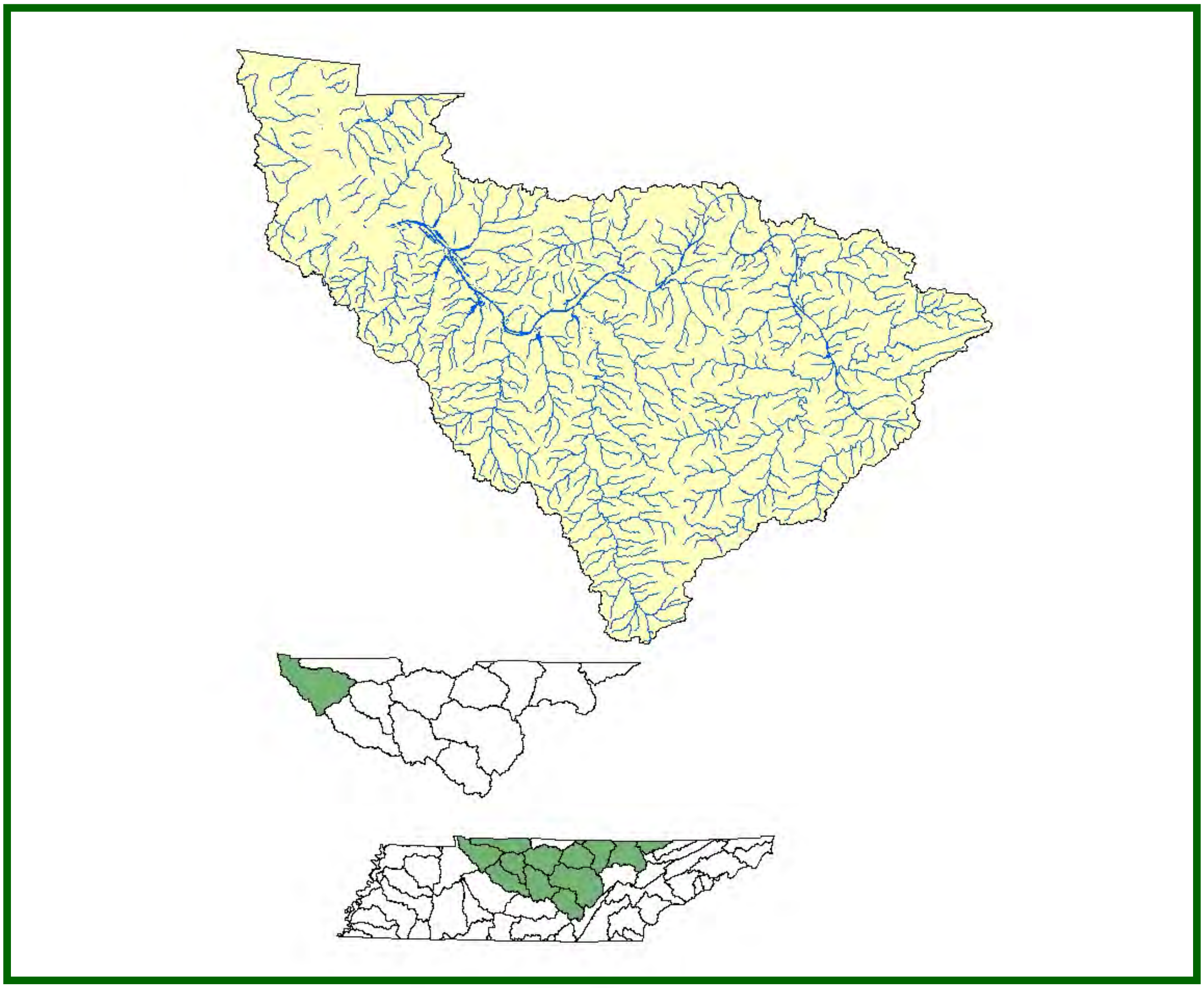
LAKE BARKLEY WATERSHED (05130205) OF THE CUMBERLAND RIVER BASIN

WATERSHED WATER QUALITY MANAGEMENT PLAN



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

LAKE BARKLEY 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 – Lake Barkley Watershed (05130205)

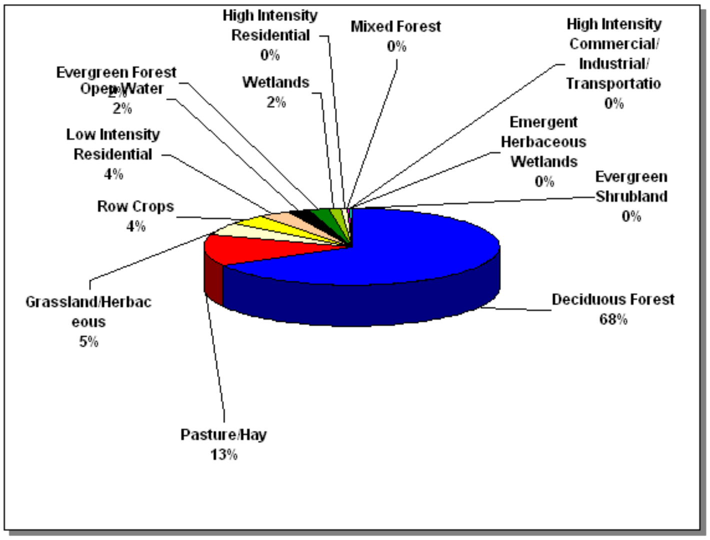
In 1996, the Tennessee Department of Environment and Conservation Division of Water Pollution Control adopted a watershed approach to water quality. This approach is based on the idea that many water quality problems, like the accumulation of point and nonpoint pollutants, are best addressed at the watershed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

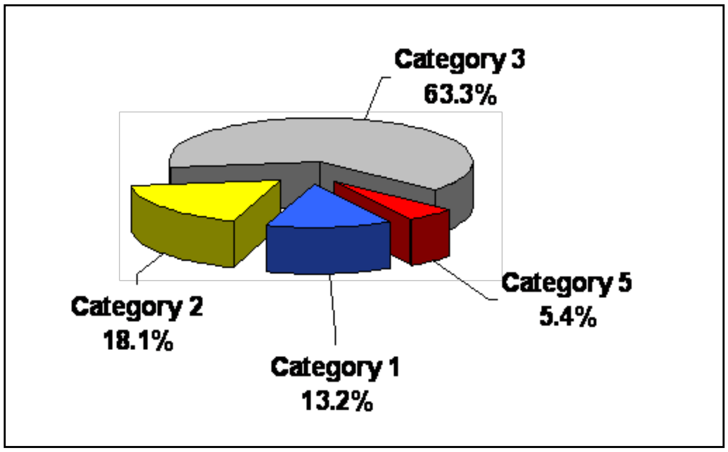
A detailed description of the watershed can be found in Chapter 2. The Lake Barkley Watershed is approximately 2,343 square miles (982 mi^2 in Tennessee) and includes parts of six counties. A part of the Cumberland River drainage basin, the watershed has 1,258.4 stream miles and 27,000 lake acres in Tennessee.

Seven wildlife management areas, six recreation areas, one state forest, one designated state natural area, one national wildlife refuge, one national military park, and two streams listed in the National Rivers Inventory are located in the watershed. Seventy-two rare plant and animal species have been documented in the Tennessee portion of the watershed, including two rare fish species and two rare crustacean species.



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

A review of water quality sampling and assessment is presented in Chapter 3. Using the Watershed Approach to Water Quality, 352 sampling events occurred in the Tennessee portion of the Lake Barkley Watershed in 2000-2005. These were conducted at ambient, ecoregion or watershed monitoring sites. Monitoring results support the conclusion that 85.3% of stream miles assessed fully support one or more designated uses.



Water Quality Assessment of Streams and Rivers in the Tennessee Portion of the Lake Barkley Watershed.. Assessment data are based on the 2006 Water Quality Assessment of 1,258.4 stream miles in the Tennessee portion of the watershed.

Also in Chapter 3, a series of maps illustrates overall use support in the watershed, as well as use support for the individual uses of Fish and Aquatic Life Support, Recreation, Irrigation, and Livestock Watering and Wildlife. Additional maps illustrate streams that are listed for impairment by specific causes (siltation, nutrients, E. coli).Point and Nonpoint Sources are addressed in Chapter 4 which is organized by HUC-12 subwatersheds. Maps illustrating the locations of STORET monitoring sites and stream gauging stations are also presented in each subwatershed.

HUC-8	HUC-10	HUC-12
05130205	0513020501	051302050101 Cumberland River
		051302050102 Half Pone Creek
		051302050103 Cumberland River
		051302050104 Big McAdoo Creek
		051302050105 Cumberland River
		051302050106 Budds Creek
		051302050107 Blooming Grove Creek
	0513020502	051302050201 Bartons Creek, Upper
		051302050202 Furnace Creek
		051302050203 Bartons Creek, Lower
		051302050204 Louise Creek
	0513020503	051302050301 Yellow Creek, Upper
		051302050302 Yellow Creek, Lower
		051302050303 East Fork Yellow Creek
	0513020504	051302050401 Cumberland River
		051302050402 Guices Creek
		051302050403 Wells Creek
		051302050404 Cumberland River
		051302050405 Cumberland River
		051302050406 Cumberland River
		051302050407 Saline Creek
		051302050408 Lake Barkley

The Tennessee Portion of the Lake Barkley Watershed is Composed of twenty-two USGS-Delineated Subwatersheds (12-Digit Subwatersheds).

Point source contributions to the Lake Barkley Watershed consist of 13 individual NPDES-permitted facilities. Other permits in the watershed (as of October 20, 2008) are Mining Permits (1), Aquatic Resource Alteration Permits (46), Tennessee Multi-Sector Permits (25), Construction General Permits (44), Water Treatment Plant Permits (5), CAFO Permits (1), and Ready Mix Concrete Plant Permits (2). Agricultural operations include cattle, chicken, hog, and sheep farming. Maps illustrating the locations of permit sites and tables summarizing livestock practices are presented in each subwatershed.

Chapter 5 is entitled *Water Quality Partnerships in the Lake Barkley 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, U.S. Corps of Engineers) and state agencies (TDEC/State Revolving Fund, TDEC Division of Water Supply, Tennessee Department of Agriculture, Tennessee Wildlife Resources Agency, and Kentucky Division of Water). Local initiatives of organizations active in the watershed (Cumberland River Compact, Five Rivers RC and D Council) are also described.

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

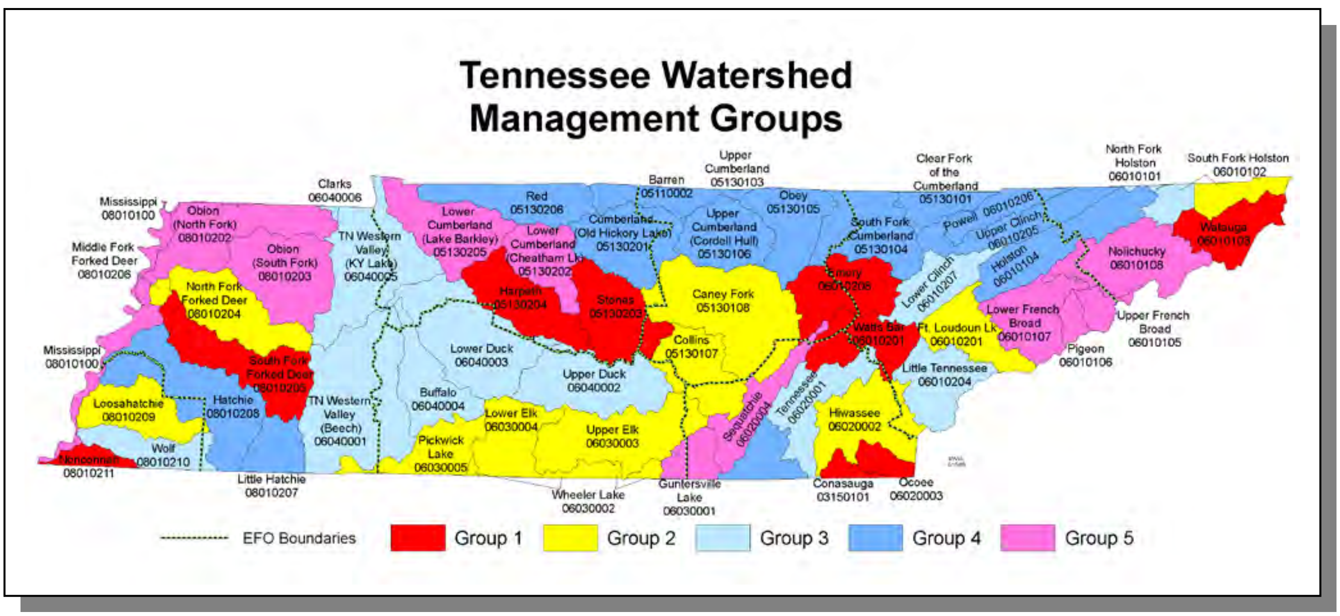


Figure 1-1. Watershed Groups in Tennessee's Watershed Approach to Water Quality.

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.

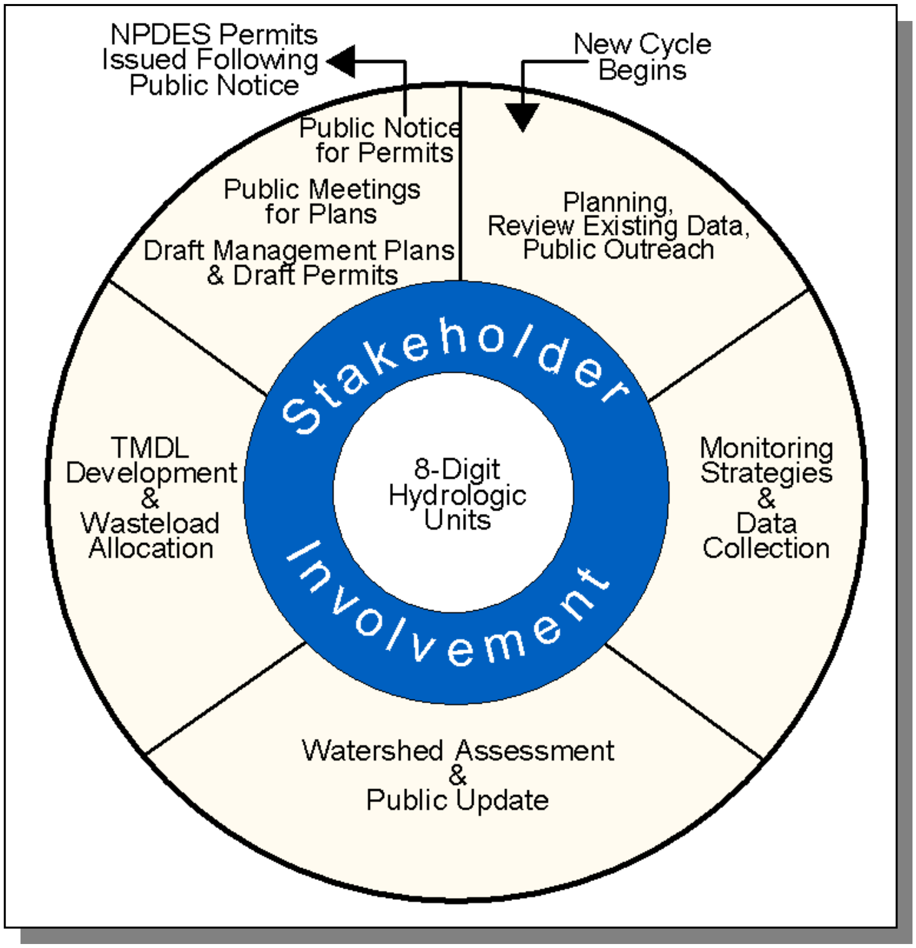


Figure 1-2. The Watershed Approach Cycle.

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 LAKE BARKLEY WATERSHED

2.1. BACKGROUND. Lake Barkley is the westernmost U.S. Army Corp of Engineers project in a series of dams along the Cumberland River, and is surrounded by 1,004 miles of shoreline. Lake Barkley was named for former Vice-President Alben Barkley. Land Between the Lakes (US Forest Service) and Fort Donelson National Military Park are on Lake Barkley's western shore.

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

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. The Lake Barkley Watershed is located in the northwestern section of Middle Tennessee and includes parts of Cheatham, Dickson, Houston, Montgomery, Robertson, and Stewart Counties.

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

COUNTY	% OF WATERSHED IN EACH COUNTY
Montgomery	31.52
Stewart	31.29
Dickson	20.29
Houston	10.74
Cheatham	6.11
Robertson	0.05

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

2.2.B. Population Density Centers. Twelve highways serve the major communities in the Tennessee Portion of the Lake Barkley Watershed.

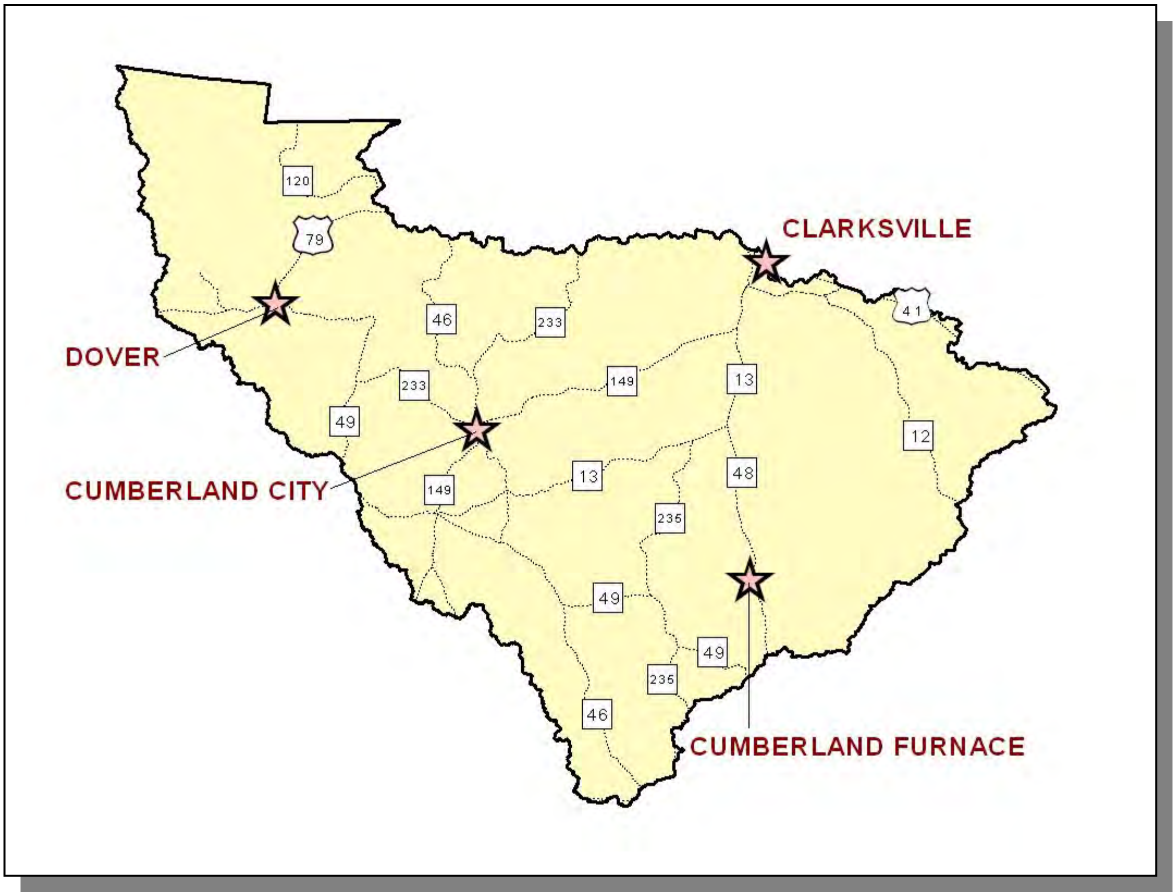


Figure 2-2. Communities and Roads in the Tennessee Portion of the Lake Barkley Watershed.

MUNICIPALITY	POPULATION	COUNTY
Clarksville*	103,455	Montgomery
Dover*	1442	Stewart
Cumberland City	316	Stewart
Cumberland Furnace	150	Stewart

Table 2-2. Municipalities in the Tennessee Portion of the Lake Barkley 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 Lake Barkley Watershed, designated 05130205 by the USGS, is approximately 2,343 square miles (982 square miles in Tennessee) and drains to the Cumberland River.

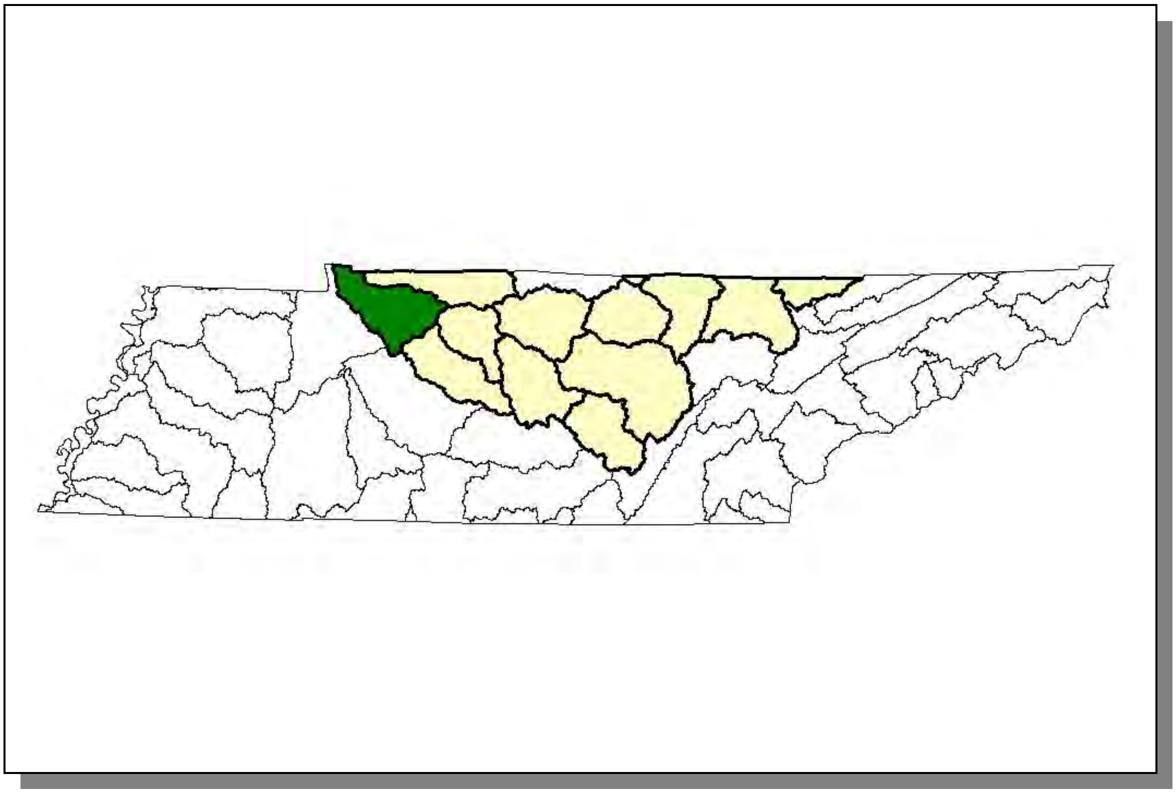


Figure 2-3. The Lake Barkley Watershed is Part of the Cumberland River Basin.

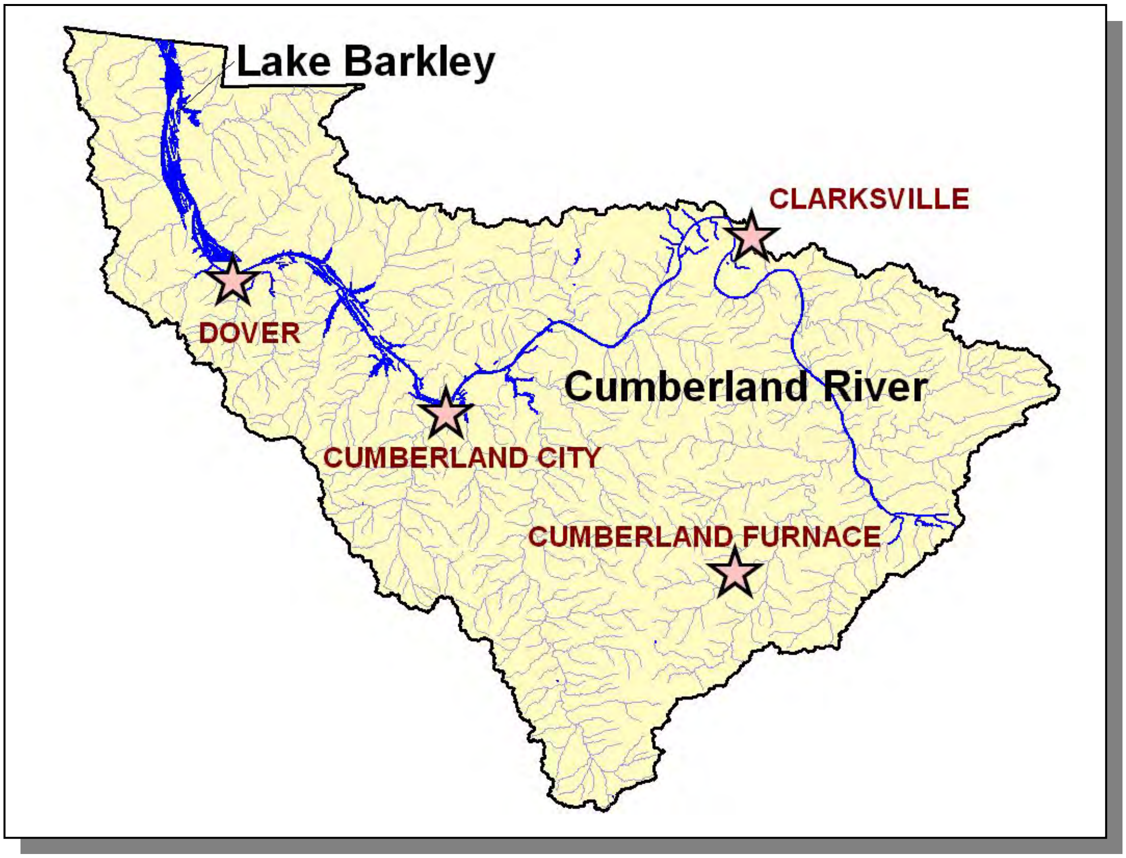


Figure 2-4. Hydrology in the Tennessee Portion of the Lake Barkley Watershed. *There are 1,258.4 stream miles and 37,000 lake acres recorded in River Reach File 3 in the Tennessee Portion of the Lake Barkley Watershed. Location of the Cumberland River including Lake Barkley, and the cities of Clarksville, Cumberland City, Cumberland Furnace, and Dover are shown for reference.*

2.3.B. Dams. There are 9 dams inventoried by TDEC Division of Water Supply in the Tennessee Portion of the Lake Barkley Watershed. These dams either retain 30 acre-feet of water or have structures at least 20 feet high.

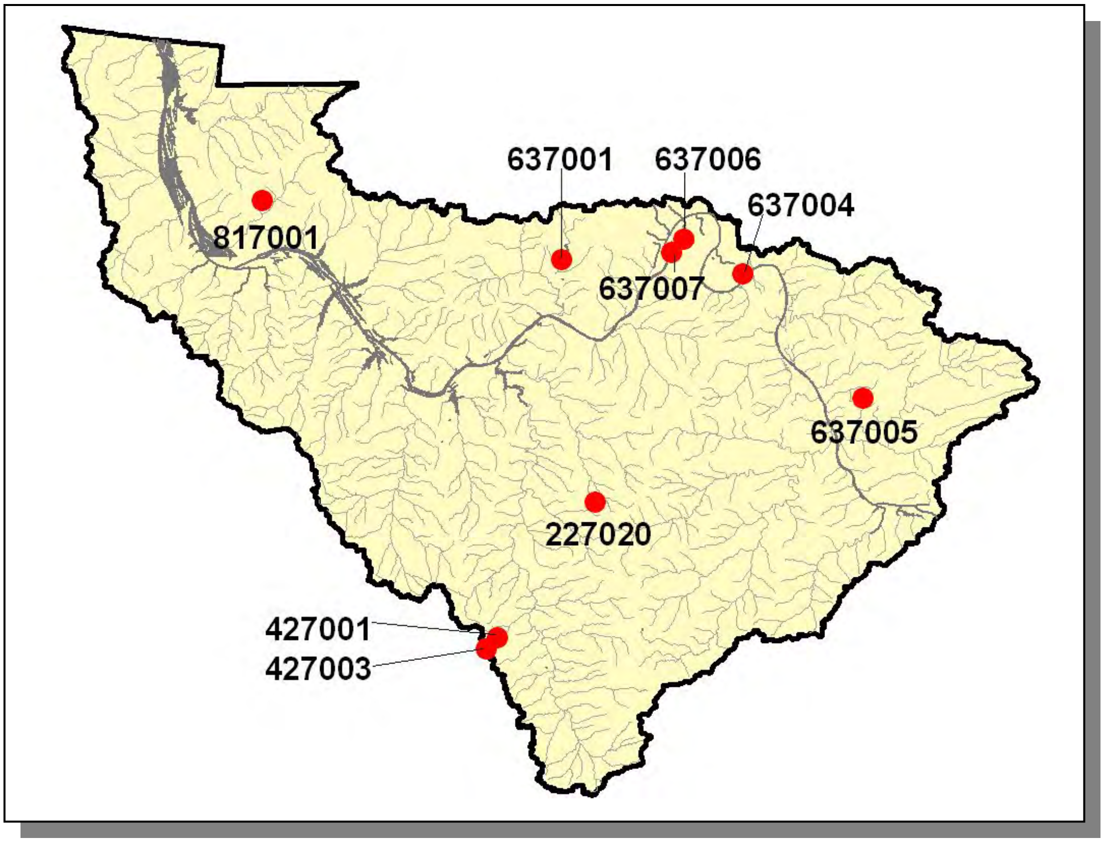


Figure 2-5. Location of Inventoried Dams in the Tennessee Portion of the Lake Barkley Watershed. *More information, including identification of inventoried dams labeled, is provided in Appendix II and at http://gwidc.memphis.edu/website/dams/viewer.htm.*

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

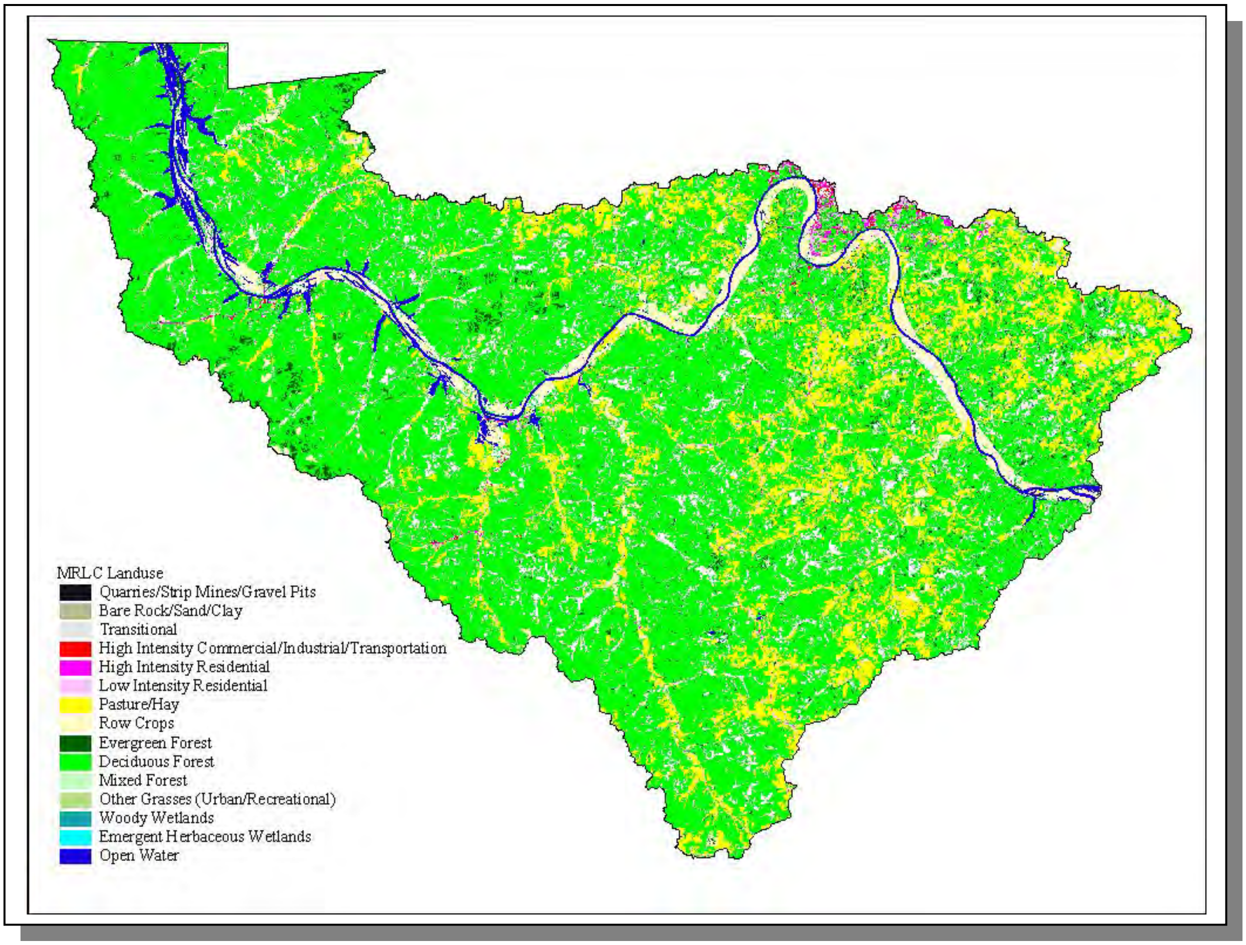


Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery.

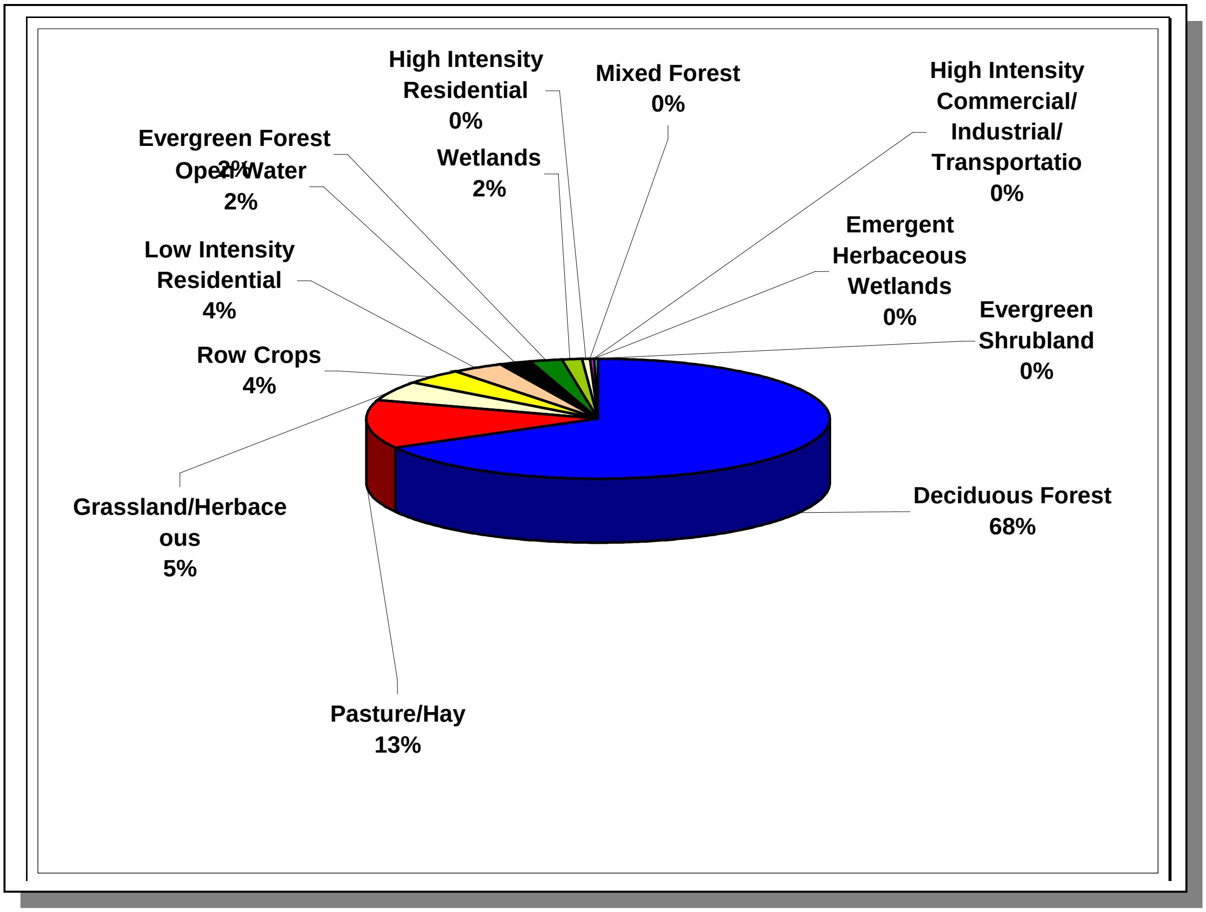


Figure 2-7. Land Use Distribution in the Tennessee Portion of the Lake Barkley Watershed. *More information is provided in Appendix II.*

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.

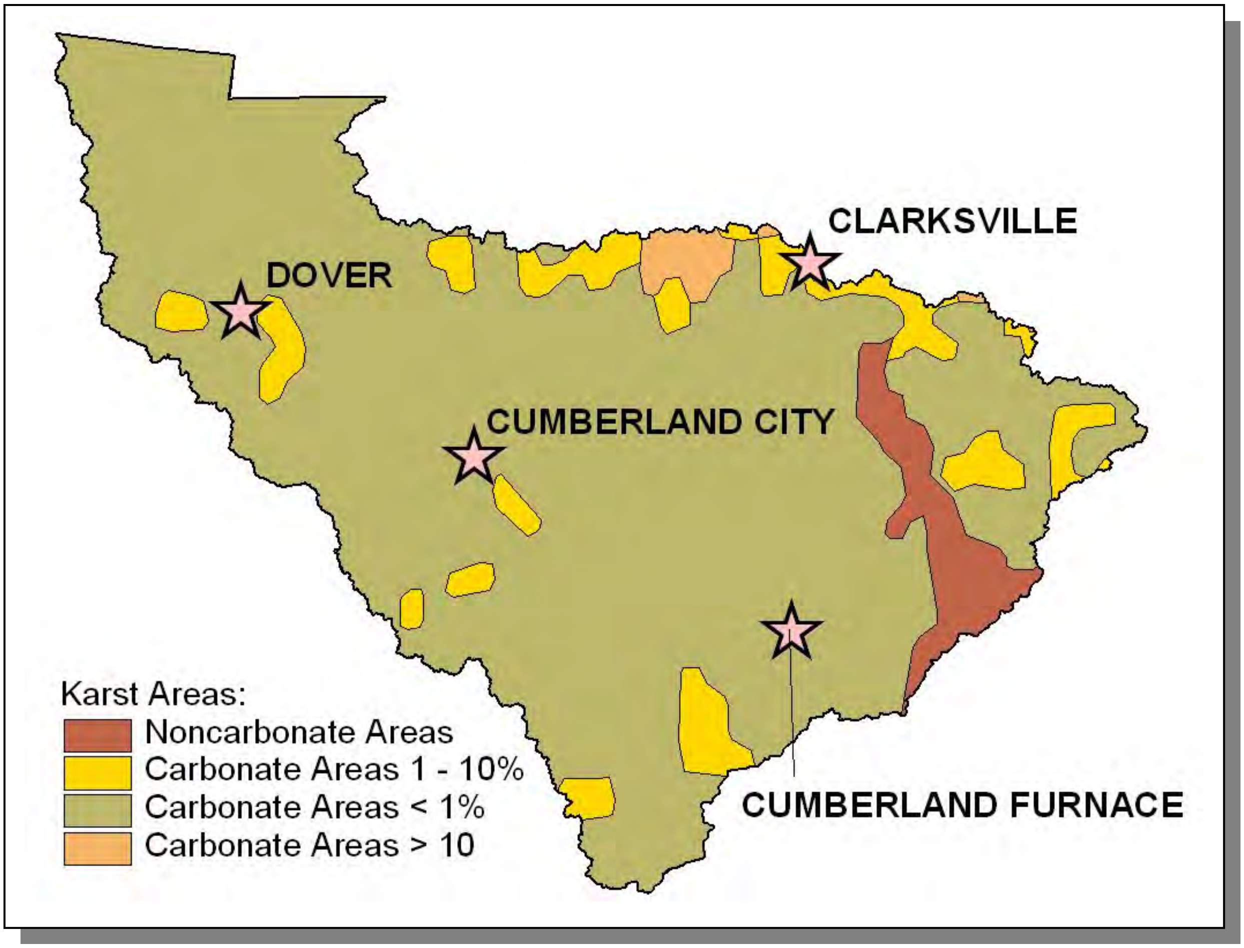


Figure 2-8. Illustration of Karst Areas in the Tennessee Portion of the Lake Barkley Watershed. *Locations of communities in the watershed are shown for reference.*

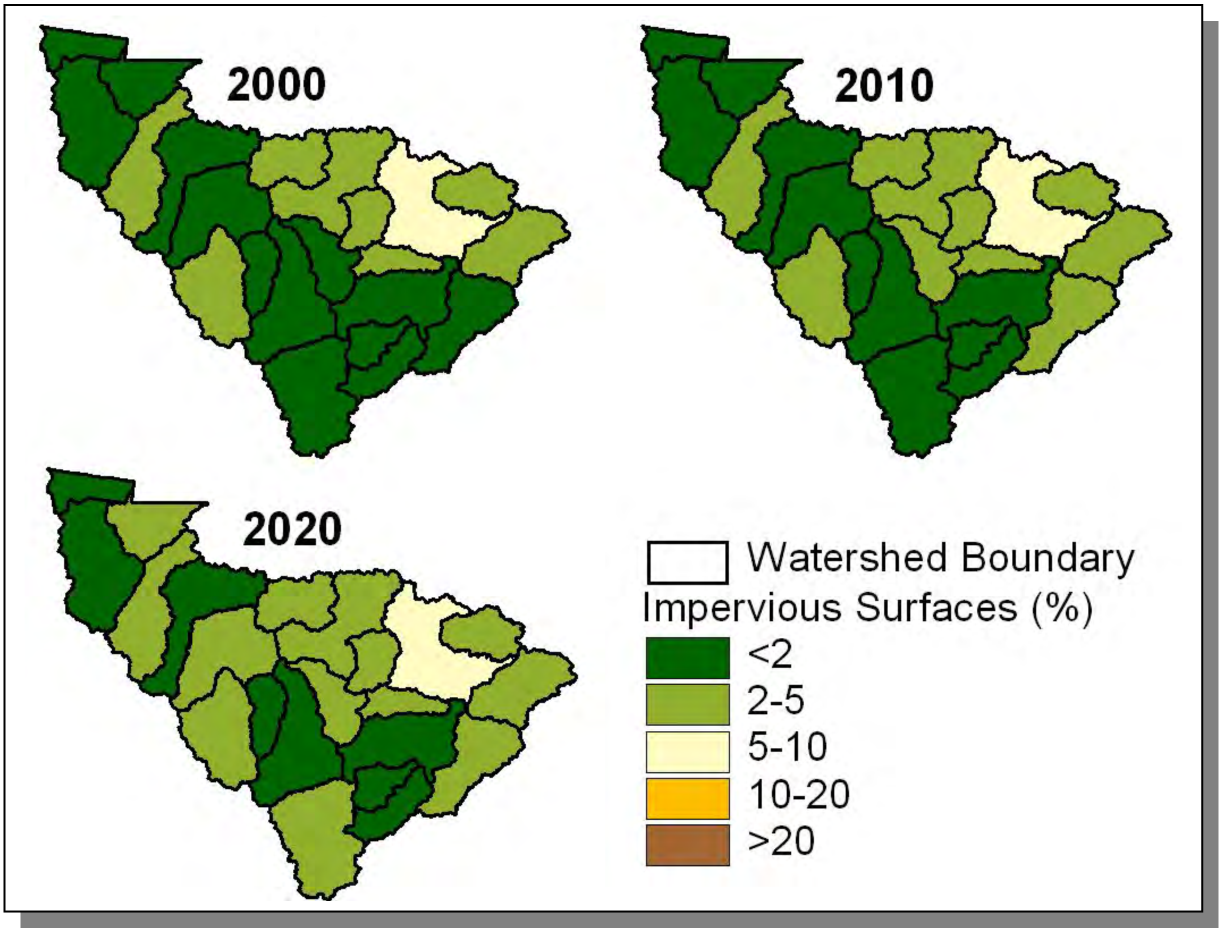


Figure 2-9. Illustration of Total Impervious Area in the Tennessee Portion of the Lake Barkley Watershed. *All HUC-12 subwatersheds are shown. Current estimates and projected total impervious cover calculated by HUC-12 are provided by EPA Region 4. More information can be found at: http://www.epa.gov/ATHENS/research/impervious/.*

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

There are eight Level III Ecoregions and twenty-five Level IV subecoregions in Tennessee. The Tennessee Portion of the Lake Barkley Watershed lies within 1 Level III ecoregion (Interior Plateau) and contains 2 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 to 1000 feet. The geologic base of Mississippian-age limestone, chert, and shale is covered by soils that tend to be cherty, acidic 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 areas between streams and in the stream and river valleys: mostly hay, pasture, and cattle, with some cultivation of corn and tobacco.

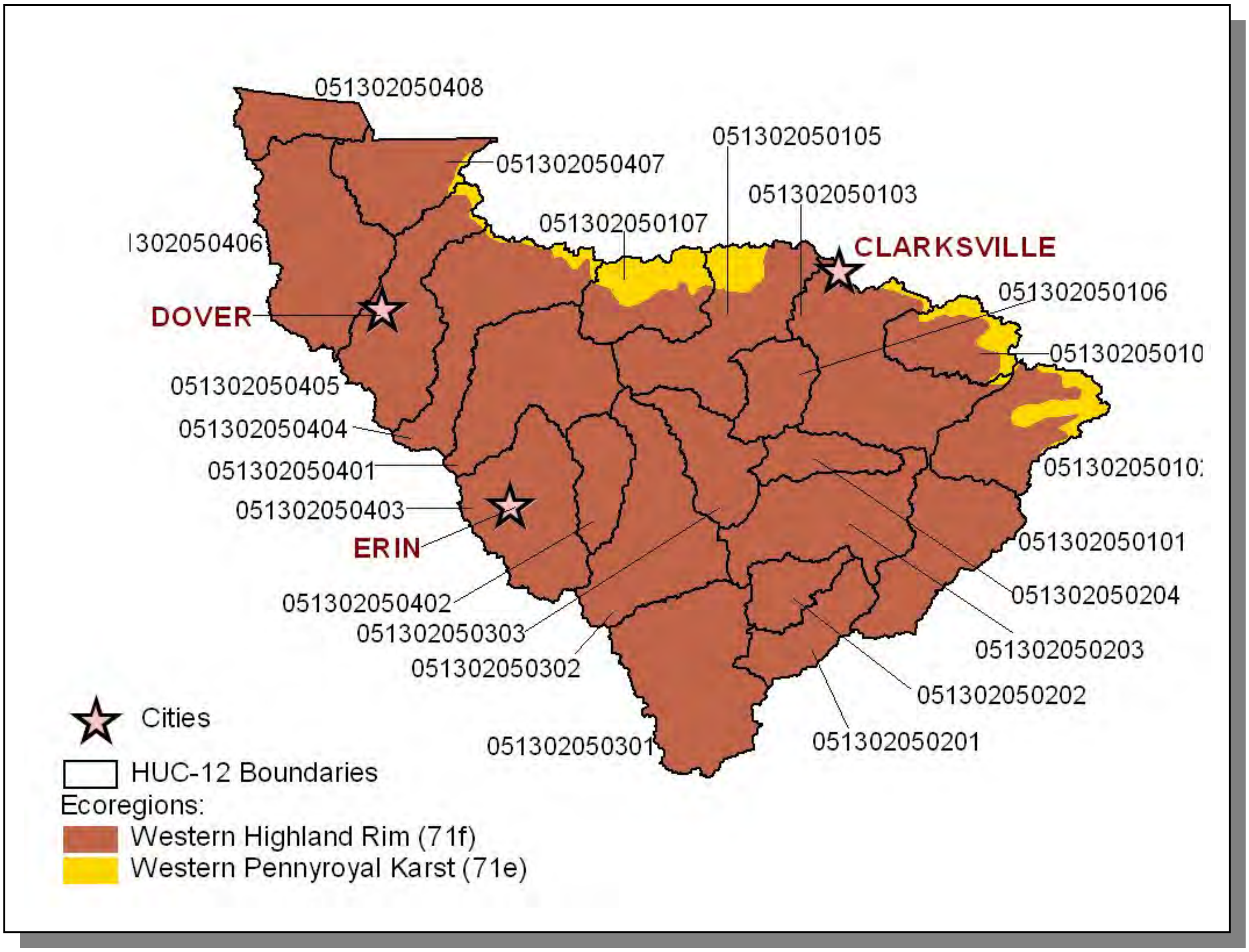


Figure 2-10. Level IV Ecoregions in the Tennessee Portion of the Lake Barkley Watershed. *HUC-12 subwatershed boundaries and locations of Clarksville, Dover, and Erin are shown for reference.*

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

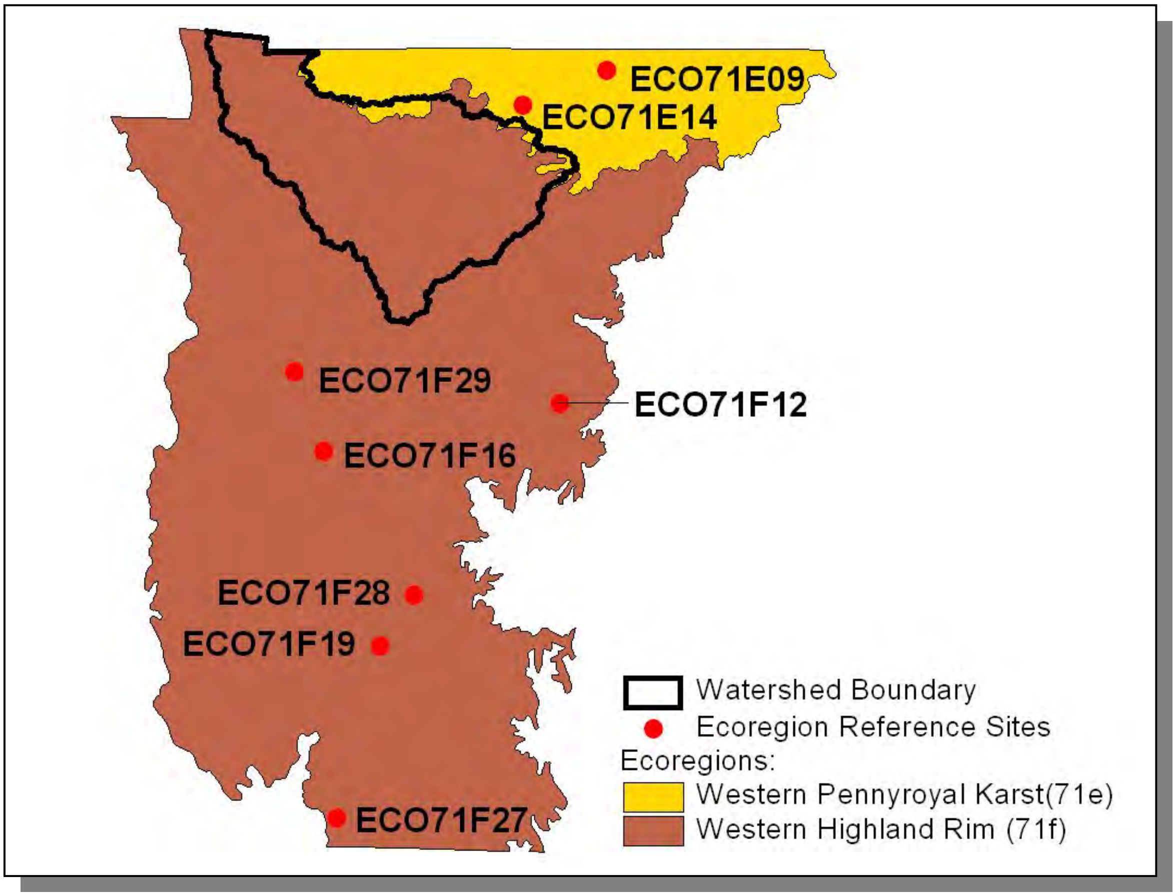


Figure 2-11. Ecoregion Monitoring Sites in Level IV Ecoregions 71e and 71f. *The Lake Barkley Watershed is shown for reference. More information, including which ecoregion reference sites were inactive or dropped prior to 06/01/2006, is provided in Appendix II.*

2.6. NATURAL RESOURCES.

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

The Tennessee Portion of the Lake Barkley Watershed has one Designated State Natural Area:

> **Barnett's Woods** is a 40-acre natural area in Montgomery County located approximately sixteen miles west of Clarksville on the Western Highland Rim. It is owned by The Nature Conservancy and was acquired in 1981. It is most significant because it supports a population of the federally listed Price's potato bean (*Apios priceana*) and because federally endangered Indiana bats (*Myotis sodalis*) have also been known to use Foster Cave (Barnett's Cave) as a temporary roost while moving from breeding to hibernation. Barnett's Woods is also noteworthy because it is floristically diverse for its size with 443 vascular plant species present representing 95 plant families. It is a favorite place for Austin Peay State University students and faculty to botanize because of its floristic significance and close proximity to Clarksville.

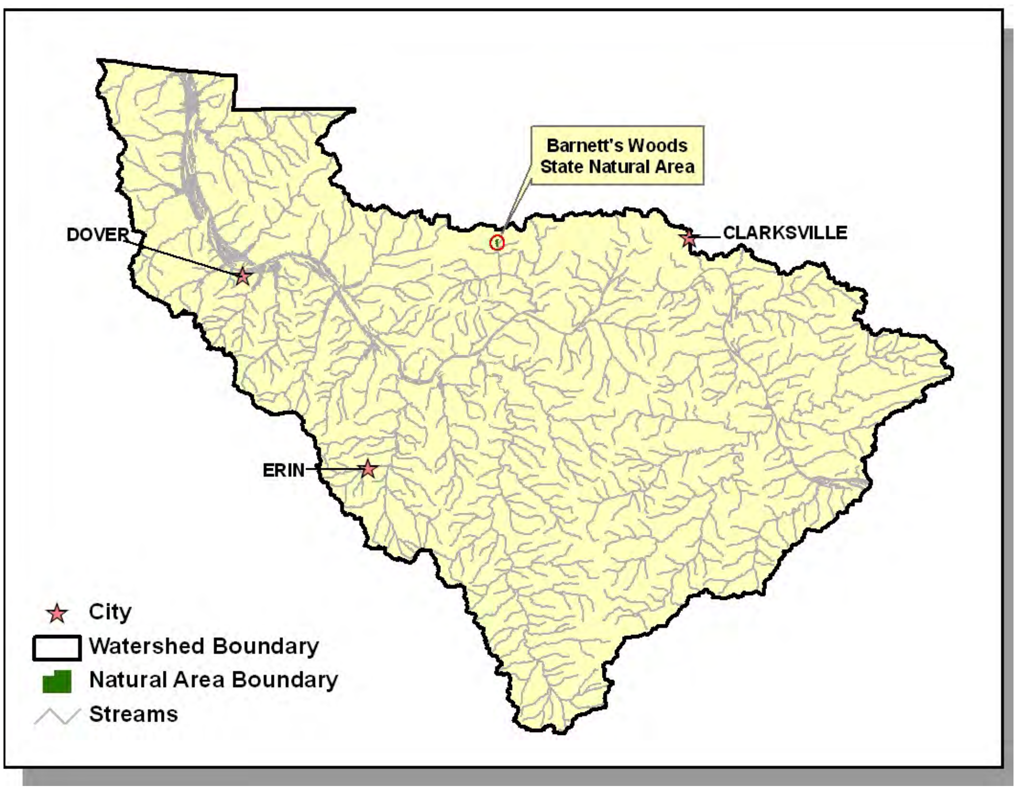


Figure 2-12. There is One Designated State Natural Area in the Tennessee Portion of the Lake Barkley Watershed.

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

GROUPING	**NUMBER OF RARE SPECIES**
Crustaceans	2
Insects	5
Snails	1
Amphibians	1
Birds	6
Fish	2
Mammals	6
Reptiles	5
Plants	44
Total	**72**

Table 2-3. There are 72 Known Rare Plant and Animal Species in the Tennessee Portion of the Lake Barkley Watershed.

In the Tennessee Portion of the Lake Barkley Watershed, there are one known rare amphibian species, two known rare crustacean species, two known rare fish species, and one known rare reptile species.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
Cryptobranchus alleganiensis	Hellbender		D
Cambarus brachydactylus	Crayfish		
Orconectes pellucidus	Eyeless Crayfish		
Cycleptus elongatus	Blue Sucker		T
Typhlichthys subterraneus	Southern Cavefish		D
Macroclemys temminckii	Alligator Snapping Turtle		D

Table 2-4. Rare Aquatic Species in the Tennessee Portion of the Lake Barkley Watershed. *Federal Status: LE, Listed Endangered by the U.S. Fish and Wildlife Service. State Status: T, Listed Threatened by the Tennessee Wildlife Resources Agency; E, Listed Endangered by the Tennessee Wildlife Resources Agency; D, Deemed in Need of Management by the Tennessee Wildlife Resources Agency. More information may be found at http://www.state.tn.us/environment/na/.*

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

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

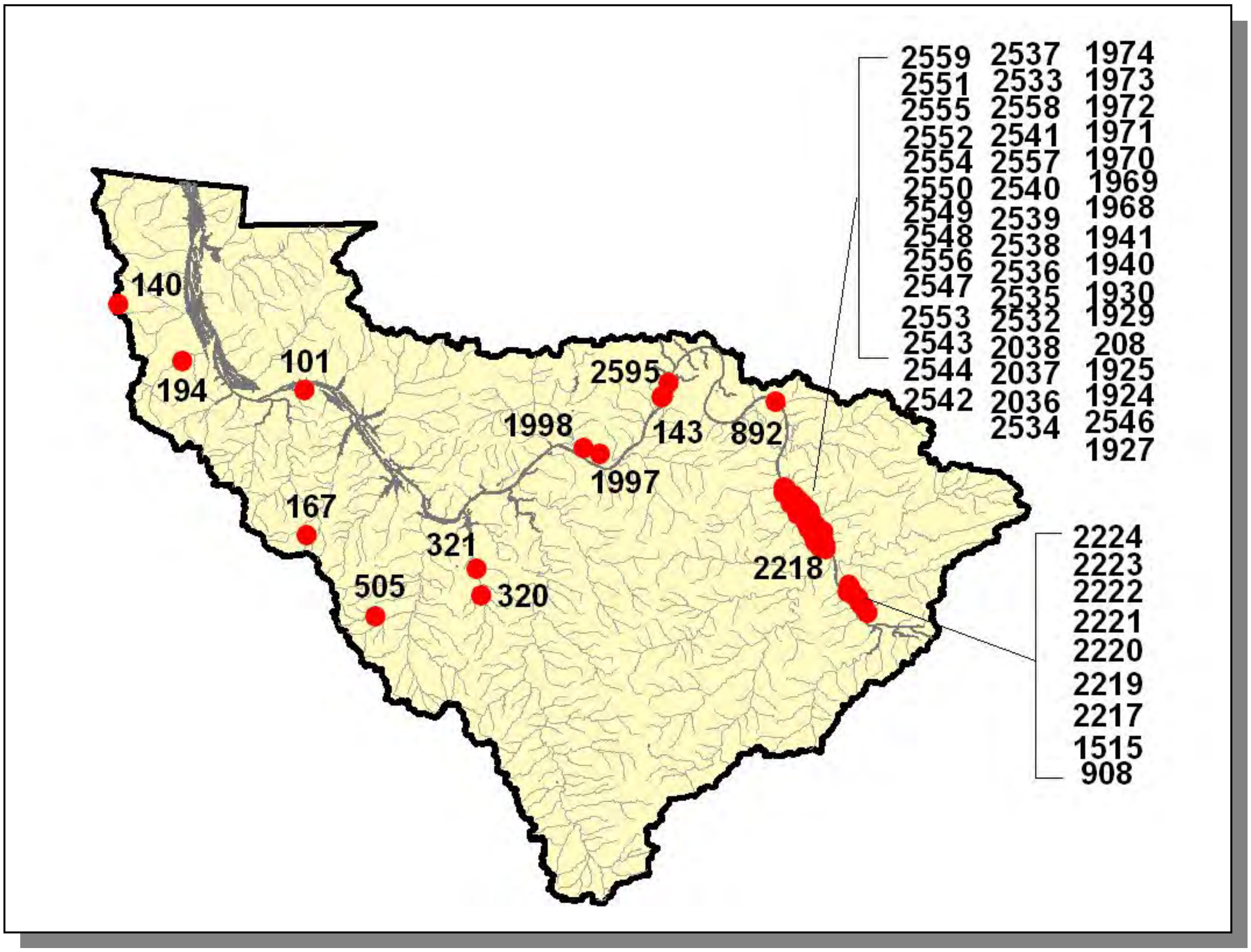


Figure 2-13. Location of Wetland Sites in TDEC Division of Natural Areas Database in the Tennessee Portion of the Lake Barkley Watershed. This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands. *There may be additional wetland sites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

2.7. CULTURAL RESOURCES.

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

The most recent version of the Nationwide Rivers Inventory lists portions of two streams in the Tennessee Portion of the Lake Barkley Watershed:

Long Creek (RM 0 to RM 10) is a scenic stream that supports game fishery.

Yellow Creek (RM 5 to RM 13) is a scenic and recreational stream that supports game fishery.

RIVER	SCENIC	RECREATION	FISH
Long Creek	X	X	X
Yellow Creek	X	X	X

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

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

2.7.B. Public Lands. Some sites representative of the cultural heritage in the Tennessee portion of the Lake Barkley Watershed are under state or federal protection:

- Barkley Wildlife Management Area is managed by the Tennessee Wildlife Resources Agency (TWRA). More information may be found at: http://www.state.tn.us/twra/

- Bumpus Mills Marina and Recreation Area is managed by the U.S. Army Corps of Engineers (USACOE). More information may be found at: http://www.lrn.usace.army.mil/op/bar/rec/marinas.htm

- Cheatham Reservoir Wildlife Management Area is a 1,988-acre tract on the Cheatham Reervoir and is managed by the TWRA. More information may be found at: http://www.state.tn.us/twra/gis/region2maps.html

- Cross Creeks National Wildlife Refuge is an 8,862-acre site along the Cumberland River in Stewart County, Tennessee. More information may be found at: http://www.fws.gov/crosscreeks/

- Dyers Creek Recreation Area is an 87-acre site managed by the USACOE. It is located on Lake Barkley in Montgomery County, Tennessee. More information may be found at: http://www.lrn.usace.army.mil/op/bar/rec/recreation.htm

- Fort Campbell Military Reservation & WMA's 85,000 acres are managed by the U.S. Army and are located in both Tennessee and Kentucky. More information may be found at: http://www.kdfwr.state.ky.us/kfwis/arcims/wma.asp?strID=9076

- Fort Donelson National Military Park memorializes a key Civil War battle in 1862, and comprises 572-acres. More information may be found at: http://www.explorekentuckylake.com/stewart/attractions/attractions.htm

- Guices Creek Recreation Area is a 230-acre site managed by the U.S. Army Corps of Engineers (USACOE). It is located on Lake Barkley in Montgomery County, Tennessee. More information may be found at: http://www.lrn.usace.army.mil/op/bar/rec/recreation.htm

- Haynes Bottom Wildlife Management Area is managed by the TWRA and is located in Montgomery County. More information may be found at: http://state.tn.us/twra/

- Hickman Creek Recreation Area is a 251-acre site managed by the U.S. Army Corps of Engineers (USACOE). It is located on Lake Barkley in Montgomery County, Tennessee. More information may be found at: http://www.lrn.usace.army.mil/op/bar/rec/recreation.htm

- Land Between The Lakes Wildlife Management Area is a 170,000-acre site managed by the U.S. Forest Service (USFS). More information may be found at: http://www.lbl.org/AboutLBL.html

- Lick Creek Recreation Area is a 58-acre parcel of land managed by the U.S. Army Corp of Engineers and is located in Stewart County.

- Long Pond Wildlife Management Area is a 24-acre parcel of land managed by TWRA. More information may be found at: http://state.tn.us/twra/

- Pardue Pond Refuge and Dyson Ditch Refuge comprise 736 acres and are managed by TWRA. More information may be found at: http://www.state.tn.us/twra/

- River's Bend Recreation Area is an 84-acre site managed by the U.S. Army Corp of Engineers and is located in Stewart County.

- Saline Creek Access Area is a 72-acre site managed by the U.S. Army Corps of Engineers (USACOE). It is located on Lake Barkley in Montgomery County, Tennessee. More information may be found at: http://www.lrn.usace.army.mil/op/bar/rec/recreation.htm

- Shelton Ferry Wildlife Management area is located in Montgomery County and consists of 628 acres. It is managed by the TWRA. More information may be found at: http://www.state.tn.us/twra/

- Stewart State Forest is a 4,277-acre forest located in Stewart County, Tennessee and managed by the Tennessee Department of Agriculture, Division of Forestry. More information may be found at: http://www.state.tn.us/agriculture/forestry/stateforests/3.html

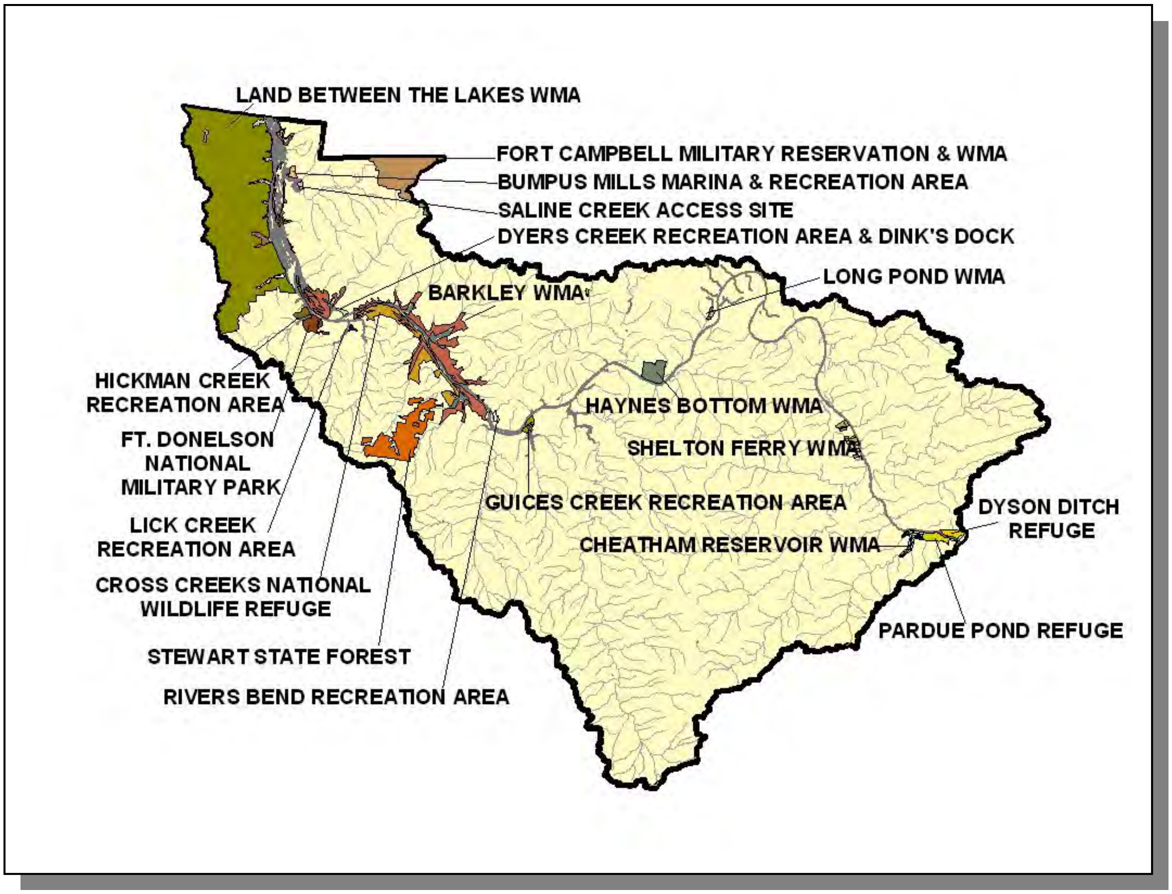


Figure 2-14. Public Lands in the Tennessee River Portion of the Lake Barkley River Watershed. *Data are from Tennessee Wildlife Resources Agency. WMA, Wildlife Management Area.*

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
Bartee Branch Creek	4			Honey Fork Creek	3		
Bear Creek	1			Johnson Creek	2	2	
Big Bartons Creek	1,2,3			Leatherwood Creek	3		
Big Elk Creek	2			Lee Creek		2	
Big McAdoo Creek	3			Lick Creek		3	
Blooming Grove Creek	2			Little Bartons Creek	2		
Budds Creek	4			Little McAdoo Creek	3		
Cumberland River	2,3	1,2		Long Creek	2		
Dry Fork Creek		2	1	Louise Creek	2		2
Dyers Creek	3		2	North Cross Creek	2		
East Fork Creek	2			Racoon Creek			
Furnace Creek	2			Saline Creek	3		2
Guices Creek	3			South Cross Creek	2		3
Half Pone Creek	3			Wells Creek	3		3
Hayes Fork Creek	3			Yellow Creek	3	2	1,2

Table 2-6. Tennessee Rivers Assessment Project Stream Scoring in the Lake Barkley 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 LAKE BARKLEY WATERSHED

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

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

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

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

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

1. Describe the water quality assessment process.

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

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

4. Provide detailed information on each watershed.

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

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

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

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

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

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

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

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

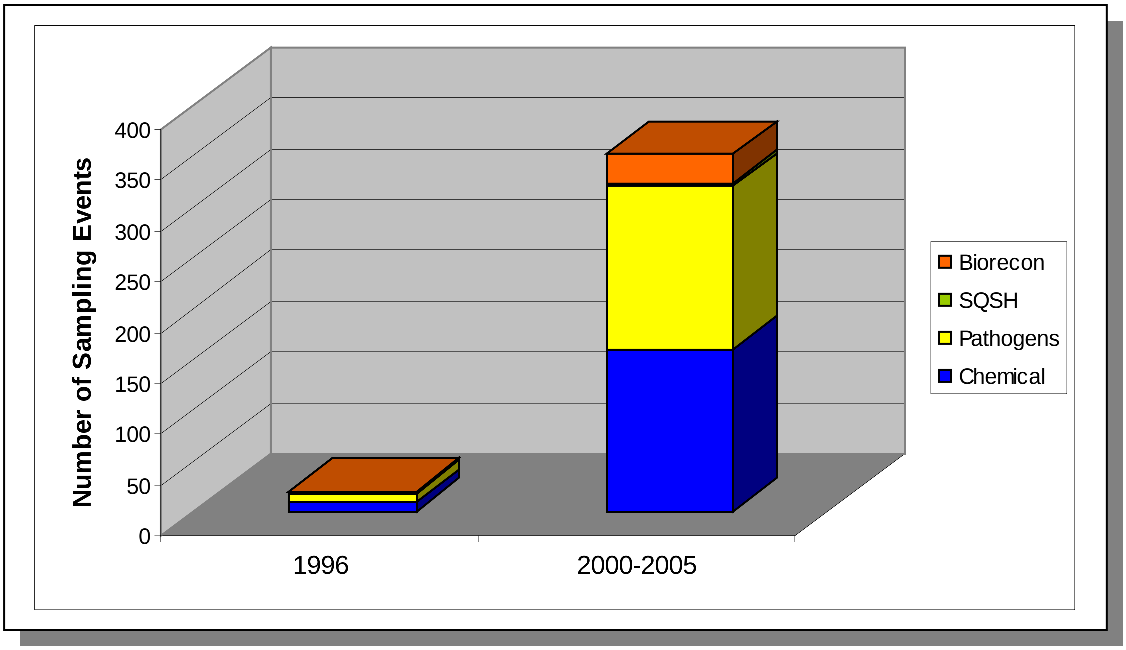


Figure 3-1. Number of Sampling Events Using the Traditional Approach (1996) and Watershed Approach (July 1, 2000 through June 30, 2005) in the Tennessee Portion of the Lake Barkley Watershed.

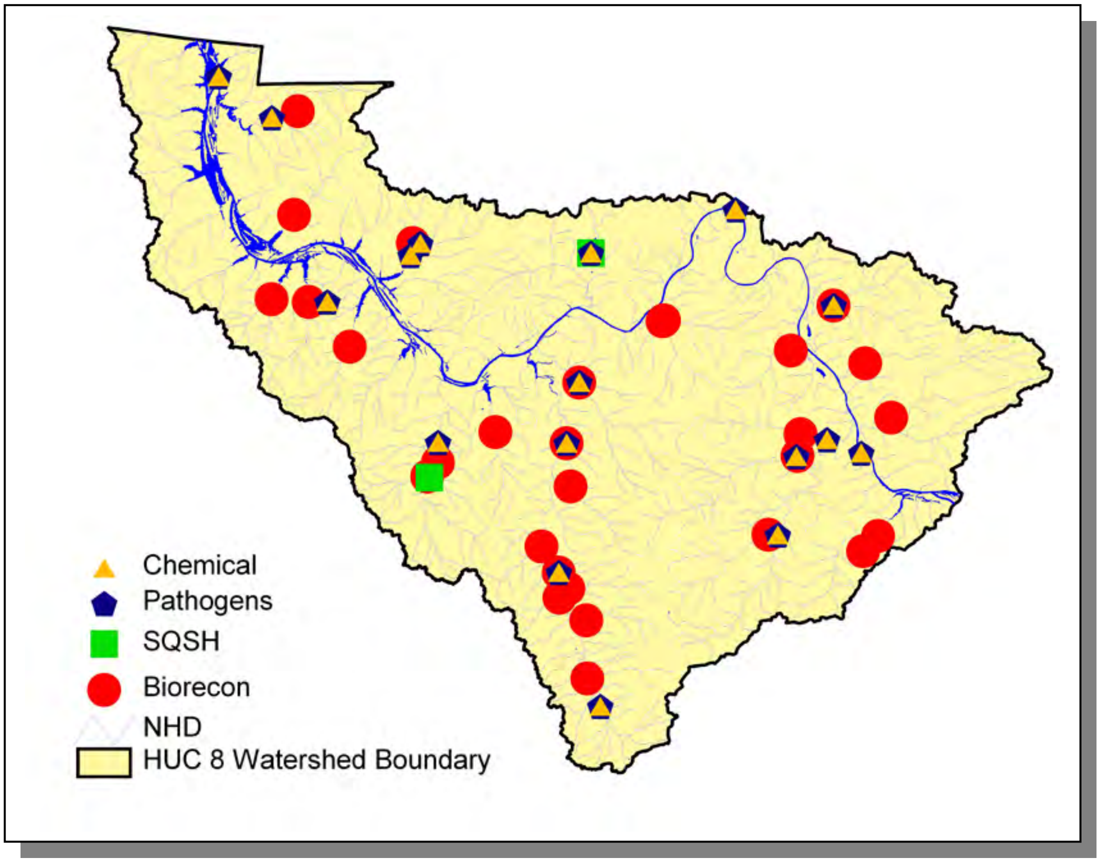


Figure 3-2. Location of Monitoring Sites in the Tennessee Portion of the Lake Barkley Watershed (July 1, 2000 through June 30, 2005). *Pathogens include E. coli and fecal coliform; NHD, National Hydrography Dataset of Streams; SQSH, Semi-Quantitative Single Habitat Assessment.*

	1996	2000-2005
Chemical	9	160
Pathogens	9	160
SQSH	2	3
Biorecon	0	29
Total	**20**	**352**

Table 3-1. Number of Sampling Events in the Tennessee Portion of the Lake Barkley Watershed in 1996 and in the last 5-Year Cycle (July 1, 2000 through June 30, 2005).

3.2.A. Ambient Monitoring Sites. These fixed-station chemical monitoring sites are sampled quarterly or monthly by the Environmental Field Office-Nashville staff (this is in addition to samples collected by water and wastewater treatment plant operators and MS4 permitees). 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 Lake Barkley 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 Lake Barkley Watershed lies within 1 Level III ecoregions (Interior Plateau) and contains 2 subecoregions (Level IV):

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

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.

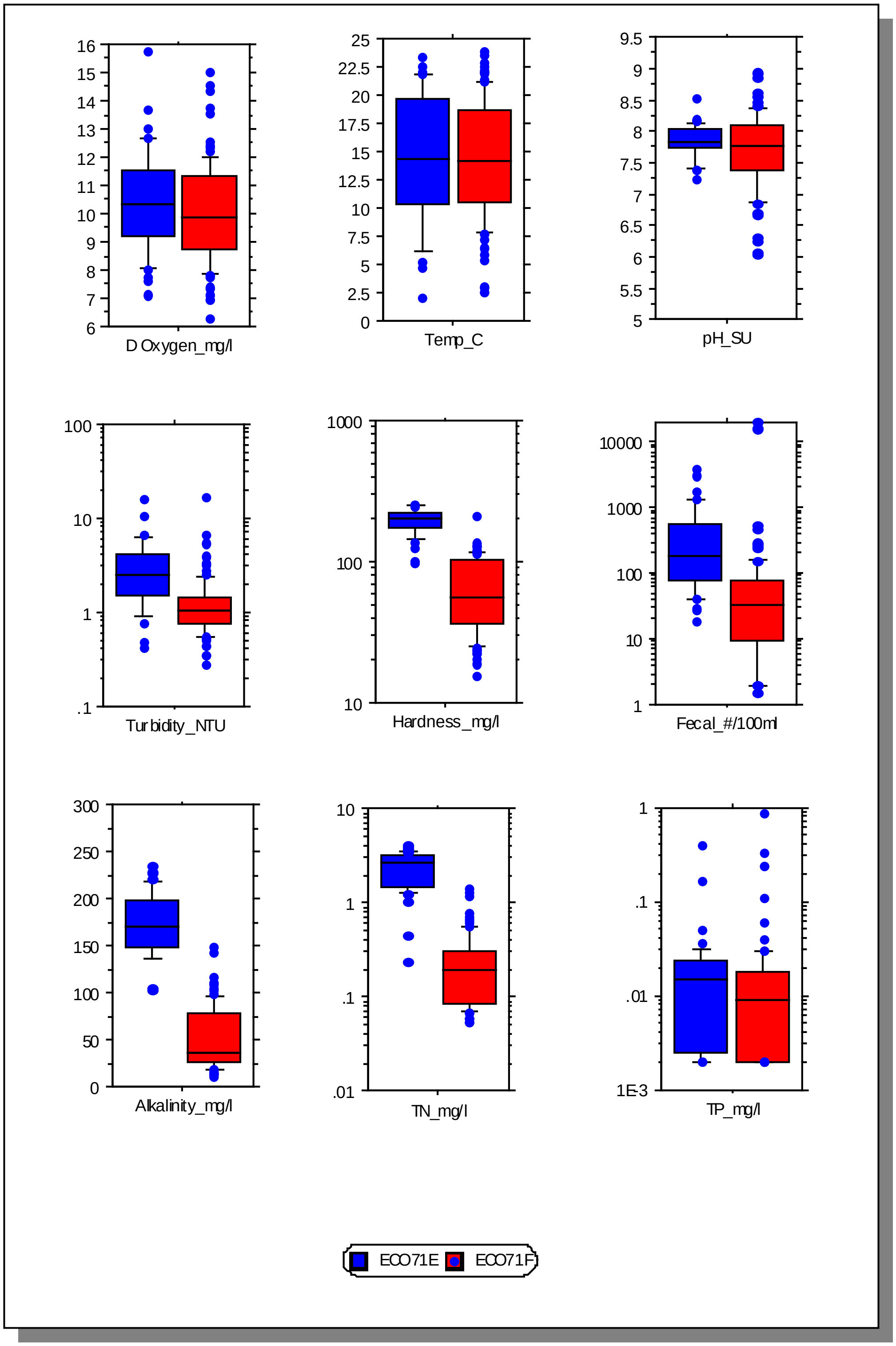


Figure 3-3. Select Chemical Data Collected in the Lake Barkley Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th percentiles. Extreme values are also shown as dots. Fecal, fecal coliform bacteria; TN, Total Nitrogen; TP, Total Phosphorus.*

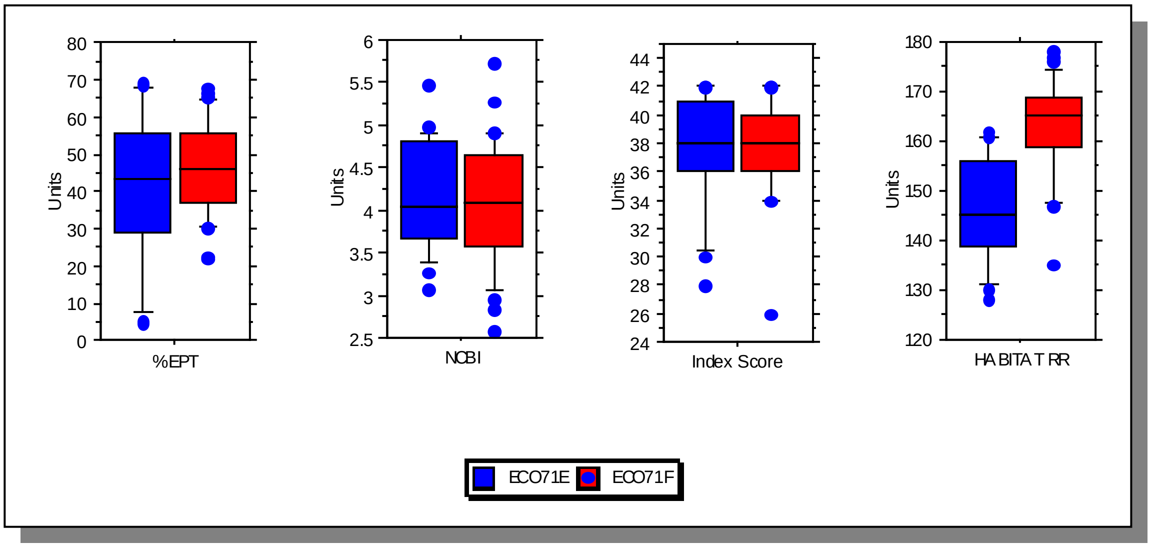


Figure 3-4. Benthic Macroinvertebrate and Habitat Scores for the Lake Barkley Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th percentiles. Extreme values are also shown as dots. NCBI, North Carolina Biotic Index. Index Score and Habitat Riffle/Run scoring system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

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

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

- The current 303(d) list,
- HUC-12 maps (every HUC-12 is considered for a BioRecon)
- Land Use/Land Cover maps
- Topographic maps
- Locations of NPDES facilities
- Sites of recent ARAP activities.

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

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

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

3.3. STATUS OF WATER QUALITY. Use support determinations, which can be classified as monitored or evaluated, are based on:

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

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

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

Category Assessment	Stream Miles	Reservoir Acres
Total	1,257.9	37,000
Assessed	461.5	37,000
Category 1	166.6	37,000
Category 2	227.6	0
Category 3	796.4	0
Category 4	0.0	0
Category 5	67.3	0

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

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

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

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

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

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

Category 4a impaired waters that have already had all necessary TMDLs approved by EPA.

Category 4b impaired waters do not require TMDL development since "other pollution control requirements required by local, State or Federal authority are expected to address all water-quality pollutants" (EPA, 2003). An example of a 4b stream might be where a discharge point will be moved in the near future to another waterbody with more assimilative capacity.

Category 4c impaired waters in which the impacts are not caused by a pollutant (e.g., certain habitat or flow alterations).

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

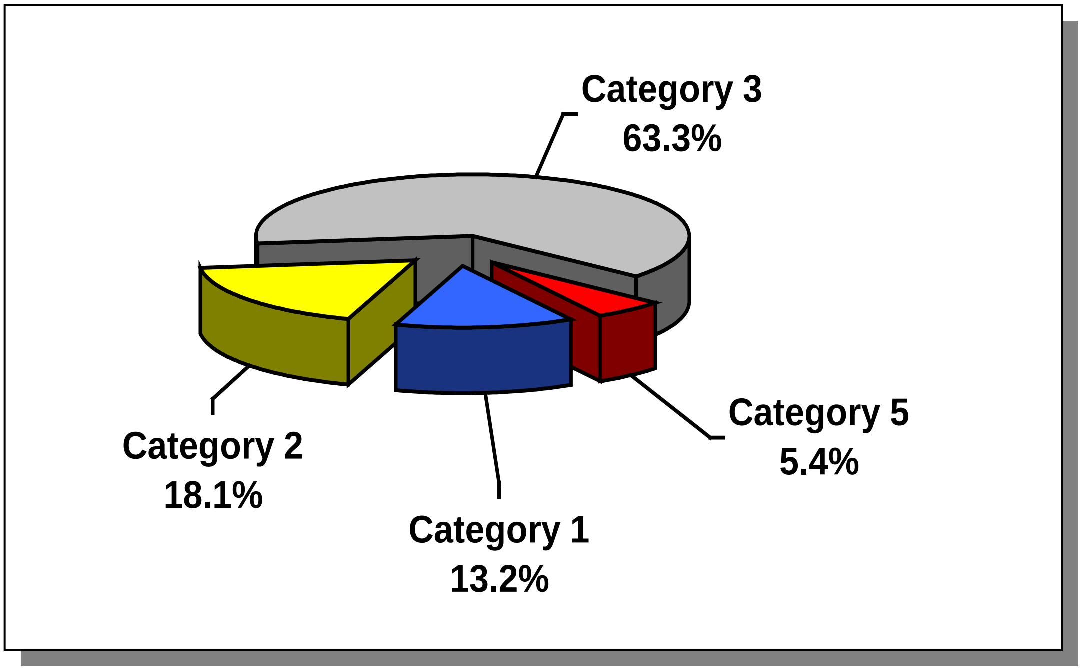


Figure 3-5. Water Quality Assessment of Streams in the Tennessee Portion of the Lake Barkley Watershed. *Assessment data are based on the 2006 Water Quality Assessment of 1,257.9 stream miles in the watershed.*

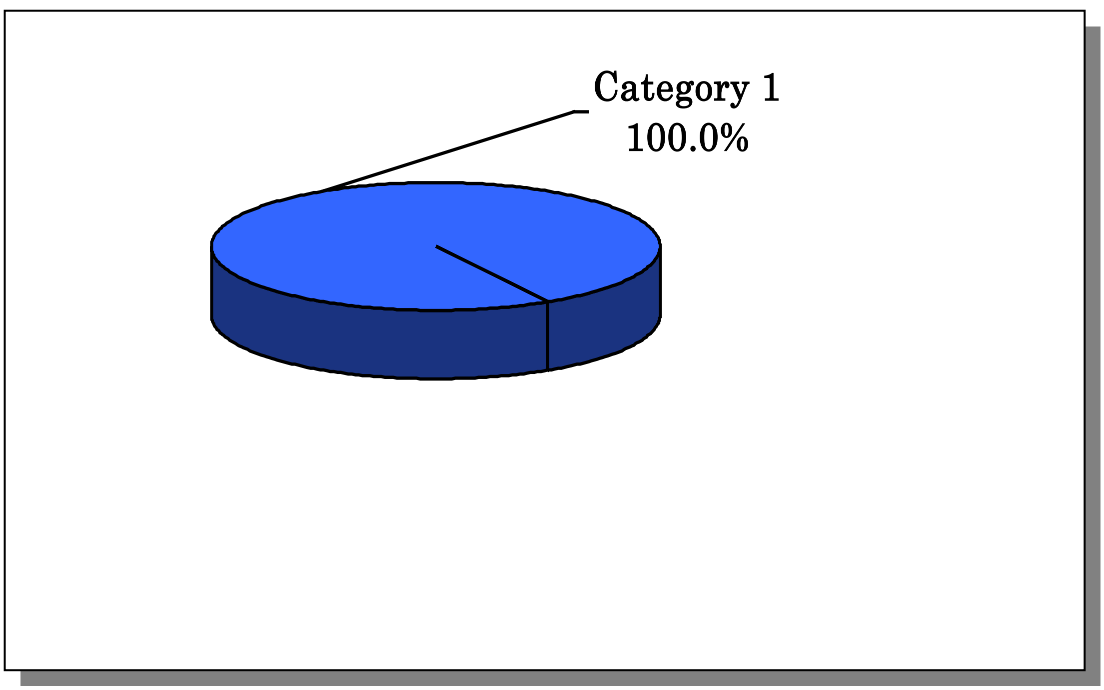


Figure 3-6. Water Quality Assessment of Lakes in the Tennessee Portion of the Guntersville Lake Watershed. *Assessment data are based on the 2006 Water Quality Assessment of 37,000 lake acres in the watershed.*

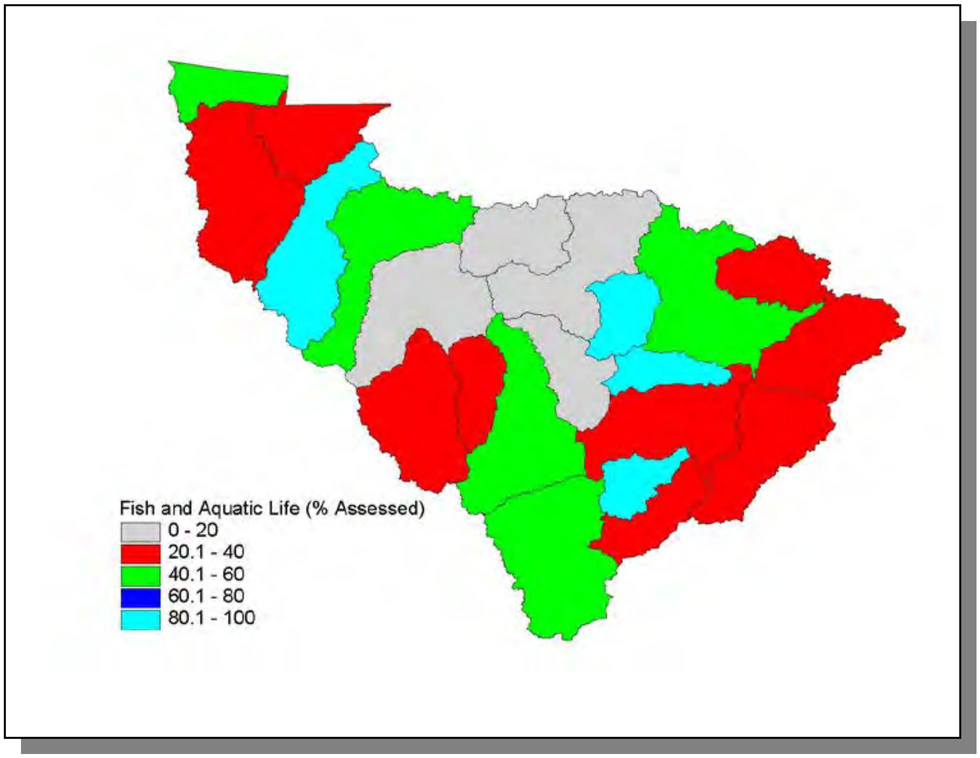


Figure 3-7. Percentage of Stream Miles Assessed for Support of Fish and Aquatic Life Designated Use in HUC-12 Subwatersheds.

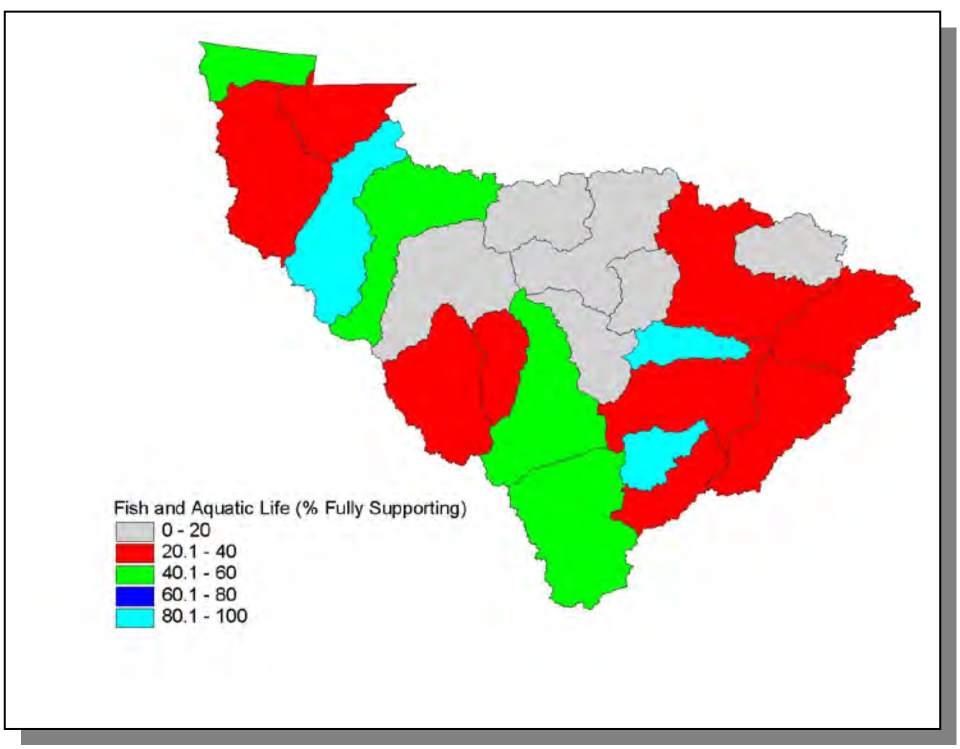


Figure 3-8. Percentage of Stream Miles Fully Supporting for Fish and Aquatic Life Designated Use in HUC-12 Subwatersheds.

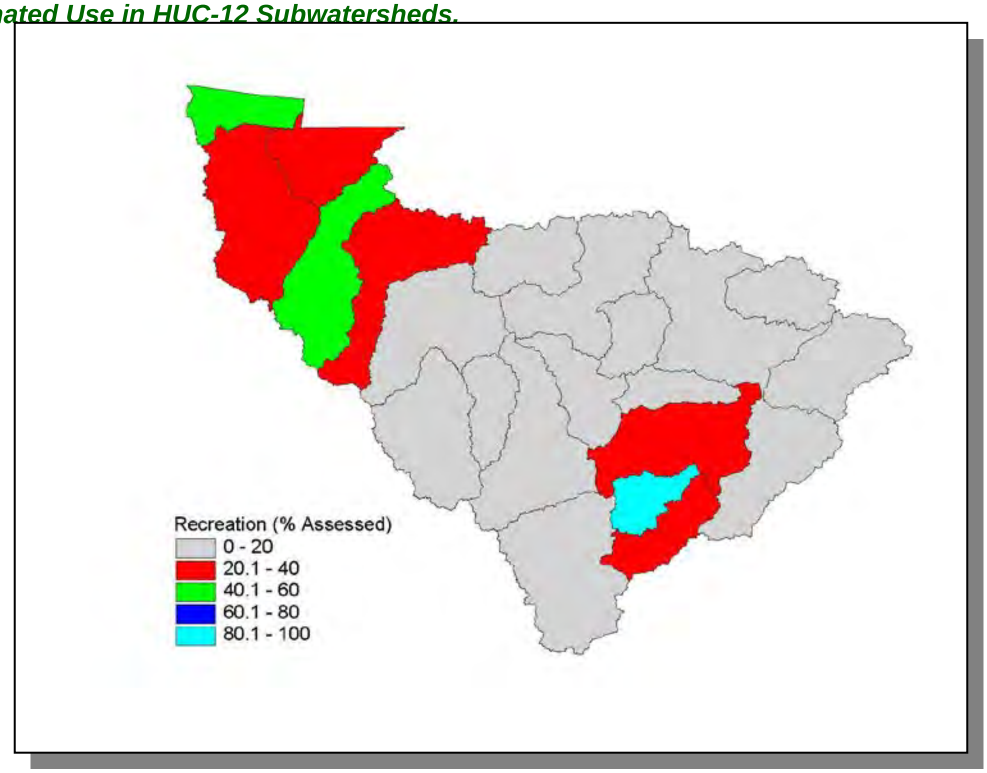


Figure 3-9. Percentage of Stream Miles Assessed for Support of Recreation Designated Use in HUC-12 Subwatersheds.

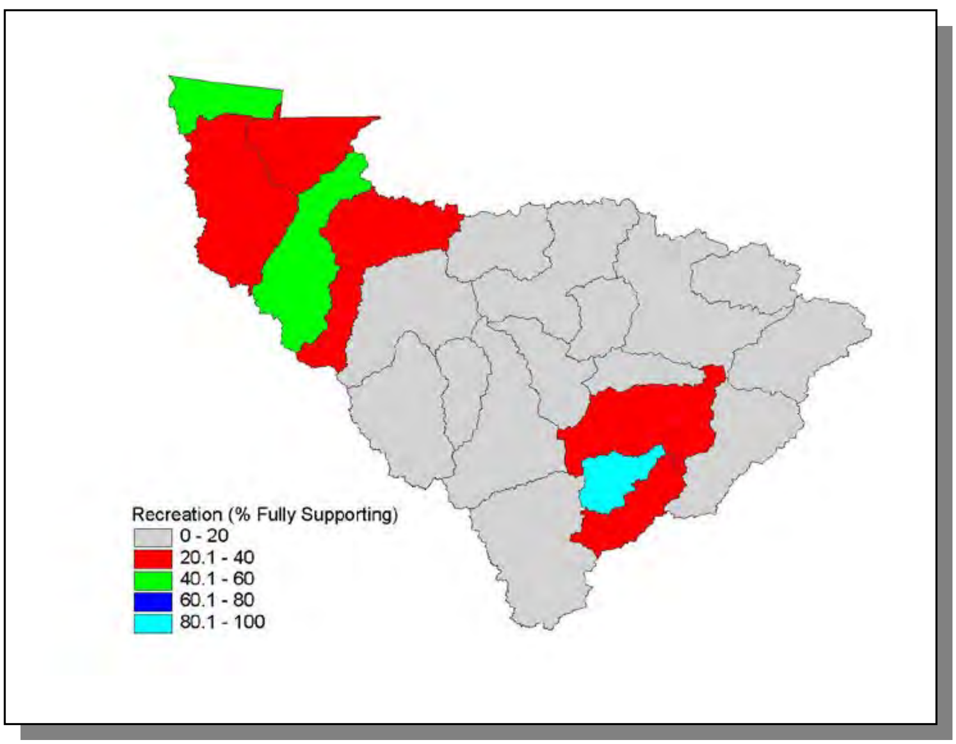


Figure 3-10. Percentage of Stream Miles Fully Supporting for Recreation Designated Use in HUC-12 Subwatersheds.

3.3.A. Assessment Summary.

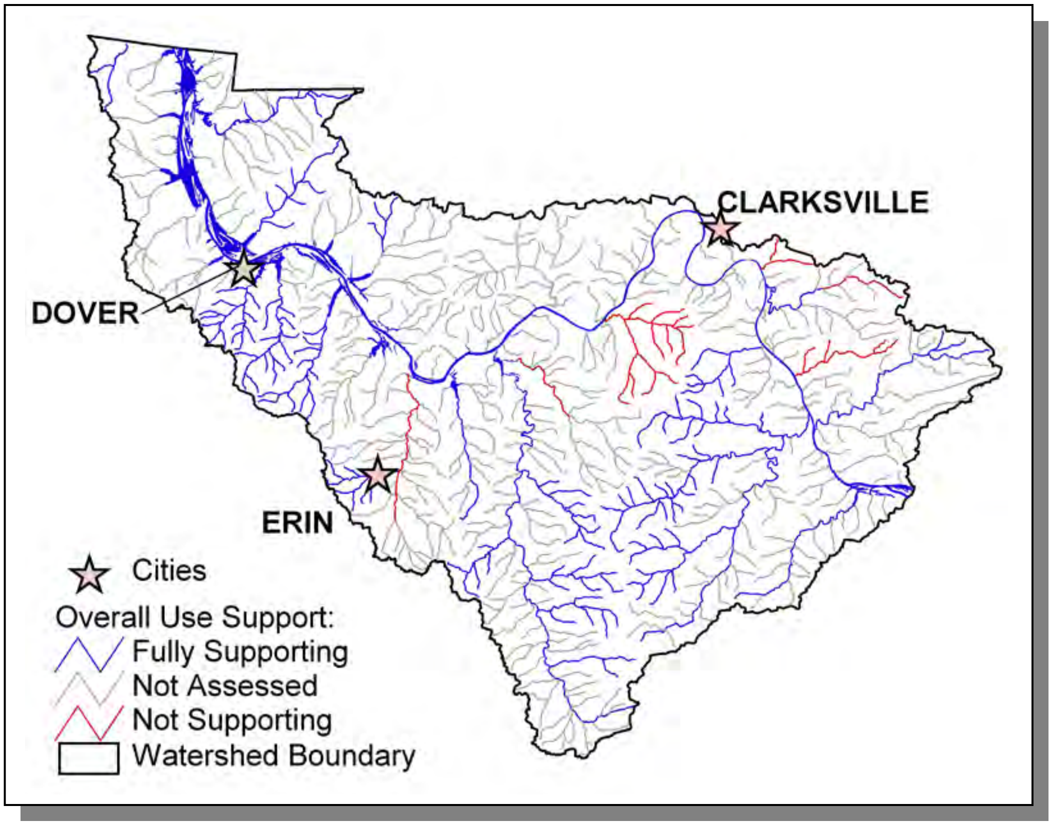


Figure 3-11. Overall Use Support Attainment in the Tennessee Portion of the Lake Barkley Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Clarksville, Erin, and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

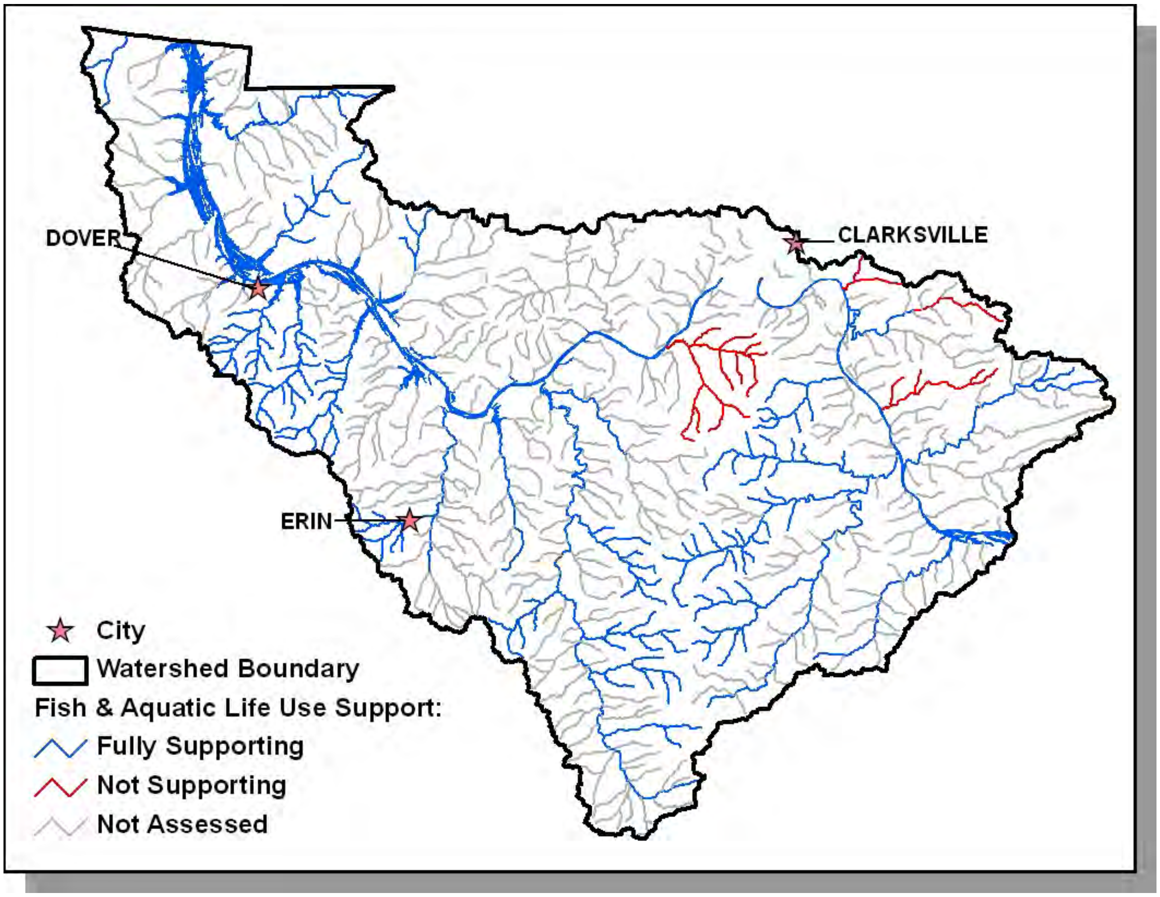


Figure 3-12. Fish and Aquatic Life Use Support Attainment in the Tennessee Portion of the Lake Barkley Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Clarksville,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

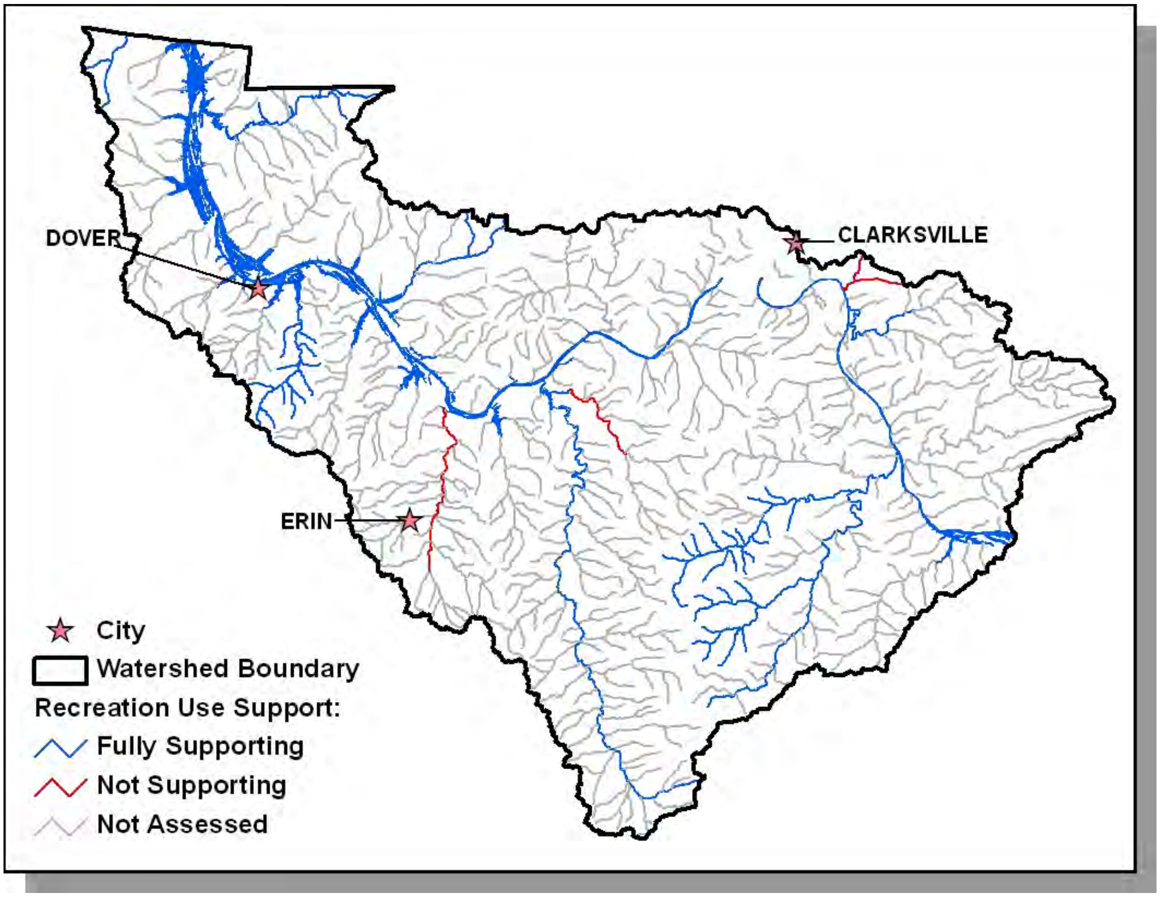


Figure 3-13. Recreation Use Support Attainment in the Tennessee Portion of the Lake Barkley Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Clarksville, Erin, and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

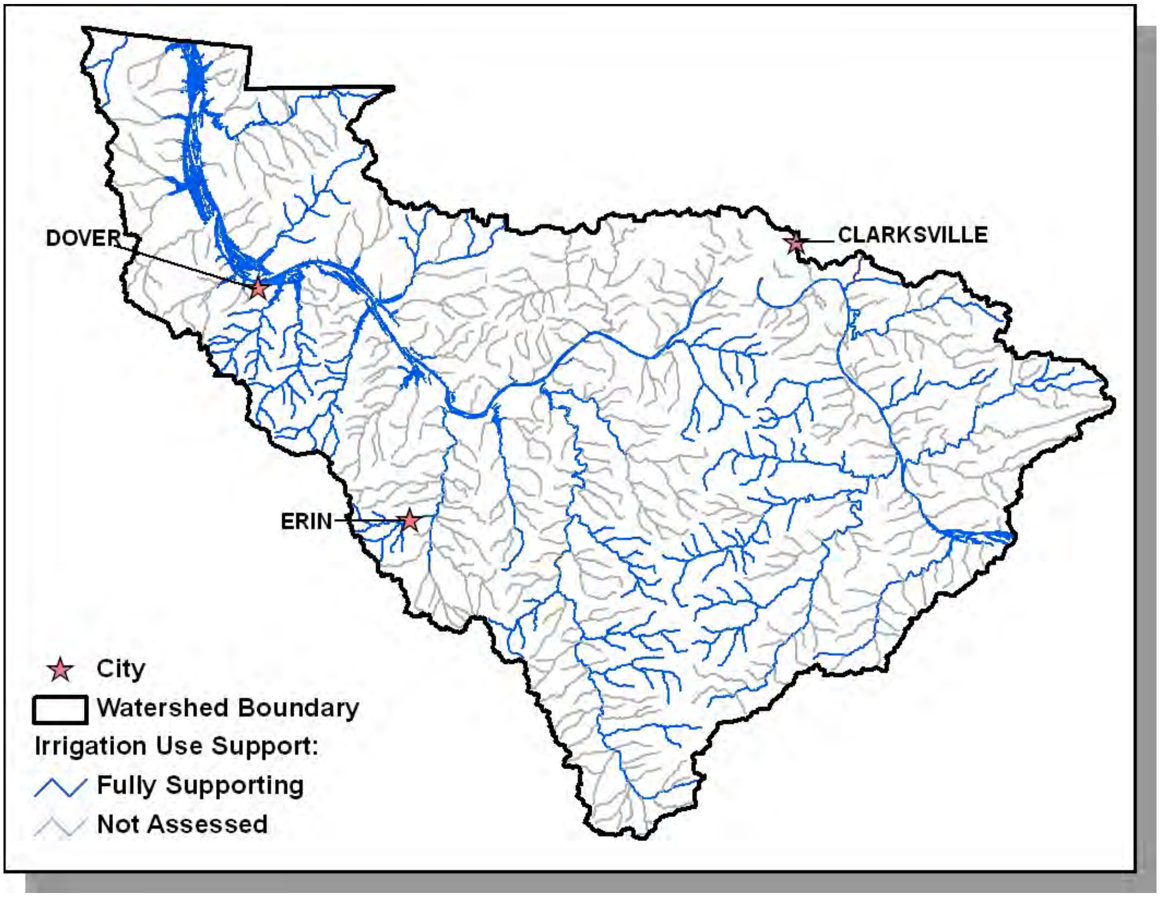


Figure 3-14. Irrigation Use Support Attainment in the Tennessee Portion of the Lake Barkley Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Clarksville, Erin, and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

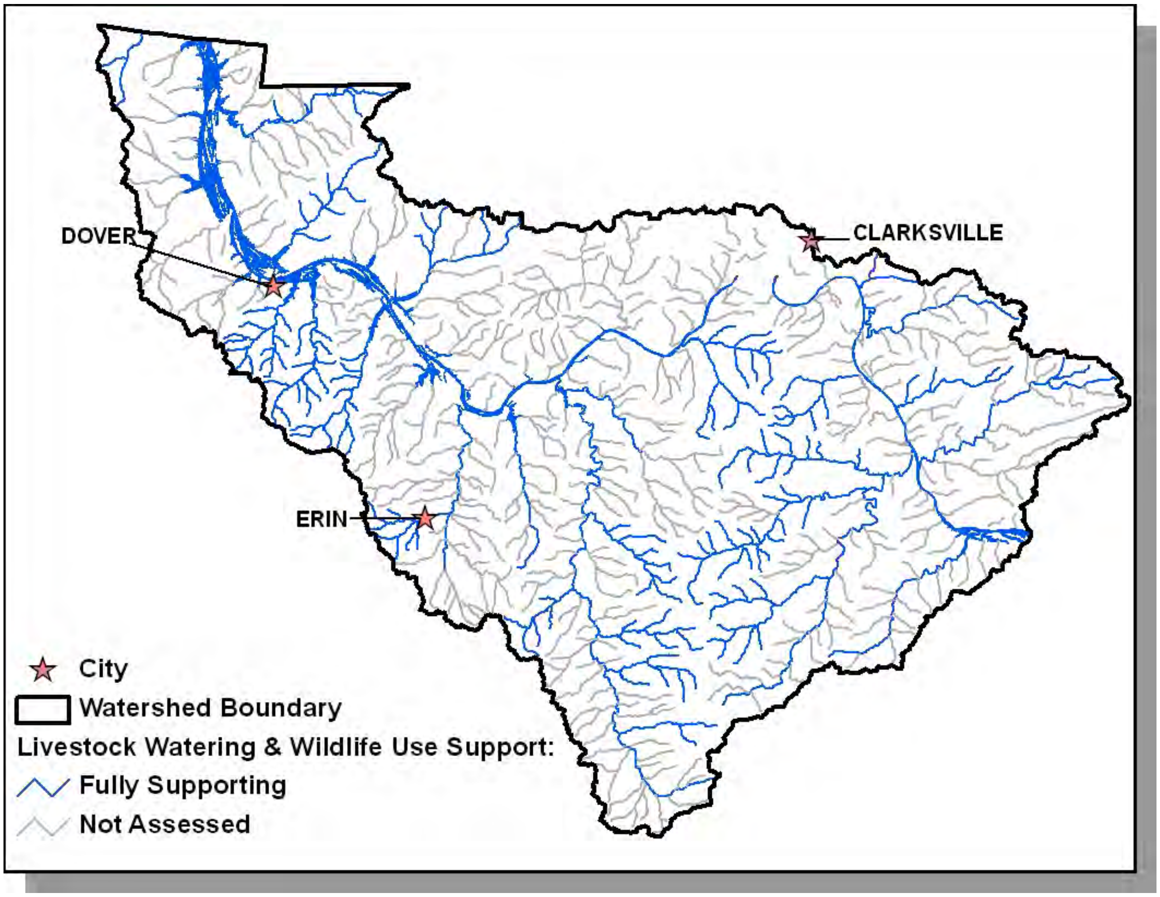


Figure 3-15. Livestock Watering and Wildlife Use Support Attainment in the Tennessee Portion of the Lake Barkley Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of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

3.3.B. Use Impairment Summary.

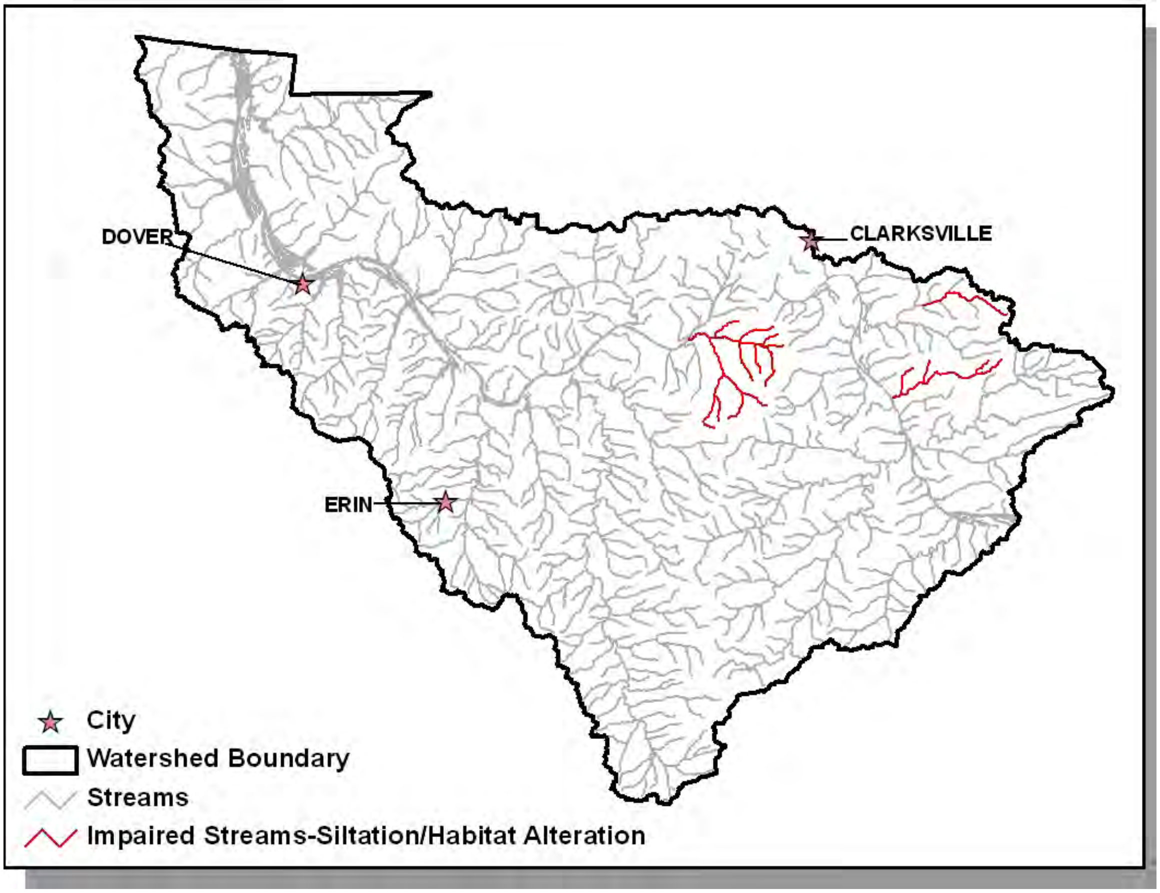


Figure 3-16. Impaired Streams Due to Siltation in the Tennessee Portion of the Lake Barkley Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Locations of Clarksville, Erin, and Dover are shown for reference. More information is provided in Appendix III.*

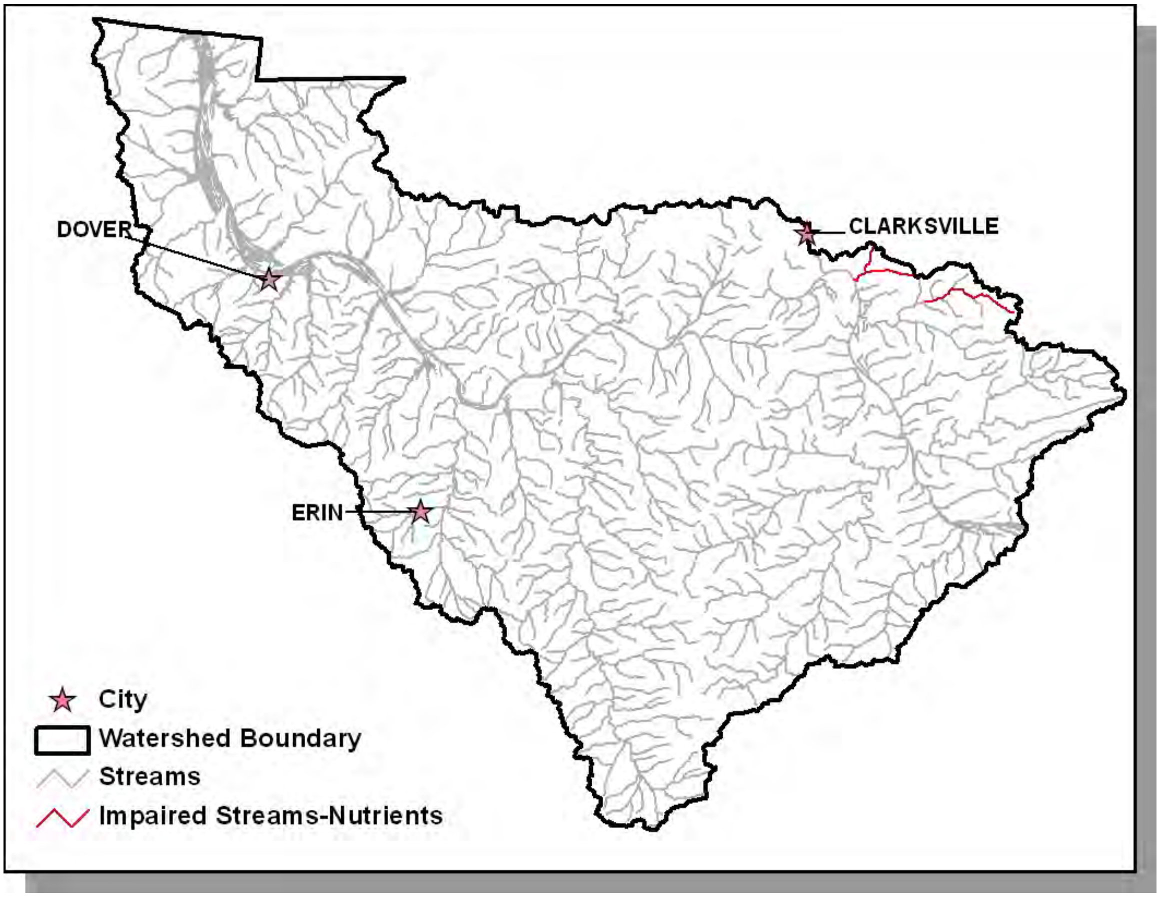


Figure 3-17. Impaired Streams Due to Nutrients in the Tennessee Portion of the Lake Barkley Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Locations of Clarksville, Erin, and Dover are shown for reference. More information is provided in Appendix III.*

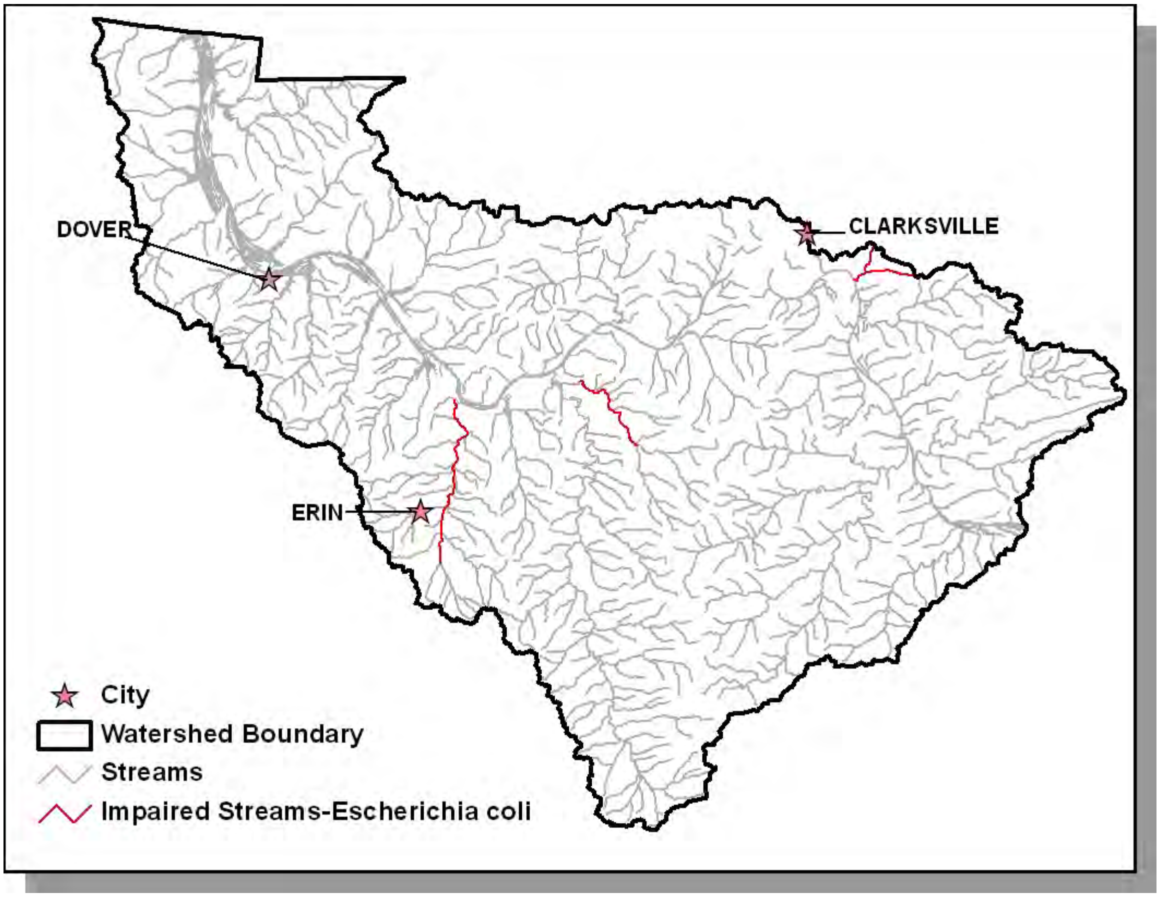


Figure 3-18. Impaired Streams Due to Escherichia coli in the Tennessee Portion of the Lake Barkley Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Locations of Clarksville, Erin, and Dover are shown for reference. More information is provided in Appendix III.*

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

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

The ADB was used to create maps that illustrate water quality. These maps may be viewed at http://gis3.memphis.edu/wpc/.

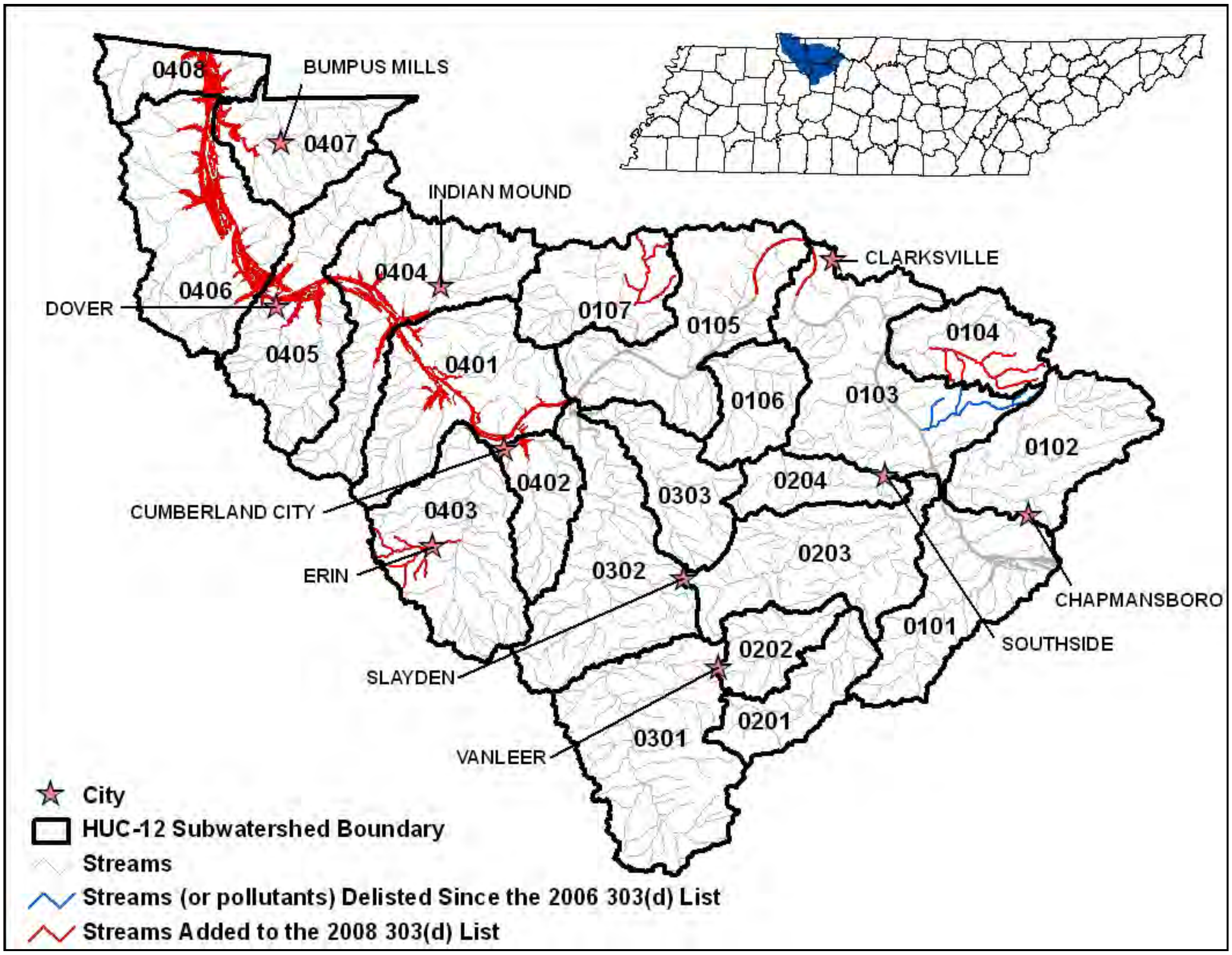


Figure 3-19. Changes to the 303(d) List of Impaired Waters in the Tennessee Portion of the Lake Barkley Watershed Since Approval of the 2006 List by EPA. *More information is provided in Appendix III.*

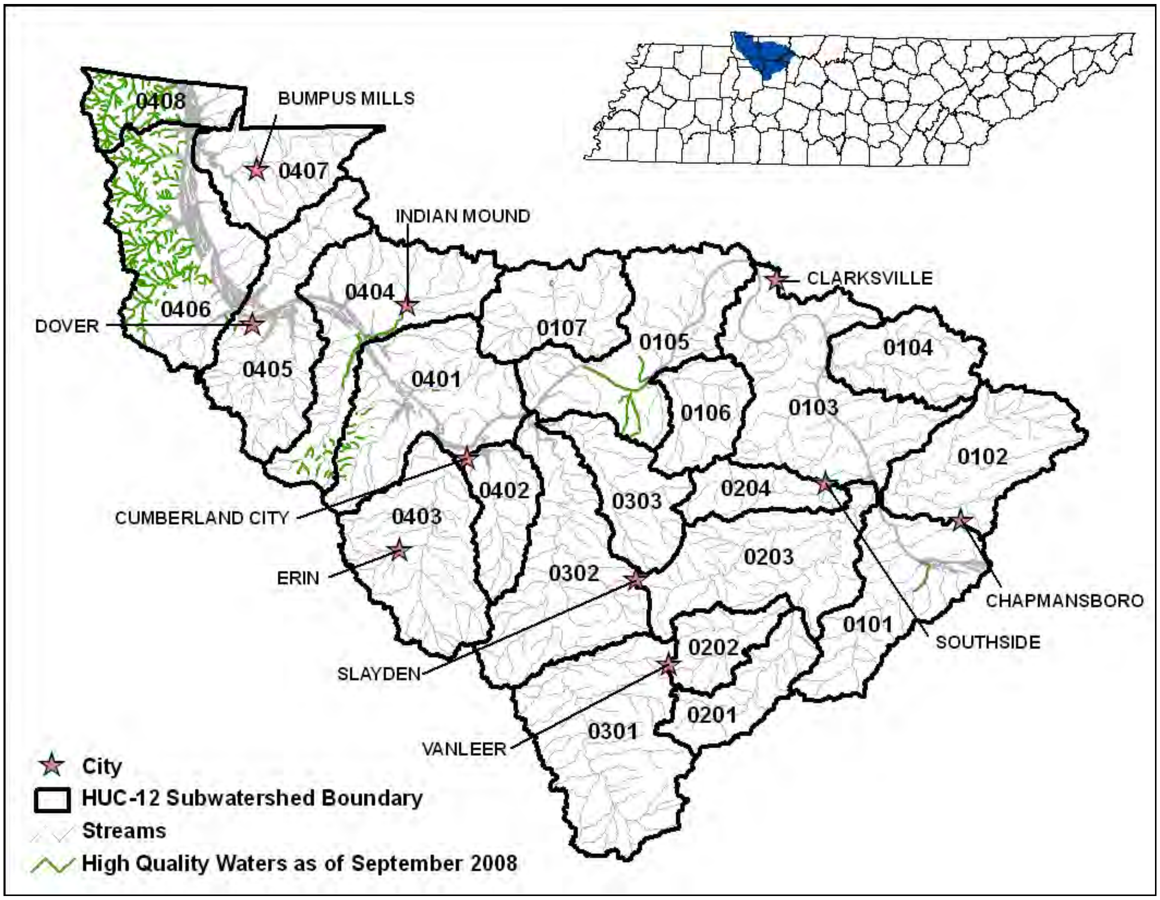


Figure 3-20. High Quality Waters Identified in the Tennessee Portion of the Lake Barkley Watershed. *More information is provided in Appendix III.*

CHAPTER 4

POINT AND NONPOINT SOURCE CHARACTERIZATION OF THE LAKE BARKLEY WATERSHED

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

i. General description of the subwatershed
ii. Location of USGS (United States Geological Survey) and STORET sites
iii. Location of permitted activities
iv. Description of nonpoint source contributions

The HUC can range from 2 to 16 digits long, more digits indicating a smaller and smaller portion of the watershed is represented. The Tennessee portion of the Lake Barkley Watershed (HUC 05130205) has been delineated into twenty two HUC-12 subwatersheds.

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

WCS integrates with ArcView® v3.x and Spatial Analyst® v1.1 to analyze user-delineated (sub)watersheds based on hydrologically connected water bodies. Reports are generated by integrating WCS with Microsoft® Word. Land Use/Land Cover information from 2001 MRLC (Multi-Resolution Land Cover) data are calculated based on the proportion of county-based land use/land cover in user-delineated (sub)watersheds. Nonpoint source data in WCS are based on agricultural census data collected 1992–1998; nonpoint source data were reviewed by Tennessee NRCS staff.

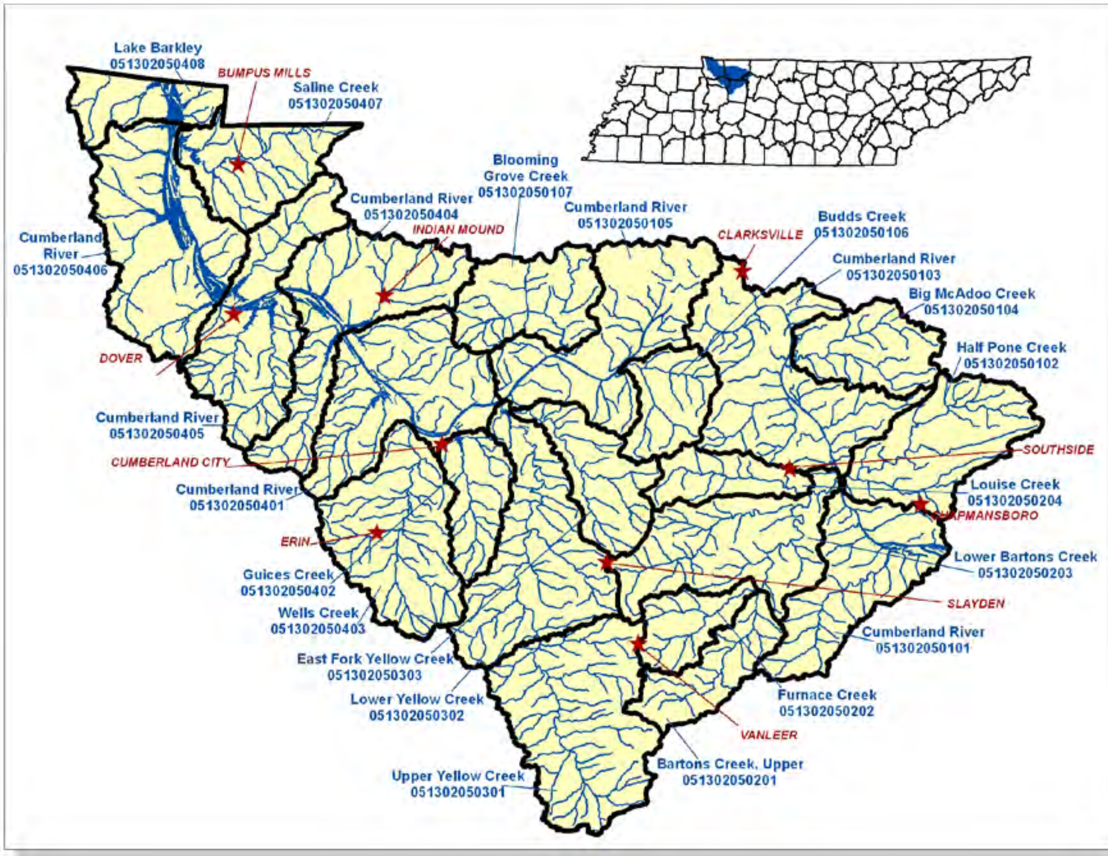


Figure 4-1. The Tennessee Portion of the Lake Barkley Watershed is Composed of twenty two USGS-Delineated Subwatersheds (12-Digit Subwatersheds).

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

<table>
<tr><th>HUC-8</th><th>HUC-10</th><th>HUC-12</th></tr>
<tr><td rowspan="22">05130205</td><td rowspan="7">0513020501</td><td>051302050101 Cumberland River</td></tr>
<tr><td>051302050102 Half Pone Creek</td></tr>
<tr><td>051302050103 Cumberland River</td></tr>
<tr><td>051302050104 Big McAdoo Creek</td></tr>
<tr><td>051302050105 Cumberland River</td></tr>
<tr><td>051302050106 Budds Creek</td></tr>
<tr><td>051302050107 Blooming Grove Creek</td></tr>
<tr><td rowspan="4">0513020502</td><td>051302050201 Bartons Creek, Upper</td></tr>
<tr><td>051302050202 Furnace Creek</td></tr>
<tr><td>051302050203 Bartons Creek, Lower</td></tr>
<tr><td>051302050204 Louise Creek</td></tr>
<tr><td rowspan="3">0513020503</td><td>051302050301 Yellow Creek, Upper</td></tr>
<tr><td>051302050302 Yellow Creek, Lower</td></tr>
<tr><td>051302050303 East Fork Yellow Creek</td></tr>
<tr><td rowspan="8">0513020504</td><td>051302050401 Cumberland River</td></tr>
<tr><td>051302050402 Guices Creek</td></tr>
<tr><td>051302050403 Wells Creek</td></tr>
<tr><td>051302050404 Cumberland River</td></tr>
<tr><td>051302050405 Cumberland River</td></tr>
<tr><td>051302050406 Cumberland River</td></tr>
<tr><td>051302050407 Saline Creek</td></tr>
<tr><td>051302050408 Lake Barkley</td></tr>
</table>

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. 051302050101 (Cumberland River).

4.2.A.i. General Description.

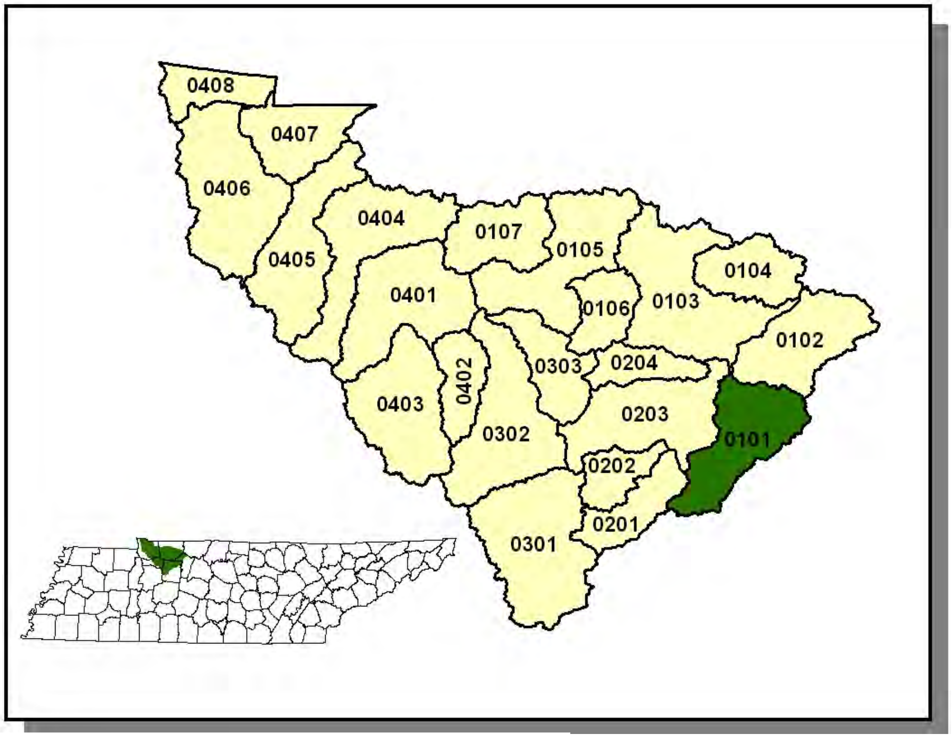


Figure 4-2. Location of Subwatershed 051302050101. *All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

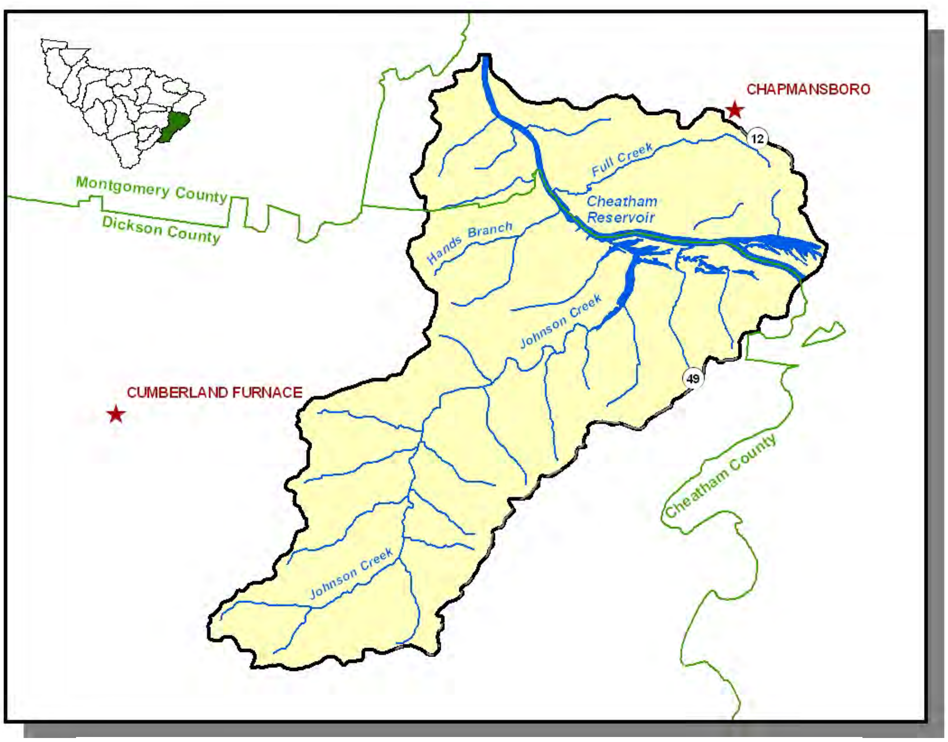


Figure 4-3. Locational Details of Subwatershed 051302050101.

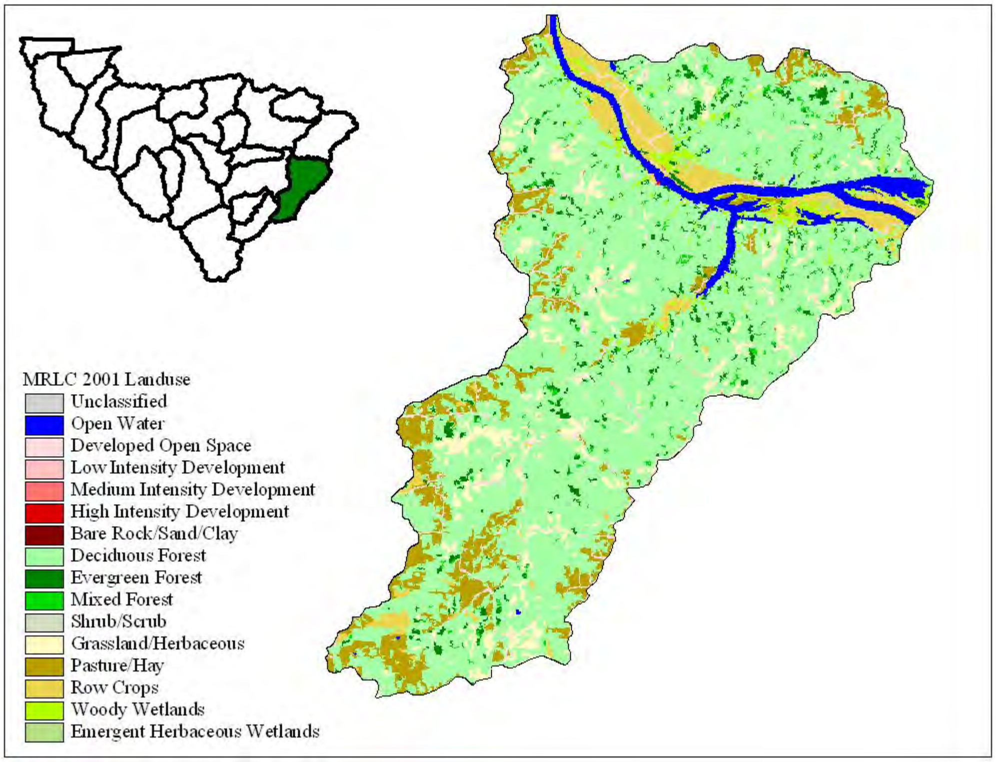


Figure 4-4. Illustration of Land Use Distribution in Subwatershed 051302050101.

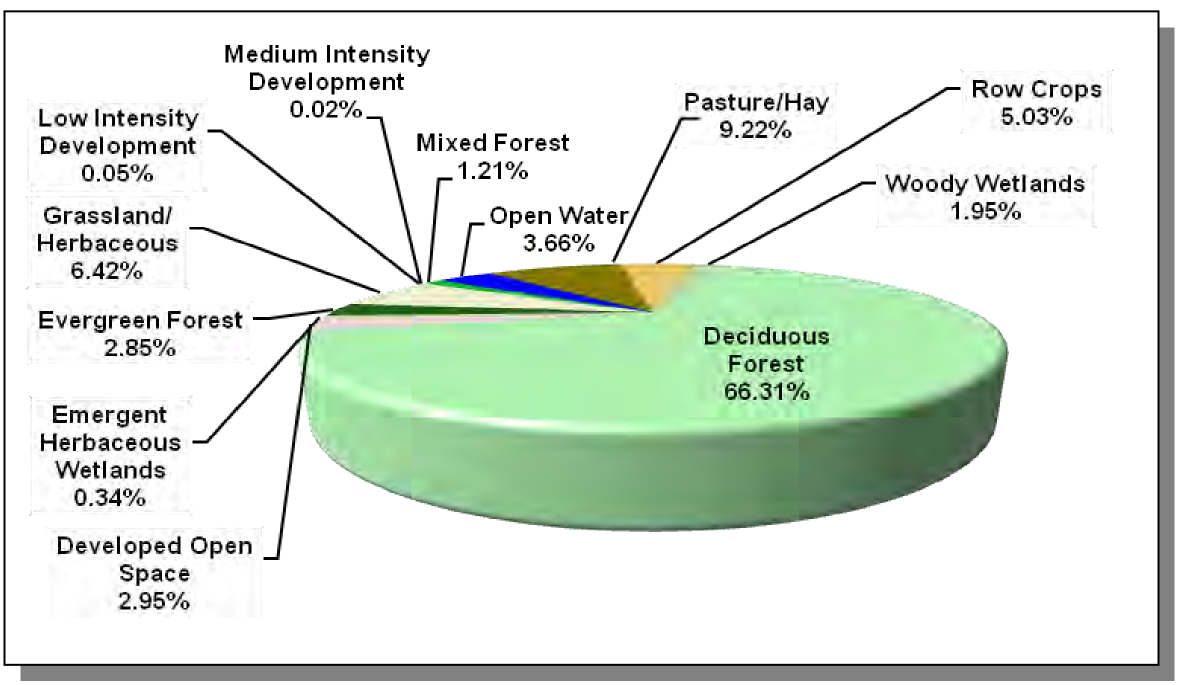


Figure 4-5. Land Use Distribution in Subwatershed 051302050101. *More information is provided in Appendix IV.*

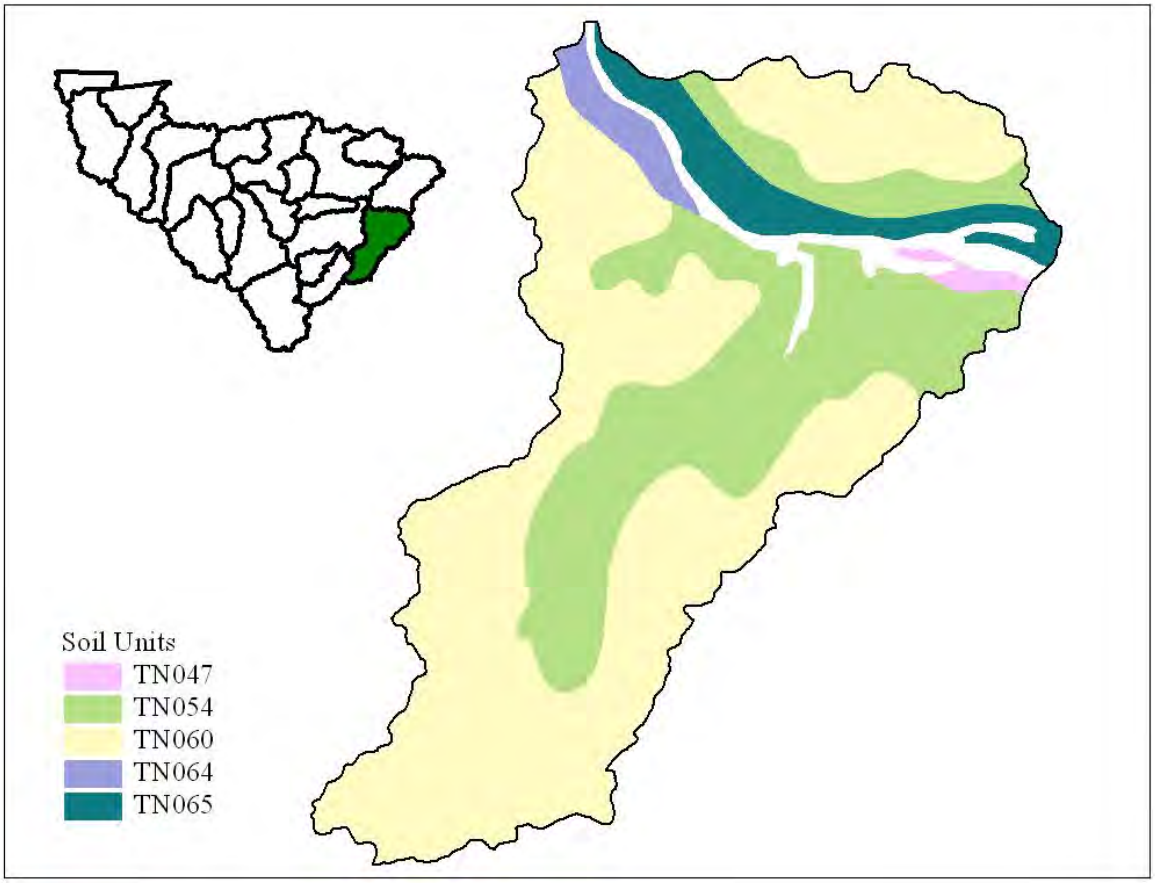


Figure 4-6. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050101.

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
TN054	0.00	C	3.04	4.84	Loam	0.32
TN060	5.00	B	1.30	5.32	Silty Loam	0.39
TN064	7.00	C	1.19	5.82	Silty Loam	0.37
TN065	0.00	C	1.15	5.52	Loam	0.32

Table 4-2. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050101. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Cheatham	27,140	34,402	35,912	4.93	1,338	1,695	1,770	32.30
Dickson	35,061	40,937	43,156	6.86	2,403	2,806	2,958	23.10
Totals	**62,201**	**75,339**	**79,068**		**3,741**	**4,501**	**4,728**	**26.40**

Table 4-3. Population Estimates in Subwatershed 051302050101.

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

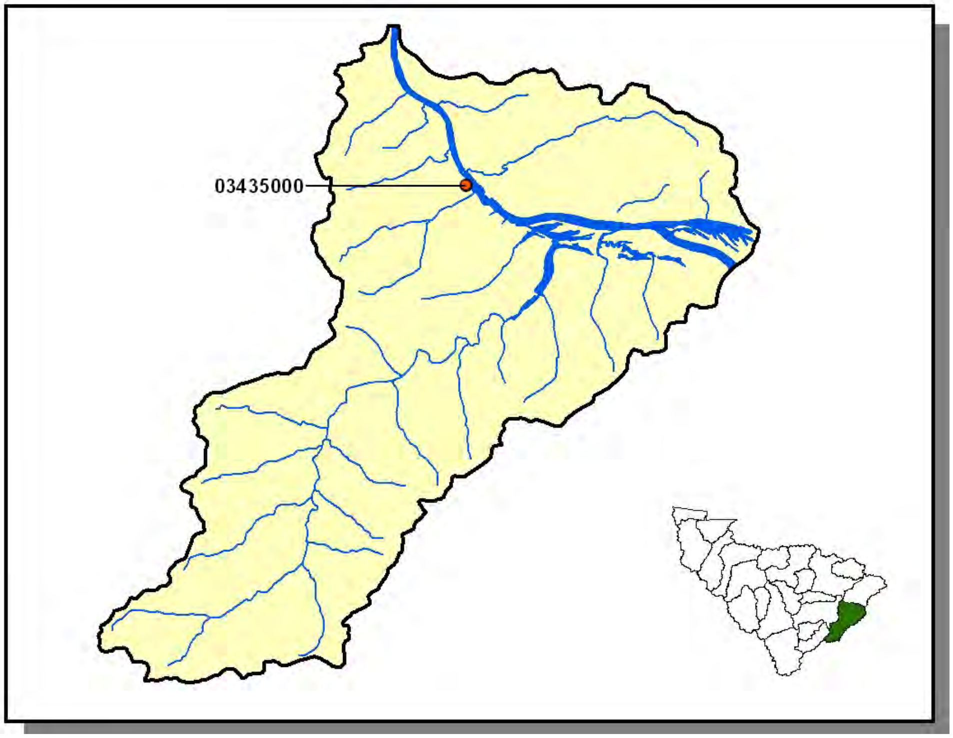


Figure 4-7. Location of USGS Continuous Record Gaging Stations in Subwatershed 051302050101. *More information is provided in Appendix IV.*

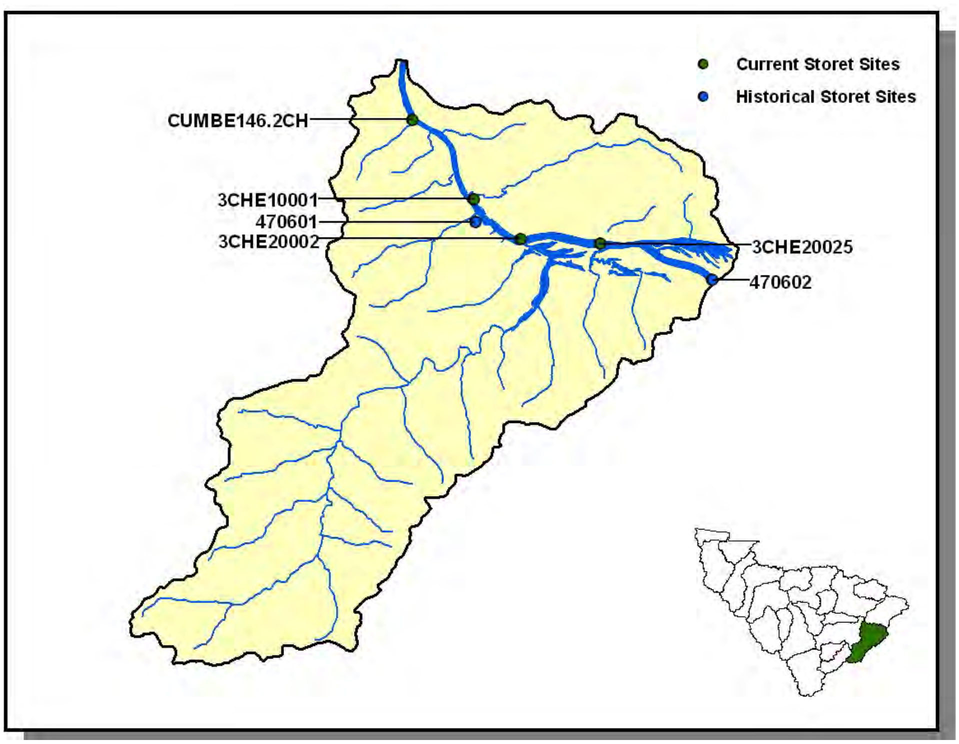


Figure 4-8. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302050101. *More information, including site names and locations, is provided in Appendix IV.*

4.2.A.iii. Permitted Activities.

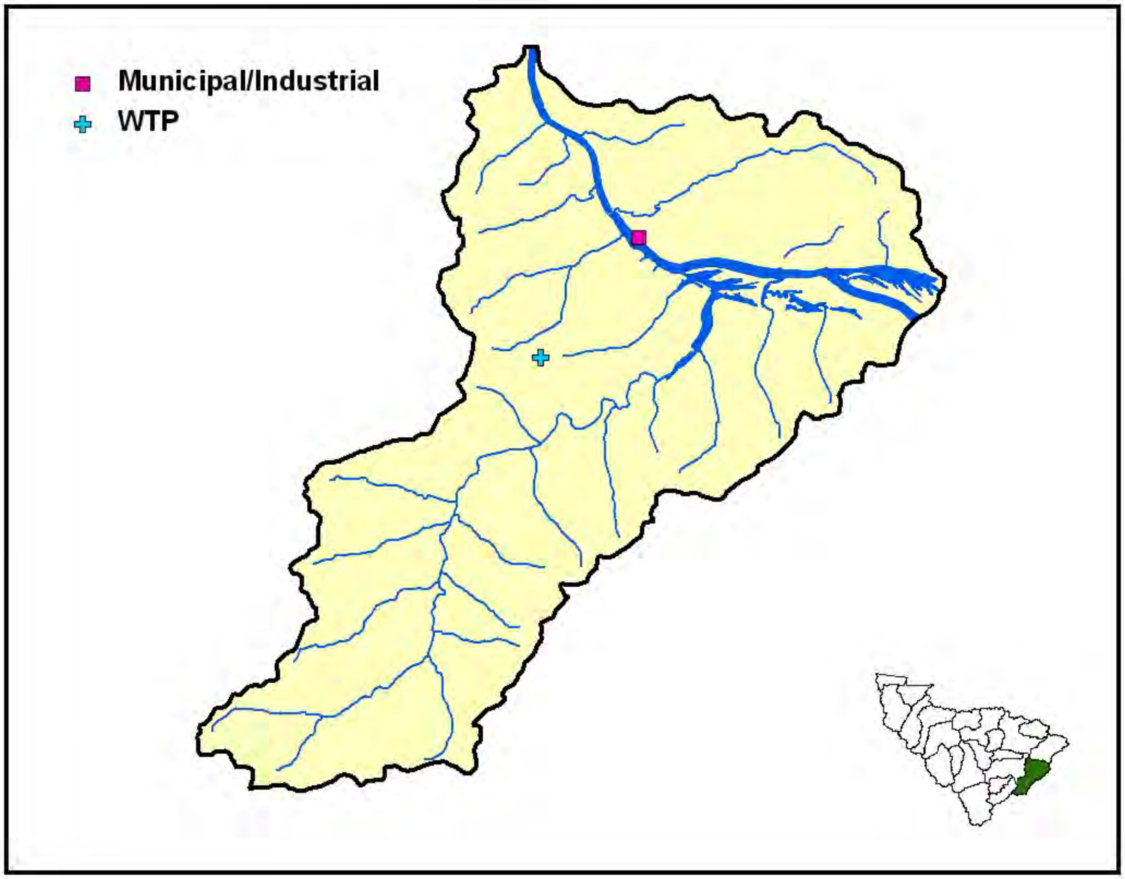


Figure 4-9. Location of Permits Issued in Subwatershed 051302050101. *More information, including the names of facilities, is provided in Appendix IV.*

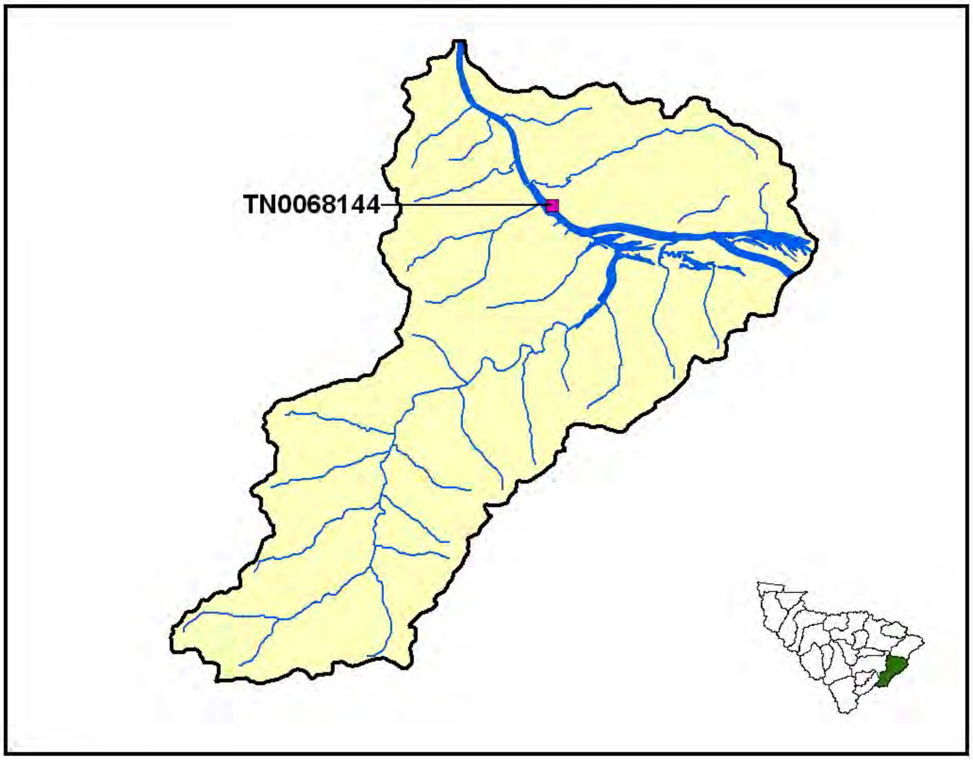


Figure 4-10. Location of Permitted Municipal and Industrial Facilities in Subwatershed 051302050101. *More information, including the name of the facility is provided in Appendix IV.*

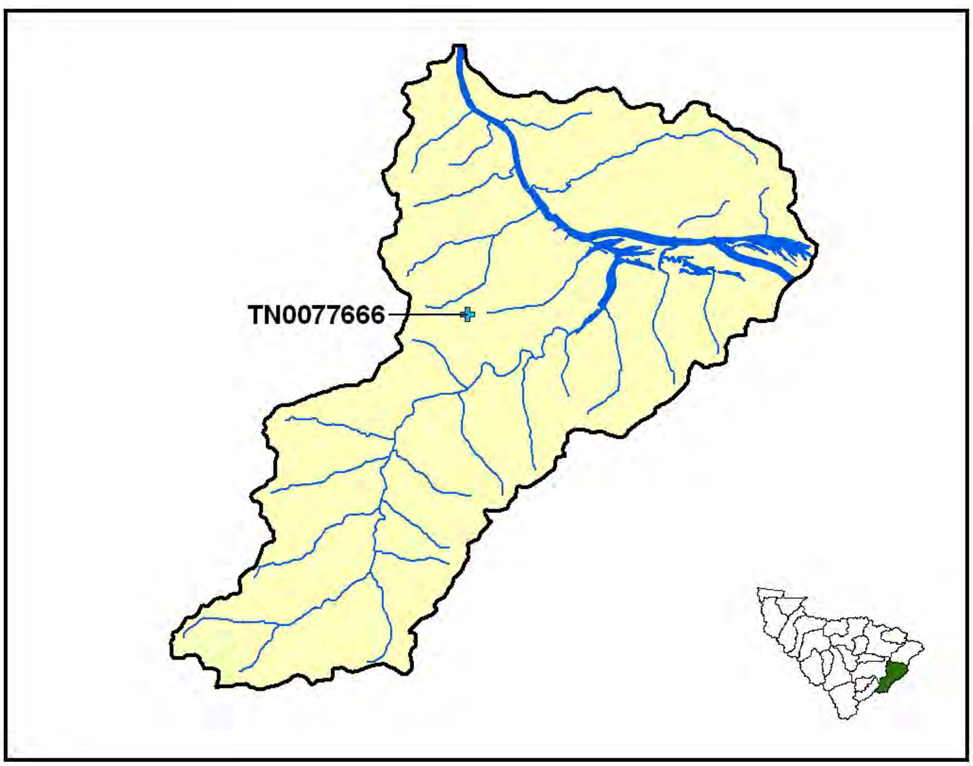


Figure 4-11. Location of Active Water Treatment Plant (WTP) Facilities in Subwatershed 051302050101. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.A.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS					
County	Beef Cow	Cattle	Chickens (Layers)	Hogs	Sheep
Cheatham		11,429	121	1,183	
Dickson		28,271	1,931	2,029	30

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

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Cheatham	118.2	118.2	2.3	8.4
Dickson	174.3	174.3	1.8	7.7

Table 4-5. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Soybeans (Row Crops)	9.51
Other Vegetable and Truck Crop	7.71
Corn (Row Crops)	4.67
Farmsteads and Ranch Headquarters	2.66
Vineyard (Horticultural)	1.05
Grass Forbs Legumes Mixed (Pastureland)	0.77
Grass (Pastureland)	0.63
Other Cropland not Planted	0.52
Legume Grass (Hayland)	0.50
Grass (Hayland)	0.49
Legume (Hayland)	0.38
Conservation Reserve Program Land	0.07

Table 4-6. Annual Estimated Total Soil Loss in Subwatershed 051302050101.

4.2.B. 051302050102 (Half Pone Creek).

4.2.B.i. General Description.

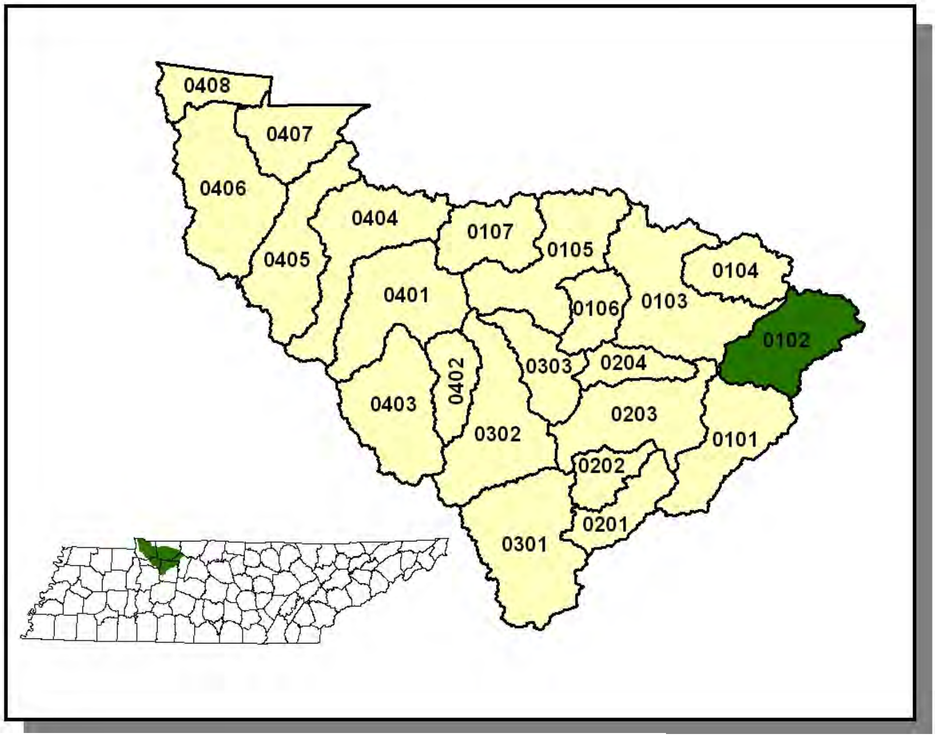


Figure 4-12. Location of Subwatershed 051302050102. All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.

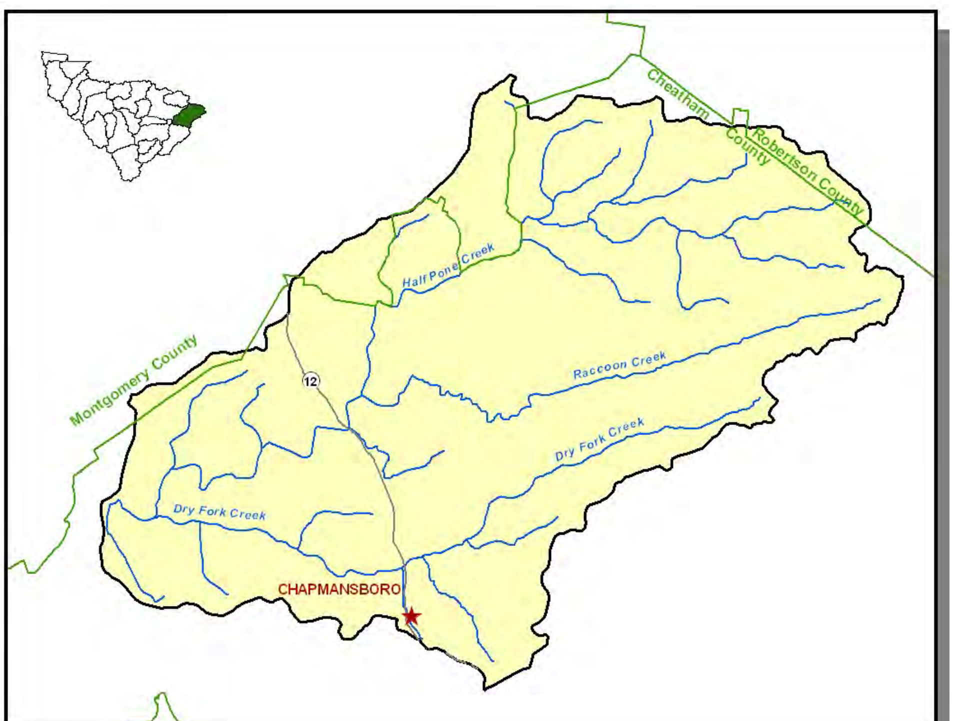


Figure 4-13. Locational Details of Subwatershed 051302050102.

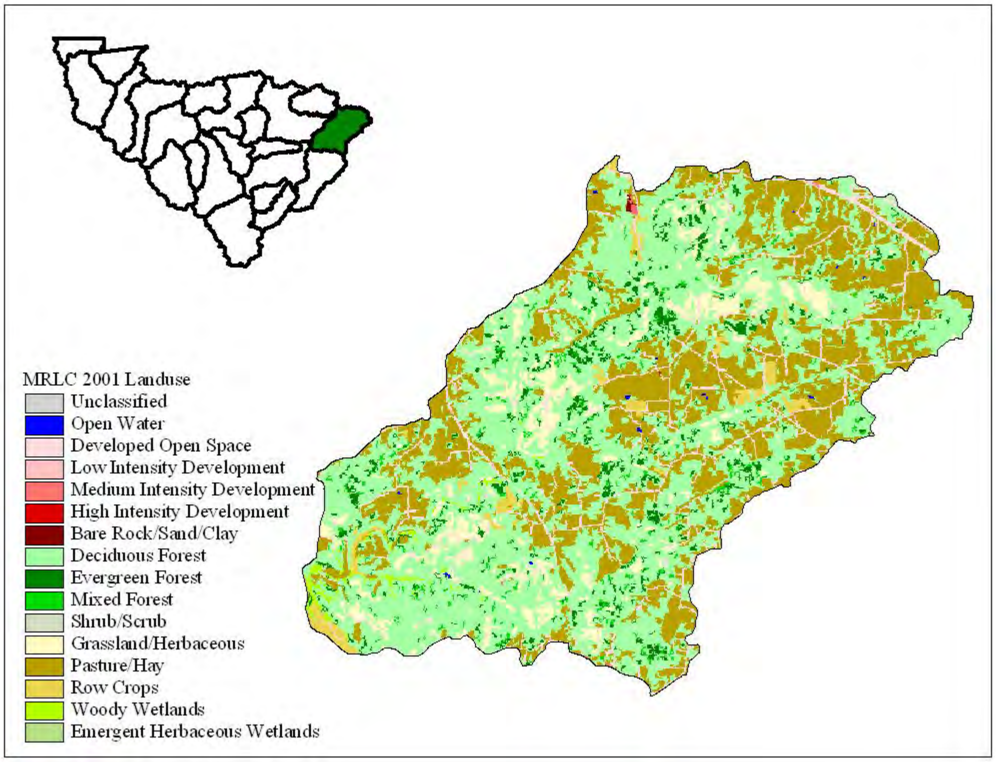


Figure 4-14. Illustration of Land Use Distribution in Subwatershed 051302050102.

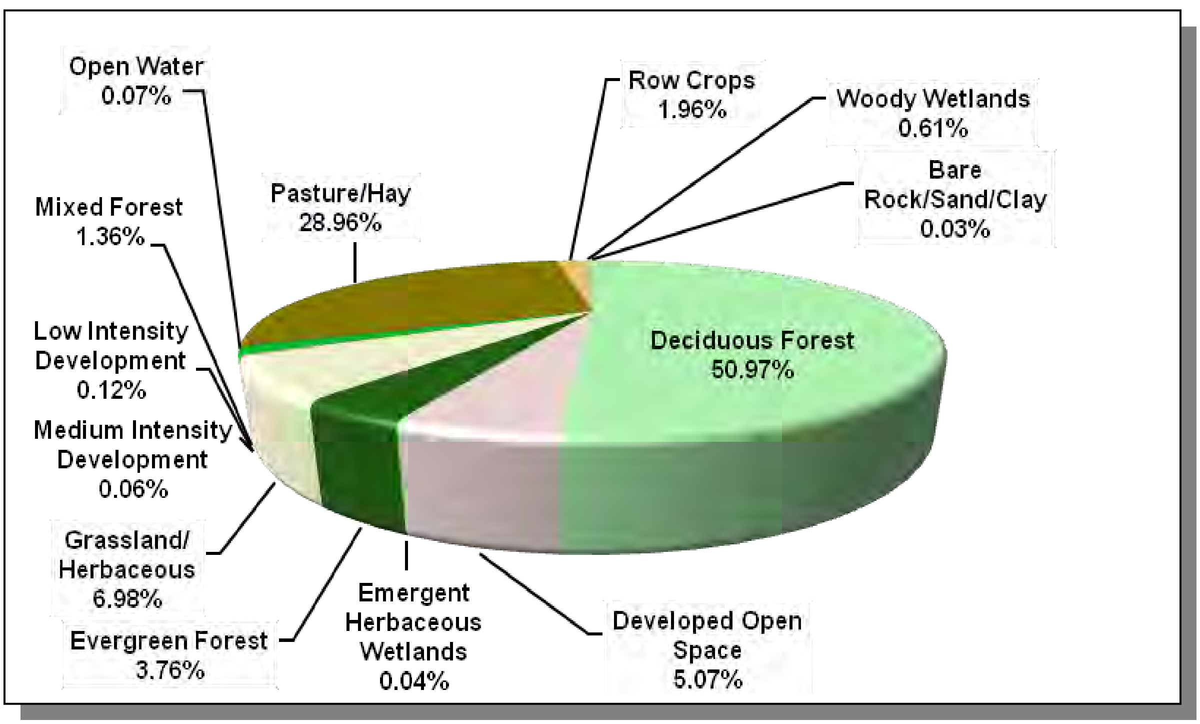


Figure 4-15. Land Use Distribution in Subwatershed 051302050102. *More information is provided in Appendix IV.*

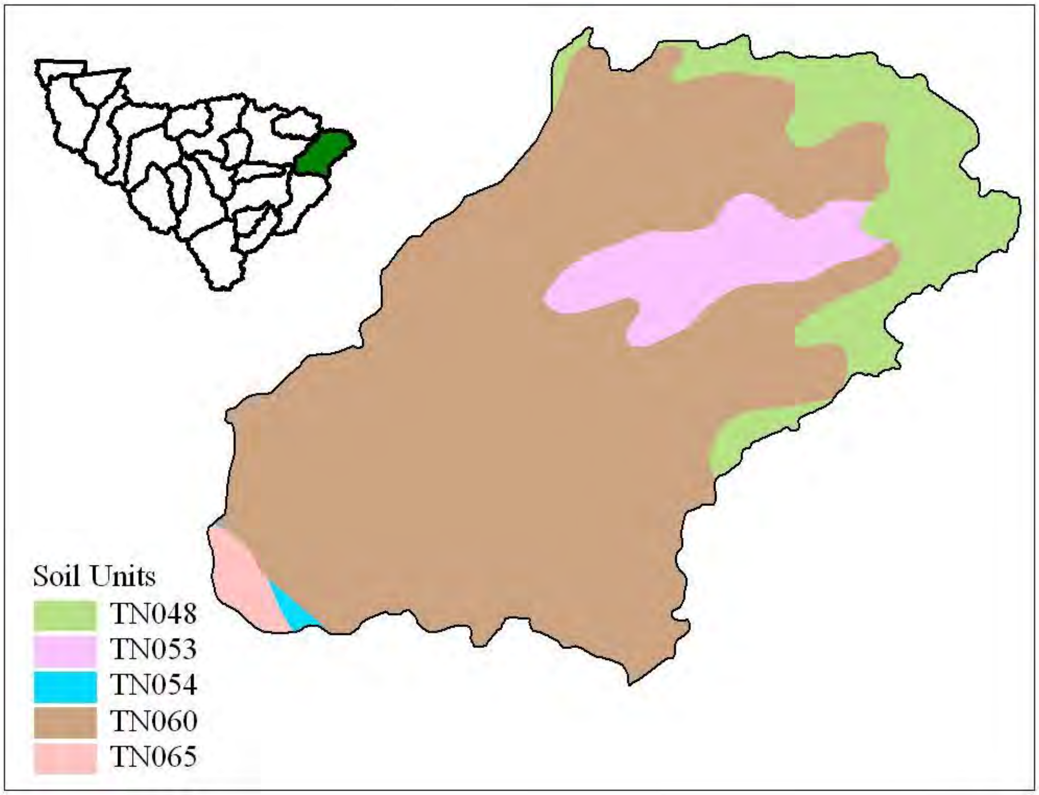


Figure 4-16. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050102.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN048	8.00	C	1.38	5.06	Silty Loam	0.42
TN053	0.00	B	1.29	5.45	Loam	0.33
TN054	0.00	C	3.04	4.84	Loam	0.32
TN060	5.00	B	1.30	5.32	Silty Loam	0.39
TN065	0.00	C	1.15	5.52	Loam	0.32

Table 4-7. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050102. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Cheatham	27,140	34,402	35,912	14.25	3,866	4,901	5,116	32.30
Montgomery	100,498	124,369	134,768	0.29	295	365	396	34.20
Robertson	41,494	51,533	54,433	0.11	47	58	62	31.90
Totals	**169,132**	**210304**	**225,113**		**4,208**	**5,324**	**5,574**	**32.50**

Table 4-8. Population Estimates in Subwatershed 051302050102.

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

There are no USGS continuous record gaging stations or STORET sites in subwatershed 051302050102.

4.2.B.iii. Permitted Activities.

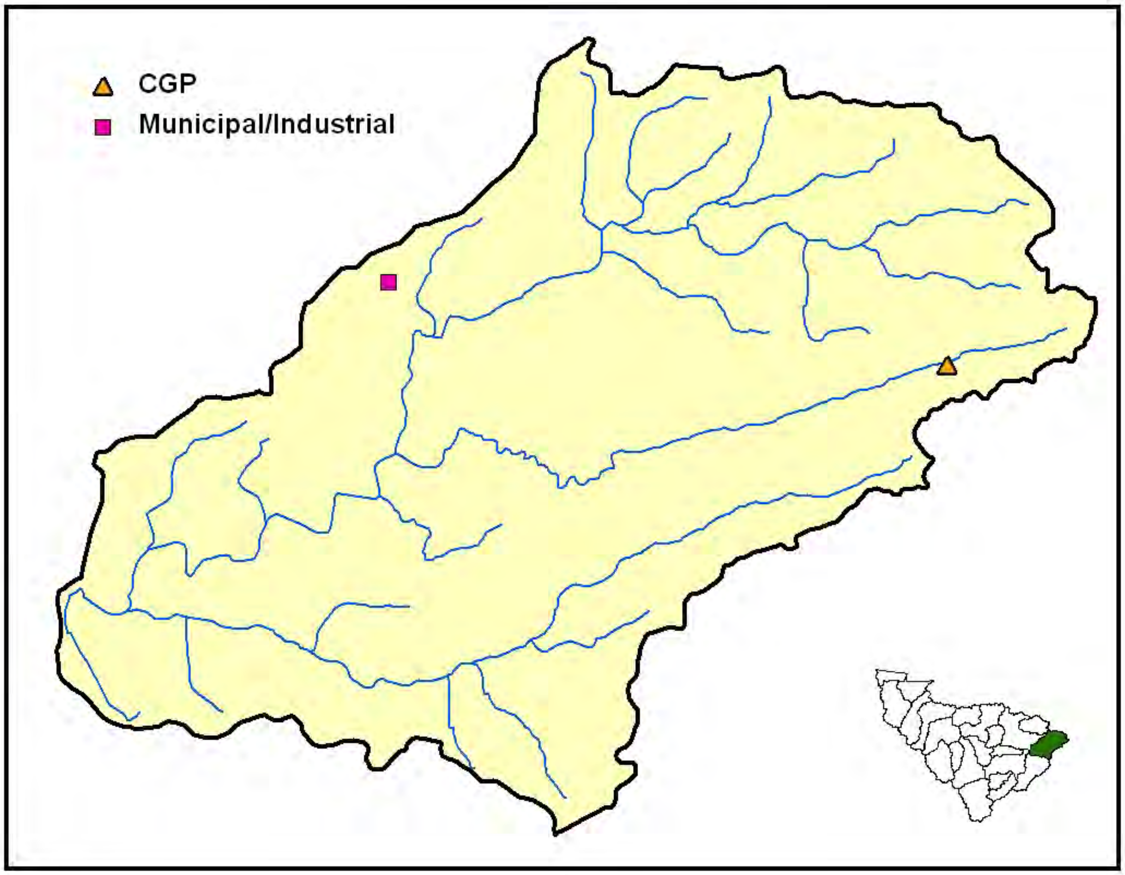


Figure 4-17. Location of Permits Issued in Subwatershed 051302050102. More information, including the names of facilities, is provided in Appendix IV.

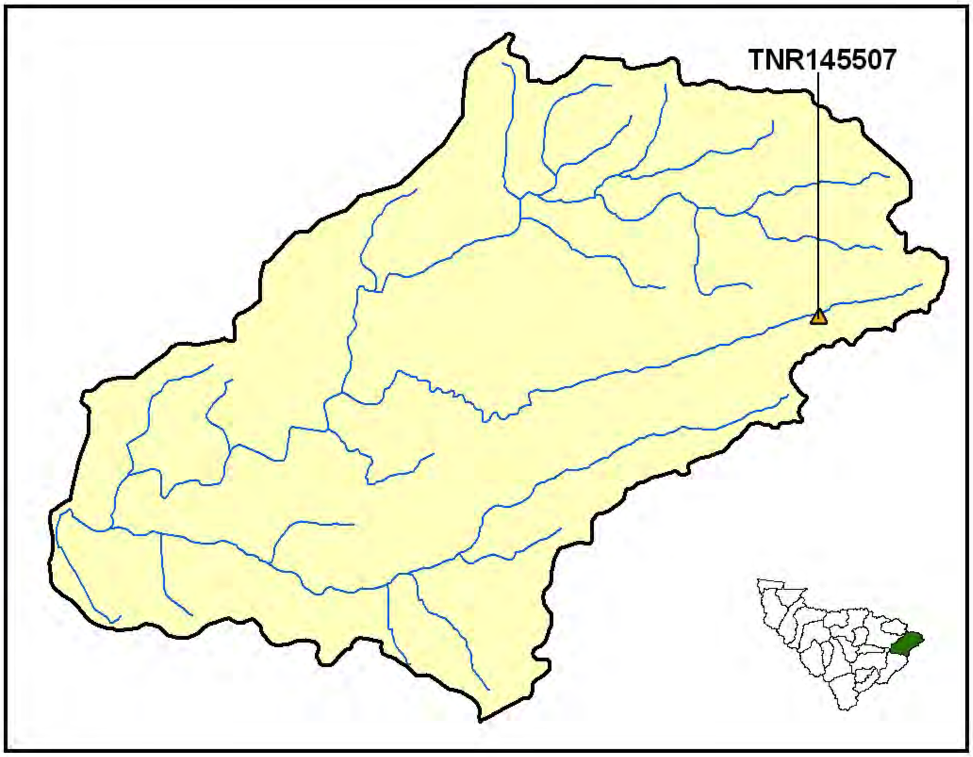


Figure 4-18. Location of CGP (Construction General Permit) Sites in Subwatershed 051302050102. *More information is provided in Appendix IV.*

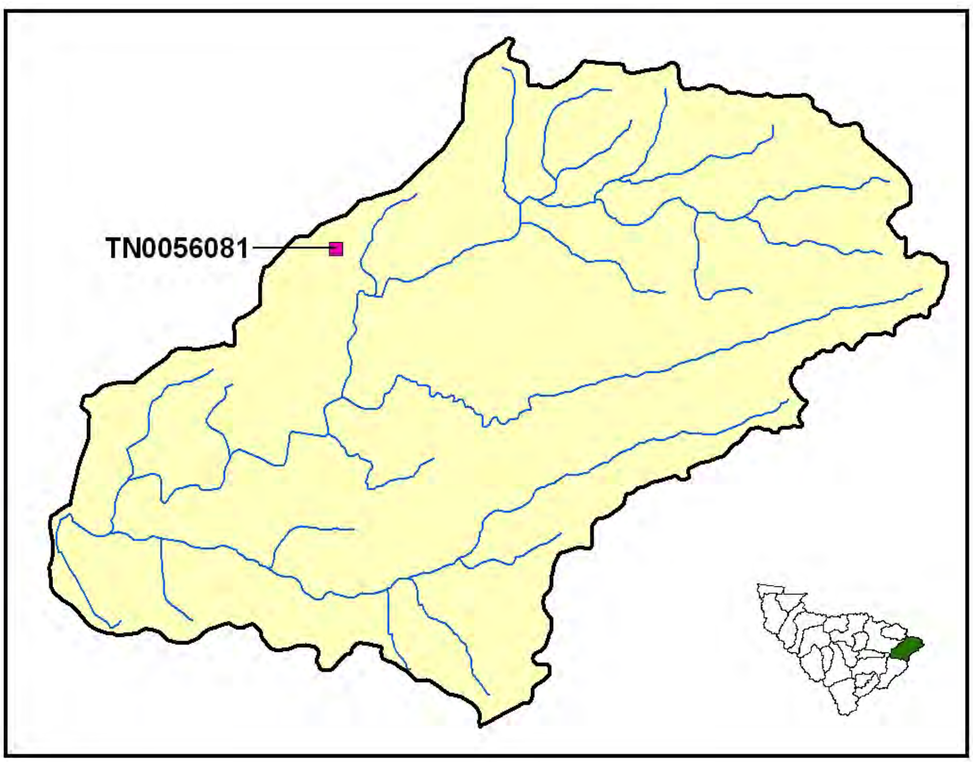


Figure 4-19. Location of Permitted Municipal and Industrial Facilities in Subwatershed 051302050102. *More information, including the name of the facility is provided in Appendix IV.*

4.2.B.iv. Nonpoint Source Contributions.

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

Table 4-9. Summary of Livestock Count Estimates by County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Cheatham	118.2	118.2	2.3	8.4
Robertson	53.0	53.0	2.2	9.7

Table 4-10. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Tobacco (Row Crops)	19.59
Soybeans (Row Crops)	9.33
Corn (Row Crops)	8.47
Wheat (Close Grown Cropland)	1.68
Grass Forbs Legumes Mixed (Pastureland)	0.82
Grass (Pastureland)	0.68
Other Cropland not Planted	0.63
Grass (Hayland)	0.49
Conservation Reserve Program Land	0.40
Legume (Hayland)	0.38
Legume Grass (Hayland)	0.30
Other Land in Farms	0.27
Farmsteads and Ranch Headquarters	0.21

Table 4-11. Annual Estimated Total Soil Loss in Subwatershed 051302050102.

4.2.C. 051302050103 (Cumberland River).

4.2.C.i. General Description.

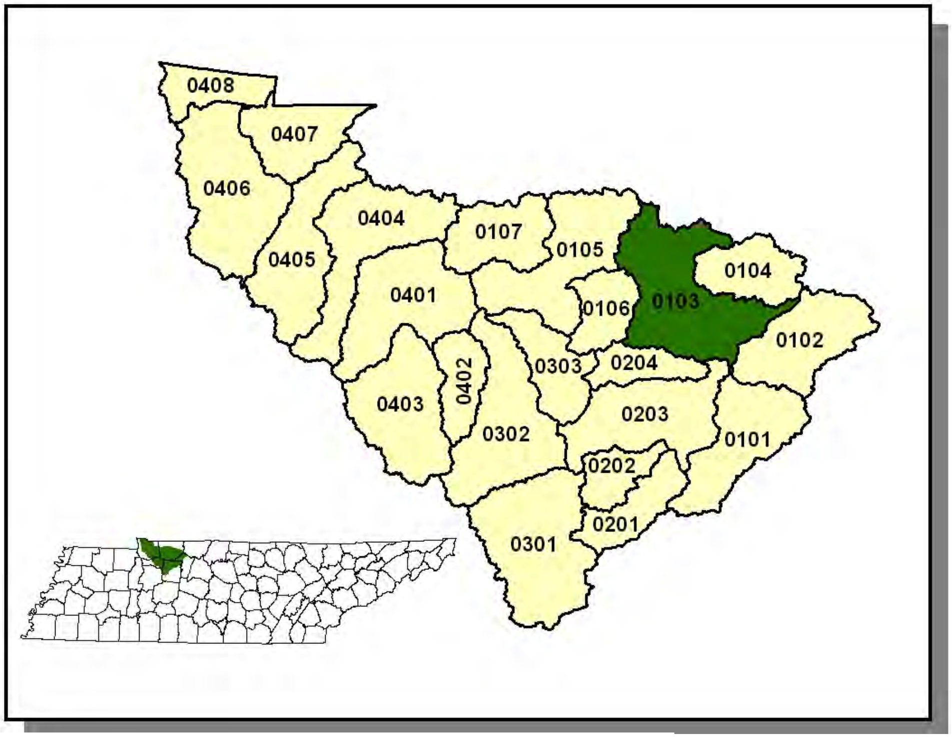


Figure 4-20. Location of Subwatershed 051302050103. All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.

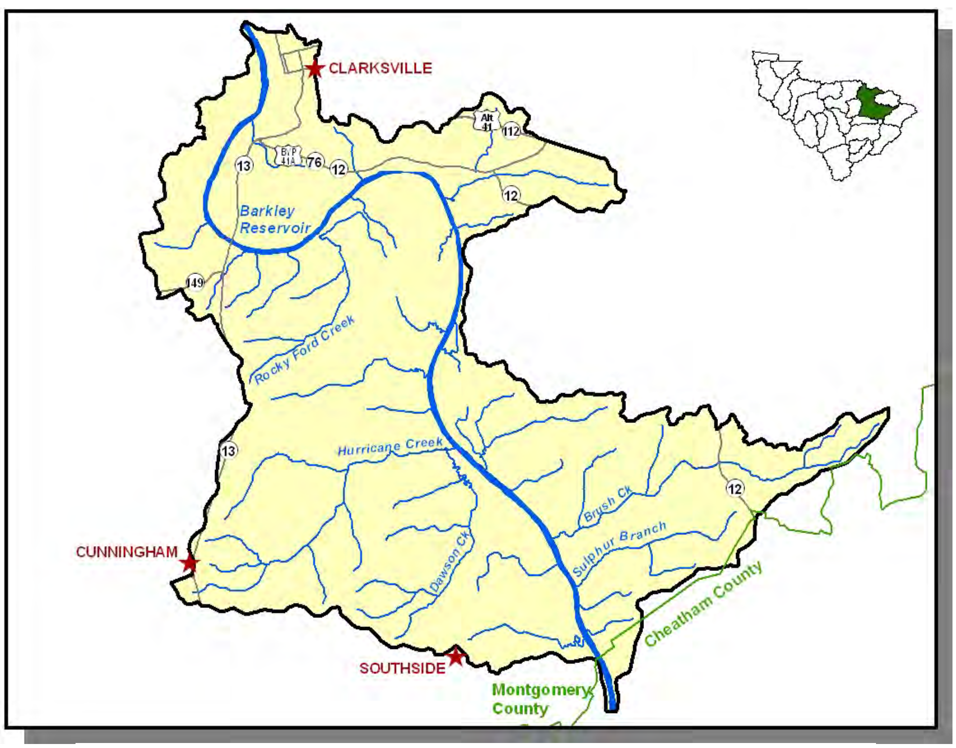


Figure 4-21. Locational Details of Subwatershed 051302050103.

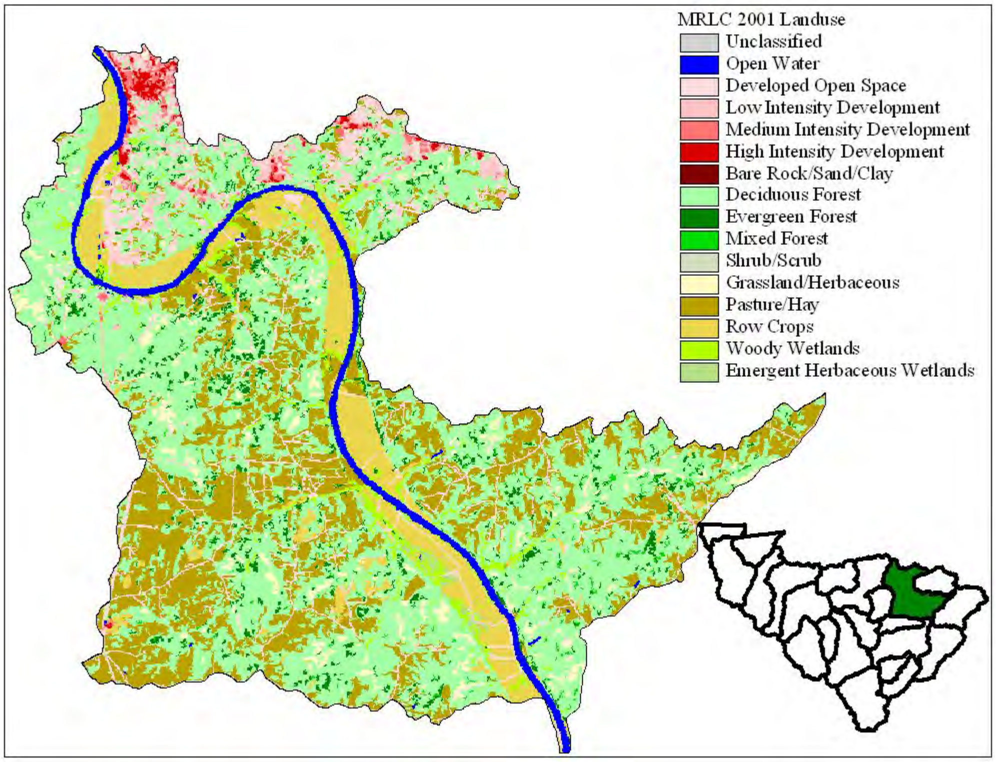


Figure 4-22. Illustration of Land Use Distribution in Subwatershed 051302050103.

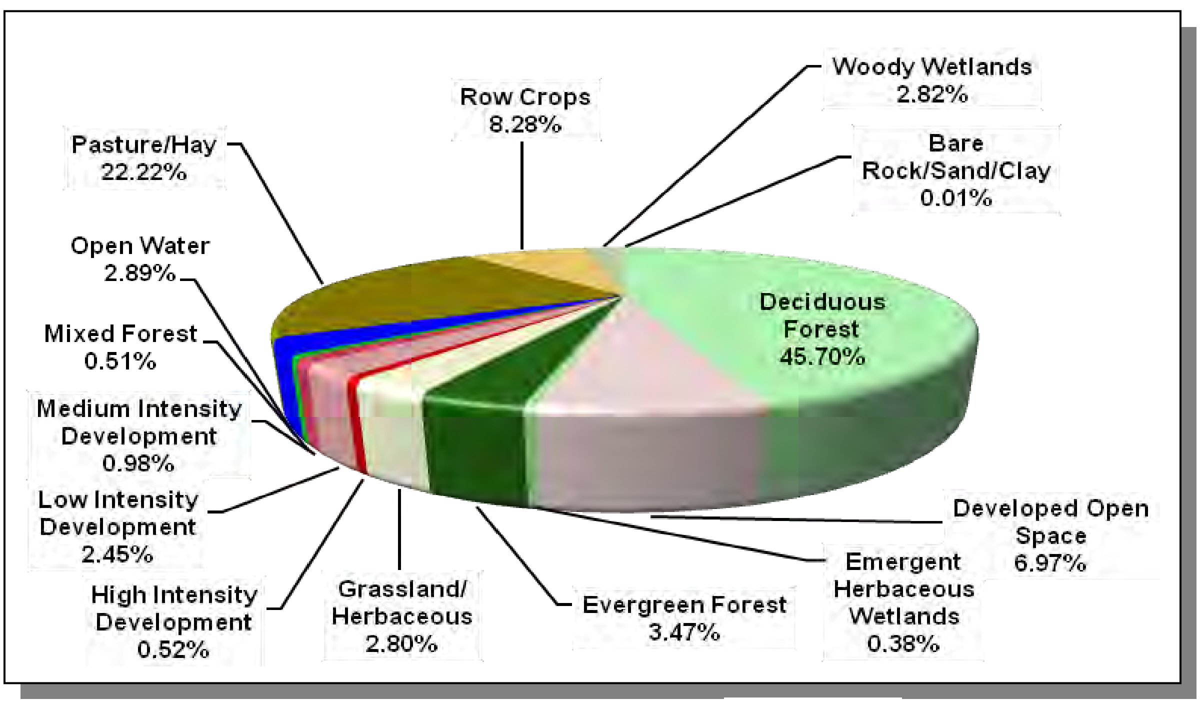


Figure 4-23. Land Use Distribution in Subwatershed 051302050103. *More information is provided in Appendix IV.*

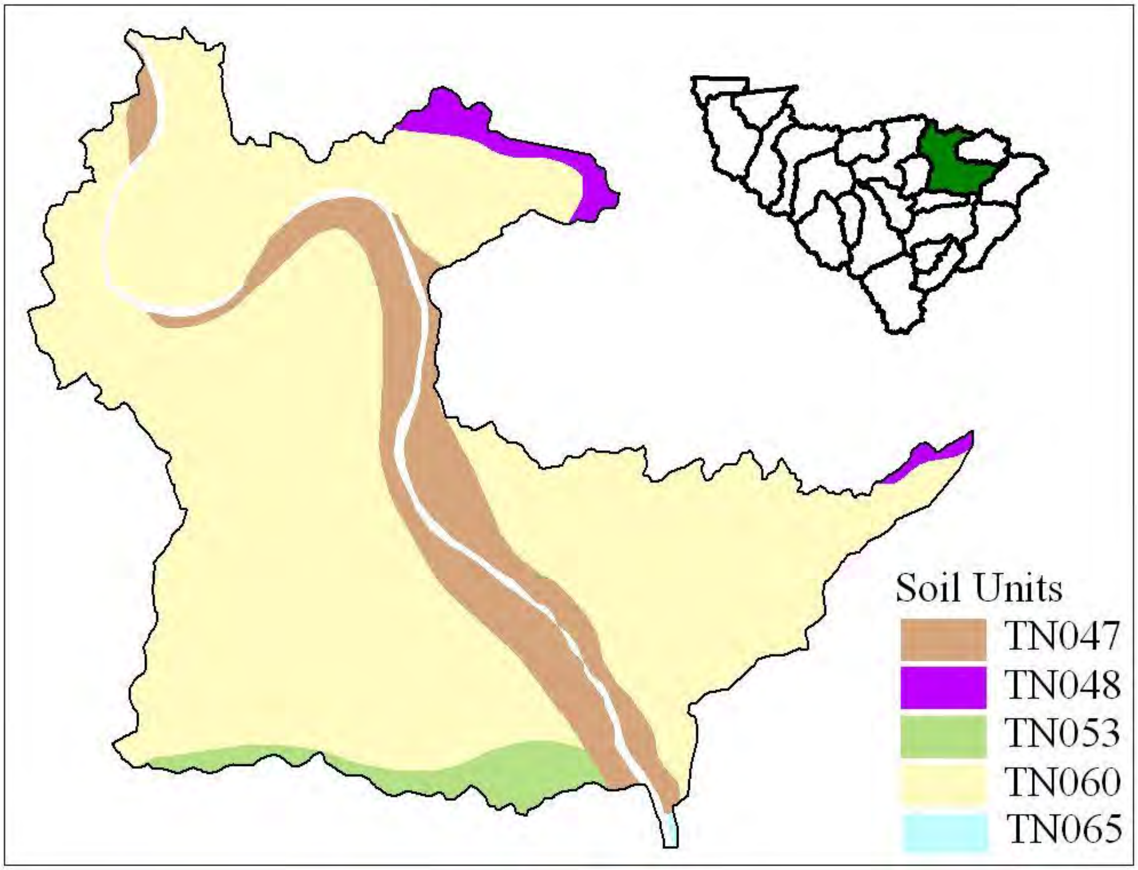


Figure 4-24. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050103.

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	C	1.38	5.06	Silty Loam	0.42
TN053	0.00	B	1.29	5.45	Loam	0.33
TN060	5.00	B	1.30	5.32	Silty Loam	0.39
TN065	0.00	C	1.15	5.52	Loam	0.32

Table 4-12. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050103. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Cheatham	27,140	34,402	35,912	0.45	123	156	163	32.50
Montgomery	100,498	124,369	134,768	13.16	13,222	16,362	17,730	34.10
Totals	**127,638**	**158,771**	**170,680**		**13,345**	**16,518**	**17,893**	**34.10**

Table 4-13. Population Estimates in Subwatershed 051302050103.

			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 4-14. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302050103.

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

Figure 4-25. Location of USGS Continuous Record Gaging Stations in Subwatershed 051302050103. *More information is provided in Appendix IV.*

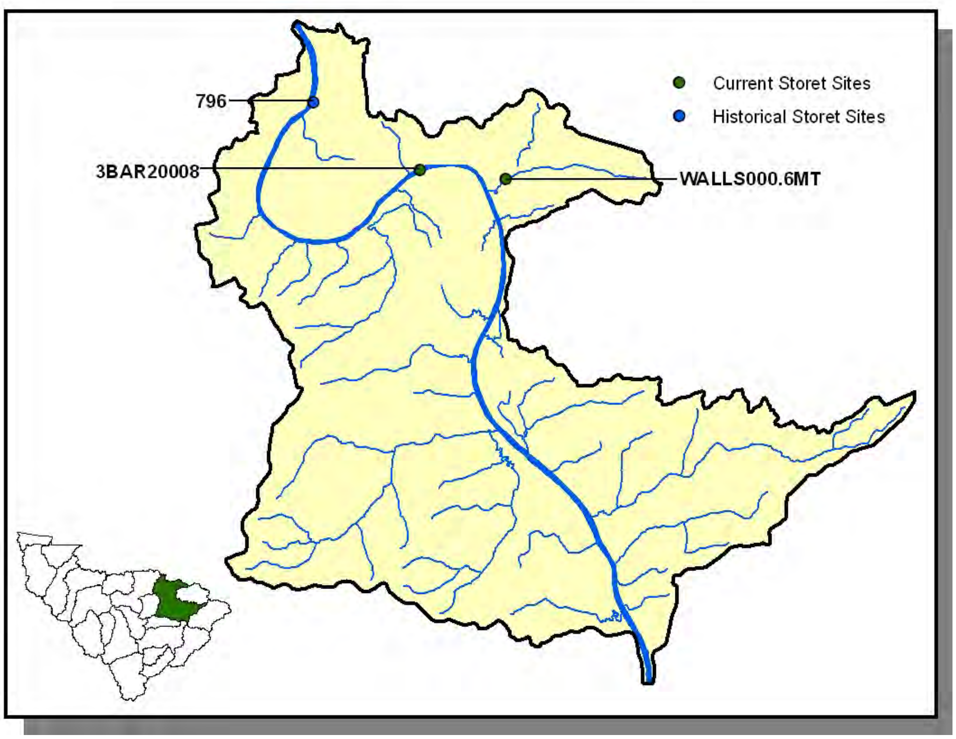


Figure 4-26. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302050103. *More information, including site names and locations, is provided in Appendix IV.*

4.2.C.iii. Permitted Activities.

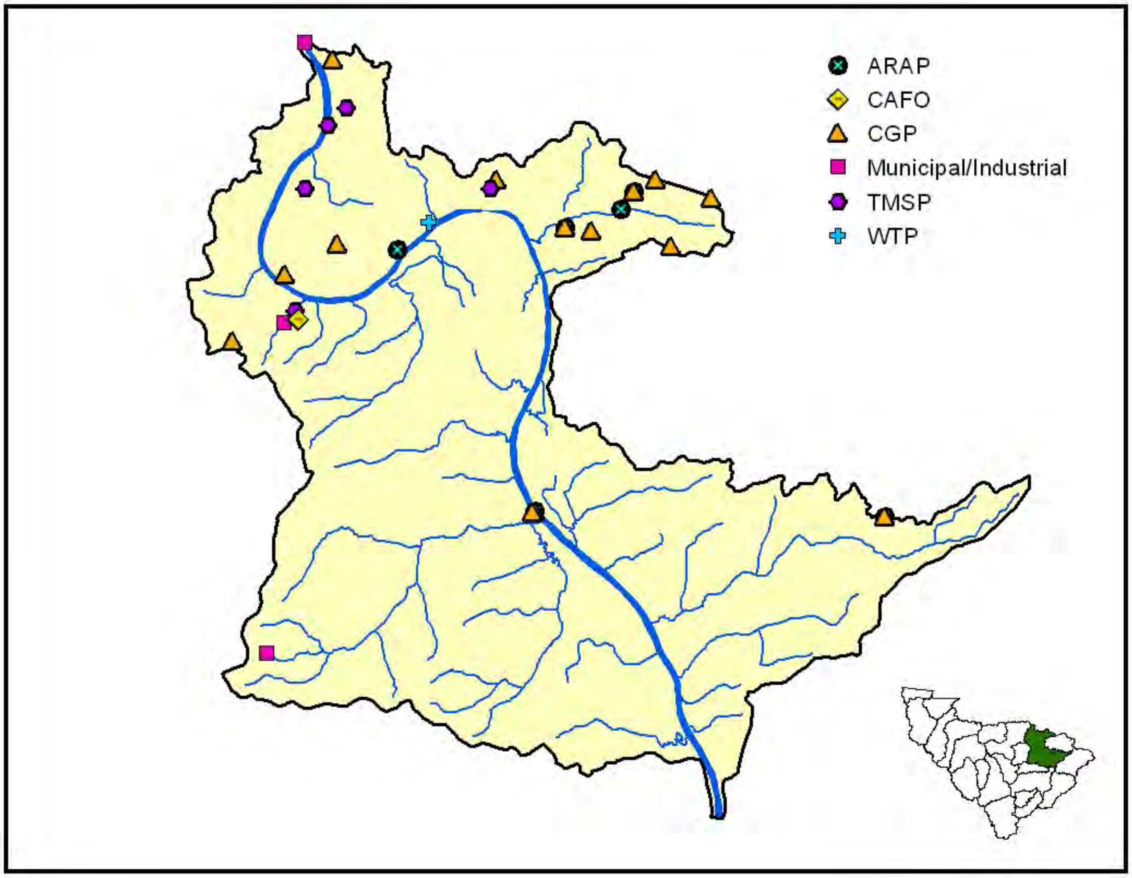


Figure 4-27. Location of Permits Issued in Subwatershed 051302050103. *More information, including the names of facilities, is provided in Appendix IV.*

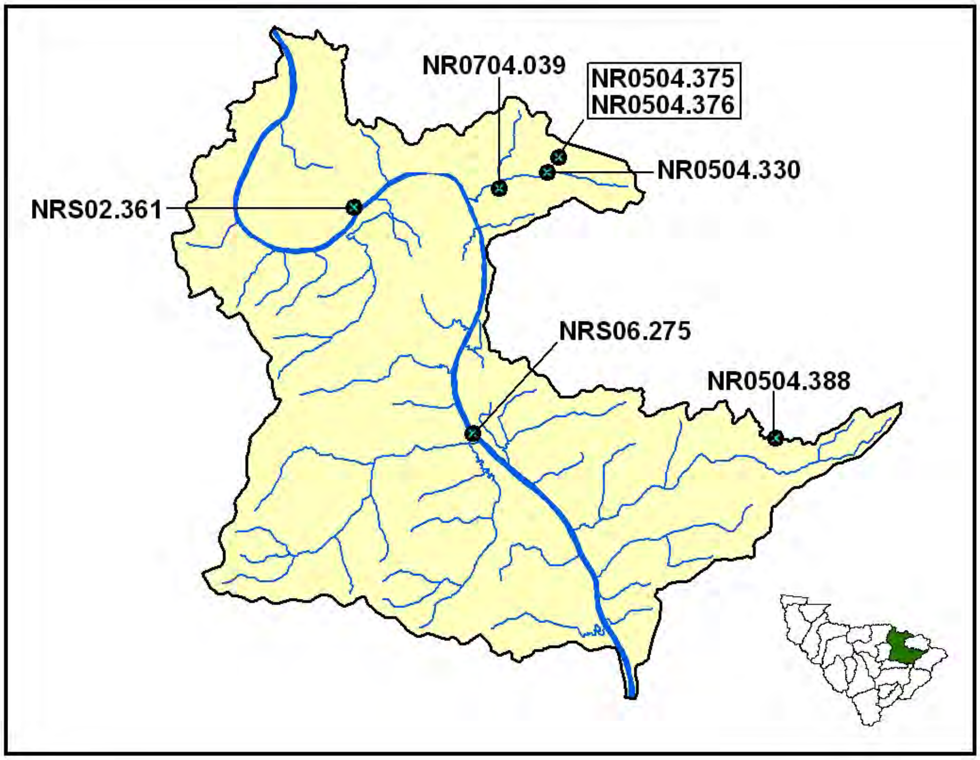


Figure 4-28. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 051302050103. *More information is provided in Appendix IV.*

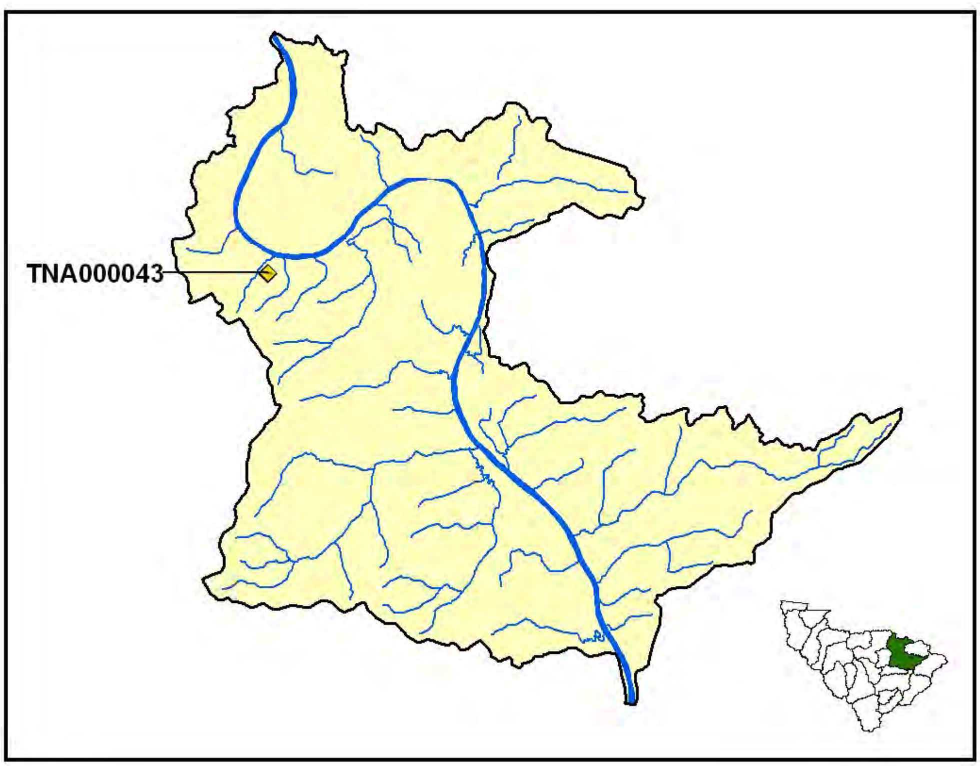


Figure 4-29. Location of CAFO (Concentrated Animal Feel Operation) Permit Sites in Subwatershed 051302050103. *More information, including the names of facilities, is provided in Appendix IV.*

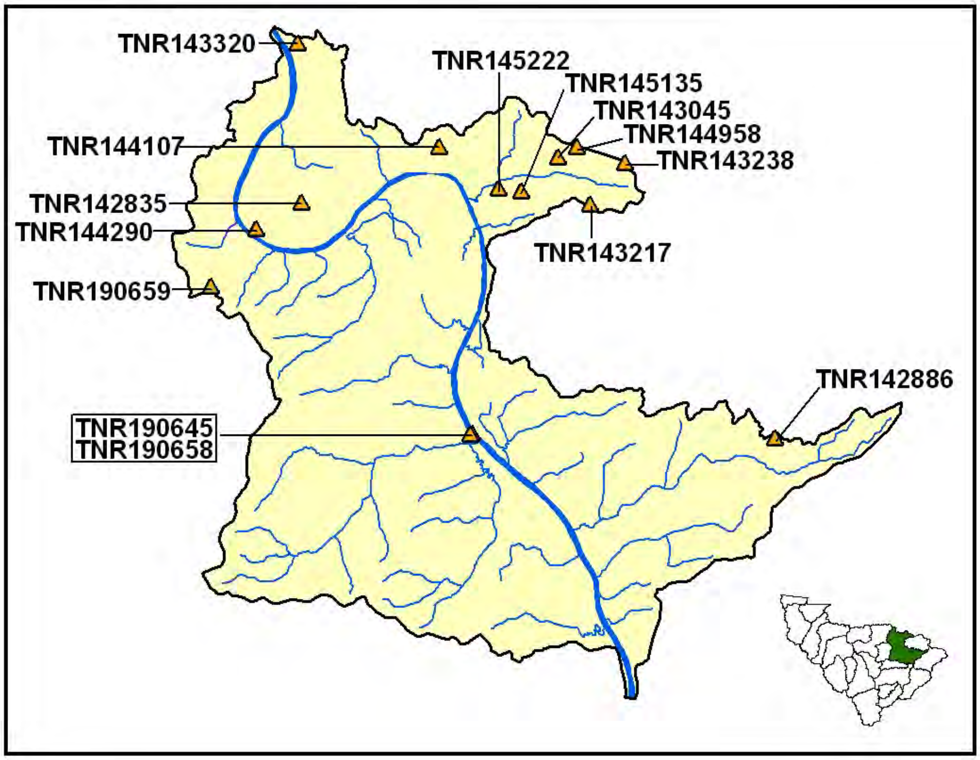


Figure 4-30. Location of CGP (Construction General Permit) Sites in Subwatershed 051302050103. *More information is provided in Appendix IV.*

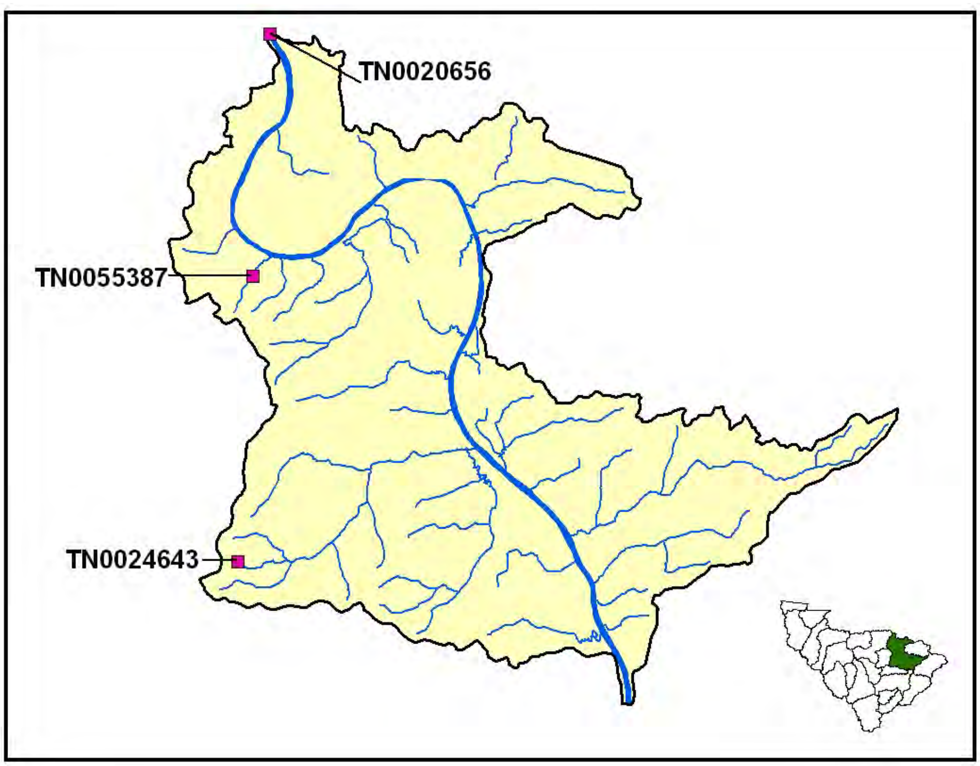


Figure 4-31. Location of Permitted Municipal and Industrial Facilities in Subwatershed 051302050103. *More information, including the name of the facility is provided in Appendix IV.*

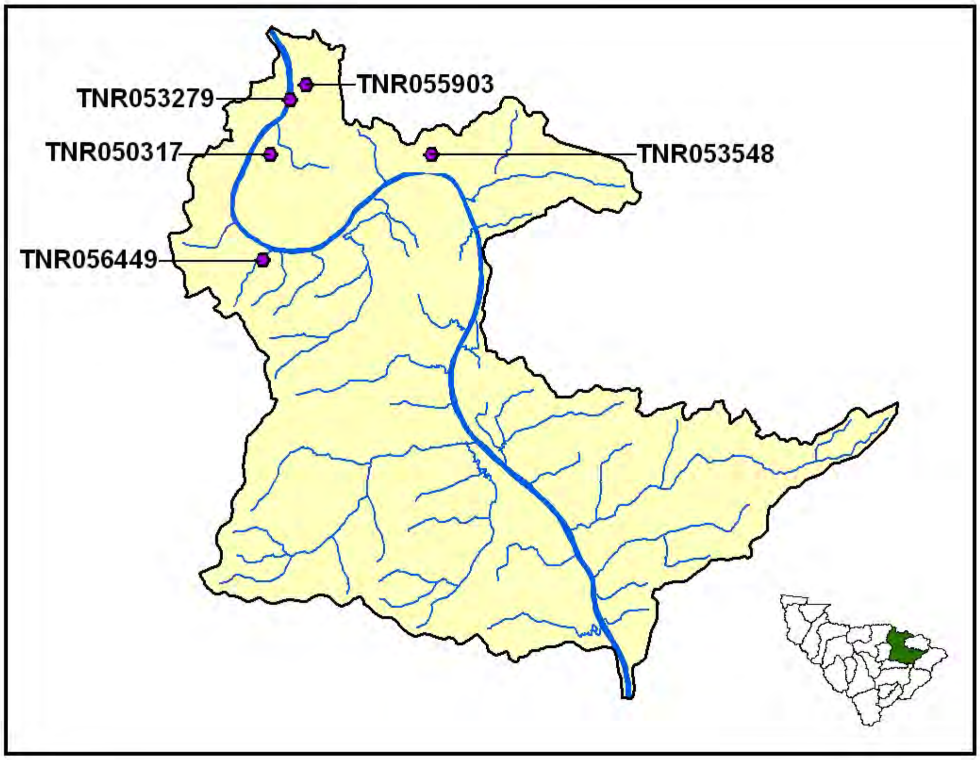


Figure 4-32. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 051302050103. *More information is provided in Appendix IV.*

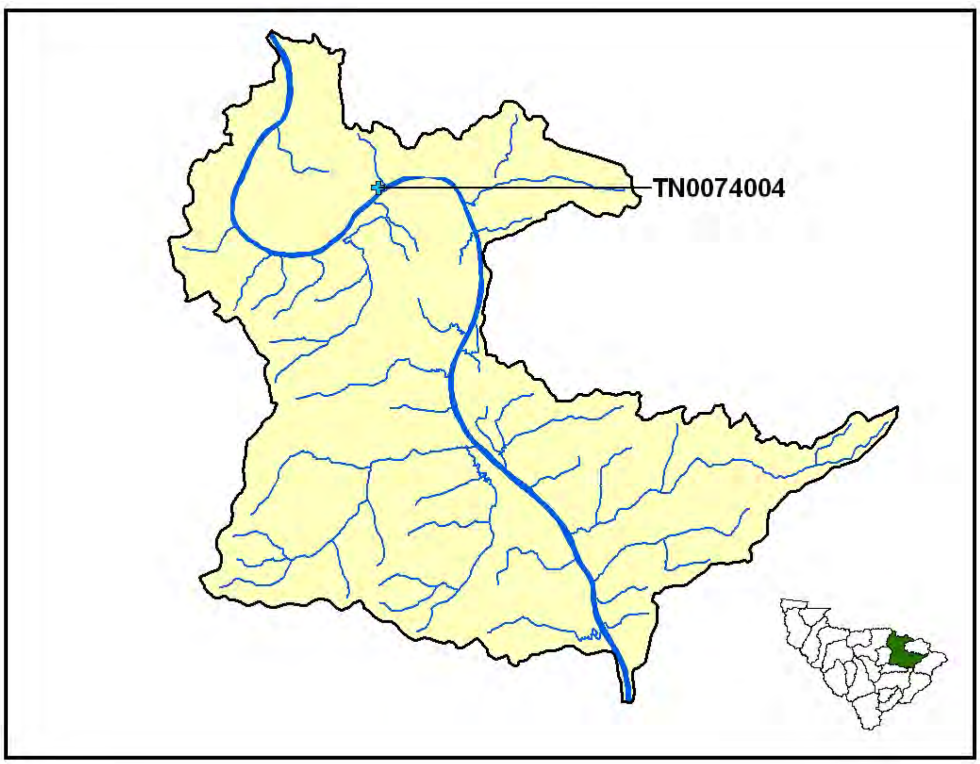


Figure 4-33. Location of Active Water Treatment Plant (WTP) Facilities in Subwatershed 051302050103. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.C.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Cheatham		11,429		121	1,183	
Montgomery	16,051	30,959	760	913	1,408	107

Table 4-15. Summary of Livestock Count Estimates by County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Cheatham	118.2	118.2	2.3	8.4

Table 4-16. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Tobacco (Row Crops)	22.25
Corn (Row Crops)	8.05
Soybeans (Row Crops)	4.36
Grass Forbs Legumes Mixed (Pastureland)	0.56
Other Cropland not Planted	0.52
Grass (Pastureland)	0.45
Conservation Reserve Program Land	0.41
Legume Grass (Hayland)	0.40
Legume (Hayland)	0.38
Grass (Hayland)	0.29
Farmsteads and Ranch Headquarters	0.04

Table 4-17. Annual Estimated Total Soil Loss in Subwatershed 051302050103.

4.2.D. 051302050104 (Big McAdoo Creek).

4.2.D.i. General Description

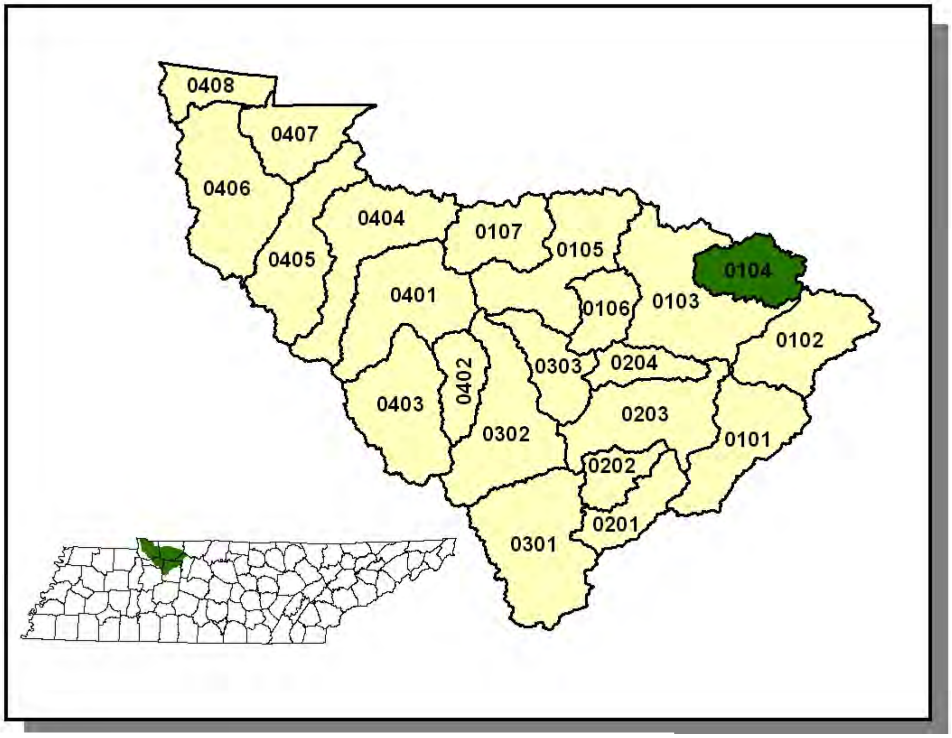


Figure 4-34. Location of Subwatershed 051302050104. All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.

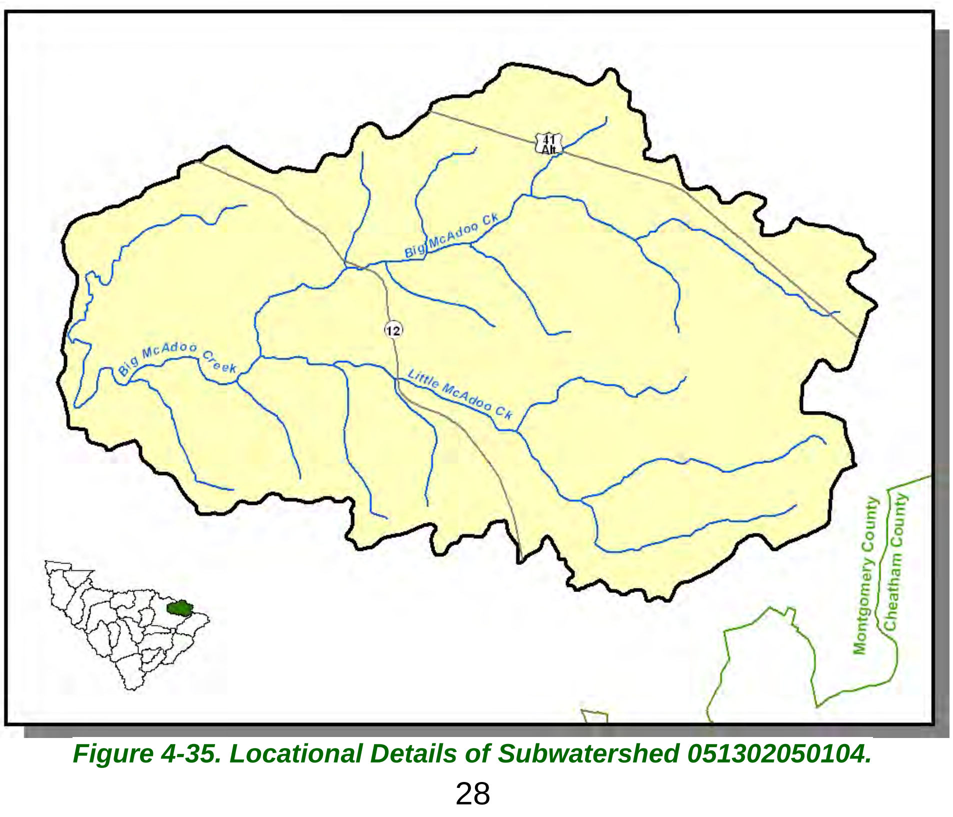


Figure 4-35. Locational Details of Subwatershed 051302050104.

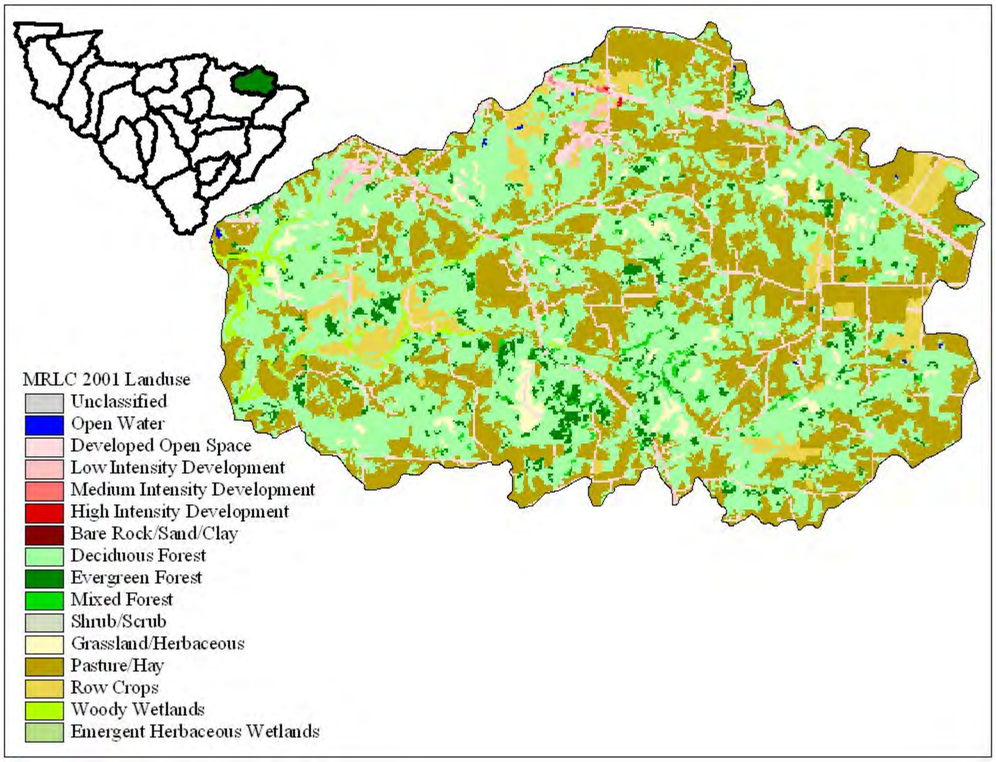


Figure 4-36. Illustration of Land Use Distribution in Subwatershed 051302050104.

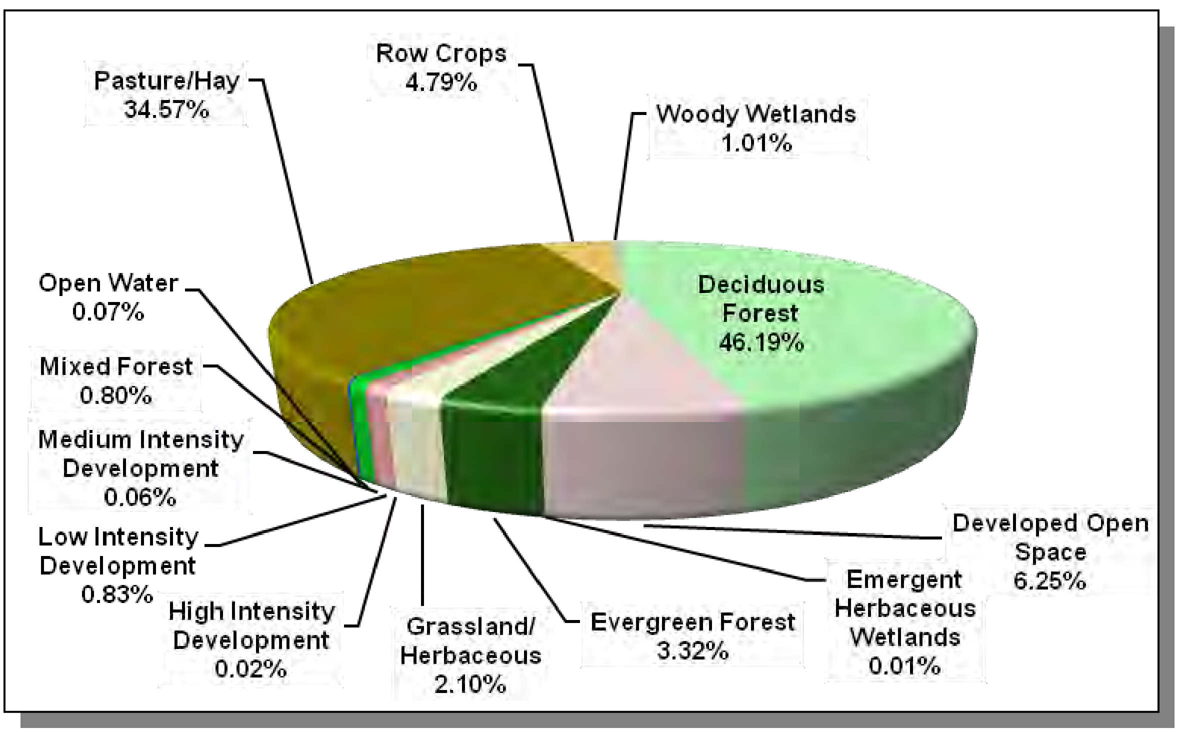


Figure 4-37. Land Use Distribution in Subwatershed 051302050104. *More information is provided in Appendix IV.*

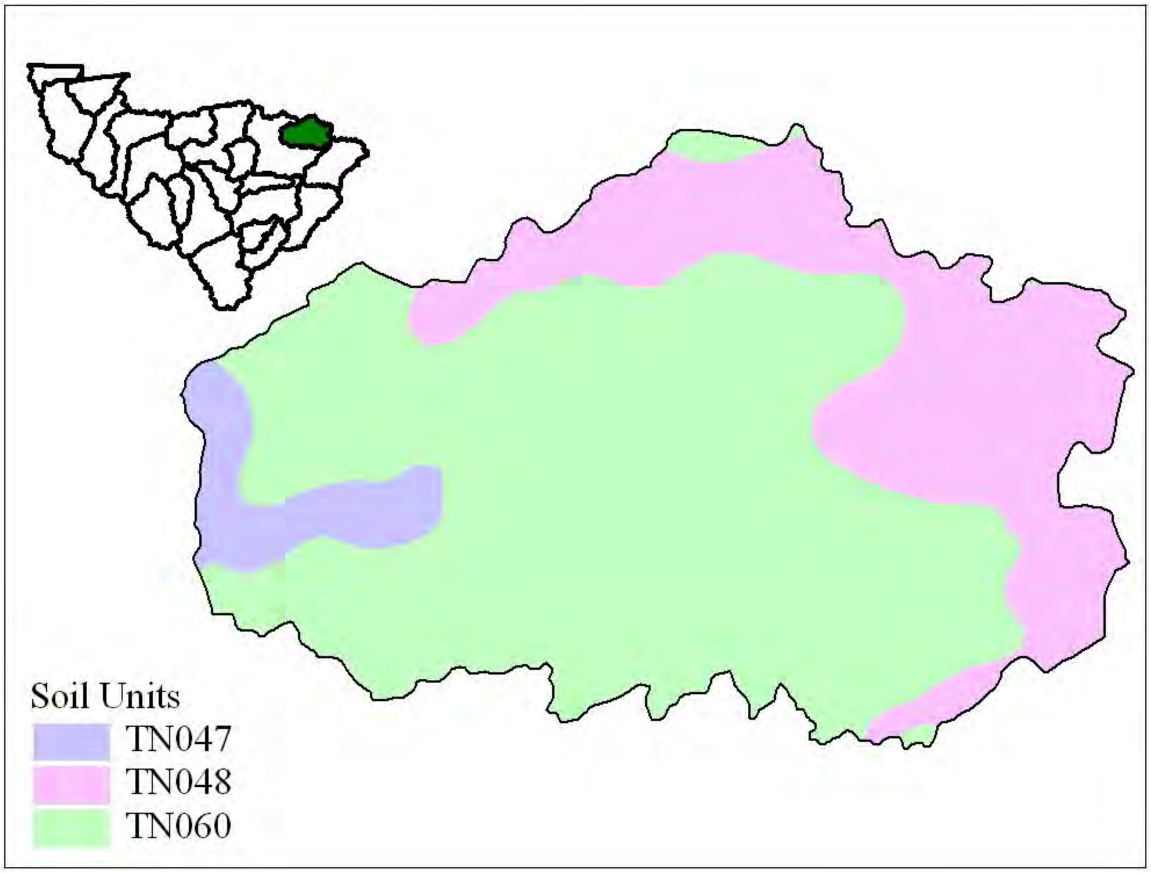


Figure 4-38. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050104.

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	C	1.38	5.06	Silty Loam	0.42
TN060	5.00	B	1.30	5.32	Silty Loam	0.39

Table 4-18. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050104. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Montgomery	100,498	124,369	134,768	5.32	5,342	6611	7,163	34.10

Table 4-19. Population Estimates in Subwatershed 051302050104.

			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 4-20. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302050104.

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

There are no continuous record gaging stations located in subwatershed 051302050104.

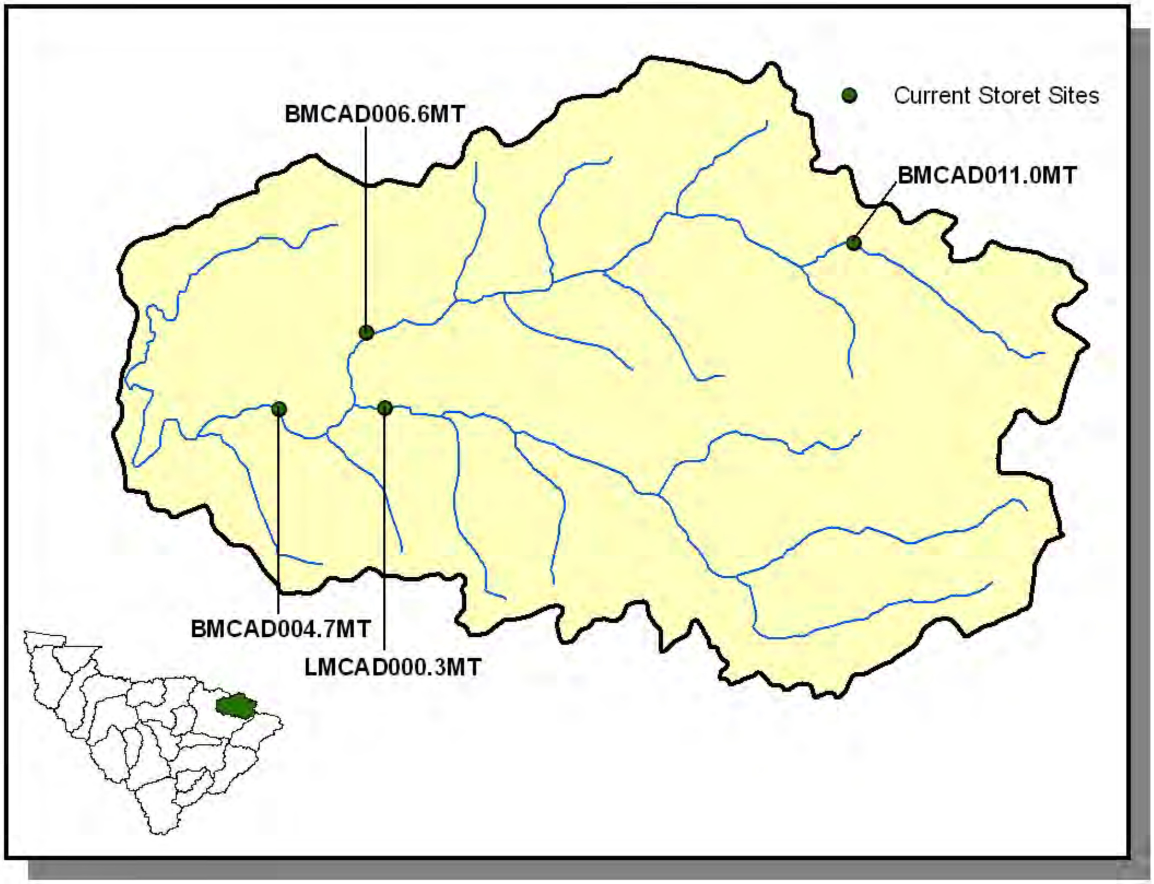


Figure 4-39. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302050104. *More information, including site names and locations, is provided in Appendix IV.*

4.2.D.iii. Permitted Activities.

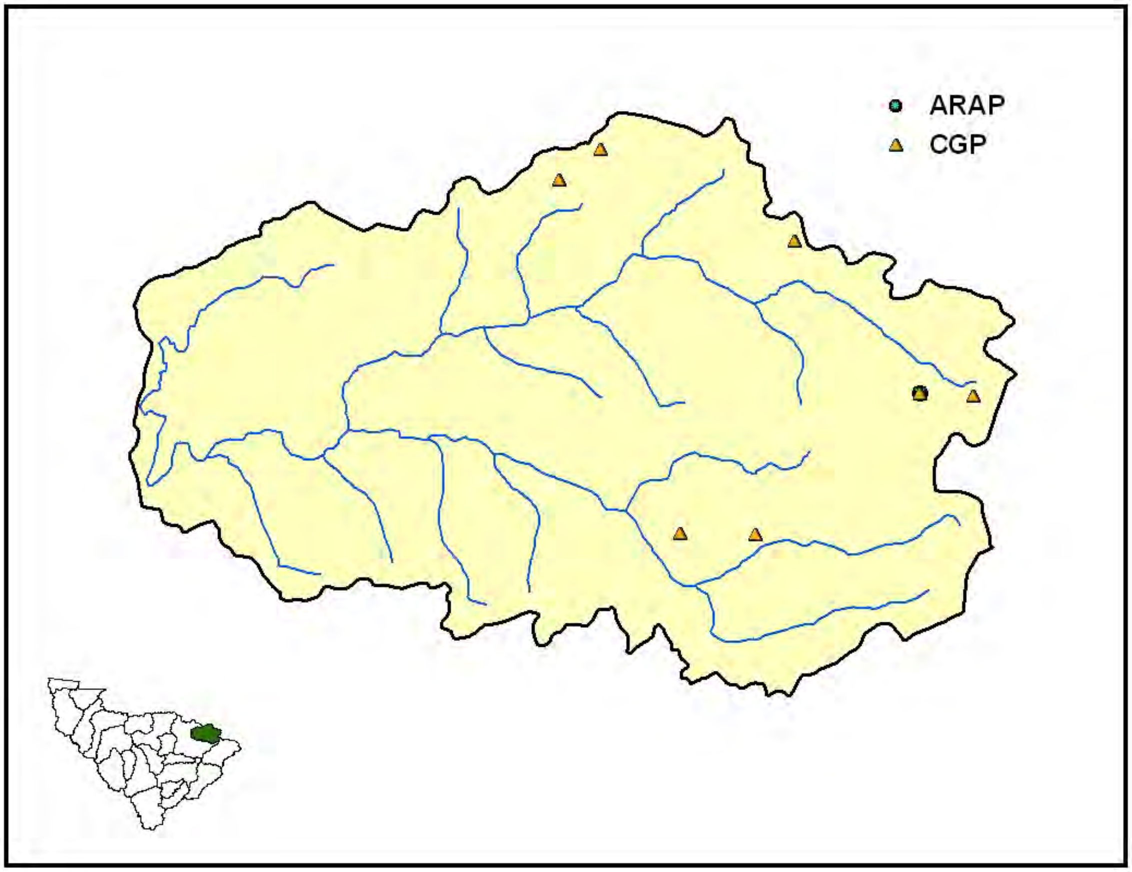


Figure 4-40. Location of Permits Issued in Subwatershed 051302050104. *More information, including the names of facilities, is provided in Appendix IV.*

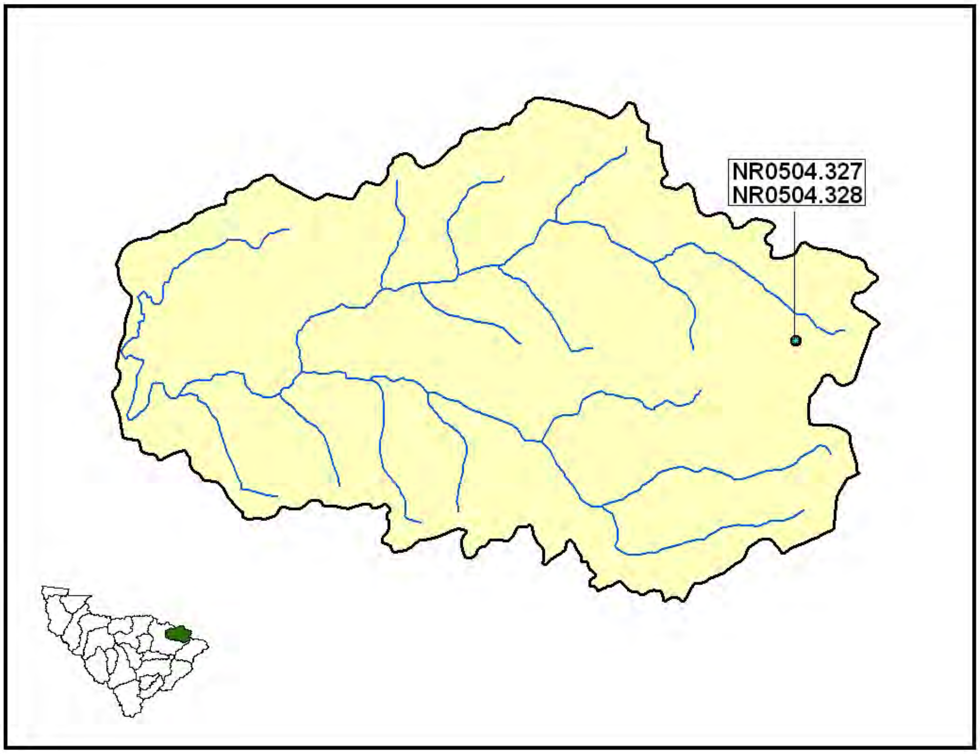


Figure 4-41. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 051302050104. *More information is provided in Appendix IV.*

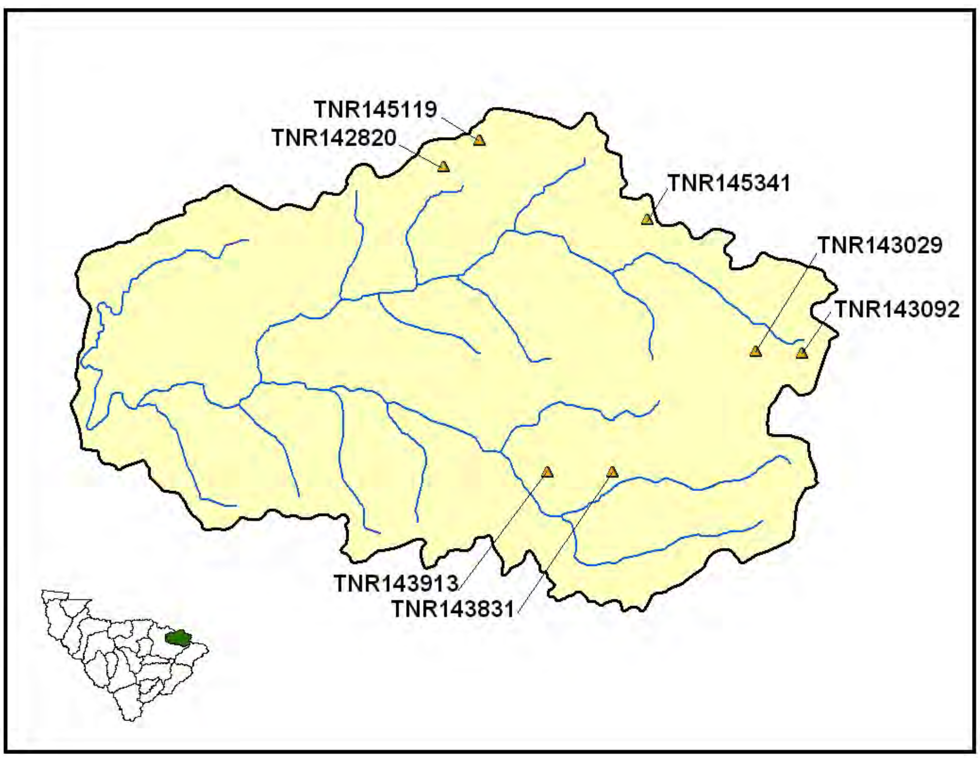


Figure 4-42. Location of CGP (Construction General Permit) Sites in Subwatershed 051302050104. *More information is provided in Appendix IV.*

4.2.D.iv. Nonpoint Source Contributions.

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

Table 4-21. Summary of Livestock Count Estimates by County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

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

Table 4-22. Annual Estimated Total Soil Loss in Subwatershed 051302050104.

4.2.E. 051302050105 (Cumberland River).

4.2.E.i. General Description.

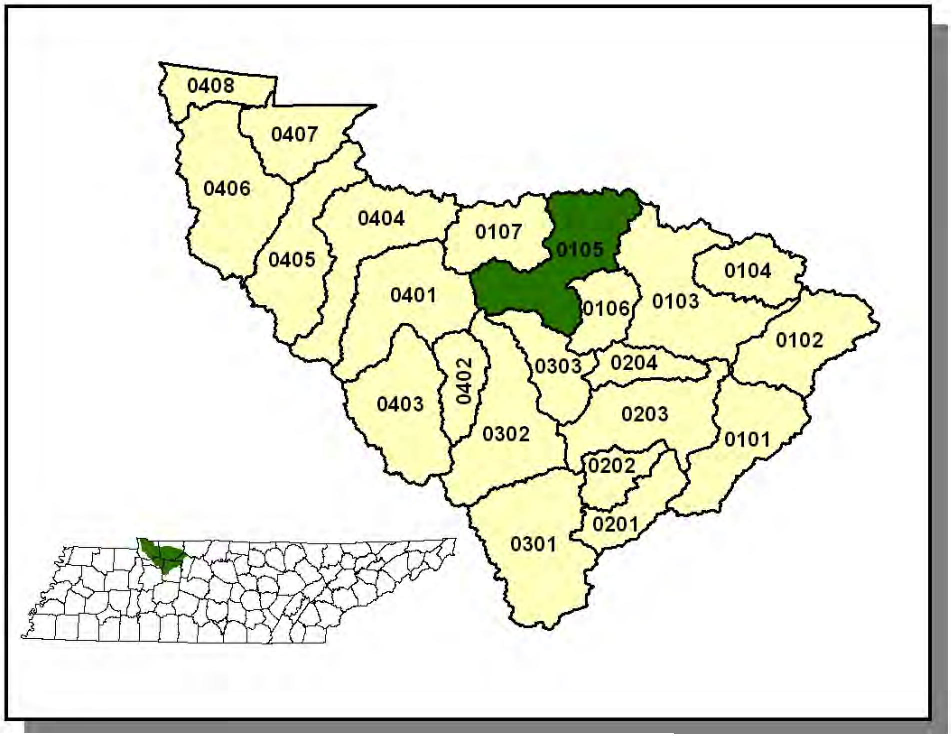


Figure 4-43. Location of Subwatershed 051302050105. All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.

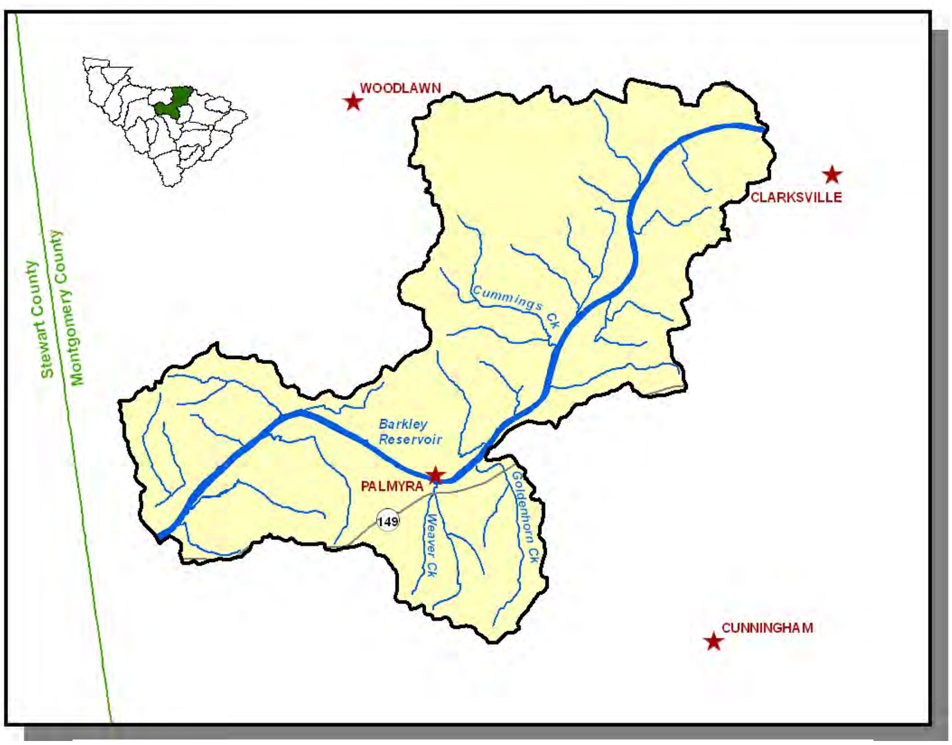


Figure 4-44. Locational Details of Subwatershed 051302050105.

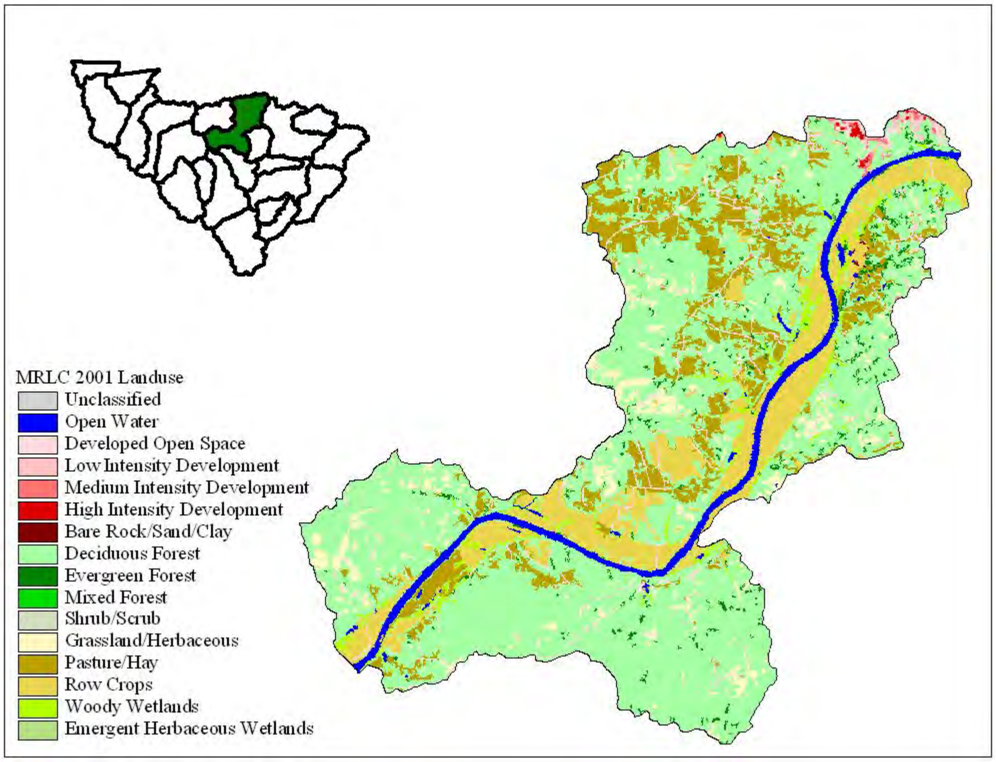


Figure 4-45. Illustration of Land Use Distribution in Subwatershed 051302050105.

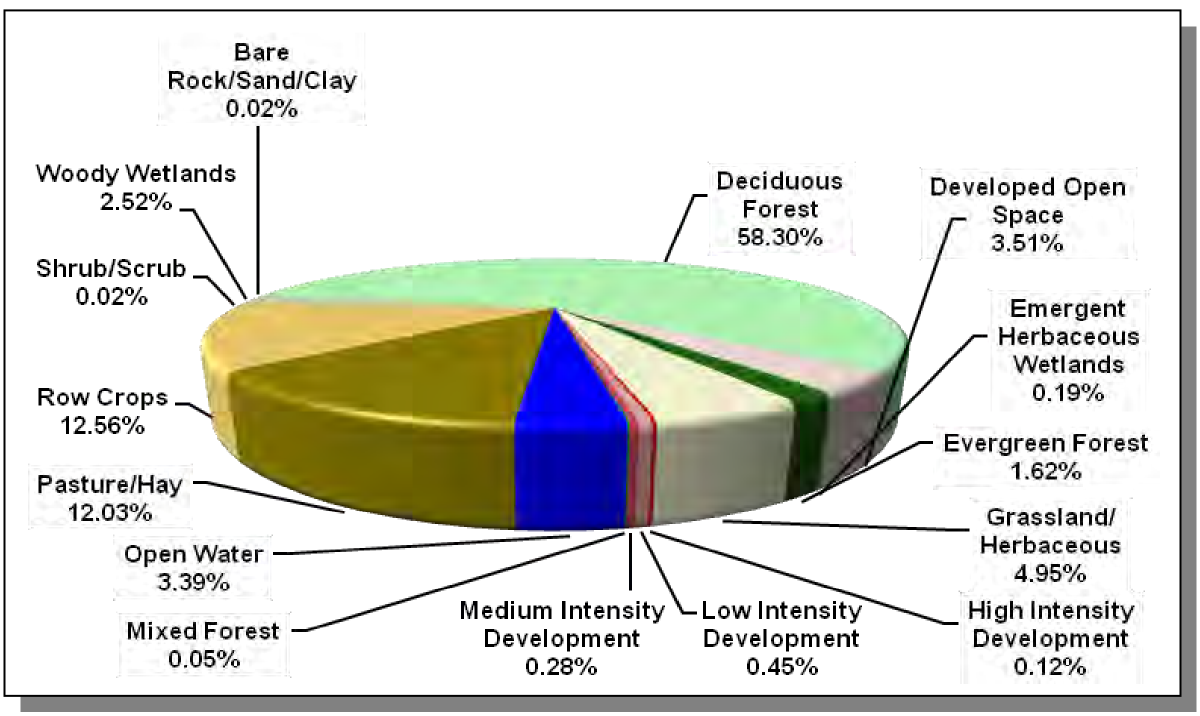


Figure 4-46. Land Use Distribution in Subwatershed 051302050105. *More information is provided in Appendix IV.*

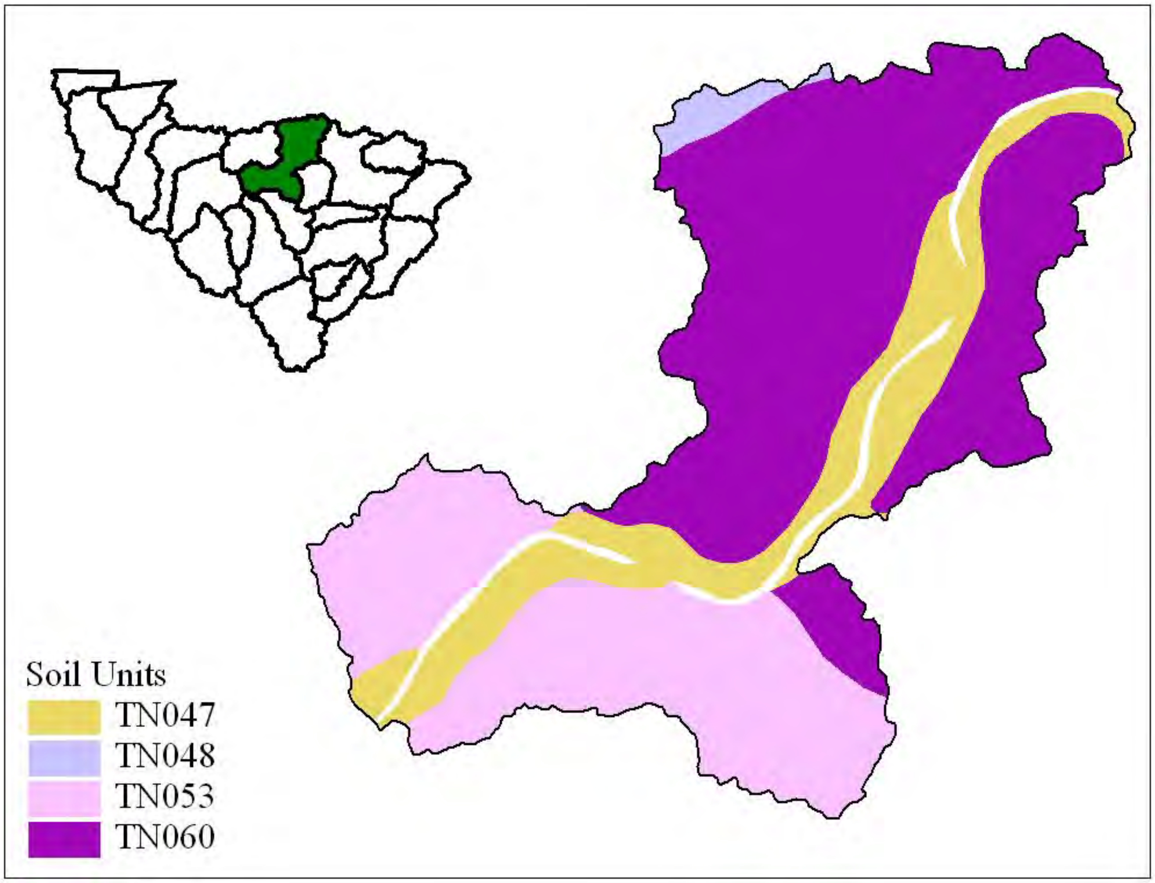


Figure 4-47. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050105.

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	C	1.38	5.06	Silty Loam	0.42
TN053	0.00	B	1.29	5.45	Loam	0.33
TN060	5.00	B	1.30	5.32	Silty Loam	0.39

Table 4-23. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050105. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Montgomery	100,498	124,369	134,768	11.0	11,056	1,3682	14,826	34.1

Table 4-24. Population Estimates in Subwatershed 051302050105.

			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 4-25. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302050105.

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

There are no USGS continuous record gaging stations located in subwatershed 051302050105.

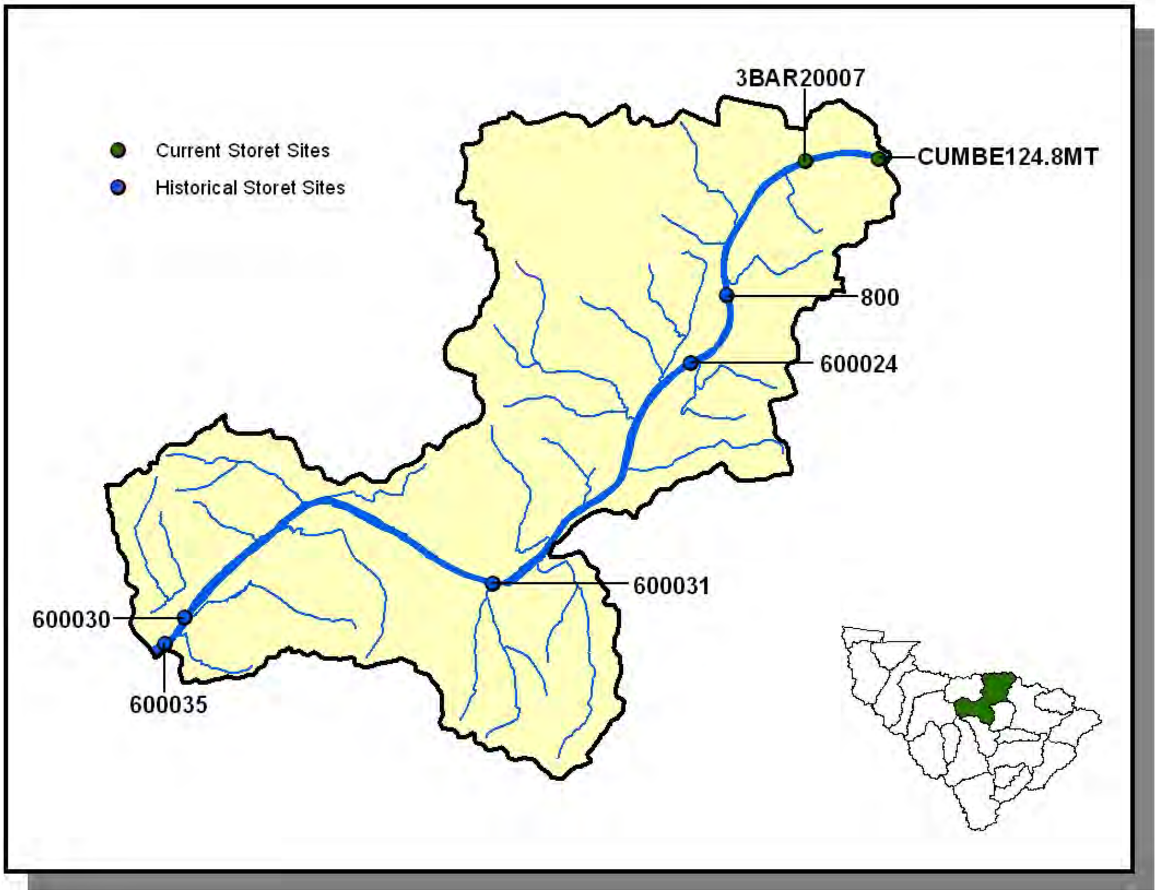


Figure 4-48. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302050105. *More information, including site names and locations, is provided in Appendix IV.*

4.2.E.iii. Permitted Activities.

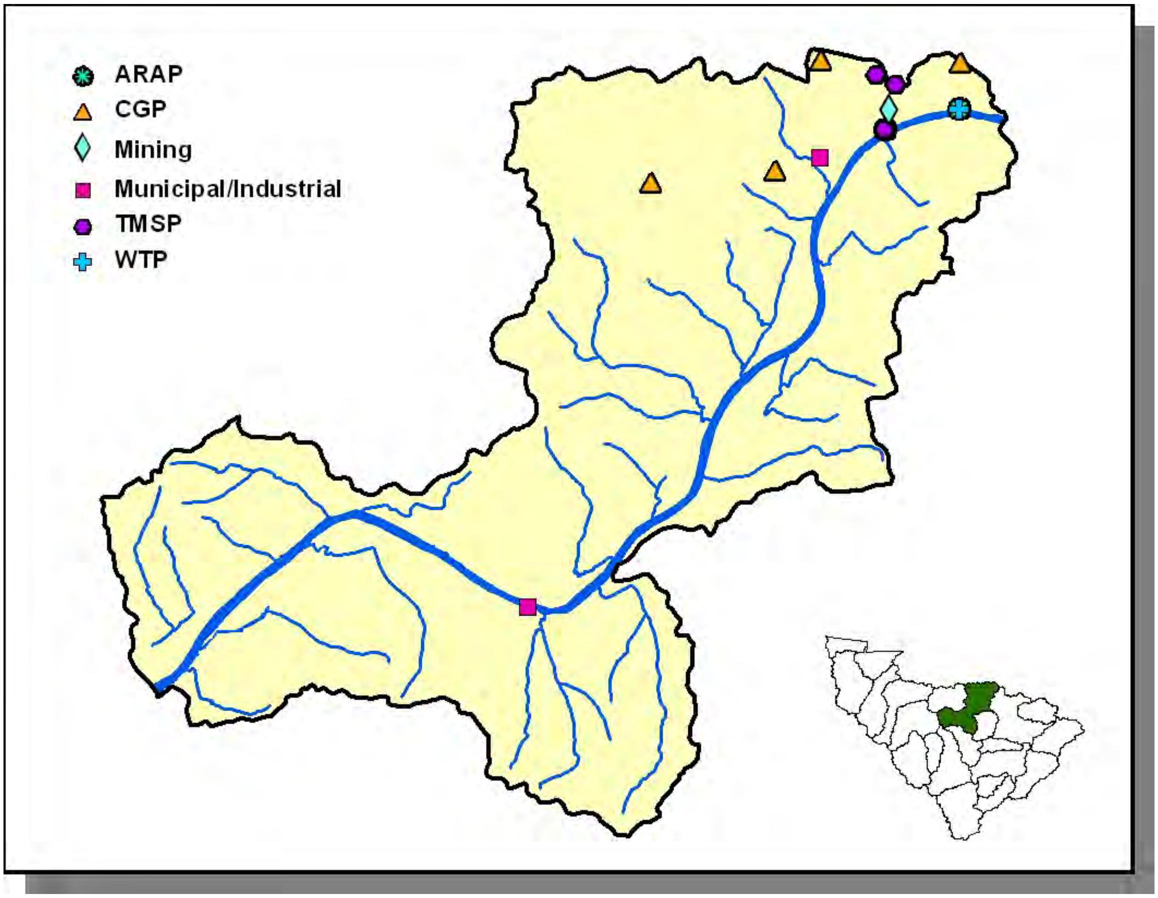


Figure 4-49. Location of Permits Issued in Subwatershed 051302050105. *More information, including the names of facilities, is provided in Appendix IV.*

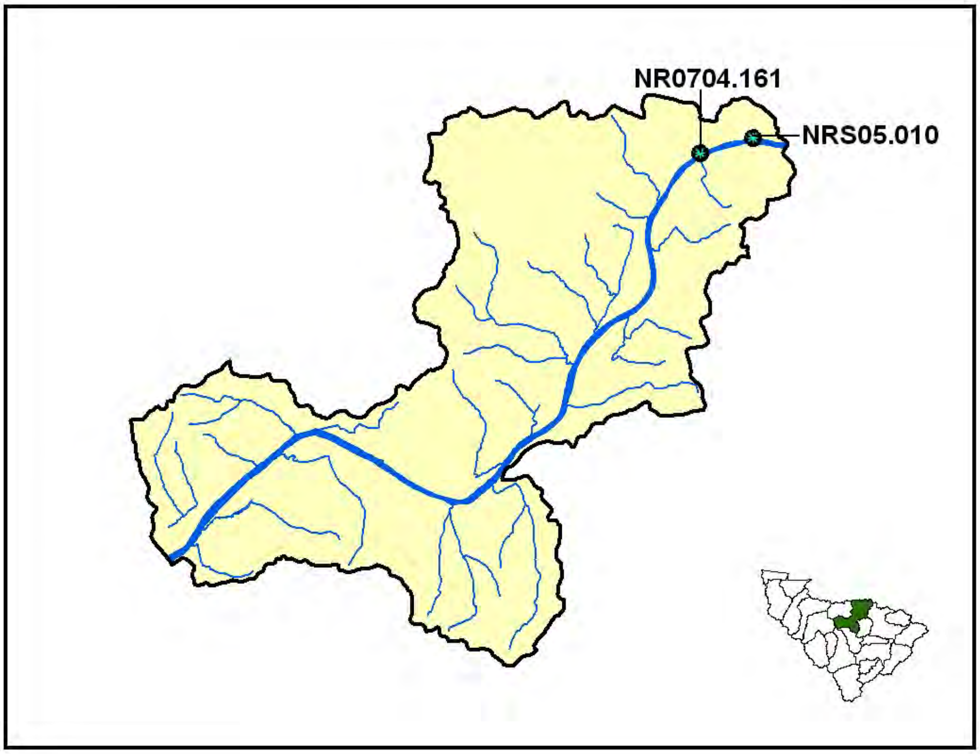


Figure 4-50. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 051302050105. *More information is provided in Appendix IV.*

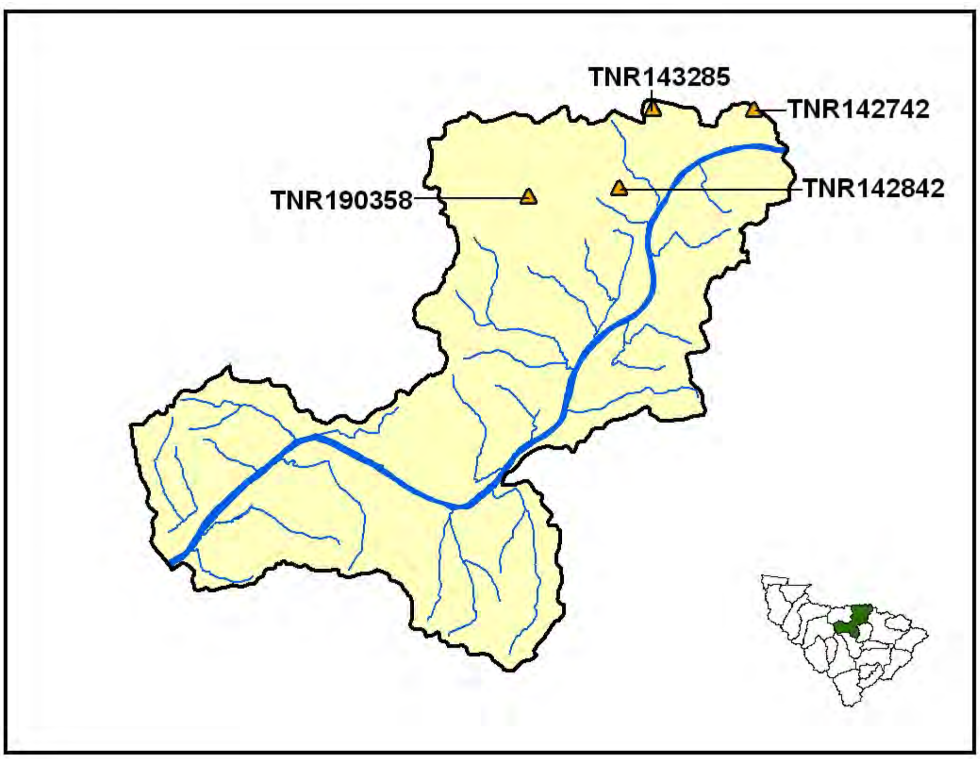


Figure 4-51. Location of CGP (Construction General Permit) Sites in Subwatershed 051302050105. *More information is provided in Appendix IV.*

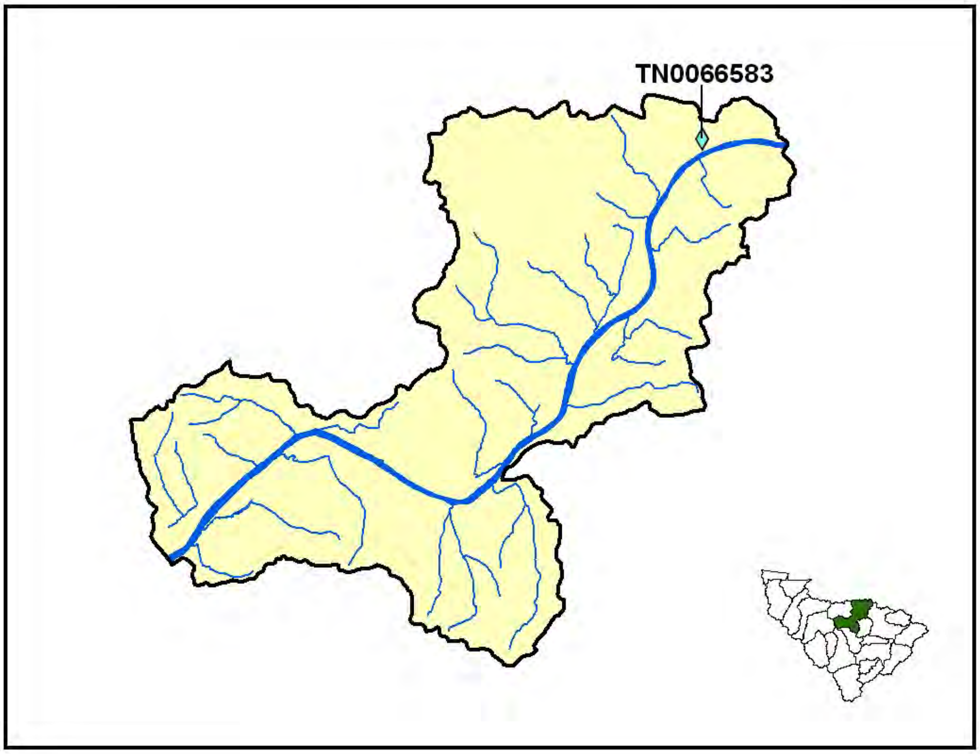


Figure 4-52. Location of Permitted Mining Facilities in Subwatershed 051302050105. *More information is provided in Appendix IV.*

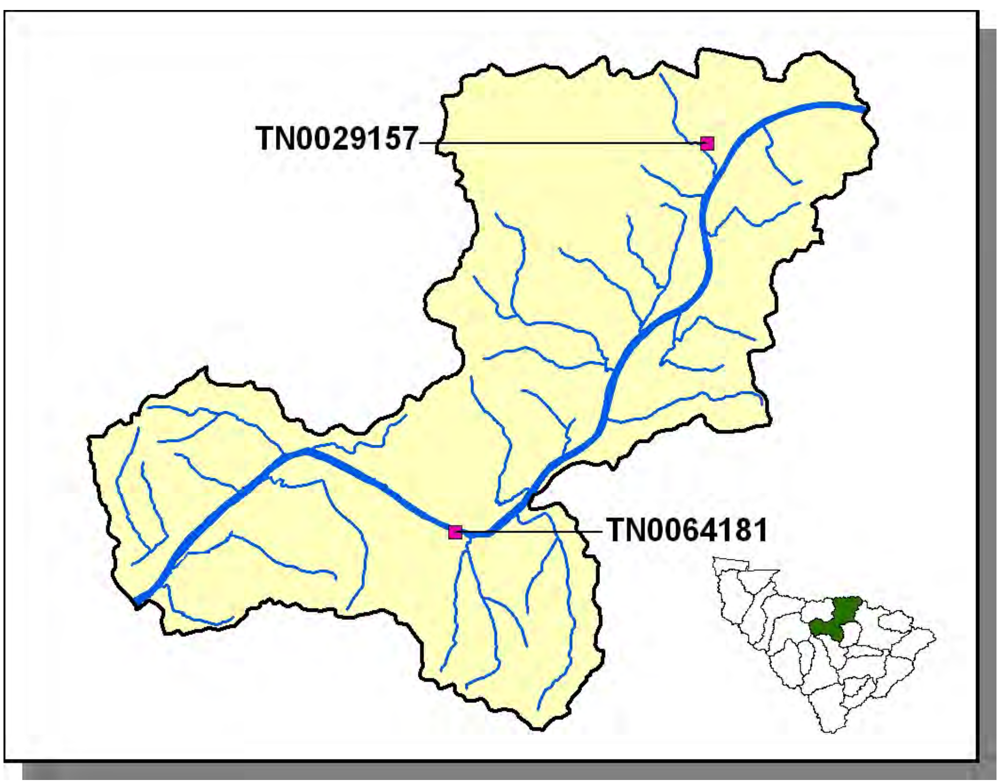


Figure 4-53. Location of Permitted Municipal and Industrial Facilities in Subwatershed 051302050105. *More information, including the name of the facility is provided in Appendix IV.*

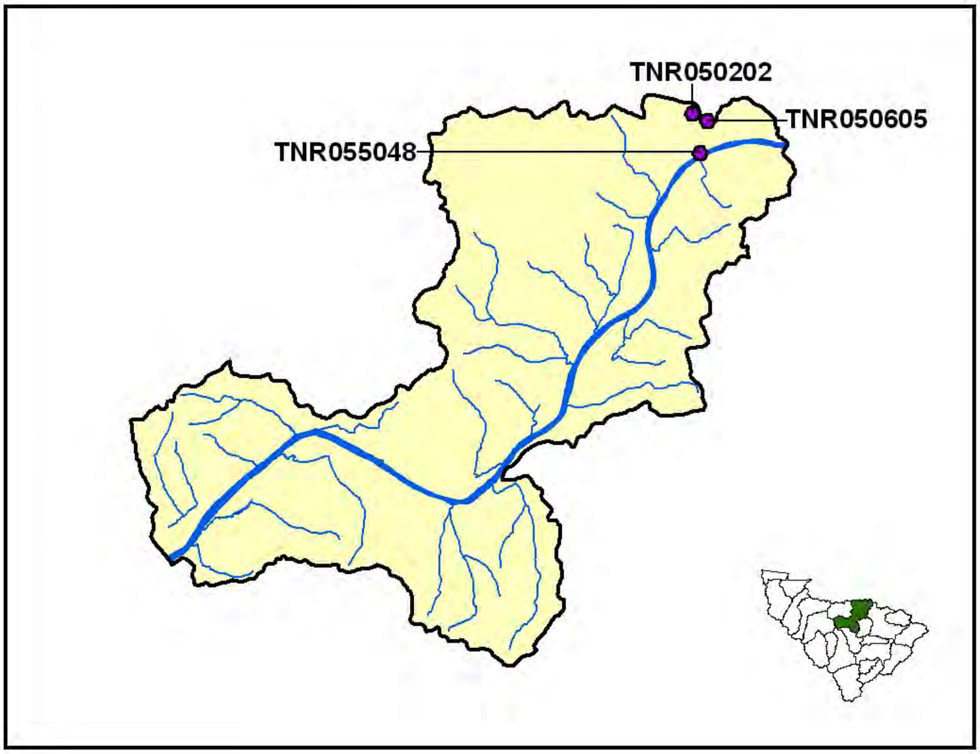


Figure 4-54. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 051302050105. *More information is provided in Appendix IV.*

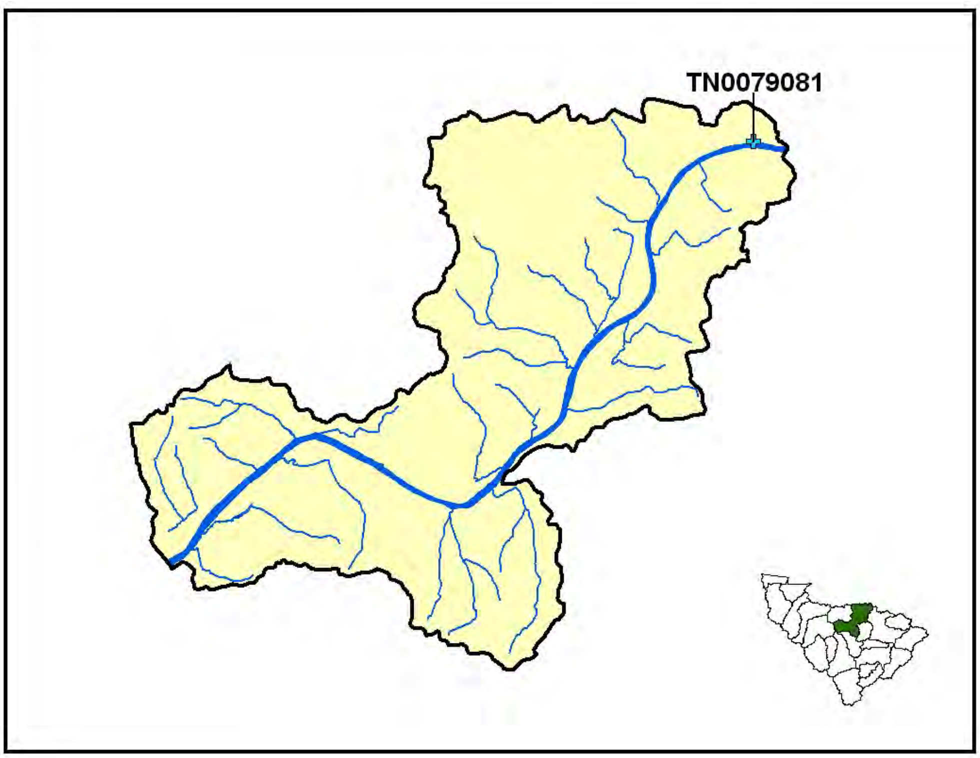


Figure 4-55. Location of Active Water Treatment Plants (WTP) Facilities in Subwatershed 051302050105. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.E.iv. Nonpoint Source Contributions.

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

Table 4-26. Summary of Livestock Count Estimates by County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

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

Table 4-27. Annual Estimated Total Soil Loss in Subwatershed 051302050105.

4.2.F. 051302050106 (Budds Creek).

4.2.F.i. General Description.

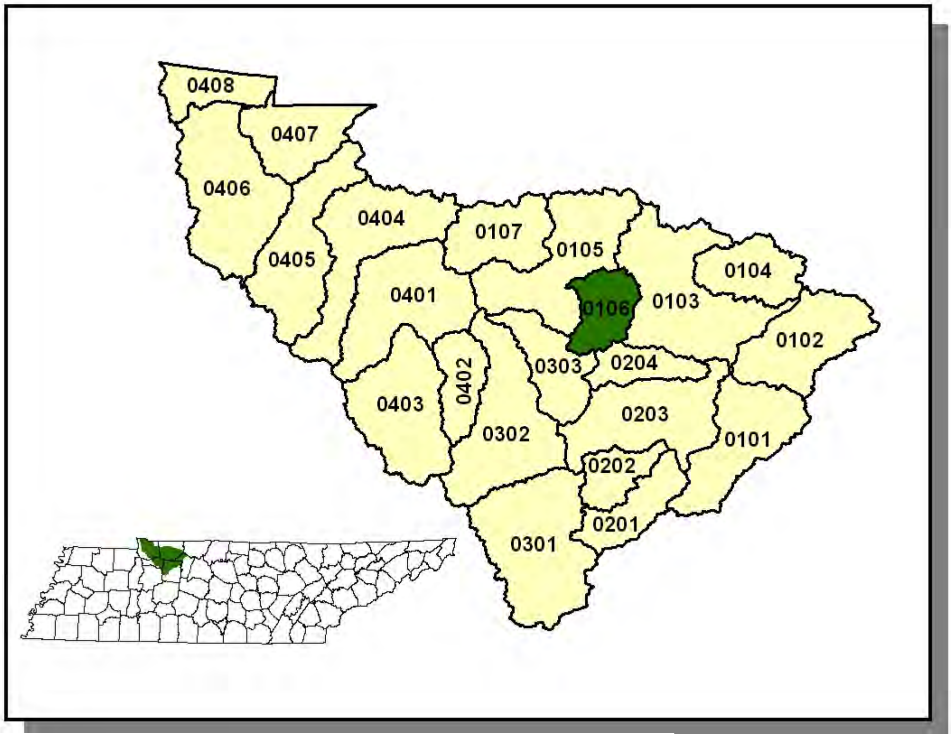


Figure 4-56. Location of Subwatershed 051302050106. *All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

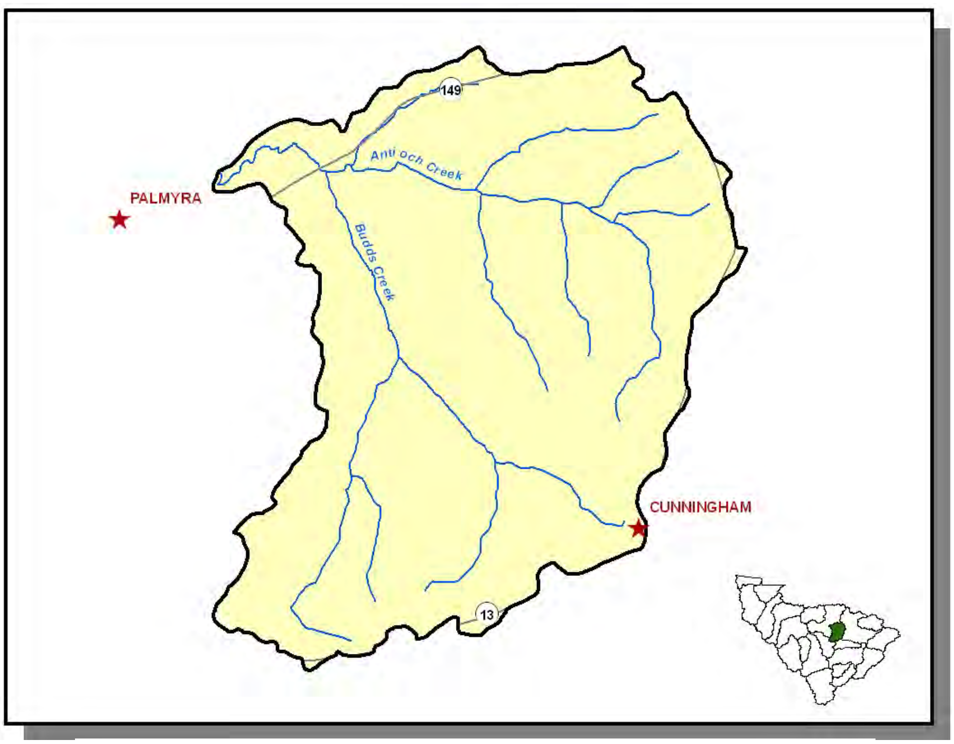


Figure 4-57. Locational Details of Subwatershed 051302050106.

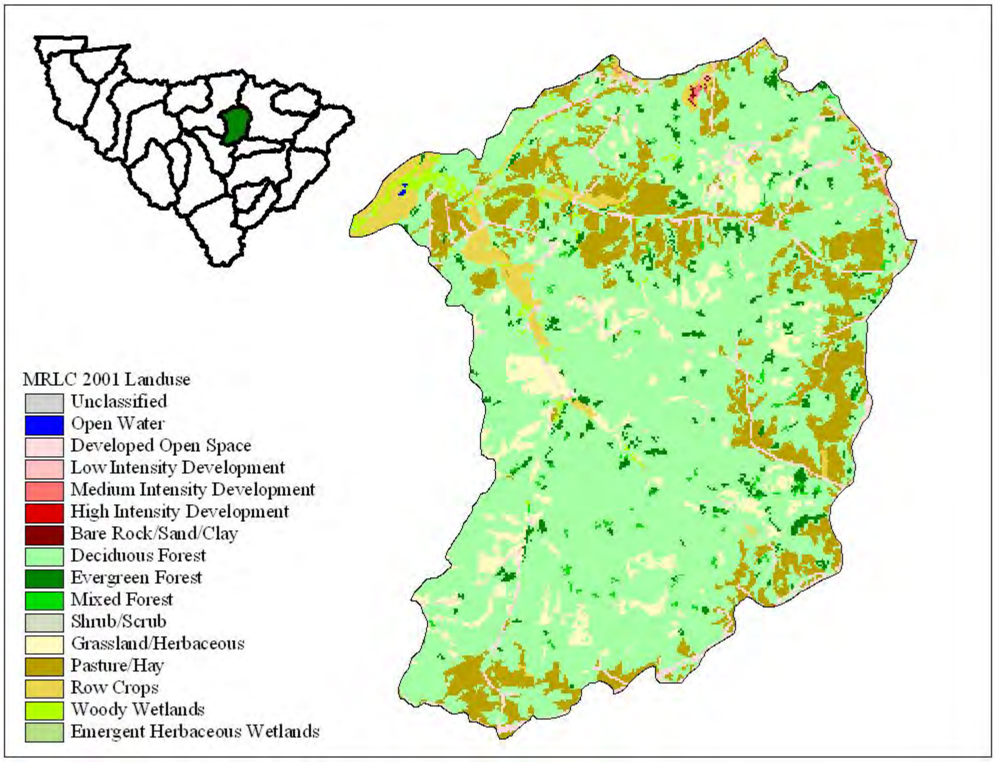


Figure 4-58. Illustration of Land Use Distribution in Subwatershed 051302050106.

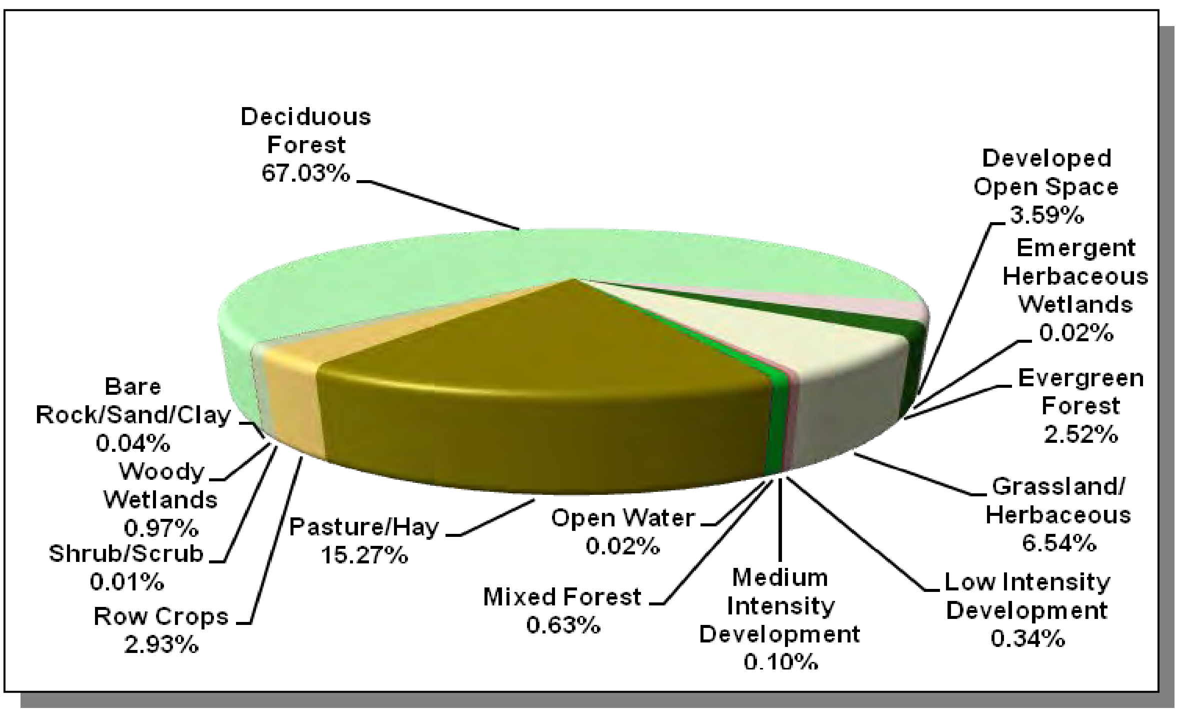


Figure 4-59. Land Use Distribution in Subwatershed 051302050106. *More information is provided in Appendix IV.*

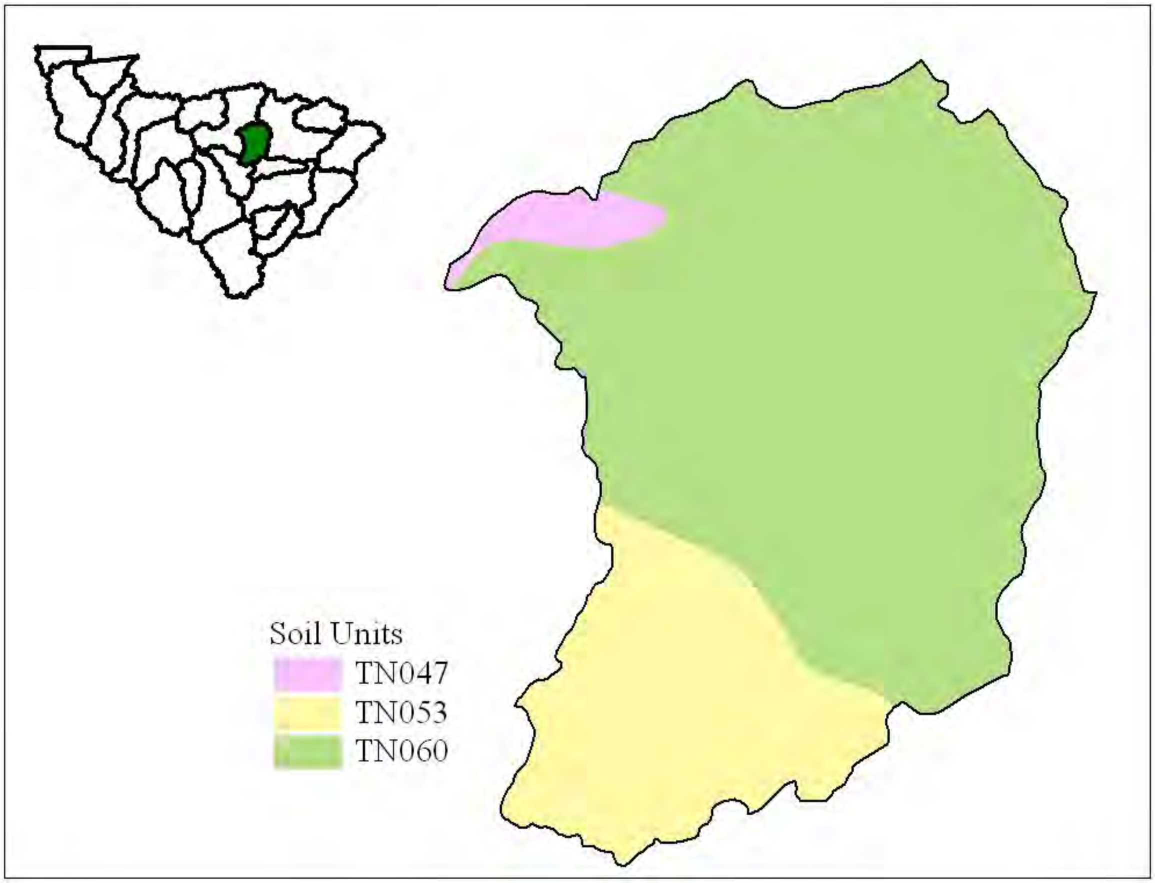


Figure 4-60. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050106.

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
TN053	0.00	B	1.29	5.45	Loam	0.33
TN060	5.00	B	1.30	5.32	Silty Loam	0.39

Table 4-28. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050106. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Montgomery	100,498	124,369	134,768	4.14	4,164	5,154	5,584	34.1

Table 4-29. Population Estimates in Subwatershed 051302050106.

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

There are no USGS continuous record gaging stations located in subwatershed 051302050106.

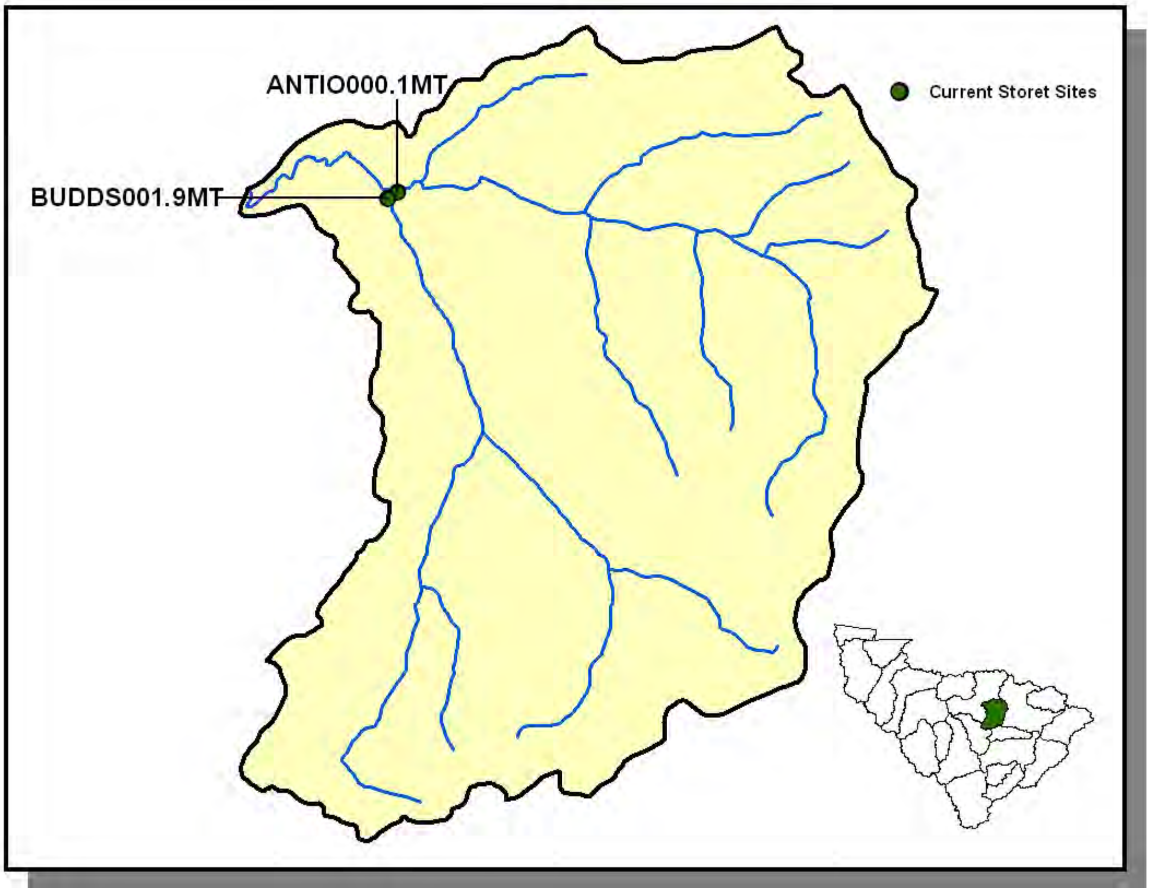


Figure 4-61. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302050106. *More information, including site names and locations, is provided in Appendix IV.*

4.2.F.iii. Permitted Activities.

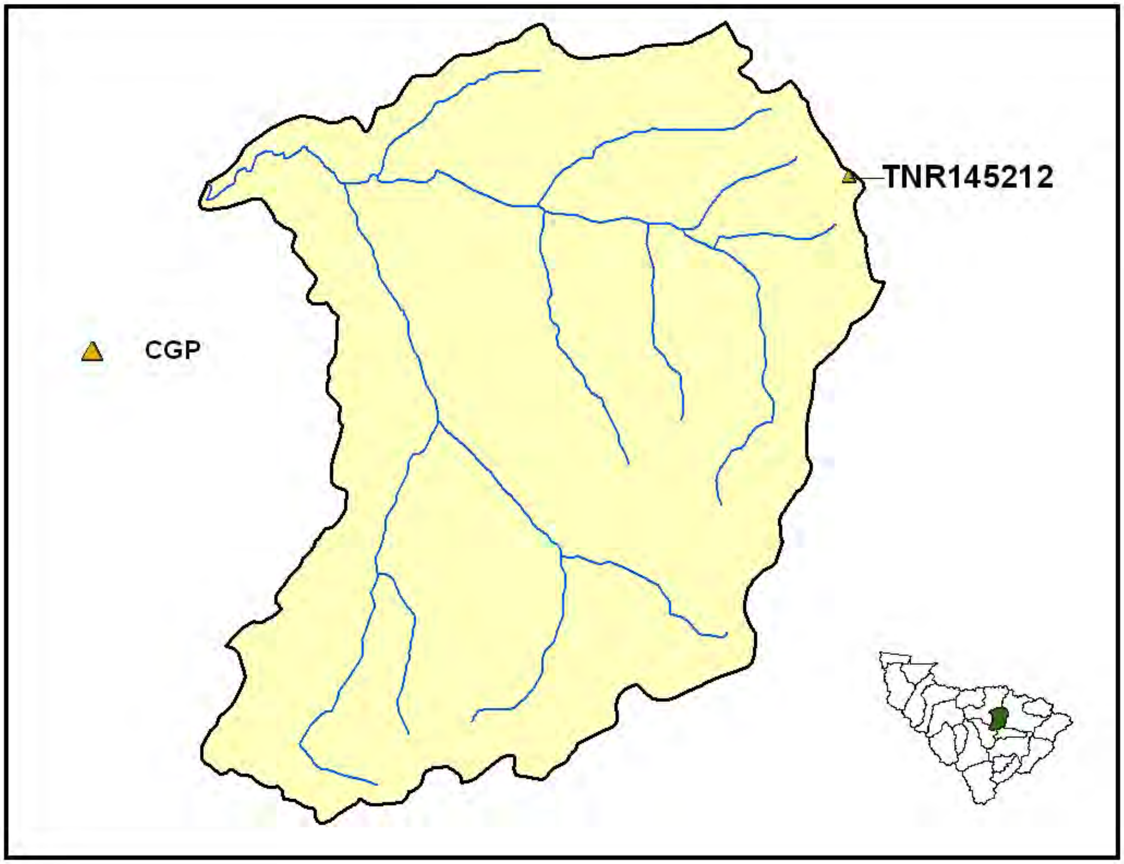


Figure 4-62. Location of Permits Issued in Subwatershed 051302050106. *CGP, Construction General Permit. More information, including the names of facilities, is provided in Appendix IV.*

4.2.F.iv. Nonpoint Source Contributions.

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

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

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

Table 4-31. Annual Estimated Total Soil Loss in Subwatershed 051302050106.

4.2.G. 051302050107 (Blooming Grove Creek).

4.2.G.i. General Description.

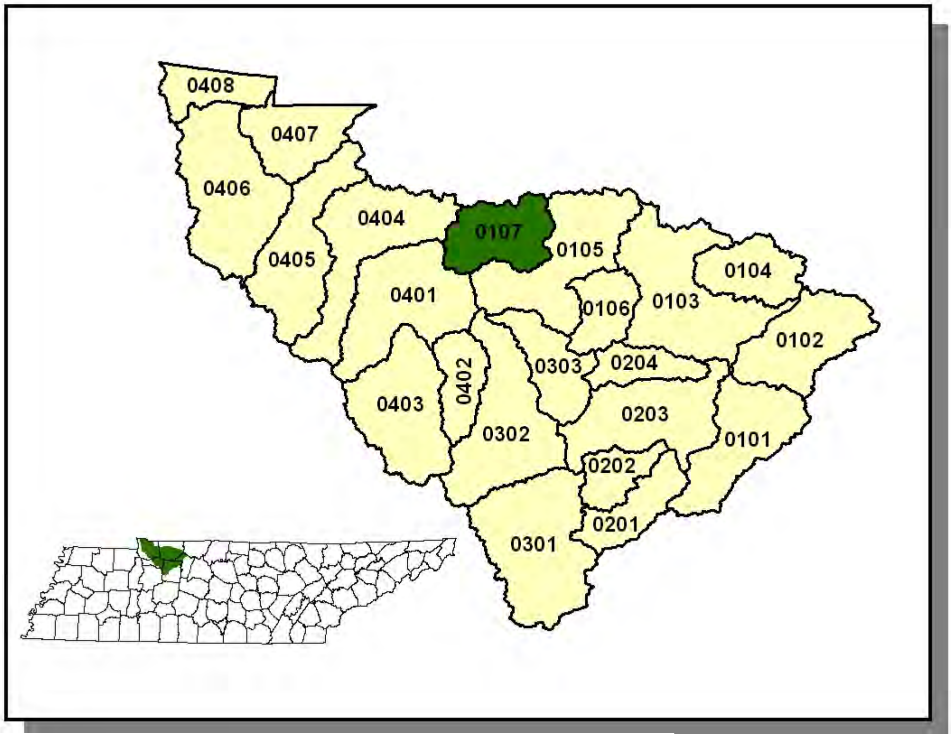


Figure 4-63. Location of Subwatershed 051302050107. *All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

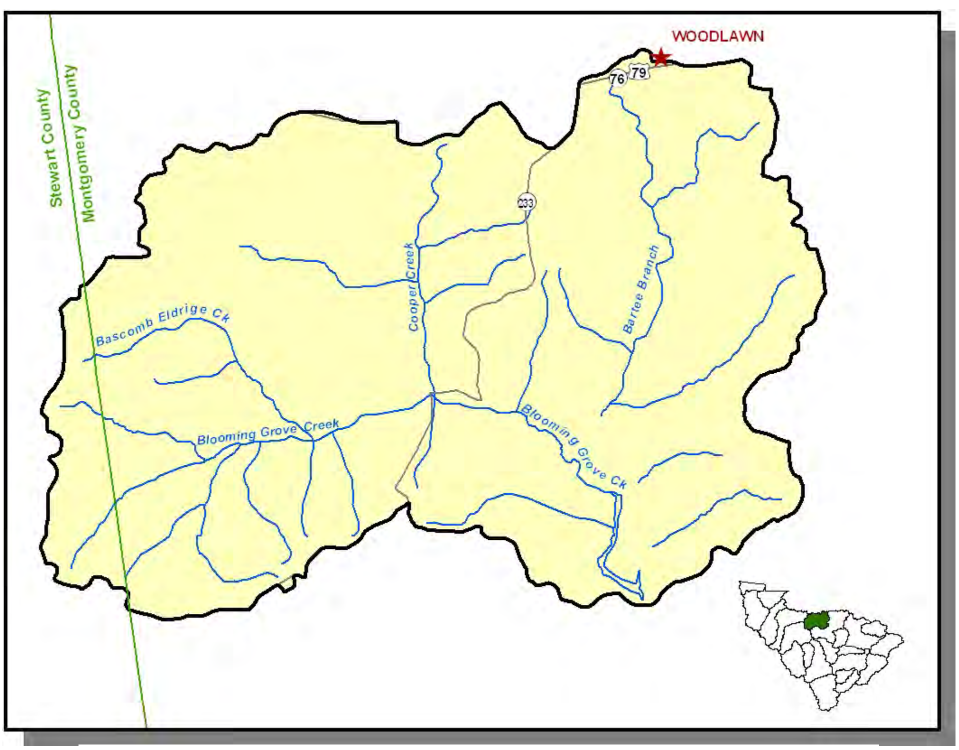


Figure 4-64. Locational Details of Subwatershed 051302050107.

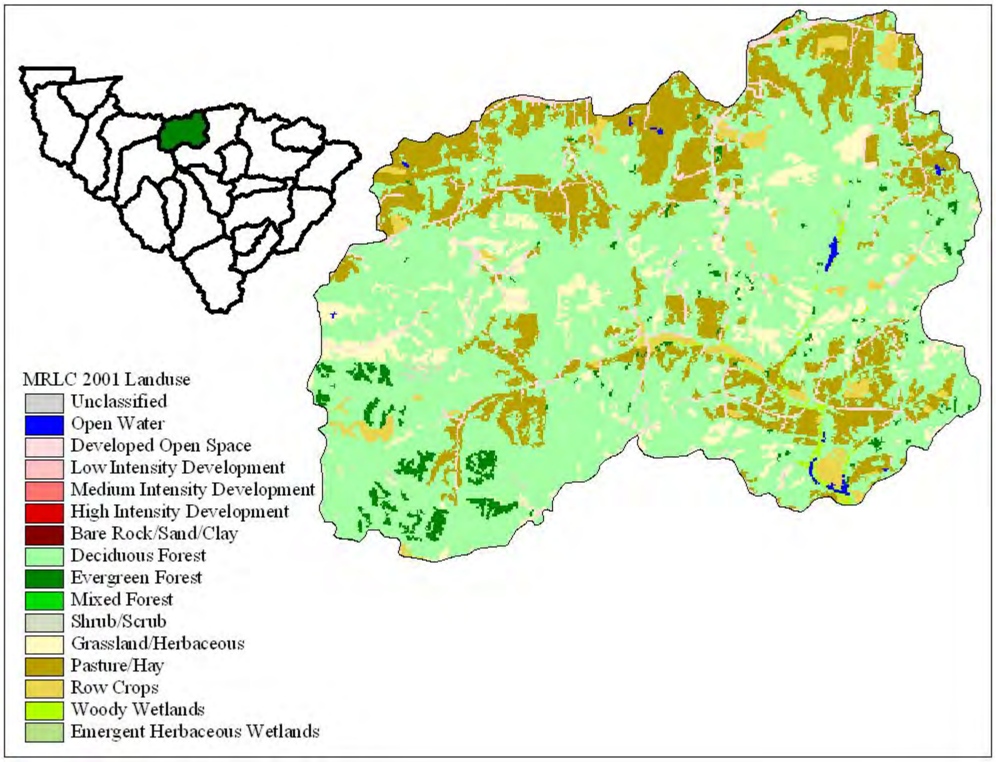


Figure 4-65. Illustration of Land Use Distribution in Subwatershed 051302050107.

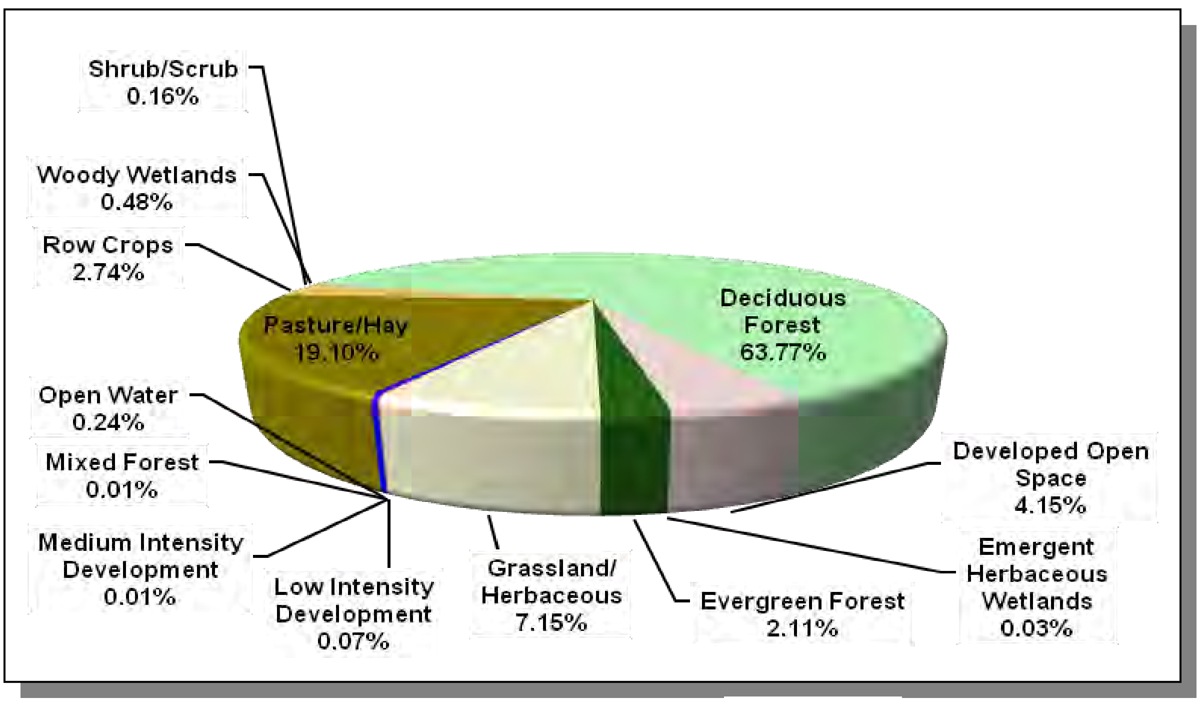


Figure 4-66. Land Use Distribution in Subwatershed 051302050107. *More information is provided in Appendix IV.*

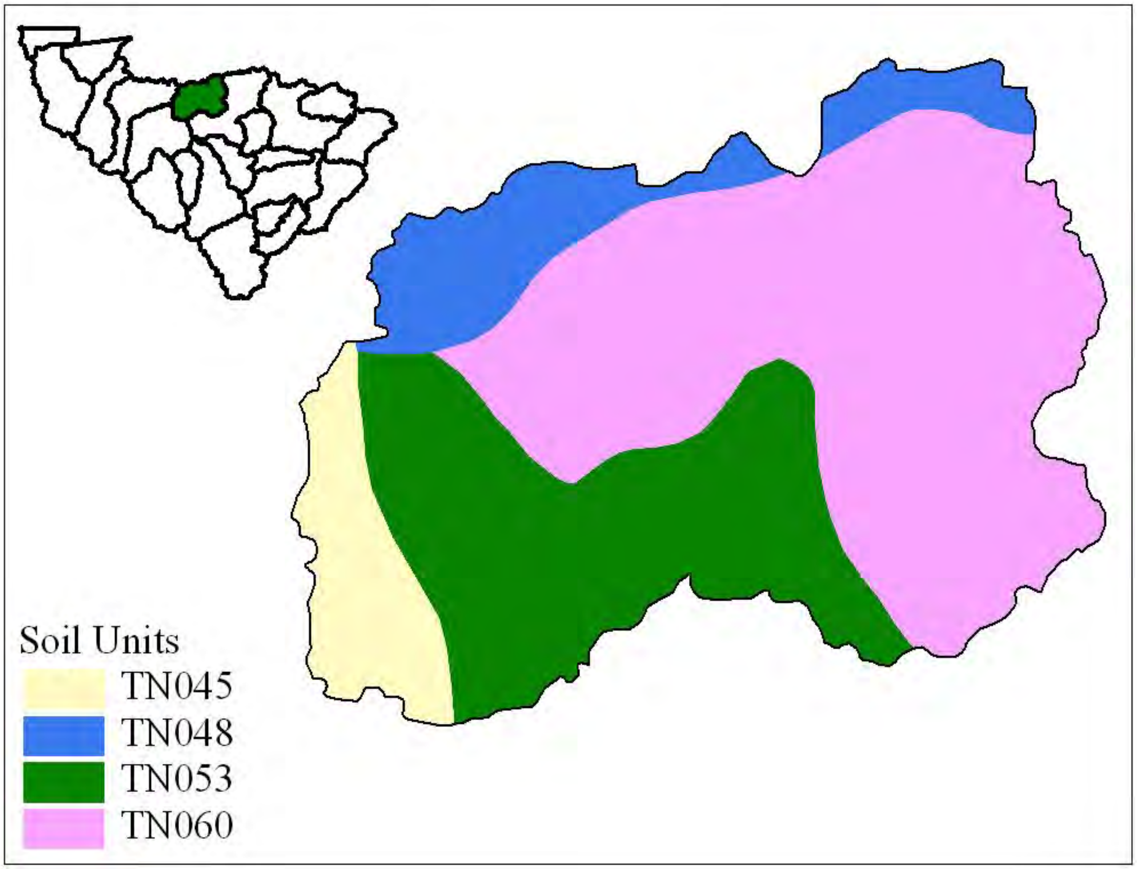


Figure 4-67. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050107.

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	C	1.38	5.06	Silty Loam	0.42
TN053	0.00	B	1.29	5.45	Loam	0.33
TN060	5.00	B	1.30	5.32	Silty Loam	0.39

Table 4-32. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050107. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Montgomery	100,498	124,369	134,768	5.81	5,844	7,232	7,836	34.10
Stewart	9,479	11,241	12,370	0.49	46	55	60	30.40
Totals	**109,977**	**135,610**	**147,138**		**5,890**	**7,287**	**7,896**	**34.10**

Table 4-33. Population Estimates in Subwatershed 051302050107.

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

There are no USGS continuous record gaging stations located in subwatershed 051302050107.

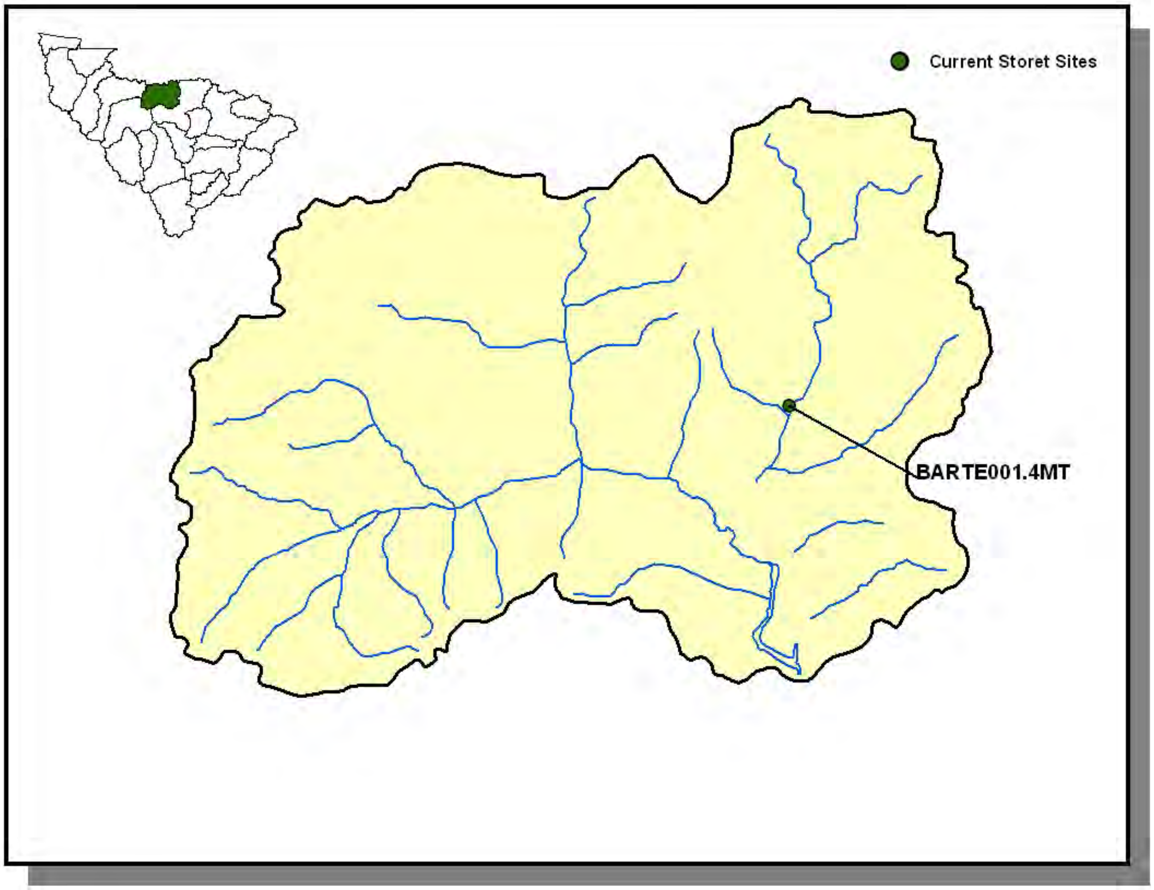


Figure 4-68. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302050107. *More information, including site names and locations, is provided in Appendix IV.*

4.2.G.iii. Permitted Activities.

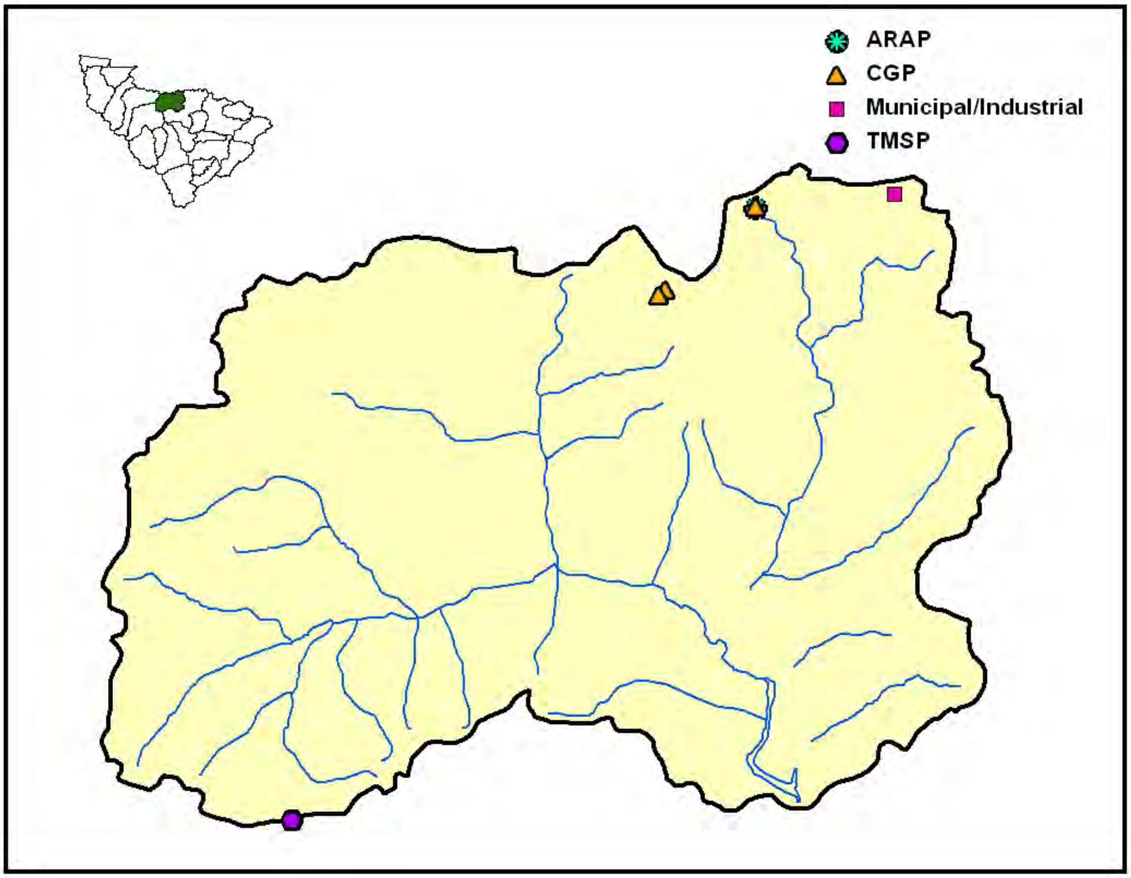


Figure 4-69. Location of Permits Issued in Subwatershed 051302050107. *More information, including the names of facilities, is provided in Appendix IV.*

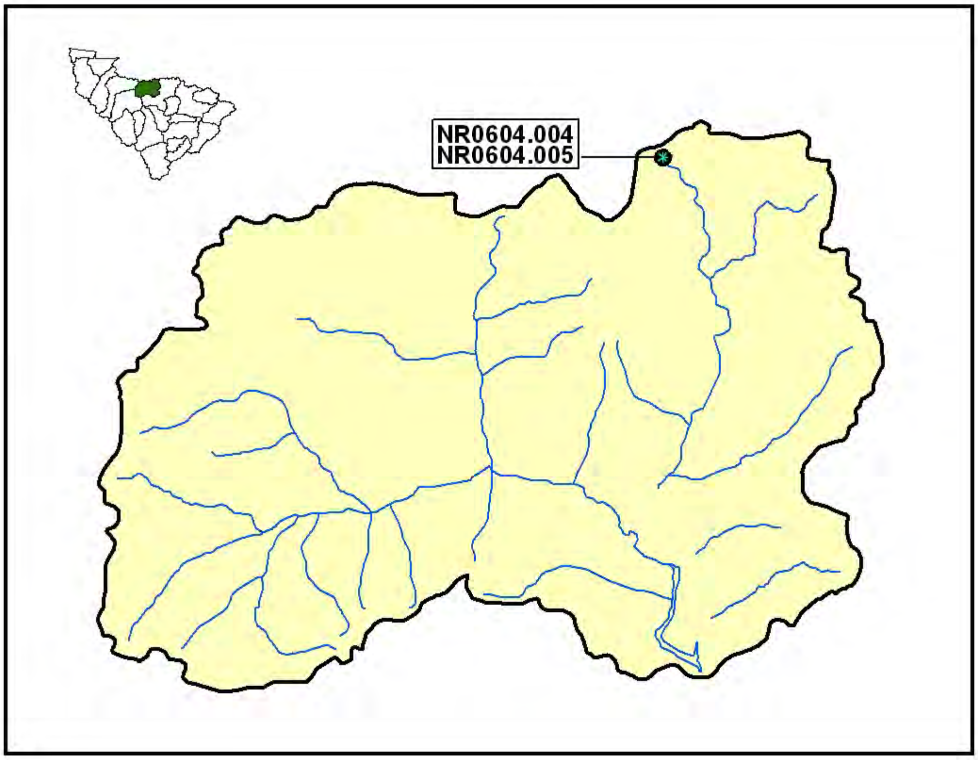


Figure 4-70. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 051302050107. *More information is provided in Appendix IV.*

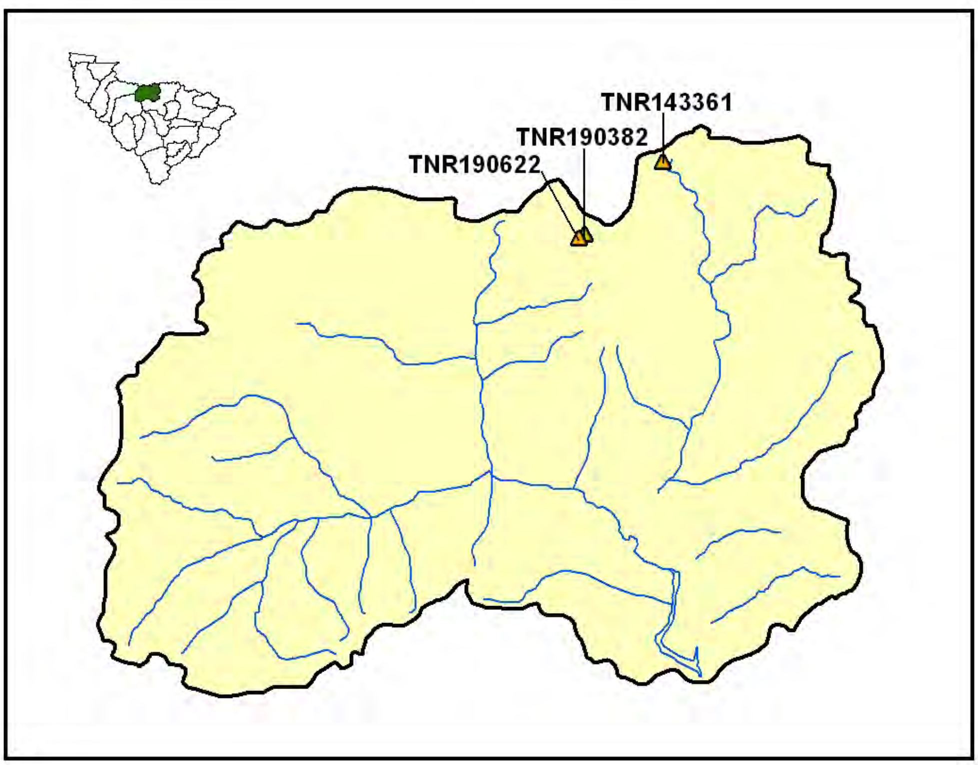


Figure 4-71. Location of CGP (Construction General Permit) Sites in Subwatershed 051302050107. *More information is provided in Appendix IV.*

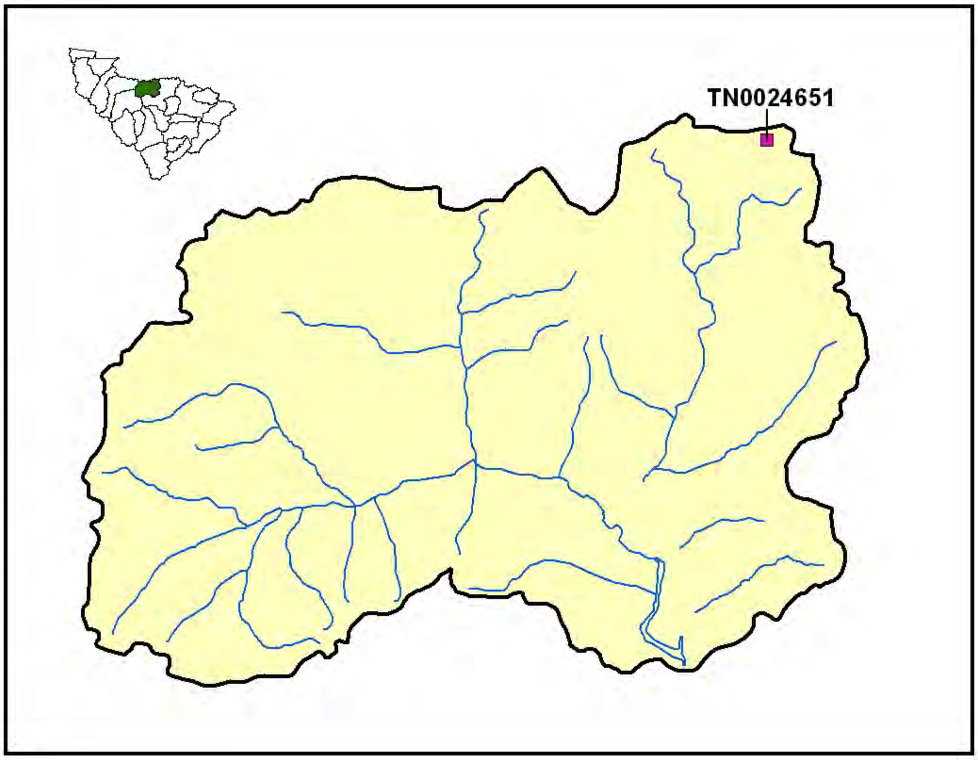


Figure 4-72. Location of Permitted Municipal and Industrial Facilities in Subwatershed 051302050107. *More information, including the name of the facility is provided in Appendix IV.*

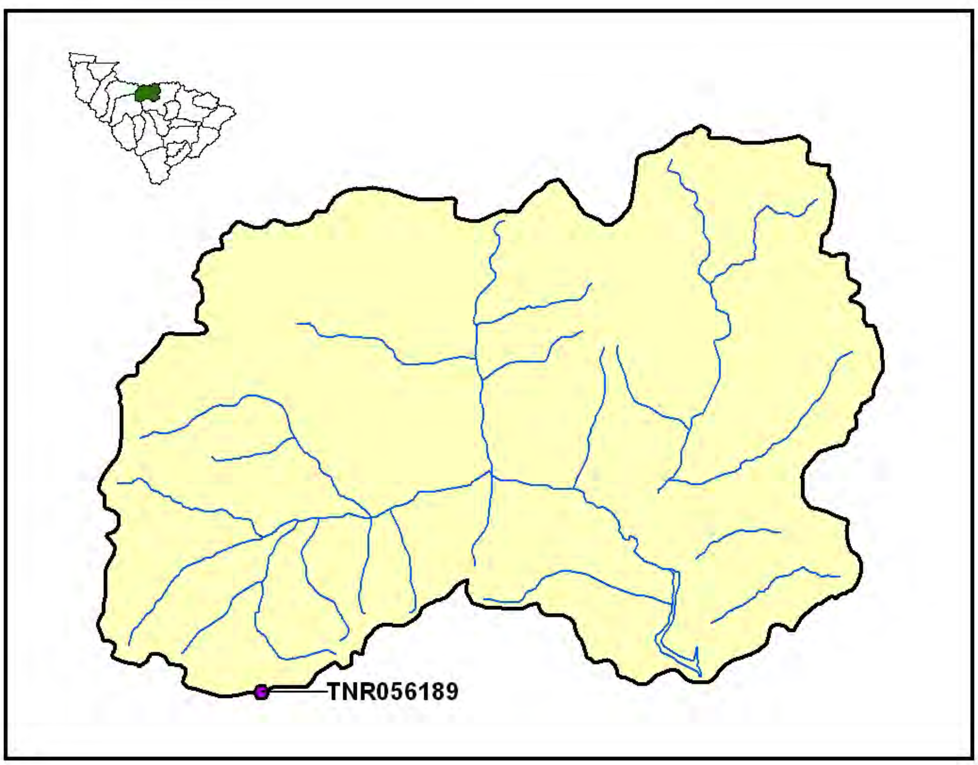


Figure 4-73. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 051302050107. *More information is provided in Appendix IV.*

4.2.G.iv. Nonpoint Source Contributions.

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

Table 4-34. Summary of Livestock Count Estimates by County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Stewart	219.7	219.7	5.4	25.4

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

CROPS	TONS/ACRE/YEAR
Tobacco (Row Crops)	21.09
Corn (Row Crops)	7.59
Soybeans (Row Crops)	4.63
Grass Forbs Legumes Mixed (Pastureland)	0.53
Grass (Pastureland)	0.52
Conservation Reserve Program Land	0.41
Legume Grass (Hayland)	0.40
Other Land in Farms	0.30
Grass (Hayland)	0.27
Farmsteads and Ranch Headquarters	0.05

Table 4-36. Annual Estimated Total Soil Loss in Subwatershed 051302050107.

4.2.H. 051302050201 (Bartons Creek, Upper).

4.2.H.i. General Description.

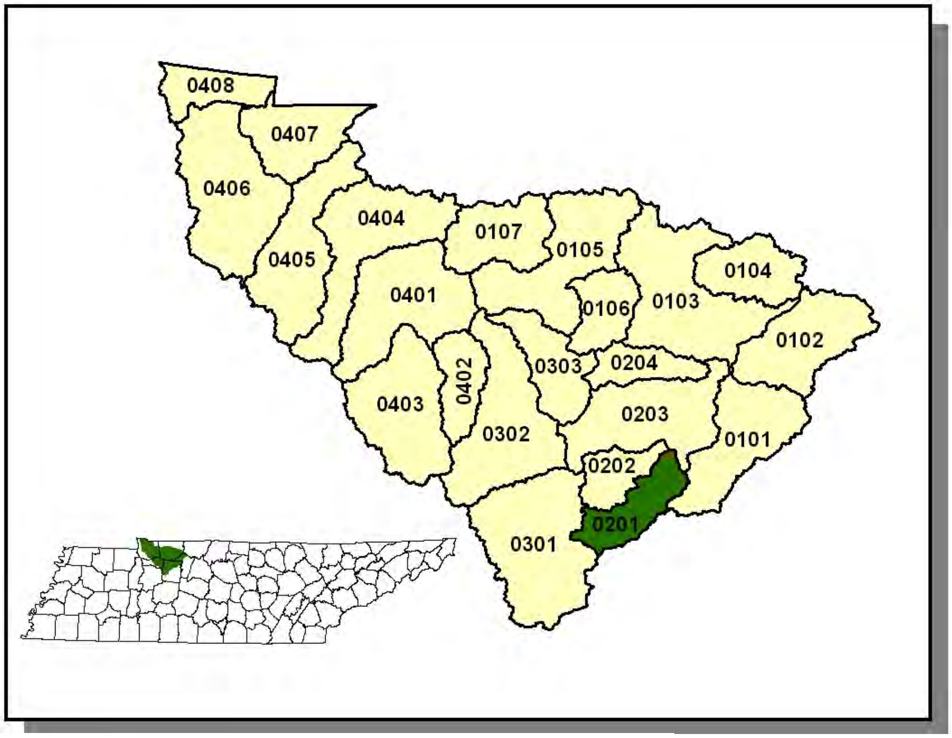


Figure 4-74. Location of Subwatershed 051302050201. *All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

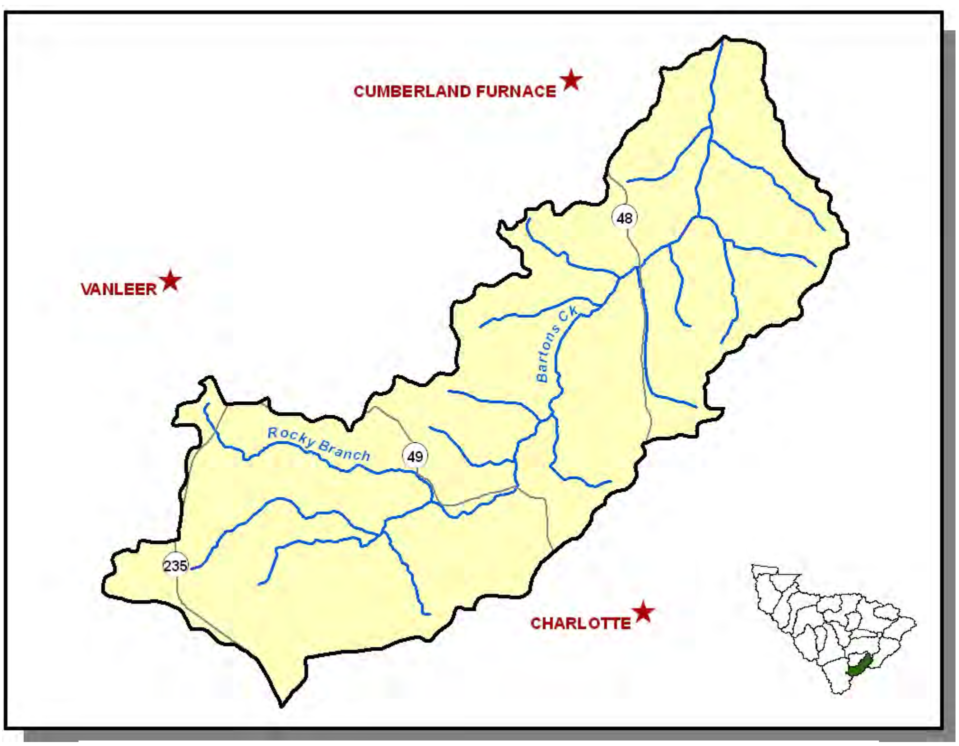


Figure 4-75. Locational Details of Subwatershed 051302050201.

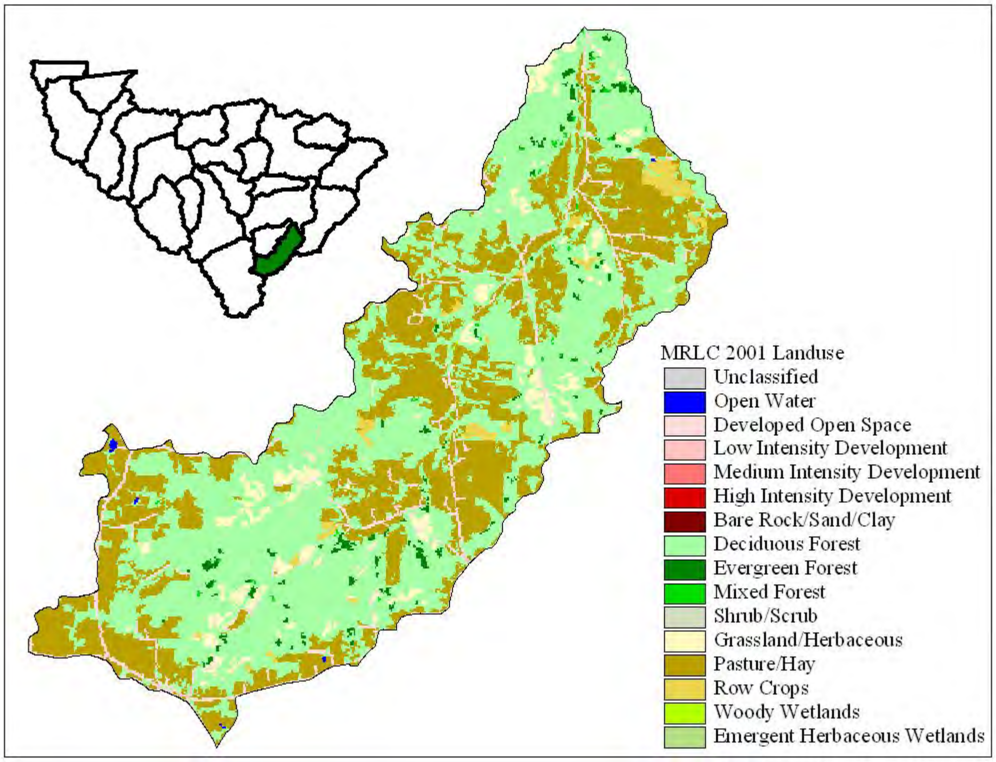


Figure 4-76. Illustration of Land Use Distribution in Subwatershed 051302050201.

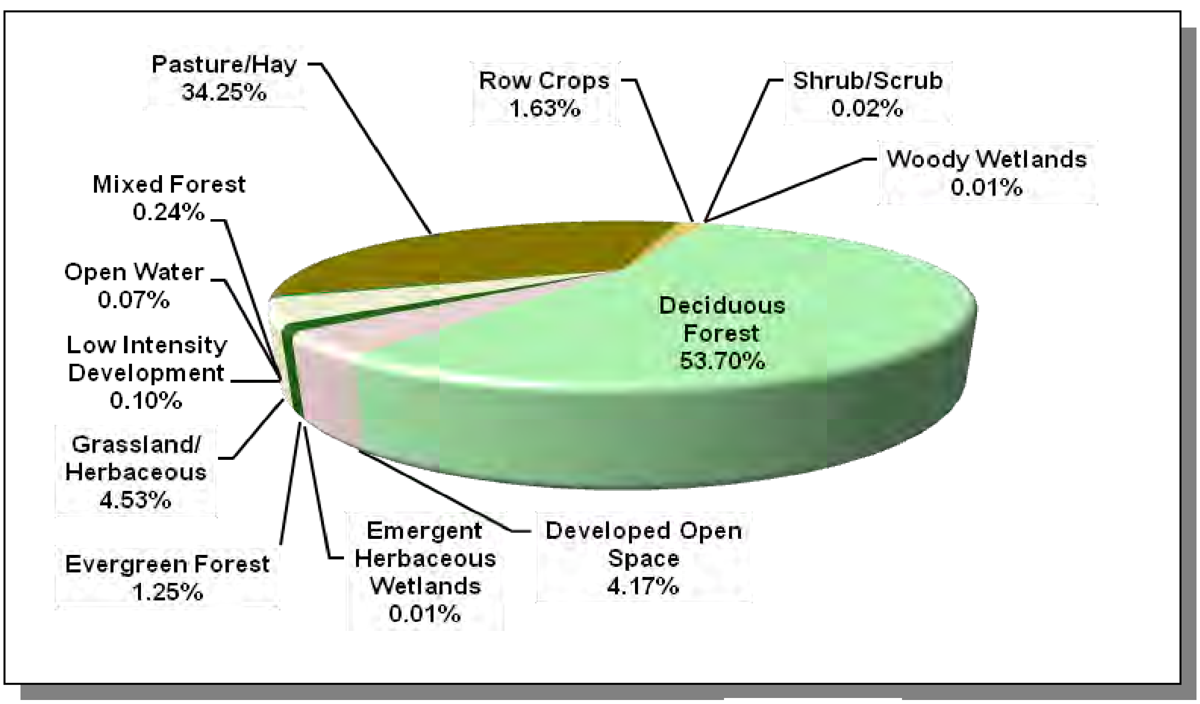


Figure 4-77. Land Use Distribution in Subwatershed 051302050201. *More information is provided in Appendix IV.*

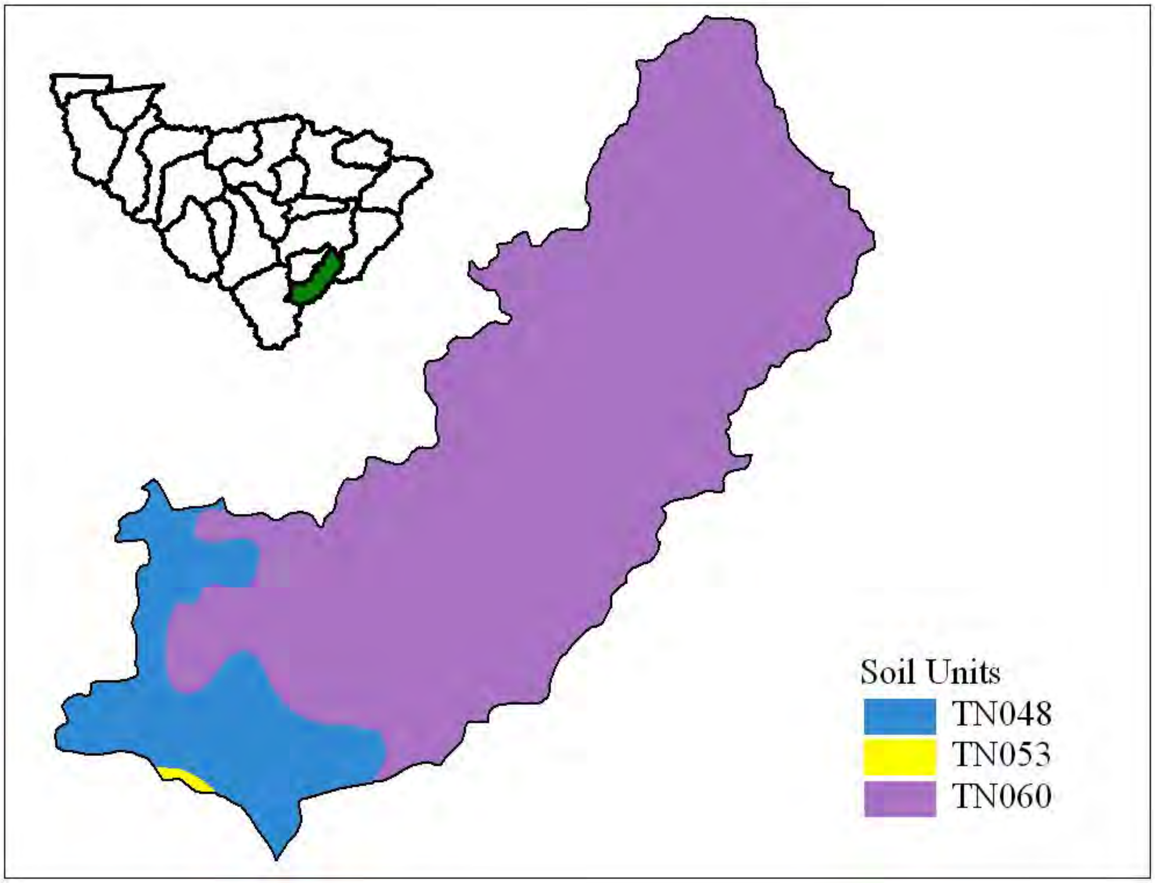


Figure 4-78. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050201.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN048	8.00	C	1.38	5.06	Silty Loam	0.42
TN053	0.00	B	1.29	5.45	Loam	0.33
TN060	5.00	B	1.30	5.32	Silty Loam	0.39

Table 4-37. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050201. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Dickson	35,061	40,937	43,156	5.24	1,837	2,145	2,262	23.10

Table 4-38. Population Estimates in Subwatershed 051302050201.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Charlotte	Dickson	854	374	272	97	5

Table 4-39. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302050201.

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

There are no USGS continuous record gaging stations or STORET sites located in subwatershed 051302050201.

4.2.H.iii. Permitted Activities.

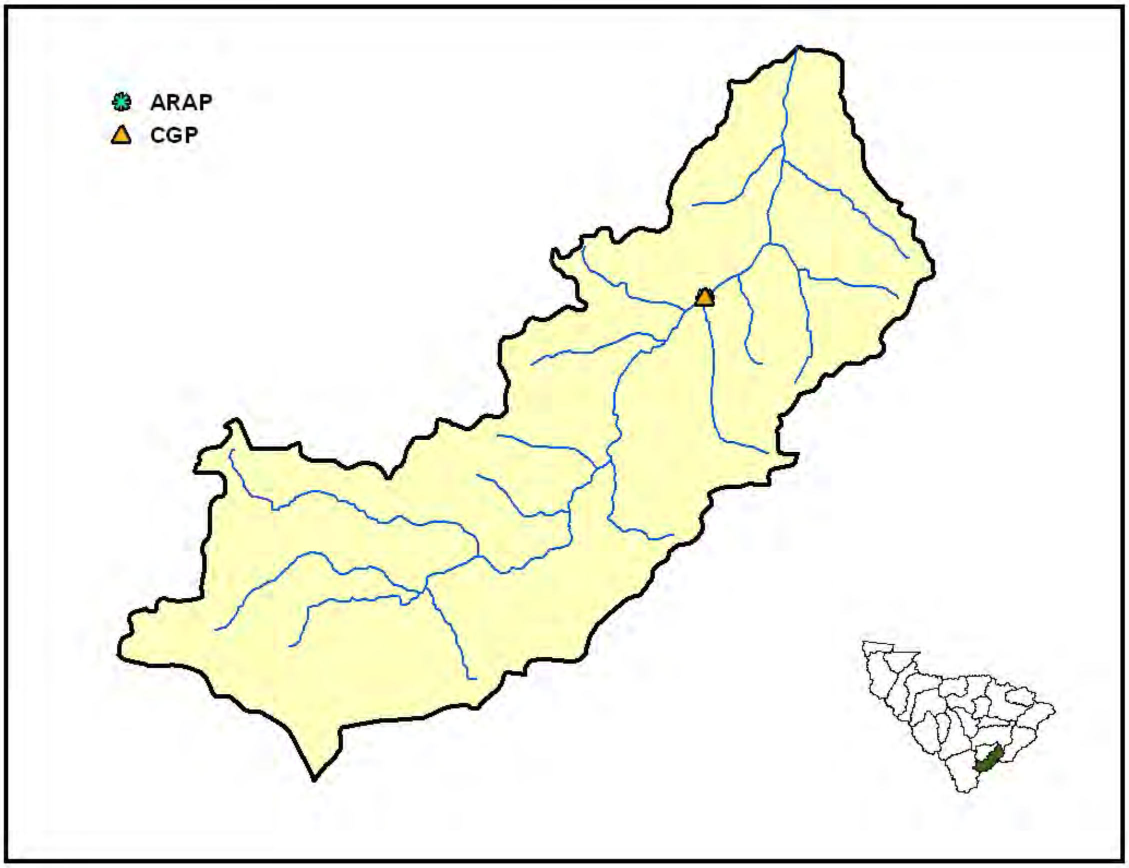


Figure 4-79. Location of Permits Issued in Subwatershed 051302050201. *More information, including the names of facilities, is provided in Appendix IV.*

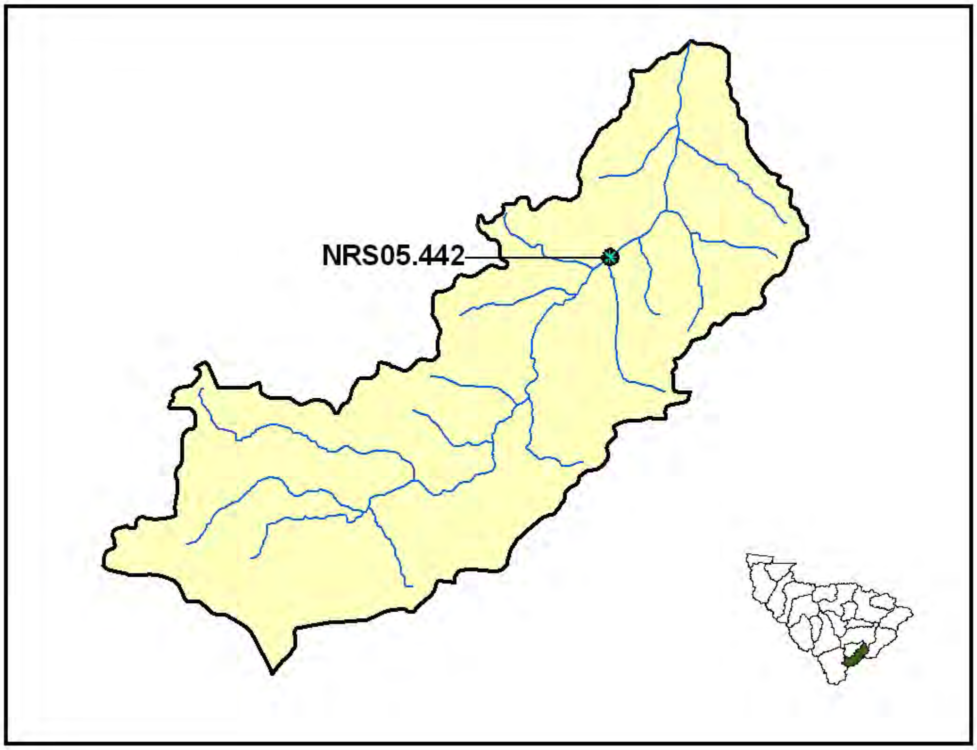


Figure 4-80. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 051302050201. *More information is provided in Appendix IV.*

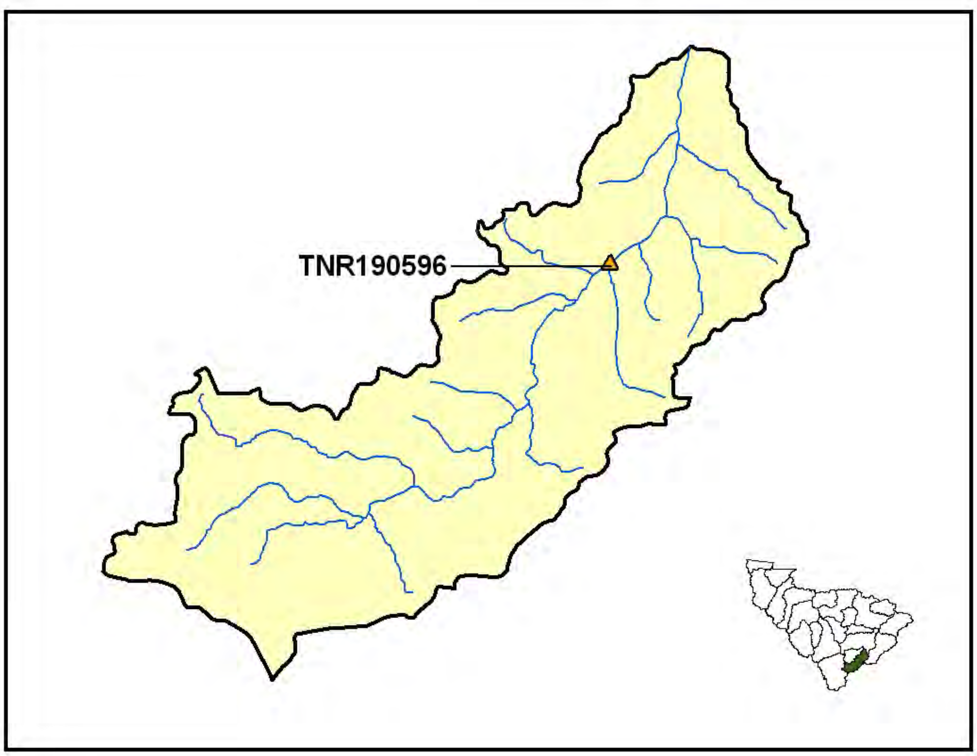


Figure 4-81. Location of CGP (Construction General Permit) Sites in Subwatershed 051302050201. *More information is provided in Appendix IV.*

4.2.H.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Dickson		28,271		1,931	2,029	30

Table 4-40. Summary of Livestock Count Estimates by County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Dickson	174.3	174.3	1.8	7.7

Table 4-41. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Other Vegetable and Truck Crop	7.71
Farmsteads and Ranch Headquarters	3.78
Corn (Row Crops)	2.91
Vineyard (Horticultural)	1.05
Grass Forbs Legumes Mixed (Pastureland)	0.74
Grass (Pastureland)	0.60
Legume Grass (Hayland)	0.59
Grass (Hayland)	0.48
Conservation Reserve Program Land	0.07

Table 4-42. Annual Estimated Total Soil Loss in Subwatershed 051302050201.

4.2.I. 051302050202 (Furnace Creek).

4.2.I.i. General Description.

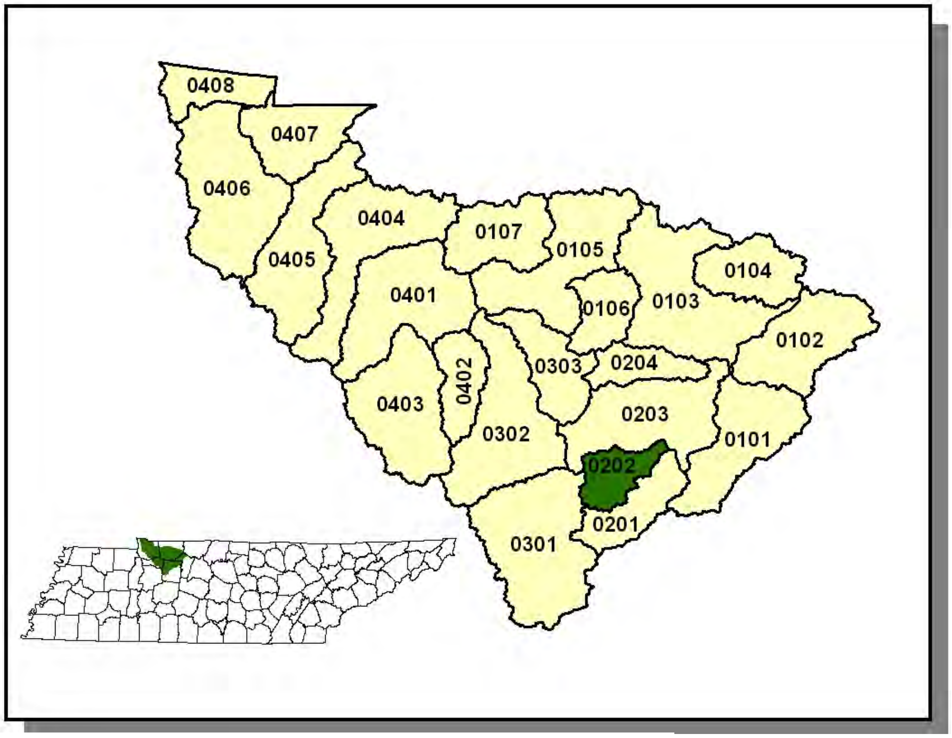


Figure 4-82. Location of Subwatershed 051302050202. *All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

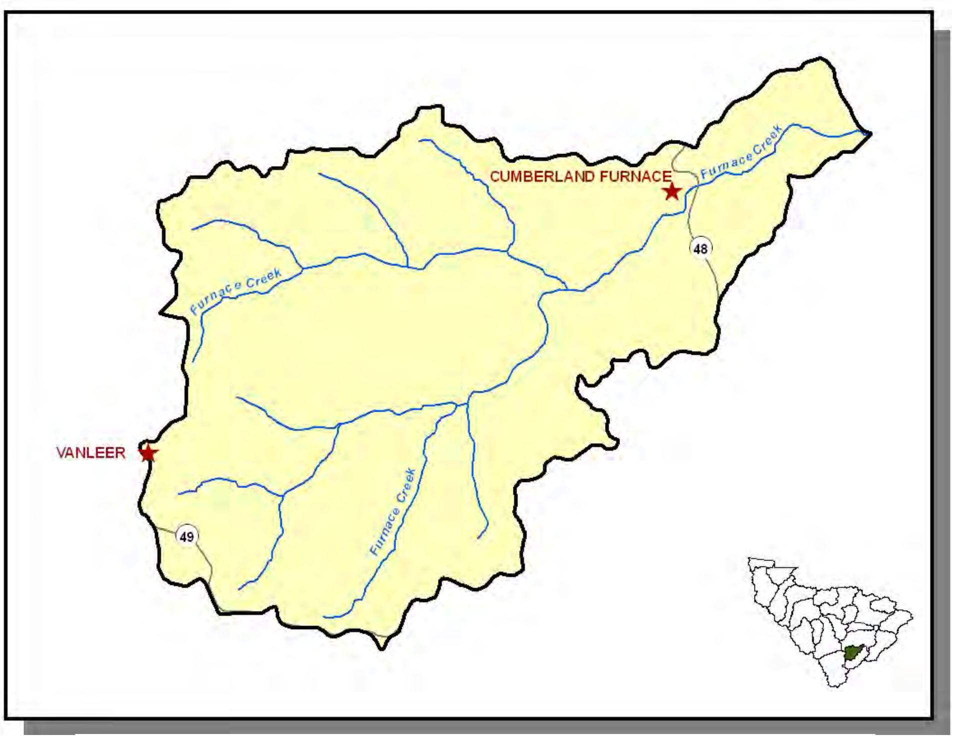


Figure 4-83. Locational Details of Subwatershed 051302050202.

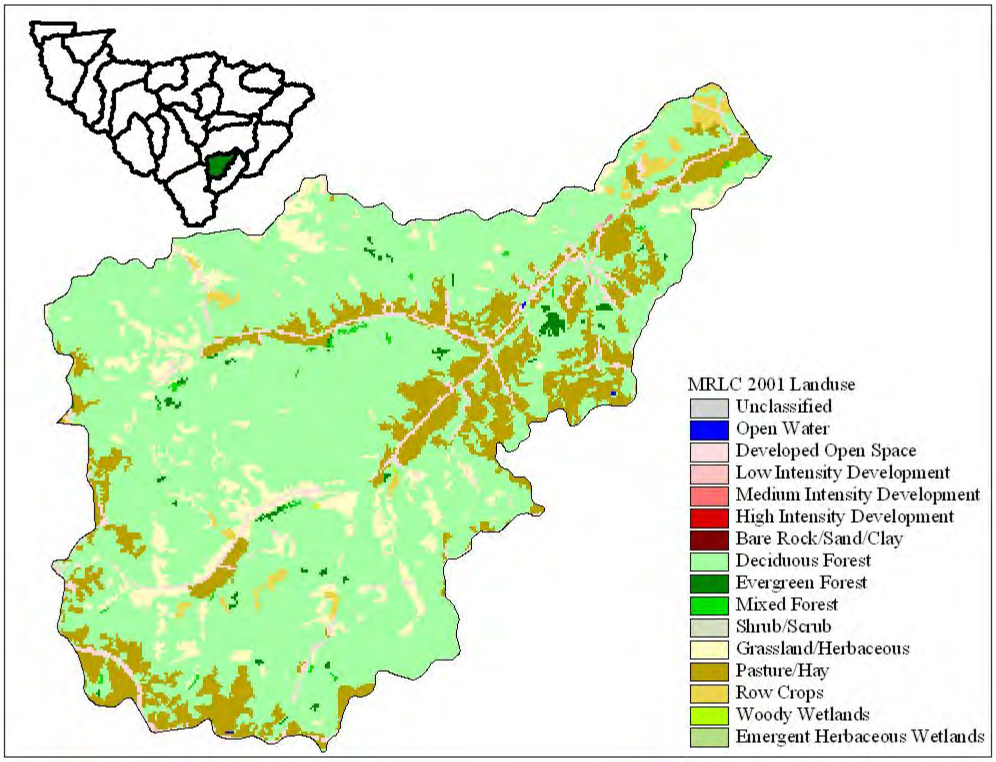


Figure 4-84. Illustration of Land Use Distribution in Subwatershed 051302050202.

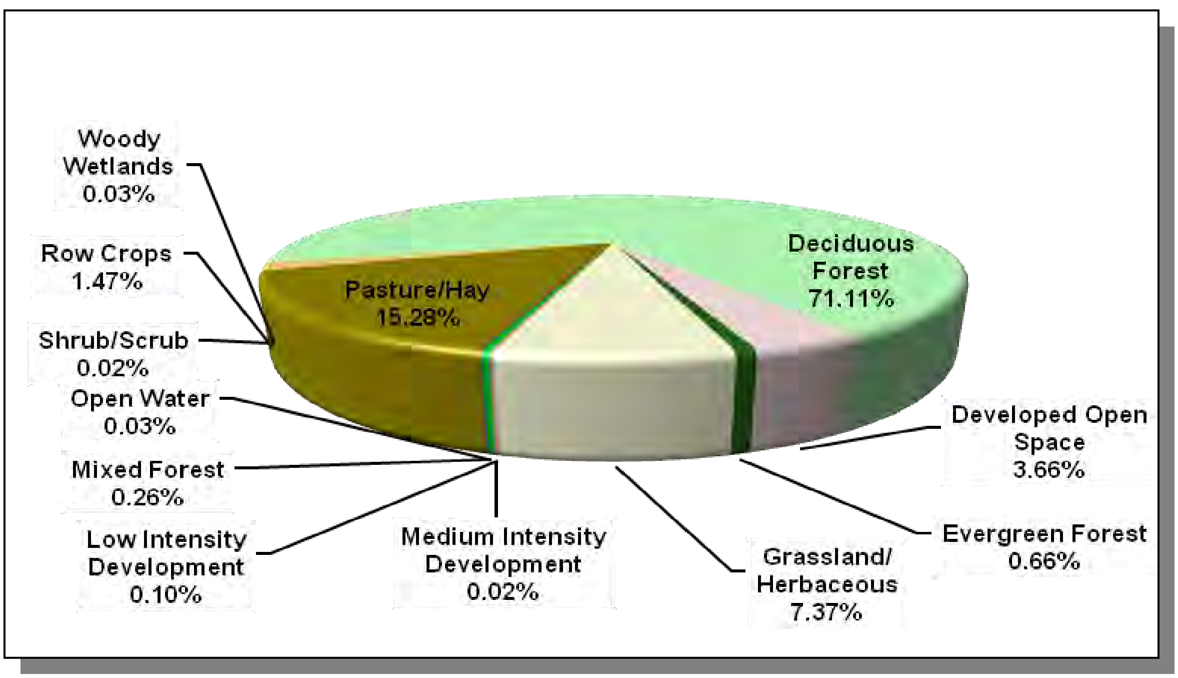


Figure 4-85. Land Use Distribution in Subwatershed 051302050202. *More information is provided in Appendix IV.*

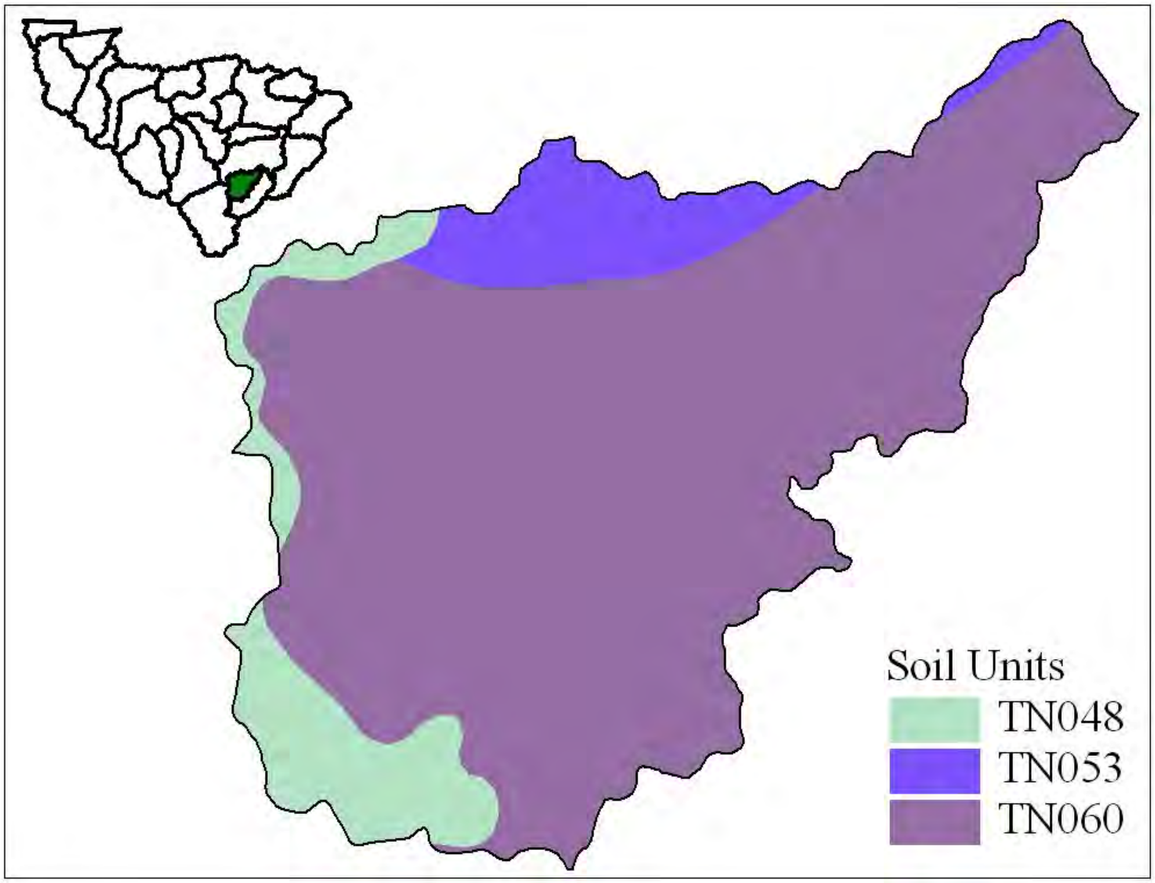


Figure 4-86. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050202.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN048	8.00	C	1.38	5.06	Silty Loam	0.42
TN053	0.00	B	1.29	5.45	Loam	0.33
TN060	5.00	B	1.30	5.32	Silty Loam	0.39

Table 4-43. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050202. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Dickson	35,061	40,937	43,156	3.77	1,322	1,544	1,627	23.10

Table 4-44. Population Estimates in Subwatershed 051302050202.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Vanleer	Dickson	383	176	16	155	5

Table 4-45. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302050202.

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

There are no USGS continuous record gaging stations or STORET sites located in subwatershed 051302050202.

4.2.I.iii. Permitted Activities.

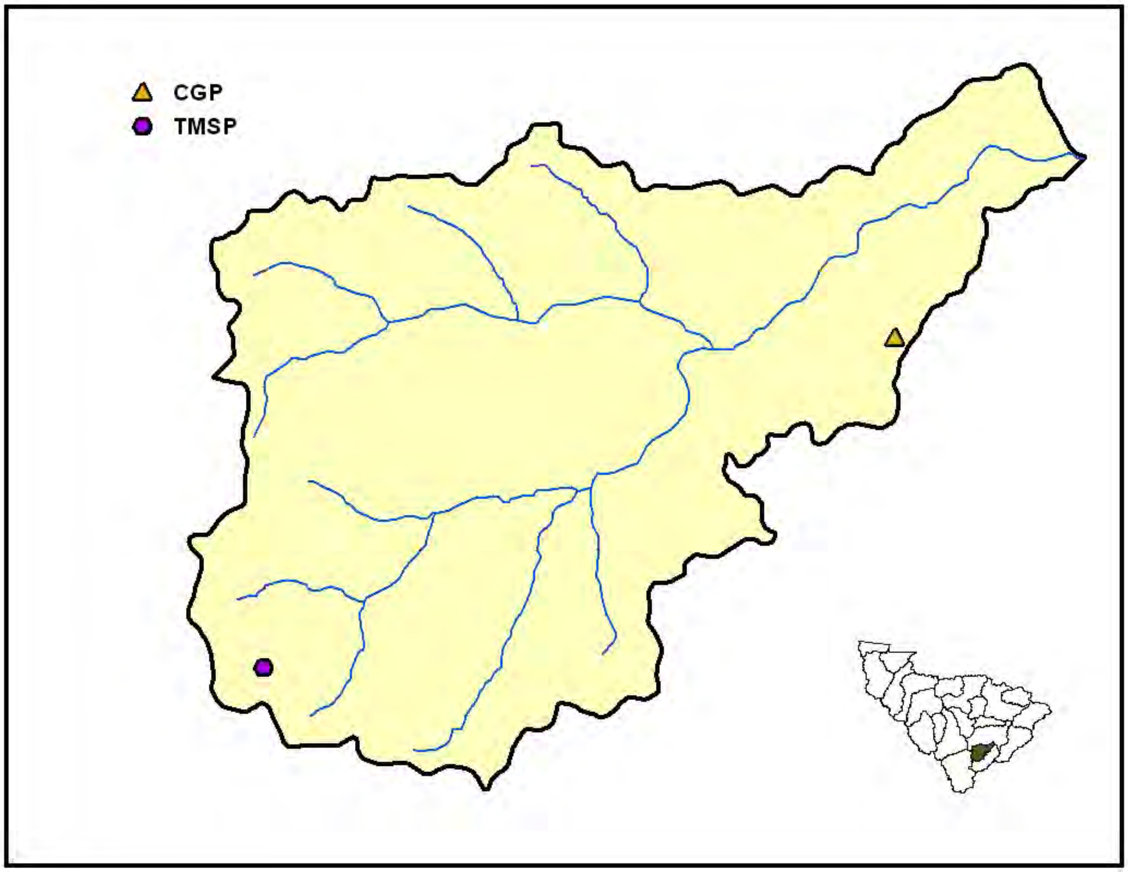


Figure 4-87. Location of Permits Issued in Subwatershed 051302050202. *More information, including the names of facilities, is provided in Appendix IV.*

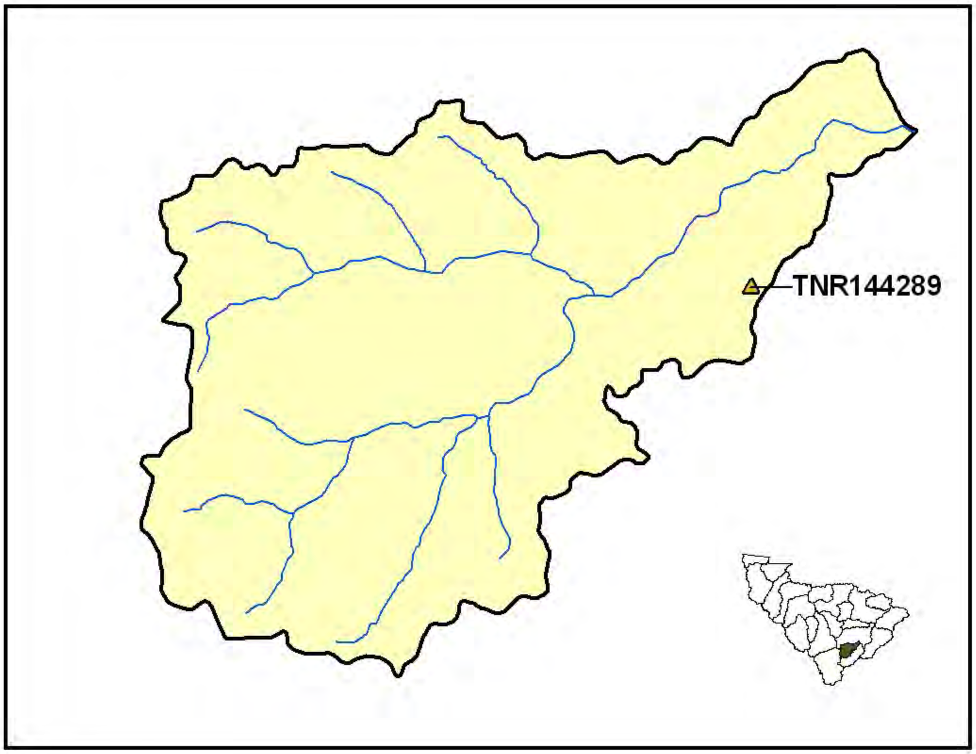


Figure 4-88. Location of CGP (Construction General Permit) Sites in Subwatershed 051302050202. *More information is provided in Appendix IV.*

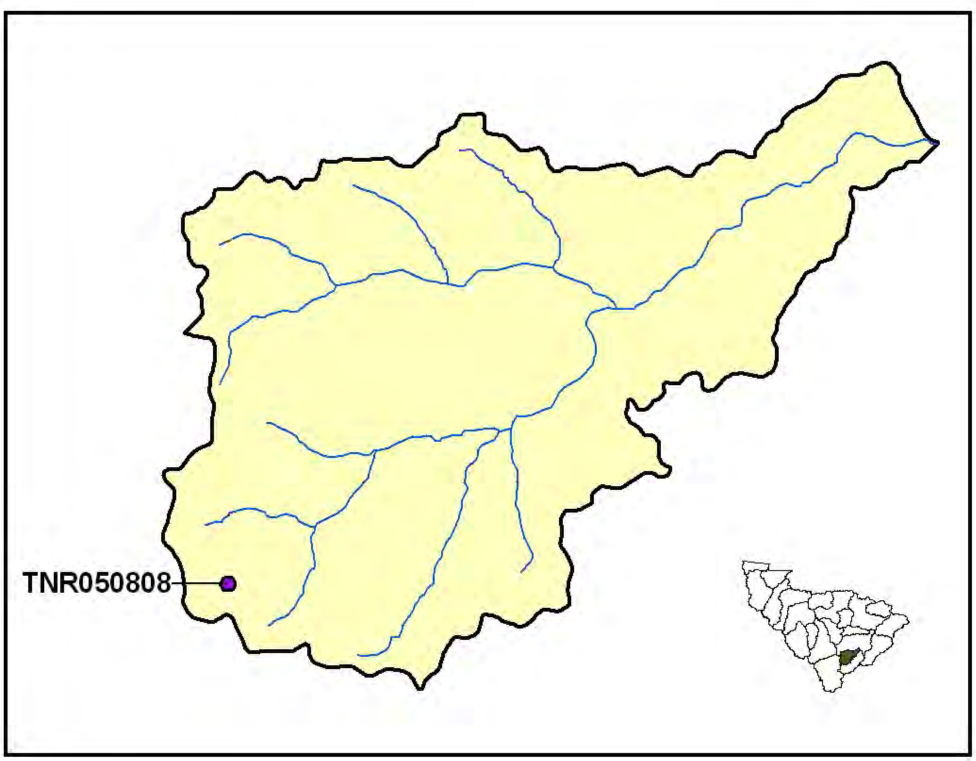


Figure 4-89. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 051302050202. *More information is provided in Appendix IV.*

4.2.I.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Dickson		28,271		1,931	2,029	30

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

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Dickson	174.3	174.3	1.8	7.7

Table 4-47. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Other Vegetable and Truck Crop	7.71
Farmsteads and Ranch Headquarters	3.78
Corn (Row Crops)	2.91
Vineyard (Horticultural)	1.05
Grass Forbs Legumes Mixed (Pastureland)	0.74
Grass (Pastureland)	0.60
Legume Grass (Hayland)	0.59
Grass (Hayland)	0.48
Conservation Reserve Program Land	0.07

Table 4-48. Annual Estimated Total Soil Loss in Subwatershed 051302050202.

4.2.J. 051302050203 (Bartons Creek, Lower).

4.2.J.i. General Description.

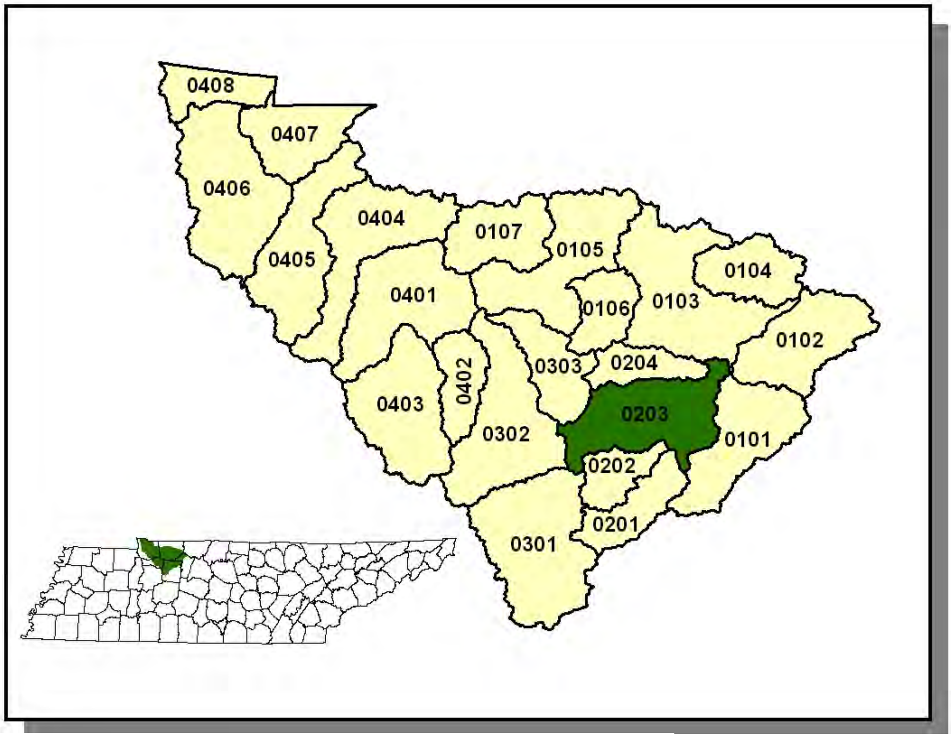


Figure 4-90. Location of Subwatershed 051302050203. All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.

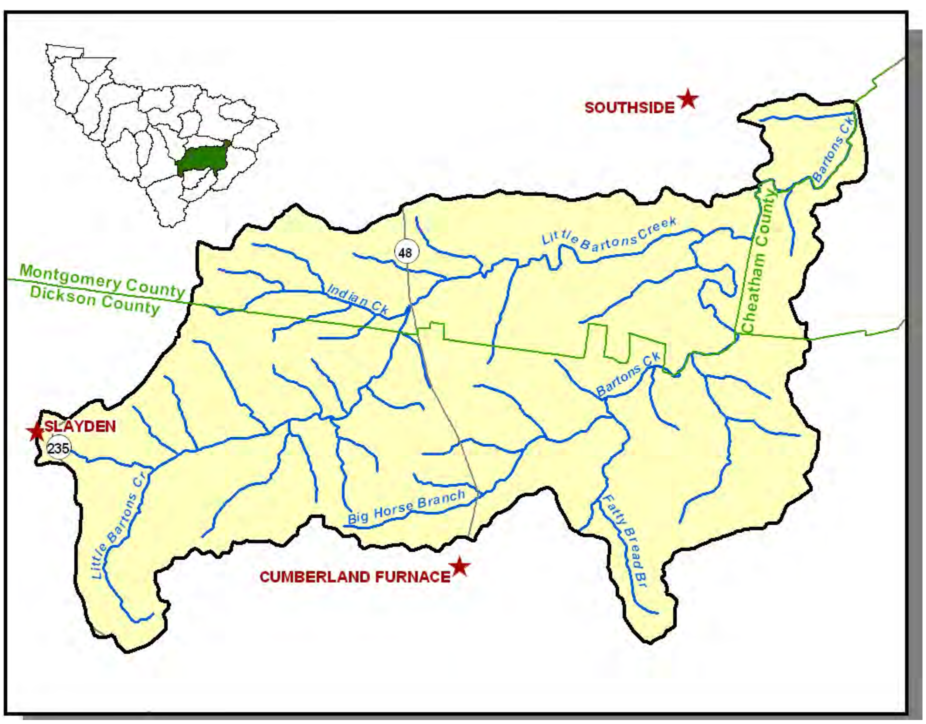


Figure 4-91. Locational Details of Subwatershed 051302050203.

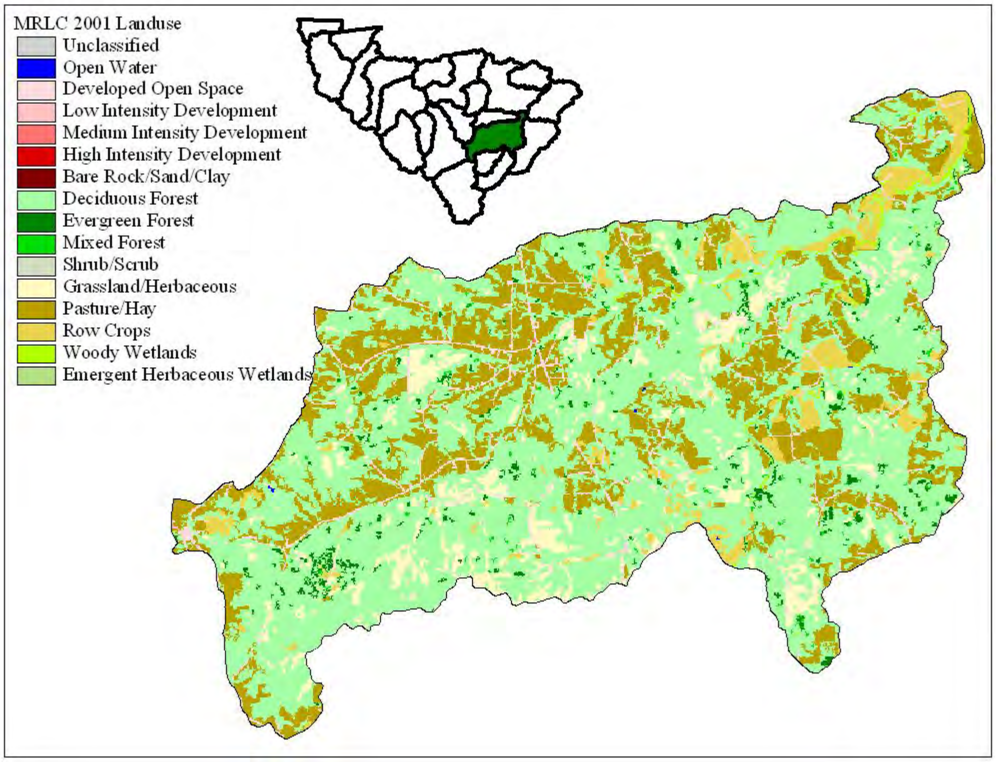


Figure 4-92. Illustration of Land Use Distribution in Subwatershed 051302050203.

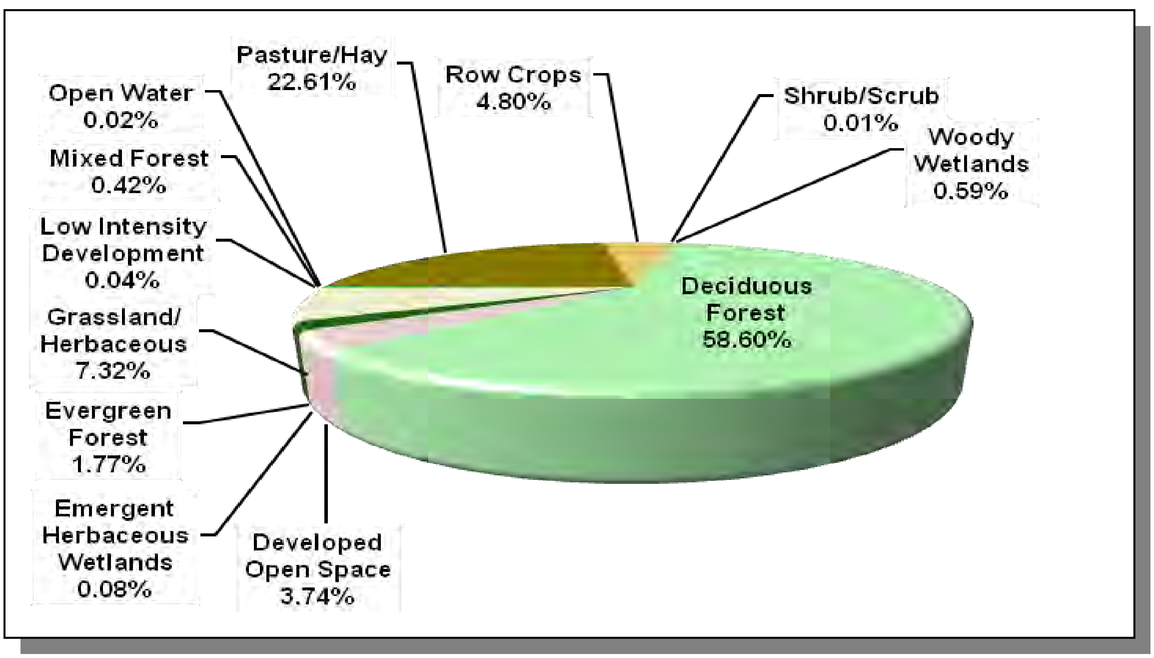


Figure 4-93. Land Use Distribution in Subwatershed 051302050203. *More information is provided in Appendix IV.*

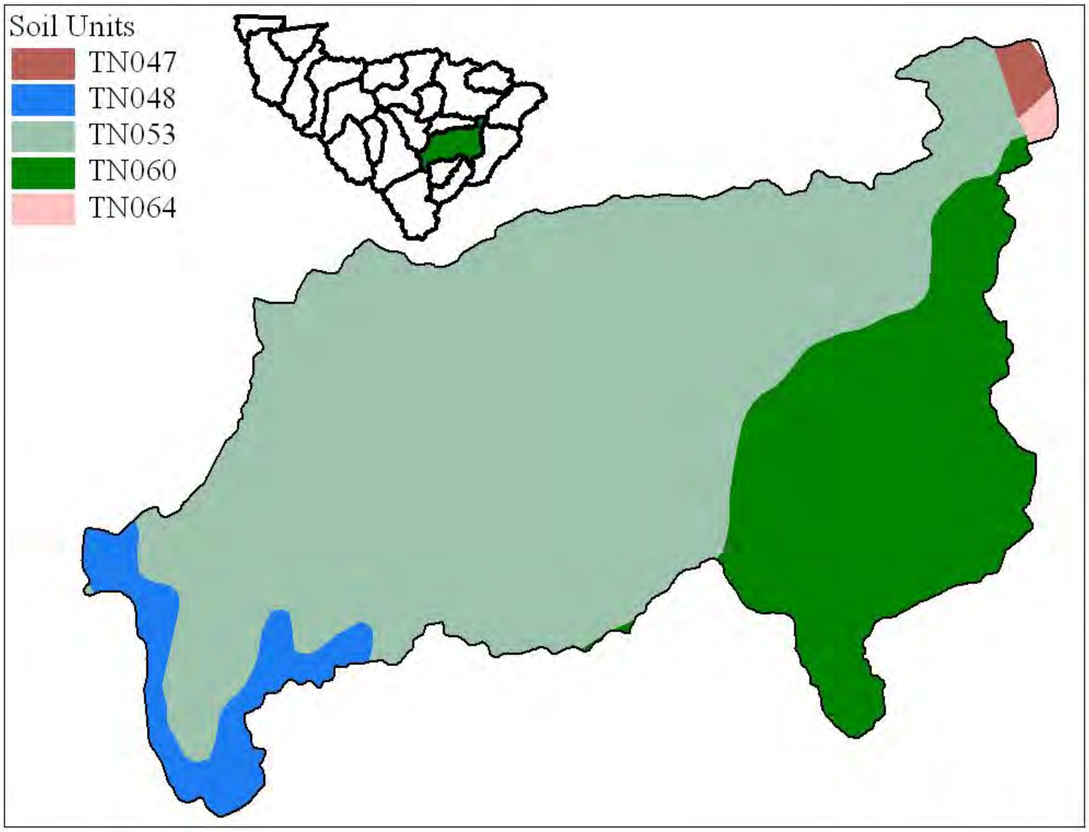


Figure 4-94. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050203.

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	C	1.38	5.06	Silty Loam	0.42
TN053	0.00	B	1.29	5.45	Loam	0.33
TN060	5.00	B	1.30	5.32	Silty Loam	0.39
TN064	7.00	C	1.19	5.82	Silty Loam	0.37

Table 4-49. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050203. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				**ESTIMATED POPULATION IN WATERSHED**			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Cheatham	27,140	34,402	35,912	0.67	183	232	242	32.20
Dickson	35,061	40,937	43,156	7.73	2,709	3,164	3,335	23.10
Montgomery	100,498	124,369	134,768	2.95	2,963	3,667	3,973	34.10
Totals	**162,699**	**199,708**	**213,836**		**5,855**	**7,063**	**7,550**	**28.90**

Table 4-50. Population Estimates in Subwatershed 051302050203.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Slayden	Dickson	107	57	5	50	2
Vanleer	Dickson	383	176	16	155	5

Table 4-51. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302050203.

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

There are no USGS continuous record gaging stations located in subwatershed 051302050203.

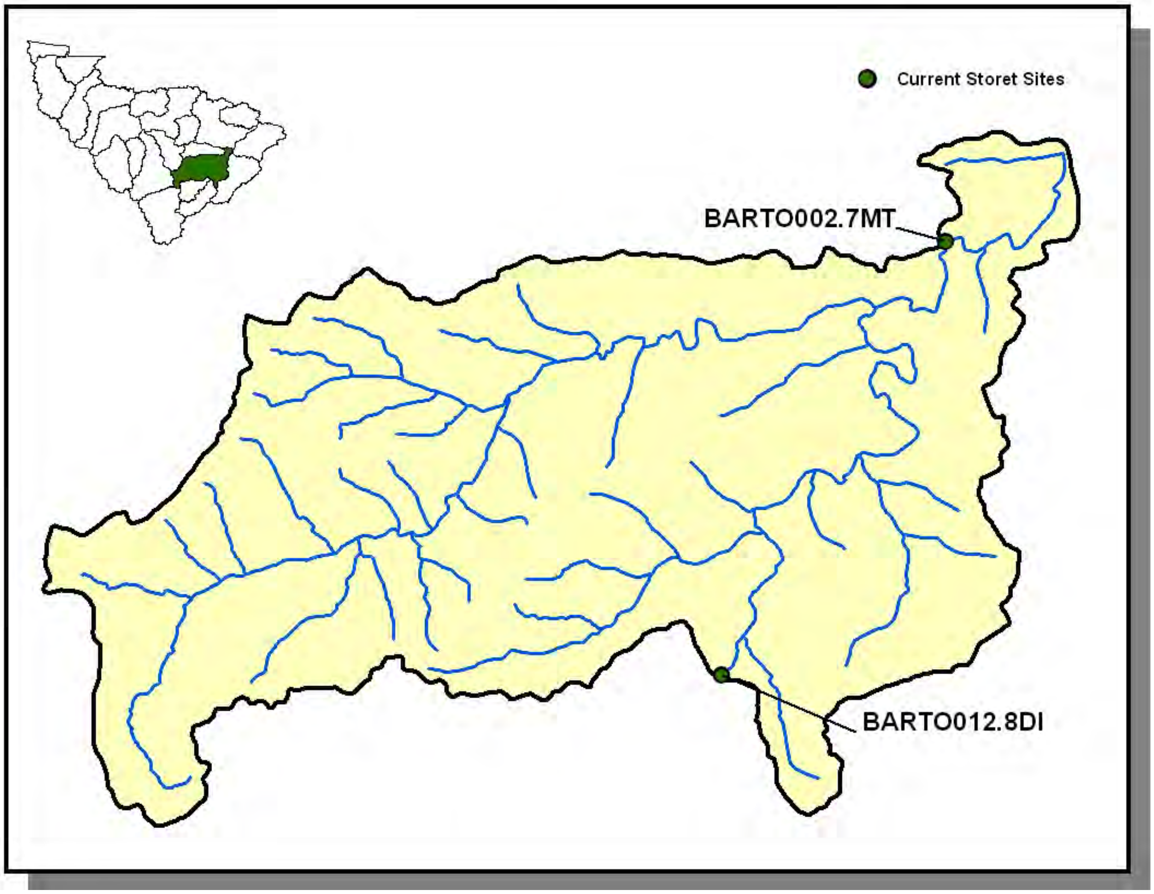


Figure 4-95. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302050203. *More information, including site names and locations, is provided in Appendix IV.*

4.2.J.iii. Permitted Activities.

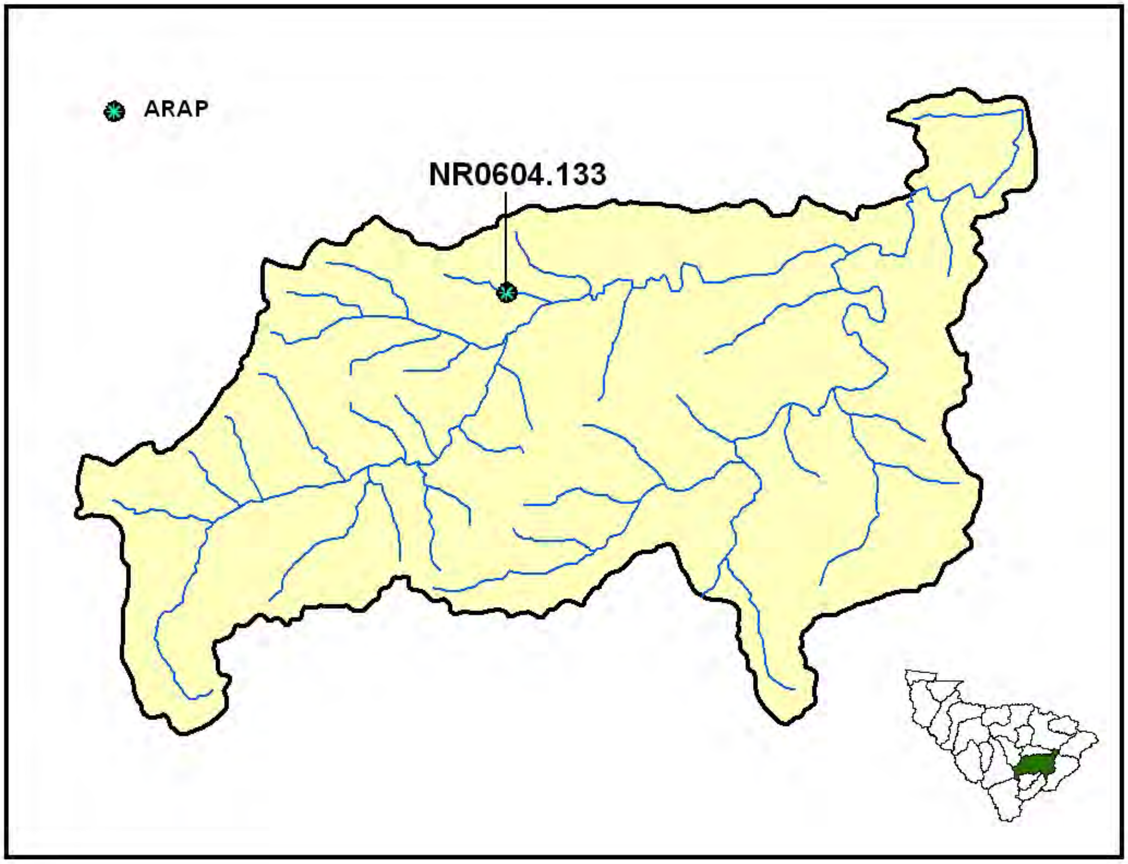


Figure 4-96. Location of Permits Issued in Subwatershed 051302050203. *ARAP, Aquatic Resource Alteration Permit. More information, including the names of facilities, is provided in Appendix IV.*

4.2.J.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Cheatham		11,429		121	1,183	
Dickson		28,271		1,931	2,029	30
Montgomery	16,051	30,959	760	913	1,408	107

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

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Cheatham	118.2	118.2	2.3	8.4
Dickson	174.3	174.3	1.8	7.7

Table 4-53. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Tobacco (Row Crops)	22.25
Other Vegetable and Truck Crop	7.71
Soybeans (Row Crops)	4.85
Corn (Row Crops)	4.62
Farmsteads and Ranch Headquarters	2.56
Vineyard (Horticultural)	1.05
Grass Forbs Legumes Mixed (Pastureland)	0.69
Grass (Pastureland)	0.56
Legume Grass (Hayland)	0.52
Other Cropland not Planted	0.52
Grass (Hayland)	0.43
Legume (Hayland)	0.38
Conservation Reserve Program Land	0.17

Table 4-54. Annual Estimated Total Soil Loss in Subwatershed 051302050203.

4.2.K. 051302050204 (Louise Creek).

4.2.K.i. General Description.

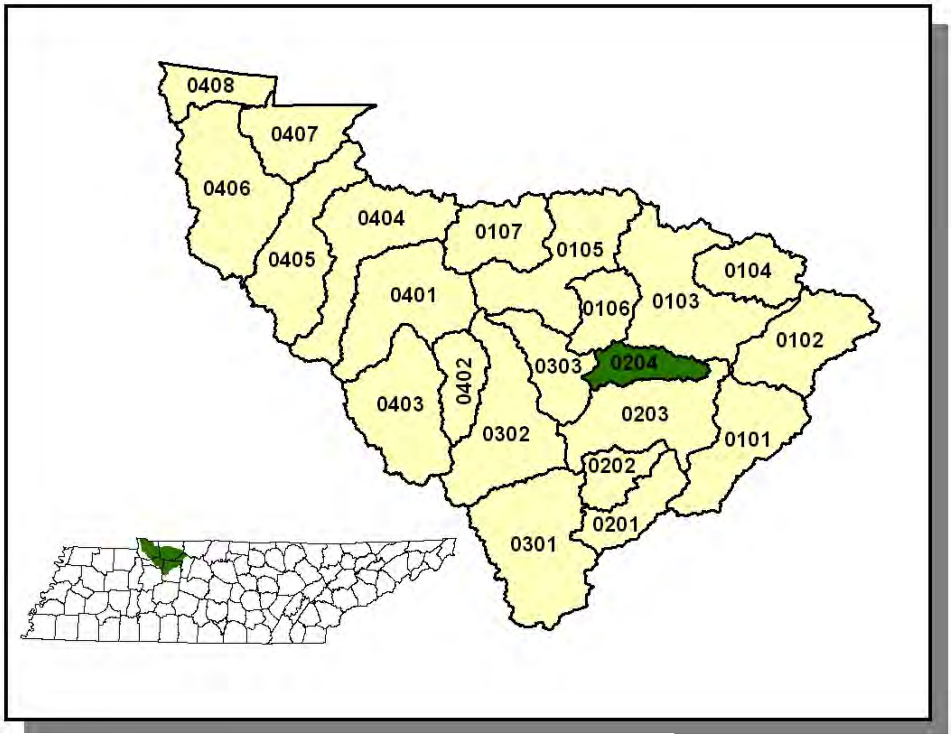


Figure 4-97. Location of Subwatershed 051302050204. *All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

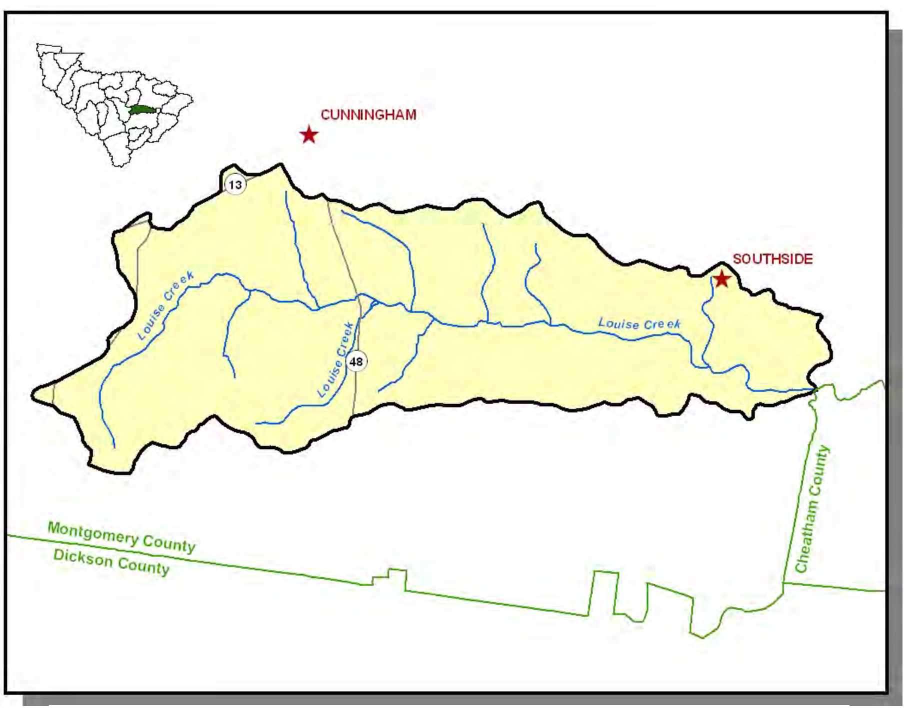


Figure 4-98. Locational Details of Subwatershed 051302050204.

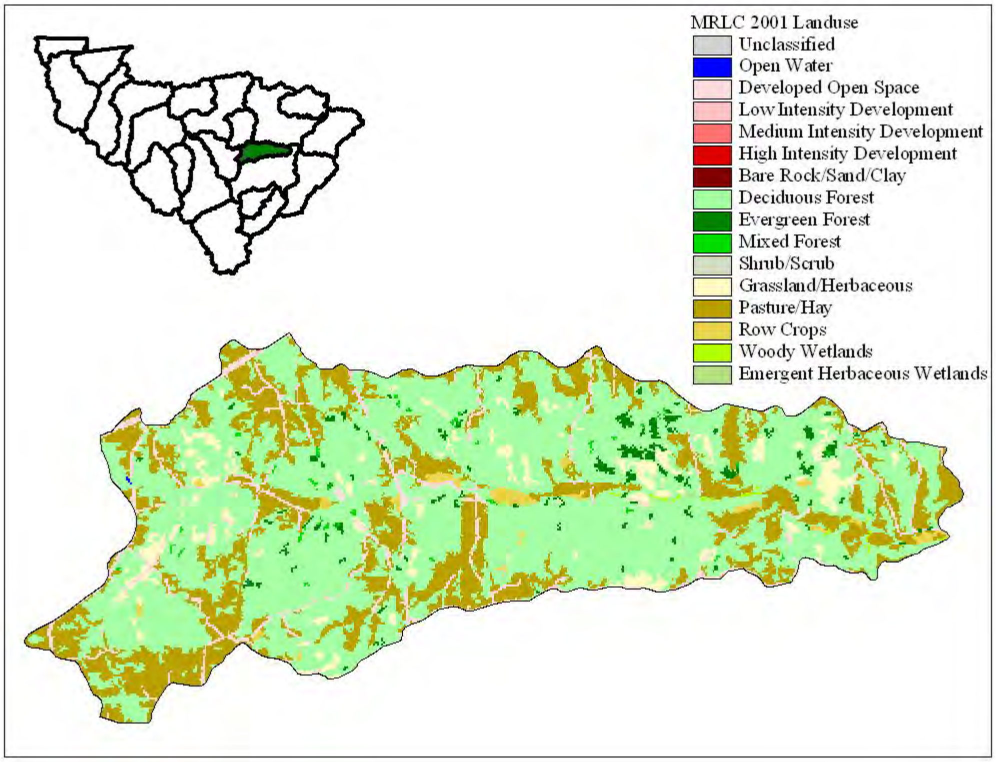


Figure 4-99. Illustration of Land Use Distribution in Subwatershed 051302050204.

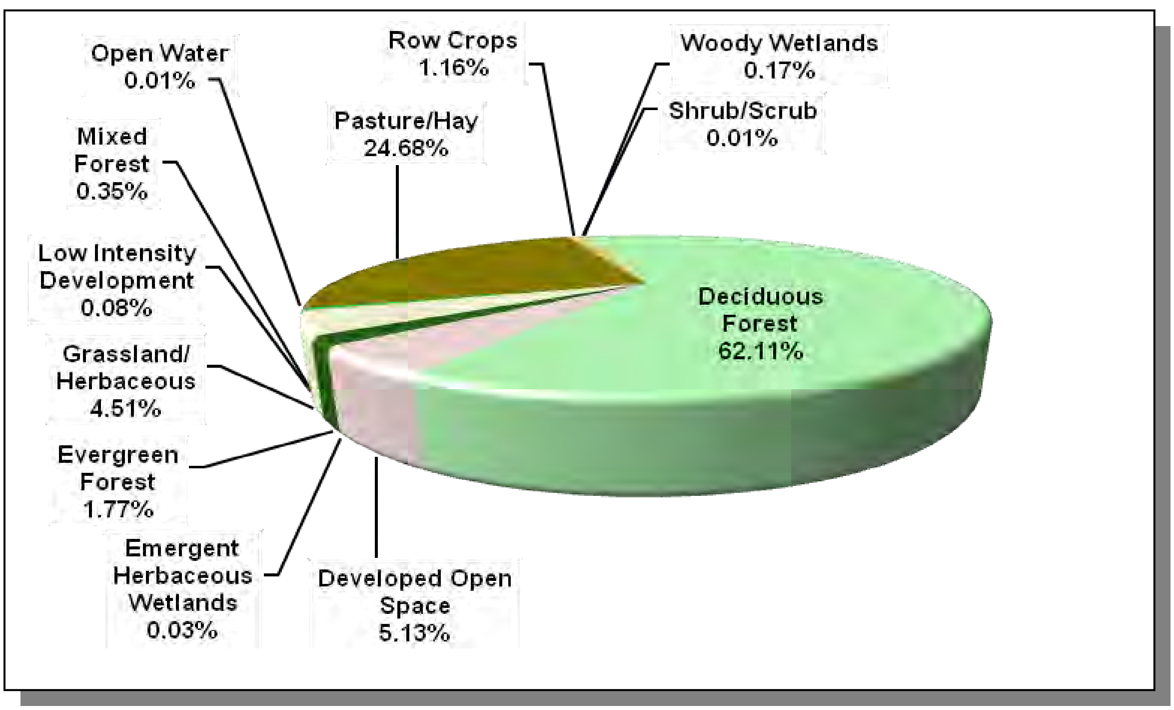


Figure 4-100. Land Use Distribution in Subwatershed 051302050204. *More information is provided in Appendix IV.*

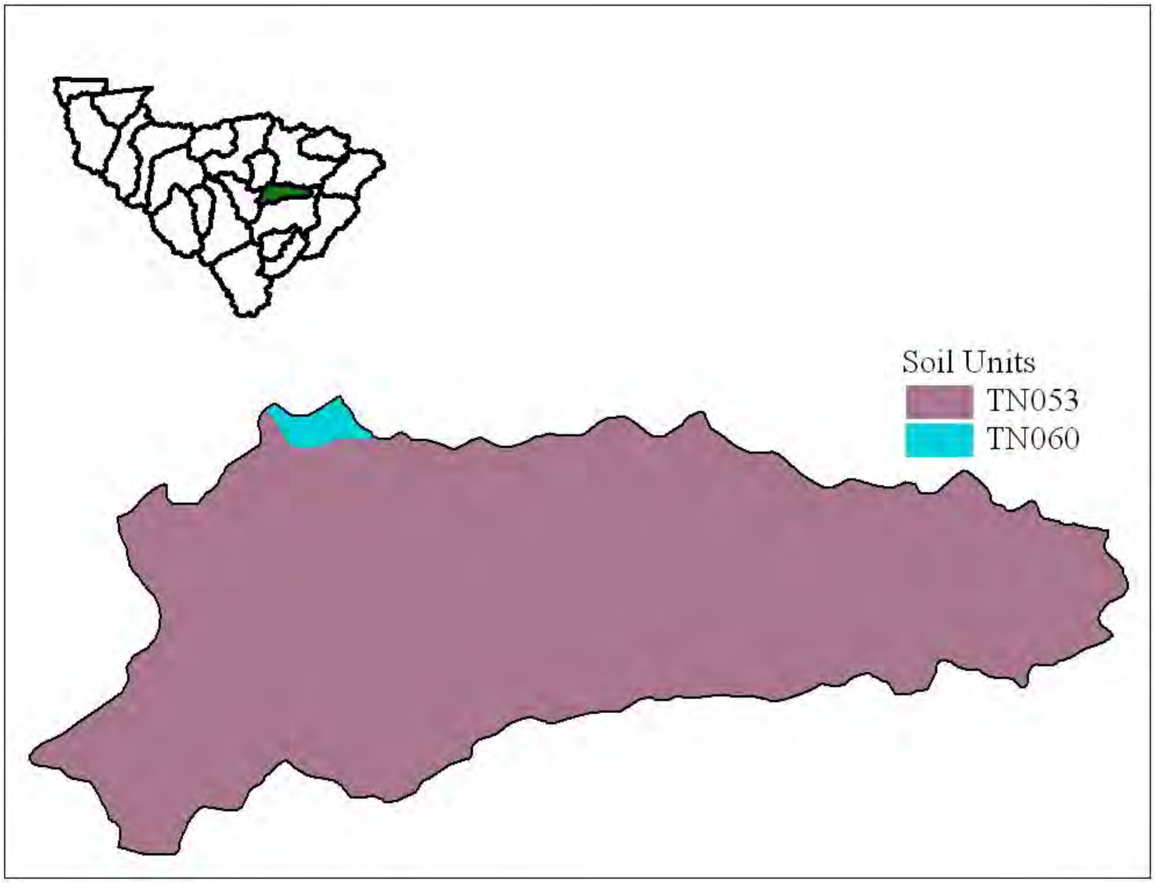


Figure 4-101. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050204.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN053	0.00	B	1.29	5.45	Loam	0.33
TN060	5.00	B	1.30	5.32	Silty Loam	0.39

Table 4-55. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050204. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Montgomery	100,498	124,369	134,768	3.37	3,386	4,191	4,541	34.10

Table 4-56. Population Estimates in Subwatershed 051302050204.

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

There are no USGS continuous record gaging stations or STORET sites located in subwatershed 051302050204.

4.2.K.iii. Permitted Activities.

There are no permitted activities located in subwatershed 051302050204 as of June 30th 2007.

4.2.K.iv. Nonpoint Source Contributions.

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

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

CROPS	TONS/ACRE/YEAR
Tobacco (Row Crops)	22.25
Corn (Row Crops)	8.04
Soybeans (Row Crops)	4.26
Grass Forbs Legumes Mixed (Pastureland)	0.55
Grass (Pastureland)	0.45
Conservation Reserve Program Land	0.41
Legume Grass (Hayland)	0.40
Grass (Hayland)	0.29

Table 4-58. Annual Estimated Total Soil Loss in Subwatershed 051302050204.

4.2.L. 051302050301 (Yellow Creek, Upper).

4.2.L.i. General Description.

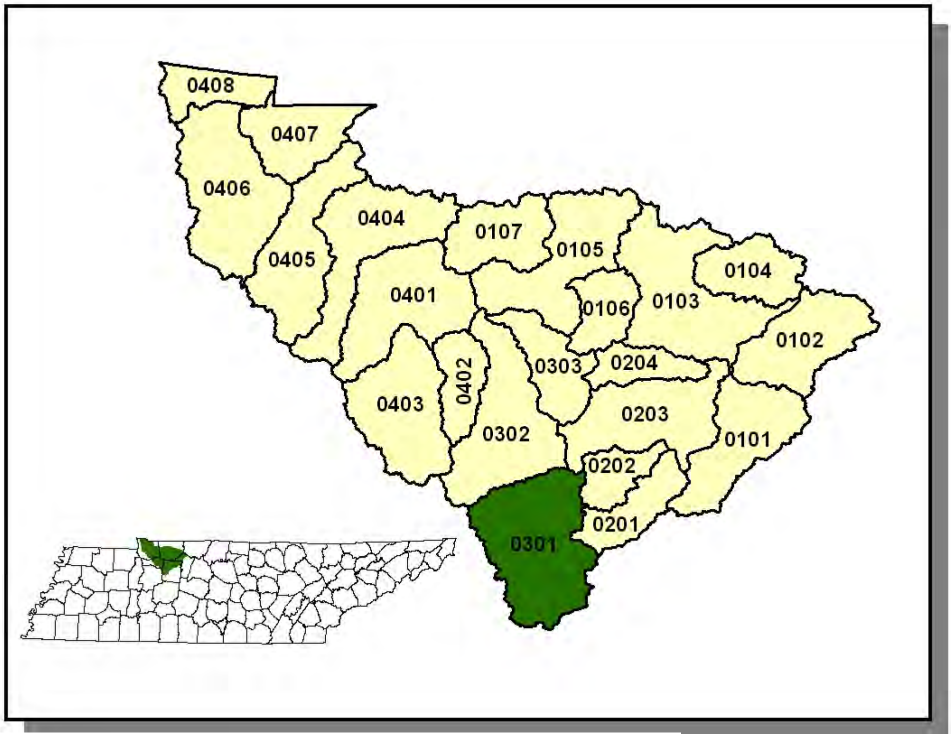


Figure 4-102. Location of Subwatershed 051302050301. *All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

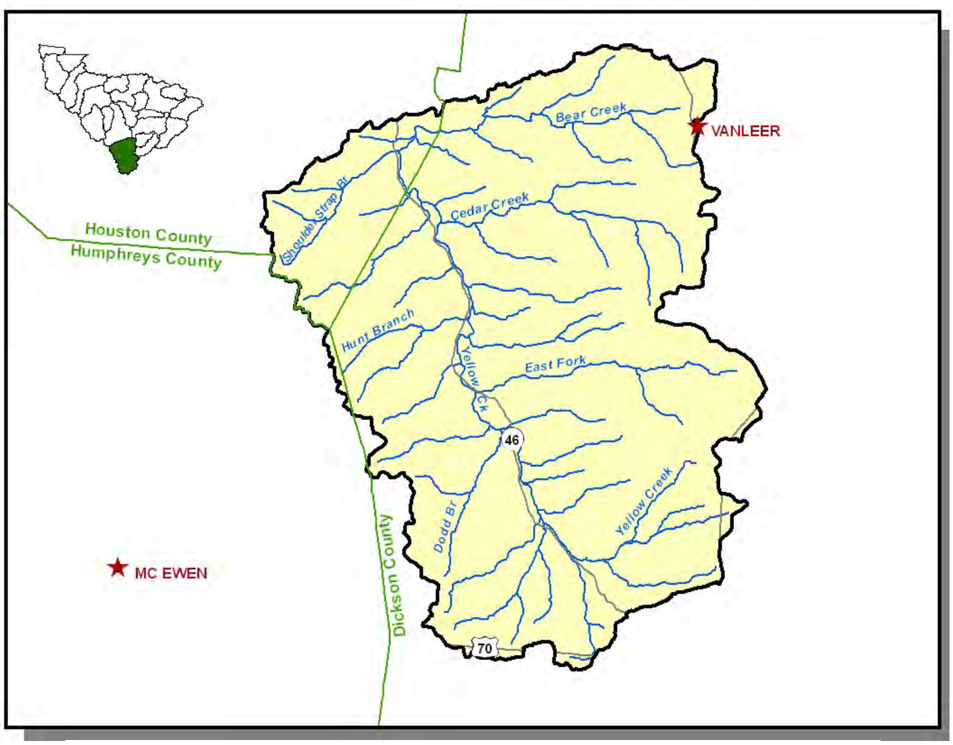


Figure 4-103. Locational Details of Subwatershed 051302050301.

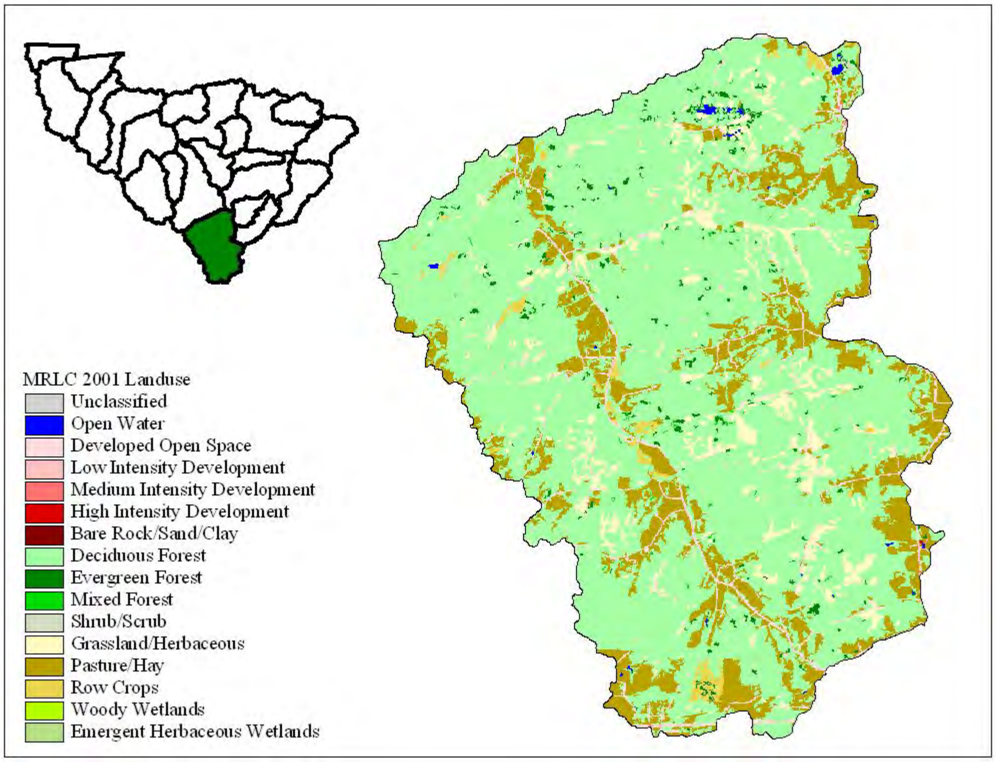


Figure 4-104. Illustration of Land Use Distribution in Subwatershed 051302050301.

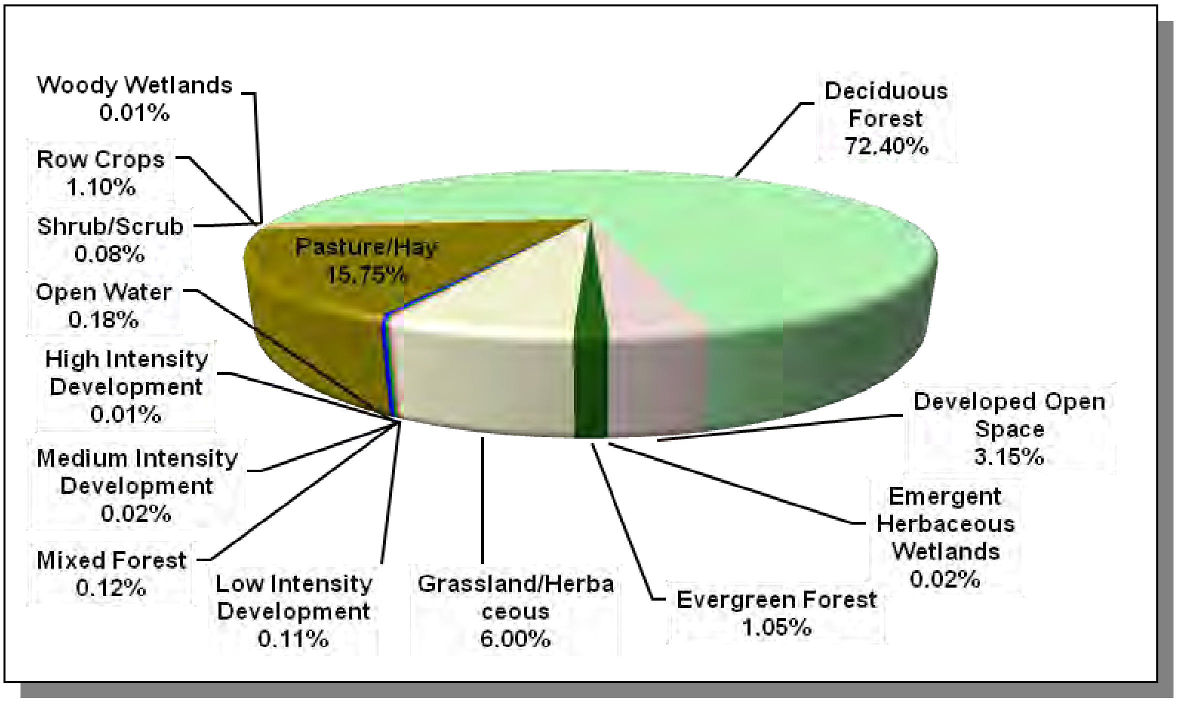


Figure 4-105. Land Use Distribution in Subwatershed 051302050301. *More information is provided in Appendix IV.*

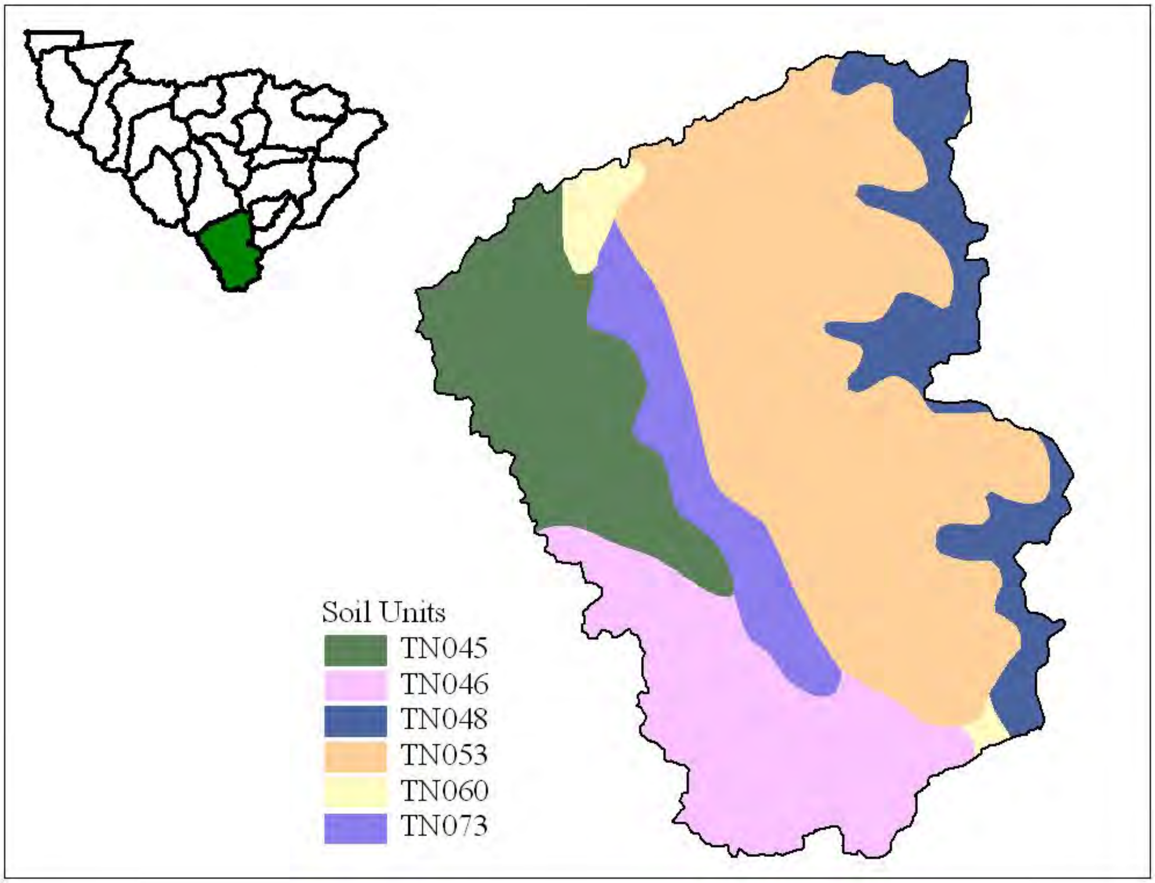


Figure 4-106. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050301.

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
TN046	0.00	B	1.98	5.09	Silty Loam	0.38
TN048	8.00	C	1.38	5.06	Silty Loam	0.42
TN053	0.00	B	1.29	5.45	Loam	0.33
TN060	5.00	B	1.30	5.32	Silty Loam	0.39
TN073	0.00	B	2.97	5.21	Loam	0.34

Table 4-59. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050301. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Dickson	35,061	40,937	43,156	13.33	4,672	5,455	5,751	23.1
Houston	7,018	7,769	8,088	2.68	188	208	217	15.4
Humphreys	15,795	16,839	17,929	0.35	56	60	64	14.3
Totals	**57,874**	**65,545**	**69,173**		**4,916**	**5,723**	**6,032**	**22.7**

Table 4-60. Population Estimates in Subwatershed 051302050301.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Vanleer	Dickson	383	176	16	155	5

Table 4-61. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302050301.

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

There are no USGS continuous record gaging stations located in subwatershed 051302050301.

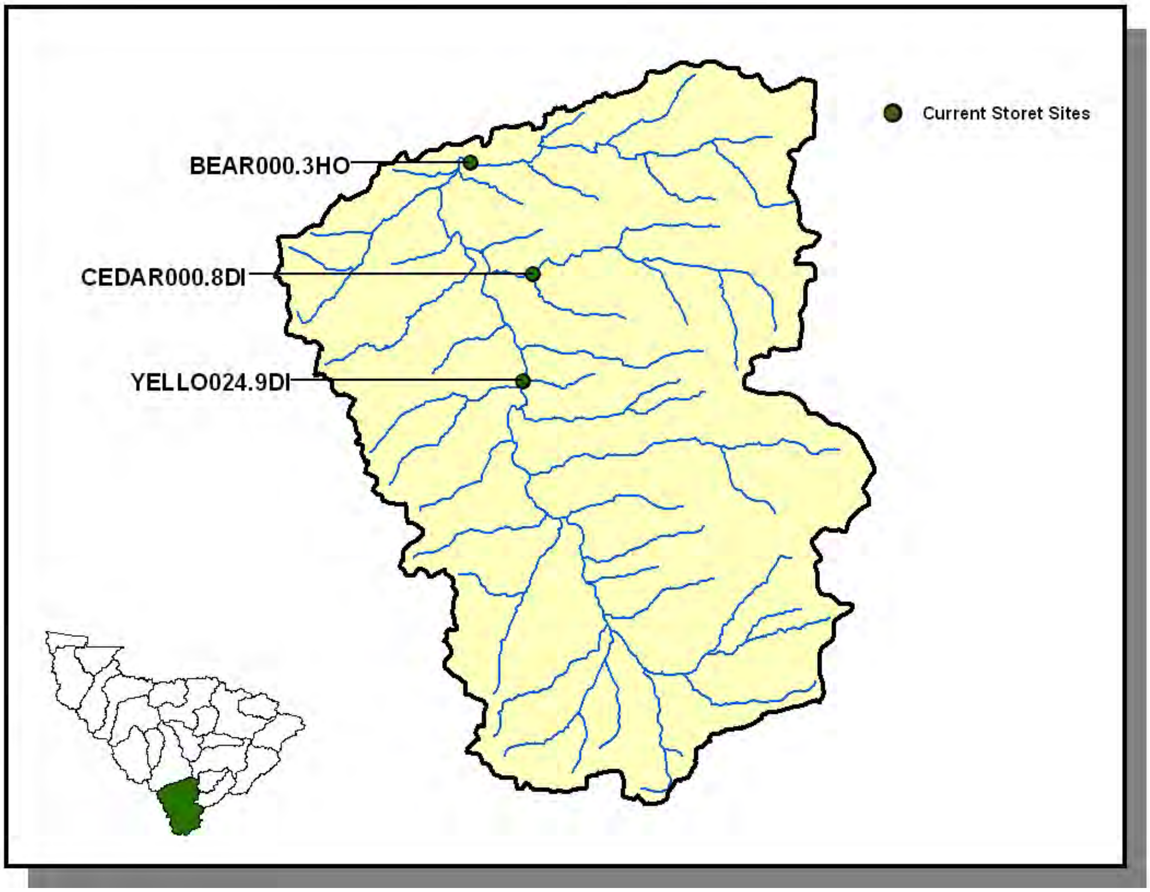


Figure 4-107. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302050301. *More information, including site names and locations, is provided in Appendix IV.*

4.2.L.iii. Permitted Activities.

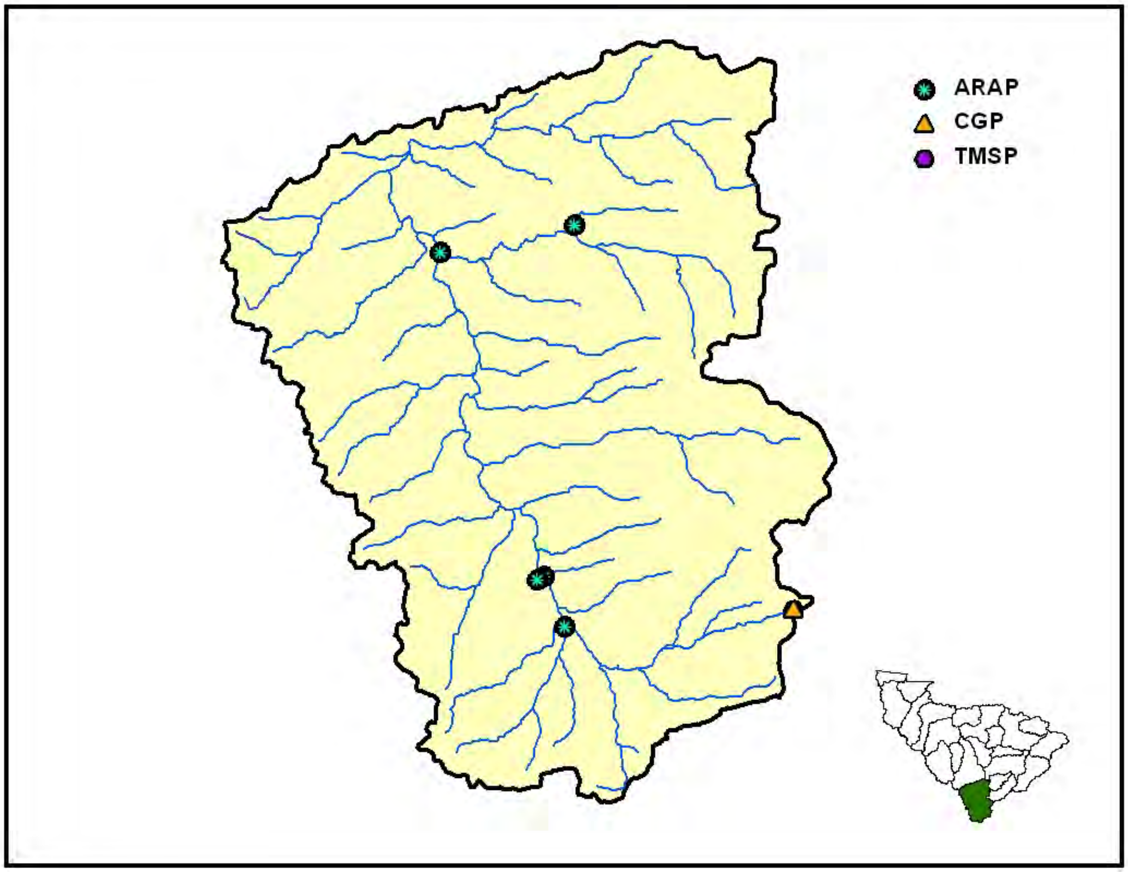


Figure 4-108. Location of Permits Issued in Subwatershed 051302050301. *More information, including the names of facilities, is provided in Appendix IV.*

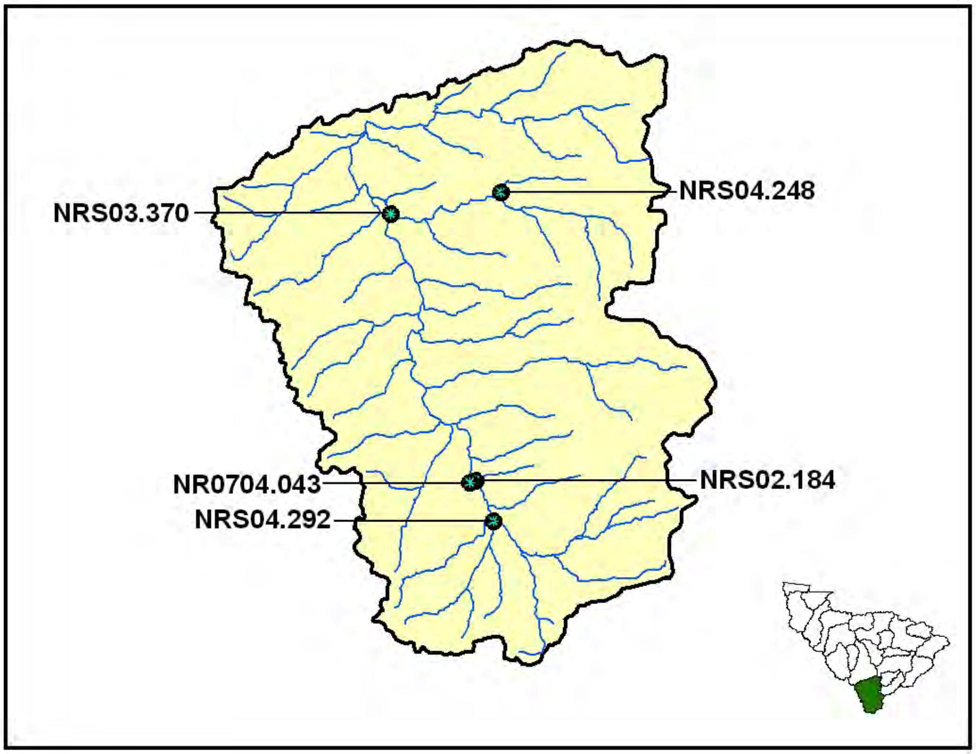


Figure 4-109. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 051302050301. *More information is provided in Appendix IV.*

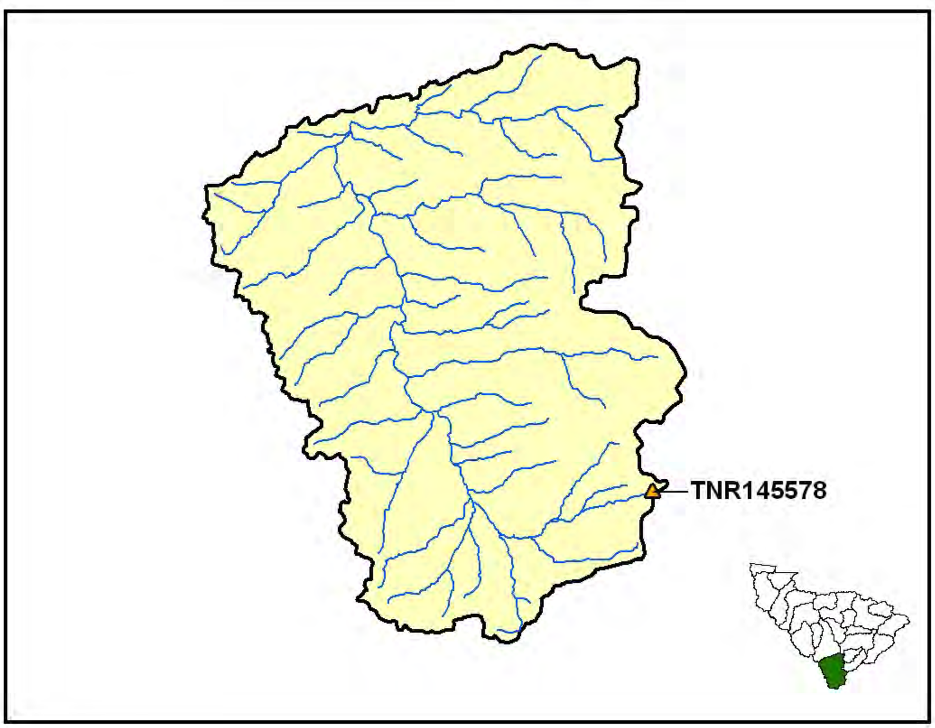


Figure 4-110. Location of CGP (Construction General Permit) Sites in Subwatershed 051302050301. *More information is provided in Appendix IV.*

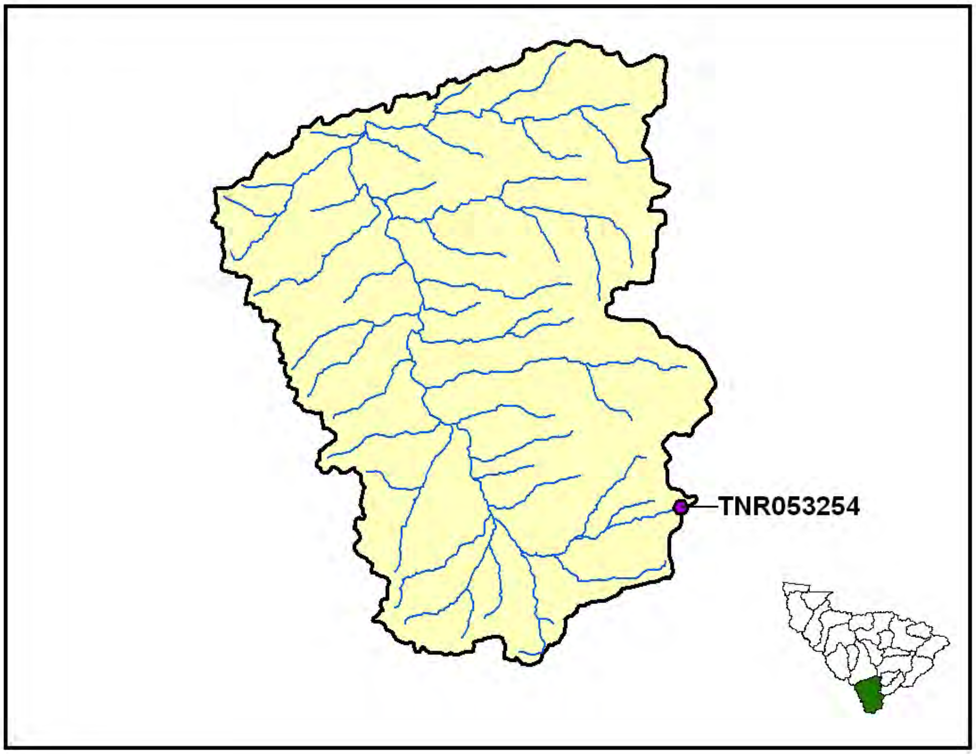


Figure 4-111. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 051302050301. *More information is provided in Appendix IV.*

4.2.L.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Dickson		28,271		1,931	2,029	30
Houston		11,528		9	199	
Humphreys	9,170	18,997	341	554	997	

Table 4-62. Summary of Livestock Count Estimates by County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Dickson	174.3	174.3	1.8	7.7
Houston	94.2	94.2	0.0	0.0
Humphreys	241.2	241.2	3.7	14.4

Table 4-63. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Soybeans (Row Crops)	23.49
Other Vegetable and Truck Crop	7.71
Sorghum (Row Crops)	5.80
Corn (Row Crops)	3.85
Farmsteads and Ranch Headquarters	3.43
Legume (Hayland)	2.01
Vineyard (Horticultural)	1.05
Grass Forbs Legumes Mixed (Pastureland)	0.76
Grass (Pastureland)	0.65
Legume Grass (Hayland)	0.57
Grass (Hayland)	0.45
Other Land in Farms	0.16
Conservation Reserve Program Land	0.07

Table 4-64. Annual Estimated Total Soil Loss in Subwatershed 051302050301.

4.2.M. 051302050302 (Yellow Creek, Lower).

4.2.M.i. General Description

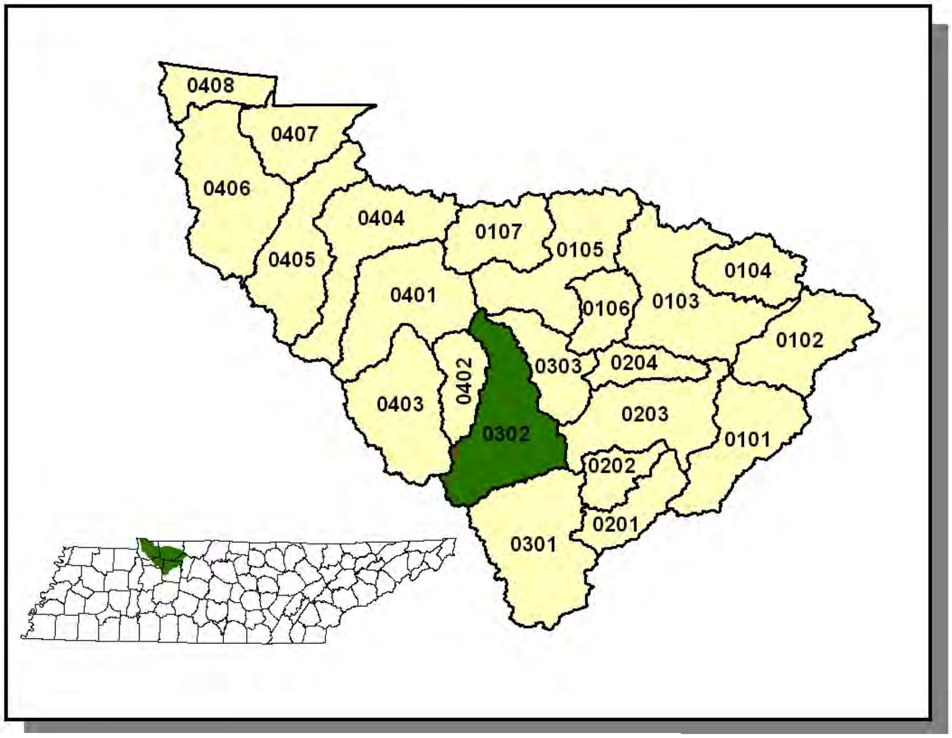


Figure 4-112. Location of Subwatershed 051302050302. *All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

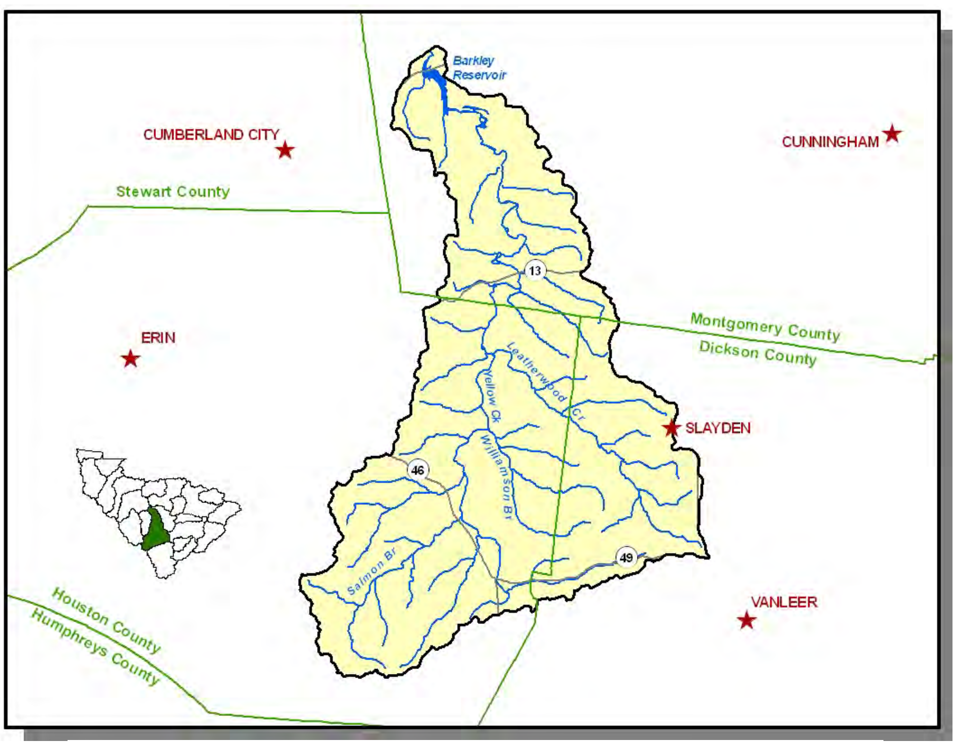


Figure 4-113. Locational Details of Subwatershed 051302050302.

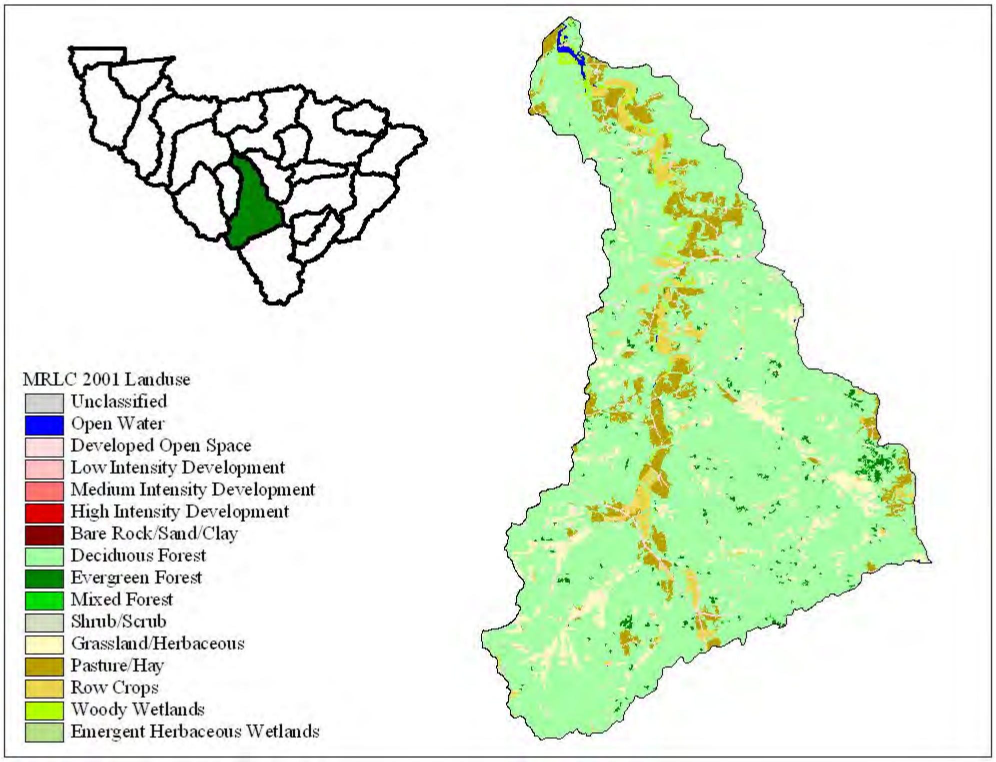


Figure 4-114. Illustration of Land Use Distribution in Subwatershed 051302050302.

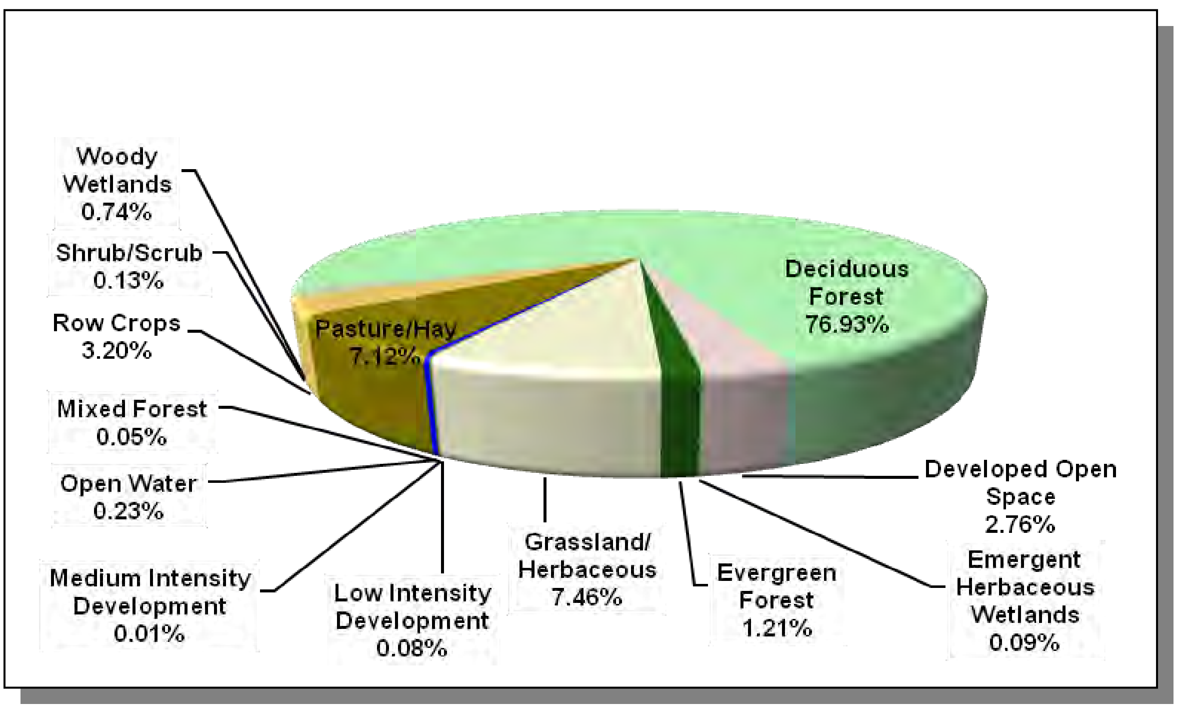


Figure 4-115. Land Use Distribution in Subwatershed 051302050302. *More information is provided in Appendix IV.*

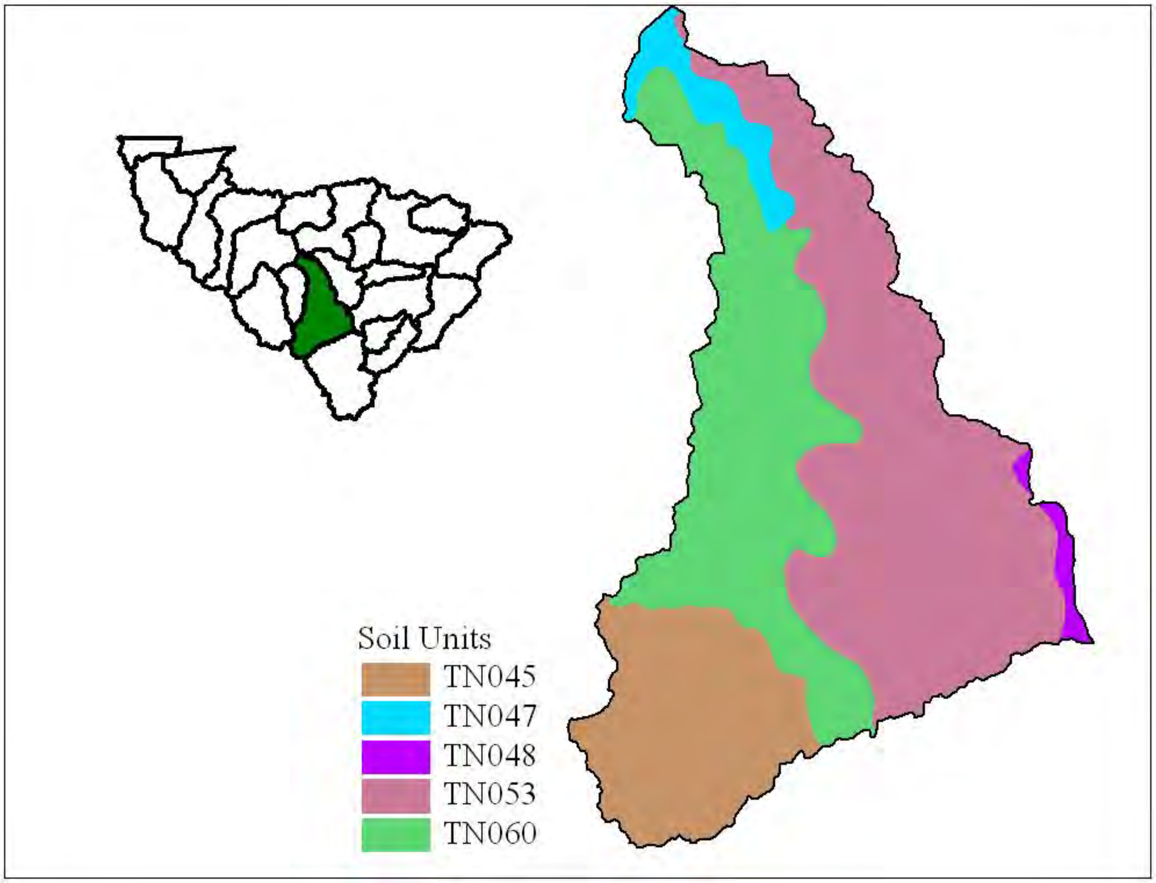


Figure 4-116. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050302.

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
TN047	21.00	C	1.62	5.73	Silty Loam	0.37
TN048	8.00	C	1.38	5.06	Silty Loam	0.42
TN053	0.00	B	1.29	5.45	Loam	0.33
TN060	5.00	B	1.30	5.32	Silty Loam	0.39

Table 4-65. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050302. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Dickson	35,061	40,937	43,156	2.95	1,033	1,206	1,271	23.00
Houston	7,018	7,769	8,088	17.45	1,224	1,355	1,411	15.30
Montgomery	100,498	124,369	134,768	2.57	2,578	3,190	3,457	34.10
Totals	**142,577**	**173,075**	**186,012**		**4,835**	**5,751**	**6,139**	**27.00**

Table 4-66. Population Estimates in Subwatershed 051302050302.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Slayden	Dickson	107	57	5	50	2
Vanleer	Dickson	383	176	16	155	5
Total		**490**	**233**	**21**	**205**	**7**

Table 4-67. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302050302.

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

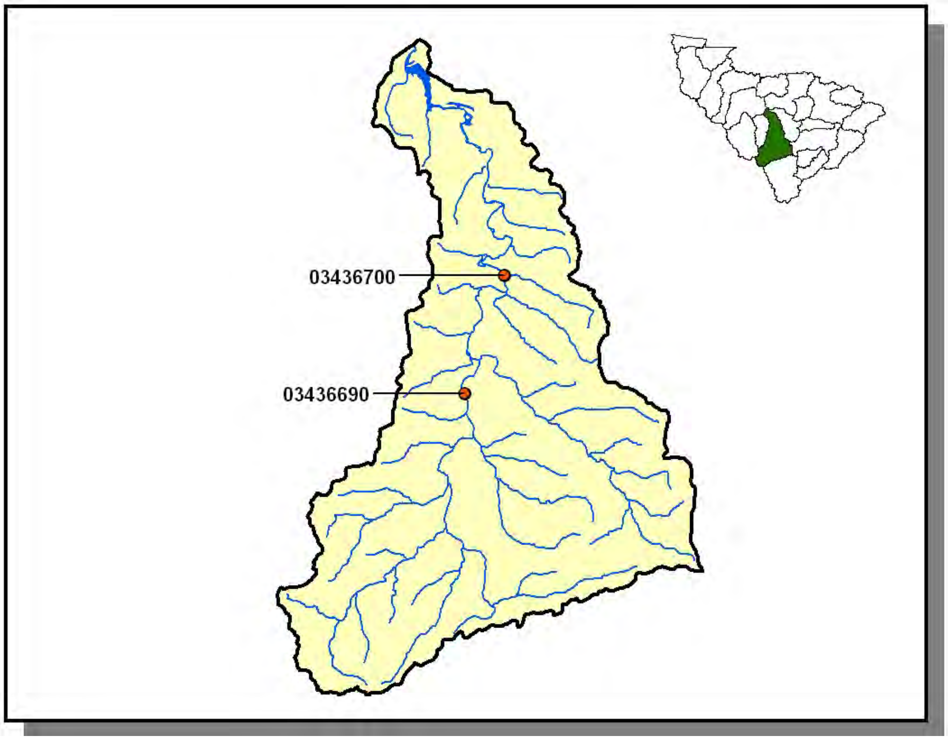


Figure 4-117. Location of USGS Continuous Record Gaging Stations in Subwatershed 051302050302. *More information is provided in Appendix IV.*

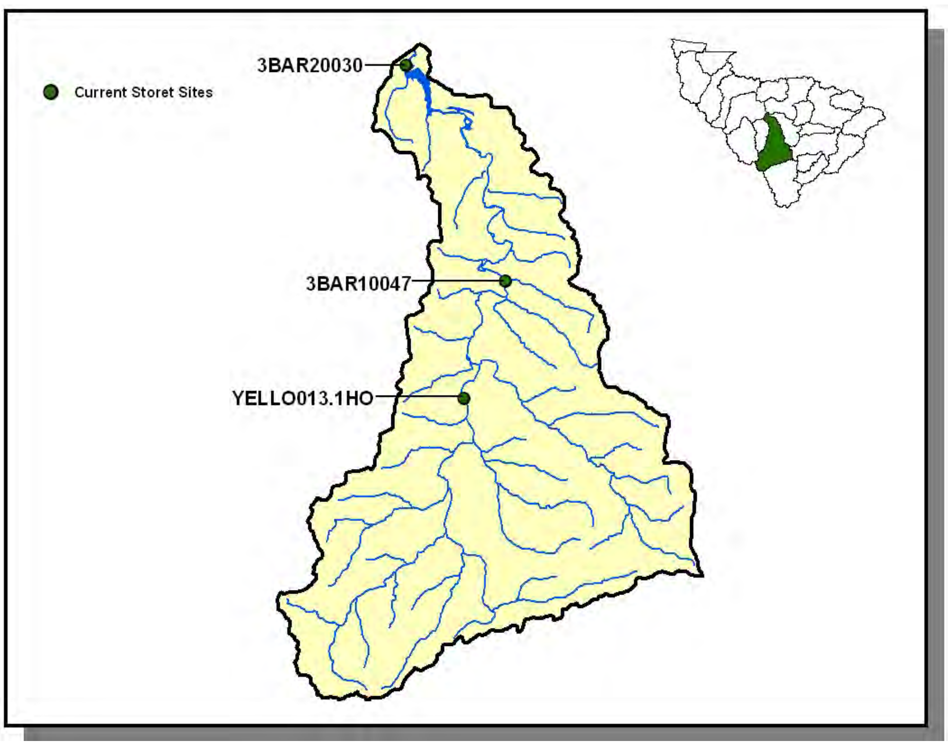


Figure 4-118. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302050302. *More information, including site names and locations, is provided in Appendix IV.*

4.2.M.iii. Permitted Activities.

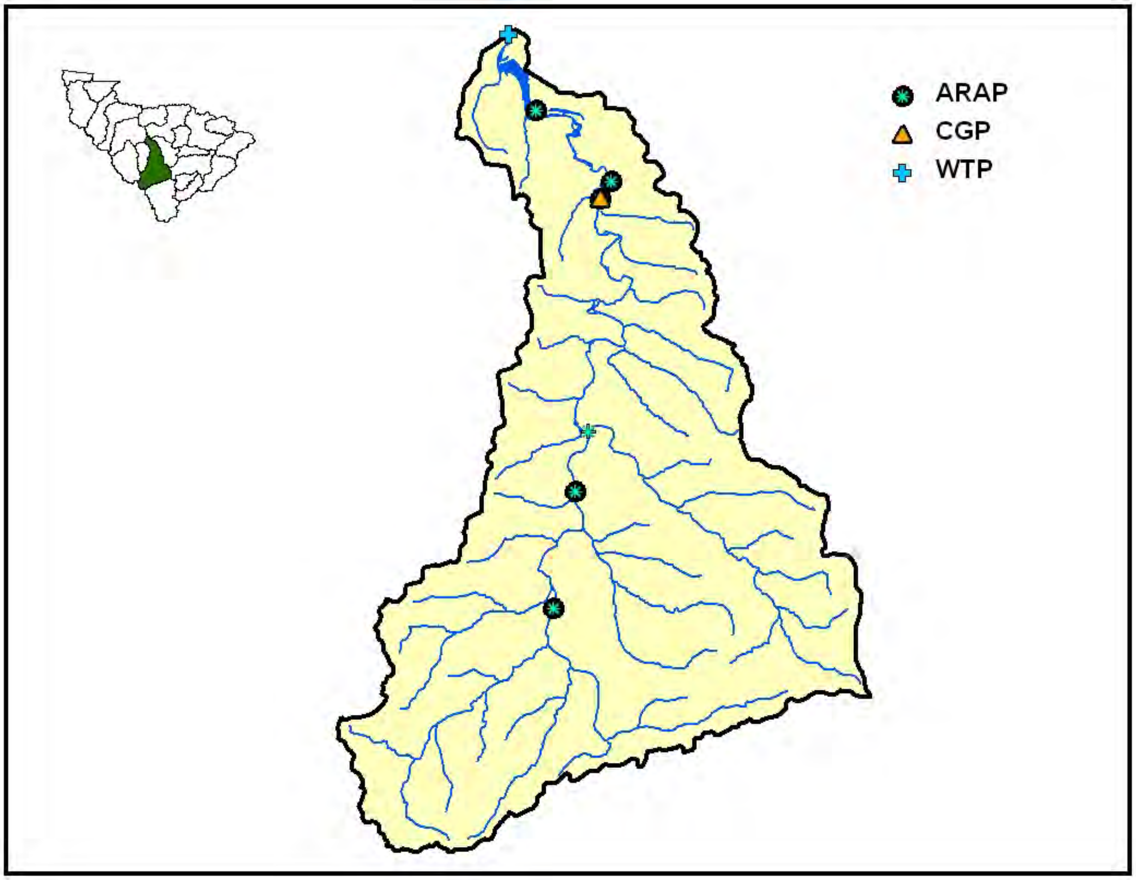


Figure 4-119. Location of Permits Issued in Subwatershed 051302050302. *More information, including the names of facilities, is provided in Appendix IV.*

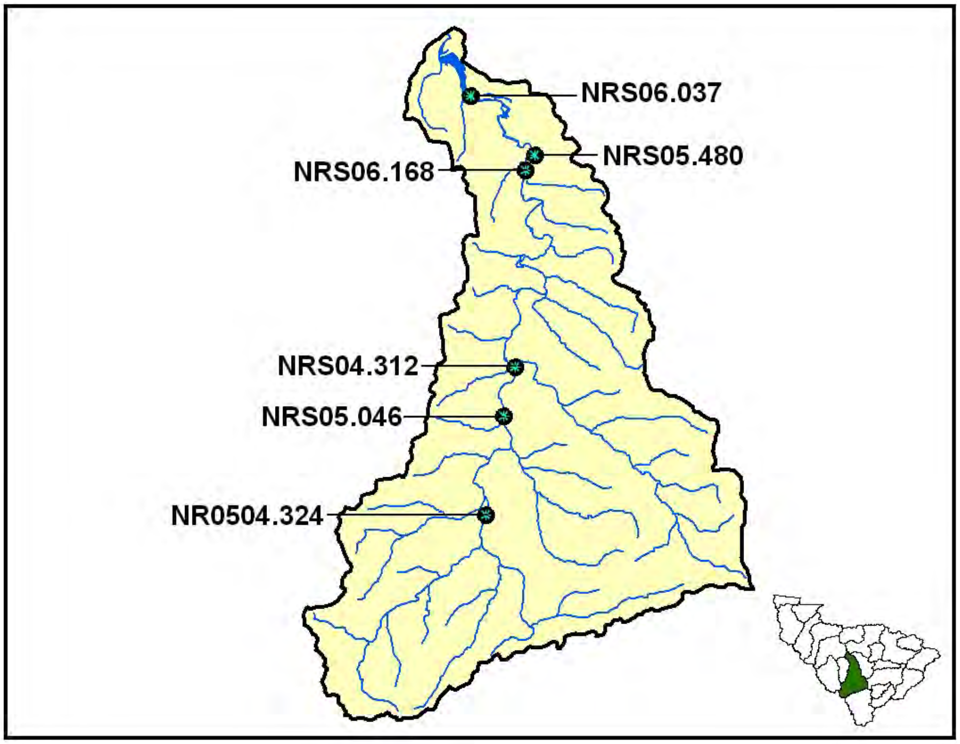


Figure 4-120. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 051302050302. *More information is provided in Appendix IV.*

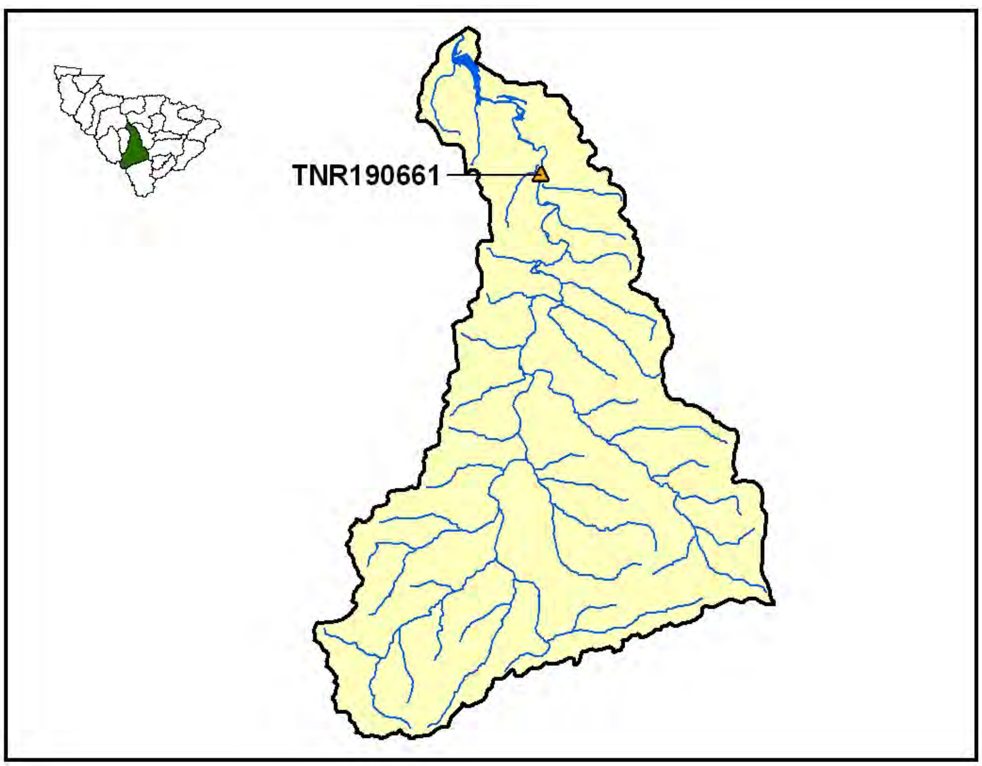


Figure 4-121. Location of CGP (Construction General Permit) Sites in Subwatershed 051302050302. *More information is provided in Appendix IV.*

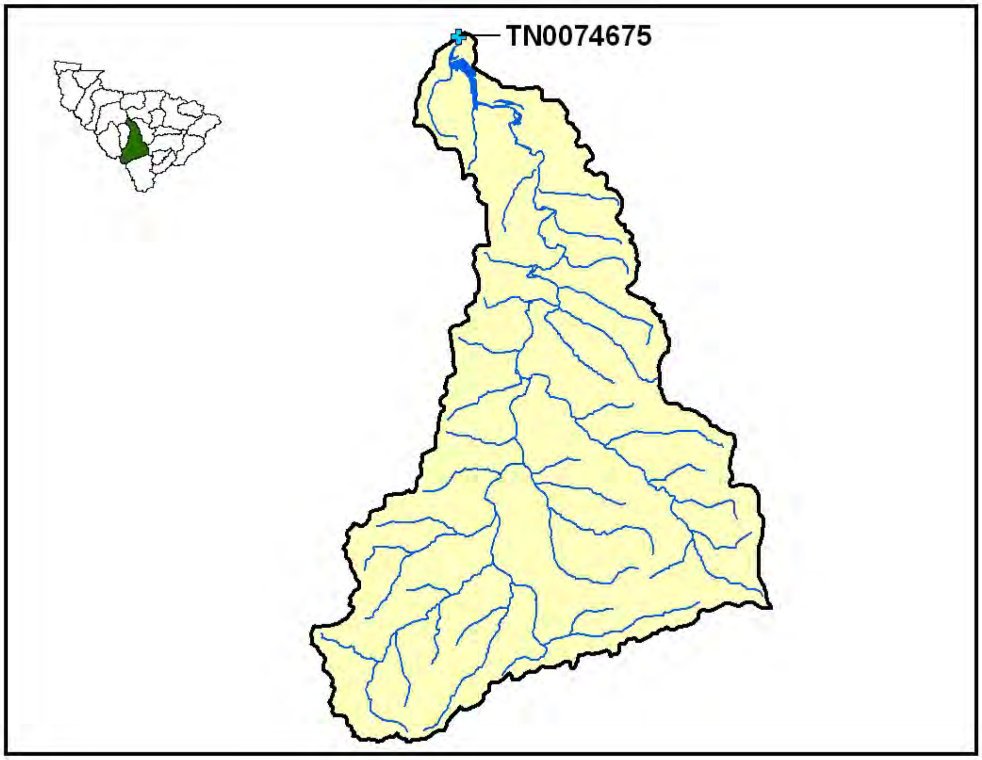


Figure 4-122. Location of Active Water Treatment Plant (WTP) Facilities in Subwatershed 051302050302. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.M.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Dickson		28,271		1,931	2,029	30
Houston		11,528		9	199	
Montgomery	16,051	30,959	760	913	1,408	107

Table 4-68. Summary of Livestock Count Estimates by County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Dickson	174.3	174.3	1.8	7.7
Houston	94.2	94.2	0.0	0.0

Table 4-69. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Tobacco (Row Crops)	22.25
Other Vegetable and Truck Crop	7.71
Corn (Row Crops)	6.44
Soybeans (Row Crops)	4.26
Vineyard (Horticultural)	1.05
Farmsteads and Ranch Headquarters	1.01
Grass (Pastureland)	0.75
Grass Forbs Legumes Mixed (Pastureland)	0.69
Legume Grass (Hayland)	0.50
Grass (Hayland)	0.28
Conservation Reserve Program Land	0.24
Other Land in Farms	0.21

Table 4-70. Annual Estimated Total Soil Loss in Subwatershed 051302050302.

4.2.N. 051302050303 (East Fork Yellow Creek).

4.2.N.i. General Description.

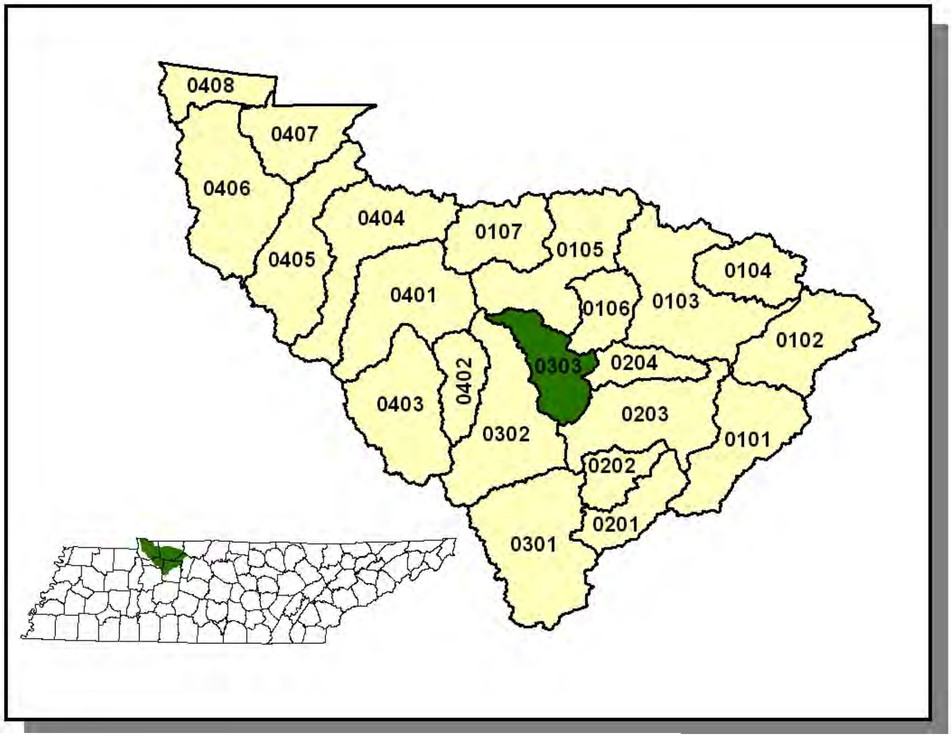


Figure 4-123. Location of Subwatershed 051302050303. All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.

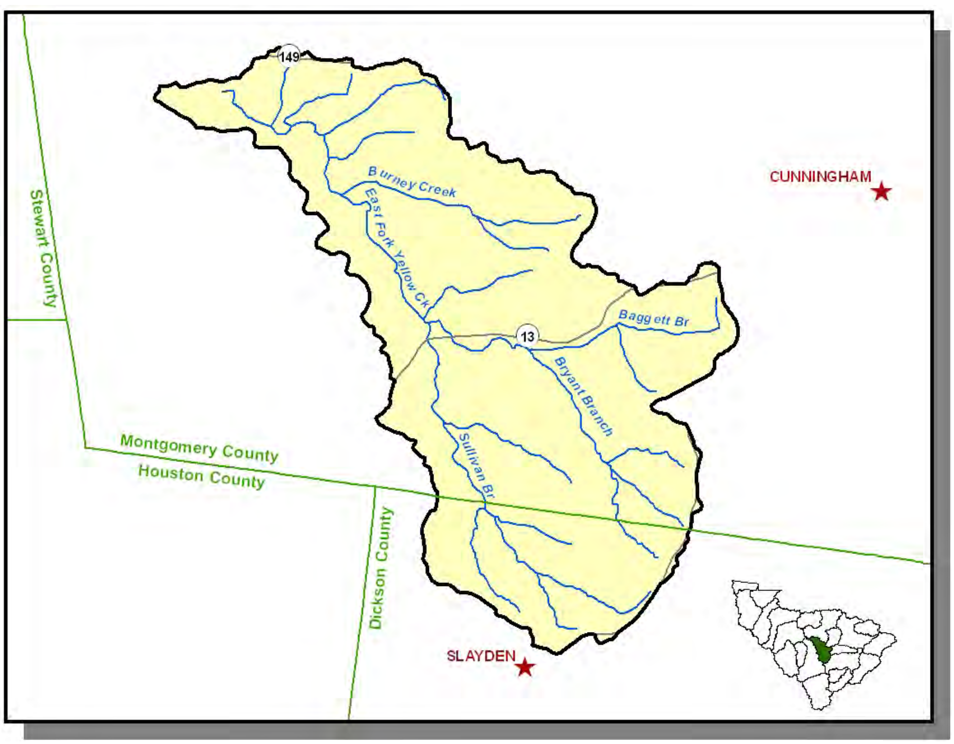


Figure 4-124. Locational Details of Subwatershed 051302050303.

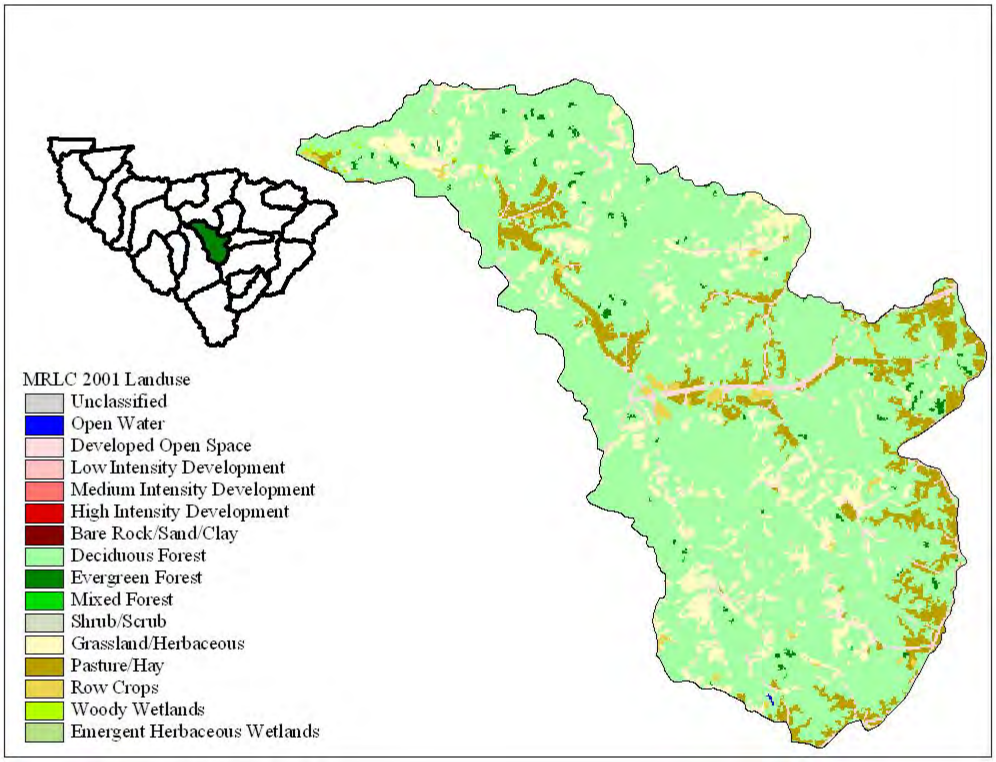


Figure 4-125. Illustration of Land Use Distribution in Subwatershed 051302050303.

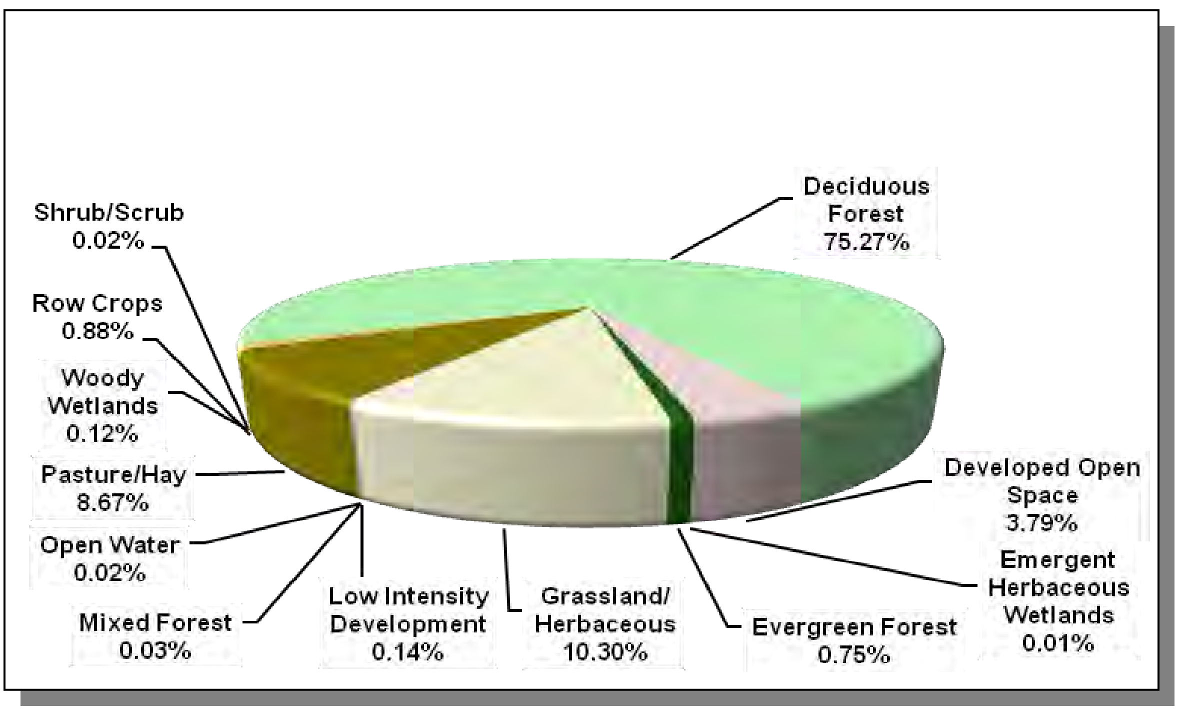


Figure 4-126. Land Use Distribution in Subwatershed 051302050303. *More information is provided in Appendix IV.*

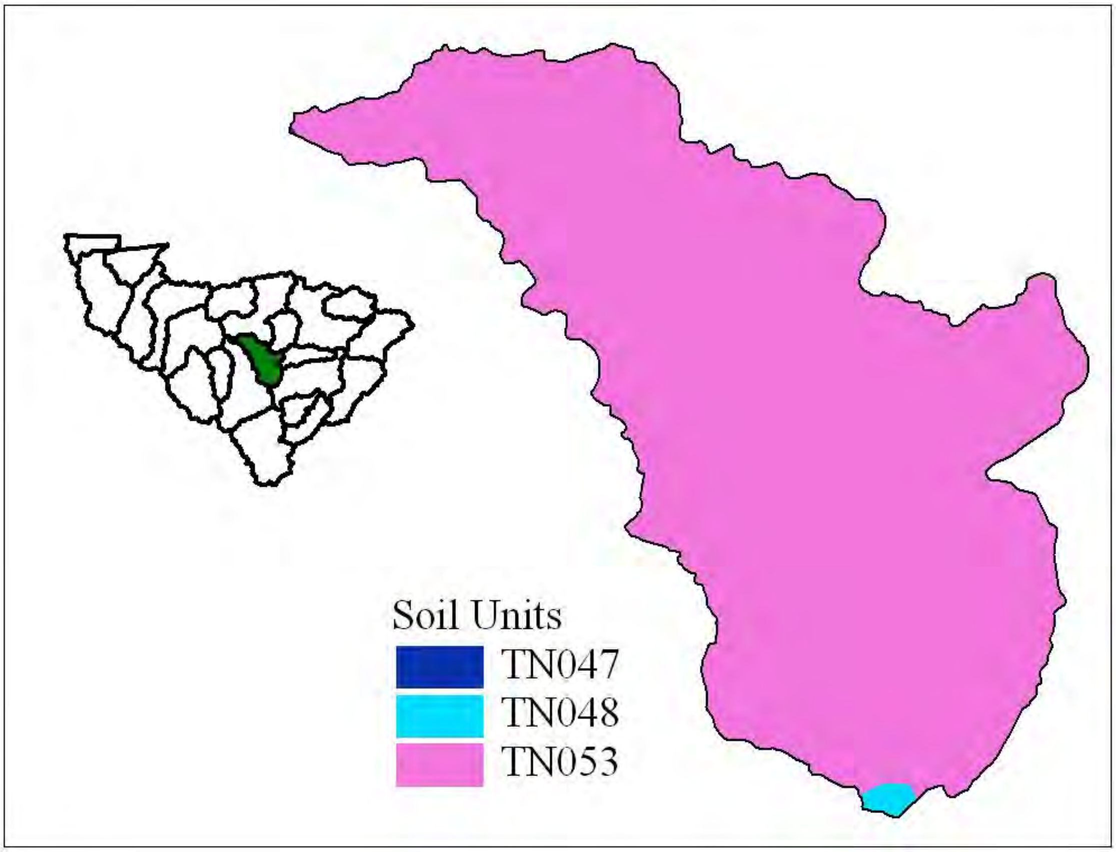


Figure 4-127. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050303.

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	C	1.38	5.06	Silty Loam	0.42
TN053	0.00	B	1.29	5.45	Loam	0.33

Table 4-71. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050303. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Dickson	35,061	40,937	43,156	1.30	457	534	563	23.20
Montgomery	100,498	124,369	134,768	4.35	4,370	5,407	5,860	34.10
Totals	**135,559**	**165,306**	**177,924**		**4,827**	**5,941**	**6,423**	**33.10**

Table 4-72. Population Estimates in Subwatershed 051302050303.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Slayden	Dickson	107	57	5	50	2

Table 4-73. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302050303.

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

There are no USGS continuous record gaging stations or STORET sites located in subwatershed 051302050303.

4.2.N.iii. Point Source Contributions.

There are no permitted activities located in subwatershed 051302050303 as of June 30th, 2007.

4.2.N.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Dickson		28,271		1,931	2,029	30
Montgomery	16,051	30,959	760	913	1,408	107

Table 4-74. Summary of Livestock Count Estimates by County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Dickson	174.3	174.3	1.8	7.7

Table 4-75. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Tobacco (Row Crops)	22.25
Other Vegetable and Truck Crop	7.71
Corn (Row Crops)	6.97
Soybeans (Row Crops)	4.26
Vineyard (Horticultural)	1.05
Farmsteads and Ranch Headquarters	0.82
Grass Forbs Legumes Mixed (Pastureland)	0.59
Grass (Pastureland)	0.48
Legume Grass (Hayland)	0.44
Conservation Reserve Program Land	0.34
Grass (Hayland)	0.33

Table 4-76. Annual Estimated Total Soil Loss in Subwatershed 051302050303.

4.2.O. 051302050401 (Cumberland River).

4.2.O.i. General Description

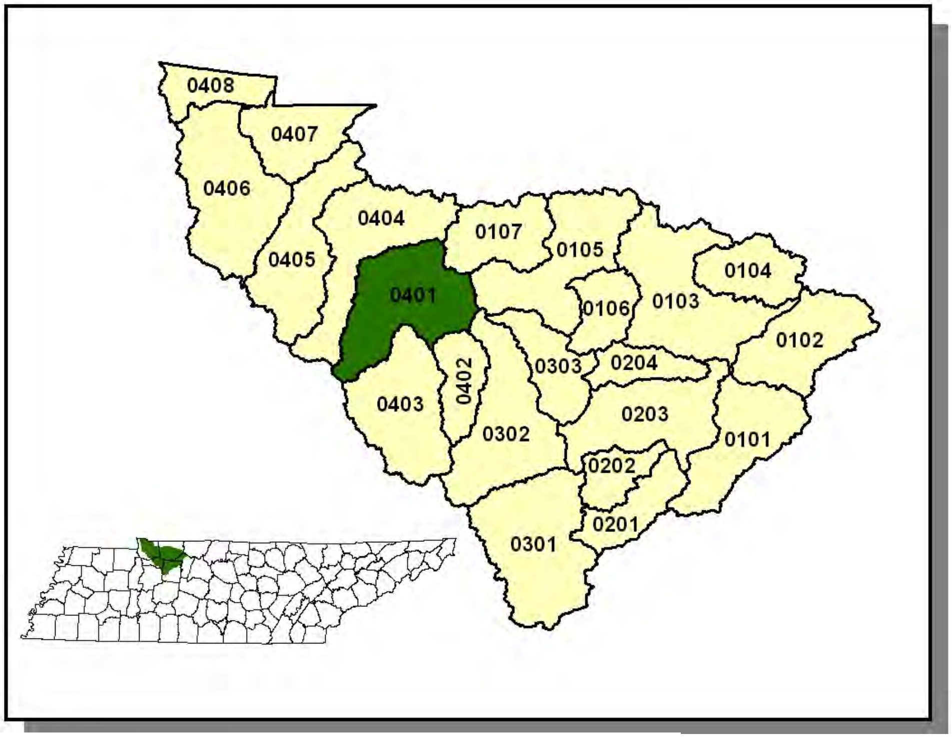


Figure 4-128. Location of Subwatershed 051302050401. *All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

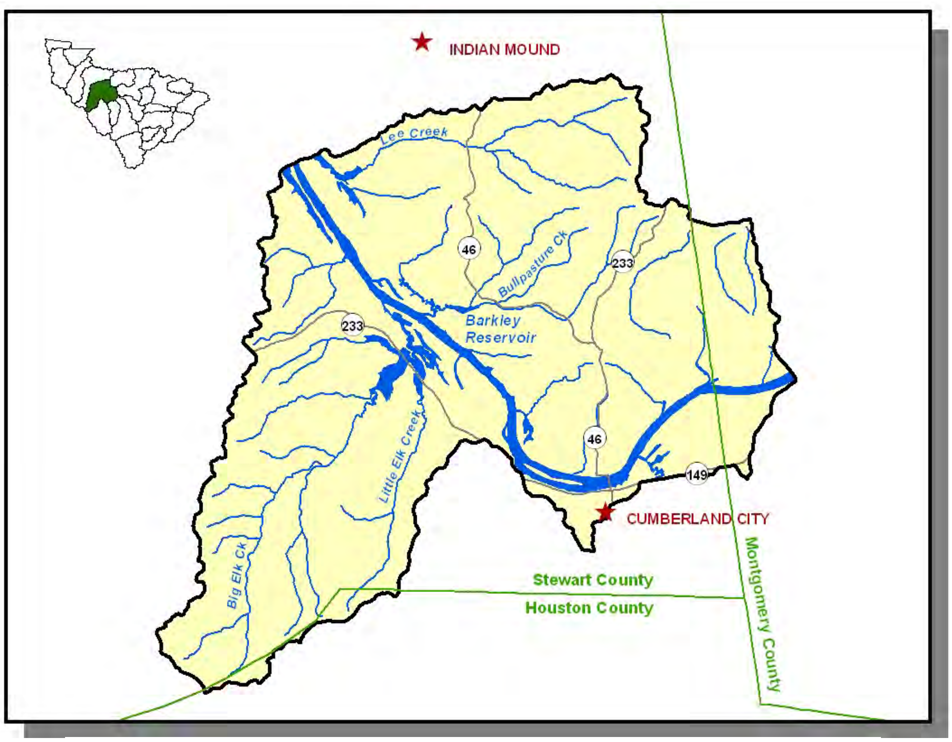


Figure 4-129. Locational Details of Subwatershed 051302050401.

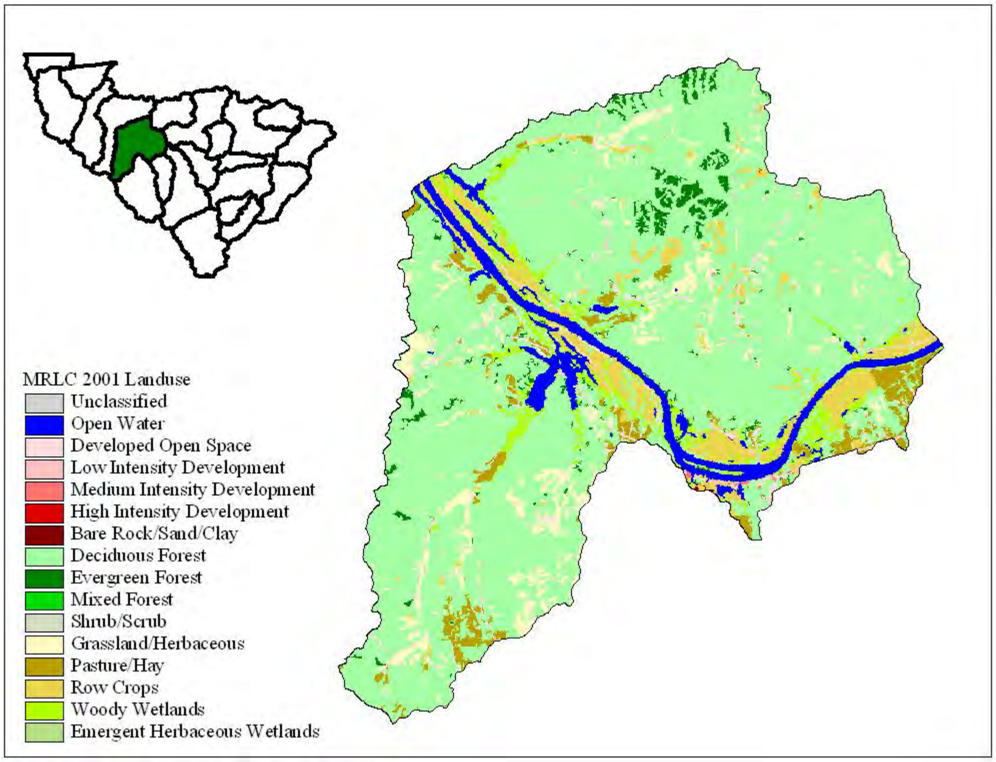


Figure 4-130. Illustration of Land Use Distribution in Subwatershed 051302050401.

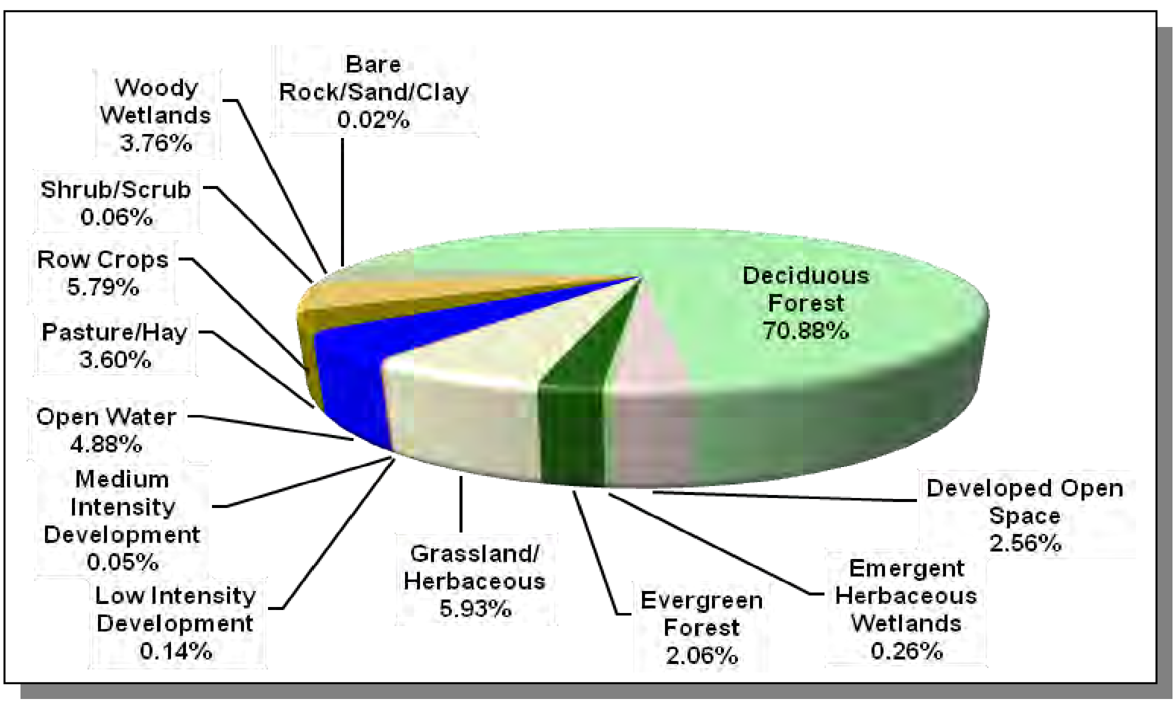


Figure 4-131. Land Use Distribution in Subwatershed 051302050401. *More information is provided in Appendix IV.*

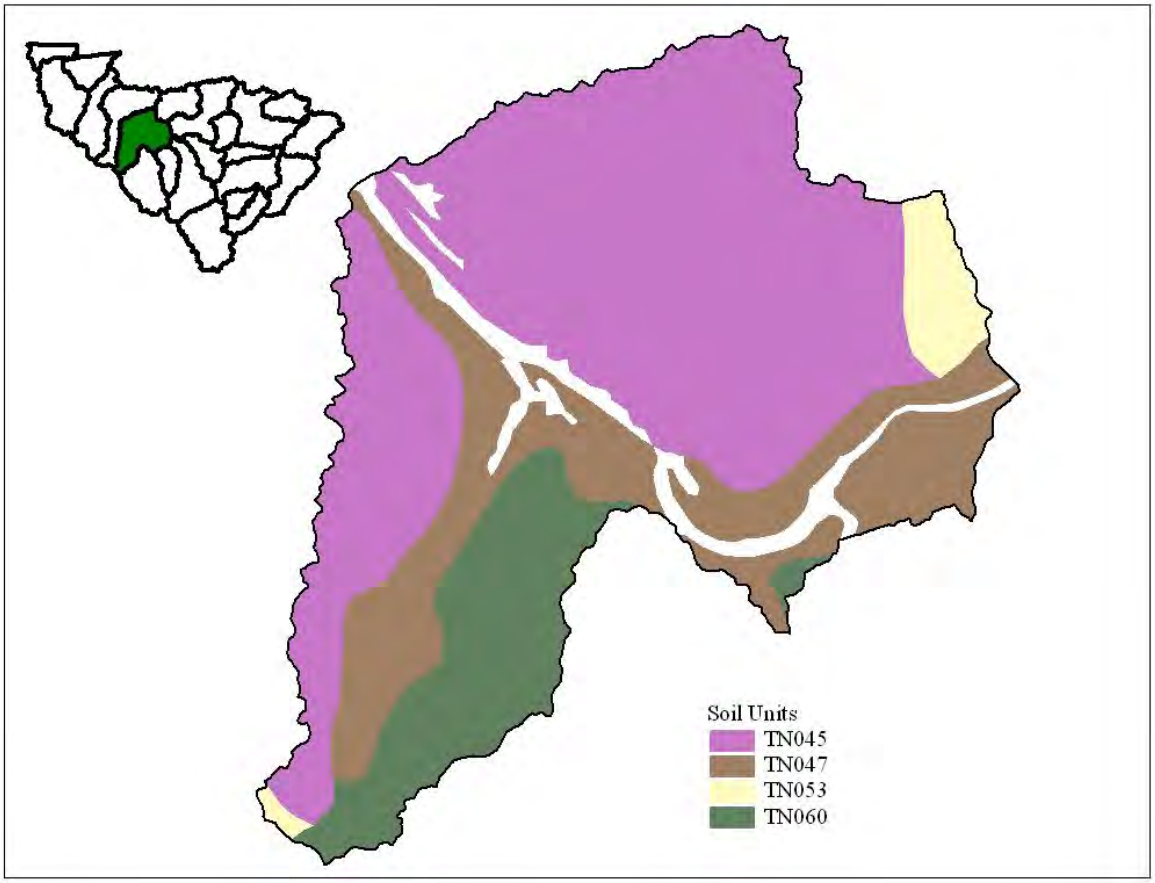


Figure 4-132. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050401.

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
TN047	21.00	C	1.62	5.73	Silty Loam	0.37
TN053	0.00	B	1.29	5.45	Loam	0.33
TN060	5.00	B	1.30	5.32	Silty Loam	0.39

Table 4-77. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050401. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Houston	7,018	7,769	8,088	0.15	11	12	12	9.10
Montgomery	100,498	124,369	134,768	0.59	594	736	797	34.20
Stewart	9,479	11,241	12,370	11.28	1,070	1,269	1,396	30.50
Totals	**116,995**	**143,379**	**155,226**		**1,675**	**2,017**	**2,205**	**31.60**

Table 4-78. Population Estimates in Subwatershed 051302050401.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Cumberland City	Stewart	324	167	121	31	15
Tennessee Ridge	Stewart	1,271	499	117	377	5
Total		**1,595**	**666**	**238**	**408**	**20**

Table 4-79. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302050401.

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

There are no USGS continuous record gaging stations located in subwatershed 051302050401.

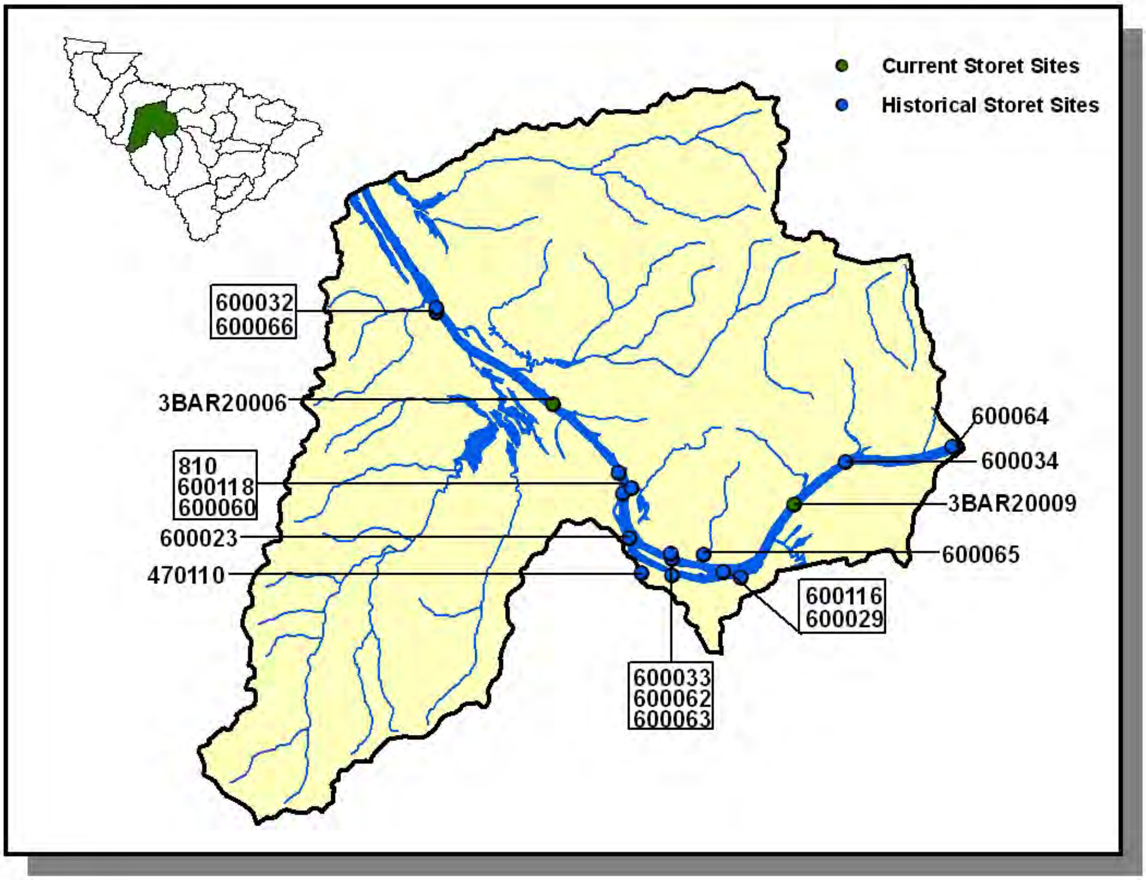


Figure 4-133. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302050401. *More information, including site names and locations, is provided in Appendix IV.*

4.2.O.iii. Permitted Activities.

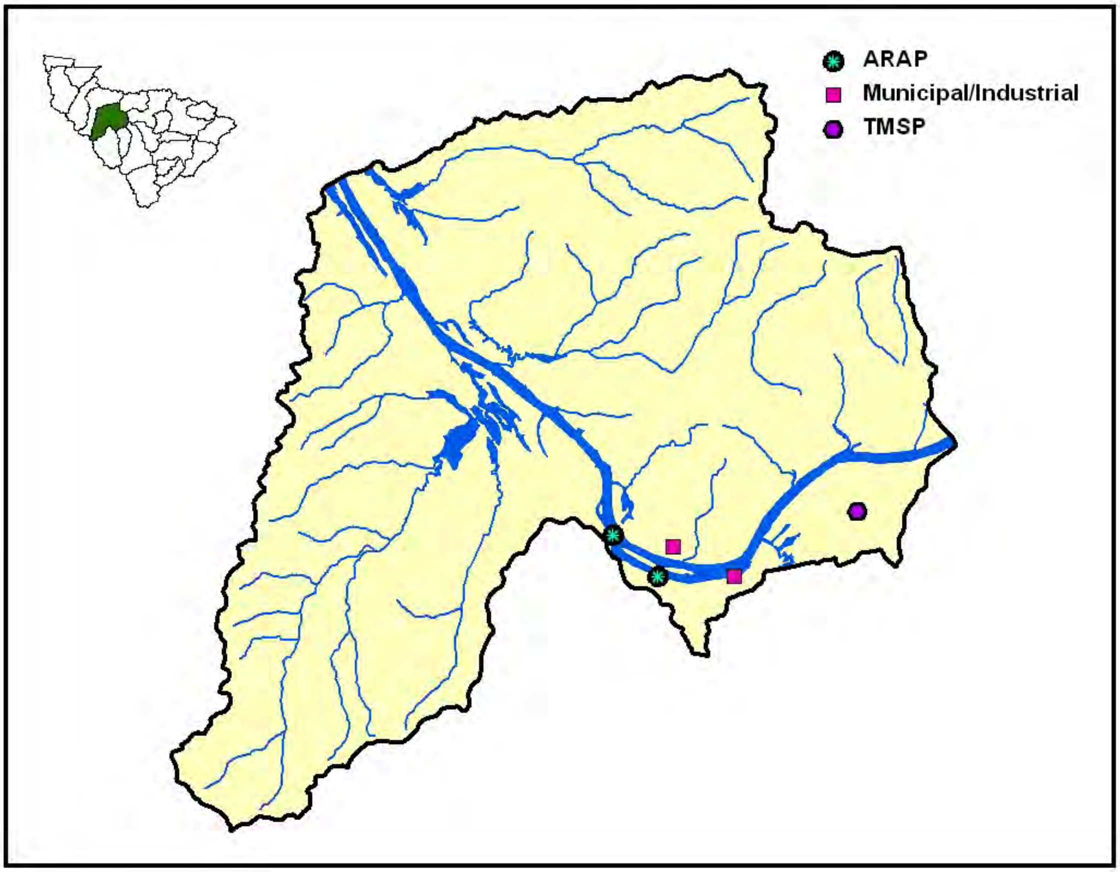


Figure 4-134. Location of Permits Issued in Subwatershed 051302050401. *More information, including the names of facilities, is provided in Appendix IV.*

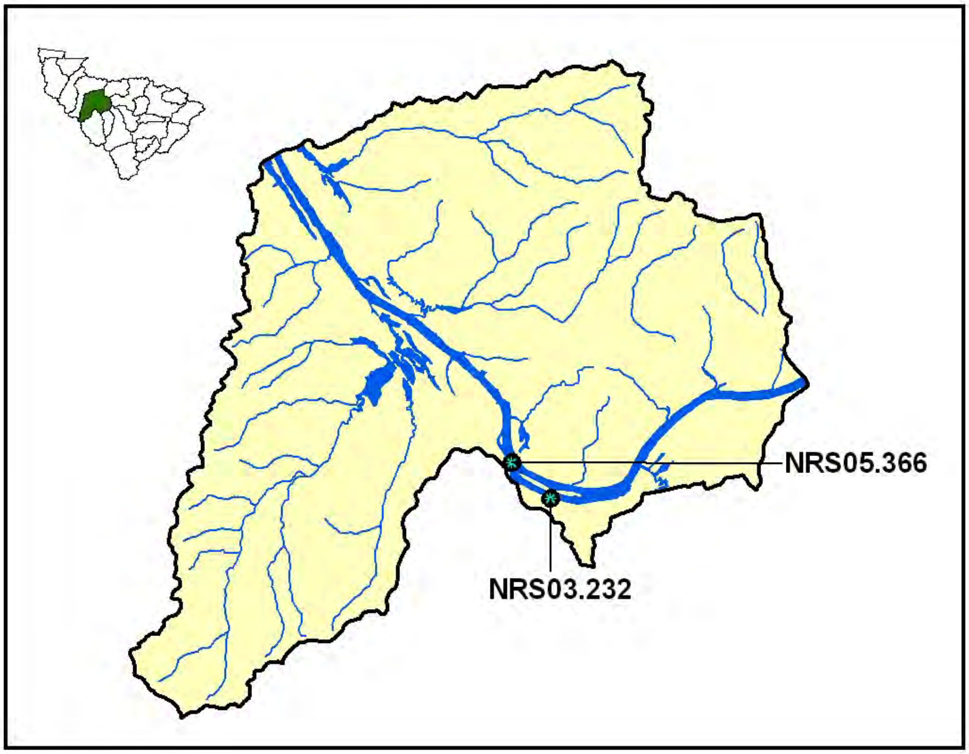


Figure 4-135. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 051302050401. *More information is provided in Appendix IV.*

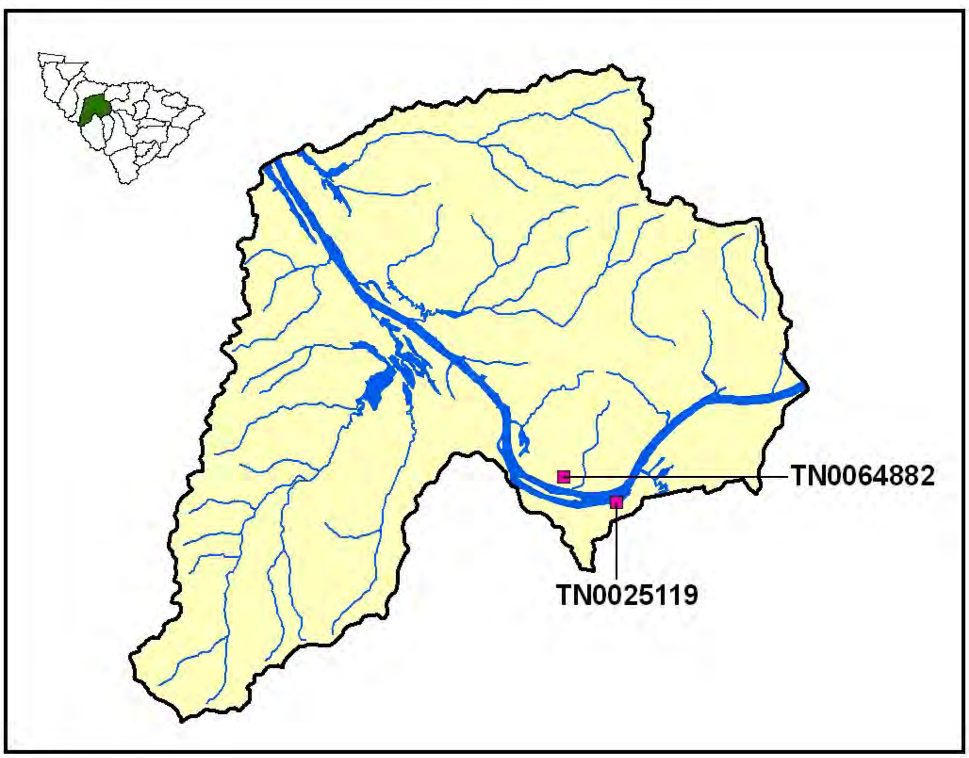


Figure 4-136. Location of Permitted Municipal and Industrial Facilities in Subwatershed 051302050401. *More information, including the name of the facility is provided in Appendix IV.*

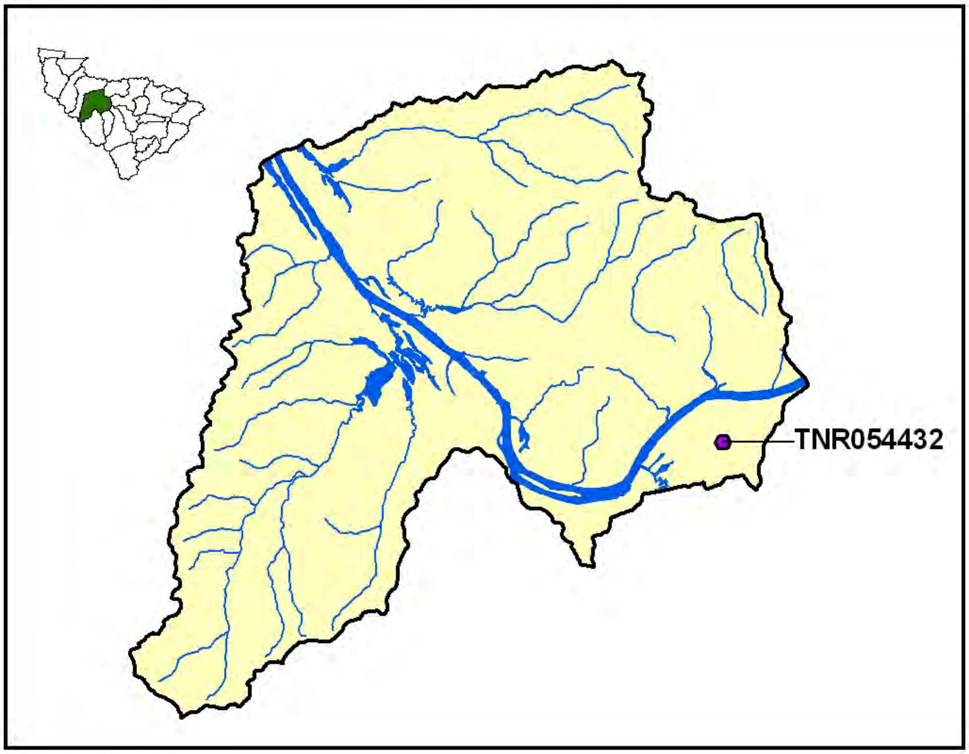


Figure 4-137. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 051302050401. *More information is provided in Appendix IV.*

4.2.O.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Houston		11,528		9	199	
Montgomery	16,051	30,959	760	913	1,408	107
Stewart		8,925		477	683	21

Table 4-80. Summary of Livestock Count Estimates by County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/),* ***"****Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Houston	94.2	94.2	0.0	0.0
Stewart	219.7	219.7	5.4	25.4

Table 4-81. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Soybeans (Row Crops)	9.17
Tobacco (Row Crops)	6.89
Corn (Row Crops)	2.15
Grass (Pastureland)	1.36
Conservation Reserve Program Land	0.41
Legume Grass (Hayland)	0.40
Other Land in Farms	0.30
Grass Forbs Legumes Mixed (Pastureland)	0.25
Farmsteads and Ranch Headquarters	0.14
Grass (Hayland)	0.06

Table 4-82. Annual Estimated Total Soil Loss in Subwatershed 051302050401.

4.2.P. 051302050402 (Guices Creek).

4.2.P.i. General Description.

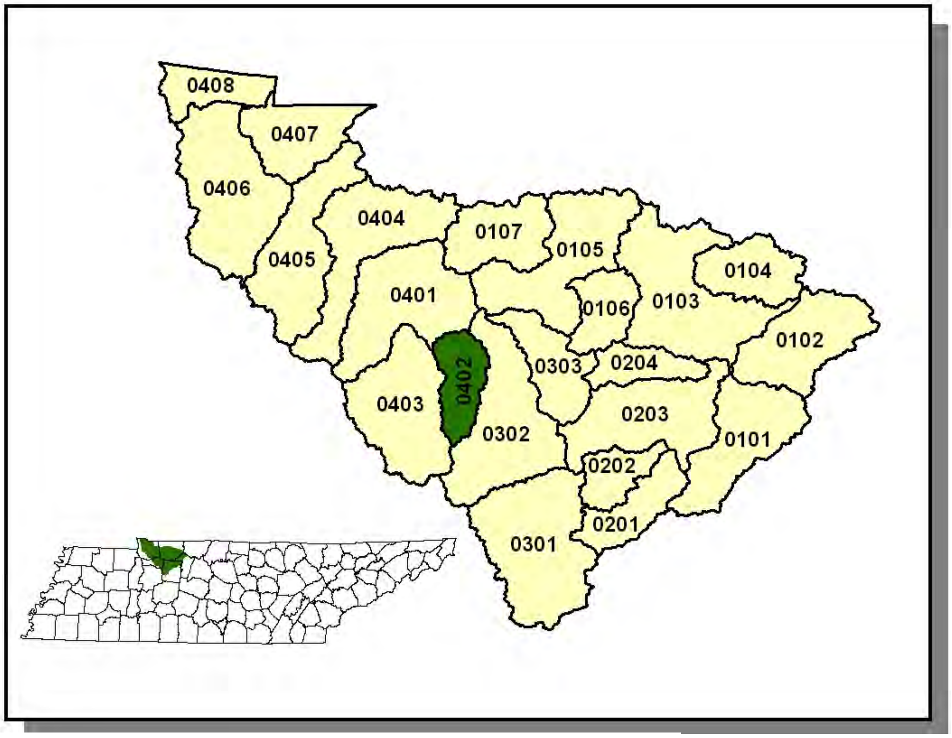


Figure 4-138. Location of Subwatershed 051302050402. *All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

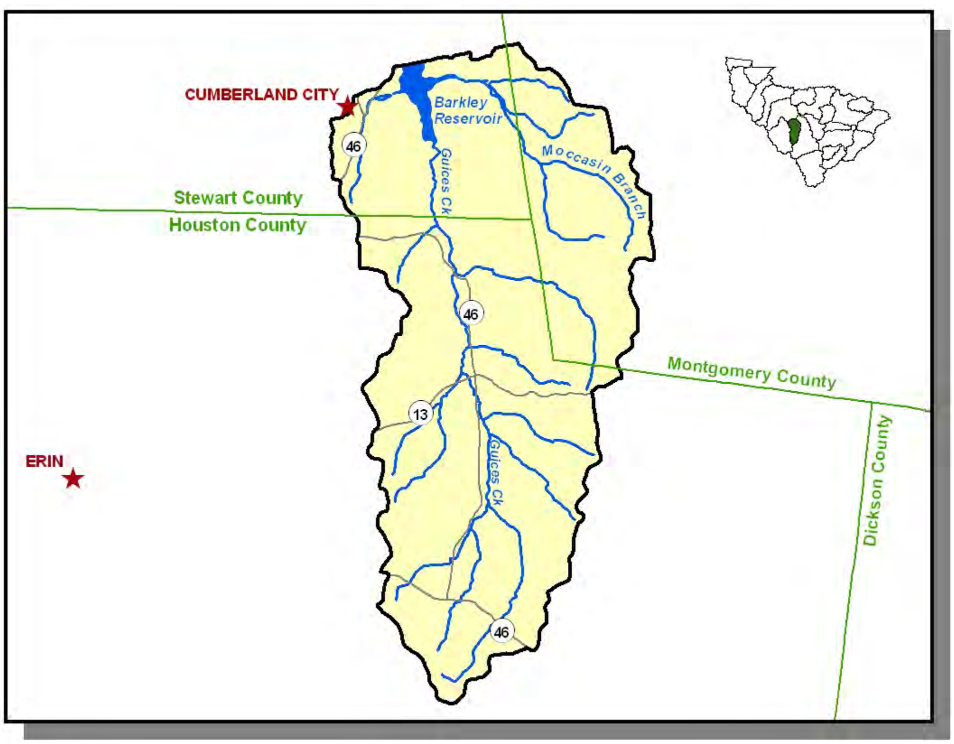


Figure 4-139. Locational Details of Subwatershed 051302050402.

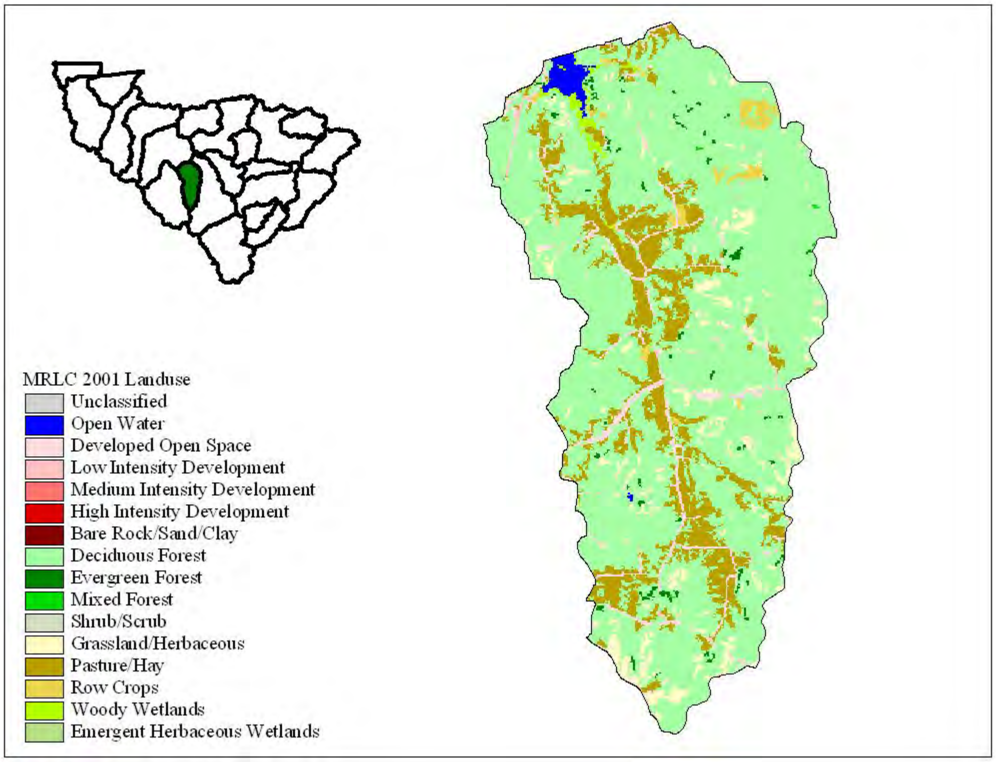


Figure 4-140. Illustration of Land Use Distribution in Subwatershed 051302050402.

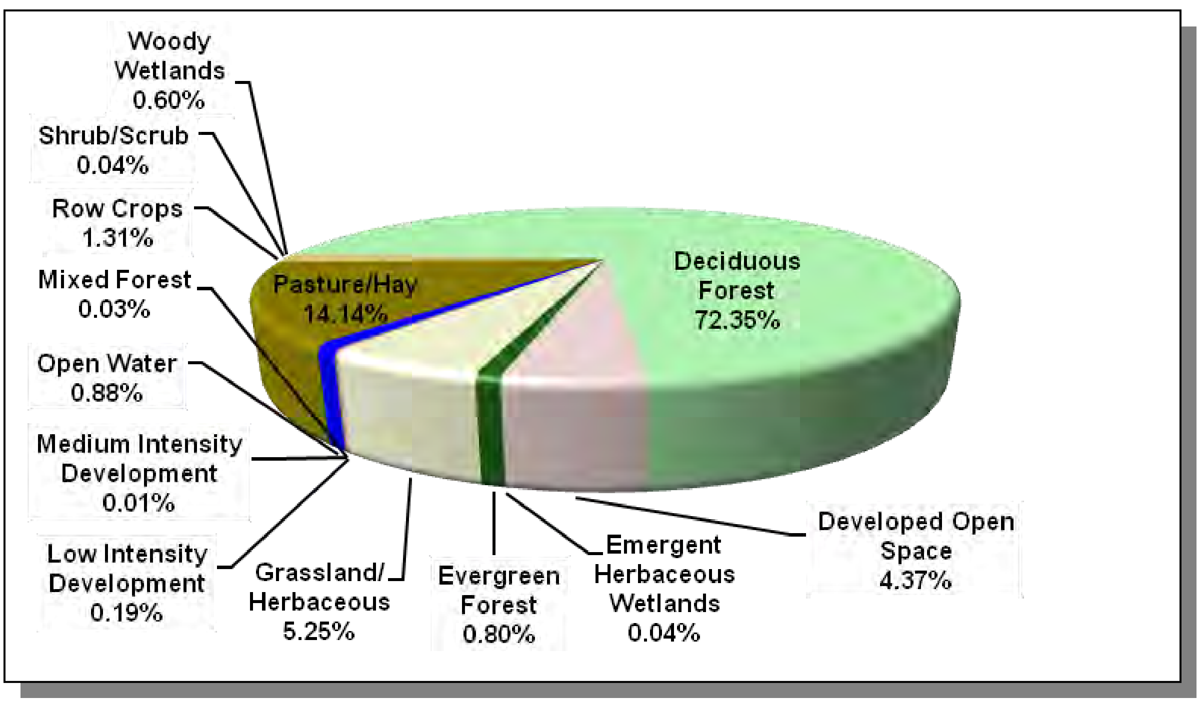


Figure 4-141. Land Use Distribution in Subwatershed 051302050402. *More information is provided in Appendix IV.*

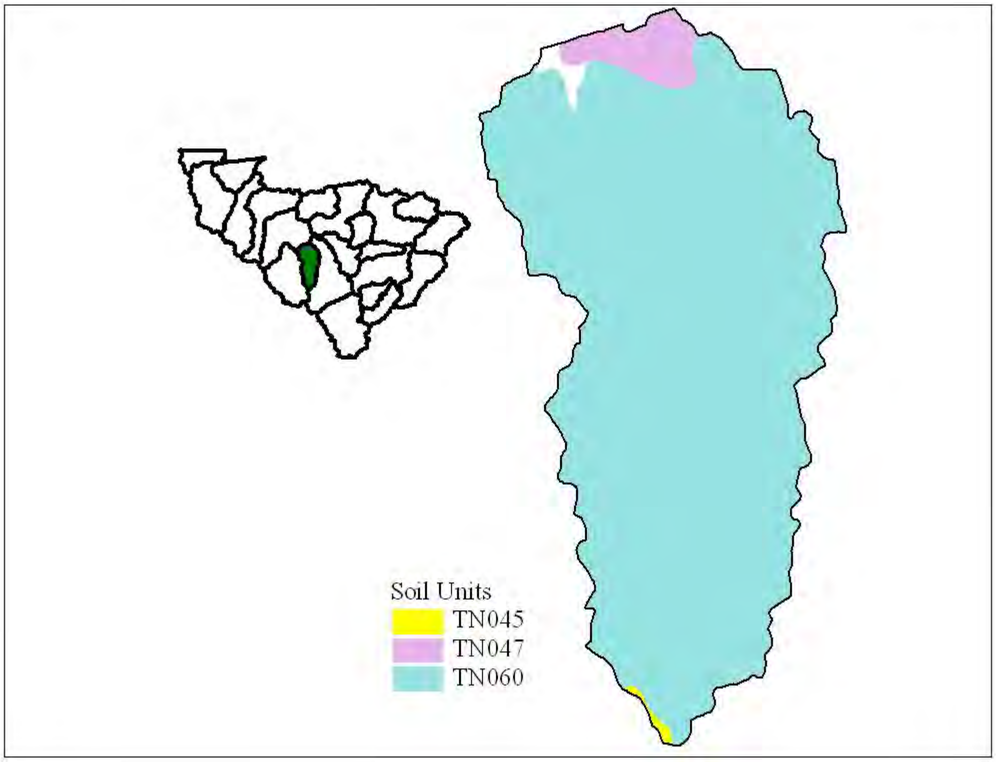


Figure 4-142. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050402.

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
TN047	21.00	C	1.62	5.73	Silty Loam	0.37
TN060	5.00	B	1.30	5.32	Silty Loam	0.39

Table 4-83. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050402. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Houston	7,018	7,769	8,088	7.09	498	551	574	15.30
Montgomery	100,498	124,369	134,768	0.65	656	812	879	34.00
Stewart	9,479	11,241	12,370	0.88	84	99	109	29.80
Totals	**116,995**	**143,379**	**155,226**		**1,238**	**1,462**	**1,562**	**26.20**

Table 4-84. Population Estimates in Subwatershed 051302050402.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Cumberland City	Stewart	324	167	121	31	15

Table 4-85. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302050402.

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

There are no USGS continuous record gaging stations or STORET sites located in subwatershed 051302050402.

4.2.P.iii. Permitted Activities.

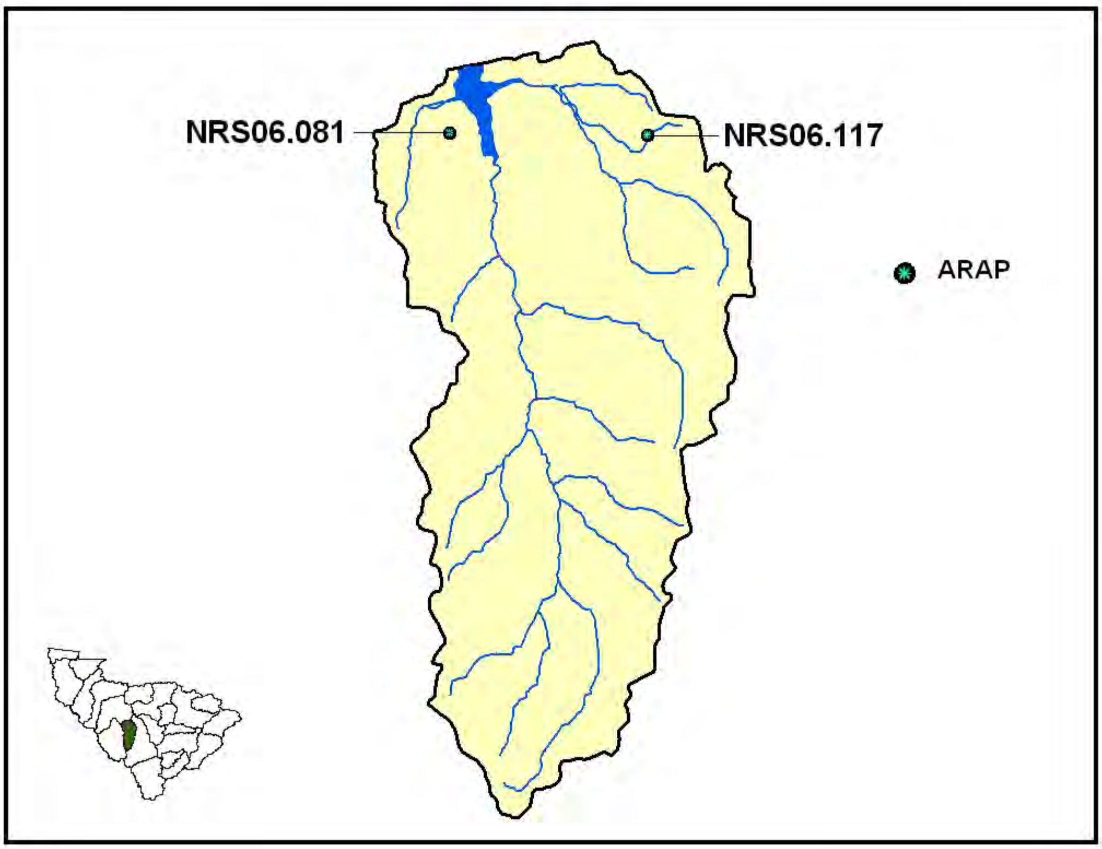


Figure 4-143. Location of Permits Issued in Subwatershed 051302050402. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.P.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Houston		11,528		9	199	
Montgomery	16,051	30,959	760	913	1,408	107
Stewart		8,925		477	683	21

Table 4-86. Summary of Livestock Count Estimates by County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Houston	94.2	94.2	0.0	0.0
Stewart	219.7	219.7	5.4	25.4

Table 4-87. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Tobacco (Row Crops)	13.26
Soybeans (Row Crops)	7.13
Corn (Row Crops)	6.28
Grass (Pastureland)	0.95
Grass Forbs Legumes Mixed (Pastureland)	0.60
Conservation Reserve Program Land	0.41
Legume Grass (Hayland)	0.40
Other Land in Farms	0.23
Farmsteads and Ranch Headquarters	0.22
Grass (Hayland)	0.18

Table 4-88. Annual Estimated Total Soil Loss in Subwatershed 051302050402.

4.2.Q. 051302050403 (Wells Creek).

4.2.Q.i. General Location.

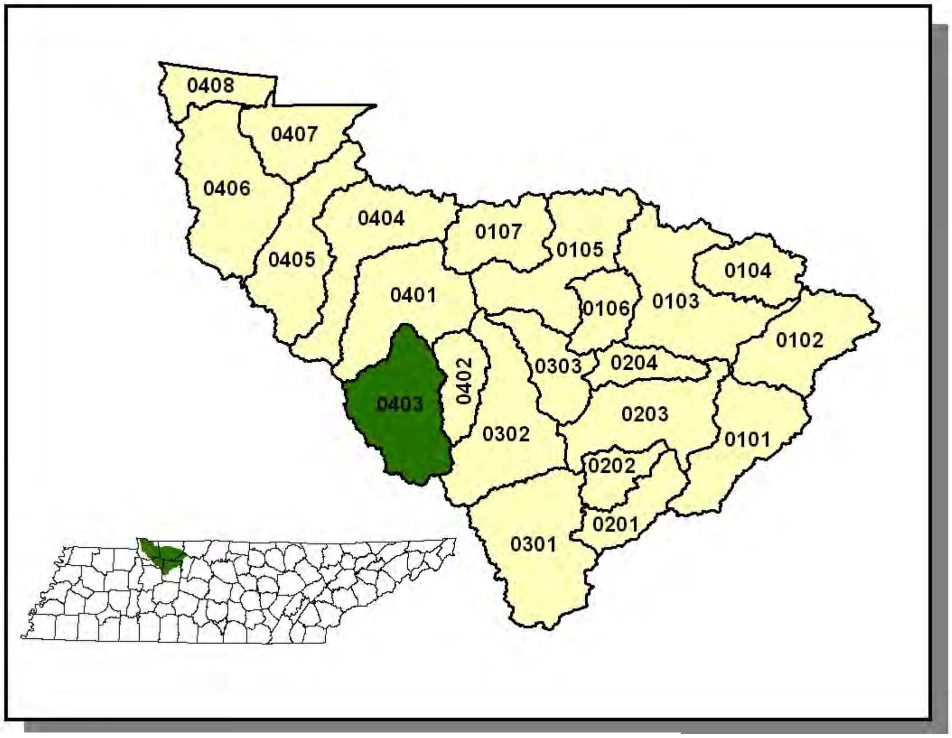


Figure 4-144. Location of Subwatershed 051302050403. All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.

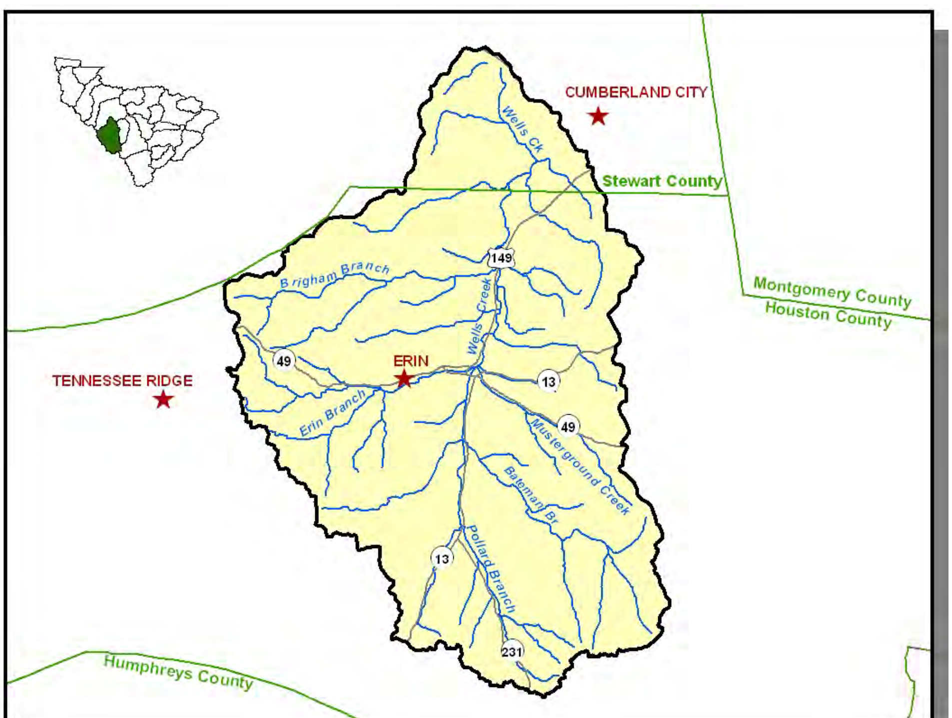


Figure 4-145. Locational Details of Subwatershed 051302050403.

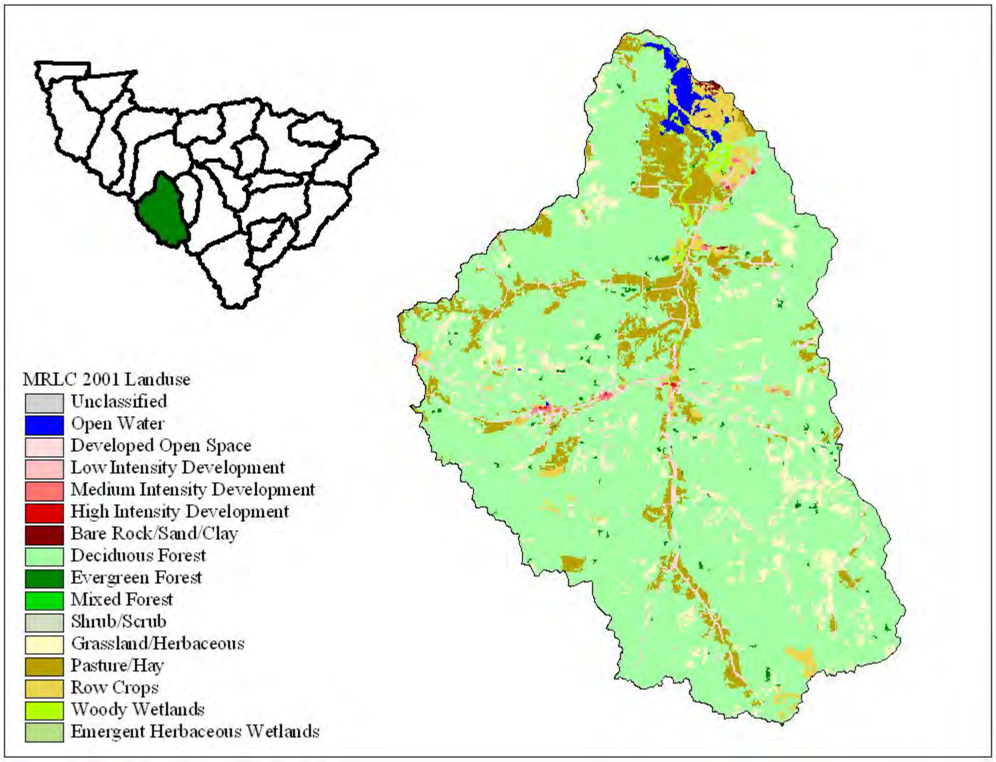


Figure 4-146. Illustration of Land Use Distribution in Subwatershed 051302050403.

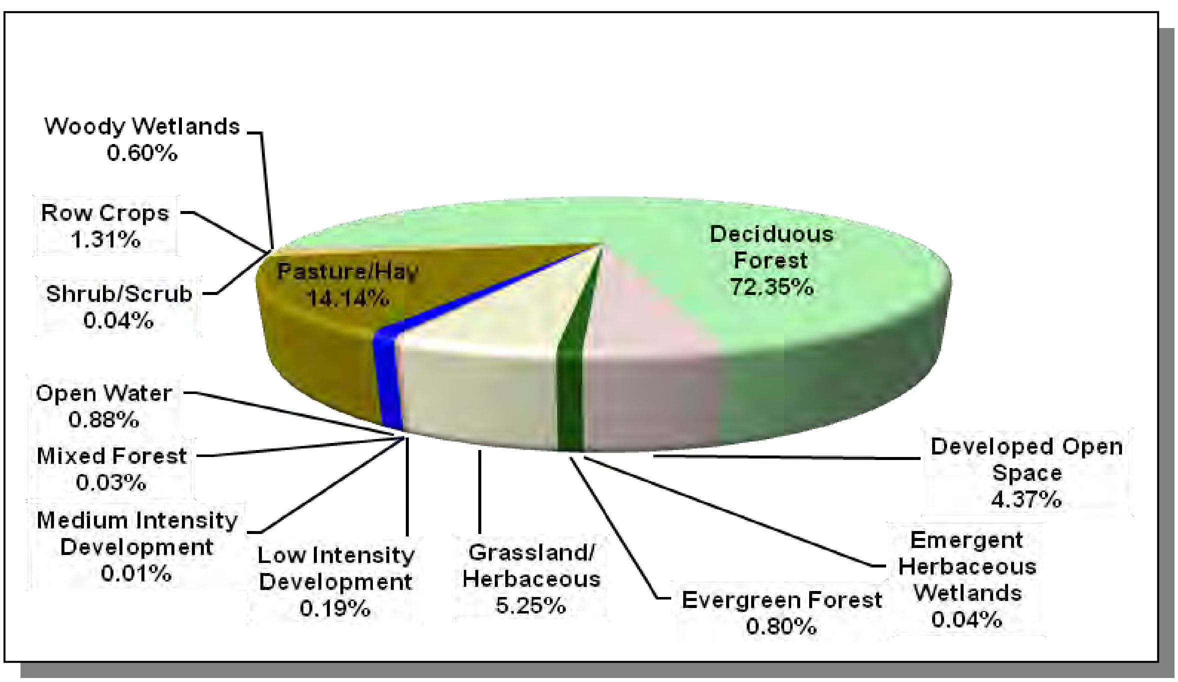


Figure 4-147. Land Use Distribution in Subwatershed 051302050403. *More information is provided in Appendix IV.*

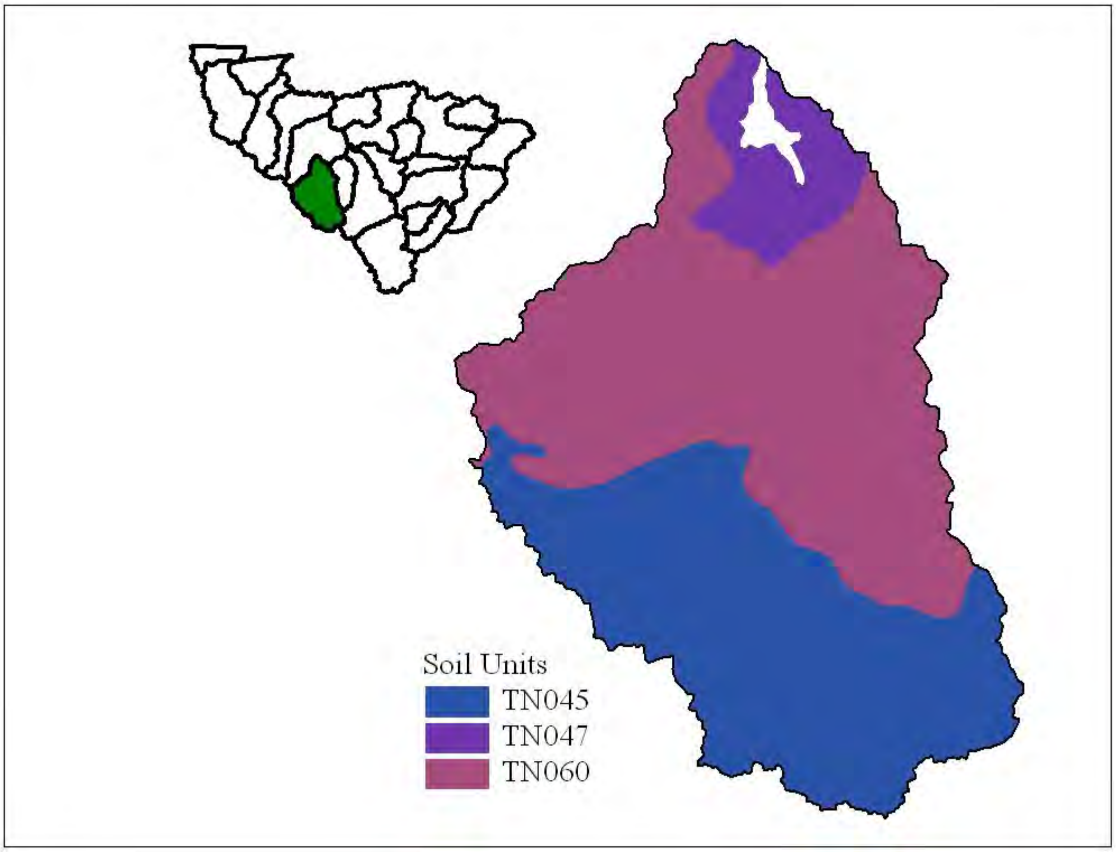


Figure 4-148. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050403.

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
TN047	21.00	C	1.62	5.73	Silty Loam	0.37
TN060	5.00	B	1.30	5.32	Silty Loam	0.39

Table 4-89. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050403. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Houston	7,018	7,769	8,088	25.12	1,763	1,951	2,031	15.20
Stewart	9,479	11,241	12,370	1.11	105	124	137	30.50
Totals	**16,497**	**19,010**	**20,458**		**1,868**	**2,075**	**2,168**	**16.10**

Table 4-90. Population Estimates in Subwatershed 051302050403.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Cumberland City	Stewart	324	167	121	31	15
Erin	Houston	1,586	668	469	193	6
Tennessee Ridge	Houston	1,271	499	117	377	5
Total		**3,181**	**1,334**	**707**	**601**	**26**

Table 4-91. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302050403.

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

There are no USGS continuous record gaging stations located in subwatershed 051302050403.

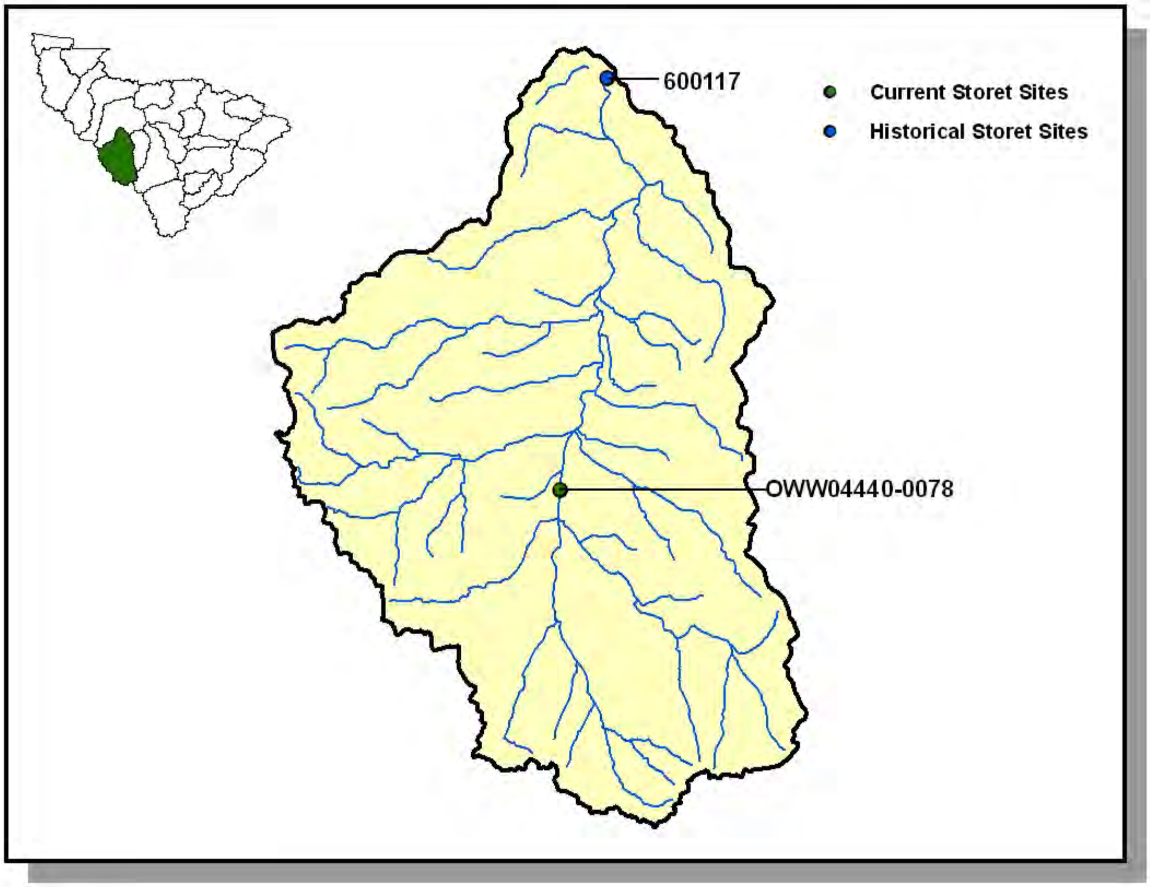


Figure 4-149. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302050403. *More information, including site names and locations, is provided in Appendix IV.*

4.2.Q.iii. Permitted Activities.

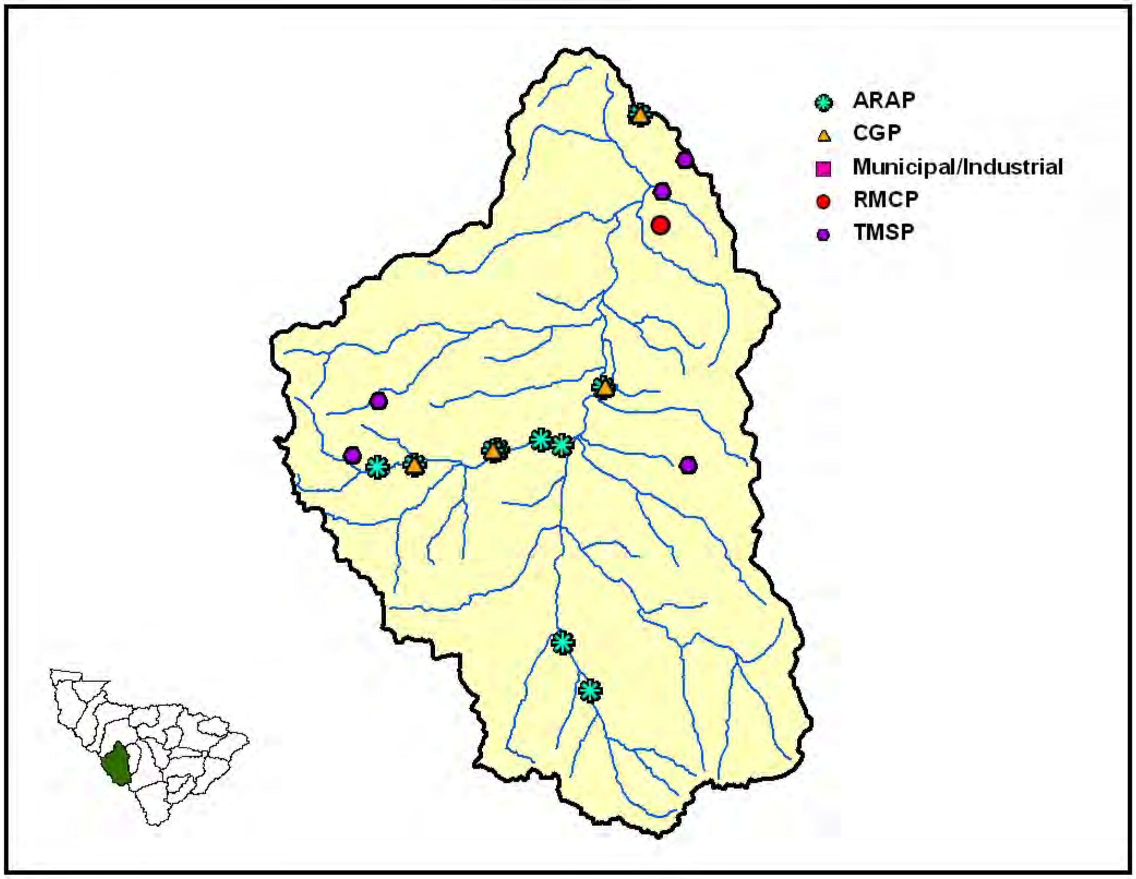


Figure 4-150. Location of Permits Issued in Subwatershed 051302050403. *More information, including the names of facilities, is provided in Appendix IV.*

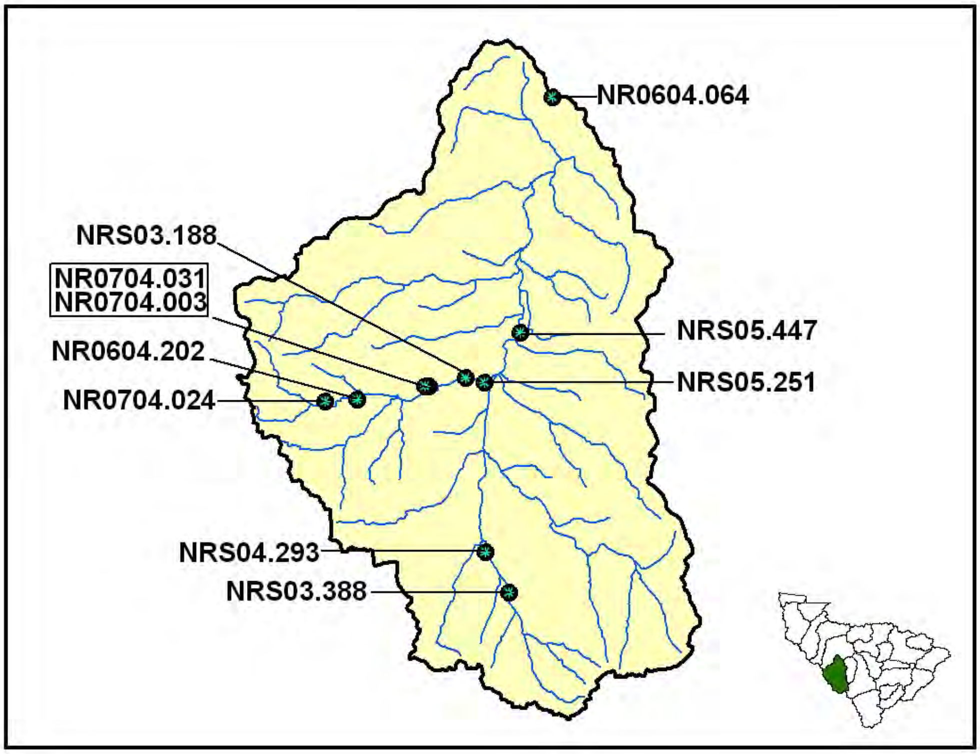


Figure 4-151. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 051302050403. *More information is provided in Appendix IV.*

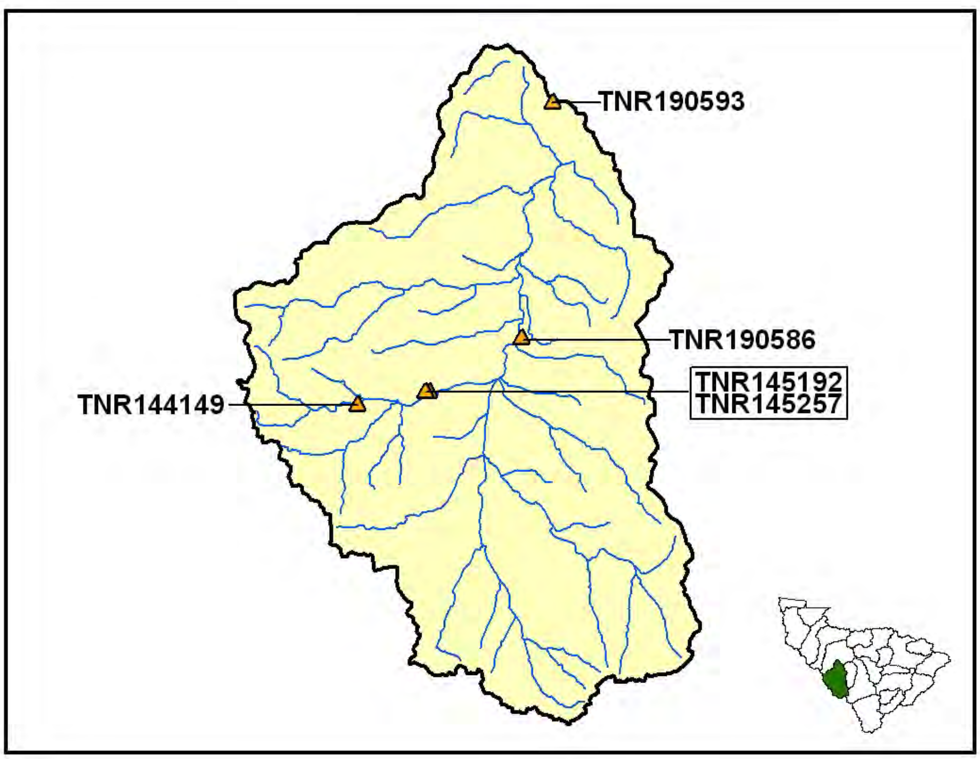


Figure 4-152. Location of CGP (Construction General Permit) Sites in Subwatershed 051302050403. *More information is provided in Appendix IV.*

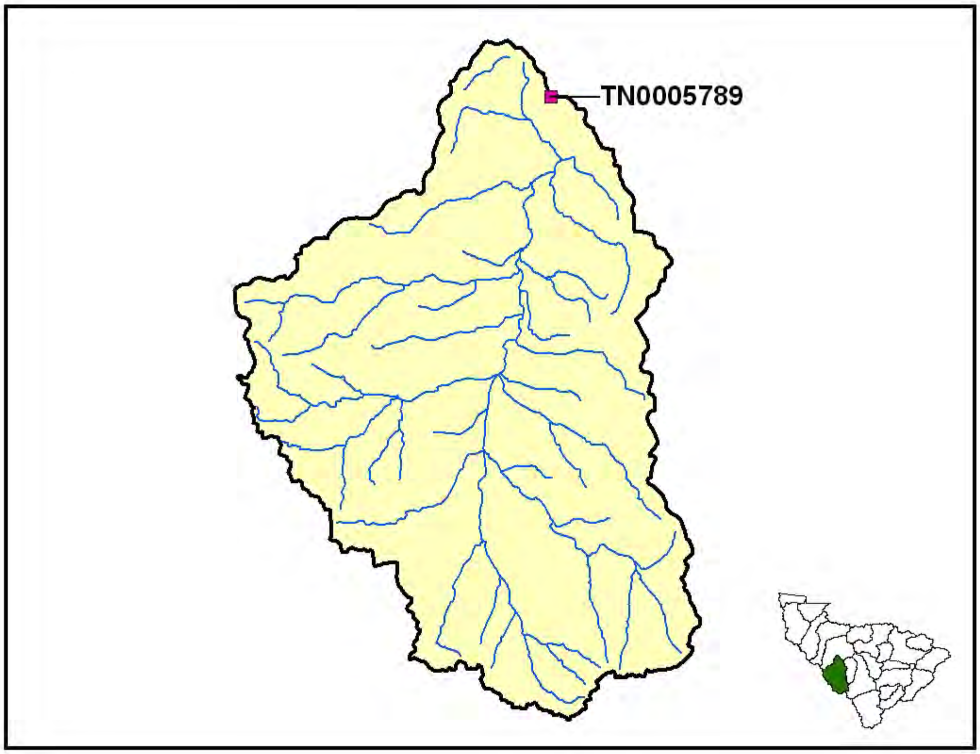


Figure 4-153. Location of Permitted Municipal and Industrial Facilities in Subwatershed 051302050403. *More information, including the name of the facility is provided in Appendix IV.*

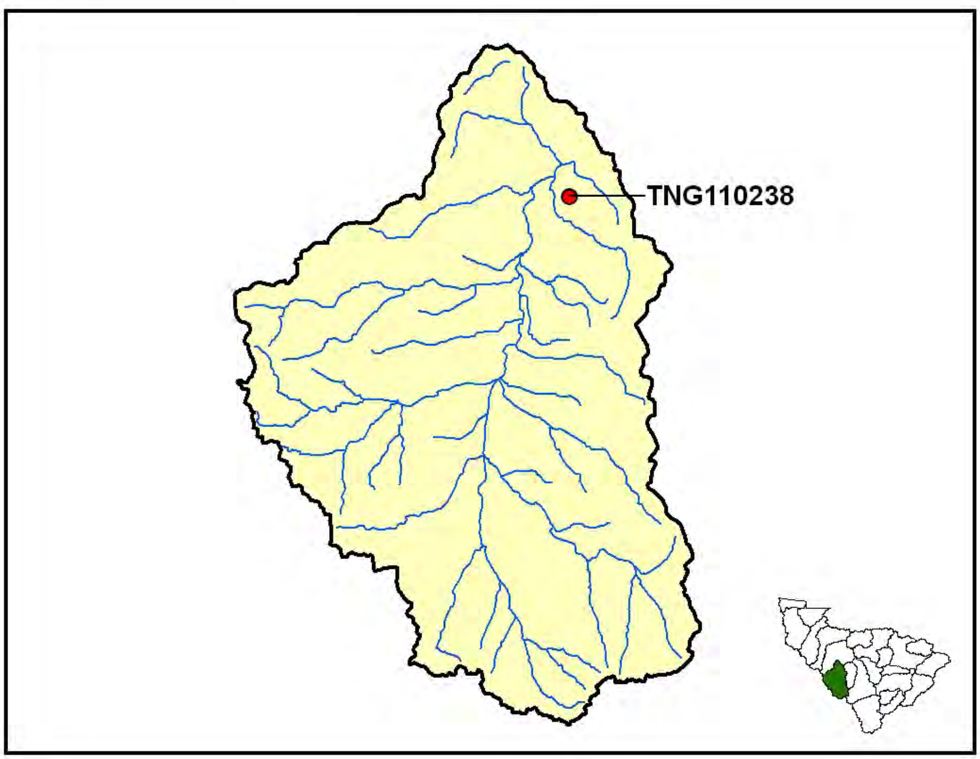


Figure 4-154. Location of RMCP (Ready Mix Concrete Plant) facilities in Subwatershed 051302050403. *More information, including the names of facilities, is provided in Appendix IV.*

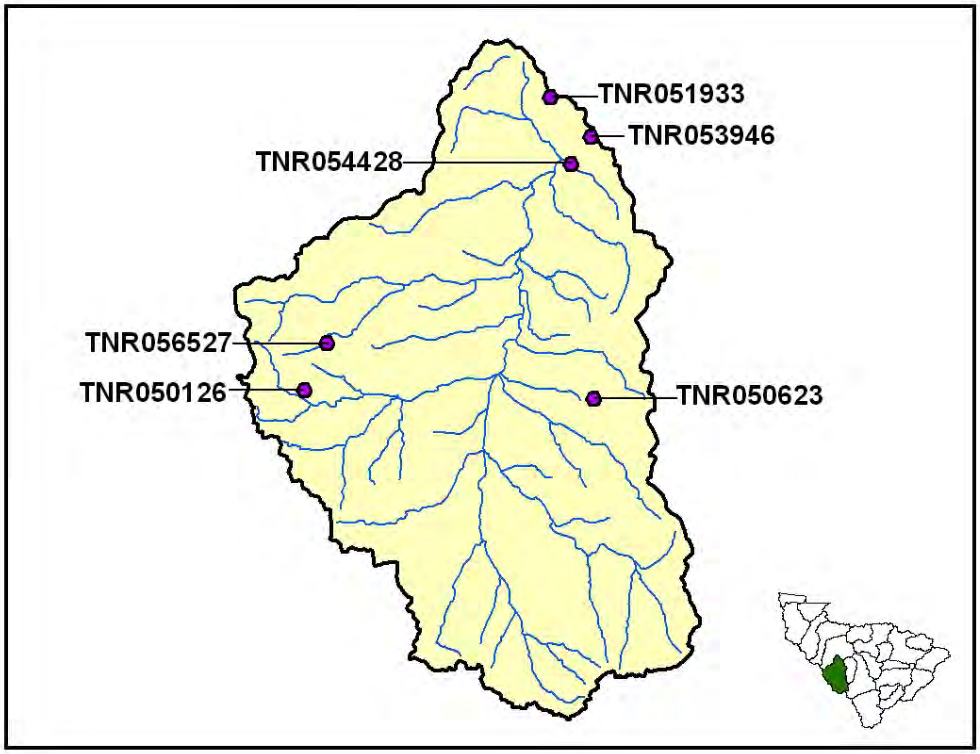


Figure 4-155. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 051302050403. *More information is provided in Appendix IV.*

4.2.Q.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Houston		11,528		9	199	
Stewart		8,925		477	683	21

Table 4-92. Summary of Livestock Count Estimates by County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Houston	94.2	94.2	0.0	0.0
Stewart	219.7	219.7	5.4	25.4

Table 4-93. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Soybeans (Row Crops)	9.45
Corn (Row Crops)	6.69
Tobacco (Row Crops)	6.01
Grass (Pastureland)	0.98
Grass Forbs Legumes Mixed (Pastureland)	0.68
Farmsteads and Ranch Headquarters	0.28
Other Land in Farms	0.22
Grass (Hayland)	0.18

Table 4-94. Annual Estimated Total Soil Loss in Subwatershed 051302050403.

4.2.R. 051302050404 (Cumberland River).

4.2.R.i. General Description

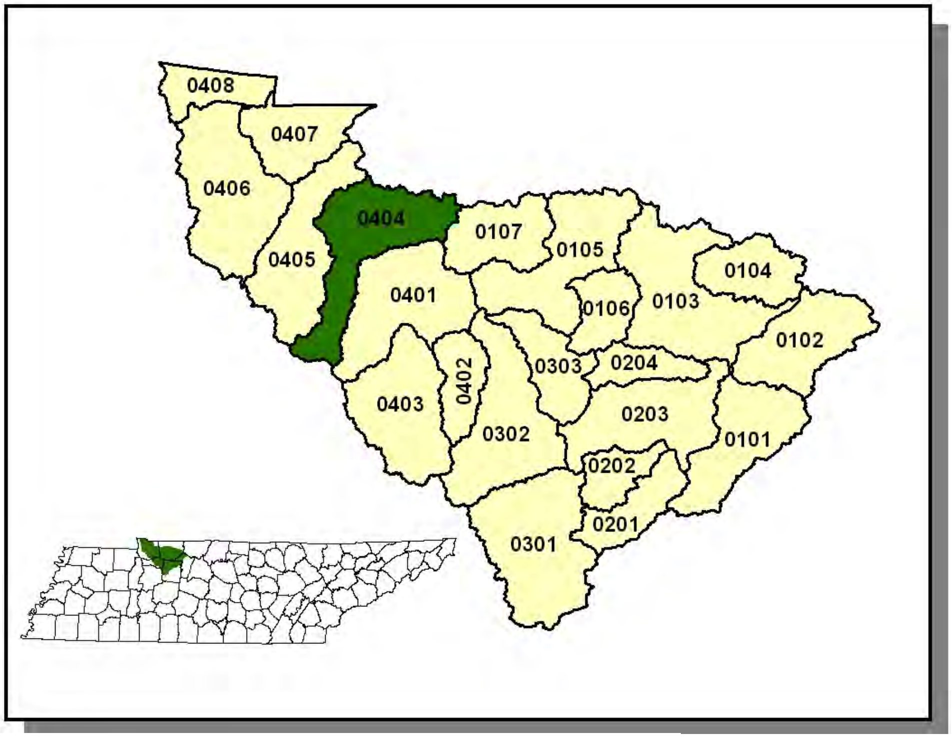


Figure 4-156. Location of Subwatershed 051302050404. *All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

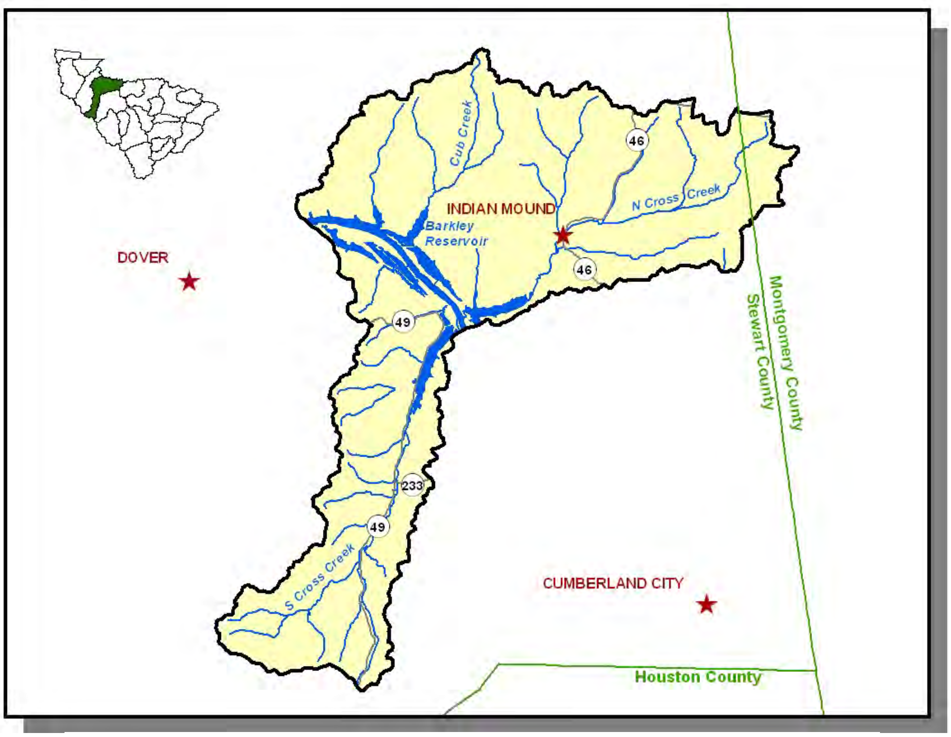


Figure 4-157. Locational Details of Subwatershed 051302050404.

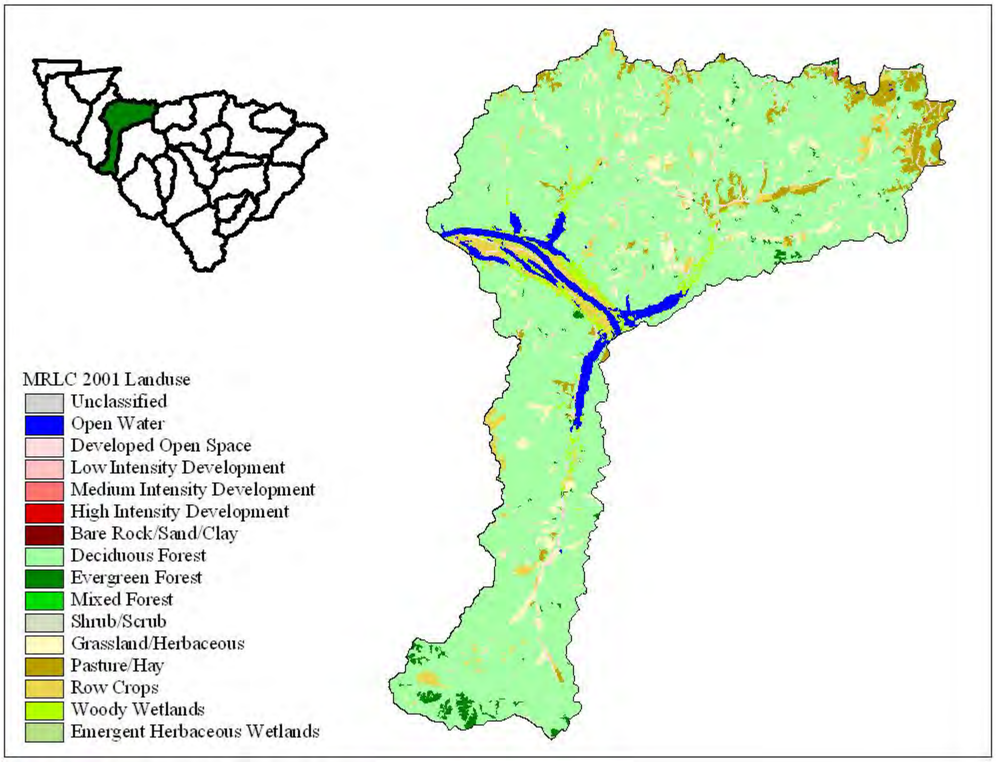


Figure 4-158. Illustration of Land Use Distribution in Subwatershed 051302050404.

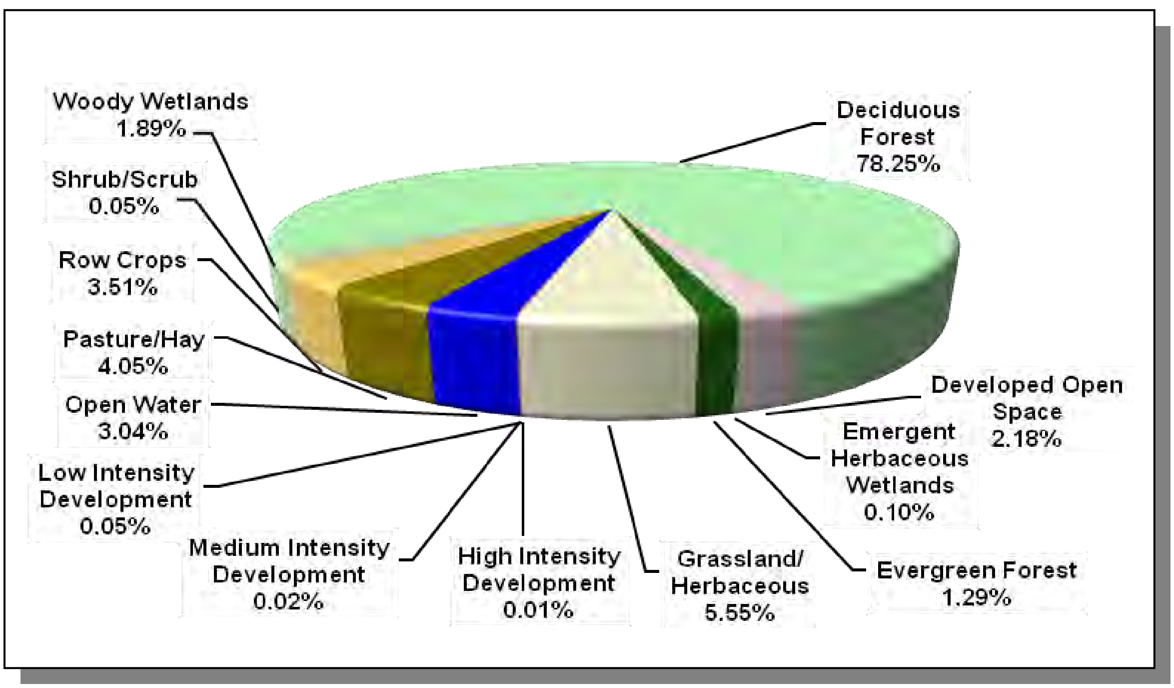


Figure 4-159. Land Use Distribution in Subwatershed 051302050404. *More information is provided in Appendix IV.*

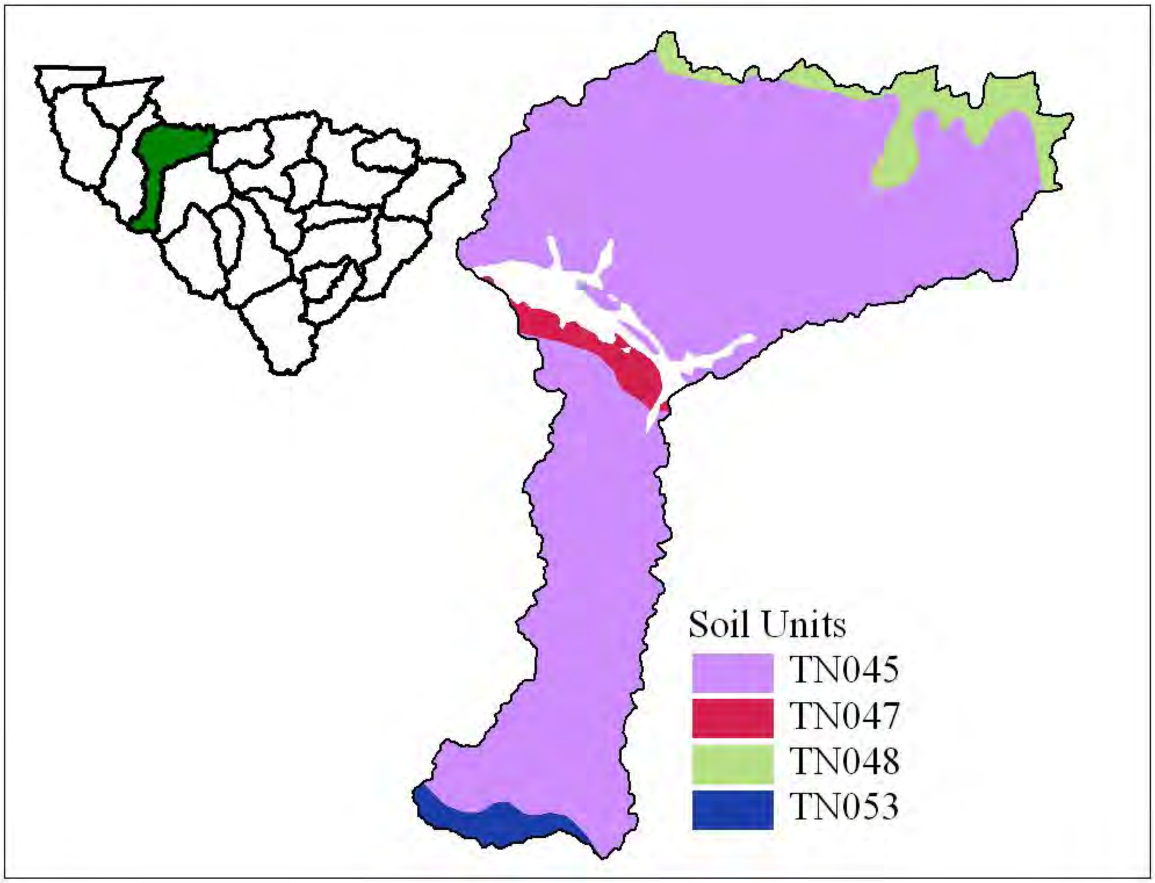


Figure 4-160. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050404.

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
TN047	21.00	C	1.62	5.73	Silty Loam	0.37
TN048	8.00	C	1.38	5.06	Silty Loam	0.42
TN053	0.00	B	1.29	5.45	Loam	0.33

Table 4-95. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050404. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Montgomery	100,498	124,369	134,768	0.19	189	234	254	34.40
Stewart	9,479	11,241	12,370	11.61	1,100	1,305	1,436	30.50
Totals	**109,977**	**135,610**	**147,138**		**1,289**	**1,539**	**1,690**	**31.10**

Table 4-96. Population Estimates in Subwatershed 051302050404.

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

There are no USGS continuous record gaging stations located in subwatershed 051302050404.

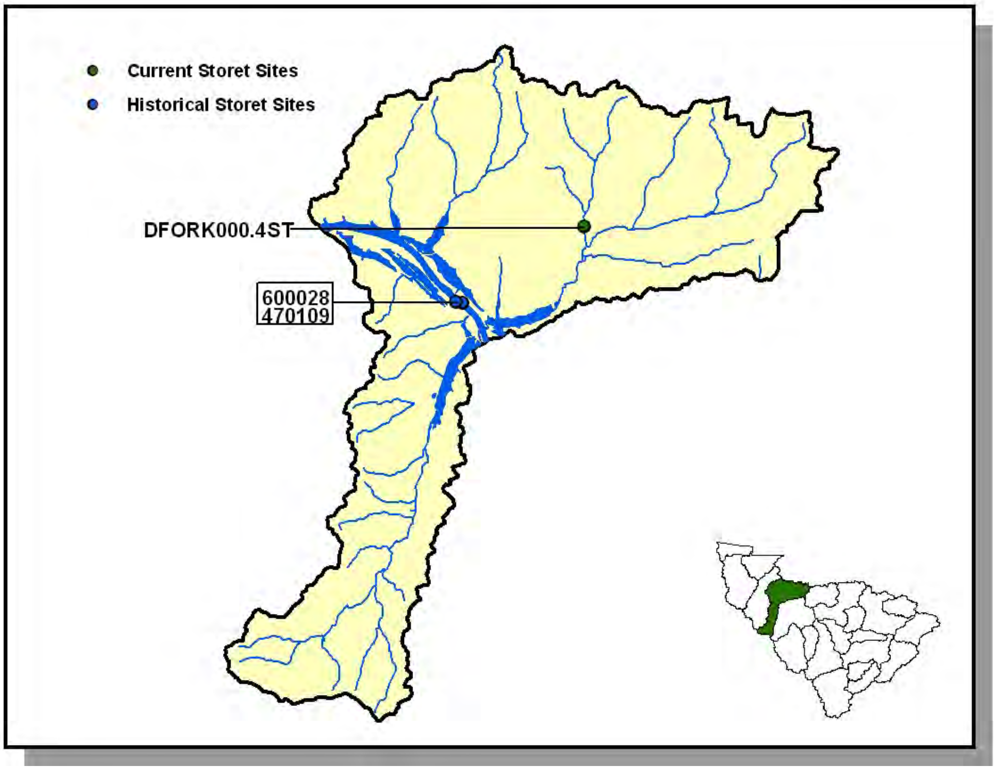


Figure 4-161. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302050404. *More information, including site names and locations, is provided in Appendix IV.*

4.2.R.iii. Permitted Activities.

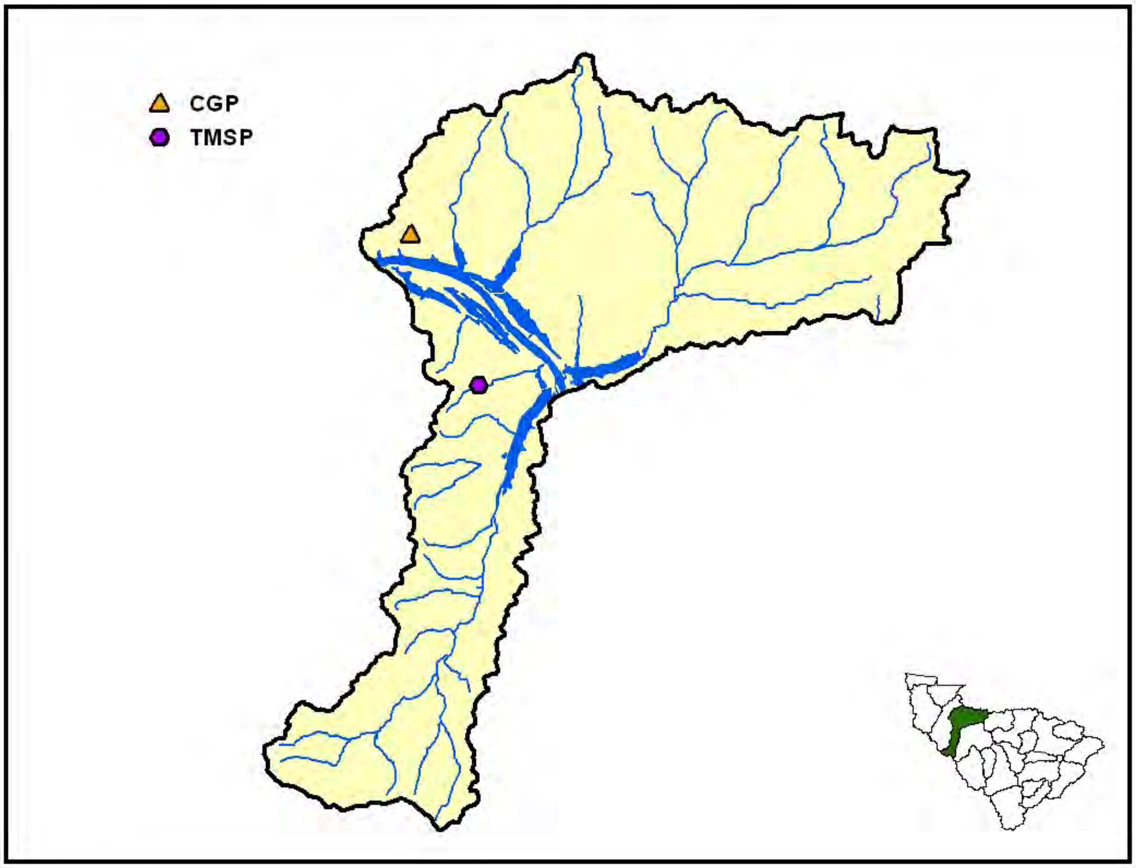


Figure 4-162. Location of Permits Issued in Subwatershed 051302050404. *More information, including the names of facilities, is provided in Appendix IV.*

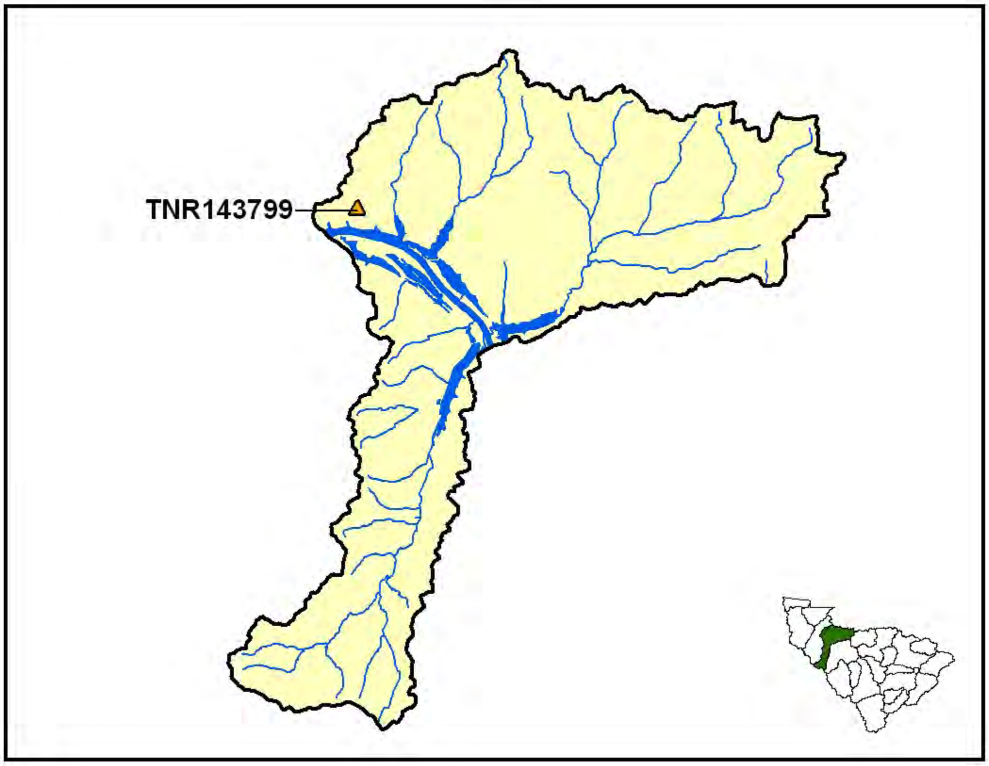


Figure 4-163. Location of CGP (Construction General Permit) Sites in Subwatershed 051302050404. *More information is provided in Appendix IV.*

Figure 4-164. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 051302050404. *More information is provided in Appendix IV.*

4.2.R.iv. Nonpoint Source Contributions.

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

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

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Stewart	219.7	219.7	5.4	25.4

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

CROPS	TONS/ACRE/YEAR
Soybeans (Row Crops)	9.36
Tobacco (Row Crops)	6.29
Corn (Row Crops)	1.90
Grass (Pastureland)	1.40
Conservation Reserve Program Land	0.41
Legume Grass (Hayland)	0.40
Other Land in Farms	0.30
Grass Forbs Legumes Mixed (Pastureland)	0.24
Farmsteads and Ranch Headquarters	0.14
Grass (Hayland)	0.05

Table 4-99. Annual Estimated Total Soil Loss in Subwatershed 051302050404.

4.2.S. 051302050405 (Cumberland River).

4.2.S.i. General Description.

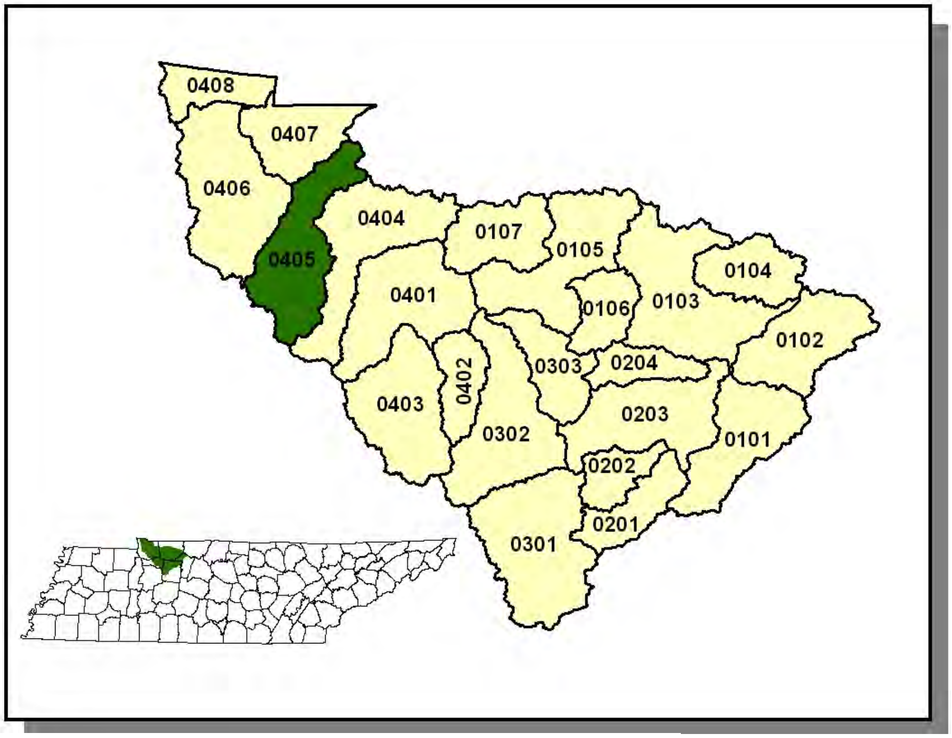


Figure 4-165. Location of Subwatershed 051302050405. *All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

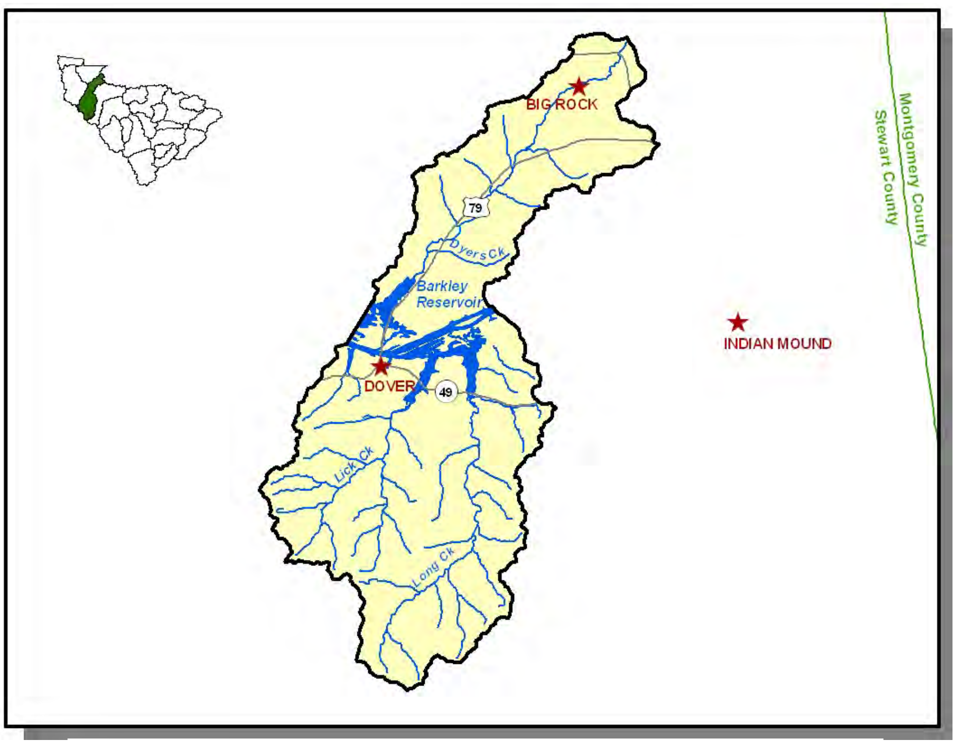


Figure 4-166. Locational Details of Subwatershed 051302050405.

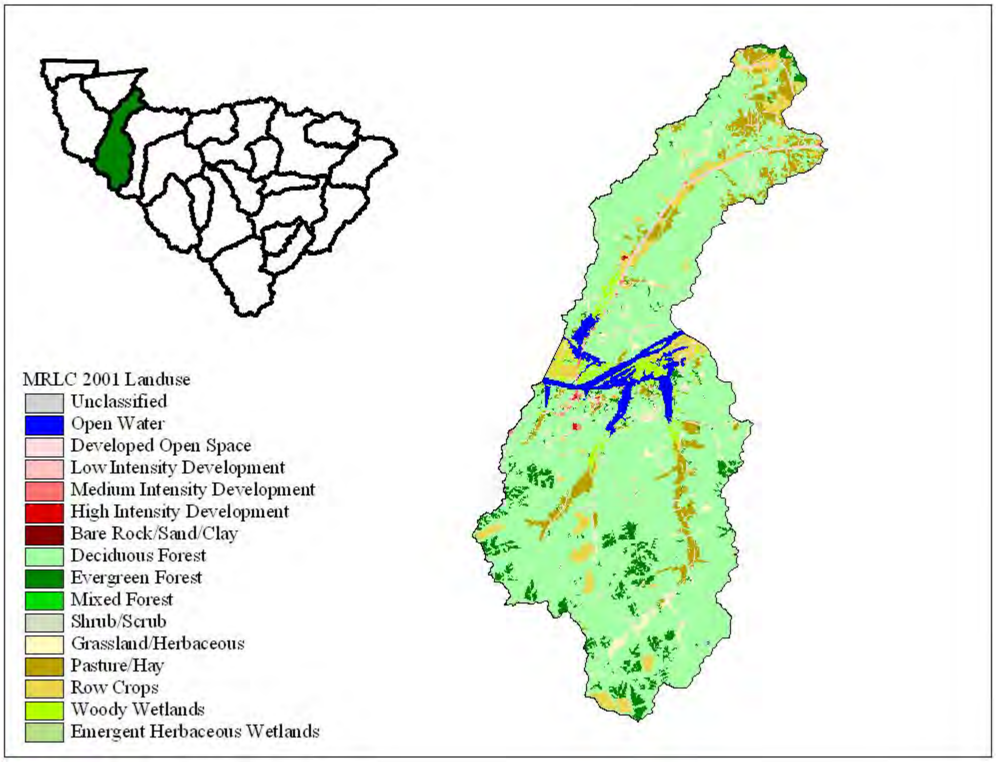


Figure 4-167. Illustration of Land Use Distribution in Subwatershed 051302050405.

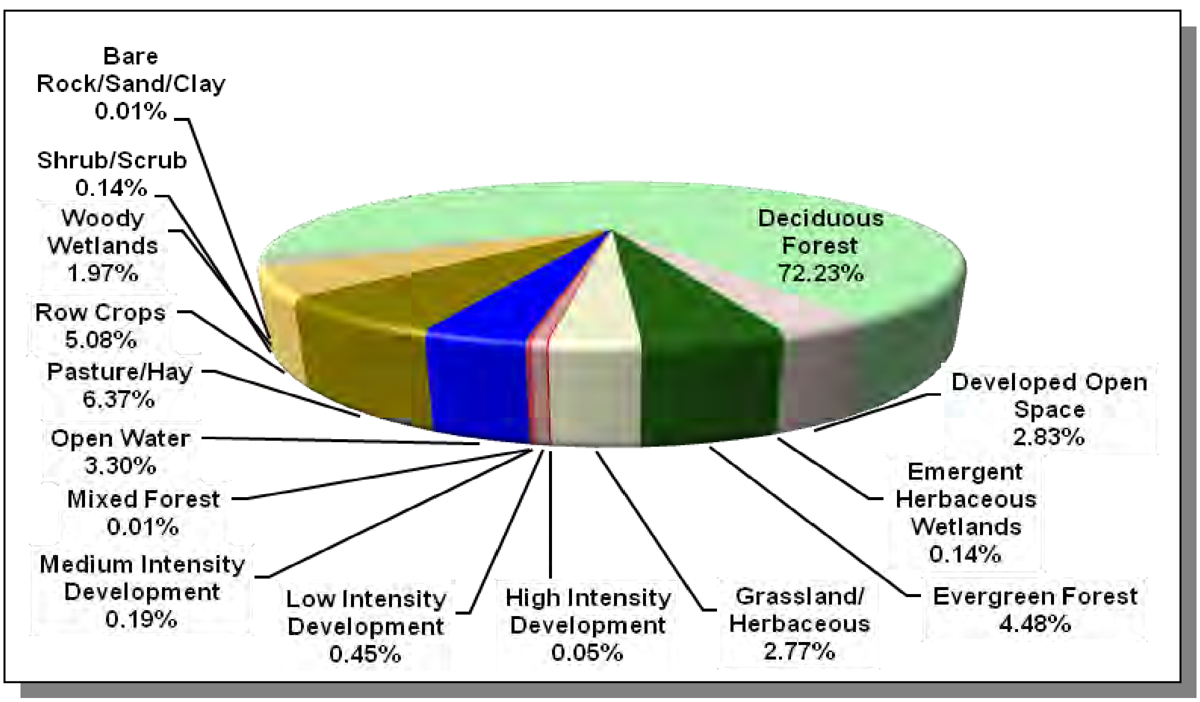


Figure 4-168. Land Use Distribution in Subwatershed 051302050405. *More information is provided in Appendix IV.*

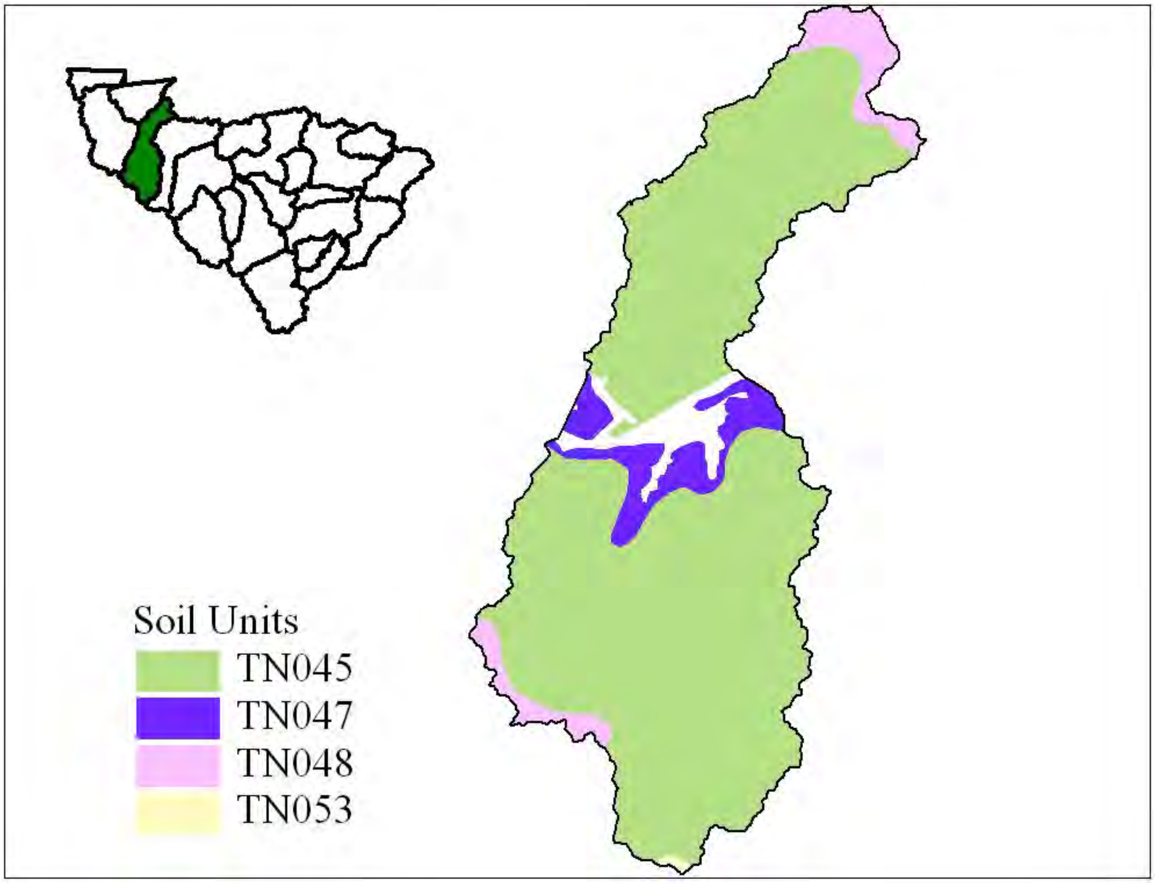


Figure 4-169. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050405.

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
TN047	21.00	C	1.62	5.73	Silty Loam	0.37
TN048	8.00	C	1.38	5.06	Silty Loam	0.42
TN053	0.00	B	1.29	5.45	Loam	0.33

Table 4-100. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050405. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Stewart	9,479	11,241	12,370	10.87	1,030	1,222	1,344	30.50

Table 4-101. Population Estimates in Subwatershed 051302050405.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Dover	Stewart	1,336	597	359	234	4

Table 4-102. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302050405.

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

Figure 4-170. Location of USGS Continuous Record Gaging Stations in Subwatershed 051302050405. *More information is provided in Appendix IV.*

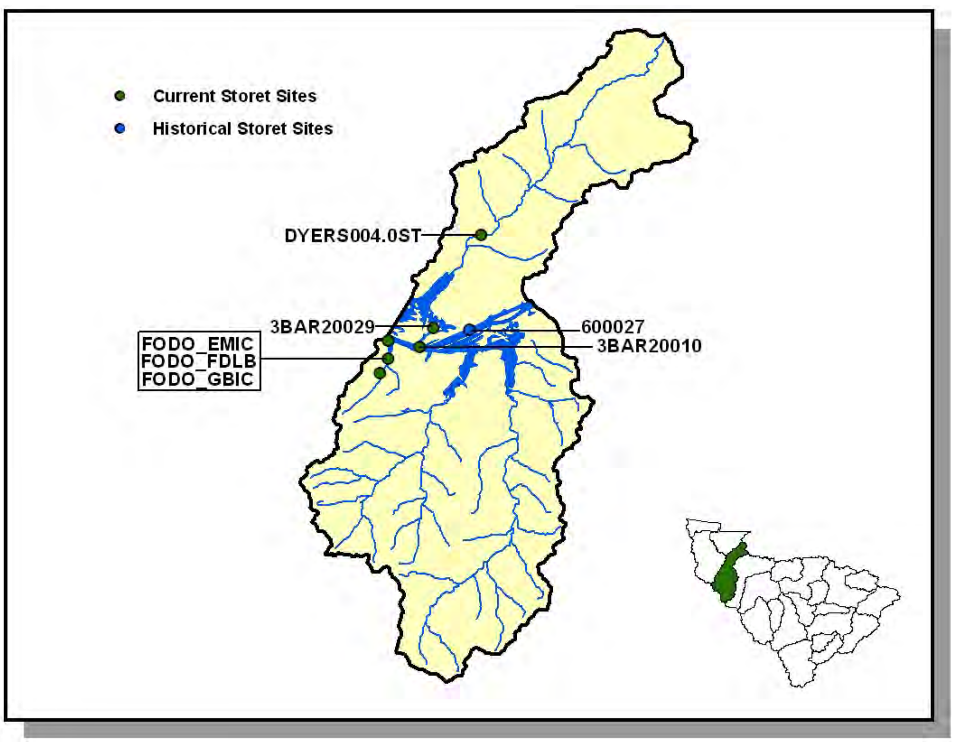


Figure 4-171. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302050405. *More information, including site names and locations, is provided in Appendix IV.*

4.2.S.iii. Permitted Activities.

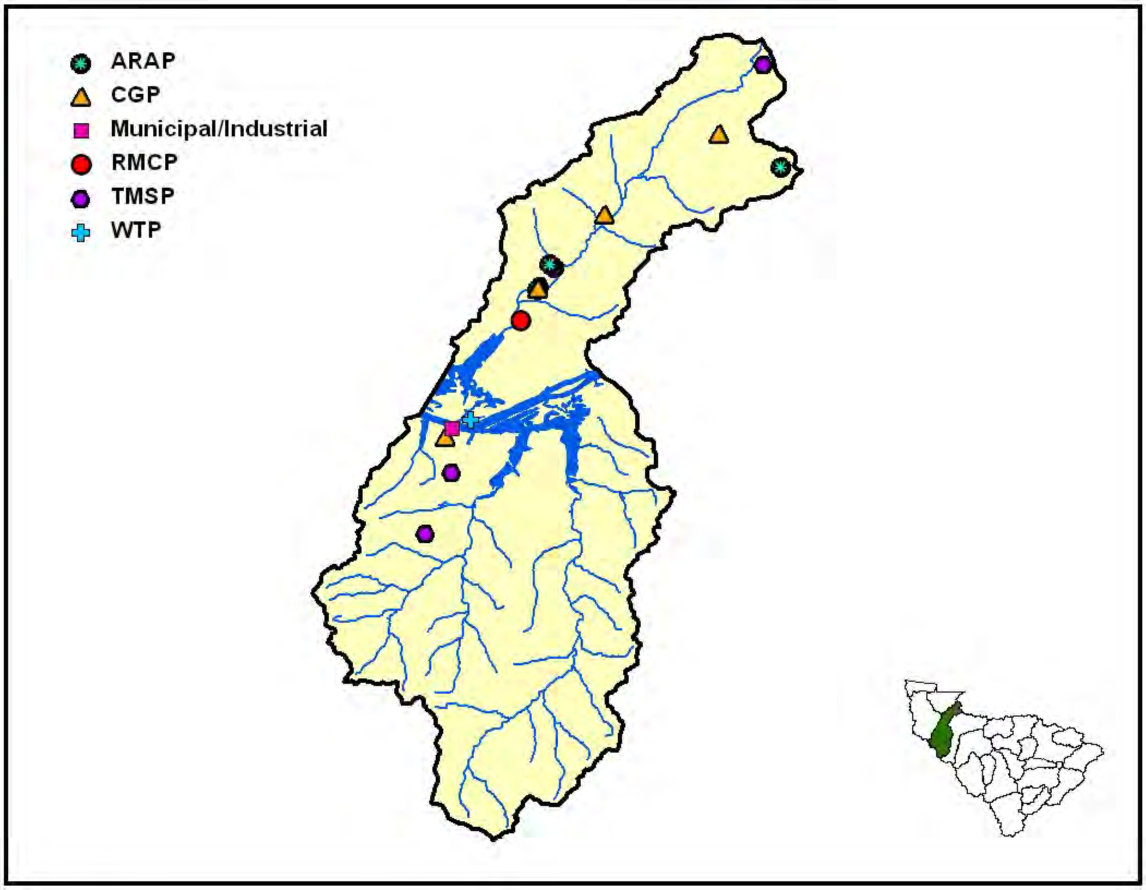


Figure 4-172. Location of Permits Issued in Subwatershed 051302050405. *More information, including the names of facilities, is provided in Appendix IV.*

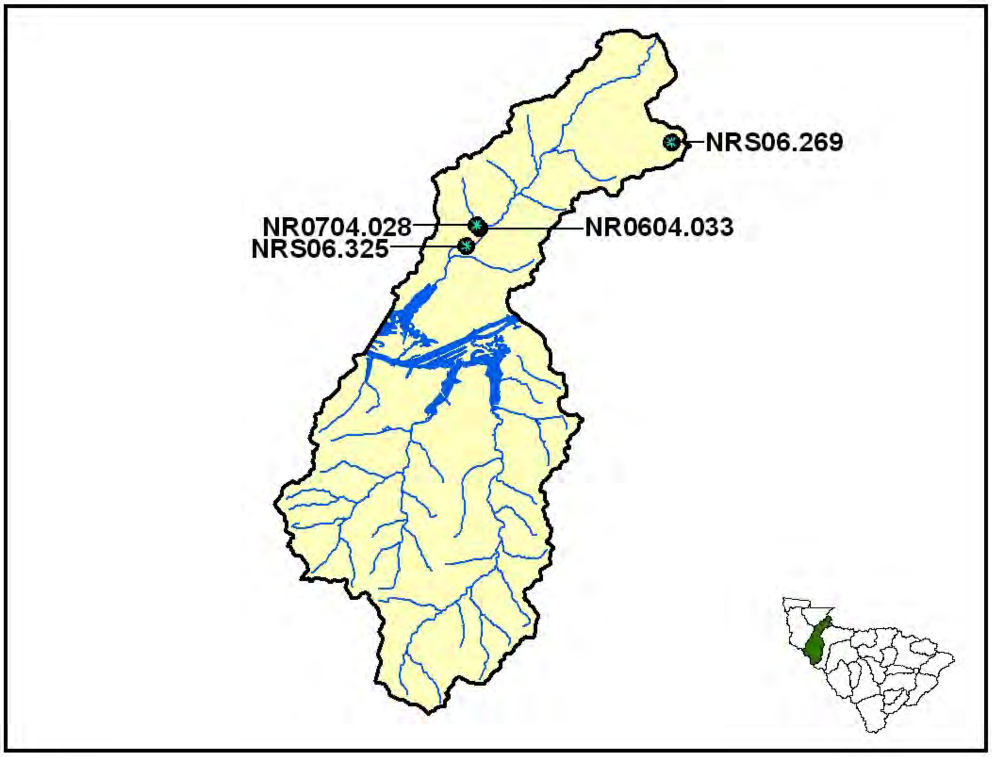


Figure 4-173. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 051302050405. *More information is provided in Appendix IV.*

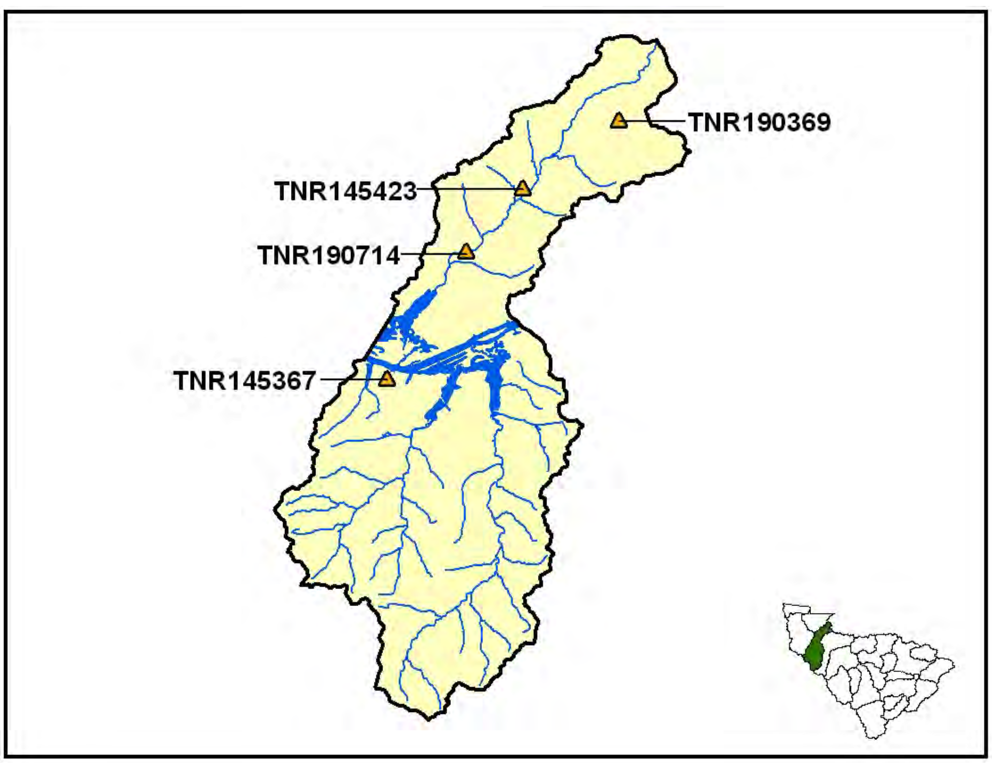


Figure 4-174. Location of CGP (Construction General Permit) Sites in Subwatershed 051302050405. *More information is provided in Appendix IV.*

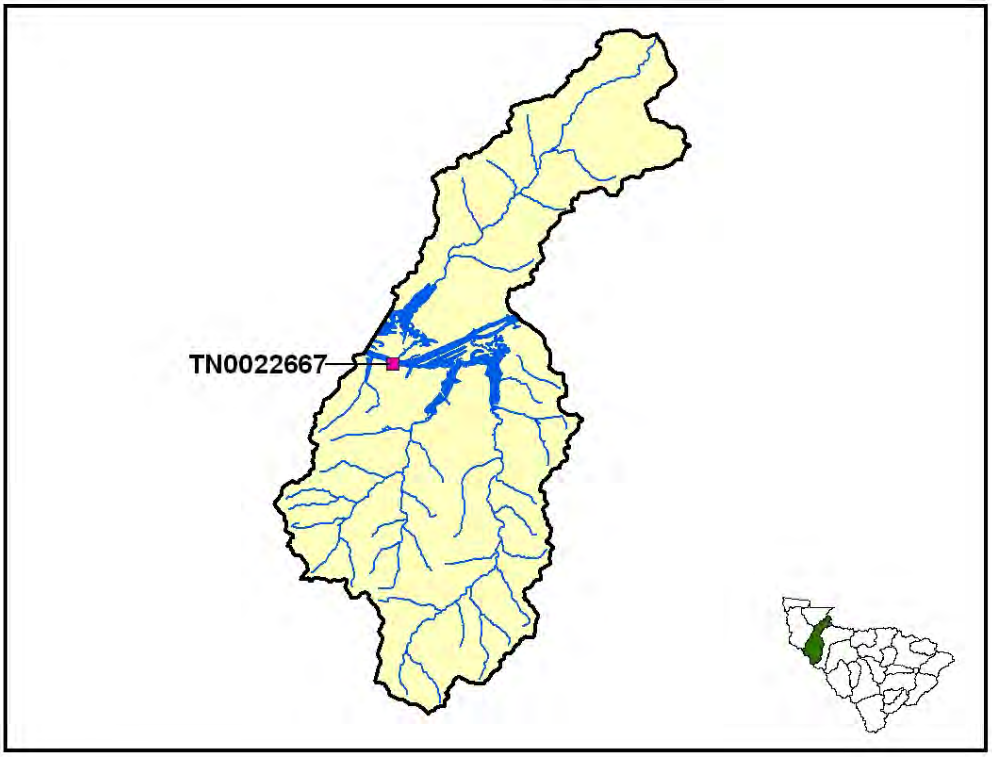


Figure 4-175. Location of Permitted Municipal and Industrial Facilities in Subwatershed 051302050405. *More information, including the name of the facility is provided in Appendix IV.*

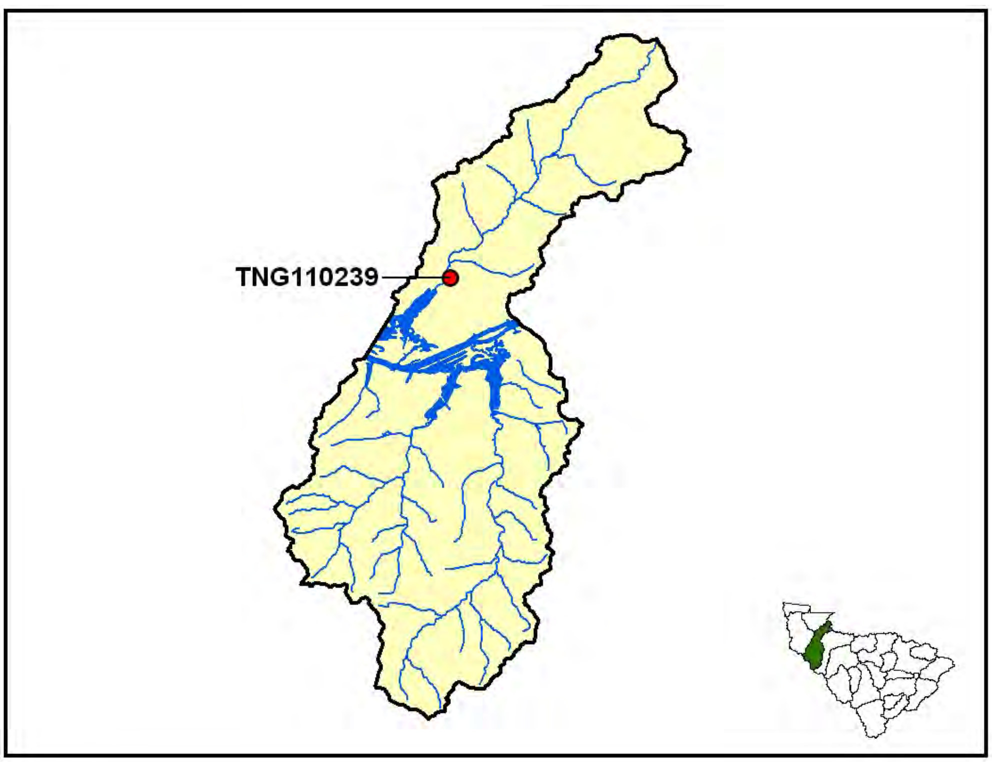


Figure 4-176. Location of RMCP (Ready Mix Concrete Plant) facilities in Subwatershed 051302050405. *More information, including the names of facilities, is provided in Appendix IV.*

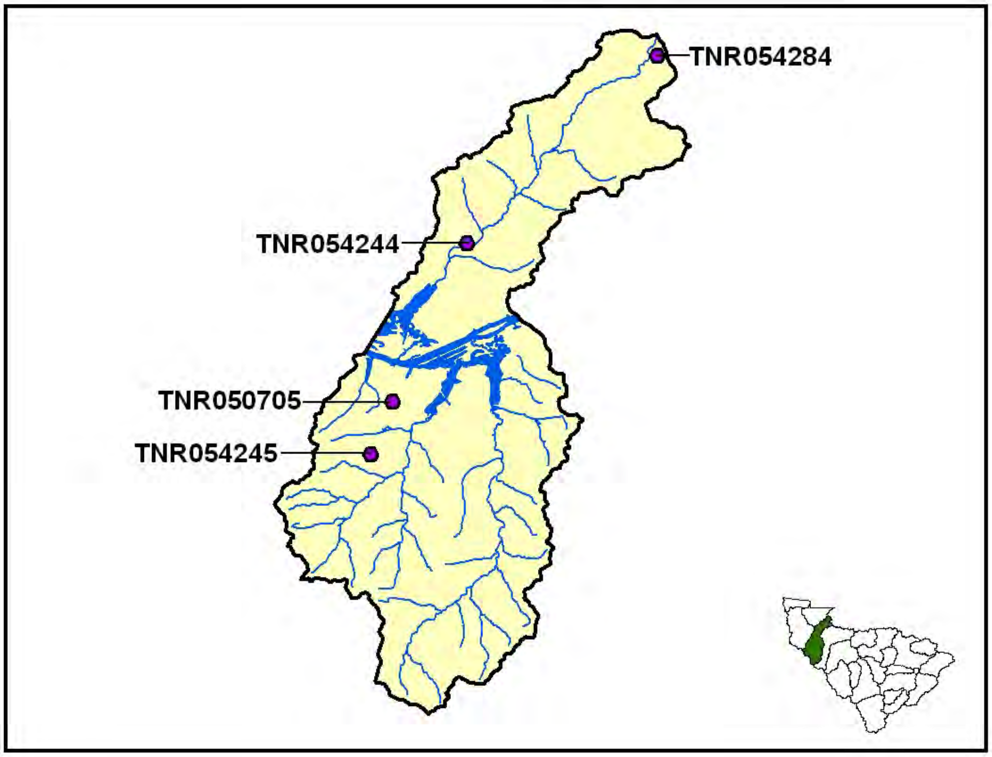


Figure 4-177. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 051302050405. *More information is provided in Appendix IV.*

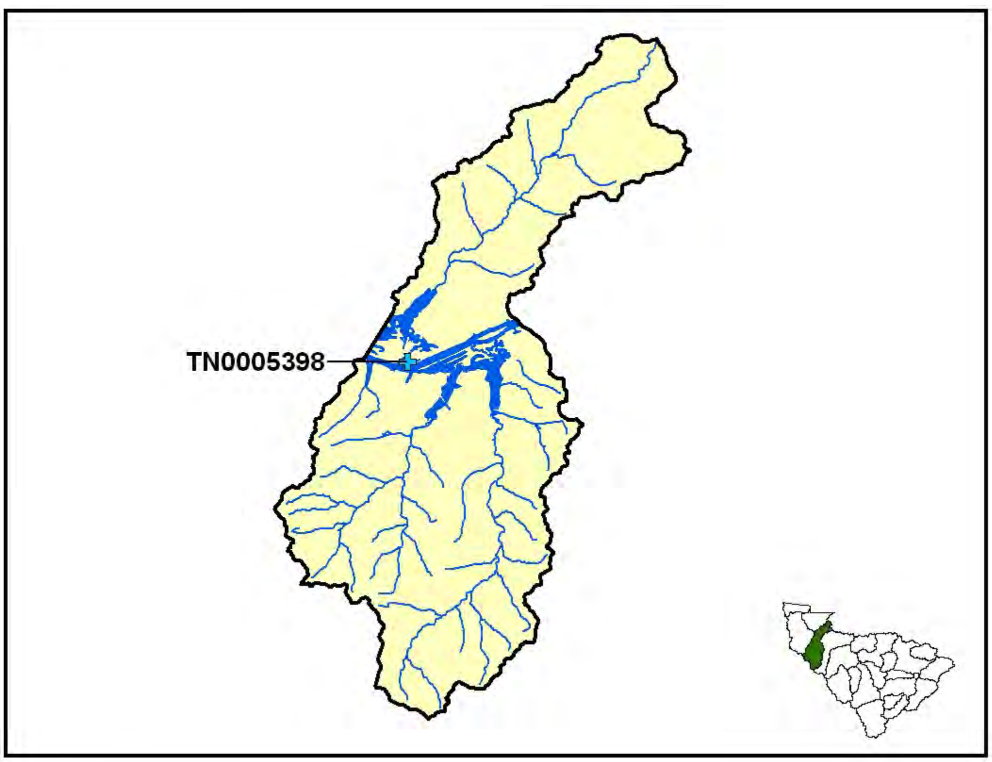


Figure 4-178. Location of Active Water Treatment Plant (WTP) Facilities in Subwatershed 051302050405. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.S.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Stewart		8,925		477	683	21

Table 4-103. Summary of Livestock Count Estimates by County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Stewart	219.7	219.7	5.4	25.4

Table 4-104. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Soybeans (Row Crops)	9.45
Tobacco (Row Crops)	6.01
Corn (Row Crops)	1.79
Grass (Pastureland)	1.42
Other Land in Farms	0.30
Grass Forbs Legumes Mixed (Pastureland)	0.23
Farmsteads and Ranch Headquarters	0.14
Grass (Hayland)	0.05

Table 4-105. Annual Estimated Total Soil Loss in Subwatershed 051302050405.

4.2.T. 051302050406 (Cumberland River).

4.2.T.i. General Description.

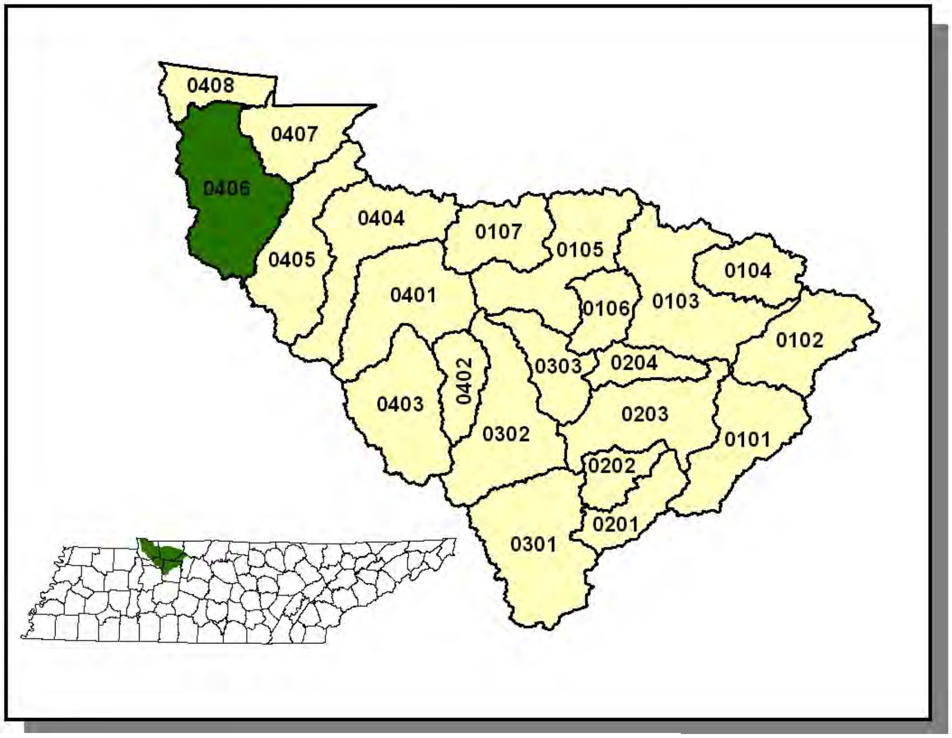


Figure 4-179. Location of Subwatershed 051302050406. *All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

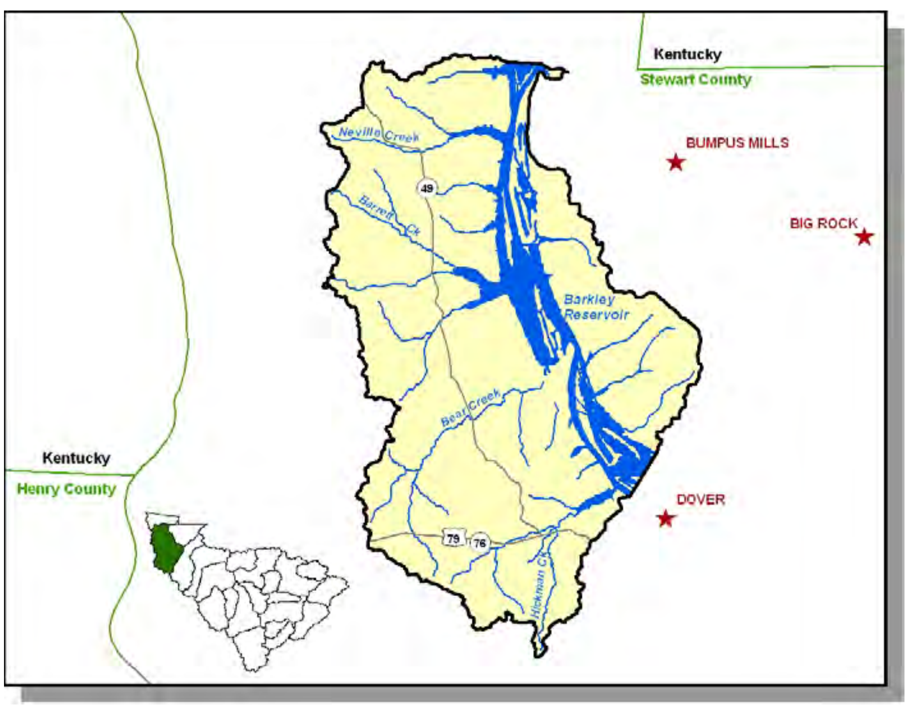


Figure 4-180. Locational Details of Subwatershed 051302050406.

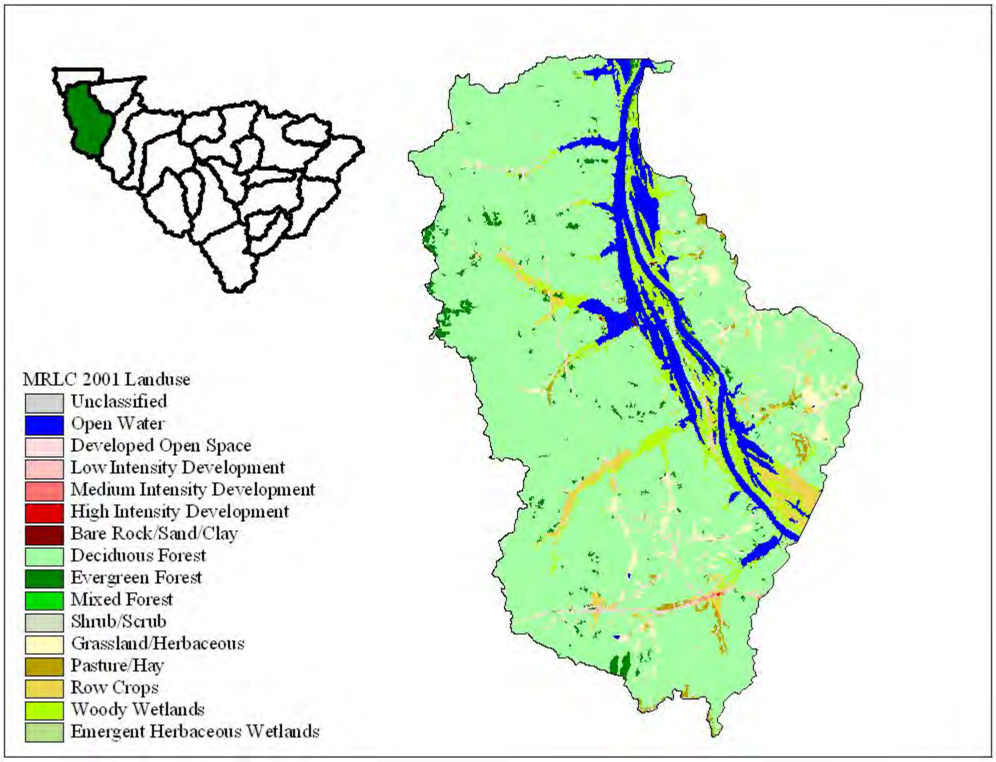


Figure 4-181. Illustration of Land Use Distribution in Subwatershed 051302050406.

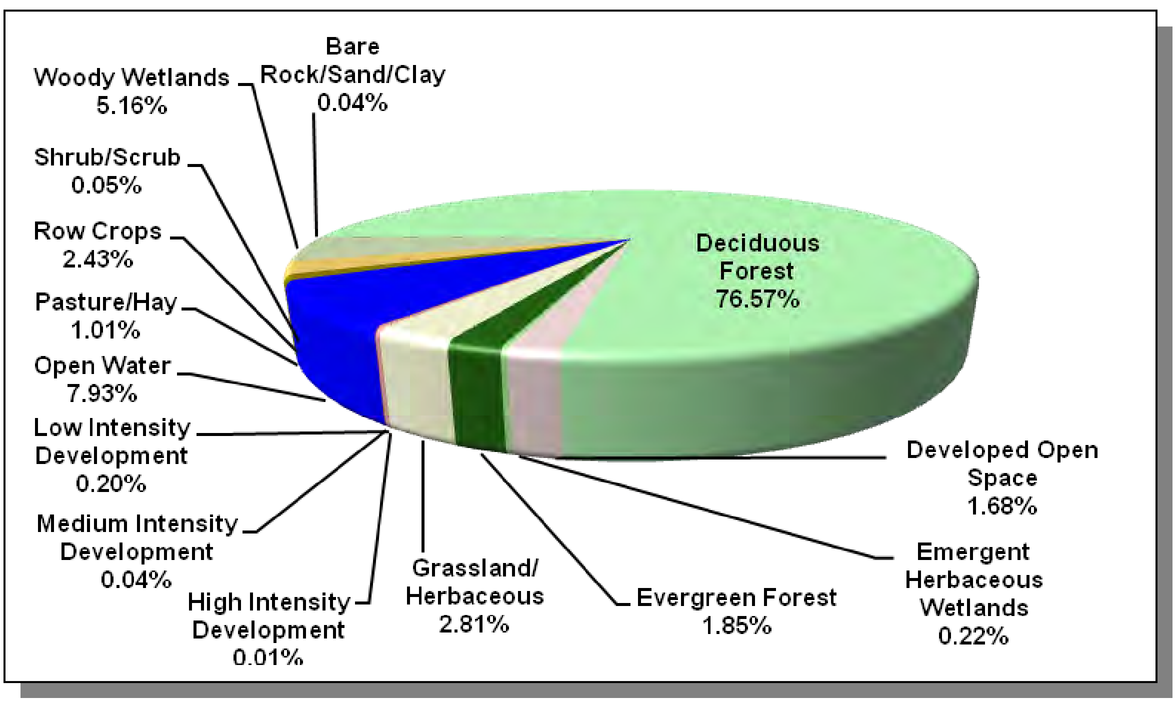


Figure 4-182. Land Use Distribution in Subwatershed 051302050406. *More information is provided in Appendix IV.*

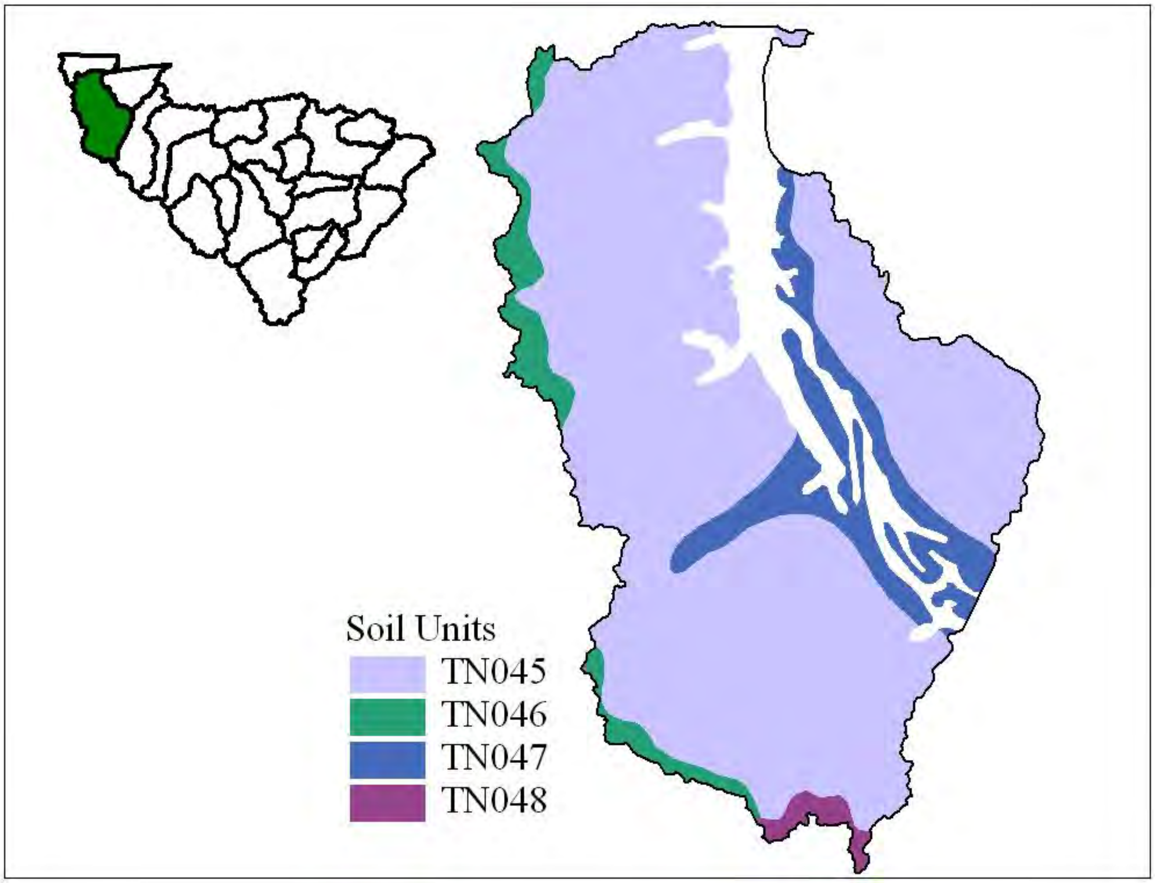


Figure 4-183. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050406.

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
TN046	0.00	B	1.98	5.09	Silty Loam	0.38
TN047	21.00	C	1.62	5.73	Silty Loam	0.37
TN048	8.00	C	1.38	5.06	Silty Loam	0.42

Table 4-106. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050406. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Stewart	9,479	11,241	12,370	13.73	1,301	1,543	1,698	30.50

Table 4-107. Population Estimates in Subwatershed 051302050406.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Dover	Stewart	1,336	597	359	234	4

Table 4-108. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 051302050406.

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

There are no USGS continuous record gaging stations located in subwatershed 051302050406.

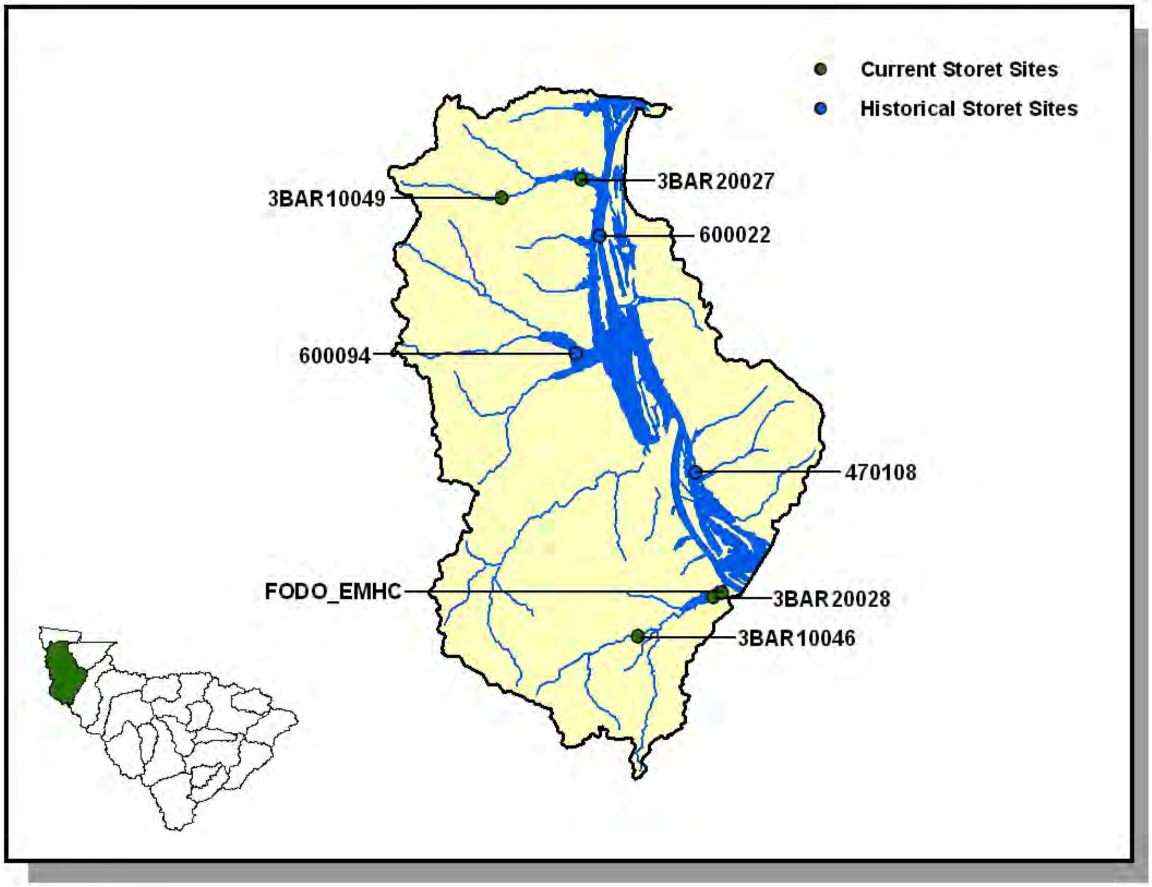


Figure 4-184. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302050406. *More information, including site names and locations, is provided in Appendix IV.*

4.2.T.iii. Permitted Activities.

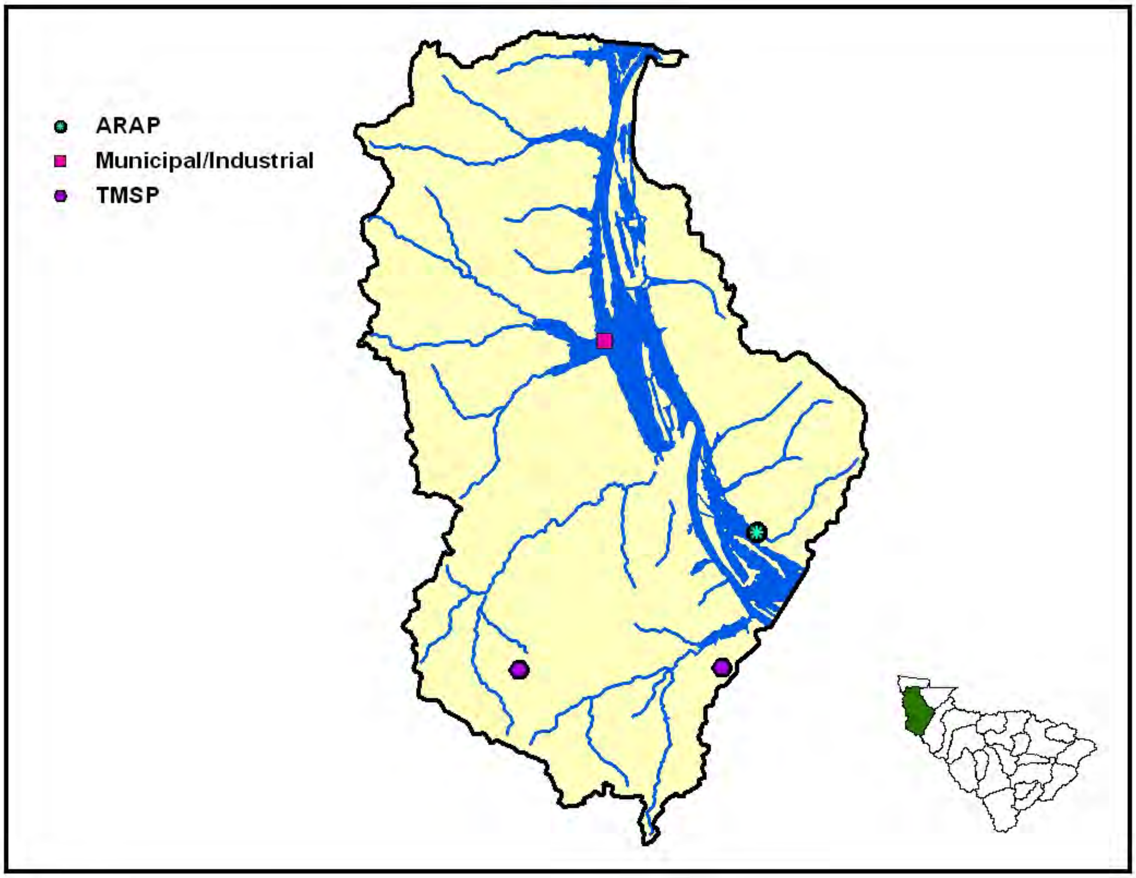


Figure 4-185. Location of Permits Issued in Subwatershed 051302050406. *More information, including the names of facilities, is provided in Appendix IV.*

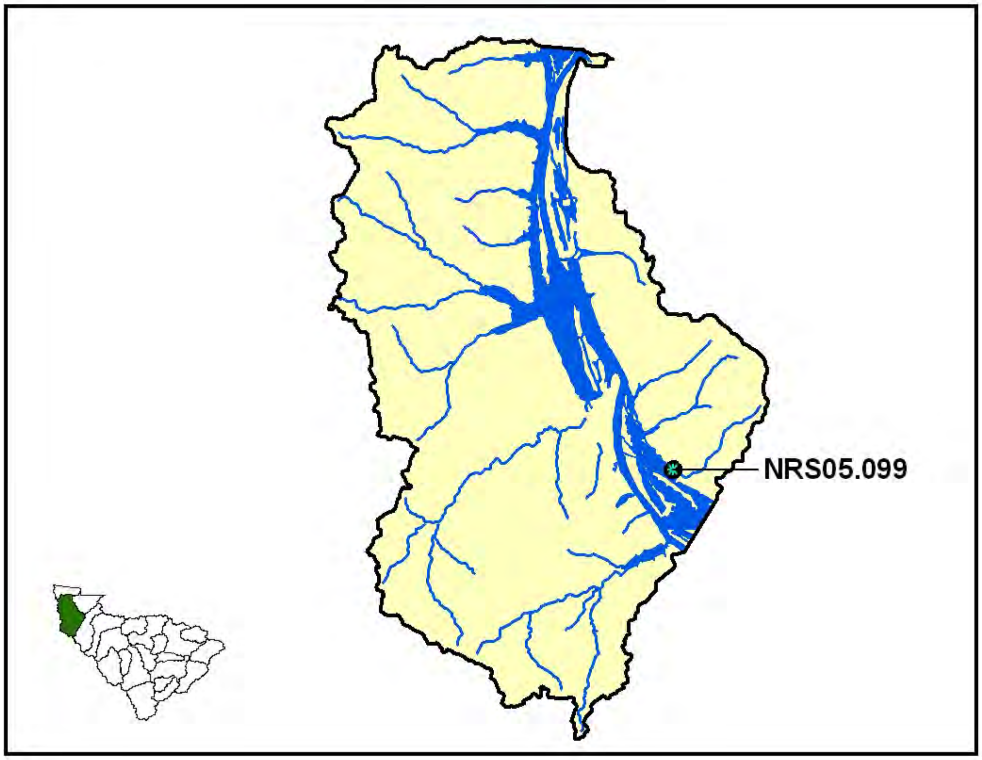


Figure 4-186. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 051302050406. *More information is provided in Appendix IV.*

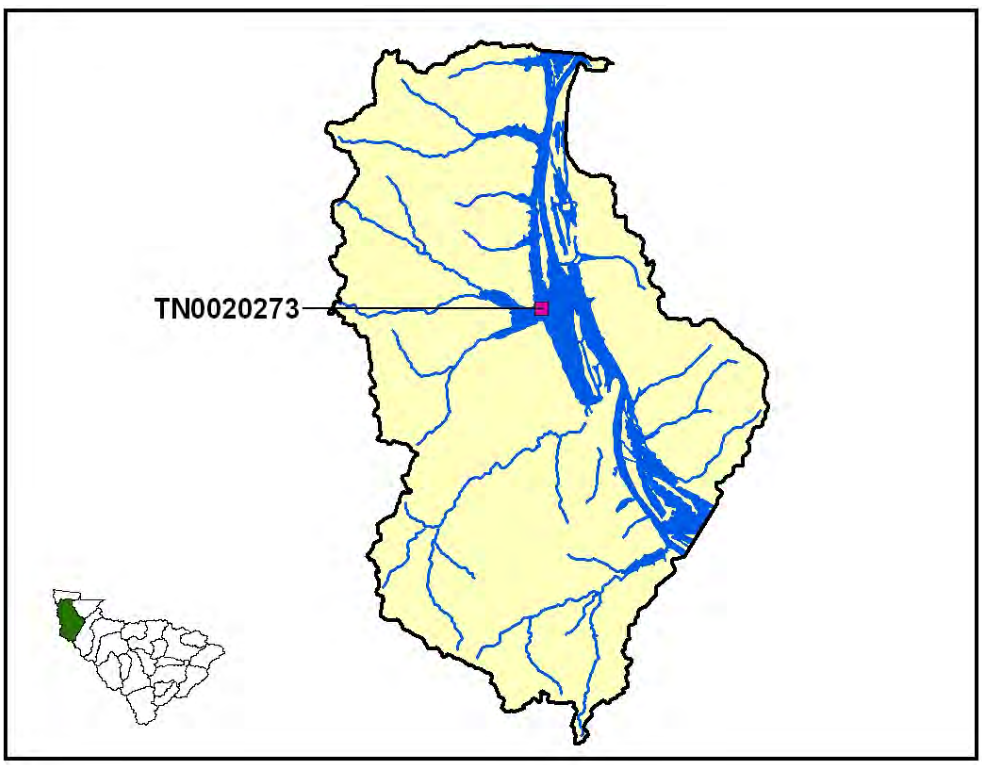


Figure 4-187. Location of Permitted Municipal and Industrial Facilities in Subwatershed 051302050406. *More information, including the name of the facility is provided in Appendix IV.*

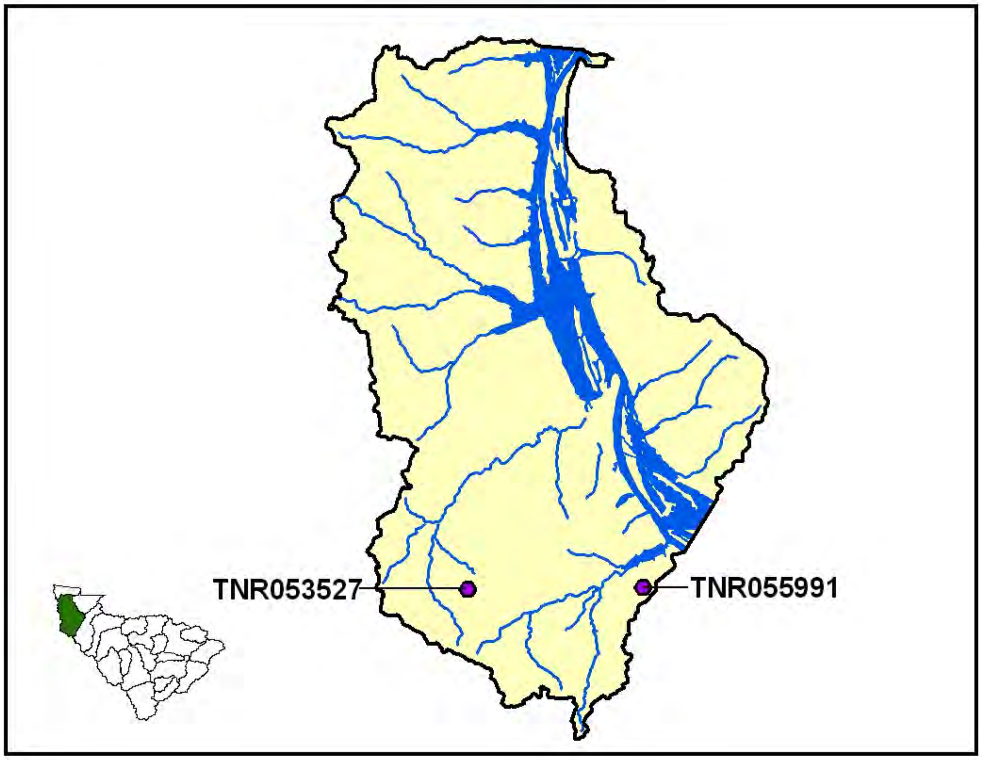


Figure 4-188. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 051302050406. *More information is provided in Appendix IV.*

4.2.T.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Stewart		8,925		477	683	21

Table 4-109. Summary of Livestock Count Estimates by County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), **"**Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Stewart	219.7	219.7	5.4	25.4

Table 4-110. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Soybeans (Row Crops)	9.45
Tobacco (Row Crops)	6.01
Corn (Row Crops)	1.79
Grass (Pastureland)	1.42
Other Land in Farms	0.30
Grass Forbs Legumes Mixed (Pastureland)	0.23
Farmsteads and Ranch Headquarters	0.14
Grass (Hayland)	0.05

Table 4-111. Annual Estimated Total Soil Loss in Subwatershed 051302050406.

4.2.U. 051302050407 (Saline Creek).

4.2.U.i. General Description.

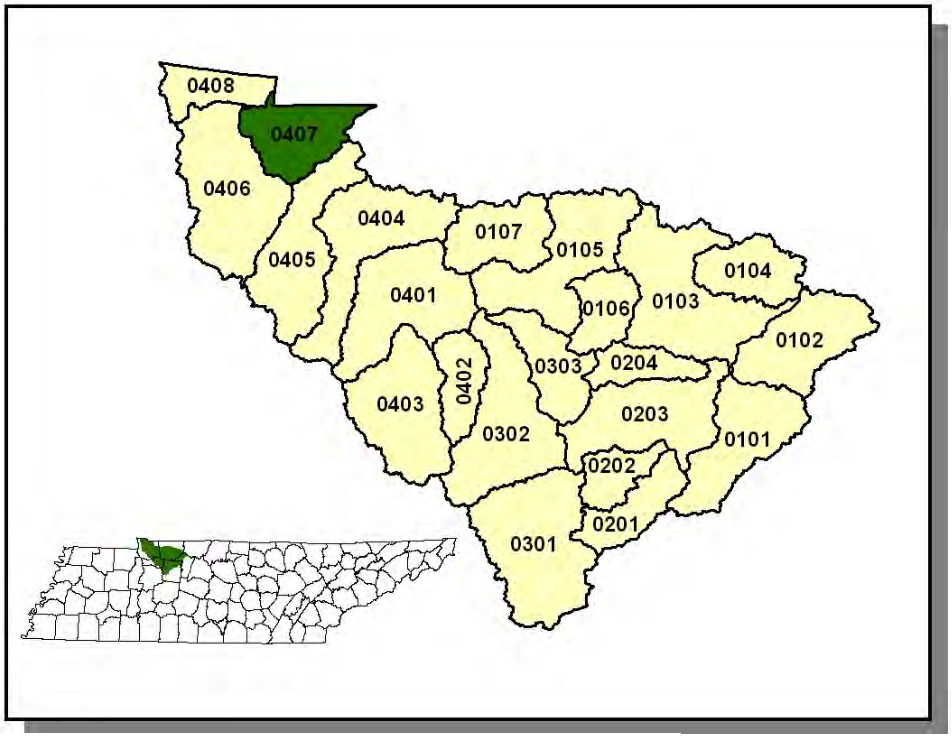


Figure 4-189. Location of Subwatershed 051302050407. All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.

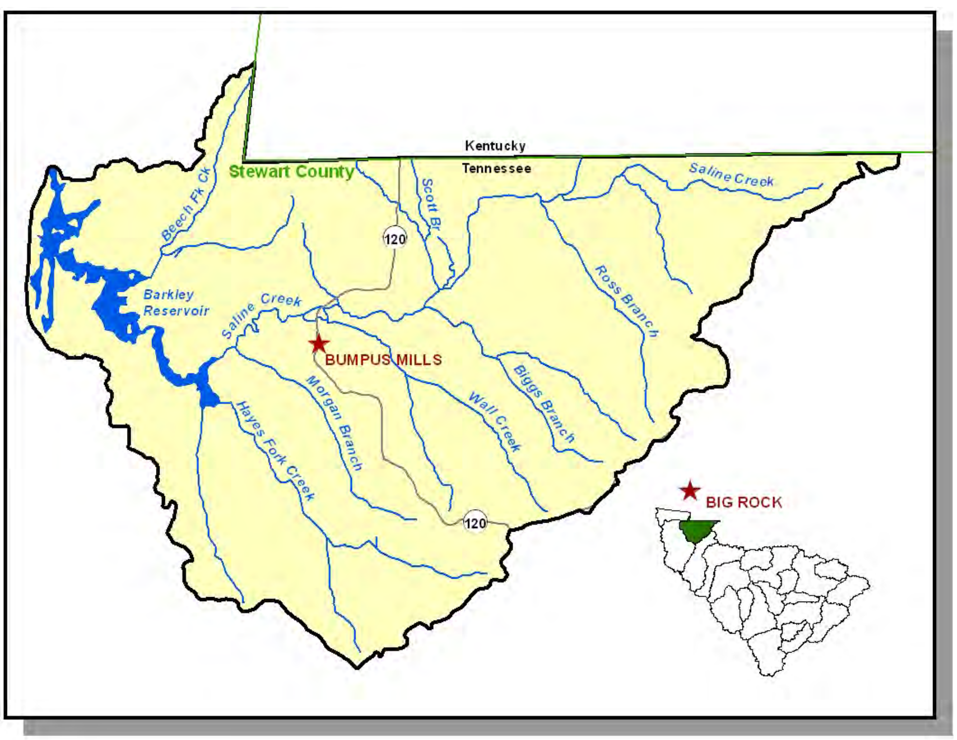


Figure 4-190. Locational Details of Subwatershed 051302050407.

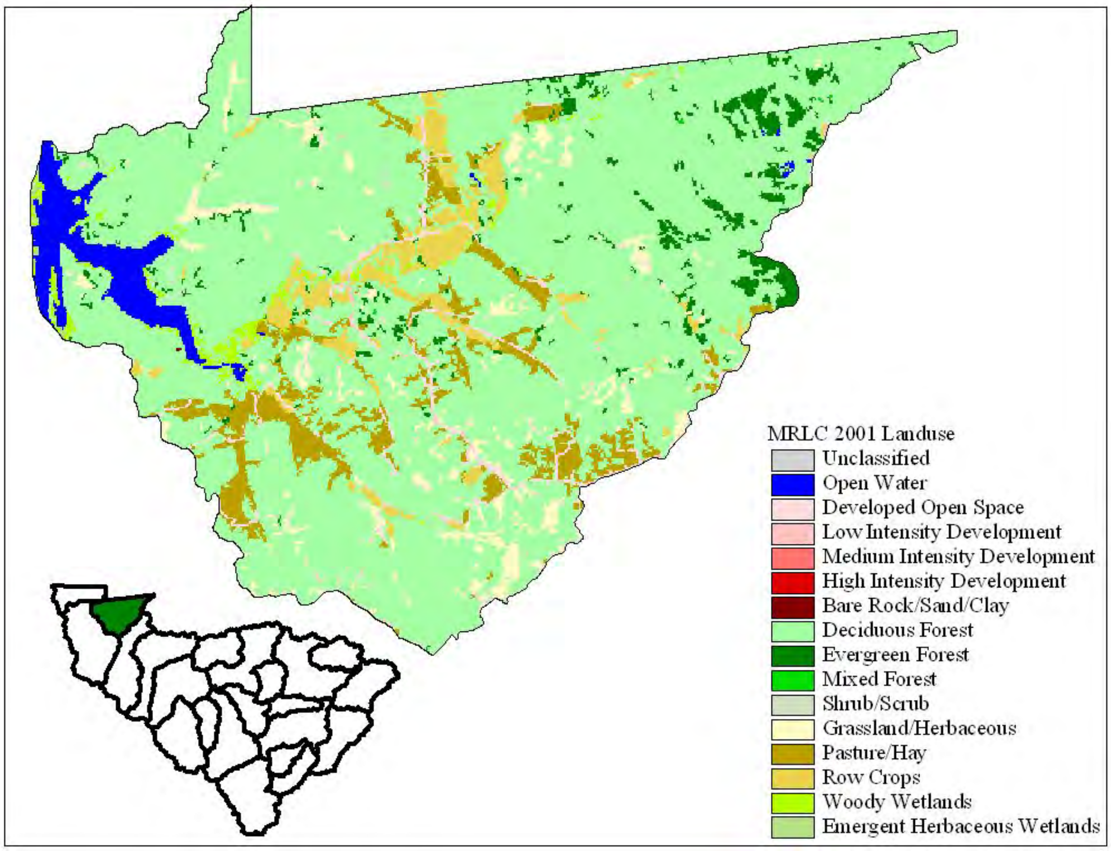


Figure 4-191. Illustration of Land Use Distribution in Subwatershed 051302050407.

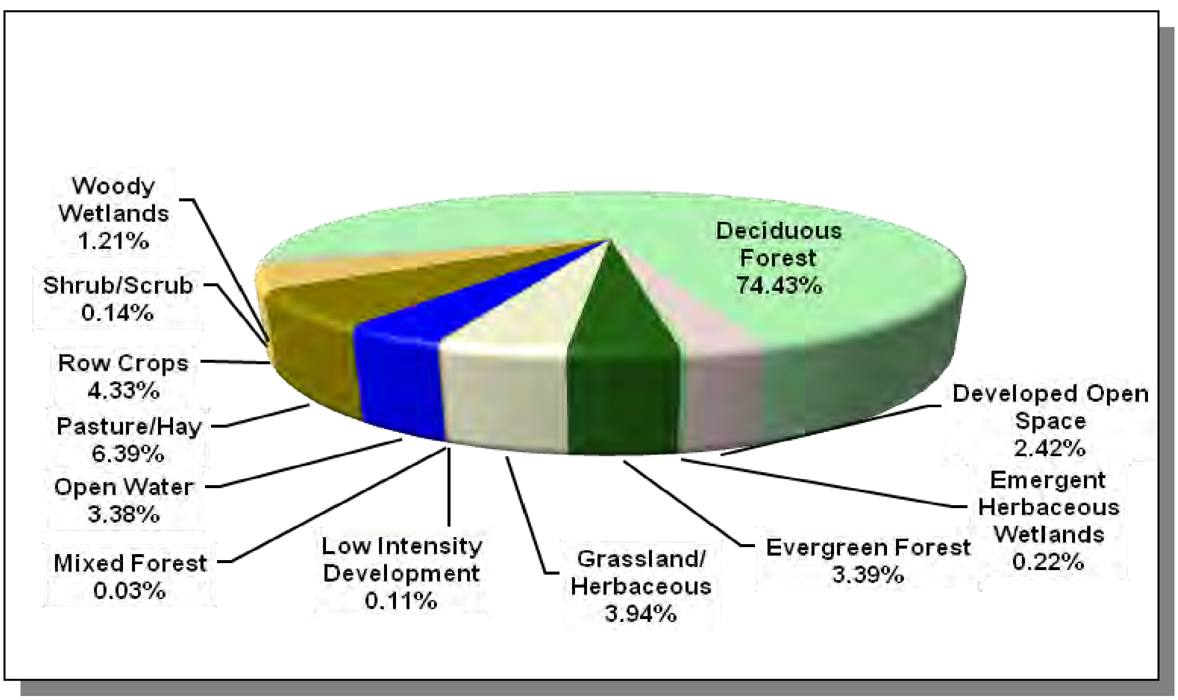


Figure 4-192. Land Use Distribution in Subwatershed 051302050407. *More information is provided in Appendix IV.*

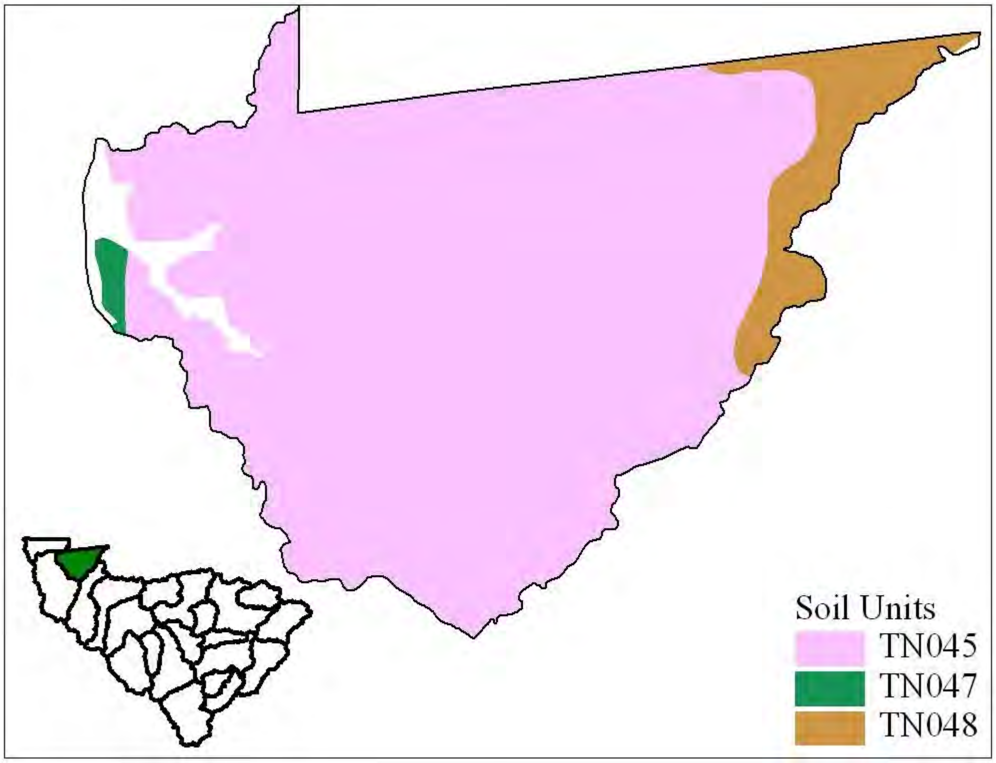


Figure 4-193. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050407.

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
TN047	21.00	C	1.62	5.73	Silty Loam	0.37
TN048	8.00	C	1.38	5.06	Silty Loam	0.42

Table 4-112. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050407. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Stewart	9,479	11,241	12,370	6.86	651	772	849	30.40

Table 4-113. Population Estimates in Subwatershed 051302050407.

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

There are no USGS continuous record gaging stations located in subwatershed 051302050407.

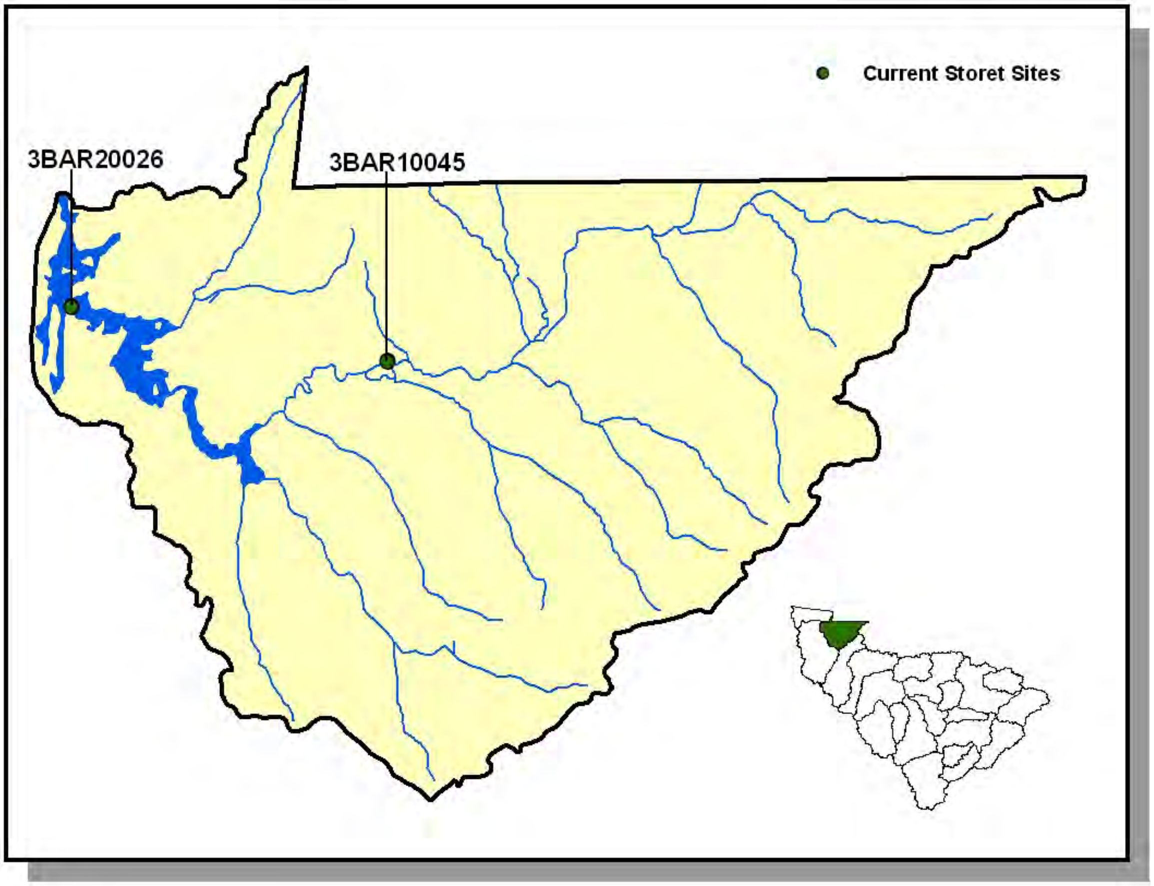


Figure 4-194. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302050407. *More information, including site names and locations, is provided in Appendix IV.*

4.2.U.iii. Permitted Activities.

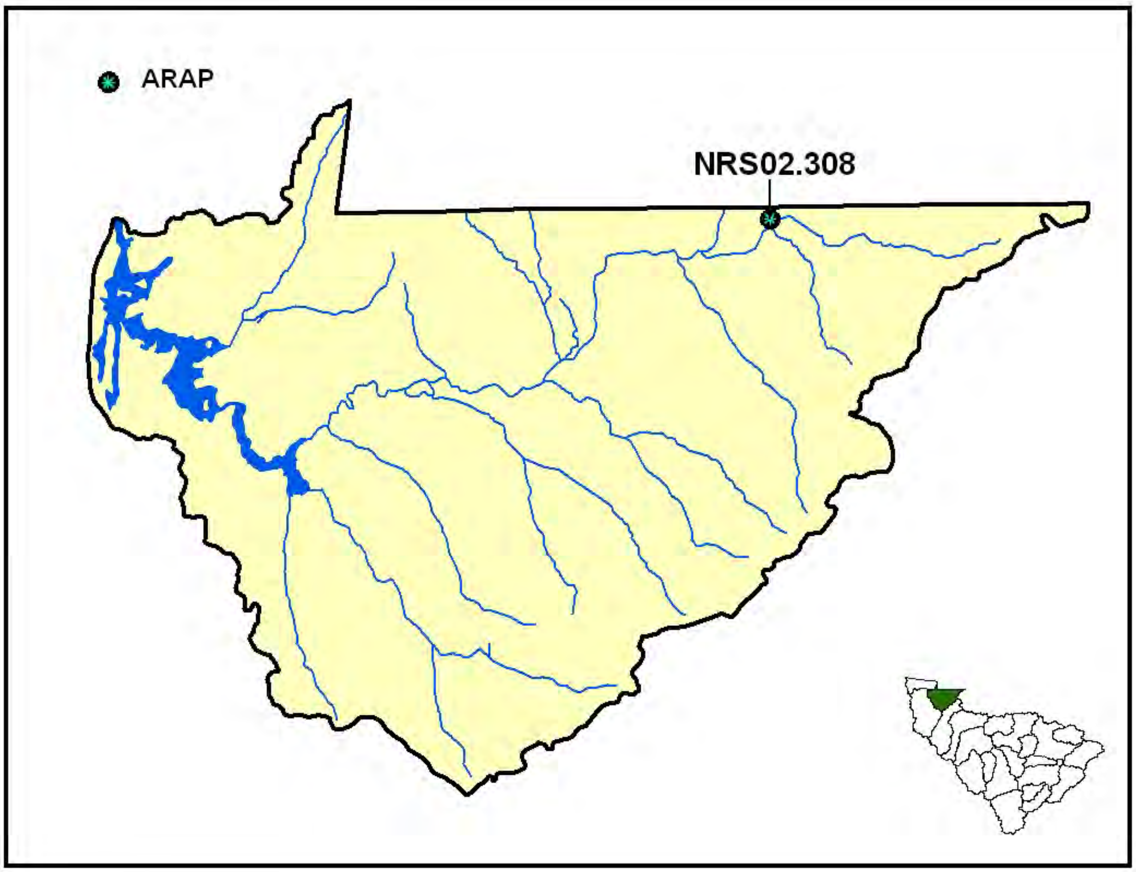


Figure 4-195. Location of Permits Issued in Subwatershed 051302050407. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.U.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Stewart		8,925		477	683	21
Trigg	10,232	18,257	115	5	22,545	28

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

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Trigg	163.0	159.0	3.0	9.0
Stewart	219.7	219.7	5.4	25.4

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

CROPS	TONS/ACRE/YEAR
Soybeans (Row Crops)	9.44
Wheat (Close Grown Cropland)	8.16
Tobacco (Row Crops)	6.01
Other Cropland not Planted	3.52
Corn (Row Crops)	1.81
Grass (Pastureland)	1.41
Conservation Reserve Program Land	0.58
Legume (Hayland)	0.57
Legume Grass (Hayland)	0.40
Other Land in Farms	0.30
Grass Forbs Legumes Mixed (Pastureland)	0.23
Farmsteads and Ranch Headquarters	0.14
Grass (Hayland)	0.05

Table 4-116. Annual Estimated Total Soil Loss in Subwatershed 051302050407.

4.2.V. 051302050408 (Lake Barkley).

4.2.V.i. General Description.

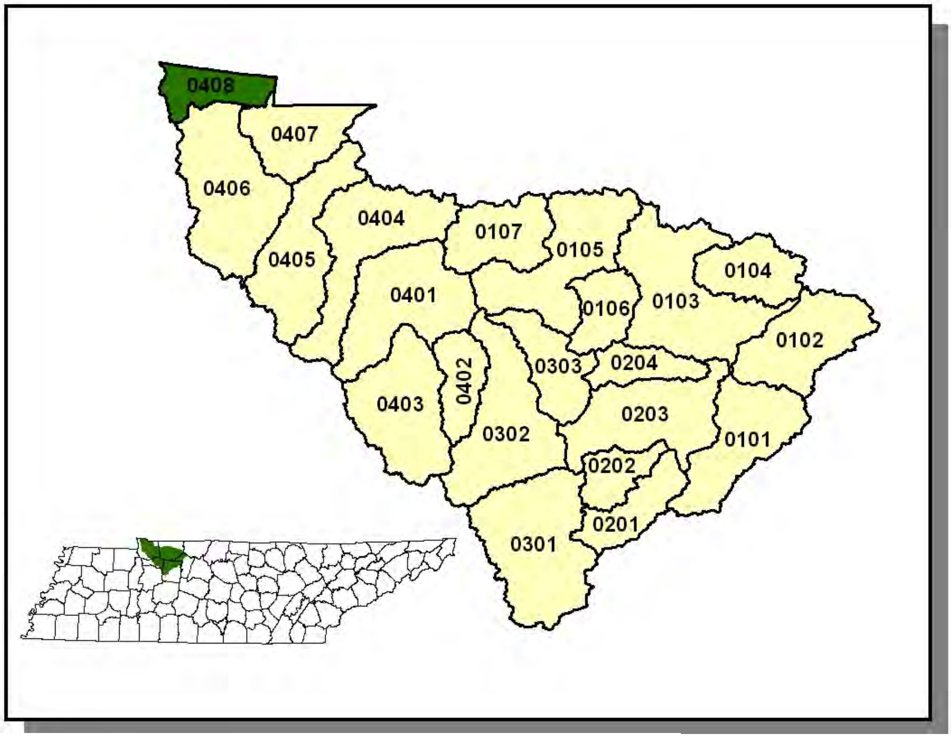


Figure 4-196. Location of Subwatershed 051302050408. *All Lake Barkley HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

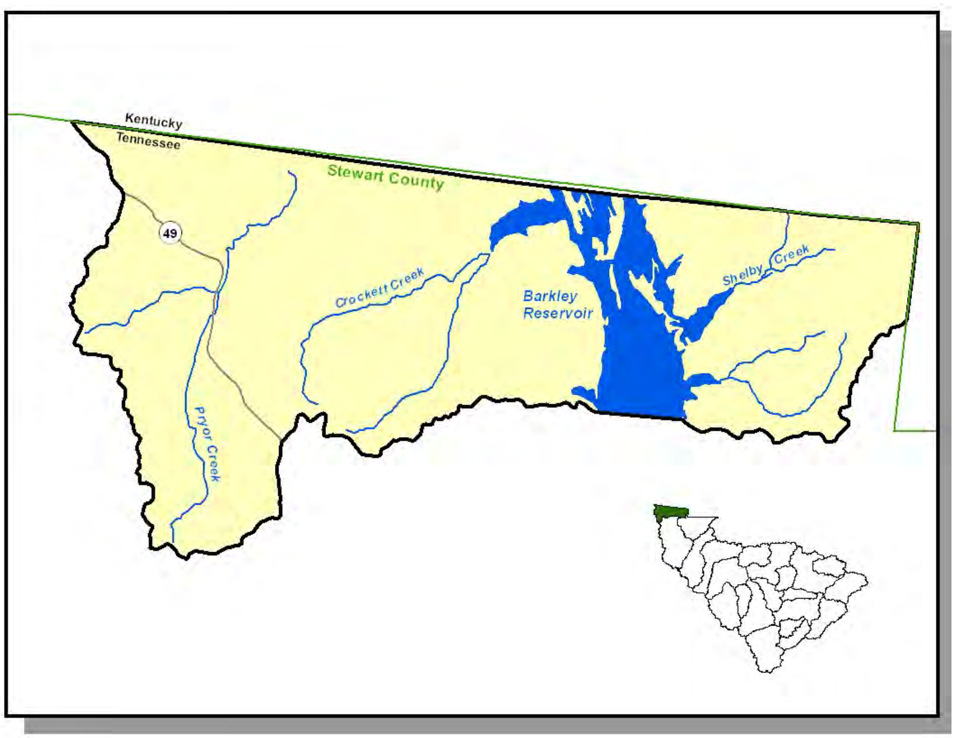


Figure 4-197. Locational Details of Subwatershed 051302050408.

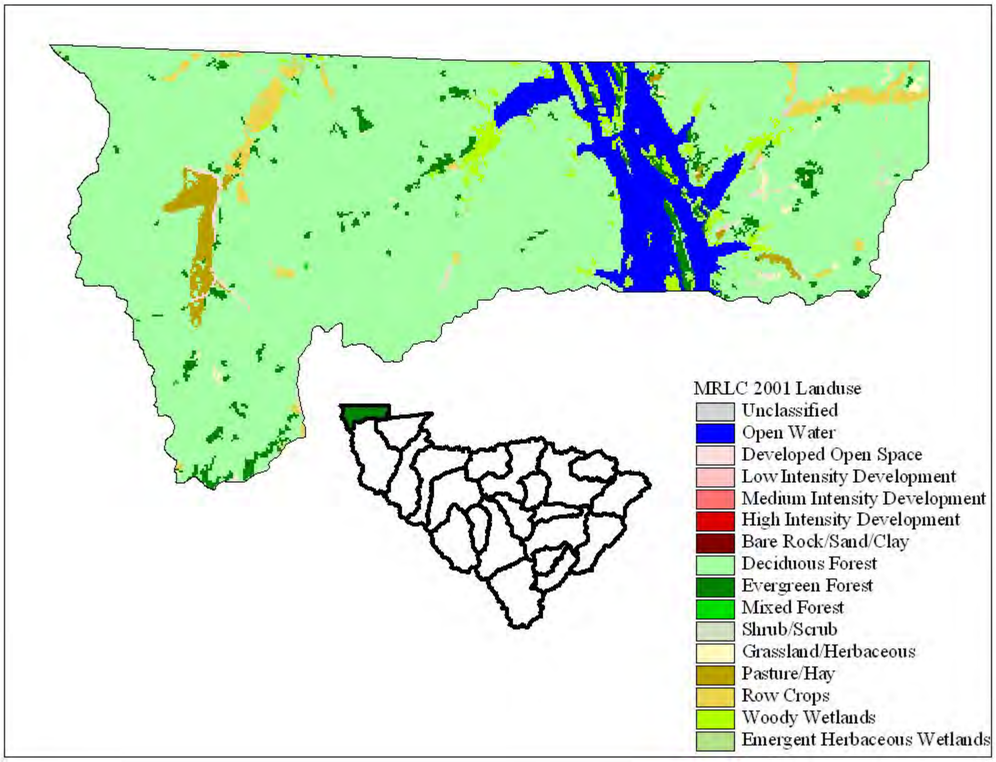


Figure 4-198. Illustration of Land Use Distribution in Subwatershed 051302050408.

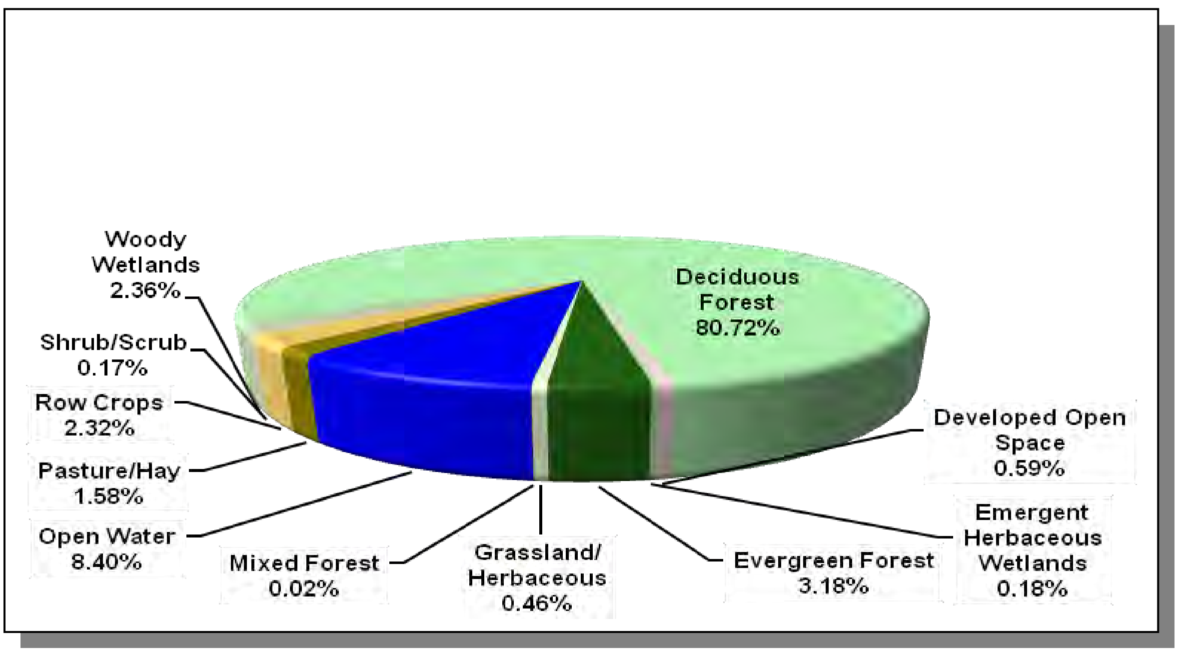


Figure 4-199. Land Use Distribution in Subwatershed 051302050408. *More information is provided in Appendix IV.*

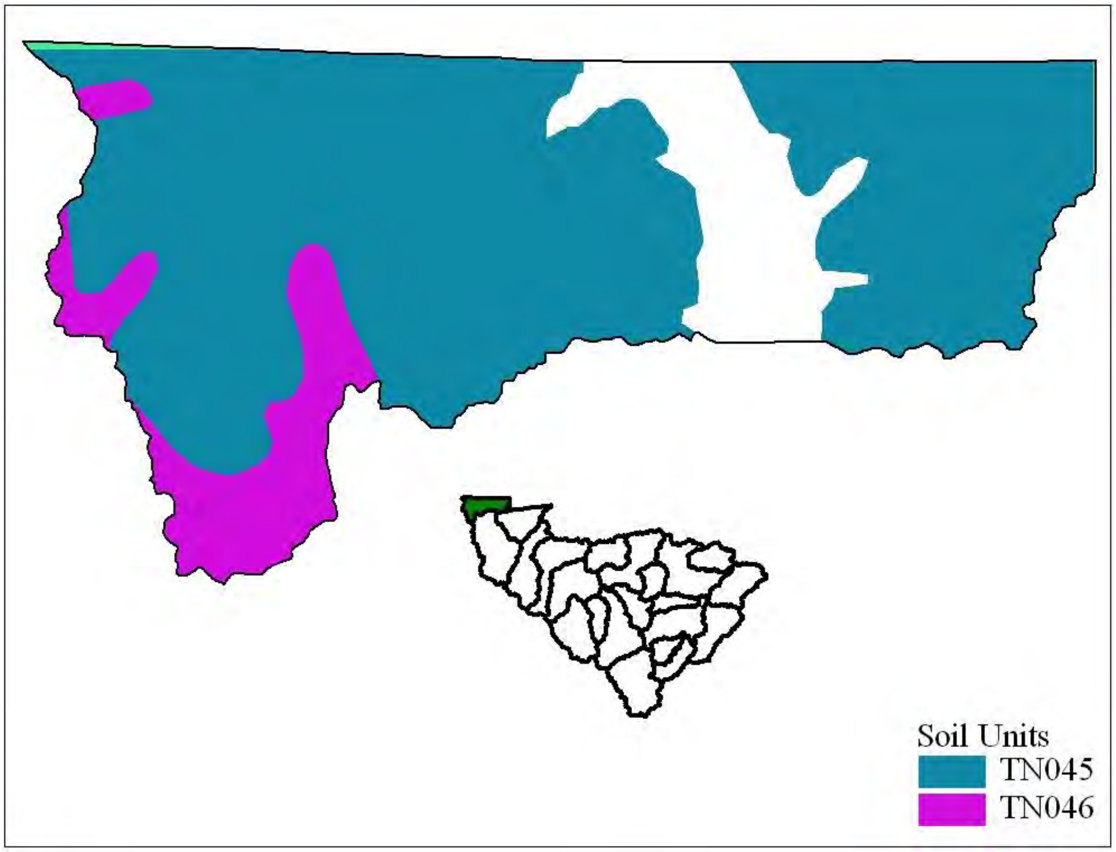


Figure 4-200. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050408.

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
TN046	0.00	B	1.98	5.09	Silty Loam	0.38

Table 4-117. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051302050408. *The definition of "Hydrologic Group" is provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	% of County in Watershed	1990	1997	2000	% Change (1990-2000)
Stewart	9,479	11,241	12,370	4.12	391	463	510	30.40

Table 4-118. Population Estimates in Subwatershed 051302050408.

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

There are no USGS continuous record gaging stations located in subwatershed 051302050408.

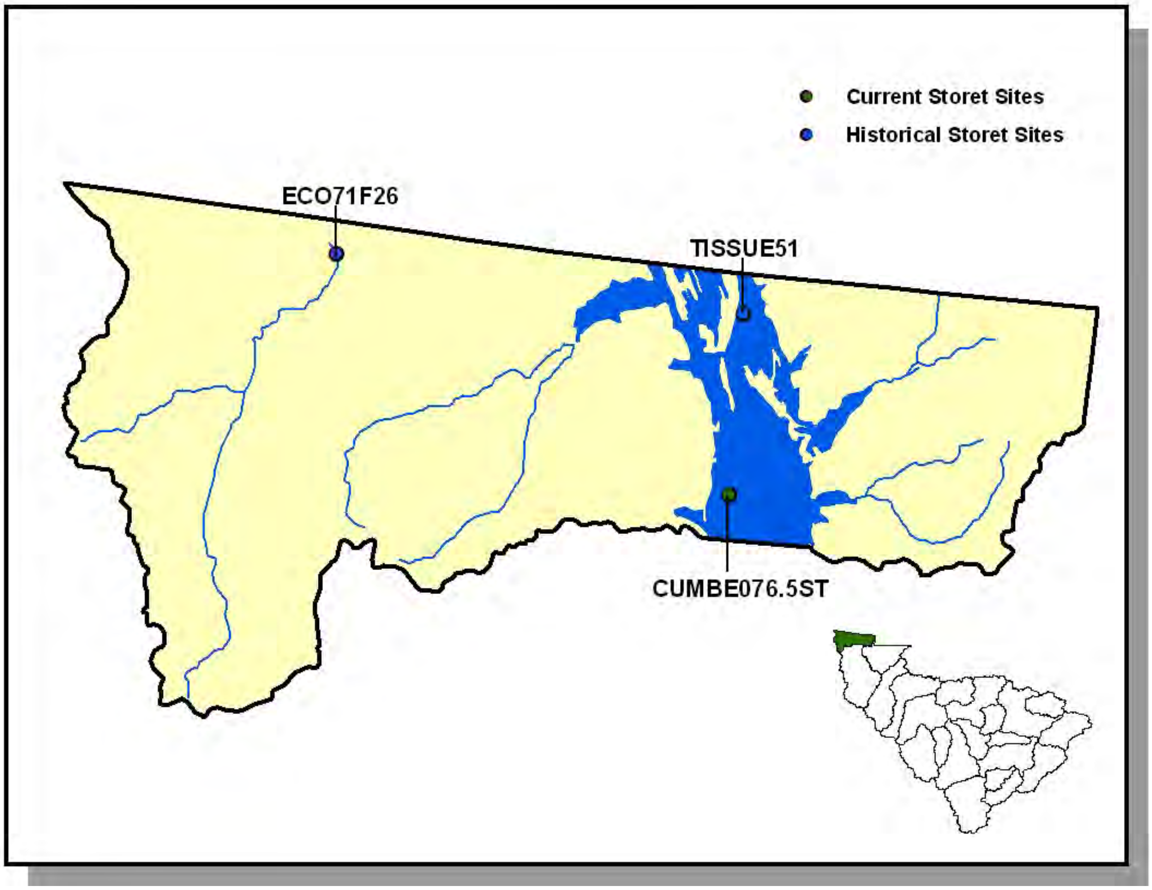


Figure 4-201. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 051302050408. *More information, including site names and locations, is provided in Appendix IV.*

4.2.V.iii. Permitted Activities.

There are no permitted activities located in subwatershed 051302050408 as of June 30th, 2007.

4.2. V.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Stewart		8,925		477	683	21

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

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Stewart	219.7	219.7	5.4	25.4

Table 4-120. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Soybeans (Row Crops)	9.36
Wheat (Close Grown Cropland)	8.16
Tobacco (Row Crops)	6.01
Other Cropland not Planted	3.52
Corn (Row Crops)	1.93
Grass (Pastureland)	1.40
Conservation Reserve Program Land	0.58
Legume (Hayland)	0.57
Legume Grass (Hayland)	0.40
Other Land in Farms	0.30
Grass Forbs Legumes Mixed (Pastureland)	0.24
Farmsteads and Ranch Headquarters	0.15
Grass (Hayland)	0.08

Table 4-121. Annual Estimated Total Soil Loss in Subwatershed 051302050408.

CHAPTER 5

WATER QUALITY PARTNERSHIPS IN THE LAKE BARKLEY WATERSHED

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

- Partnerships between agencies
- Partnerships between agencies and landowners

This chapter describes both types of partnerships in the Tennessee Portion of the Lake Barkley 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	51,466	81	
Erosion Control		4,744	
Nutrient Management		18,395	
Pest Management		18,136	
Grazing / Forages	63,035	8,098	
Tree and Shrub Practices		7,612	
Tillage and Cropping		4,693	
Wetlands		68	
Wildlife Habitat Management		7,404	
Water Supply		13,932	15

Table 5-1. Landowner Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Lake Barkley Watershed. *Data are from PRMS for October 1, 2002 through September 30, 2006 reporting period. More information is provided in Appendix V.*

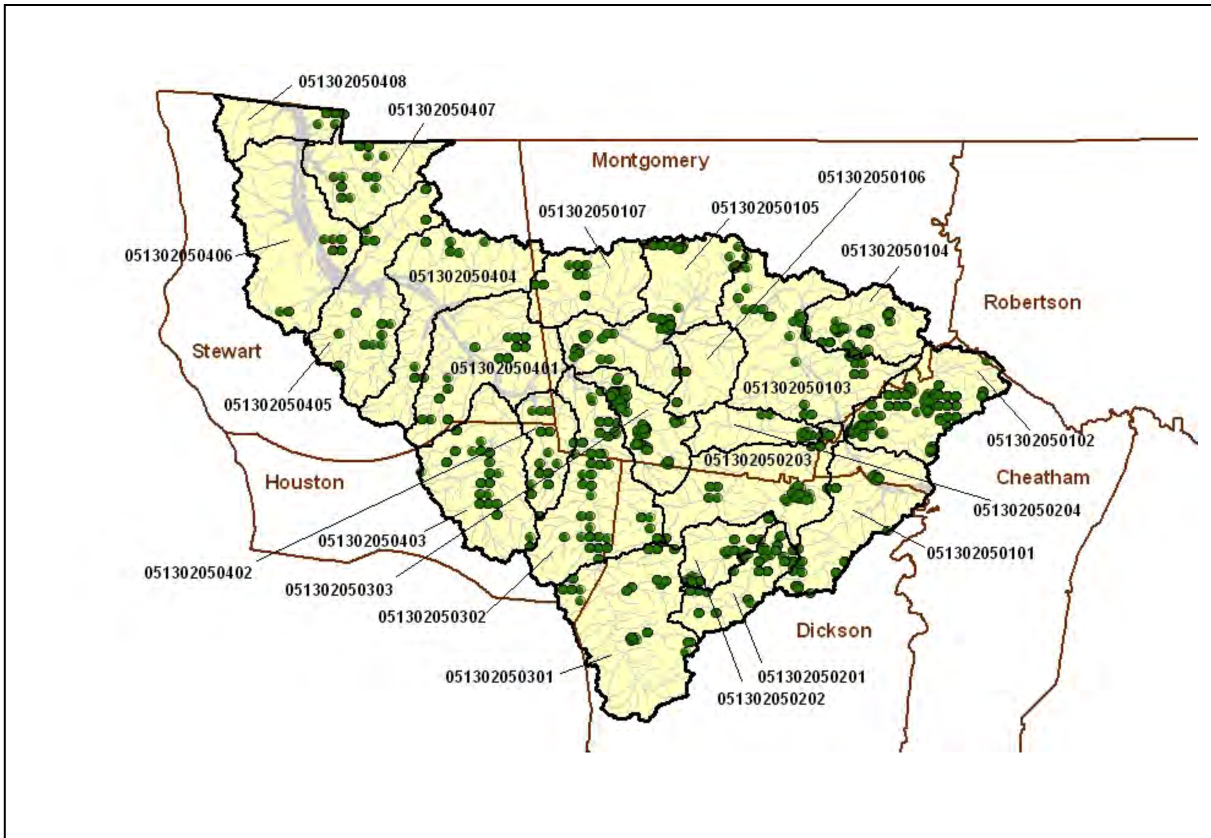


Figure 5-1. BMPs Installed by NRCS in the Lake Barkley Watershed in 2006 and 2007. Information was provided as part of Conservation Technical Assistance Grant 060701T47. *Best Management Practices applied in the watershed may be found in Appendix V.*

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.

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

Endangered Species Program

Through the Endangered Species Program, the Service consults with other federal agencies concerning their program activities and their effects on endangered and threatened species. Other Service activities under the Endangered Species Program include the listing of rare species under the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended: 16 U.S.C. 1531 et seq.) and the recovery of listed species. Once listed, a species is afforded the full range of protections available under the ESA, including prohibitions on killing, harming, or otherwise taking a species. In some instances, species listing can be avoided by the development of Candidate Conservation Agreements, which may remove threats facing the candidate species, and funding efforts such as the Private Stewardship Grant Program.

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

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

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

The following federally endangered (E), threatened (T), and candidate (C), species occur in the Lower Cumberland River (Lake Barkley) Watershed: gray bat (*Myotis grisescens*) (E); Indiana bat (*Myotis sodalis*) (E); bald eagle (*Haliaeetus leucocephalus*) (T); Price's potato-bean (*Apios priceana*) (T); and Short's bladderpod (*Lesquerella globosa*) (C). For a complete listing of endangered and threatened species in Tennessee, please visit the Service's website at http://www.fws.gov/cookeville/

Partners for Fish and Wildlife Program

The U.S. Fish and Wildlife Service established the Partners for Fish and Wildlife Program to restore historic habitat types that 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://www.fws.gov/cookeville/*

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.

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 are 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, 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.

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.

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.lrn.usace.army.mil/

WATER QUALITY ISSUES AND HIGHLIGHTS OF ACTIONS AND INITIATIVES IN THE CUMBERLAND RIVER WATERSHED

Dam Safety Issues and Water Management/Quality Consequences

Besides environmental concerns in the immediate reservoir and tailwater environments of two projects, Wolf Creek and Center Hill Lake Dam restorations. Downstream needs may be even more critical within two downstream Group Five Watersheds, Cheatham Lake and Lake Barkley. In one of these, the Cumberland River or Cheatham Lake below Old Hickory Dam (CRM 216.2), the consequences of reduced flows in the Cumberland River above Old Hickory Dam may cause lower than normal DO levels in the Old Hickory Dam outflow. In order to maintain at least the warm water standard for DO of 5.0 mg/l, hydropower production may be foregone or reduced at times in favor of spilling water over the dam in order to provide additional aeration. By meeting the DO target at the Old Hickory Dam tailwater, it is likely downstream wastewater assimilative needs will be satisfied and the river environment protected.

Below, Cheatham Dam (CRM 148.7) further water management challenges continue. Here, water management will focus on keeping the critically important TVA coal fired, Cumberland City generating plant functioning by providing adequate cooling water.

Information about reservoir and river conditions is key to long-term system management. Additional and more intensive water quality monitoring by the Nashville District has already gotten underway at several of the Nashville District's storage reservoirs in order to better define conditions prior to the critical low flow season. This monitoring data is vital for the day to day and long term operation of the river system while the dam repairs proceed.

In summary, challenges to maintaining the water quality of the Cumberland River System are significantly more complicated than normal due to the vast reduction of water normally held in storage, the uncertainty of antecedent meteorological events, and multiyear time scale for repairs to the dams. Each year will represent a new set of circumstances until the compromised reservoir projects can return to normal operations.

Cumberland City Dredged Material Disposal

The navigation channel between Cumberland River Miles 102.2 and 104.5 near Cumberland City in Stewart County, Tennessee was relocated during construction of the TVA steam plant and has historically required frequent dredging. Since the material to be dredged is primarily fine sands and silt with plant detritus, there have been concerns for a number of years about smothering benthic habitat using routine open water disposal. To address these concerns, the Corps is studying the feasibility of constructing a confined upland disposal area adjacent to the channel in this area.

Lake Barkley Pool Levels

Summer pool levels have been an issue since the impoundment of Lake Barkley and its connection with TVA's Kentucky Lake in 1966. The two lakes are linked by an unregulated canal and operated in unison. Summer pool is currently held until after the July 4^{th} holiday weekend. There is local and congressional interest to extend the duration of summer pool levels on Lake Barkley until after Labor Day weekend. The Corps and TVA recently completed an environmental assessment (EA), which evaluated extending summer pool until mid-July then gradually returning to the existing guide curve by mid-August. The EA selected the No Action Alternative (maintain existing operation) as a good balance of existing economic, environmental, and recreational considerations. The Corps additionally concluded that any pool extensions would require an Environmental Impact Statement of sufficient detail and scope to consider the wide range of issues related to pool extensions, including downstream navigation and flood control effects. The downstream effects extend to the lower Ohio and Mississippi Rivers.

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 springs), since the differentiation between ground water and surface water is sometimes nearly impossible. What is surface water can become ground water in the distance of a few feet and vice versa.

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

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

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

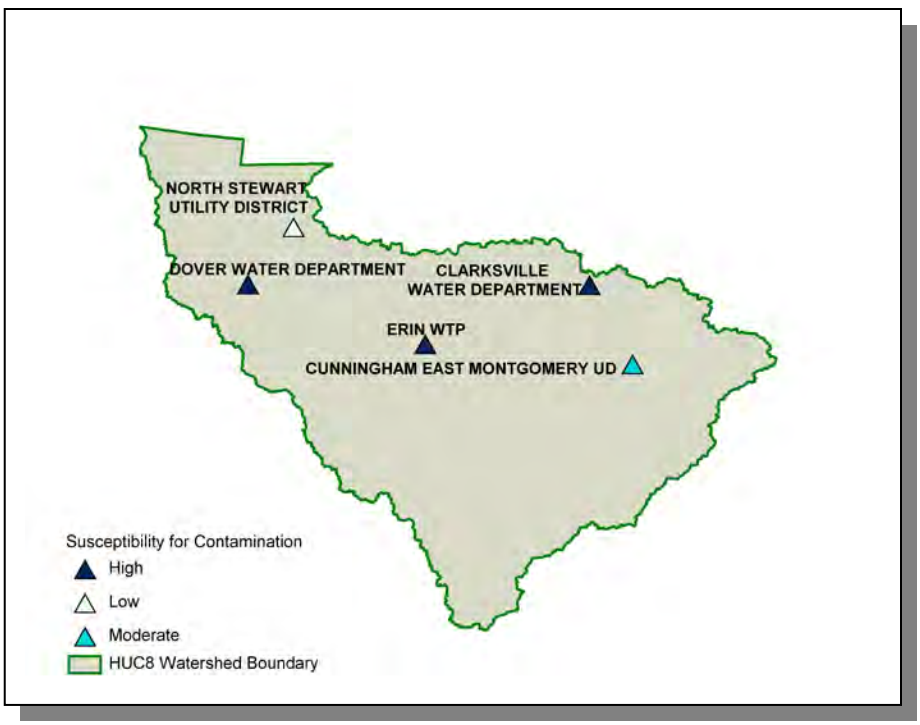


Figure 5-2. Public Water Systems Susceptible to Contamination in the Tennessee Portion of the Lake Barkley Watershed.

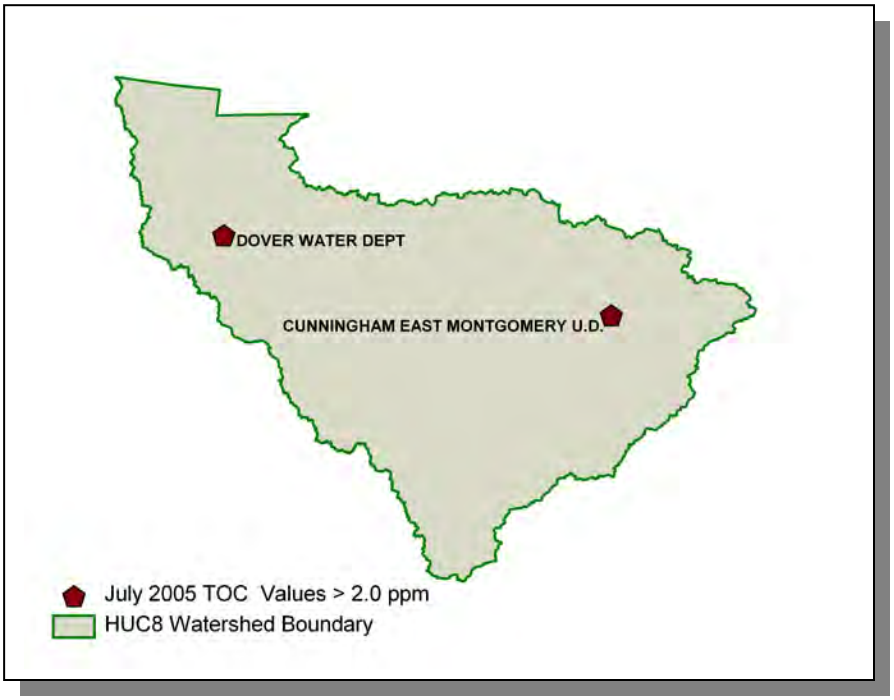


Figure 5-3. July 2005 Raw Water Total Organic Carbon (TOC) Analysis in the Tennessee Portion of the Lake Barkley Watershed.

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

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

5.3.B. TDEC Clean Water State Revolving Fund Program. The Division of Water Pollution Control and the Division of Water Supply jointly administer the state's Clean Water State Revolving Fund Program. Amendment of the Federal Clean Water Act in 1987 created the Clean Water State Revolving Fund (SRF) Program to provide low-interest loans to cities, counties, and utility districts for the planning, design, and construction of wastewater facilities. The U.S. Environmental Protection Agency awards annual capitalization grants to fund the program and the State of Tennessee provides a twenty-percent funding match. TDEC has awarded loans totaling over $675 million since the creation of the SRF Program. SRF loan repayments are returned to the program and used to fund future SRF loans.

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

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

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

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

For further information about Tennessee's Clean Water SRF Loan Program, contact the Clean Water SRF Loan Program by telephone at (615) 532-0445 or visit their Web site at http://tennessee.gov/environment/srf.

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

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

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

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

- 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

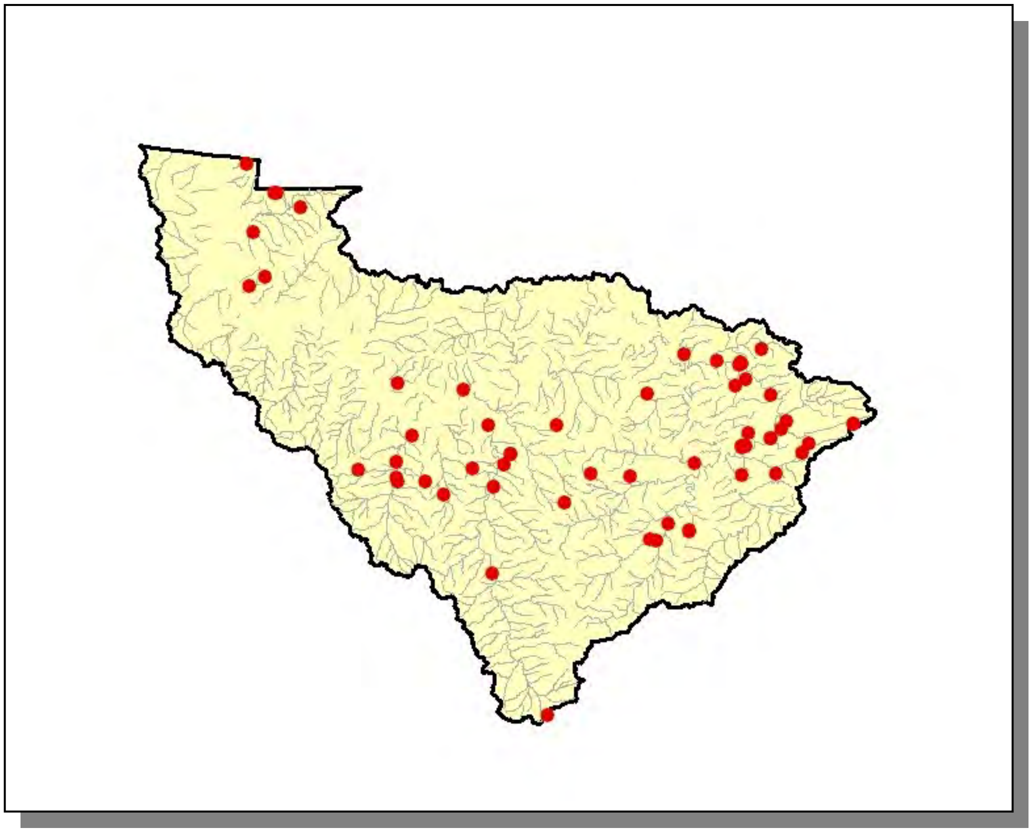


Figure 5-4. Location of BMPs installed from 1999 through 2005 in the Tennessee Portion of the Lake Barkley Watershed with Financial Assistance from the Tennessee Department of Agriculture's Nonpoint Source and Agricultural Resources Conservation Fund Grant Programs. *More information is provided in Appendix V.*

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

The Tennessee Aquatic Database System (TADS)

The Tennessee Aquatic Database System (TADS) originated in the mid-1980's as a geographically referenced fisheries database maintained with ESRI's GIS Arc/Info software. It consists of mapping coverages of streams, rivers and reservoirs along with relatable fisheries data files. These database files include stream and river fish distributions, sample site data, and Index of Biotic Integrity (IBI) data. The fish inventory data file contains over 15,000 records of fish occurrences from over 3,600 sample sites across the state. Fish data is referenced by river reach and a point coverage generated by latitude and longitude. Physical and chemical data and habitat evaluations from most of the sample sites have been entered into a database.

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

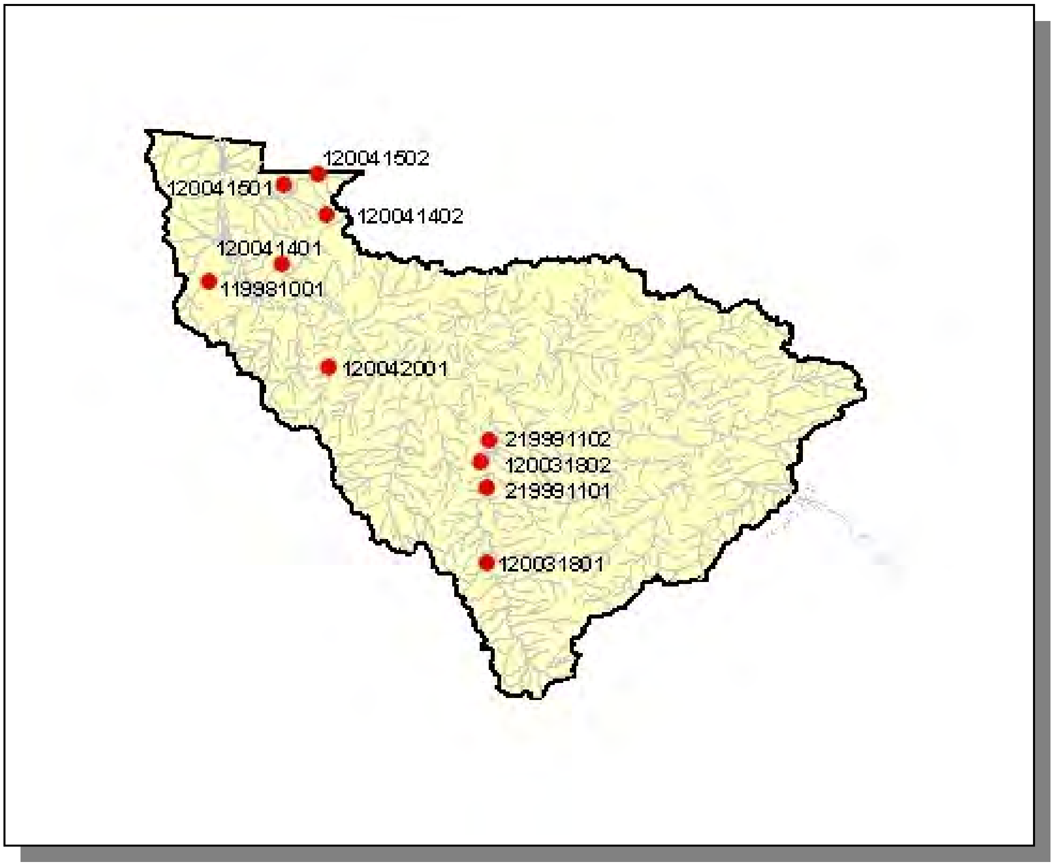


Figure 5-5. Location of TWRA TADS Sampling Sites in the Tennessee Portion of the Lake Barkley Watershed from 1987-2005. *More information is provided in Appendix V.*

Tennessee State Wildlife Action Plan (SWAP)

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

Priority problems affecting species and needed conservation actions are detailed across each region of the state. For complete information about the Tennessee SWAP, please visit: http://www.state.tn.us/twra/cwcs/cwcsindex.html to read or download the full report.

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

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

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

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

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

Benefits to the people of Kentucky include:

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

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

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

Watershed Framework activities in the Lake Barkley Watershed are coordinated thru 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 Janet Miller, Four Rivers Basin Coordinator at (270)270-933-1317 or via email at janet.miller@jpf.org. The web address is http://www.watersheds.ky.gov/basins/four_rivers/

Lake Barkley

Saline Creek (05130205160)
Donaldson Creek (05130205170)
Little River (05130205200)
South Fork of the Little River (05130205180)
North Fork of the Little River (05130205190)
Sinking Fork (05130205210)
Muddy Fork of the Little River (05130205220)
Eddy Creek (05130205230)
Cumberland River, at Lake Barkley (05130205140)

Geography

This watershed encompasses Kentucky streams upstream of Barkley Dam. On the far eastern edge of the watershed the terrain is rugged with steep slopes rising 75-300 feet to ridge and knob formations. This terrain 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. There are very few karst features in this transition area.

The terrain begins to change downstream of Highway 68/80. At this point the terrain is characteristic of the Western Pennyrile region with narrow stream valleys rising gradually to ridges and rolling hills. Elevations generally vary less than 100 feet between valleys and ridge tops. The region is underlain by Mississippian limestone rock resulting in widespread karst topography.

Moving further west the terrain is typical of the transitional region between the Pennyroyal and Jackson Purchase known as “the breaks”. The landscape is rugged with valleys rising quickly to narrow ridges. Elevations vary 75-250 feet between valleys and ridge tops. Valleys are narrow on tributaries and wider along main stems. There is less karst topography in this part of the watershed. On the far western side of Lake Barkley the watershed is comprised of The Land Between the Lakes National Recreation Area. The Tennessee Valley Divide runs north to south down the middle of the Land Between the Lakes and forms the watershed boundary between the Lake Barkley and Kentucky Lake.

Waterways

The watershed contains 987 square miles and 1928 miles of streams. There are 53 KPDES permits including wastewater treatment facilities at Cadiz, Princeton, Eddyville and two facilities at Hopkinsville.

Land cover/land use

The eastern portion of the watershed is dominated by agriculture production of row crops, swine and dairy. The exception being the rugged escarpment area, which is mostly forested ridges and knobs. Near Lake Barkley, land is also rugged and is mostly deciduous forest. Lake Barkley State Resort Park is located in this part of the watershed. Around the city of Cadiz, Grand River, Kuttawa, Princeton and Hopkinsville land is used for residential, commercial and industrial purposes. A portion of the watershed is part of the Fort Campbell Military Reservation. Interstate 24 crosses the watershed but the corridor is not heavily developed. On the west side of Lake Barkley the watershed is part of the Land Between the Lakes National Recreation Area and is covered with deciduous forest.

Agency Data Assessment

Numerous stream segments were analyzed for the 2000 water quality assessment. These segments are highlighted in the table below showing the stream mile points as well as the Use Support Designations: Full Support (FS), Partial Support (PS), and Not Supporting (NS).

STREAM	MILES	Aquatic Life	Primary Contact Recreation	Fish Consumption
Donaldson Creek	6.0 - 9.6	FS		
Donaldson Creek	9.6 - 14.2	PS		
Little River	20.4 - 23.6	NS		
Little River	23.6 - 33.1	PS	FS	PS
Little River	33.1 - 34.4	NS	PS	
Little River	34.4 - 48.4		PS	
Little River	48.4 - 53.8	NS		
Little River	53.8 - 61.0	PS	NS	
Casey Creek	0.0 - 3.6	PS	FS	
S. Fork of Little River	0.0 - 10.5	NS	NS	
S. Fork of Little River	10.5 - 19.9	PS	NS	
S. Fork of Little River	20.9 - 25.4	NS		
Skinner Creek	0.0 - 5.8	NS		
N. Fork of Little River	0.0 - 0.3	NS	PS	
N. Fork of Little River	0.3 - 6.9	PS		
N. Fork of Little River	6.9 - 18.6	NS		
Upper Branch of N. Fork of Little River	0.0 - 2.7	PS		
Lower Branch of N. Fork of Little River	3.7 - 9.2	PS		
Sinking Fork	2.2 - 5.6	PS	FS	
Sinking Fork	13.6 - 16.6	NS		
Sinking Fork	24.2 - 30.5	FS		
Kenady Creek	0.0 - 3.9	PS		
Sugar Creek	1.0 -1.4	NS		
Long Pond Branch	2.7 - 3.1	NS		
Eddy Creek	11.9 - 14.1		NS	
Eddy Creek	14.1 - 16.9	FS		
Eddy Creek	16.9 - 19.7	PS		
Dry Creek	4.9 - 7.4	NS		
Dry Creek	0.0 - 3.5	PS		
Crooked Creek	4.0 - 9.4	FS		
Fulton Creek	2.6 - 6.0	FS		
Hammond Creek	2.0 - 2.2	PS		
Long Creek	1.3 - 3.4	FS		

Watershed Efforts in the Tennessee Portion of the Lake Barkley Watershed

Currently U.S. EPA is in the process of developing pathogen TMDLs for nine segments in the Little River watershed (05130205200).

Since 1999, Four Rivers Watershed Watch has been monitoring approximately 17 sites in the Tennessee Portion of the Lake Barkley Watershed. Three times per year, water samples are collected at sites on Lake Barkley, Little River, and Muddy Fork. Physical measurements, such as temperature, pH, dissolved oxygen, and Secchi depth (lake samples only) are collected. Stream measurements also include macro-invertebrate and habitat assessments. Water samples are routinely tested for *E.coli*, fecal coliform, selected pesticides, and nutrients.

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. 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.

For more information on the Five Rivers RC&D Council and its programs, contact Chandra B. 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 LAKE BARKLEY 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 Lake Barkley Watershed as well as specific NPDES permittee information.

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 Lake Barkley Watershed public meeting was held on December 5, 2000, at the Houston County Board of Education Building in Erin. The goals of the meeting were to: (1) present, and review the objectives of the Watershed Approach, (2) introduce local, state, and federal agency and nongovernmental organization partners, (3) review water quality monitoring strategies, and (4) solicit input from the public.

Major Concerns/Comments Voiced at Public Meeting

- How does WPC assess lakes?
- Is the COE proceeding with plans to charge public water supplies for water withdrawal from their reservoirs (collect a storage fee)?

6.2.B. Year 3 Public Meeting. The second Lake Barkley Watershed public meeting was held on October 10, 2002, at the Stewart County Public Library in Dover. The goals of the meeting were to: (1) provide an overview of the watershed approach, (2) review the monitoring strategy, (3) summarize the most recent water quality assessment, (4) discuss the TMDL schedule and citizens' role in commenting on draft TMDLs, and (5) discuss BMPs and other nonpoint source tools available through the Tennessee Department of Agriculture 319 Program and NRCS conservation assistance programs.

Major Concerns/Comments Voiced at Public Meeting

- Tobacco farms draw water for irrigation and return water has pesticides and fertilizers entering rivers and lakes.

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

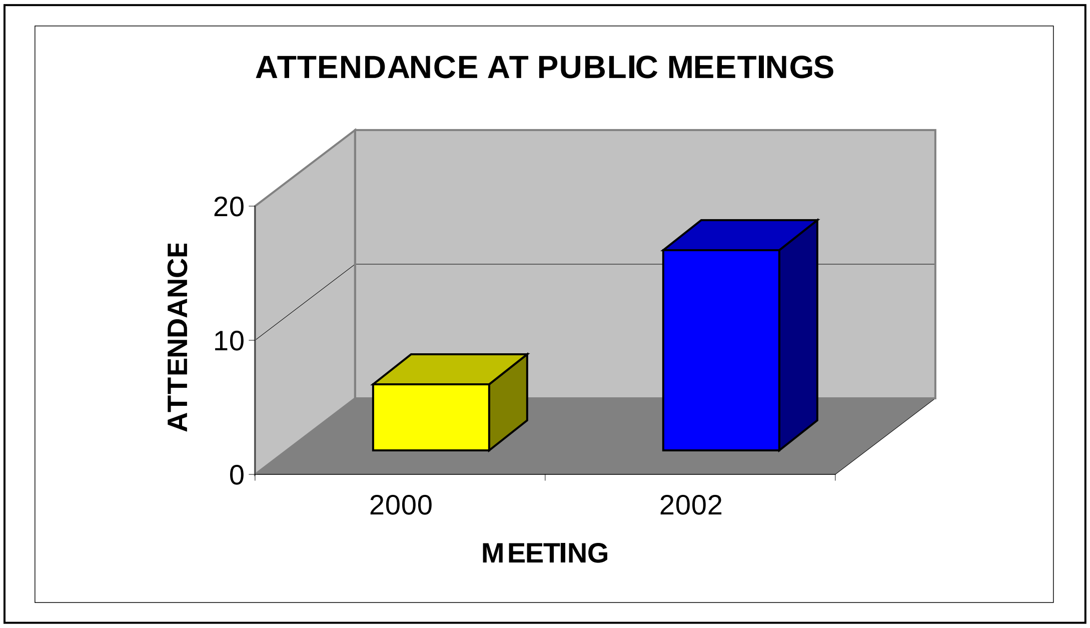


Figure 6-1. Attendance at the Lake Barkley Watershed Public Meetings. *Attendance numbers do not include TDEC personnel.*

6.3. APPROACHES USED.

6.3.A. Point Sources. Point source contributions to stream impairment are primarily addressed by NPDES and ARAP permit requirements and compliance with the terms of the permits. Notices of NPDES and ARAP draft permits available for public comment can be viewed at http://www.state.tn.us/environment/wpc/wpcppo/. Discharge monitoring data submitted by NPDES-permitted facilities may be viewed at http://www.epa.gov/enviro/html/pcs/pcs_query_java.html.

The purpose of the TMDL program is to identify remaining sources of pollution and allocate pollution control needs in places where water quality goals are still not being achieved. TMDL studies are tools that allow for a better understanding of load reductions necessary for impaired streams to return to compliance with water quality standards. More information about Tennessee's TMDL program may be found at:
http://www.state.tn.us/environment/wpc/tmdl/.

Approved TMDL:

Lake Barkley - Total Maximum Daily Load for E. Coli in the Barkley Reservoir Watershed in Cheatham, Dickson, Houston, Humphreys, Montgomery, Robertson and Stewart Counties. Approved 12/26/2007.
http://state.tn.us/environment/wpc/tmdl/approvedtmdl/BarkleyEcoli.pdf

TMDLs are prioritized for development based on many factors.

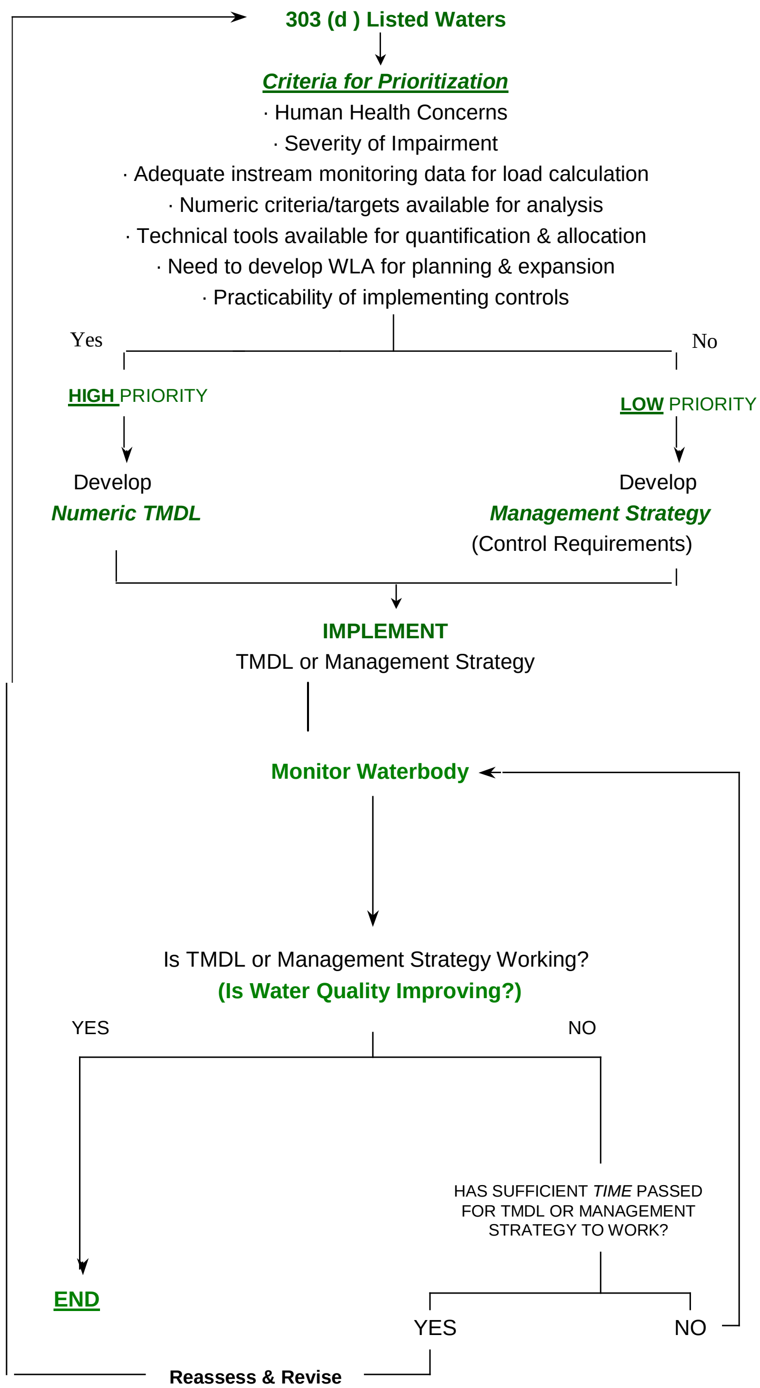


Figure 6-2. Prioritization Scheme for TMDL Development.

Several permitted discharges within the Lake Barkley Watershed discharge suspended solids under the conditions of an NPDES permit and are reviewed during the watershed cycle for reissuance. Many of these facilities fall under Industrial Storm Water permit coverage. Common types of industries that may discharge solids include rock quarries, concrete plants, water treatment facilities, ore processing, and automotive washing operations.

6.3.B. Nonpoint Sources

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

There are several state and federal regulations that address contaminants impacting waters in the Lake Barkley Watershed. Many of these are limited to point sources: pollution coming from a pipe or ditch. Often, controls of point sources are not sufficient to protect waters, so other measures are necessary. Some measures include efforts by landowners and volunteer groups, and the possible implementation of new regulations. Many agencies, such as the Tennessee Department of Agriculture (TDA) and the Natural Resources Conservation Service (NRCS), offer financial assistance to landowners for corrective actions (like Best Management Practices) that may be sufficient for recovery of impacted streams. Many nonpoint problems will require an active civic involvement at the local level geared towards establishment of improved zoning guidelines, building codes, streamside buffer zones and greenways, and general landowner education.

The following text describes types of impairments, possible causes, and suggested improvement measures. Restoration efforts should not be limited to only those streams and measures suggested below.

6.3.B.i. Sedimentation.

6.3.B.i.a. From Construction Sites. Construction activities have historically been considered “nonpoint sources.” In the late 1980’s, EPA designated them as being subject to NPDES regulation if more than 5 acres were being disturbed. In the spring of 2003, that threshold became 1 acre or less than 1 acre if it’s part of a larger development. The general permit issued for such construction sites establishes conditions for maintenance of the sites to minimize pollution from storm water runoff, including requirements for installation and inspection of erosion prevention and sediment controls. Also, the general permit imposes more stringent inspection, design criteria and sediment control measures on sites in the watershed of streams that are already impaired due to siltation or are considered high quality. Regardless of the size, no construction site is allowed to cause a condition of pollution.

Beginning in 2003, the state began requiring some municipalities to obtain coverage under a permit designed to address nonpoint runoff issues: the General NPDES Municipal Separate Storm Sewer System Permit, commonly known as MS4 (see section 6.3.B.viii). Among other requirements, this permit directs the holder to develop a comprehensive storm water management program, including the adoption of local regulatory ordinances governing land disturbance near streams, and regular inspection of construction sites and other discharges into their storm sewers. 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.
Given the low population densities and rural nature of the area, most of the Lake Barkley Watershed is not covered by an active local MS4 program, with the notable exceptions of the City of Clarksville and the Ft. Campbell Military Reservation, both of which have highly urbanized areas that discharge storm water into watershed streams. In addition, the non-incorporated areas of Montgomery County are also covered under an MS4 permit.

In general, however, most of the rapid and large-scale land development in the greater Clarksville region is occurring in the Red River Watershed, and only a relatively small number of streams within the Lake Barkley watershed have been directly impacted by construction activities, including the Big McAdoo drainage and Wall Branch. There are indications however, that there will be large-scale “second-home” developments along much of the lower end of Lake Barkley in Stewart County in the coming years, which would have the potential to impact many near-pristine streams in the area.

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

Some improper agricultural practices, overzealous land development, and failure to properly manage storm water runoff have impacted the hydrology and morphology of many stream channels in the Lake Barkley watershed. Once destablized, bank erosion and stream widening can progress rapidly, and is often difficult to repair.

Unpermitted gravel dredging can also severely disturb stream banks. Destabilized banks contribute to sediment load and to the loss of beneficial riparian vegetation to the stream. The historical removal of cobble and rock from stream channels has resulted in destabilization of stream channels and aggressive erosion of stream banks. This is a serious problem in several streams in this area, including many in the Yellow Creek basin.

Several agencies such as the NRCS, USCOE, TDA, and the Tennessee Stream Mitigation Program, as well as citizen watershed groups, are working to stabilize portions of stream banks using bioengineering and other techniques. Many affected streams would 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, and stabilize banks through bioengineering techniques. Just about every stream in the watershed would benefit from this type of activity, be it landowner management, or large-scale restoration project*).*
- Establish off-channel watering areas for livestock by moving watering troughs and feeders back from stream banks, or at least limit cattle access to restricted areas with armored banks entry (East Fork Yellow Creek, Wells Creek)*.*

Regulatory Strategies

- Increase efforts in the Master Logger program to recognize impaired streams and require more effective management practices within streamside management zones. (Rural areas of Stewart and Houston Counties still have fairly active logging industries)
- Require post-construction run-off rates to be no greater than pre-construction rates in order to avoid in-channel erosion (Wall Branch, Big McAdoo).
- Limit road and utility crossings of streams through better site design (This emphasis of site design is especially crucial within municipal zoning, codes, and permit review process).
- Restrict the use of off-highway vehicles on stream banks and in stream channels. (More rural areas such as Yellow Creek, Lick Creek, and Bartons Creek watersheds).
- Limit clearing of stream and roadside ditch banks or other alterations (Watershed-wide issue, including smaller tributaries to the Cumberland River). *Note: Permits may be required for any work along streams.*
- Encourage or require strong local buffer ordinances, especially dealing with post-construction, no-disturb easements.
- Restrict rock harvesting to permitted sites.

Additional Strategies

- Better community planning and MS4 oversight for the impacts of development on small streams, especially development in the smaller towns currently without MS4 programs, such as Dover, Erin, and Cumberland City.

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 due to agricultural land uses is a problem in large areas of the Lake Barkley Watershed. Many streams, such as Yellow Creek, Brush Creek, Budds Creek, Little Bartons Creek, and Antioch Creek, could benefit from the establishment of more extensive riparian buffer zones on farmland.

6.3.B.ii. Pathogen Contamination.

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

Permits issued by the Division of Water Pollution Control regulate discharges from point sources and require adequate control for these sources. Individual homes are required to have subsurface, on-site treatment (i.e., septic tank and field lines) if public sewers are not available. The Division of Ground Water Protection within the Nashville Environmental Field Offices 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, only three streams within the Lake Barkley Watershed are known to have excessive pathogen contamination: Wall Branch, East Fork Yellow Creek, and Wells Creek. Wall Branch and Wells Creek are impacted by urban areas, with contributions of bacterial contamination coming from storm water runoff, sewage collection system leaks, or failing septic tanks. The elevated bacteria levels in East Fork Yellow Creek are most likely due to livestock waste. Many streams in the remaining agricultural watersheds also generally show elevated bacterial levels shortly after rainstorms due to the influx of contaminated storm water.

Some measures that may be necessary to control pathogens are:

Voluntary Activities

- Clean up pet waste. This has been found to be a surprisingly important source of fecal contamination in highly urbanized watersheds
- Repair failed septic systems.
- Limit livestock access to streams and restrict stream crossings (much of the Yellow Creek drainage, including the East Fork).

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.
- Require comprehensive pathogen source identification and elimination procedures to be implemented by municipal MS4 storm water programs.
- Identify Concentrated Animal Feeding Operations not currently permitted.

Additional Strategies

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

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

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

Dissolved oxygen depletion can also be due to the direct discharge of nutrients or other biodegradable materials by point sources. Limits in NPDES permits placed on parameters such as nitrates, ammonia, phosphorous, Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD), are designed to restrict the amounts of these pollutants to assimilative levels

Some sources of nutrients can be addressed by:

Voluntary Activities

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

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

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

Regulatory Strategies.

- Strengthen enforcement of regulations governing on-site wastewater treatment.
- Impose more stringent permit limits for nutrients discharged from sewage treatment plants
- Impose timely and appropriate enforcement for noncomplying sewage treatment plants, large and small, and their collection systems (Wall Branch).
- Identify Concentrated Animal Feeding Operations (CAFO) not currently permitted, or 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 (Big McAdoo Creek).
- 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 in small quantities 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 Lake Barkley Watershed, very few streams are damaged by toxins in storm water runoff from industrial facilities or urban areas. More stringent inspection and regulation of permitted industrial facilities, and local storm water quality initiatives and regulations, could help reduce the amount of contaminated runoff reaching state waters.

Individuals may also cause contaminants to enter streams by activities that may be attributed to apathy or the lack of knowledge or civility. Litter in roadside ditches, garbage bags tossed over bridge railings, paint brushes washed off over storm drains, and oil drained into ditches are all blatant examples of pollution in streams. Misapplication of chemicals, on agricultural and suburban areas, is another source of toxins.

Some of these problems can be addressed by:

Voluntary Activities

- Provide public education.
- Paint warnings on storm drains that connect to a stream.
- Sponsor community clean-up days.
- Landscape public areas.
- Encourage public surveillance of their streams and reporting of dumping activities to their local authorities.
- Encourage local municipalities to provide more convenient public disposal sites, especially for hazardous wastes.

Regulatory Strategies

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

6.3.B.v. Habitat Alteration.

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

Many streams within the Lake Barkley Watershed suffer from some degree of habitat alteration, especially riparian loss and bank disturbances from agricultural practices. As described in earlier sections, besides the direct loss of habitat, these types of disturbances also affect sediment and nutrient loadings, water temperatures, oxygen levels, storm water filtration, and nuisance algae growths.

Illicit gravel dredging is a particularly widespread and serious problem in the Lake Barkley Watershed due to the abundance of gravel substrate in streams in this area and their relative remoteness. "Wildcat" dredgers can do a devastating amount of damage to a localized area, then pack up and leave within a short period of time, making enforcement difficult. Streams affected by chronically recurring dredging operations include Yellow Creek and Half Pone Creek.

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

Voluntary Activities

- 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 historically altered streams to stabilize banks and provide habitat (Budds Creek, Antioch Creek, among many others).
- Encourage developers to use better site design and avoid extensive use of culverts or channel relocations 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.viii. Local Storm Water Management.

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/.

Within the Lake Barkley Watershed, the only areas currently covered by active MS4 Phase II programs are the City of Clarksville, Montgomery County, and Ft. Campbell. They are all three still somewhat in the formative process, and are just reaching the end of their first 5-year permit cycle. All have ongoing initiatives to address storm water runoff quantity and quality, in varying degrees of implementation.

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 are encouraged to develop and implement appropriate monitoring programs by the designated date.

Some storm sewer discharges are not regulated through the NPDES MS4 program. Strategies to address runoff in these urban areas include adapting Tennessee Growth Readiness Program (TGRP) educational materials to the watershed. TGRP is a statewide program built on existing best management practices from the Nonpoint Education for Municipal Officials program and the Center for Watershed Protection. TGRP developed the program to provide communities and counties with tools to design economically viable and watershed friendly developments. The program assists community leaders in reviewing current land use practices, determining impacts of imperviousness on watershed functions, and allowing them to understand the economics of good watershed management and site design.

6.4. PERMIT REISSUANCE PLANNING

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

The following three sections provide specific information on municipal, industrial, and water treatment plant active permit holders in the Tennessee Portion of the Lake Barkley Watershed. Compliance information was obtained from EPA's Permit Compliance System (PCS). All data was queried for a five-year period between January 1, 2001 and December 31, 2006. PCS can be accessed publicly through EPA's Envirofacts website. This website provides access to several EPA databases to provide the public with information about environmental activities that may affect air, water, and land anywhere in the United States:

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

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

6.4.A. Municipal Permits

TN0064882 Erin STP

Discharger rating: Minor
City: Erin
County: Houston
EFO Name: Memphis
Issuance Date: 3/01/05
Expiration Date: 5/31/10
Receiving Stream(s): Cumberland River at mile 103.7
HUC-12: 051302050401
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: WAS to aerobic dig to dry bed to landfill

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD % removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
BOD % removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
BOD5	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
BOD5	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
BOD5	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
BOD5	All Year	40	mg/L	WAvg Conc	3/Week	Composite	Effluent
BOD5	All Year	188	lb/day	MAvg Load	3/Week	Composite	Effluent
BOD5	All Year	30	mg/L	MAvg Conc	3/Week	Composite	Effluent
BOD5	All Year	250	lb/day	WAvg Load	3/Week	Composite	Effluent
Bypass of Treatment (occurrences)	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
D.O.	All Year	1	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	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	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
Overflow Use Occurences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
Overflow Use Occurences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Non Wet Weather
Settleable Solids	All Year	1	mL/L	DMax Conc	Weekdays	Grab	Effluent
TRC	All Year	2	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent

Table 6.1a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
TSS	All Year	250	lb/day	WAvg Load	3/Week	Composite	Effluent
TSS	All Year	40	mg/L	WAvg Conc	3/Week	Composite	Effluent
TSS	All Year	188	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year	30	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6.1b.

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

Compliance History:

The following numbers of exceedences were noted in PCS:

- 5 Biological Oxygen Demand (BOD)
- 3 Total Suspended Solids (TSS)
- 14 Suspended Solids % Removal
- 2 Settleable Solids
- 1 pH
- 50 Overflows
- 54 Bypasses

Comments:

1/10/07 Pretreatment Inspection: In compliance:

- The City has no significant industrial users (SIUs) covered by the pretreatment program, since Southern Gage moved to the industrial park on February 1, 1999, and no longer has an industrial discharge to the City sewer system.
- The Town of Tennessee Ridge, which discharges into the City sewer system, has no significant industrial users.
- The City has continued to perform influent and effluent sampling at the City's wastewater treatment plant semi-annually, and has continued to submit semi-annual reports to our Pretreatment Section. The City should notify WPC's Pretreatment Section if an industry requiring an Industrial User permit should connect to the City sewer system.

7/28/05 Compliance Evaluation Inspection: NOV sent

- Severe Inflow and Infiltration (I/I), influent flow exceeds design capacity almost daily during winter and spring months, & during rain events throughout the year (one third of the year for 2003 thru 2005), aggressive sewer rehabilitation program needed.
- Influent & effluent flow meters not calibrated.
- Very inadequate operation and maintenance, treatment units & structures severely corroded, effluent sampler & pumps out of service, chlorine storage & room hazardous.
- All analysis data invalid for self-monitoring purposes due to failure to follow EPA approved sampling & analysis procedures.
- Loss of solids through effluent discharge / plant washouts during high flow events.

TN0020656 Clarksville STP

Discharger rating:	Major
City:	Clarksville
County:	Montgomery
EFO Name:	Nashville
Issuance Date:	6/1/07
Expiration Date:	4/30/10
Receiving Stream(s):	Barkley Reservoir at Cumberland River at miles 125.0, 125.4, and 126.2.
HUC-12:	051302050105
Effluent Summary:	Treated municipal and partially treated combined wastewater from Outfall 001, treated and limited untreated combined wastewater from Oufalls 002 (Gallows Hollow) and 006 (McClure Street combined sewer vortex separators).
Treatment system:	Activated sludge preceded by rotary screening, grit removal and primary clarification and followed by clarification and ultraviolet disinfection.

SEGMENT	TN05130205015_1000
Name	Barkley Reservoir
Size	37000
Unit	Acres
First Year on 303(d) List	-
Designated Uses	Fish and Aquatic Life (Supporting), Livestock Watering and Wildlife (Supporting), Recreation (Supporting), Industrial Water Supply (Supporting), Domestic Water Supply (Supporting), Irrigation (Supporting)
Causes	N/A
Sources	N/A

Table 6-2. Stream Segment Information for Clarksville STP.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	All Year	10	mg/L	DMax Conc	Weekly	Grab	Effluent
Ammonia as N (Total)	All Year	5	mg/L	MAvg Conc	Weekly	Grab	Effluent
CBOD5	All Year	40	mg/L	DMax Conc	Weekly	Grab	Effluent
CBOD5	All Year	30	mg/L	MAvg Conc	Weekly	Grab	Effluent
D.O.	All Year	6	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	941	#/100mL	MAvg Ari Mean	Weekly	Grab	Effluent
E. coli	All Year	123	#/100mL	MAvg Geo Mean	Weekly	Grab	Effluent
Flow	All Year		MGD	DMax Load	Weekdays	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Weekdays	Continuous	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	Weekdays	Grab	Effluent
TRC	All Year	0.5	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	Weekly	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	Weekly	Grab	Effluent
pH	All Year	8.5	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-3. Permit Limits for Clarksville STP.

Compliance History:

The following numbers of exceedences were noted in PCS:

- 21 Fecal coliform
- 19 Total Suspended Solids (TSS)
- 8 Biological Oxygen Demand (BOD)
- 16 Settleable Solids
- 848 Overflows

Enforcement:

Commissioners Order #04-0356: The NPDES permit violations that resulted in this enforcement action include overflows, failure to report, bod, solids and fecal coliform limit violations. This enforcement action was initiated in consultation with EPA. It was initially drafted as director's order 03-067D. It was decided that it would be negotiated as a Consent Order; however, Clarksville did not consent to the terms and therefore was issued as a commissioner's order.

Comments:
12/6/06 Pretreatment Compliance Inspection: In compliance:

The City currently has a total of seven industries under industrial user (IU) permit. Two of these facilities are classified as categorical industrial users.

When the IU permits are reissued the requirements on the non-transferability clause of the permit should be modified. The IU permit should state that the buyer must receive a copy of the permit

Modifications to the pretreatment program, both required and otherwise, are ongoing. Mr. Gray expects to submit all program modifications for review and approval by June 07.

The pretreatment files were found in satisfactory condition. No deficiencies were observed, and the Pretreatment Coordinator reported no problems in implementing the program.

5/9/06 Compliance Sampling Inspection: Both the State and facility laboratory determined all the sampled parameters were in compliance with permit.

TN0024651 Woodlawn School

Discharger rating: Minor
City: Woodlawn
County: Montgomery
EFO Name: Nashville
Issuance Date: 6/1/07
Expiration Date: 4/29/10
Receiving Stream(s): Unnamed tributary at mile 1.8 to Bartee Branch at mile 3.1
HUC-12: 051302050107
Effluent Summary: Treated domestic wastewater from Outfall 001
Treatment system: Septic tank, recirculating sand filter and ultraviolet disinfection

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	Summer	1.8	mg/L	DMax Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	Summer	1.2	mg/L	MAvg Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	Winter	3.2	mg/L	DMax Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	Winter	2.1	mg/L	MAvg Conc	2/Month	Grab	Effluent
CBOD5	All Year	35	mg/L	DMax Conc	2/Month	Grab	Effluent
CBOD5	All Year	25	mg/L	MAvg Conc	2/Month	Grab	Effluent
D.O.	All Year	6	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	941	#/100mL	MAvg Ari Mean	2/Month	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	2/Month	Grab	Effluent
Flow	All Year		MGD	DMax Load	Weekdays	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Weekdays	Instantaneous	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Week	Grab	Effluent
TRC	All Year	0.02	mg/L	DMax 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 6-4. Permit Limits for Woodlawn School.

Comments:
None

TN0024643 Montgomery Central High School

Discharger rating:	Minor
City:	Cunningham
County:	Montgomery
EFO Name:	Nashville
Issuance Date:	6/1/07
Expiration Date:	4/29/10
Receiving Stream(s):	Unnamed tributary at mile 1.2 to Sulphur Spring Branch at mile 2.9
HUC-12:	051302050103
Effluent Summary:	Treated domestic wastewater from Outfall 001
Treatment system:	Extended Aeration

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	Summer	4	mg/L	DMax Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	Summer	2	mg/L	MAvg Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	Winter	10	mg/L	DMax Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	Winter	5	mg/L	MAvg Conc	2/Month	Grab	Effluent
CBOD5	All Year	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	6	mg/L	DMin Conc	Weekdays	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 6-5. Permit Limits for Montgomery Central High School.

Comments:
Last Inspection – CEI December 7, 2006, NOV sent

- New treatment plant put in service April 2006, design capacity increased from 45,000 GPD to 100,000 GPD, need permit changes to reflect new design capacity.
- Elementary school & middle school now connected to High School STP.
- Serious Inflow and Infiltration (I/I) due to old clay sewer lines & inflow into manholes, storm drains & gutters may also be connected to sewer.
- Occasional effluent violations minimum pH, monthly average ammonia, daily maximum and monthly average suspended solids, and a number of violations of minimum dissolved oxygen limits since the new treatment plant came on line, these may be due to excessive sludge age.

TN0055387 Ramblewood Apartment II, LLC

Discharger rating: Minor
City: Clarksville
County: Montgomery
EFO Name: Nashville
Issuance Date: 1/1/06
Expiration Date: 11/30/10
Receiving Stream(s): Unnamed tributary at mile 0.5 to the Cumberland River at mile 130.2
HUC-12: 051302050103
Effluent Summary: Treated domestic wastewater from Outfall 001
Treatment system: Extended aeration

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD5	All Year	45	mg/L	DMax Conc	2/Month	Grab	Effluent
BOD5	All Year	30	mg/L	MAvg Conc	2/Month	Grab	Effluent
D.O.	All Year	5	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	941	#/100mL	DMax Conc	2/Month	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Conc	2/Month	Grab	Effluent
Flow	All Year		MGD	MAvg Load	Weekdays	Instantaneous	Effluent
Flow	All Year		MGD	DMax 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	Weekdays	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-6. Permit Limits for Ramblewood Apartment II, LLC.

Comments:
None

TN0056081 Chad Youth Enhancement Center

Discharger rating: Minor
City: Clarksville
County: Montgomery
EFO Name: Nashville
Issuance Date: 9/1/05
Expiration Date: 9/30/10
Receiving Stream(s): Wet weather conveyance at mile 0.3 to an unnamed tributary at mile 0.4 to Half Pone Creek at mile 7.7
HUC-12: 051302050103
Effluent Summary: Treated municipal and partially treated combined wastewater from Outfall 001, treated and limited untreated combined wastewater from Oufalls 002 (Gallows Hollow) and 006 (McClure Street combined sewer vortex separators).
Treatment system: Extended aeration

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	30	mg/L	DMax Conc	2/Month	Grab	Effluent
CBOD5	All Year	20	mg/L	MAvg Conc	2/Month	Grab	Effluent
D.O.	All Year	6	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	941	#/100mL	DMax Conc	2/Month	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	2/Month	Grab	Effluent
Flow	All Year		MGD	DMax Load	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 6-7. Permit Limits for Chad Youth Enhancement Center

Comments

Facility has 6 buildings serving 90 children. The children stay onsite 24 hours per day. System believed to have been installed by the County in the 1960s time frame. Now owned by a private group.

TN0064181 Palmyra Health Care Center

Discharger rating:	Minor
City:	Palmyra
County:	Montgomery
EFO Name:	Nashville
Issuance Date:	1/1/06
Expiration Date:	11/30/10
Receiving Stream(s):	Cumberland River at mile 114.7
HUC-12:	051302050105
Effluent Summary:	Treated domestic wastewater from Outfall 001
Treatment system:	Septic tank followed by Bio-reel system

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD5	All Year	45	mg/L	DMax Conc	Monthly	Grab	Effluent
BOD5	All Year	30	mg/L	MAvg Conc	Monthly	Grab	Effluent
D.O.	All Year	1	mg/L	DMin Conc	2/Week	Grab	Effluent
E. coli	All Year	487	#/100mL	DMax Conc	Monthly	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	Monthly	Grab	Effluent
Flow	All Year		MGD	MAvg Load	2/Week	Instantaneous	Effluent
Flow	All Year		MGD	DMax Load	2/Week	Instantaneous	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Week	Grab	Effluent
TRC	All Year	2	mg/L	DMax Conc	2/Week	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6	SU	DMin Conc	2/Week	Grab	Effluent

Table 6-8. Permit Limits for Palmyra Health Care Center.

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

Enforcement:
Operation & maintence problems, self-monitoring and record keeping deficiencies, BOD, TSS & E. coli violations.
NOV date 9/19/06.
Enforcement request date 9/19/06.

Comments
6/27/07 Compliance Evaluation Inspection:
Continued violations of permit limits, serious deficiencies in self-monitoring program records, contract certified operator is still signing reports as principal executive officer. Plant is old and severely corroded, one bioreel still doesn't work, serious O & M and operational problems. Enforcement request previously submitted September 2006, will provide updated inspection information to Enforcement Section so it can be added to the Order. Will issue 2nd NOV.

6/16/06, Compliance Evaluation Inspection & effluent sampling NOV sent, enforcement action requested

- Aging, severely corroded treatment plant, structural failure of treatment units due to corrosion, inadequate O & M, can't meet effluent limits
- Self-monitoring analysis data questionable or invalid
- Effluent violations for daily maximum & monthly average BOD, daily maximum & monthly average total suspended solids, daily maximum e. coli
- Replacement of treatment system is needed

TN0022667 Dover STP

Discharger rating: Minor
City: Dover
County: Stewart
EFO Name: Nashville
Issuance Date: 6/1/07
Expiration Date: 1/30/10
Receiving Stream(s): Barkley Reservoir at Cumberland River mile 88.6
HUC-12: 051302050405
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: Aerobic digester to land application

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD % removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
BOD % removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
BOD5	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
BOD5	All Year	66	lb/day	WAvg Load	3/Week	Composite	Effluent
BOD5	All Year	40	mg/L	WAvg Conc	3/Week	Composite	Effluent
BOD5	All Year	50	lb/day	MAvg Load	3/Week	Composite	Effluent
BOD5	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
BOD5	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
BOD5	All Year	30	mg/L	MAvg Conc	3/Week	Composite	Effluent
Bypass of Treatment (occurrences)	All Year		Occurrences/Month	MAvg Load	Continuous	Visual	Wet Weather
D.O.	All Year	1	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	487	#/100mL	DMax Conc	3/Week	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Influent (Raw Sewage)
Overflow Use Occurences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
Overflow Use Occurences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Non Wet Weather
Settleable Solids	All Year	1	mL/L	DMax Conc	Weekdays	Grab	Effluent
TRC	All Year	2	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year	66	lb/day	WAvg Load	3/Week	Composite	Effluent
TSS	All Year	40	mg/L	WAvg Conc	3/Week	Composite	Effluent
TSS	All Year	30	mg/L	MAvg Conc	3/Week	Composite	Effluent

Table 6-9.

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	All Year	50	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	9	SU	DMax Conc	Weekdays	Grab	Effluent
PH	All Year	6	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-10. Permit Limits for Dover STP.

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

- 4 Settleable Solids
- 3 Biological Oxygen Demand (BOD)
- 2 Escherichia coli
- 3 Total Suspended Solids (TSS)
- 1 pH
- 1 Suspended Solids % Removal

Enforcement:
9/12/05 - NOV for incomplete permit application.
7/24/06 **-** NOV for sampling, self-monitoring, & recordkeeping deficiencies.

Comments:
Last inspection – PAI / CEI June 1, 2006, NOV sent

- Plans underway to build new SBR treatment plant on same site to replace current STP
- Severe I/I, influent flow exceeds design capacity on a regular basis during rain events & wet weather, aggressive sewer rehabilitation program needed
- Loss of solids through effluent discharge / plant washouts during high flow events
- DO, pH, E-coli & BOD analysis data invalid for self-monitoring purposes due to failure to follow EPA approved sampling & analysis procedures.

08/25/06 - WPC received plans for construction of whole new 0.6 MGD sequencing batch reactor plant (two units) WWTP. Permit modification will be required.

TN0020273 USDA Forest Service, Brandon Springs Camp

Discharger rating: Minor
City: Brandon Springs
County: Stewart
EFO Name: Nashville
Issuance Date: 2/1/06
Expiration Date: 12/29/10
Receiving Stream(s): Barkley Reservoir (Cumberland River) at mile 82.6
HUC-12: 051302050406
Effluent Summary: Treated domestic wastewater from Outfall 001
Treatment system: Activated sludge

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD5	All Year	45	mg/L	DMax Conc	2/Month	Grab	Effluent
BOD5	All Year	30	mg/L	MAvg Conc	2/Month	Grab	Effluent
D.O.	All Year	1	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	487	#/100mL	DMax Conc	2/Month	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	2/Month	Grab	Effluent
Flow	All Year		MGD	MAvg Load	Weekdays	Instantaneous	Effluent
Flow	All Year		MGD	DMax Load	Weekdays	Instantaneous	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Month	Grab	Effluent
TRC	All Year	2	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	2/Month	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	2/Month	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6	SU	DMin Conc	2/Week	Grab	Effluent

Table 6-11. Permit Limits for USDA Forest Service, Brandon Springs Camp.

Comments:
12/06/06: Compliance Evaluation Inspection:

1. The treatment plant appeared to be operating properly and well maintained. A surge basin at the head of the plant helps to moderate the peak influent flows. The comminutor was working properly. Airflow to the aeration basin was controlled by timer and was working properly, with good air distribution. No problems were observed with the clarifier. Chlorine bleach fed by a flow-proportional metering pump is used for disinfection. Effluent flow is measured by a 90-degree V-notch weir and ultrasonic water level sensor. Waste sludge is removed periodically and taken to a sludge holding lagoon in Kentucky for permanent storage. The treatment plant site perimeter has a wire mesh fence and locked gate for security.

2. WPC staff understands that the Forest Service is considering purchasing a portable generator with the capacity to operate this treatment plant in the event of a power outage. As this plant does not have a standby generator, and has only one source of power to it, a portable generator would be a desirable addition.

3. The clay pipe wastewater collection lines have been subject to high levels of infiltration during wet weather in the past. WPC staff understands that some of these collection lines and a manhole cover were replaced about two years ago. WPC staff understands that the collection line from the kitchen facilities has a grease trap, which is monitored and maintained. These are commendable measures, which help maintain treatment plant performance.

4. The outfall pipe location at Gatlin Point was posted with an identification sign as required by the permit. The lake showed no visible evidence of adverse impact from the treated effluent discharge.

5. Review of the Monthly Operation Reports (MOR/DMRs) received since January 2003 reported no violations of the effluent limits despite flows ranging from a reported low of 200 gallons per day to a reported high of 17,900 gallons per day. The operator explained that the population using the group camp facilities varies widely, hence the wide range of influent flow. The treatment plant performance is excellent and is commended.

TN0025119 Cumberland City Lagoon

Discharger rating: Minor
City: Cumberland City
County: Stewart
EFO Name: Nashville
Issuance Date: 5/31/05
Expiration Date: 5/31/10
Receiving Stream(s): Cumberland River at mile 104.5
HUC-12: 051302050401
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: Lagoon

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD % removal	All Year	65	Percent	MAvg % Removal	Weekly	Calculated	% Removal
BOD5	All Year	45	mg/L	DMax Conc	Weekly	Grab	Effluent
BOD5	All Year	32	mg/L	DMax Load	Weekly	Grab	Effluent
BOD5	All Year	30	mg/L	MAvg Conc	Weekly	Grab	Effluent
BOD5	All Year	40	mg/L	WAvg Conc	Weekly	Grab	Effluent
BOD5	All Year	28	lb/day	WAvg Load	Weekly	Grab	Effluent
BOD5	All Year	21	lb/day	MAvg Load	Weekly	Grab	Effluent
D.O.	All Year	1	mg/L	DMin Conc	Weekdays	Grab	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	2	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	Weekly	Grab	Effluent
TSS	All Year	28	lb/day	WAvg Load	Weekly	Grab	Effluent
TSS	All Year	31	mg/L	DMax Load	Weekly	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	Weekly	Grab	Effluent
TSS	All Year	21	lb/day	MAvg Load	Weekly	Grab	Effluent
TSS	All Year	40	mg/L	WAvg Conc	Weekly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6	SU	DMin Conc	2/Week	Grab	Effluent

Table 6-12. Permit Limits for Cumberland City Lagoon.

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

- 5 Escherichia coli
- 2 Biological Oxygen Demand (BOD)
- 1 Total Chlorine

Comments

11/22/06 Compliance Evaluation Inspection: In compliance:

1. The wastewater treatment plant consists of a headworks structure with a comminutor, an aerated lagoon, an unaerated lagoon, and a chlorine contact tank with a 22.5 degree V-notch weir with water level monitored by an ultrasonic device. The effluent flow meter had been checked within the past 12 months by Wade Instrument Service. Both the aerated lagoon and the unaerated lagoon are about eight feet deep. The water surface of the unaerated lagoon was covered with duckweed. However, a baffle on the outlet pipe prevented the duckweed from flowing into the chlorine contact chamber. The plant appeared to be operating properly and was well maintained. The plant site has a perimeter security fence with warning signs.

2. Disinfection is by liquid chlorine bleach; the solution pump is paced by the effluent flow meter to achieve flow proportional control.

3. The outfall pipe was posted with an identification sign as required by the permit. The treated effluent was causing no visible adverse impact on the receiving stream (Cumberland River).

4. All required records were being kept and retained. Review of the Monthly Operation Reports (MORs) indicated very good compliance with the permit effluent limits.

5. All three pump stations in the collection system were visited. None have overflow pipes. There was no evidence of overflows. All appeared to be operating properly and well maintained. All are inspected daily and log books kept of these inspections. These are factory built buried dry well/wet well type. The dry well of one of these pump stations was said to be about 30 feet deep. I understand that the City intends to apply for a grant to replace all of these pump stations with a modern type which will have the pumping equipment at ground level, thereby minimizing the safety concerns associated with descending into confined spaces as the present pump stations require for maintenance or repair.

6. WPC staff understands that Mr. Phillip Baggett of Erin currently is the Acting Certified Operator for the wastewater treatment plant and for the collection system, until Mr. Cook obtains these certifications.

6.4.B. Industrial Permits

TN0068144 Cheatham Hydro Power Plant

Discharger rating: Minor
City: Charlotte
County: Dickson
EFO Name: Nashville
Issuance Date: 9/30/05
Expiration Date: 9/29/10
Receiving Stream(s): Cumberland River
HUC-12: 051302050105
Effluent Summary: Noncontact cooling waters, station sump wastewater (which includes waters such as cooling water; river water that has leaked into the plant at various points; river water from unwatering of penstock, scroll case, and draft tube; air compressor blowdown and other condensate; and floor washwater); river water from unwatering operations; river water that has leaked into the plant; backwash of strainers; test waters from fire protection system; spent waters from certain activities outdoors, including pressure washing of painted surfaces, slot cutting the dam and washing equipment from outfalls 001 - 006.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Intake
Flow	All Year		MGD	DMax Load	Annually	Estimate	Effluent
Settleable Solids	All Year		mg/L	MAvg Conc	1/Batch	Grab	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	1/Batch	Grab	Effluent

Table 6-13. Permit Limits for Cheatham Hydro Power Plant.

Comments:
Generation of electric power

TN0029157 Zinifex Clarksville, Inc.

Discharger rating:	Major
City:	Clarksville
County:	Montgomery
EFO Name:	Nashville
Issuance Date:	6/1/07
Expiration Date:	11/30/10
Receiving Stream(s):	Cumberland River at mile 122 (Outfall 001), unnamed tributary to Cumberland River at mile 122.6 (Outfall 002), unnamed tributary to the Cumberland River at mile 121.1 (Outfalls SW3 & SW5) and unnamed tributary to the Cumberland River at mile 122.6 (Outfalls SW4 & SW6)
HUC-12:	051302050105
Effluent Summary:	Process water, sanitary wastewater and cooling water through Outfall 001, demineralized regeneration water, water plant overflow and filter backwash through Outfall 002, storm water runoff and cooling water through Outfalls SW3 and SW4 and storm water runoff though Outfalls SW5 and SW6

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
As (T)	All Year	29.8	lb/day	DMax Load	Semi-annually	Composite	Effluent
As (T)	All Year	13.77	lb/day	MAvg Load	Semi-annually	Composite	Effluent
Cd (T)	All Year	4.4	lb/day	DMax Load	2/Month	Composite	Effluent
Cd (T)	All Year	1.76	lb/day	MAvg Load	2/Month	Composite	Effluent
Cu (T)	All Year	29.52	lb/day	DMax Load	Quarterly	Composite	Effluent
Cu (T)	All Year	14.1	lb/day	MAvg Load	Quarterly	Composite	Effluent
Flow	All Year		MGD	DMax Load	Continuous	Recorder	Effluent
Flow	All Year		MGD	MAvg Load	Continuous	Recorder	Effluent
Pb (T)	All Year	6.28	lb/day	DMax Load	Quarterly	Composite	Effluent
Pb (T)	All Year	2.93	lb/day	MAvg Load	Quarterly	Composite	Effluent
Se (T)	All Year	85.34	lb/day	DMax Load	Semi-annually	Composite	Effluent
Se (T)	All Year	11.02	lb/day	MAvg Load	Semi-annually	Composite	Effluent
TSS	All Year	3723	lb/day	DMax Load	Bi-monthly	Composite	Effluent
TSS	All Year	1876	lb/day	MAvg Load	Bi-monthly	Composite	Effluent
Zn (T)	All Year	25.3	lb/day	DMax Load	Weekly	Composite	Effluent
Zn (T)	All Year	10.68	lb/day	MAvg Load	Weekly	Composite	Effluent
pH	All Year	9	SU	DMax Conc	Weekly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekly	Grab	Effluent

Table 6-14. Permit Limits for Zinifex Clarksville, Inc.

Comments:

Production of zinc metal from the beneficiation of zinc concentrate ore by hydrometallurgical process; production of co-product cadmium metal, sulfuric acid and metallurgically valuable by-products.

12/8/06 Compliance Evaluation Inspection: In compliance:

No operational problems were observed during the inspection. The records and reports were organized and well maintained. In the pH calibration log, all entries contained the date, analyst, and result for each record. The time was missing for some of the entries. The permit requirement to record the date, time, analyst, and result for each record is applicable to this record.

TN0005789 TVA - Cumberland Fossil Plant

Discharger rating: Major
City: Cumberland City
County: Stewart
EFO Name: Nashville
Issuance Date: 1/1/06
Expiration Date: 5/31/10
Receiving Stream(s): Cumberland River at mile 103
HUC-12: 051302050403
Effluent Summary: Ash transport water, treated chemical and nonchemical metal cleaning wastewaters, coal pile runoff, low volume wastes, and storm water runoff through Outfall 001, once through condenser cooling water, miscellaneous equipment cooling and lubricating water, and storm water through Outfall 002, intake screen backwash water through Outfall 004, and chemical and nonchemical metal cleaning wastewaters through Outfall 007
Treatment system: Settling, Chemical Precipitation, Neutralization and Discharge to Surface Water

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ag (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Ammonia as N (Total)	All Year		mg/L	DMax Conc	Monthly	Grab	Effluent
Cd (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Chloride (as Cl)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Cr (T)	All Year		mg/L	DMax Conc	Quarterly	Grab	Effluent
Cu (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Dissolved Solids, Total (TDS)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
F (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Fe (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Flow	All Year		MGD	DMax Load	Weekly	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Weekly	Instantaneous	Effluent
Hg (T)	All Year		mg/L	DMax Conc	Quarterly	Grab	Effluent
Mn (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Oil and Grease (Freon EM)	All Year	19	mg/L	DMax Conc	Monthly	Grab	Effluent
Oil and Grease (Freon EM)	All Year	14	mg/L	MAvg Conc	Monthly	Grab	Effluent
Pb (T)	All Year		mg/L	DMax Conc	Quarterly	Grab	Effluent
Se (T)	All Year		mg/L	DMax Conc	Quarterly	Grab	Effluent
Sulfate (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
TSS	All Year	96	mg/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	29	mg/L	MAvg Conc	Monthly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekly	Grab	Effluent

Table 6-15. Permit Limits for Outfall 001 at TVA - Cumberland Fossil Plant.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Duration of Discharge	All Year	120	Minutes	DMax Load	Weekly	Recorder	Effluent
Flow	All Year		MGD	DMax Load	Weekly	Estimate	Effluent
Flow	All Year		MGD	MAvg Load	Weekly	Estimate	Effluent
IC25 7day Ceriodaphnia Dubia	All Year	100	Percent	DMin Conc	Annually	Composite	Effluent
IC25 7day Fathead Minnows	All Year	100	Percent	DMin Conc	Annually	Composite	Effluent
Oxidants Total Residual	All Year	0.019	mg/L	DMax Conc	Weekly	Grab	Effluent
Oxidants Total Residual	All Year	0.011	mg/L	MAvg Conc	Weekly	Grab	Effluent
Temperature (°C)	All Year	36.7	Deg. C	DMax Conc	Daily	Calculated	Effluent
Temperature (°C)	All Year		Deg. C	DMax Conc	Continuous	Recorder	Intake
pH	All Year	9	SU	DMax Conc	Daily	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Daily	Grab	Effluent

Table 6-16. Permit Limits for Outfall 002 at TVA - Cumberland Fossil Plant.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Cu (T)	All Year	1	mg/L	DMax Conc	1/Batch	Grab	Effluent
Cu (T)	All Year	1	mg/L	MAvg Conc	1/Batch	Grab	Effluent
Fe (T)	All Year	1	mg/L	DMax Conc	1/Batch	Grab	Effluent
Fe (T)	All Year	1	mg/L	MAvg Conc	1/Batch	Grab	Effluent
Flow	All Year		MGD	MAvg Load	1/Batch	Estimate	Effluent

Table 6-17. Permit Limits for Outfall 007 at TVA - Cumberland Fossil Plant.

Comments

Fossil-fueled steam electric generating plant. Has two coal-fired units with a combined rated generating capacity of 2,600 megawatts.

June 11,2007. Modification to remove compliance date, January 7, 2008, for complete CDS data collection for Court remanded 316(b) Rule. Instead will submit "biological monitoring data collected in accordance with the Permittee's Proposal for Information Collection (PIC) plan as developed under the 316(b) requirements prior to their suspension by EPA."

3/7/06 Compliance Evaluation Inspection: In compliance.

6.4.C. Water Treatment Permits

TN0077666 Water Authority of Dickson County (WADC) - Cumberland River

Discharger rating:	Minor
City:	Burns
County:	Dickson
EFO Name:	Nashville
Issuance Date:	10/26/04
Expiration Date:	9/27/09
Receiving Stream(s):	Unnamed tributary to Barkley Reservoir (Cheatham Reservoir)
HUC-12:	051302050101
Effluent Summary:	Filter backwash and/or sedimentation basin washdown from Outfall 001
Treatment system:	Ultrafiltration membrane enhanced coagulation system

SEGMENT	TN05130205015T_0999
Name	Barkley Reservoir Misc Tribs
Size	161.5
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Fish and Aquatic Life (Not Assessed), Recreation (Not Assessed), Irrigation (Not Assessed), Livestock Watering and Wildlife (Not Assessed)
Causes	N/A
Sources	N/A

Table 6-18. Stream Segment Information for WADC-Cumberland River.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Al (T)	All Year	0.75	mg/L	DMax Conc	Monthly	Grab	Effluent
Fe (T)	All Year	2	mg/L	DMax Conc	Monthly	Grab	Effluent
Flow	All Year		MGD	DMax Load	Monthly	Instantaneous	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Monthly	Grab	Effluent
TRC	All Year	0.019	mg/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Monthly	Grab	Effluent

Table 6-19. Permit Limits for WADC-Cumberland River.

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

- 5 Total Aluminum
- 1 Total Chlorine

Comments
Membrane filtration, turbidity removal WTP

11/21/06 Compliance Evaluation Inspection: In compliance:

- At the time of the inspection the WADC WTP - Turnbull (TN0004855) located in the suburbs of Burns was not in operation. Mr. Michael Chandler, general manger, explained that the plant is operated on a modified evening – night shift schedule.

- The WADC WTP – Cumberland River (TN0077666) located in the rural Dickson County was in operation. The three sequential settling ponds appeared to be well maintained.

- The infestation of mussels caused operational problems at the Cumberland River facility with the water treatment portion of the facility. There were no reported operational problems with the NPDES discharge.

TN0074004 Clarksville WTP

Discharger rating:	Minor
City:	Clarksville
County:	Montgomery
EFO Name:	Nashville
Issuance Date:	10/1/04
Expiration Date:	9/27/09
Receiving Stream(s):	Cumberland River at mile 132.8
HUC-12:	051302050103
Effluent Summary:	Filter backwash and/or sedimentation basin washdown from Outfall 001
Treatment system:	Aluminum chlorohydrate, chlorine, sodium fluoride, PAC (seasonal), potassium permanganate, sodium hexametaphosphate

SEGMENT	TN05130205015_1000
Name	Barkley Reservoir
Size	37000
Unit	Acres
First Year on 303(d) List	-
Designated Uses	Fish and Aquatic Life (Supporting), Livestock Watering and Wildlife (Supporting), Recreation (Supporting), Industrial Water Supply (Supporting), Domestic Water Supply (Supporting), Irrigation (Supporting)
Causes	N/A
Sources	N/A

Table 6-20. Stream Segment Information for Clarksville WTP.

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

Table 6-21. Permit Limits for Clarksville STP.

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

- 1 Total Aluminum
- 1 Settleable Solids

Comments:
9/7/05 Compliance Evaluation Inspection: In compliance

TN0074675 Erin Water Works WTP

Discharger rating:	Minor
City:	Palmyra
County:	Montgomery
EFO Name:	Nashville
Issuance Date:	10/1/04
Expiration Date:	9/27/09
Receiving Stream(s):	Yellow Creek to Cumberland River at mile 108.3.
HUC-12:	051302050302
Effluent Summary:	Filter backwash and/or sedimentation basin washdown from Outfall 001
Treatment system:	Turbidity removal with aluminum sulfate, sodium hydroxide and sodium hypochlorite

Segment	TN05130205019_1000
Name	Yellow Creek
Size	15.6
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Recreation (Supporting), Irrigation (Supporting), Fish and Aquatic Life (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	N/A
Sources	N/A

Table 6-22. Stream Segment Information for Erin Water Works WTP.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Al (T)	All Year	0.75	mg/L	DMax Conc	Monthly	Grab	Effluent
Flow	All Year		MGD	DMax Load	Monthly	Instantaneous	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Monthly	Grab	Effluent
TRC	All Year	0.019	mg/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Monthly	Grab	Effluent

Table 6-23. Permit Limits for Erin Water Works WTP.

Comments:
Turbidity removal WTP

TN0079081 Barge Point Road Water Treatment Plant and Intake

Discharger rating:	Minor
City:	Clarksville
County:	Montgomery
EFO Name:	Nashville
Issuance Date:	10/1/04
Expiration Date:	9/27/09
Receiving Stream(s):	Unnamed tributary to Barkley Reservoir (Cumberland River) at approx. river mile 124.8
HUC-12:	051302050105
Effluent Summary:	Filter backwash and/or sedimentation basin washdown from Outfall 001
Treatment system:	Water treated with aluminum chlorhydrate, sodium hydroxide, polyphosphate, potassium permanganate, sodium hypochlorite, hydrofluosilic acid, and powder activated carbon

SEGMENT	TN05130205015_1000
Name	Barkley Reservoir
Size	37000
Unit	Acres
First Year on 303(d) List	-
Designated Uses	Fish and Aquatic Life (Supporting), Livestock Watering and Wildlife (Supporting), Recreation (Supporting), Industrial Water Supply (Supporting), Domestic Water Supply (Supporting), Irrigation (Supporting)
Causes	N/A
Sources	N/A

Table 6-24. Stream Segment Information for Barge Point Road Water Treatment Plant and Intake.

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

Table 6-25. Permit Limits for Barge Point Road Water Treatment Plant and Intake.

Comments:
Turbidity removal WTP

TN0005398 Dover Water Treatment Plant

Discharger rating: Minor
City: Dover
County: Montgomery
EFO Name: Nashville
Issuance Date: 10/1/04
Expiration Date: 9/27/09
Receiving Stream(s): Barkley Reservoir at Cumberland River mile 88.9
HUC-12: 051302050405
Effluent Summary: Filter backwash and/or sedimentation basin washdown from Outfall 001
Treatment system: Alum, polymer, chlorine

SEGMENT	TN05130205015_1000
Name	Barkley Reservoir
Size	37000
Unit	Acres
First Year on 303(d) List	-
Designated Uses	Fish and Aquatic Life (Supporting), Livestock Watering and Wildlife (Supporting), Recreation (Supporting), Industrial Water Supply (Supporting), Domestic Water Supply (Supporting), Irrigation (Supporting)
Causes	N/A
Sources	N/A

Table 6-26. Stream Segment Information for Dover WTP.

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

Table 6-27. Permit Limits for Dover WTP.

Comments:
Turbidity removal WTP
5/23/07 Compliance Evaluation Inspection: In compliance:

- Outfall ID sign somewhat obscured by vegetation; needs trimming. Both sludge basins nearly full; not alternating them; need SOP for sludge handling. All else satisfactory.

APPENDIX II

ID	NAME	Hazard
637001	MORROW	2
637004	FORT CAMPBELL #3	X
637005	KINGSBURY	L
427001	BETHANY	L
227020	OLD SHOAL CREEK	S
427003	MIHEVIC	L
637006	DABIT	N
637007	NANCE	3
817001	BOWYER	X

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

LAND COVER/LAND USE	ACRES	% OF WATERSHED
Deciduous Forest	420940	66.9
Pasture/Hay	82454	13.1
Grassland/Herbaceous	33378	5.3
Row Crops	26088	4.1
Low Intensity Residential	22141	3.5
Open Water	14242	2.3
Evergreen Forest	13165	2.1
Wetlands	10245	1.6
High Intensity Residential	2268	0.4
Mixed Forest	1648	0.3
High Intensity Commercial/Industrial/Transportatio	1170	0.2
Emergent Herbaceous Wetlands	837	0.1
Evergreen Shrubland	359	0.1
Total	629026	100

Table A2-2. Land Use Distribution in the Tennessee Portion of the Lake Barkley 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)	
Western Pennyroyal Karst (71e)	Buzzard Creek (71E09)	Red River	05130206
	Passenger Creek (71E14)	Red River	05130206
Western Highland Rim (71f)	Brush Creek (71F19)	Buffalo River	06040004
	Little Swan Creek (71F28)	Lower Duck	06040003
	Hurricane Creek (71F29)	Lower Duck	06040003
	South Harpeth River (71F12)	Harpeth	05130204
	Swanegan Branch (71F27)	Pickwick Lake	06030005
	Wolf Creek (71F16)	Lower Duck	06040003
Outer Nashville Basin (71h)	Carson Fork (71H09)	Stones	05130203
	Clear Fork (71H06)	Caney Fork	05130108
	Flynn Creek (71H03)	Cordell Hull	05130106
Inner Nashville Basin (71i)	Flat Creek (71I03)	Upper Duck	06040002
	Little Flat Creek (71I14)	Upper Duck	06040002
	Cedar Creek (71I12)	Cumberland River (Old Hickory Lake)	05130201
	Fall Creek (71I13)	Stones River	05130203
	Stewart Creek (71I03)	Stones River	05130203
	Harpeth River (71I15)	Harpeth	05130204
	West Fork Stones River (71I09)	Stones River	05130203
	West Fork Stones River (71I16)	Stones River	05130203

Table A2-3. Ecoregion Monitoring Sites in Ecoregions 7e, 71f, 71h, and 71i.

CODE	NAME	AGENCY	AGENCY ID
101	TDEC/DNH CROSS CREEKS NATIONAL WILDLIFE REFUGE	TDEC/DNH	M.USTNHP 102
140	TDEC/DNH LAND BETWEEN THE LAKES SITE	TDEC/DNH	M.USTNHP 223
143	TDEC/DNH LONG POND SLOUGH SITE	TDEC/DNH	S.USTNHP 152
167	TDEC/DNH STEWART FOREST SINK SITE	TDEC/DNH	S.USTNHP 335
194	TDEC/DNH LOWER BEAR CREEK SITE	TDEC/DNH	QUARTERMAN REP.
208	USACOE-NASHVILLE CLIENT SITE	USACOE-NASHVILLE	
320	TDOT SR 46 MITIGATION/PERMIT SITE	TDOT	
321	TDOT SR 46 MITIGATION/PERMIT SITE	TDOT	
505	TDEC/WPC TRIB OF ERIN BR PERMIT/MITIGATION SITE	TDEC/WPC	
892	USFWS JACK BUMPUS WRP SITE	USFWS	TRACT 1450
908	USFWS GARRY WEAKLEY SWAMPBUSTER SITE	USFWS	
1515	USACOE-ORN PN 96-29/GARRY D. WEAKLEY SITE	USFWS	
1924	TWRA SHELTON FERRY BOTTOMS SITE	TWRA	
1925	TWRA SHELTON FERRY BOTTOMS SITE	TWRA	
1927	TWRA SHELTON FERRY BOTTOMS SITE	TWRA	
1929	TWRA SHELTON FERRY SITE	TWRA	
1930	TWRA SHELTON FERRY SITE	TWRA	
1940	TWRA SHELTON FERRY SITE	TWRA	
1941	TWRA SHELTON FERRY SITE	TWRA	
1968	TWRA SHELTON FERRY BOTTOMS SITE	TWRA	
1969	TWRA SHELTON FERRY BOTTOMS SITE	TWRA	
1970	TWRA SHELTON FERRY BOTTOMS SITE	TWRA	
1971	TWRA SHELTON FERRY BOTTOMS SITE	TWRA	
1972	TWRA SHELTON FERRY BOTTOMS SITE	TWRA	
1973	TWRA SHELTON FERRY BOTTOMS SITE	TWRA	
1974	TWRA SHELTON FERRY BOTTOMS SITE	TWRA	
1997	TWRA PALMYRA SITE	TWRA	
1998	TWRA PALMYRA SITE	TWRA	
2036	TWRA SHELTON FERRY SITE	TWRA	
2037	TWRA SHELTON FERRY SITE	TWRA	
2038	TWRA SHELTON FERRY SITE	TWRA	
2049	TWRA LONG POND SITE	TWRA	
2217	TWRA CHEATHAM RESERVOIR SITE	TWRA	
2218	TWRA CHEATHAM WMA SITE	TWRA	
2219	TWRA CHEATHAM WMA SITE	TWRA	
2220	TWRA CHEATHAM WMA SITE	TWRA	
2221	TWRA CHEATHAM WMA SITE	TWRA	
2222	TWRA CHEATHAM WMA SITE	TWRA	
2223	TWRA CHEATHAM WMA SITE	TWRA	
2224	TWRA CHEATHAM WMA SITE	TWRA	
2532	TWRA SHELTON FERRY SITE	TWRA	
2533	TWRA SHELTON FERRY SITE	TWRA	
2534	TWRA SHELTON FERRY SITE	TWRA	
2535	TWRA SHELTON FERRY SITE	TWRA	
2536	TWRA SHELTON FERRY SITE	TWRA	
2537	TWRA SHELTON FERRY SITE	TWRA	
2538	TWRA SHELTON FERRY SITE	TWRA	
2539	TWRA SHELTON FERRY SITE	TWRA	

Table A2-4a.

CODE	NAME	AGENCY	AGENCY ID
2540	TWRA SHELTON FERRY SITE	TWRA	
2541	TWRA SHELTON FERRY SITE	TWRA	
2542	TWRA SHELTON FERRY SITE	TWRA	
2543	TWRA SHELTON FERRY SITE	TWRA	
2544	TWRA SHELTON FERRY SITE	TWRA	
2546	TWRA SHELTON FERRY SITE	TWRA	
2547	TWRA SHELTON FERRY SITE	TWRA	
2548	TWRA SHELTON FERRY SITE	TWRA	
2549	TWRA SHELTON FERRY SITE	TWRA	
2550	TWRA SHELTON FERRY SITE	TWRA	
2551	TWRA SHELTON FERRY SITE	TWRA	
2552	TWRA SHELTON FERRY SITE	TWRA	
2553	TWRA SHELTON FERRY SITE	TWRA	
2554	TWRA SHELTON FERRY SITE	TWRA	
2555	TWRA SHELTON FERRY SITE	TWRA	
2556	TWRA SHELTON FERRY SITE	TWRA	
2557	TWRA SHELTON FERRY SITE	TWRA	
2558	TWRA SHELTON FERRY SITE	TWRA	
2559	TWRA SHELTON FERRY SITE	TWRA	
2595	TWRA LONG POND SITE	TWRA	

Table A2-4b.

Tables A2-4a-b. Wetland Sites in the Tennessee Portion of the Lake Barkley Watershed in TDEC Database. *TDEC, Tennessee Department of Environment and Conservation; USACOE-Nashville, United States Army Corps of Engineers-Nashville District; TDOT, Tennessee Department of Transportation; TWRA, Tennessee Wildlife Resources Agency; DNH, Division of Natural Heritage.* ***This table represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands in the watershed.***

APPENDIX III

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Bartons Creek	TN05130205024_1000	23.7
Big McAdoo Creek	TN05130205038_1000	7.3
Furnace Creek	TN05130205024_0400	22.2
Little Bartons Creek	TN05130205024_0600	35.1
Long Creek	TN05130205015T_2700	24.6
North Cross Creek	TN05130205015T_0600	10.4
Pryor Creek	TN05130205015T_3700	6.3
Saline Creek	TN05130205042_1000	14.2
Yellow Creek	TN05130205019_1000	15.6
Yellow Creek	TN05130205019_2000	17.6

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

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
East Fork Yellow Creek	TN05130205020_1000	5.5
Wall Branch	TN05130205015T_1100	4.8
Wells Creek	TN051302051735_1000	9.9

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

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Barkley Reservoir Misc Tribs	TN05130205015T_0999	161.5
Beech Fork Creek	TN05130205015T_0200	4.5
Brush Creek	TN05130205015T_1300	11.6
Bullpasture Creek	TN05130205015T_0800	7.8
Cherry Branch	TN05130205015T_0620	2.8
Cub Creek	TN05130205015T_0500	8.5
Cummings Creek	TN05130205015T_0900	7.3
Dawson Creek	TN05130205015T_1710	11.0
Dicks Fork Creek	TN05130205015T_0610	6.3
Dyers Creek	TN05130205015T_0400	17.1
Full Creek	TN05130205015T_1500	4.5
Hands Branch	TN05130205015T_1600	4.4
Hayes Fork Creek	TN05130205015T_0300	5.9
Honey Fork Creek	TN05130205015T_0630	3.8
Hurricane Creek	TN05130205015T_1700	14.4
Lee Creek	TN05130205015T_0700	10.3
Muddy Branch	TN05130205015T_1200	5.7
Rocky Ford Creek	TN05130205015T_1800	8.2
Shelby Creek	TN05130205015T_0100	2.3
Sulphur Branch	TN05130205015T_1400	5.0

Table A3-3a.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Antioch Creek	TN05130205015T_1910	15.8
Baggett Branch	TN05130205020_0200	6.3
Balthrop Branch	TN05130205019_1100	3.8
Barrett Creek	TN05130205015T_3400	5.4
Bear Creek	TN05130205015T_3100	12.4
Bear Creek	TN05130205019_0400	13.5
Big Elk Creek	TN05130205015T_2500	20.0
Big Horse Branch	TN05130205024_0500	9.1
Brandon Spring Branch	TN05130205015T_3200	4.6
Bryant Branch	TN05130205020_0210	6.5
Budds Creek	TN05130205015T_1900	13.9
Burney Creek	TN05130205020_0100	4.8
Cedar Creek	TN05130205019_0500	12.7
Childress Branch	TN05130205019_0300	4.7
Crockett Creek	TN05130205015T_3600	5.6
Dodd Branch	TN05130205019_0800	4.5
Dry Branch	TN05130205019_1300	5.3
East Fork	TN05130205019_0600	6.9
Fannie Branch	TN05130205019_0700	2.5
Fatty Bread Branch	TN05130205024_0200	2.1
Goldenhorn Creek	TN05130205015T_2100	5.5
Hickman Creek	TN05130205015T_2900	9.7
Hunt Branch	TN05130205019_0900	5.0
Indian Creek	TN05130205024_0610	8.6
Leatherwood Creek	TN05130205019_0100	17.5
Lick Creek	TN05130205015T_2800	22.2
Little Elk Creek	TN05130205015T_2400	5.3
Louise Creek	TN05130205024_0700	22.4
Misc Tribs to Bartons Creek	TN05130205024_0999	26.8
Misc Tribs to East Fork Yellow Creek	TN05130205020_0999	7.8
Misc Tribs to Johnson Creek	TN05130205031_0999	20.1
Misc Tribs to Yellow Creek	TN05130205019_0999	66.5
Moccasin Branch	TN05130205015T_2300	8.4
Neville Creek	TN05130205015T_3500	4.7
Rayburn Creek	TN05130205015T_3300	3.1
Rocky Branch	TN05130205024_0300	3.6
Salmon Branch	TN05130205019_1400	11
Shelter Branch	TN05130205024_0100	5.4
Shoulder Strap Branch	TN05130205019_1200	5.7
South Cross Creek	TN05130205015T_2600	21.1
Sullivan Branch	TN05130205020_0300	12.5
Town Branch	TN05130205019_1500	7.1
Weaver Creek	TN05130205015T_2200	6.1
Williamson Branch	TN05130205019_0200	10.1

Table A3-3b.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Bartee Branch	TN05130205110_0300	8.9
Bascomb Eldrige Creek	TN05130205110_0100	4.2
Bateman Branch	TN051302051735_0200	12.8
Big McAdoo Creek	TN05130205038_2000	5.8
Biggs Branch	TN05130205042_0300	5.1
Blooming Grove Creek	TN05130205110_1000	11.1
Brigham Branch	TN051302051735_0500	10.1
Cooper Creek	TN05130205110_0200	7.6
Dry Fork Creek	TN05130205033_0400	16.1
Erin Branch	TN051302051735_0400	14.4
Guices Creek	TN05130205121_1000	8.2
Half Pone Creek	TN05130205033_1000	15.1
Johnson Creek	TN05130205031_1000	10.5
Little McAdoo Creek	TN05130205038_0100	14.8
Misc Tribs to Big McAdoo Creek	TN05130205038_0999	12.5
Misc Tribs to Blooming Grove Creek	TN05130205110_0999	18.3
Misc Tribs to Guices Creek	TN05130205121_0999	15.9
Misc Tribs to Half Pone Creek	TN05130205033_0999	15.5
Misc Tribs to Wells Creek	TN051302051735_0999	29.4
Morgan Branch	TN05130205042_0500	3.1
Musterground Creek	TN051302051735_0100	7.1
Pollard Branch	TN051302051735_0300	8.8
Raccoon Creek	TN05130205033_0300	8.3
Ross Branch	TN05130205042_0200	3.1
Scott Branch	TN05130205042_0100	3.0
Sorgham Branch	TN05130205033_0100	3.3
Unnamed trib to Half Pone Creek	TN05130205033_0200	3.9
Wall Creek	TN05130205042_0400	5.4

Table A3-3c.

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

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Bartons Creek	TN05130205024_1000	23.7
Bear Creek	TN05130205019_0400	13.5
Big McAdoo Creek	TN05130205038_1000	7.3
Cedar Creek	TN05130205019_0500	12.7
Dicks Fork Creek	TN05130205015T_0610	6.3
Dyers Creek	TN05130205015T_0400	7.1
East Fork	TN05130205019_0600	6.9
East Fork Yellow Creek	TN05130205020_1000	5.5
Erin Branch	TN051302051735_0400	14.4
Furnace Creek	TN05130205024_0400	22.2
Guices Creek	TN05130205121_1000	8.2
Half Pone Creek	TN05130205033_1000	15.1
Hurricane Creek	TN05130205015T_1700	14.4
Johnson Creek	TN05130205031_1000	10.5
Leatherwood Creek	TN05130205019_0100	17.5
Lick Creek	TN05130205015T_2800	22.2
Little Bartons Creek	TN05130205024_0600	35.1
Long Creek	TN05130205015T_2700	24.6
Louise Creek	TN05130205024_0700	22.4
Pryor Creek	TN05130205015T_3700	6.3
Saline Creek	TN05130205042_1000	14.2
Salmon Branch	TN05130205019_1400	11.0
South Cross Creek	TN05130205015T_2600	21.1
Unnamed trib to Half Pone Creek	TN05130205033_0200	3.9
Wells Creek	TN051302051735_1000	9.9
Yellow Creek	TN05130205019_1000	15.6
Yellow Creek	TN05130205019_2000	17.6

Table A3-4.

Tables A3-4. Streams Fully Supporting the Designated Use of Fish & Aquatic Life in the Tennessee Portion of the Lake Barkley Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Antioch Creek	TN05130205015T_1910	15.8
Big McAdoo Creek	TN05130205038_2000	5.8
Brush Creek	TN05130205015T_1300	11.6
Budds Creek	TN05130205015T_1900	13.9
Wall Branch	TN05130205015T_1100	4.8

Table A3-5. Streams Not Supporting the Designated Use of Fish & Aquatic Life in the Tennessee Portion of the Lake Barkley Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Barkley Reservoir Misc Tribs	TN05130205015T_0999	161.5
Beech Fork Creek	TN05130205015T_0200	4.5
Bullpasture Creek	TN05130205015T_0800	7.8
Cherry Branch	TN05130205015T_0620	2.8
Cub Creek	TN05130205015T_0500	8.5
Cummings Creek	TN05130205015T_0900	7.3
Hayes Fork Creek	TN05130205015T_0300	5.9
Honey Fork Creek	TN05130205015T_0630	3.8
Lee Creek	TN05130205015T_0700	10.3
Muddy Branch	TN05130205015T_1200	5.7
North Cross Creek	TN05130205015T_0600	10.4
Shelby Creek	TN05130205015T_0100	2.3
Baggett Branch	TN05130205020_0200	6.3
Balthrop Branch	TN05130205019_1100	3.8
Barrett Creek	TN05130205015T_3400	5.4
Bear Creek	TN05130205015T_3100	12.4
Big Elk Creek	TN05130205015T_2500	20.0
Big Horse Branch	TN05130205024_0500	9.1
Brandon Spring Branch	TN05130205015T_3200	4.6
Bryant Branch	TN05130205020_0210	6.5
Burney Creek	TN05130205020_0100	4.8
Childress Branch	TN05130205019_0300	4.7
Crockett Creek	TN05130205015T_3600	5.6
Dawson Creek	TN05130205015T_1710	11.0
Dodd Branch	TN05130205019_0800	4.5
Dry Branch	TN05130205019_1300	5.3
Dry Fork Creek	TN05130205033_0400	16.1
Fannie Branch	TN05130205019_0700	2.5
Fatty Bread Branch	TN05130205024_0200	2.1
Full Creek	TN05130205015T_1500	4.5
Goldenhorn Creek	TN05130205015T_2100	5.5
Hands Branch	TN05130205015T_1600	4.4
Hickman Creek	TN05130205015T_2900	9.7
Hunt Branch	TN05130205019_0900	5.0
Indian Creek	TN05130205024_0610	8.6
Little Elk Creek	TN05130205015T_2400	5.3
Misc Tribs to Bartons Creek	TN05130205024_0999	26.8
Misc Tribs to East Fork Yellow Creek	TN05130205020_0999	7.8
Misc Tribs to Half Pone Creek	TN05130205033_0999	15.5
Misc Tribs to Johnson Creek	TN05130205031_0999	20.1
Misc Tribs to Yellow Creek	TN05130205019_0999	66.5
Moccasin Branch	TN05130205015T_2300	8.4

Table A3-6a.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Neville Creek	TN05130205015T_3500	4.7
Raccoon Creek	TN05130205033_0300	8.3
Rayburn Creek	TN05130205015T_3300	3.1
Rocky Branch	TN05130205024_0300	3.6
Rocky Ford Creek	TN05130205015T_1800	8.2
Shelter Branch	TN05130205024_0100	5.4
Shoulder Strap Branch	TN05130205019_1200	5.7
Sorgham Branch	TN05130205033_0100	3.3
Sullivan Branch	TN05130205020_0300	12.5
Sulphur Branch	TN05130205015T_1400	5.0
Town Branch	TN05130205019_1500	7.1
Weaver Creek	TN05130205015T_2200	6.1
Williamson Branch	TN05130205019_0200	10.1
Bartee Branch	TN05130205110_0300	8.9
Bascomb Eldrige Creek	TN05130205110_0100	4.2
Bateman Branch	TN051302051735_0200	12.8
Biggs Branch	TN05130205042_0300	5.1
Blooming Grove Creek	TN05130205110_1000	11.1
Brigham Branch	TN051302051735_0500	10.1
Cooper Creek	TN05130205110_0200	7.6
Little McAdoo Creek	TN05130205038_0100	14.8
Misc Tribs to Big McAdoo Creek	TN05130205038_0999	12.5
Misc Tribs to Blooming Grove Creek	TN05130205110_0999	18.3
Misc Tribs to Guices Creek	TN05130205121_0999	15.9
Misc Tribs to Wells Creek	TN051302051735_0999	29.4
Morgan Branch	TN05130205042_0500	3.1
Musterground Creek	TN051302051735_0100	7.1
Pollard Branch	TN051302051735_0300	8.8
Ross Branch	TN05130205042_0200	3.1
Scott Branch	TN05130205042_0100	3.0
Wall Creek	TN05130205042_0400	5.4

Table A3-6b.

Tables A3-6a-b. Streams Not Assessed for the Designated Use of Fish & Aquatic Life in the Tennessee Portion of the Lake Barkley Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (ACRES)
Barkley Reservoir	TN05130205015_1000	37000

Table A3-7. Lake Segments Supporting Recreational Use in the Tennessee Portion of the Lake Barkley Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (ACRES)
Barkley Reservoir	TN05130205015_1000	37000

Table A3-8. Lake Segments Supporting Designated Fish & Aquatic Use in the Tennessee Portion of the Lake Barkley Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)	SUPPORT DESCRIPTION
East Fork Yellow Creek	TN05130205020_1000	5.5	Not Supporting
Wall Branch	TN05130205015T_1100	4.8	Not Supporting
Wells Creek	TN051302051735_1000	9.9	Not Supporting

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

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)	SUPPORT DESCRIPTION
Antioch Creek	TN05130205015T_1910	15.8	Not Supporting
Antioch Creek	TN05130205015T_1910	15.8	Not Supporting
Antioch Creek	TN05130205015T_1910	15.8	Not Supporting
Big McAdoo Creek	TN05130205038_2000	5.8	Not Supporting
Brush Creek	TN05130205015T_1300	11.6	Not Supporting
Budds Creek	TN05130205015T_1900	13.9	Not Supporting
Budds Creek	TN05130205015T_1900	13.9	Not Supporting
Budds Creek	TN05130205015T_1900	13.9	Not Supporting

Table A3-10. Stream Segments Impaired Due to Siltation in the Tennessee Portion of the Lake Barkley Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)	SUPPORT DESCRIPTION
Big McAdoo Creek	TN05130205038_2000	5.8	Not Supporting
Wall Branch	TN05130205015T_1100	4.8	Not Supporting

Table A3-11. Stream Segments Impaired Due to Nutrients in the Tennessee Portion of the Lake Barkley Watershed.

WATERBODY ID	WATERBODY NAME	TOTAL SEGMENT MILES IMPAIRED	HUC-12
TN05130205038_0100	Little McAdoo Creek	14.8	051302050104
TN05130205110_0300	Bartee Branch	4.0	051302050107
TN051302051735_0400	Erin Branch	14.4	051302050403

Table A3-12. Streams Added to the 2008 303(d) List in the Tennessee Portion of the Lake Barkley Watershed. *For more information see Tennessee's 2008 303(d) List at: http://www.state.tn.us/environment/wpc/publications/2008_303d.pdf .*

WATERBODY ID	WATERBODY NAME	TOTAL SEGMENT MILES IMPAIRED	CAUSE/POLLUTANT	HUC-12
TN05130205015T_1300	Brush Creek	11.6	Loss of Biological Integrity due to Siltation	051302050103

Table A3-13. Streams (or pollutants) Delisted Since the 2006 303(d) List in the Tennessee Portion of the Lake Barkley Watershed. *For more information see Tennessee's 2008 303(d) List at http://www.state.tn.us/environment/wpc/publications/2008_303d.pdf .*

WATERBODY	DESCRIPTION	BASIS FOR CHANGE	HUC-12
Acree Creek	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050406
Barett Creek UT	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050406
Barrett Creek	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050406
Bear Creek	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050406
Bear Creek UT	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050406
Bear Creek*	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050406
Bee Branch	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050406
Bee Branch UT	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050406
Big Elk Creek UT	Portion in Cross Creeks National NWR and Stewart State Forest	Cross Creeks NWR and Stewart State Forest.	051302050401
Brandon Springs Branch	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050406
Brandon Springs BranchUnnamedTrib	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050406
Cooper Creek	Portion in Barnetts Woods SNA	Barnetts Woods SNA.	051302050107
Cow Creek	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050406
Cow Creek UT	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050406
Crockett Branch	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA and state threatened Bristly Sedge and Short-beaked Arrowhead.	051302050408
Crockett Branch UT	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA and state threatened Bristly Sedge and Short-beaked Arrowhead.	051302050408
Crockett Creek	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA and state threatened Bristly Sedge.	051302050408

Table A3-14a.

WATERBODY	DESCRIPTION	BASIS FOR CHANGE	HUC-12
Crockett Creek UT	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA and state threatened Bristly Sedge.	051302050408
Cross Creek Reservoir	Portion in Cross Creeks NWR	Cross Creeks NWR	051302050404
Cumberland River	From Blooming Grove Creek (RM 112) to Hog Branch (RM 116.2)	State threatened Short-beaked Arrowhead. (State endangered Rock Goldenrod whos habit is limestone riverbanks also occurs).	051302050105
Cumberland River (Barkley Res) UT			051302050406
Cumberland River (Barkley Res) UT			051302050408
Cumberland River (Lake Barkley)	RM 90.3 to 108.0	Cross Creeks NWR RM 60.3 to 102.6, state endangered lake sturgeon RM 96.0 to 108.0.	051302050405
Cumberland River UT	Portion in Cross Creeks National NWR and Stewart State Forest	Cross Creeks NWR and Stewart State Forest.	051302050401
Deason Creek	From Weaver Creek to origin	State threatened Short-Beaked Arrowhead.	051302050105
Dicks Fork Creek	Portion in Barkley NRA	Barkley NRA	051302050404
Dry Branch	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050406
Dry Branch UT	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050406
Hickman Creek UT	From Hickman Creek in Fort Donelson National Battlefield to origin	Fort Donelson National Battlefield.	051302050406
Hog Branch	From Cumberland River to O-Neal Road	State threatened Short-Beaked Arrowhead.	051302050105
Hopewell Branch	Portion in Barkley NRA	Barkley NRA	051302050401
Indian Creek	Portion in Ft. Donelson NMP	Ft. Donelson National Military Park	051302050405
Johnson Creek	Portion in Cheatham Reservoir NRA	Cheatham Reservoir NRA	051302050101
Junebug Branch	Portion in Stewart State Forest	Stewart State Forest	051302050401
Junebug Branch UT	Portion in Stewart State Forest	Stewart State Forest	051302050401
Neville Creek	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050406
Neville Creek UT	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050406
North Cross Creek	Portion in Cross Creeks NWR and Stewart State Forest	Cross Creeks NWR, Stewart State Forest.	051302050404
North Cross Creek UT	Portion in Cross Creeks National NWR and Stewart State Forest	Cross Creeks NWR and Stewart State Forest.	051302050404
Pryor Creek	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050408
Pryor Creek UTs	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050408
Rat Branch	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050408
Rat Branch UTs	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050408
Rayburn Creek	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050406
Rayburn Creek UT	Portion in Land Between the Lakes NRA	Land Between the Lakes NRA	051302050406
South Cross Creek	Portion in Cross Creeks National NWR and Stewart State Forest	Cross Creeks NWR and Stewart State Forest.	051302050404
South Cross Creek UT	Portion in Cross Creeks National NWR and Stewart State Forest	Cross Creeks NWR and Stewart State Forest.	051302050404

Table A3-14b.

WATERBODY	DESCRIPTION	BASIS FOR CHANGE	HUC-12
Weaver Creek	From Cumberland River to origin	State threatened Short-Beaked Arrowhead.	051302050105
Weaver Creek UT	Unnamed tributary to Weaver Creek near Palmyra	State threatened Short-Beaked Arrowhead.	051302050105

Table A3-14c.

Table A3-14a-c. Known High Quality Waters in the Tennessee Portion of the Lake Barkley Watershed as of September 2008. *The most recently published list is available at www.state.tn.us/environment/wpc/publications/hqwlist.mht. NRA, National Recreation Area; NWR, National Wildlife Refuge; RM, River Mile; SNA, State Natural Area; *Located within state or federally protected lands.*

APPENDIX IV

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0101	0102	0103	0104	0105
Bare Rock/Sand/Clay		10	3		9
Deciduous Forest	20,552	15,005	21,718	8,702	22,730
Developed Open Space	914	1,492	3,310	1,177	1,367
Emergent Herbaceous Wetlands	105	12	181	1	75
Evergreen Forest	882	1,108	1,651	626	632
Grassland/Herbaceous	1,990	2,054	1,333	395	1,929
High Intensity Development	1	1	249	4	46
Low Intensity Development	14	35	1,162	156	175
Medium Intensity Development	5	18	465	11	109
Mixed Forest	376	400	244	150	19
Open Water	1,135	21	1,372	13	1,322
Pasture/Hay	2,856	8,524	10,561	6,513	4,690
Row Crops	1,558	576	3,934	902	4,898
Shrub/Scrub		1			6
Woody Wetlands	604	179	1,340	191	983
Total	**30,992**	**29,436**	**47,523**	**18,841**	**38,990**

Table A4-1a.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0106	0107	0201	0202	0203
Bare Rock/Sand/Clay	6				
Deciduous Forest	9,847	14,151	8,744	8,329	20,970
Developed Open Space	527	920	679	429	1,339
Emergent Herbaceous Wetlands	3	7	2		28
Evergreen Forest	370	468	204	77	632
Grassland/Herbaceous	961	1,586	738	863	2,620
High Intensity Development					
Low Intensity Development	50	15	16	12	16
Medium Intensity Development	14	2		2	1
Mixed Forest	92	2	39	30	152
Open Water	3	54	12	3	6
Pasture/Hay	2,243	4,239	5,577	1,790	8,091
Row Crops	430	607	266	172	1,716
Shrub/Scrub	1	35	3	2	3
Woody Wetlands	143	106	2	4	211
Total	**14,690**	**22,192**	**16,282**	**11,713**	**35,785**

Table A4-1b.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0204	0301	0302	0303	0401
Bare Rock/Sand/Clay					8
Deciduous Forest	7,416	33,430	31,622	14,646	27,566
Developed Open Space	613	1,453	1,135	738	996
Emergent Herbaceous Wetlands	3	9	37	1	103
Evergreen Forest	211	484	496	146	803
Grassland/Herbaceous	539	2,770	3,065	2,005	2,306
High Intensity Development		3			
Low Intensity Development	9	51	32	27	54
Medium Intensity Development		10	3		20
Mixed Forest	42	55	20	6	
Open Water	1	82	93	3	1,898
Pasture/Hay	2,947	7,274	2,927	1,688	1,402
Row Crops	139	510	1,315	171	2,250
Shrub/Scrub	1	38	55	4	23
Woody Wetlands	20	4	304	24	1,463
Total	**11,941**	**46,173**	**41,104**	**19,459**	**38,892**

Table A4-1c.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0402	0403	0404	0405	0406
Bare Rock/Sand/Clay		32		3	17
Deciduous Forest	10,474	27,889	29,982	25,455	34,087
Developed Open Space	632	1,219	837	996	750
Emergent Herbaceous Wetlands	6	5	38	48	97
Evergreen Forest	116	174	495	1,577	822
Grassland/Herbaceous	760	2,165	2,128	975	1,252
High Intensity Development		12	4	18	4
Low Intensity Development	27	127	20	158	87
Medium Intensity Development	1	75	7	68	20
Mixed Forest	4	3		4	1
Open Water	127	338	1,166	1,162	3,531
Pasture/Hay	2,047	3,193	1,552	2,245	451
Row Crops	189	953	1,346	1,789	1,084
Shrub/Scrub	6	39	18	49	21
Woody Wetlands	87	275	724	693	2,296
Total	**14,476**	**36,499**	**38,317**	**35,240**	**44,520**

Table A4-1d.

LAND USE/LAND COVER	**AREAS IN HUC-12 SUBWATERSHEDS (ACRES)**	
	0407	0408
Bare Rock/Sand/Clay	1	
Deciduous Forest	16,608	11,014
Developed Open Space	540	81
Emergent Herbaceous Wetlands	50	25
Evergreen Forest	757	434
Grassland/Herbaceous	880	63
High Intensity Development		
Low Intensity Development	25	
Medium Intensity Development		
Mixed Forest	7	3
Open Water	755	1,146
Pasture/Hay	1,425	216
Row Crops	966	317
Shrub/Scrub	31	23
Woody Wetlands	270	322
Total	**22,315**	**13,644**

Table A4-1e.

Table A4-1a-e. Land Use Distribution in the Tennessee Portion of the Lake Barkley Watershed by HUC-12. *Data are from 2001 Multi-Resolution Land Characterization (MRLC) derived by applying a generalized Anderson Level II system to mosaics of Landsat thematic mapper images collected every five years.*

HYDROLOGIC SOIL GROUPS
GROUP A SOILS have low runoff potential and high infiltration rates even when wet. They consist chiefly of sand and gravel and are well to excessively drained.
GROUP B SOILS have moderate infiltration rates when wet and consist chiefly of soils that are moderately deep to deep, moderately to well drained, and moderately coarse to coarse textures.
GROUP C SOILS have low infiltration rates when wet and consist chiefly of soils having a layer that impedes downward movement of water with moderately fine to fine texture.
GROUP D SOILS have high runoff potential, very low infiltration rates, and consist chiefly of clay soils.

Table A4-2. Hydrologic Soil Groups in Tennessee as Described in WCS. *Soils are grouped into four hydrologic soil groups that describe a soil's permeability and, therefore, its susceptibility to runoff.*

STATION	LOCATION	HUC 12	AREA (SQ MILES)	LOW FLOW (CFS)		
				1Q10	7Q10	3Q20
03435000	Cumberland River	051302050101				
03436500	Cumberland River	051302050103	15,897.00		385.00	416.00
03436690	Yellow Creek	051302050302				
03436700	Yellow Creek	051302050302	124.00	19.05	20.18	18.30
03437000	Cumberland River	051302050405				

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

AGENCY	STATION	LOCATION	HUC 12
USEPA	470601	Cheatham Reservoir	051302050101
USEPA	470602	Cheatham Reservoir	051302050101
USACOE	3CHE10001	Cumberland River @ RM 148.3	051302050101
USACOE	3CHE20002	Cumberland River @ RM 149.1	051302050101
USACOE	3CHE20025	Cumberland River @ RM 150.8	051302050101
TDEC	CUMBE146.2CH	Cumberland River @ RM 146.2	051302050101
TDEC	796	Clarksville Filtration Plant 126.5	051302050103
USACOE	3BAR20008	Cumberland River @ RM 133.1	051302050103
TDEC	WALLS000.6MT	Walls Branch @ RM 0.6	051302050103
TDEC	BMCAD004.7MT	Big McAdoo Creek @ RM 4.7	051302050104
TDEC	BMCAD006.6MT	Big McAdoo Creek @ RM 6.6	051302050104
TDEC	BMCAD011.0MT	Big McAdoo Creek @ RM 11.0	051302050104
TDEC	LMCAD000.3MT	Little McAdoo Creek @ RM 0.3	051302050104
TDEC	800	Cumberland River @ RM 120.75	051302050105
TVA	600024	Cumberland River @ RM 120.00	051302050105
TVA	600030	Cumberland River @ RM 109.0	051302050105
TVA	600031	Cumberland River @ RM 115.0	051302050105
TVA	600035	Cumberland River @ RM 108.5	051302050105
USACOE	3BAR20007	Cumberland River @ RM 124.0	051302050105
TDEC	CUMBE124.8MT	Cumberland River @ RM 124.8	051302050105
TDEC	ANTIO000.1MT	Antioch Creek @ RM 0.1	051302050106
TDEC	BUDDS001.9MT	Budds Creek @ RM 1.9	051302050106
TDEC	BARTE001.4MT	Bartee Branch @ RM 1.4	051302050107
TDEC	BARTO002.7MT	Bartons Creek @ RM 2.7	051302050203
TDEC	BARTO012.8DI	Bartons Creek @ RM 12.8	051302050203
TDEC	BEAR000.3HO	Bear Creek @ RM 0.3	051302050301
TDEC	CEDAR000.8DI	Cedar Creek @ RM 0.8	051302050301
TDEC	YELLO024.9DI	Yellow Creek @ RM 24.9	051302050301
USACOE	3BAR10047	Yellow Creek @ RM 9.0	051302050302
USACOE	3BAR20030	Yellow Creek @ RM 0.5	051302050302
TDEC	YELLO013.1HO	Yellow Creek @ RM 13.1	051302050302
TDEC	810	Cumberland River @ RM 101.7	051302050401
USEPA	470110	Lake Barkley	051302050401
TVA	600023	Cumberland River @ RM 102.47	051302050401
TVA	600029	Cumberland River @ RM 104.0	051302050401
TVA	600032	Cumberland River @ RM 98.05	051302050401
TVA	600033	Cumberland River @ RM 103.2	051302050401
TVA	600034	Cumberland River @ RM 106.5	051302050401

Table A4-4a.

AGENCY	STATION	LOCATION	HUC 12
TVA	600060	Cumberland River @ RM 101.8	051302050401
TVA	600062	Cumberland River @ RM 102.9	051302050401
TVA	600063	Cumberland River @ RM 103.3	051302050401
TVA	600064	Cumberland River @ RM 105.0	051302050401
TVA	600065	Cumberland River @ RM 103.7	051302050401
TVA	600066	Cumberland River @ RM 98.0	051302050401
TVA	600116	Cumberland River @ RM 104.29	051302050401
TVA	600118	Cumberland Steam Plant	051302050401
USACOE	3BAR20006	Cumberland River @ RM 100.1	051302050401
USACOE	3BAR20009	Cumberland River @ RM 105.5	051302050401
TVA	600117	Cumberland Steam Plant	051302050403
EPA NARS	OWW04440-0078	Wells Creek	051302050403
USEPA	470109	Lake Barkley	051302050404
TVA	600028	Cumberland River @ RM 95.0	051302050404
TDEC	DFORK000.4ST	Dicks Fork Creek	051302050404
TVA	600027	Cumberland River @ RM 90.01	051302050405
USACOE	3BAR20010	Cumberland River @ RM 88.8	051302050405
USACOE	3BAR20029	Dyers Creek @ RM 0.5	051302050405
TDEC	DYERS004.0ST	Dyers Creek	051302050405
NPS	FODO_EMIC	Indian Creek Embayment	051302050405
NPS	FODO_FDLB	Lake Barkley at Fort Donelson Overlook	051302050405
NPS	FODO_GBIC	Indian Creek at Graves Battery	051302050405
USEPA	470108	Lake Barkley	051302050406
TVA	600022	Cumberland River @ RM 80.00	051302050406
TVA	600094	Cumberland River @ RM 81.8	051302050406
USACOE	3BAR10046	Hickman Creek @ RM 2.5	051302050406
USACOE	3BAR10049	Neville Creek @ RM 2.0	051302050406
USACOE	3BAR20027	Neville Creek @ RM 0.7	051302050406
USACOE	3BAR20028	Hickman Creek @ RM 0.4	051302050406
NPS	FODO_EMHC	Hickman Creek Embayment	051302050406
USACOE	3BAR10045	Saline Creek @ RM 8.0	051302050407
USACOE	3BAR20026	Saline Creek @ RM 1.4	051302050407
TDEC	CUMBE076.5ST	Cumberland River	051302050408
TDEC	ECO71F26	Pryor Creek @ RM 2.0	051302050408
TDEC	TISSUE51	Cumberland River @ RM 75.0	051302050408

Table A4-4b.

Table A4-4a-b. STORET Water Quality Monitoring Stations in the Lake Barkley Watershed*. EPA NARS, Environmental Protection Agency National Aquatic Resource Survey; NPS, National Park Service; TDEC, Tennessee Department of Environment and Conservation; USACOE, United States Army Corps of Engineers; TVA, Tennessee Valley Authority; USEPA, United States Environmental Protection Agency.*

PERMIT NUMBER	COUNTY	DESCRIPTION	WATERBODY	HUC-12
NR0504.330	Montgomery	Utility Line Crossings	UT to Wall Branch	051302050103
NR0504.375	Montgomery	Construction of Intake and Outfall Structures	UT to Wall Branch	051302050103
NR0504.376	Montgomery	Utility Line Crossings	UT to Wall Branch	051302050103
NR0504.388	Montgomery	Stream Restoration and Habitat Enhancement	UT to Brush Creek	051302050103
NR0704.039	Montgomery	Temporary Road Construction	Wall Branch	051302050103
NRS02.361	Montgomery	Utility Line Crossings	Cumberland river	051302050103
NRS06.275	Montgomery	Construction and Removal of Minor Road Crossings	UT to Burney Creek	051302050103
NR0504.327	Montgomery	Construction and Removal of Minor Road Crossings	Big McAdoo Creek	051302050104
NR0504.328	Montgomery	Alteration to WWC	Not Identified	051302050104
NR0704.161	Montgomery	Construction and Removal of Minor Road Crossings	UT to Cumberland River	051302050105
NRS05.010	Montgomery	Construction of Intake and Outfall Structures	Cumberland River	051302050105
NR0604.004	Montgomery	Utility Line Crossings	UT to Bartee Branch	051302050107
NR0604.005	Montgomery	Construction and Removal of Minor Road Crossings	UT to Bartee Branch	051302050107
NRS05.442	Dickson	Bridge and Approaches	Big Bartons Creek	051302050201
NR0604.133	Montgomery	Utility Line Crossings	UT to Little Bartons Creek	051302050203
NR0704.043	Dickson	Construction and Removal of Minor Road Crossings	Yellow Creek	051302050301
NRS02.184	Dickson	Bank Stabilization	Yellow Creek	051302050301
NRS03.370	Dickson	Construction of Intake and Outfall Structures	Yellow Creek	051302050301
NRS04.248	Dickson	Utility Line Crossings	Cedar Creek	051302050301
NRS04.292	Dickson	Utility Line Crossings	Yellow Creek, Cedar Creek, Coon Creek, West Piney, & UTs	051302050301
NR0504.324	Houston	Bank Stabilization	Yellow Creek	051302050302
NRS04.312	Houston	Gravel Dredging	Yellow Creek	051302050302
NRS05.046	Houston	Sand and Gravel Dredging	Yellow Creek	051302050302
NRS05.480	Montgomery	Bridge and Approaches	Yellow Creek	051302050302
NRS06.037	Montgomery	Stream Restoration and Habitat Enhancement	Yellow Creek	051302050302
NRS06.168	Montgomery	Culvert Installation	UT to Yellow Creek	051302050302
NRS03.232	Stewart	Fill Activities for Crane Access	Cumberland River	051302050401
NRS05.366	Stewart	Maintenance Activities	Cumberland River	051302050401
NRS06.081	Stewart	Transmission Line Installation	Guices Creek	051302050402
NRS06.117	Montgomery	Culvert Replacement	Guices Creek	051302050402
NR0604.064	Stewart	Culvert Installation	UT to Guices Creek	051302050403
NR0604.202	Houston	Utility Line Crossings	Erin Branch	051302050403

Table 4-5a.

PERMIT NUMBER	COUNTY	DESCRIPTION	WATERBODY	HUC-12
NR0704.003	Houston	Utility Line Crossings	Brigham Branch, Dry Branch, Guices Creek, Lewis Branch, North Fork, Patterson Branch, Spring Branch, Wells Creek, & UTs	051302050403
NR0704.024	Houston	Utility Line Crossings	Erin Branch	051302050403
NR0704.031	Houston	Utility Line Crossings	Erin Branch	051302050403
NRS03.188	Houston	Bridge and Approaches	Erin Branch	051302050403
NRS03.388	Houston	Gravel Removal	Pollard Branch	051302050403
NRS04.293	Houston	Bank Stabilization and Gravel Dredging	Pollard Branch	051302050403
NRS05.251	Houston	Gravel Dredging	Muster Ground Creek	051302050403
NRS05.447	Houston	Bridge and Approaches	Wells Creek	051302050403
NR0604.033	Stewart	Utility Line Crossings	Dyers Creek	051302050405
NR0704.028	Stewart	Sewer Line Installation	UT to Dyers Creek	051302050405
NRS06.269	Stewart	Construction and Removal of Minor Road Crossings	Morris Creek	051302050405
NRS06.325	Stewart	Multiple Activities	Wetland & UT to Dyers Creek	051302050405
NRS05.099	Henry	Transmission Line Repairs	Tennessee River/ Kentucky Lake	051302050406
NRS02.308	Montgomery	Repair of Low Water Crossing	Saline Creek	051302050407

Table 4-5b.

Table 4-5a-b. ARAPs (Aquatic Resource Alteration Permit) issued June 2002 through June 2007 in the Tennessee Portion of the Lake Barkley Watershed. WWC, Wet Weather Conveyance; UT, Unnamed Tributary.

PERMIT NUMBER	PERMITTEE	COUNTY	LIVESTOCK	WATERBODY	HUC-12
TNA000043	Richard V. & Carmela J. Davis	Montgomery	Poultry	Cumberland River	051302050103

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

PERMIT NUMBER	COUNTY	PERMITTEE: DESCRIPTION	AREA	WATERBODY	HUC-12
TNR145507	Cheatham	Byron Dale Weakley: Dale Weakley Property	2.00	Headwaters of Raccoon Creek	051302050102
TNR142835	Montgomery	Greenland Partners, LLC: Greenland Farms Subdivision	30.44	UT to Barkley Lake	051302050103
TNR142886	Montgomery	David Welch: Welchtree Subdivision	19.00	UT to Brush Creek	051302050103
TNR143045	Montgomery	Herb Baggett: Birnam Wood Subdivision	6.80	UT to Wall Branch	051302050103
TNR143217	Montgomery	Parkvue Village LLC: Parkvue Village Subdivision	20.47	Wall Branch	051302050103
TNR143238	Montgomery	Alliant Commercial Realty Services: Sango Village Marketplace	2.67	UT to Wall Branch	051302050103
TNR143320	Montgomery	Jeff Robinson: Highpoint Row Condominiums	2.85	UT to Cumberland River	051302050103
TNR144107	Montgomery	Bill Mace: Fox Hollow Subdivision	8.95	UT to Cumberland River	051302050103
TNR144290	Montgomery	Clarksville Academy: Sports Complex	31.71	Cumberland River	051302050103
TNR144958	Montgomery	Mainstream Investments: Madison Street Office and Retail Lots	2.60	UT to Wall Branch	051302050103
TNR145135	Montgomery	Terrie Buck: Just for Kids Too	2.20	UT to Wall Branch.	051302050103
TNR145222	Montgomery	Bill Belew: Temporary Construction Road Grading	10.50	Wall Branch Creek	051302050103
TNR190645	Montgomery	TVA: Cumberland-Montgomery Transmission Line	1.66	Burney Creek, Holdenhorn Creek, Budds Creek, Vernon Creek, Antioch Creek, Hurricane Creek, Sulphur Spring Branch, Cumberland River, & UTs	051302050103
TNR190658	Montgomery	TVA: Cumberland-Montgomery Transmission Line	1.78	Cumberland River, Muddy Branch, Little McAdoo Creek, Big McAdoo Creek Red River, & UTs	051302050103
TNR190659	Montgomery	TDOT: SR 149	7.42	Cumberland River	051302050103
TNR142820	Montgomery	Cal McKay: Sango Place Subdivision	1.80	Big McAdoo Creek	051302050104
TNR143029	Montgomery	Rex Hawkins: Waterford Subdivision	14.00	Big McAdoo Creek	051302050104
TNR143092	Montgomery	Wall Brothers Glass, Inc: Commercial Building	1.54	Big McAdoo Creek	051302050104
TNR143831	Montgomery	Herb E Baggett: Brookhaven Subdivision	22.00	McAdoo Creek	051302050104

Table 4-7a.

PERMIT NUMBER	COUNTY	PERMITTEE: DESCRIPTION	AREA	WATERBODY	HUC-12
TNR143913	Montgomery	Mark Deering: Marquee Estates	39.10	Little McAdoo Creek	051302050104
TNR145119	Montgomery	Billy Wilson: Wilson Way Subdivision	3.90	Big McAdoo Creek	051302050104
TNR145341	Montgomery	Miller Sango Storage: Facility Expansion	4.40	UT to Big McAdoo Creek	051302050104
TNR142742	Montgomery	Billy J Mace: Walnut Street Shopping Center	1.20	Cumberland River (Lower Barkley Lake)	051302050105
TNR142842	Montgomery	Andy Phillips: Robyn Lynn Hills Subdivision	4.00	Donaldson Creek	051302050105
TNR143285	Montgomery	Bill Pollard	8.50	UT to Cumberland River	051302050105
TNR190358	Montgomery	TDOT: SR 374	81.00	UTs to Cumberland River	051302050105
TNR145212	Montgomery	Hawkins & Lafferty: Mini Storage Facility	2.34	UT to Antioch Creek	051302050106
TNR143361	Montgomery	Stanley Bumpus: Peach Grove Estates	7.00	UT to Bartee Branch	051302050107
TNR190382	Montgomery	TVA: Montgomery-Barley Transmission Line	65.00	UT to Cooper Creek, Fletchers Fork, UTs to Fletchers Fork, & Lake Taal	051302050107
TNR190622	Montgomery	TVA: Oakwood Switching Station	3.90	UT to Cooper Creek	051302050107
TNR190596	Dickson	TDOT: SR 48	2.45	Bartons Creek & UT (Miller Branch)	051302050201
TNR144289	Dickson	Donald Cunningham: CDC Express, LLC	4.00	Furnace Creek	051302050202
TNR145578	Dickson	Dickson County Municipal Airport Authority: Tee- Hanger and Apron	2.50	UT to Yellow Creek	051302050301
TNR190661	Montgomery	TDOT: SR 149	1.92	Yellow Creek	051302050302
TNR144149	Houston	City of Erin: Water System Improvements	4.00	Erin Branch	051302050403
TNR145192	Houston	City of Erin: Water System Improvements	19.00	Brigham Branch, Dry Branch, Guices Creek, Lewis Branch, North Fork, Patterson Branch, Spring Branch, Wells Creek, & UTs	051302050403
TNR145257	Houston	City of Erin: Water System Improvements	4.00	Erin Branch	051302050403

Table 4-7b.

PERMIT NUMBER	COUNTY	PERMITTEE: DESCRIPTION	AREA	WATERBODY	HUC-12
TNR190586	Houston	TDOT: Marable Hollow Road	1.20	Wells Creek	051302050403
TNR190593	Stewart	TVA: Cumberland-Montgomery Transmission Line	1.81	Wells Creek, UT to Guices Creek, Guices Creek, UT to Moccasin Branch, Moccasin Branch, UT to Yellow Creek, Yellow Creek, East Fork Yellow Creek, Burney Creek, Antioch Creek, Big McAdoo Creek	051302050403
TNR143799	Stewart	Southeastern Development: Wildlife Estates at Dover Cliffs	8.00	UT to Cumberland River	051302050404
TNR145367	Stewart	The Town of Dover: Wastewater Treatment Plant	3.00	Lake Barkley	051302050405
TNR145423	Stewart	Shirley Wallace: Fill Areas	5.00	Project Stream S-10 & Dyers Creek	051302050405
TNR190369	Stewart	TDOT: SR 76	1.07	Morris Creek to Dyers Creek	051302050405
TNR190714	Stewart	TDOT: SR 76	1.33	Cumberland River (Barkley Reservoir), UT to Dyers Creek, & Dyers Creek	051302050405

Table 4-7c.

Table 4-7a-c. CGPs (Construction General Permit) issued June 2002 through June 2007 in the Tennessee Portion of the Lake Barkley Watershed. Area, acres of property associated with construction activity; UT, Unnamed Tributary.

PERMIT NUMBER	PERMITTEE	SIC	SIC NAME	WATERBODY	HUC-12
TN0066583	Winn Materials, Inc. Clarksville Quarry	1422	Crushed and Broken Limestone	UT to Cumberland River	051302050105

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

PERMIT NUMBER	PERMITTEE	SIC	SIC NAME	MADI	WATERBODY	HUC-12
TN0068144	Cheatham Hydro Power Plant	4911	Electric Services	Minor	Cumberland River	051302050101
TN0056081	Chad Youth Enhancement Center	4952	Sewerage Systems	Minor	WWC @ RM 0.3 to UT @ RM 0.4 to Half Pone Creek @ RM 7.7	051302050102
TN0020656	Clarksville STP	4952	Sewerage Systems	Major	Cumberland River (Barkley Reservoir) @ RMs 125.0, 125.4 &126.2.	051302050103
TN0024643	Montgomery Central High School	4952	Sewerage Systems	Minor	UT @ RM 1.2 to Sulphur Spring Branch @ RM 2.9	051302050103
TN0055387	Ramblewood Apartment II, LLC	4952	Sewerage Systems	Minor	UT @ RM 0.5 to Cumberland River @ RM 130.2	051302050103
TN0029157	Zinifex Clarksville, Inc.	1031	Lead and Zinc Ores	Major	Cumberland River @ RM 122, UT to Cumberland River @ RM 122.6, & UT to Cumberland River @ RM 121.1	051302050105
TN0064181	Palmyra Health Care Center	4952	Sewerage Systems	Minor	Cumberland River @ RM 114.7	051302050105
TN0024651	Woodlawn School	4952	Sewerage Systems	Minor	UT @ RM 1.8 to Bartee Branch @ RM 3.1	051302050107
TN0025119	Cumberland City Lagoon	4952	Sewerage Systems	Minor	Cumberland River @ RM 104.5	051302050401
TN0064882	Erin STP	4952	Sewerage Systems	Minor	Cumberland River @ RM 103.7	051302050401
TN0005789	TVA: Cumberland Fossil Plant	4911	Electric Services	Minor	Cumberland River @ RM 103	051302050403
TN0022667	Dover STP	4952	Sewerage Systems	Minor	Cumberland River (Barkley Reservoir) @ RM 88.6	051302050405
TN0020273	USDA Forest Service, Brandon Springs Camp	4952	Sewerage Systems	Minor	Cumberland River (Barkley Reservoir) @ RM 82.6	051302050406

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

PERMIT NUMBER	PERMITTEE	WATERBODY	HUC-12
TNG110238	Irving Materials, Inc. Cumberland City	Lickskillet Branch to Cumberland River	051302050403
TNG110239	iMi South, LLC - Dover	Dyers Creek	051302050405

Table 4-10. RMCP (Ready Mix Concrete Plant) Permittees in the Tennessee Portion of the Lake Barkley Watershed.

PERMIT NUMBER	PERMITTEE	SECTOR	WATERBODY	AREA	HUC-12
TNR050317	Jostens Printing & Publishing	X	UT to Ground Water	2.20	051302050103
TNR053279	Ingram Materials Company	J	Cumberland River	3.00	051302050103
TNR053548	United Parcel Service Clarksville	P	Cumberland River	1.14	051302050103
TNR055903	McLeod's, Inc.	C	Cumberland River	1.25	051302050103
TNR056449	Beach Oil Convenience Store	P	Cumberland River	1.11	051302050103
TNR050202	Eubank, LLC	A	Cumberland River	43.10	051302050105
TNR050605	D & D Auto Salvage, Inc.	M	Cumberland River (Barkley Reservoir)	17.00	051302050105
TNR055048	Winn Materials, Inc.	Q	Cumberland River @ RM 123.6	5.00	051302050105
TNR056189	Keats & Bromley Auto Sales & Salvage	M	Not Identified	23.89	051302050107
TNR050808	Milam & Stanfill Sawmill Inc.	A	Dry Hollow/ Bell Hollow Creek	14.00	051302050202
TNR053254	Dickson County Municipal Airport	S	Standing Rock Hollow Creek	0.30	051302050301
TNR054432	Nagle Industries	AB	Wells Creek	10.00	051302050401
TNR050126	Ralph Largent Sawmill, Inc.	A	Denmark Branch & Town Branch	11.90	051302050403
TNR050623	J.V. Averitt Lumber Company Inc.	A	Musterground Creek & Wells Creek	15.00	051302050403
TNR051933	TVA: Cumberland Fossil Plant	O	Cumberland River @ RM 103.7, Cumberland River @ RM 103.6, Cumberland River @ RM 103.3, & Cumberland River @ RM 102.8	3.82	051302050403
TNR053946	TIN, Inc., dba Temple-Inland, Cumberland City Wallboard Plant	E	Wells Creek to Cumberland River	1.23	051302050403
TNR054428	Allied Custom Gypsum of Tennessee, LLC	E	Metropolitan Storm Sewer to Barkley Reservoir	7.00	051302050403
TNR056527	Coleman Lumber Company	A	Catch Pond to Brigham Branch	6.00	051302050403
TNR051829	Mathis Brothers Lumber Company	A	Cumberland River (Barkley Reservoir)	12.00	051302050404
TNR050705	Nashville Wire Products	AA	Cumberland River	4.50	051302050405
TNR054244	Swift Sawmill	A	Dyers Creek	3.00	051302050405
TNR054245	Milton Lumber Company, Inc.	A	UT to West Fork Lick Creek	4.00	051302050405

Table 4-11a.

PERMIT NUMBER	PERMITTEE	SECTOR	WATERBODY	AREA	HUC-12
TNR054284	Oneal Keatts Sawmill	A	Dyers Creek	5.00	051302050405
TNR053527	Wickliffe Paper Company Dover Woodyard	A	Bear Creek	18.00	051302050406
TNR055991	Averitt Lumber Company	A	Bear Creek	13.40	051302050406

Table 4-11b.

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

PERMIT NUMBER	PERMITTEE	WATERBODY	HUC-12
TN0077666	Water Authority of Dickson County	UT to Barkley Reservoir (Cheatham Reservoir)	051302050101
TN0074004	Clarksville WTP	Cumberland River @ RM 132.8	051302050103
TN0079081	North Clarksville Water Treatment Plant	UT to Cumberland River (Barkley Reservoir) @ RM 124.8	051302050105
TN0074675	Erin Water Works WTP	Yellow Creek to Cumberland River @ RM 108.3	051302050302
TN0005398	Dover Water Treatment Plant	Cumberland River (Barkley Reservoir) @ RM 88.9	051302050405

Table 4-12. WTP (Water Treatment Plant) Permittees in the Tennessee Portion of the Lake Barkley Watershed. UT, Unnamed Tributary

SECTOR	TMSP SECTOR NAME
A	Timber Products Facilities
AA	Facilities That Manufacture Metal Products including Jewelry, Silverware and Plated Ware
AB	Facilities That Manufacture Transportation Equipment, Industrial or Commercial Machinery
AC	Facilities That Manufacture Electronic and Electrical Equipment and Components, Photographic and Optical Goods
AD	Facilities That Are Not Covered Under Sectors A Thru AC (Monitoring Required)
AE	Facilities That Are Not Covered Under Sectors A Thru AC (Monitoring Not Required)
B	Paper and Allied Products Manufacturing Facilities
C	Chemical and Allied Products Manufacturing Facilities
D	Asphalt Paving, Roofing Materials, and Lubricant Manufacturing Facilities
E	Glass, Clay, Cement, Concrete, and Gypsum Product Manufacturing Facilities
F	Primary Metals Facilities
G	Metal Mines (Ore Mining and Dressing) (RESERVED)
H	Inactive Coal Mines and Inactive Coal Mining-Related Facilities
I	Oil or Gas Extraction Facilities
J	Construction Sand and Gravel Mining and Processing and Dimension Stone Mining and Quarrying Facilities
K	Hazardous Waste Treatment Storage or Disposal Facilities
L	Landfills and Land Application Sites
M	Automobile Salvage Yards
N	Scrap Recycling and Waste and Recycling Facilities
O	Steam Electric Power Generating Facilities
P	Vehicle Maintenance or Equipment Cleaning areas at Motor Freight Transportation Facilities, Passenger Transportation Facilities, Petroleum Bulk Oil Stations and Terminals, the United States Postal Service, or Railroad Transportation Facilities
Q	Vehicle Maintenance Areas and Equipment Cleaning Areas of Water Transportation Facilities
R	Ship or Boat Building and Repair Yards
S	Vehicle Maintenance Areas, Equipment Cleaning Areas or From Airport Deicing Operations located at Air Transportation Facilities
T	Wastewater Treatment Works
U	Food and Kindred Products Facilities
V	Textile Mills, Apparel and other Fabric Product Manufacturing Facilities
W	Furniture and Fixture Manufacturing Facilities
X	Printing and Platemaking Facilities
Y	Rubber and Miscellaneous Plastic Product Manufacturing Facilities
Z	Leather Tanning and Finishing Facilities

Table A4-13. TMSP Sectors and Descriptions.

APPENDIX V

LAND TREATMENT – CONSERVATION BUFFERS					
	Contour Buffer Strips (acres)	Field Borders (feet)	Filter Strip (feet)	Streambank / Shoreline Protection (feet)	Riparian Forest Buffer (acres)
FY 2002	6	7950	2	325	21
FY 2003		25988	5	1870	42
FY 2004			1	4050	1
FY 2006		8208	16	1755	
FY 2006		1275	1		11

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

EROSION CONTROL		
	Est. soil saved (tons/year)	Land Treated with erosion control measures (acres)
FY 2002	13650	1856
FY 2003	20256	2888

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

NUTRIENT MANAGEMENT			
	AFO Nutrient Mgmt Applied (acres)	Non-AFO Nutrient Mgmt. Applied (acres)	Total Applied (acres)
FY 2002	81	3864	3945
FY 2003		4567	4567
FY 2004	3412		3412
FY 2005	2447		2447
FY 2006	4024		4024

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

PEST MANAGEMENT	
	Pest Mgmt. Systems (acres)
FY 2002	3086
FY 2003	4370
FY 2004	3366
FY 2005	2420
FY 2006	4894

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

GRAZING/FORAGES				
	Prescribed Grazing (acres)	Fencing (feet)	Heavy Use Area Protection (acres)	Pasture and Hay Planting (acres)
FY 2002	1557			
FY 2003	1723			
FY 2004	1795	17370	3	131
FY 2005	1740	9030	2	103
FY 2006	438	36635	22	584

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

TREE AND SHRUB PRACTICES					
	Land Prepared for revegetation of Forest (acres)	Land Improved through Forest Stand improvement (acres)	Total Tree & Shrub Estab. (acres)	Forestland Re-established or improved (acres)	Use Exclusion (acres)
FY 2002		1016	4		
FY 2003	81	2222			
FY 2004		852	12	864	3
FY 2005		1330		1330	193
FY 2006		1859		1859	40

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

LAND TREATMENT – TILLAGE AND CROPPING						
	Residue Mgmt, No-till, Strip till (acres)	Residue Mgmt - Mulch Till (acres)	Tillage & Residue Mgmt Systems (acres)	Conservation Crop Rotation (acres)	Contour Farming (acres)	Cover Crop (acres)
FY 2002	89	353	442			
FY 2003	213	571	784			
FY 2004	11	14	25	949	45	376
FY 2005	16		16	430	10	100
FY 2006	61	226	287	822	28	379

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

WETLANDS	
	Wetlands Created or Restored (acres)
FY 2002	48
FY 2003	20

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

WILDLIFE HABITAT MANAGEMENT			
	Upland Habitat Mgmt (acres)	Wetland Habitat Mgmt (acres)	Total Wildlife Habitat Mgmt Applied (acres)
FY 2003	1531	18	1549
FY 2004	1979		1979
FY 2005	1260	79	1339
FY 2006	2522	15	2537

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

WATER SUPPLY			
	Pipeline (ft)	Pond (number)	Watering Facility (number)
FY 2004	200	1	2
FY 2005	5,764	1	4
FY 2006	7968	1	6

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

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
051302050101	328	Conservation Crop Rotation	11	Crop
	340	Cover Crop	11	Crop
	382	Fence	1	Pasture
	472	Use Exclusion	1	Wildlife
	511	Forage Harvest Management	24	Crop (19) Pasture (5)
	512	Pasture and Hay Planting	15	Crop
	516	Pipeline	1	Pasture
	528	Prescribed Grazing	1	Pasture
	561	Heavy Use Area Protection	1	Pasture
	590	Nutrient Management	24	Crop (12) Hay (1) Pasture (11)
	595	Pest Management	45	Crop (14) Hay (1) Pasture (28) Wildlife (2)
	614	Watering Facility	1	Pasture
	645	Upland Wildlife Habitat Management	11	Crop (3) Forest (2) Grazed Forest (1) Wildlife (5)
	647	Early Successional Habitat Development/Manage	1	Wildlife
	666	Forest Stand Improvement	2	Forest (1) Grazed Forest (1)

Table A5-2a.

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
051302050102	328	Conservation Crop Rotation	7	Crop
	340	Cover Crop	3	Crop
	386	Field Border	1	Wildlife
	472	Use Exclusion	1	Forest
	511	Forage Harvest Management	4	Crop (3) Hay (1)
	512	Pasture and Hay Planting	3	Crop
	528	Prescribed Grazing	6	Pasture
	580	Streambank and Shoreline Protection	1	Hay
	590	Nutrient Management	12	Crop (2) Pasture (9) Wildlife (1)
	595	Pest Management	19	Crop (3) Hay (1) Pasture (14) Wildlife (1)
	645	Upland Wildlife Habitat Management	2	Forest (1) Wildlife (1)
	666	Forest Stand Improvement	1	Forest
051302050103	382	Fence	3	Pasture
	511	Forage Harvest Management	8	Hay
	516	Pipeline	1	Pasture
	561	Heavy Use Area Protection	1	Pasture
	614	Watering Facility	1	Pasture
051302050104	327	Conservation Cover	18	Crop
	328	Conservation Crop Rotation	2	Crop
	340	Cover Crop	2	Crop
	342	Critical Area Planting	1	Pasture
	382	Fence	4	Pasture
	410	Grade Stabilization Structure	1	Crop
	472	Use Exclusion	6	Crop
	511	Forage Harvest Management	13	Crop (6) Hay (7)
	512	Pasture and Hay Planting	2	Crop
	516	Pipeline	2	Crop
	528	Prescribed Grazing	1	Pasture
	533	Pumping Plant	1	Crop

Table A5-2b.

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
051302050104	561	Heavy Use Area Protection	3	Crop
	590	Nutrient Management	11	Crop (2) Hay (7) Pasture (2)
	595	Pest Management	21	Crop (2) Hay (7) Pasture (12)
	614	Watering Facility	1	Crop
051302050201	328	Conservation Crop Rotation	8	Crop
	330	Contour Farming	3	Crop
	340	Cover Crop	5	Crop
	511	Forage Harvest Management	6	Crop (5) Hay (1)
	512	Pasture and Hay Planting	8	Crop (7) Hay (1)
	528	Prescribed Grazing	2	Pasture
	533	Pumping Plant	1	Pasture
	590	Nutrient Management	18	Crop (8) Hay (1) Pasture (9)
	595	Pest Management	27	Crop (15) Hay (1) Pasture (11)
	642	Water Well	1	Pasture
	644	Wetland Wildlife Habitat Management	1	Forest
	645	Upland Wildlife Habitat Management	11	Forest (1) Wildlife (10)
	666	Forest Stand Improvement	3	Forest (2) Wildlife (1)
051302050202	328	Conservation Crop Rotation	42	Crop (41) Pasture (1)
	340	Cover Crop	8	Crop (7) Pasture (1)
	344	Residue Management, Seasonal	5	Crop
	382	Fence	5	Pasture
	391	Riparian Forest Buffer	1	Crop

Table A5-2c.

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
051302050202	472	Use Exclusion	10	Wildlife
	511	Forage Harvest Management	35	Crop (14) Hay (15) Pasture (6)
	512	Pasture and Hay Planting	18	Crop (12) Pasture (6)
	516	Pipeline	3	Pasture
	528	Prescribed Grazing	25	Crop (1) Hay (1) Pasture (23)
	561	Heavy Use Area Protection	4	Pasture
	578	Stream Crossing	2	Pasture
	580	Streambank and Shoreline Protection	6	Crop (3) Hay (1) Pasture (2)
	590	Nutrient Management	103	Crop (38) Hay (9) Pasture (56)
	595	Pest Management	90	Crop (38) Hay (9) Pasture (43)
	614	Watering Facility	3	Pasture
	645	Upland Wildlife Habitat Management	28	Forest (27) Wildlife (1)
	666	Forest Stand Improvement	28	Forest
051302050203	328	Conservation Crop Rotation	11	Crop
	330	Contour Farming	7	Crop
	340	Cover Crop	4	Crop
	342	Critical Area Planting	3	Pasture
	382	Fence	3	Pasture
	393	Filter Strip	2	Pasture
	410	Grade Stabilization Structure	1	Pasture
	412	Grassed Waterway	3	Pasture
	511	Forage Harvest Management	3	Crop
	512	Pasture and Hay Planting	7	Crop (4) Hay (1) Pasture (2)
	516	Pipeline	2	Pasture
	528	Prescribed Grazing	5	Pasture
	561	Heavy Use Area Protection	2	Pasture

Table A5-2d.

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
051302050203	580	Streambank and Shoreline Protection	1	Pasture
	590	Nutrient Management	28	Crop (11) Pasture (17)
	595	Pest Management	27	Crop (10) Pasture (17)
	614	Watering Facility	2	Pasture
	645	Upland Wildlife Habitat Management	7	Forest
	666	Forest Stand Improvement	7	Forest
051302050204	327	Conservation Cover	5	Crop
	328	Conservation Crop Rotation	1	Pasture
	329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	11	Crop
	342	Critical Area Planting	3	Pasture
	382	Fence	6	Crop (1) Forest (1) Hay (2) Pasture (2)
	528	Prescribed Grazing	3	Pasture
	561	Heavy Use Area Protection	1	Pasture
	590	Nutrient Management	15	Crop (3) Pasture (12)
	595	Pest Management	16	Crop (4) Pasture (12)
	645	Upland Wildlife Habitat Management	4	Forest
	666	Forest Stand Improvement	4	Forest
051302050205	328	Conservation Crop Rotation	2	Crop
	330	Contour Farming	2	Crop
	340	Cover Crop	2	Crop
	382	Fence	1	Forest
	511	Forage Harvest Management	4	Crop (2) Hay (2)
	512	Pasture and Hay Planting	6	Crop (4) Hay (2)
	590	Nutrient Management	7	Crop (2) Hay (2) Pasture (3)
	595	Pest Management	7	Crop (2) Hay (2) Pasture (3)
	645	Upland Wildlife Habitat Management	1	Hay
	666	Forest Stand Improvement	1	Forest

Table A5-2e.

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
051302050206	327	Conservation Cover	3	Crop
	328	Conservation Crop Rotation	2	Crop
	340	Cover Crop	2	Crop
	511	Forage Harvest Management	8	Crop (7) Hay (1)
	512	Pasture and Hay Planting	2	Crop
	516	Pipeline	5	Pasture
	590	Nutrient Management	9	Crop (4) Hay (1) Pasture (4)
	595	Pest Management	3	Crop (2) Hay (1)
	614	Watering Facility	3	Pasture
	645	Upland Wildlife Habitat Management	5	Crop
051302050207	327	Conservation Cover	4	Crop (3) Wildlife (1)
	328	Conservation Crop Rotation	7	Crop
	329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	2	Crop
	330	Contour Farming	6	Crop
	344	Residue Management, Seasonal	7	Crop
	378	Pond	1	Pasture
	386	Field Border	1	Crop
	391	Riparian Forest Buffer	6	Crop (4) Forest (2)
	511	Forage Harvest Management	15	Hay (4) Pasture (10) Wildlife (1)
	512	Pasture and Hay Planting	4	Crop (1) Hay (2) Pasture (1)
	516	Pipeline	7	Pasture
	528	Prescribed Grazing	13	Pasture
	561	Heavy Use Area Protection	2	Pasture
	590	Nutrient Management	53	Crop (12) Hay (4) Pasture (34) Wildlife (3)
	595	Pest Management	56	Crop (15) Hay (4) Pasture (34) Wildlife (3)

Table A5-2f.

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
051302050207	645	Upland Wildlife Habitat Management	21	Crop (1) Forest (17) Wildlife (3)
	666	Forest Stand Improvement	28	Forest
051302050301	327	Conservation Cover	3	Crop
	328	Conservation Crop Rotation	7	Crop
	338	Prescribed Burning	2	Wildlife
	340	Cover Crop	8	Crop
	378	Pond	1	Pasture
	382	Fence	2	Pasture
	386	Field Border	3	Wildlife
	472	Use Exclusion	8	Crop (2) Wildlife (6)
	511	Forage Harvest Management	11	Crop (7) Hay (4)
	512	Pasture and Hay Planting	5	Crop
	516	Pipeline	1	Pasture
	561	Heavy Use Area Protection	1	Pasture
	590	Nutrient Management	18	Crop (7) Hay (4) Pasture (5) Wildlife (2)
	595	Pest Management	19	Crop (8) Hay (4) Pasture (5) Wildlife (2)
	614	Watering Facility	1	Pasture
	645	Upland Wildlife Habitat Management	12	Crop (3) Forest (1) Wildlife (8)
	645	Upland Wildlife Habitat	8	Wildlife
	666	Forest Stand Improvement	2	Forest
051302050302	327	Conservation Cover	4	Crop
	472	Use Exclusion	2	Crop
	511	Forage Harvest Management	3	Hay
	528	Prescribed Grazing	51	Pasture
	590	Nutrient Management	55	Hay (3) Pasture (51) Wildlife (1)

Table A5-2g.

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
051302050302	595	Pest Management	53	Hay (3) Pasture (50)
	645	Upland Wildlife Habitat Management	6	Forest (5) Wildlife (1)
	666	Forest Stand Improvement	5	Forest
051302050303	328	Conservation Crop Rotation	1	Crop
	340	Cover Crop	1	Crop
	342	Critical Area Planting	3	Pasture
	344	Residue Management,	2	Crop
	378	Pond	1	Pasture
	382	Fence	21	Crop (1) Forest (1) Pasture (19)
	391	Riparian Forest Buffer	6	Crop (2) Forest (1) Pasture (1) Water (2)
	393	Filter Strip	1	Pasture
	399	Fishpond Management	1	Pasture
	511	Forage Harvest Management	1	Crop
	512	Pasture and Hay Planting	1	Crop
	516	Pipeline	7	Pasture
	528	Prescribed Grazing	24	Pasture
	561	Heavy Use Area Protection	1	Pasture
	580	Streambank and Shoreline Stabilization	4	Pasture (1) Water (3)
	590	Nutrient Management	33	Hay (9) Crop (2) Pasture (21) Water (1)
	595	Pest Management	48	Crop (4) Hay (14) Pasture (30)
	614	Watering Facility	4	Pasture (4)
	642	Water Well	1	Pasture
	645	Upland Wildlife Habitat Management	7	Forest (5) Grazed Forest (1) Wildlife (1)
	666	Forest Stand Improvement	2	Forest (1) Grazed Forest (1)

Table A5-2h.

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
051302050401	382	Fence	7	Hay (3) Pasture (4)
	511	Forage Harvest Management	6	Hay
	512	Pasture and Hay Planting	3	Crop
	516	Pipeline	2	Pasture
	528	Prescribed Grazing	5	Pasture
	533	Pumping Plant	1	Pasture
	561	Heavy Use Area Protection	2	Pasture
		Heavy Use Area Protection	3	Pasture
	590	Nutrient Management	30	Crop (2) Hay (8) Pasture (20)
	595	Pest Management	10	Hay (6) Pasture (4)
	614	Watering Facility	2	Pasture
	645	Upland Wildlife Habitat Management	7	Forest (5) Grazed Forest (1) Wildlife (1)
051302050402	328	Conservation Crop Rotation	2	Crop
	340	Cover Crop	3	Crop
	382	Fence	1	Pasture
	511	Forage Harvest Management	21	Hay (2) Pasture (19)
	512	Pasture and Hay Planting	1	Crop
	516	Pipeline	4	Headquarters (2) Pasture (2)
	528	Prescribed Grazing	16	Pasture
	533	Pumping Plant	1	Forest
	561	Heavy Use Area Protection	3	Headquarters (1) Pasture (2)
	590	Nutrient Management	39	Crop (3) Forest (1) Hay (10) Pasture (25)
	595	Pest Management	11	Hay (5) Pasture (6)
	614	Watering Facility	3	Headquarters (1) Pasture (2)
	645	Upland Wildlife Habitat	2	Forest

Table A5-2i.

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
051302050403	327	Conservation Cover	1	Crop
	328	Conservation Crop Rotation	6	Crop
	340	Cover Crop	1	Crop
	382	Fence	6	Crop (1) Pasture (5)
	472	Use Exclusion	2	Crop (1) Forest (1)
	511	Forage Harvest Management	14	Crop (3) Hay (11)
	512	Pasture and Hay Planting	3	Crop (3)
	516	Pipeline	4	Hay (1) Pasture (3)
	528	Prescribed Grazing	13	Pasture
	533	Pumping Plant	1	Hay
	561	Heavy Use Area Protection	4	Pasture
	590	Nutrient Management	38	Crop (9) Hay (12) Pasture (17)
	595	Pest Management	53	Crop (10) Hay (14) Pasture (29)
	614	Watering Facility	4	Pasture
	645	Upland Wildlife Habitat Management	23	Crop (1) Forest (22)
	666	Forest Stand Improvement	23	Forest
051302050404	328	Conservation Crop Rotation	4	Crop
	340	Cover Crop	8	Crop (5) Hay (2) Wildlife (1)
	382	Fence	3	Pasture
	472	Use Exclusion	1	Forest
	511	Forage Harvest Management	6	Crop 4) Hay (1) Wildlife (1)
	528	Prescribed Grazing	1	Pasture
	590	Nutrient Management	6	Hay (1) Pasture (4) Wildlife (1)
	595	Pest Management	22	Crop (4) Hay (2) Pasture (15) Wildlife (1)

Table A5-2j.

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
051302050404	645	Upland Wildlife Habitat Management	7	Crop (4) Hay (1) Wildlife (2)
	666	Forest Stand Improvement	7	Crop (4) Hay (1) Wildlife (2)
051302050405	328	Conservation Crop Rotation	8	Crop
	329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	3	Crop
	344	Residue Management, Seasonal	3	Crop
	391	Riparian Forest Buffer	1	Pasture
	590	Nutrient Management	18	Crop (7) Hay (3) Pasture (8)
	595	Pest Management	14	Crop (2) Hay (3) Pasture (9)
	645	Upland Wildlife Habitat Management	3	Forest
	666	Forest Stand Improvement	3	Forest
051302050406	330	Contour Farming	3	Crop (2) Hay (1)
	362	Diversion	1	Crop
	382	Fence	9	Pasture
	561	Heavy Use Area Protection	4	Pasture
	590	Nutrient Management	2	Pasture
	595	Pest Management	25	Crop (2) Hay (1) Pasture (22)
	666	Forest Stand Improvement	1	Forest
051302050407	382	Fence	2	Pasture
	516	Pipeline	1	Pasture
	561	Heavy Use Area Protection	1	Pasture
	595	Pest Management	25	Hay (6) Pasture (19)
	614	Watering Facility	1	Pasture
	645	Upland Wildlife Habitat Management	1	Forest
	666	Forest Stand Improvement	2	Forest

Table A5-2k.

HUC-12	NRCS PRACTICE CODE	NRCS PRACTICE NAME	NUMBER OF PRACTICES INSTALLED	LAND USE DISPLAY
051302050408	382	Fence	3	Pasture
	511	Forage Harvest Management	5	Pasture
	512	Pasture and Hay Planting	7	Pasture
	516	Pipeline	3	Pasture
	528	Prescribed Grazing	10	Pasture
	561	Heavy Use Area Protection	1	Pasture
	590	Nutrient Management	23	Hay (1) Pasture (22)
	595	Pest Management	23	Hay (1) Pasture (22)
	614	Watering Facility	3	Pasture
	645	Upland Wildlife Habitat Management	3	Forest
	666	Forest Stand Improvement	4	Forest (3) Wildlife (1)

Table A5-2l.

Tables A5-2a-l. Best Management Practices Installed in Partnership with NRCS (2006-2007) in the Tennessee Portion of the Lake Barkley Watershed*. Information was provided as part of Conservation Technical Assistance Grant 060701T47.*

PRACTICE	NRCS CODE	NUMBER OF BMPs
Critical Area Planting	342	4
Dike	356	1
Diversion	362	3
Pond for Rotational Grazing System	378	2
Fencing for Livestock Exclusion	382	1
Fence	382	7
Riparian Forest Buffer as streambank Res	391	2
Grassed Waterway	412	1
Cropland Conversion	512	7
Pipeline	516	5
Heavy Use Area	561	11
Streambank/Shoreline Protection	580	13
Alternative Watering System Public Water	614	3
Total BMPs		**60**

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

SITE ID	WATER BODY	YEAR
120041401	Dyers Creek	2004
120041402	Dyers Creek	2004
120041501	Saline Creek	2004
120041502	Saline Creek	2004
120042001	South Cross Creek	2004
219991102	Yellow Creek	1999
219991101	Yellow Creek	1999
119981001	Bear Creek	1998
120031801	Yellow Creek	2003
120031802	Yellow Creek	2003

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