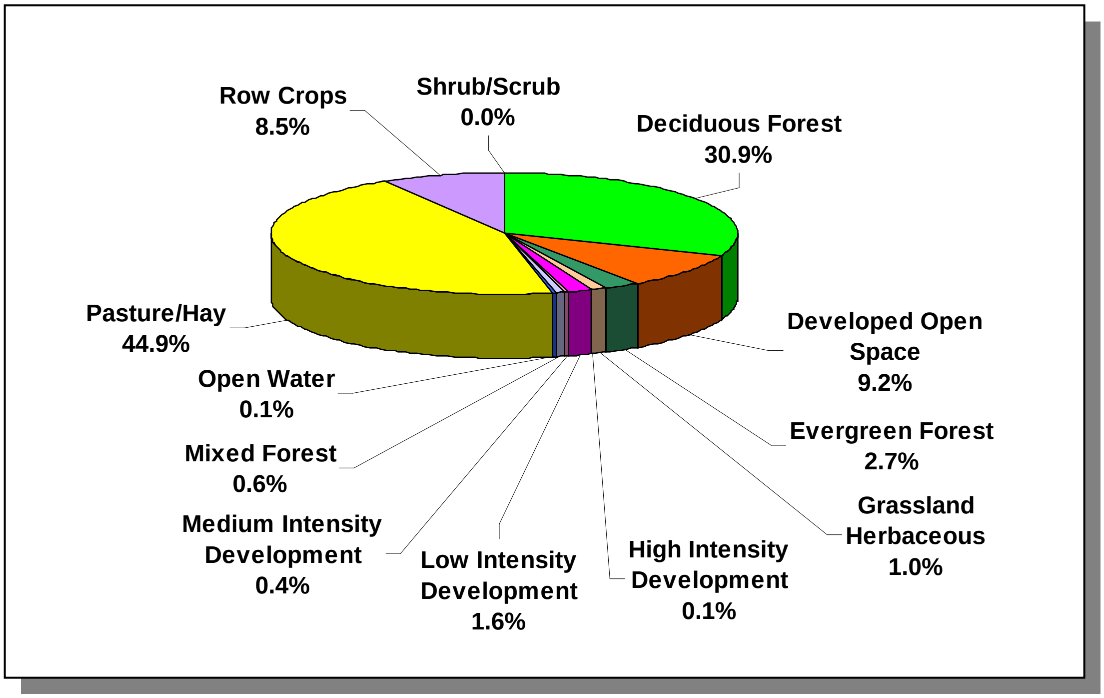


Figure 4-23. Land Use Distribution in Subwatershed 051302060201. *More information is provided in Appendix IV.*

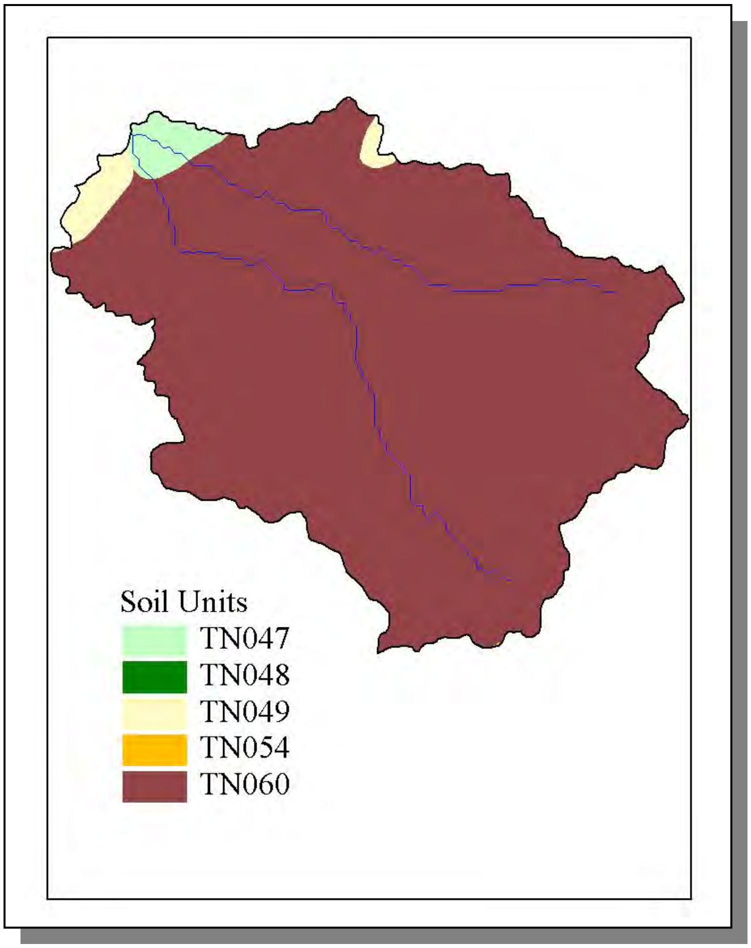


Figure 4-24. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060201.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN047	21.00	C	1.62	5.73	Silty Loam	0.37
TN048	8.00	B	1.38	5.06	Silty Loam	0.42
TN049	0.00	C	1.30	5.94	Silty Loam	0.34
TN054	0.00	B	3.04	4.84	Loam	0.32
TN060	5.00	C	1.30	5.32	Silty Loam	0.39

Table 4-16. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060102060201. *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)
Robertson	41,494	51,533	54,433	7.33	3,041	3,777	3,989	31.2
Sumner	103,281	121,936	130,449	4.08	4,212	4,972	5,319	26.3
Total	**144,775**	**173,469**	**184,882**		**7,253**	**8,749**	**9,308**	**28.3**

Table 4-17. Population Estimates in Subwatershed 051302060201.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
White House	Sumner	3,024	1,130	991	136	3
Cross Plains	Robertson	1,005	389	15	369	5
Total		**4,029**	**1,519**	**1,006**	**505**	**8**

Table 4-18. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302060201.

Figure 4-25. Location of Historical Streamflow Data Collection Sites in Subwatershed 051302060201. *More information is provided in Appendix IV.*

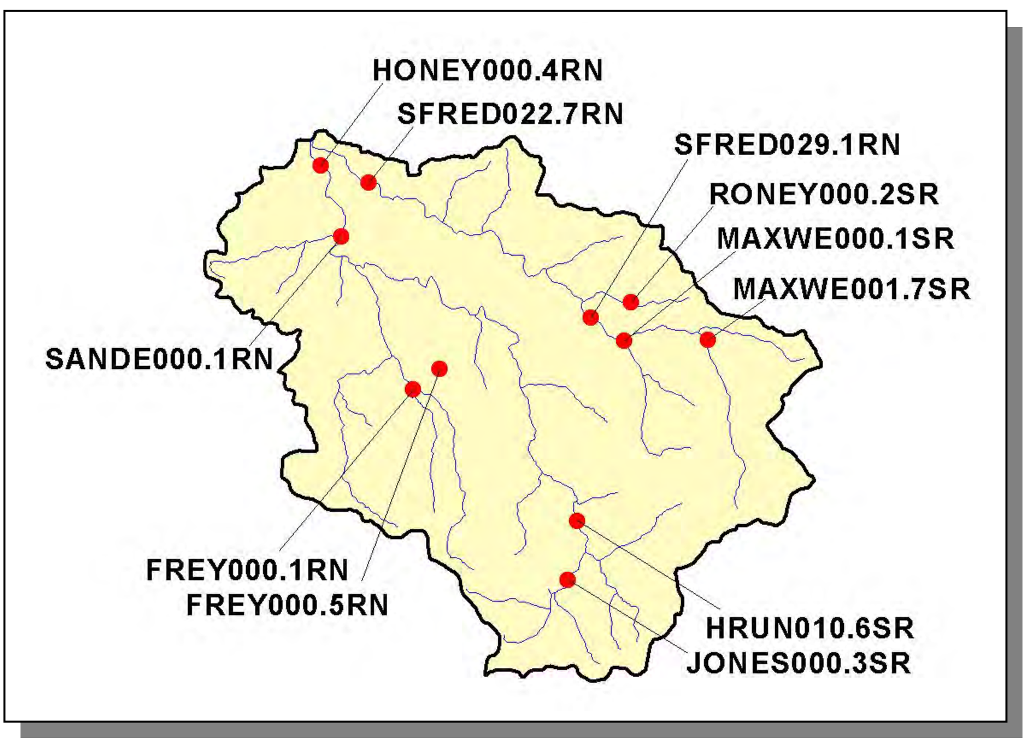


Figure 4-26. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060201. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

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

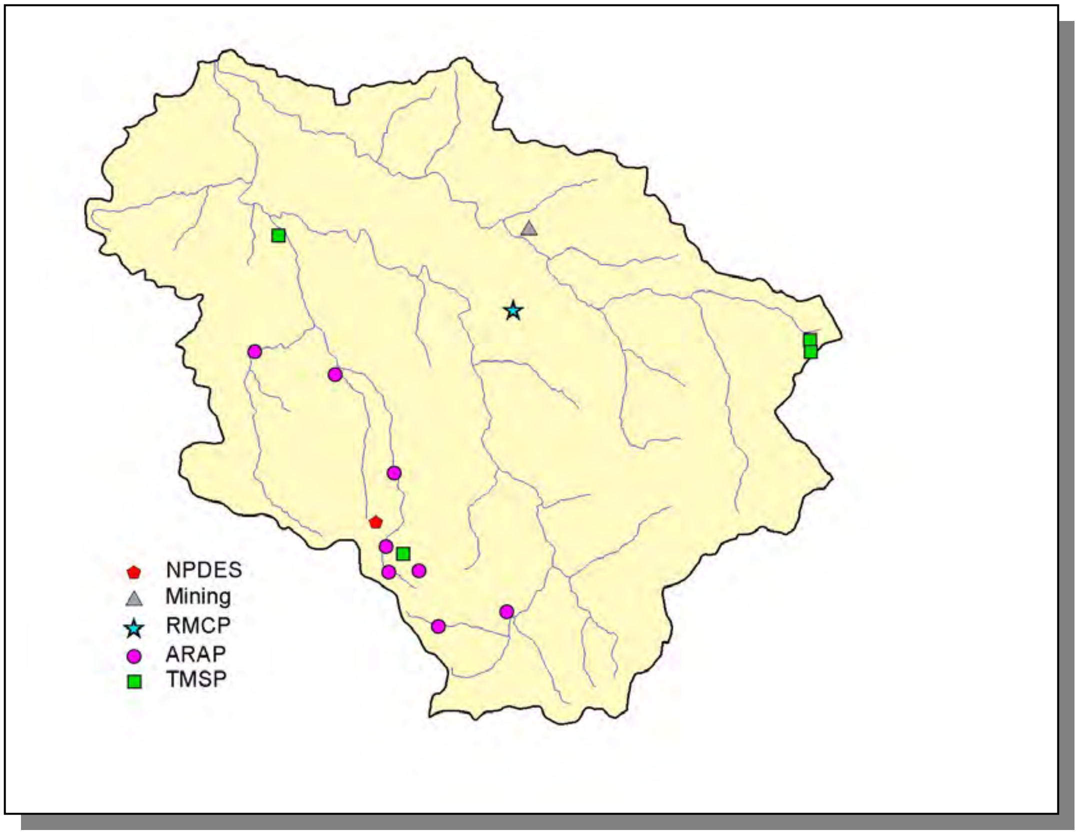


Figure 4-27. Location of Permits Issued in Subwatershed 051302060201. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-28. Location of Active NPDES Sites in Subwatershed 051302060201. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-29. Location of Active Mining Sites in Subwatershed 051302060201. *More information, including the names of mining operations, is provided in Appendix IV.*

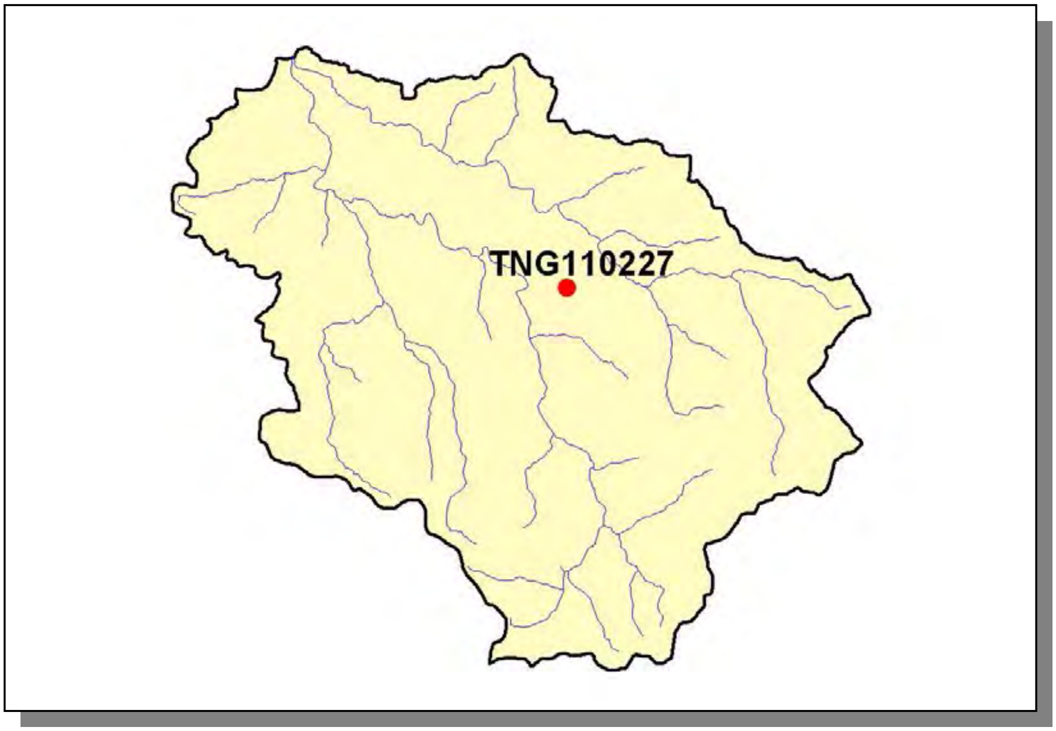


Figure 4-30. Location of Ready Mix Concrete Plants (RMCP) in Subwatershed 051302060201. *More information is provided in Appendix IV.*

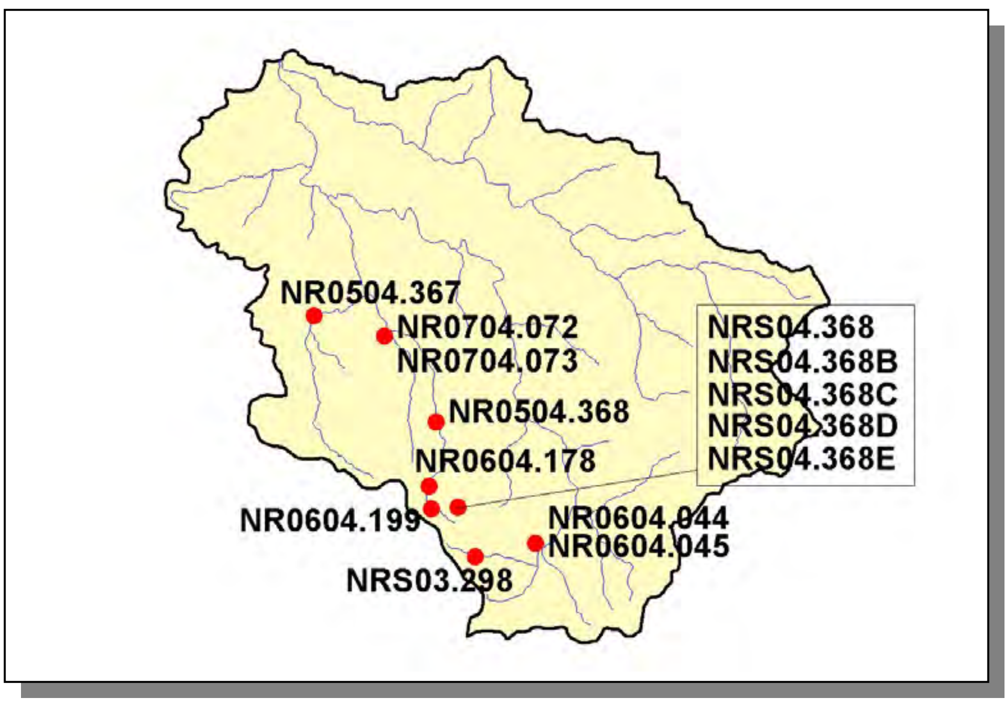


Figure 4-31. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051302060201. *More information is provided in Appendix IV.*

Figure 4-32. Location of TMSP Sites in Subwatershed 051302060201. *More information, including the names of facilities, is provided in Appendix IV.*

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

There is one NPDES facility discharging to water bodies listed on the 2004 303(d) list in Subwatershed 051302060201:

- TN0059404 (White House STP) discharges to Frey Branch Creek @ RM 2.2

Figure 4-33. Location of NPDES Dischargers to Water Bodies Listed on the 2004 303(d) List in Subwatershed 051302060201. *More information, including the names of facilities, is provided in Appendix IV.*

Permit #	3Q2	1Q10	3Q10	3Q20	7Q10
TN0059404	0.00	na	0.00	0.00	0.00

Table 4-19. Receiving Stream Low Flow Information for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051302060201. *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 #	WET	$CBOD_5$	NH_3	TSS	SETTLEABLE SOLIDS	DO	pH	Flow
TN0059404	X	X	X	X	X	X	X	X

Table 4-20. Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051302060201. *WET, Whole Effluent Toxicity; $CBOD_5$, Carbonaceous Biochemical Oxygen Demand (5-Day), NH3, ammonia; TSS, Total Suspended Solids; DO, Dissolved Oxygen.*

PERMIT #	*E. coli*	FECAL COLIFORM
TN0059404	X	X

Table 4-21. Bacteria Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051302060201.

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
3,605	7,466	387	7	729	37

Table 4-22. Summary of Livestock Count Estimates in Subwatershed 051302060201. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Robertson	22,502	47,887	3,478	31	6,982	279
Sumner	22,296	45,116	1,515	50	2,500	189

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

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Robertson	53.0	53.0	2.2	9.7
Sumner	88.2	88.2	2.0	6.3

Table 4-24. Forest Acreage and Annual Removal Rates (1987-1994) in Robertson and Sumner Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.59
Grass (Hayland)	0.35
Legumes, Grass (Hayland)	0.41
Legumes (Hayland)	0.49
Grass, Forbs, Legumes (Mixed Pasture)	0.46
Corn (Row Crops)	7.91
Soybeans (Row Crops)	10.51
Wheat (Close-Grown Cropland)	1.68
Tobacco (Row Crops)	11.87
Other Cropland not Planted	13.31
Conservation Reserve Program Lands	0.32
Other Land in Farms	0.27
Farmsteads and Ranch Headquarters	0.71

Table 4-25. Annual Estimated Total Soil Loss in Subwatershed 051302060201.

4.2.B.ii. 051302060202 (South Fork Red River).

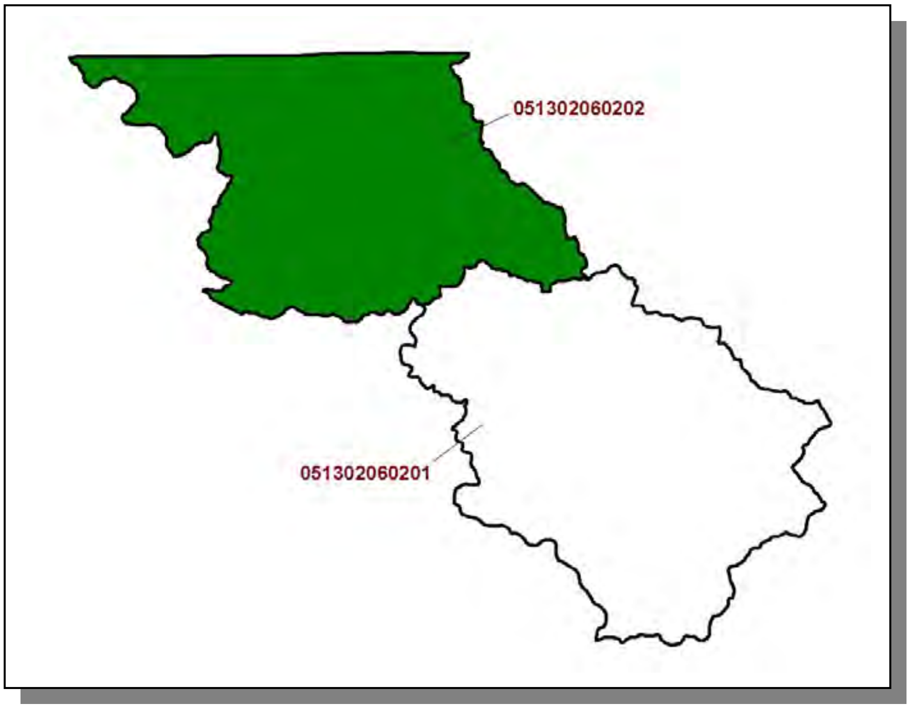


Figure 4-34. Location of Subwatershed 051302060202. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

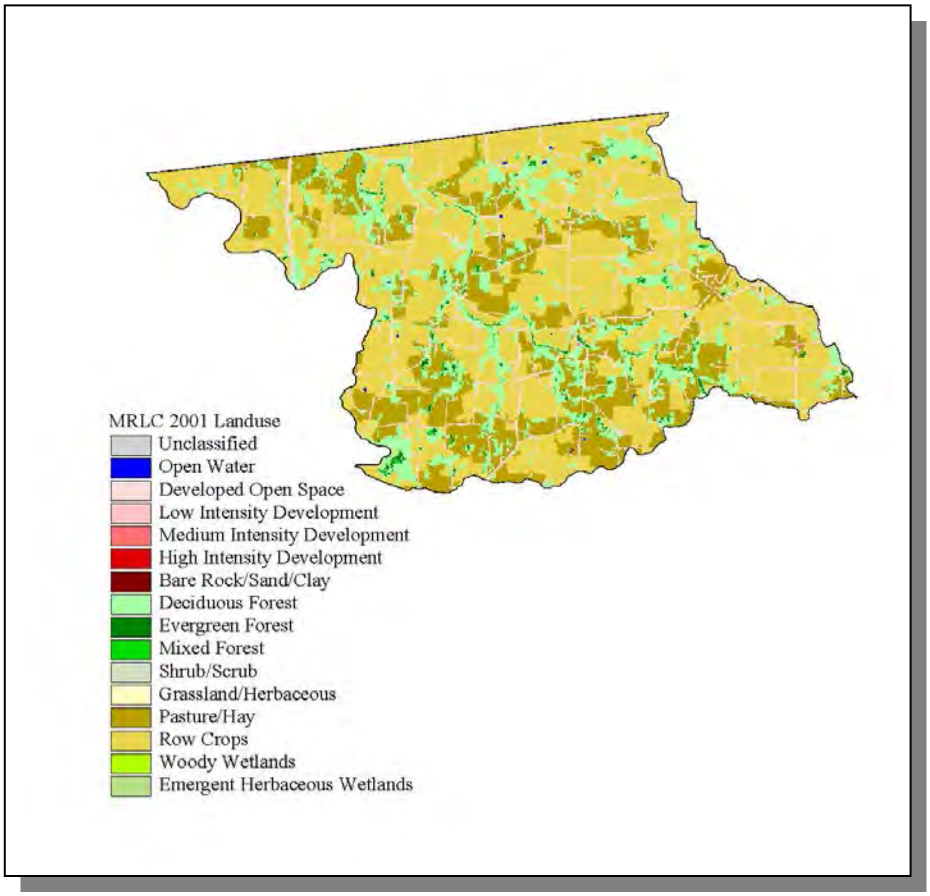


Figure 4-35. Illustration of Land Use Distribution in Subwatershed 051302060202.

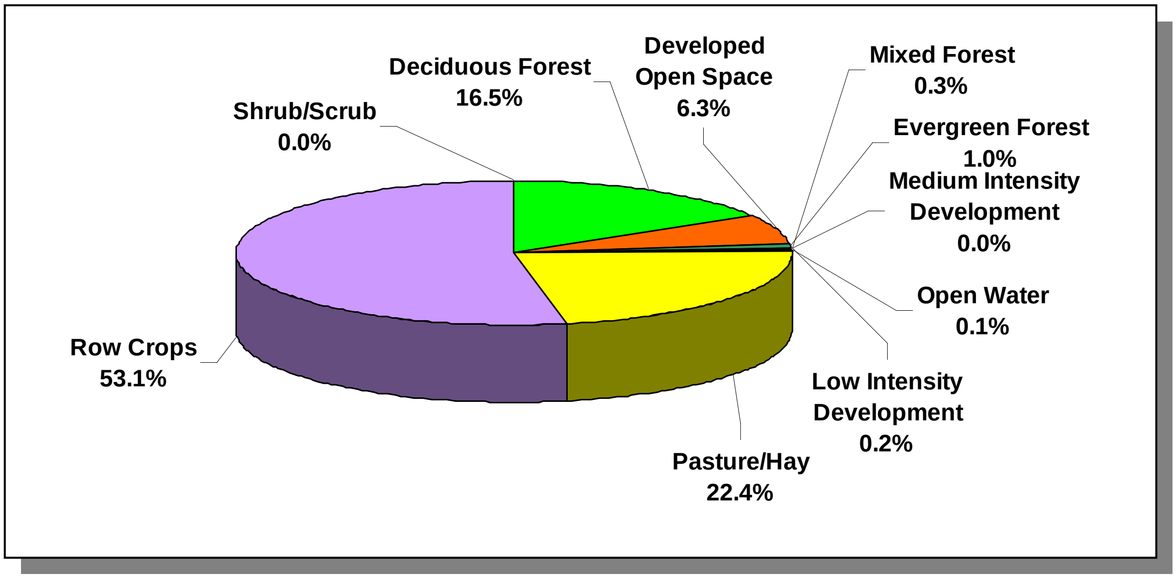


Figure 4-36. Land Use Distribution in Subwatershed 051302060202. *More information is provided in Appendix IV.*

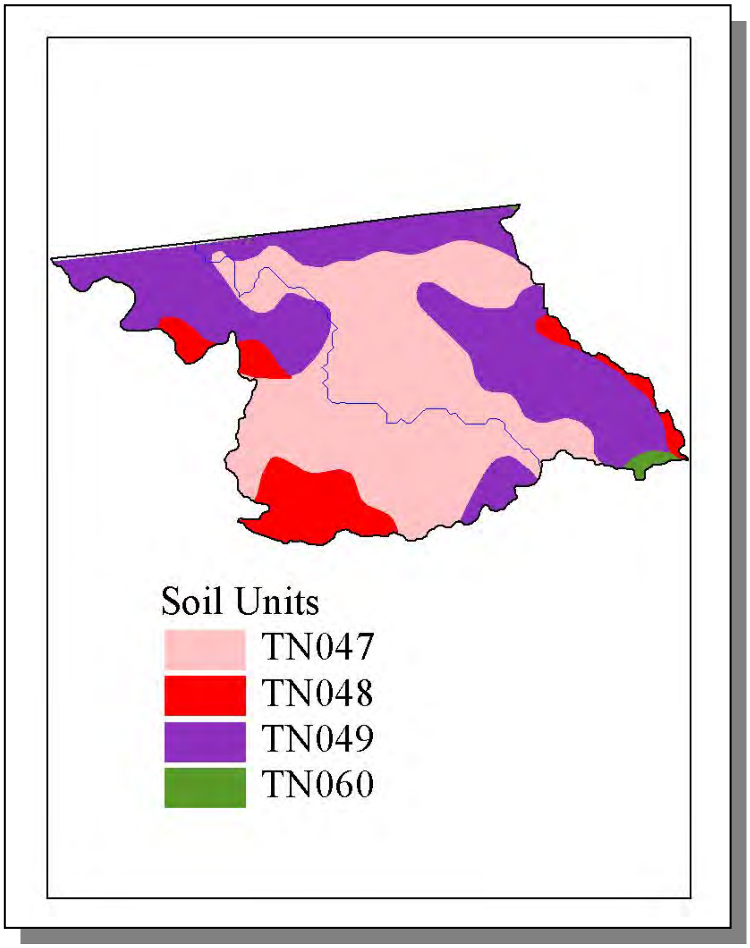


Figure 4-37. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060202.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN047	21.00	C	1.62	5.73	Silty Loam	0.37
TN048	8.00	B	1.38	5.06	Silty Loam	0.42
TN049	0.00	C	1.30	5.94	Silty Loam	0.34
TN060	5.00	C	1.30	5.32	Silty Loam	0.39

Table 4-26. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060202. *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)
Robertson	41,494	51,533	54,433	10.11	4,195	5,209	5,503	31.2

Table 4-27. Population Estimates in Subwatershed 051302060202.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Cross Plains	Robertson	1,005	389	15	369	5
Orlinda	Robertson	476	199	2	194	3
Total		**1,481**	**588**	**17**	**563**	**8**

Table 4-28. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302060202.

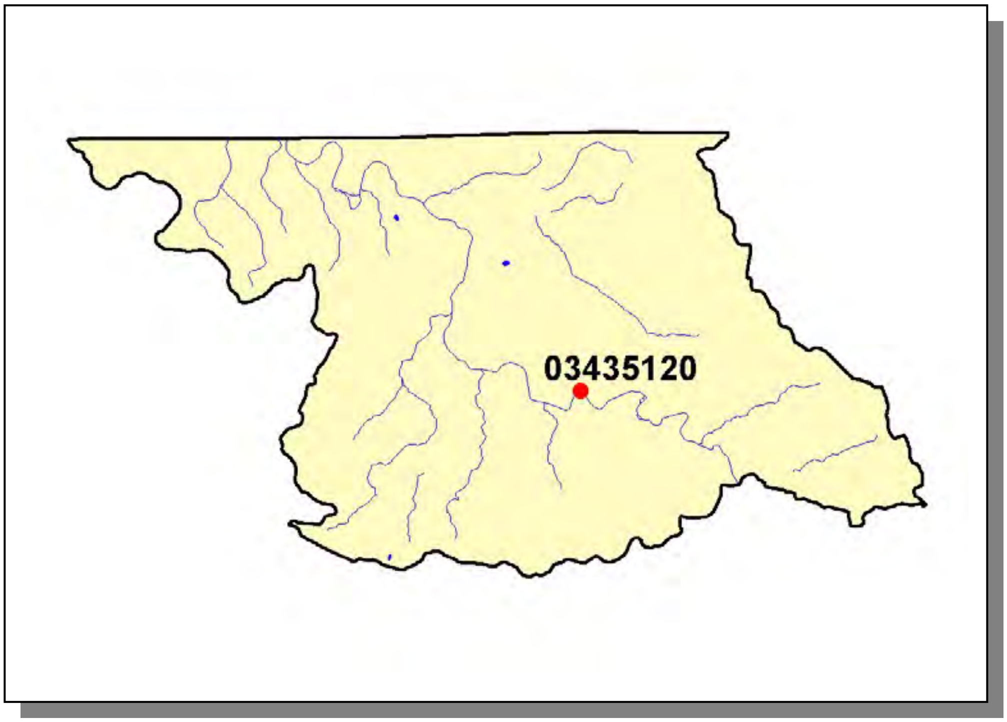

Figure 4-38. Location of Historical Streamflow Data Collection Sites in Subwatershed 051302060202. *More information is provided in Appendix IV.*

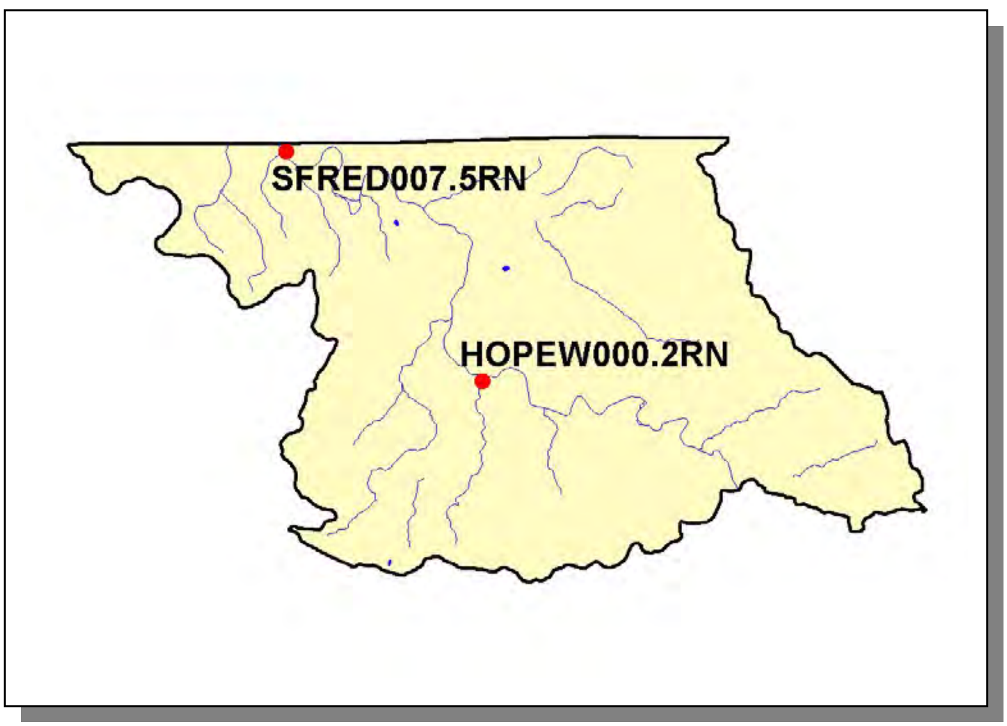

Figure 4-39. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060202. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

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

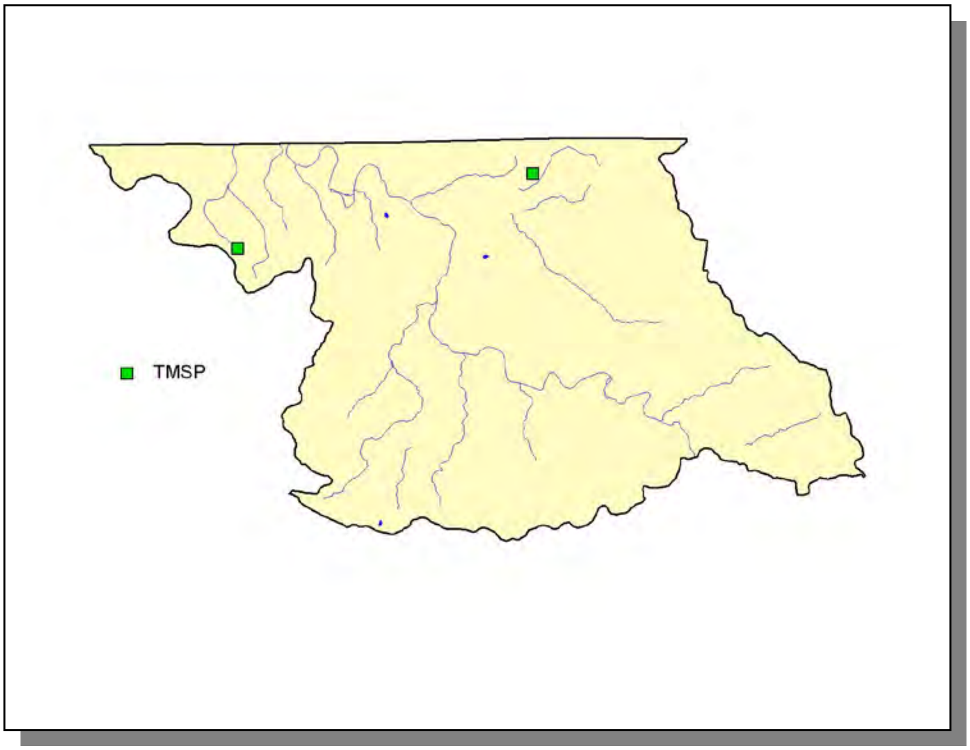

Figure 4-40. Location of Permits Issued in Subwatershed 051302060202. *More information, including the names of facilities, is provided in Appendix IV.*

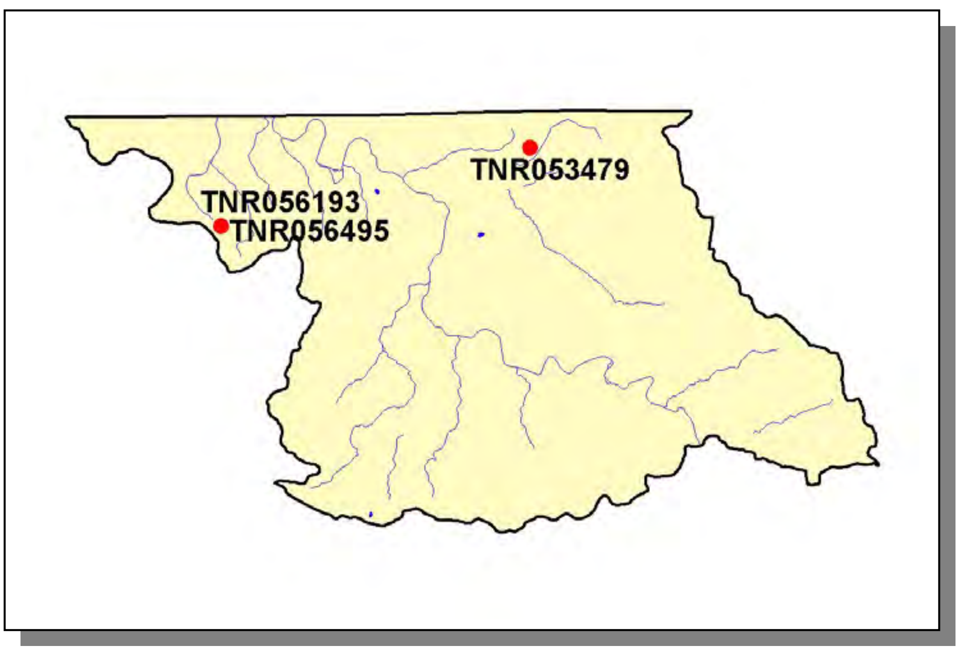

Figure 4-41. Location of TMSP Sites in Subwatershed 051302060202. *More information, including the names of facilities, is provided in Appendix IV.*

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
2,607	5,548	403	<5	809	32

Table 4-29. Summary of Livestock Count Estimates in Subwatershed 051302060202. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Robertson	22,502	47,887	3,478	31	6,982	279

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

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Robertson	53.0	53.0	2.2	9.7

Table 4-31. Forest Acreage and Annual Removal Rates (1987-1994) in Robertson County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.67
Grass (Hayland)	0.37
Legumes, Grass (Hayland)	0.53
Legumes (Hayland)	0.73
Grass, Forbs, Legumes (Mixed Pasture)	0.42
Corn (Row Crops)	5.15
Soybeans (Row Crops)	10.03
Tobacco (Row Crops)	11.87
Wheat (Close-Grown Cropland)	1.68
Other Cropland not Planted	9.59
Conservation Reserve Program Lands	0.36
Other Land in Farms	0.27
Farmsteads and Ranch Headquarters	0.95

Table 4-32. Annual Estimated Total Soil Loss in Subwatershed 051302060202.

4.2.C. 0513020604.

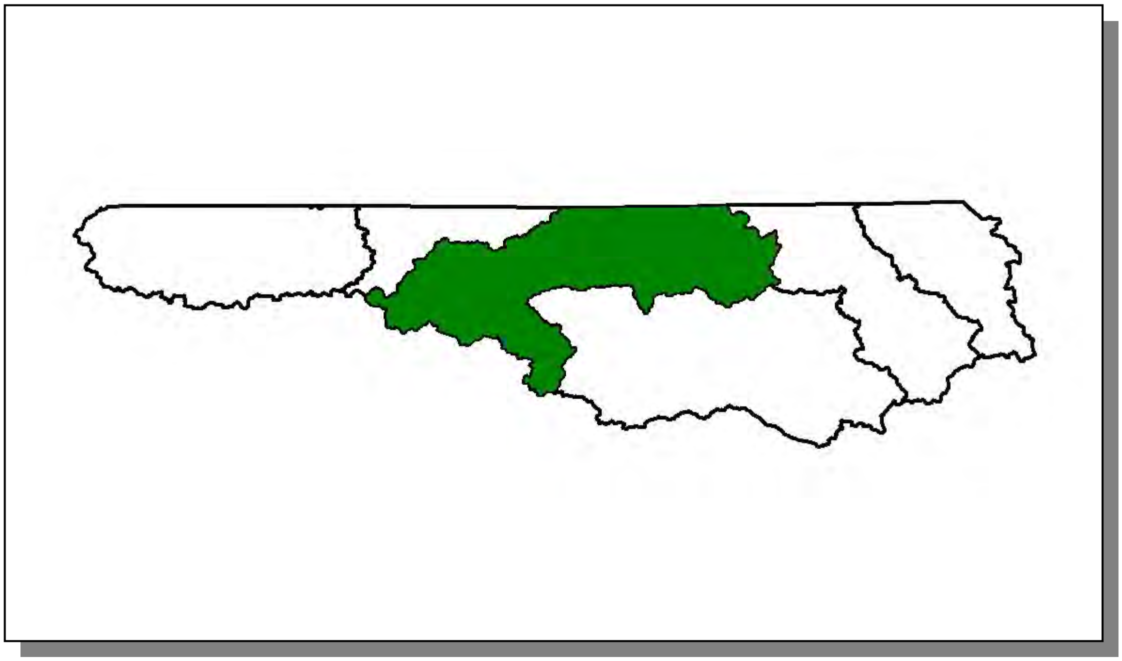

Figure 4-42. Location of Subwatershed 0513020604. *All Red River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.C.i. 051302060401 (Red River).

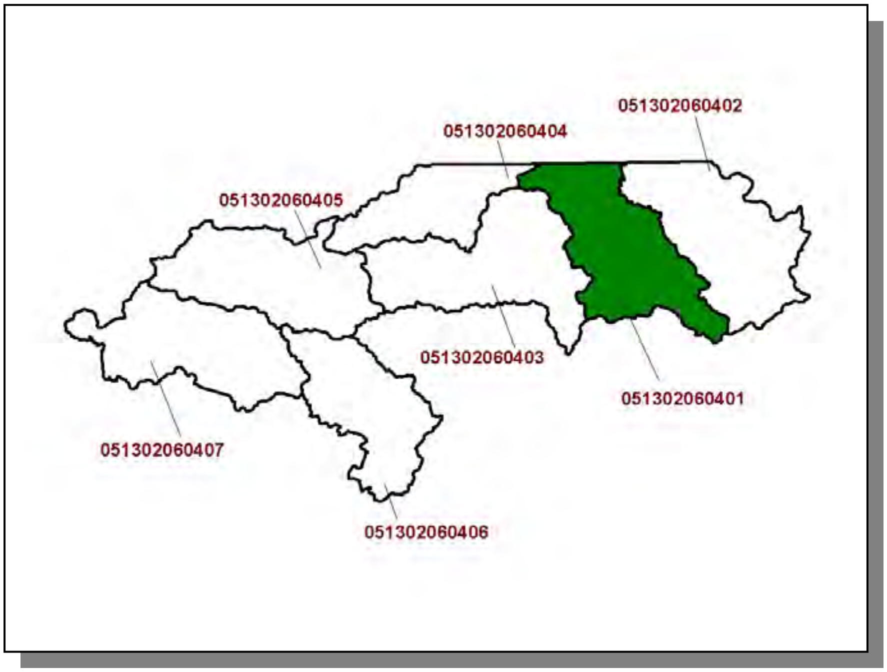

Figure 4-43. Location of Subwatershed 051302060401. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

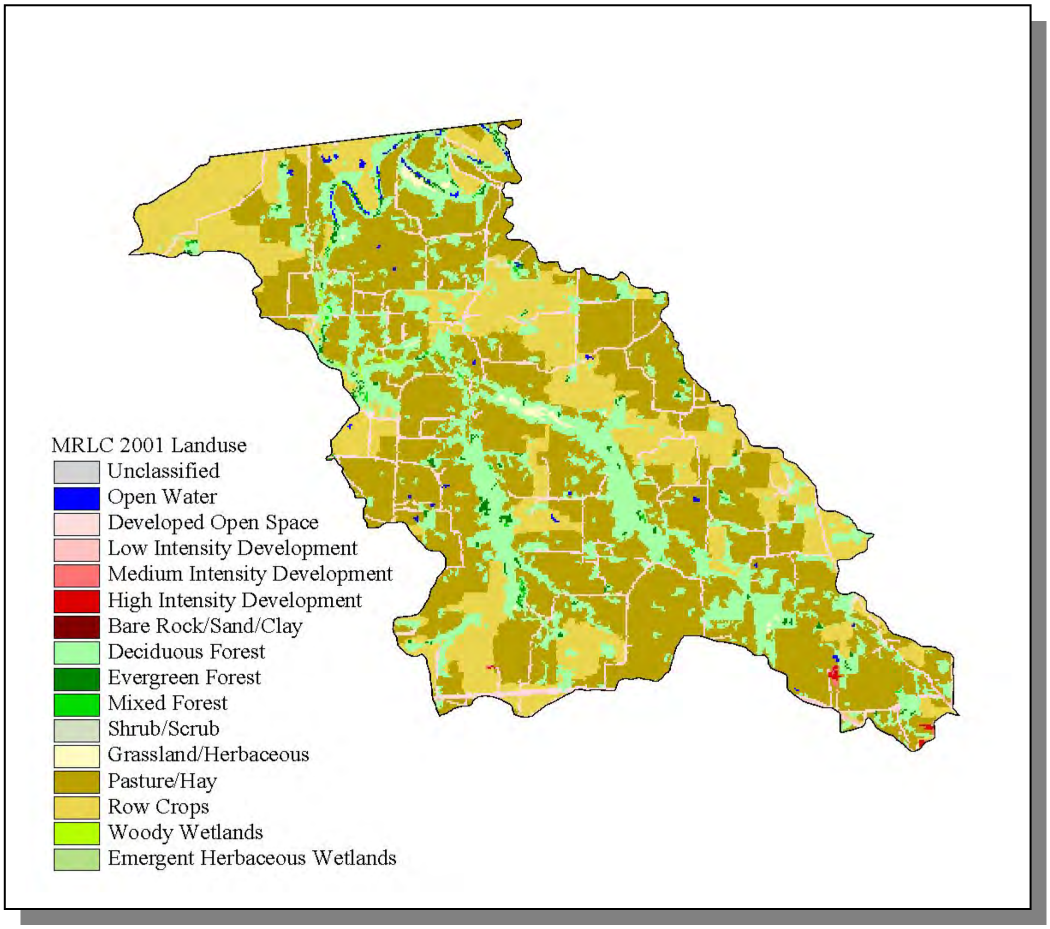

Figure 4-44. Illustration of Land Use Distribution in Subwatershed 051302060401.

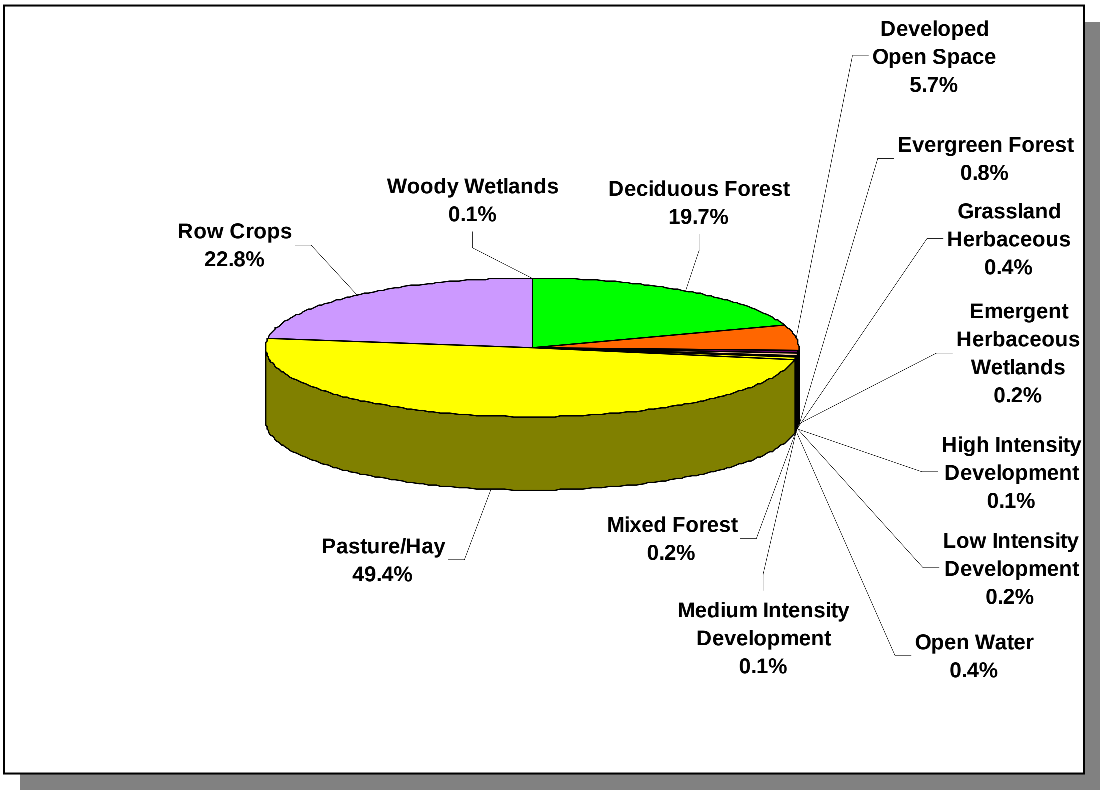

Figure 4-45. Land Use Distribution in Subwatershed 051302060401. *More information is provided in Appendix IV.*

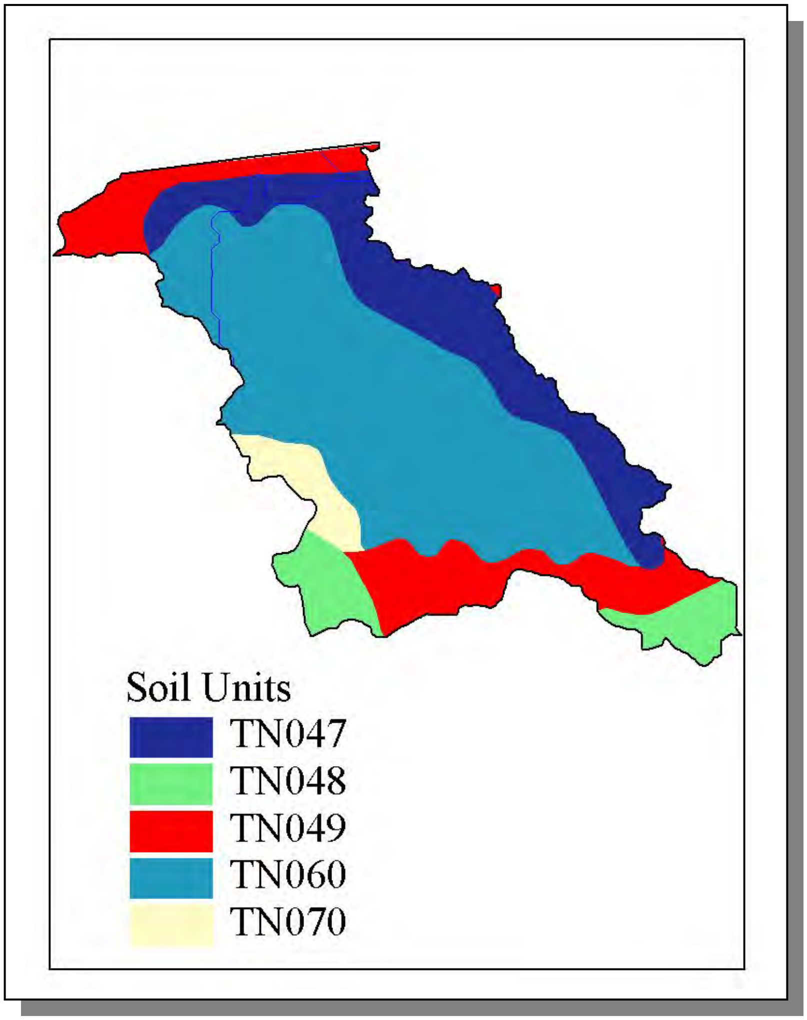

Figure 4-46. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060401.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN047	21.00	C	1.62	5.73	Silty Loam	0.37
TN048	8.00	B	1.38	5.06	Silty Loam	0.42
TN049	0.00	C	1.30	5.94	Silty Loam	0.34
TN060	5.00	C	1.30	5.32	Silty Loam	0.39
TN070	0.00	B	1.38	5.76	Loam	0.33

Table 4-33. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060401. *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)
Robertson	41,494	51,533	54,433	5.63	2,334	2,899	3,062	31.2

Table 4-34. Population Estimates in Subwatershed 051302060401.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Cedar Hill	Robertson	363	128	16	105	7
Springfield	Robertson	11,227	4,530	4,436	94	0
Total		**11,590**	**4,658**	**4,452**	**199**	**7**

Table 4-35. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302060401.

Figure 4-47. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060401. *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.i.a. Point Source Contributions.

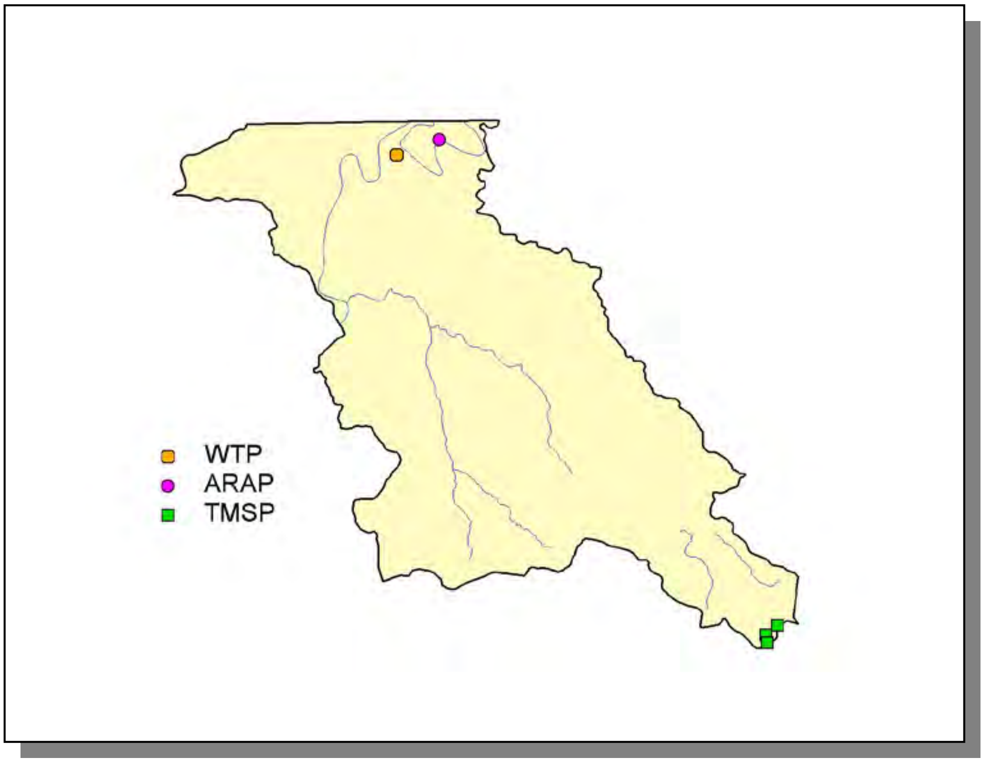

Figure 4-48. Location of Permits Issued in Subwatershed 051302060401. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-49. Location of Water Treatment Plants in Subwatershed 051302060401. *More information, including the names of facilities, is provided in Appendix IV.*

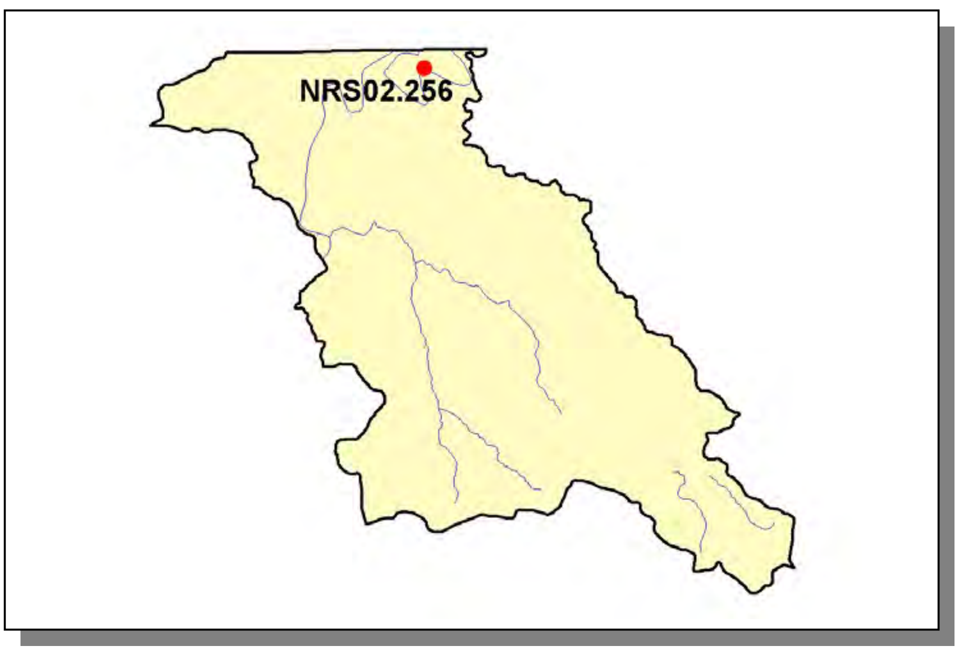

Figure 4-50. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051302060401. *More information is provided in Appendix IV.*

Figure 4-51. Location of TMSP Sites in Subwatershed 051302060401. *More information, including the names of facilities, is provided in Appendix IV.*

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
1,572	3,345	243	<5	488	19

Table 4-36. Summary of Livestock Count Estimates in Subwatershed 051302060401. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* **"***Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Robertson	22,502	47,887	3,478	31	6,982	279

Table 4-37. Summary of Livestock Count Estimates in Robertson County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* **"***Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Robertson	53.0	53.0	2.2	9.7

Table 4-38. Forest Acreage and Annual Removal Rates (1987-1994) in Robertson County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.67
Grass (Hayland)	0.37
Legumes, Grass (Hayland)	0.53
Legumes (Hayland)	0.73
Grass, Forbs, Legumes (Mixed Pasture)	0.42
Corn (Row Crops)	5.15
Soybeans (Row Crops)	10.03
Tobacco (Row Crops)	11.87
Wheat (Close-Grown Cropland)	1.68
Other Cropland not Planted	9.59
Conservation Reserve Program Lands	0.36
Other Land in Farms	0.27
Farmsteads and Ranch Headquarters	0.95

Table 4-39. Annual Estimated Total Soil Loss in Subwatershed 051302060401.

4.2.C.ii. 051302060402 (Spring Creek).

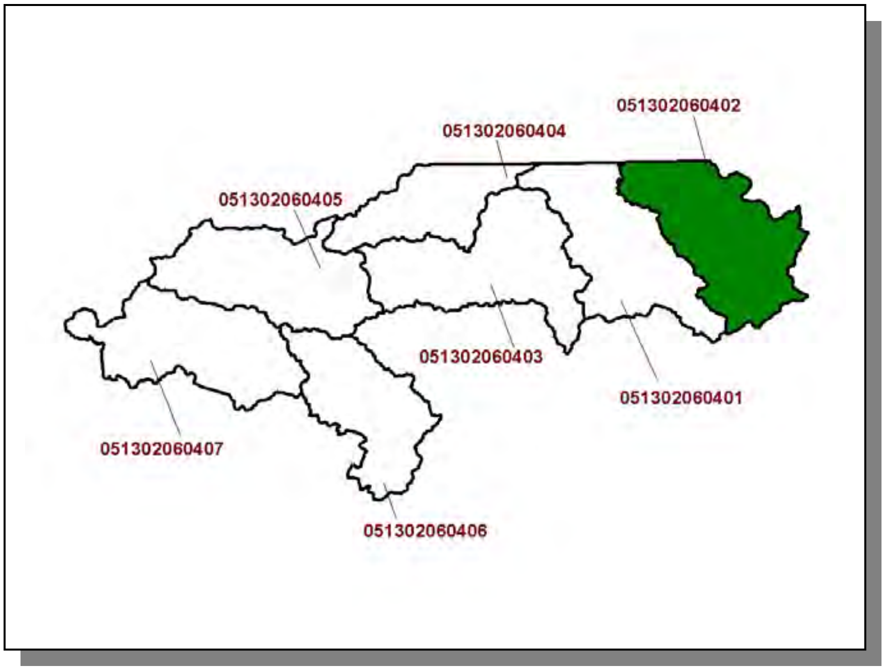

Figure 4-52. Location of Subwatershed 051302060402. *All HUC-12 subwatershed boundaries are shown for reference.*

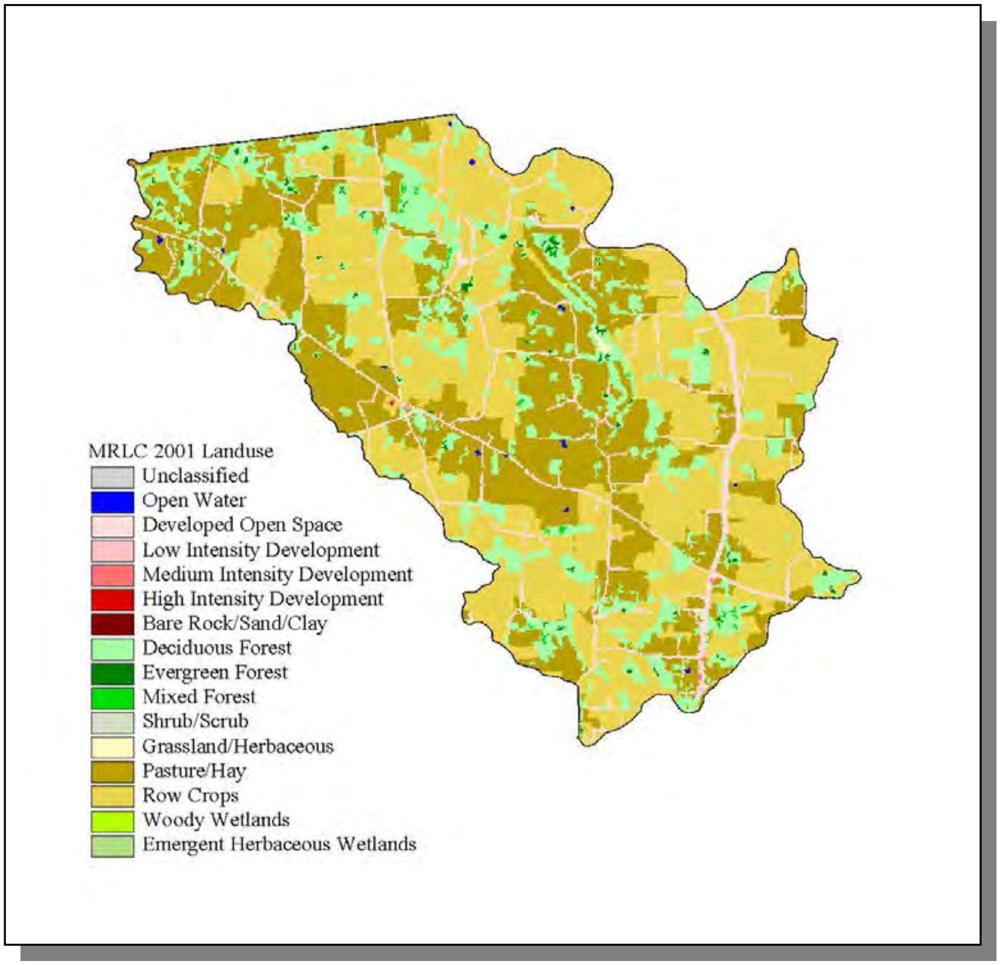

Figure 4-53. Illustration of Land Use Distribution in Subwatershed 051302060402.

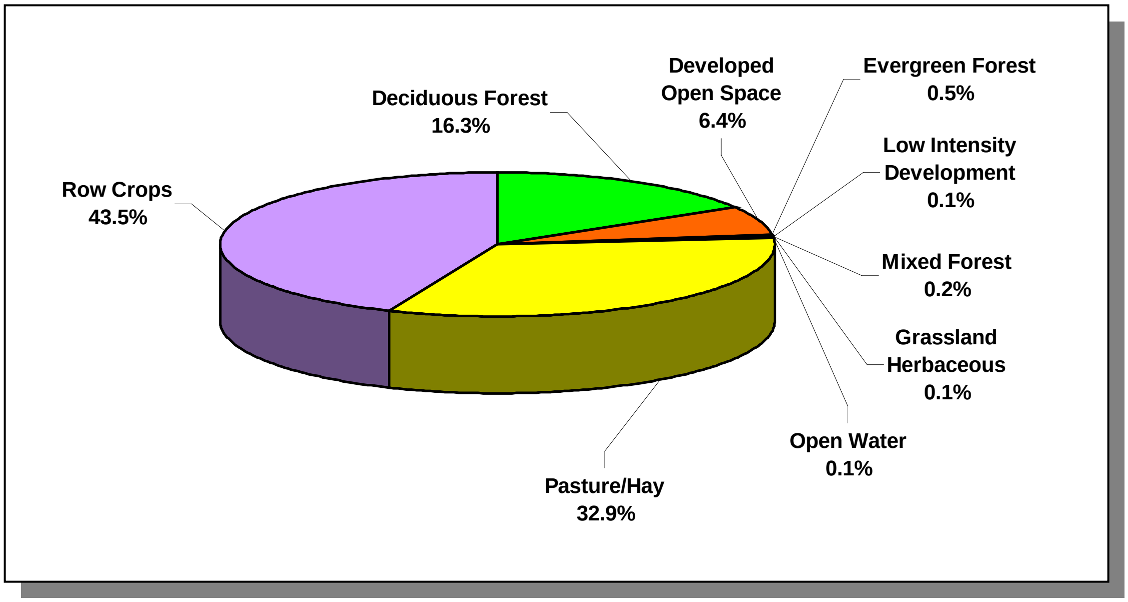

Figure 4-54. Land Use Distribution in Subwatershed 051302060402. *More information is provided in Appendix IV.*

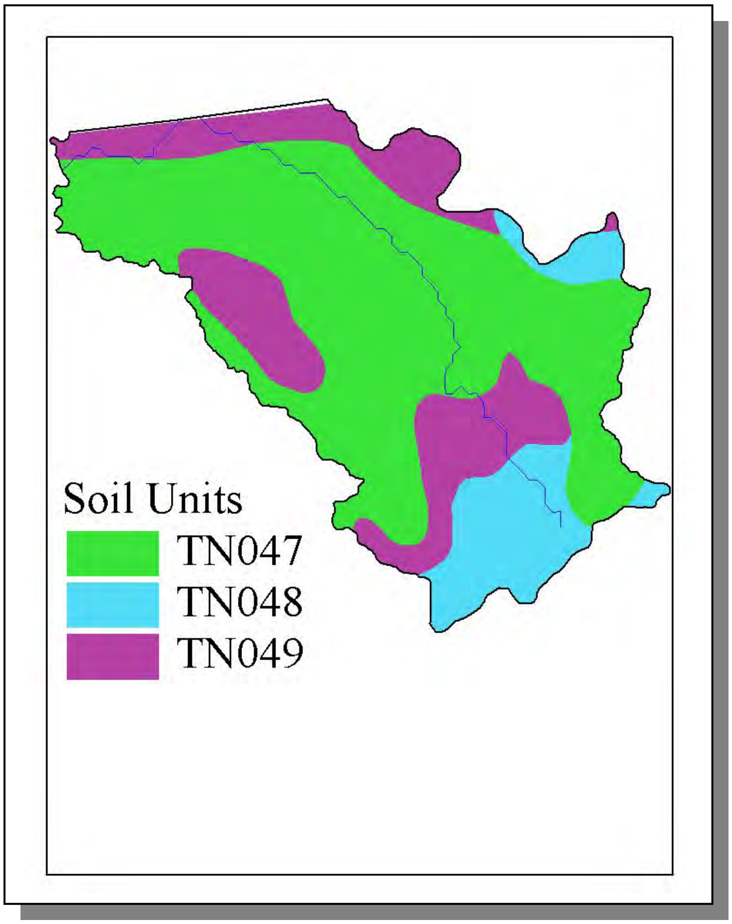

Figure 4-55. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060402.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN047	21.00	C	1.62	5.73	Silty Loam	0.37
TN048	8.00	B	1.38	5.06	Silty Loam	0.42
TN049	0.00	C	1.30	5.94	Silty Loam	0.34

Table 4-40. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060402. *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)
Robertson	41,494	51,533	54,433	5.95	2,467	3,064	3,237	31.2

Table 4-41. Population Estimates in Subwatershed 051302060402.

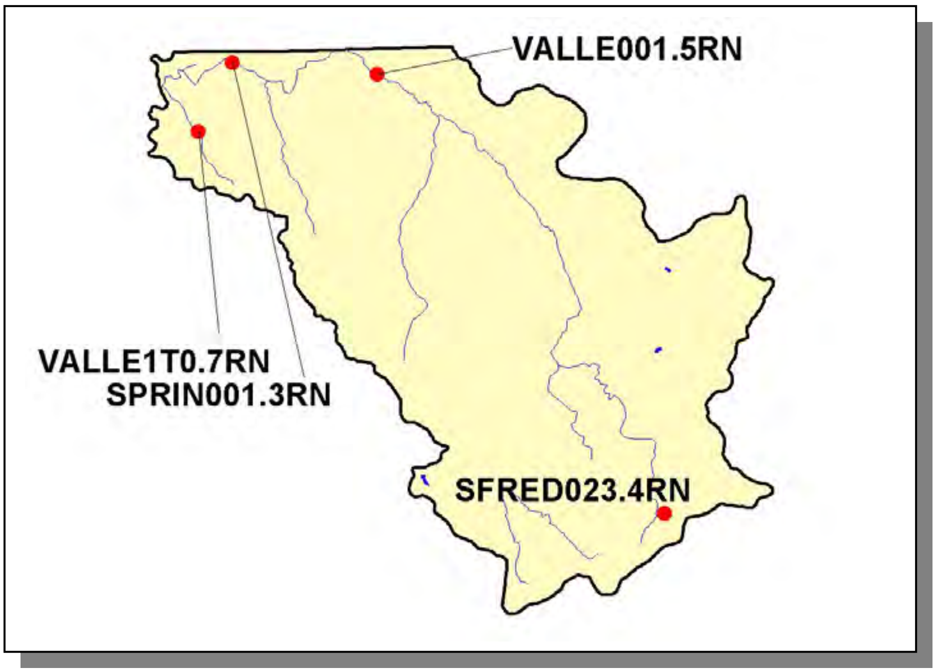

Figure 4-56. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060402. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

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

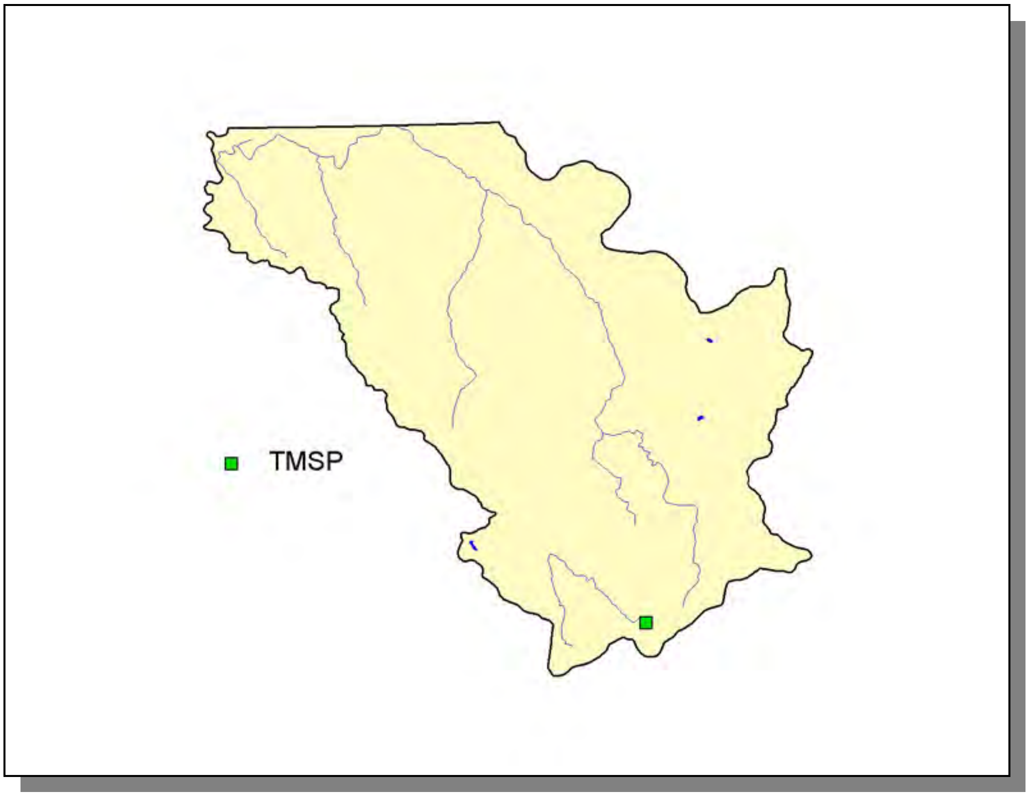

Figure 4-57. Location of Permits Issued in Subwatershed 051302060402. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-58. Location of TMSP Sites in Subwatershed 051302060402. *More information, including the names of facilities, is provided in Appendix IV.*

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
1,364	2,903	211	<5	423	17

Table 4-42. Summary of Livestock Count Estimates in Subwatershed 051302060402. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Robertson	22,502	47,887	3,478	31	6,982	279

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

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Robertson	53.0	53.0	2.2	9.7

Table 4-44. Forest Acreage and Annual Removal Rates (1987-1994) in Robertson County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.67
Grass (Hayland)	0.37
Legumes, Grass (Hayland)	0.53
Legumes (Hayland)	0.73
Grass, Forbs, Legumes (Mixed Pasture)	0.42
Corn (Row Crops)	5.15
Soybeans (Row Crops)	10.03
Tobacco (row Crops)	11.87
Wheat (Close-Grown Cropland)	1.68
Other Cropland not Planted	9.59
Conservation Reserve Program Lands	0.36
Other Land in Farms	0.27
Farmsteads and Ranch Headquarters	0.95

Table 4-45. Annual Estimated Total Soil Loss in Subwatershed 051302060402.

4.2.C.iii. 051302060403 (Red River).

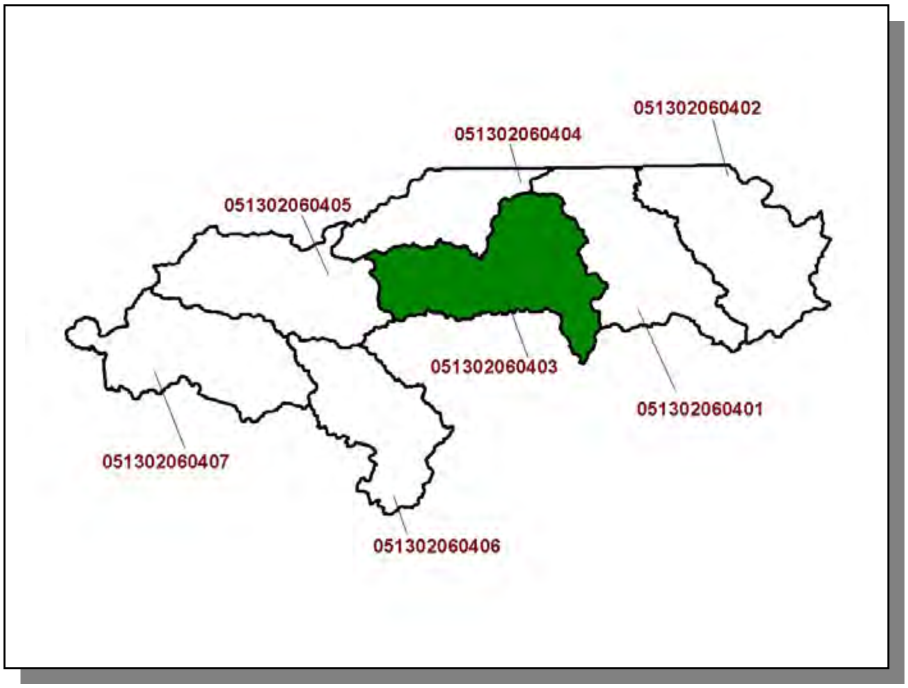

Figure 4-59. Location of Subwatershed 051302060403. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

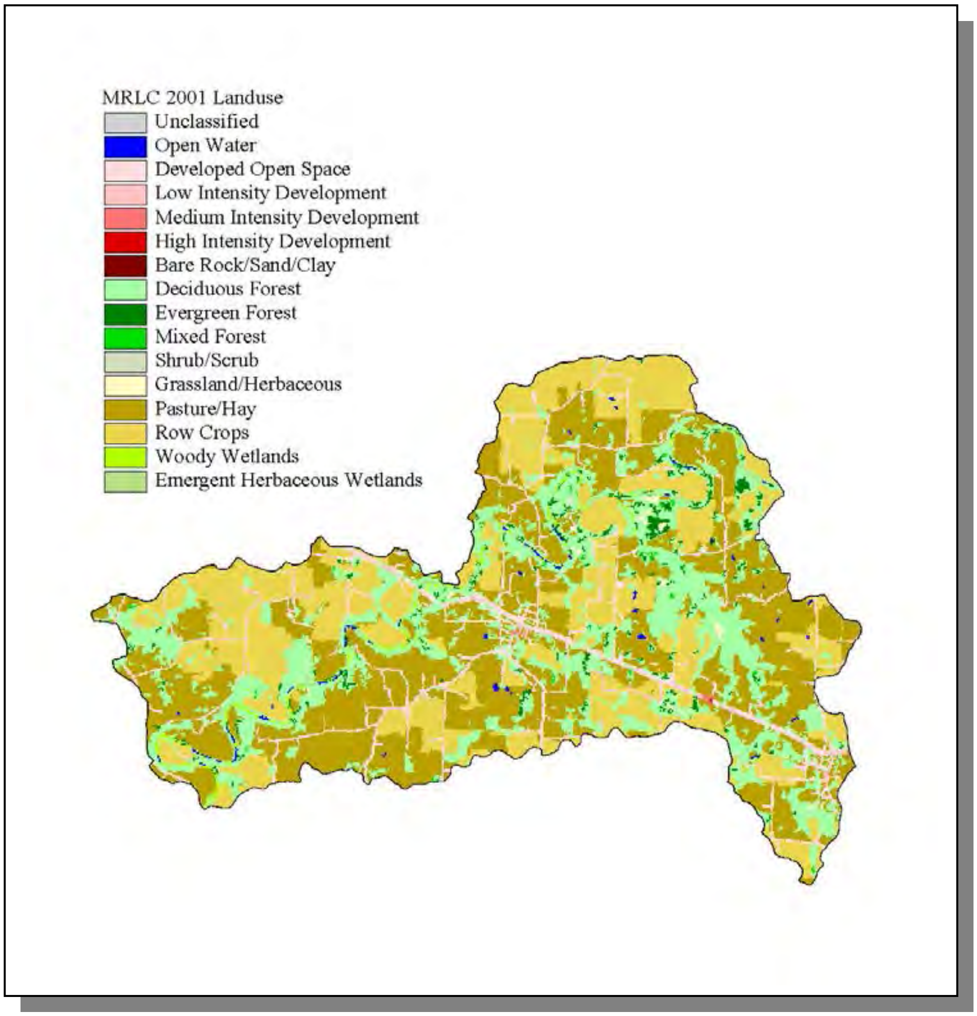

Figure 4-60. Illustration of Land Use Distribution in Subwatershed 051302060403.

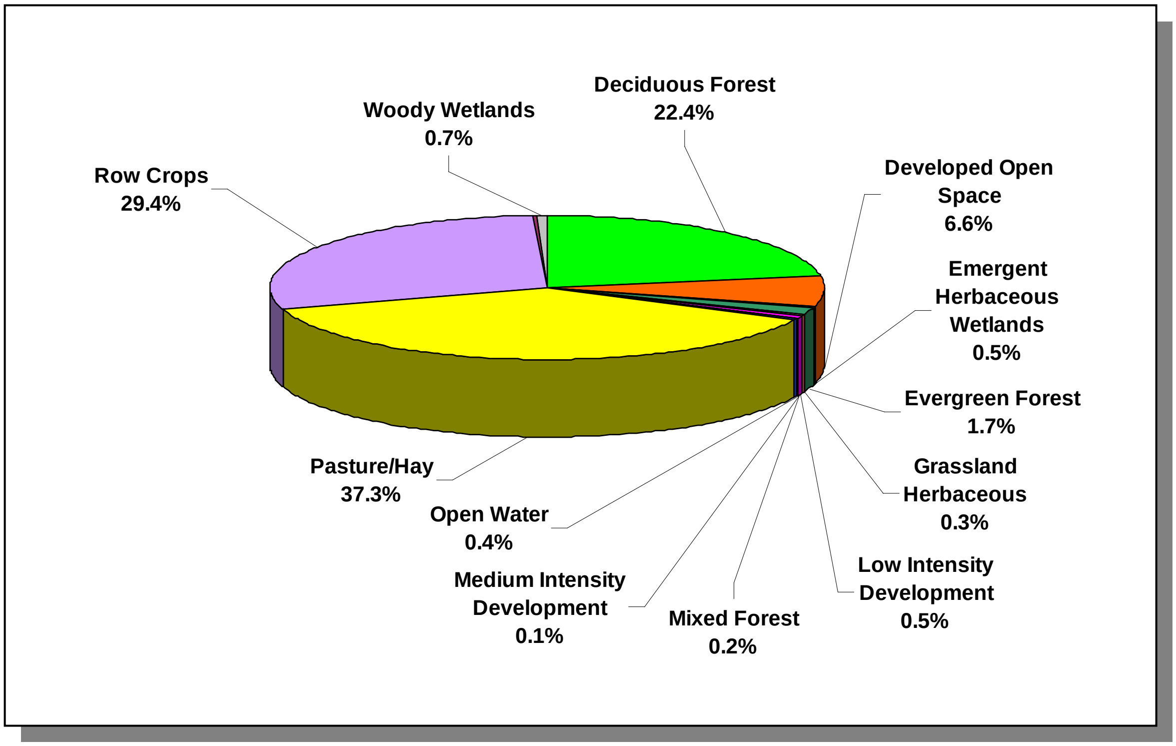

Figure 4-61. Land Use Distribution in Subwatershed 051302060403. *More information is provided in Appendix IV.*

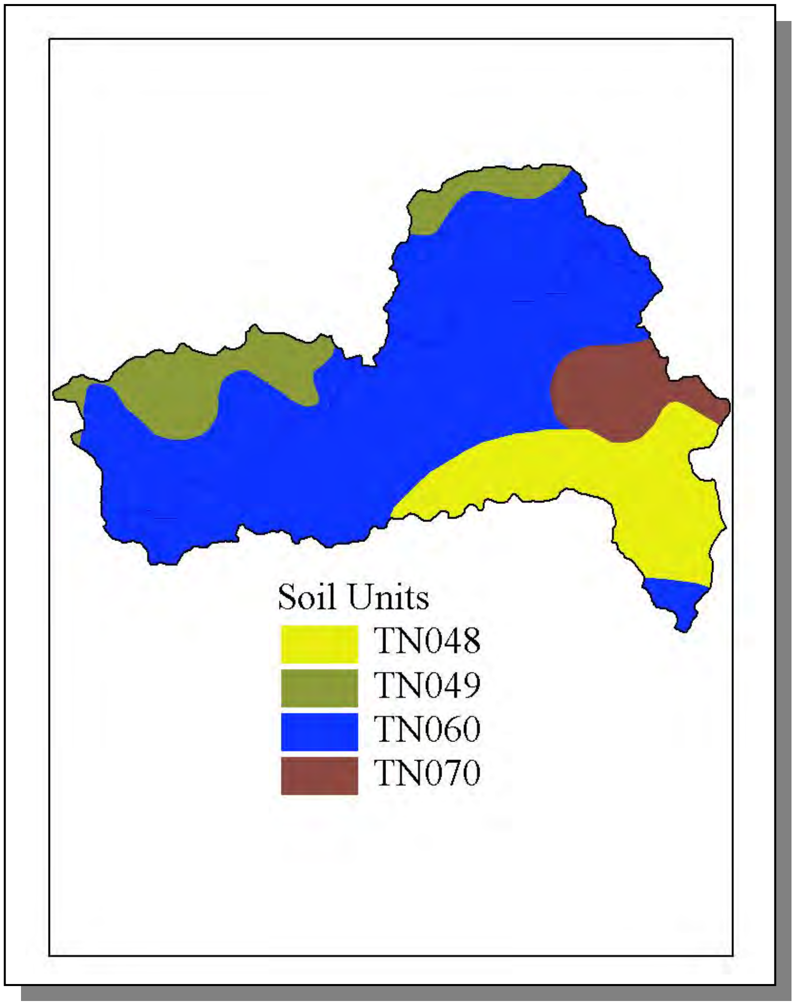

Figure 4-62. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060403.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN048	8.00	B	1.38	5.06	Silty Loam	0.42
TN049	0.00	C	1.30	5.94	Silty Loam	0.34
TN060	5.00	C	1.30	5.32	Silty Loam	0.39
TN070	0.00	B	1.38	5.76	Loam	0.33

Table 4-46. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060403. *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)
Montgomery	100,498	124,369	134,768	0.72	722	894	968	34.1
Robertson	41,494	51,533	54,433	5.49	2,277	2,828	2,988	31.2
Total	**141,992**	**175,902**	**189,201**		**2,999**	**3,722**	**3,956**	**31.9**

Table 4-47. Population Estimates in Subwatershed 051302060403.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Adams	Robertson	571	241	18	215	8
Cedar Hill	Robertson	363	128	16	105	7
Total		**934**	**369**	**34**	**320**	**15**

Table 4-48. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302060403.

Figure 4-63. Location of Historical Streamflow Data Collection Sites in Subwatershed 051302060403. *More information is provided in Appendix IV.*

Figure 4-64. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060403. *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.

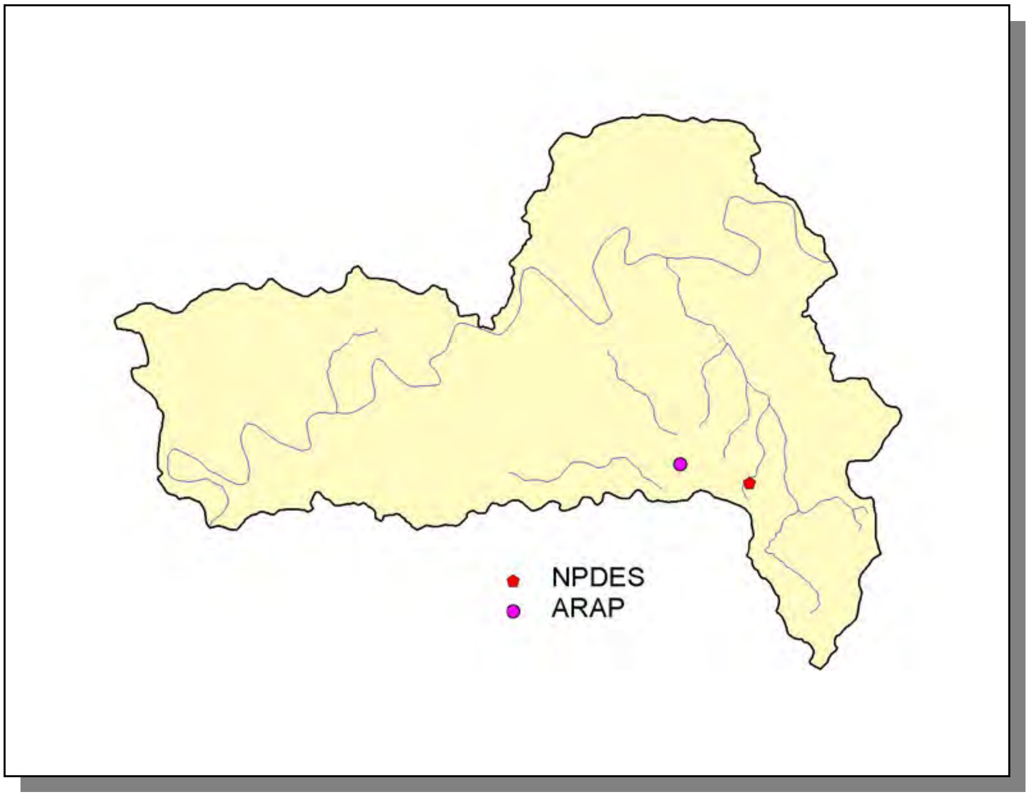

Figure 4-65. Location of Permits Issued in Subwatershed 051302060403. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-66. Location of Active NPDES Sites in Subwatershed 051302060403. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-67. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051302060403. *More information is provided in Appendix IV.*

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

There is one NPDES facility discharging to water bodies listed on the 2004 303(d) list in Subwatershed 051302060403:

- TN0058076 (Jo Byrnes School) discharges to an unnamed tributary @ RM 1.1 to Sturgeon Creek @ RM 2.4 Branch Creek @ RM 2.2

Figure 4-68. Location of NPDES Dischargers to Water Bodies Listed on the 2004 303(d) List in Subwatershed 051302060403. *More information, including the names of facilities, is provided in Appendix IV.*

Permit #	3Q2	1Q10	3Q10	3Q20	7Q10
TN0058076	0.02	na	0.01	0.01	0.01

Table 4-49. Receiving Stream Low Flow Information for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051302060403. *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 #	$CBOD_5$	NH_3	TSS	TRC	SETTLEABLE SOLIDS	DO	pH	FLOW
TN0058076	X	X	X	X	X	X	X	X

Table 4-50. Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051302060403. *WET, Whole Effluent Toxicity; $CBOD_5$, Carbonaceous Biochemical Oxygen Demand (5-Day); NH_3, Ammonia; TSS, Total Suspended Solids; TRC, Total Residual Chlorine; DO, Dissolved Oxygen.*

PERMIT #	FECAL COLIFORM
TN0058076	X

Table 4-51. Bacteria Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051302060403.

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
1,714	3,583	230	<5	460	19

Table 4-52. Summary of Livestock Count Estimates in Subwatershed 051302060403. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Montgomery	16,051	30,959	760	913	1,408	107
Robertson	22,502	47,887	3,478	31	6,982	279

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

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.64
Grass (Hayland)	0.36
Legumes, Grass (Hayland)	0.51
Legumes (Hayland)	0.73
Grass, Forbs, Legumes (Mixed Pasture)	0.44
Corn (Row Crops)	5.52
Soybeans (Row Crops)	9.29
Tobacco (Row Crops)	13.19
Wheat (Close-Grown Cropland)	1.68
Other Cropland not Planted	9.59
Conservation Reserve Program Lands	0.37
Other Land in Farms	0.27
Farmsteads and Ranch Headquarters	0.83

Table 4-54. Annual Estimated Total Soil Loss in Subwatershed 051302060403.

4.2.C.iv. 051302060404 (Elk Fork Creek).

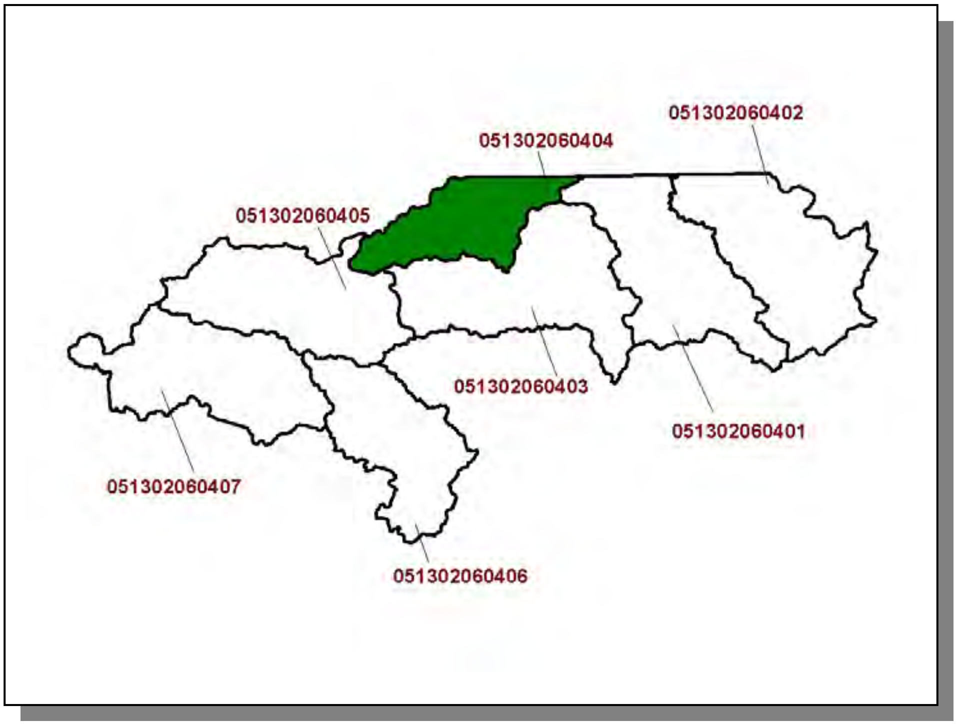

Figure 4-69. Location of Subwatershed 051302060404. *HUC-12 subwatershed boundaries in the Tennessee portion of the watershed are shown for reference.*

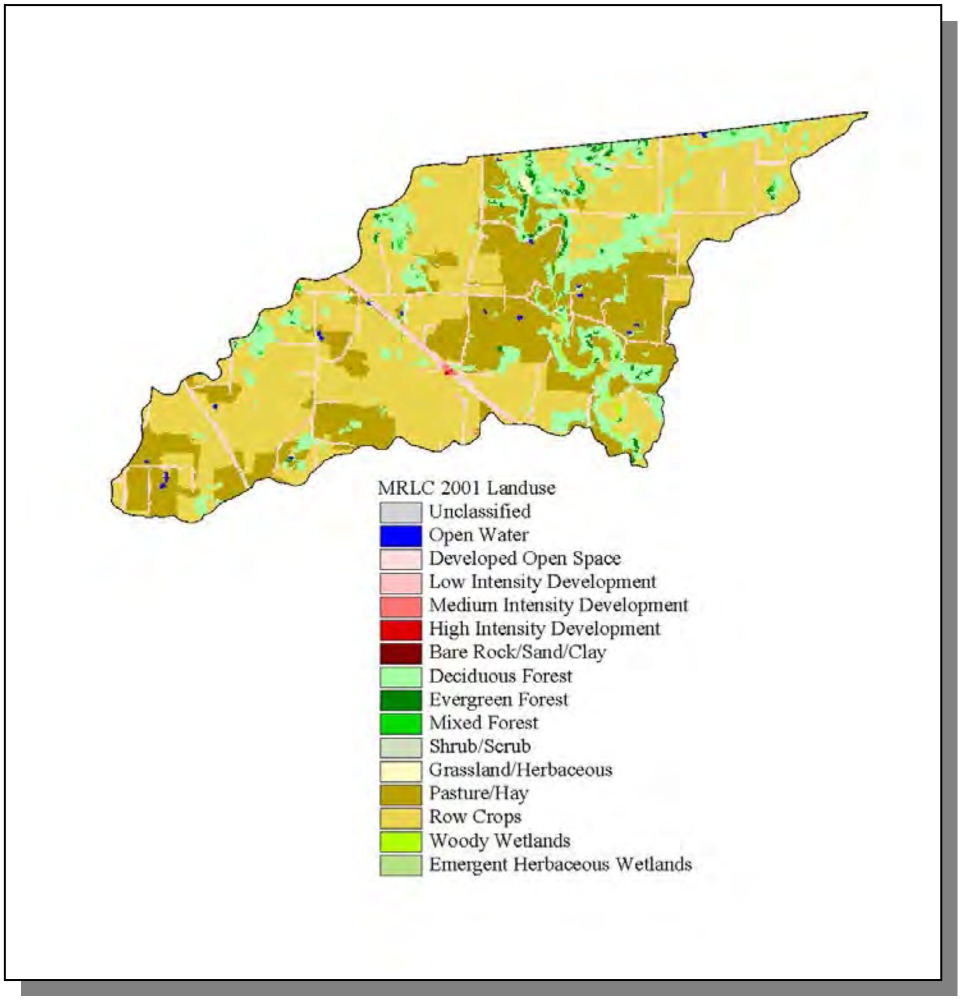

Figure 4-70. Illustration of Land Use Distribution in Subwatershed 051302060404.

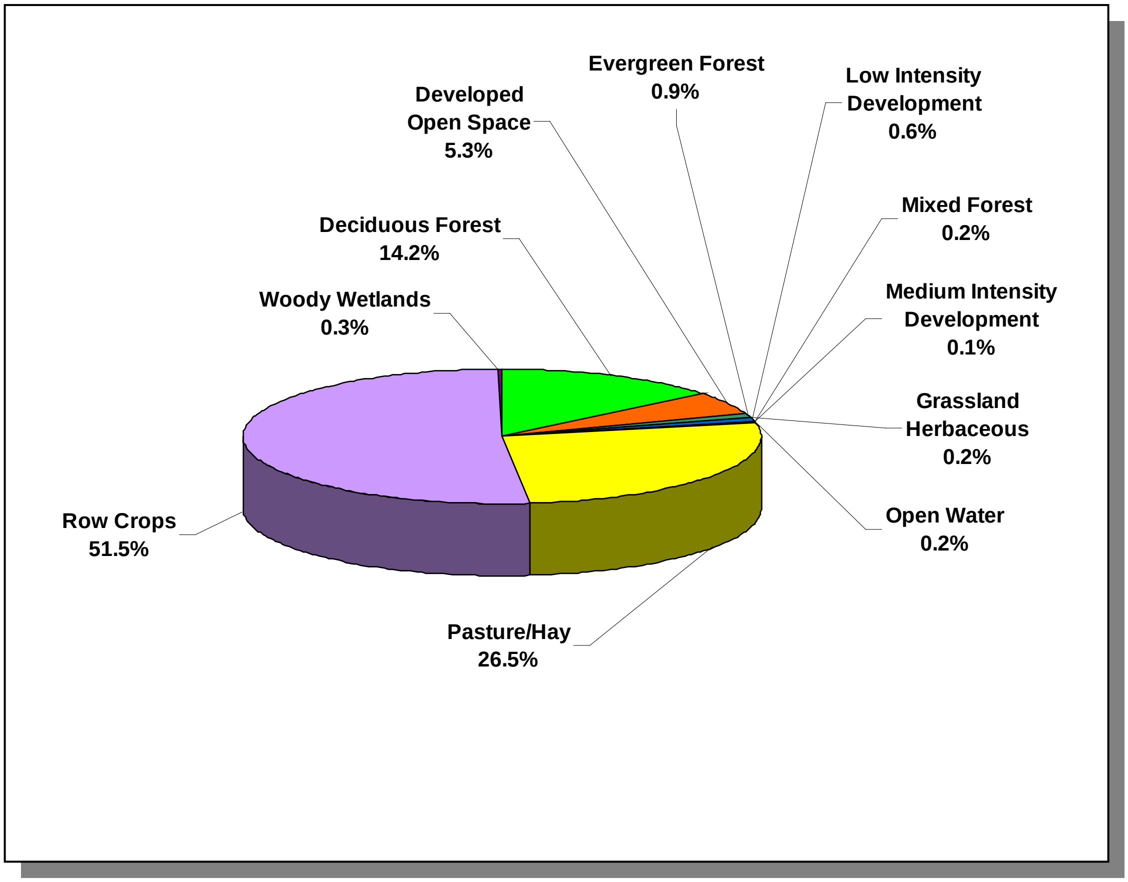

Figure 4-71. Land Use Distribution in Subwatershed 051302060404. *More information is provided in Appendix IV.*

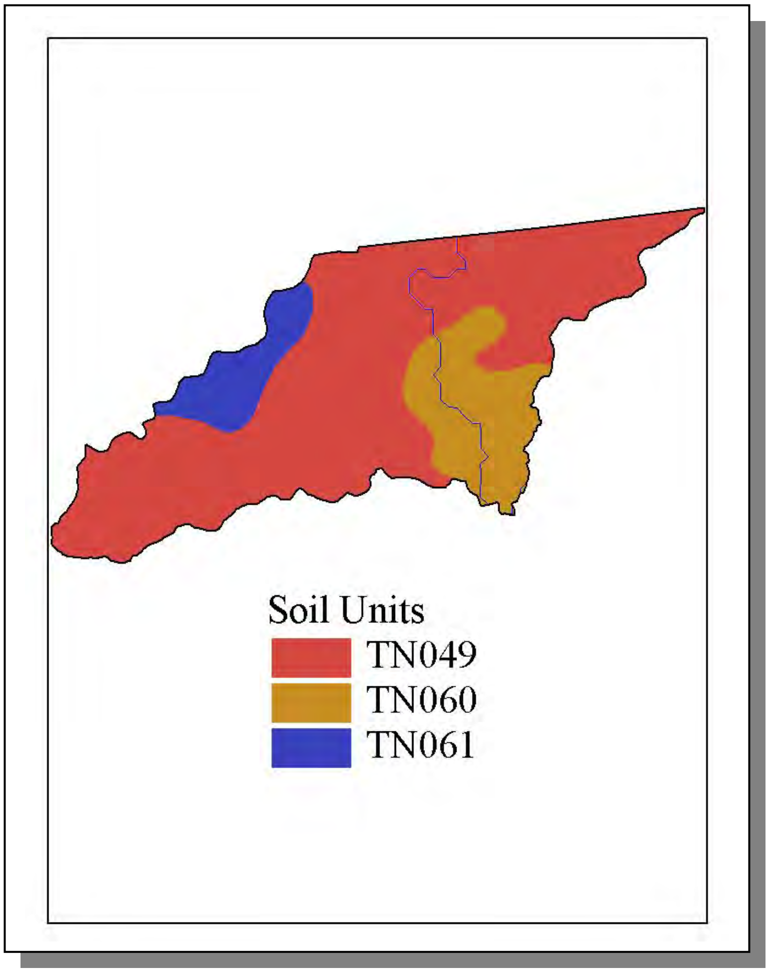

Figure 4-72. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060404.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN049	0.00	C	1.30	5.94	Silty Loam	0.34
TN060	5.00	C	1.30	5.32	Silty Loam	0.39
TN061	50.00	B	1.30	5.09	Silty Loam	0.42

Table 4-55. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060404. *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)
Montgomery	100,498	124,369	134,768	1.25	1,252	1,549	1,679	34.1
Robertson	41,494	51,533	54,433	2.02	836	1,039	1,097	31.2
Total	**141,992**	**175,902**	**189,201**		**2,088**	**2,588**	**2,776**	**33.0**

Table 4-56. Population Estimates in Subwatershed 051302060404.

Figure 4-73. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060404. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

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

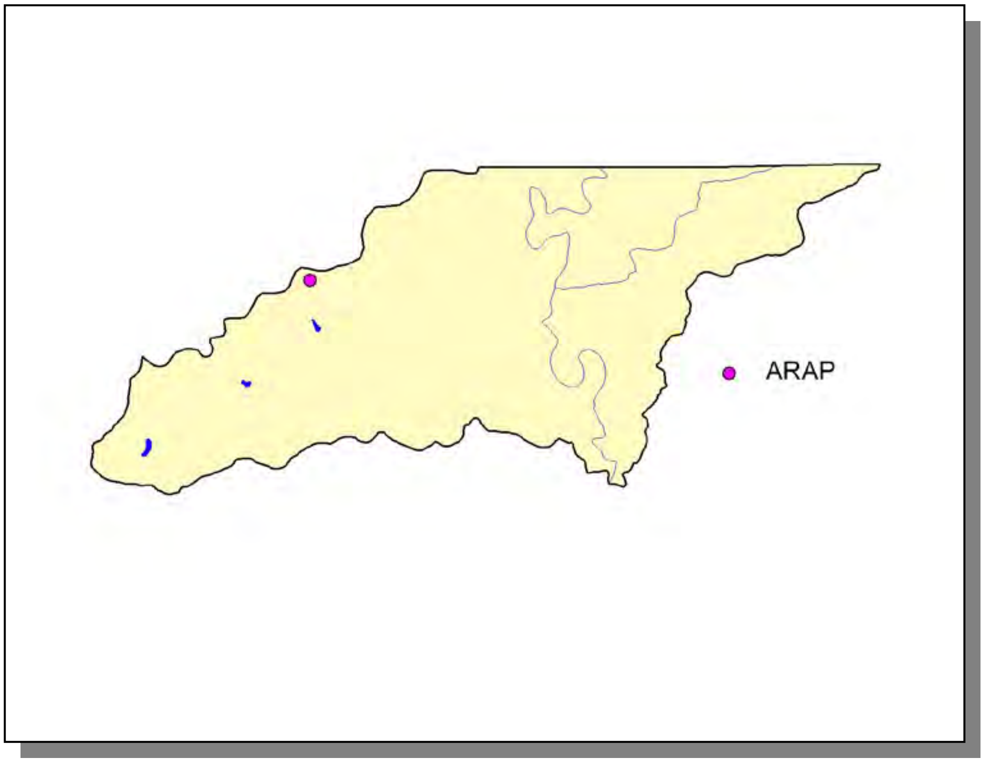

Figure 4-74. Location of Permits Issued in Subwatershed 051302060404. *More information, including the names of facilities, is provided in Appendix IV.*

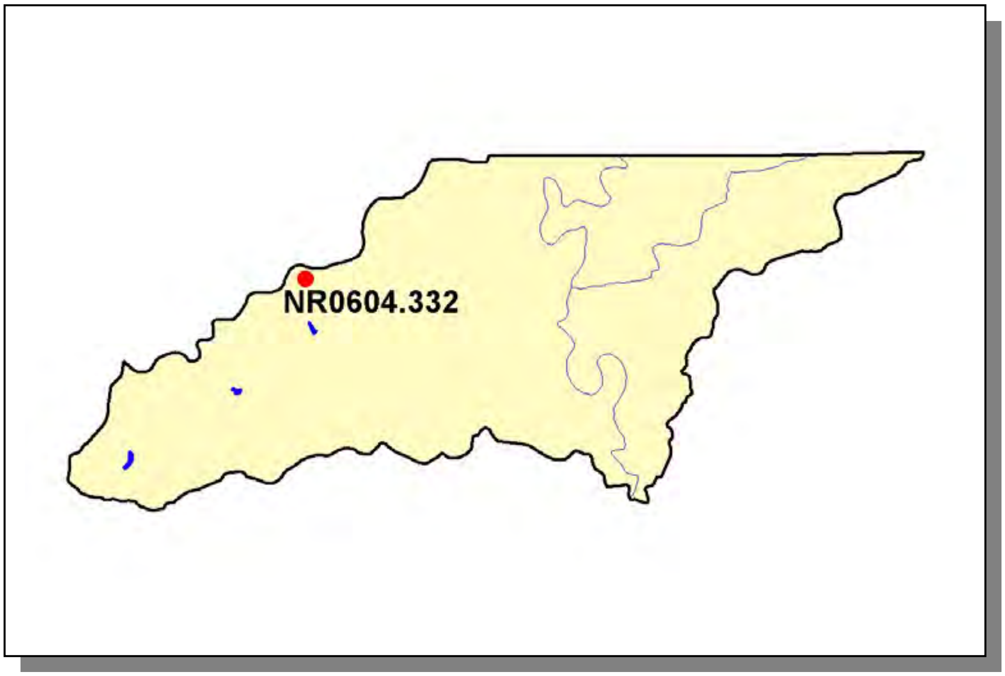

Figure 4-75. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051302060404. *More information is provided in Appendix IV.*

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
1,125	2,2271	107	<5	211	10

Table 4-57. Summary of Livestock Count Estimates in Subwatershed 051302060404. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Montgomery	16,051	30,959	760	913	1,408	107
Robertson	22,502	47,887	3,478	31	6,982	279

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

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.58
Grass (Hayland)	0.34
Legumes, Grass (Hayland)	0.48
Legumes (Hayland)	0.73
Grass, Forbs, Legumes (Mixed Pasture)	0.47
Corn (Row Crops)	6.33
Soybeans (Row Crops)	7.67
Tobacco (Row Crops)	16.11
Wheat (Close-Grown Cropland)	1.68
Other Cropland not Planted	9.59
Conservation Reserve Program Lands	0.38
Other Land in Farms	0.27
Farmsteads and Ranch Headquarters	0.58

Table 4-59. Annual Estimated Total Soil Loss in Subwatershed 051302060404.

4.2.C.v. 051302060405 (Red River).

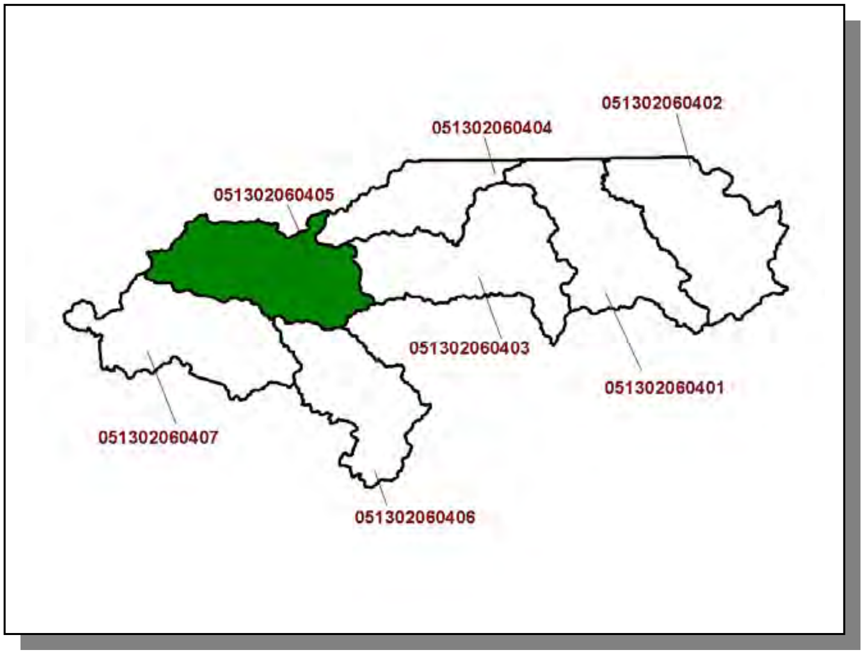

Figure 4-76. Location of Subwatershed 051302060405. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

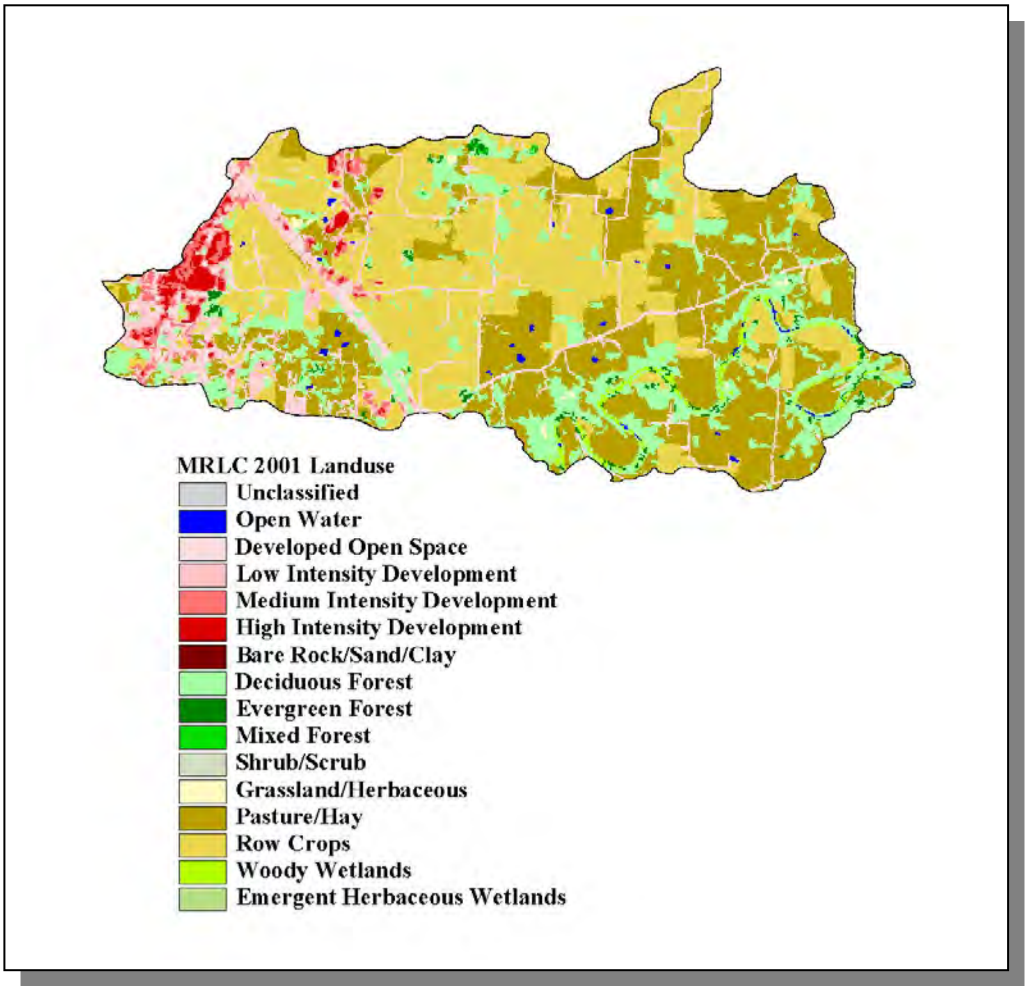

Figure 4-77. Illustration of Land Use Distribution in Subwatershed 051302060405.

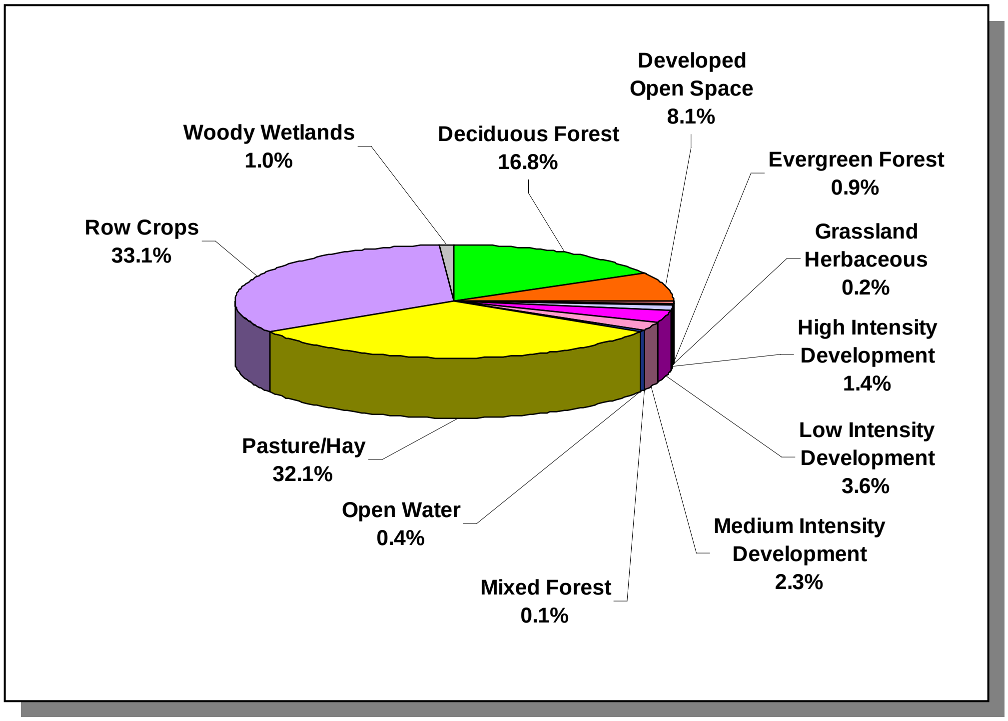

Figure 4-78. Land Use Distribution in Subwatershed 051302060405. More information is provided in Appendix IV.

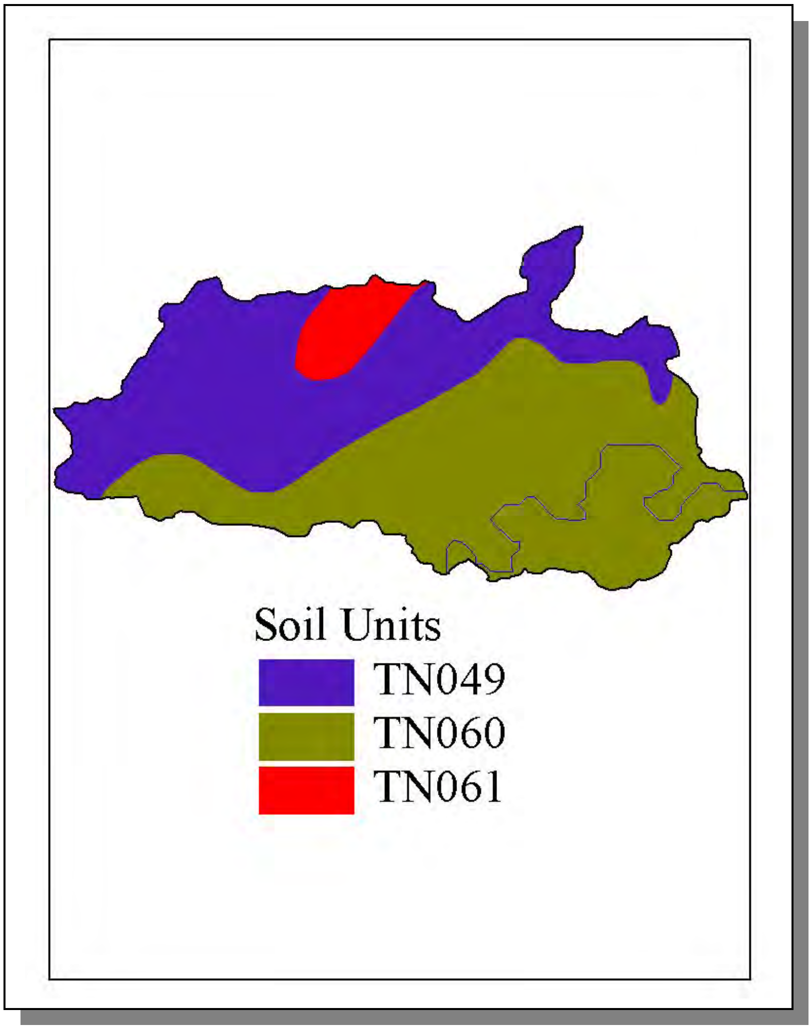

Figure 4-79. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060405.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN049	0.00	C	1.30	5.94	Silty Loam	0.34
TN060	5.00	C	1.30	5.32	Silty Loam	0.39
TN061	50.00	B	1.30	5.09	Silty Loam	0.42

Table 4-60. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060405. *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)
Montgomery	100,498	124,369	134,768	5.09	5,117	6,333	6,862	34.1

Table 4-61. Population Estimates in Subwatershed 051302060405.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Clarksville	Montgomery	75,494	27,642	23,610	3,956	76

Table 4-62. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302060405.

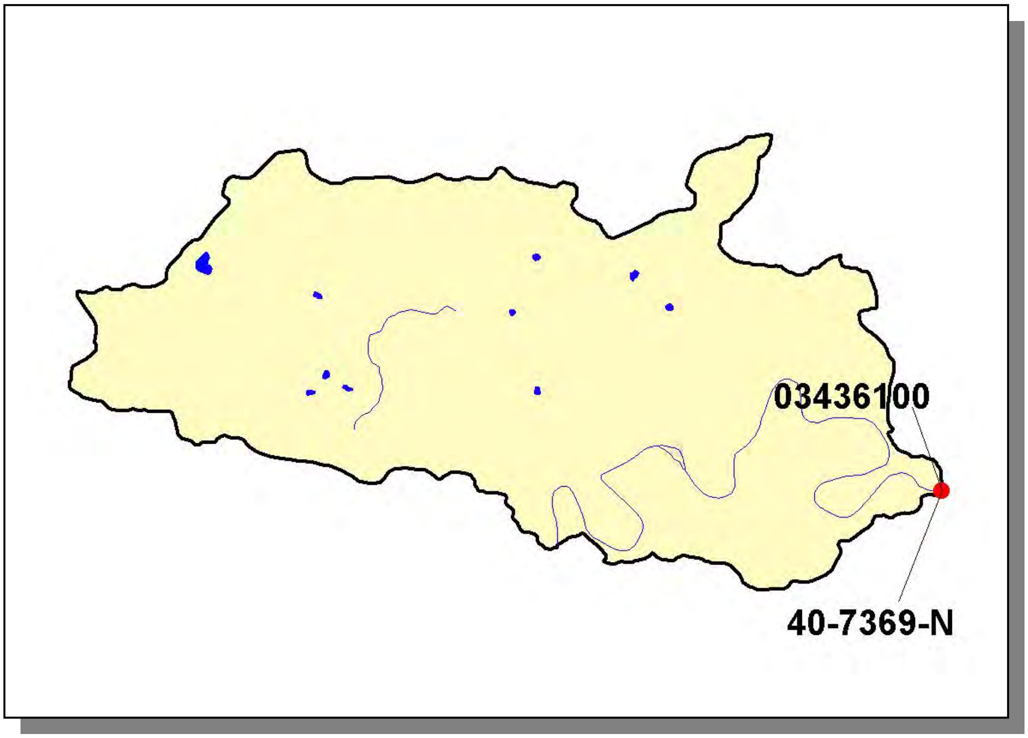

Figure 4-80. Location of Historical Streamflow Data Collection Sites in Subwatershed 051302060405. *More information is provided in Appendix IV.*

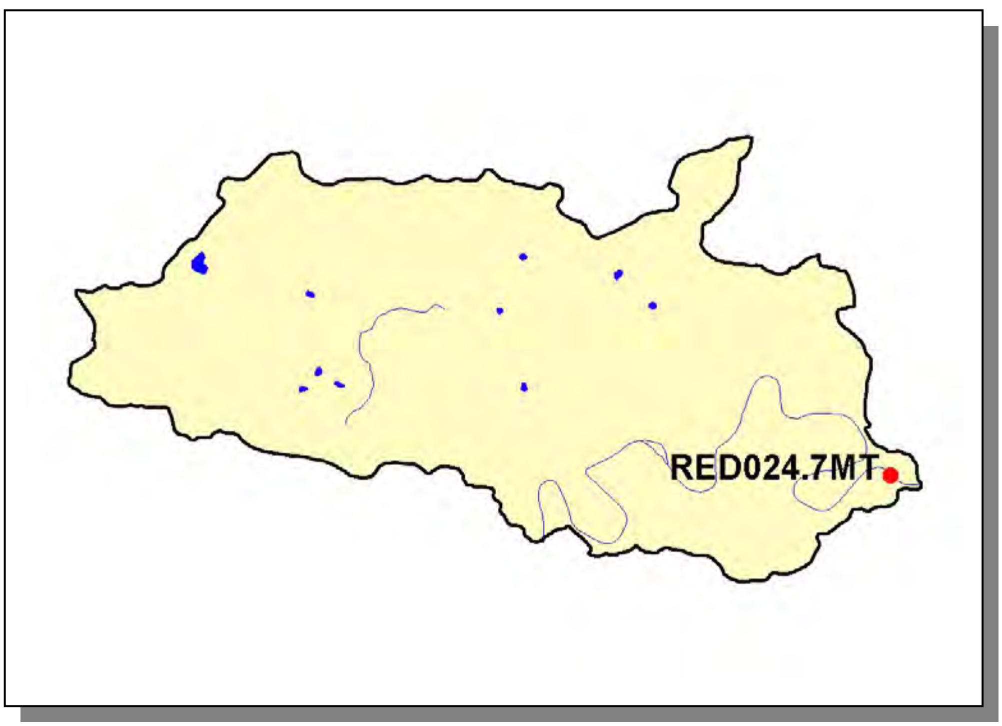

Figure 4-81. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060405. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.C.v.a. Point Source Contributions.

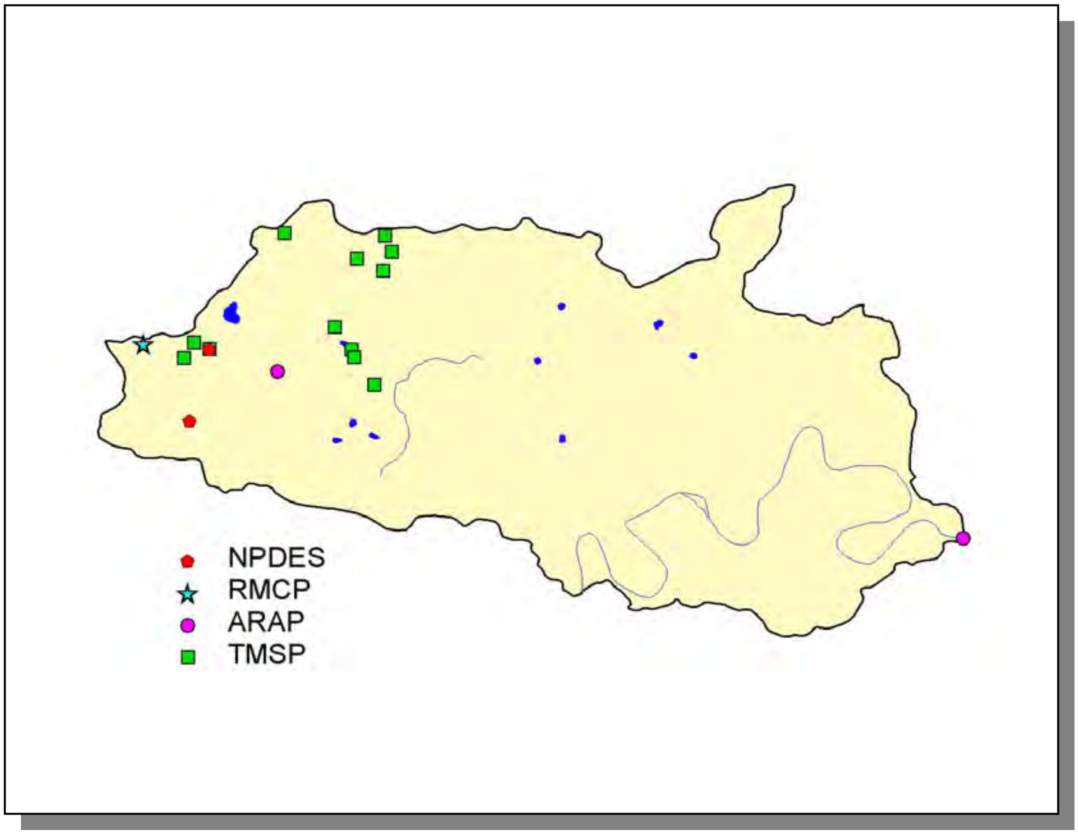

Figure 4-82. Location of Permits Issued in Subwatershed 051302060405. *More information, including the names of facilities, is provided in Appendix IV.*

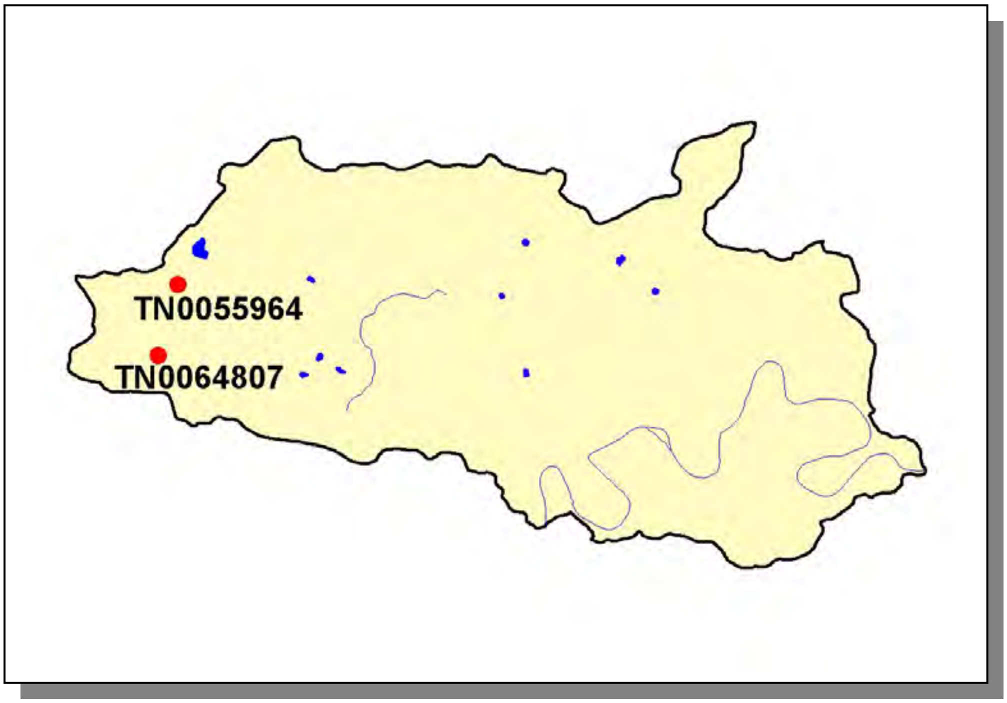

Figure 4-83. Location of Active NPDES Sites in Subwatershed 051302060405. *More information, including the names of facilities, is provided in Appendix IV.*

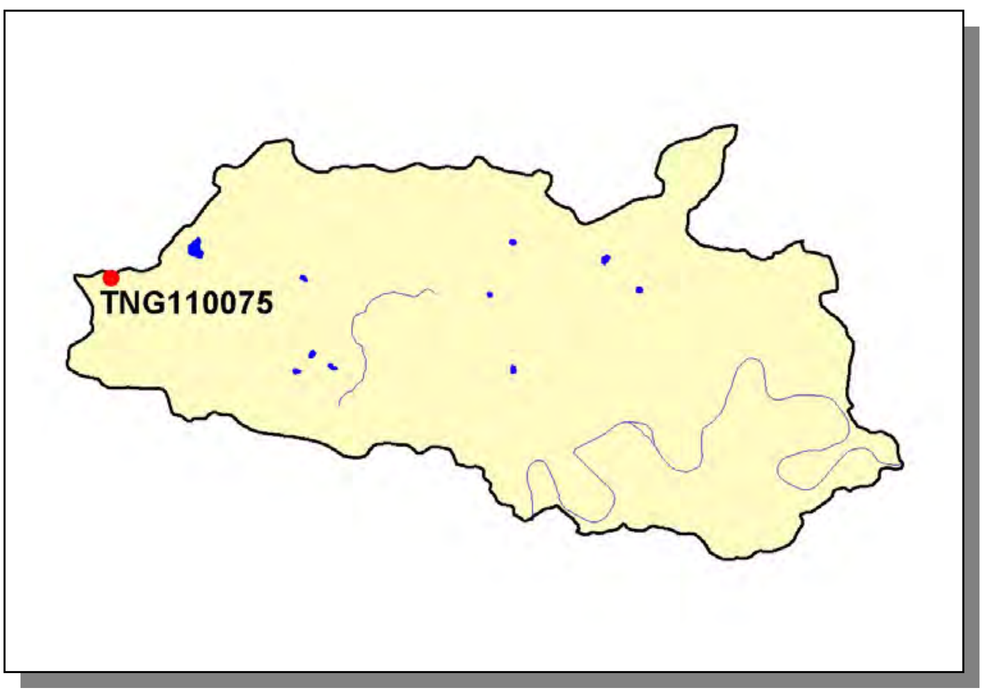

Figure 4-84. Location of Ready Mix Concrete Plants (RMCP) in Subwatershed 051302060405. *More information is provided in Appendix IV.*

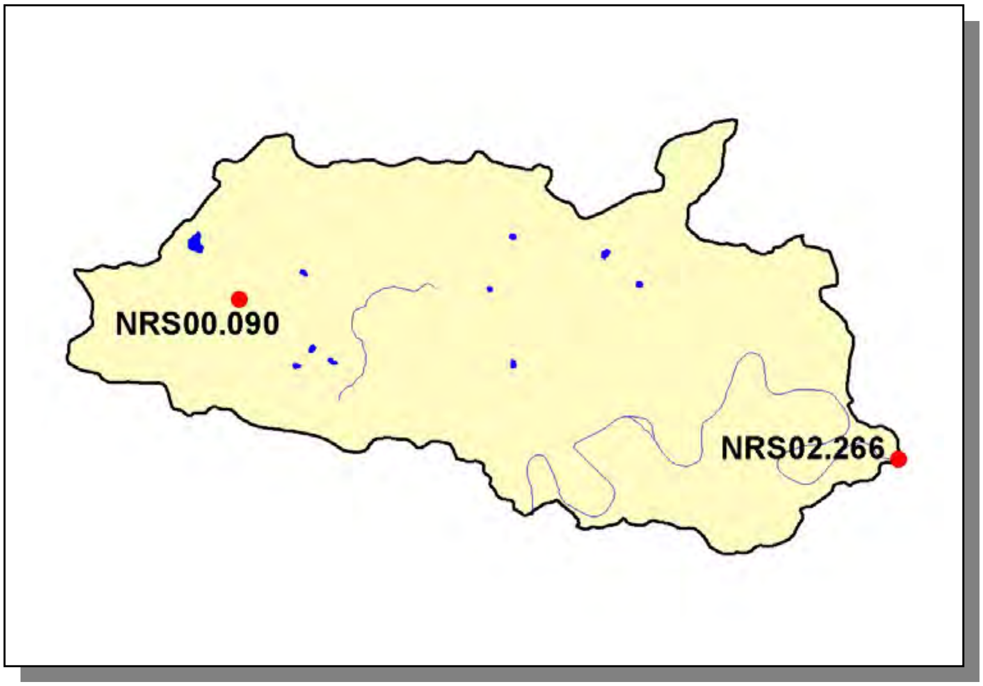

Figure 4-85. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051302060405. *More information is provided in Appendix IV.*

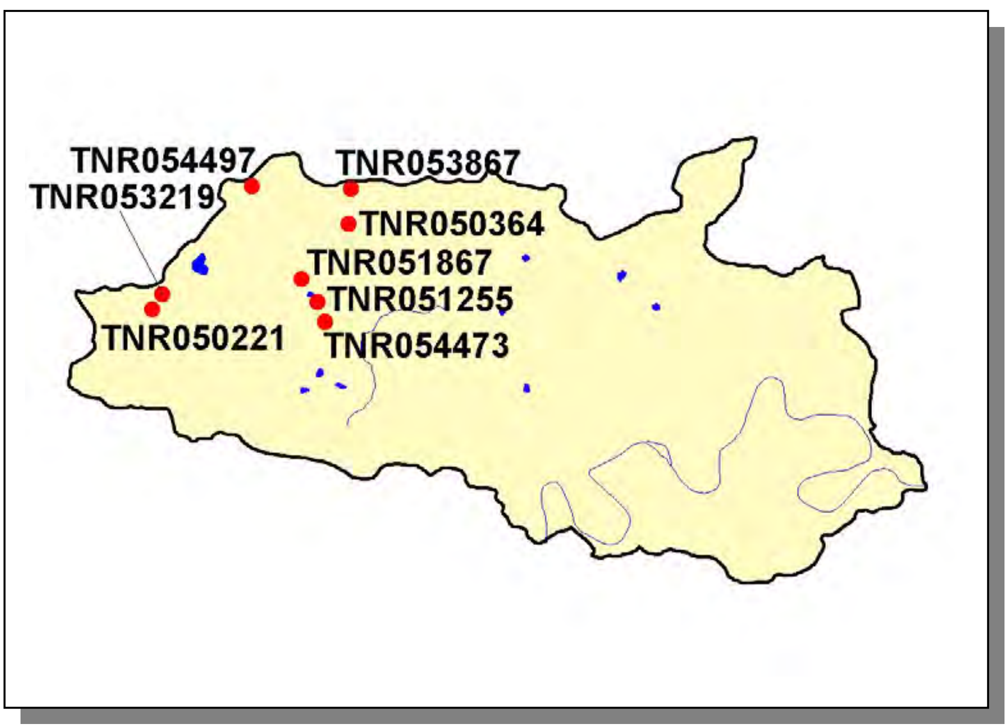

Figure 4-86. Location of TMSP Sites in Subwatershed 051302060405. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.C.v.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 051302060405:

- TN0055964 (Trane Company) discharges to an unnamed tributary to a sink hole and to a wet weather conveyance to Gibbs Creek

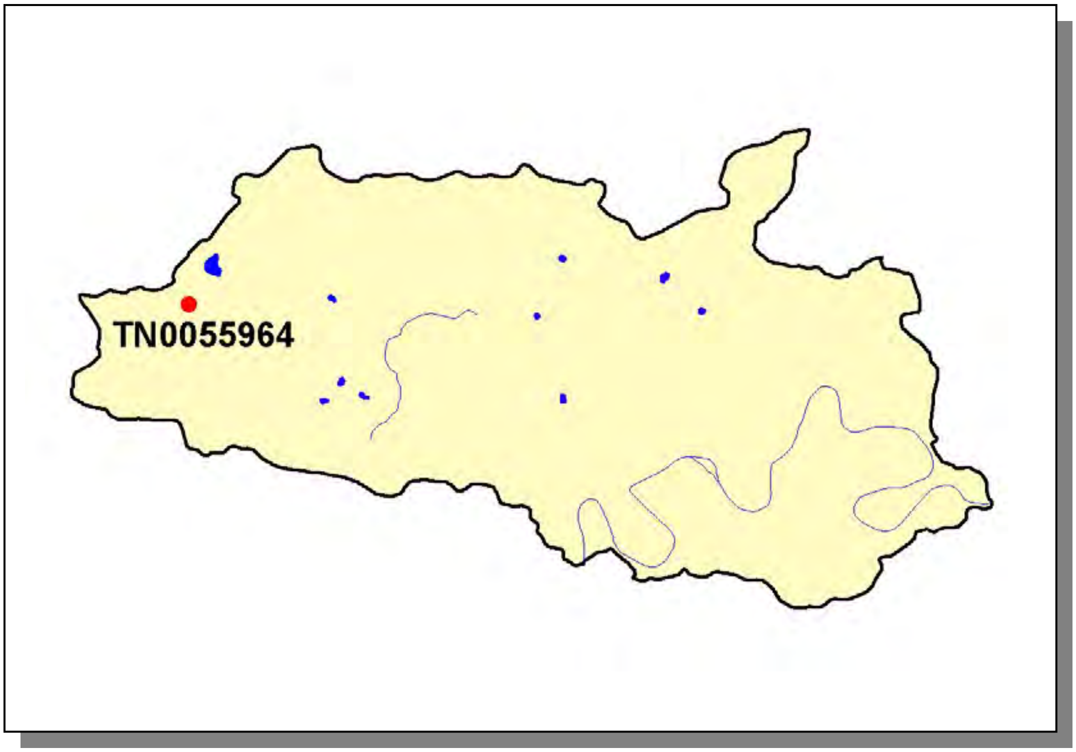

Figure 4-87. Location of NPDES Dischargers to Water Bodies Listed on the 2004 303(d) List in Subwatershed 051302060405. *More information, including the names of facilities, is provided in Appendix IV.*

Permit #	3Q2	1Q10	3Q10	3Q20	7Q10
TN0055964	na	na	na	na	na

Table 4-63. Receiving Stream Low Flow Information for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051302060405. *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 #	OIL and GREASE	Fe	Cu	Zn	pH	FLOW
TN0055964	X	X	X	X	X	X

Table 4-64. Stormwater Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051302060405.

4.2.C.v.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
1,898	3,661	90	<5	166	13

Table 4-65. Summary of Livestock Count Estimates in Subwatershed 051302060405. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Montgomery	16,051	30,959	760	913	1,408	107

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

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.45
Grass (Hayland)	0.29
Legumes, Grass (Hayland)	0.40
Grass, Forbs, Legumes (Mixed Pasture)	0.55
Corn (Row Crops)	8.04
Soybeans (Row Crops)	4.26
Tobacco (Row Crops)	22.25
Conservation Reserve Program Lands	0.41
Farmsteads and Ranch Headquarters	0.04

Table 4-67. Annual Estimated Total Soil Loss in Subwatershed 051302060405.

4.2.C.vi. 051302060406 (Passenger Creek).

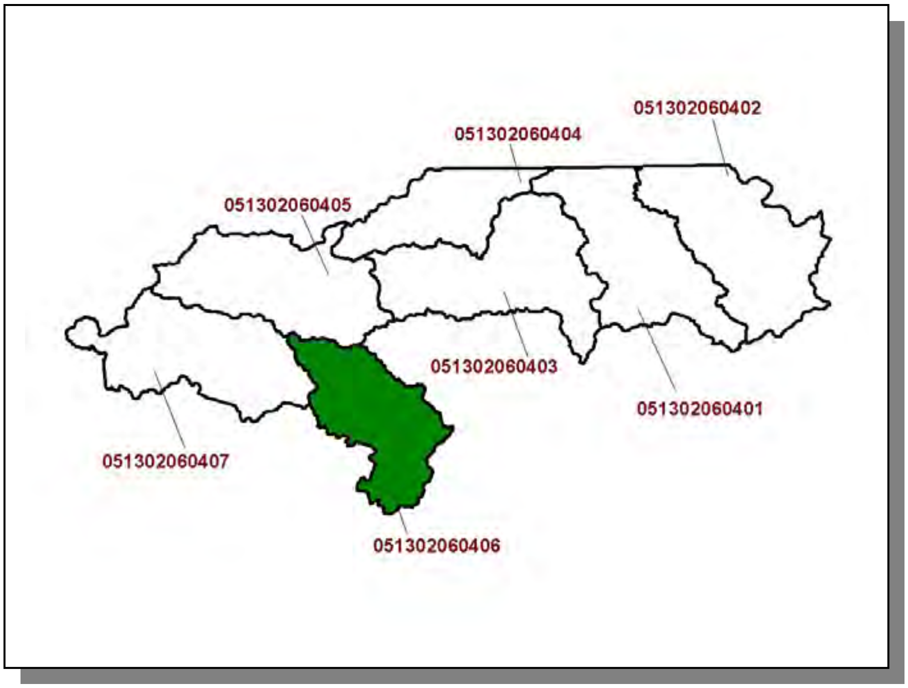

Figure 4-88. Location of Subwatershed 051302060406. *HUC-12 subwatershed boundaries are shown for reference.*

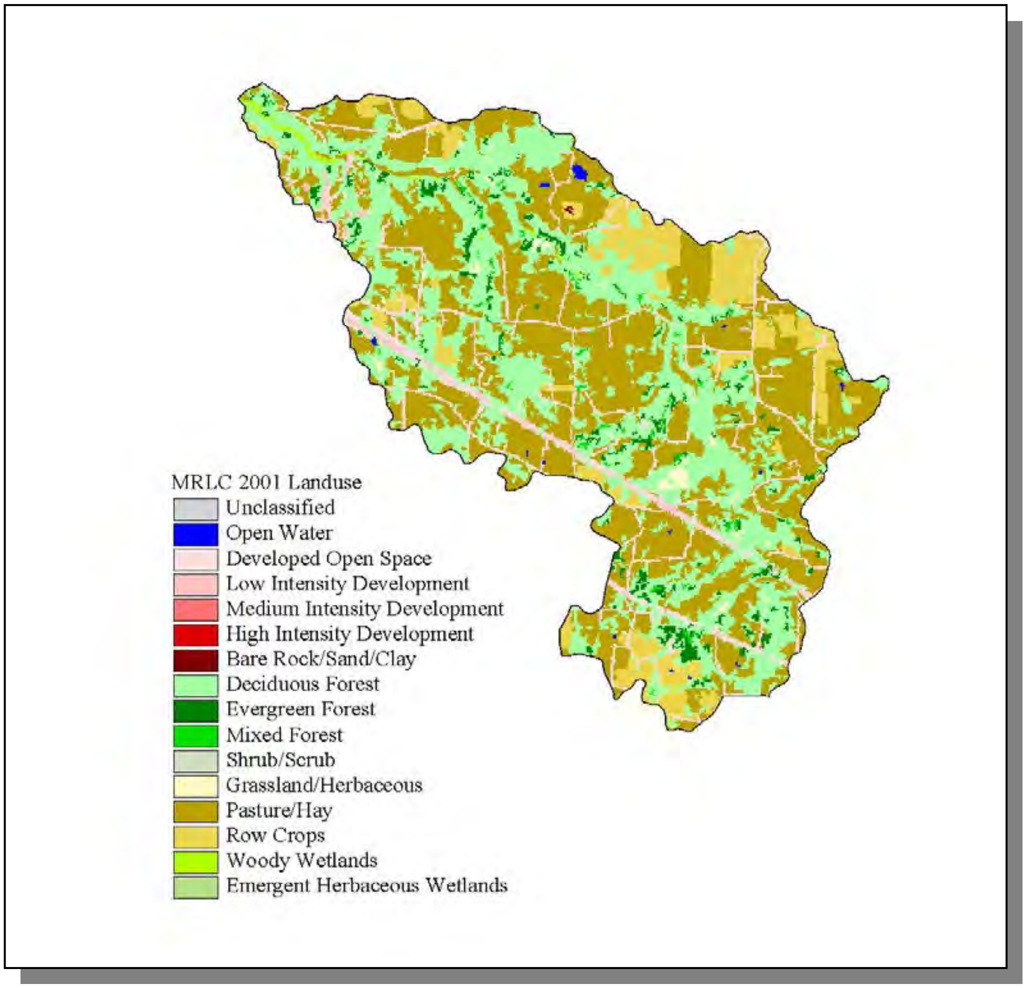

Figure 4-89. Illustration of Land Use Distribution in Subwatershed 051302060406.

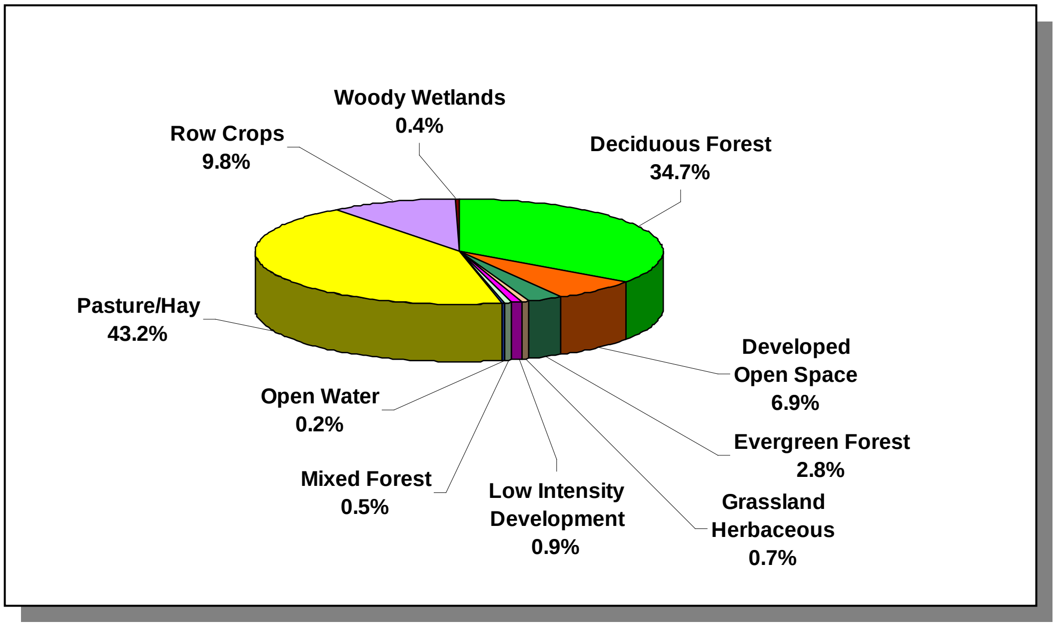

Figure 4-90. Land Use Distribution in Subwatershed 051302060406. *More information is provided in Appendix IV.*

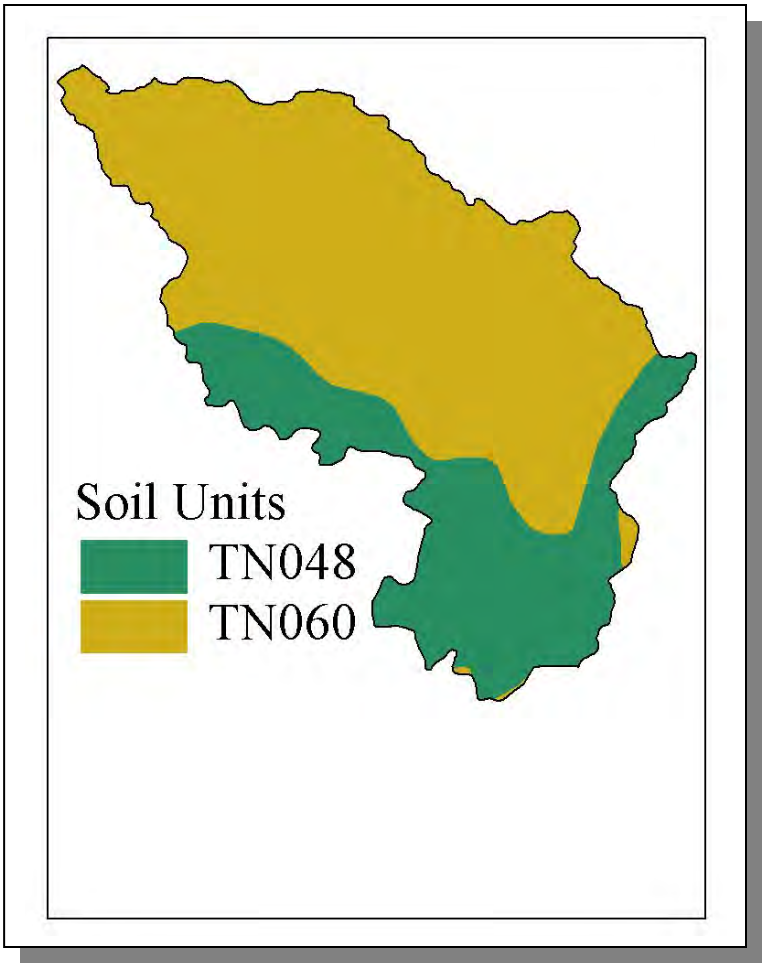

Figure 4-91. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060406.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN048	8.00	B	1.38	5.06	Silty Loam	0.42
TN060	5.00	C	1.30	5.32	Silty Loam	0.39

Table 4-68. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060406. *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)
Cheatham	27,140	34,402	35,912	0.37	100	127	132	32.0
Montgomery	100,498	124,369	134,768	3.47	3,492	4,321	4,682	34.1
Robertson	41,494	51,533	54,433	0.37	152	189	200	31.6
Total	**169,132**	**210,304**	**225,113**		**3,644**	**4,637**	**5,014**	**33.9**

Table 4-69. Population Estimates in Subwatershed 051302060406.

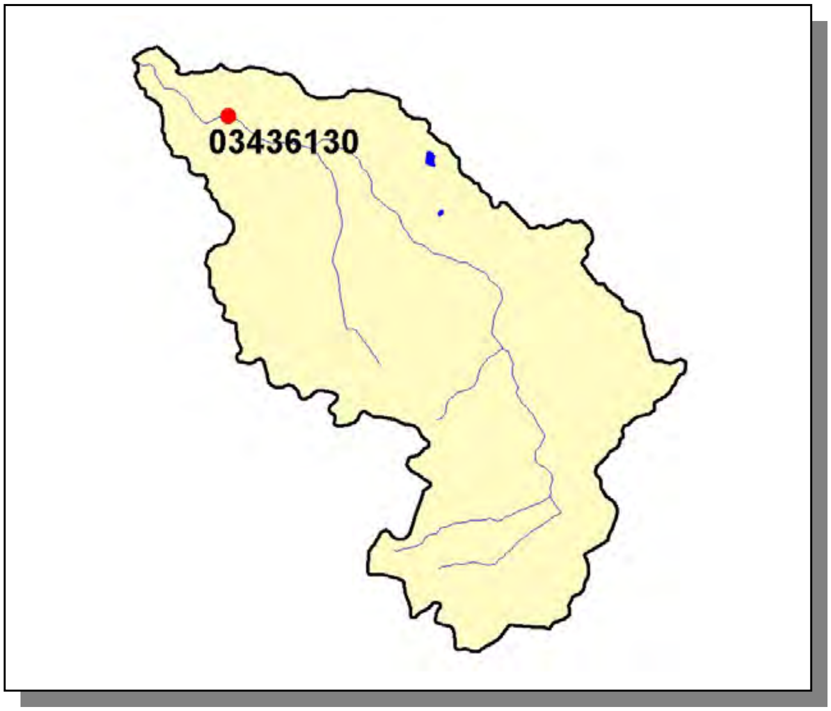

Figure 4-92. Location of Historical Streamflow Data Collection Sites in Subwatershed 051302060406. *More information is provided in Appendix IV.*

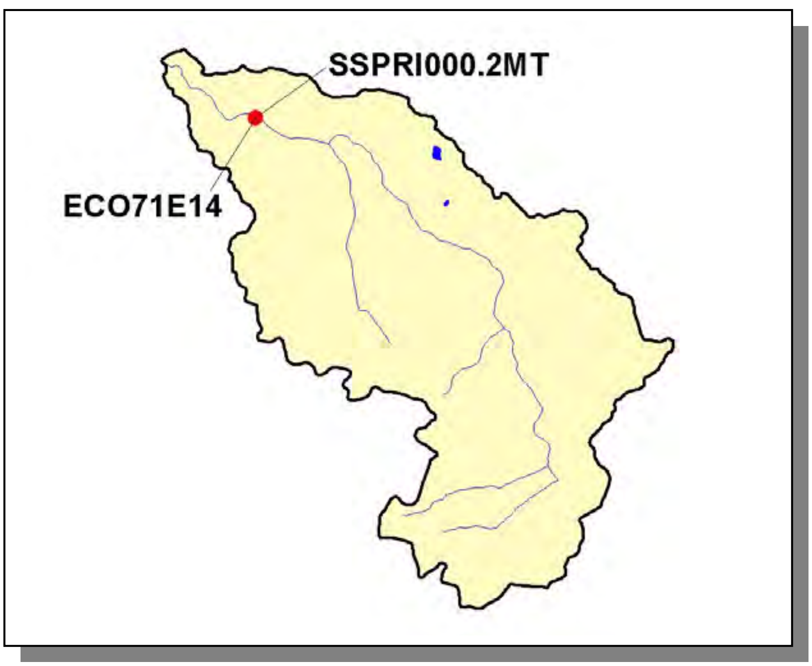

Figure 4-93. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060406. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.C.vi.a. Point Source Contributions.

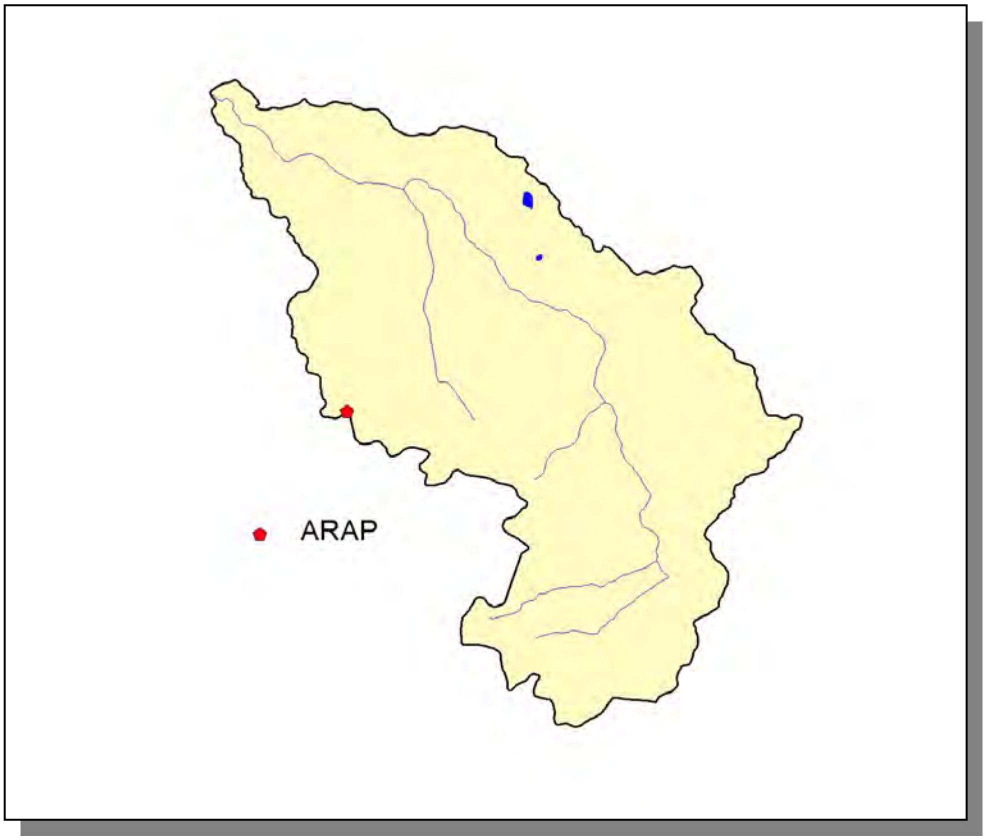

Figure 4-94. Location of Permits Issued in Subwatershed 051302060406. *More information, including the names of facilities, is provided in Appendix IV.*

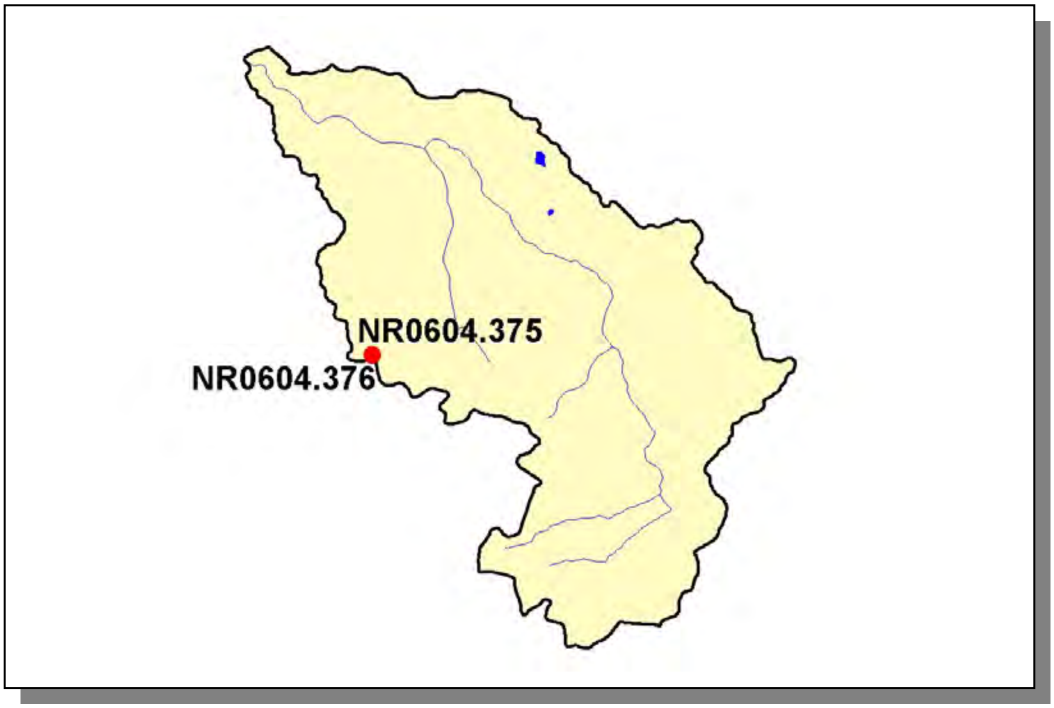

Figure 4-95. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051302060406. *More information is provided in Appendix IV.*

4.2.C.vi.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
1,225	2,633	69	<5	156	9

Table 4-70. Summary of Livestock Count Estimates in Subwatershed 051302060406. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Cheatham	0	11,429	0	121	1,183	0
Montgomery	16,051	30,959	760	913	1,408	107
Robertson	22,502	47,887	3,478	31	6,982	279

Table 4-71. Summary of Livestock Count Estimates in Cheatham, Montgomery, and Robertson Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.48
Grass (Hayland)	0.30
Legumes, Grass (Hayland)	0.41
Legumes (Hayland)	0.60
Grass, Forbs, Legumes (Mixed Pasture)	0.55
Corn (Row Crops)	7.83
Soybeans (Row Crops)	5.00
Tobacco (Row Crops)	21.35
Wheat (Close-Grown Cropland)	1.68
Other Cropland not Planted	6.11
Conservation Reserve Program Lands	0.41
Other Land in Farms	0.27
Farmsteads and Ranch Headquarters	0.12

Table 4-72. Annual Estimated Total Soil Loss in Subwatershed 051302060406.

4.2.C.vii. 051302060407 (Red River).

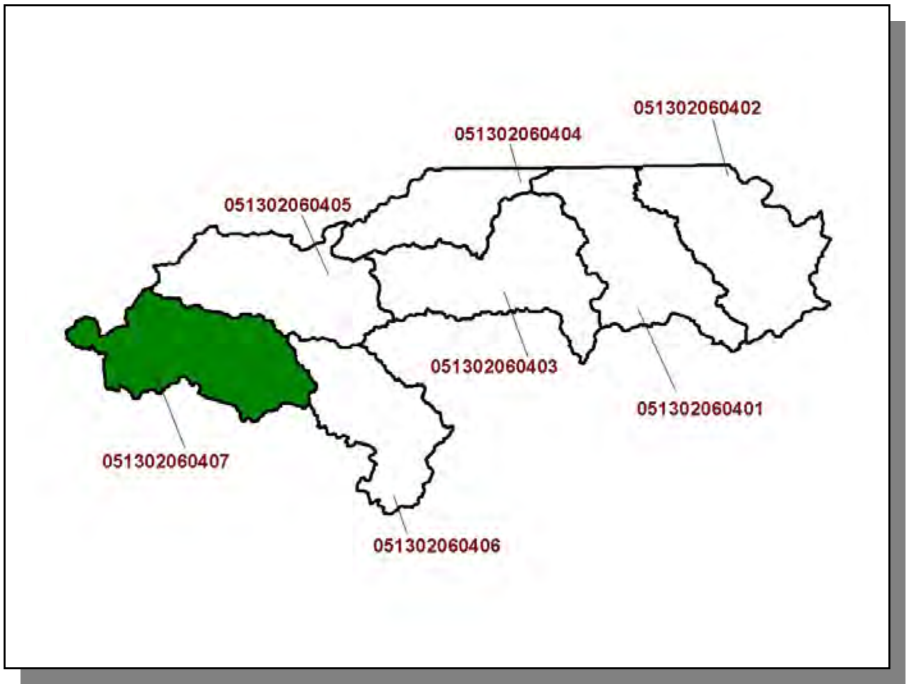

Figure 4-96. Location of Subwatershed 051302060407. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

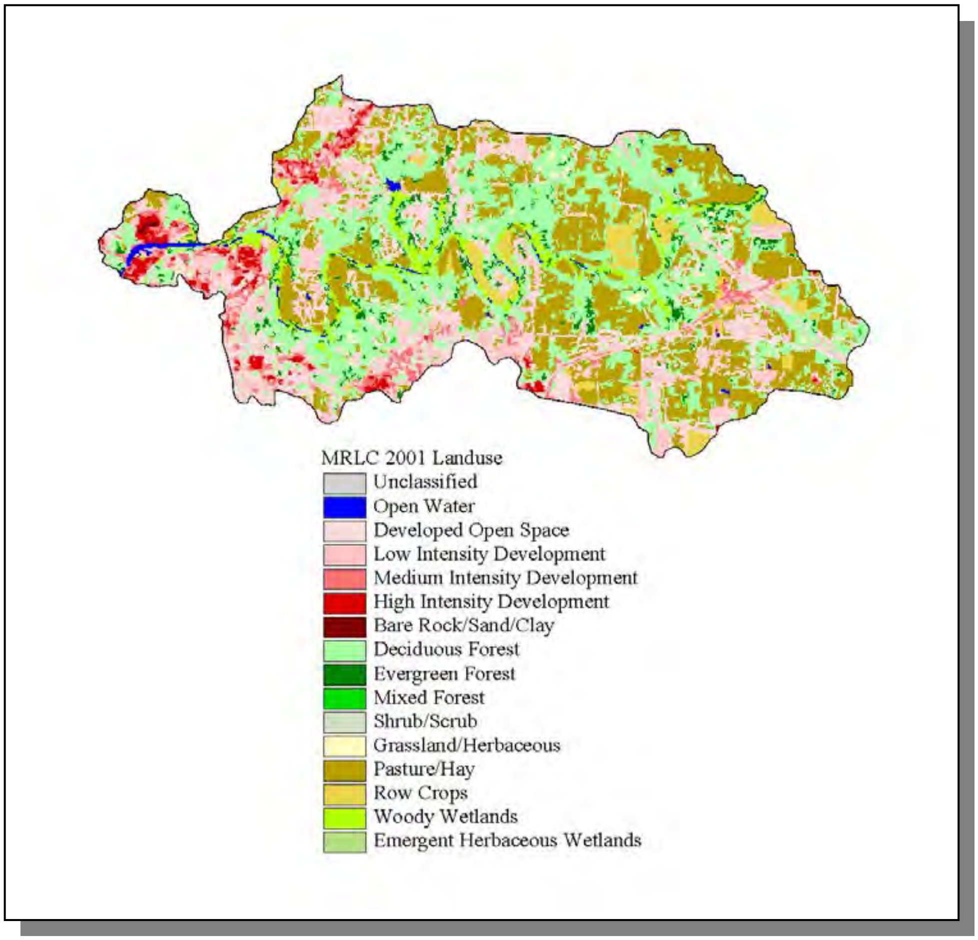

Figure 4-97. Illustration of Land Use Distribution in Subwatershed 051302060407.

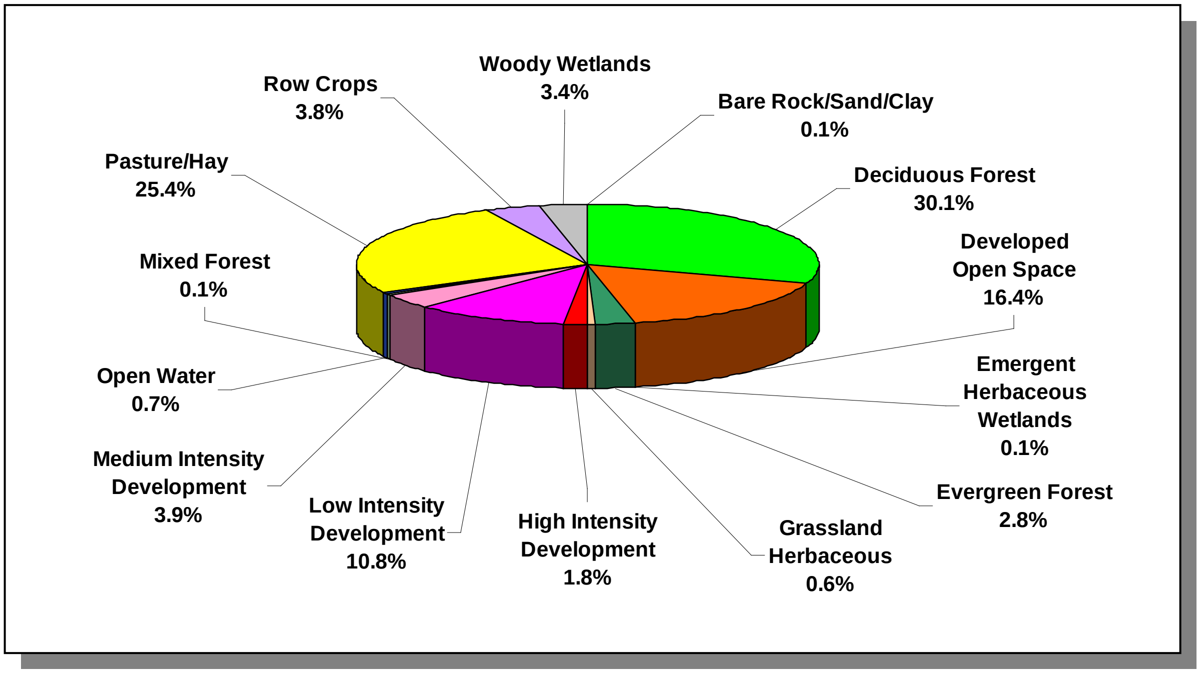

Figure 4-98. Land Use Distribution in Subwatershed 051302060407. *More information is provided in Appendix IV.*

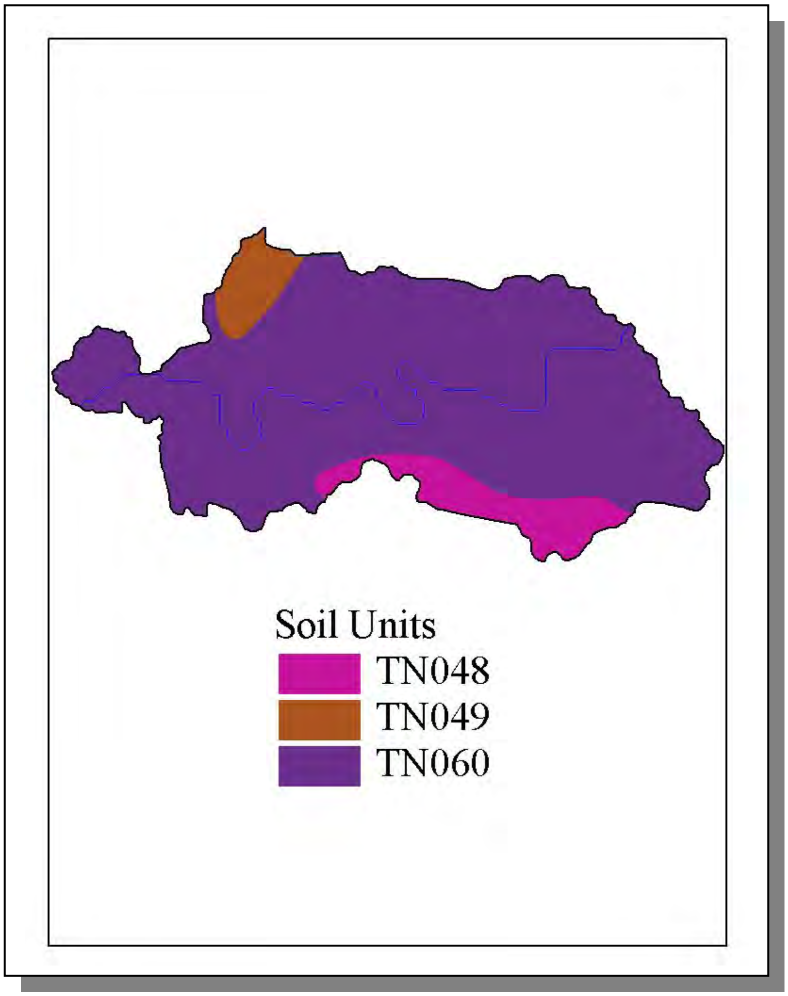

Figure 4-99. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060407.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN048	8.00	B	1.38	5.06	Silty Loam	0.42
TN049	0.00	C	1.30	5.94	Silty Loam	0.34
TN060	5.00	C	1.30	5.32	Silty Loam	0.39

Table 4-73. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060407. *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)
Montgomery	100,498	124,369	134,768	5.04	5,067	6,271	6,795	34.1

Table 4-74. Population Estimates in Subwatershed 051302060407.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Clarksville	Montgomery	75,494	27,642	23,610	3,956	76

Table 4-75. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302060407.

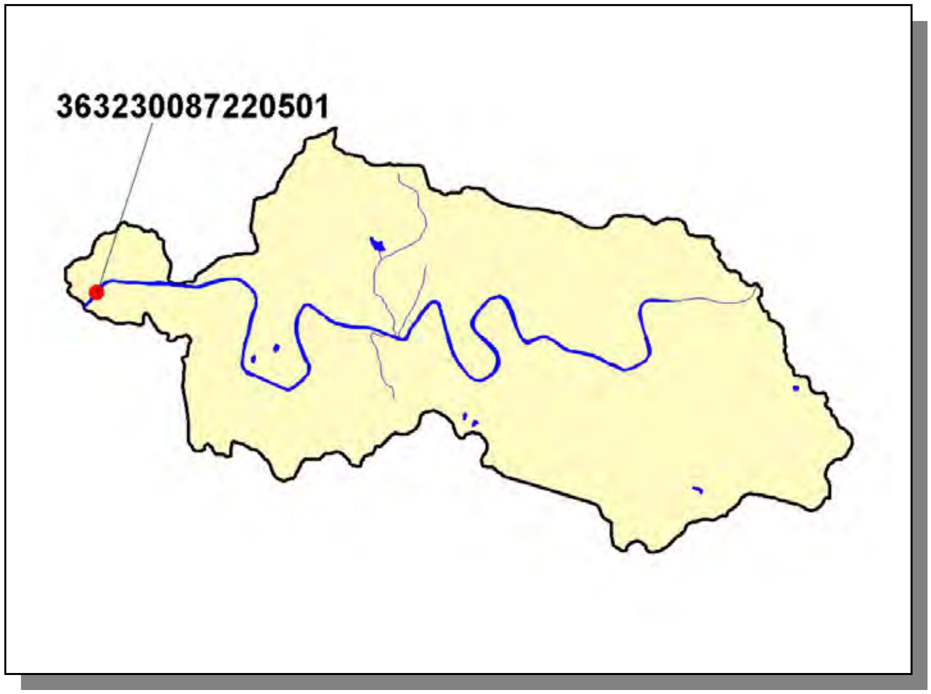

Figure 4-100. Location of Historical Streamflow Data Collection Sites in Subwatershed 051302060407. *More information is provided in Appendix IV.*

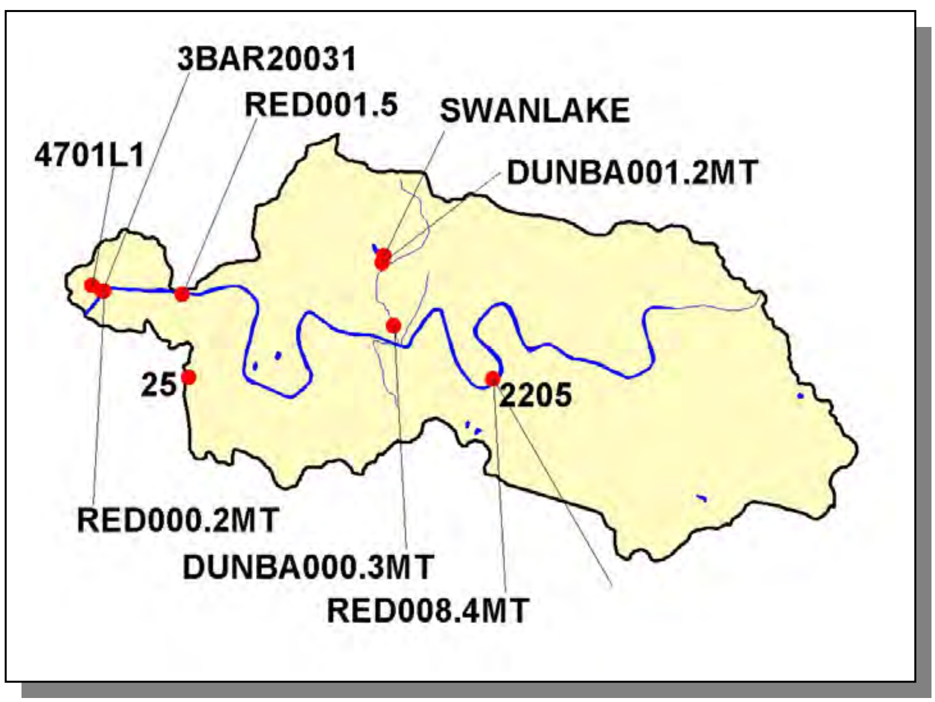

Figure 4-101. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060407. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.C.vii.a. Point Source Contributions.

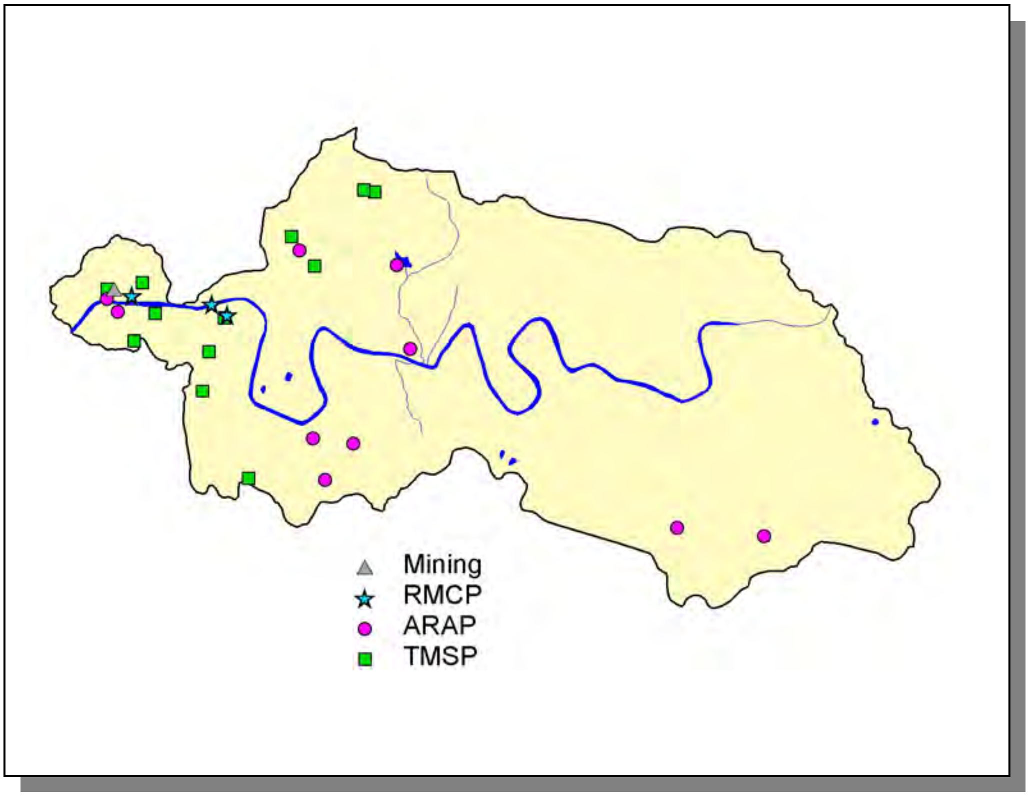

Figure 4-102. Location of Permits Issued in Subwatershed 051302060407. *More information, including the names of facilities, is provided in Appendix IV.*

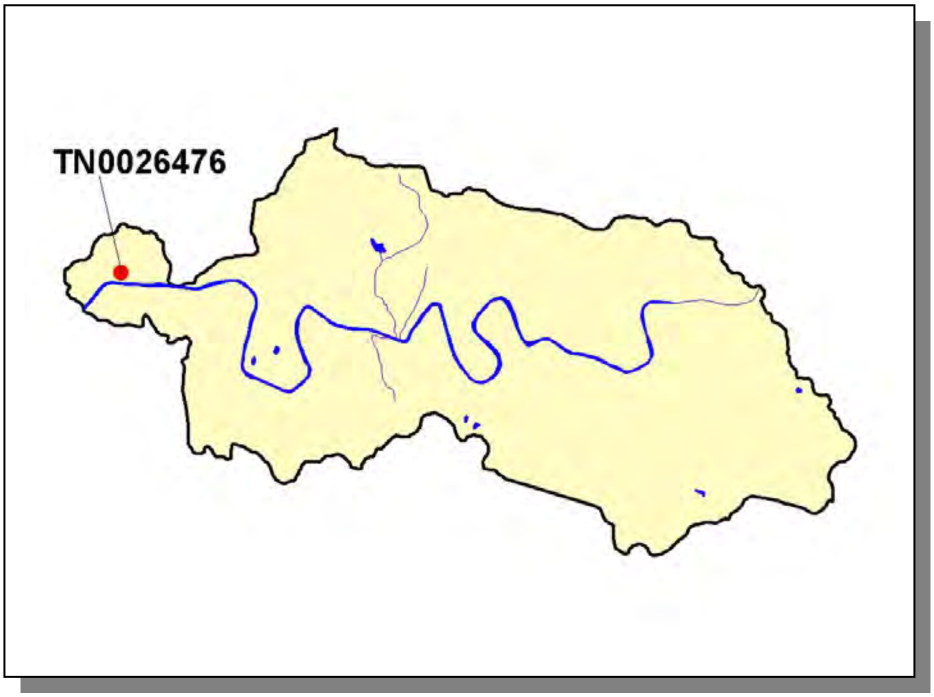

Figure 4-103. Location of Active Mining Sites in Subwatershed 051302060407. *More information, including the names of mining operations, is provided in Appendix IV.*

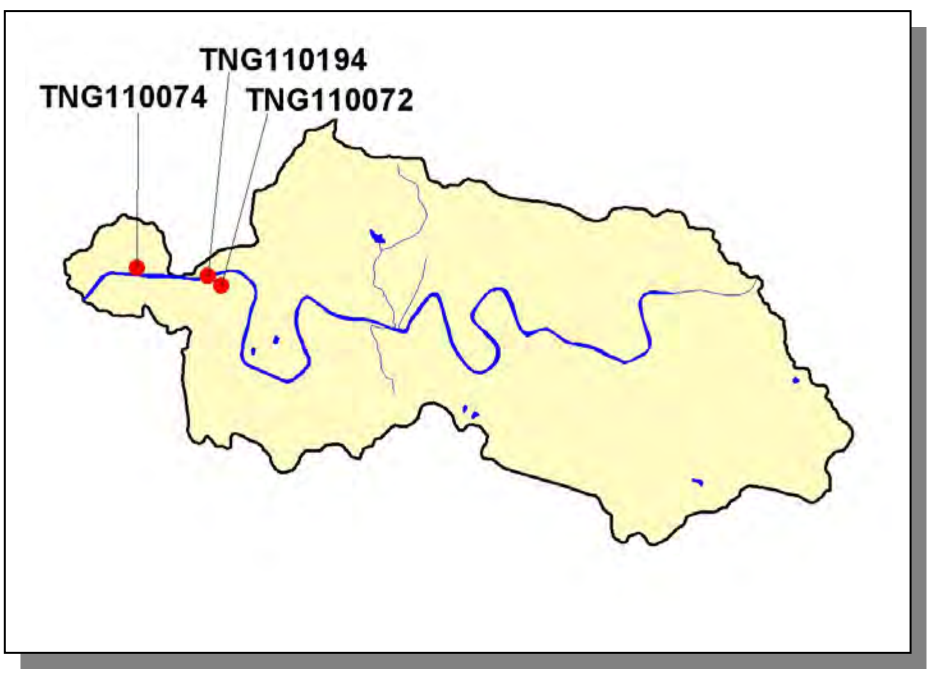

Figure 4-104. Location of Ready Mix Concrete Plants (RMCP) in Subwatershed 051302060407. *More information is provided in Appendix IV.*

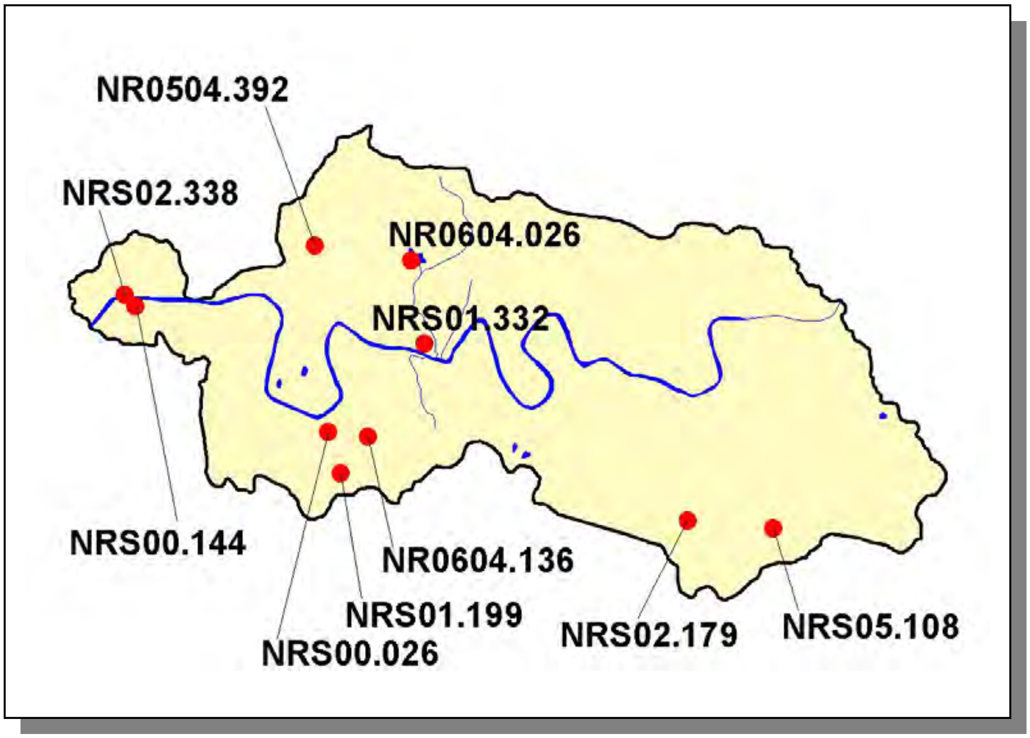

Figure 4-105. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051302060407. *More information is provided in Appendix IV.*

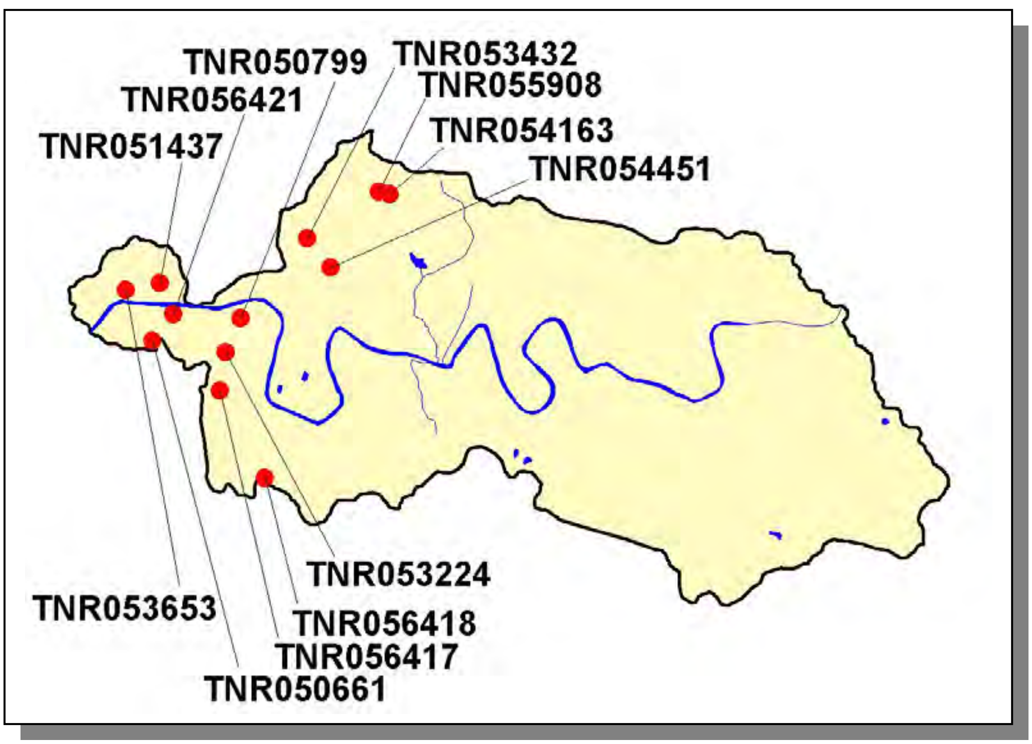

Figure 4-106. Location of TMSP Sites in Subwatershed 051302060407. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.C.vii.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
873	1,683	41	<5	77	6

Table 4-76. Summary of Livestock Count Estimates in Subwatershed 051302060407. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Montgomery	16,051	30,959	760	913	1,408	107

Table 4-77. Summary of Livestock Count Estimates in Montgomery County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.45
Grass (Hayland)	0.29
Legumes, Grass (Hayland)	0.40
Grass, Forbs, Legumes (Mixed Pasture)	0.55
Corn (Row Crops)	8.04
Soybeans (Row Crops)	4.26
Tobacco (Row Crops)	22.25
Conservation Reserve Program Lands	0.41
Farmsteads and Ranch Headquarters	0.04

Table 4-78. Annual Estimated Total Soil Loss in Subwatershed 051302060407.

4.2.D. 0513020605.

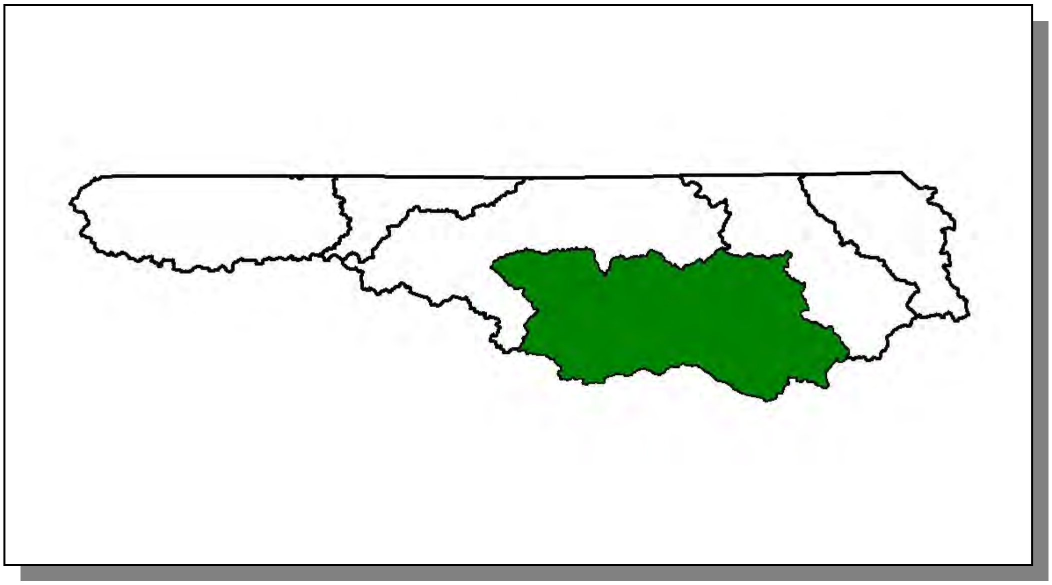

Figure 4-107. Location of Subwatershed 0513020605. *All Red River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.D.i. 051302060501 (Sulphur Fork Creek).

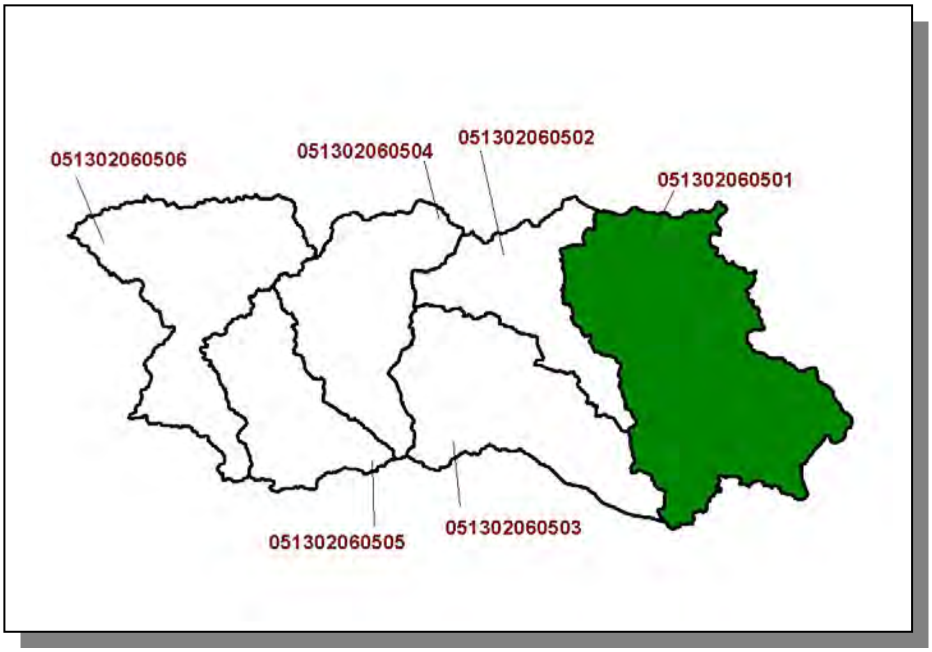

Figure 4-108. Location of Subwatershed 051302060501. *HUC-12 subwatershed boundaries are shown for reference.*

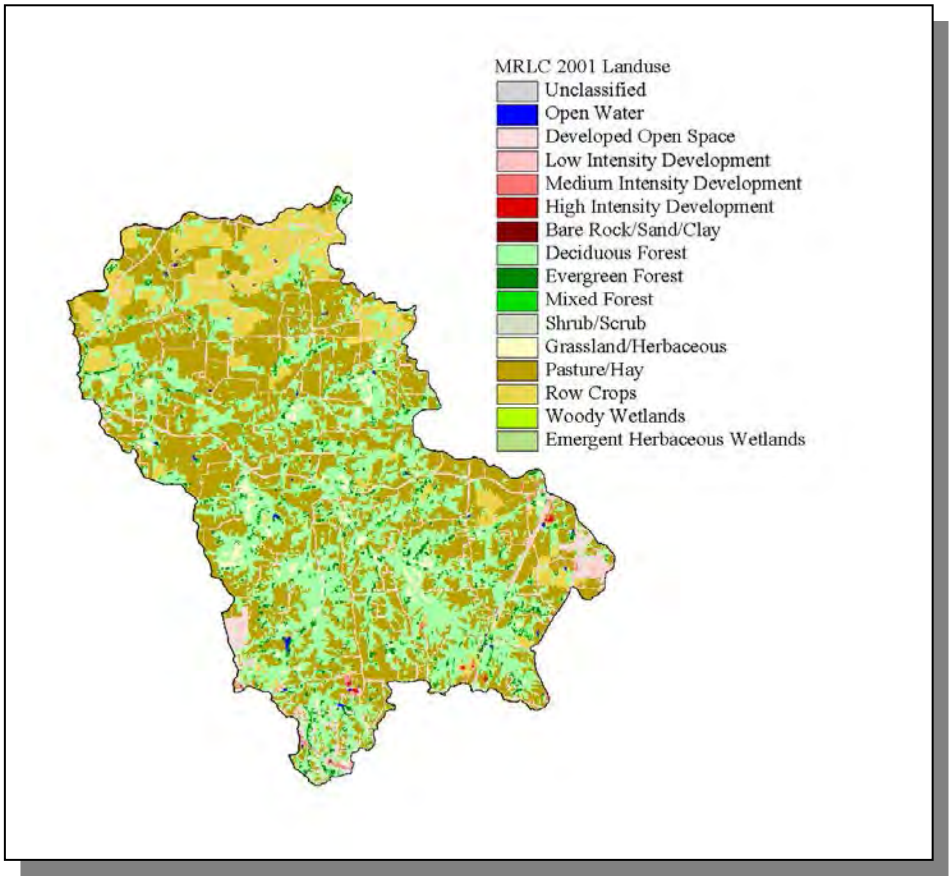

Figure 4-109. Illustration of Land Use Distribution in Subwatershed 051302060501.

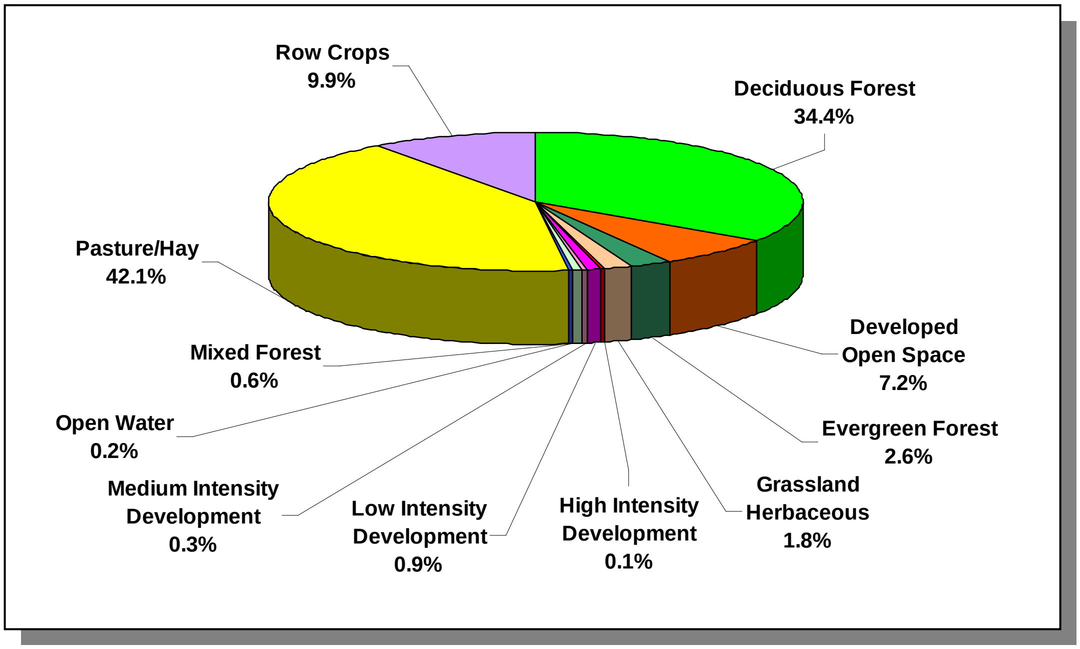

Figure 4-110. Land Use Distribution in Subwatershed 051302060501. *More information is provided in Appendix IV.*

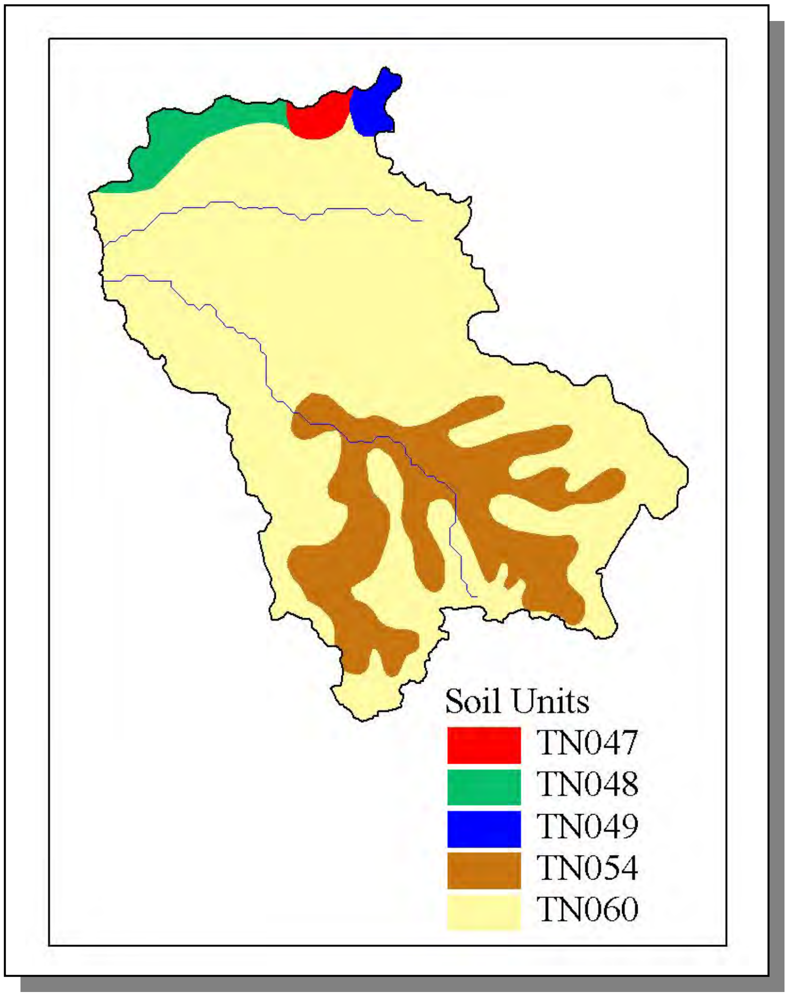

Figure 4-111. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060501.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN047	21.00	C	1.62	5.73	Silty Loam	0.37
TN048	8.00	B	1.38	5.06	Silty Loam	0.42
TN049	0.00	C	1.30	5.94	Silty Loam	0.34
TN054	0.00	B	3.04	4.84	Loam	0.32
TN060	5.00	C	1.30	5.32	Silty Loam	0.39

Table 4-79. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060501. *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)
Robertson	41,494	51,533	54,433	12.43	5,156	6,403	6,764	31.2
Sumner	103,281	121,936	130,449	0.45	468	553	591	26.3
Total	**144,775**	**173,469**	**184,882**		**5,624**	**6,956**	**7,355**	**30.8**

Table 4-80. Population Estimates in Subwatershed 051302060501.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Greenbrier	Robertson	2,873	1,111	1,106	86	9
Millersville	Sumner	2,544	1,033	849	180	4
Nashville	Davidson	488,518	219,521	203,640	15,576	305
Springfield	Robertson	11,227	4,530	4,436	94	0
White House	Robertson	3,025	1,130	991	136	3
Total		**508,187**	**227,325**	**211,022**	**16,072**	**321**

Table 4-81. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302060501.

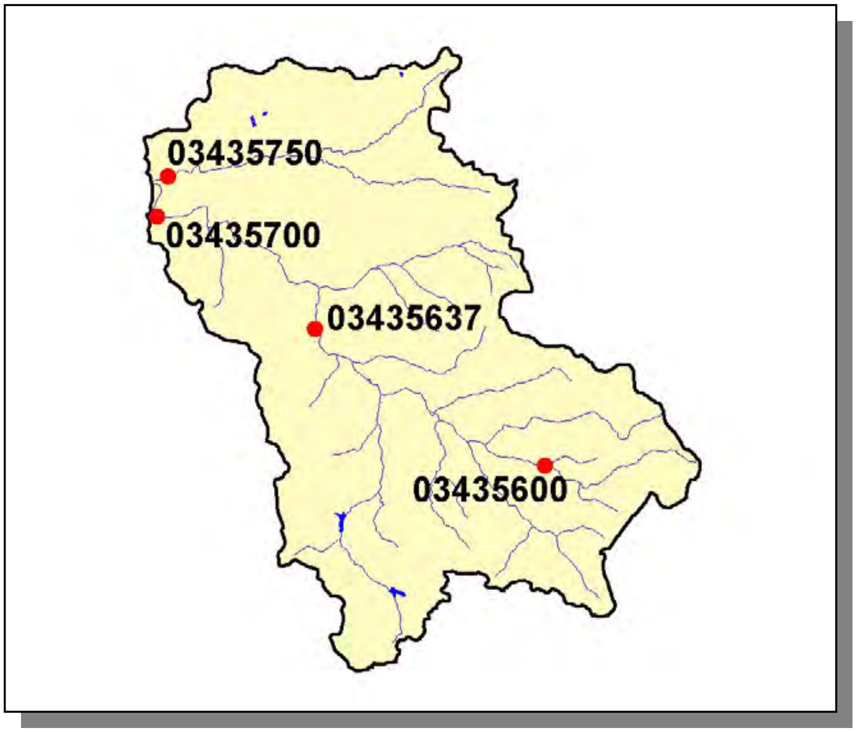

Figure 4-112. Location of Historical Streamflow Data Collection Sites in Subwatershed 051302060501. *More information is provided in Appendix IV.*

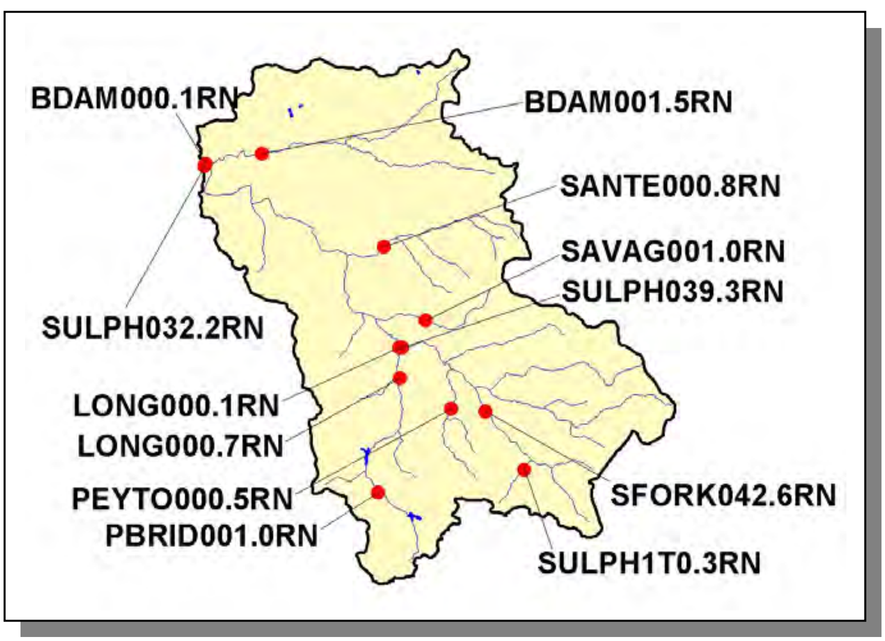

Figure 4-113. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060501. *More information, including site names and locations and stations located in the watershed outside of Tennessee, is provided in Appendix IV.*

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

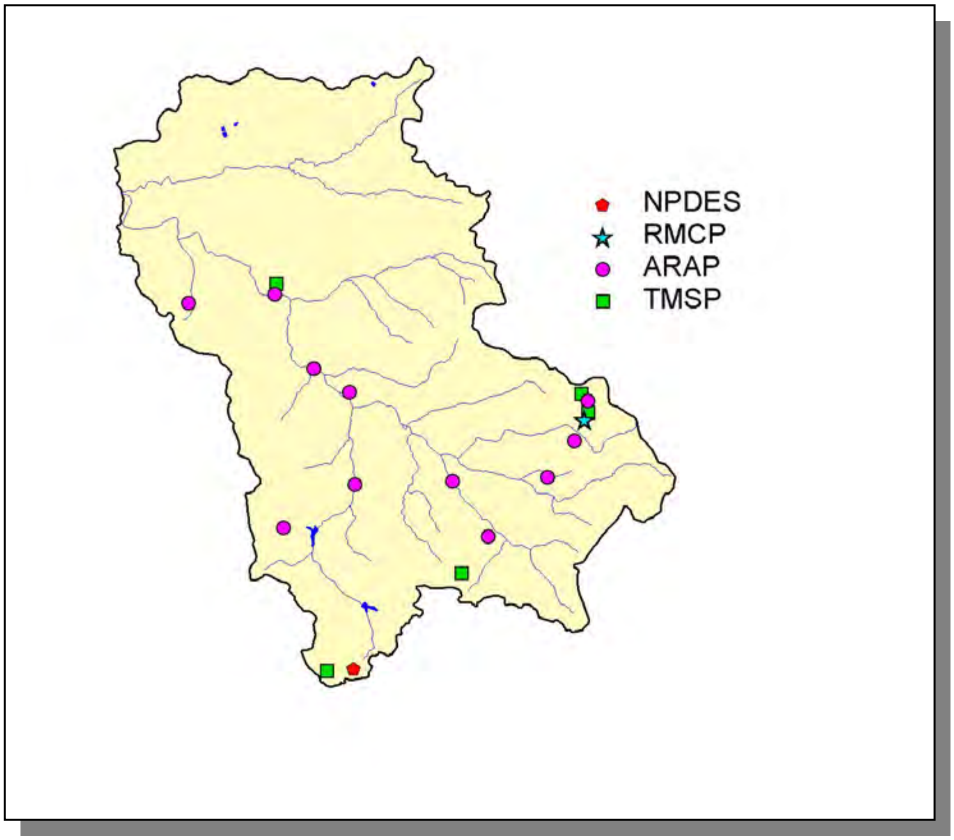

Figure 4-114. Location of Permits Issued in Subwatershed 051302060501. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-115. Location of Active NPDES Sites in Subwatershed 051302060501. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-116. Location of Ready Mix Concrete Plants (RMCP) in Subwatershed 051302060501. *More information is provided in Appendix IV.*

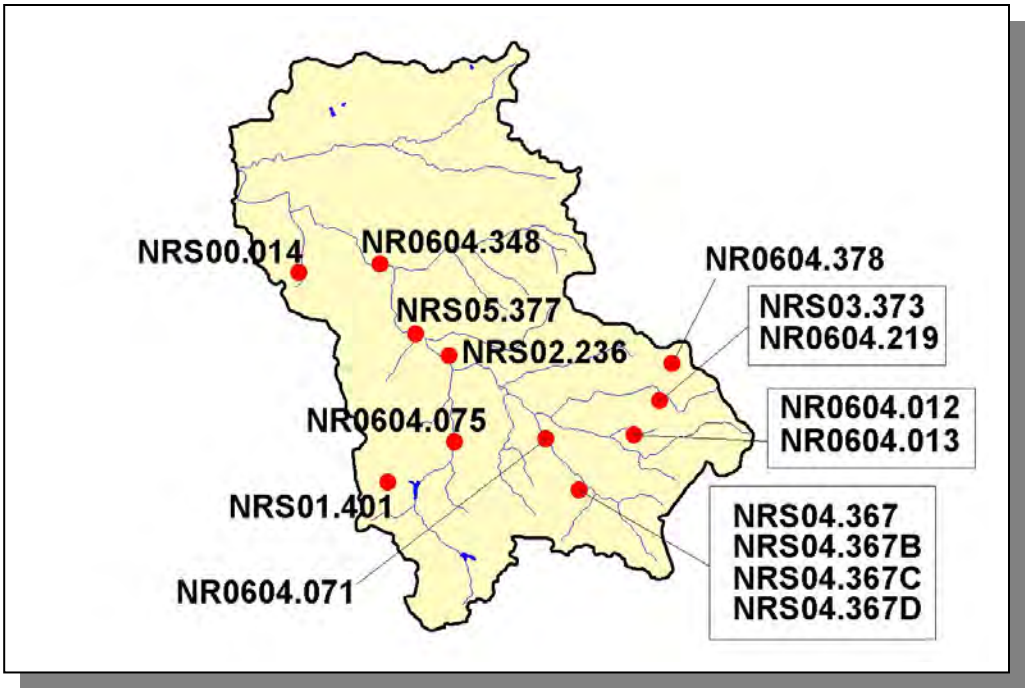

Figure 4-117. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051302060501. *More information is provided in Appendix IV.*

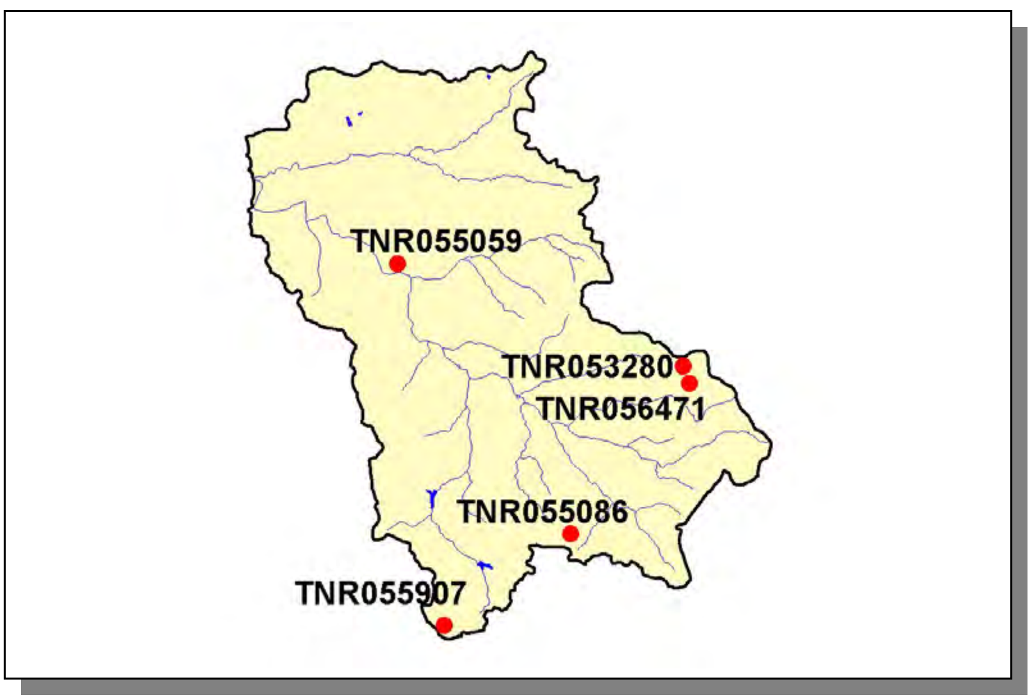

Figure 4-118. Location of TMSP Sites in Subwatershed 051302060501. *More information, including the names of facilities, is provided in Appendix IV.*

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
2,887	6,129	434	<5	868	35

Table 4-82. Summary of Livestock Count Estimates in Subwatershed 051302060501. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Robertson	22,502	47,887	3,478	31	6,982	279
Sumner	22,296	45,116	1,515	50	2,500	189

Table 4-83. Summary of Livestock Count Estimates in Montgomery and Sumner Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Robertson	53.0	53.0	2.2	9.7
Sumner	88.2	88.2	2.0	6.3

Table 4-84. Forest Acreage and Annual Removal Rates (1987-1994) in Robertson and Sumner Counties.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.66
Grass (Hayland)	0.37
Legumes, Grass (Hayland)	0.52
Legumes (Hayland)	0.71
Grass, Forbs, Legumes (Mixed Pasture)	0.42
Corn (Row Crops)	5.43
Soybeans (Row Crops)	10.08
Tobacco (Row Crops)	11.87
Wheat (Close-Grown Cropland)	1.68
Other Cropland not Planted	9.97
Conservation Reserve Program Lands	0.36
Other Land in Farms	0.27
Farmsteads and Ranch Headquarters	0.93

Table 4-85. Annual Estimated Total Soil Loss in Subwatershed 051302060501.

4.2.D.ii. 051302060502 (Sulphur Fork Creek).

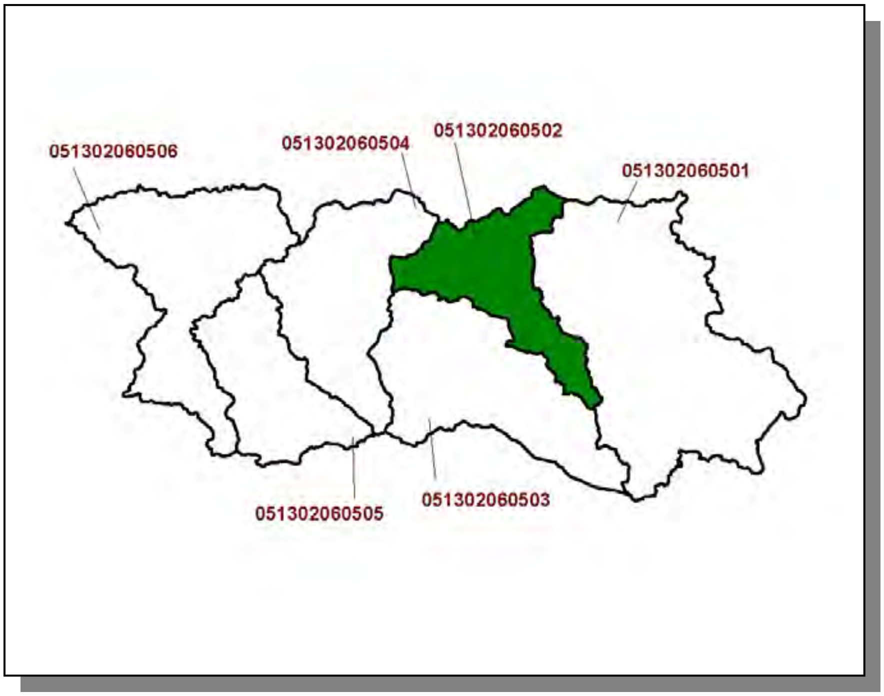

Figure 4-119. Location of Subwatershed 051302060502. *HUC-12 subwatershed boundaries are shown for reference.*

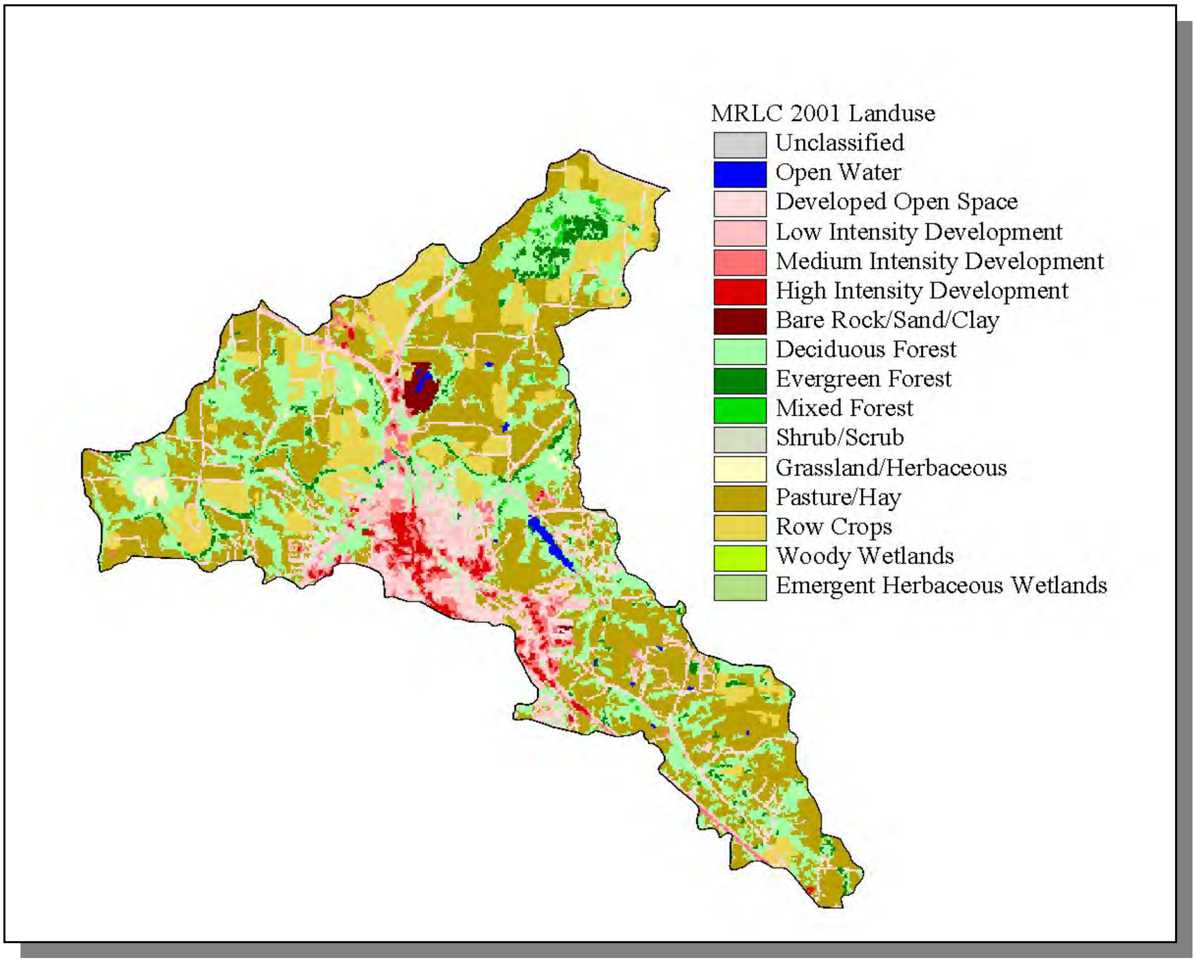

Figure 4-120. Illustration of Land Use Distribution in Subwatershed 051302060502.

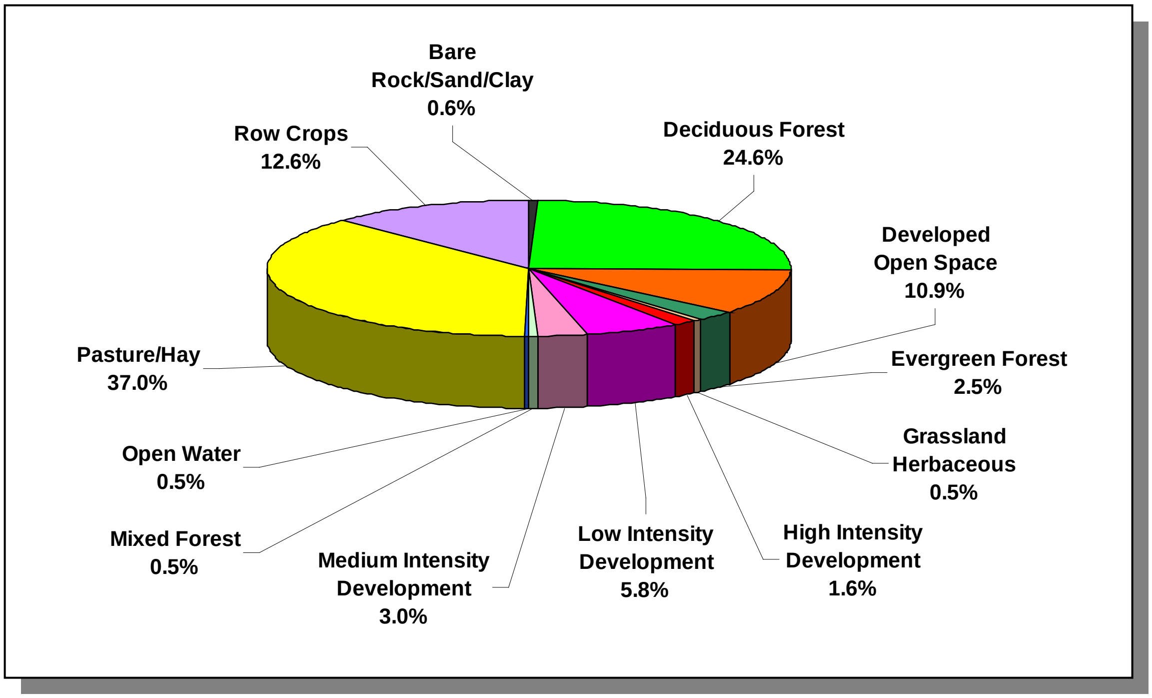

Figure 4-121. Land Use Distribution in Subwatershed 051302060502. *More information is provided in Appendix IV.*

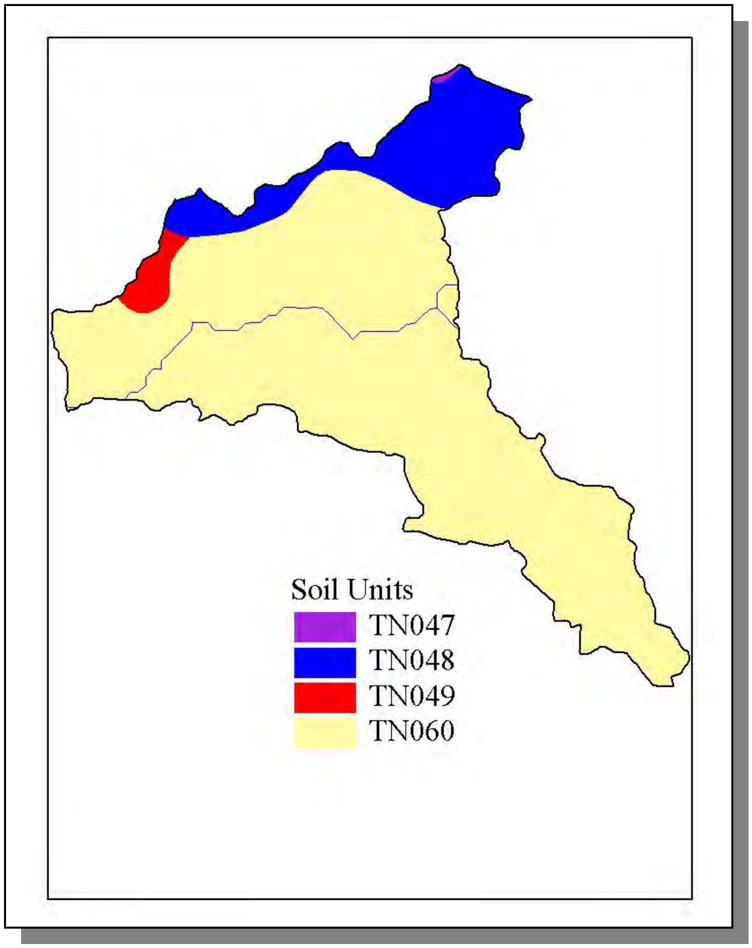

Figure 4-122. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060502.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN047	21.00	C	1.62	5.73	Silty Loam	0.37
TN048	8.00	B	1.38	5.06	Silty Loam	0.42
TN049	0.00	C	1.30	5.94	Silty Loam	0.34
TN060	5.00	C	1.30	5.32	Silty Loam	0.39

Table 4-86. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060502. *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)
Robertson	41,494	51,533	54,433	4.64	1,926	2,392	2,526	31.2

Table 4-87. Population Estimates in Subwatershed 051302060502.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Greenbrier	Robertson	2,873	1,111	1,016	86	9
Springfield	Robertson	11,227	4,530	4,436	94	0
Total		**14,100**	**5,641**	**5,452**	**180**	**9**

Table 4-88. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302060502.

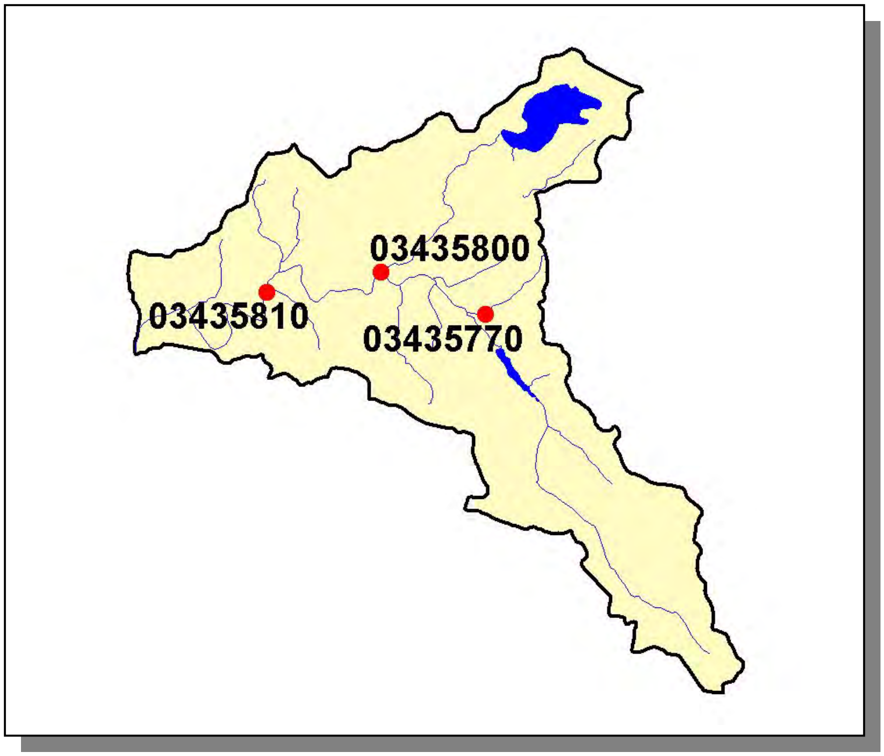

Figure 4-123. Location of Historical Streamflow Data Collection Sites in Subwatershed 051302060502. *More information is provided in Appendix IV.*

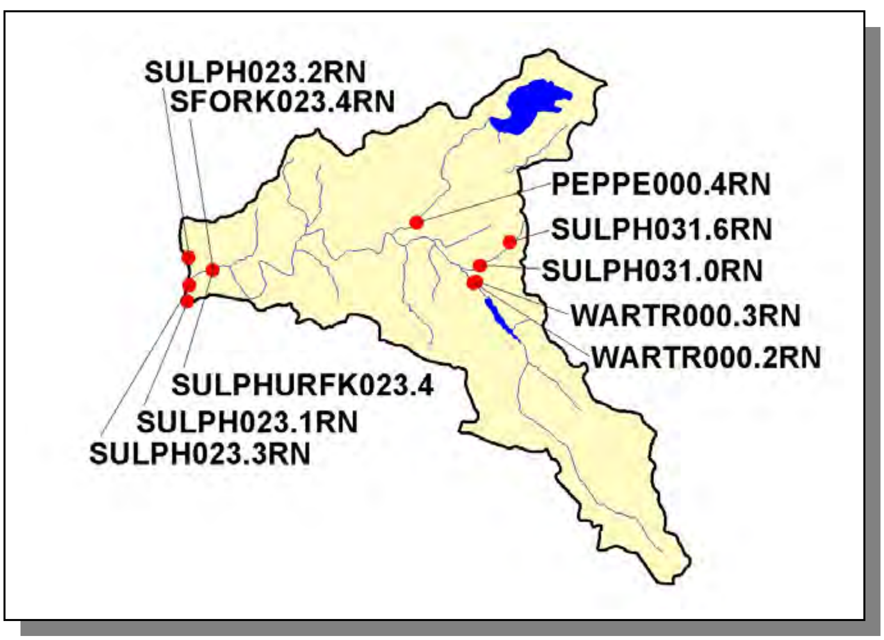

Figure 4-124. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060502. *More information, including site names and locations and stations located in the watershed outside of Tennessee, is provided in Appendix IV.*

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

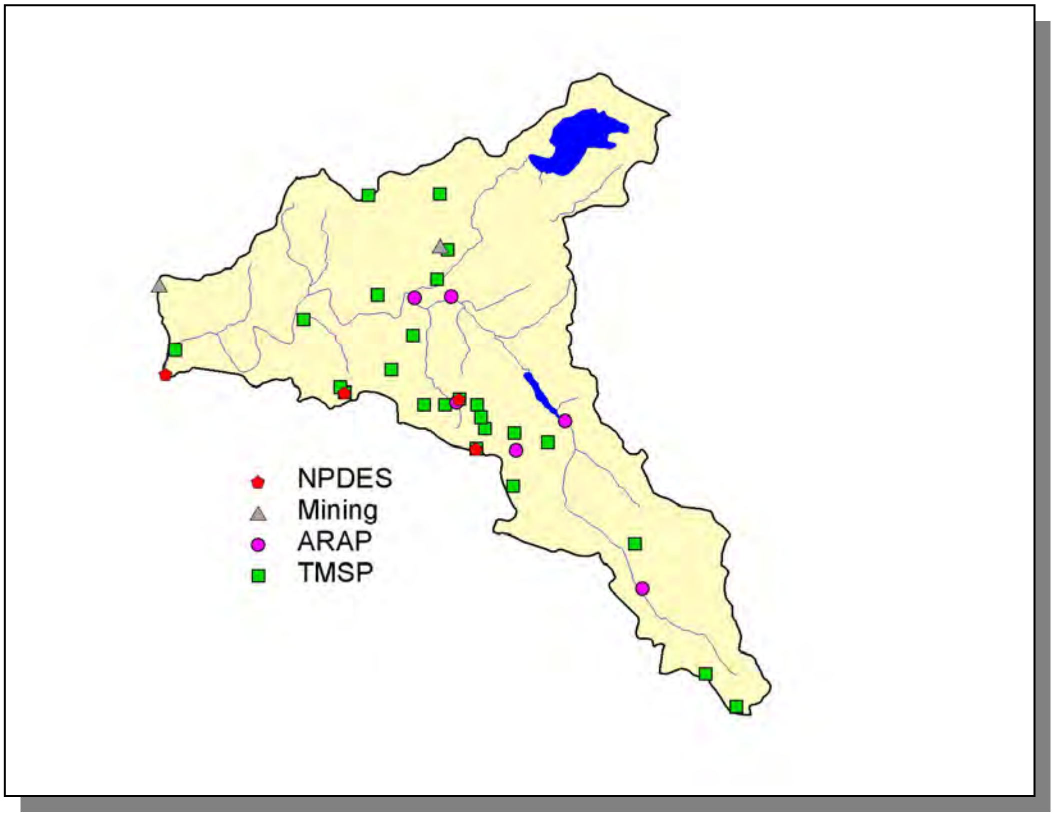

Figure 4-125. Location of Permits Issued in Subwatershed 051302060502. *More information, including the names of facilities, is provided in Appendix IV.*

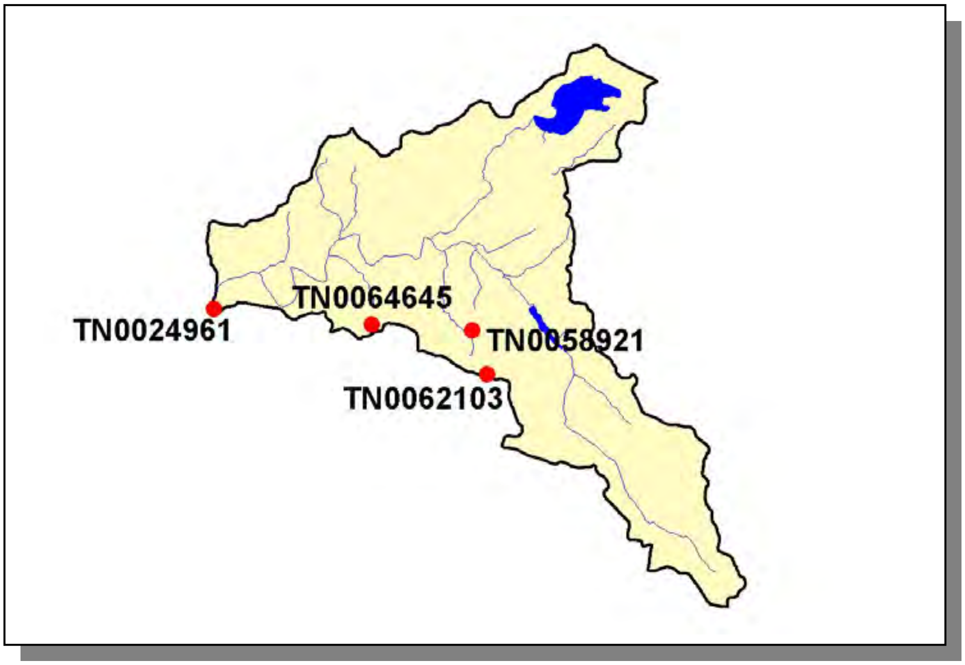

Figure 4-126. Location of Active NPDES Sites in Subwatershed 051302060502. *More information, including the names of facilities, is provided in Appendix IV.*

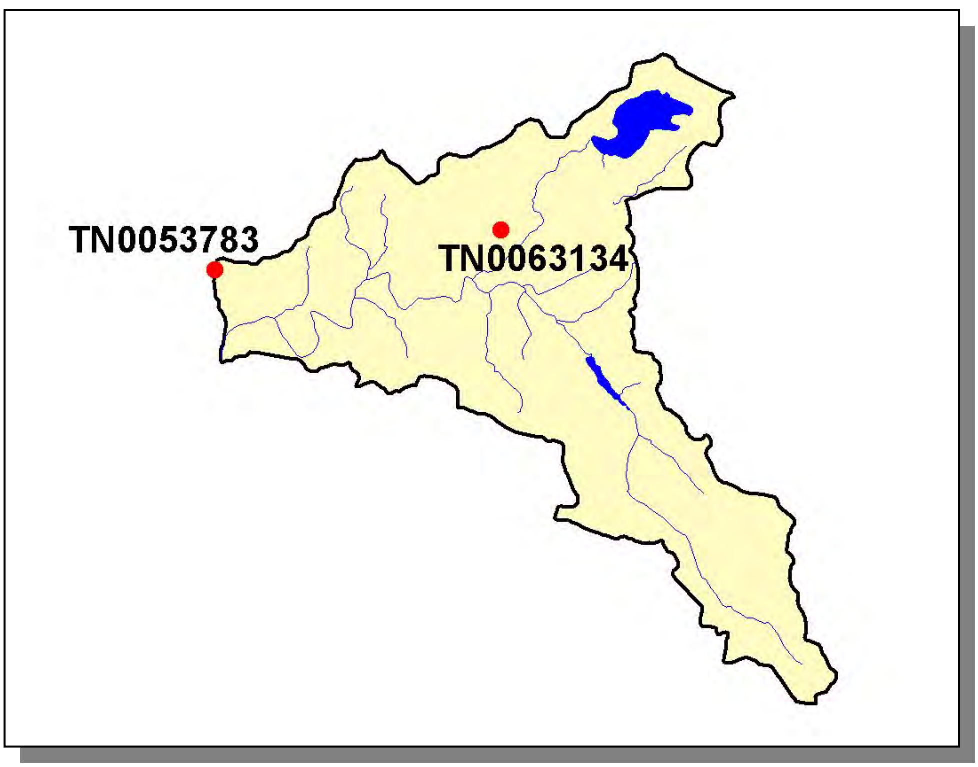

Figure 4-127. Location of Active Mining Sites in Subwatershed 051302060502. *More information, including the names of mining operations, is provided in Appendix IV.*

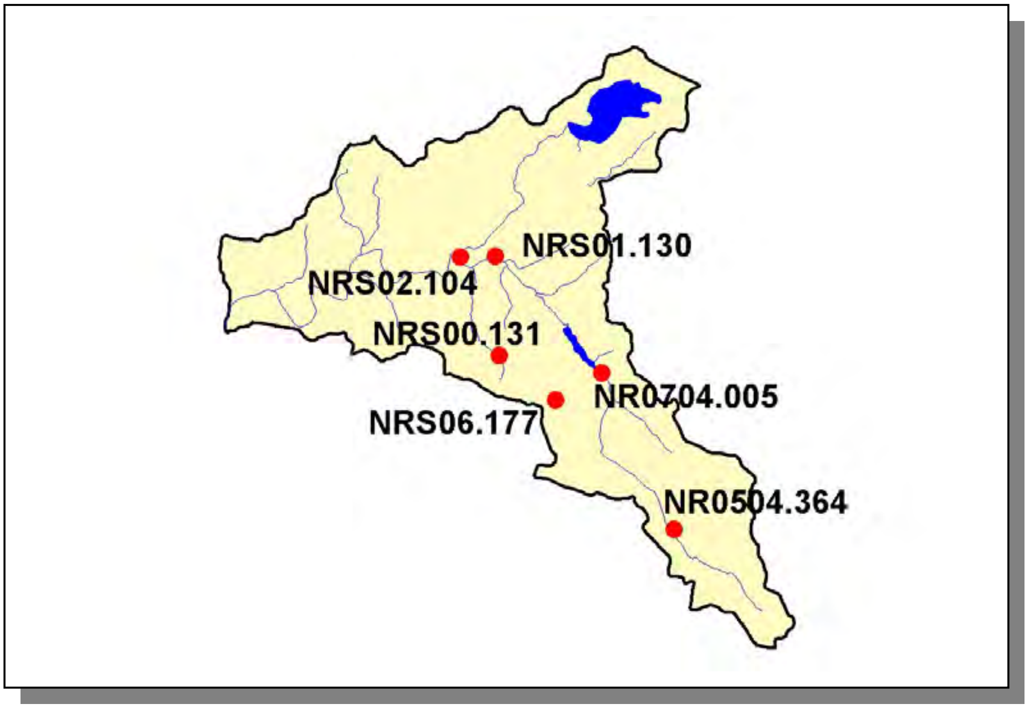

Figure 4-128. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051302060502. *More information is provided in Appendix IV.*

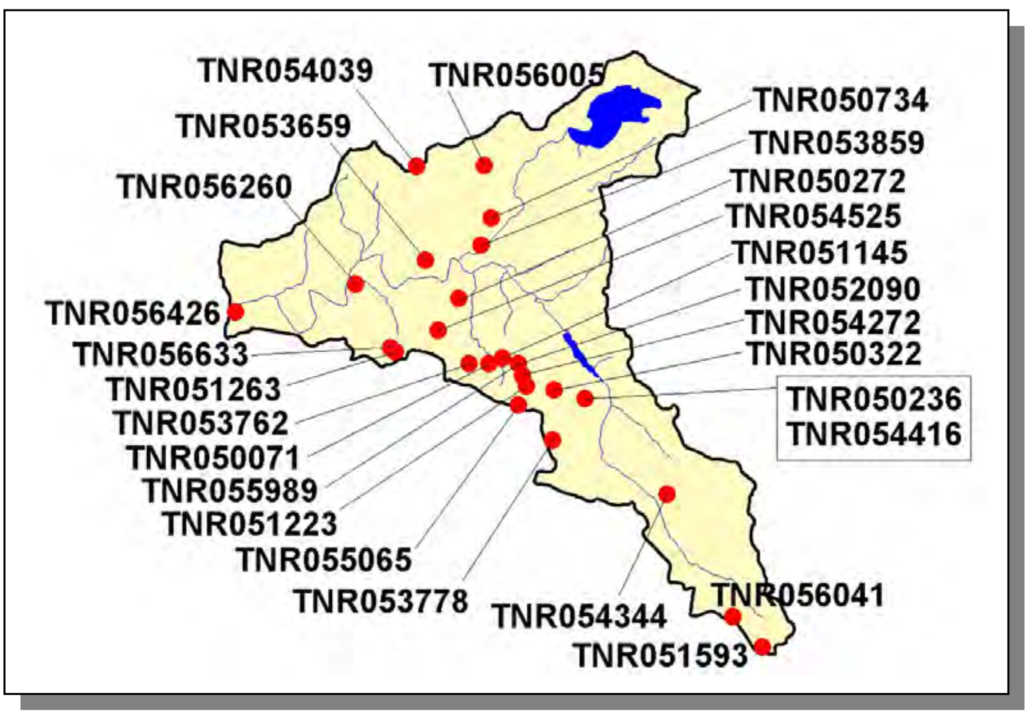

Figure 4-129. Location of TMSP Sites in Subwatershed 051302060502. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.D.ii.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 051302060502:

- TN0024961 (Springfield STP) discharges to Sulphur Fork Creek @ RM 23.2

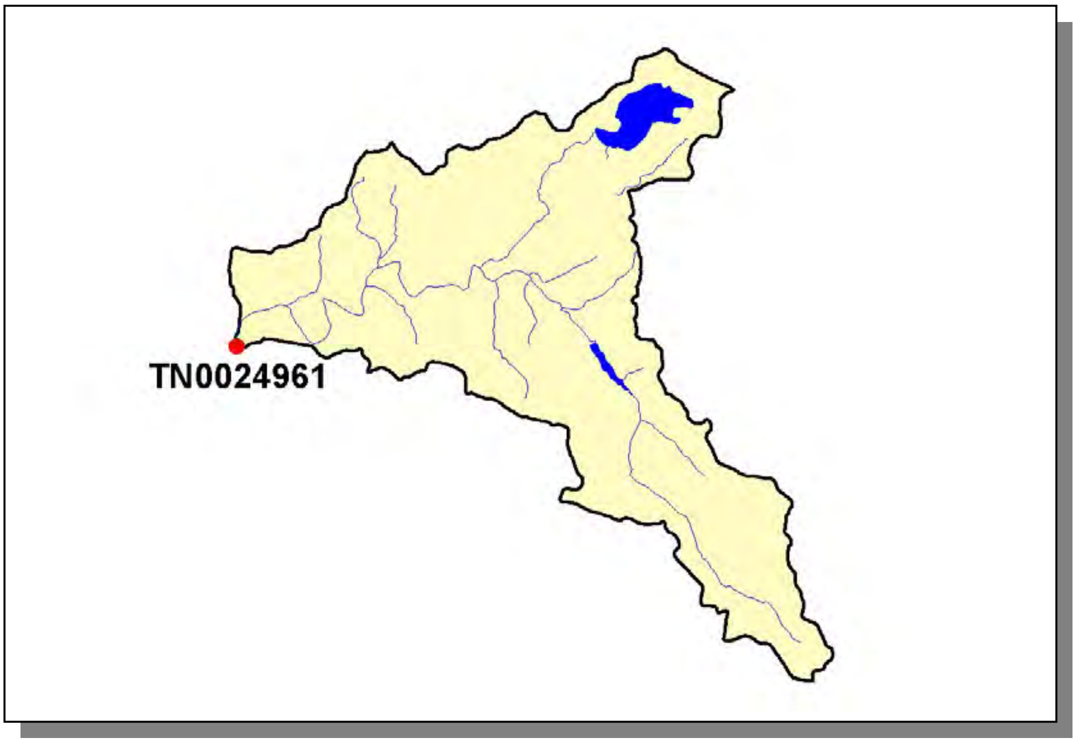

Figure 4-130. Location of NPDES Dischargers to Water Bodies Listed on the 2004 303(d) List in Subwatershed 051302060502. *More information, including the names of facilities, is provided in Appendix IV.*

Permit #	3Q2	1Q10	3Q10	3Q20	7Q10
TN0024961	5.82		2.85	2.23	3.09

Table 4-89. Receiving Stream Low Flow Information for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051302060502. *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 #	TOTAL NITROGEN	TOTAL PHOSPHOROUS	TEMPERATURE	FLOW
TN0024961	X	X	X	X

Table 4-90. Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051302060502.

PERMIT #	WET	$CBOD_5$	NH_3	Hg	CN	TSS	DO	pH
TN0024961	X	X	X	X	X	X	X	X

Table 4-91. Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051302060502. *WET, Whole Effluent Toxicity; $CBOD_5$, Carbonaceous Biochemical Oxygen Demand (5-Day); NH3, Ammonia, TSS, Total Suspended Solids; DO, Dissolved Oxygen.*

PERMIT #	*E. coli*
TN0024961	X

Table 4-92. Bacteria Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051302060502.

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
1,053	2,241	163	<5	327	13

Table 4-93. Summary of Livestock Count Estimates in Subwatershed 051302060502. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Robertson	22,502	47,887	3,478	31	6,982	279

Table 4-94. Summary of Livestock Count Estimates in Robertson County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Robertson	53.0	53.0	2.2	9.7

Table 4-95. Forest Acreage and Annual Removal Rates (1987-1994) in Robertson County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.67
Grass (Hayland)	0.37
Legumes, Grass (Hayland)	0.53
Legumes (Hayland)	0.73
Grass, Forbs, Legumes (Mixed Pasture)	0.42
Corn (Row Crops)	5.15
Soybeans (Row Crops)	10.03
Tobacco (Row Crops)	11.87
Wheat (Close-Grown Cropland)	1.68
Other Cropland not Planted	9.59
Conservation Reserve Program Lands	0.36
Other Land in Farms	0.27
Farmsteads and Ranch Headquarters	0.95

Table 4-96. Annual Estimated Total Soil Loss in Subwatershed 051302060502.

4.2.D.iii. 051302060503 (Carr Creek).

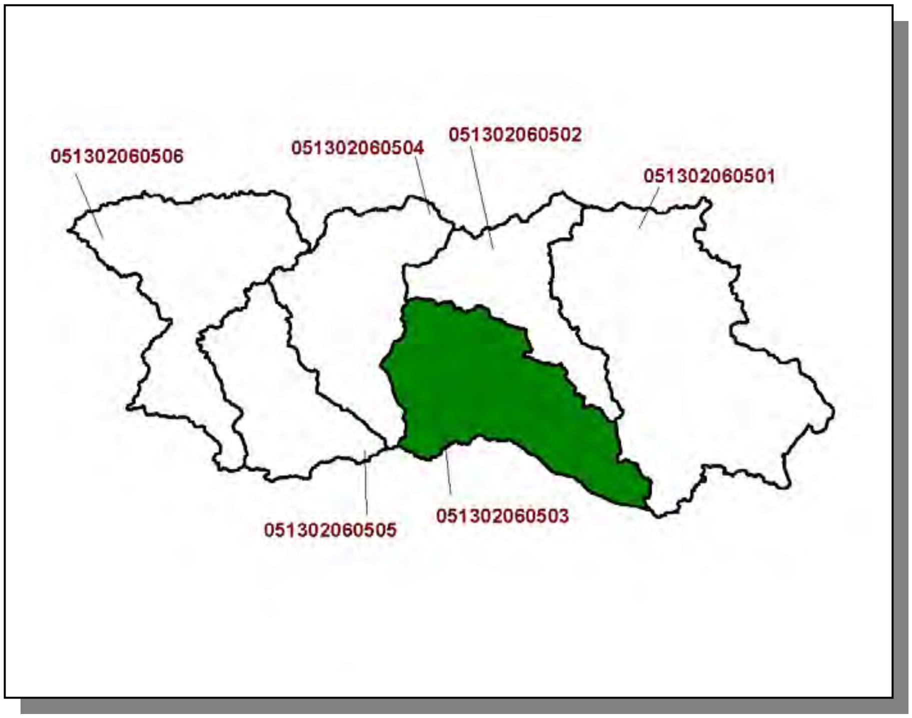

Figure 4-131. Location of Subwatershed 051302060503. *All HUC-12 subwatershed boundaries are shown for reference.*

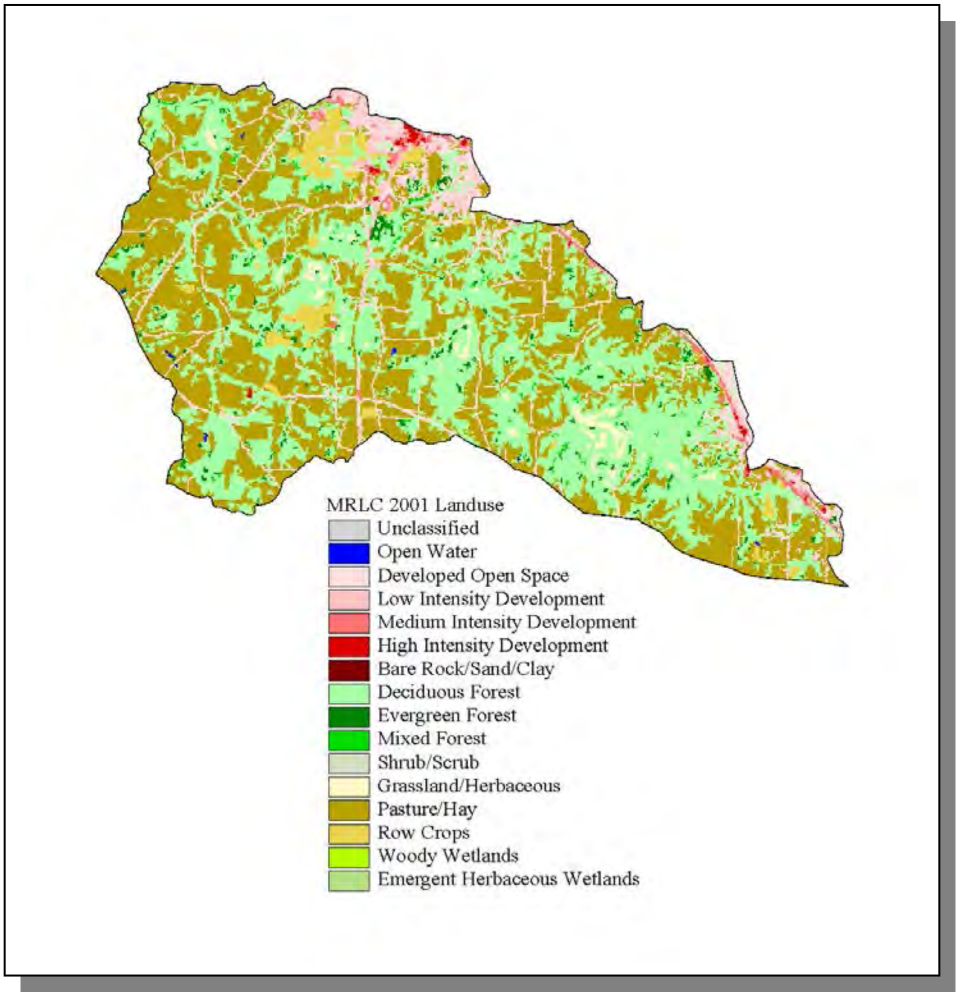

Figure 4-132. Illustration of Land Use Distribution in Subwatershed 051302060503.

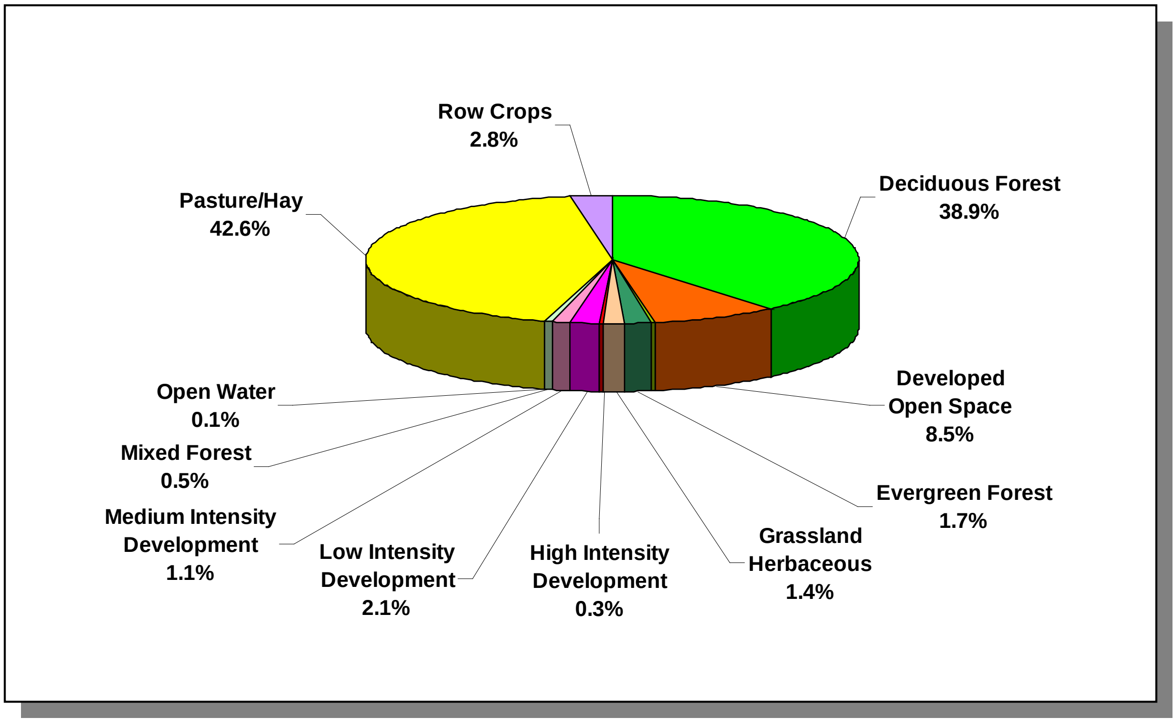

Figure 4-133. Land Use Distribution in Subwatershed 051302060503. *More information is provided in Appendix IV.*

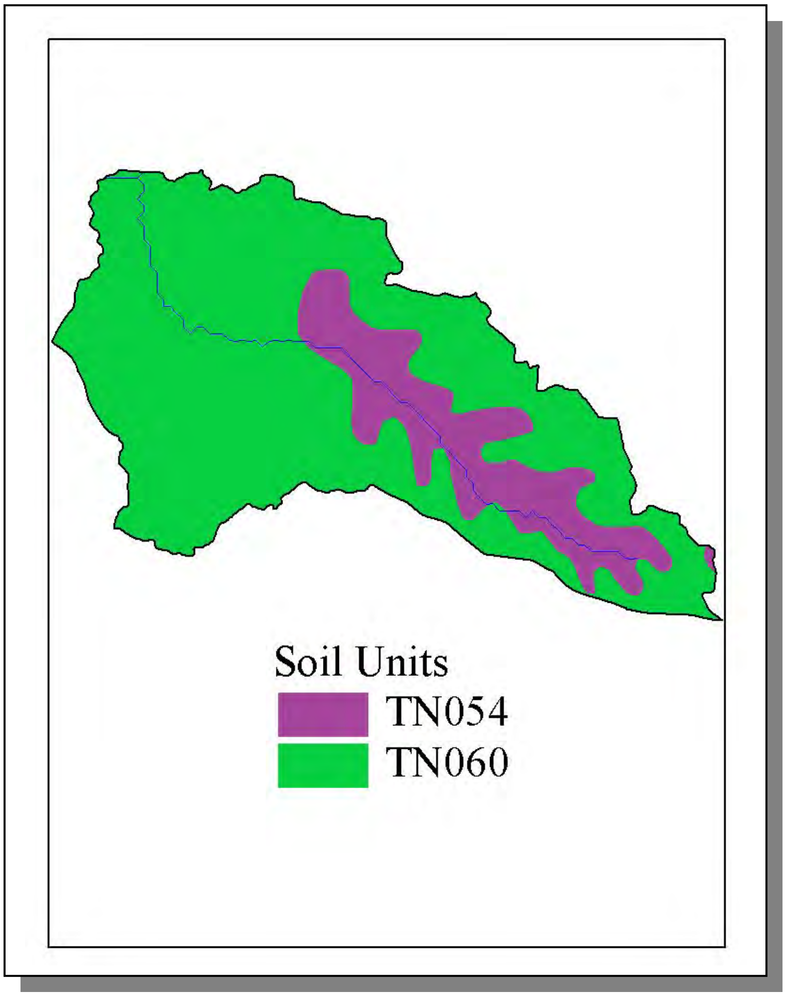

Figure 4-134. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060503.

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

Table 4-97. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060503. *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)
Robertson	41,494	51,533	54,433	7.36	3,055	3,794	4,007	31.2

Table 4-98. Population Estimates in Subwatershed 051302060503.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Greenbrier	Robertson	2,873	1,111	1,016	86	9
Ridgetop	Robertson	1,129	396	7	389	0
Springfield	Robertson	11,227	4,530	4,436	94	0
Total		**15,229**	**6,037**	**5,459**	**569**	**9**

Table 4-99. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302060503.

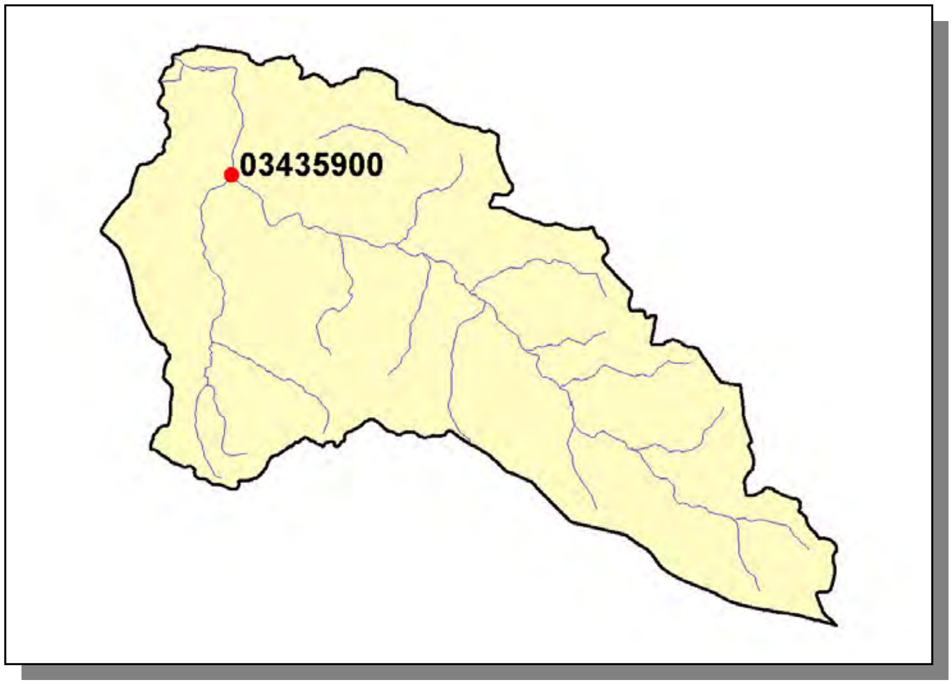

Figure 4-135. Location of Historical Streamflow Data Collection Sites in Subwatershed 051302060503. *More information is provided in Appendix IV.*

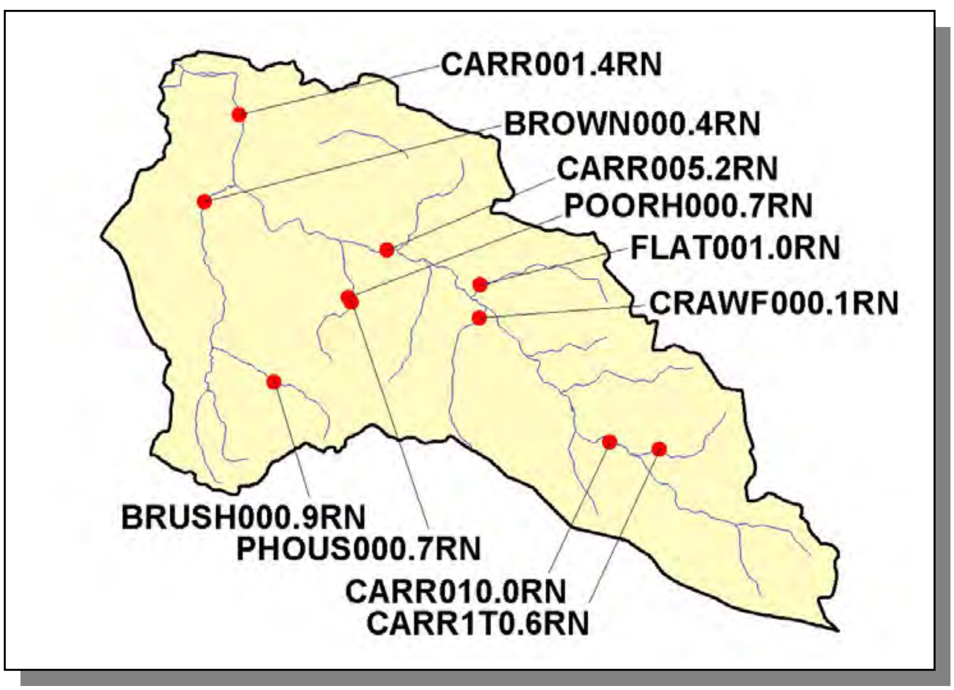

Figure 4-136. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060503. *More information, including site names and locations and stations located in the watershed outside of Tennessee, is provided in Appendix IV.*

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

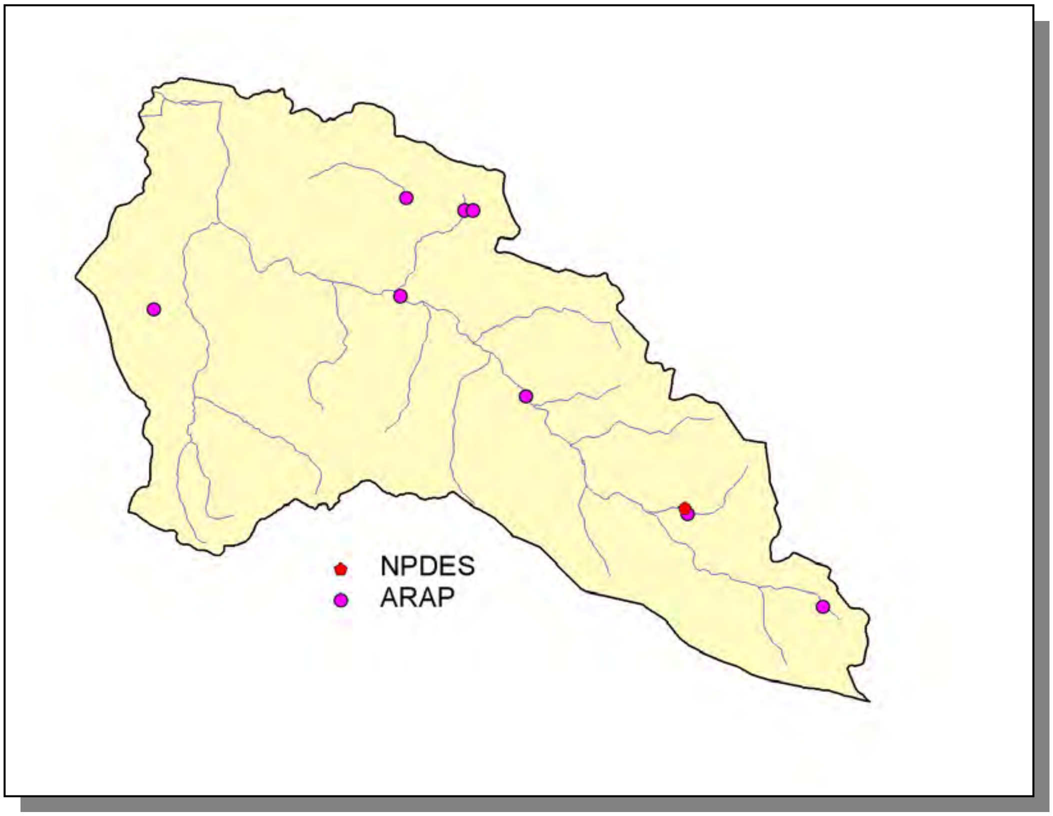

Figure 4-137. Location of Permits Issued in Subwatershed 051302060503. More information, including the names of facilities, is provided in Appendix IV.

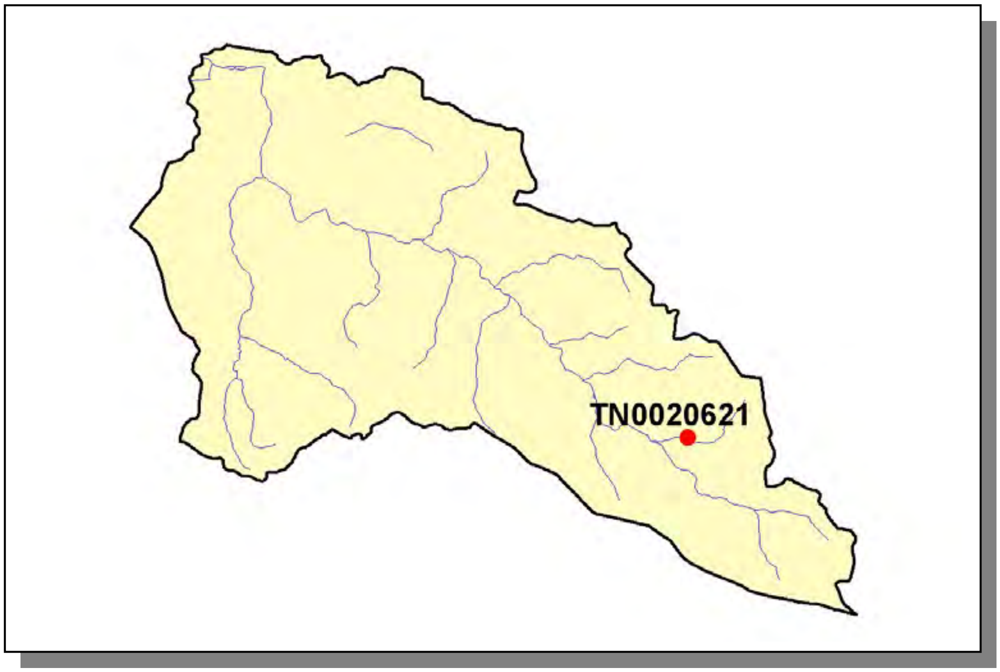

Figure 4-138. Location of Active NPDES Sites in Subwatershed 051302060503. *More information, including the names of facilities, is provided in Appendix IV.*

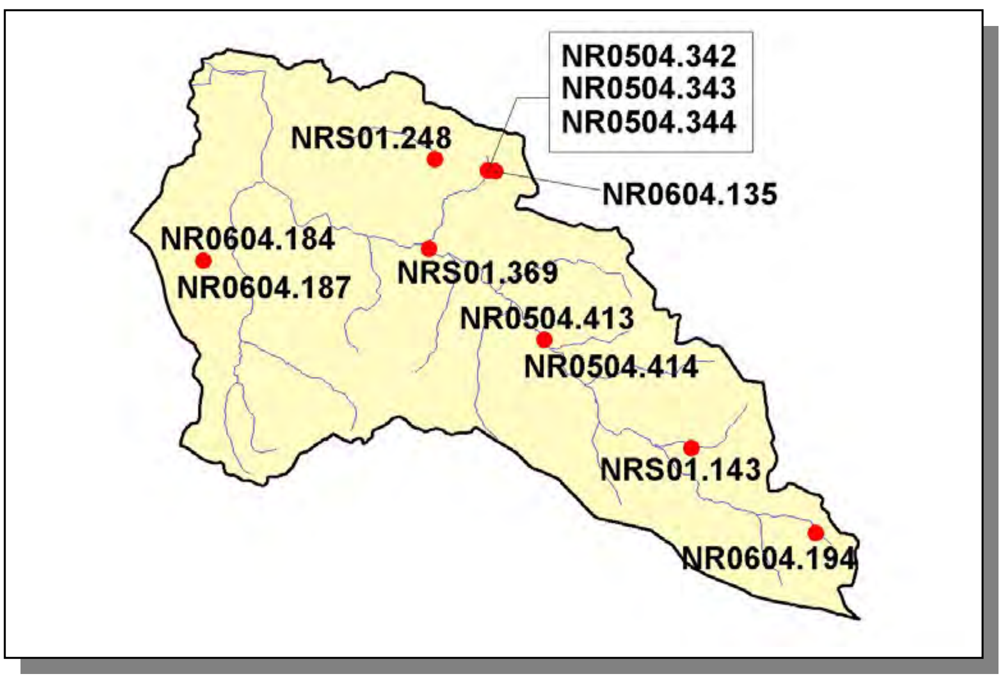

Figure 4-139. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051302060503. *More information is provided in Appendix IV.*

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
1,454	3,094	225	<5	451	18

Table 4-100. Summary of Livestock Count Estimates in Subwatershed 051302060503. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Robertson	22,502	47,887	3,478	31	6,982	279

Table 4-101. Summary of Livestock Count Estimates in Robertson County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Robertson	53.0	53.0	2.2	9.7

Table 4-102. Forest Acreage and Annual Removal Rates (1987-1994) in Robertson County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.67
Grass (Hayland)	0.37
Legumes, Grass (Hayland)	0.53
Legumes (Hayland)	0.73
Grass, Forbs, Legumes (Mixed Pasture)	0.42
Corn (Row Crops)	5.15
Soybeans (Row Crops)	10.03
Tobacco (Row Crops)	11.87
Wheat (Close-Grown Cropland)	1.68
Other Cropland not Planted	9.59
Conservation Reserve Program Lands	0.36
Other Land in Farms	0.27
Farmsteads and Ranch Headquarters	0.95

Table 4-103. Annual Estimated Total Soil Loss in Subwatershed 051302060503.

4.2.D.iv. 051302060504 (Sulphur Fork Creek).

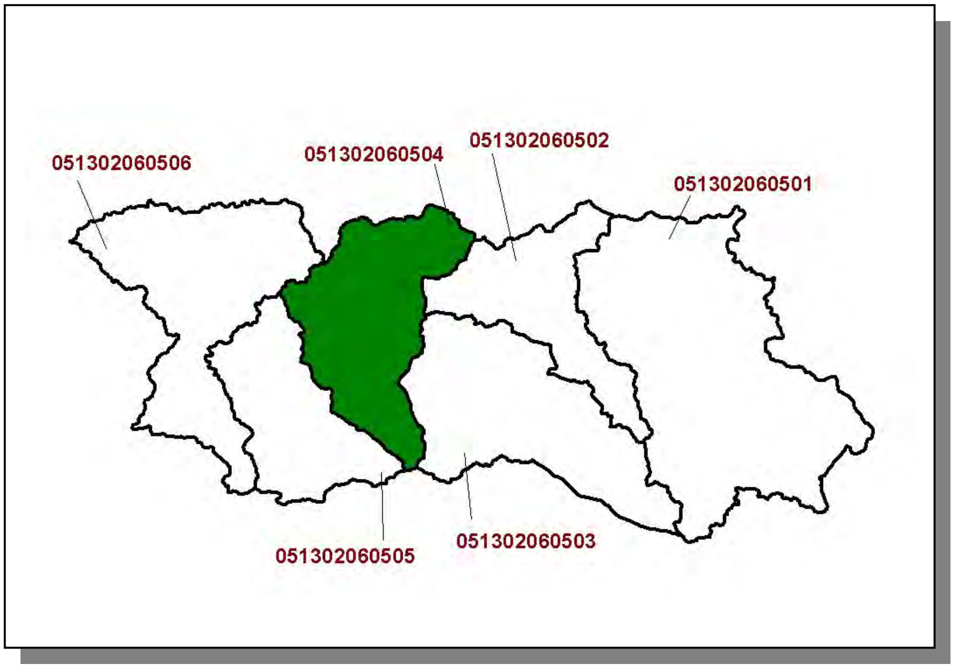

Figure 4-140. Location of Subwatershed 051302060504. *HUC-12 subwatershed boundaries are shown for reference.*

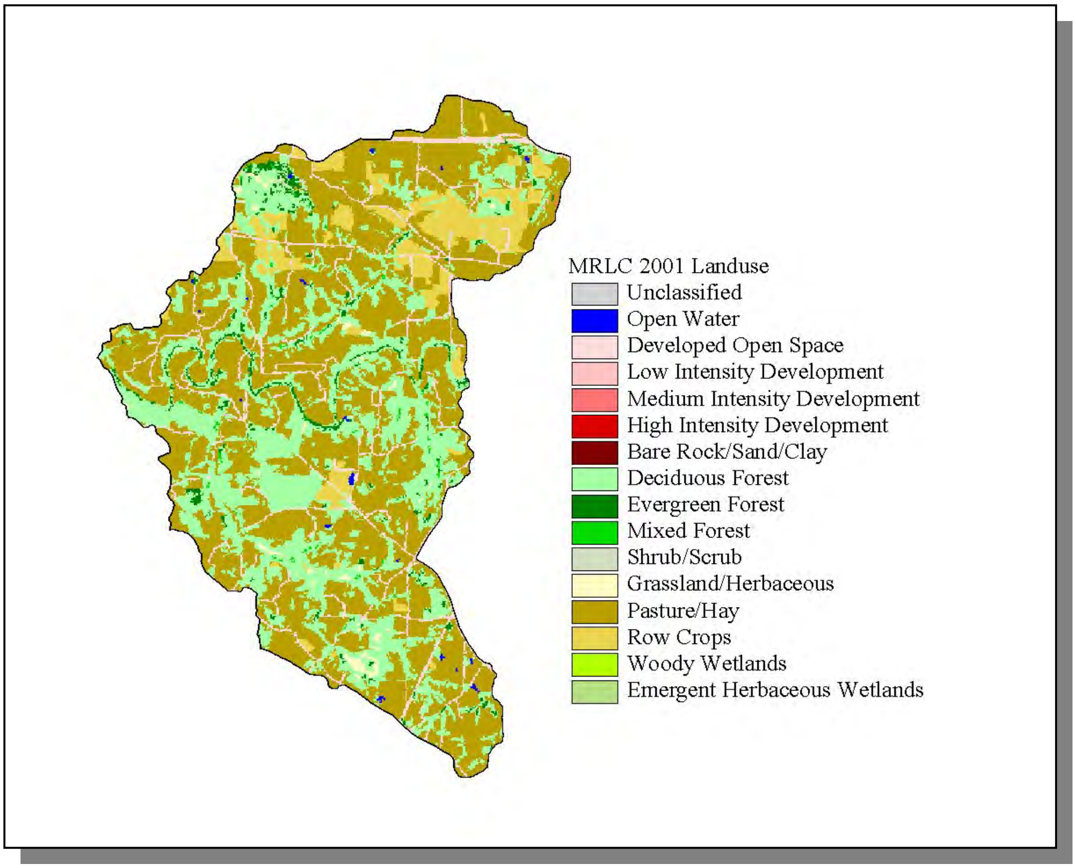

Figure 4-141. Illustration of Land Use Distribution in Subwatershed 051302060504.

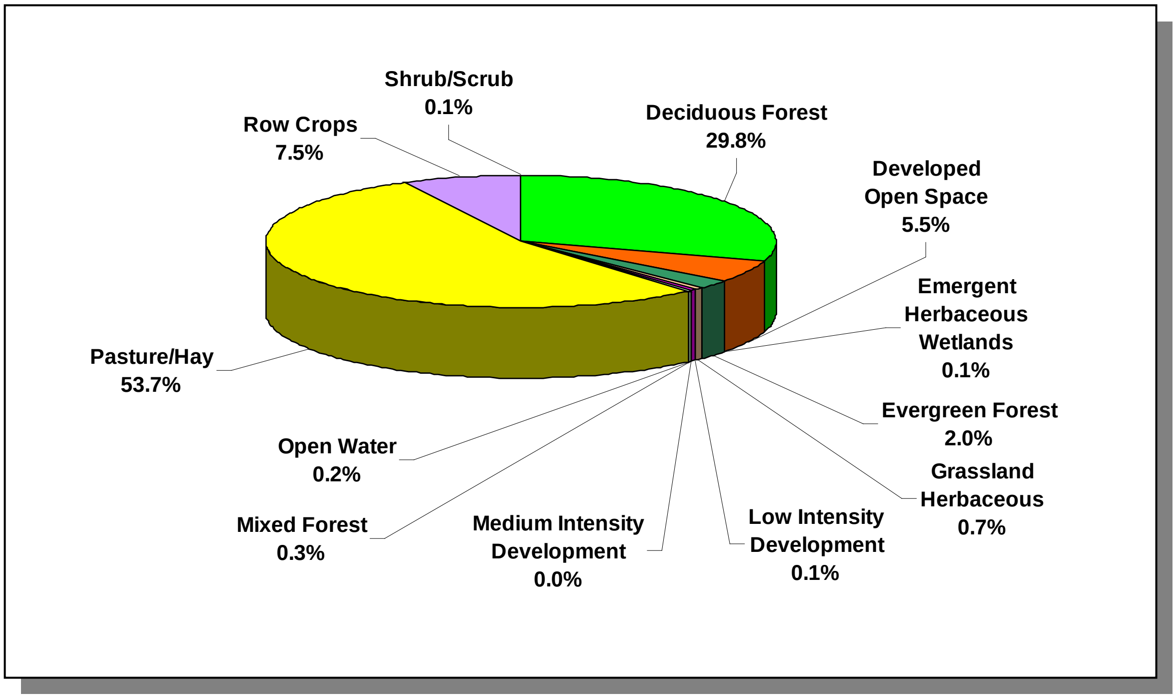

Figure 4-142. Land Use Distribution in Subwatershed 051302060504. *More information is provided in Appendix IV.*

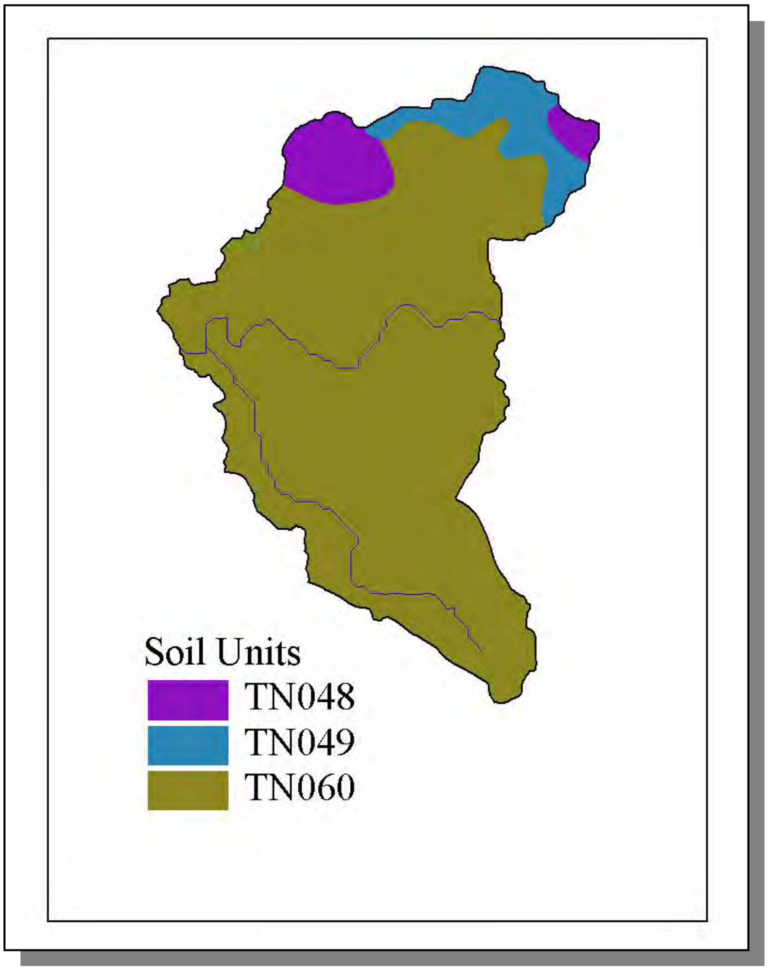

Figure 4-143. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060504.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN048	8.00	B	1.38	5.06	Silty Loam	0.42
TN049	0.00	C	1.30	5.94	Silty Loam	0.34
TN060	5.00	C	1.30	5.32	Silty Loam	0.39

Table 4-104. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060504. *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)
Robertson	41,494	51,533	54,433	6.27	2,600	3,230	3,411	31,2

Table 4-105. Population Estimates in Subwatershed 051302060504.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Cedar Hill	Robertson	363	128	16	105	7

Table 4-106. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302060504.

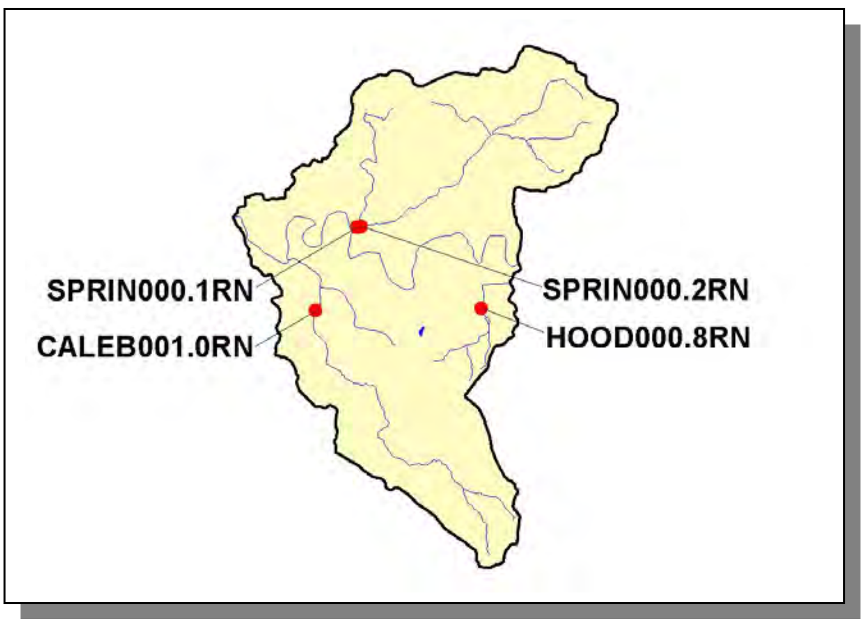

Figure 4-144. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060504. *More information, including site names and locations and stations located in the watershed outside of Tennessee, is provided in Appendix IV.*

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

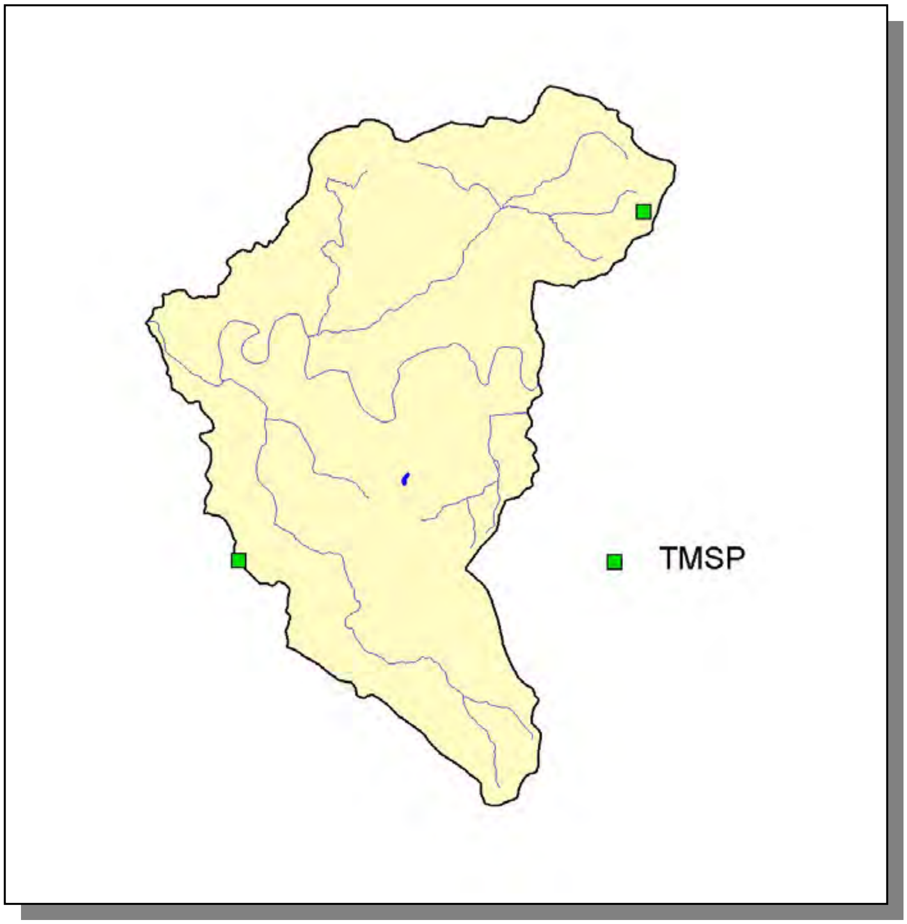

Figure 4-145. Location of Permits Issued in Subwatershed 051302060504. *More information, including the names of facilities, is provided in Appendix IV.*

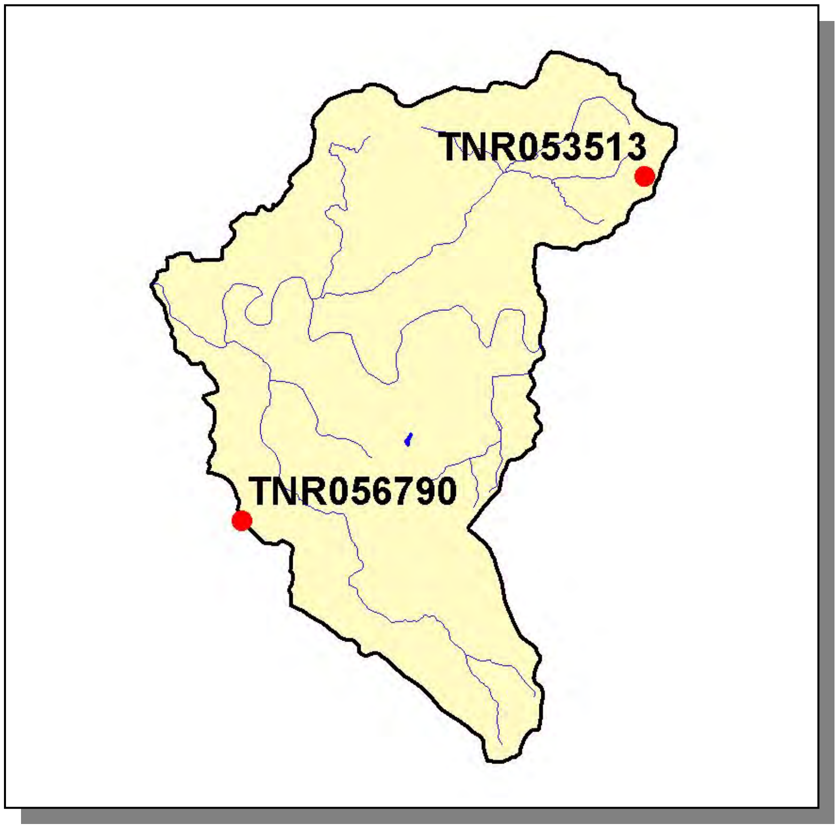

Figure 4-146. Location of TMSP Sites in Subwatershed 051302060504. *More information, including the names of facilities, is provided in Appendix IV.*

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
1,505	3,202	233	<5	467	19

Table 4-107. Summary of Livestock Count Estimates in Subwatershed 051302060504. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Robertson	22,502	47,887	3,478	31	6,982	279

Table 4-108. Summary of Livestock Count Estimates in Robertson County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Robertson	53.0	53.0	2.2	9.7

Table 4-109. Forest Acreage and Annual Removal Rates (1987-1994) in Robertson County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.67
Grass (Hayland)	0.37
Legumes, Grass (Hayland)	0.53
Legumes (Hayland)	0.73
Grass, Forbs, Legumes (Mixed Pasture)	0.42
Corn (Row Crops)	5.15
Soybeans (Row Crops)	10.03
Tobacco (Row Crops)	11.87
Wheat (Close-Grown Cropland)	1.68
Other Cropland not Planted	9.59
Conservation Reserve Program Lands	0.36
Other Land in Farms	0.27
Farmsteads and Ranch Headquarters	0.95

Table 4-110. Annual Estimated Total Soil Loss in Subwatershed 051302060504.

4.2.D.v. 051302060505 (Millers Creek).

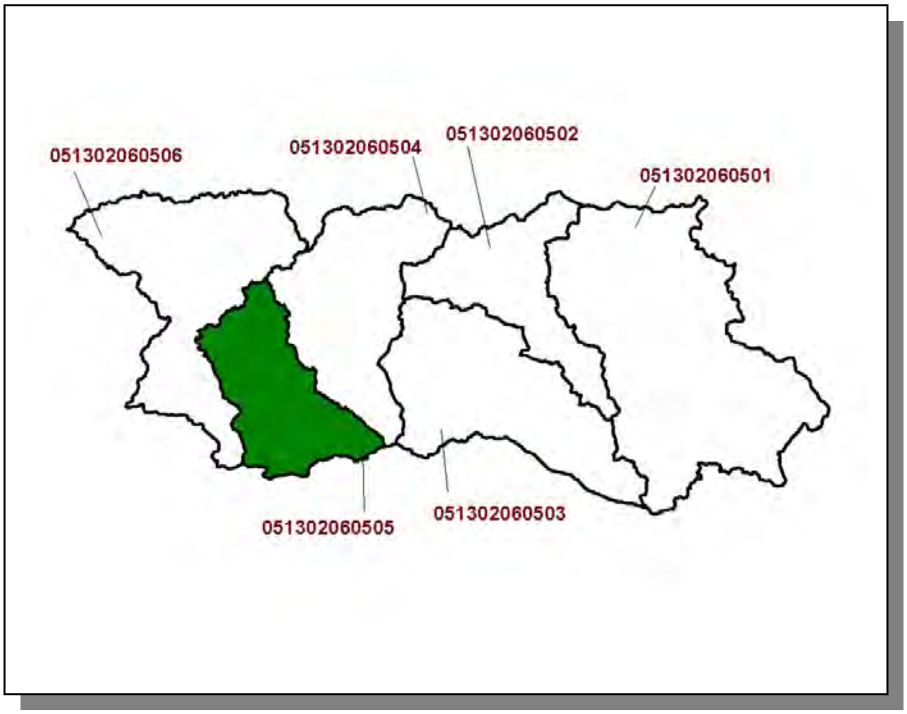

Figure 4-147. Location of Subwatershed 051302060505. *HUC-12 subwatershed boundaries are shown for reference.*

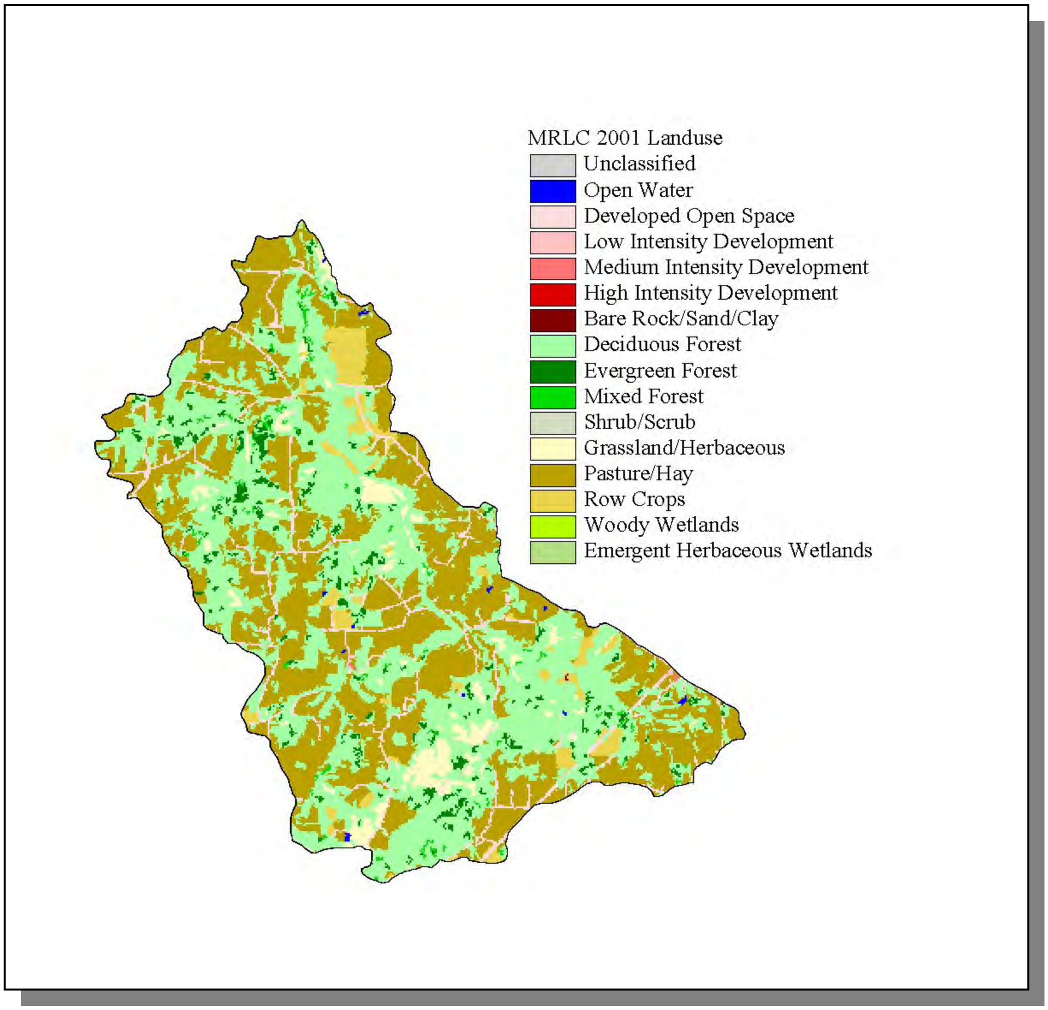

Figure 4-148. Illustration of Land Use Distribution in Subwatershed 051302060505.

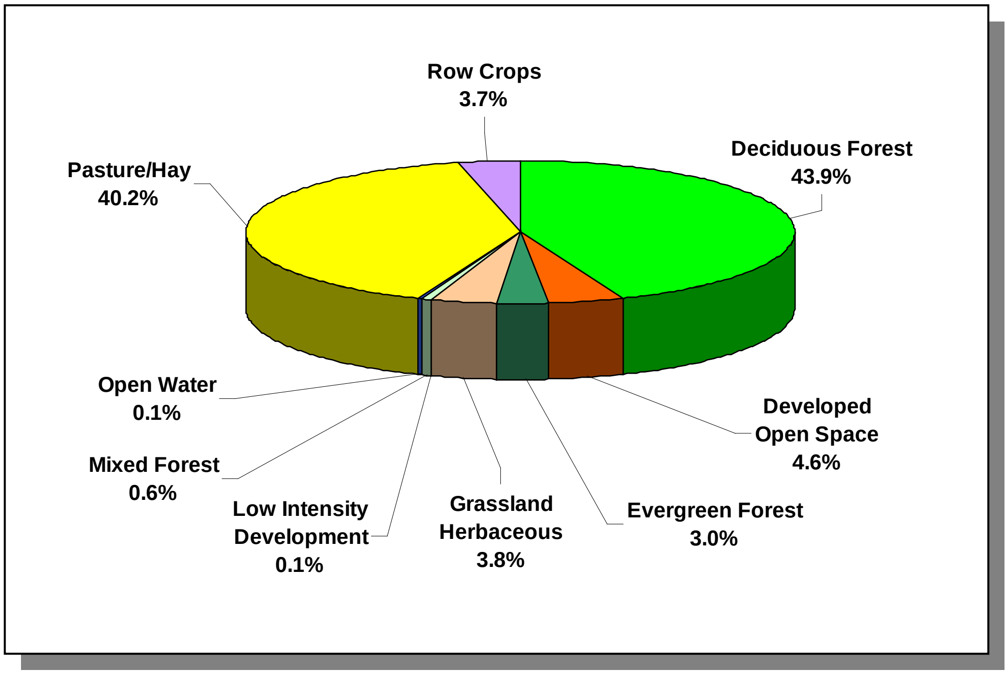

Figure 4-149. Land Use Distribution in Subwatershed 051302060505. *More information is provided in Appendix IV.*

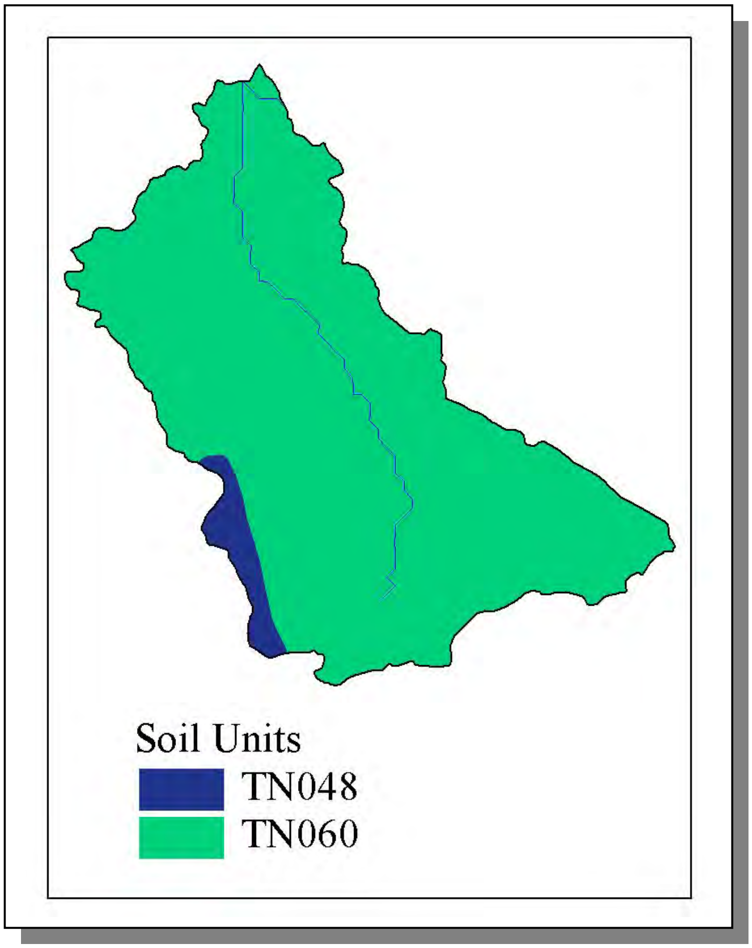

Figure 4-150. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060505.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN048	8.00	B	1.38	5.06	Silty Loam	0.42
TN060	5.00	C	1.30	5.32	Silty Loam	0.39

Table 4-111. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060505. *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)
Robertson	41,494	51,533	54,433	4.67	1,940	2,409	2,545	31.2

Table 4-112. Population Estimates in Subwatershed 051302060505.

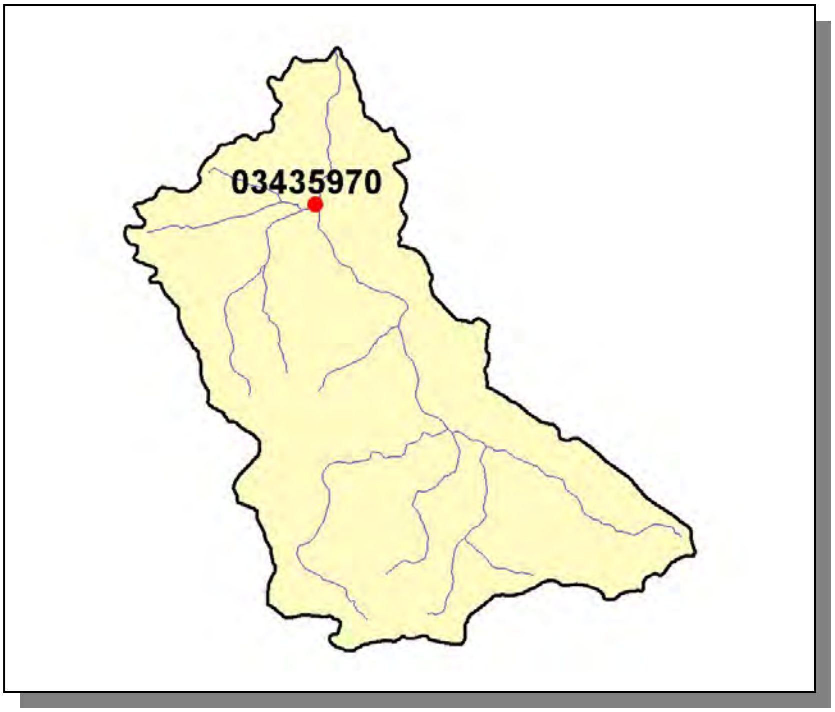

Figure 4-151. Location of Historical Streamflow Data Collection Sites in Subwatershed 051302060505. *More information is provided in Appendix IV.*

Figure 4-152. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060505. *More information, including site names and locations and stations located in the watershed outside of Tennessee, is provided in Appendix IV.*

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

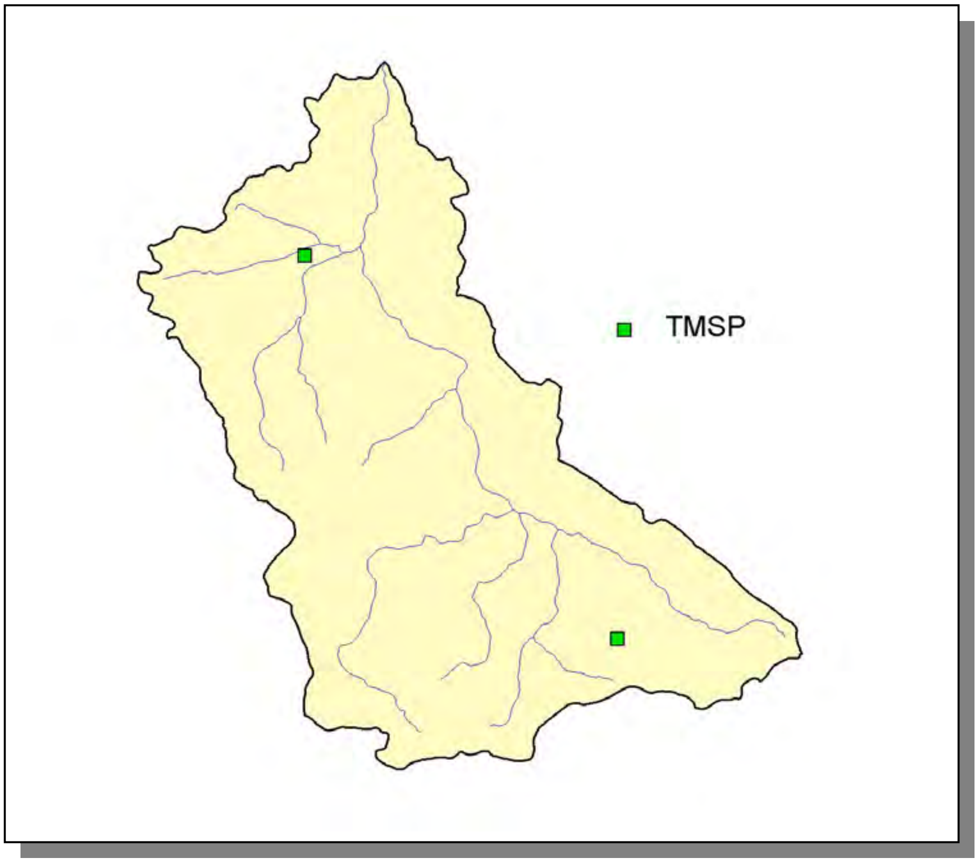

Figure 4-153. Location of Permits Issued in Subwatershed 051302060505. *More information, including the names of facilities, is provided in Appendix IV.*

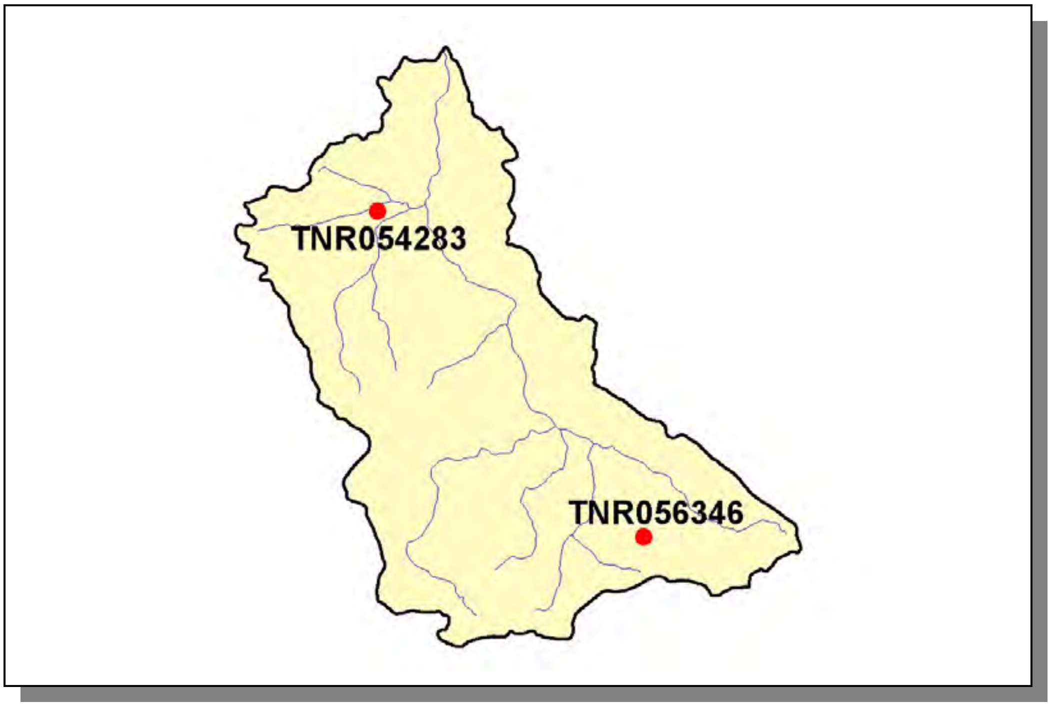

Figure 4-154. Location of TMSP Sites in Subwatershed 051302060505. *More information, including the names of facilities, is provided in Appendix IV.*

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
847	1,802	131	<5	263	10

Table 4-113. Summary of Livestock Count Estimates in Subwatershed 051302060505. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Robertson	22,502	47,887	3,478	31	6,982	279

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

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Robertson	53.0	53.0	2.2	9.7

Table 4-115. Forest Acreage and Annual Removal Rates (1987-1994) in Robertson County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.67
Grass (Hayland)	0.37
Legumes, Grass (Hayland)	0.53
Legumes (Hayland)	0.73
Grass, Forbs, Legumes (Mixed Pasture)	0.42
Corn (Row Crops)	5.15
Soybeans (Row Crops)	10.03
Tobacco (Row Crops)	11.87
Wheat (Close-Grown Cropland)	1.68
Other Cropland not Planted	9.59
Conservation Reserve Program Lands	0.36
Other Land in Farms	0.27
Farmsteads and Ranch Headquarters	0.95

Table 4-116. Annual Estimated Total Soil Loss in Subwatershed 051302060505.

4.2.D.vi. 051302060506 (Sulphur Fork Creek).

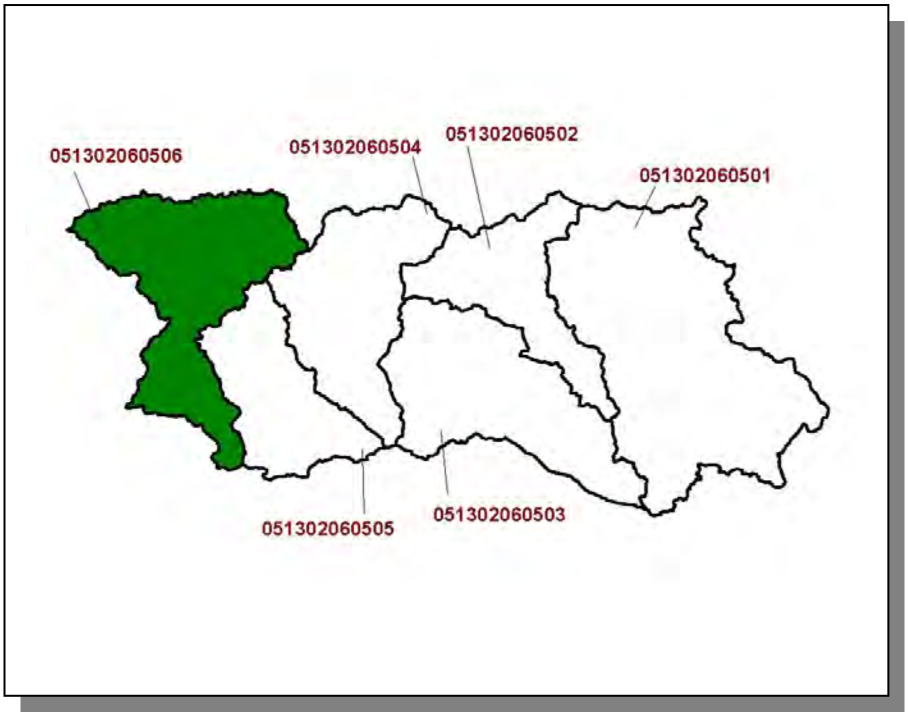

Figure 4-155. Location of Subwatershed 051302060506. *All HUC-12 subwatershed boundaries are shown for reference.*

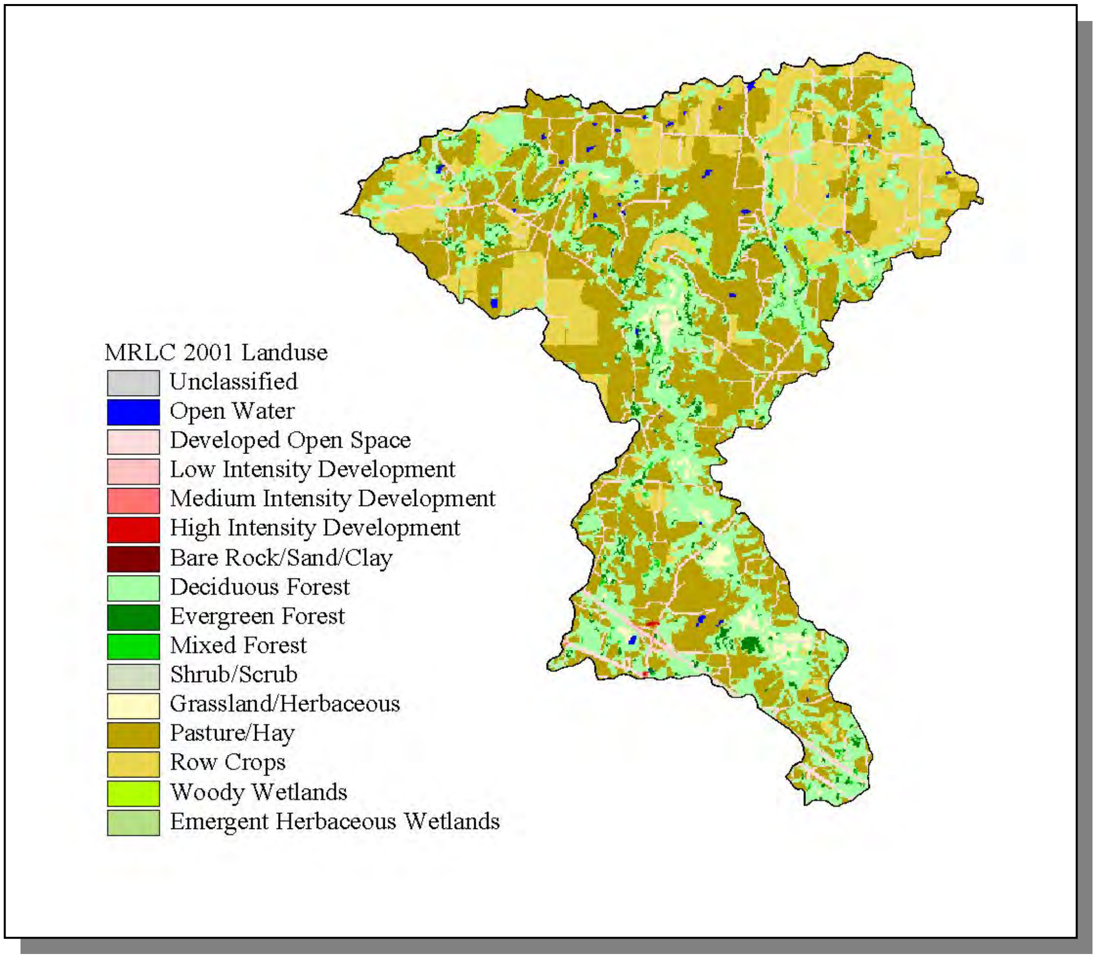

Figure 4-156. Illustration of Land Use Distribution in Subwatershed 051302060506.

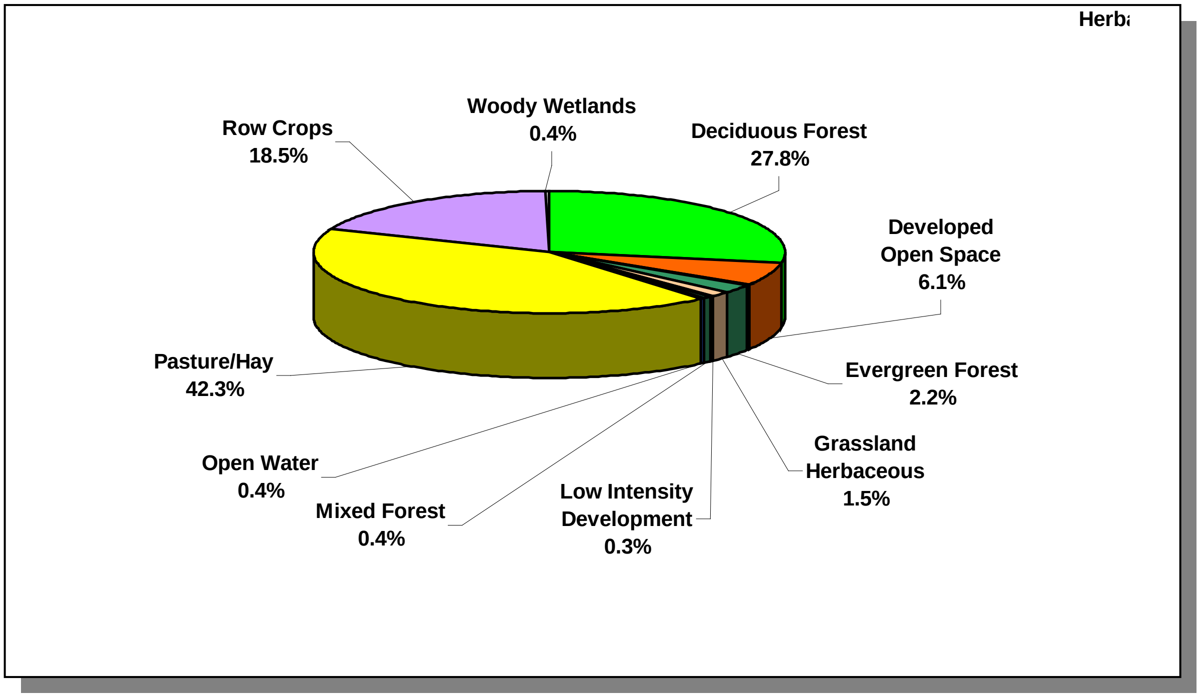

Figure 4-157. Land Use Distribution in Subwatershed 051302060506. *More information is provided in Appendix IV.*

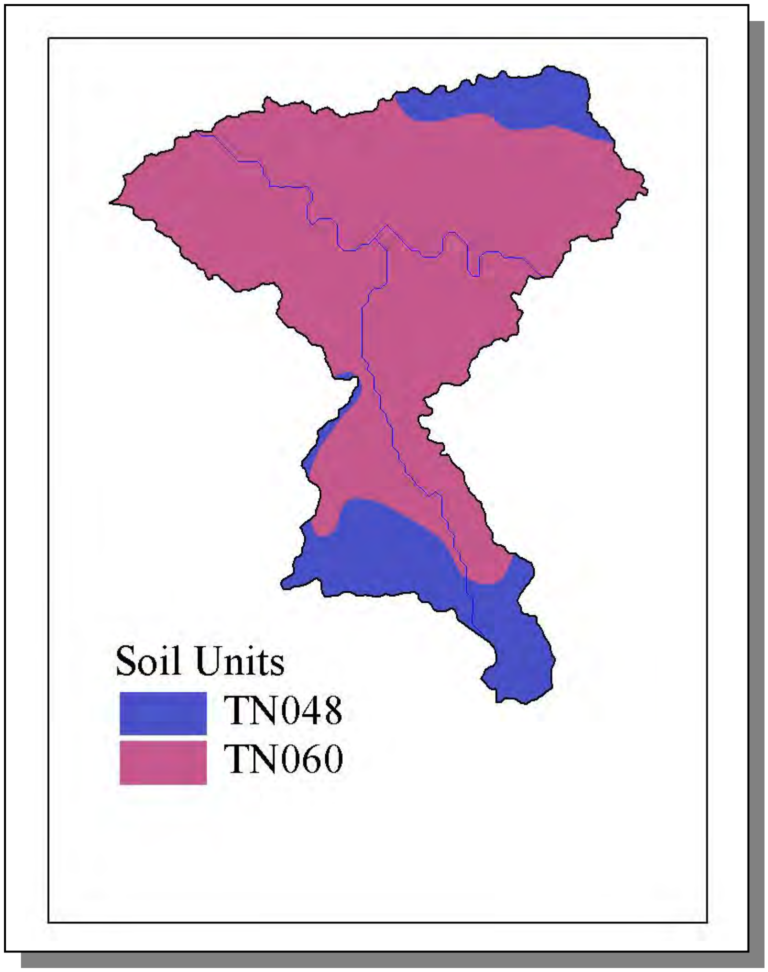

Figure 4-158. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060506.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN048	8.00	B	1.38	5.06	Silty Loam	0.42
TN060	5.00	C	1.30	5.32	Silty Loam	0.39

Table 4-117. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060506. *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)
Cheatham	27,140	34,402	35,912	0.32	88	112	117	33.0
Montgomery	100,498	124,369	134,768	0.9	900	1,114	1,207	34.1
Robertson	41,494	51,533	54,433	6.49	2,694	3,345	3,534	31.2
Total	**169,132**	**210,304**	**225,113**		**3,682**	**4,571**	**4,858**	**31.9**

Table 4-118. Population Estimates in Subwatershed 051302060506.

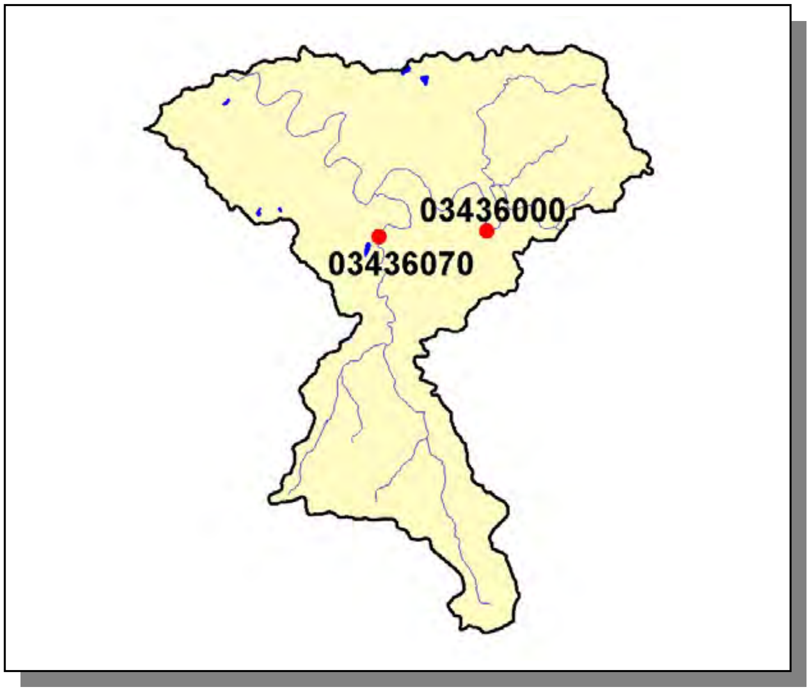

Figure 4-159. Location of Historical Streamflow Data Collection Sites in Subwatershed 051302060506. *More information is provided in Appendix IV.*

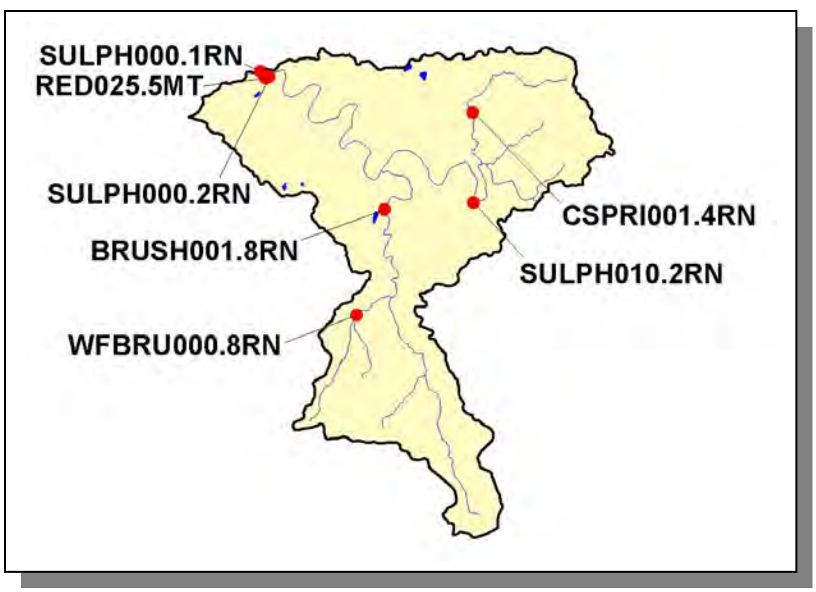

Figure 4-160. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060506. *More information, including site names and locations and stations located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.D.vi.a. Point Source Contributions.

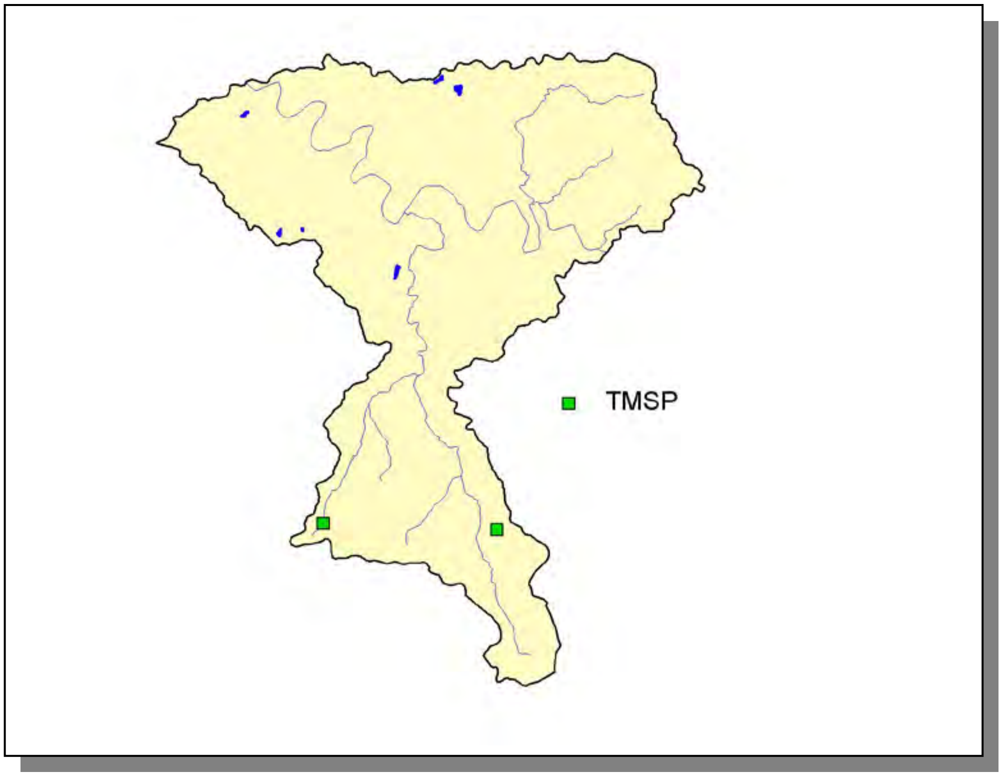

Figure 4-161. Location of Permits Issued in Subwatershed 051302060506. *More information, including the names of facilities, is provided in Appendix IV.*

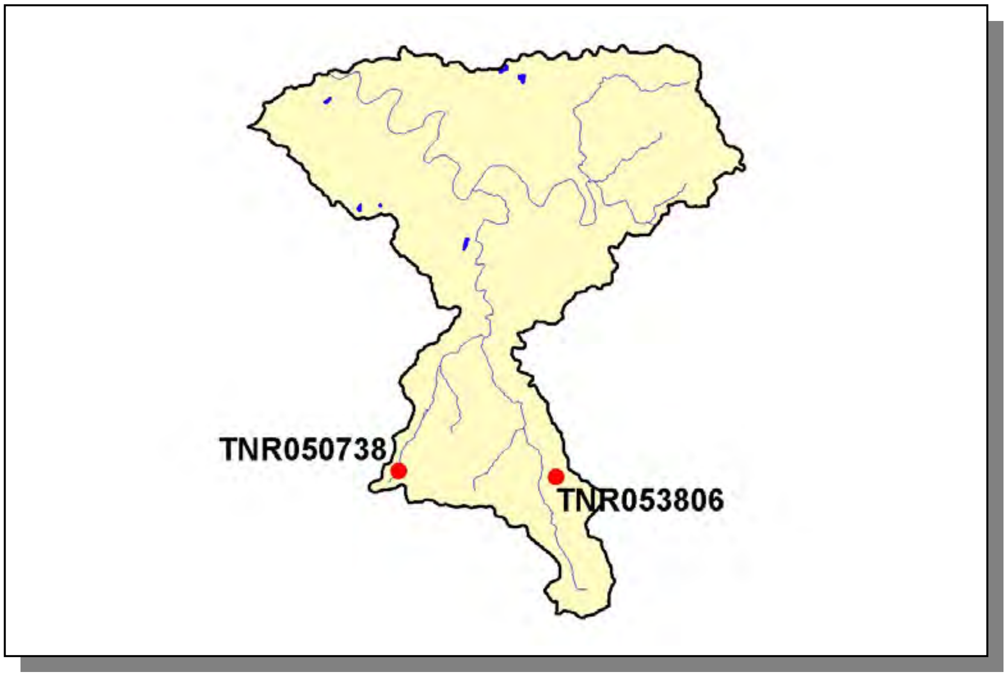

Figure 4-162. Location of TMSP Sites in Subwatershed 051302060506. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.D.vi.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
1,982	4,269	259	<5	532	22

Table 4-119. Summary of Livestock Count Estimates in Subwatershed 051302060506. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Cheatham	0	11,429	0	121	1,183	0
Montgomery	16,051	30,959	760	913	1,408	107
Robertson	22,502	47,887	3,478	31	6,982	279

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

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.64
Grass (Hayland)	0.36
Legumes, Grass (Hayland)	0.51
Legumes (Hayland)	0.72
Grass, Forbs, Legumes (Mixed Pasture)	0.45
Corn (Row Crops)	5.61
Soybeans (Row Crops)	9.27
Tobacco (Row Crops)	13.25
Wheat (Close-Grown Cropland)	1.68
Other Cropland not Planted	9.32
Conservation Reserve Program Lands	0.37
Other Land in Farms	0.27
Farmsteads and Ranch Headquarters	0.81

Table 4-121. Annual Estimated Total Soil Loss in Subwatershed 051302060506.

4.2.E. 0513020606

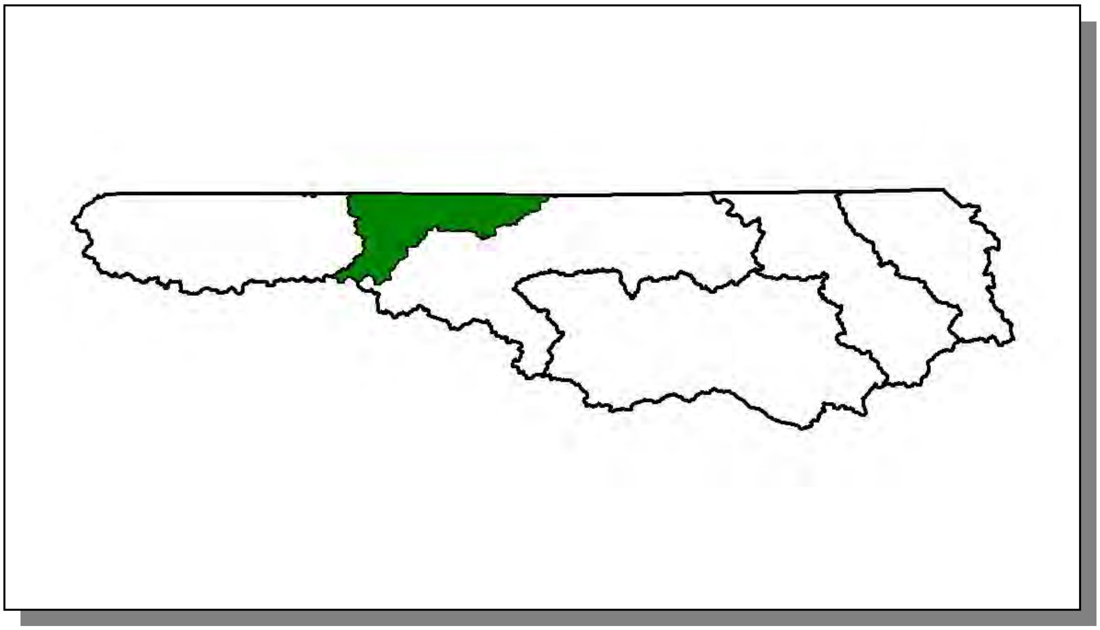

Figure 4-163. Location of Subwatershed 0513020606. *All Red River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.E.i. 051302060603 (West Fork Red River).

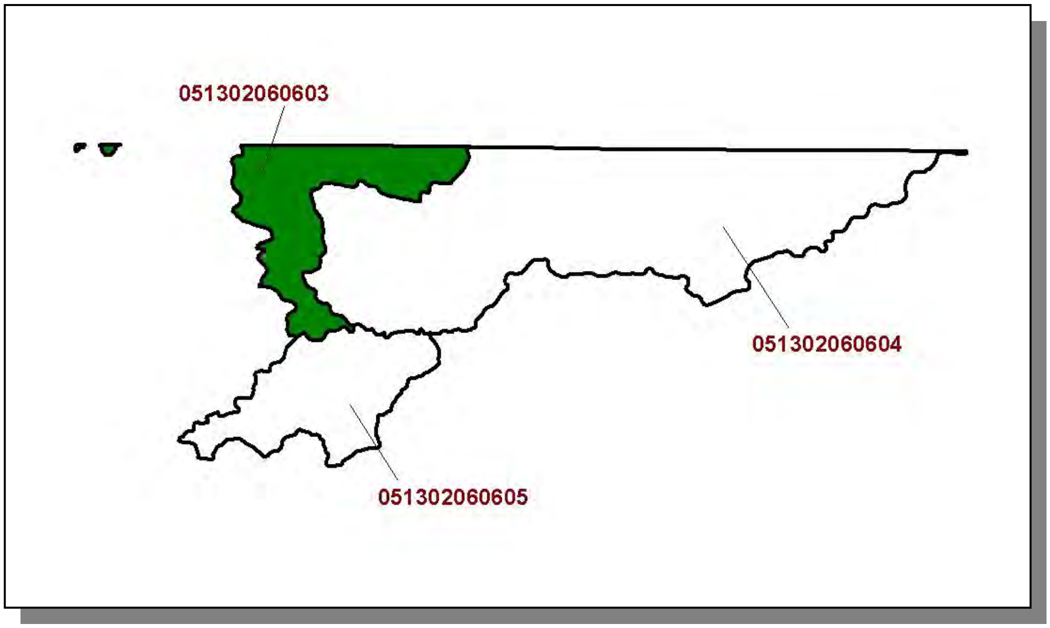

Figure 4-164. Location of Subwatershed 051302060603. *HUC-12 subwatershed boundaries are shown for reference.*

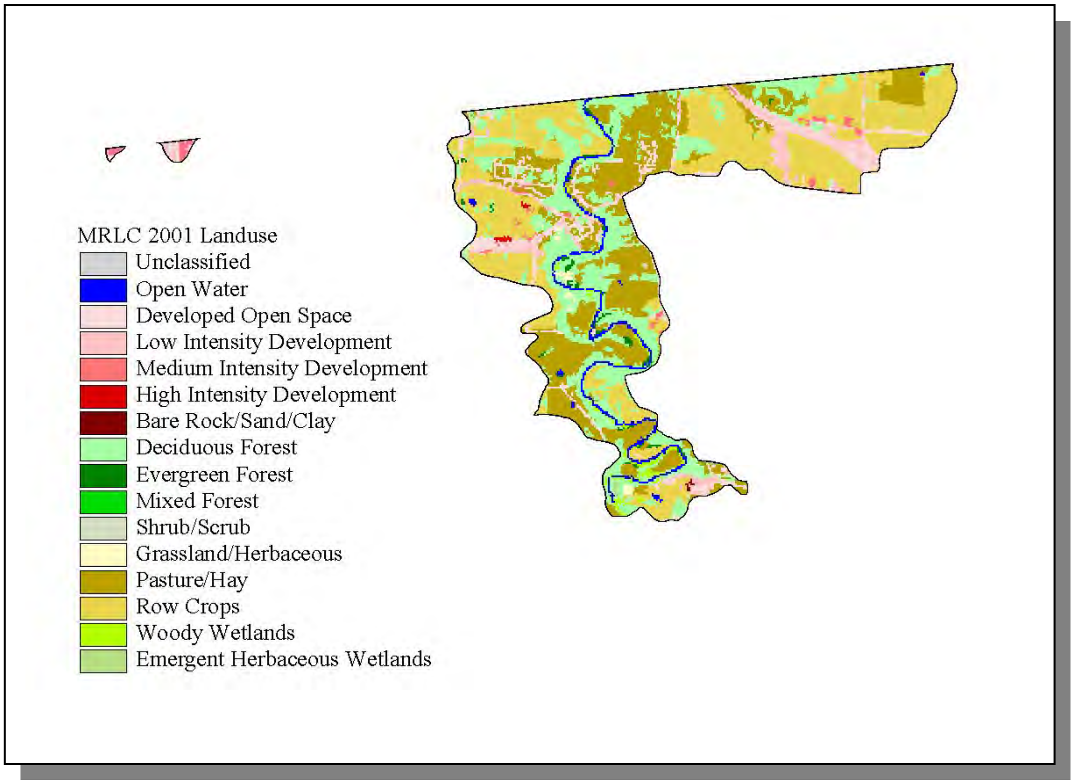

Figure 4-165. Illustration of Land Use Distribution in Subwatershed 051302060603.

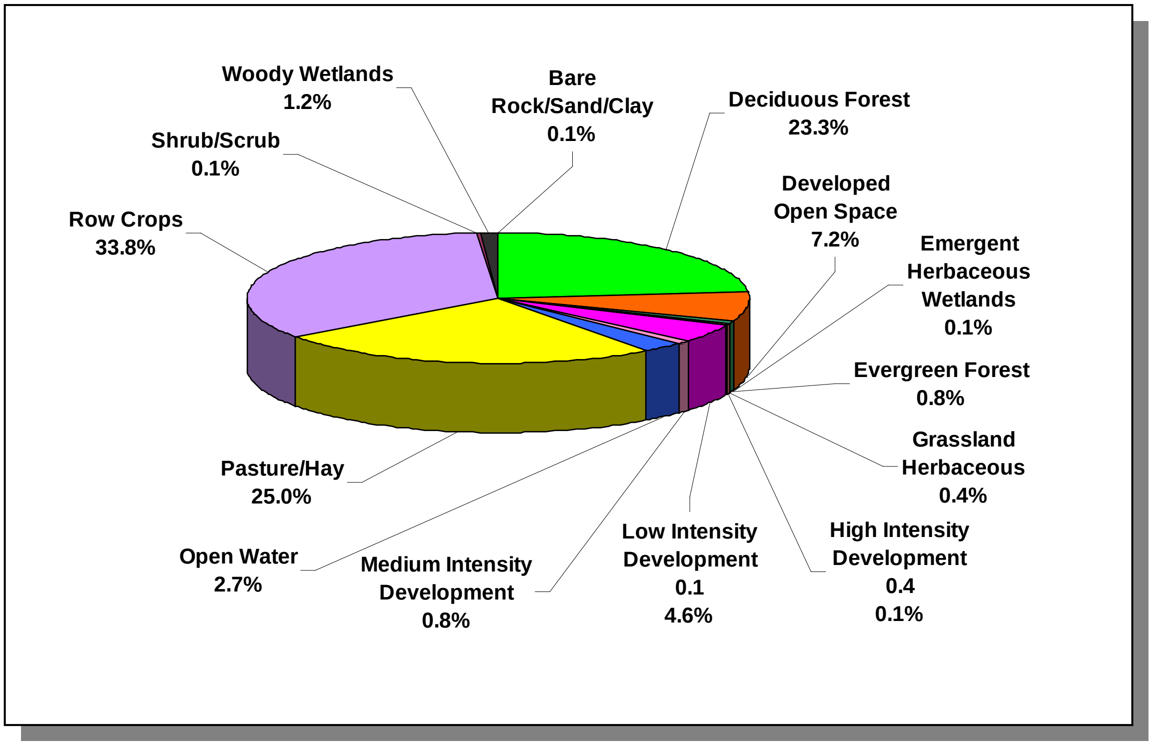

Figure 4-166. Land Use Distribution in Subwatershed 051302060603. *More information is provided in Appendix IV.*

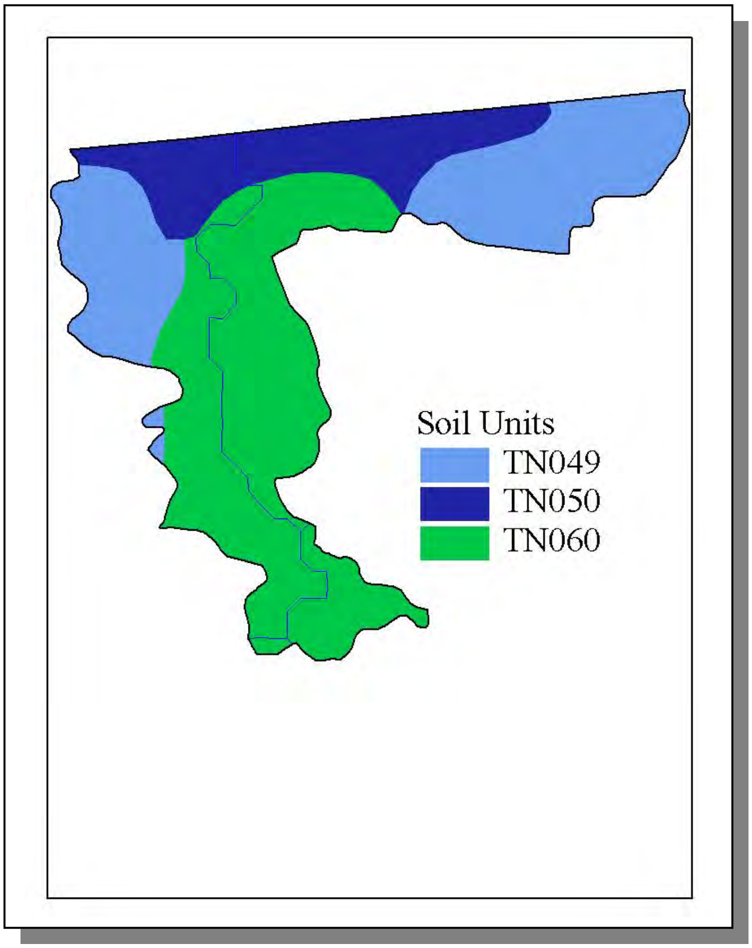

Figure 4-167. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060603.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN049	0.00	C	1.30	5.94	Silty Loam	0.34
TN050	0.00	B	1.30	5.97	Silty Loam	0.33
TN060	5.00	C	1.30	5.32	Silty Loam	0.39

Table 4-122. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060603. *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)
Montgomery	100,498	124,369	134,768	1.46	1,463	1,811	1,962	34.1

Table 4-123. Population Estimates in Subwatershed 051302060603.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Clarksville	Montgomery	75,494	27,642	23,610	3,956	76

Table 4-124. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302060603.

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

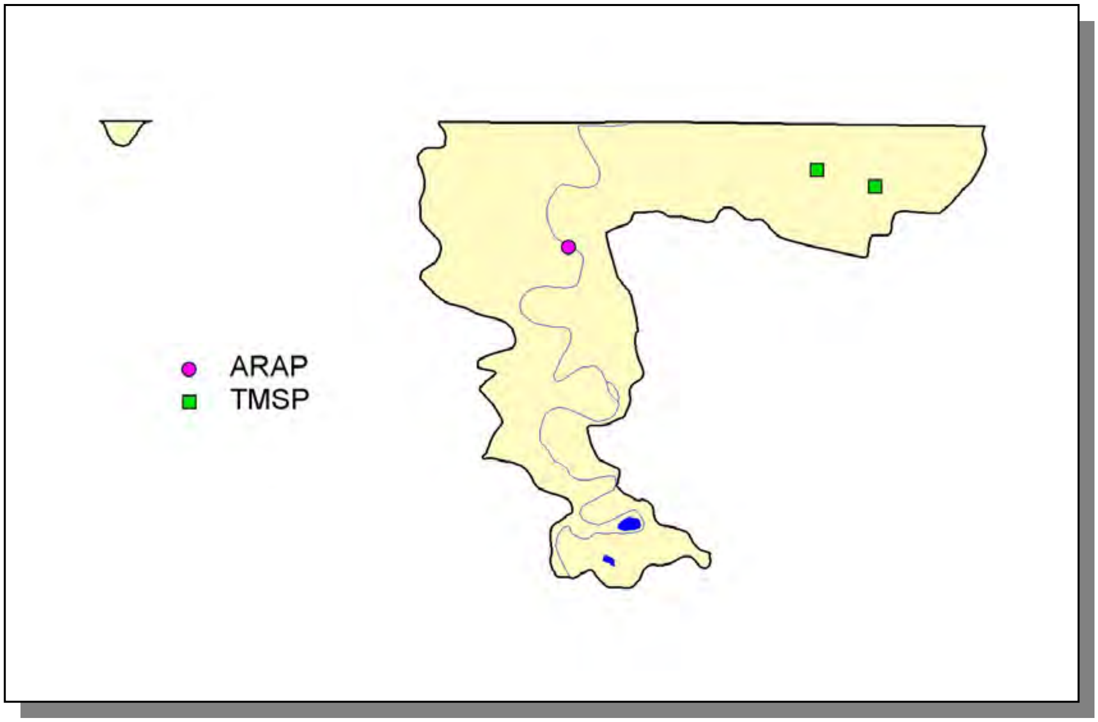

Figure 4-168. Location of Permits Issued in Subwatershed 051302060603. *More information, including the names of facilities, is provided in Appendix IV.*

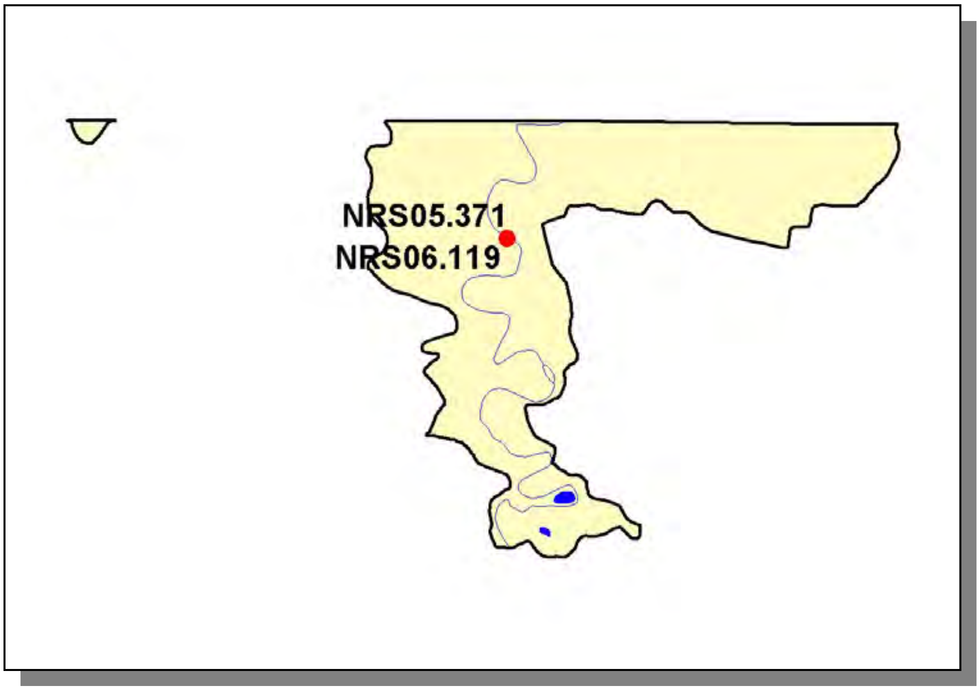

Figure 4-169. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051302060603. *More information is provided in Appendix IV.*

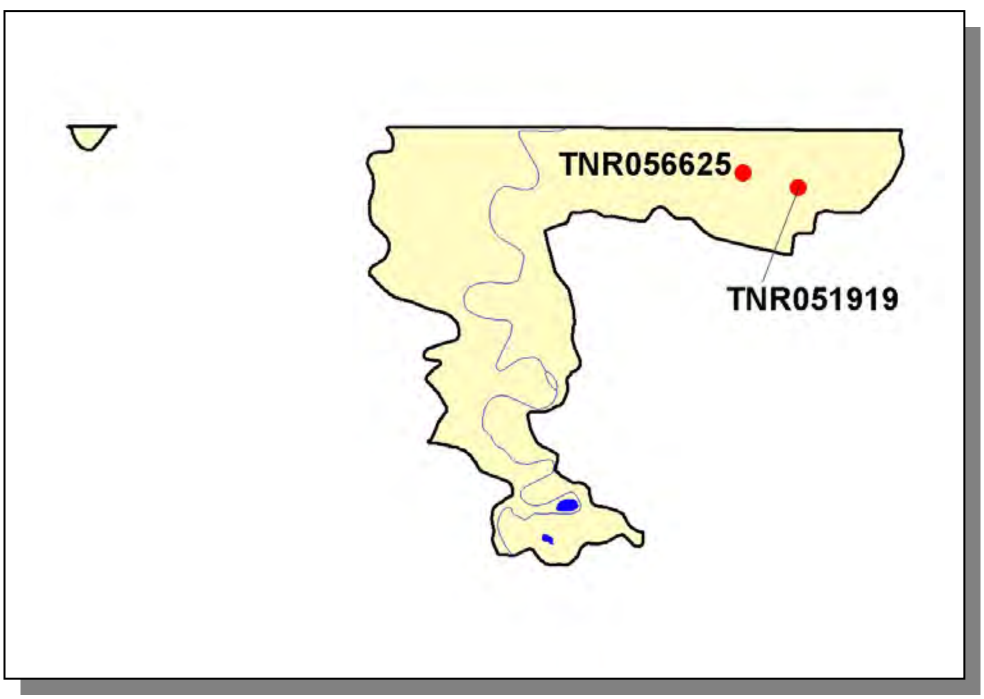

Figure 4-170. Location of TMSP Sites in Subwatershed 051302060603. *More information, including the names of facilities, is provided in Appendix IV.*

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
495	955	23	<5	43	<5

Table 4-125. Summary of Livestock Count Estimates in Subwatershed 051302060603. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Montgomery	16,051	30,959	760	913	1,408	107

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

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.45
Grass (Hayland)	0.29
Legumes, Grass (Hayland)	0.40
Grass, Forbs, Legumes (Mixed Pasture)	0.55
Corn (Row Crops)	8.04
Soybeans (Row Crops)	4.26
Tobacco (Row Crops)	22.25
Conservation Reserve Program Lands	0.41
Farmsteads and Ranch Headquarters	0.04

Table 4-127. Annual Estimated Total Soil Loss in Subwatershed 051302060603.

4.2.E.ii. 051302060604 (Spring Creek).

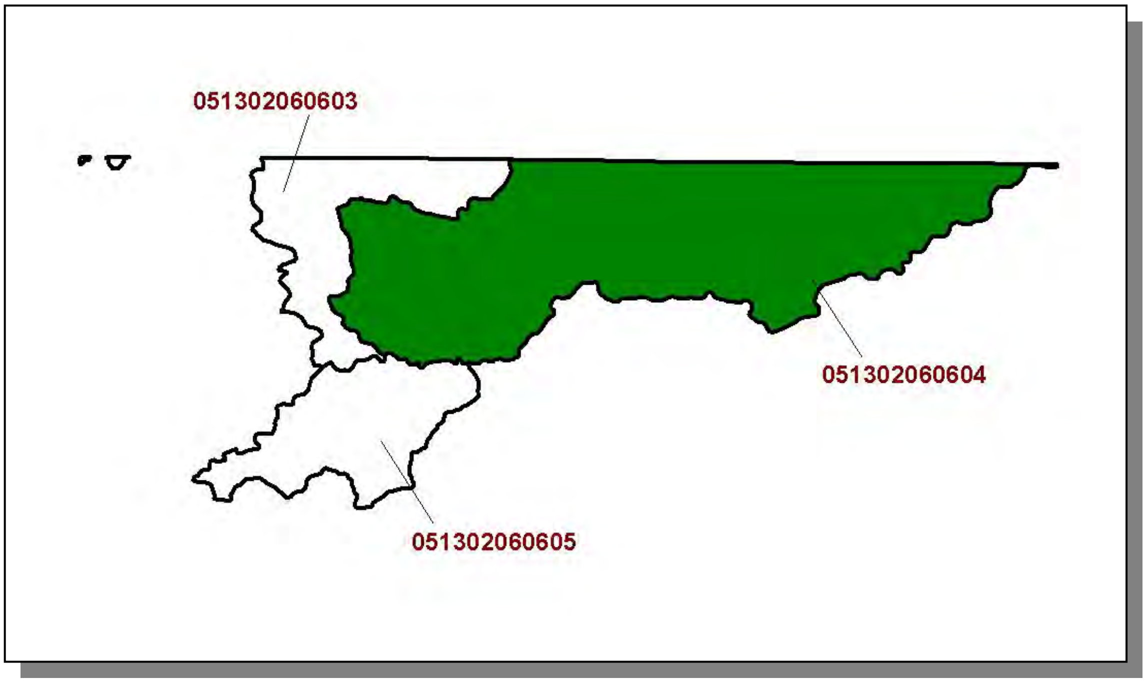

Figure 4-171. Location of Subwatershed 051302060604. HUC-12 subwatershed boundaries are shown for reference.

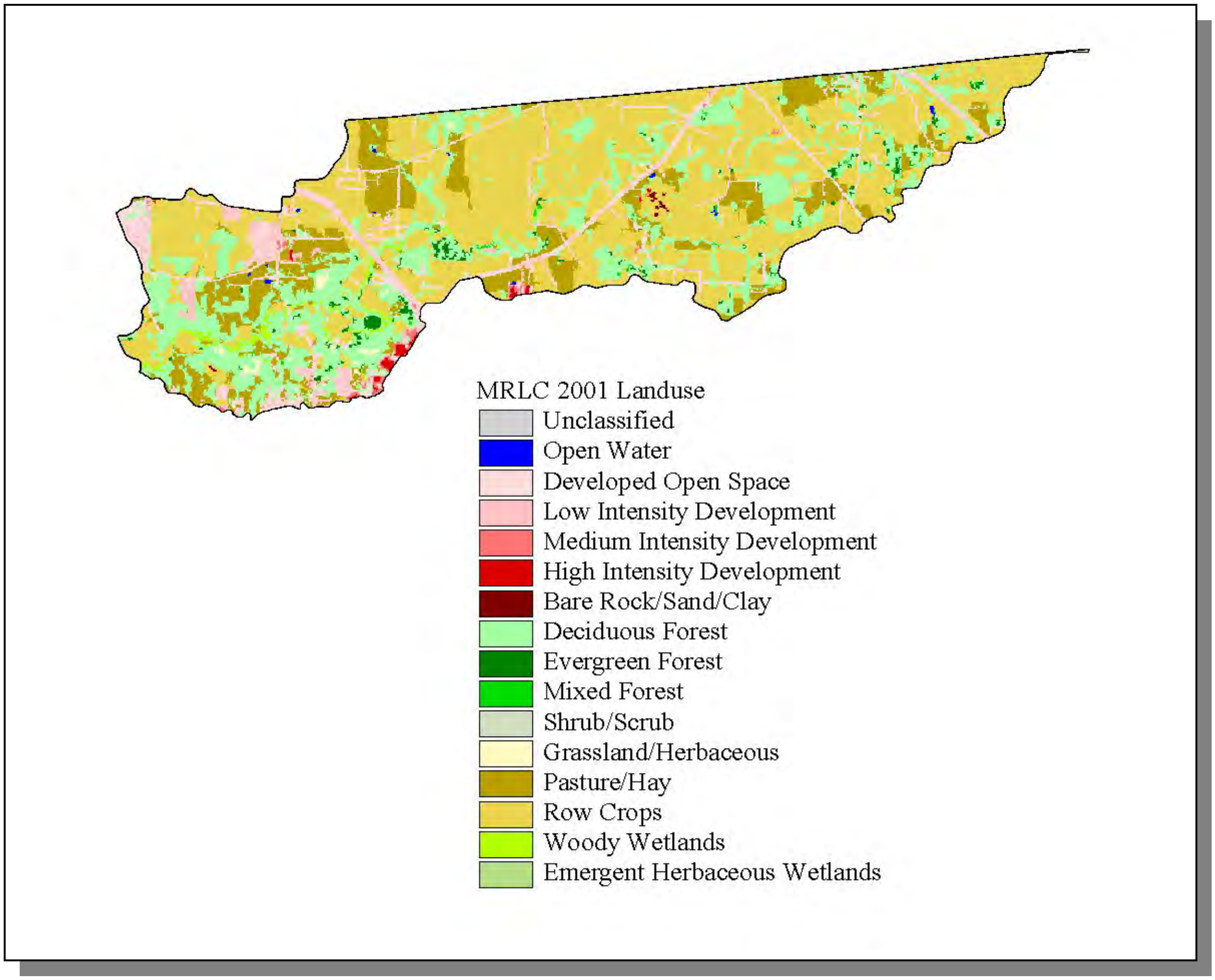

Figure 4-172. Illustration of Land Use Distribution in Subwatershed 051302060604.

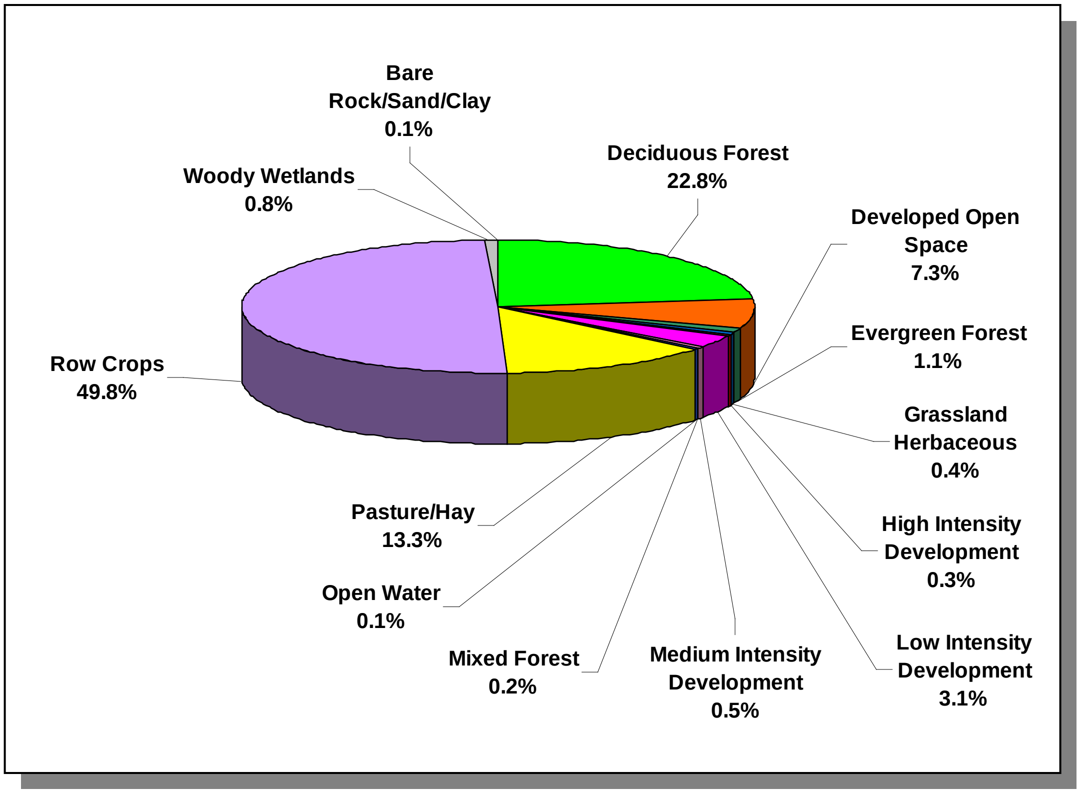

Figure 4-173. Land Use Distribution in Subwatershed 051302060604. *More information is provided in Appendix IV.*

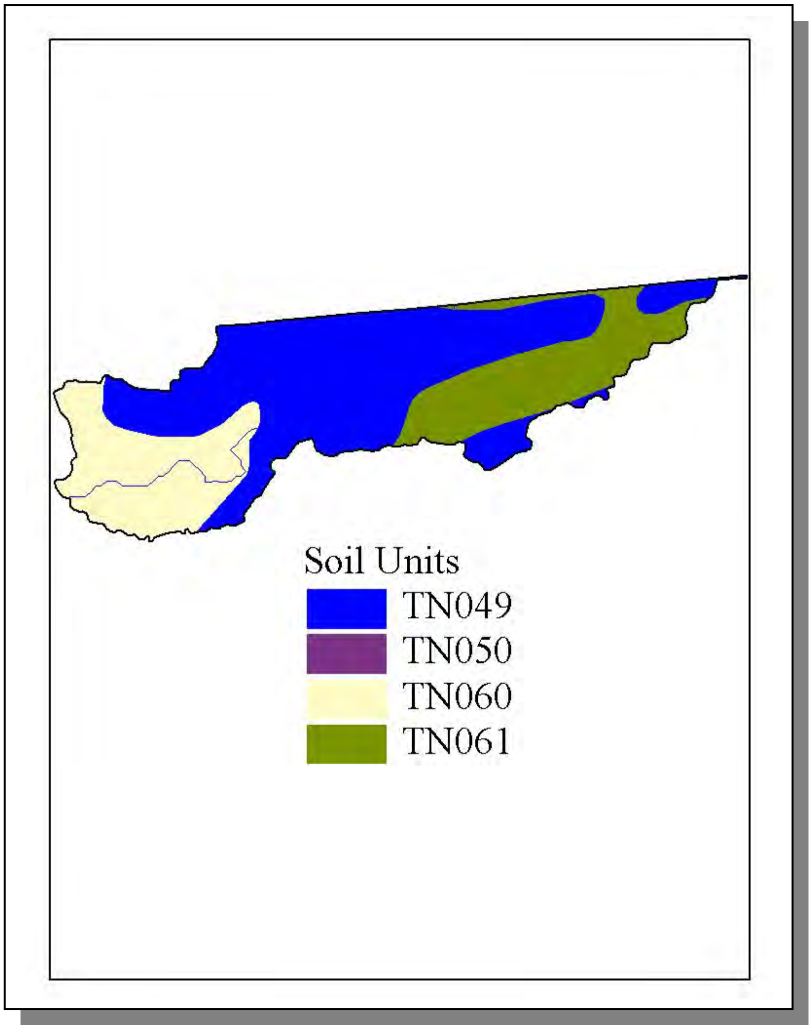

Figure 4-174. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060604.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN049	0.00	C	1.30	5.94	Silty Loam	0.34
TN050	0.00	B	1.30	5.97	Silty Loam	0.33
TN060	5.00	C	1.30	5.32	Silty Loam	0.39
TN061	50.00	B	1.30	5.09	Silty Loam	0.42

Table 4-128. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060604. *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)
Montgomery	100,498	124,369	134,768	5.86	5,887	7,286	7,895	34.1

Table 4-129. Population Estimates in Subwatershed 051302060604.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Clarksville	Montgomery	75,494	27,642	23,610	3,956	76

Table 4-130. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302060604.

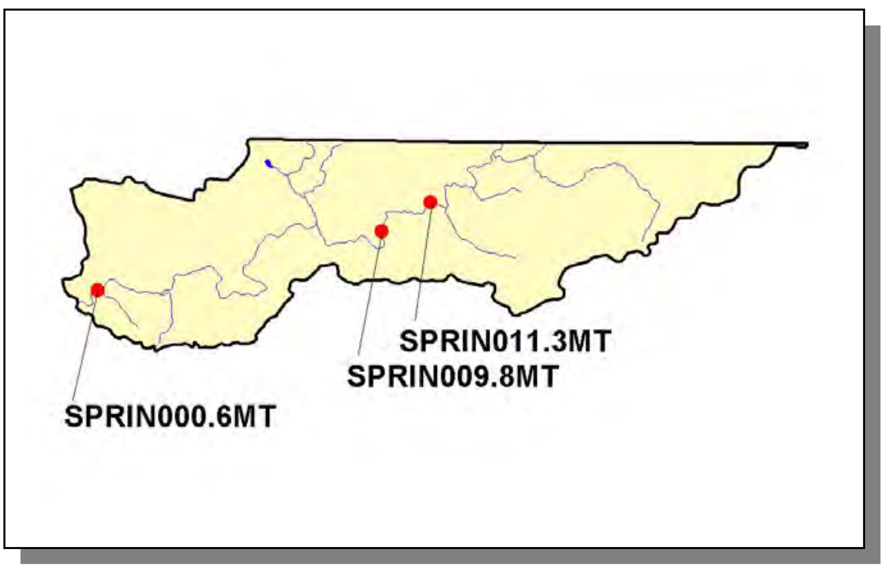

Figure 4-175. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060604. *More information, including site names and locations and stations located in the watershed outside of Tennessee, is provided in Appendix IV.*

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

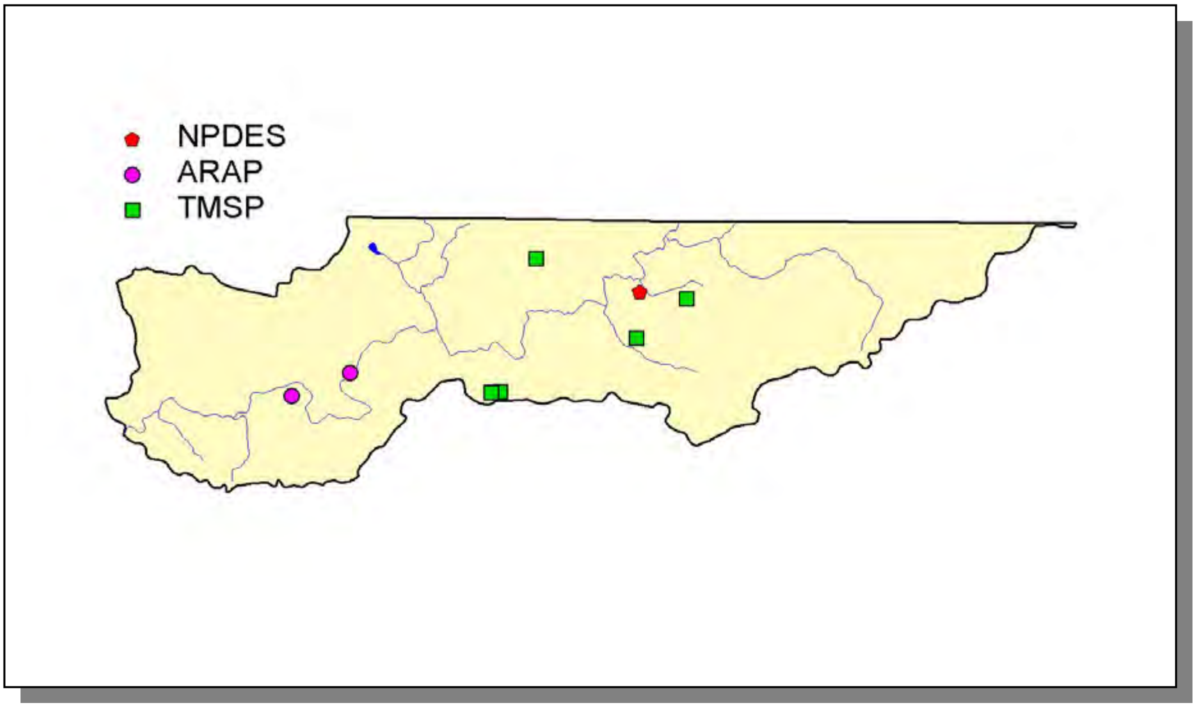

Figure 4-176. Location of Permits Issued in Subwatershed 051302060604. *More information, including the names of facilities, is provided in Appendix IV.*

Figure 4-177. Location of Active NPDES Sites in Subwatershed 051302060604. *More information, including the names of facilities, is provided in Appendix IV.*

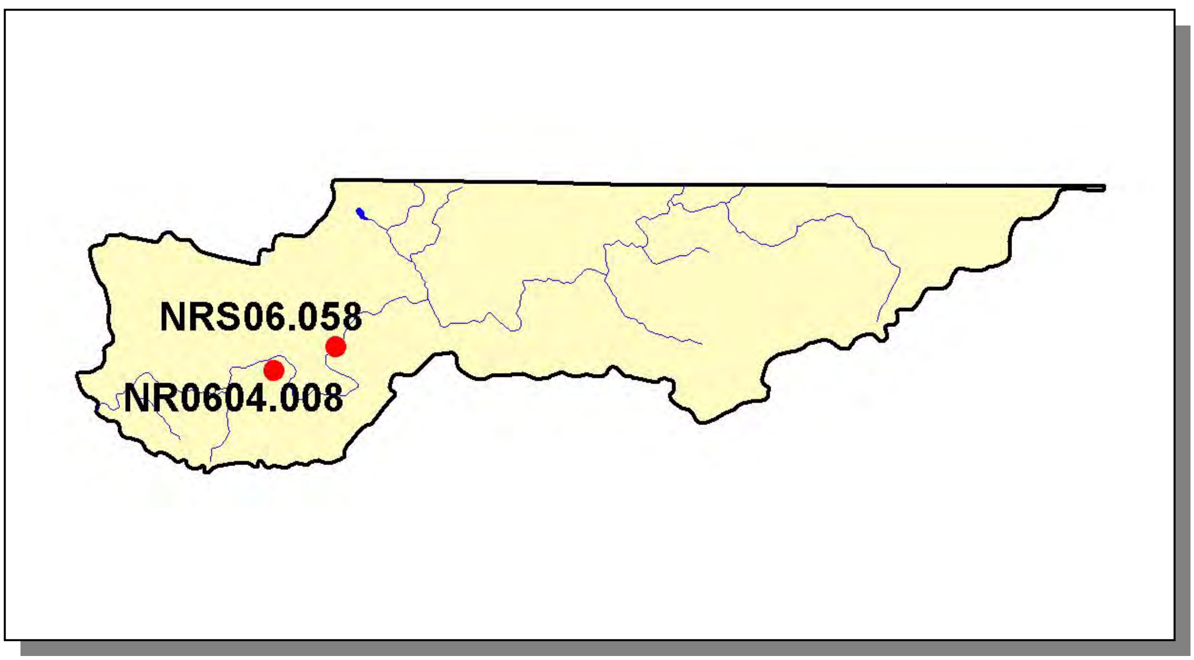

Figure 4-178. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051302060604. *More information is provided in Appendix IV.*

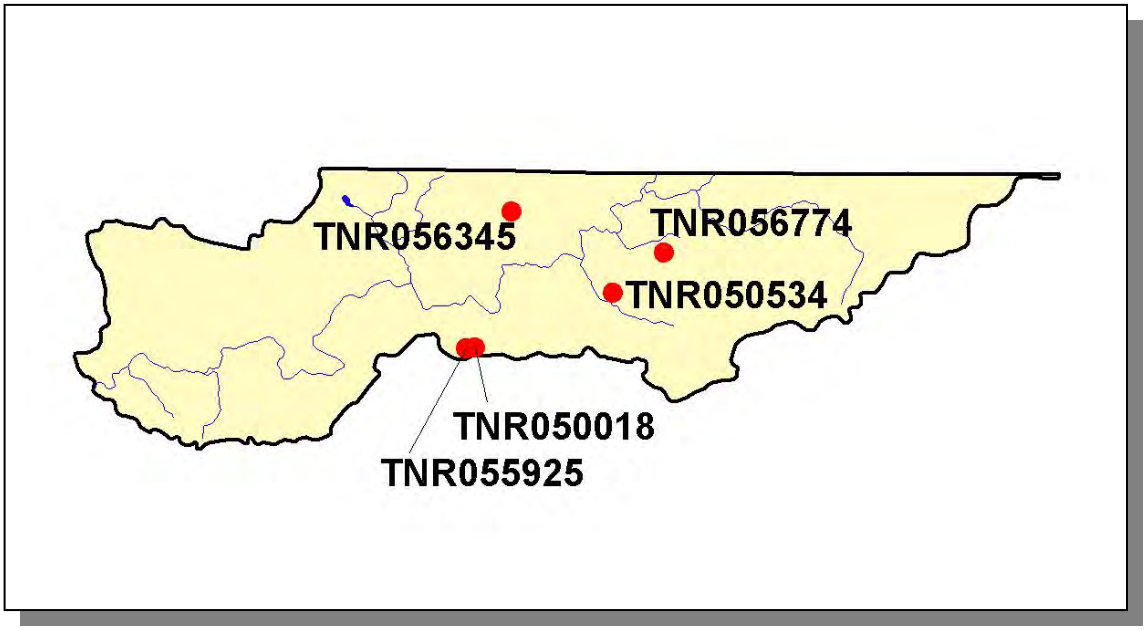

Figure 4-179. Location of TMSP Sites in Subwatershed 051302060604. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.E.ii.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 051302060604:

- TN0031127 (SIRCO) discharges to a wet weather conveyance to Spring Creek @ RM 11.5

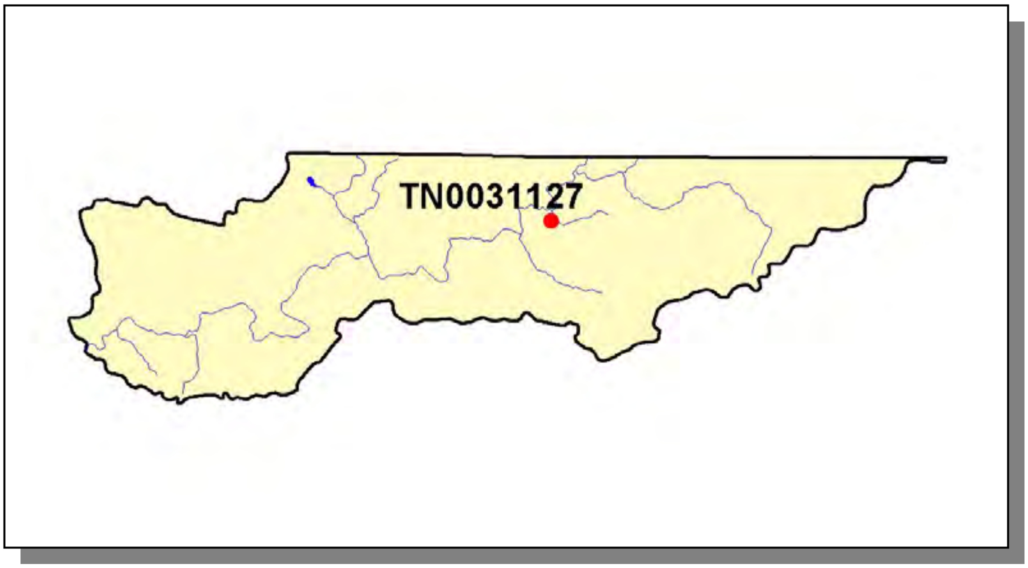

Figure 4-180. Location of NPDES Dischargers to Water Bodies Listed on the 2004 303(d) List in Subwatershed 051302060604. *More information, including the names of facilities, is provided in Appendix IV.*

Permit #	3Q2	1Q10	3Q10	3Q20	7Q10
TN0031127	0.12	na	0.07	0.06	0.08

Table 4-131. Receiving Stream Low Flow Information for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051302060604. *Data are in cubic feet per second (CFS). Data were obtained from the USGS web application StreamStats at http://water.usgs.gov/osw/streamstats/. (na, data not available)*

PERMIT #	FLOW
TN0031127	X

Table 4-132. Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051302060604.

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
1,551	2,991	73	<5	136	10

Table 4-133. Summary of Livestock Count Estimates in Subwatershed 051302060604. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* **"***Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Montgomery	16,051	30,959	760	913	1,408	107
Robertson	22,502	47,887	3,478	31	6,982	279

Table 4-134. Summary of Livestock Count Estimates in Montgomery and Robertson Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* **"***Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.45
Grass (Hayland)	0.29
Legumes, Grass (Hayland)	0.40
Legumes (Hayland)	0.73
Grass, Forbs, Legumes (Mixed Pasture)	0.55
Corn (Row Crops)	8.04
Soybeans (Row Crops)	4.26
Tobacco (Row Crops)	22.25
Wheat (Close-Grown Cropland)	1.68
Other Cropland not Planted	9.59
Conservation Reserve Program Lands	0.41
Other Land in Farms	0.27
Farmsteads and Ranch Headquarters	0.04

Table 4-135. Annual Estimated Total Soil Loss in Subwatershed 051302060604.

4.2.E.iii. 051302060605 (West Fork Red River).

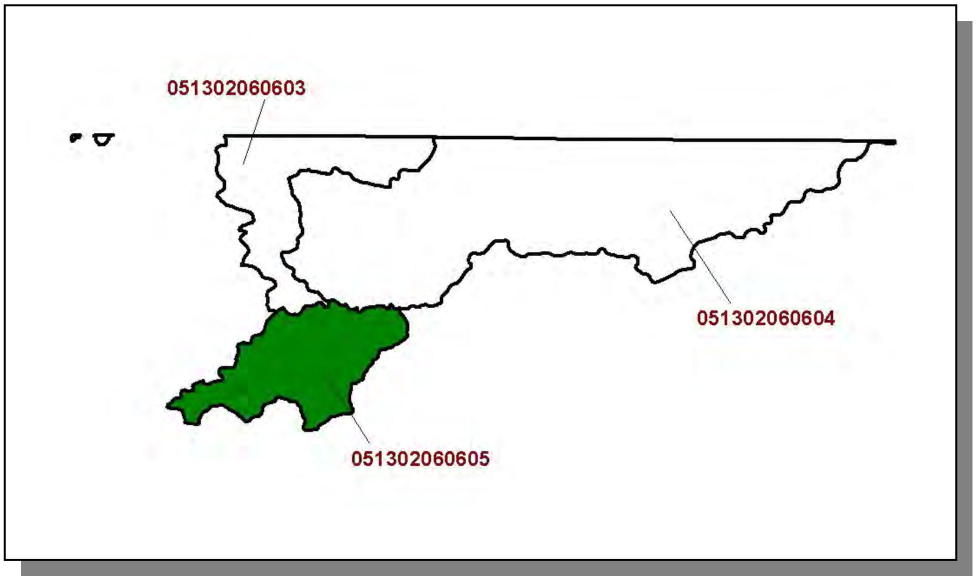

Figure 4-181. Location of Subwatershed 051302060605. *HUC-12 subwatershed are shown for reference.*

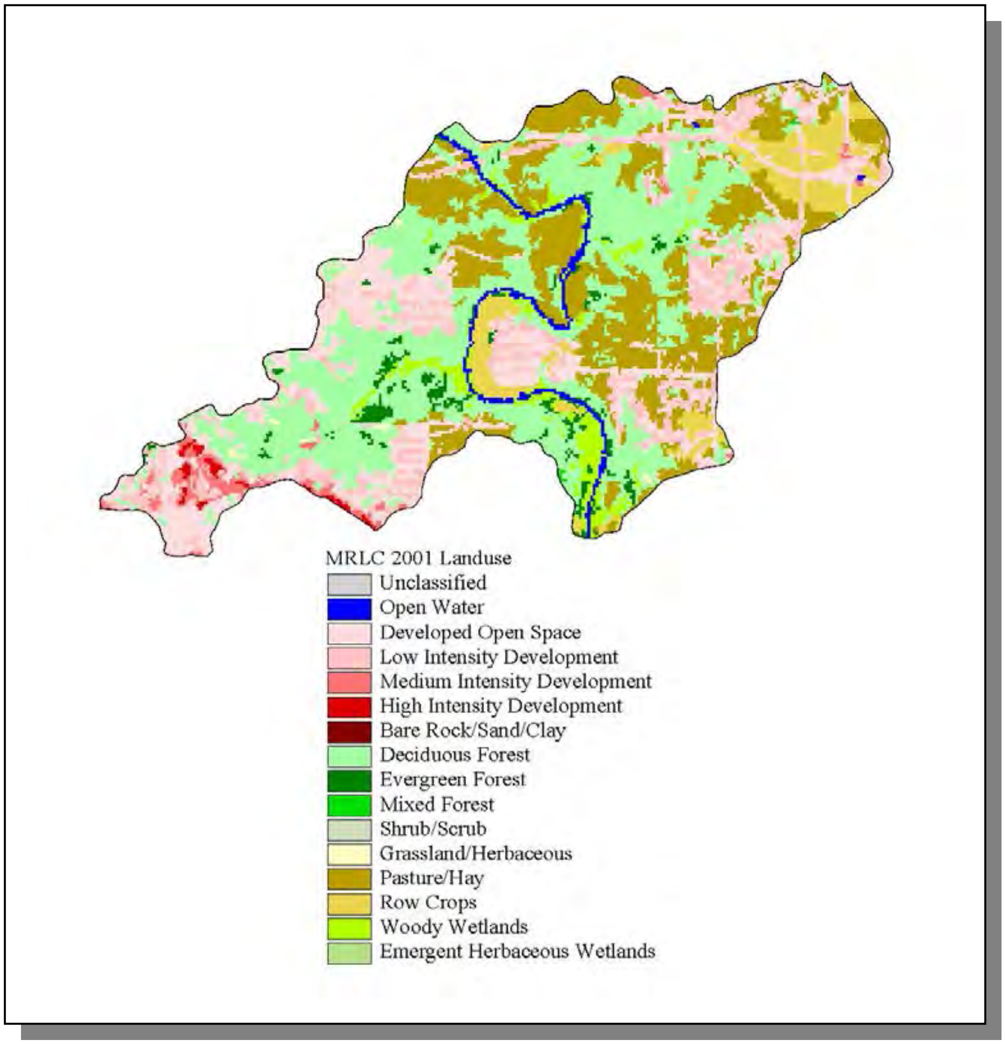

Figure 4-182. Illustration of Land Use Distribution in Subwatershed 051302060605.

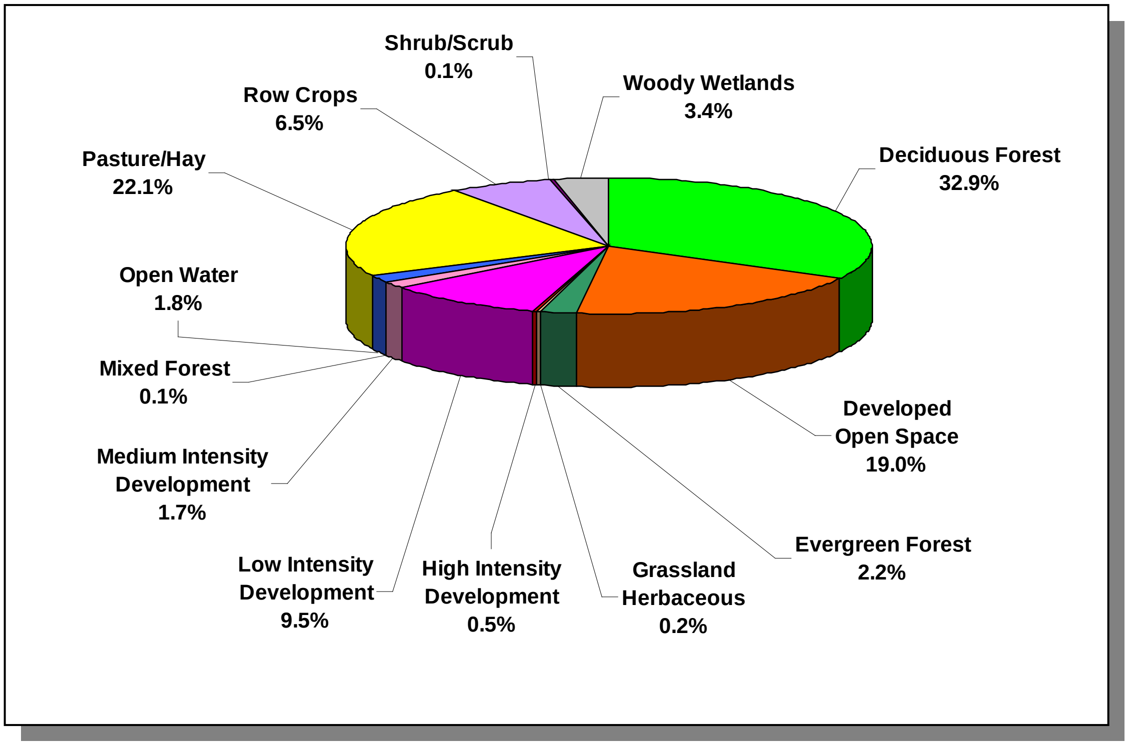

Figure 4-183. Land Use Distribution in Subwatershed 051302060605. *More information is provided in Appendix IV.*

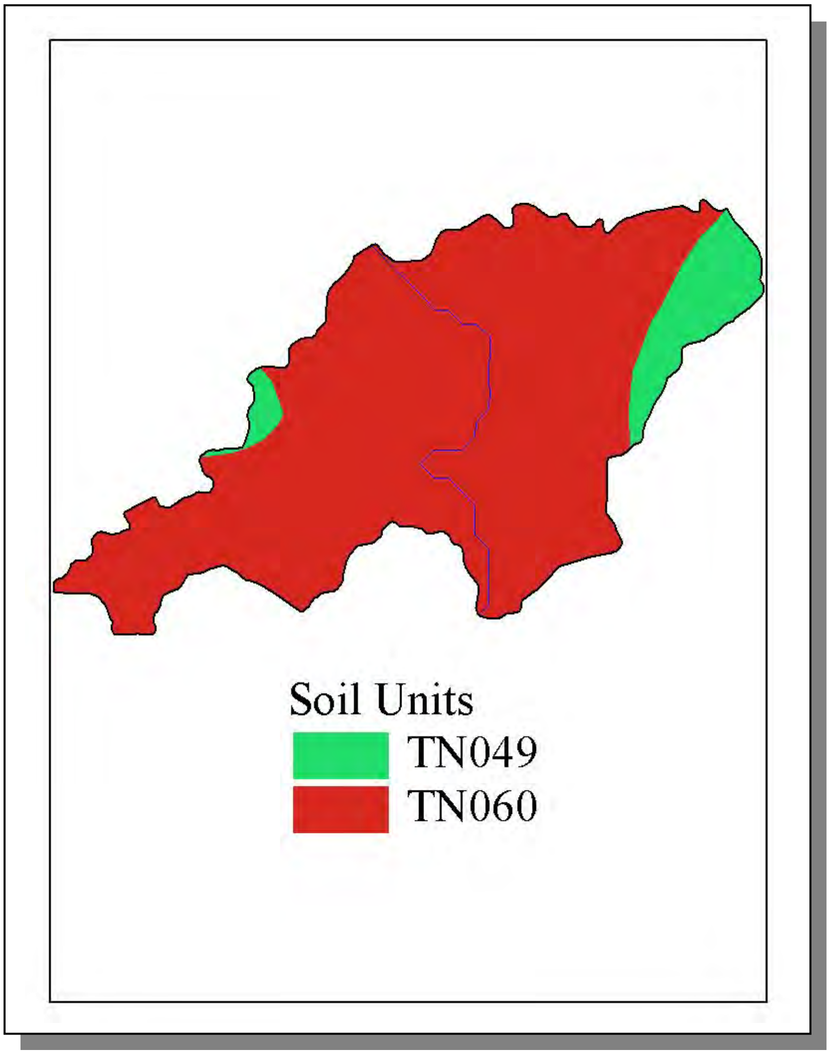

Figure 4-184. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060605.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN049	0.00	B	1.30	5.94	Silty Loam	0.34
TN060	5.00	B	1.30	5.32	Silty Loam	0.39

Table 4-136. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060605. *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)
Montgomery	100,498	124,369	134,768	1.5	1,512	1,871	2,028	34.1

Table 4-137. Population Estimates in Subwatershed 051302060605.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Clarksville	Montgomery	75,494	27,642	23,610	3,956	76

Table 4-138. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302060605.

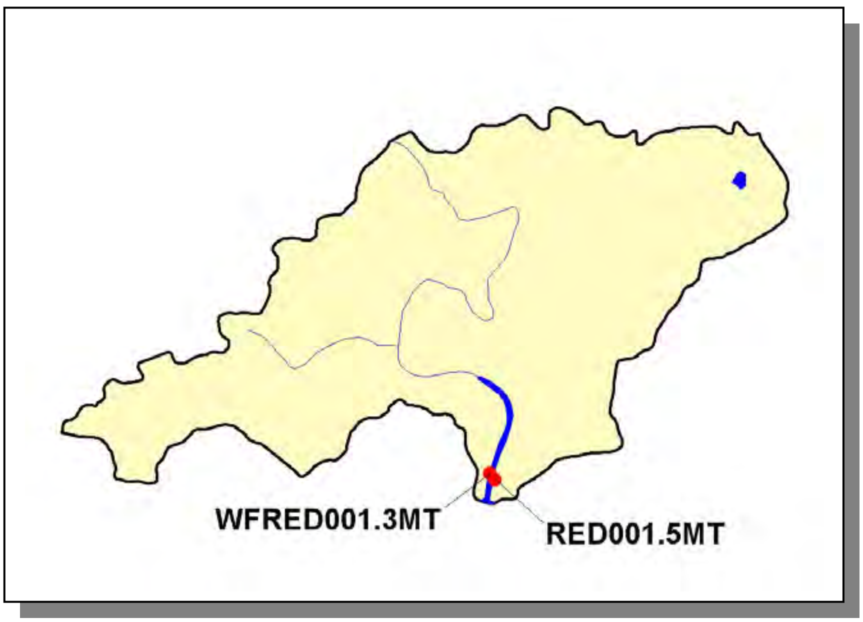

Figure 4-185. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060605. *More information, including site names and locations and stations located in the watershed outside of Tennessee, is provided in Appendix IV.*

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

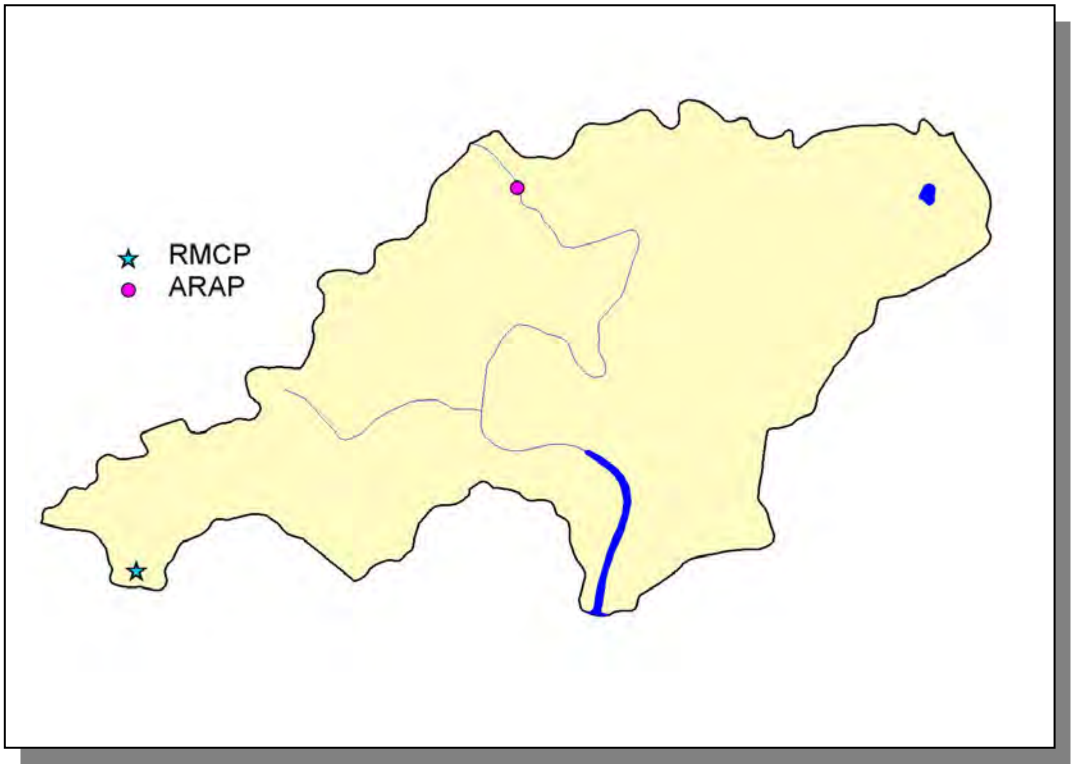

Figure 4-186. Location of Permits Issued in Subwatershed 051302060605. *More information, including the names of facilities, is provided in Appendix IV.*

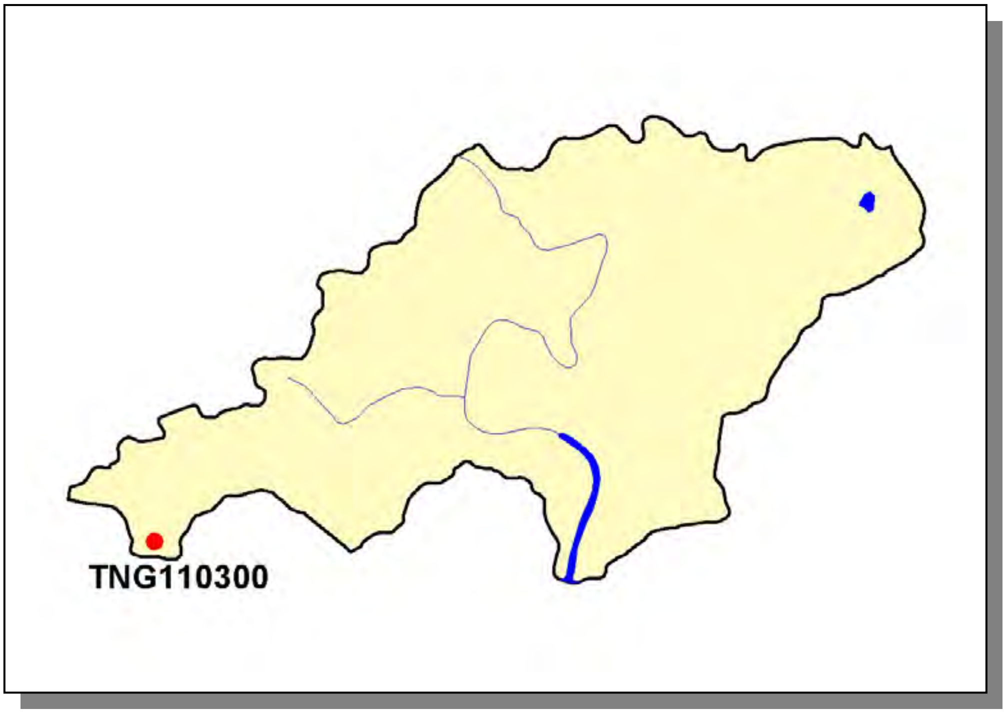

Figure 4-187. Location of Ready Mix Concrete Plants (RMCP) in Subwatershed 051302060605. *More information is provided in Appendix IV.*

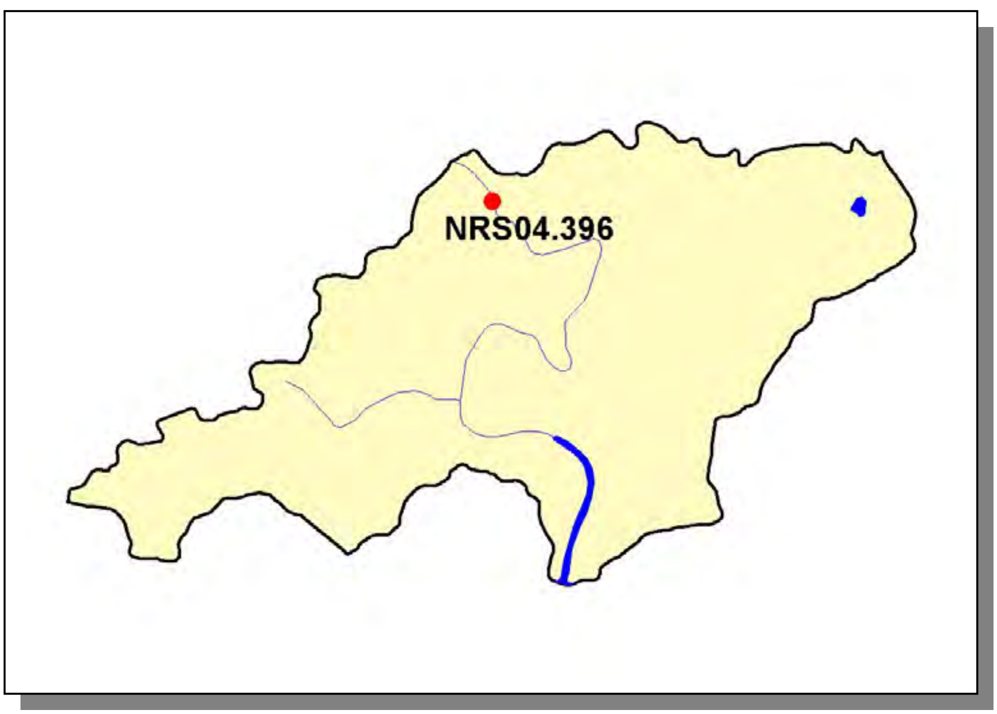

Figure 4-188. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051302060605. *More information is provided in Appendix IV.*

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

LIVESTOCK COUNTS				
Beef Cow	Cattle	Milk Cow	Hogs	Sheep
245	473	12	22	<5

Table 4-139. Summary of Livestock Count Estimates in Subwatershed 051302060605. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Montgomery	16,051	30,959	760	913	1,408	107

Table 4-140. Summary of Livestock Count Estimates in Montgomery County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.45
Grass (Hayland)	0.29
Legumes, Grass (Hayland)	0.40
Grass, Forbs, Legumes (Mixed Pasture)	0.55
Corn (Row Crops)	8.04
Soybeans (Row Crops)	4.26
Tobacco (Row Crops)	22.25
Conservation Reserve Program Lands	0.41
Farmsteads and Ranch Headquarters	0.04

Table 4-141. Annual Estimated Total Soil Loss in Subwatershed 051302060605.

4.2.F. 0513020607.

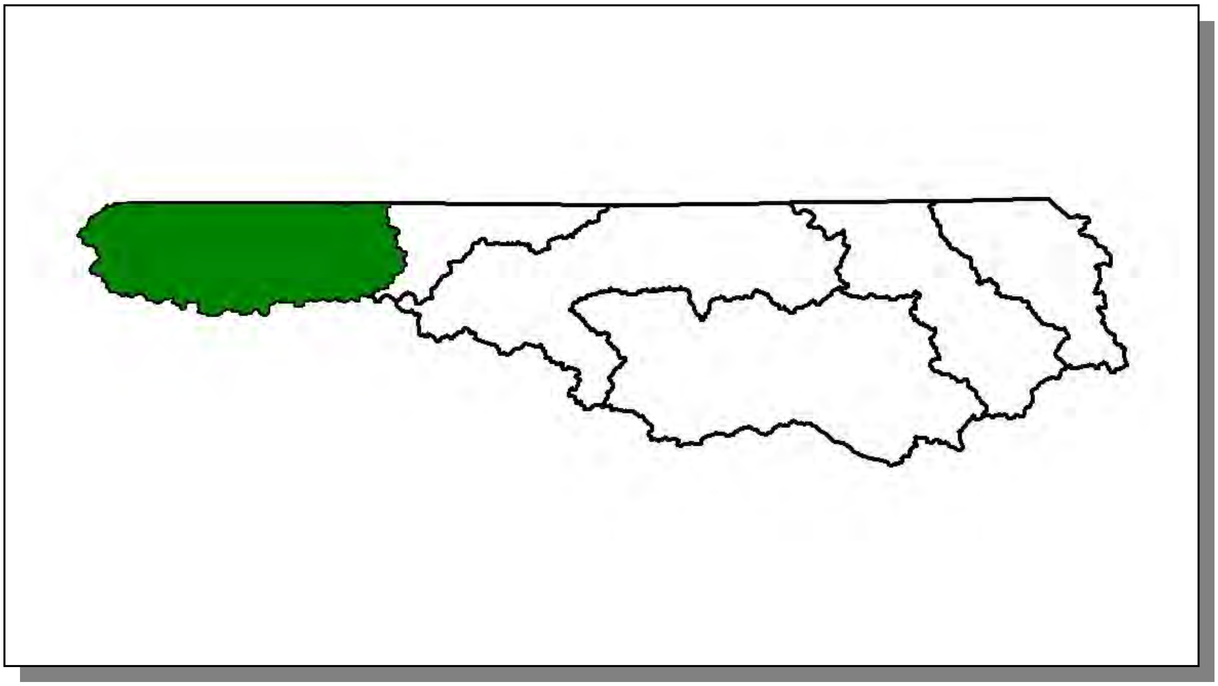

Figure 4-189. Location of Subwatershed 0513020607. *All Red River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.F.i. 051302060701 (Noahs Spring Branch).

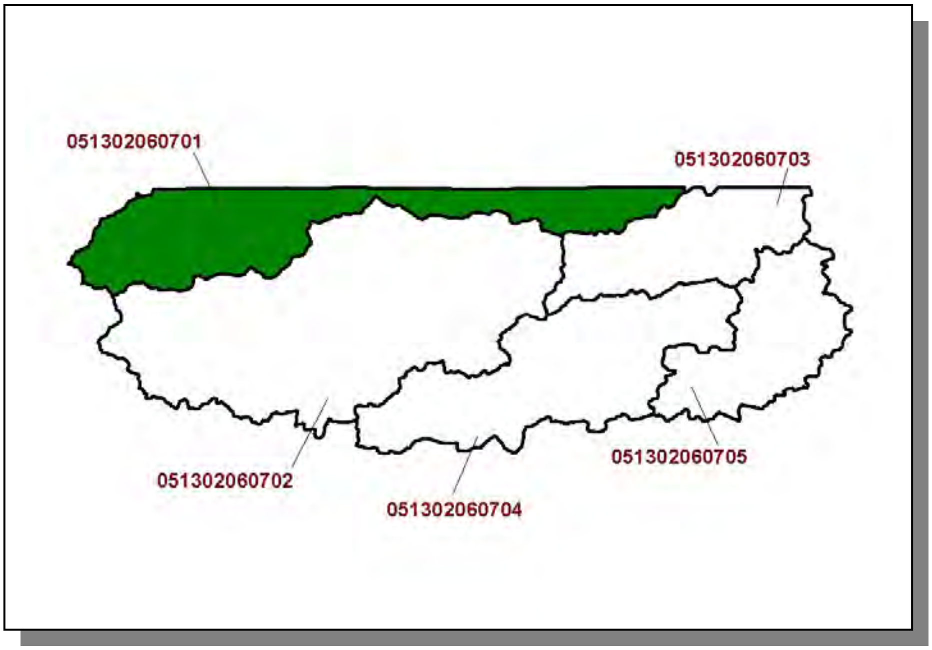

Figure 4-190. Location of Subwatershed 051302060701. *HUC-12 subwatershed boundaries are shown for reference.*

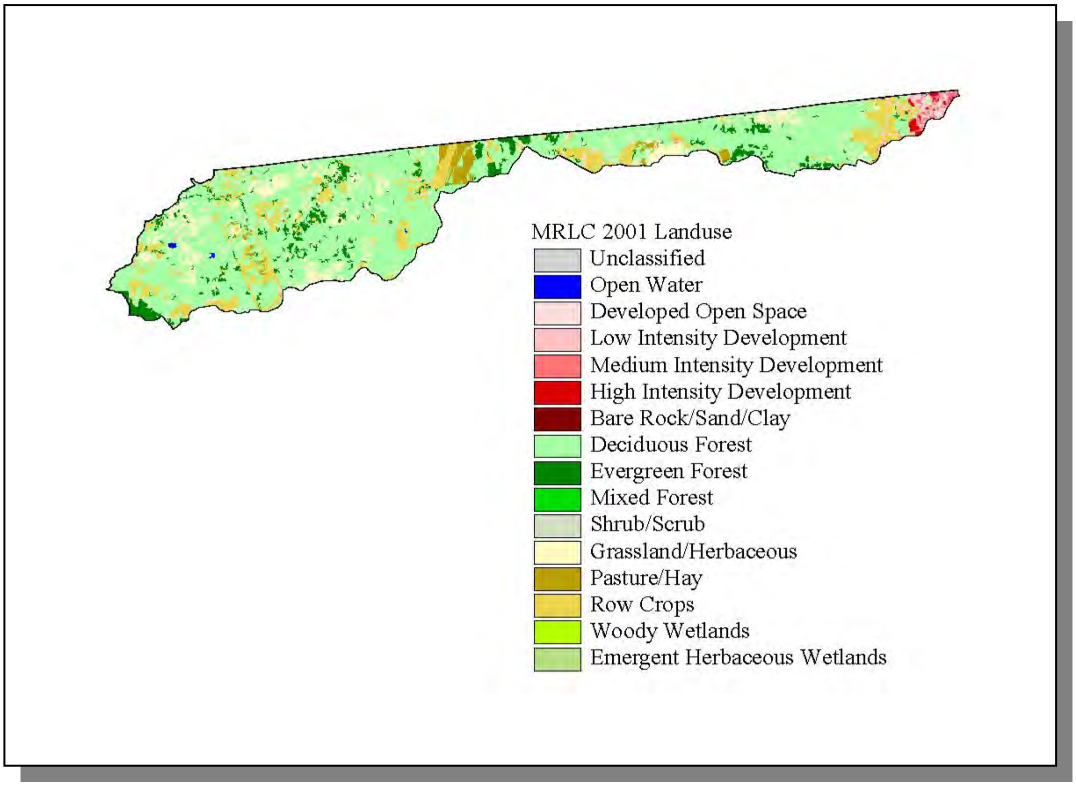

Figure 4-191. Illustration of Land Use Distribution in Subwatershed 051302060701.

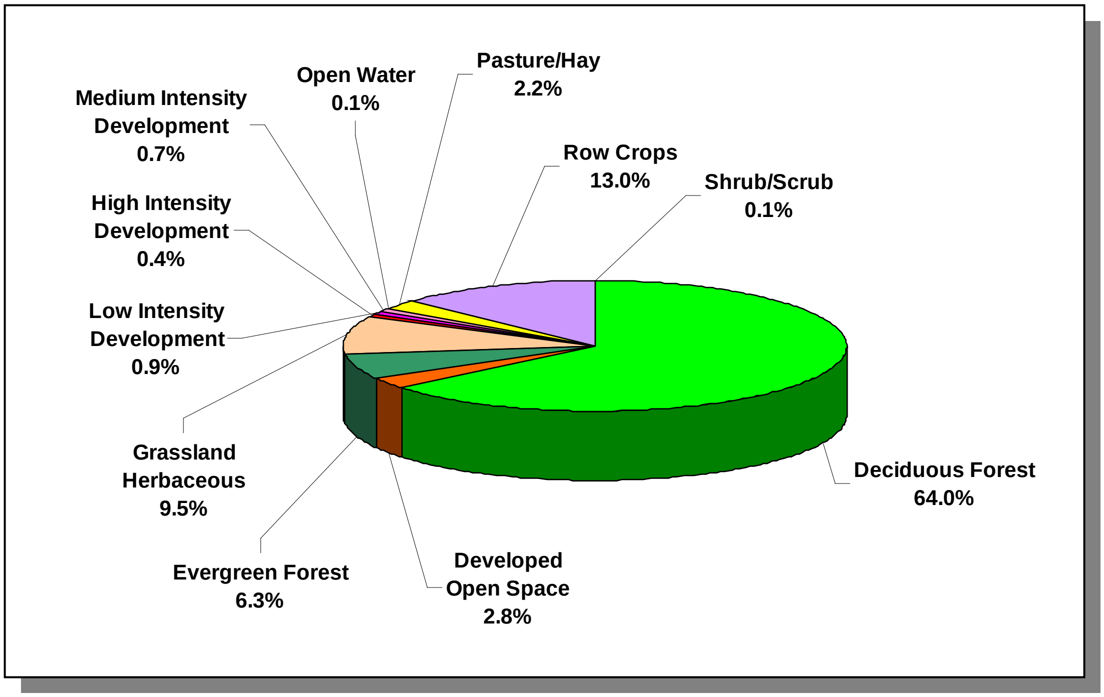

Figure 4-192. Land Use Distribution in Subwatershed 051302060701. *More information is provided in Appendix IV.*

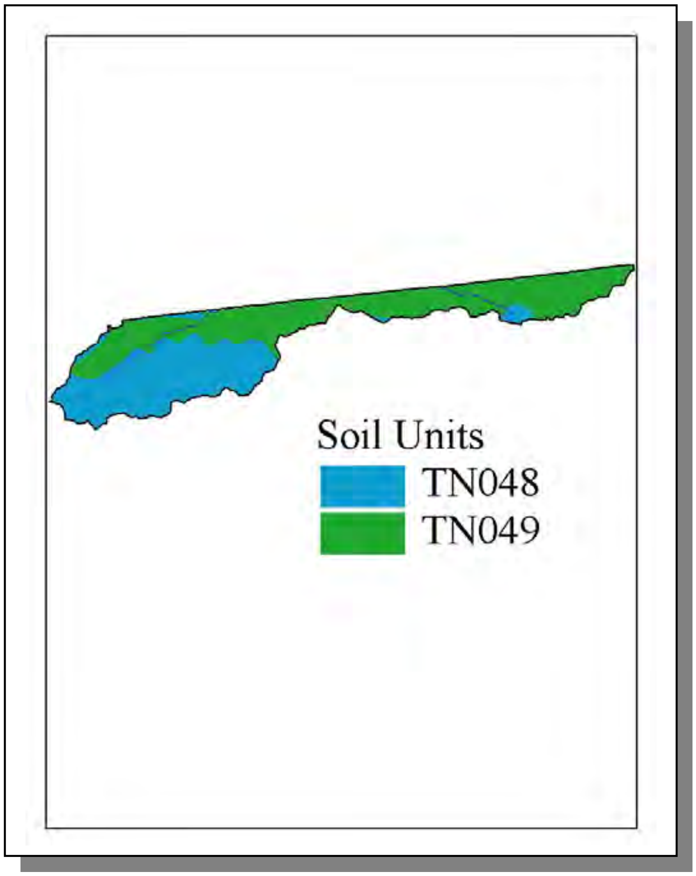

Figure 4-193. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060701.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN048	8.00	B	1.38	5.06	Silty Loam	0.42
TN049	0.00	C	1.30	5.94	Silty Loam	0.34

Table 4-142. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060701. *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)
Montgomery	100,498	124,369	134,768	1.6	1,608	1,990	2,157	34.1
Stewart	9,479	11,241	12,370	2.98	282	335	368	30.5
Total	**109,977**	**135,610**	**147,138**		**1,890**	**2,325**	**2,525**	**33.6**

Table 4-143. Population Estimates in Subwatershed 051302060701.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Clarksville	Montgomery	75,494	27,642	23,610	3,956	76

Table 4-144. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302060701.

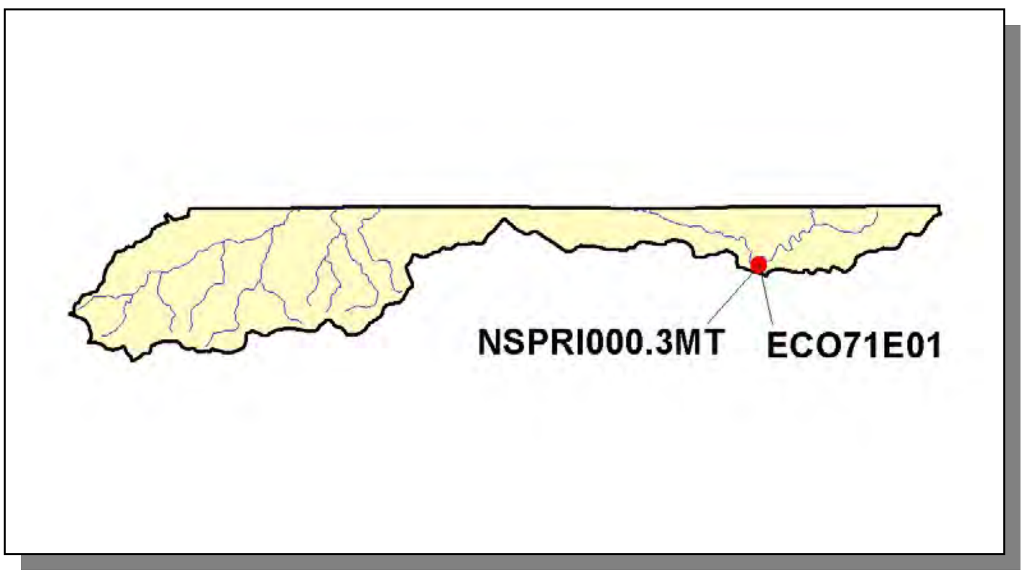

Figure 4-194. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060701. *More information, including site names and locations and stations located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.F.i.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.F.i.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS				
Beef Cow	Cattle	Milk Cow	Hogs	Sheep
62	226	<5	14	<5

Table 4-145. Summary of Livestock Count Estimates in Subwatershed 051302060701. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Montgomery	16,051	30,959	760	913	1,408	107
Stewart	0	8,925	0	477	683	21

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

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.06
Grass (Hayland)	0.14
Legumes, Grass (Hayland)	0.40
Grass, Forbs, Legumes (Mixed Pasture)	0.35
Corn (Row Crops)	4.10
Soybeans (Row Crops)	7.53
Tobacco (Row Crops)	12.02
Conservation Reserve Program Lands	0.41
Other Land in Farms	0.30
Farmsteads and Ranch Headquarters	0.10

Table 4-147. Annual Estimated Total Soil Loss in Subwatershed 051302060701.

4.2.F.ii. 051302060702 (Piney Fork Creek).

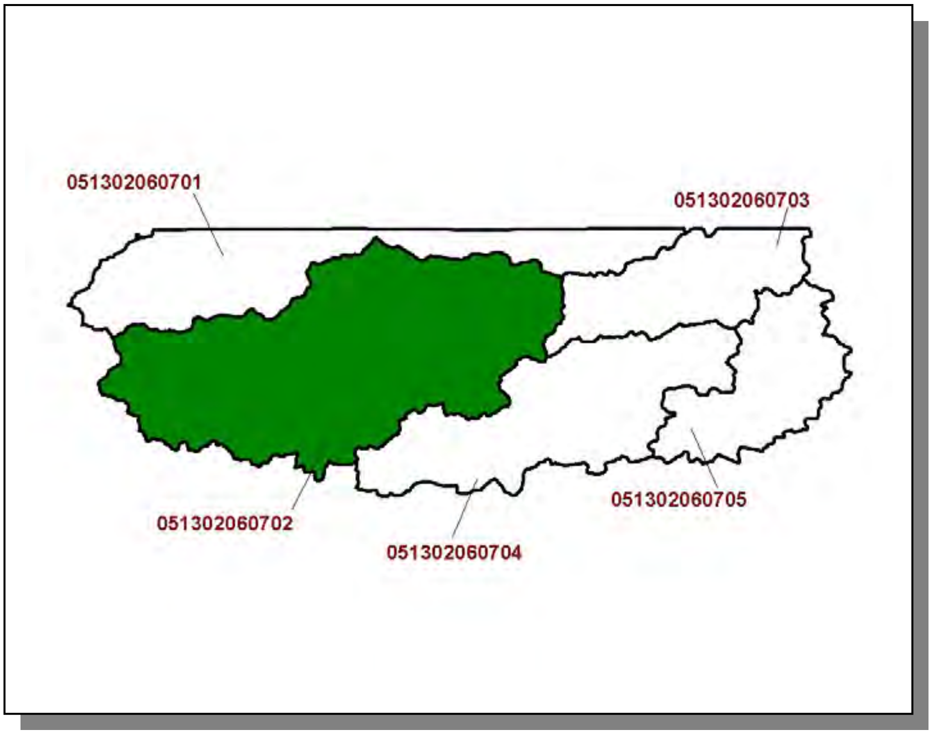

Figure 4-195. Location of Subwatershed 051302060702. *All HUC-12 subwatershed boundaries are shown for reference.*

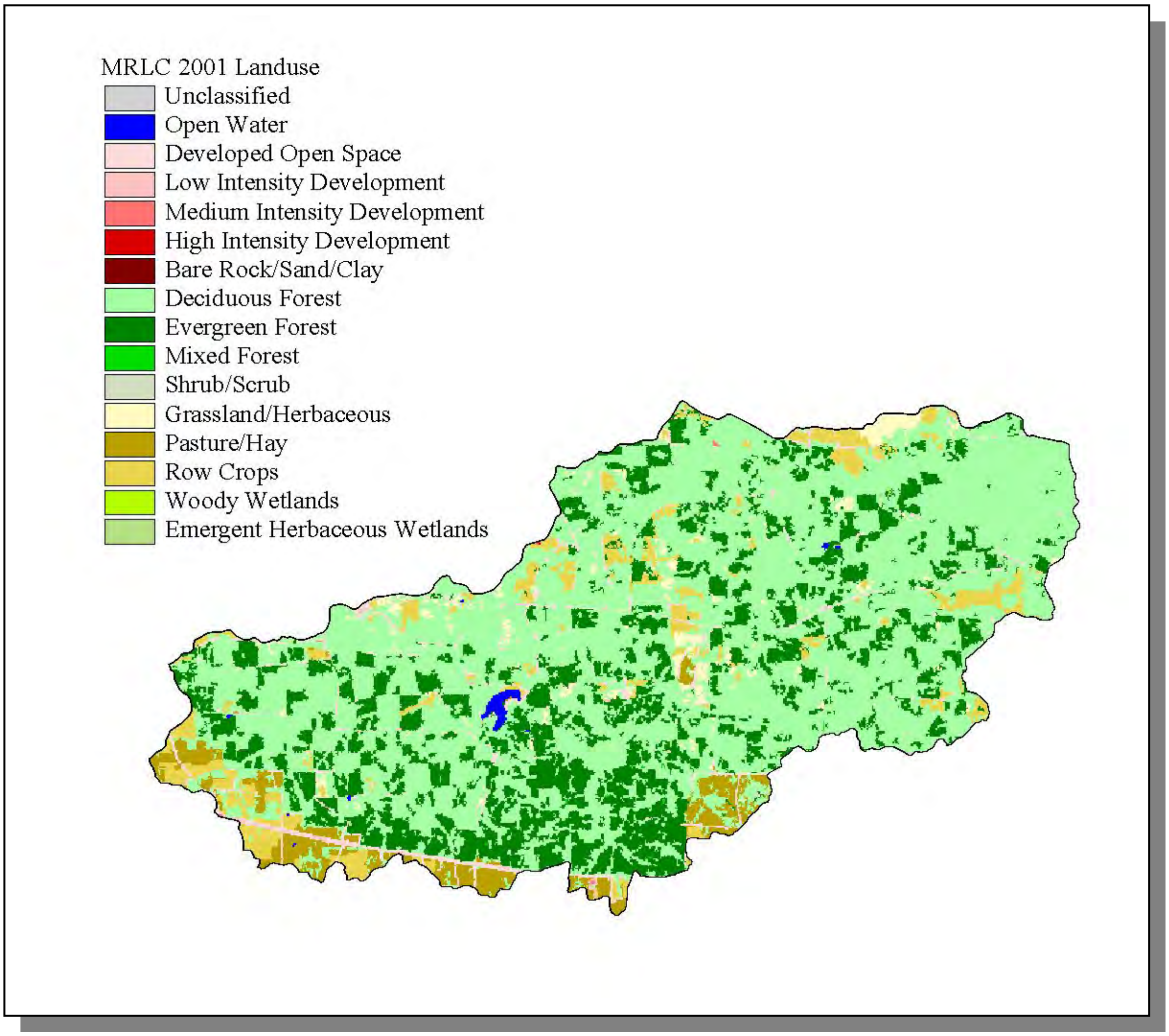

Figure 4-196. Illustration of Land Use Distribution in Subwatershed 051302060702.

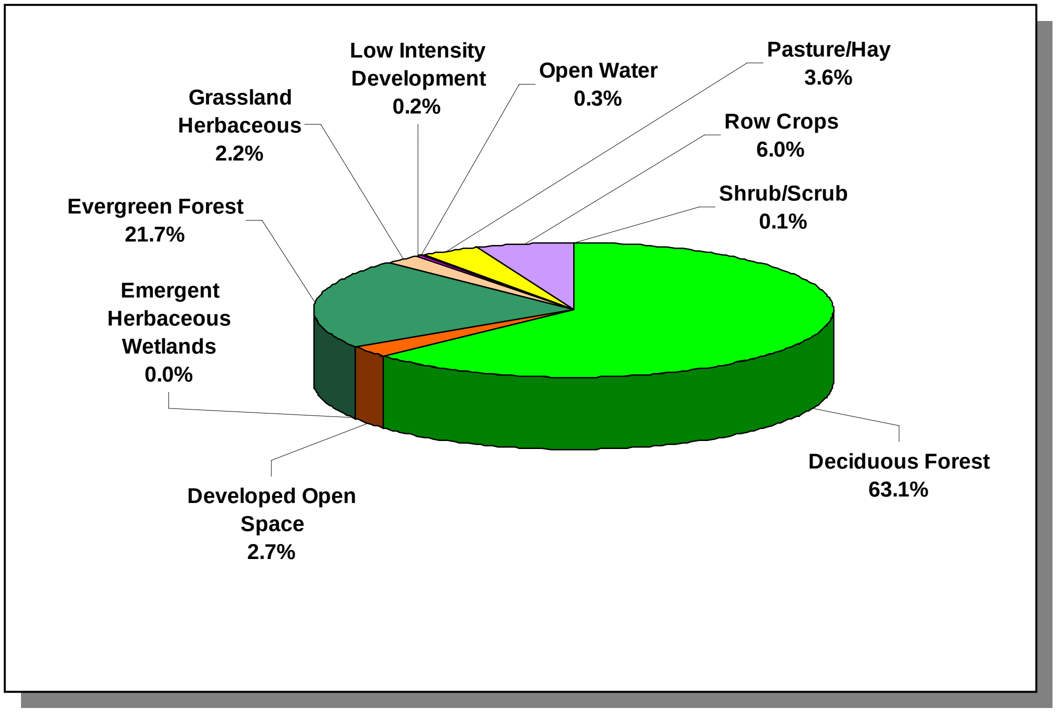

Figure 4-197. Land Use Distribution in Subwatershed 051302060702. *More information is provided in Appendix IV.*

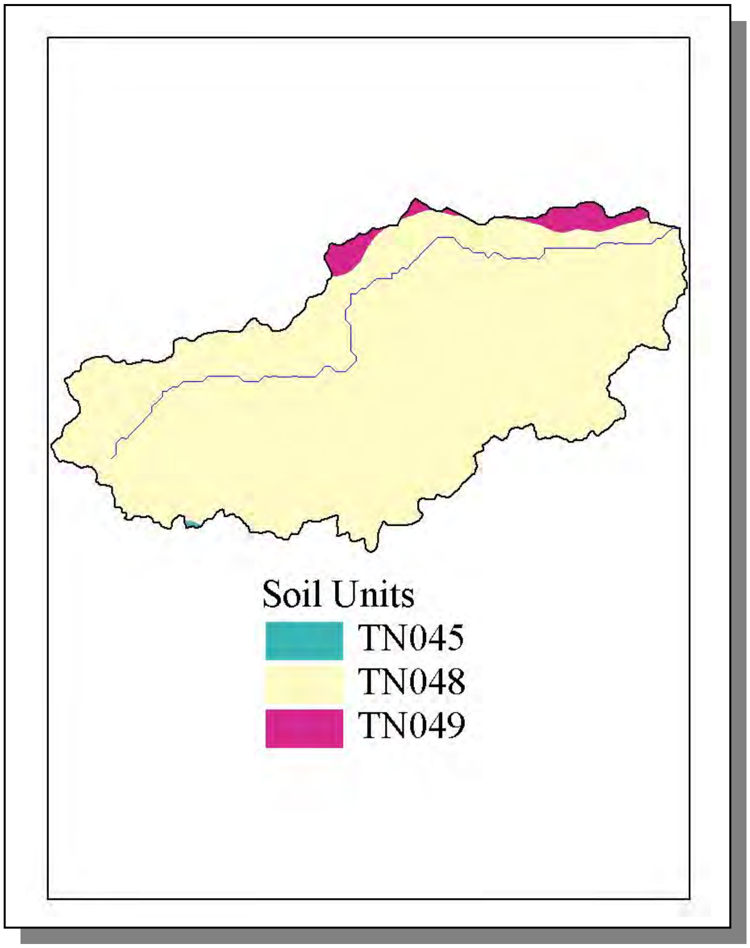

Figure 4-198. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060702.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN045	0.00	B	1.95	5.45	Loam	0.35
TN048	8.00	B	1.38	5.06	Silty Loam	0.42
TN049	0.00	C	1.30	5.94	Silty Loam	0.34

Table 4-148. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060702. *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)
Montgomery	100,498	124,369	134,768	5.14	5,163	6,389	6,924	34.1
Stewart	9,479	11,241	12,370	4.45	422	501	551	30.6
Total	**109,977**	**135,610**	**147,138**		**5,585**	**6,890**	**7,475**	**33.8**

Table 4-149. Population Estimates in Subwatershed 051302060702.

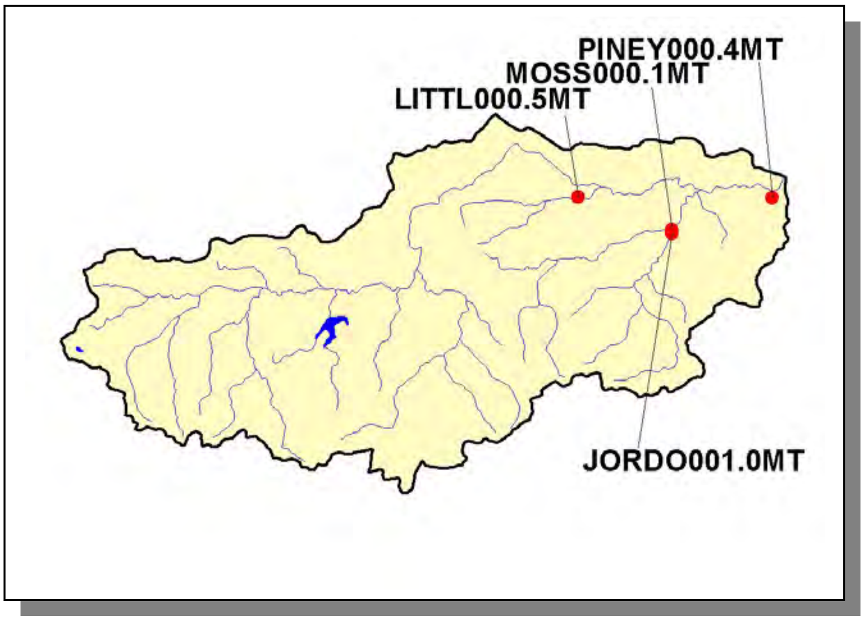

Figure 4-199. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060702. *More information, including site names and locations and stations located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.F.ii.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.F.ii.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
76	1,041	<5	<5	75	<5

Table 4-150. Summary of Livestock Count Estimates in Subwatershed 051302060702. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Montgomery	16,051	30,959	760	913	1,408	107
Stewart	0	8,925	0	477	683	21

Table 4-151. Summary of Livestock Count Estimates in Montgomery and Stewart Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.88
Grass (Hayland)	0.18
Legumes, Grass (Hayland)	0.40
Grass, Forbs, Legumes (Mixed Pasture)	0.41
Corn (Row Crops)	5.28
Soybeans (Row Crops)	6.56
Tobacco (Row Crops)	15.06
Conservation Reserve Program Lands	0.41
Other Land in Farms	0.30
Farmsteads and Ranch Headquarters	0.08

Table 4-152. Annual Estimated Total Soil Loss in Subwatershed 051302060702.

4.2.F.iii. 051302060703 (Little West Fork Red River).

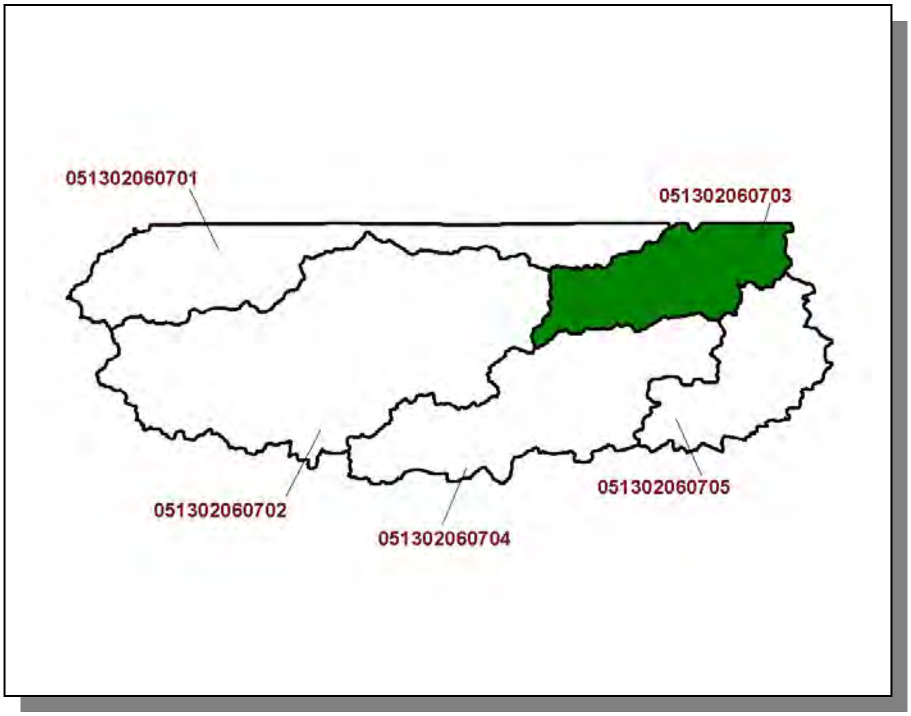

Figure 4-200. Location of Subwatershed 051302060703. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

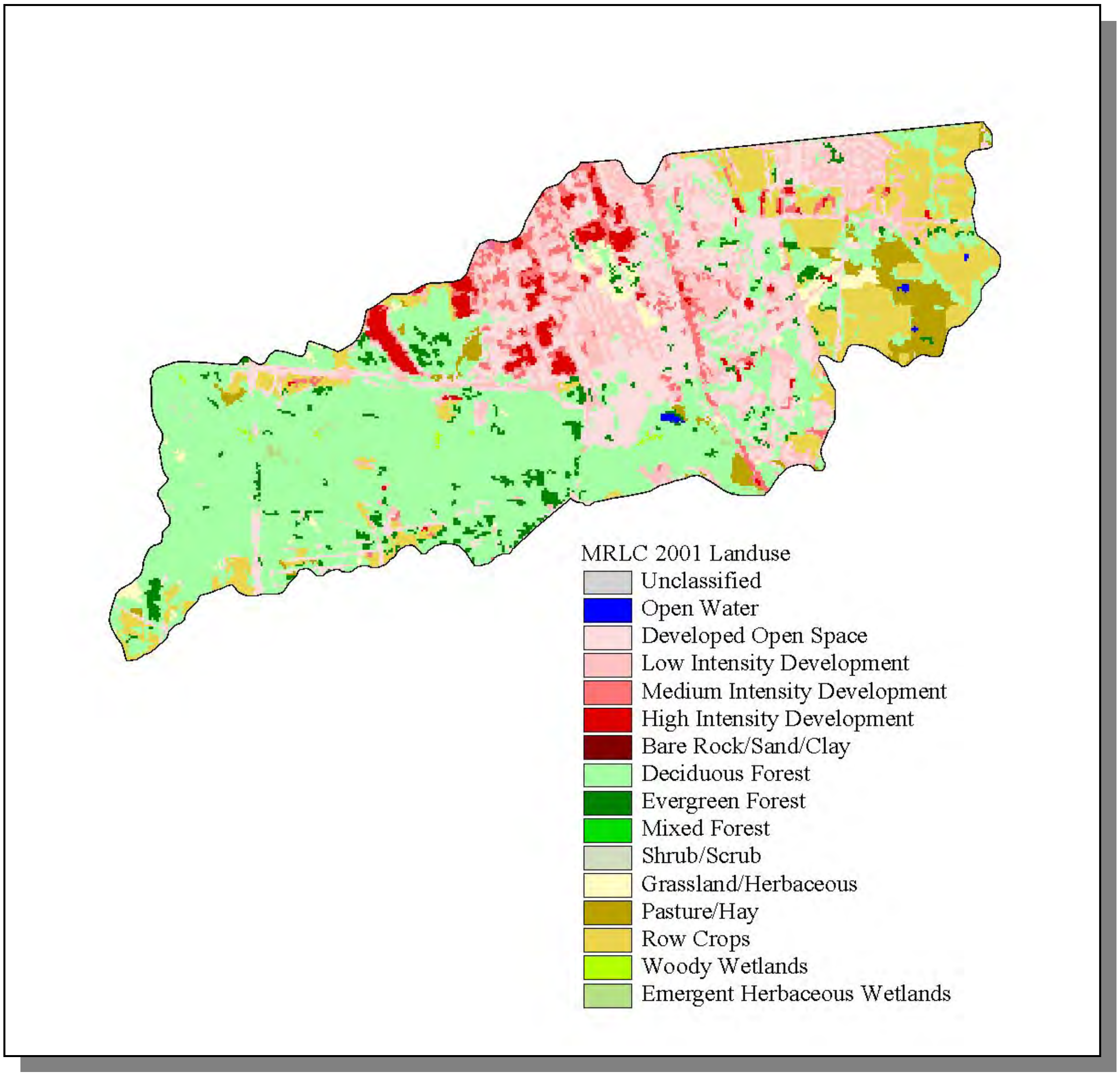

Figure 4-201. Illustration of Land Use Distribution in Subwatershed 051302060703.

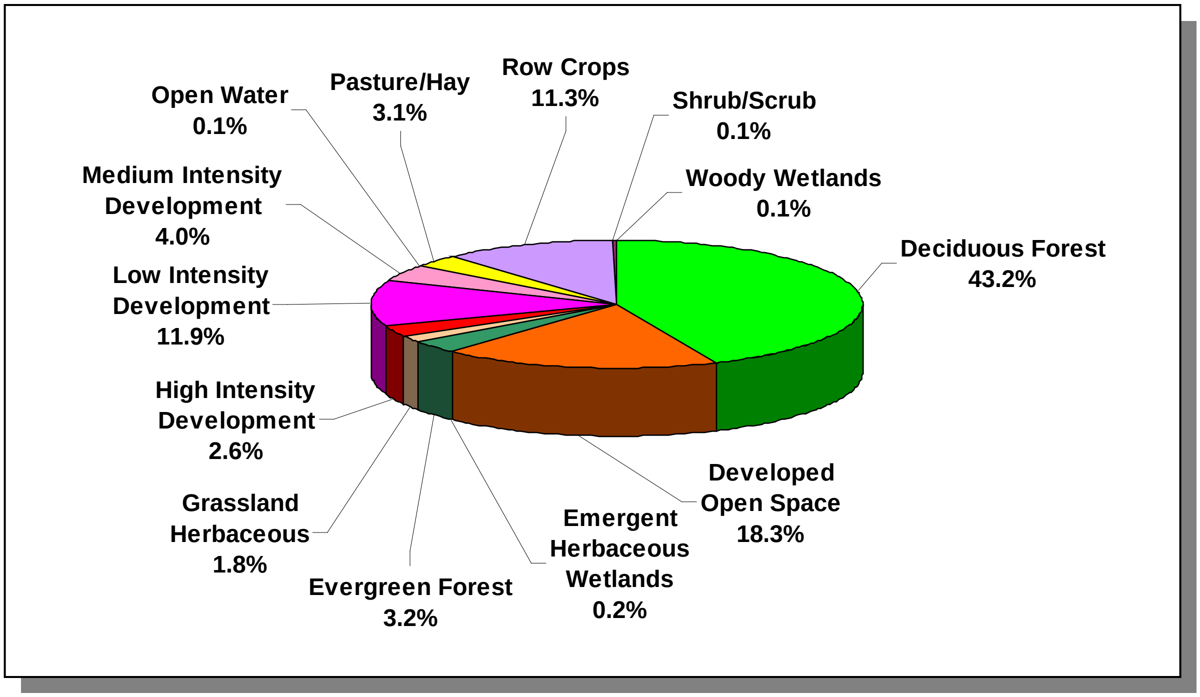

Figure 4-202. Land Use Distribution in Subwatershed 051302060703. *More information is provided in Appendix IV.*

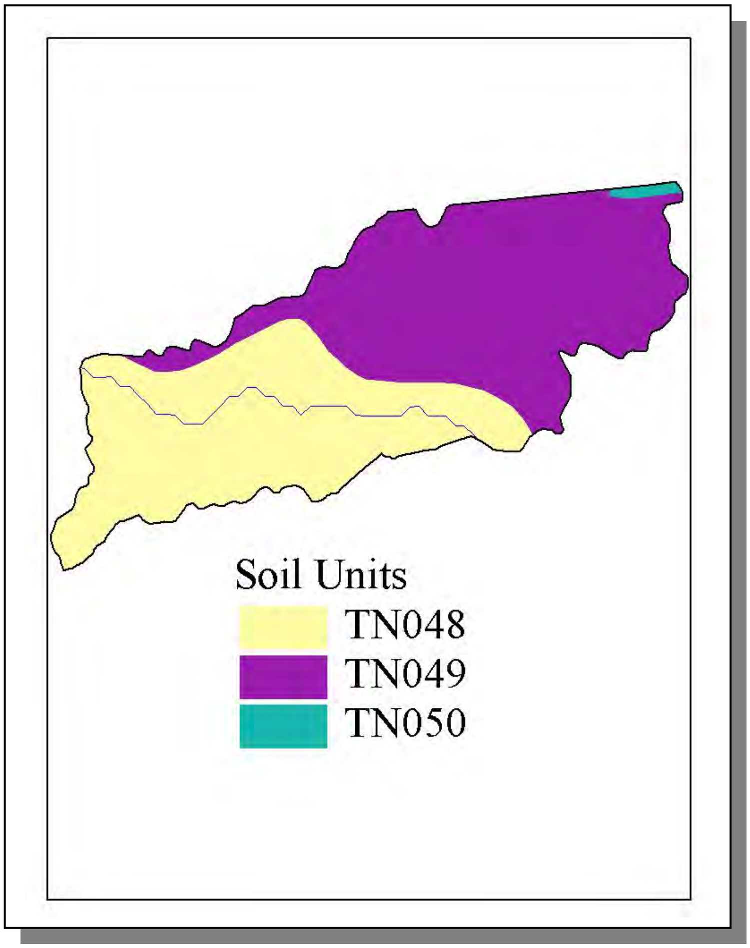

Figure 4-203. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060703.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN048	8.00	B	1.38	5.06	Silty Loam	0.42
TN049	0.00	C	1.30	5.94	Silty Loam	0.34
TN050	0.00	B	1.30	5.97	Silty Loam	0.33

Table 4-153. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 060102060703. *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)
Montgomery	100,498	124,369	134,768	2.72	2,729	3,377	3,659	34.1

Table 4-154. Population Estimates in Subwatershed 051302060703.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Clarksville	Montgomery	75,494	27,642	23,610	3,956	76

Table 4-155. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302060703.

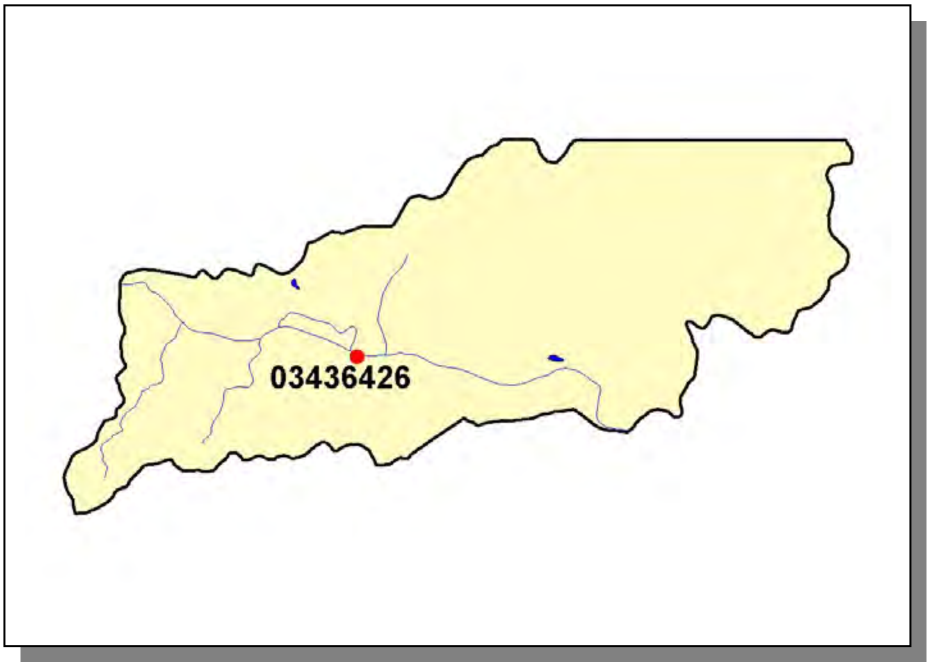

Figure 4-204. Location of Historical Streamflow Data Collection Sites in Subwatershed 051302060703. More information is provided in Appendix IV.

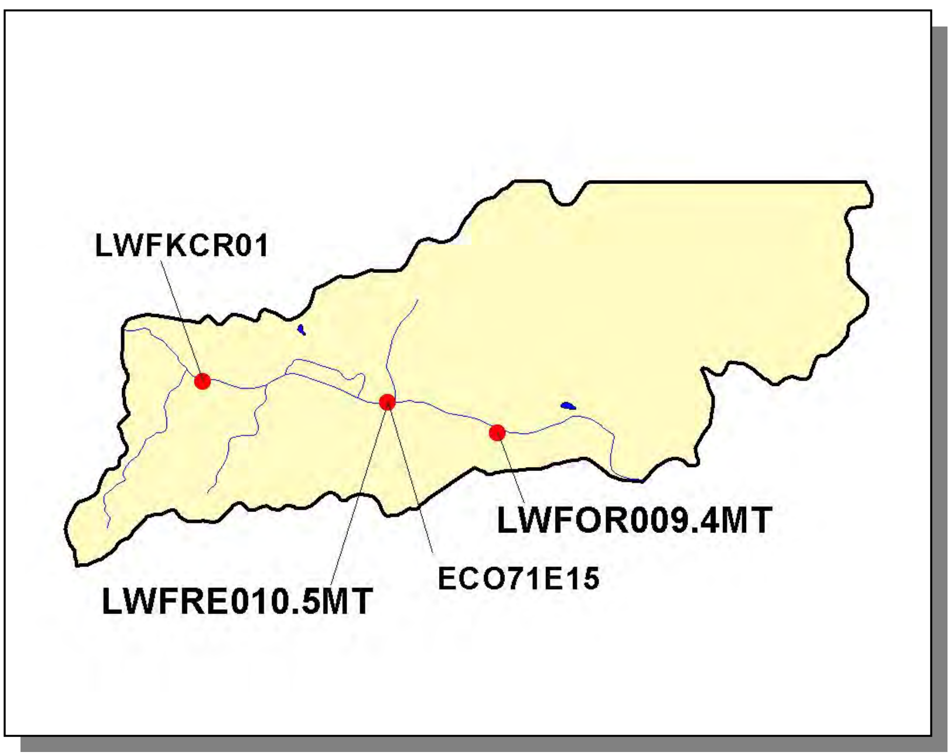

Figure 4-205. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060703. More information, including site names and locations and stations located in the watershed outside of Tennessee, is provided in Appendix IV.

4.2.F.iii.a. Point Source Contributions.

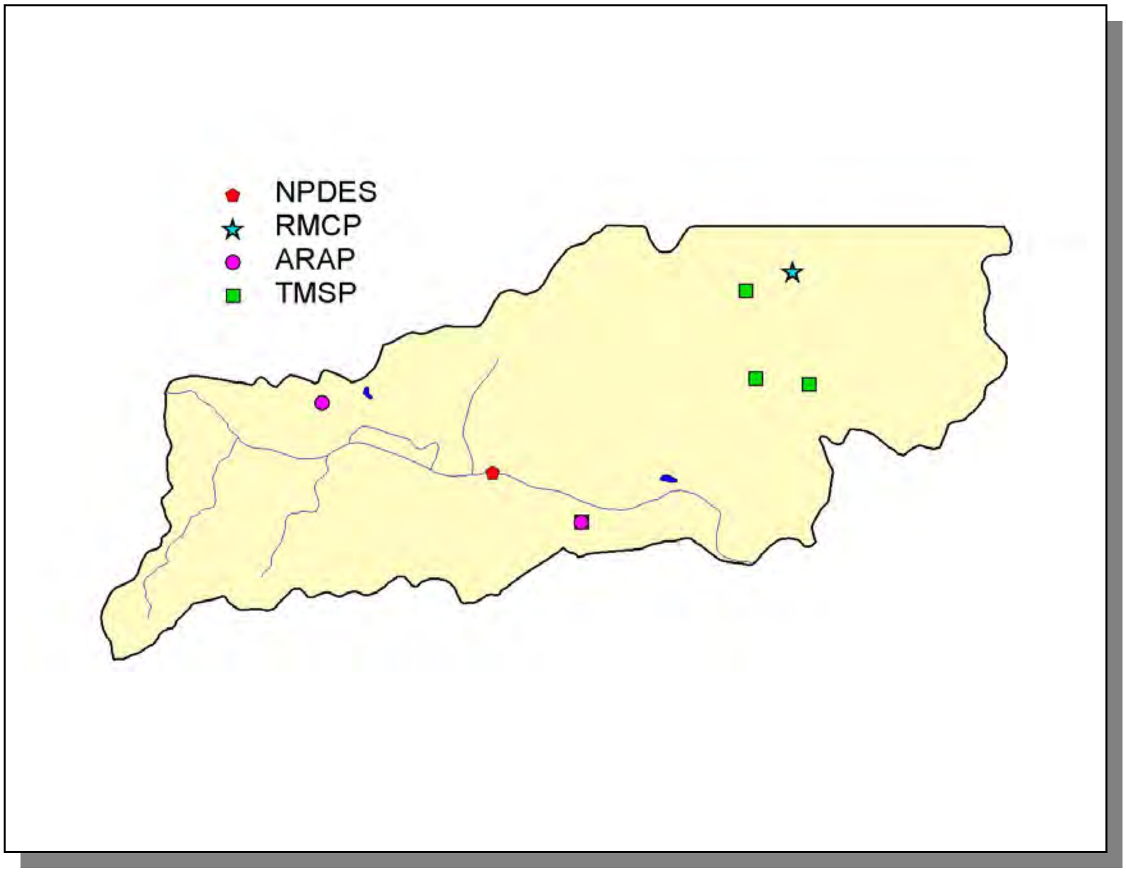

Figure 4-206. Location of Permits Issued in Subwatershed 051302060703. *More information, including the names of facilities, is provided in Appendix IV.*

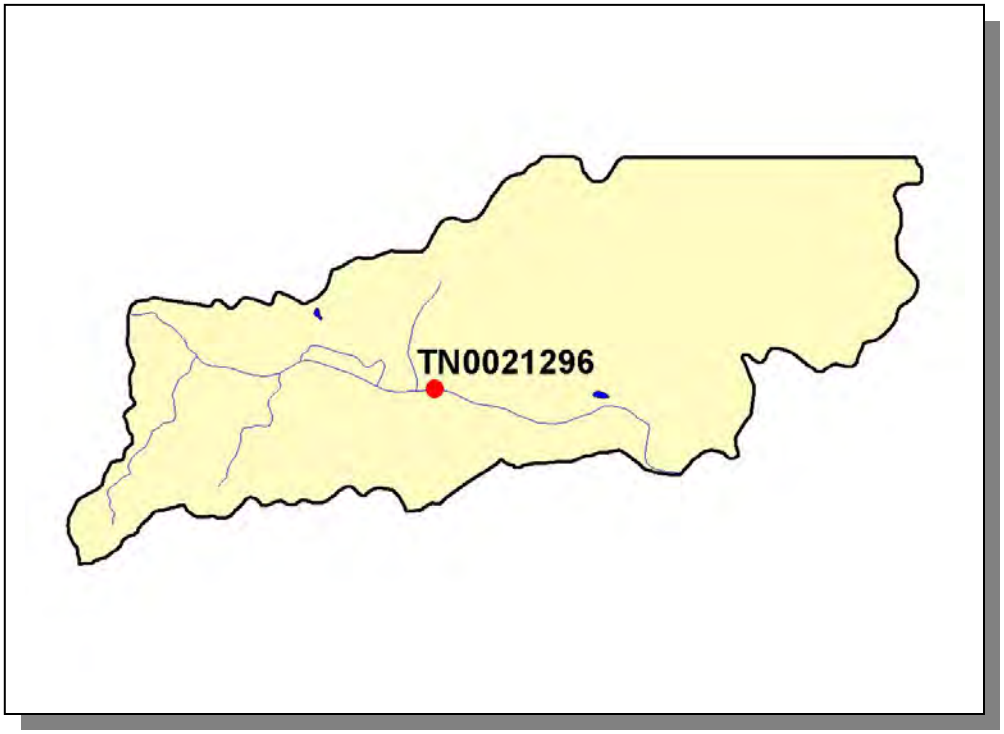

Figure 4-207. Location of Active NPDES Sites in Subwatershed 051302060703. *More information, including the names of facilities, is provided in Appendix IV.*

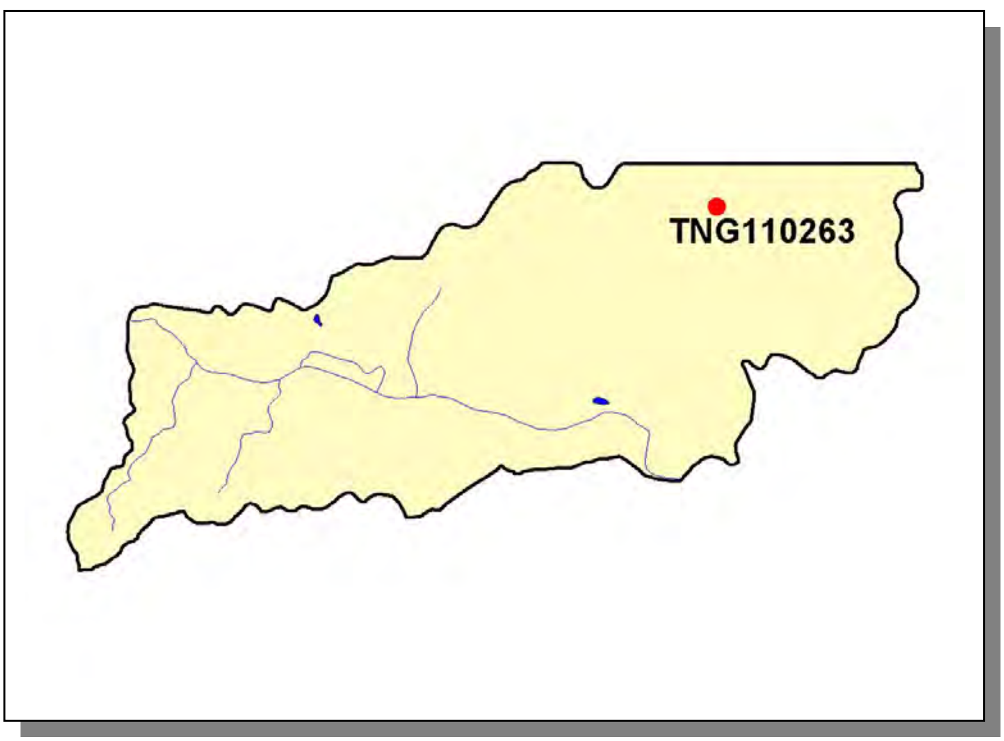

Figure 4-208. Location of Ready Mix Concrete Plants (RMCP) in Subwatershed 051302060703. *More information is provided in Appendix IV.*

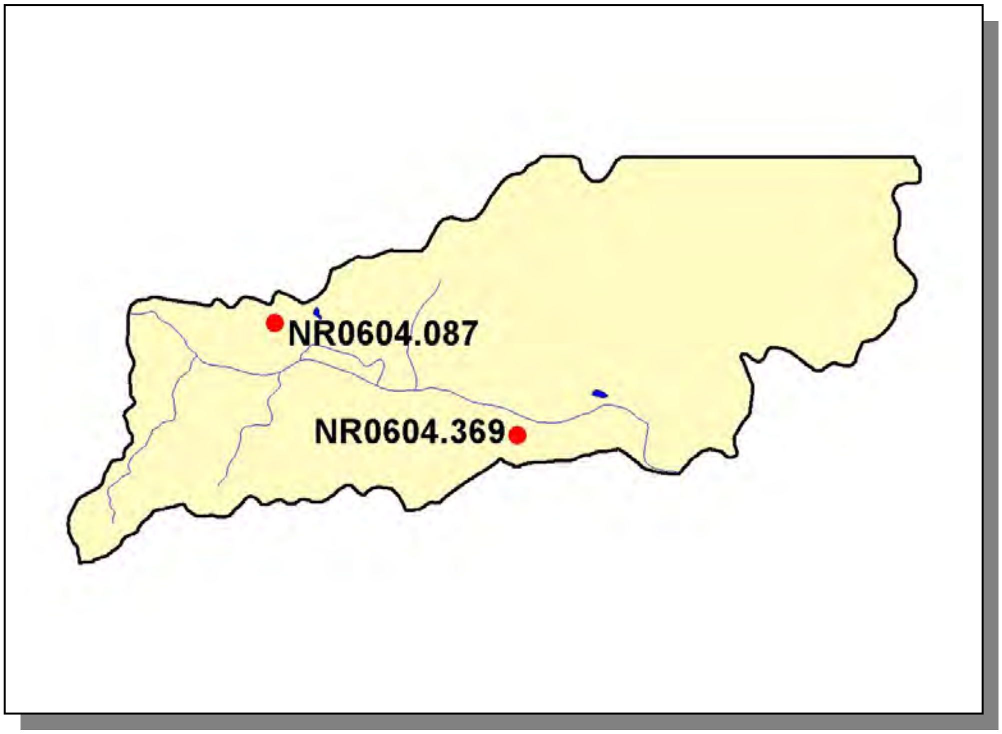

Figure 4-209. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051302060703. *More information is provided in Appendix IV.*

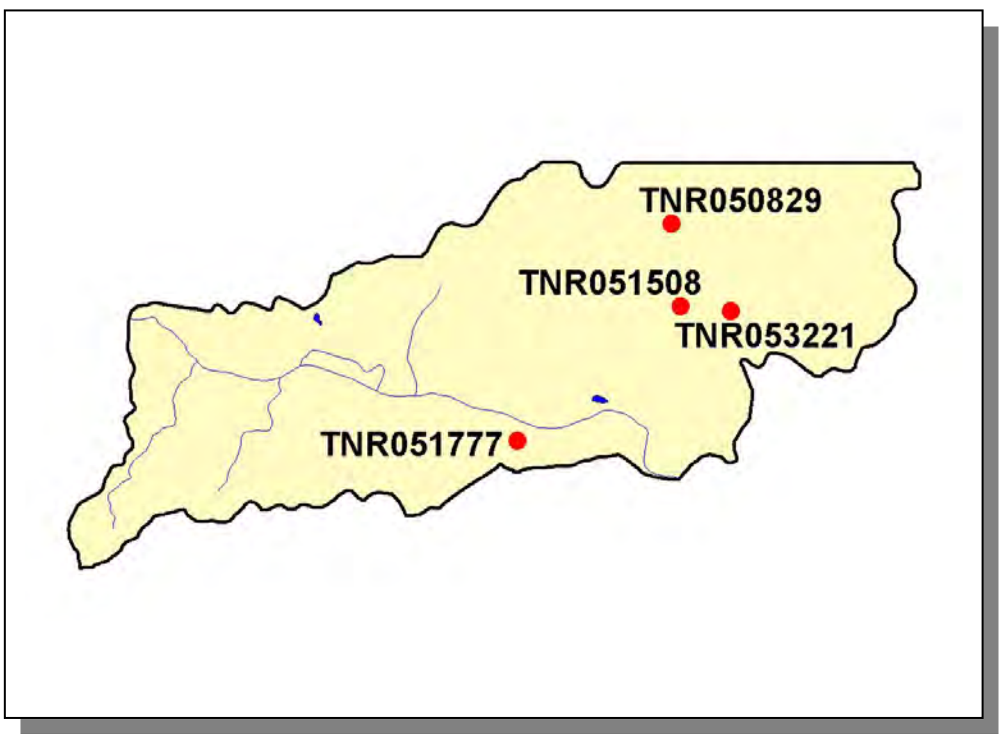

Figure 4-210. Location of TMSP Sites in Subwatershed 051302060703. *More information, including the names of facilities, is provided in Appendix IV.*

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

There is one NPDES facility discharging to water bodies listed on the 2004 303(d) list in Subwatershed 051302060703:

- TN0021296 (CH2M Hill Services) discharges to Little West Fork Creek @ RM 10.4

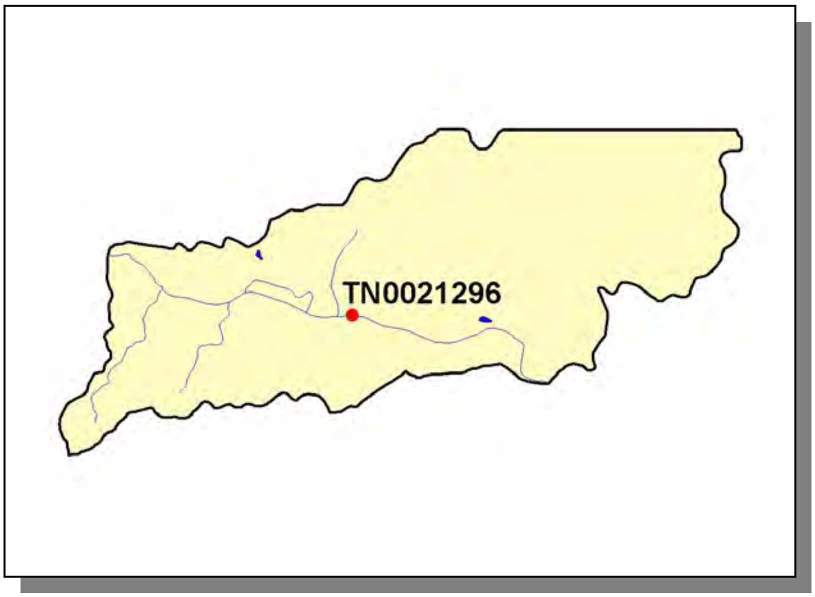

Figure 4-211. Location of NPDES Dischargers to Water Bodies Listed on the 2004 303(d) List in Subwatershed 051302060703. *More information, including the names of facilities, is provided in Appendix IV.*

Permit #	3Q2	1Q10	3Q10	3Q20	7Q10
TN0021296	19.80	na	12.30	10.30	12.70

Table 4-156. Receiving Stream Low Flow Information for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051302060703. *Data are in cubic feet per second (CFS). Data were obtained from the USGS web application StreamStats at http://water.usgs.gov/osw/streamstats/. (na, data not available)*

PERMIT #	P	N	Cu	Hg	FLOW
TN0021296	X	X	X	X	X

Table 4-157. Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051302060703.

PERMIT #	WET	$CBOD_5$	*E. coli*	NH_3	TSS	SETTLEABLE SOLIDS	DO	pH
TN0021296	X	X	X	X	X	X	X	X

Table 4-158. Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2004 303(d) List in Subwatershed 051302060703. *WET, Whole Effluent Toxicity; $CBOD_5$, Carbonaceous Biochemical Oxygen Demand (5-Day); TRC, Total Residual Chlorine; TSS, Total Suspended Solids; DO, Dissolved Oxygen.*

4.2.F.iii.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS				
Beef Cow	Cattle	Milk Cow	Hogs	Sheep
259	500	12	23	<5

Table 4-159. Summary of Livestock Count Estimates in Subwatershed 051302060703. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Montgomery	16,051	30,959	760	913	1,408	107

Table 4-160. Summary of Livestock Count Estimates in Montgomery County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.45
Grass (Hayland)	0.29
Legumes, Grass (Hayland)	0.40
Grass, Forbs, Legumes (Mixed Pasture)	0.55
Corn (Row Crops)	8.04
Soybeans (Row Crops)	4.26
Tobacco (Row Crops)	22.25
Conservation Reserve Program Lands	0.41
Farmsteads and Ranch Headquarters	0.04

Table 4-161. Annual Estimated Total Soil Loss in Subwatershed 051302060703.

4.2.F.iv. 051302060704 (Fletchers Fork).

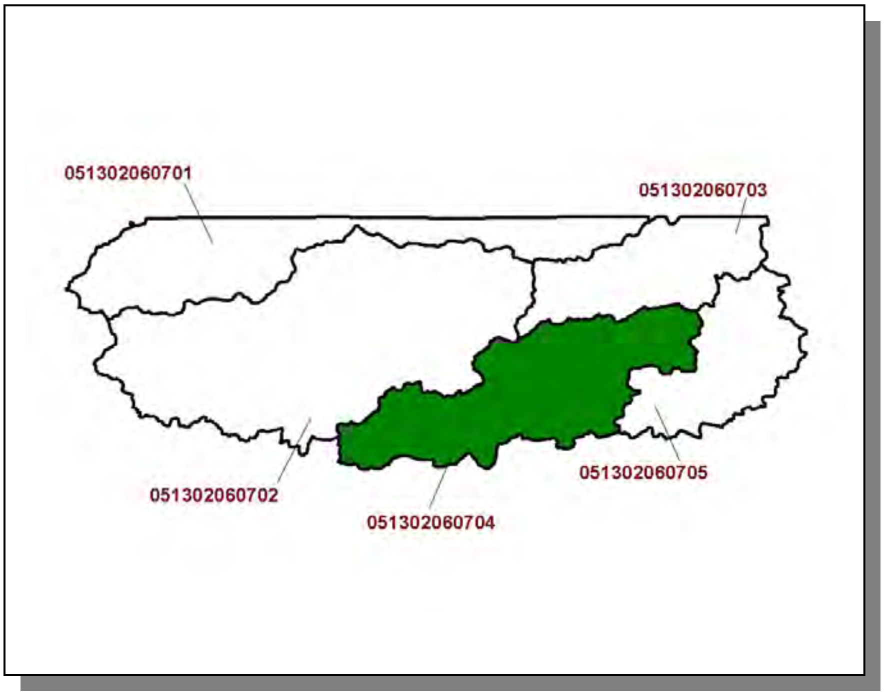

Figure 4-212. Location of Subwatershed 051302060704. *HUC-12 subwatershed boundaries are shown for reference.*

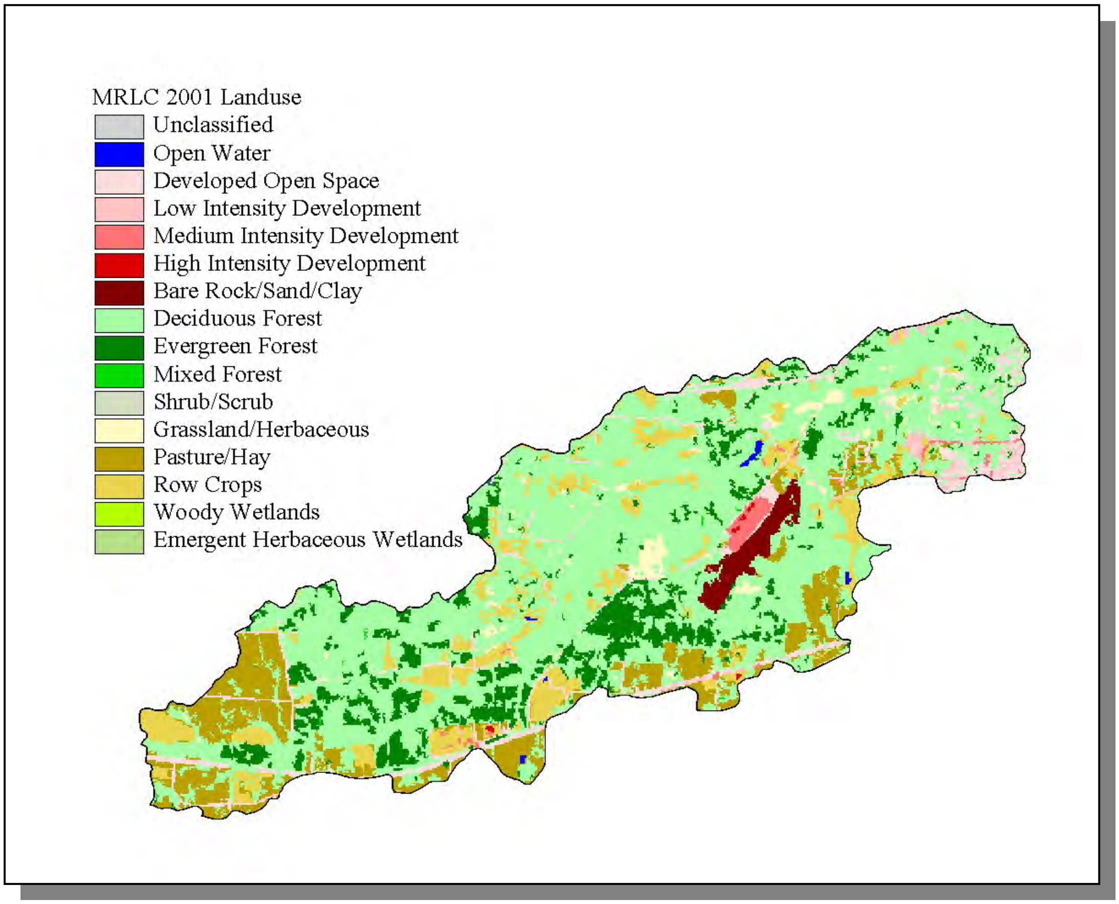

Figure 4-213. Illustration of Land Use Distribution in Subwatershed 051302060704.

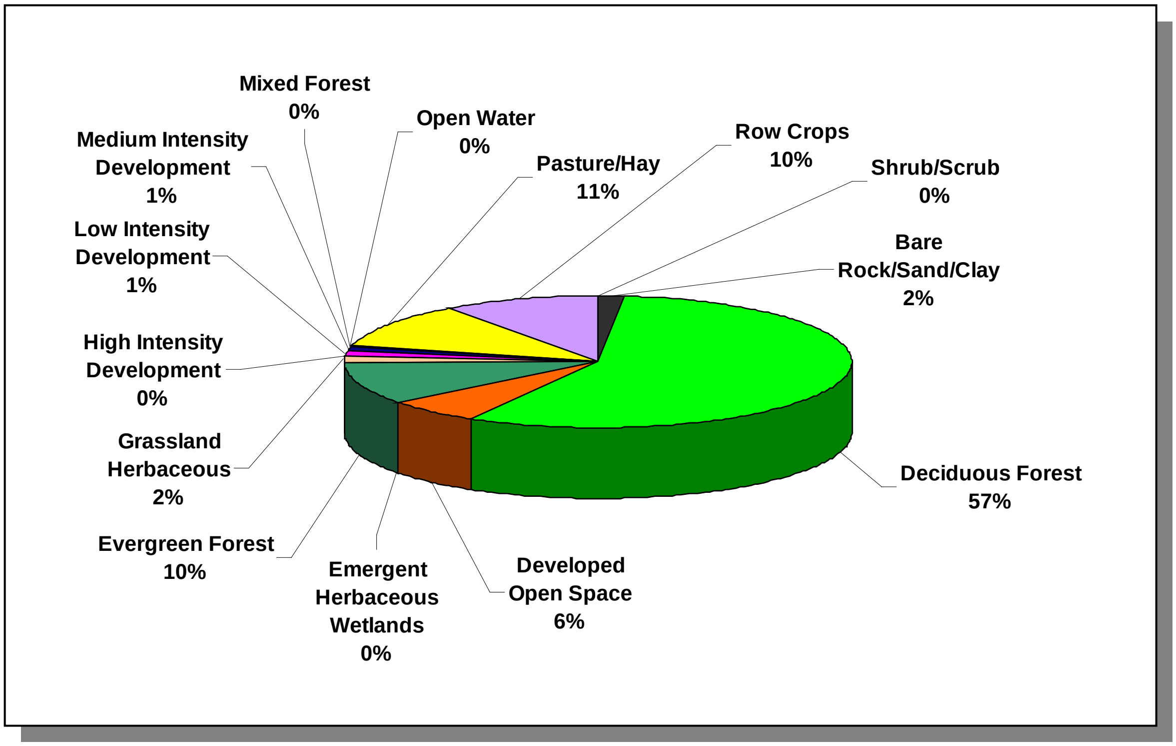

Figure 4-214. Land Use Distribution in Subwatershed 051302060704. *More information is provided in Appendix IV.*

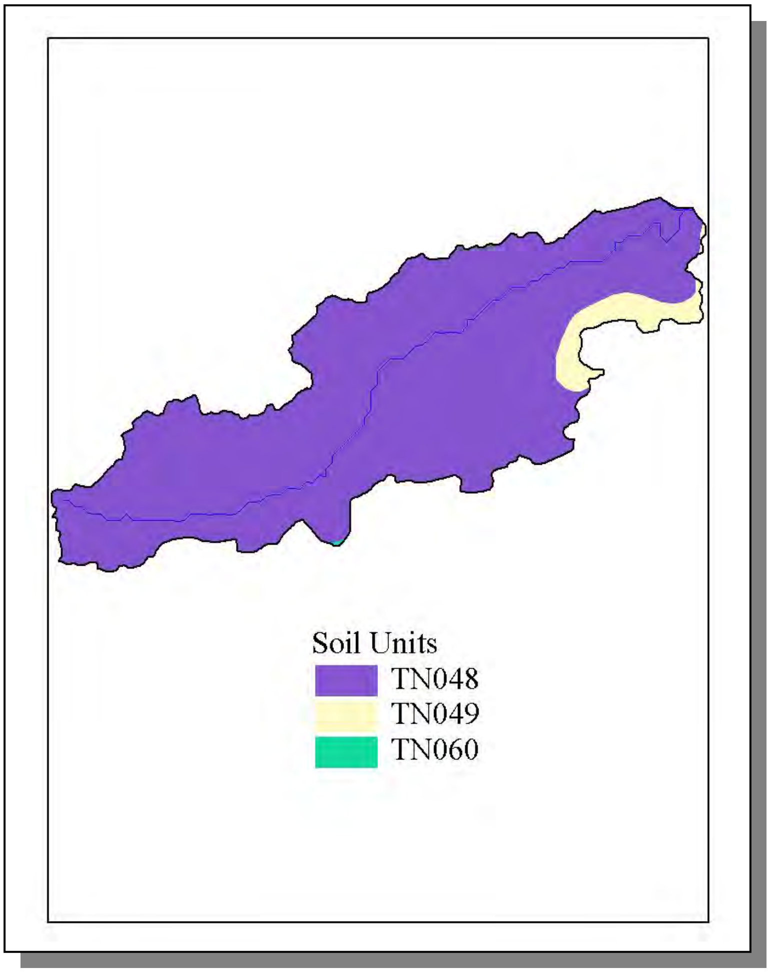

Figure 4-215. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060704.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN048	8.00	B	1.38	5.06	Silty Loam	0.42
TN049	0.00	C	1.30	5.94	Silty Loam	0.34
TN060	5.00	C	1.30	5.32	Silty Loam	0.39

Table 4-162. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060704. *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)
Montgomery	100,498	124,369	134,768	4.78	4,801	5,942	6,438	34.1

Table 4-163. Population Estimates in Subwatershed 051302060704.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Clarksville	Montgomery	75,494	27,642	23,610	3,956	76

Table 4-164. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302060704.

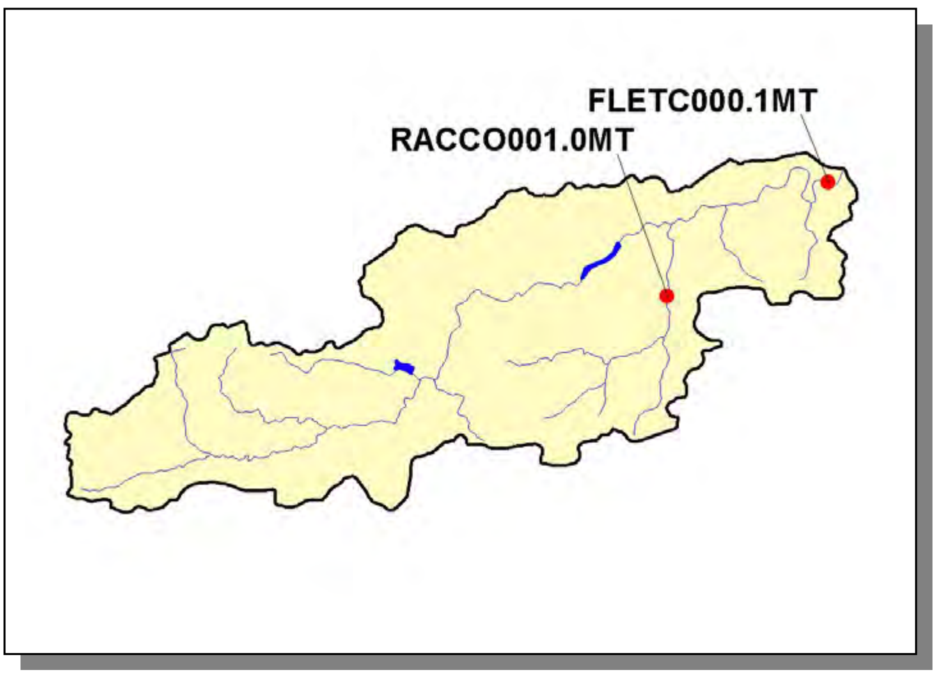

Figure 4-216. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060704. *More information, including site names and locations and stations located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.F.iv.a. Point Source Contributions.

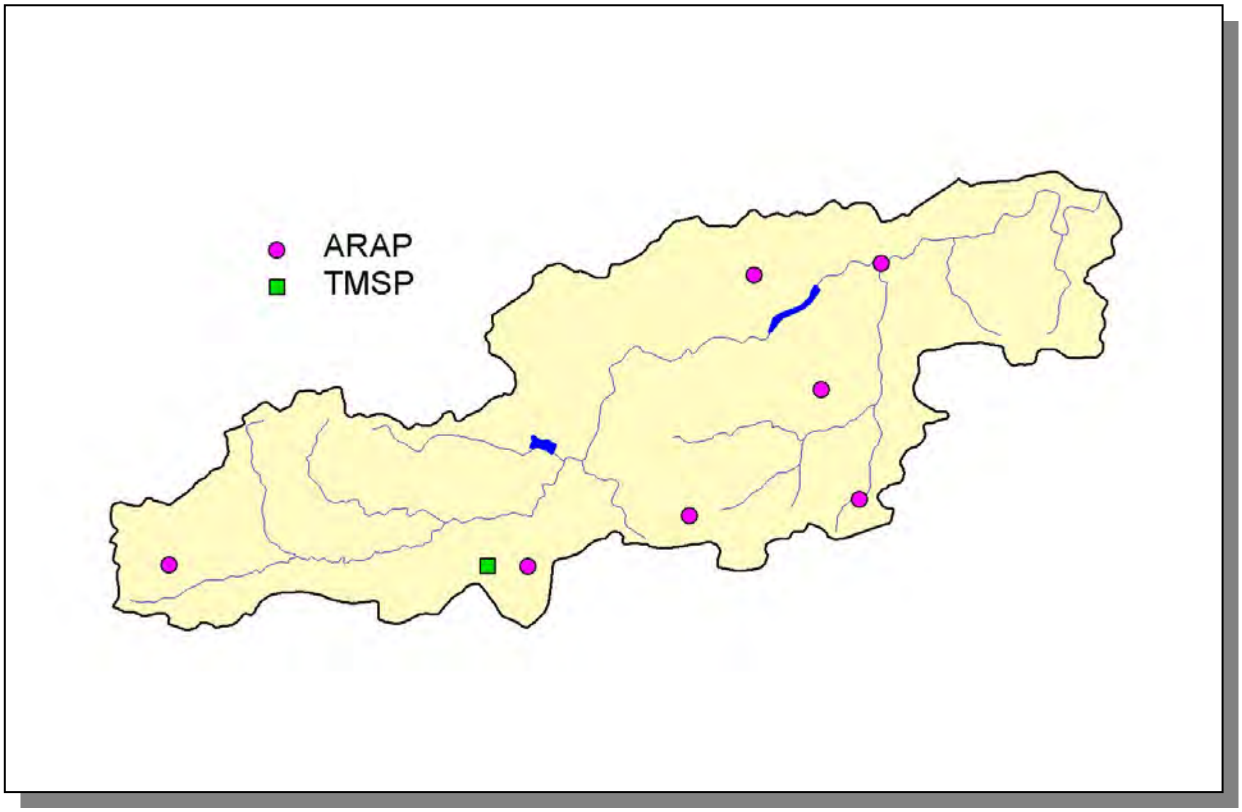

Figure 4-217. Location of Permits Issued in Subwatershed 051302060704. *More information, including the names of facilities, is provided in Appendix IV.*

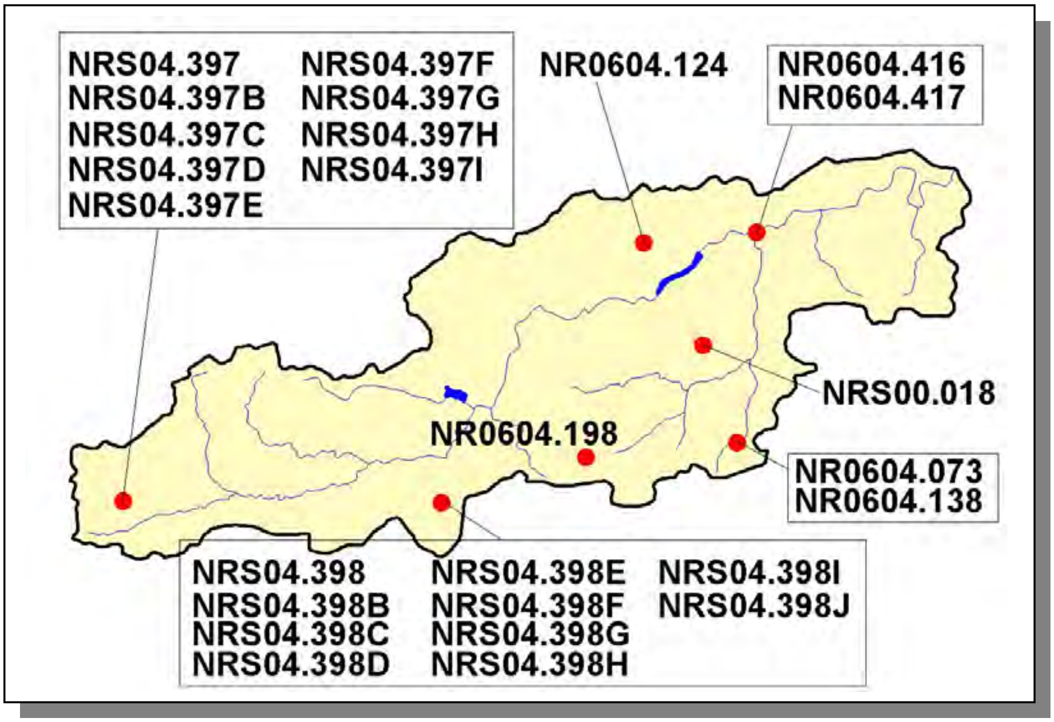

Figure 4-218. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051302060704. *More information is provided in Appendix IV.*

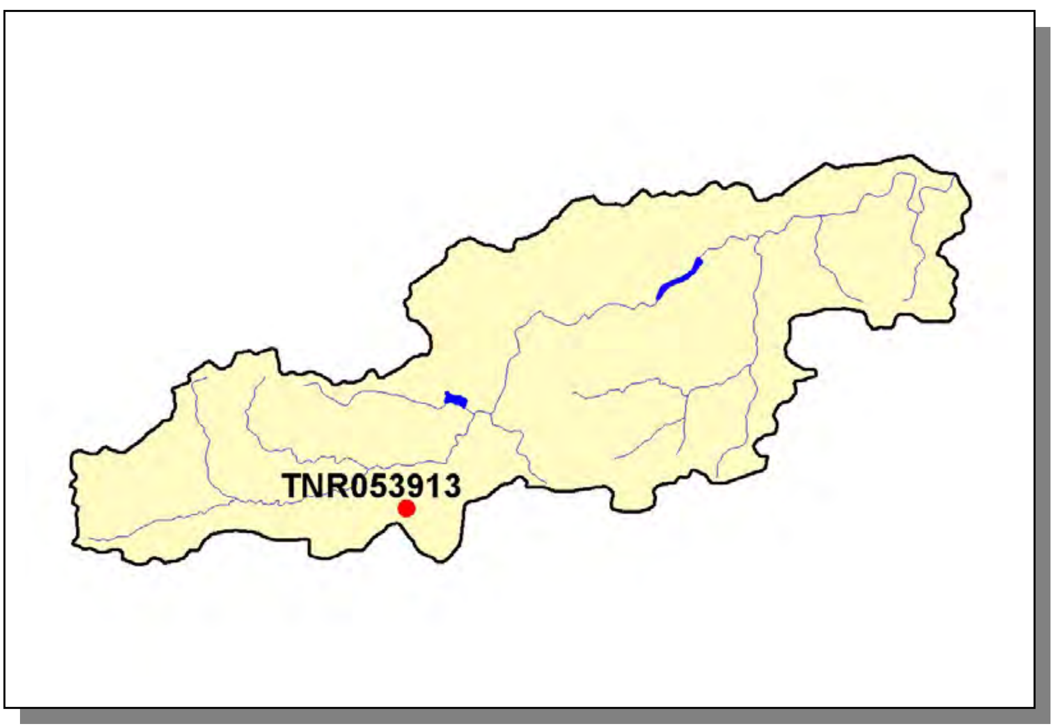

Figure 4-219. Location of TMSP Sites in Subwatershed 051302060704. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.F.iv.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
333	641	16	<5	29	<5

Table 4-165. Summary of Livestock Count Estimates in Subwatershed 051302060704. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* **"***Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Montgomery	16,051	30,959	760	913	1,408	107

Table 4-166. Summary of Livestock Count Estimates in Montgomery County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* **"***Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.45
Grass (Hayland)	0.29
Legumes, Grass (Hayland)	0.40
Grass, Forbs, Legumes (Mixed Pasture)	0.55
Corn (Row Crops)	8.04
Soybeans (Row Crops)	4.26
Tobacco (Row Crops)	22.25
Conservation Reserve Program Lands	0.41
Farmsteads and Ranch Headquarters	0.04

Table 4-167. Annual Estimated Total Soil Loss in Subwatershed 051302060704.

4.2.F.v. 051302060705 (Little West Fork Red River).

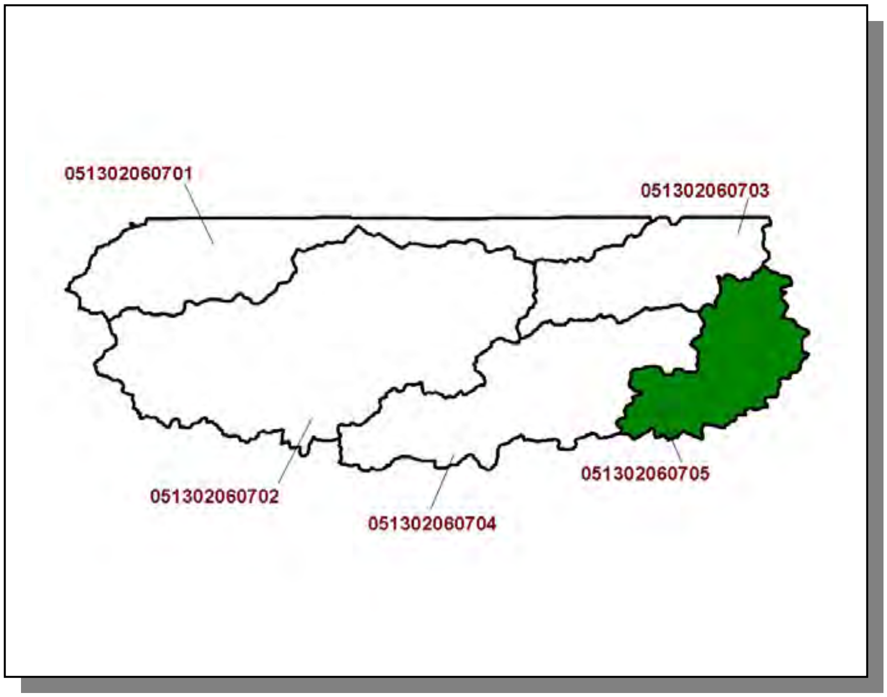

Figure 4-220. Location of Subwatershed 051302060705. *HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

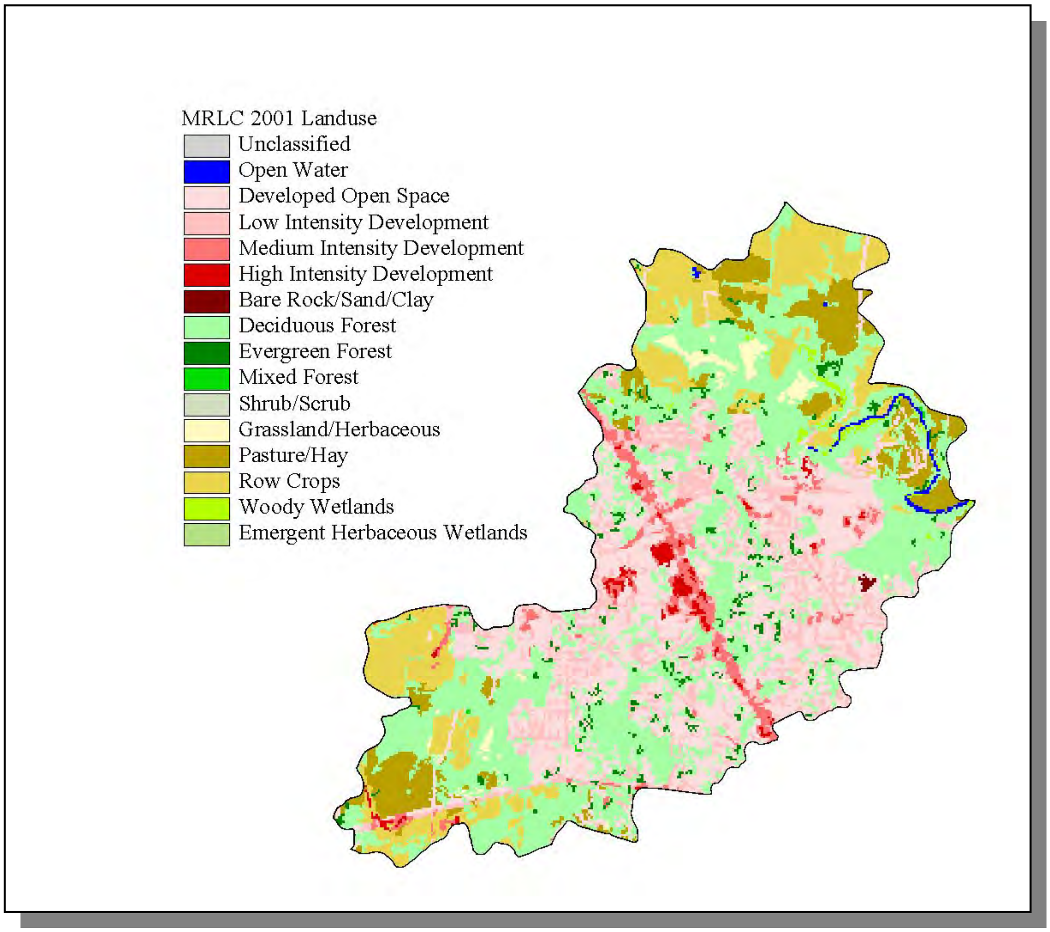

Figure 4-221. Illustration of Land Use Distribution in Subwatershed 051302060705.

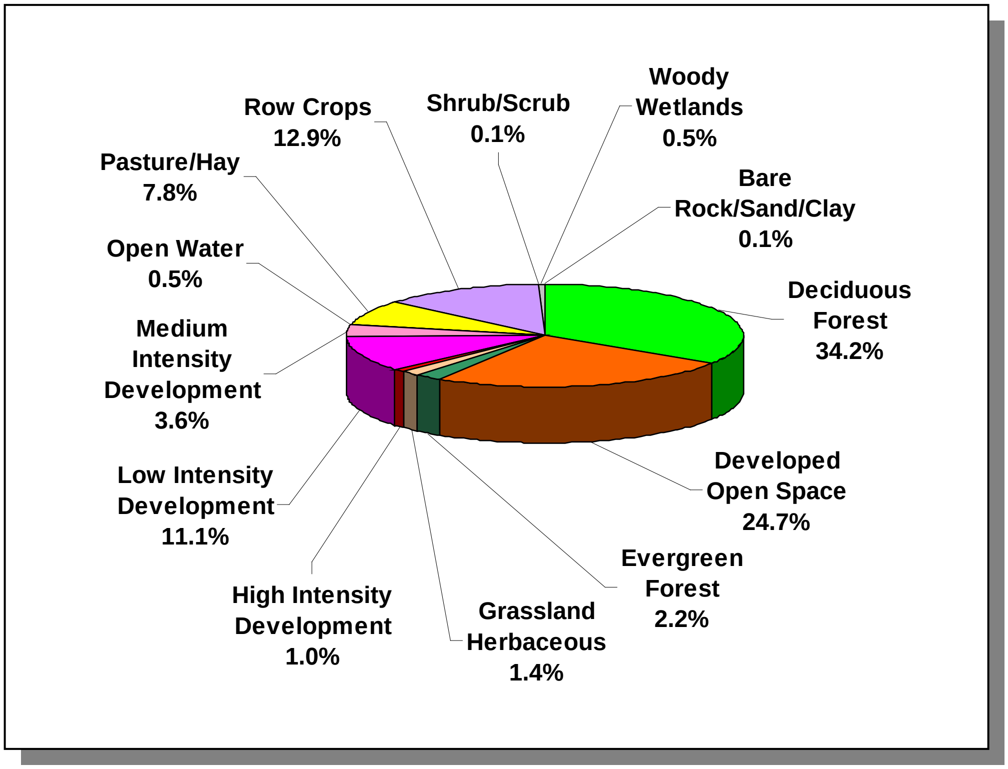

Figure 4-222. Land Use Distribution in Subwatershed 051302060705. *More information is provided in Appendix IV.*

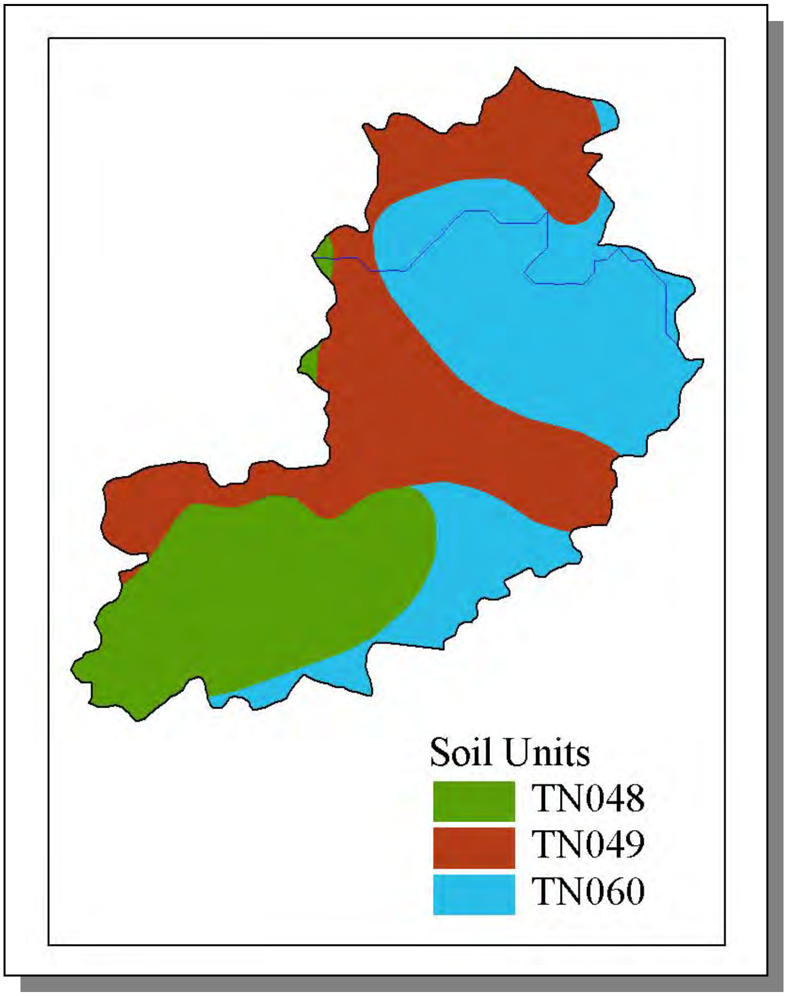

Figure 4-223. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060705.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN048	8.00	B	1.38	5.06	Silty Loam	0.42
TN049	0.00	C	1.30	5.94	Silty Loam	0.34
TN060	5.00	C	1.30	5.32	Silty Loam	0.39

Table 4-168. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302060705. *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)
Montgomery	100,498	124,369	134,768	2.68	2,695	3,335	3,614	34.1

Table 4-169. Population Estimates in Subwatershed 051302060705.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Clarksville	Montgomery	75,494	27,642	23,610	3,956	76

Table 4-170. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302060705.

Figure 4-224. Location of Historical Streamflow Data Collection Sites in Subwatershed 051302060705. *More information is provided in Appendix IV.*

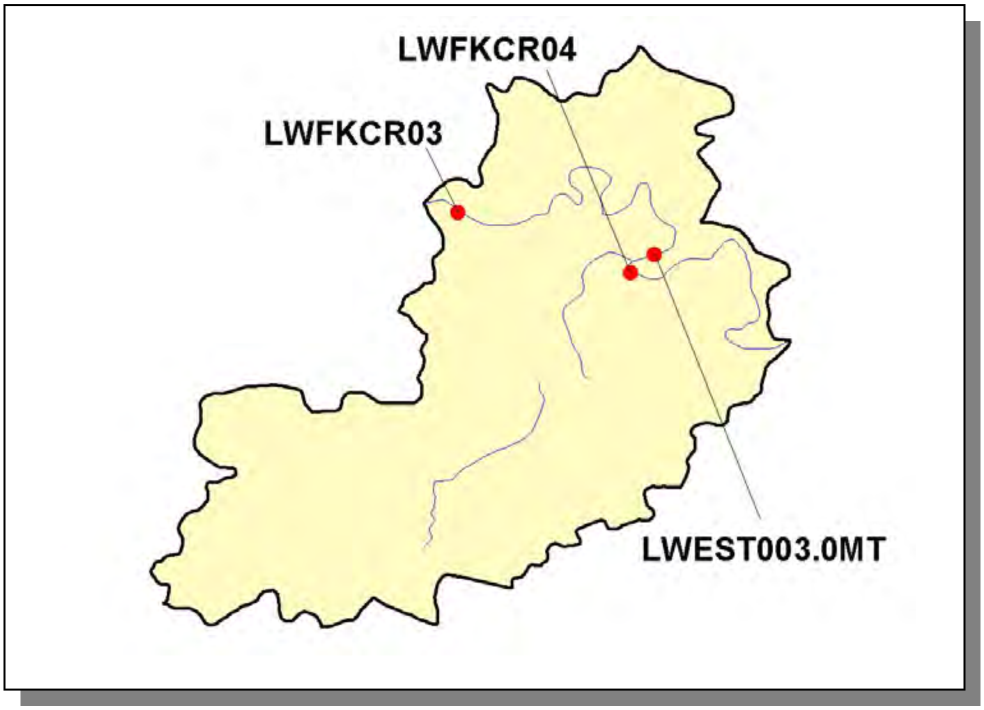

Figure 4-225. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302060705. *More information, including site names and locations and stations located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.F.v.a. Point Source Contributions.

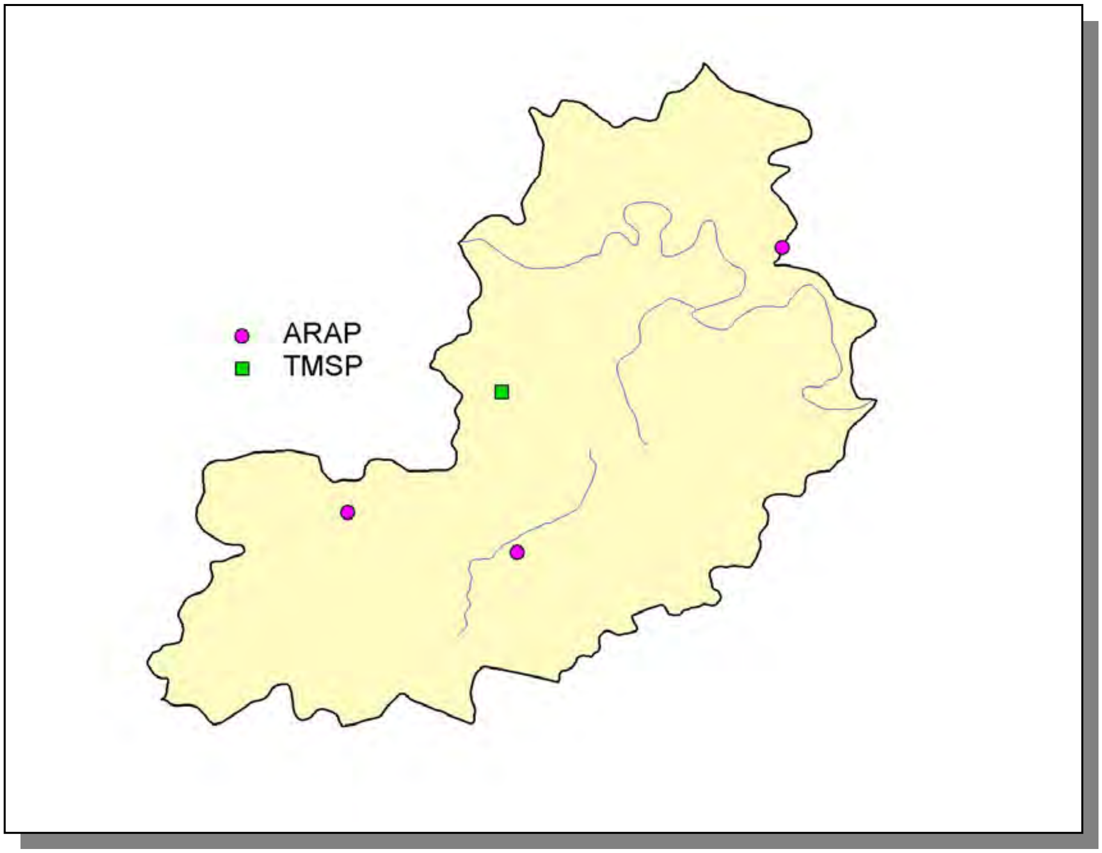

Figure 4-226. Location of Permits Issued in Subwatershed 051302060705. More information, including the names of facilities, is provided in Appendix IV.

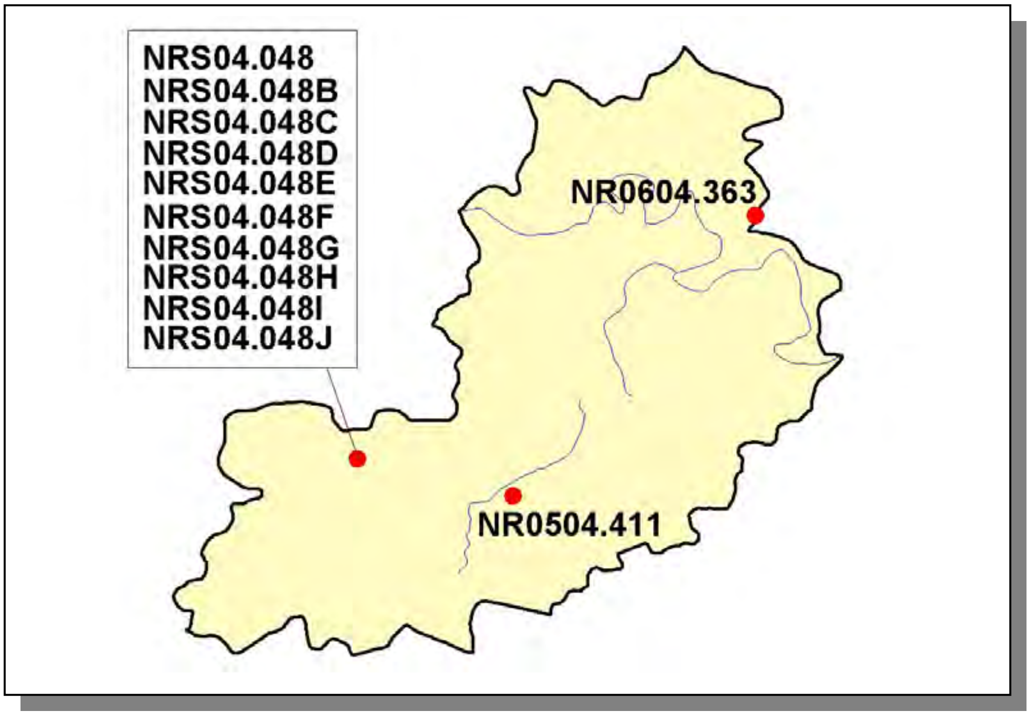

Figure 4-227. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051302060705. *More information is provided in Appendix IV.*

Figure 4-228. Location of TMSP Sites in Subwatershed 051302060705. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.F.v.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
375	724	18	<5	33	<5

Table 4-171. Summary of Livestock Count Estimates in Subwatershed 051302060705. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Montgomery	16,051	30,959	760	913	1,408	107

Table 4-172. Summary of Livestock Count Estimates in Montgomery County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.45
Grass (Hayland)	0.29
Legumes, Grass (Hayland)	0.40
Grass, Forbs, Legumes (Mixed Pasture)	0.55
Corn (Row Crops)	8.04
Soybeans (Row Crops)	4.26
Tobacco (Row Crops)	22.25
Conservation Reserve Program Lands	0.41
Farmsteads and Ranch Headquarters	0.04

Table 4-173. Annual Estimated Total Soil Loss in Subwatershed 051302060705.

CHAPTER 5

WATER QUALITY PARTNERSHIPS IN THE RED 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 Red River Watershed. The information presented is provided by the agencies and organizations described.

5.2. FEDERAL PARTNERSHIPS.

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

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

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

Conservation Practice	Feet	Acres	Number
Conservation Buffers	410,364	94	
Erosion Control		31,609	
Nutrient Management		36,960	
Comprehensive Nutrient Management Plans			1
Pest Management		35,300	63
Grazing / Forages	37,039	13,993	
Tree and Shrub Practices		2,713	
Tillage and Cropping		29,091	
Waste Management Systems			1
Wildlife Habitat Management		3,622	
Water Supply	7,451		14

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

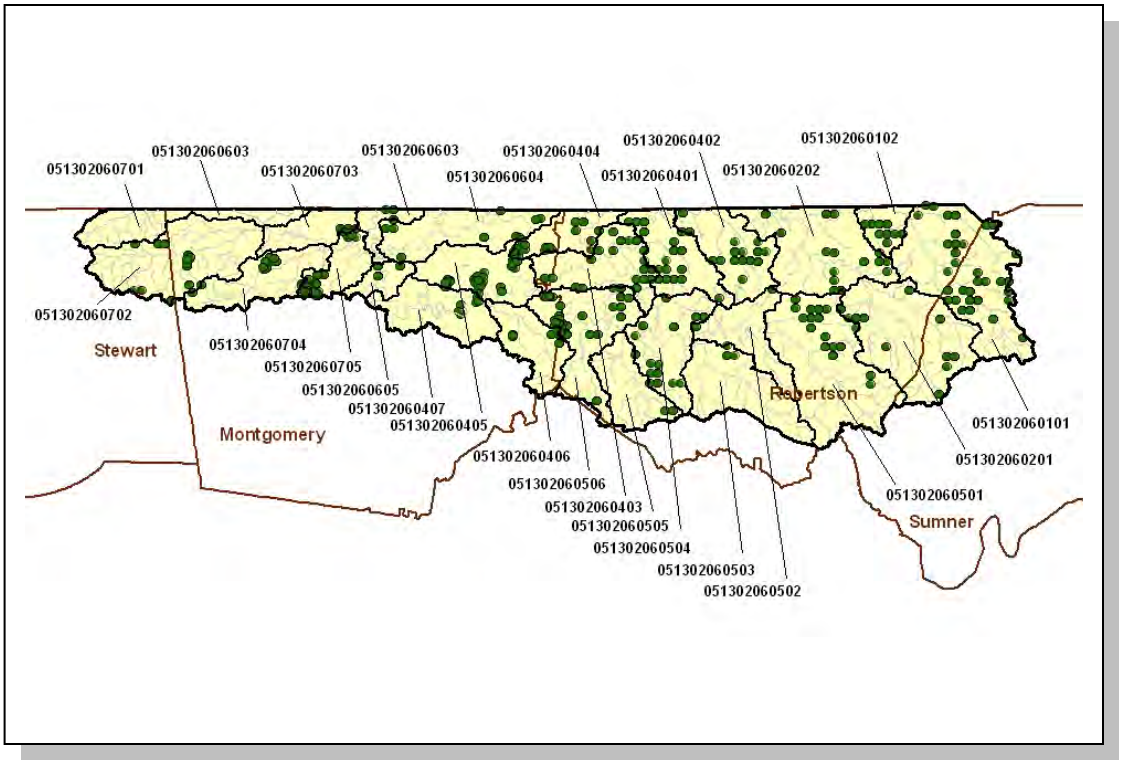

Figure 5-1. BMPs Installed by NRCS in the Red River Watershed in 2006 and 2007. Information was provided as part of Conservation Technical Assistance Grant 060701T47. *Best Management Practices applied in the watershed may be found in Appendix V.*

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

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

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

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

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

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

Endangered Species Program

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

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

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

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

Partners for Fish and Wildlife Program

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

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

HOW TO PARTICIPATE ...

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

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

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.

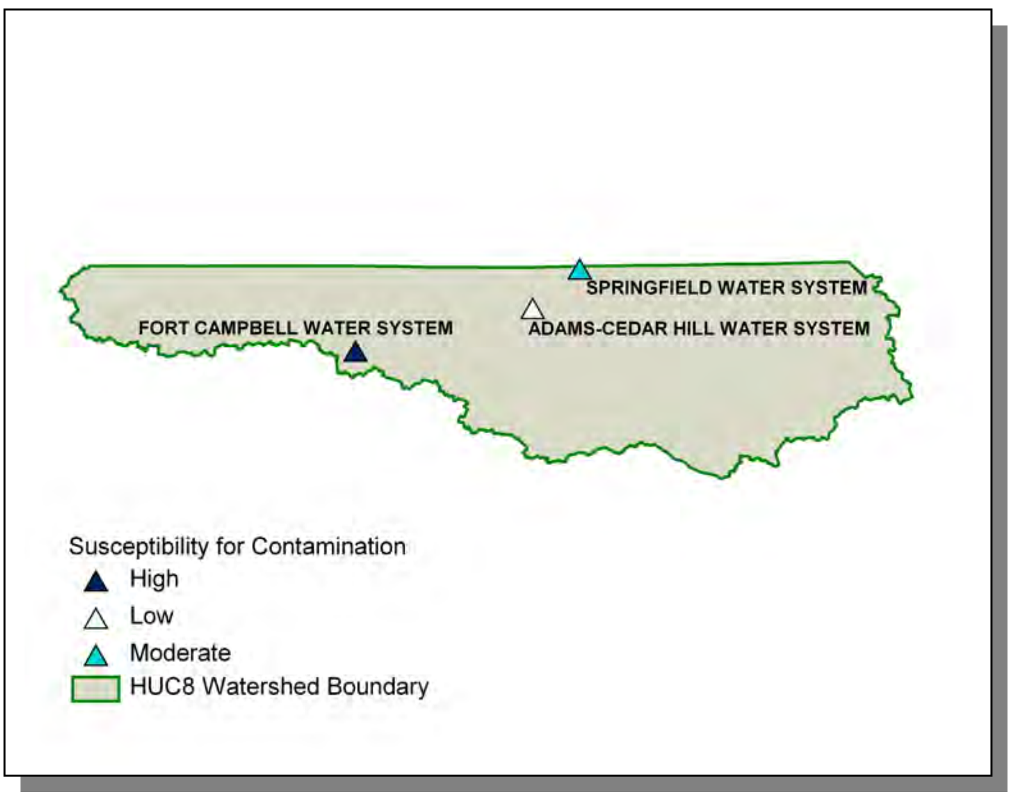

Figure 5-2. Susceptibility for Contamination in the Red River Watershed.

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 Red River Watershed was funded under an agreement with the Tennessee Department of Agriculture, Nonpoint Source Program (U.S. Environmental Protection Agency Assistance Agreement C99944674-04-0).

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

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

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

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

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

The complaint form is available at:

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

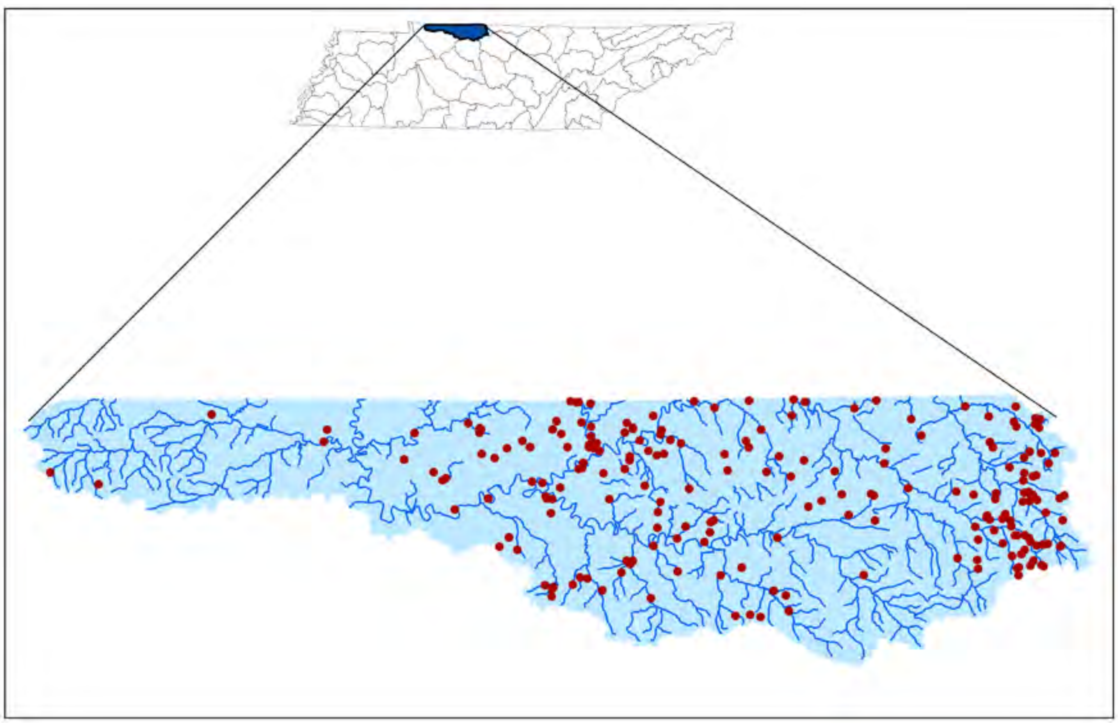

Figure 5-3. Location of BMPs installed from 1999 through 2005 in the Tennessee Portion of the Red River Watershed with Financial Assistance from the Tennessee Department of Agriculture's Nonpoint Source and Agricultural Resources Conservation Fund Grant Programs. *More information is provided in Appendix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

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

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

Benefits to the people of Kentucky include:

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

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

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

Watershed Framework activities in Red River Watershed are coordinated through the Four Rivers Basin Team. The Four 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 Four Rivers Basin Team contact Bob Wise, Four Rivers Basin Coordinator at (270) 442-3343 or via email at robert.wise@jpf.org. The web address is http://www.watersheds.ky.gov/basins/four_rivers/

Red River Watershed

Summers Branch (05130206030)
Sulphur Spring Creek (05130206060)
Red River, below Prices Mill (05130206050)
Red River, below Adairville (05130206070)
Little Whippoorwill Creek (05130206080)
Red River, at Oakville (05130206090)
South Fork of Red River (05130206140)
Red River, below Keysburg (05130206160)
Whippoorwill Creek (05130206150)
Elk Fork, below Bradshaw (05130206180)
Elk Fork, below Allensville (05130206190)
Spring Creek (05130206250)
West Fork of the Red River (05130206230)
Little West Fork (05130206300)
Noahs Spring Creek (05130206280)

Geography. The Red River Watershed in Kentucky is comprised of about 700 square miles. In the south the watershed terrain is typical of the Western Pennyrile region with narrow stream valleys rising gradually to ridges and rolling hills. Elevations vary only 100-175 feet between valleys and ridge tops. The region is underlain by Mississippian limestone rock resulting in widespread karst topography. The extensive karst topography causes creeks to disappear into sinkholes and reappear at lower elevations at springs and glades. There are a number of swamps or wetlands that remain in the watershed.

Along the northern perimeter of the watershed is much more rugged with features like Rainbow Rock Knob, Luckett Knob and Buzzard Knob rising to more than 800 feet in elevation. This change is due to the Dripping Springs Escarpment that forms a boundary between the Western Pennyrile and the Western Coal Field regions. The escarpment is a line of hills formed by isolated Pennsylvanian- and Mississippian-age sandstones capping more erodible Mississippian-age shales and limestones.

Waterways. There are more than 700 miles of streams in the KY portion of the watershed. Primary tributaries to the Red River are Sulphur Spring Creek, Whippoorwill Creek, Little Whippoorwill Creek, South Fork of the Red River, Pleasant Grove Creek, Elk Fork, & West Fork of the Red River.

Due to the karst topography many tributaries disappear underground and reappear at lower elevations as springs or glades.

The upper 44.6 miles of the main stem of Whippoorwill Creek are Outstanding Resource Water due to the presence of littlewing pearlymussel (*Pegias fabula).*

Land cover/land use. The watershed is dominated by row crop agriculture. along with some livestock, swine, poultry and dairy production. Wetland areas and a few small areas along streams remain forested. Most of the forest areas remain on the rugged knobs and ridges along the escarpment in the northern part of the watershed. There are some residential areas in the near the communities of Adairville, Russellville, Pembroke, Trenton, Elkton and especially around Oak Grove and the Fort Campbell Military Reservation.

Agency Data Assessment. During the 2000 water quality assessment the stream reaches in the Red River Watershed were assessed.

- Lower 6.6 miles of Sulphur Spring Creek were assessed for fish and were judged fully supporting for aquatic life.
- A 7.0-mile segment of the main stem of the Red River, from the state line downstream to the mouth of Sulphur Spring Creek, was assessed for fish. This segment was judged partially supporting for aquatic life.
- A 4.2-mile segment of Little Whippoorwill Creek, from the mouth to Pleasant Run Creek, was assessed for fish. This segment was judged fully supporting for aquatic life.
- A 1.2-mile segment of the South Fork of the Red River was assessed for drinking water parameters and was judged fully supporting as a drinking water supply. A 5.3-mile segment of the main stem from the mouth to the Adairville Wastewater Treatment Plant was assessed for fish, but the data was judged to be inconclusive for support of aquatic life.
- The entire 2.2 miles of Pleasant Grove Creek were assessed for macroinvertebrates and fecal coliform bacteria. The stream was judged partially supporting for aquatic life and not supporting for primary contact recreation.
- An 8.7-mile segment of the main stem of the Red River, from the South Fork to Little Whippoorwill Creek, was assessed for fish, macroinvertebrates, algae, and fish tissue consumption. The segment was judged fully supporting for aquatic life and fish tissue consumption. An aquatic and riparian habitat survey conducted on this segment yielded a score in the fully supporting range. An additional 2.1-mile segment from Whippoorwill Creek to the South Fork of the Red River was assessed for fish, but the data was judged to be inconclusive for support of aquatic life.
- A 3.1-mile segment of the main stem of the Red River, from the mouth of Whippoorwill Creek downstream to the state line, was assessed for fish, macroinvertebrates, algae, water quality and fecal coliform bacteria. The segment was judged fully supporting for primary contact recreation but only partially supporting for aquatic life.
- The lower 13.0 miles of Whippoorwill Creek were assessed for fish, macroinvertebrates, algae, water quality and fecal coliform bacteria. The segment was judged fully supporting for both aquatic life and primary contact recreation.
- A 7.0-mile segment of the Elk Fork, from Dry Branch upstream to the city of Elkton, was assessed for fish and was judged not supporting for aquatic life.
- A 14.4-mile segment of the Elk Fork, from Dry Branch downstream to the Tennessee state line, was assessed for fish, macroinvertebrates and algae. This segment was judged fully supporting for aquatic life.

- An 11.9-mile segment of the West Fork of the Red River was assessed for fish, macroinvertebrates, algae, water quality and fecal coliform bacteria. The segment was judged fully supporting for aquatic life and primary contact recreation.
- A 0.8-mile segment of Dry Fork Creek was assessed for macroinvertebrates and was judged not supporting for aquatic life.

Watershed Efforts in the Red River. The Red River, at Oakville was one of three HUC 11 watersheds identified by the Four River's Basin Team as a priority watershed for watershed planning in the first cycle of the KY Watershed Management Framework. The Basin Team has worked with the Red River Watershed Association (RRWA), which has been the driving force behind activities within the watershed.

The primary area of focus has been on Pleasant Grove Creek, an impaired tributary to the Red River. Previously EPA funded projects from the 1990's have identified numerous sources of impairments to Pleasant Grove Creek. Dealing with the impairments is complicated due to the extensive karst topography in the watershed. More recent projects in the subwatershed include:

- EPA 319(h) funding to the RRWA to focus on sinkhole education and restoration in this subwatershed.
- Additional EPA funding has been allocated to the Cumberland River Compact to focus on innovative approaches to sustainable agriculture in this subwatershed.

In addition, the Red River Watershed was identified as a priority by the Joint Kentucky/Tennessee Water Quality Project. Both states will work together to identify sources of impairment using groundwater and surface water sampling.

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 Red River Watershed Association. The Red River Watershed Association (RRWA) is a community-based organization made up of Kentucky and Tennessee residents, stakeholders in the watershed dedicated to preserving and restoring the ecological health of the Red River. The mission of the Red River Watershed Association is “To enhance and protect the quality and quantity of the creeks, streams and springs of our area through activities that educate, promote community cooperation, and encourage responsible stewardship.” Through this mission, the RRWA addresses a wide range of challenges facing the Red River Watershed. Though non-confrontational in style, the RRWA actively seeks solutions to problems affecting water quality and quantity by seeking to understand all perspectives and working collaboratively with a wide range of interests to yield long lasting and practical results.

The RRWA's work is made possible by the scientific and technical training and experience of its staff and advisors and the participation of a diverse corps of volunteers who are crucial to its programs. The organization conducts field projects and monitoring studies to get a more detailed understanding of the threats and priorities in the watershed. Education and outreach efforts include sponsorship of public meetings and special events, training workshops, water quality education programs, canoe trips, stream clean-ups, streambank restoration and habitat improvement projects, and the publishing of literature on key issues/topics affecting the watershed. The RRWA has positive relationships and strong working partnerships with key environmental agencies, community groups, and academic institutions.

Initiated by the Cumberland River Compact in 2000, the RRWA held its first solo meeting in 2001. As a 501(c)(3) non-profit membership organization since 2002, the RRWA relies on the support of its members and generous individuals and corporations to provide critical funding that supports scientific and technical staff, gives flexibility to program work, and to leverage funding from government grants to put money to work in the watershed.

RRWA successes to date include:

- Annual canoe float trips on the Red River
- Multi-site stream clean-ups on the mainstem and tributaries to the Red River
- Public education meetings throughout the watershed focusing on key issues affecting water quality and quantity
- Sediment and bacteria monitoring studies
- A "Green Agricultural Practices For Watershed Management Exposition"
- Stream enhancement/restoration demonstration projects
- Conduct visual stream assessments of impaired creeks and streams in the watershed to establish protection priorities
- Strategic partnerships and collaborative work with landowners and agencies including Tennessee Department of Environment & Conservation's Division of Water Pollution Control, Tennessee Department of Agriculture's Non-point Source Program, Tennessee Wildlife Resources Agency, Kentucky Division of Water, local Natural Resources Conservation Service offices, organizations like the Cumberland River Compact, World Wildlife Fund, Four Rivers Basin team, Austin Peay State University's Center For Field Biology, and more

For more information contact:

RRWA
P.O. Box 1185
Springfield, TN 37172
Phone: 615-384-5622
Email: info@redriverwatershed.org
Web address: http://www.redriverwatershed.org

5.4.C. 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.D. The Five Rivers Resource Conservation and Development Council (RC&D).

Red River Watershed BMP work in Five Rivers RC&D Area

Five Rivers RC&D Council – The mission of the Five Rivers RC&D Council is to promote activities that will enhance the quality of life, conserve natural resources, and promote economic development in the council area.

The Five Rivers RC&D Council covers seven (7) counties in Middle Tennessee. Named for the 5 major rivers following through the area, the council serves Cheatham, Dickson, Houston, Humphreys, Montgomery, Robertson and Stewart Counties. With the natural resources and community activities being diverse in geography, the Council responds to the needs of their local communities, both for conservation issues and for economic and rural development. The collaboration of its numerous partners makes the Five Rivers RC&D Council area distinctive.

The Five Rivers RC&D Council assists in administering the USDA Resource Conservation and Development Program, which is a unique combination of private enterprise and federal assistance that encourages economic growth through development, conservation, and planned utilization of natural resources across the council area and Tennessee. Just a few services the RC&D Program is providing in our community are Conservation Education, Farmland Protection, providing Technical Assistance, ensuring Community Services, establishing Sustainable Development, encouraging Natural Resource Protection, and Communicating Local Issues.

The Five Rivers RC&D Council has worked with landowners along the Red River in Montgomery and Robertson Counties to demonstrate solutions to sedimentation and non-point source pollution loading by installing Best Management Practices along sensitive stream segments. Assisting the Natural Resources Conservation Service and the Red River Watershed Association in developing conservation plans to include new techniques for stream crossing and watering livestock animals has proven to be critical to influencing adjacent landowners.

The environmental problems addressed within the watershed were caused by severe streambank erosion from changes in the stream channels, livestock accessibility to these streams, a lack of buffer and riparian zones, and some improper farming techniques that have impaired the stream systems.

Some of the management practices include solar ram pumps for watering troughs to provide fresh clean water supplies for cattle and fences to exclude livestock from access to ponds or adjacent stream. The landowners used geo-textile fabrics and bioengineering to restore streambanks and to provide protection against future river swells. The stabilization of the slopes allowed the landowners to establish a stream crossing for farm and heavy equipment to gain access to secluded portions of their property. Landowners reduced sedimentation by improving their pasture lands and providing intensive rotational grazing systems to adequately feed forages and maintain healthy open lands. The improved varieties of grass were better suited for Middle Tennessee's drier conditions. The opportunity to establish some native warm season grass plots for wildlife habitat was made possible through some USDA farm programs.

The project installations totaled over $12,000 in addition to improving the water quality along the Red River. The aquatic habitat remains intact and the rare native plants have a better environment to flourish. The knowledge carried on by these landowners speaks to their neighbors, ensuring the rest of the farming community grasped these conservation concepts for their own benefit and for the benefit of generations to come. These conservation measures are also being used in Kentucky within the Red River Watershed, for cross state improvements.

For more information on the Five Rivers RC&D Council and its programs, contact Chandra Berry-Owens, NRCS-RC&D Coordinator at 931-368-0252 ext. 5 or visit the web site http://www.FiveRiversRCD.org.

CHAPTER 6

RESTORATION STRATEGIES IN THE RED 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 Red 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 Red River Watershed public meeting was held October 12, 1999 at the Austin Peay State University Clarksville campus. 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

- Pathogens (especially antibiotic-resistant strains)
- Aquaculture should be treated as a CAFO and require BMPs
- Groundwater contamination
- New impervious surfaces leading to more runoff
- Aquaculture may compete with municipal water sources
- Gravity sewer line in streams causes inflow and infiltration and stream bed fractures (during installation) leading to loss of instream flow
- Loss of headwaters due to poor utility line construction practices
- No follow-up to ARAP permits that require no loss of flow for utility crossings

6.2.B. Year 3 Public Meeting. The second Red River Watershed public meeting was held December 3, 2001 at the Senior Citizen Center in Springfield. 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

- Pathogens (especially antibiotic strains) in streams and wells
- Aquaculture should be treated as a CAFO and require BMPs
- Groundwater contamination
- New impervious surfaces leading to more runoff
- Aquaculture may compete with municipal water source
- Gravity sewer line in streams causes Inflow and Infiltration and stream bed fractures (during installation) leading to loss of instream flow
- Loss of headwaters due to poor utility line connection practices
- No follow-up of ARAP permits requiring no loss of flow for utility crossings

6.2.D. Year 5 Public Meeting. The third scheduled Red River Watershed public meeting was held October 15, 2007 at the Senior Center in Springfield and featured ten 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
- Red River Watershed Association educational display
- Western Kentucky University educational display
- Kentucky Division of Water educational display

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

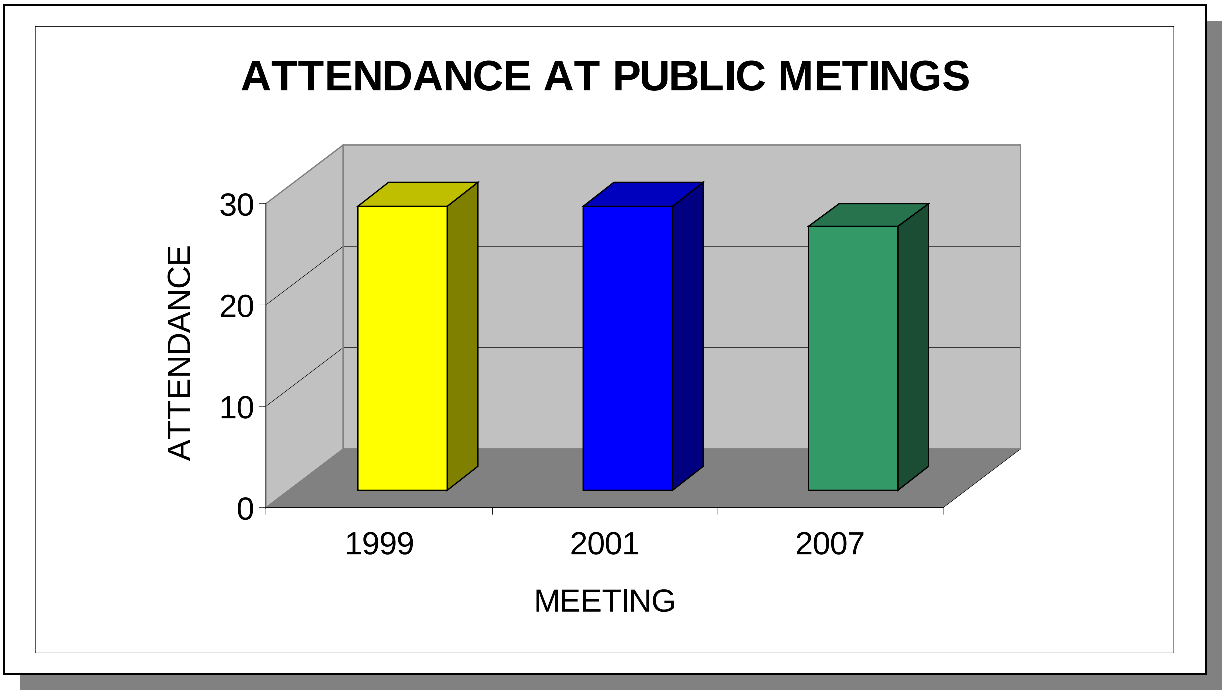

Figure 6-1. Attendance at the Red River Watershed Public Meetings. *Attendance numbers do not include TDEC personnel.*

Figure 6-2. Red River Watershed Association Board Member Jim Pascoe Brings the Watershed Meeting to Order.

Figure 6-3. Watershed Meetings Bring Citizens, Discharge Permit Holders, Universities, Local Interest Groups, NGOs, and Staff Together to Discuss the Condition of the Watershed.

Figure 6-4. Displays by NGOs, Like the Cumberland River Compact, Attract Interest at the Watershed Meeting.

Figure 6-5. Watershed Meetings are a Good Time for Staff and Discharge Permit Holders to Share Ideas and Concerns.

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

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

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.

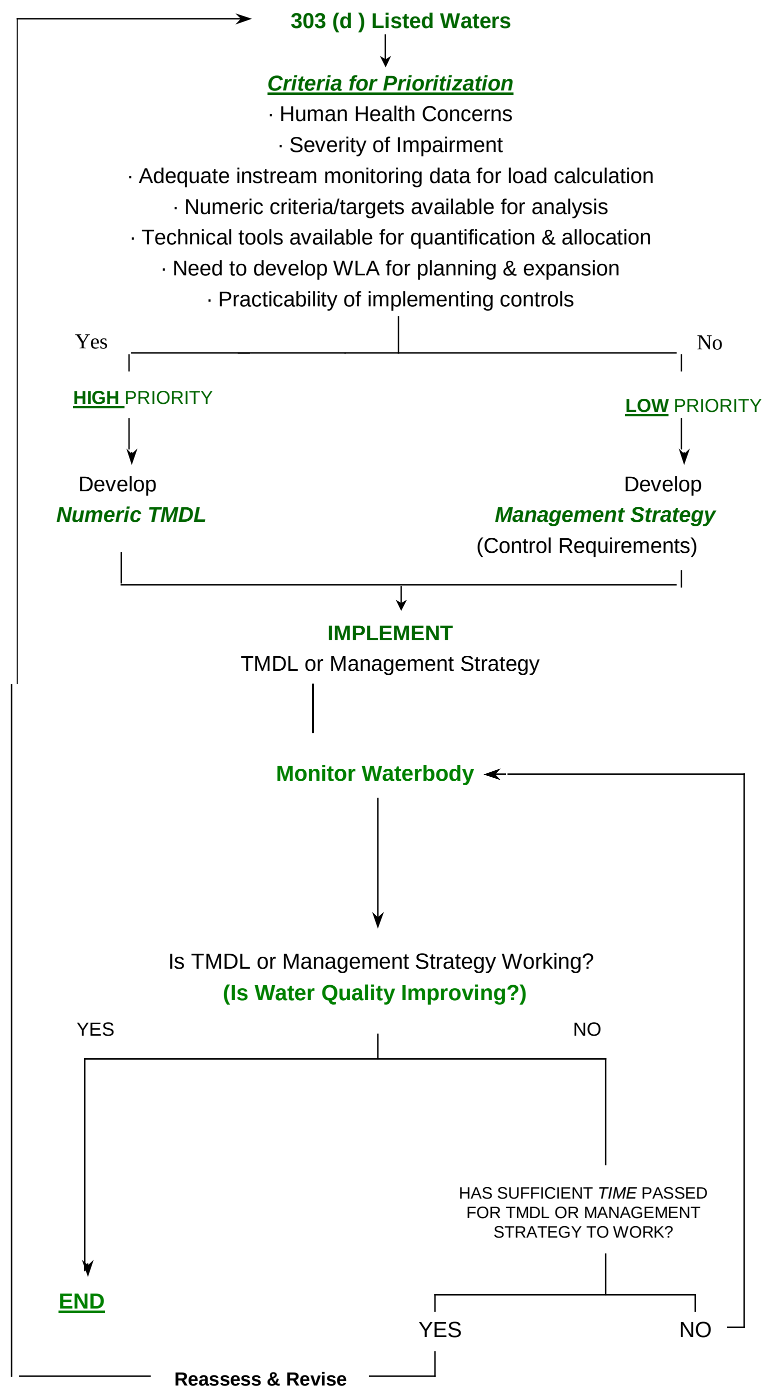

Figure 6-8. Prioritization Scheme for TMDL Development.

6.3.B. Nonpoint Sources

Common nonpoint sources of pollution in the Red 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 Red 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.

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, which in the Tennessee portion of the Red River Watershed include Fort Campbell Military Reservation, Montgomery County, Sumner County, Clarksville, Springfield, and Greenbrier.

The explosive housing and land development activities occurring around Clarksville, and to a lesser extent throughout the Red River Watershed, has made the development of these local programs essential, and, unfortunately, has also resulted in additional sediment runoff into some streams. Examples of streams impaired by sediment and land development in the Red River Watershed are Dunbar Cave Creek, Seven Springs Creek, the West Fork and mainstem of the Red River in the Clarksville and Montgomery Counties, Raccoon Branch and Little West Fork in Fort Campbell, Sulphur Fork near Springfield, and Summers Branch in Portland.

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

6.3.B.i.b. From Channel and/or Bank Erosion. Many streams within the Red 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 many stream channels in this watershed.

Several agencies such as the NRCS and TDA, as well as citizen watershed groups, are working to stabilize portions of stream banks using bioengineering and other techniques. Many of the affected streams, especially in rural areas of Robertson County with significant livestock grazing, 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 (Spring Creek in Montgomery County).
- 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 (Frey Branch, Smith Branch).
- Limit cattle access to streams and bank vegetation (Buntin Branch, Austin Branch, Hall Town Creek).

Regulatory Strategies

- Require post-construction run-off rates to be no greater than pre-construction rates in order to avoid in-channel erosion (all MS4 areas should establish these ordinances).
- Encourage or require strong local buffer ordinances.
- Implement additional restrictions on logging in streamside management zones.

- Limit clearing of stream and ditch banks or other alterations (Fletchers Fork, Piney Fork, Fort Campbell Military Reservation). *Note: Permits may be required for any work along streams.*
- Restrict the use of off-highway vehicles on stream banks and in stream channels.

Additional Strategies

- Better community planning and MS4 oversight for the impacts of development on small streams, especially development in growing areas (West Fork and Red River tributaries in Clarksville and northern Montgomery County).
- Limit road and utility crossings of streams through better site design.

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

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

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

Many sediment problems traceable to agricultural practices also involve riparian loss due to close row cropping or pasture clearing for grazing. Lack of vegetated buffers along stream corridors is a problem throughout much of the Red River Watershed, due both to agricultural and residential/commercial land uses. Many streams could benefit from the establishment of more extensive riparian buffer zones including Spring Creek and various small tributaries to the Red River.

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. One recent area of increasing concern is the stockpiling and land application of large quantities of chicken manure from factory-scale production and processing facilities in northern Robertson County and Kentucky.

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 Nashville 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, eight stream systems in the Tennessee portion of the Red River Watershed are known to have excessive pathogen contamination. The Red River and Seven Springs Creek (Clarksville), Carr Creek and tributaries (Springfield and Greenbrier), Frey Branch (White House), and Summers Branch (Portland) are impacted by urban areas, with contributions of bacterial contamination coming from storm water runoff, sewage collection system leaks, and treatment plant operation failures. A few streams in agricultural watersheds show elevated bacterial levels, including Buzzard Creek and Frey Branch in Robertson County.

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.
- Increase regulatory oversight of manure application and stockpiling.
- Develop and enforce leash laws and controls on pet fecal material.
- Review the pathogen limits in discharge permits to determine the need for further restriction.

Additional Strategies

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

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

These two impacts are usually listed together because high nutrients often contribute to low dissolved oxygen within a stream. Elevated nutrient loading is one of the most widespread and pervasive problems in the watershed. Nearly the entire length of the Red River mainstem shows greatly elevated levels of nitrates, causing problems in the treatment for drinking water to Adams and surrounding communities.

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. Nearly every stream in the Tennessee portion of the Red River Watershed could benefit from additional riparian buffers.
- 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 (including Fort Campbell Military Reservation, Greenbrier, White House, Springfield, and Portland).
- Impose timely and appropriate enforcement for noncomplying sewage treatment plants, large and small, and their collection systems (Red River (Clarksville), Carr Creek (Springfield).
- Identify Concentrated Animal Feeding Operations (CAFO) not currently permitted.
- Identify any Animal Feeding Operations (AFO) that contribute to stream impacts and declare them as a CAFO requiring a permit.
- Support and train local MS4 programs within municipalities to deal with storm water pollution issues and require additional storm runoff quality control measures.
- Require nutrient management plans for all golf courses.

Additional Strategies.

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

6.3.B.iv. Toxins and Other Materials.

Although some toxic substances are discharged directly into waters of the state from a point source, much of these materials are washed in during rainfalls from an upland location, or via improper waste disposal that contaminates groundwater. In the Tennessee portion of the Red River Watershed, a relatively small number of streams are damaged by storm water runoff from industrial facilities or urban areas. Notable exceptions are Peppers Branch which receives industrial storm water from a limestone quarry and Wartrace Creek which receives both industrial and construction runoff. More stringent inspection and regulation of permitted industrial facilities, and local storm water quality initiatives and regulations, could help reduce the amount of contaminated runoff reaching state waters. Examples of streams that could benefit from these measures include the many small, urbanized tributaries feeding the Red River in Clarksville and Fort Campbell Military Reservation.

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 notable streams in the Tennessee portion of the Red River Watershed that have suffered significant harm from alterations include Elk Fork Creek (riparian loss and bank erosion), Wartrace Creek (impoundment), Piney Fork (heavy equipment crossings and bridge construction), Fletchers Fork (impoundment) and Noahs Spring Branch (various military activities).

Some measures that can help address these problems are:

Voluntary Activities

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

Regulatory Strategies

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

6.3.B.vi. 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 Red River Watershed. Compliance information was obtained from EPA's Permit Compliance System (PCS). All data was queried for a five-year period between August 1, 2002 and July 31, 2007. PCS can be accessed publicly through EPA's Envirofacts website. This website provides access to several EPA databases to provide the public with information about environmental activities that may affect air, water, and land anywhere in the United States:

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

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

6.4.A. Municipal Permits

TN0021865 Portland STP

Discharger rating:	Major
City:	Portland
County:	Sumner
EFO Name:	Nashville
Issuance Date:	1/1/07
Expiration Date:	7/30/09
Receiving Stream(s):	Summers Branch of the Red River at mile 8.6
HUC-12:	051302060101
Effluent Summary:	Treated municipal wastewater from Outfall 001
Treatment system:	Sequencing Batch Reactor (SBR) activated sludge with chlorination, dechlorination, and post aeration. Sludge: Waste Activated Sludge, Imhoff, drybeds or belt press to land application

Segment	TN05130206024_0150
Name	Summers Branch
Size	12.6
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Recreation (Non-Supporting), Irrigation (Supporting), Fish and Aquatic Life (Non-Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Escherichia coli, Sedimentation/Siltation, Phosphate
Sources	Municipal (Urbanized High Density Area), Municipal Point Source Discharges

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

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	Summer	2.2	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	25	lb/day	DMax Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	1.1	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	1.6	mg/L	MAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	17	lb/day	MAvg 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	2.2	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	3.3	mg/L	MAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	35	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	52	lb/day	DMax Load	3/Week	Composite	Effluent
Bypass of Treatment (occurrences)	All Year		Occurences/ Month	MAvg Load	Continuous	Visual	Wet Weather
CBOD % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	Percent Removal
CBOD % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	Percent Removal
CBOD5	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	Summer	20	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	Summer	14.2	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	Summer	167	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	Summer	10.5	mg/L	DMin Conc	3/Week	Composite	Effluent
CBOD5	Summer	225	lb/day	DMax Load	3/Week	Composite	Effluent
CBOD5	Winter	25	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	Winter	292	lb/day	DMax Load	3/Week	Composite	Effluent
CBOD5	Winter	15.7	mg/L	DMin Conc	3/Week	Composite	Effluent
CBOD5	Winter	250	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	Winter	18.4	mg/L	MAvg Conc	3/Week	Composite	Effluent
Cu (T)	All Year	0.034	mg/L	MAvg Conc	Monthly	Composite	Effluent
Cyanide, Total (CN-)	All Year	0.0048	mg/L	MAvg Conc	Monthly	Grab	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
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Influent (Raw Sewage)
Hg (T)	All Year	5.2E-05	mg/L	MAvg Conc	Monthly	Composite	Effluent
IC25 7day Ceriodaphnia Dubia	All Year	95	Percent	DMin Conc	Quarterly	Composite	Effluent
IC25 7day Fathead Minnows	All Year	95	Percent	DMin Conc	Quarterly	Composite	Effluent
Nitrogen Total (as N)	Summer	14.6	mg/L	DMax Conc	2/Month	Composite	Effluent
Nitrogen Total (as N)	Summer	7.3	mg/L	DMin Conc	2/Month	Composite	Effluent
Nitrogen Total (as N)	Summer	173.5	lb/day	DMax Load	2/Month	Composite	Effluent
Nitrogen Total (as N)	Summer	115.7	lb/day	MAvg Load	2/Month	Composite	Effluent

Table 6-2a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Nitrogen Total (as N)	Summer	10.95	mg/L	MAvg Conc	2/Month	Composite	Effluent
Overflow Use Occurences	All Year		Occurences/ Month	MAvg Load	Continuous	Visual	Wet Weather
Overflow Use Occurences	All Year		Occurences/ Month	MAvg Load	Continuous	Visual	Non Wet Weather
Pb (T)	All Year	0.0142	mg/L	MAvg Conc	Monthly	Composite	Effluent
Phosphorus, Total	All Year	9	mg/L	DMax Conc	2/Month	Composite	Effluent
Phosphorus, Total	All Year	71.3	lb/day	MAvg Load	2/Month	Composite	Effluent
Phosphorus, Total	All Year	107	lb/day	DMax Load	2/Month	Composite	Effluent
Phosphorus, Total	All Year	4.5	mg/L	DMin Conc	2/Month	Composite	Effluent
Phosphorus, Total	All Year	6.75	mg/L	MAvg Conc	2/Month	Composite	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	Weekdays	Composite	Effluent
TRC	All Year	0.02	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year	634	lb/day	DMax Load	3/Week	Composite	Effluent
TSS	All Year	40	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS	All Year	475	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year	30	mg/L	WAvg Conc	3/Week	Composite	Effluent
TSS % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	Percent Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	Percent Removal
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-2b.

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

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

283 Overflows
1 Bypass
16 Ammonia
5 Settleable Solids
19 Fecal Coliform
14 Escherichia coli
2 Mercury
4 Cyanide
2 Total Suspended Solids
3 Total Chlorine
6 Carbonaceous Biological Oxygen Demand
2 Suspended Solids % Removal
7 Total Nitrogen
1 Total Phosphorus

Enforcement:
July 11, 2007 Notice of Violation for violations of the NPDES permit.
8/5/05 Commissioner's Order #04-0585. On EPA Watch List for Overflows and for failing to pursue enforcement action on Significant Industrial User violations (Pretreatment).

Comments:
6/1/07 Compliance Evaluation Inspection
WWTP operation and control problems continuing due to design deficiencies; City has hired consultant to evaluate and make recommendations. Collection system continues to have inflow & infiltration related overflows.

1. Review of the Monthly Operation Reports (MORs) received from June 2006 through May 2007 indicated the following effluent violations:

    1. Settleable Solids, effluent daily maximum conc. = 2
    2. E. Coli, effluent daily maximum conc. = 20
    3. E. Coli, effluent monthly average MPN = 1
    4. Ammonia as N, effluent monthly average conc. = 3
    5. Ammonia as N, effluent monthly average mass = 3
    6. Ammonia as N, effluent weekly average conc. = 6
    7. Ammonia as N, effluent weekly average mass = 5
    8. Ammonia as N, effluent daily maximum conc. = 14
    9. Quarterly biomonitoring test failure = 1, and failed retest; TIE/TRE study indicated nickel was the toxic agent which was traced to Imperial Fabrication Plant #2. Enforcement action against Imperial under the City's Pretreatment Program led to the correction of the problem.
    10. The collection system was reported to have had approximately 11 wet weather related overflows, 9 overflows attributed to mechanical or electrical or clogs or other failure, and 1 overflow attributed to a broken force main, for a total of approximately 21 incidents reported.

2. Despite the foregoing list of effluent violations, the treatment plant appeared to be well-operated and well-maintained although certain control and operation problems remain. The division understands that the engineering firm Jordan Jones & Goulding Inc. has been hired by the City to evaluate the design and operation of the plant in order to improve and stabilize its operation, and we understand that several plant improvements are scheduled to address these problems. The City's efforts to resolve these problems and achieve reliable compliance with the permit requirements are noted and appreciated.

3. The laboratory instrumentation and the influent flow meter had been checked for accuracy; the effluent flow meter is scheduled to be relocated to improve its accuracy and control functions. All required records were being maintained. The outfall pipe was posted with an identification sign. The effluent appeared to be clear with no grease particulates, etc. Two standby generators have the capacity to operate the entire treatment plant; these are exercised on a regular schedule.

4. We visited several pump stations and known overflow locations. We understand that none of the pump stations in the system have overflow pipes. The Jerry Street manhole, College Street Pump Station manhole, and the Victor Reiter Pump Station manhole are posted as overflow points as required by the permit. While the approximately 21 reported overflows are of concern, it is noted that these are about half the number noted in the previous inspection, suggesting that progress has been made as the result of the City's sewer system rehabilitation program.

6/1/07 Technical Assistance Visit and file review: The City's pretreatment program currently has under industrial user permit two Categorical and three Significant Noncategorical industries. The Categoricals include Imperial Fabrication Plant #2 and Crown Group; the Significant Noncategoricals include Stevison Ham, Unipres USA, and Precision Industries. The Cissell plant has closed since the previous pretreatment program inspection.

The City has had numerous compliance issues with Imperial Fabrication Plant #2, some of which were severe enough to cause major problems at the City's wastewater treatment plant. With the City's discovery of Imperial's bypass of process water in violation of the Industrial User permit, the City issued a Cease and Desist Order. This Order appears to have been effective as intended. The City's timely and appropriate response in this matter is commended.

TN0020621 Greenbrier STP

Discharger rating:	Minor
City:	Greenbrier
County:	Robertson
EFO Name:	Nashville
Issuance Date:	12/1/04
Expiration Date:	10/29/09
Receiving Stream(s):	Unnamed tributary at mile 0.5 to Carr Creek at mile 10.3
HUC-12:	051302060503
Effluent Summary:	Treated municipal wastewater from Outfall 001
Treatment system:	Sequencing Batch Reactor with ultraviolet disinfecting

Segment	TN05130206003_1220
Name	Unnamed Trib to Carr Creek
Size	1.6
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Temperature, water, Nutrient/Eutrophication Biological Indicators, Escherichia coli
Sources	Municipal Point Source Discharges

Table 6-3. Stream Segment Information for Greenbrier STP.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	Summer	2	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	1	mg/L	MAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	1.3	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	8.2	lb/day	WAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	6.1	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	3	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	8.2	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	12.3	lb/day	WAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	2	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	1.3	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
CBOD % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
CBOD5	Summer	13	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	Summer	6.6	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	Summer	9.9	mg/L	WAvg Conc	3/Week	Composite	Effluent
CBOD5	Summer	61	lb/day	WAvg Load	3/Week	Composite	Effluent
CBOD5	Summer	41	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	Winter	15	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	Winter	9.9	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	Winter	61	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	Winter	13.3	mg/L	WAvg Conc	3/Week	Composite	Effluent
CBOD5	Winter	82	lb/day	WAvg Load	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
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Influent (Raw Sewage)
IC25 7day Fathead Minnows	All Year	100	Percent	DMin Conc	Quarterly	Composite	Effluent
Nitrogen Total (as N)	Summer	5	mg/L	MAvg Conc	2/Month	Composite	Effluent
Nitrogen Total (as N)	Summer	31	lb/day	MAvg Load	2/Month	Composite	Effluent
Phosphorus Total	Summer		mg/L	MAvg Conc	2/Month	Composite	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year	30	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS	All Year	40	mg/L	WAvg Conc	3/Week	Composite	Effluent
TSS	All Year	247	lb/day	WAvg Load	3/Week	Composite	Effluent
TSS	All Year	185	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
pH	All Year	8.5	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-4. Permit Limits for Greenbrier STP.

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

136 Overflows
1 Bypass
13 Dissolved Oxygen
27 Ammonia
8 Fecal Coliform
22 Carbonaceous Biological Oxygen Demand
8 Suspended Solids % Removal
1 Total Chlorine
1 pH
9 Total Suspended Solids
4 Settleable Solids
11 Carbonaceous Oxygen Demand
4 Escherichia coli

Comments:
10/25/07 Pretreatment Compliance Inspection:

1. The City currently has a total of one industry under industrial user permit, Atwood Mobile Products, LLC/Greenbrier Operations. It is classified as “Categorical”.

2. The pretreatment files were in good order. The observations and comments contained in the Pretreatment Audit Inspection report dated December 15, 2006, have been addressed.

3. The Sewer Use Ordinance is in the process of being modified to include the mandatory aspects of the recent “streamlining” regulations. These modifications are scheduled to be completed by mid-2008.

12/21/05 Compliance Evaluation Inspection:
The effluent outfall had the required identification sign. The effluent appeared clear and free of color or particulates. The receiving stream showed no foaming, sludge banks, or other visual evidence of adverse impact from the effluent.

The operators are commended for their efforts in correcting previously cited deficiencies, incorporating a QA/QC program, and updating the SOP. They are also commended for their continued efforts in improving the wastewater and collection systems.

TN0058076 Jo Byrns School

Discharger rating:	Minor
City:	Cedar Hill
County:	Robertson
EFO Name:	Nashville
Issuance Date:	1/1/05
Expiration Date:	11/30/10
Receiving Stream(s):	Unnamed tributary at mile 1.1 to Sturgeon Creek at mile 2.4
HUC-12:	051302060403
Effluent Summary:	Treated domestic wastewater from Outfall 001
Treatment system:	Activated sludge

Segment	TN05130206002_0500
Name	Sturgeon Creek
Size	10.7
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Livestock Watering and Wildlife (Supporting), Irrigation (Supporting), Fish and Aquatic Life (Supporting), Recreation (Not Assessed)
Causes	N/A
Sources	N/A

Table 6-5. Stream Segment Information for Jo Byrns School.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	All Year	10	mg/L	DMax Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	All Year	5	mg/L	MAvg Conc	2/Month	Grab	Effluent
CBOD5	All Year	40	mg/L	DMax Conc	2/Month	Grab	Effluent
CBOD5	All Year	25	mg/L	MAvg Conc	2/Month	Grab	Effluent
D.O.	All Year	1	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg 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	0.5	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	2/Month	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	2/Month	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	2/Week	Grab	Effluent

Table 6-6. Permit Limits for Jo Byrns School.

Comments:
9/14/05 Compliance Evaluation Inspection: In compliance

TN0024961 Springfield STP

Discharger rating:	Major
City:	Springfield
County:	Robertson
EFO Name:	Nashville
Issuance Date:	1/1/00
Expiration Date:	11/30/04
Receiving Stream(s):	Sulphur Fork Creek at mile 23.2
HUC-12:	051302060502
Effluent Summary:	Treated municipal wastewater from Outfall 001
Treatment system:	Extended aeration activated sludge preceded by screening and grit removal and followed by ultraviolet disinfecting and oxygenation. Sludge is digested for either belt press dewatering or land application.

Segment	TN05130206003_3000
Name	Sulphur Fork
Size	1.9
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Industrial Water Supply (Supporting), Fish and Aquatic Life (Non-Supporting), Recreation (Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting), Domestic Water Supply (Supporting)
Causes	Nitrates, Phosphate, Sedimentation/Siltation
Sources	Municipal Point Source Discharges, Discharges from Municipal Separate Storm Sewer Systems (MS4)

Table 6-7. Stream Segment Information for Springfield STP.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	All Year	4	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
Ammonia as N (Total)	All Year	2	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	85	lb/day	DMax Load	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	3	mg/L	MAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	57	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
Bypass of Treatment (occurrences)	All Year		Occurrences/Month	MAvg Load	Continuous	Visual	Wet Weather
CBOD % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	Percent Removal
CBOD % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	Percent Removal
CBOD5	All Year	20	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	All Year	284	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year	10	mg/L	DMin Conc	3/Week	Composite	Effluent
CBOD5	All Year	15	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year	425	lb/day	DMax Load	3/Week	Composite	Effluent
D.O.	All Year	5	mg/L	DMin Conc	Weekdays	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	3/Week	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
Hg (T)	All Year	1E-05	mg/L	MAvg Conc	Monthly	Composite	Effluent
IC25 7day Ceriodaphnia dubia	All Year	71	Percent	DMin Conc	Continuous	Composite	Effluent
IC25 7day Fathead Minnows	All Year	71	Percent	DMin Conc	Continuous	Composite	Effluent
Overflow Use Occurrences	All Year		Occurrences/Month	MAvg Load	Continuous	Visual	Wet Weather
Overflow Use Occurrences	All Year		Occurrences/Month	MAvg Load	Continuous	Visual	Non Wet Weather
Settleable Solids	All Year	1	mL/L	DMax Conc	Weekdays	Composite	Effluent
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year	1134	lb/day	DMax Load	3/Week	Composite	Effluent
TSS	All Year	40	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS	All Year	850	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)

Table 6-8a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
TSS	All Year	30	mg/L	WAvg Conc	3/Week	Composite	Effluent
TSS % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	Percent Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	Percent Removal
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-8b.

Tables 6-8a-b. Permit Limits for Springfield STP.

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

189 Overflows
1 Total Suspended Solids
1 Settleable Solids
4 Ammonia
4 Fecal Coliform
3 Mercury

Comments:
6/26/07 Sludge/Biosolids Inspection:
Minor deficiencies with records retention. Land application on WPC approved sites at STP. Land application fields are mowed, but they are not removing vegetation to prevent buildup of nutrients or metals. Some biosolids are belt pressed and disposed of in a mulch blending process at McDonalds of Nebo, Ky.

5/18/07 Pretreatment Inspection: In compliance
Pretreatment Compliance Inspection with visit to one Industrial User permittee.

2/14/07 Compliance Evaluation Inspection: In compliance
Replacing UV disinfection system. Have replaced mechanical screen in headworks, debugging it. Currently operating under expired permit pending resolution of questions raised by City about certain provisions contained in the draft of the new permit.

TN0059404 White House STP

Discharger rating:	Major
City:	White House
County:	Robertson
EFO Name:	Nashville
Issuance Date:	9/1/04
Expiration Date:	7/30/10
Receiving Stream(s):	Frey Branch at mile 2.2
HUC-12:	051302060201
Effluent Summary:	Treated municipal wastewater from Outfall 001
Treatment system:	Oxidation ditch activated sludge with UV disinfection and final cascade aeration; some treated effluent disposal via land irrigation via storage pond

Segment	TN05130206019_0321
Name	Frey Branch
Size	7.2
Unit	Miles
First Year on 303(d) List	2002
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Ammonia (Un-ionized), Phosphate, Escherichia coli, Sedimentation/Siltation
Sources	Municipal Point Source Discharges, Unrestricted Cattle Access

Table 6-9. Stream Segment Information for White House STP.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	Summer	1.5	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	0.77	mg/L	MAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	1.2	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	7.1	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	3.1	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	2.4	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	22	lb/day	WAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	14.2	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	1.55	mg/L	MAvg Conc	3/Week	Composite	Effluent
Bypass of Treatment (occurrences)	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
CBOD5	All Year	20	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	All Year	40	Percent	DMin Conc	3/Week	Calculated	Percent Removal
CBOD5	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year	10	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	All Year	85	Percent	MAvg Conc	3/Week	Calculated	Percent Removal
CBOD5	All Year	15	mg/L	WAvg Conc	3/Week	Composite	Effluent
CBOD5	All Year	138	lb/day	WAvg Load	3/Week	Composite	Effluent
CBOD5	All Year	92	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
D.O.	All Year	6	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	3/Week	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Influent (Raw Sewage)
IC25 7day Ceriodaphnia Dubia	All Year	100	Percent	DMin Conc	Continuous	Composite	Effluent
IC25 7day Fathead Minnows	All Year	100	Percent	DMin Conc	Continuous	Composite	Effluent
Overflow Use Occurences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
Overflow Use Occurences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Non Wet Weather
Settleable Solids	All Year	1	mL/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year	30	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS	All Year	275	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year	367	lb/day	WAvg Load	3/Week	Composite	Effluent
TSS	All Year	40	mg/L	WAvg Conc	3/Week	Composite	Effluent

Table 6-10a

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
TSS	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
TSS % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	Percent Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	Percent Removal
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-10b

Tables 6-10a-b. Permit Limits for White House STP.

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

46 Overflows
2 Bypasses
2 Dissolved Oxygen
17 Ammonia
1 Total Suspended Solids
2 Fecal Coliform
7 Carbonaceous Biological Oxygen Demand
13 Suspended Solids % Removal

Comments:
11/29/07 Performance Audit Inspection (PAI)
A PAI is conducted to determine compliance with the NPDES permit, to review laboratory technique, and to review the operation of the wastewater treatment system. As a result of this inspection the city has been found to be in violation of its NPDES permit and the *Tennessee Water Quality Control Act* (T.C.A. 69-3-101 et seq) with regard to the following items:

1. Failure to meet effluent sampling requirement for Settleable Solids.
2. Failure to follow procedures for EPA approved laboratory methods of analyses for the following parameters: Ammonia as Nitrogen (specifically, meeting the effluent sample holding time), Fecal Coliform and E.Coli.

TN0021296 CH2M HILL Services (Fort Campbell)

Discharger rating:	Major
City:	Fort Campbell
County:	Montgomery
EFO Name:	Nashville
Issuance Date:	2/1/05
Expiration Date:	12/31/09
Receiving Stream(s):	Little West Fork Creek at mile 10.4
HUC-12:	051302060703
Effluent Summary:	Treated municipal wastewater from Outfall 001
Treatment system:	Sludge to anaerobic dig to drybeds to landfill

Segment	TN05130206034_1000
Name	Little West Fork
Size	7.2
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting), Industrial Water Supply (Supporting)
Causes	Phosphate, Oxygen, Dissolved, Sedimentation/Siltation
Sources	Municipal Point Source Discharges, NPS Pollution from Military Base Facilities (Other than Port Facilities)

Table 6-11. Stream Segment Information for CH2M HILL Services (Fort Campbell).

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	Summer	3.8	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	1.9	mg/L	MAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	63.4	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	96.7	lb/day	WAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	2.9	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	7.4	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	3.7	mg/L	MAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	5.6	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	186.8	lb/day	WAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	123.4	lb/day	MAvg Load	3/Week	Composite	Effluent
Bypass of Treatment (occurrences)	All Year		Occurrences/ Month	MAvg Load	Continuous	Visual	Wet Weather
CBOD % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	Percent Removal
CBOD % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	Percent Removal
CBOD5	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	Summer	30	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	Summer	15	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	Summer	500	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	Summer	22.5	mg/L	WAvg Conc	3/Week	Composite	Effluent
CBOD5	Summer	750	lb/day	WAvg Load	3/Week	Composite	Effluent
CBOD5	Winter	40	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	Winter	20	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	Winter	1001	lb/day	WAvg Load	3/Week	Composite	Effluent
CBOD5	Winter	30	mg/L	WAvg Conc	3/Week	Composite	Effluent
CBOD5	Winter	667	lb/day	MAvg Load	3/Week	Composite	Effluent
Copper Total Recoverable	All Year		mg/L	DMax Conc	Semi-annually	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
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
Hg (T)	All Year		mg/L	DMax Conc	Semi-annually	Composite	Effluent
Hg (T)	All Year		mg/L	MAvg Conc	Semi-annually	Composite	Effluent
IC25 7day Ceriodaphnia dubia	All Year	54	Percent	DMin Conc	Quarterly	Composite	Effluent
IC25 7day Fathead Minnows	All Year	54	Percent	DMin Conc	Quarterly	Composite	Effluent
Nitrogen Total (as N)	All Year		mg/L	DMax Conc	Weekly	Composite	Effluent
Nitrogen Total (as N)	All Year		mg/L	MAvg Conc	Weekly	Composite	Effluent
Overflow Use Occurrences	All Year		Occurrences/ Month	MAvg Load	Continuous	Visual	Wet Weather

Table 6-12a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Overflow Use Occurrences	All Year		Occurrences/ Month	MAvg Load	Continuous	Visual	Non Wet Weather
Phosphorus, Total	All Year		mg/L	DMax Conc	Weekly	Composite	Effluent
Phosphorus, Total	All Year		mg/L	MAvg Conc	Weekly	Composite	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year	30	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS	All Year	1001	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year	1334	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 % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	Percent Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	Percent Removal
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-12b.

Tables 6-12a-b. Permit Limits for CH2M HILL Services - Clarksville.

Enforcement:
1/23/07 Notice of Violation (NOV): See below

Comments:
1/17/07 Performance Audit Inspection
Comments from Letter/NOV:
On January 17, 2007,Nashville EFO-WPC personnel conducted a Performance Audit Inspection (PAI) evaluating the sampling and analytical procedures performed by personnel at the Fort Campbell Sewage Treatment Plant (STP). It was conducted to determine compliance with the National Pollutant Discharge Elimination System (NPDES) permit with a more intensive review of the laboratory operations, including the observation of sample collection, analysis and examination of the logs and records.

During the inspection, EPA-approved methodology was not followed for analysis of settleable solids. The technician collected the sample as a composite and allowed the sample to settle for one hour without stirring prior to recording results. The NPDES permit requires that settleable solids be collected as a grab sample. The sample should sit for 45 minutes, gently stirred once along the edge, and then allowed to sit for an addition 15 minutes prior to reading. This violation had been corrected prior to the end of the inspection.

All other parameters were analyzed according to approved methodology. The lab also had an extensive record keeping system and quality assurance program.

6.4.B. Industrial Permits

TN0055964 Trane Company - Clarksville

Discharger rating: Minor
City: Clarksville
County: Montgomery
EFO Name: Nashville
Issuance Date: 6/1/06
Expiration Date: 5/31/09
Receiving Stream(s): Unnamed tributary to a sinkhole for Outfall 001 and a wet weather conveyance at mile 0.6 to a sinkhole for SW1, then from the sinkhole, 001/SW1 ultimately travel to Gibbs Spring tributary (fed by a spring) to mile 4.3 of Spring Creek
HUC-12: 051302060405
Effluent Summary: Non-contact cooling water from Outfall 001 and contaminated storm water from Outfall SW1
Treatment system: None

Segment	TN05130206039_0150
Name	Spring Creek
Size	22.5
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Not Assessed), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Sedimentation/Siltation, Alteration in stream-side or littoral vegetative covers, Nitrates, Phosphate
Sources	Non-irrigated Crop Production, Sources Outside State Jurisdiction or Borders, Loss of Riparian Habitat

Table 6-13. Stream Segment Information for Trane Company - Clarksville.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Flow	All Year		MGD	DMax Load	Monthly	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Monthly	Continuous	Effluent

Table 6-14. Permit Limits for Trane Company - Clarksville.

Comments:
Air-conditioning and warm air heating equipment and commercial and industrial refrigeration equipment

TN0031127 SIRCO - Southern Industrial Redevelopment Company

Discharger rating:	Minor
City:	Clarksville
County:	Montgomery
EFO Name:	Nashville
Issuance Date:	3/1/05
Expiration Date:	1/30/09
Receiving Stream(s):	Wet weather conveyance at mile 0.2 to Spring Creek at mile 11.5
HUC-12:	051302060604
Effluent Summary:	Condensate from air conditioning systems, production process water, boiler blowdown water and domestic wastewater through Outfall 001
Treatment system:	The wastewater is diverted into a subsurface sewage disposal system.

Segment	TN05130206039_0150
Name	Spring Creek
Size	22.5
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Not Assessed), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Sedimentation/Siltation, Alteration in stream-side or littoral vegetative covers, Nitrates, Phosphate
Sources	Non-irrigated Crop Production, Sources Outside State Juristiction or Borders, Loss of Riparian Habitat

Table 6-15. Stream Segment Information for SIRCO - Southern Industrial Redevelopment Company.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Flow	All Year		MGD	DMax Load	See Permit	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	See Permit	Instantaneous	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	Weekly	Grab	Effluent
Oil and Grease (Freon EM)	All Year	10	mg/L	MAvg Conc	Weekly	Grab	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Weekly	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	2/Month	Grab	Effluent
pH	All Year	9	SU	DMax Conc	3/Week	Grab	Effluent
pH	All Year	6	SU	DMin Conc	3/Week	Grab	Effluent

Table 6-16. Permit Limits for SIRCO - Southern Industrial Redevelopment Company.

Comments:
4/12/07 Compliance Evaluation Inspection: In compliance.

APPENDIX II

ID	NAME	HAZARD
747008	D Name	L
747009	Spectrum	X
747007	Hills Mill	L
747002	Cumberland Springs	1
747004	Greenbrier	1
637002	Clarksville Lake	3
637003	Dunbar	F
747005	Oak Hills	L
747006	Harper	N
837014	Fairvue	L
837022	Falcon Ridge	S
837024	Farnsworth-Scharding	H

Table A2-1. Inventoried Dams in the Tennessee Portion of the Red River Watershed. *Hazard Codes: (H, 1), High; S, Significant; (L, 3); X, A non-dam structure; F, Federally owned or operated; N, Not yet built. TDEC only regulates dams indicated by a numeric hazard score.*

LAND COVER/LAND USE	ACRES	% OF WATERSHED
Bare Rock/Sand/Clay	426	0.1
Deciduous Forest	153,453	31.3
Developed Open Space	38,059	7.8
Emergent Herbaceous Wetlands	248	0.1
Evergreen Forest	17,806	3.6
Grassland/Herbaceous	6,113	1.2
High Intensity Development	1,615	0.3
Low Intensity Development	9,886	2.0
Medium Intensity development	3,598	0.7
Mixed Forest	1,530	0.3
Open Water	1,274	0.3
Pasture/Hay	151,243	30.8
Row Crops	103,815	21.2
Shrub/Scrub	161	0.0
Woody Wetlands	1,602	0.3
Total	**490,828**	**100.0**

Table A2-2. Land Use Distribution in the Tennessee Portion of the Red 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)	
Western Pennyroyal Karst (71e)	Buzzard Creek (71E09)	Red River	05130206
	Passenger Creek (71E14)	Red River	05130206
Western Highland Rim (71f)	South Harpeth Creek (71F12)	Harpeth River	05130204
	Wolf Creek (71F16)	Lower Duck River	06040003
	Brush Creek (71F19)	Buffalo River	06040004
	Swanegan Branch (71F27)	Pickwick Lake	06030005
	Little Swan Creek (71F28)	Lower Duck River	06040003
	Hurricane Creek (71F29)	Lower Duck River	06040003
Eastern Highland Rim (71g)	Flat creek (71G03)	Cordell Hull Lake	05130106
	Spring Creek (71G04)	Cordell Hull Lake	05130106

Table A2-3. Ecoregion Monitoring Sites in Ecoregions 71e, 71f, 71g.

CODE	NAME	AGENCY	AGENCY ID
23	TDEC/DNAThe Swamps Site	TDEC/DNA	S.USSER01 1109
100	TDEC/DNA Cedar Hill Swamp State WMA Site	TDEC/DNA	M.USTNHP 1
129	TDEC/DNA Hellcat Prairie Site	TDEC/DNA	S.USTNHP 156
205	USACOE-Nashville Client Site	USACOE-Nashville	
228	USACOE-Nashville Client Site	USACOE-Nashville	
232	USACOE-Nashville Client Site	USACOE-Nashville	
233	USACOE-Nashville Client Site	USACOE-Nashville	
238	USACOE-Nashville Client Site	USACOE-Nashville	
261	USACOE-Nashville Client Site	USACOE-Nashville	
313	TDOT SR 52 Mitigation Site	TDOT	
371	TDOT SR 76 Mitigation/Permit Site	TDOT	
473	TDEC/WPC Portland WPC Permit/Mitigation Site	TDEC/WPC	
1509	USACOE-ORL PN199501071 Site	USFWS	
1916	TWRA Cedar Hill Swamp Site	TWRA	
1917	TWRA Cedar Hill Swamp Site	TWRA	
1918	TWRA Cedar Hill Swamp Site	TWRA	
1919	TWRA Cedar Hill Swamp Site	TWRA	
1920	TWRA Cedar Hill Swamp Site	TWRA	
1921	TWRA Cedar Hill Swamp Site	TWRA	
2111	TWRA The Swamps Site	TWRA	
2112	TWRA The Swamps Site	TWRA	
2113	TWRA The Swamps Site	TWRA	
2114	TWRA The Swamps Site	TWRA	
2115	TWRA The Swamps Site	TWRA	
2116	TWRA The Swamps Site	TWRA	
2117	TWRA The Swamps Site	TWRA	
2242	TWRA FMHA Site	TWRA	
2243	TWRA FMHA Site	TWRA	
2244	TWRA FMHA R.O.W. Site	TWRA	
2269	TWRA Cedar Hill Swamp Site	TWRA	
2270	TWRA Cedar Hill Swamp Site	TWRA	
2271	TWRA Cedar Hill Swamp Site	TWRA	
2272	TWRA Cedar Hill Swamp Site	TWRA	
2273	TWRA Cedar Hill Swamp Site	TWRA	
2274	TWRA Cedar Hill Swamp Site	TWRA	
2275	TWRA Cedar Hill Swamp Site	TWRA	
2276	TWRA Cedar Hill Swamp Site	TWRA	
2725	USACOE Spring Creek Site	USACOE-Nashville	960048266
2727	USACOE Red River 6.0 L Site	USACOE-Nashville	960048022

Table A2-4. Wetland Sites in the Red River Watershed in TDEC Database. *TDEC, Tennessee Department of Environment and Conservation; DNA, Division of Natural Areas; WPC, Water Pollution Control; TDOT, Tennessee Department of Transportation; USACOE, US Army Corps of Engineers; TWRA, Tennessee Wildlife Resources Agency; WMA, Wildlife Management Area.* ***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)
Beaver Dam Creek	TN05130206003_0400	10.3
Browns Fork	TN05130206003_1260	6.2
Brush Creek	TN05130206003_1500	8.1
Brushy Creek	TN05130206003_1261	2.2
Buzzard Creek	TN05130206002_0400	11.0
Calebs Creek	TN05130206003_1300	8.5
Carr Creek	TN05130206003_1200	2.9
Carr Creek	TN05130206003_1250	7.8
Carr Creek	TN05130206003_1255	11.3
Chambers Spring Branch	TN05130206003_0100	4.3
Crawford Branch	TN05130206003_1230	2.3
Elk Folk Creek	TN05130206002_0250	3.6
Empson Branch	TN05130206019_0320	7.2
Flat Branch	TN05130206003_1210	2.3
Honey Run	TN05130206019_0300	12.2
Honey Run	TN05130206019_0350	11.2
Honey Run Creek	TN05130206003_1410	7.7
Hood Branch	TN05130206003_1270	4.7
Jones Branch	TN05130206019_0310	4.2
Jordan Creek	TN05130206034_0210	10.9
Little Buzzard Creek	TN05130206002_0410	5.6
Little West Fork	TN05130206034_2000	6.0
Long Branch	TN05130206003_0900	6.4
Maxwell Branch	TN05130206019_0100	7.0
Millers Creek	TN05130206003_1400	21.1
Noahs Spring Branch	TN05130206034_0300	2.8
Passenger Creek	TN05130206002_0600	17.0
Peppers Branch	TN05130206003_0300	4.2
Peyton Branch	TN05130206003_0800	5.0
Pole Bridge Branch	TN05130206003_0910	2.4
Poorhouse Branch	TN05130206003_1240	2.1
Red River	TN05130206002_3000	17.5
Red River	TN05130206002_4000	4.5
Red River	TN05130206024_1000	6.6
Red River	TN05130206024_2000	8.0
Red River	TN05130206024_3000	4.4
Roney Creek	TN05130206019_0200	4.1
Sanders Branch	TN05130206019_0330	4.1
Santee Creek	TN05130206003_0500	9.2

Table A3-1a.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Savage Branch	TN05130206003_0600	3.2
South Fork Red River	TN05130206019_1000	12.9
South Fork Red River	TN05130206019_2000	10.0
Spring Creek	TN05130206003_0200	13.5
Spring Creek	TN05130206039_0100	8.9
Sturgeon Creek	TN05130206002_0500	10.7
Sulphur Fork	TN05130206003_1000	11.3
Sulphur Fork	TN05130206003_2000	10.7
Sulphur Fork	TN05130206003_4000	8.6
Sulphur Fork	TN05130206003_5000	7.0
Sulphur Fork	TN05130206003_6000	7.4
Summers Branch	TN05130206024_0100	4.8
Unnamed Trib to Red River	TN05130206024_0500	2.9
Unnamed Trib to Sulphur Fork	TN05130206003_0700	1.3
West Fork Brush Creek	TN05130206003_1510	5.1
West Fork Red River	TN05130206039_2000	7.0

Table A3-1b.

Table A3-1a-b. Streams Fully Supporting Fish and Aquatic Life Designated Use in the Tennessee Portion of the Red River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Austin Branch	TN05130206024_0300	3.9
Buntin Branch	TN05130206024_0200	7.6
Dunbar Cave Creek	TN05130206002_0100	2.7
Elk Fork Creek	TN05130206002_0200	3.9
Fletchers Fork	TN05130206034_0100	25.3
Frey Branch	TN05130206019_0321	7.2
Hall Town Creek	TN05130206024_0400	6.4
Little West Fork	TN05130206034_1000	7.2
Piney Fork	TN05130206034_0200	38.5
Raccoon Branch	TN05130206034_0110	7.7
Red River	TN05130206002_1000	2.4
Red River	TN05130206002_2000	22.9
Red River	TN05130206002_5000	3.3
Seven Springs	TN05130206002_0700	1.1
Smith Branch	TN05130206019_0600	4.1
Somerville Branch	TN05130206024_0600	4.3
Spring Creek	TN05130206039_0150	22.5
Sulphur Fork	TN05130206003_3000	1.9
Summers Branch	TN05130206024_0150	12.6
Unnamed Trib to Carr Creek	TN05130206003_1220	1.6
Wartrace Creek	TN05130206003_1100	6.8
West Fork Red River	TN05130206039_1000	10.2

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

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (ACRES)
Dunbar Cave Lake	TN05130206DUNCLK_1000	15

Table A3-3. Lakes Not Supporting Fish and Aquatic Life Designated Use in the Tennessee Portion of the Red River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Dry Fork Creek	TN05130206034_0400	4.1
Elk Fork	TN05130206034_0230	10.6
Hopewell Branch	TN05130206019_0400	3.2
Little Creek	TN05130206034_0220	4.7
Misc Tribs to Little West Fork	TN05130206034_0999	9.2
Misc Tribs to Red River	TN05130206002_0999	8.5
Misc Tribs to Red River	TN05130206024_0999	17.9
Misc Tribs to South Fork Red River	TN05130206019_0999	24.9
Misc Tribs to Sulphur Fork	TN05130206003_0999	30.1
Moss Creek	TN05130206034_0211	8.0
Neal Branch	TN05130206024_0700	5.0
Noahs Spring Branch	TN05130206034_0350	8.9
Unnamed Trib to Elk Fork Creek	TN05130206002_0210	4.4
Unnamed Trib to South Fork Red River	TN05130206019_0500	6.6
Weavers Creek	TN05130206034_0310	14.2

Table A3-4. Streams Not Assessed for Fish and Aquatic Life Designated Use in the Tennessee Portion of the Red River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Buzzard Creek	TN05130206002_0400	11.0
Dunbar Cave Creek	TN05130206002_0100	2.7
Little Buzzard Creek	TN05130206002_0410	5.6
Little West Fork	TN05130206034_1000	7.2
Little West Fork	TN05130206034_2000	6.0
Millers Creek	TN05130206003_1400	21.1
Noahs Spring Branch	TN05130206034_0300	2.8
Passenger Creek	TN05130206002_0600	17.0
Red River	TN05130206002_2000	22.9
Red River	TN05130206002_3000	17.5
Red River	TN05130206002_4000	4.5
Red River	TN05130206002_5000	3.3
Spring Creek	TN05130206039_0100	8.9
Sulphur Fork	TN05130206003_1000	11.3
Sulphur Fork	TN05130206003_2000	10.7
Sulphur Fork	TN05130206003_3000	1.9
Sulphur Fork	TN05130206003_4000	8.6

Table A3-5. Streams Fully Supporting Recreation Designated Use in the Tennessee Portion of the Red River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Frey Branch	TN05130206019_0321	7.2
Red River	TN05130206002_1000	2.4
Summers Branch	TN05130206024_0150	12.6
Unnamed Trib to Carr Creek	TN05130206003_1220	1.6

Table A3-6. Streams Not Supporting Recreation Designated Use in the Tennessee Portion of the Red River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (ACRES)
Dunbar Cave Lake	TN05130206DUNCLK_1000	15

Table A3-7. Lakes Not Supporting Recreation Designated Use in the Tennessee Portion of the Red River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Austin Branch	TN05130206024_0300	3.9
Beaver Dam Creek	TN05130206003_0400	10.3
Browns Fork	TN05130206003_1260	6.2
Brush Creek	TN05130206003_1500	8.1
Brushy Creek	TN05130206003_1261	2.2
Buntin Branch	TN05130206024_0200	7.6
Calebs Creek	TN05130206003_1300	8.5
Carr Creek	TN05130206003_1200	2.9
Carr Creek	TN05130206003_1250	7.8
Carr Creek	TN05130206003_1255	11.3
Chambers Spring Branch	TN05130206003_0100	4.3
Crawford Branch	TN05130206003_1230	2.3
Dry Fork Creek	TN05130206034_0400	4.1
Elk Folk Creek	TN05130206002_0250	3.6
Elk Fork	TN05130206034_0230	10.6
Elk Fork Creek	TN05130206002_0200	3.9
Empson Branch	TN05130206019_0320	7.2
Flat Branch	TN05130206003_1210	2.3
Fletchers Fork	TN05130206034_0100	25.3
Hall Town Creek	TN05130206024_0400	6.4
Honey Run	TN05130206019_0300	12.2
Honey Run	TN05130206019_0350	11.2
Honey Run Creek	TN05130206003_1410	7.7

Table A3-8a.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Hood Branch	TN05130206003_1270	4.7
Hopewell Branch	TN05130206019_0400	3.2
Jones Branch	TN05130206019_0310	4.2
Jordan Creek	TN05130206034_0210	10.9
Little Creek	TN05130206034_0220	4.7
Long Branch	TN05130206003_0900	6.4
Maxwell Branch	TN05130206019_0100	7.0
Misc Tribs to Little West Fork	TN05130206034_0999	9.2
Misc Tribs to Red River	TN05130206002_0999	8.5
Misc Tribs to Red River	TN05130206024_0999	17.9
Misc Tribs to South Fork Red River	TN05130206019_0999	24.9
Misc Tribs to Sulphur Fork	TN05130206003_0999	30.1
Moss Creek	TN05130206034_0211	8.0
Neal Branch	TN05130206024_0700	5.0
Noahs Spring Branch	TN05130206034_0350	8.9
Peppers Branch	TN05130206003_0300	4.2
Peyton Branch	TN05130206003_0800	5.0
Piney Fork	TN05130206034_0200	38.5
Pole Bridge Branch	TN05130206003_0910	2.4
Poorhouse Branch	TN05130206003_1240	2.1
Raccoon Branch	TN05130206034_0110	7.7
Red River	TN05130206024_1000	6.6
Red River	TN05130206024_2000	8.0
Red River	TN05130206024_3000	4.4
Roney Creek	TN05130206019_0200	4.1
Sanders Branch	TN05130206019_0330	4.1
Santee Creek	TN05130206003_0500	9.2
Savage Branch	TN05130206003_0600	3.2
Seven Springs	TN05130206002_0700	1.1
Smith Branch	TN05130206019_0600	4.1
Somerville Branch	TN05130206024_0600	4.3
South Fork Red River	TN05130206019_1000	12.9
South Fork Red River	TN05130206019_2000	10.0
Spring Creek	TN05130206003_0200	13.5
Spring Creek	TN05130206039_0150	22.5
Sturgeon Creek	TN05130206002_0500	10.7
Sulphur Fork	TN05130206003_5000	7.0
Sulphur Fork	TN05130206003_6000	7.4
Summers Branch	TN05130206024_0100	4.8
Unnamed Trib to Elk Fork Creek	TN05130206002_0210	4.4
Unnamed Trib to Red River	TN05130206024_0500	2.9

Table A3-8b.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Unnamed Trib to South Fork Red River	TN05130206019_0500	6.6
Unnamed Trib to Sulphur Fork	TN05130206003_0700	1.3
Valley Branch	TN05130206002_0300	22.1
Wartrace Creek	TN05130206003_1100	6.8
Weavers Creek	TN05130206034_0310	14.2
Weavers Creek	TN05130206034_0310	14.2
West Fork Brush Creek	TN05130206003_1510	5.1
West Fork Red River	TN05130206039_1000	10.2
West Fork Red River	TN05130206039_2000	7.0

Table A3-8c.

Table A3-8a-c. Streams Not Assessed for Recreation Designated Use in the Tennessee Portion of the Red River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Austin Branch	TN05130206024_0300	3.9
Beaver Dam Creek	TN05130206003_0400	10.3
Browns Fork	TN05130206003_1260	6.2
Brush Creek	TN05130206003_1500	8.1
Brushy Creek	TN05130206003_1261	2.2
Buntin Branch	TN05130206024_0200	7.6
Buzzard Creek	TN05130206002_0400	11.0
Calebs Creek	TN05130206003_1300	8.5
Carr Creek	TN05130206003_1200	2.9
Carr Creek	TN05130206003_1250	7.8
Carr Creek	TN05130206003_1255	11.3
Chambers Spring Branch	TN05130206003_0100	4.3
Crawford Branch	TN05130206003_1230	2.3
Dry Fork Creek	TN05130206034_0400	4.1
Dunbar Cave Creek	TN05130206002_0100	2.7
Elk Folk Creek	TN05130206002_0250	3.6
Elk Fork	TN05130206034_0230	10.6
Elk Fork Creek	TN05130206002_0200	3.9
Empson Branch	TN05130206019_0320	7.2
Flat Branch	TN05130206003_1210	2.3
Fletchers Fork	TN05130206034_0100	25.3
Frey Branch	TN05130206019_0321	7.2
Hall Town Creek	TN05130206024_0400	6.4
Honey Run	TN05130206019_0350	11.2
Honey Run	TN05130206019_0300	12.2

Table A3-9a.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Honey Run Creek	TN05130206003_1410	7.7
Hood Branch	TN05130206003_1270	4.7
Hopewell Branch	TN05130206019_0400	3.2
Jones Branch	TN05130206019_0310	4.2
Jordan Creek	TN05130206034_0210	10.9
Little Buzzard Creek	TN05130206002_0410	5.6
Little Creek	TN05130206034_0220	4.7
Little West Fork	TN05130206034_2000	6.0
Little West Fork	TN05130206034_1000	7.2
Long Branch	TN05130206003_0900	6.4
Maxwell Branch	TN05130206019_0100	7.0
Millers Creek	TN05130206003_1400	21.1
Misc Tribs to Little West Fork	TN05130206034_0999	9.2
Misc Tribs to Red River	TN05130206002_0999	8.5
Misc Tribs to Red River	TN05130206024_0999	17.9
Misc Tribs to South Fork Red River	TN05130206019_0999	24.9
Misc Tribs to Sulphur Fork	TN05130206003_0999	30.1
Moss Creek	TN05130206034_0211	8.0
Neal Branch	TN05130206024_0700	5.0
Noahs Spring Branch	TN05130206034_0300	2.8
Noahs Spring Branch	TN05130206034_0350	8.9
Passenger Creek	TN05130206002_0600	17.0
Peppers Branch	TN05130206003_0300	4.2
Peyton Branch	TN05130206003_0800	5.0
Piney Fork	TN05130206034_0200	38.5
Pole Bridge Branch	TN05130206003_0910	2.4
Poorhouse Branch	TN05130206003_1240	2.1
Raccoon Branch	TN05130206034_0110	7.7
Red River	TN05130206002_1000	2.4
Red River	TN05130206002_5000	3.3
Red River	TN05130206024_3000	4.4
Red River	TN05130206002_4000	4.5
Red River	TN05130206024_1000	6.6
Red River	TN05130206024_2000	8.0
Red River	TN05130206002_3000	17.5
Red River	TN05130206002_2000	22.9
Roney Creek	TN05130206019_0200	4.1
Sanders Branch	TN05130206019_0330	4.1
Santee Creek	TN05130206003_0500	9.2
Savage Branch	TN05130206003_0600	3.2
Seven Springs	TN05130206002_0700	1.1
Smith Branch	TN05130206019_0600	4.1
Somerville Branch	TN05130206024_0600	4.3

Table A3-9b

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
South Fork Red River	TN05130206019_2000	10.0
South Fork Red River	TN05130206019_1000	12.9
Spring Creek	TN05130206039_0100	8.9
Spring Creek	TN05130206003_0200	13.5
Spring Creek	TN05130206039_0150	22.5
Sturgeon Creek	TN05130206002_0500	10.7
Sulphur Fork	TN05130206003_3000	1.9
Sulphur Fork	TN05130206003_5000	7.0
Sulphur Fork	TN05130206003_6000	7.4
Sulphur Fork	TN05130206003_4000	8.6
Sulphur Fork	TN05130206003_2000	10.7
Sulphur Fork	TN05130206003_1000	11.3
Summers Branch	TN05130206024_0100	4.8

Table A3-9c.

Table A3-9a-c. Stream Impairment Due to Siltation in the Tennessee Portion of the Red River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Austin Branch	TN05130206024_0300	3.9
Beaver Dam Creek	TN05130206003_0400	10.3
Browns Fork	TN05130206003_1260	6.2
Brush Creek	TN05130206003_1500	8.1
Brushy Creek	TN05130206003_1261	2.2
Buntin Branch	TN05130206024_0200	7.6
Buzzard Creek	TN05130206002_0400	11.0
Calebs Creek	TN05130206003_1300	8.5
Carr Creek	TN05130206003_1200	2.9
Carr Creek	TN05130206003_1250	7.8
Carr Creek	TN05130206003_1255	11.3
Chambers Spring Branch	TN05130206003_0100	4.3
Crawford Branch	TN05130206003_1230	2.3
Dry Fork Creek	TN05130206034_0400	4.1
Dunbar Cave Creek	TN05130206002_0100	2.7
Elk Folk Creek	TN05130206002_0250	3.6
Elk Fork	TN05130206034_0230	10.6
Elk Fork Creek	TN05130206002_0200	3.9
Empson Branch	TN05130206019_0320	7.2
Flat Branch	TN05130206003_1210	2.3
Fletchers Fork	TN05130206034_0100	25.3
Frey Branch	TN05130206019_0321	7.2
Hall Town Creek	TN05130206024_0400	6.4

Table A3-10a.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Honey Run	TN05130206019_0350	11.2
Honey Run	TN05130206019_0300	12.2
Honey Run Creek	TN05130206003_1410	7.7
Hood Branch	TN05130206003_1270	4.7
Hopewell Branch	TN05130206019_0400	3.2
Jones Branch	TN05130206019_0310	4.2
Jordan Creek	TN05130206034_0210	10.9
Little Buzzard Creek	TN05130206002_0410	5.6
Little Creek	TN05130206034_0220	4.7
Little West Fork	TN05130206034_2000	6.0
Little West Fork	TN05130206034_1000	7.2
Long Branch	TN05130206003_0900	6.4
Maxwell Branch	TN05130206019_0100	7.0
Millers Creek	TN05130206003_1400	21.1
Misc Tribs to Little West Fork	TN05130206034_0999	9.2
Misc Tribs to Red River	TN05130206002_0999	8.5
Misc Tribs to Red River	TN05130206024_0999	17.9
Misc Tribs to South Fork Red River	TN05130206019_0999	24.9
Misc Tribs to Sulphur Fork	TN05130206003_0999	30.1
Moss Creek	TN05130206034_0211	8.0
Neal Branch	TN05130206024_0700	5.0
Noahs Spring Branch	TN05130206034_0300	2.8
Noahs Spring Branch	TN05130206034_0350	8.9
Passenger Creek	TN05130206002_0600	17.0
Peppers Branch	TN05130206003_0300	4.2
Peyton Branch	TN05130206003_0800	5.0
Piney Fork	TN05130206034_0200	38.5
Pole Bridge Branch	TN05130206003_0910	2.4
Poorhouse Branch	TN05130206003_1240	2.1
Raccoon Branch	TN05130206034_0110	7.7
Red River	TN05130206002_1000	2.4
Red River	TN05130206002_5000	3.3
Red River	TN05130206024_3000	4.4
Red River	TN05130206002_4000	4.5
Red River	TN05130206024_1000	6.6
Red River	TN05130206024_2000	8.0
Red River	TN05130206002_3000	17.5
Red River	TN05130206002_2000	22.9
Roney Creek	TN05130206019_0200	4.1
Sanders Branch	TN05130206019_0330	4.1
Santee Creek	TN05130206003_0500	9.2
Savage Branch	TN05130206003_0600	3.2
Seven Springs	TN05130206002_0700	1.1

Table A3-10b.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Smith Branch	TN05130206019_0600	4.1
Somerville Branch	TN05130206024_0600	4.3
South Fork Red River	TN05130206019_2000	10.0
South Fork Red River	TN05130206019_1000	12.9
Spring Creek	TN05130206039_0100	8.9
Spring Creek	TN05130206003_0200	13.5
Spring Creek	TN05130206039_0150	22.5
Sturgeon Creek	TN05130206002_0500	10.7
Sulphur Fork	TN05130206003_3000	1.9
Sulphur Fork	TN05130206003_5000	7.0
Sulphur Fork	TN05130206003_6000	7.4
Sulphur Fork	TN05130206003_4000	8.6
Sulphur Fork	TN05130206003_2000	10.7
Sulphur Fork	TN05130206003_1000	11.3
Summers Branch	TN05130206024_0100	4.8
Summers Branch	TN05130206024_0150	12.6
Unnamed trib to Carr Creek	TN05130206003_1220	1.6
Unnamed trib to Carr Creek	TN05130206003_1220	1.6
Unnamed Trib to Elk Fork Creek	TN05130206002_0210	4.4
Unnamed Trib to Red River	TN05130206024_0500	2.9
Unnamed Trib to South Fork Red River	TN05130206019_0500	6.6
Unnamed Trib to Sulphur Fork	TN05130206003_0700	1.3
Valley Branch	TN05130206002_0300	22.1
Wartrace Creek	TN05130206003_1100	6.8
Wartrace Creek	TN05130206003_1100	6.8
Weavers Creek	TN05130206034_0310	14.2
West Fork Brush Creek	TN05130206003_1510	5.1
West Fork Red River	TN05130206039_2000	7.0
West Fork Red River	TN05130206039_1000	10.2

Table A3-10c.

Table A3-10a-c. Stream Impairment due to Organic Enrichment in the Tennessee Portion of the Red River Watershed.

APPENDIX IV

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0101	0102	0201	0202	0401
Bare Rock/Sand/Clay	1				
Deciduous Forest	8,434	874	11,701	5,300	3,524
Developed Open Space	3,482	412	3,503	2,034	1,021
Emergent Herbaceous Wetlands	1				32
Evergreen Forest	777	61	1,021	324	144
Grassland/Herbaceous	220	10	377	14	72
High Intensity Development	109		42		15
Low Intensity Development	425	15	611	60	38
Medium Intensity Development	207	1	144	16	9
Mixed Forest	220	11	224	89	32
Open Water	62	4	29	19	65
Pasture/Hay	14,672	1,151	16,996	7,205	8,826
Row Crops	14,092	4,157	3,219	17,047	4,070
Shrub/Scrub	7		10	2	
Woody Wetlands					19
Total	**42,711**	**6,697**	**37,877**	**32,110**	**17,865**

Table A4-1a.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0402	0403	0404	0405	0406
Bare Rock/Sand/Clay				1	3
Deciduous Forest	3,073	4,479	1,533	3,029	4,928
Developed Open Space	1,204	1,323	577	1,455	974
Emergent Herbaceous Wetlands		91	4	6	1
Evergreen Forest	89	338	101	160	393
Grassland/Herbaceous	17	53	20	43	100
High Intensity Development	1	1	2	260	
Low Intensity Development	12	105	64	650	128
Medium Intensity Development	8	12	7	415	
Mixed Forest	38	38	23	12	76
Open Water	20	76	24	72	26
Pasture/Hay	6,208	7,455	2,866	5,786	6,131
Row Crops	8,219	5,868	5,566	5,977	1,388
Shrub/Scrub	3	4		2	1
Woody Wetlands		138	31	181	54
Total	**18,890**	**19,979**	**10,818**	**18,050**	**14,203**

Table A4-1b.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0407	0501	0502	0503	0504
Bare Rock/Sand/Clay	15		92		
Deciduous Forest	5,376	14,129	3,631	9,088	5,933
Developed Open Space	2,929	2,951	1,603	1,987	1,097
Emergent Herbaceous Wetlands	10	1	4	2	10
Evergreen Forest	493	1,071	366	391	407
Grassland/Herbaceous	102	726	67	333	141
High Intensity Development	325	31	235	66	
Low Intensity Development	1,927	357	859	499	23
Medium Intensity Development	697	126	438	248	3
Mixed Forest	26	237	69	123	52
Open Water	133	73	68	17	39
Pasture/Hay	4,548	17,298	5,448	9,964	10,689
Row Crops	680	4,069	1,861	664	1,501
Shrub/Scrub		18	2	3	12
Woody Wetlands	610				1
Total	**17,871**	**41,088**	**14,744**	**23,385**	**19,909**

Table A4-1c.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0505	0506	0603	0604	0605
Bare Rock/Sand/Clay	1		3	17	
Deciduous Forest	6,516	6,803	1,200	4,745	1,758
Developed Open Space	676	1,486	370	1,523	1,016
Emergent Herbaceous Wetlands	2	28	5	10	
Evergreen Forest	440	549	40	231	117
Grassland/Herbaceous	559	372	22	85	11
High Intensity Development		7	6	61	25
Low Intensity Development	10	73	237	645	507
Medium Intensity Development	4	9	39	107	92
Mixed Forest	96	96	1	37	4
Open Water	18	87	140	22	94
Pasture/Hay	5,968	10,333	1,288	2,768	1,179
Row Crops	556	4,509	1,741	10,346	349
Shrub/Scrub			4		6
Woody Wetlands		87	62	176	180
Total	**14,846**	**24,436**	**5,159**	**20,772**	**5,337**

Table A4-1d.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0701	0702	0703	0704	0705
Bare Rock/Sand/Clay				287	7
Deciduous Forest	9,803	20,586	4,161	9,599	3,249
Developed Open Space	425	878	1,763	1,017	2,342
Emergent Herbaceous Wetlands	3	8	20	5	4
Evergreen Forest	964	7,090	310	1,723	205
Grassland/Herbaceous	1,457	722	170	293	129
High Intensity Development	64	2	250	15	96
Low Intensity Development	137	65	1,146	215	1,058
Medium Intensity Development	113	9	386	153	344
Mixed Forest		12		10	3
Open Water	17	89	11	26	43
Pasture/Hay	333	1,185	299	1,907	739
Row Crops	1,988	1,968	1,089	1,668	1,221
Shrub/Scrub	19	34	10	14	10
Woody Wetlands		1	11		50
Total	**15,324**	**32,651**	**9,626**	**16,933**	**9,502**

Table A4-1e.

Table A4-1a-e. Land Use Distribution in the Red River Watershed by HUC-12. *Data are from 1992 Multi-Resolution Land Characterization (MRLC) derived by applying a generalized Anderson Level II system to mosaics of Landsat thematic mapper images collected every five years.*

HYDROLOGIC SOIL GROUPS
GROUP A SOILS have low runoff potential and high infiltration rates even when wet. They consist chiefly of sand and gravel and are well to excessively drained.
GROUP B SOILS have moderate infiltration rates when wet and consist chiefly of soils that are moderately deep to deep, moderately to well drained, and moderately coarse to coarse textures.
GROUP C SOILS have low infiltration rates when wet and consist chiefly of soils having a layer that impedes downward movement of water with moderately fine to fine texture.
GROUP D SOILS have high runoff potential, very low infiltration rates, and consist chiefly of clay soils.

Table A4-2. Hydrologic Soil Groups in Tennessee as Described in WCS. *Soils are grouped into four hydrologic soil groups that describe a soil's permeability and, therefore, its susceptibility to runoff.*

STATION	HUC 10	STREAM	AREA (MI2)	DAILY FLOW AVG	DAILY FLOW MAX	DAILY FLOW MIN	3Q2	1Q10	3Q10	7Q10	3Q20
3435030	0513020601	Red River	15.10	24.4	1650.0	0.7	na	na	na	na	na
3435020	0513020601	Red River	9.32	na	na	na	na	na	na	na	na
3435500	0513020604	Red River	706.00	934.9	40100.0	30.0	na	na	na	41.8	36.3
3436100	0513020604	Red River	935.00	1307.6	56600.0	52.0	98.4	64.9	65.4	66.6	61.3
3435600	0513020605	Mill Branch	3.50	na	na	na	na	na	na	na	na
3435770	0513020605	Sulphur Fork	65.60	96.8	5570.0	2.4	na	na	na	na	na
3436000	0513020605	Sulphur Fork	186.00	253.7	20800.0	1.9	10.2	4.6	4.7	5.0	3.7

Table A4-3. Stream Flow Data from USGS Gaging Stations in the Red River Watershed. *Data are in cubic feet per second (CFS). Data were obtained from the USGS web application StreamStats at http://water.usgs.gov/osw/streamstats. (na, data not available)*

AGENCY	STATION	LOCATION	HUC-12
TDECWPC	AUSTI000.4SR	Austin Branch @ RM 0.4	051302060101
TDECWPC	AUSTI001.7SR	Austin Branch @ RM 1.7	051302060101
TDECWPC	BUNTI000.4RN	Buntin Branch @ 0.4	051302060101
TDECWPC	BUNTI002.3SR	Buntin Branch @ RM 2.3	051302060101
TDECWPC	HTOWN000.2SR	Hall Town Creek @ RM 0.2	051302060101
TDECWPC	HTOWN001.3SR	Hall Town Creek @ RM 1.3	051302060101
TDECWPC	NEAL001.0RN	Neal Branch @ RM 1.0	051302060101
TDECWPC	RED082.3RN	Red River @ RM 82.3	051302060101
TDECWPC	RED090.5SR	Red River @ RM 90.5	051302060101
TDECWPC	RED093.0SR	Red River @ RM 93.0	051302060101
TDECWPC	RED095.6SR	Red River @ RM 95.6	051302060101
TDECWPC	RED097.7SR	Red River @ RM 97.7	051302060101
TDECWPC	RED1T0.5SR	UT to Red River @ RM 0.5	051302060101
TDECWPC	SOMER000.1RN	Somerville Branch @ RM 0.1	051302060101
TDECWPC	SUMME000.8RN	Summers Branch @ RM 0.8	051302060101
TDECWPC	SUMME006.6SR	Summers Branch @ RM 6.6	051302060101
TDECWPC	SUMME008.6SR	Summers Branch @ RM 8.6	051302060101
TDECWPC	SUMME008.7SR	Summers Branch @ RM 8.7	051302060101
TDECWPC	SUMME008.8SR	Summers Branch @ RM 8.8	051302060101
TDECWPC	SUMME009.8SR	Summers Branch @ RM 9.8	051302060101
TDECWPC	SUMME1T0.02SR	UT to Summers Branch @ RM 0.02	051302060101
TDECWPC	SUMME1T0.1SR	UT to Summers Branch @ RM 0.1	051302060101
TDECWPC	RED080.0RN	Red River @ RM 80.0	051302060102
TDECWPC	FREY000.1RN	Frey Branch @ RM 0.1	051302060201
TDECWPC	FREY000.5RN	Frey Branch @ RM 0.5	051302060201
TDECWPC	HONEY000.4RN	Honey Run @ RM 0.4	051302060201
TDECWPC	HRUN010.6SR	Honey Run Branch @ RM 10.6	051302060201
TDECWPC	JONES000.3SR	Jones Branch @ RM 0.3	051302060201
TDECWPC	MAXWE000.1SR	Maxwell Branch @ RM 0.1	051302060201
TDECWPC	MAXWE001.7SR	Maxwells Branch Creek @ RM 1.7	051302060201
TDECWPC	RONEY000.2SR	Roney Creek @ RM 0.2	051302060201
TDECWPC	SANDE000.1RN	Sanders Branch @ RM 0.1	051302060201
TDECWPC	SFRED022.7RN	South Fork Red R @ RM 22.7	051302060201
TDECWPC	SFRED029.1RN	South Fork Red River @ RM 29.1	051302060201
TDECWPC	HOPEW000.2RN	Hopewell Branch @ RM 0.2	051302060202
TDECWPC	SFRED007.5RN	South Fork Red River @ RM 7.5	051302060202
TDECWPC	SMITH000.8RN	Smith Branch @ RM 0.8	051302060202
TDECWPC	ECO71E09	Buzzard Creek @ RM 1.3	051302060401
21KY	PRI069	Red River Near Keysburg	051302060401
TDECWPC	RED047.0RN	Red River @ RM 47.0	051302060401
TDECWPC	SFRED023.4RN	South Fork Red River @ RM 23.4	051302060402

Table A4-4a.

AGENCY	STATION	LOCATION	HUC-12
TDECWPC	SPRIN001.3RN	Spring Creek @ RM 1.3	051302060402
TDECWPC	VALLE001.5RN	Valley Branch @ RM 1.5	051302060402
TDECWPC	VALLE1T0.7RN	UT to Valley Branch @ RM 0.7	051302060402
TDECWPC	STURG000.7RN	Sturgeon Creek @ RM 0.7	051302060403
TDECWPC	EFORK003.4RN	Elk Fork Creek @ RM 3.4	051302060404
TDECWPC	EFORK004.5RN	Elk Fork River @ RM 4.5	051302060404
TDECWPC	RED024.7MT	Red River @ RM 24.7	051302060405
TDECWPC	ECO71E14	Passenger Creek @ RM 1.6	051302060406
TDECWPC	SSPRI000.2MT	Seven Springs Branch @ RM 0.2	051302060406
TDECWPC	DUNBA000.3MT	Dunbar Creek @ RM 0.3	051302060407
TDECWPC	DUNBA001.2MT	Dunbar Lake @ RM 1.2	051302060407
TDECWPC	RED000.2MT	Red River @ RM 0.2	051302060407
TDECWPC	RED008.4MT	Red River @ RM 8.4	051302060407
TDECWPC	BDAM000.1RN	Beaver Dam Creek @ RM 0.1	051302060501
TDECWPC	BDAM001.5RN	Beaver Dam Creek @ RM 1.5	051302060501
TDECWPC	LONG000.1RN	Long Branch @ RM 0.1	051302060501
TDECWPC	LONG000.7RN	Long Branch @ RM 0.7	051302060501
TDECWPC	PBRID001.0RN	Pole Bridge Branch @ RM 1.0	051302060501
TDECWPC	PEYTO000.5RN	Peyton Branch @ RM 0.5	051302060501
TDECWPC	SANTE000.8RN	Santee Creek @ RM 0.8	051302060501
TDECWPC	SAVAG001.0RN	Savage Branch @ RM 1.0	051302060501
TDECWPC	SFORK042.6RN	Sulphur Fork Creek @ RM 42.6	051302060501
TDECWPC	SULPH032.2RN	Sulphur Fork @ RM 32.2	051302060501
TDECWPC	SULPH039.3RN	Sulphur Fork @ RM 39.3	051302060501
TDECWPC	SULPH1T0.3RN	Sulphur Fork UT @ RM 0.3	051302060501
TDECWPC	PEPPE000.4RN	Pepper's Branch @ RM 0.4	051302060502
TDECWPC	SFORK023.4RN	Sulphur Fork Creek @ RM 23.4	051302060502
TDECWPC	SULPH023.1RN	Sulphur Fork @ RM 23.1	051302060502
TDECWPC	SULPH023.2RN	Sulphur Fork @ RM 23.2	051302060502
TDECWPC	SULPH023.3RN	Sulphur Fork @ RM 23.3	051302060502
TDECWPC	SULPH031.0RN	Sulphur Fork @ RM 31.0	051302060502
TDECWPC	SULPH031.6RN	Sulphur Fork @ RM 31.6	051302060502
TDECWPC	WARTR000.2RN	Wartrace Creek @ RM 0.2	051302060502
TDECWPC	WARTR000.3RN	Wartrace Creek @ RM 0.3	051302060502
TDECWPC	BROWN000.4RN	Browns Fork @ RM 0.4	051302060503
TDECWPC	BRUSH000.9RN	Brushy Creek @ RM 0.9	051302060503
TDECWPC	CARR001.4RN	Carr Creek @ RM 1.4	051302060503
TDECWPC	CARR005.2RN	Carr Creek @ RM 5.2	051302060503
TDECWPC	CARR010.0RN	Carr Creek @ RM 10.0	051302060503
TDECWPC	CARR1T0.6RN	UT to Carr Creek @ RM 0.6	051302060503
TDECWPC	CRAWF000.1RN	Crawford Branch @ RM 0.1	051302060503
TDECWPC	FLAT001.0RN	Flat Branch @ RM 1.0	051302060503
TDECWPC	PHOUS000.7RN	Poor House Branch @ RM 0.7	051302060503

Table A4-4b.

AGENCY	STATION	LOCATION	HUC-12
TDECWPC	POORH000.7RN	Poorhouse Branch @ RM 0.7	051302060503
TDECWPC	CALEB001.0RN	Calebs Creek @ RM 1.0	051302060504
TDECWPC	HOOD000.8RN	Hood Branch @ RM 0.8	051302060504
TDECWPC	SPRIN000.1RN	Spring Creek @ RM 0.1	051302060504
TDECWPC	SPRIN000.2RN	Spring Creek @ RM 0.2	051302060504
TDECWPC	HRUN000.1RN	Honey Run Creek @ RM 0.1	051302060505
TDECWPC	MILLE000.6RN	Millers Creek @ RM 0.6	051302060505
TDECWPC	BRUSH001.8RN	Brush Creek @ RM 1.8	051302060506
TDECWPC	CSPRI001.4RN	Chambers Spring Br @ RM 1.4	051302060506
TDECWPC	RED025.5MT	Red River @ RM 25.5	051302060506
TDECWPC	SULPH000.1RN	Sulphur Fork @ RM 0.1	051302060506
TDECWPC	SULPH000.2RN	Sulphur Fork @ RM 0.2	051302060506
TDECWPC	SULPH010.2RN	Sulphur Fork @ RM 10.2	051302060506
TDECWPC	WFBRU000.8RN	West Fork Brush Cr@ RM 0.8	051302060506
TDECWPC	SPRIN000.6MT	Spring Creek @ RM 0.6	051302060604
TDECWPC	SPRIN009.8MT	Spring Creek @ RM 9.8	051302060604
TDECWPC	SPRIN011.3MT	Spring Creek @ RM 11.3	051302060604
TDECWPC	RED001.5MT	Red River @ RM 1.5	051302060605
TDECWPC	WFRED001.3MT	West Fork Red River @ RM 1.3	051302060605
TDECWPC	NSPRI000.3MT	Noahs Spring Branch @ RM 0.3	051302060701
TDECWPC	JORDO001.0MT	Jordon Creek @ RM 1.0	051302060702
TDECWPC	LITTL000.5MT	Little Creek @ RM 0.5	051302060702
TDECWPC	MOSS000.1MT	Moss Creek @ RM 0.1	051302060702
TDECWPC	PINEY000.4MT	Piney Fork @ RM 0.4	051302060702
TDECWPC	LWFOR009.4MT	Little West Fork Creek @ RM 9.4	051302060703
TDECWPC	LWFRE010.5MT	Little West Fork Red River @ RM 10.5	051302060703
TDECWPC	FLETC000.1MT	Fletchers Fork @ RM 0.1	051302060704
TDECWPC	RACCO001.0MT	Raccoon Branch @ RM 1.0	051302060704
TDECWPC	LWEST003.0MT	Little West Fork @ RM 3.0	051302060705
21KY	CRW004	West Fork Red River Near Oak Grove	Kentucky
21KY	CRW005	Whippoorwill Creek Near Dot	Kentucky

Table A4-4c.

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

FACILITY NUMBER	FACILITY NAME	SIC	SIC NAME	MADI	WATERBODY	HUC-12
TN0067962	Delta Express #1028	5541	Convenience Store with Gas	Minor	Honey Run Creek	051302060101
TN0059404	White House STP	4952	Sewerage Systems	Minor	Frey Branch @ RM 2.2	051302060201
TN0058076	Jo Byrns School	4952	Sewerage Systems	Minor	UT @ RM 1.1 to Sturgeon Creek @ RM 2.4	051302060403
TN0055964	Trane Co.-Clarksville	3585	Air Conditioning and Warm Air Heating Equipment	Minor	UT to Sink Hole and WWC to Sink Hole to UT of Gibbs Spring	051302060405
TN0064807	TDOT I-24 Welcome Ctr	4952	Sewerage Systems	Minor	Sinkhole	051302060405
TN0073725	Ridgetop Shell Station	5541	Convenience Store with Gas	Minor	WWC to UT to Pole Bridge Branch @ RM 1.1	051302060501
TN0024961	Springfield STP	4952	Sewerage Systems	Minor	Sulphur Fork Creek @ RM 23.2	051302060502
TN0062103	Collins & Aikman Carpet	2396	Textile Automotive Trimmings	Minor	UT @ RM 0.6 to Wartrace Creek @ RM 1.9	051302060502
TN0058921	Holley Performance Products	3592	Carburetors, Pistons, Rings, and Valves	Minor	Sulphur Fork Creek @ RM 29.4	051302060502
TN0064645	Precision Products of TN	3544	Industrial Molds	Minor	Storm Drain to WWC to Sulphur Fork Creek @ RM 26.4	051302060502
TN0031127	SIRCO	3624	Carbon and Graphite Production	Minor	WWC to Spring Creek @ RM 11.5	051302060604
TN0021296	CH2M Hill Services	9711	National Security	Major	Little West Fork Creek @ RM 10.4	051302060703

Table A4-5. NPDES Permittees in the Red River Watershed. *SIC, Standard Industrial Classification; MADI, Major Discharge Indicator; UT, Unnamed Tributary; WWC, Wet Weather Conveyance.*

FACILITY NUMBER	PERMITEE	SIC	SIC NAME	WATERBODY	HUC-12
TN0072028	Rogers Group, Incorporated (Cross Plains Quarry)	1422	Crushed and Broken Limestone	UT to South Fork Red River	051302060201
TN0026476	Vulcan Construction Materials (Clarksville Quarry)	1422	Crushed and Broken Limestone	Red River	051302060407
TN0053783	Kopper-Glo Fuel, Incorporated (Refuse Area #1)	1221	Bituminous Coal and Lignite Surface Mining	UT to Rock Creek	051302060502
TN0063134	Rinker Materials-South Central (Springfield Quarry)	1422	Crushed and Broken Limestone	Pepper Branch	051302060502

Table A4-6. Active Permitted Mining Sites in the Red River Watershed. *SIC, Standard Industrial Classification; UT, Unnamed Tributary.*

FACILITY NUMBER	PERMITEE	WATERBODY	HUC-12
TN0077925	Springfield WTP	Red River	051302060401

Table A4-7. Water Treatment Plants in the Red River Watershed.

FACILITY NUMBER	FACILITY NAME	WATERBODY	HUC-12
TNG110103	Garrott Brothers Cont. Mix	WWC to Donoho Branch	051302060101
TNG110227	Garrott Brothers Cont. Mix	Honey Run Creek	051302060201
TNG110075	IMI South	WWC to West Fork Red River	051302060405
TNG110194	Nashville Ready-Mix Co.	West Fork Red River	051302060407
TNG110072	Orgain Ready-Mix Co.	West Fork Red River	051302060407
TNG11074	IMI South	WWC to Red River	051302060407
TNG110075	IMI South	WWC to West Fork Red River	051302060405
TNG110122	Garrott Brothers Cont. Mix	Metro Storm Sewer	051302060501
TNG110300	101st Ready-Mix Concrete	Barkley Reservoir	051302060605
TNG110263	Orgain Ready-Mix Co.	Ground Water	051302060703

Table A4-8. Ready Mix Concrete Plants in the Red River Watershed. *UT, Unnamed Tributary; WWC, Wet Weather Conveyance.*

LOG NUMBER	COUNTY	DESCRIPTION	WATERBODY	HUC-12
NRS01.378	Sumner			051302060101
NRS00.209	Sumner	Impoundment	UT to Sumners Branch	051302060101
NRS03.298	Sumner	Detention Pond	Wetland	051302060201
NRS05.343	Sumner		Wetland & Buntin Branch	051302060101
NRS06.289	Sumner		UT to Summers Branch	051302060101
NRS04.358	Sumner		Red River	051302060101
NRS06.289A	Sumner		UT to Summers Branch	051302060101
NRS06.289B	Sumner		UT to Summers Branch	051302060101
NRS07.003	Sumner		UT to West Fork Drakes Creek	051302060101
NRS0504.367	Robertson		UT to Empson Branch	051302060201
NRS0504.368	Robertson		Frey Branch	051302060201
NRS0604.044	Sumner		UT to Jones Branch	051302060201
NRS0604.045	Sumner		Frey Branch	051302060201
NRS0604.178	Robertson		Frey Branch	051302060201
NRS0604.199	Robertson		UT to Frey Branch	051302060201
NRS0704.072	Robertson		UT to Frey Branch	051302060201
NRS0704.073	Robertson		Wetlands	051302060201
NRS03.298	Sumner		Contiguous Wetland	051302060201
NRS04.368	Robertson		Contiguous Wetland	051302060201
NRS04.368B	Robertson		Contiguous Wetland	051302060201
NRS04.368C	Robertson		Frey Branch	051302060201
NRS04.368D	Robertson		Frey Branch	051302060201
NRS04.368E	Robertson		Frey Branch	051302060201
NRS02.256	Robertson		Red River	051302060401
NRS06.039	Robertson		UT to Sturgeon Creek and Wetlands	051302060403
NR0604.332	Montgomery		UT to Spring Creek	051302060404
NRS00.090	Montgomery	Culvert Extension	Wetland and UT to Raccoon Branch	051302060405
NRS02.266	Montgomery	Bridge Repair	Red River	051302060405
NR0604.375	Montgomery		UT to Big McAdoo Creek	051302060406
NR0604.376	Montgomery		UT to Big McAdoo Creek	051302060406
NRS01.332	Montgomery	Sewer Extension	Red River and Tributaries	051302060407
NRS01.199	Montgomery		UT to Red River	051302060407
NRS00.144	Montgomery		Red River	051302060407
NRS00.026	Montgomery		Swan Lake	051302060407
NRS02.179	Montgomery		Unnamed Tributary	051302060407
NRS02.338	Montgomery		Red River	051302060407
NRS05.108	Montgomery		Unnamed Tributary	051302060407
NR0504.392	Montgomery		UT to Red River	051302060407
NR0604.026	Montgomery		UT to Red River	051302060407
NR0604.136	Montgomery		UT to Red River	051302060407
NR0604.012	Robertson		Sulphur Fork Red River	051302060501
NR0604.013	Robertson		UT to Sulphur Fork Red River	051302060501
NR0604.071	Robertson		Sulphur Fork Red River	051302060501
NR0604.075	Robertson		Long Branch	051302060501
NR0604.219	Robertson		UT to Sulphur Fork Red River	051302060501
NR0604.348	Robertson		Sulphur Fork Red River	051302060501
NR0604.378	Robertson		UT to Sulphur Fork Red River	051302060501
NRS00.014	Robertson		UT to Sulphur Fork Creek	051302060501

Table A4-9a.

LOG NUMBER	COUNTY	DESCRIPTION	WATERBODY	HUC-12
NRS01.401	Robertson		UT to Greenbrier Lake	051302060501
NRS02.236	Robertson		Sulphur Fork Creek	051302060501
NR03.373	Sumner		Honey Run Creek	051302060501
NR04.367	Davidson		Cumberland River	051302060501
NR04.367B	Davidson		Love Branch	051302060501
NR04.367C	Davidson		Love Branch	051302060501
NR04.367D	Davidson		Love Branch	051302060501
NR05.377	Robertson		Sulphur Fork Creek	051302060501
NR0504.364	Robertson		UT to Wartrace Creek	051302060502
NR0704.005	Robertson		Wartrace Creek	051302060502
NRS00.131	Robertson		Black Branch	051302060502
NRS01.130	Robertson		Sulphur Fork Creek	051302060502
NRS02.104	Robertson		Sulphur Fork Creek	051302060502
NRS06.177	Robertson		UT to Wartrace Creek	051302060502
NR0504.342	Robertson		UT to Carr Creek	051302060503
NR0504.343	Robertson		UT to Carr Creek	051302060503
NR0504.344	Robertson		UT to Carr Creek	051302060503
NR0504.413	Robertson		Carr Creek	051302060503
NR0504.414	Robertson			051302060503
NR0604.135	Robertson		UT to Carr Creek	051302060503
NR0604.184	Robertson		UT to Brown's Creek	051302060503
NR0604.187	Robertson		UT to Brown's Creek	051302060503
NR0604.194	Robertson		Carr Creek	051302060503
NRS01.143	Robertson		UT to Carr Creek	051302060503
NRS01.248	Robertson		Isolated Wetland	051302060503
NRS01.369	Robertson		Carr Creek	051302060503
NRS05.371	Montgomery		West Fork Red River	051302060603
NRS06.19	Montgomery		West Fork Red River	051302060603
NR0604.008	Montgomery		Spring Creek	051302060604
NRS06.058	Montgomery		Spring Creek	051302060604
NRS04.396	Montgomery		West Fork Red River	051302060605
NR0604.087	Montgomery		UT to West Fork Red River UT to Cumberland River	051302060703
NR0604.369	Montgomery		Weavers Creek	051302060703
NR0504.416	Montgomery		Fletchers Fork Creek	051302060704
NR0504.417	Montgomery		Fletchers Fork Creek	051302060704
NR0604.073	Montgomery		Raccoon Creek	051302060704
NR0604.174	Montgomery		Fletchers Fork Creek	051302060704
NR0604.138	Montgomery		UT to Raccoon Creek	051302060704
NR0604.198	Montgomery		Fletchers Fork Creek	051302060704
NRS00.018	Montgomery		Wetlands Adjacent to UT to Raccoon Creek	051302060704
NRS04.397	Montgomery		Fletchers Fork Creek	051302060704
NRS04.397B	Montgomery		Fletchers Fork Creek	051302060704
NRS04.397C	Montgomery		Fletchers Fork Creek	051302060704
NRS04.397D	Montgomery		Fletchers Fork Creek	051302060704
NRS04.397E	Montgomery		Fletchers Fork Creek	051302060704
NRS04.397F	Montgomery		Fletchers Fork Creek	051302060704
NRS04.397G	Montgomery		Fletchers Fork Creek	051302060704
NRS04.397H	Montgomery		Fletchers Fork Creek	051302060704

Table A4-9b.

LOG NUMBER	COUNTY	DESCRIPTION	WATERBODY	HUC-12
NRS04.398B	Montgomery		Raccoon Branch	051302060704
NRS04.397I	Montgomery		Fletchers Fork Creek	051302060704
NRS04.398	Montgomery		Fletchers Fork Creek	051302060704
NRS04.398C	Montgomery		Raccoon Branch	051302060704
NRS04.398D	Montgomery		Raccoon Branch	051302060704
NRS04.398E	Montgomery		Raccoon Branch	051302060704
NRS04.398F	Montgomery		Raccoon Branch	051302060704
NRS04.398G	Montgomery		Raccoon Branch	051302060704
NRS04.398H	Montgomery		Raccoon Branch	051302060704
NRS04.398I	Montgomery		Raccoon Branch	051302060704
NRS04.398J	Montgomery		Raccoon Branch	051302060704
NR0504.411	Montgomery		UT to Little West Fork Red River	051302060705
NR0604.363	Montgomery		UT to Little West Fork Red River	051302060705
NRS04.048	Montgomery	Widen Road	Little West Fork Red River	051302060705
NRS04.048B	Montgomery		Little West Fork Red River	051302060705
NRS04.048C	Montgomery		Little West Fork Red River	051302060705
NRS04.048D	Montgomery		West Fork red River	051302060705
NRS04.048E	Montgomery		West Fork red River	051302060705
NRS04.048F	Montgomery		West Fork red River	051302060705
NRS04.048G	Montgomery		West Fork red River	051302060705
NRS04.048H	Montgomery		West Fork red River	051302060705
NRS04.048I	Montgomery		Wetlands	051302060705
NRS04.048J	Montgomery		Wetlands	051302060705

Table A4-9c.

Table A4-9a-c. Individual ARAP Permits Issued January 2000 Through April 2006 in the Red River Watershed. *UT, Unnamed Tributary.*

FACILITY NUMBER	FACILITY NAME	SECTOR	RECEIVING STREAM	AREA*	HUC-12
TNR050838	Western Plastics Plant	Y	Summers Branch	4	051302060101
TNR050839	Imperial Fabricating and Fleet Design	AA	Hall Town Creek	7	051302060101
TNR050848	Tsubaki Conveyor/America	AB	Summers Branch	11.52	051302060101
TNR051358	Portland Express, Incorporated	P	Portland Drainage Canal	1.5	051302060101
TNR051769	Imperial Fabricating Plant	AA	UT to Summers Branch	12	051302060101
TNR053468	S.R. Smith, Incorporated	Y	Ditch	1.377	051302060101
TNR054515	United Structures of America	AA	Willow Branch	22.81	051302060101
TNR056246	Popeye's Imports	M	Austin Branch	23.89	051302060101
TNR056481	Clearview Sawmill	A	UT to Red River	0.99	051302060101
TNR053796	Advantage Building Systems	A	Buntin Branch	6.32	051302060101
TNR053966	Western Plastics	Y	Summers Branch	3	051302060101
TNR054007	Imperial Fabricating Plant #1	AA	Grace Creek	4	051302060101
TNR056046	Billie's Used Cars and Repairs	M		3	051302060101
TNR050846	Imperial Group	AB	Maxwell Branch	5	051302060201
TNR050842	Imperial Fabricating and Fleet Design	AA	Maxwell Branch	5.8	051302060201
TNR054100	Terex Utilities-South	AB	Frey Branch	2	051302060201
TNR056436	B & G Auto Salvage	M	Empson Branch	5	051302060201
TNR053479	Schwerman Trucking Company	P	Storm Sewer System	2.2	051302060202
TNR056193	L & R Salvage		Valley Branch, Sinkhole		051302060202
TNR056495	L & R Salvage	M	Smith Branch	1.5	051302060202
TNR053003	CEI Company, Incorporated	AC	Unnamed Tributary	30.9	051302060401
TNR053779	Highland Graphics	AB, AC	Sulphur Fork Creek	30.87	051302060401
TNR054039	All American Homes of TN	Y, P	Sulphur Fork Creek	4.1	051302060401
TNR053674	Whitson Lumber Company	A	UT to Valley Branch	1.5	051302060402
TNR050221	Jackson Oil Company	AD, P	Fork Spring	1.3	051302060402
TNR051867	Precision Printing and Packaging	X	UT to Sinkhole	54.3	051302060405
TNR050364	Purity Zinc Metals	F	Retention Pond	4.2	051302060405
TNR051539	The Trane Company-Plant # 1		Sinkhole		051302060405
TNR053219	Cougar Packaging, Incorporated	B	Ground Water	5.0	051302060405
TNR051255	Waste Management of TN	P	Retention Pond	5.2	051302060405
TNR051346	Quebecor World	AB	Red River	117.3	051302060405
TNR053867	US Midwest Zinc	F	Unnamed Pond	15.0	051302060405
TNR054315	Quebecor World	X	Red River	72	051302060405
TNR054473	SPX/Contech Metal Forge	F, AB	WWC	10.0	051302060405
TNR054497	Hendrickson Trailer Suspension Systems	AB	Unnamed Tributary	24.7	051302060405
TNR054540	Beachaven Vineyards and Nursery	U	Unnamed Tributary	11.75	051302060405
TNR056750	MW/MB, LLC	E	Sinkhole	5	051302060405
TNR050661	Clarksville Foundry, Inc.	F	Unnamed Tributary	1.6	051302060407
TNR053653	Rogers Group Asphalt Plant	D	Red River	3.4	051302060407
TNR053224	Vulcan Corporation	Y	Red River	30.3	051302060407
TNR053432	Federal Express	S, P	Red River	1	051302060407
TNR050799	Red River Block/Supply Co.	E	Red River	3	051302060407

Table A4-10a

FACILITY NUMBER	FACILITY NAME	SECTOR	RECEIVING STREAM	AREA*	HUC-12
TNR051437	HMA Contractors	D	Clarksville Storm Water Sewer to Red River	6	051302060407
TNR054163	Presto Services, Incorporated			0.15	051302060407
TNR054451	Letica Corporation	B, Y	Red River @ RM 0.5	40.804	051302060407
TNR055908	Clarence Langford Welding	AB	Sinkhole	3	051302060407
TNR056417	Clarksville City Garage	AE	Sink Hole	2.5	051302060407
TNR056418	Clarksville Transit System	P	Sink Hole	4.1	051302060407
TNR056421	Clarksville WWTP	T	Sinkhole	8.5	051302060407
TNR053280	Timken Latrobe Steel Dist.	AA	UT to Sulphur Fork Creek	6	051302060501
TNR055086	North Star Lumber, Incorporated	A	UT to Sulphur Fork Creek	9.19	051302060501
TNR055907	Shrum Auto Salvage	M	Bakers Fork	2.68	051302060501
TNR056471	Leggett and Platt, Incorporated	AB	UT to Sulphur Fork Creek	6	051302060501
TNR051263	Precision Products of TN	AA, AB, AD	Sulphur Fork Creek	5.62	051302060502
TNR051593	Clean Harbors Tennessee	K		12	051302060502
TNR050734	LoJac Springfield Plant	D		2	051302060502
TNR052090	Frigidaire Company	AC, P	Sinkhole	52	051302060502
TNR050272	Beaver Adhesives, Incorporated	C	Sulphur Fork Creek	0.2	051302060502
TNR050322	Nashville Wire Products	AA	Wartrace Lake	6	051302060502
TNR051223	General Chemicals Corporation	C	UT to Wartrace Creek	2.26	051302060502
TNR051145	Holley Performance Products	AB	Black Branch Creek	2.2	051302060502
TNR050071	Unarco Material Handling	AA, W	Sulphur Fork Creek	2.3	051302060502
TNR053659	Hollingsworth Oil Company	P	UT to Sulphur Fork Creek	3.26	051302060502
TNR053762	Delight Products	U	Black Branch	13.14	051302060502
TNR053778	CEI Company, Ltd	AB, AC	Sulphur Fork Creek	11.04	051302060502
TNR053859	HMA Contractors	D	Sulphur Fork Creek	3.83	051302060502
TNR050236	Rankin Fabrication	AA	Wartrace Lake	11.77	051302060502
TNR054039	All American Homes of TN	Y, P	Sulphur Fork Creek	4.1	051302060502
TNR054272	Fontaine Fleetline Products	AA	WWC to Wartrace Creek	3	051302060502
TNR054344	Wright Industries, Incorporated	AB	Mill Creek	9.86	051302060502
TNR054416	S & R Incorporated	AA	Ditch to Wartrace Lake	1	051302060502
TNR054525	Better Block Company, Inc.	E	Sulphur Fork Creek	20	051302060502
TNR055065	Collins and Aikman Carpet and Acoustics	V, Y	UT to Wartrace Creek	14.84	051302060502
TNR055989	Electrolux Home Products	AC, P	Sinkhole	20.6	051302060502
TNR056005	ThyssenKrupp Fabco	AA	Sulphur Fork Creek	15	051302060502
TNR056260	Rawls and Son Auto	M	Ditch	2.5	051302060502
TNR056041	Bedwell Auto and Salvage	M	Wartrace Creek	4	051302060502
TNR056426	Springfield WWTP	T	Sulphur Fork Creek	65	051302060502
TNR056633	Rolling Frito-Lay Sales	P	Sulphur Fork Creek	0.9	051302060502
TNR053513	Springfield-Robertson County Regional Airport	S	Spring Creek	0.5	051302060504
TNR056790	Dowlen Sawmill	A	Calebs Creek	2	051302060504
TNR054283	Dowlen Sawmill	A	UT to Honey Run Creek	4.3	051302060505
TNR056346	Highlands Landfill	L	WF and EF Miller's Creek	240	051302060505
TNR053806	Strategic Materials, Inc.	N	Cumberland River	10	051302060506
TNR050738	Smith's Auto Salvage	M	Rush Branch	7	051302060506
TNR051919	Queen City Metals, Incorporated	N, P	Sinkhole	10	051302060603
TNR056625	Rolling Frito-Lay Sales	P	Unnamed Pond	0.25	051302060603

Table A4-10b.

FACILITY NUMBER	FACILITY NAME	SECTOR	RECEIVING STREAM	AREA*	HUC-12
TNR050018	Florim, USA	E	Sinkhole	40.0	051302060604
TNR050534	SIRCO	AC, P	Spring Creek	202.2	051302060604
TNR055925	Bosch Braking Systems Corp.	AB	Unnamed Pond	86.85	051302060604
TNR056345	Teeter Farm and Seed Co.	E	Sinkhole	10.75	051302060604
TNR056774	St. Bethlehem Landfill	L	Detention Pond	68	051302060604
TNR051777	Fort Campbell Military Reservation	AD, S, N, M, P	Fletchers Fork, Little West Fork Creek, Dry Fork Creek	520	051302060703
TNR050829	Nashville Wire Products	AA	Ringgold Creek	6	
TNR053221	Clarksville-Montgomery County Airport	S, P		0.37	051302060703
TNR051508	Gemtron Corporation	E	Little West Fork	18.22	051302060703
TNR053913	Bi-County Solid Waste Balefill/Landfill	L	UT to Fletchers Creek	158	051302060704
TNR053172	MC Asphalt, Incorporated	D	Red River	7.5	051302060705

Table A4-10c.

Table A4-10a-c. Active Permitted TMSP Facilities in the Red River Watershed. *Area, acres of property associated with industrial activity; UT, Unnamed Tributary. Sector details may be found in Table A4-11.*

SECTOR	TMSP SECTOR NAME
A	Timber Products Facilities
AA	Facilities That Manufacture Metal Products including Jewelry, Silverware and Plated Ware
AB	Facilities That Manufacture Transportation Equipment, Industrial or Commercial Machinery
AC	Facilities That Manufacture Electronic and Electrical Equipment and Components, Photographic and Optical Goods
AD	Facilities That Are Not Covered Under Sectors A Thru AC (Monitoring Required)
AE	Facilities That Are Not Covered Under Sectors A Thru AC (Monitoring Not Required)
B	Paper and Allied Products Manufacturing Facilities
C	Chemical and Allied Products Manufacturing Facilities
D	Asphalt Paving, Roofing Materials, and Lubricant Manufacturing Facilities
E	Glass, Clay, Cement, Concrete, and Gypsum Product Manufacturing Facilities
F	Primary Metals Facilities
G	Metal Mines (Ore Mining and Dressing) (RESERVED)
H	Inactive Coal Mines and Inactive Coal Mining-Related Facilities
I	Oil or Gas Extraction Facilities
J	Construction Sand and Gravel Mining and Processing and Dimension Stone Mining and Quarrying Facilities
K	Hazardous Waste Treatment Storage or Disposal Facilities
L	Landfills and Land Application Sites
M	Automobile Salvage Yards
N	Scrap Recycling and Waste and Recycling Facilities
O	Steam Electric Power Generating Facilities
P	Vehicle Maintenance or Equipment Cleaning areas at Motor Freight Transportation Facilities, Passenger Transportation Facilities, Petroleum Bulk Oil Stations and Terminals, the United States Postal Service, or Railroad Transportation Facilities
Q	Vehicle Maintenance Areas and Equipment Cleaning Areas of Water Transportation Facilities
R	Ship or Boat Building and Repair Yards
S	Vehicle Maintenance Areas, Equipment Cleaning Areas or From Airport Deicing Operations located at Air Transportation Facilities
T	Wastewater Treatment Works
U	Food and Kindred Products Facilities
V	Textile Mills, Apparel and other Fabric Product Manufacturing Facilities
W	Furniture and Fixture Manufacturing Facilities
X	Printing and Platemaking Facilities
Y	Rubber and Miscellaneous Plastic Product Manufacturing Facilities
Z	Leather Tanning and Finishing Facilities

Table A4-11. TMSP Sectors and Descriptions.

APPENDIX V

LAND TREATMENT - CONSERVATION BUFFERS					
	Contour Buffer Strips (acres)	Field Borders (feet)	Filter Strip (feet)	Streambank / Shoreline Protection (feet)	Riparian Forest Buffer (acres)
FY 2001		205887		24690	51
FY 2002	3	116370		2025	8
FY 2003	11	21931	21	1275	15
FY 2004		5			
FY 2005		38160			6

Table A5-1a. Land Treatment Conservation Practices (Conservation Buffers), in Partnership with NRCS in the Tennessee Portion of the Red 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	35531	13991
FY 2002	78251	11052
FY 2003	29070	6566
FY 2004		
FY 2005		

Table A5-1b. Erosion Control Conservation Practices, in Partnership with NRCS in the Tennessee Portion of the Red 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		8398	8398
FY 2002	40	8296	8336
FY 2003		7513	7513
FY 2004	8295		8295
FY 2005	4418		4418

Table A5-1c. Nutrient Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Red River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

COMPREHENSIVE NUTRIENT MGMT PLANS		
	Planned Comprehensive Nutrient Mgmt Plans (number)	Total Comprehensive Nutrient Mgmt Plans (number)
FY 2001		
FY 2002	1	1
FY 2003		
FY 2004		
FY 2005		

Table A5-1d. Comprehensive Nutrient Management plans, Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Red River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

PEST MANAGEMENT		
	Pest Mgmt. Systems (number)	Pest Mgmt. Systems (acres)
FY 2001	63	7827
FY 2002		8546
FY 2003		6618
FY 2004		7950
FY 2005		4359

Table A5-1e. Pest Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Red River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

GRAZING / FORAGES			
	Prescribed Grazing (acres)	Fencing (feet)	Pasture and Hay Planting (acres)
FY 2001	1526		
FY 2002	2392		
FY 2003	832		
FY 2004	6416	11403	391
FY 2005	2251	25636	185

Table A5-1f. Grazing/Forages Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Red 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 Prepared for revegetation of Forest (acres)	Land Improved through Forest Stand improvement (acres)	Total Tree & Shrub Estab. (acres)	Forestland Re-established or improved (acres)	Use Exclusion (acres)
FY 2001		469	5	474	
FY 2002	1	371	21	392	
FY 2003		193	18	211	
FY 2004		902		902	21
FY 2005		538		538	175

Table A5-1g. Tree and Shrub Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Red River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

LAND TREATMENT - TILLAGE & CROPPING						
	Residue Mgmt, No-till, Strip till (acres)	Residue Mgmt - Mulch Till (acres)	Tillage & Residue Mgmt Systems (acres)	Conservation Crop Rotation (acres)	Contour Farming (acres)	Cover Crop (acres)
FY 2001			7476			
FY 2002	6164	1642	7805			
FY 2003	5310	521	5831			
FY 2004	1711	49	1760	1105	102	2512
FY 2005	1146	312	1459	768	256	17

Table A5-1h. Land Treatment Conservation Practices (Tillage and Cropping), in Partnership with NRCS in the Tennessee Portion of the Red River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

WASTE MANAGEMENT FACILITIES		
	Waste Storage Facility (number)	Total Facilities (number)
FY 2001		
FY 2002		
FY 2003		
FY 2004		
FY 2005	1	1

Table A5-1i. Waste Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Red River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

WILDLIFE HABITAT MANAGEMENT			
	Upland Habitat Mgmt (acres)	Wetland Habitat Mgmt (acres)	Total Wildlife Habitat Mgmt Applied (acres)
FY 2001	772	44	816
FY 2002	944	110	1054
FY 2003	490		490
FY 2004	429		429
FY 2005	833		833

Table A5-1j. Wildlife Habitat Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Red River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

WATER SUPPLY			
	Pipeline (ft)	Pond (number)	Watering Facility (number)
FY 2001			
FY 2002			
FY 2003			
FY 2004	500	1	4
FY 2005	6951	1	8

Table A5-1k. Water Supply Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Red 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.*

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
051302060101	328	Conservation Crop Rotation	14	Crop (12) Hay (2)
	329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	8	Crop
	340	Cover Crop	1	Crop
	342	Critical Area Planting	1	Crop
	344	Residue Management, Seasonal	7	Crop
	382	Fence	5	Crop (2) Pasture (3)
	511	Forage Harvest Management	8	Crop (1) Hay (7)
	512	Pasture and Hay Planting	23	Crop (1) Hay (4) Pasture (18)
	516	Pipeline	4	Crop (1) Pasture (3)
	528	Prescribed Grazing	14	Pasture
	561	Heavy Use Area Protection	2	Pasture
	590	Nutrient Management	62	Crop (24) Hay (7) Pasture (31)
	595	Pest Management	53	Crop (15) Hay (7) Pasture (31)
	614	Watering Facility	4	Crop (1) Pasture (3)
	645	Upland Wildlife Habitat Management	13	Wildlife
	666	Forest Stand Improvement	12	Wildlife

Table A5-2a.

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
051302060102	328	Conservation Crop Rotation	2	Crop
	329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	14	Crop
	344	Residue Management, Seasonal	5	Crop
	528	Prescribed Grazing	1	Pasture
	590	Nutrient Management	15	Crop
	595	Pest Management	15	Crop
051302060201	327	Conservation Cover	2	Wildlife
	328	Conservation Crop Rotation	4	Crop
	329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	13	Crop
	382	Fence	2	Pasture
	511	Forage Harvest Management	2	Hay
	516	Pipeline	1	Pasture
	590	Nutrient Management	28	Crop (17) Hay (2) Pasture (5) Wildlife (4)
	595	Pest Management	29	Crop (27) Hay (2)
	614	Watering Facility	1	Pasture
	645	Upland Wildlife Habitat Management	9	Forest (3) Wildlife (6)
	647	Early Successional Habitat Development/Management	4	Wildlife
	666	Forest Stand Improvement	5	Forest (3) Wildlife (2)
051302060202	327	Conservation Cover	1	Wildlife
	328	Conservation Crop Rotation	1	Crop
	342	Critical Area Planting	1	Pasture
	344	Residue Management, Seasonal	3	Crop
	382	Fence	3	Pasture
	386	Field Border	1	Wildlife
	410	Grade Stabilization Structure	1	Pasture
	412	Grassed Waterway	6	Crop
	472	Use Exclusion	1	Pasture
	511	Forage Harvest Management	3	Crop (1) Hay (2)
	512	Pasture and Hay Planting	2	Crop (1) Hay (1)
	528	Prescribed Grazing	14	Pasture

Table A5-2b.

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
051302060202	590	Nutrient Management	12	Crop (4) Hay (2) Pasture (5) Wildlife (1)
	595	Pest Management	13	Crop (5) Hay (2) Pasture (5) Wildlife (1)
	645	Upland Wildlife Habitat Management	5	Forest (2) Wildlife (3)
	666	Forest Stand Improvement	1	Forest
051302060401	328	Conservation Crop Rotation	2	Crop
	329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	8	Crop
	382	Fence	7	Crop (2) Pasture (5)
	516	Pipeline	4	Pasture
	528	Prescribed Grazing	27	Crop (1) Pasture (26)
	561	Heavy Use Area Protection	3	Pasture
	590	Nutrient Management	13	Crop (8) Pasture (5)
	595	Pest Management	13	Crop (8) Pasture (5)
	614	Watering Facility	4	Pasture
	645	Upland Wildlife Habitat Management	1	Forest
	666	Forest Stand Improvement	1	Forest
051302060402	327	Conservation Cover	4	Crop
	328	Conservation Crop Rotation	3	Crop
	329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	1	Crop
	344	Residue Management, Seasonal	2	Crop
	382	Fence	5	Pasture
	393	Filter Strip	4	Crop
	410	Grade Stabilization Structure	1	Pasture
	412	Grassed Waterway	2	Crop (1) Pasture (1)
	472	Use Exclusion	4	Crop
	511	Forage Harvest Management	4	Crop (3) Hay (1)
	512	Pasture and Hay Planting	4	Crop (3) Pasture (1)
	516	Pipeline	1	Pasture
	528	Prescribed Grazing	34	Pasture

Table A5-2c.

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
	561	Heavy Use Area Protection	2	Pasture
051302060402	590	Nutrient Management	34	Crop (11) Hay (1) Pasture (22)
	595	Pest Management	24	Crop (11) Pasture (13)
	614	Watering Facility	1	Pasture
	645	Upland Wildlife Habitat Management	9	Crop (4) Forest (5)
	666	Forest Stand Improvement	4	Forest
051302060403	327	Conservation Cover	2	Crop
	328	Conservation Crop Rotation	1	Crop
	386	Field Border	8	Crop
	412	Grassed Waterway	1	Crop
	472	Use Exclusion	1	Crop
	511	Forage Harvest Management	1	Pasture
	516	Pipeline	4	Headquarters (1) Pasture (3)
	528	Prescribed Grazing	17	Pasture
	561	Heavy Use Area Protection	5	Headquarters (1) Pasture (4)
	590	Nutrient Management	21	Crop (12) Pasture (9)
	595	Pest Management	21	Crop (12) Pasture (9)
	614	Watering Facility	4	Headquarters (1) Pasture (3)
	645	Upland Wildlife Habitat Management	4	Forest (3) Wildlife (1)
	666	Forest Stand Improvement	3	Forest
051302060404	328	Conservation Crop Rotation	20	Crop
	329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	9	Crop
	344	Residue Management, Seasonal	11	Crop
	382	Fence	1	Pasture
	393	Filter Strip	1	Crop
	490	Tree/Shrub Site Preparation	1	Forest
	511	Forage Harvest Management	1	Crop
	512	Pasture and Hay Planting	2	Crop (1) Pasture (1)
	516	Pipeline	7	Pasture
	528	Prescribed Grazing	17	Pasture
	533	Pumping Plant	1	Pasture

Table A5-2d.

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
051302060404	561	Heavy Use Area Protection	5	Pasture
	590	Nutrient Management	27	Crop (18) Pasture (9)
	595	Pest Management	27	Crop (18) Pasture (9)
	612	Tree/Shrub Establishment	1	Forest
	614	Watering Facility	8	Pasture
	645	Upland Wildlife Habitat Management	5	Crop (1) Forest (4)
	666	Forest Stand Improvement	4	Forest
051302060405	328	Conservation Crop Rotation	7	Crop
	342	Critical Area Planting	2	Pasture
	344	Residue Management, Seasonal	1	Crop
	345	Residue and Tillage Management, Mulch Till	3	Crop
	382	Fence	4	Pasture (3) Wildlife (1)
	472	Use Exclusion	1	Wildlife
	512	Pasture and Hay Planting	1	Crop
	516	Pipeline	2	Pasture
	528	Prescribed Grazing	7	Crop (6) Pasture (1)
	561	Heavy Use Area Protection	3	Headquarters (1) Pasture (2)
	590	Nutrient Management	15	Crop (10) Pasture (5)
	595	Pest Management	8	Crop (4) Pasture (4)
	614	Watering Facility	3	Pasture
	644	Wetland Wildlife Habitat Management	1	Wildlife
	657	Wetland Restoration	1	Wildlife
051302060406	327	Conservation Cover	1	Crop
	328	Conservation Crop Rotation	2	Crop
	344	Residue Management, Seasonal	1	Crop
	382	Fence	2	Crop (1) Pasture (1)
	386	Field Border	2	Crop
	412	Grassed Waterway	2	Crop
	511	Forage Harvest Management	2	Crop
	512	Pasture and Hay Planting	4	Crop (3) Pasture (1)
	528	Prescribed Grazing	11	Pasture

Table A5-2e.

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
051302060406	590	Nutrient Management	31	Crop (20) Pasture (11)
	595	Pest Management		Crop (20)
	645	Upland Wildlife Habitat Management	1	Forest
	666	Forest Stand Improvement	1	Forest
051302060407	512	Pasture and Hay Planting	4	Hay
	590	Nutrient Management	3	Crop
	595	Pest Management	3	Crop
	645	Upland Wildlife Habitat Management	1	Hay
051302060501	329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	16	Crop
	382	Fence	11	Pasture
	511	Forage Harvest Management	6	Crop (1) Hay (5)
	512	Pasture and Hay Planting	2	Crop (1) Hay (1)
	516	Pipeline	3	Pasture
	528	Prescribed Grazing	25	Pasture
	561	Heavy Use Area Protection	4	Pasture
	590	Nutrient Management	26	Crop (12) Hay (2) Pasture (12)
	595	Pest Management	26	Crop (12) Hay (2) Pasture (12)
	614	Watering Facility	6	Pasture
	645	Upland Wildlife Habitat Management	6	Forest
	666	Forest Stand Improvement	4	Forest
051302060502	313	Waste Storage Facility	1	Pasture
	329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	1	Crop
	382	Fence	1	Pasture
	561	Heavy Use Area Protection	1	Pasture
	590	Nutrient Management	1	Crop
	595	Pest Management	1	Crop
	633	Waste Utilization	1	Pasture
051302060503	328	Conservation Crop Rotation	6	Crop
	329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	1	Crop
	590	Nutrient Management	1	Crop
	595	Pest Management	1	Crop

Table A5-2f.

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
	328	Conservation Crop Rotation	5	Crop
051302060504	329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	5	Crop
	378	Pond	1	Pasture
	382	Fence	6	Headquarters (1) Pasture (5)
	511	Forage Harvest Management	3	Pasture
	512	Pasture and Hay Planting	1	Pasture
	516	Pipeline	1	Pasture
	528	Prescribed Grazing	7	Pasture
	590	Nutrient Management	11	Pasture
	595	Pest Management	6	Pasture
	614	Watering Facility	1	Pasture
	645	Upland Wildlife Habitat Management	3	Forest
	666	Forest Stand Improvement	6	Forest
051302060505	382	Fence	1	Pasture
	516	Pipeline	1	Pasture
	528	Prescribed Grazing	1	Pasture
	561	Heavy Use Area Protection	1	Pasture
	590	Nutrient Management	6	Pasture
	595	Pest Management	6	Pasture
	614	Watering Facility	1	Pasture
051302060506	327	Conservation Cover	3	Crop
	328	Conservation Crop Rotation	27	Crop (26) Pasture (1)
	344	Residue Management, Seasonal	14	Crop
	382	Fence	9	Crop (3) Pasture (6)
	386	Field Border	3	Crop
	393	Filter Strip	1	Pasture
	511	Forage Harvest Management	10	Crop (7) Pasture (3)
	512	Pasture and Hay Planting		Crop (8)
			11	Pasture (3)
	516	Pipeline	5	Pasture
	528	Prescribed Grazing	23	Crop (7) Pasture (16)
	533	Pumping Plant	1	Pasture
	561	Heavy Use Area Protection	4	Pasture
	590	Nutrient Management	39	Crop (31) Pasture (8)
	595	Pest Management	39	Crop (31) Pasture (8)

Table A5-2g.

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
	614	Watering Facility	3	Pasture
051302060506	645	Upland Wildlife Habitat Management	2	Forest (1) Wildlife (1)
	666	Forest Stand Improvement	2	Forest
	329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	6	Crop
	590	Nutrient Management	6	Crop
051302060603	595	Pest Management	6	Crop
	645	Upland Wildlife Habitat Management	3	Forest
	666	Forest Stand Improvement	3	Forest
	328	Conservation Crop Rotation	4	Crop
	329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	3	Crop
	344	Residue Management, Seasonal	1	Crop
	386	Field Border	1	Crop
	391	Riparian Forest Buffer	1	Headquarters
051302060604	511	Forage Harvest Management	1	Hay
	512	Pasture and Hay Planting	1	Hay
	578	Stream Crossing	1	Headquarters
	590	Nutrient Management	9	Crop (8) Hay (1)
	595	Pest Management	9	Crop (8) Hay (1)
	328	Conservation Crop Rotation	1	Crop
	329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	1	Crop
	528	Prescribed Grazing	10	Pasture
051302060605	590	Nutrient Management	12	Crop (1) Pasture (10) Wildlife (1)
	595	Pest Management	12	Crop (1) Pasture (10) Wildlife (1)
	645	Upland Wildlife Habitat Management	5	Forest (4) Wildlife (1)
	666	Forest Stand Improvement	4	Forest
	328	Conservation Crop Rotation	16	Crop
051302060702	330	Contour Farming	9	Crop
	386	Field Border	10	Crop
	590	Nutrient Management	19	Crop (16) Pasture (3)

Table A5-2h.

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
051302060702	595	Pest Management	16	Crop
	645	Upland Wildlife Habitat Management	16	Crop
051302060703	329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	2	Crop
	511	Forage Harvest Management	1	Pasture
	528	Prescribed Grazing	2	Pasture
	590	Nutrient Management	2	Crop
	595	Pest Management	2	Crop
051302060704	328	Conservation Crop Rotation	10	Crop
	330	Contour Farming	9	Crop
	386	Field Border	9	Crop
	590	Nutrient Management	10	Crop
	595	Pest Management	10	Crop
	645	Upland Wildlife Habitat Management	9	Crop
051302060705	328	Conservation Crop Rotation	10	Crop
	329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	2	Crop
	342	Critical Area Planting	2	Crop
	344	Residue Management, Seasonal	4	Crop
	362	Diversion	2	Crop
	412	Grassed Waterway	2	Crop
	511	Forage Harvest Management	3	Pasture (1) Wildlife (2)
	516	Pipeline	2	Pasture
	528	Prescribed Grazing	17	Pasture
	590	Nutrient Management	31	Crop (17) Pasture (14)
	595	Pest Management	31	Crop (17) Pasture (14)
	614	Watering Facility	3	Pasture
	645	Upland Wildlife Habitat Management	16	Forest
	666	Forest Stand Improvement	16	Forest

Table A5-2i.

Tables A5-2a-i. Best Management Practices Installed in Partnership with NRCS (2006-2007) in the Tennessee Portion of the Red River Watershed. *Information was provided as part of Conservation Technical Assistance Grant 060701T47.*

COMMUNITY	AWARD DATE	AWARD AMOUNT
GREENBRIER	05/16/90	$ 877,000
GREENBRIER	12/13/99	$ 1,694,700
GREENBRIER	01/23/01	$ 80,000
PORTLAND	10/14/97	$ 245,600
PORTLAND	06/28/99	$ 4,619,000
PORTLAND	12/18/95	$ 419,972
RIDGETOP	10/14/97	$ 615,000
RIDGETOP	03/25/98	$ 1,348,665
SPRINGFIELD	12/18/95	$ 1,607,000
WHITE HOUSE	08/09/01	$ 3,608,000
CLARKSVILLE	10/14/97	$ 37,000,000
CLARKSVILLE	05/16/90	$ 13,500,000

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

COMMUNITY	AWARD DATE	AWARD AMOUNT
CLARKSVILLE	06/04/02	$ 5,200,000
CLARKSVILLE	06/04/02	$ 1,500,000

Table A5-2b. Communities in the Tennessee Portion of the Red River Watershed that have received Drinking Water State Revolving Fund Grants or Loans since the inception of the program.

PRACTICE	NRCS CODE	NUMBER OF BMPs
Sinkhole Protection	0	1
Waste Management System	312	1
Critical Area Planting	342	6
Diversion	362	6
Pond	378	19
Fence	382	14
Field Border	386	2
Riparian Buffer	391	6
Filter Strip	393	1
Grade Stabilization Structure	410	7
Grassed Waterway	412	20
Land Smoothing	466	1
Pasture/Hay Planting	512	87
Pipeline	516	14
Access Road	560	4
Heavy Use Area	561	21
Spring Development	574	1
Stream Crossing	578	3
Streambank Protection	580	11
Stream Channel Stability	584	7
Surface Drain Filed Ditch	607	7
Tree Planting	612	3
Watering Facility	614	9
Water/Sediment Control Basin	638	1
TOTAL BMPs	**-**	**252**

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