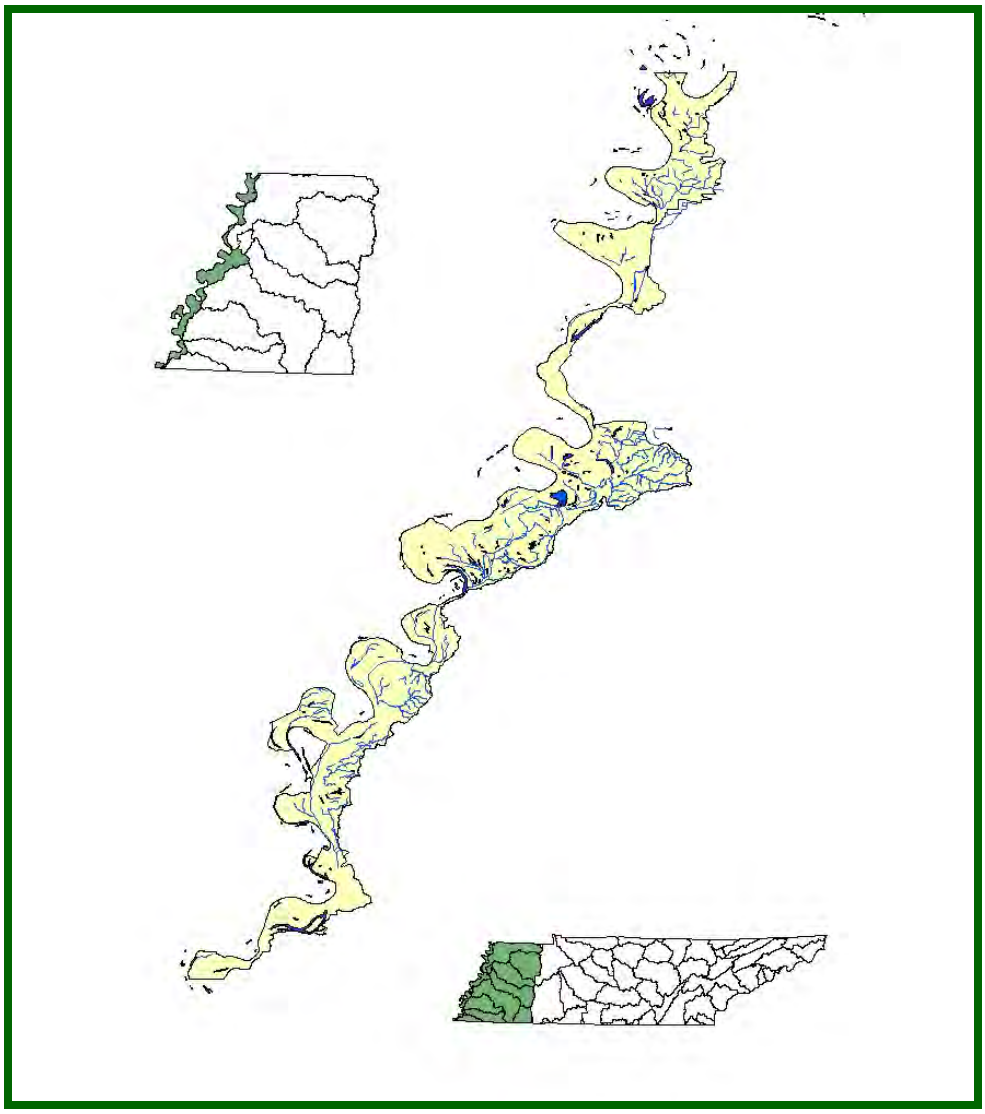
MISSISSIPPI RIVER WATERSHED (08010100) OF THE MISSISSIPPI RIVER BASIN

WATERSHED WATER QUALITY MANAGEMENT PLAN



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

MISSISSIPPI RIVER WATERSHED
WATER QUALITY MANAGEMENT PLAN

TABLE OF CONTENTS

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

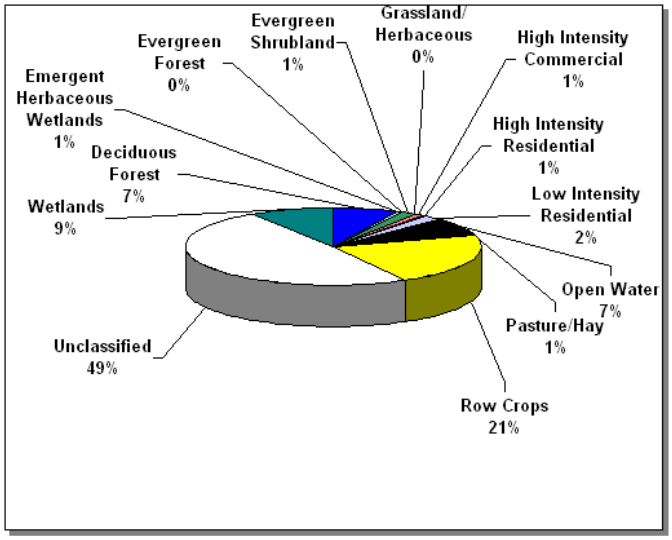
Summary – Mississippi River Watershed (08010100)

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 Mississippi River 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.

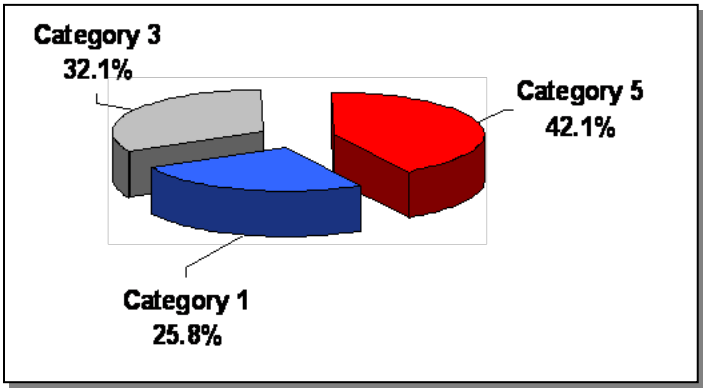
A detailed description of the watershed can be found in Chapter 2. The Mississippi River Watershed is approximately 1,086 square miles (590 mi^2 in Tennessee) and includes parts of five Tennessee counties. A part of the Mississippi River drainage basin, the watershed has 519.9 stream miles and 125 lake acres in Tennessee.



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

Two designated state natural areas, two national wildlife refuges, nine wildlife management areas, one state historic area, two state forests, and one state recreation area are located in the watershed. Thirty-five rare plant and animal species have been documented in the watershed, including seven rare fish species.

A review of water quality sampling and assessment is presented in Chapter 3. Using the Watershed Approach to Water Quality, 116 sampling events occurred in the Mississippi River Watershed in 2000-2005. These were conducted at ambient, ecoregion or watershed monitoring sites. Monitoring results support the conclusion that 38.0% of stream miles assessed fully support one or more designated uses.



Water Quality Assessment of Streams and Rivers in the Tennessee Portion of the Mississippi River Watershed. Assessment data are based on the 2006 Water Quality Assessment of 515.9 stream miles in the watershed.

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

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
08010100	080101001	080101000106 (Mississippi River)
	080101002	080101000201 (Mississippi River)
		080101000202 (Mississippi River)
		080101000203 (Blue Bank Bayou)
		080101000204 (Mississippi River)
	0801010003	080101000301 (Mississippi River)
		080101000302 (Middle Forked Deer)
		080101000303 (Mississippi River)
		080101000304 (Mississippi River)
		080101000305 (Cold Creek)
	0801010004	080101000401 (Mississippi River)
		080101000402 (Mississippi River)
		080101000403 (Mississippi River)
		080101000404 (Mississippi River)
		080101000405 (Mississippi River)

The Tennessee Portion of the Mississippi River Watershed is Composed of fifteen USGS-Delineated Subwatersheds (12-Digit Subwatersheds).

Point source contributions to the Tennessee portion of the Mississippi River Watershed consist of eighteen individual NPDES-permitted facilities, four of which discharge into streams that have been listed on the 2006 303(d) list. Other point source permits in the watershed (as of October 7, 2008) are Aquatic Resource Alteration Permits (39), Tennessee Multi-Sector Permits (104), Construction General Permits (59), and Ready Mix Concrete Plant Permits (3). Agricultural operations include cattle, chicken, hog, and sheep farming. Maps illustrating the locations of permit sites and tables summarizing livestock practices are presented in each subwatershed.

Chapter 5 is entitled *Water Quality Partnerships in the Mississippi River Watershed* and highlights partnerships between agencies and between agencies and landowners that are essential to success. Programs of federal agencies (Natural Resources Conservation Service, U.S. Fish and Wildlife Service, U.S. Geological Survey, and U.S. Army Corps of Engineers), and state agencies (TDEC/State Revolving Fund, TDEC Division of Water Supply, Tennessee Department of Agriculture, West Tennessee River Basin Authority, and Tennessee Wildlife Resources Agency) as well as Kentucky Division of Water) are summarized. Local initiatives of organizations active in the watershed (Friends of West Tennessee Refuges) are also described.

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

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

CHAPTER 1

WATERSHED APPROACH TO WATER QUALITY

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

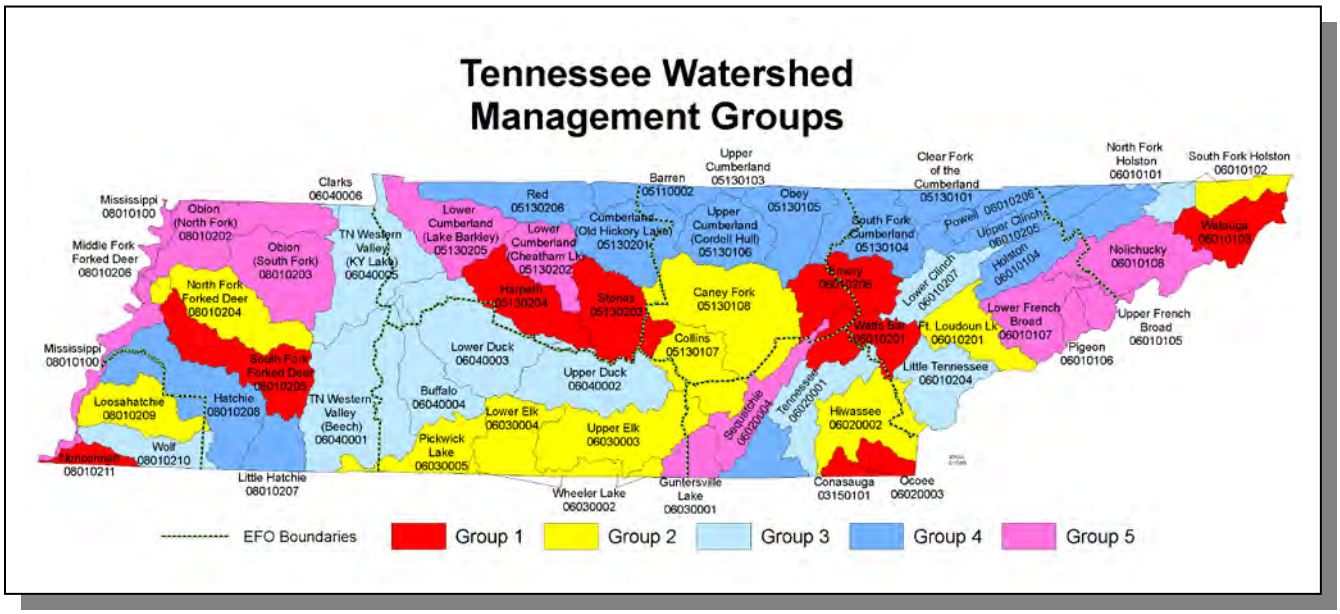


Figure 1-1. Watershed Groups in Tennessee's Watershed Approach to Water Quality.

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

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

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

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

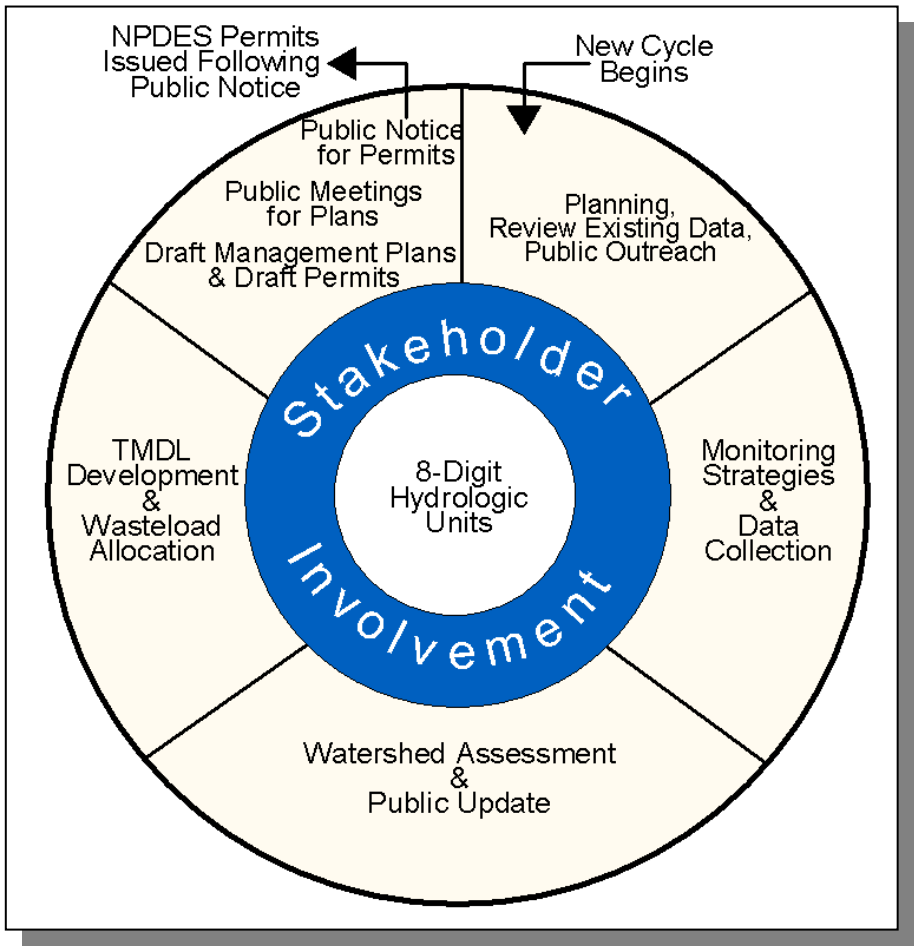


Figure 1-2. The Watershed Approach Cycle.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CHAPTER 2

DESCRIPTION OF THE MISSISSIPPI RIVER WATERSHED

2.1. BACKGROUND. The Mississippi River, derived from the old Ojibwe word *misi-ziibi* meaning 'great river', is the second-longest river in the United States. The Mississippi River has the third largest drainage basin in the world, exceeded in size only by the watersheds of the Amazon River and the Congo River. It drains 41 percent of the 48 contiguous states. The New Madrid Fault Zone, which lies near the cities of Memphis and St. Louis, was responsible for three large earthquakes in 1811 and 1812 which changed the course of the river, creating Reelfoot Lake in northwest Tennessee.

This Chapter describes the location and characteristics of the Tennessee Portion of the Mississippi River Watershed.

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. The Tennessee portion of the Mississippi River Watershed is located in West Tennessee and includes parts of Dyer, Lake, Lauderdale, Shelby, and Tipton Counties.

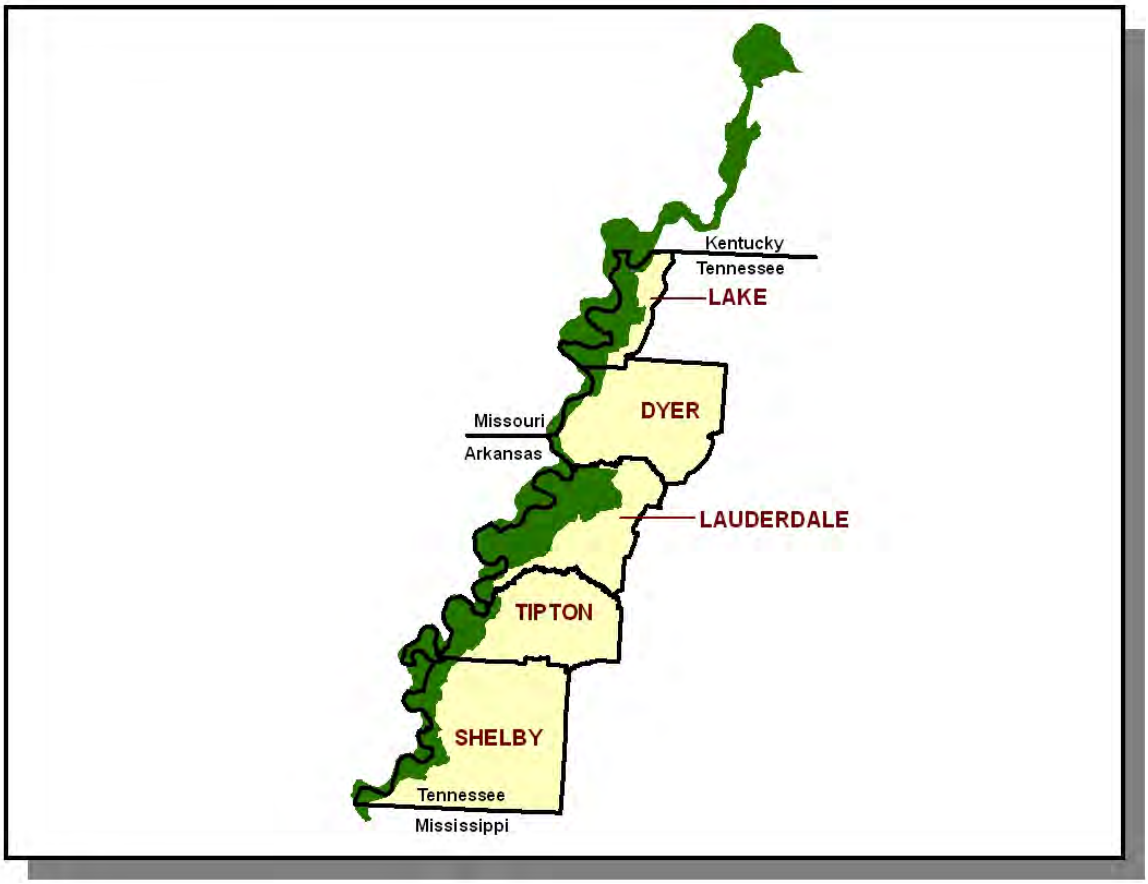


Figure 2-1. General Location of the Mississippi River Watershed.

COUNTY	% OF WATERSHED IN EACH COUNTY
Lauderdale	38.27
Shelby	21.41
Lake	18.47
Tipton	10.95
Dyer	6.29

Table 2-1. The Tennessee Portion of the Mississippi River Watershed Includes Parts of Five West Tennessee Counties.

2.2.B. Population Density Centers. Four interstates and eighteen highways serve the major communities in the Tennessee portion of the Mississippi River Watershed.

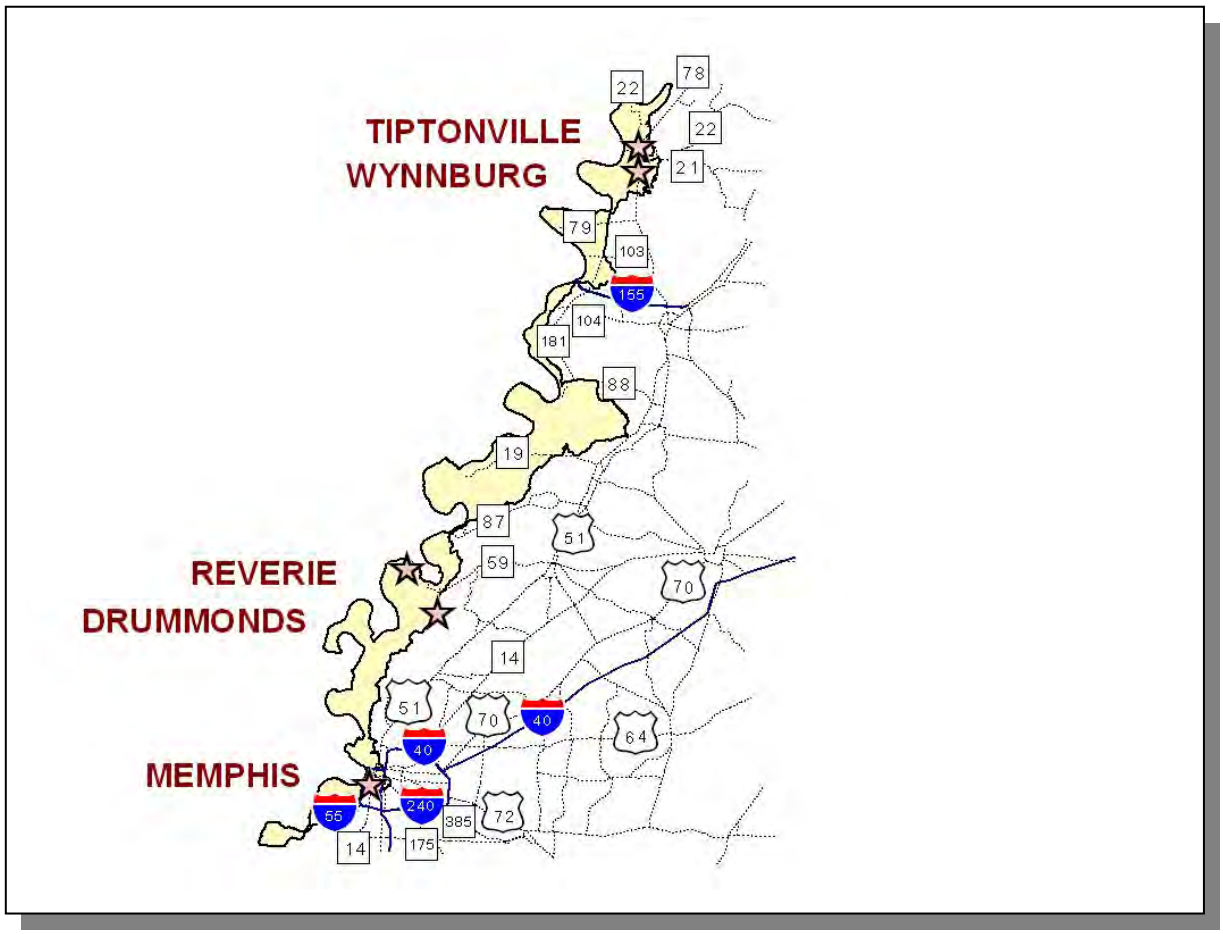


Figure 2-2. Communities and Roads in the Tennessee Portion of the Mississippi River Watershed.

MUNICIPALITY	POPULATION	COUNTY
Memphis*	666,786	Shelby
Tiptonville*	4,765	Lake
Wynnburg	2670	Lake
Drummonds	2,554	Tipton
Reverie	1,058	Tipton

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

2.3. GENERAL HYDROLOGIC DESCRIPTION.

2.3.A. Hydrology. The Mississippi River Watershed, designated 08010100 by the USGS, is approximately 1,086 square miles (590 square miles in Tennessee) and drains to the Mississippi River.

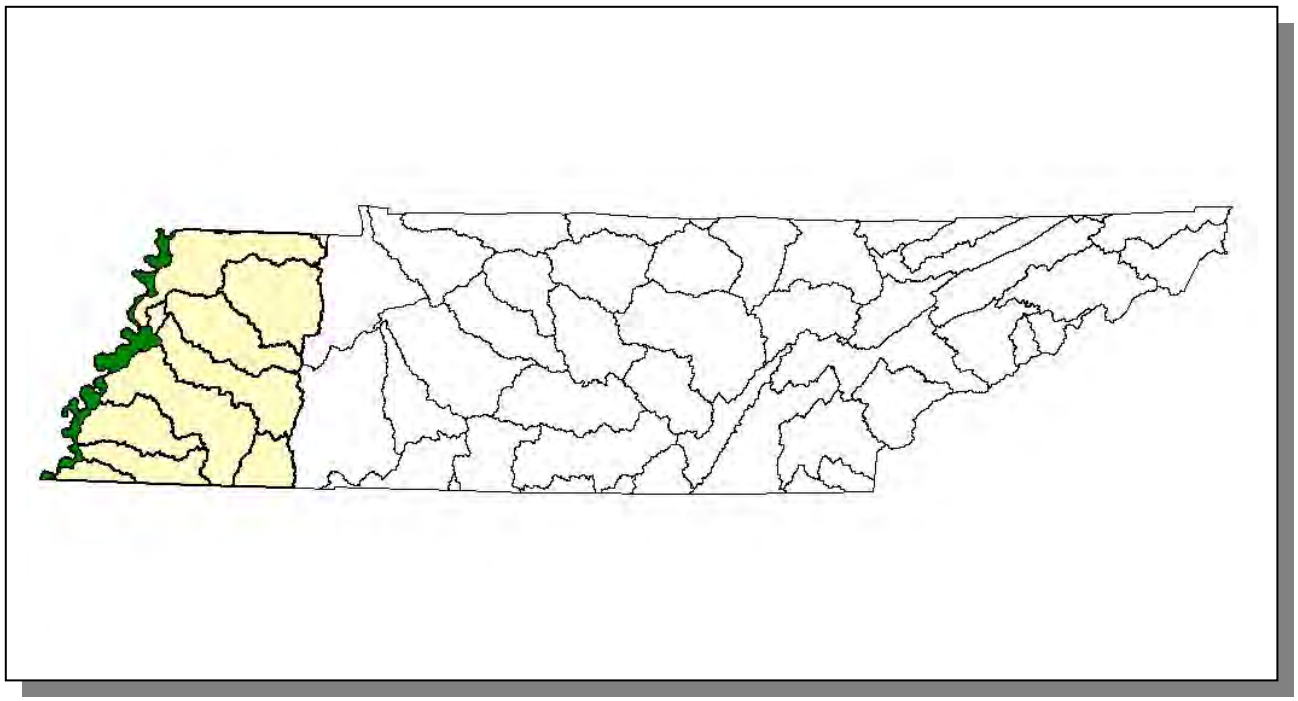


Figure 2-3. The Tennessee Portion of the Mississippi River Watershed is Part of the Mississippi River Basin.

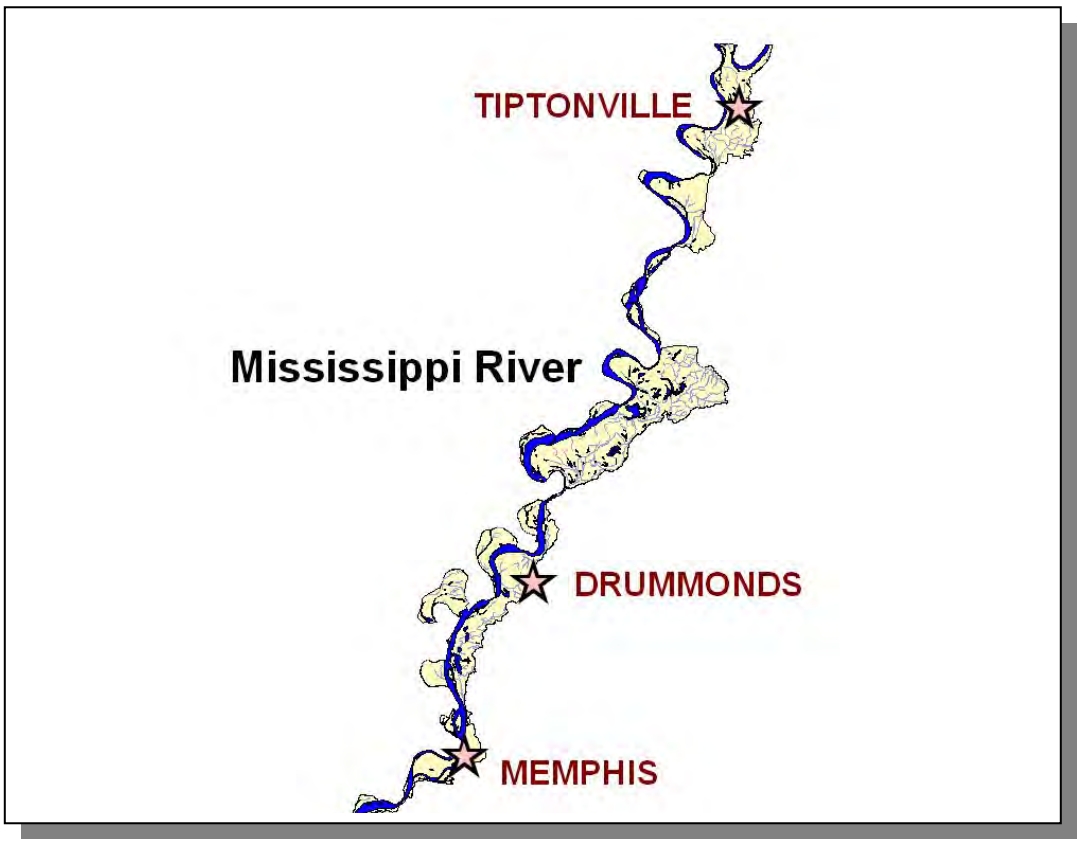


Figure 2-4. Hydrology in the Tennessee Portion of the Mississippi River Watershed. *There are 519.9 stream miles and 125 lake acres recorded in River Reach File 3 in the Tennessee Portion of the Mississippi River Watershed. Location of the Mississippi River and the cities of Drummond, Memphis, and Tiptonville 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 Mississippi River Watershed. These dams either retain 30 acre-feet of water or have structures at least 20 feet high.

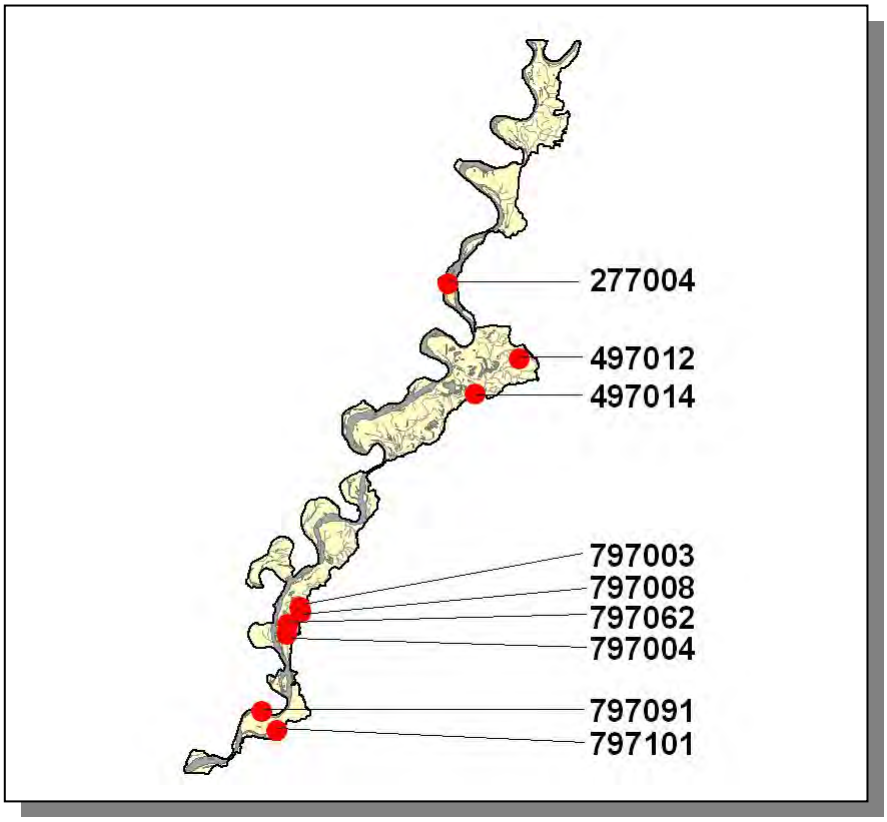


Figure 2-5. Location of Inventoried Dams in the Tennessee Portion of the Mississippi River Watershed. *More information, including identification of inventoried dams labeled, is provided in Appendix II and at http://gwidc.memphis.edu/website/dams/viewer.htm.*

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

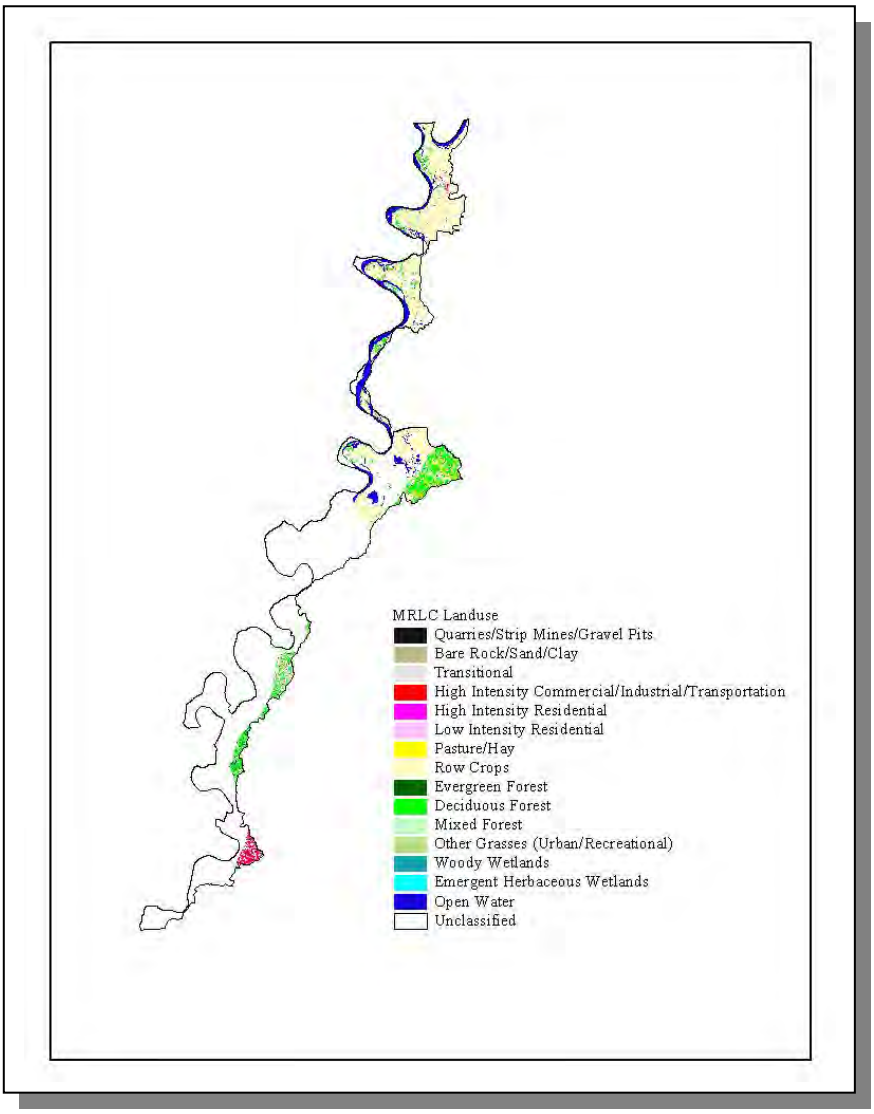


Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery.

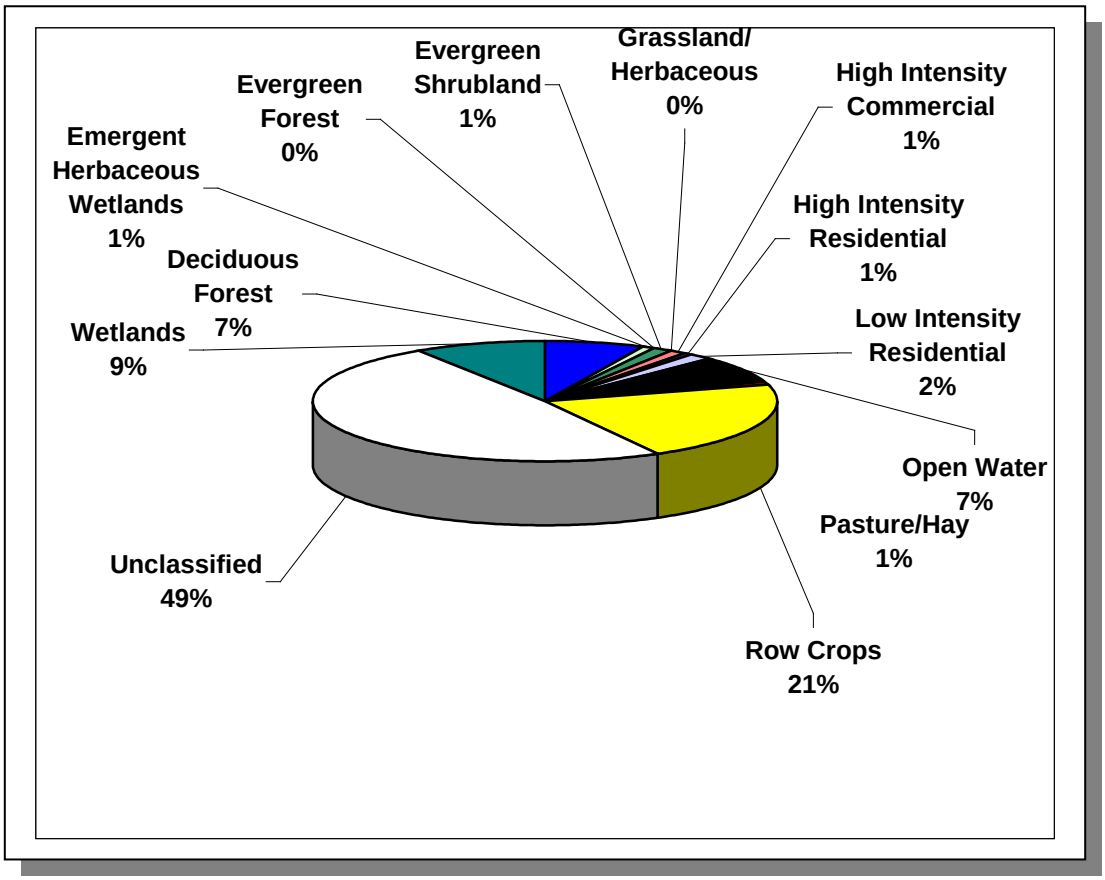


Figure 2-7. Land Use Distribution in the Tennessee Portion of the Mississippi River Watershed. *More information is provided in Appendix II.*

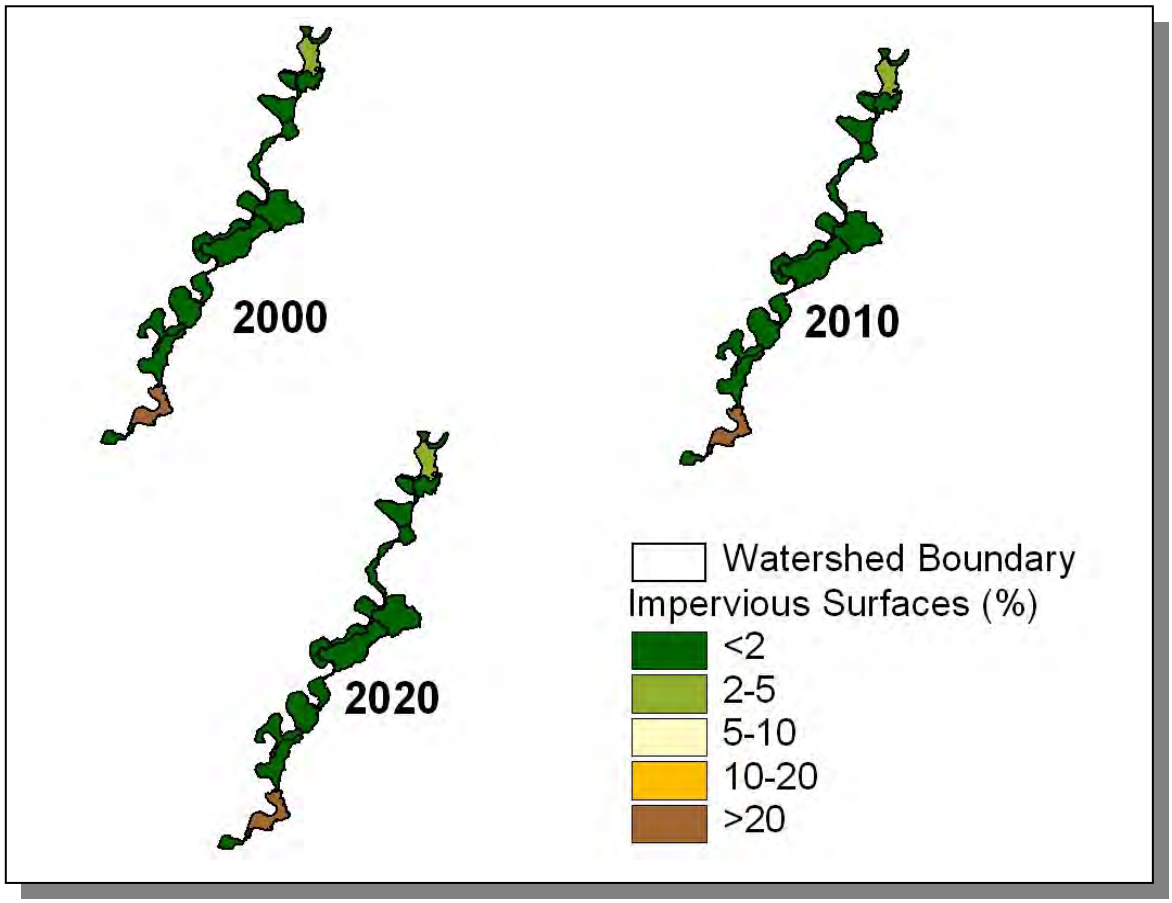


Figure 2-8. Illustration of Total Impervious Area in the Tennessee Portion of the Mississippi River Watershed. *All HUC-12 subwatersheds are shown. Current estimates and projected total impervious cover calculated by HUC-12 are provided by EPA Region 4. More information can be found at: http://www.epa.gov/ATHENS/research/impervious/.*

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

There are eight Level III Ecoregions and twenty-five Level IV subecoregions in Tennessee. The Mississippi Watershed lies within 2 Level III ecoregions (Mississippi Alluvial Plain, Mississippi Valley Loess Plains) and contains 3 Level IV subecoregions:

- The **Northern Mississippi Alluvial Plain (73a)** within Tennessee is a relatively flat region of Quaternary alluvial deposits of sand, silt, clay, and gravel. It is bounded distinctly on the east by the Bluff Hills (74a), and on the west by the Mississippi River. Average elevations are 200-300 feet with little relief. Most of the region is in cropland, with some areas of deciduous forest. Soybeans, cotton, corn, sorghum, and vegetables are the main crops. The natural vegetation consists of Southern floodplain forest (oak, tupelo, bald cypress). The two main distinctions in the Tennessee portion of the ecoregion are between areas of loamy, silty, and sandy soils with better drainage, and areas of more clayey soils of poor drainage that may contain wooded swamp-land and oxbow lakes. Waterfowl, raptors, and migratory songbirds are relatively abundant in the region.

- The **Bluff Hills (74a)** consist of sand, clay, silt, and lignite, and are capped by loess greater than 60 feet deep. The disjunct region in Tennessee encompasses those thick loess areas that are generally the steepest, most dissected, and forested. The carved loess has a mosaic of microenvironments, including dry slopes and ridges, moist slopes, ravines, bottomland areas, and small cypress swamps. While oak-hickory is the general forest type, some of the undisturbed bluff vegetation is rich in mesophytes, such as beech and sugar maple, with similarities to hardwood forests of eastern Tennessee. Smaller streams of the Bluff Hills have localized reaches of increased gradient and small areas of gravel substrate that create aquatic habitats that are distinct from those of the Loess Plains (74b) to the east. Unique, isolated fish assemblages more typical of upland habitats can be found in these stream reaches. Gravels are also exposed in places at the base of the bluffs.

- The **Loess Plains (74b)** are gently rolling, irregular plains, 250-500 feet in elevation, with loess up to 50 feet thick. The region is a productive agricultural area of soybeans, cotton, corn, milo, and sorghum crops, along with livestock and poultry. Soil erosion can be a problem on the steeper, upland Alfisol soils; bottom soils are mostly silty Entisols. Oak-hickory and southern floodplain forests are the natural vegetation types, although most of the forest cover has been removed for cropland. Some less-disturbed bottomland forest and cypress-gum swamp habitats still remain. Several large river systems with wide floodplains, the Obion, Forked Deer, Hatchie,

Loosahatchie, and Wolf, cross the region. Streams are low-gradient and murky with silt and sand bottoms, and most have been channelized.

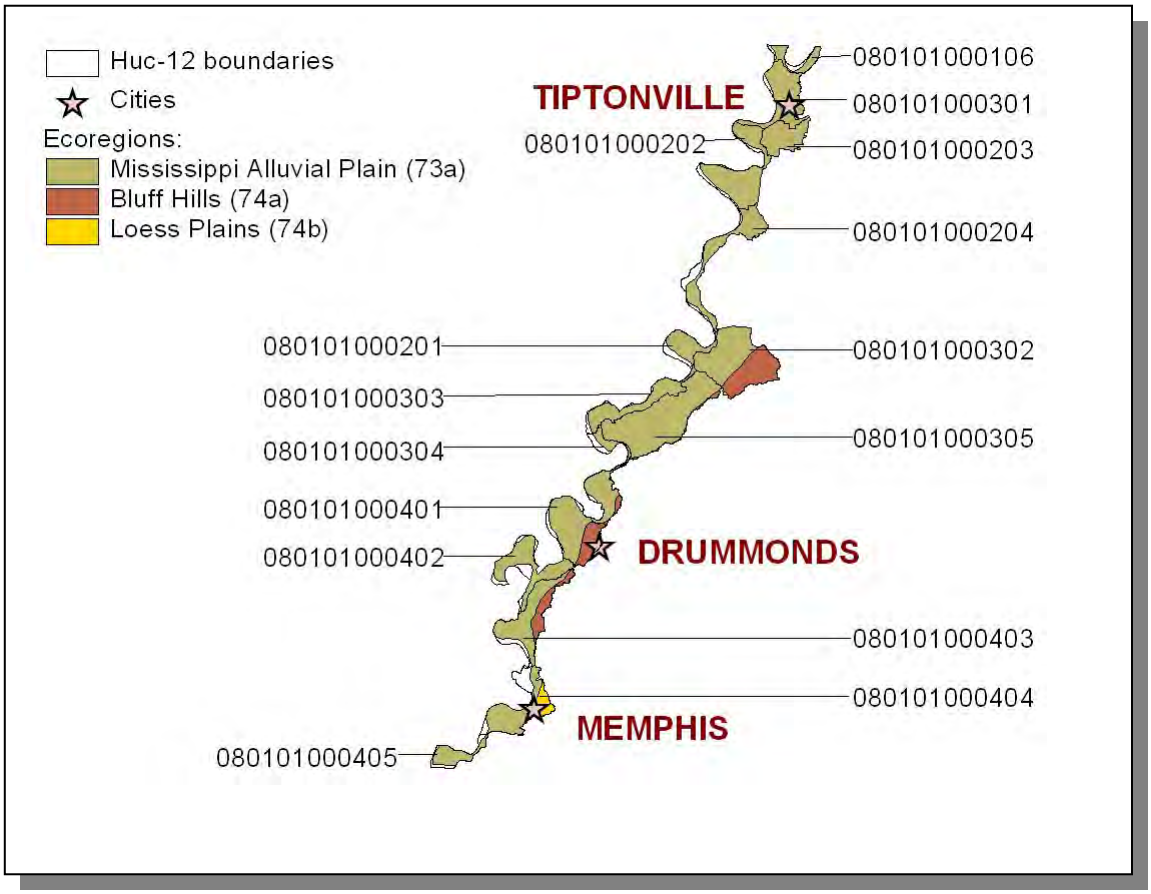


Figure 2-9. Level IV Ecoregions in the Tennessee Portion of the Mississippi River Watershed. *HUC-12 subwatershed boundaries and locations of Drummonds, Memphis, and Tiptonville are shown for reference.*

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

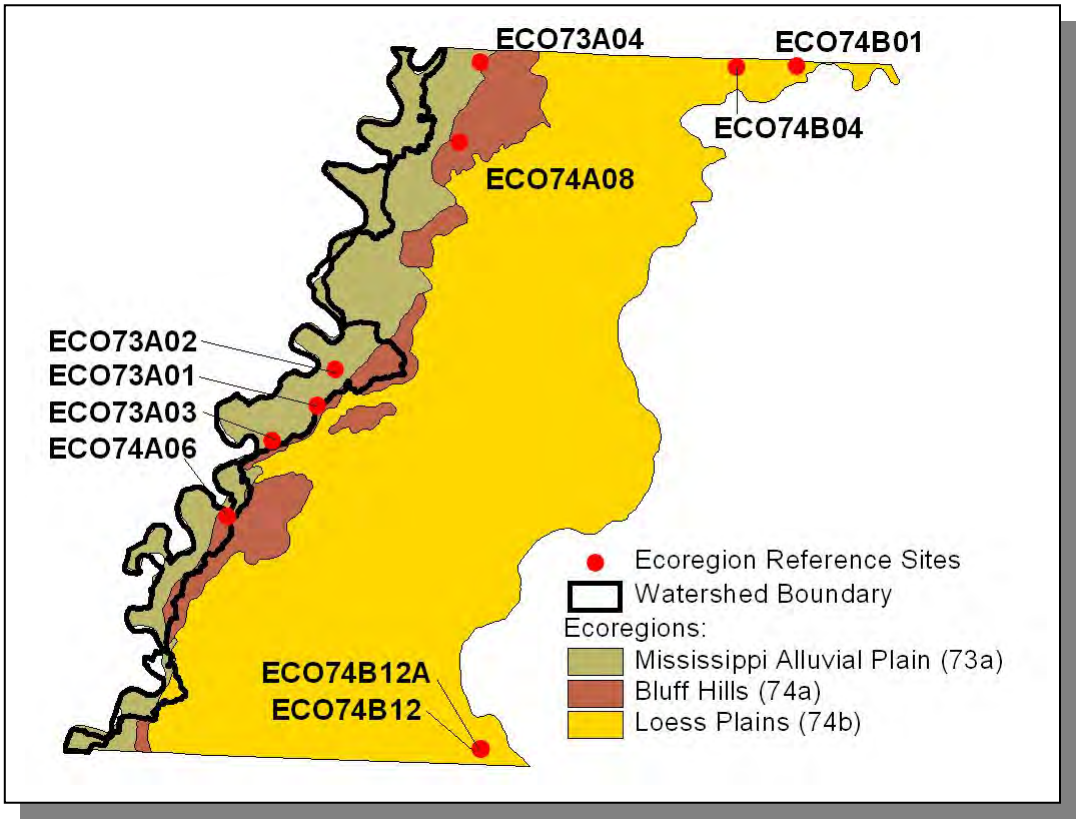


Figure 2-10. Ecoregion Monitoring Sites in Level IV Ecoregions 73a, 74a, and 74b. *The Tennessee Portion of the Mississippi River Watershed is shown for reference. More information, including which ecoregion reference sites were inactive or dropped prior to 06/01/2006, is provided in Appendix II.*

2.6. NATURAL RESOURCES.

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

The Mississippi River Watershed has two Designated State Natural Areas:

Meeman-Shelby Forest State Natural Area is an 11,000-acre natural area in Shelby County and is located in Meeman-Shelby Forest State Park. Primary management responsibility belongs to Tennessee State Parks. There is also a Wildlife Management Area within the State Park that is managed by the Tennessee Wildlife Resource Agency. Meeman-Shelby Forest State Natural Area is one of the largest contiguous tracts of mature bottomland hardwood forest and Chickasaw Bluff forest left in Tennessee. The natural area includes approximately 7,000 acres of Mississippi Alluvial Plain and approximately 4,000 acres of Chickasaw Bluff.

Sunk Lake is a 1,870 acre natural area located in Lauderdale County about 18.5 miles northwest of Covington. It is located in the Mississippi Alluvial Floodplain and included in the Eastern Gulf Coastal Region of the southeastern United States. Sunk Lake supports excellent examples of bald cypress swamp, bottomland hardwood forest, and open marshy aquatic habitat. The diversity of wetland and upland communities offer a wide range of habitat for waterfowl and other birds, fish, reptiles, amphibians, and both native terrestrial and aquatic vegetation. Rare plant species at Sunk Lake include creeping spot-flower (Acmella oppositifolia), featherfoil (Hottonia inflata), lake cress (Neobeckia aquatica), ovate-leaved arrowhead (Sagittaria platyphylla) and cedar elm (Ulmus crassifolia).

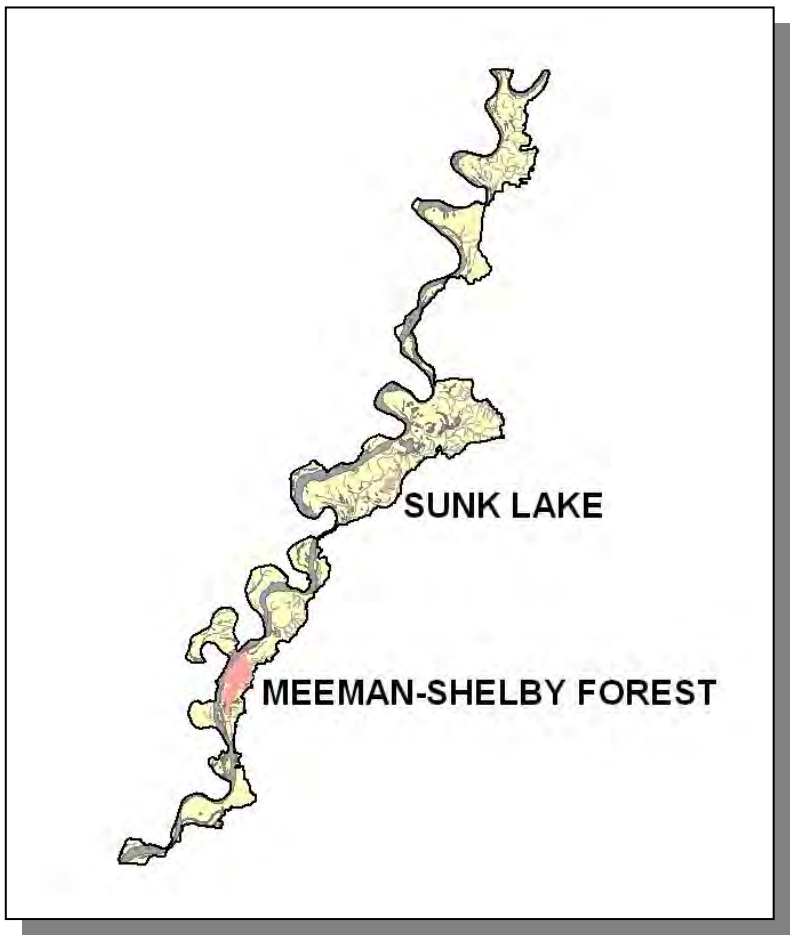


Figure 2-11. There are two Designated State Natural Areas in the Tennessee Portion of the Mississippi River Watershed.

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

GROUPING	NUMBER OF RARE SPECIES
Snails	1
Birds	9
Fish	7
Mammals	1
Reptiles	1
Plants	16
Total	**35**

Table 2-3. There are 35 Known Rare Plant and Animal Species in the Tennessee Portion of the Mississippi River Watershed.

In the Tennessee Portion of the Mississippi River Watershed, there are seven known rare fish species, one known rare reptile species, and one known rare snail species.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
Scaphirhynchus albus	Pallid Sturgeon	LE	E
Macrhybopsis gelida	Sturgeon Chub		D
Macrhybopsis meeki	Sicklefin Chub		D
Notropis dorsalis	Bigmouth Shiner		D
Cycleptus elongates	Blue sucker		T
Hybognathus placitus	Plains Minnow		D
Noturus stigmosus	Northern Madtom		D
Macroclemys temminckii	Alligator Snapping Turtle		D
Triodopsis multilineata	Striped Whitelip		

Table 2-4. Rare Aquatic Species in the Tennessee Portion of the Mississippi River 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/

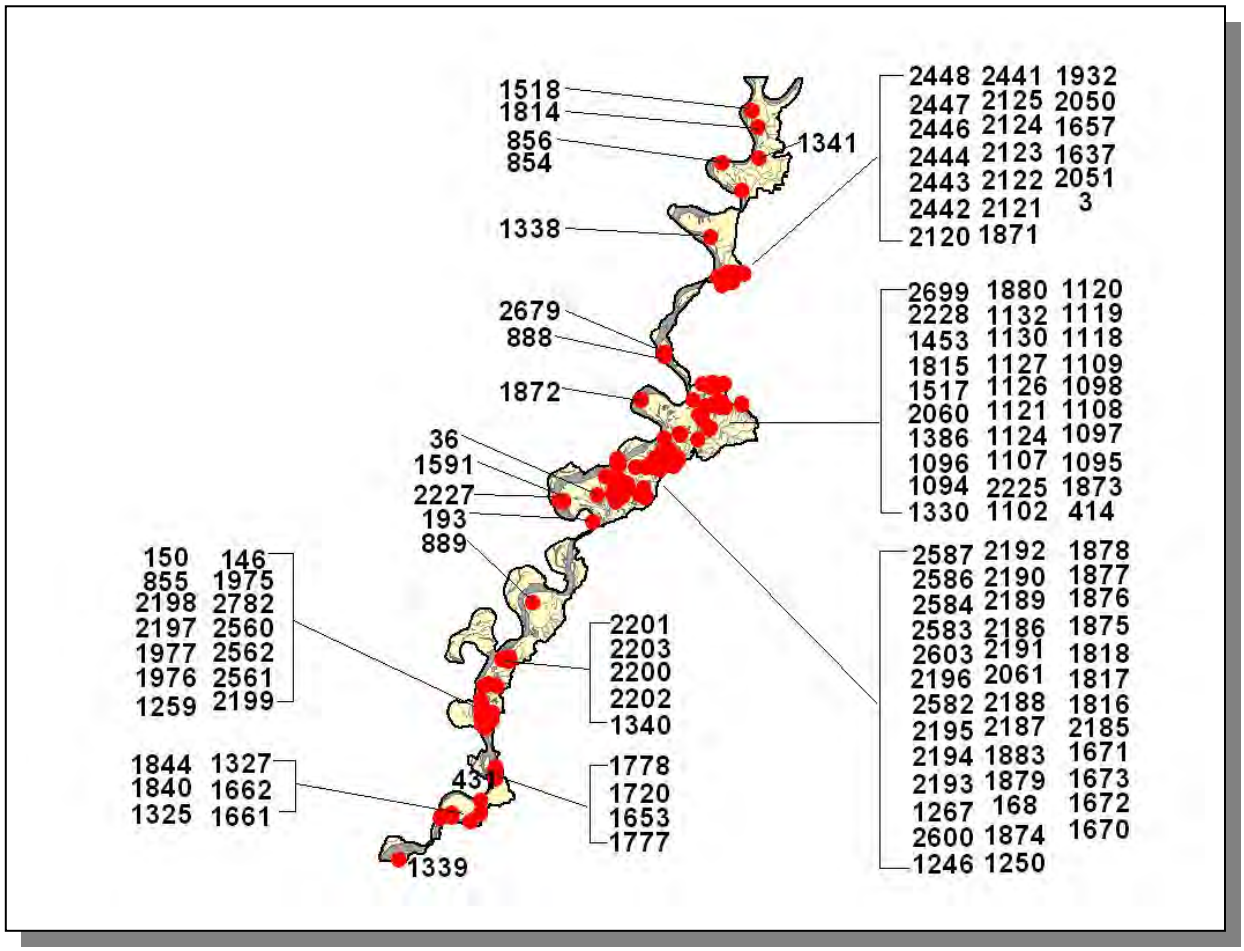


Figure 2-12. Location of Wetland Sites in TDEC Division of Natural Areas Database in Tennessee Portion of the Mississippi River Watershed. This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands. *There may be additional wetland sites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

2.7. CULTURAL RESOURCES.

2.7.A. Public Lands. Some sites representative of the cultural heritage in the Tennessee portion of the Mississippi River Watershed are under state or federal protection:

- Chickasaw WMA is a 6,158-acre tract managed by the Tennessee Wildlife Resources Agency (TWRA). More information may be found at http://www.state.tn.us/twra/gis/wmapdf/Chickasaw.pdf

- Chickasaw National Wildlife Refuge is a 24,096-acre refuge located in Lauderdale County and managed by US Fish and Wildlife Service. More information may be found at:
  http://www.fws.gov/southeast/pubs/facts/rlfpdf.pdf

- Cold Creek and John Tully WMAs comprise 945 acres and are managed by TWRA. More information may be found at:
  http://www.state.tn.us/twra/gis/wmapdf/JohnTully.pdf

- Eagle Lake WMA is a 1,600-acre refuge managed by TWRA and Ducks Unlimited, Inc. More information may be found at:
  http://southern.ducks.org/EagleLakeRefuge.php

- Ft. Pillow State Historic Area commemorates the Civil war Battle at Fort Pillow. It comprises 1, 734 acres and is managed by Tennessee State Parks. More information may be found at:
  http://state.tn.us/environment/parks/FortPillow/

- John Tully State Forest consists of 2,132-acres of prime forest land managed by the Tennessee Department of Agriculture, Division of Forestry. More information may be found at:
  http://www.state.tn.us/agriculture/forestry/stateforests/15.html

- Lower Hatchie National Wildlife Refuge is a 10,331-acre reserve located in Lauderdale and Tipton Counties and managed by the US Fish and Wildlife Service. More information may be found at:
  http://www.fws.gov/lowerhatchie/

- Mav-Fullen and Upper Mav WMAs are managed by TWRA.

- Meeman-Shelby State Recreation area is a 13,467-acre state forest bordering the Mississippi River and managed by Tennessee State Parks. More information may be found at:
  http://state.tn.us/environment/parks/MeemanShelby/

- Meeman-Shelby State Forest WMA is managed by the TWRA. More information may be found at:
  http://www.state.tn.us/twra/gis/wmapdf/MeemanShelbyForestStateParkandSNA.pdf

- Tumbleweed WMA is managed by TWRA. More information may be found at: http://www.state.tn.us/twra/gis/wmapdf/Tumbleweed.pdf

- Presidents Island WMA is managed by TWRA. More information may be found at: http://www.state.tn.us/twra/gis/wmapdf/PresidentsIsl.pdf

- Sullivan-Chisholm Wetlands WMA is managed by TWRA.

- Whites Lake refuge consists of 615 acres of land managed by TWRA and Ducks Unlimited, Inc. More information may be found at: http://www.ducks.org/Tennessee/TennesseeProjects/1582/WhiteLakeRefugeWetlandsRestoration.html

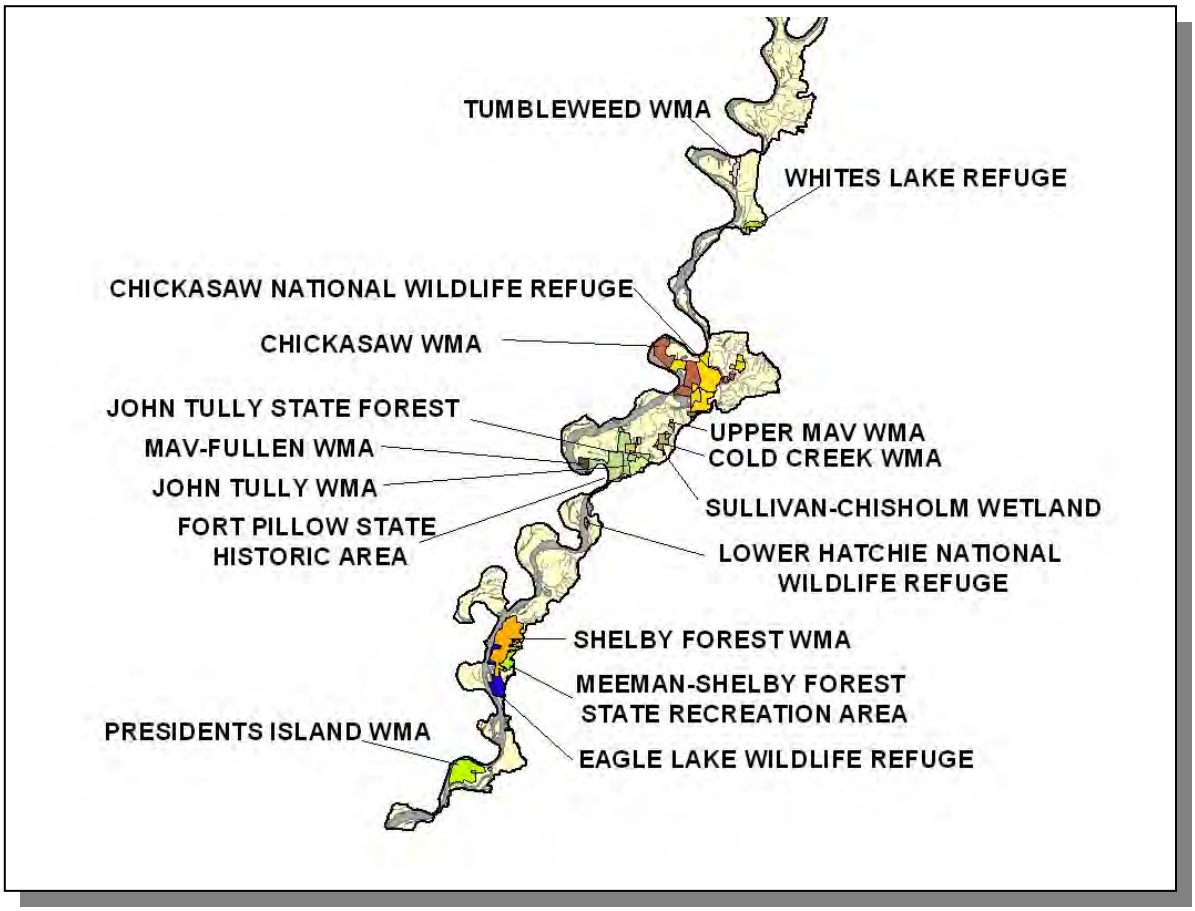


Figure 2-13. Public Lands in the Tennessee Portion of the Mississippi River Watershed. *Data are from Tennessee Wildlife Resources Agency. WMA, Wildlife Management Area.*

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
Adams Bayou	2			Knob Creek	3		
Bear Creek	3			Middle Fork Forked Deer River	4		
Blue Bank Bayou	3		3	Mississippi River			
Brinkley Bayou		1		Mooring Bayou	4		
Cold Creek	2	2		Old Bed Forked Deer River	3		
Harbor Channel	3	2,3		Unnanmed tributary to North Horn Lake			4
Jones Slough	3		1				

Table 2-5. Tennessee Rivers Assessment Project Stream Scoring in the Mississippi River Watershed.

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

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

CHAPTER 3

WATER QUALITY ASSESSMENT OF THE MISSISSIPPI RIVER WATERSHED.

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

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

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

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

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

1. Describe the water quality assessment process.

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

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

4. Provide detailed information on each watershed.

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

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

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

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

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

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

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

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

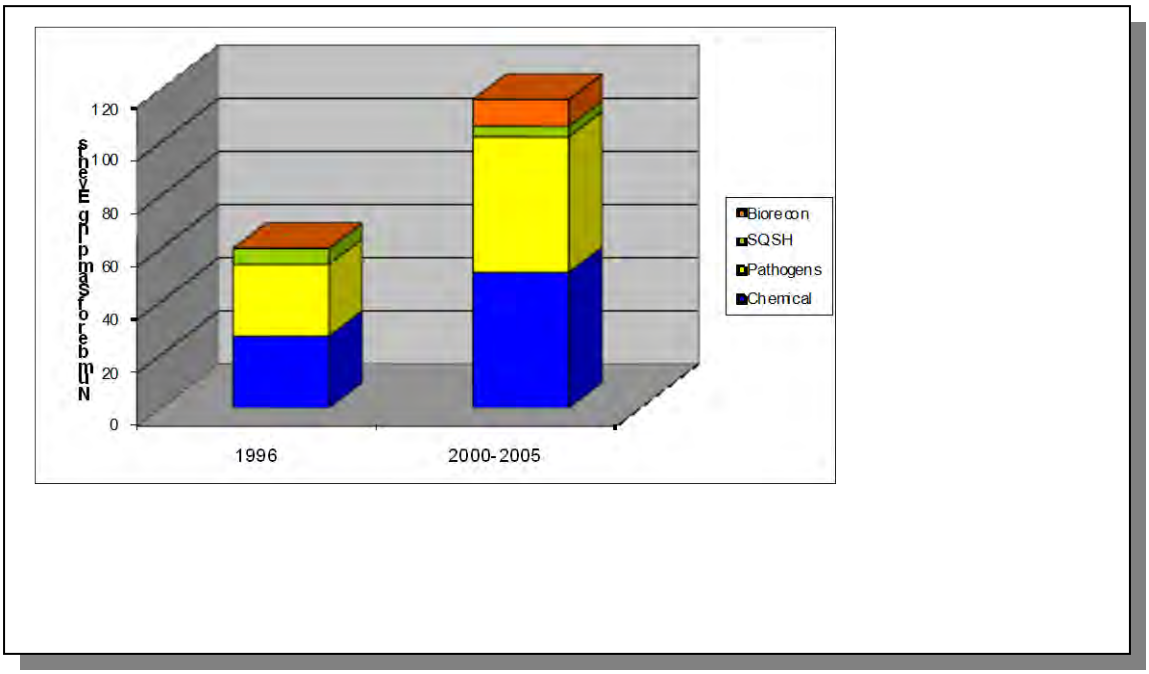


Figure 3-1. Number of Sampling Events Using the Traditional Approach (1996) and Watershed Approach (July 1, 2000 through June 30, 2005) in the Tennessee Portion of the Mississippi River Watershed.

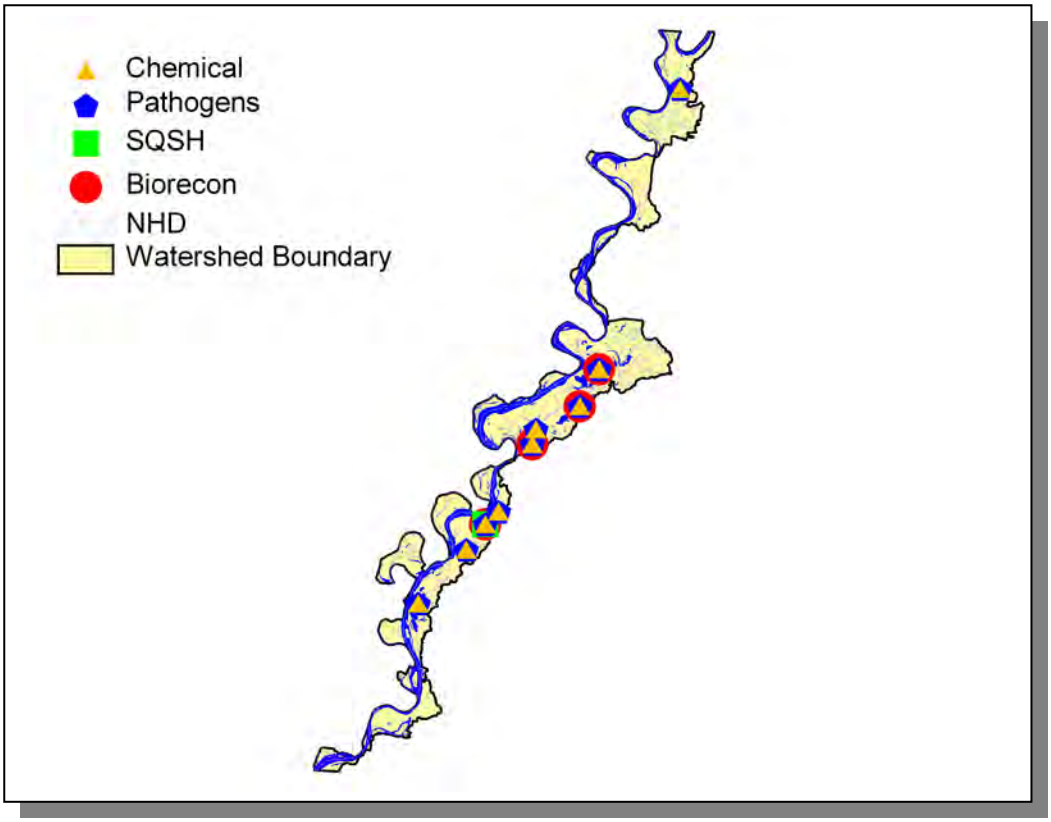


Figure 3-2. Location of Monitoring Sites in the Tennessee Portion of the Mississippi River Watershed (July 1, 2000 through June 30, 2005). *Pathogens include E. coli and fecal coliform; NHD, National Hydrography Dataset of Streams; SQSH, Semi-Quantitative Single Habitat Assessment.*

	1996	2000-2005
Chemical	27	51
Pathogens	27	51
SQSH	6	4
Biorecon	0	10
Total	**60**	**116**

Table 3-1. Number of Sampling Events in the Tennessee Portion of the Mississippi River Watershed in 1996 and 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-Jackson and Environmental Field Office-Memphis staff (this is in addition to samples collected by water and wastewater treatment plant operators and MS4 permittees). Samples are analyzed by the Tennessee Department of Health, Division of Environmental Laboratory Services. Ambient monitoring data are used to assess water quality in major bodies of water where there are NPDES facilities and to identify trends in water quality. Water quality parameters traditionally measured at ambient sites in the Tennessee portion of the Mississippi River Watershed are provided in Appendix IV.

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

3.2.B. Ecoregion Sites. Ecoregions are relatively homogeneous areas of similar geography, topography, climate and soils that support similar plants and animals. The delineation phase of the Tennessee Ecoregion Project was completed in 1997 when the ecoregions and subecoregions were mapped and summarized (EPA/600/R-97/022). There are eight Level III Ecoregions and twenty-five Level IV subecoregions in Tennessee (see Chapter 2 for more details). The Tennessee portion of the Mississippi River Watershed lies within 2 Level III ecoregions (Mississippi Alluvial Plain and Mississippi Valley Loess Plain) and contains 3 subecoregions (Level IV):

- Northern Mississippi Alluvial Plain (73a)
- Bluff Hills (74a)
- Loess Plain (74b)

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

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

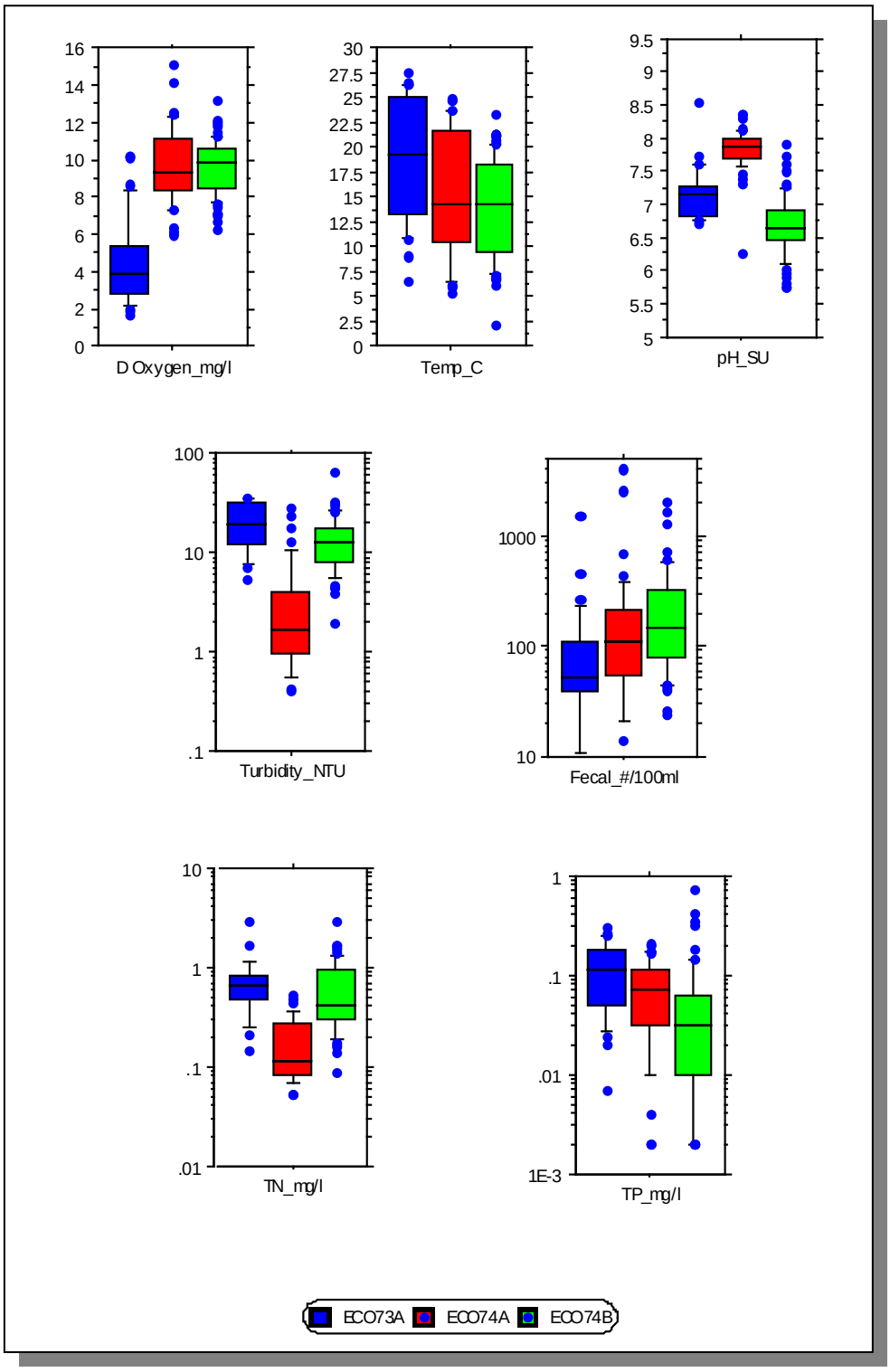


Figure 3-3. Select Chemical Data Collected in the Tennessee Portion of the Mississippi River Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th percentiles. Extreme values are also shown as dots. Fecal, fecal coliform bacteria; TN, Total Nitrogen; TP, Total Phosphorus.*

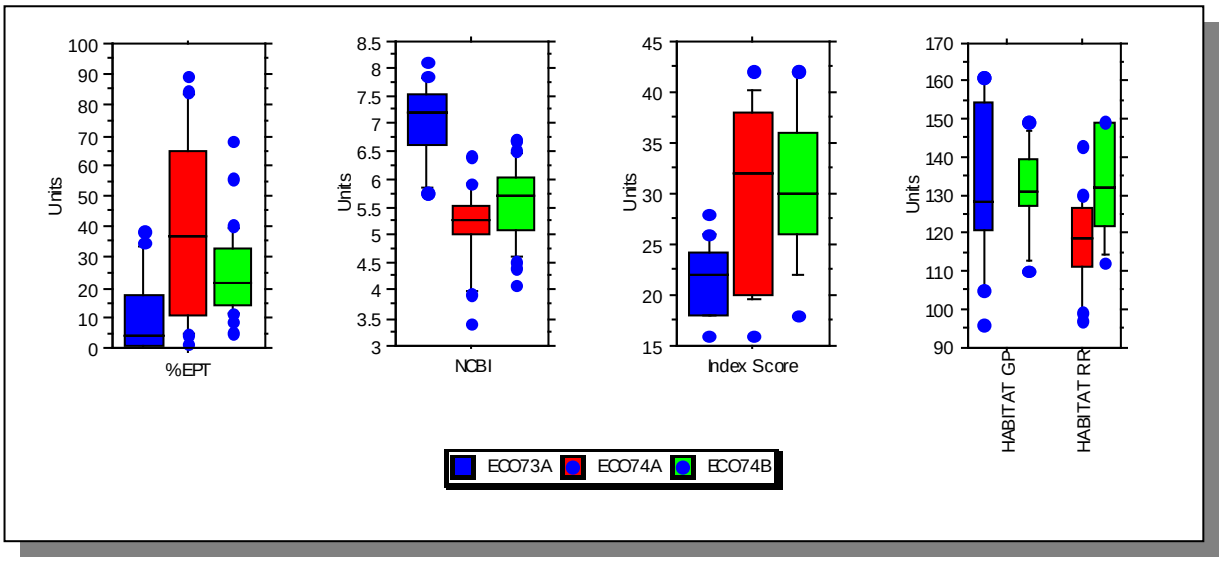


Figure 3-4. Benthic Macroinvertebrate and Habitat Scores for the Tennessee Portion of the Mississippi River Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th percentiles. Extreme values are also shown as dots. NCBI, North Carolina Biotic Index. Index Score and Habitat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

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

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

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

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

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

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

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

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

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

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

Category Assessment	Stream Miles	Reservoir Acres
Total	519.9	125
Assessed	350.2	125
Category 1	133.1	0
Category 2	0.0	0
Category 3	165.7	0
Category 4	0.0	0
Category 5	217.1	125

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

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

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

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

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

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

- **Category 4a** impaired waters that have already had all necessary TMDLs approved by EPA.
- **Category 4b** impaired waters do not require TMDL development since "other pollution control requirements required by local, State or Federal authority are expected to address all water-quality pollutants" (EPA, 2003). An example of a 4b stream might be where a discharge point will be moved in the near future to another waterbody with more assimilative capacity.
- **Category 4c** impaired waters in which the impacts are not caused by a pollutant (e.g., certain habitat or flow alterations).

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

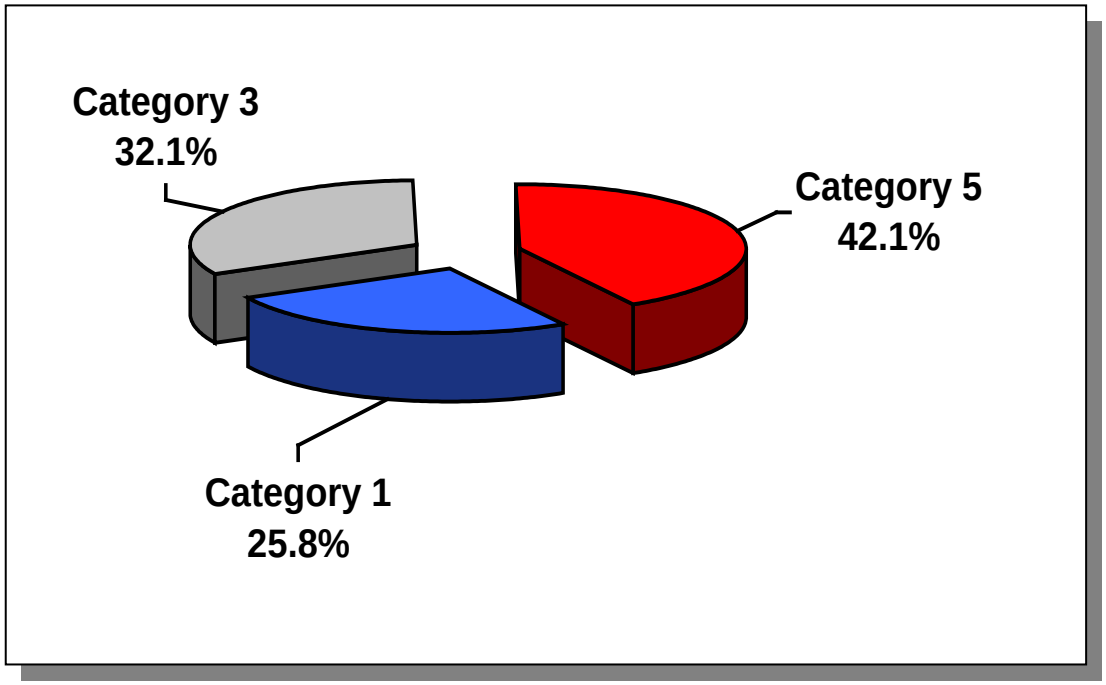


Figure 3-5. Water Quality Assessment of Streams in the Tennessee Portion of the Mississippi River Watershed. *Assessment data are based on the 2006 Water Quality Assessment of 519.9 stream miles in the watershed.*

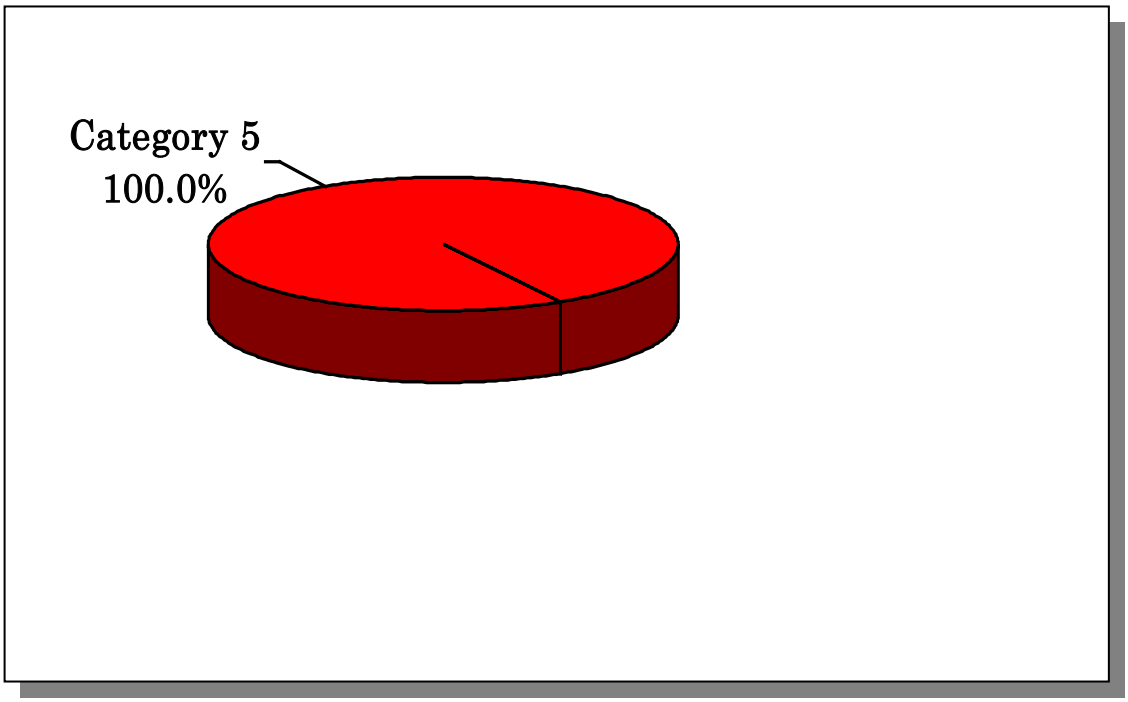


Figure 3-6. Water Quality Assessment of Lakes in the Tennessee Portion of the Mississippi River Watershed. *Assessment data are based on the 2006 Water Quality Assessment of 125 stream miles*

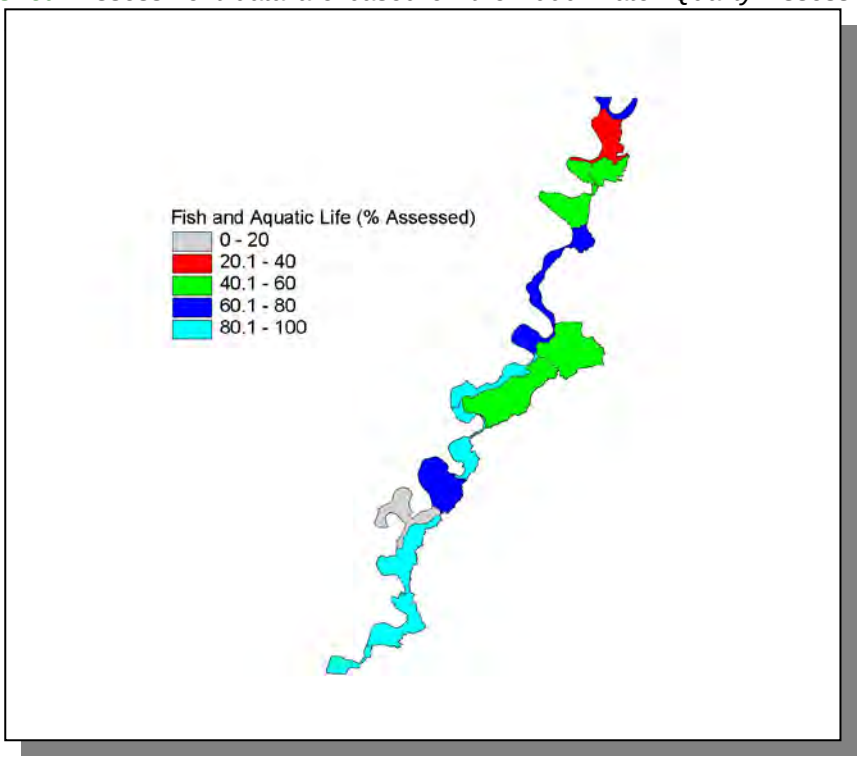


Figure 3-7. Percentage of Stream Miles Assessed for Support of Fish and Aquatic Life Designated Use in HUC-12 Subwatersheds.

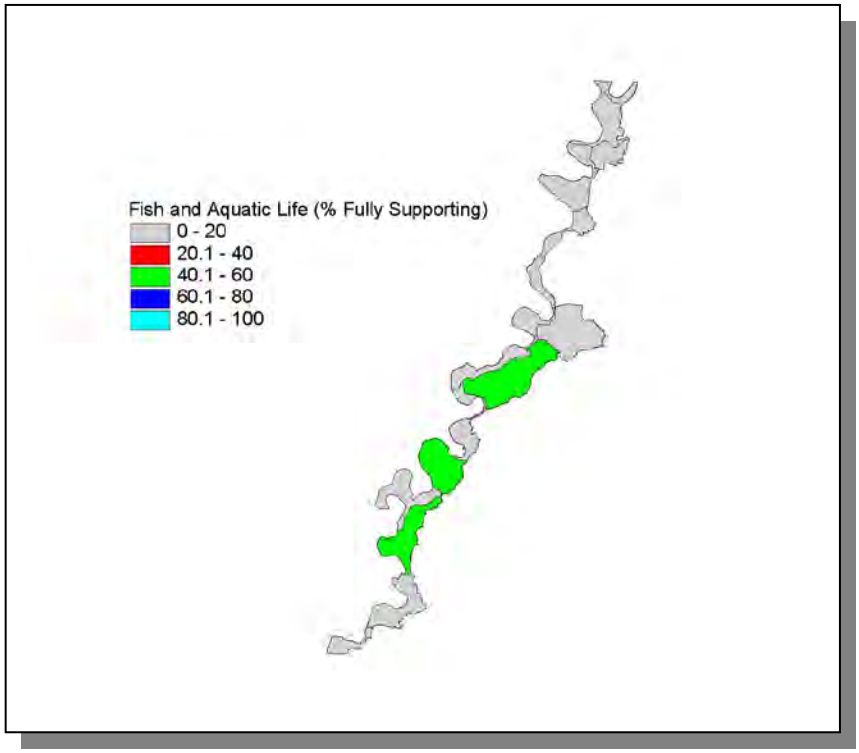


Figure 3-8. Percentage of Stream Miles Fully Supporting for Fish and Aquatic Life Designated

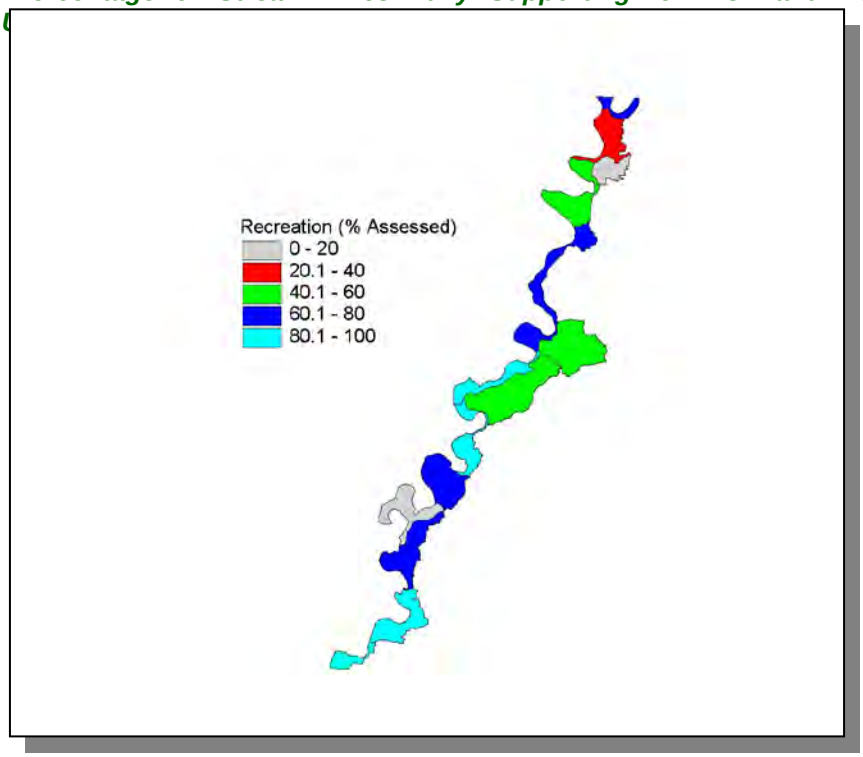


Figure 3-9. Percentage of Stream Miles Assessed for Support of Recreation Designated Use in HUC-12 Subwatersheds.

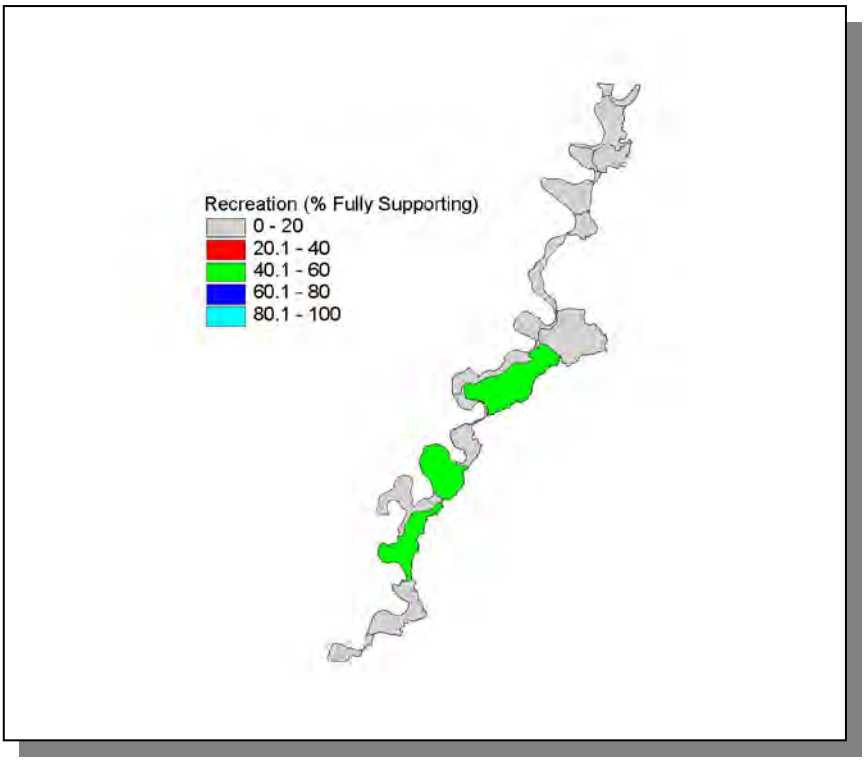


Figure 3-10. Percentage of Stream Miles Fully Supporting for Recreation Designated Use in HUC-12 Subwatersheds.

3.3.A. Assessment Summary.

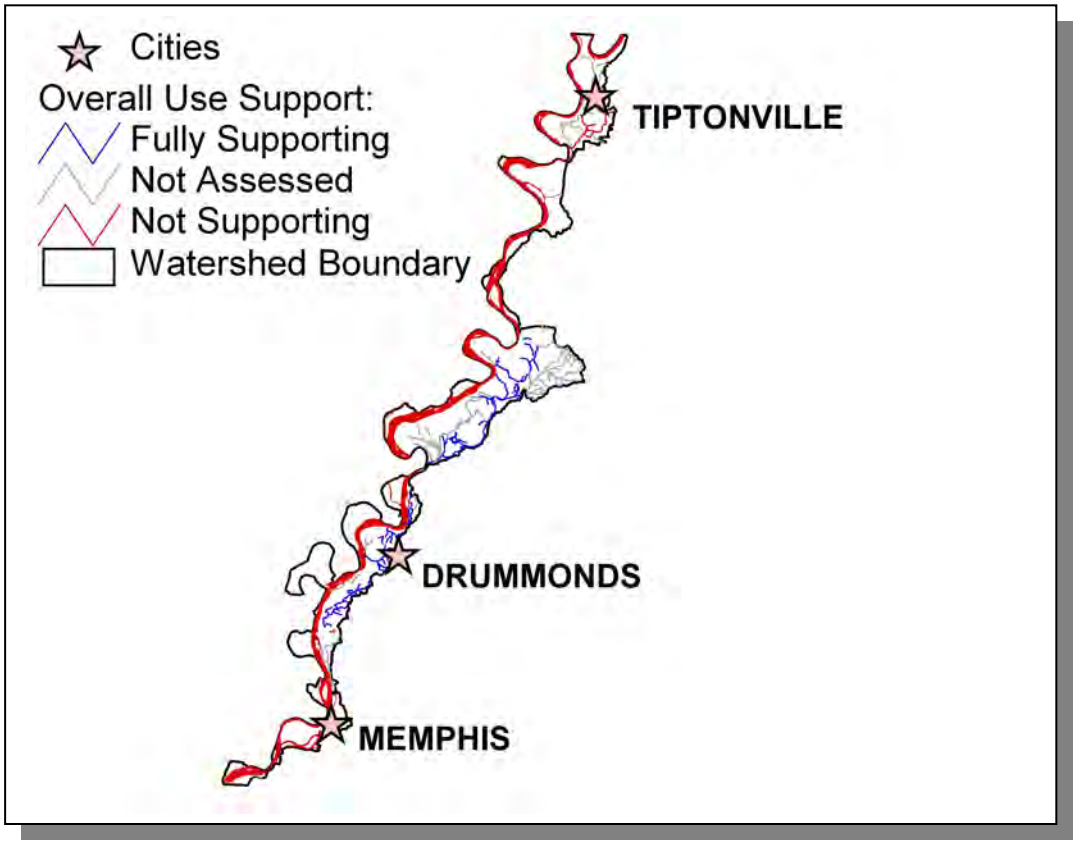


Figure 3-11. Overall Use Support Attainment in the Tennessee Portion of the Mississippi River Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Tiptonville, Drummonds,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

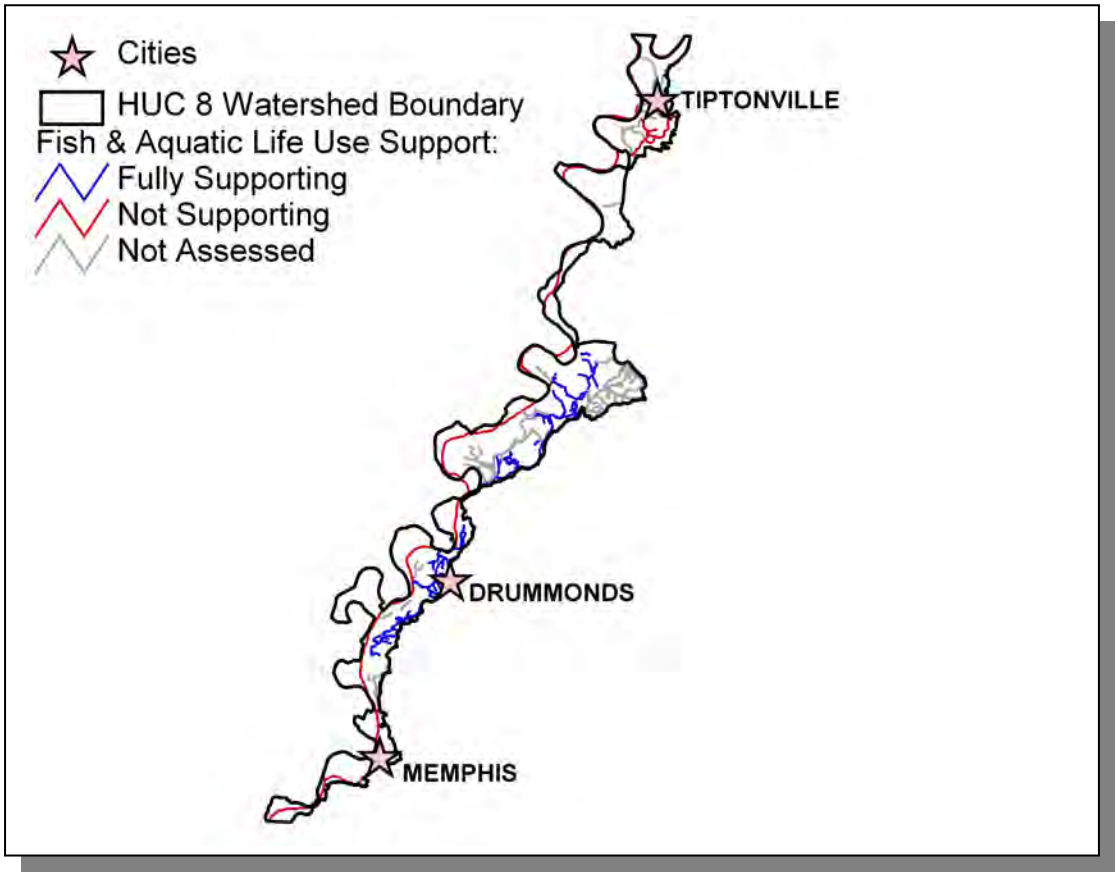


Figure 3-12. Fish and Aquatic Life Use Support Attainment in the Tennessee Portion of the Mississippi River Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Tiptonville,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

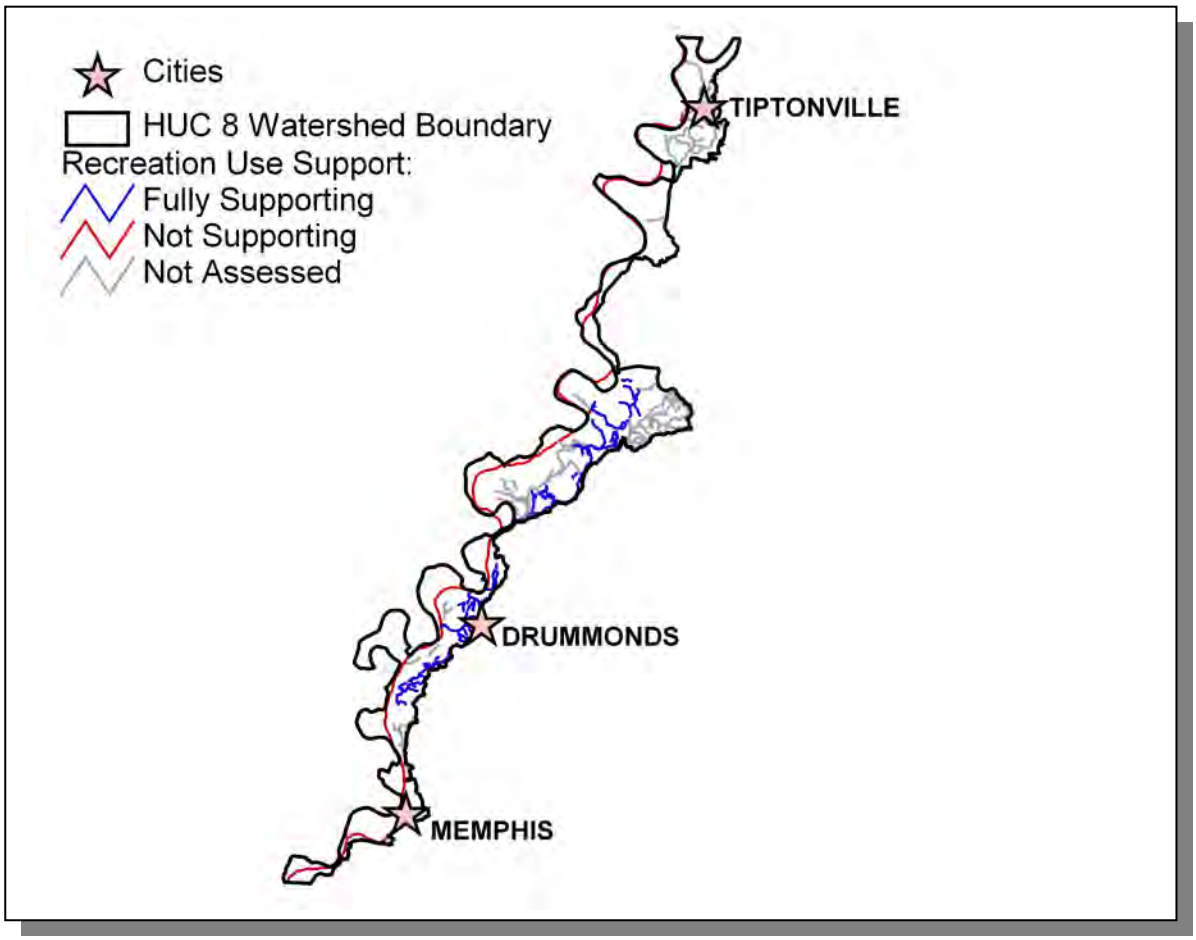


Figure 3-13. Recreation Use Support Attainment in the Tennessee Portion of the Mississippi River Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Tiptonville, Drummonds,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

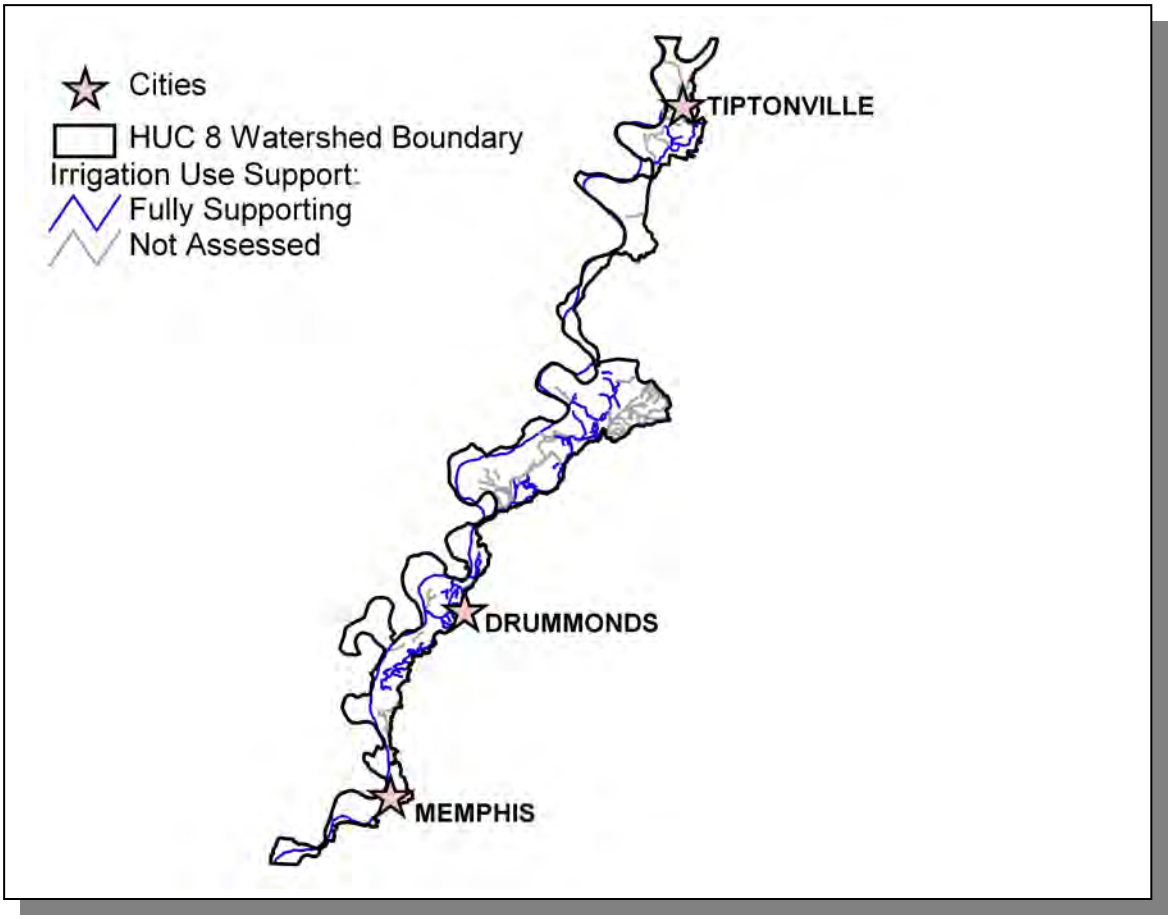


Figure 3-14. Irrigation Use Support Attainment in the Tennessee Portion of the Mississippi River Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Tiptonville, Drummonds,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

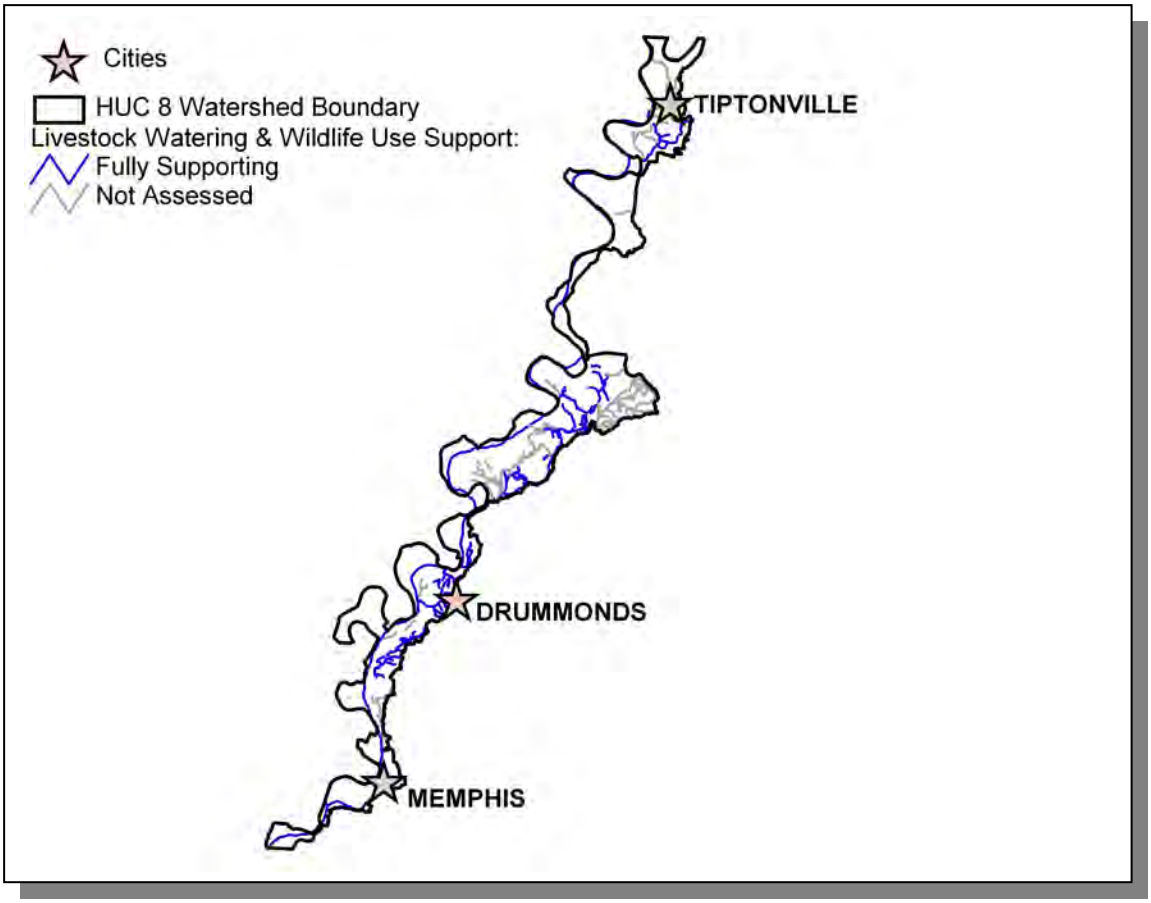


Figure 3-15. Livestock Watering and Wildlife Use Support Attainment in the Tennessee Portion of the Mississippi River Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations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

3.3.B. Use Impairment Summary.

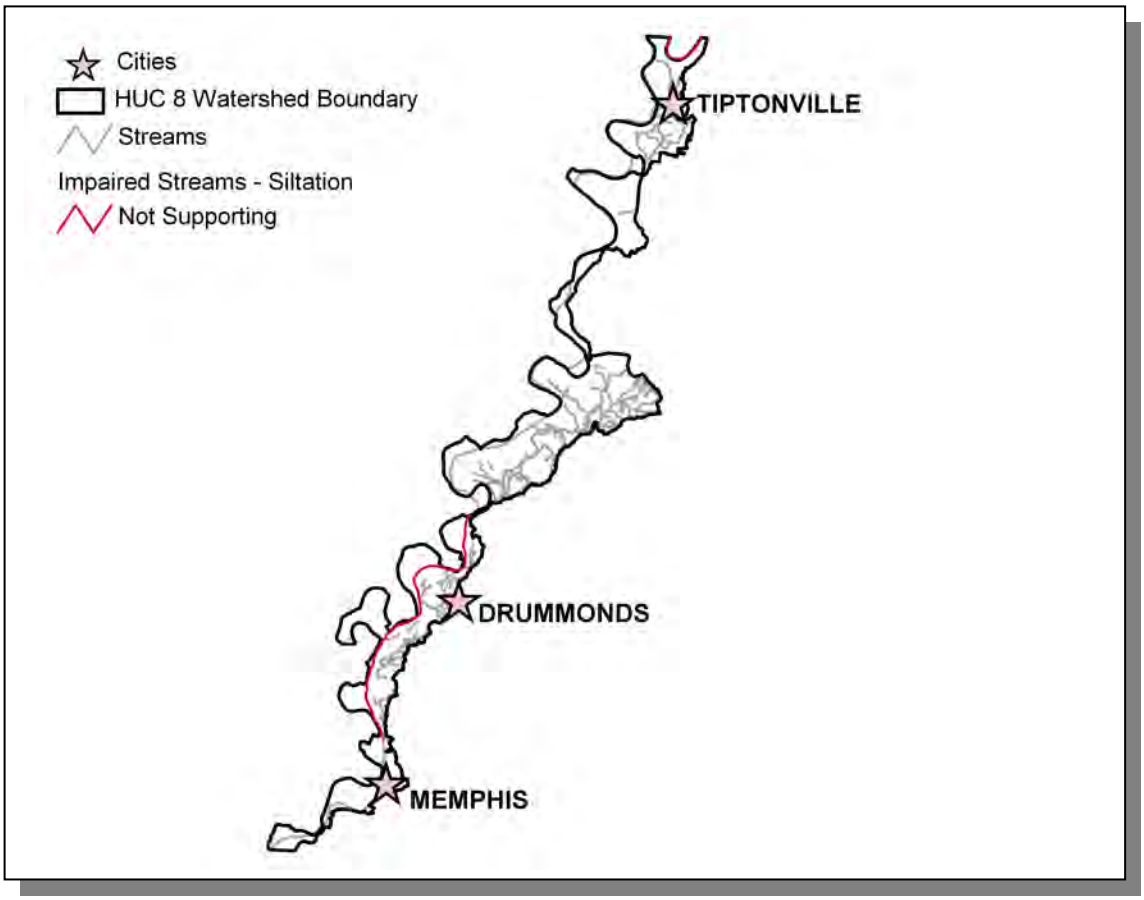


Figure 3-16. Impaired Streams Due to Siltation in the Tennessee Portion of the Mississippi River Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Locations of Tiptonville, Drummonds, and Memphis are shown for reference. More information is provided in Appendix III.*

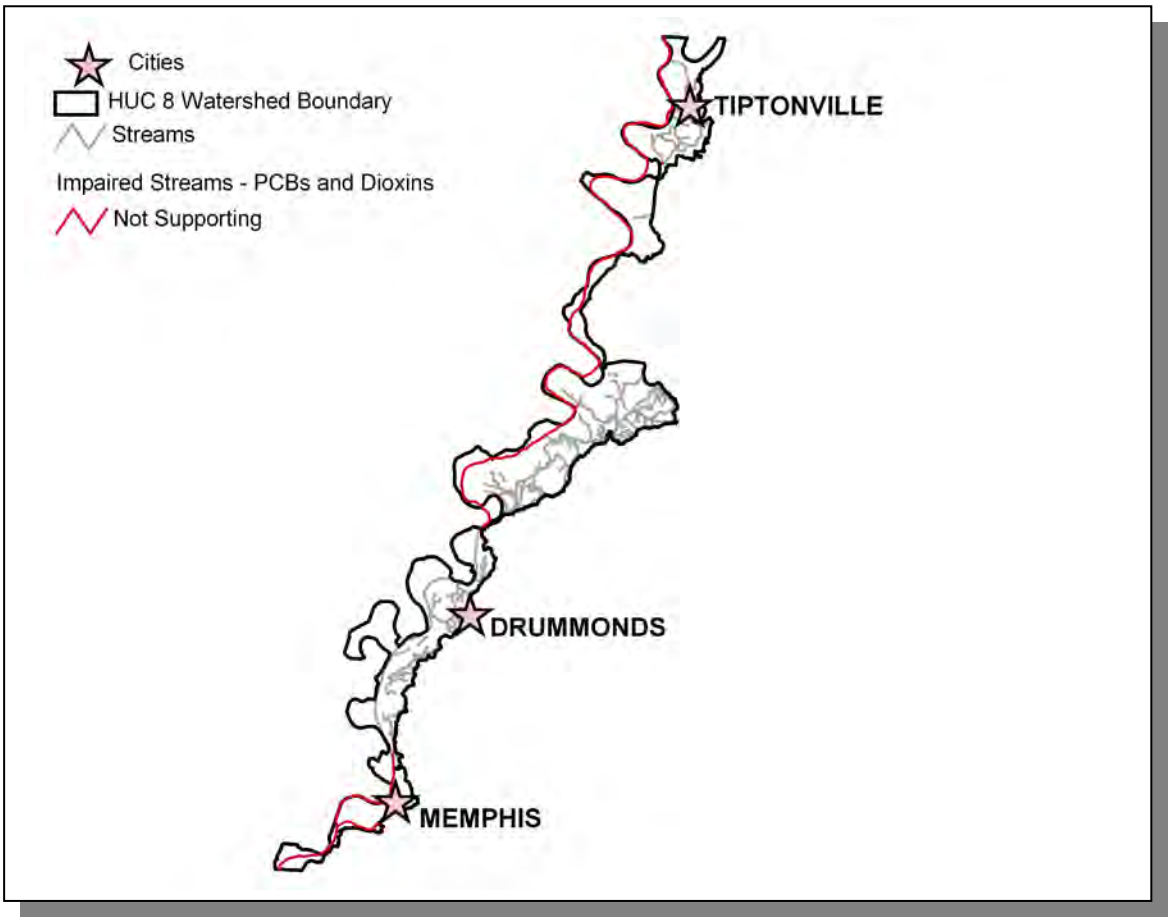


Figure 3-17. Impaired Streams Due to PCBs and Dioxins in the Tennessee Portion of the Mississippi River Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Locations of Tiptonville, Drummonds, and Memphis are shown for reference. More information is provided in Appendix III.*

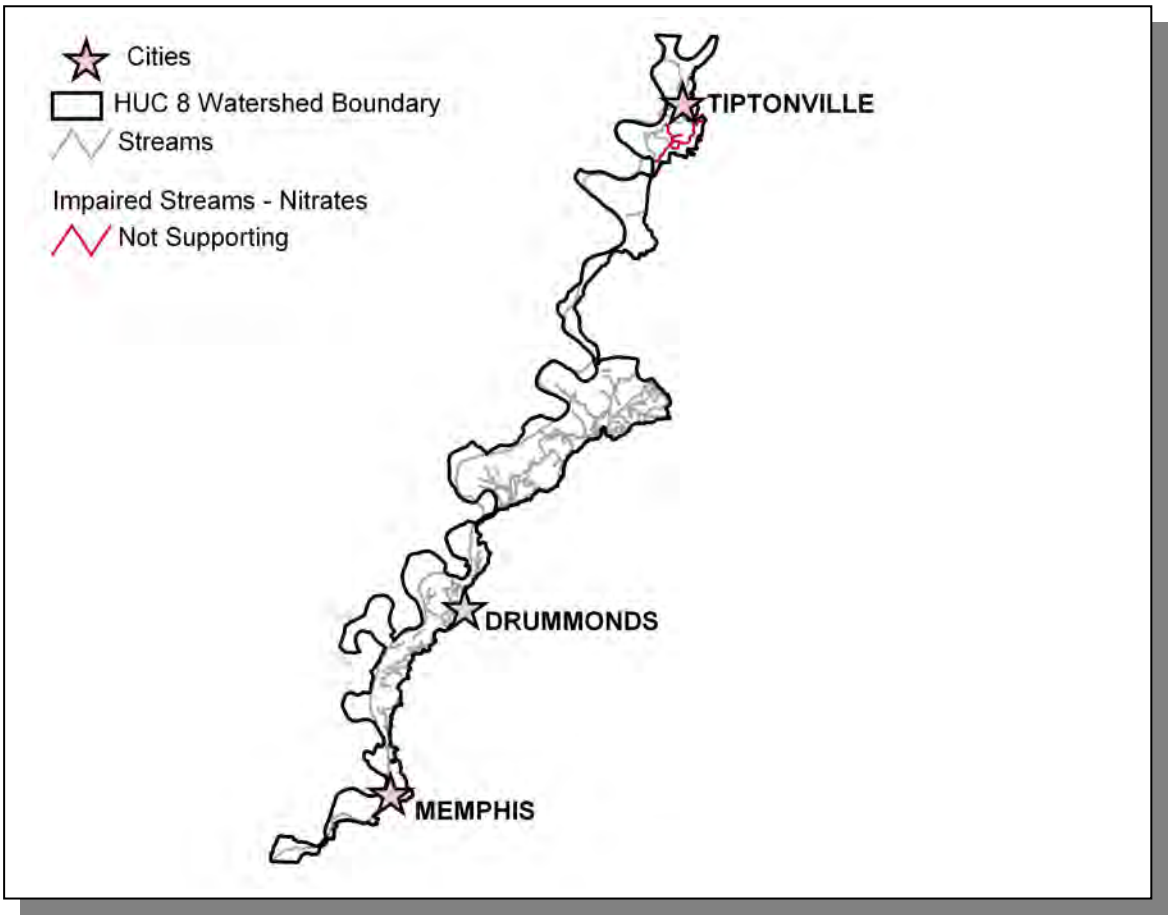


Figure 3-18. Impaired Streams Due to Nitrates in the Tennessee Portion of the Mississippi River Watershed. *Assessment data are based on the 2006 Water Quality Assessment. Locations of Tiptonville, Drummonds, and Memphis are shown for reference. More information is provided in Appendix III.*

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/.

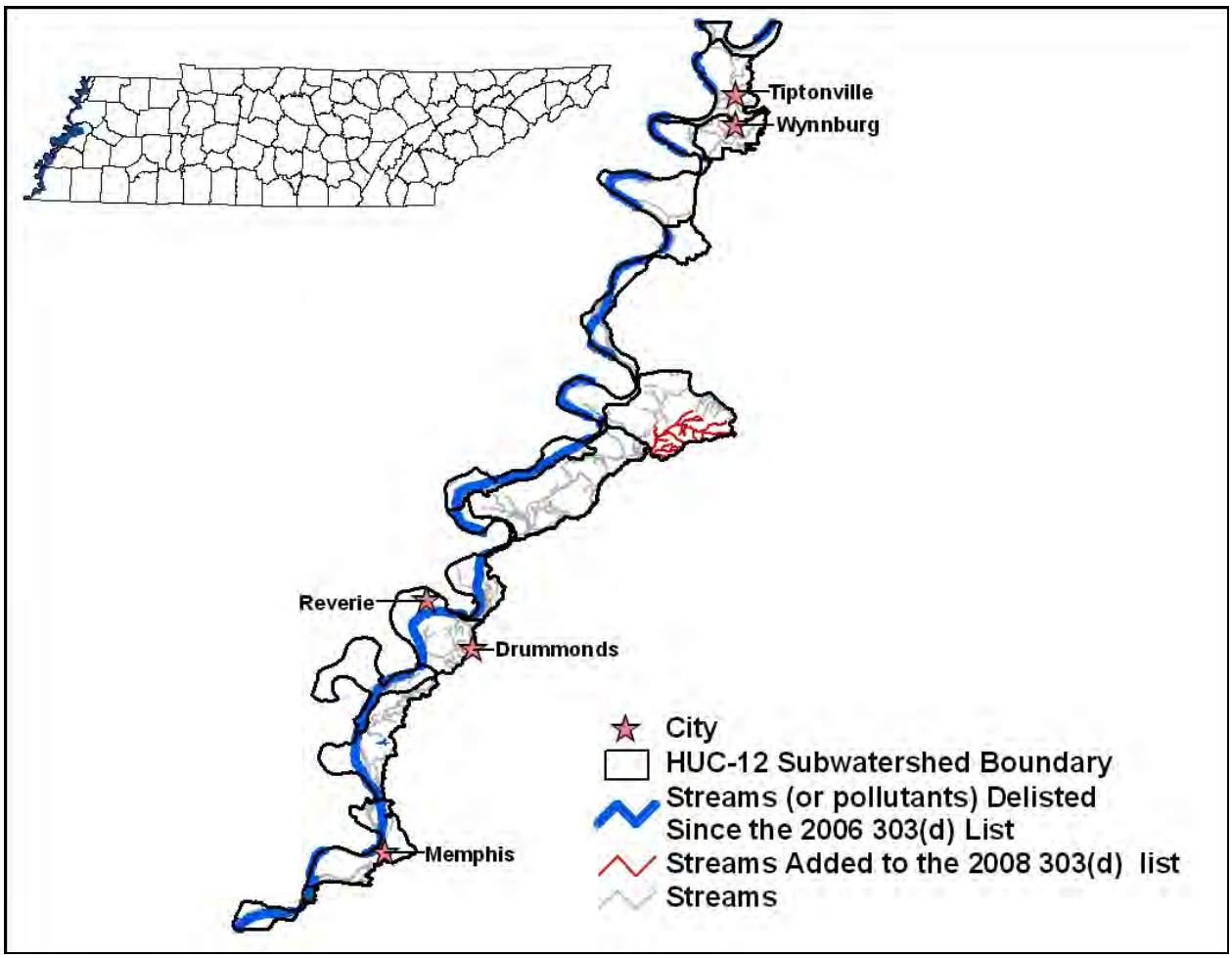


Figure 3-19. Changes to the 303(d) List of Impaired Waters in the Tennessee Portion of the Mississippi River Watershed Since Approval of the 2006 List by EPA. *More information is provided in Appendix III.*

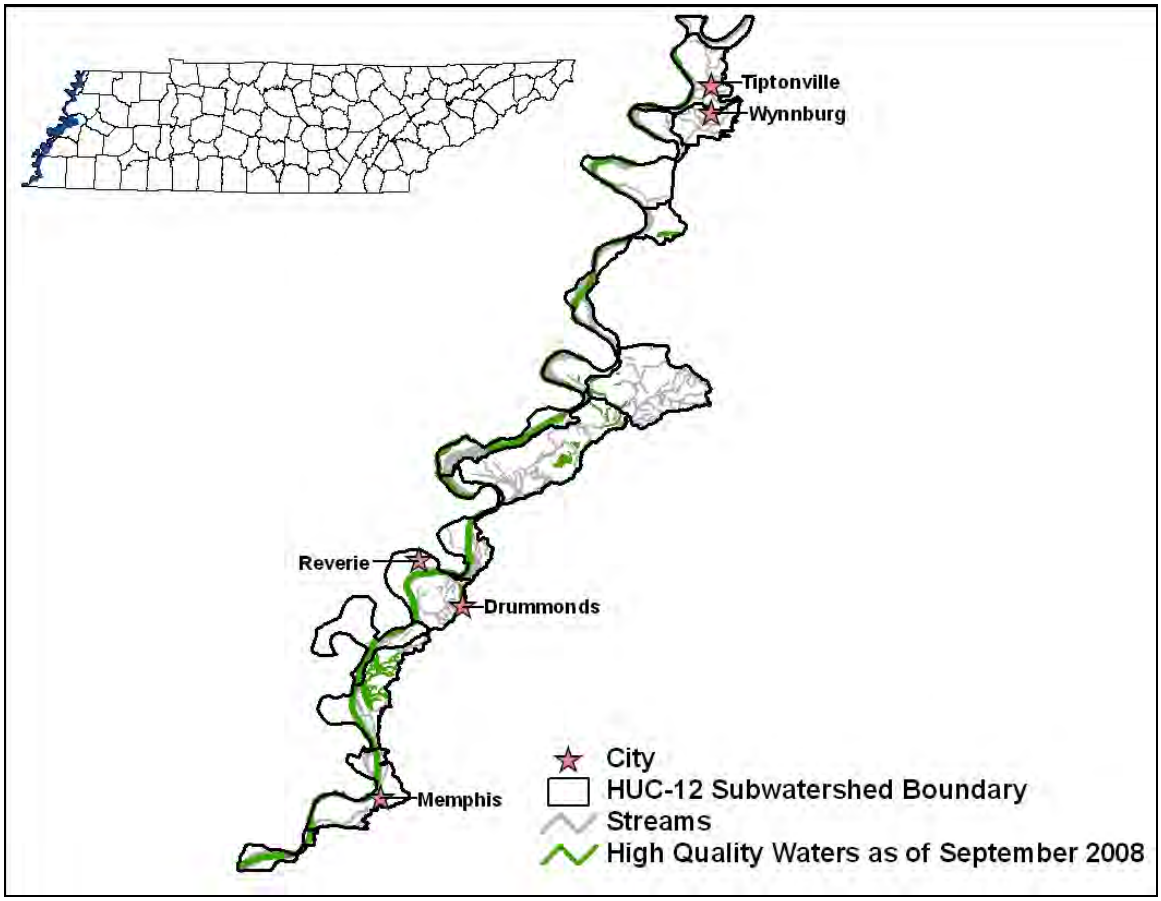


Figure 3-20. High Quality Waters Identified in the Tennessee Portion of the Mississippi River Watershed. *More information is provided in Appendix III.*

CHAPTER 4

POINT AND NONPOINT SOURCE CHARACTERIZATION OF THE MISSISSIPPI RIVER WATERSHED

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

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

The HUC can range from 2 to 16 digits long, more digits indicating a smaller and smaller portion of the watershed is represented. The Tennessee portion of the Mississippi River Watershed (HUC 08010100) has been delineated into fifteen HUC-12 subwatersheds.

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

WCS integrates with ArcView® v3.x and Spatial Analyst® v1.1 to analyze user-delineated (sub)watersheds based on hydrologically connected water bodies. Reports are generated by integrating WCS with Microsoft® Word. Land Use/Land Cover information from 1992 and 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 Mississippi River Watershed is Composed of fifteen 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 Mississippi River Watershed.

HUC-8	HUC-10	HUC-12
08010100	080101001	080101000106 (Mississippi River)
	080101002	080101000201 (Mississippi River)
		080101000202 (Mississippi River)
		080101000203 (Blue Bank Bayou)
		080101000204 (Mississippi River)
	0801010003	080101000301 (Mississippi River)
		080101000302 (Middle Forked Deer River)
		080101000303 (Mississippi River)
		080101000304 (Mississippi River)
		080101000305 (Cold Creek)
	0801010004	080101000401 (Mississippi River)
		080101000402 (Mississippi River)
		080101000403 (Mississippi River)
		080101000404 (Mississippi River)
		080101000405 (Mississippi River)

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

4.2.A. 080101000106 (Mississippi River).

4.2.A.i. General Description.

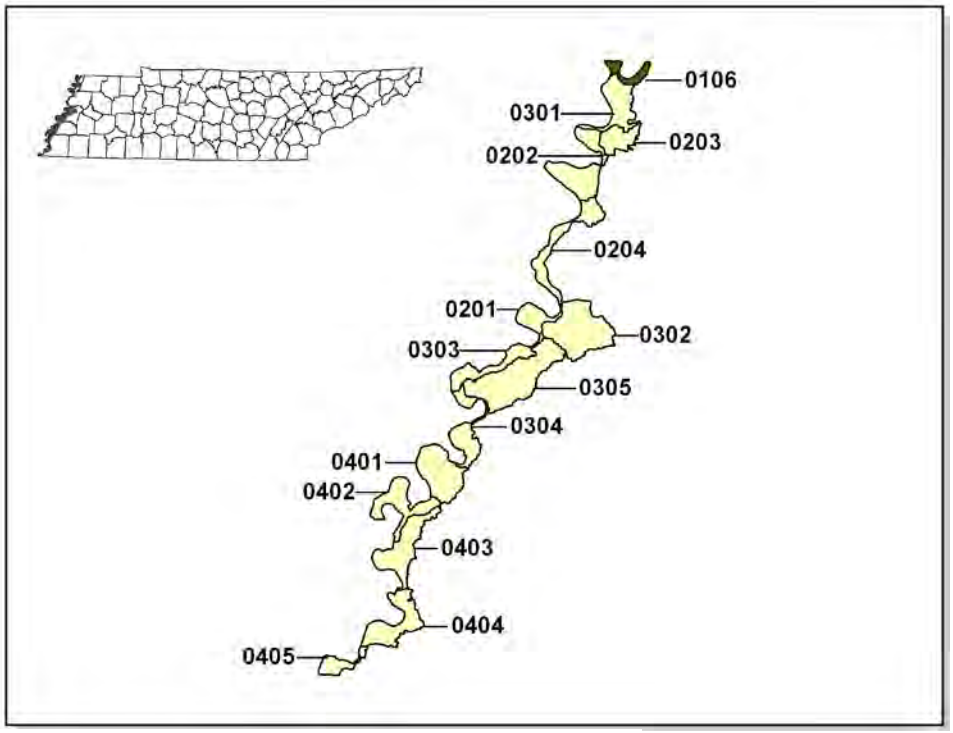


Figure 4-2. Location of Subwatershed 080101000106. *All Mississippi River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

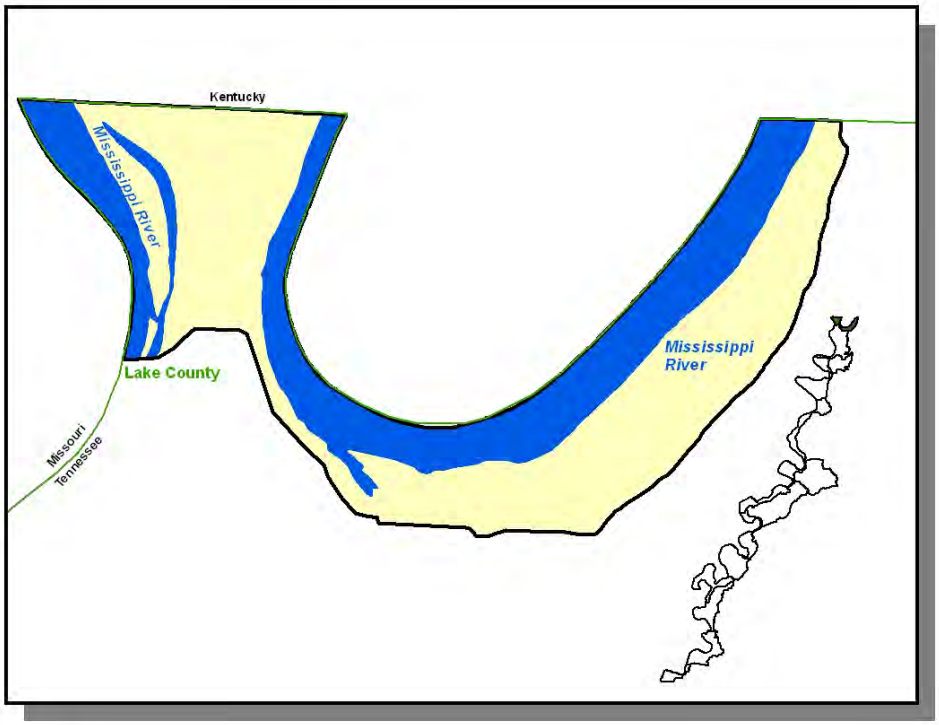


Figure 4-3. Locational Details of Subwatershed 080101000106.

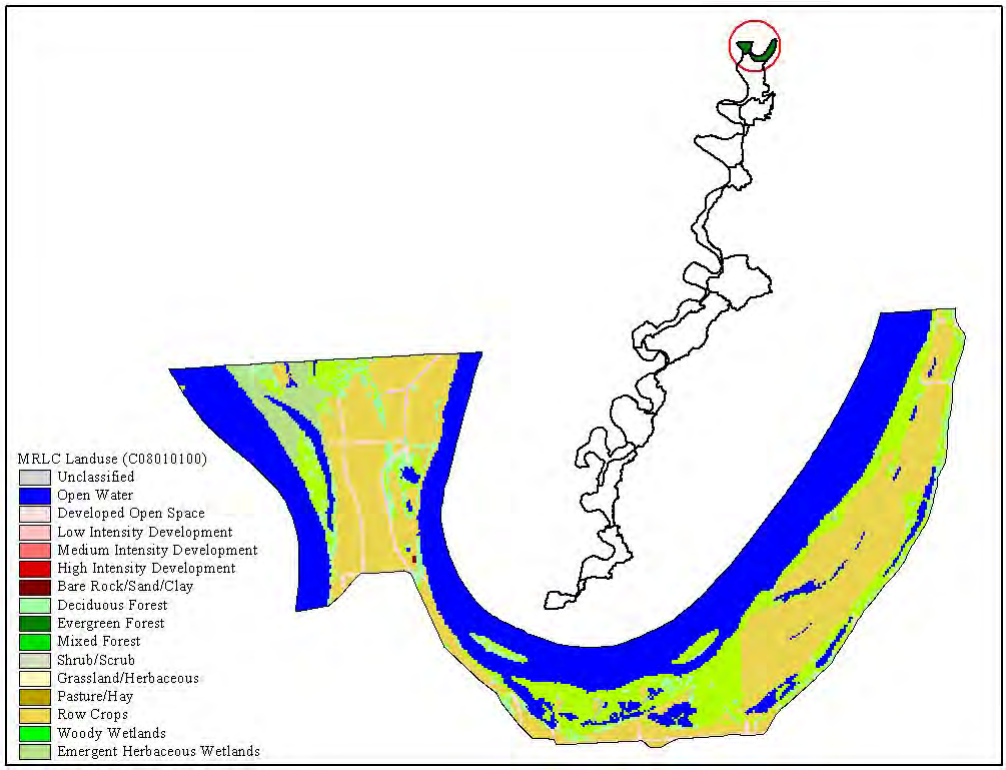


Figure 4-4. Illustration of Land Use Distribution in Subwatershed 080101000106.

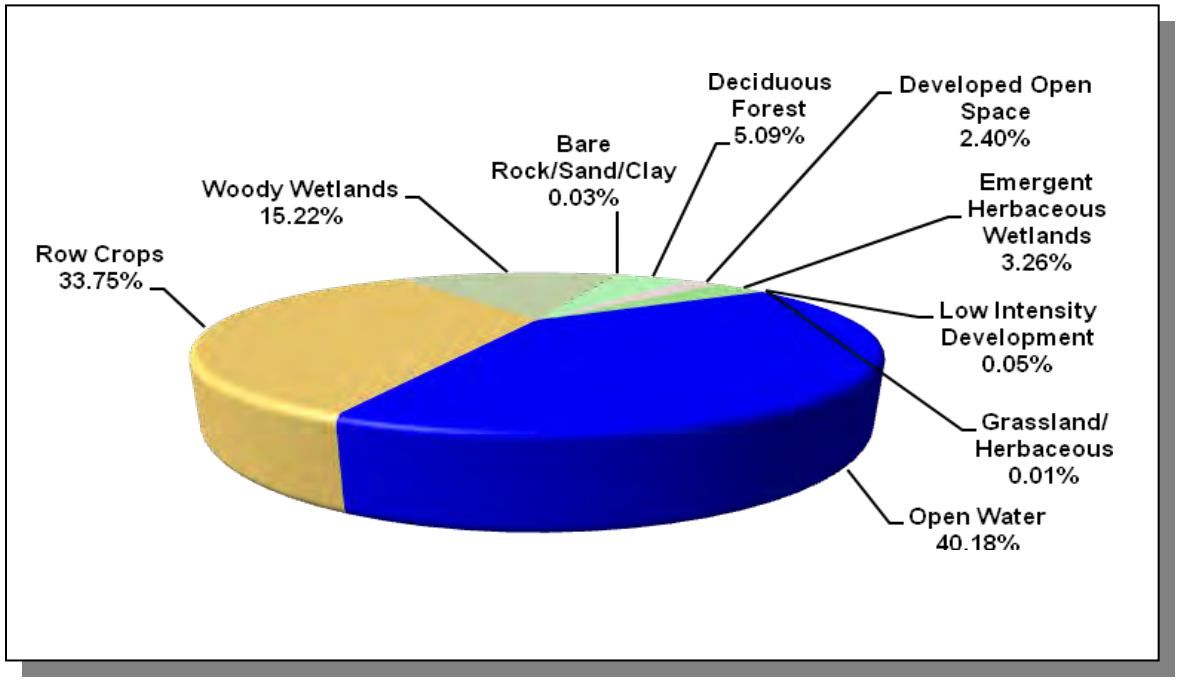


Figure 4-5. Land Use Distribution in Subwatershed 080101000106. *More information is provided in Appendix IV.*

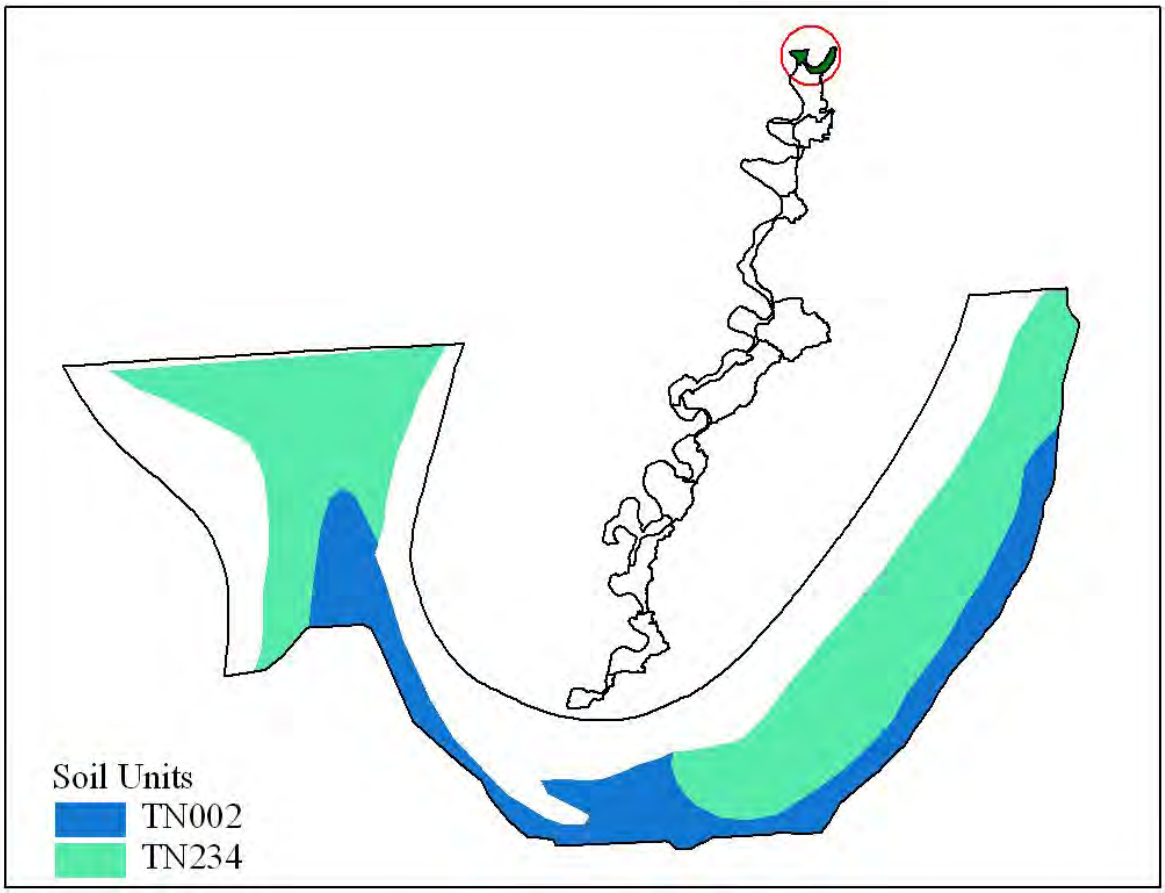


Figure 4-6. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000106.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN002	26.00	C	2.02	6.52	Silty Clay Loam	0.34
TN234	48.00	B	2.97	7.01	Loam	0.31

Table 4-2. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000106. *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)
Lake	7,129	8,177	7,954	4.72	336	386	375	11.60

Table 4-3. Population Estimates in Subwatershed 080101000106.

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

There are no USGS continuous record gaging stations located in subwatershed 080101000106.

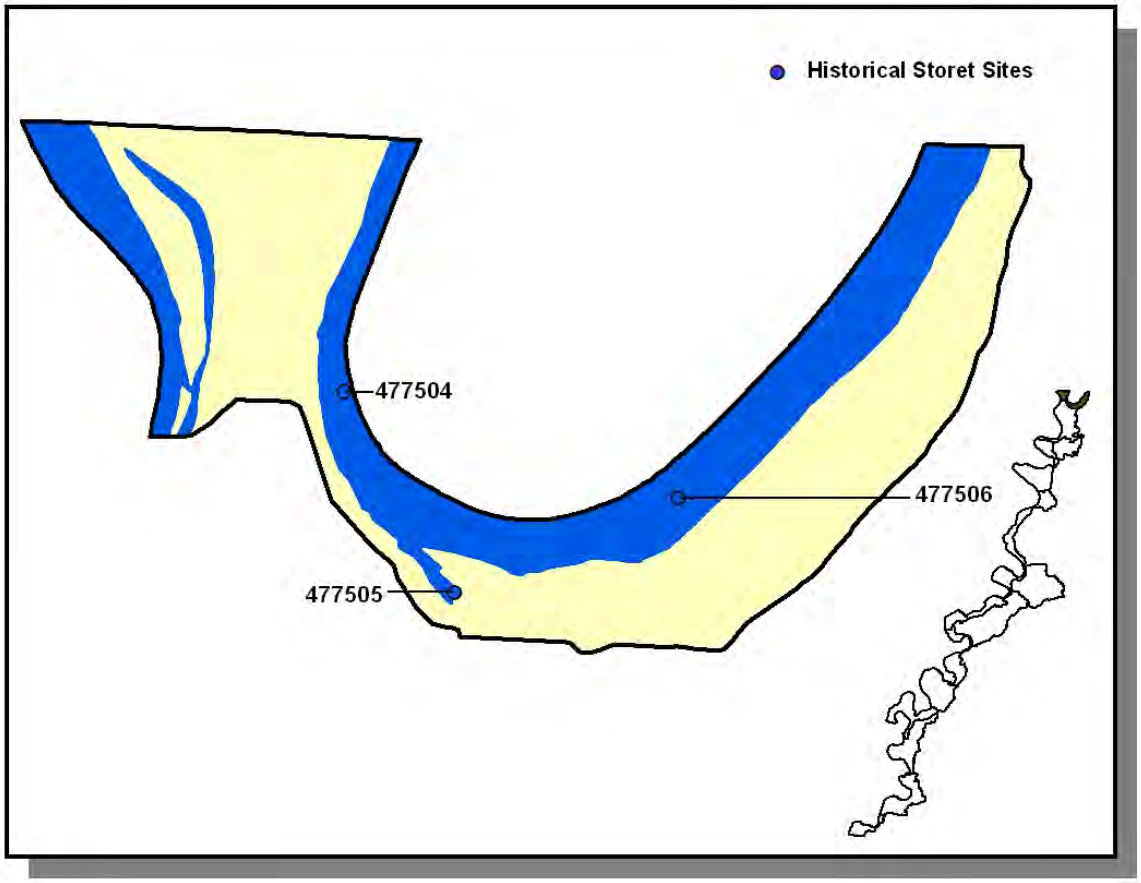


Figure 4-7. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080101000106. *More information, including site names and locations, is provided in Appendix IV.*

4.2.A.iii. Permitted Activities.

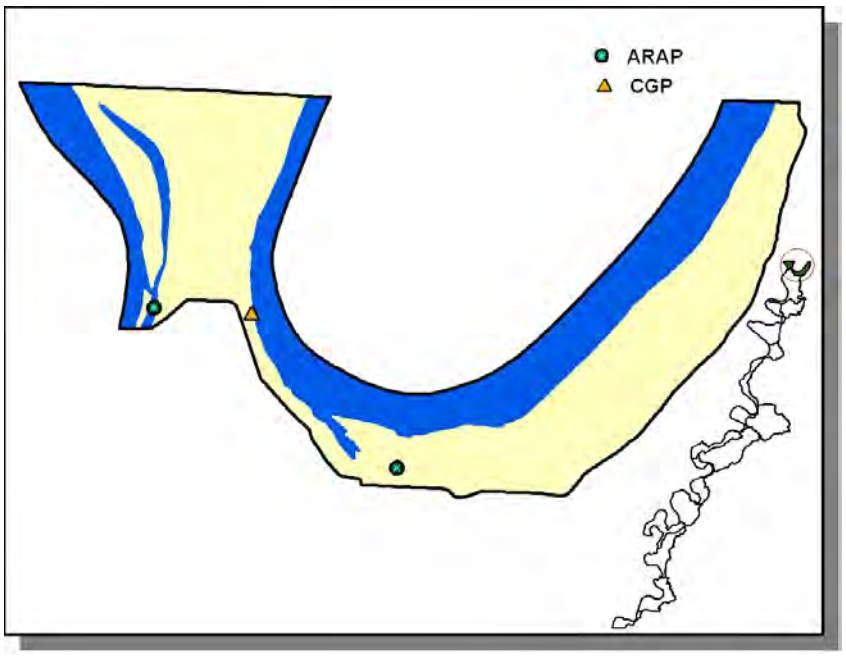


Figure 4-8. Location of Permits Issued in Subwatershed 080101000106. *More information, including the names of facilities, is provided in Appendix IV.*

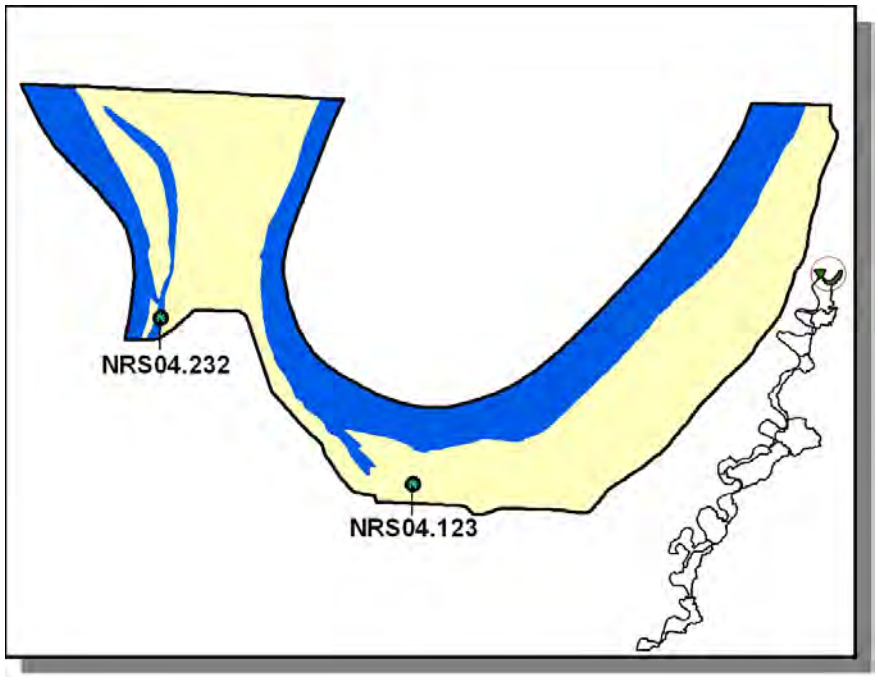
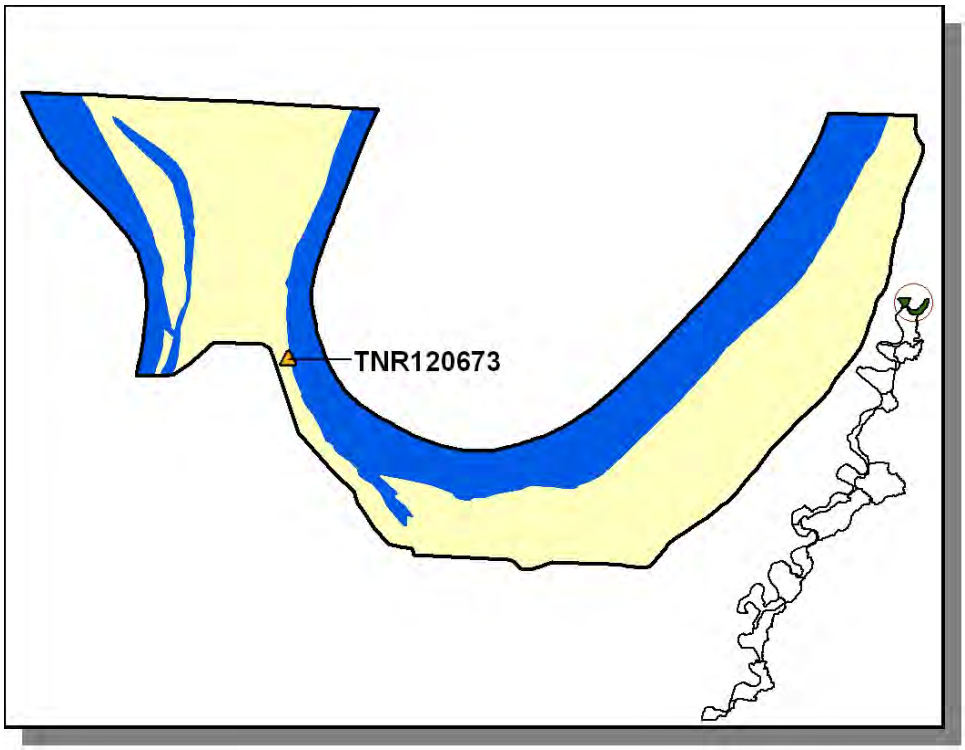


Figure 4-9. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 080101000106. *More information is provided in Appendix IV.*



Fiigure 4-10. Location of CGP (Construction General Permit) Sites in Subwatershed 080101000106. *More information is provided in Appendix IV.*

4.2.A.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS			
County	Beef Cow	Cattle	Chickens (Layers)
Fulton	1,095	2,079	4
Lake	641	986	

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)
Fulton	30.0	30.0	0.0	1.0
Lake	18.0	18.0	3.3	15.6

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

CROPS	TONS/ACRE/YEAR
Rice (Close Grown Cropland)	3.81
Farmsteads and Ranch Headquarters	3.34
Grass (Pastureland)	2.85
Cotton (Row Crops)	2.47
Soybeans (Row Crops)	2.45
Sorghum (Row Crops)	1.88
Corn (Row Crops)	1.66
Wheat (Close Grown Cropland)	1.66
Other Cropland not Planted	1.09
Conservation Reserve Program Land	0.09
Grass Forbs Legumes Mixed (Pastureland)	0.07
Other Land in Farms	0.06
Grass (Hayland)	0.04

Table 4-6. Annual Estimated Total Soil Loss in Subwatershed 080101000106.

4.2.B. 080101000201 (Mississippi River).

4.2.B.i. General Description.

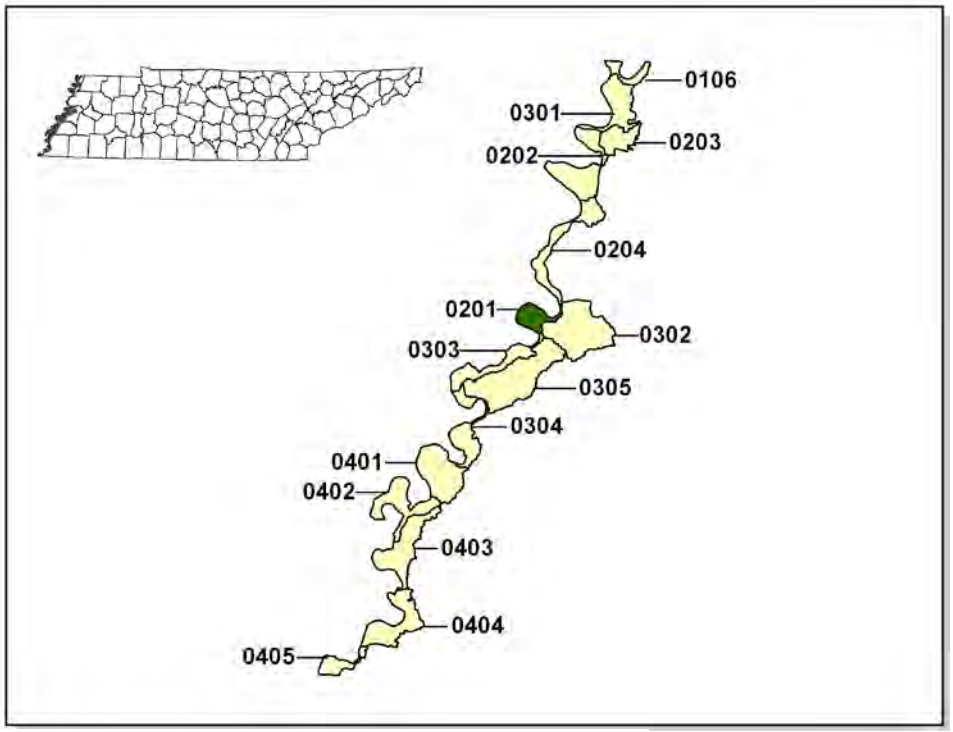


Figure 4-11. Location of Subwatershed 080101000201. *All Mississippi River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

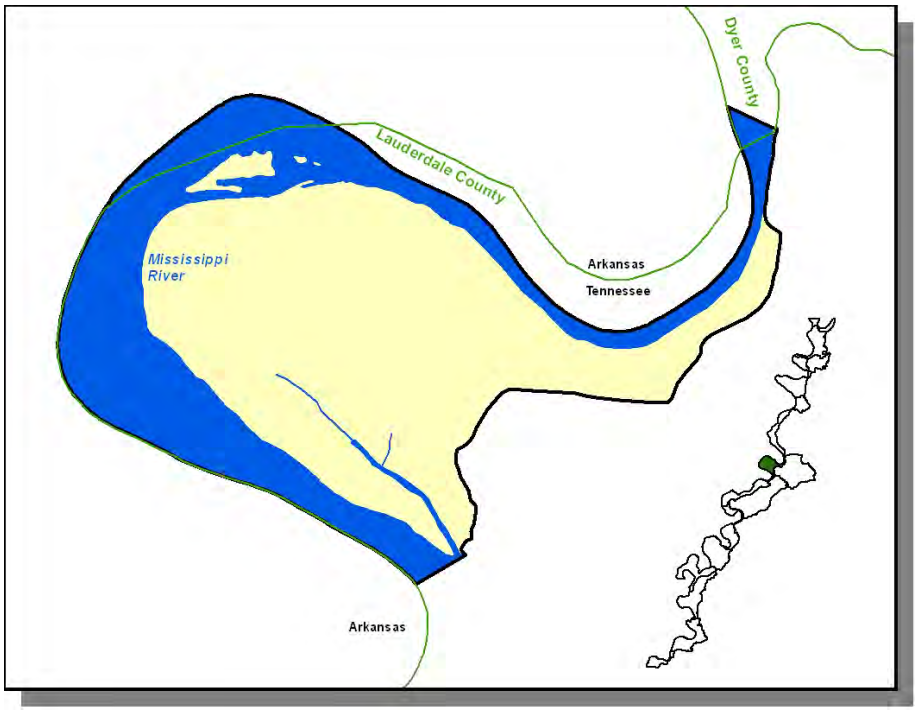


Figure 4-12. Locational Details of Subwatershed 080101000201.

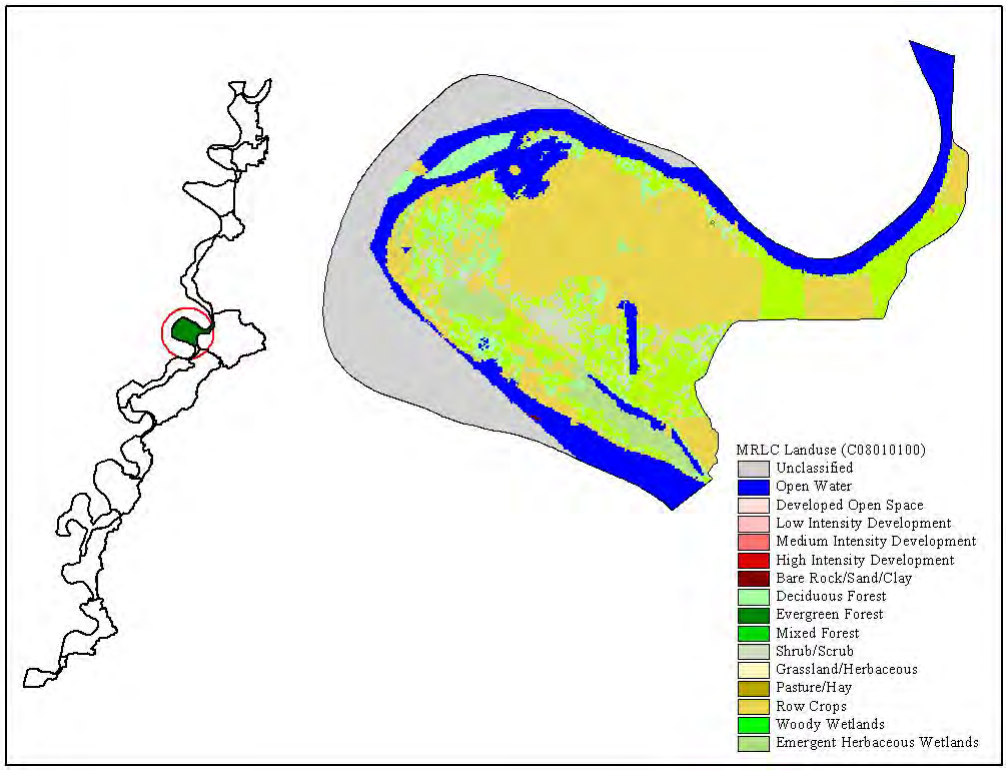


Figure 4-13. Illustration of Land Use Distribution in Subwatershed 080101000201.

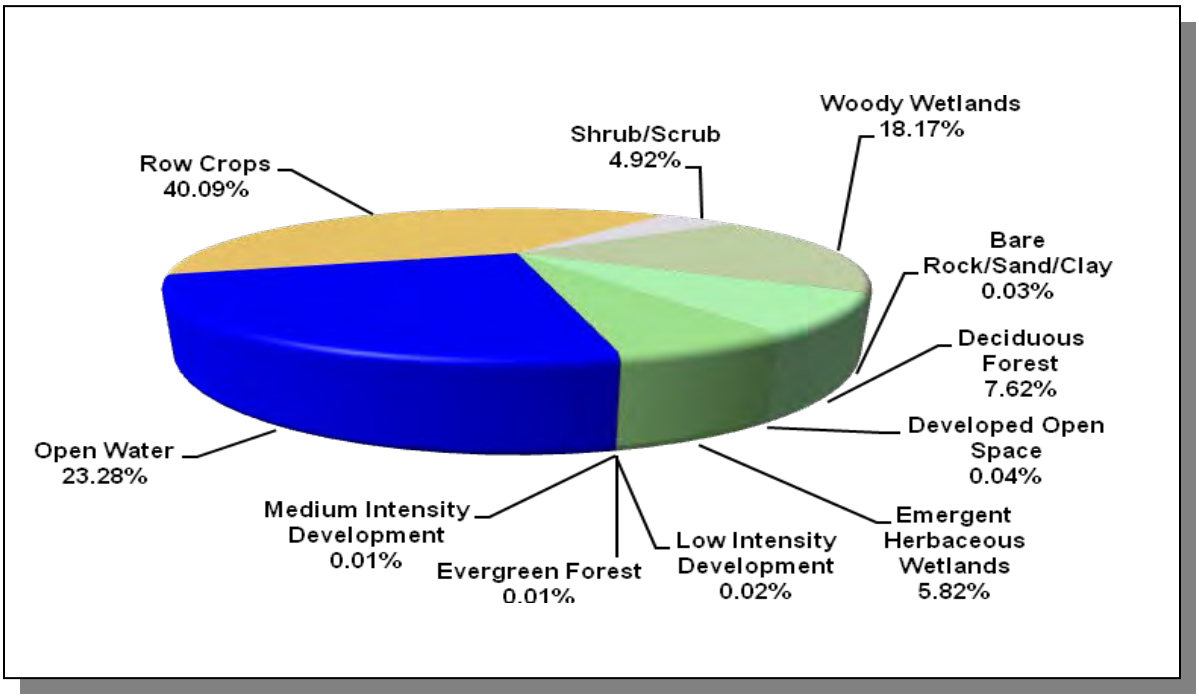


Figure 4-14. Land Use Distribution in Subwatershed 080101000201. *More information is provided in Appendix IV.*

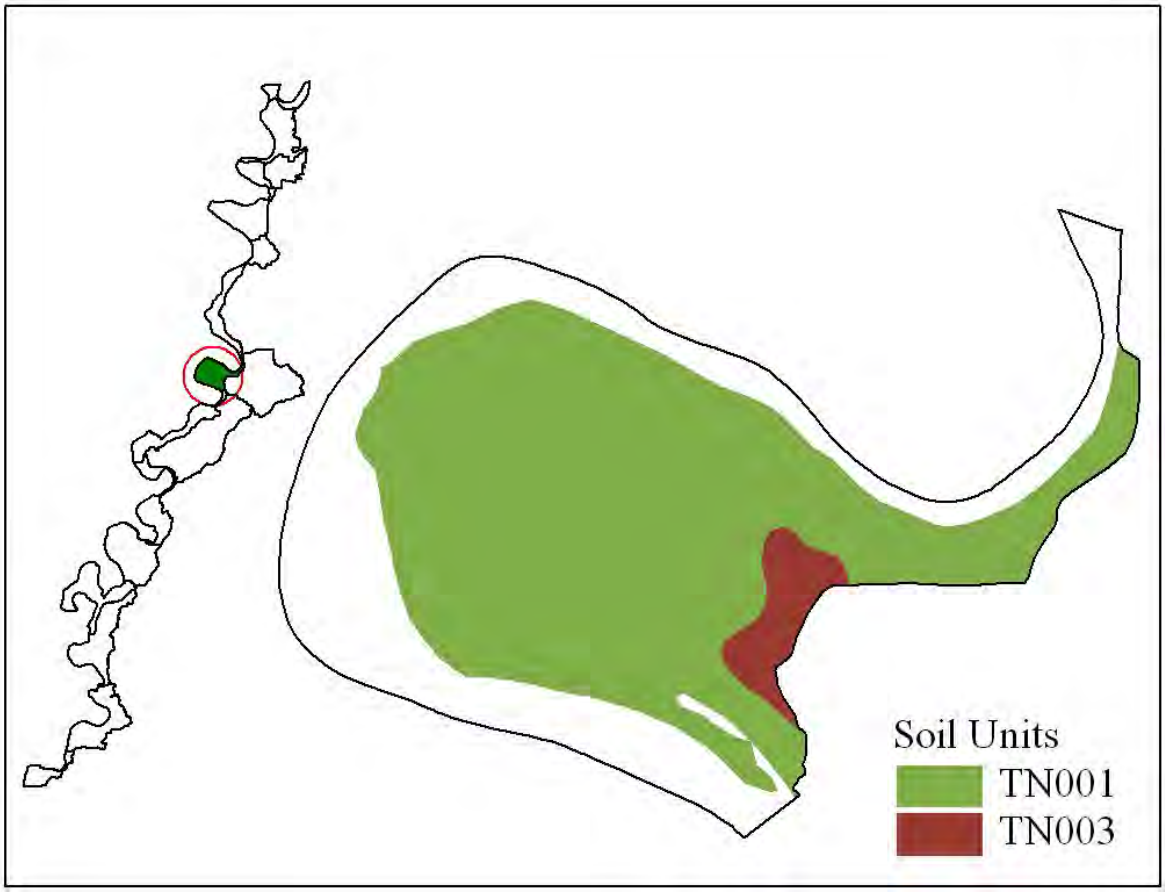


Figure 4-15. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000201.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN001	14.00	C	2.31	7.00	Silty Loam	0.33
TN003	62.00	C	0.50	6.65	Silty Clay	0.33

Table 4-7. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000201. *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)
Lauderdale	23,491	24,128	27,101	3.15	740	760	853	15.30

Table 4-8. Population Estimates in Subwatershed 080101000201.

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

There are no USGS continuous record gaging stations or STORET sites located in subwatershed 080101000201.

4.2.B.iii. Permitted Activities.

There are no permitted activities located in subwatershed 080101000201 as of June 30th, 2007.

4.2.B.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Lauderdale		8,739		243	2,355	11

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.*

CROPS	TONS/ACRE/YEAR
Corn (Row Crops)	14.77
Cotton (Row Crops)	13.53
Soybeans (Row Crops)	13.51
Wheat (Close Grown Cropland)	9.27
Summer Fallow (Other Cropland)	8.70
Other Vegetable and Truck Crop	4.00
Grass Forbs Legumes Mixed (Pastureland)	2.40
Grass (Pastureland)	2.27
Conservation Reserve Program Land	1.79
Legume (Hayland)	0.65
Legume Grass (Hayland)	0.58
Grass (Hayland)	0.37
Farmsteads and Ranch Headquarters	0.09
Other Land in Farms	0.05

Table 4-10. Annual Estimated Total Soil Loss in Subwatershed 080101000201.

4.2.C. 080101000202 (Mississippi River).

4.2.C.i. General Description.

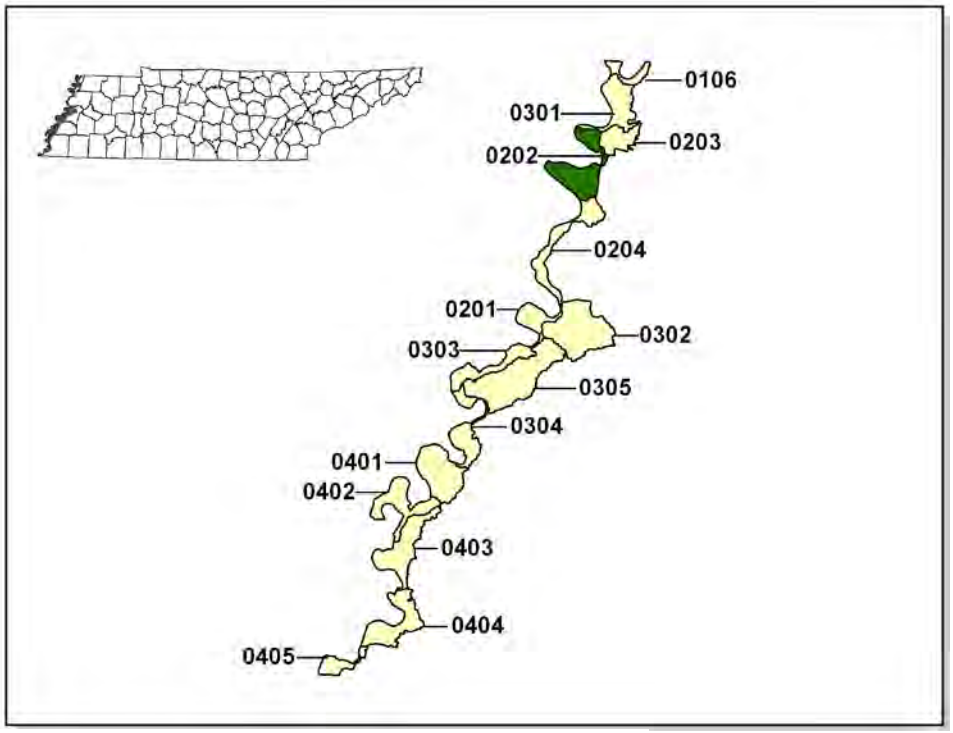


Figure 4-16. Location of Subwatershed 080101000202. *All Mississippi River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

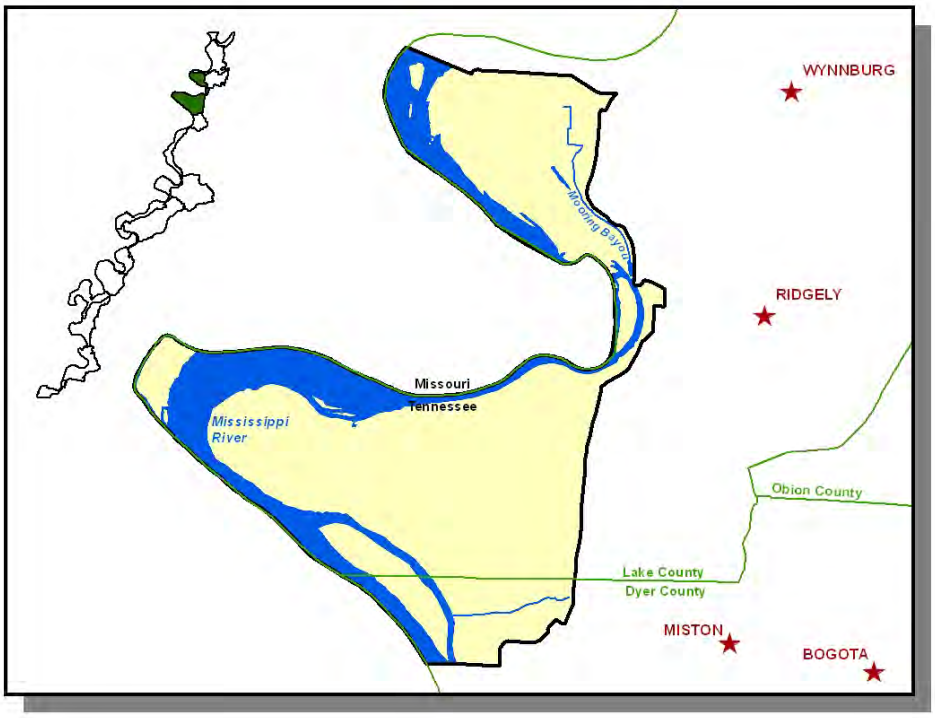


Figure 4-17. Locational Details of Subwatershed 080101000202.

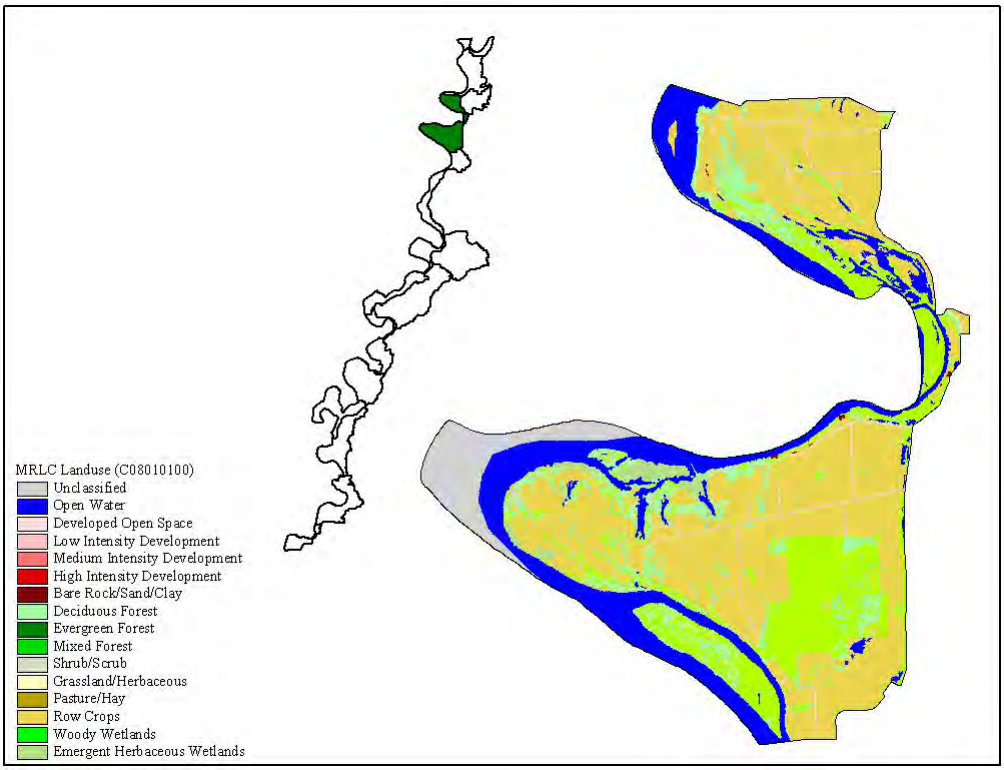


Figure 4-18. Illustration of Land Use Distribution in Subwatershed 080101000202.

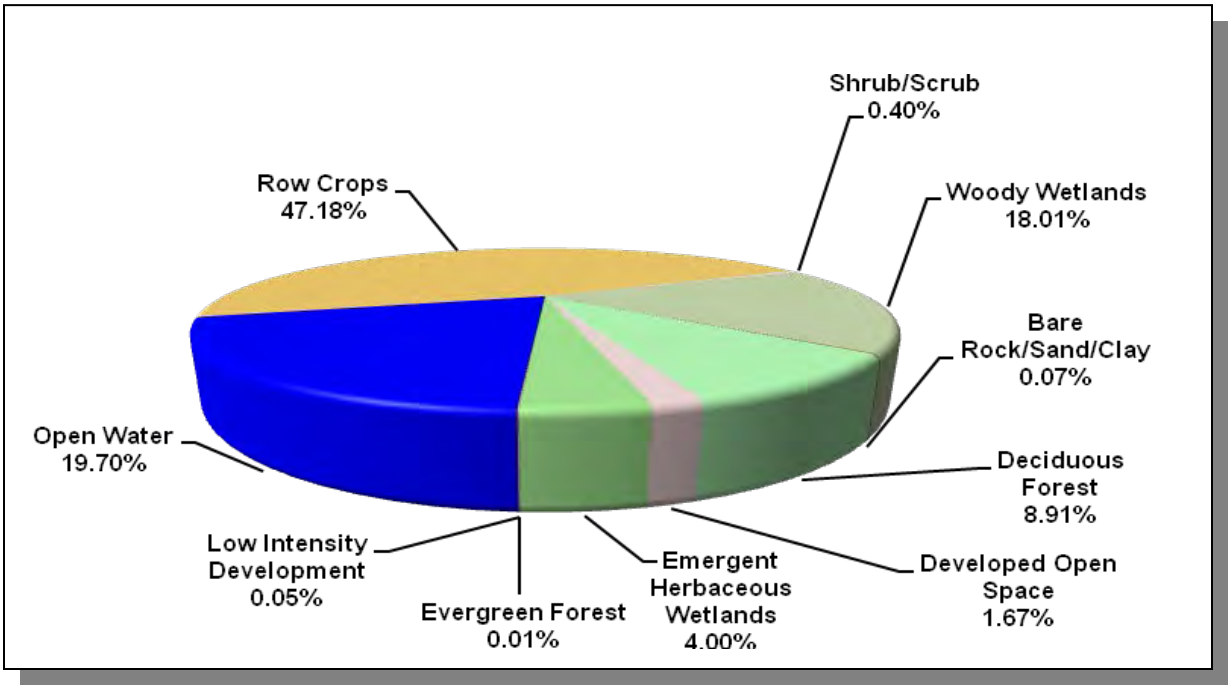


Figure 4-19. Land Use Distribution in Subwatershed 080101000202. *More information is provided in Appendix IV.*

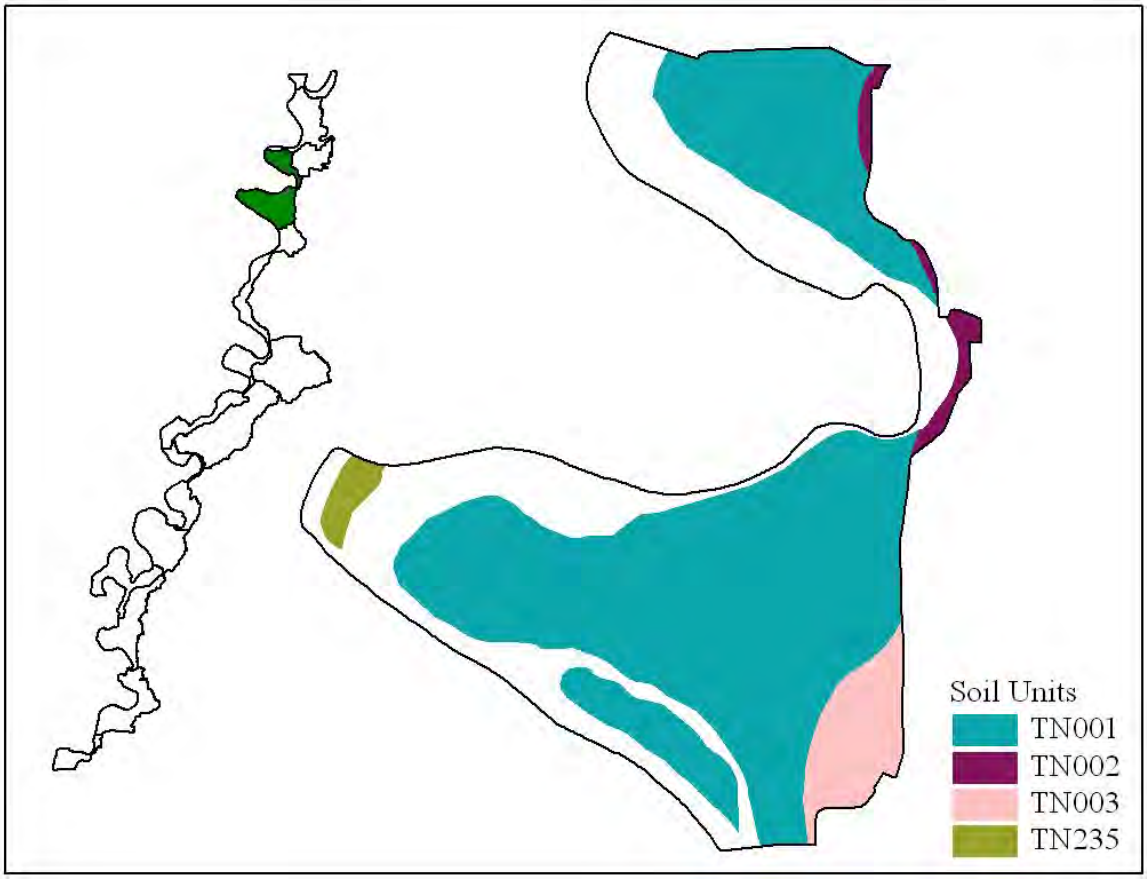


Figure 4-20. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000202.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN001	14.00	C	2.31	7.00	Silty Loam	0.33
TN002	26.00	C	2.02	6.52	Silty Clay Loam	0.34
TN003	62.00	C	0.50	6.65	Silty Clay	0.33
TN235	63.00	C	1.70	5.26	Silty Clay Loam	0.31

Table 4-11. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000202. *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)
Dyer	34,854	36,465	37,279	0.92	322	337	345	7.10
Lake	7,129	8,177	7,954	20.03	1,428	1,638	1,593	11.60
Totals	**41,983**	**44,642**	**45,233**		**1,750**	**1,975**	**1,938**	**10.70**

Table 4-12. Population Estimates in Subwatershed 080101000202.

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

There are no USGS continuous record gaging stations or STORET sites located in subwatershed 080101000202.

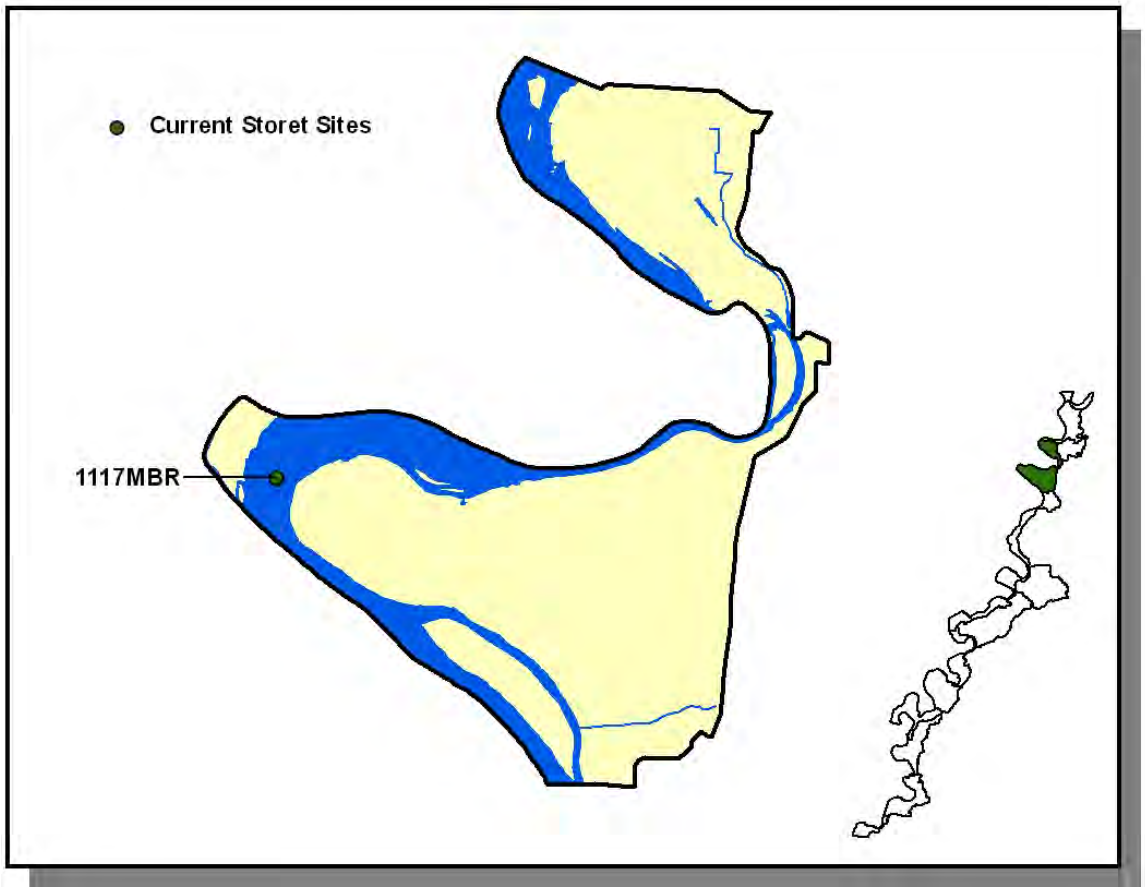


Figure 4-21. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080101000202. *More information, including site names and locations, is provided in Appendix IV.*

4.2.C.iii. Permitted Activities.

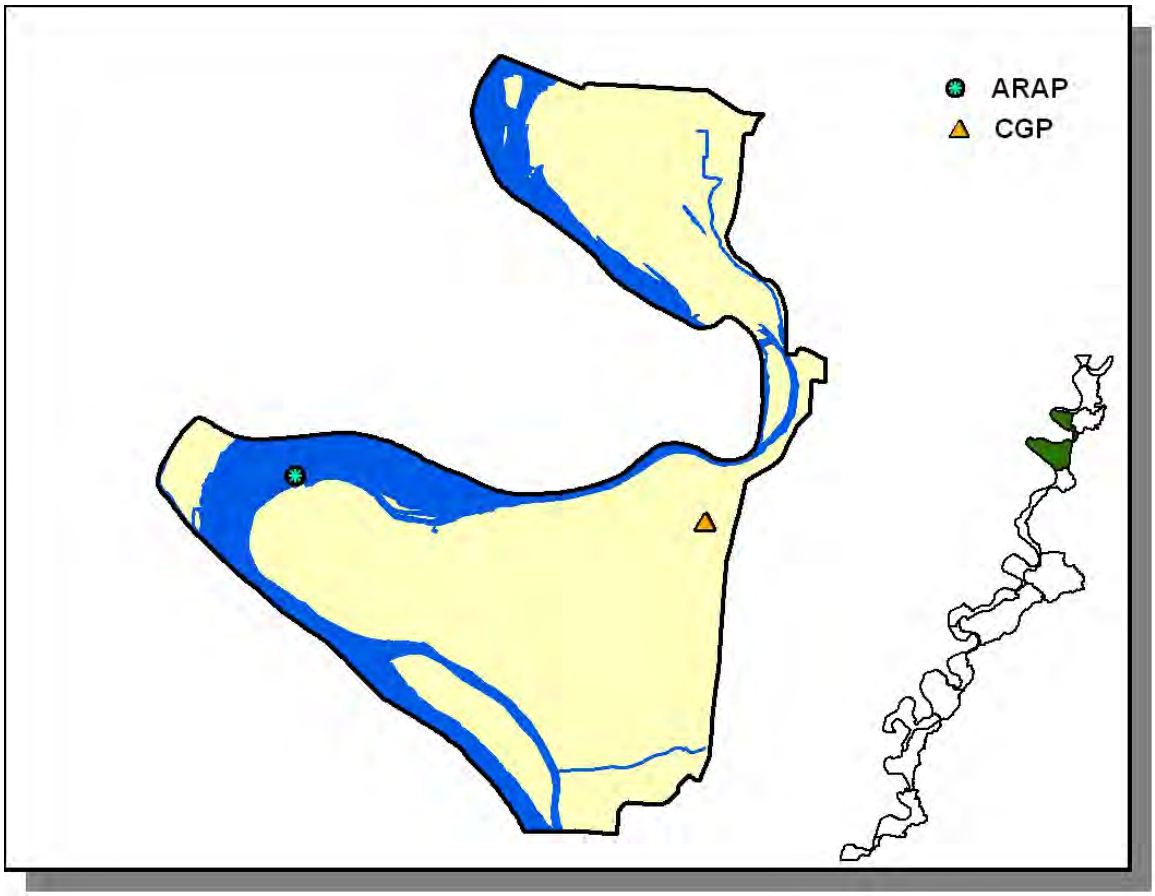


Figure 4-22. Location of Permits Issued in Subwatershed 080101000202. *More information, including the names of facilities, is provided in Appendix IV.*

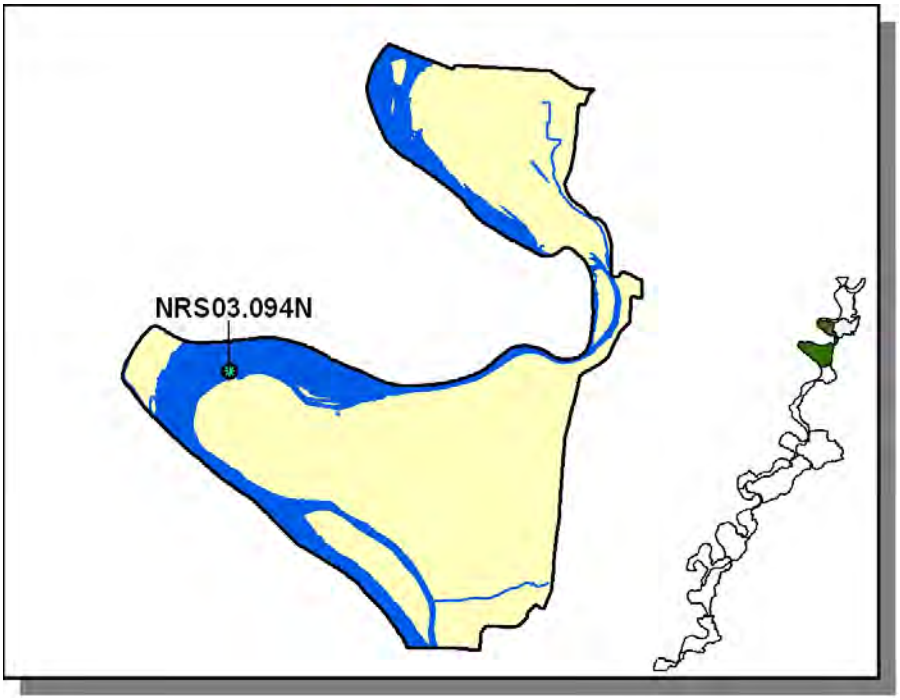


Figure 4-23. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 080101000202. *More information is provided in Appendix IV.*

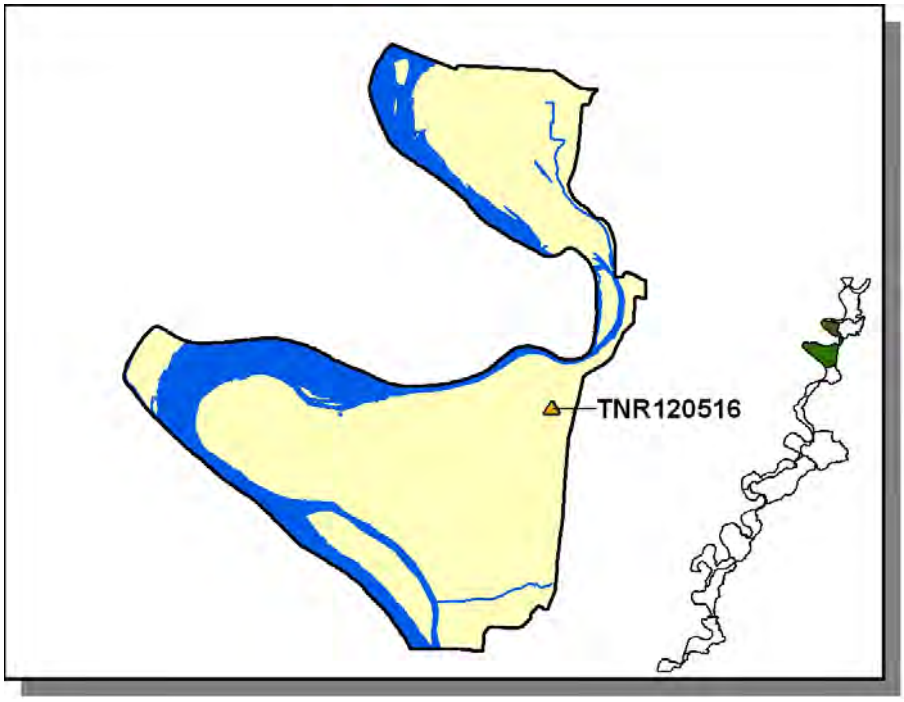


Figure 4-24. Location of CGP (Construction General Permit) Sites in Subwatershed 080101000202. *More information is provided in Appendix IV.*

4.2.C.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Dyer		10,982		12	1,311	
Lake	641	986				

Table 4-13. 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)
Dyer	40.4	40.4	0.8	2.8
Lake	18.0	18.0	3.3	15.6

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

CROPS	TONS/ACRE/YEAR
Oats (Close Grown Cropland)	3.34
Farmsteads and Ranch Headquarters	3.11
Soybeans (Row Crops)	2.79
Cotton (Row Crops)	2.78
Sorghum (Row Crops)	2.32
Corn (Row Crops)	2.29
Wheat (Close Grown Cropland)	1.90
Grass (Pastureland)	1.66
Other Cropland not Planted	1.36
Conservation Reserve Program Land	0.12
Grass Forbs Legumes Mixed (Pastureland)	0.10
Other Land in Farms	0.06
Grass (Hayland)	0.05

Table 4-15. Annual Estimated Total Soil Loss in Subwatershed 080101000202.

4.2.D. 080101000203 (Blue Bank Bayou).

4.2.D.i. General Description.

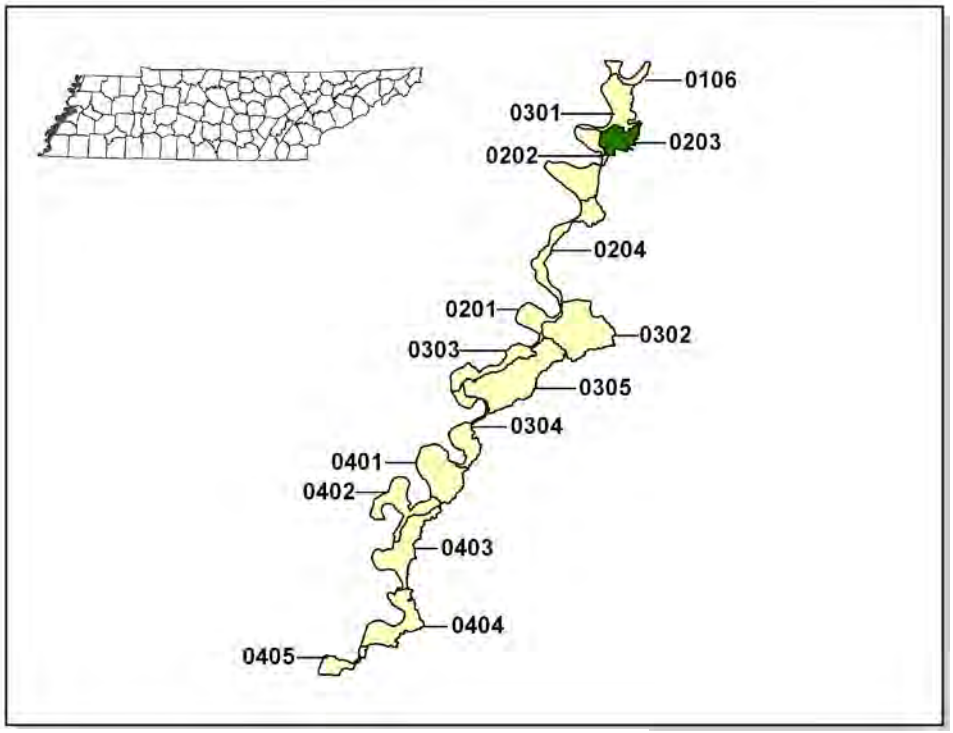


Figure 4-25. Location of Subwatershed 080101000203. *All Mississippi River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

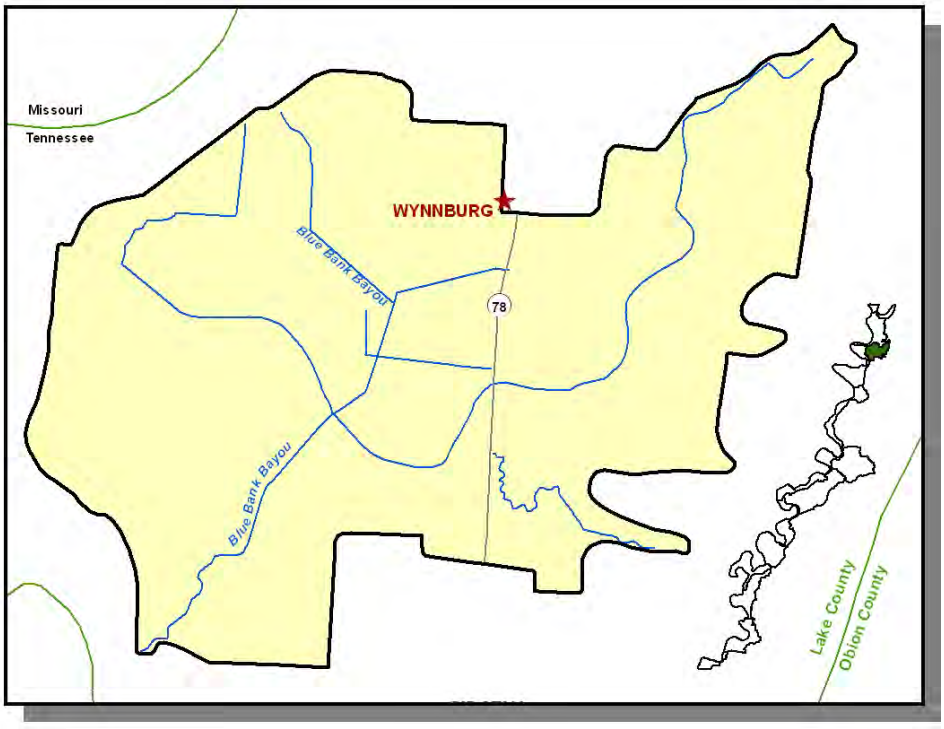


Figure 4-26. Locational Details of Subwatershed 080101000203.

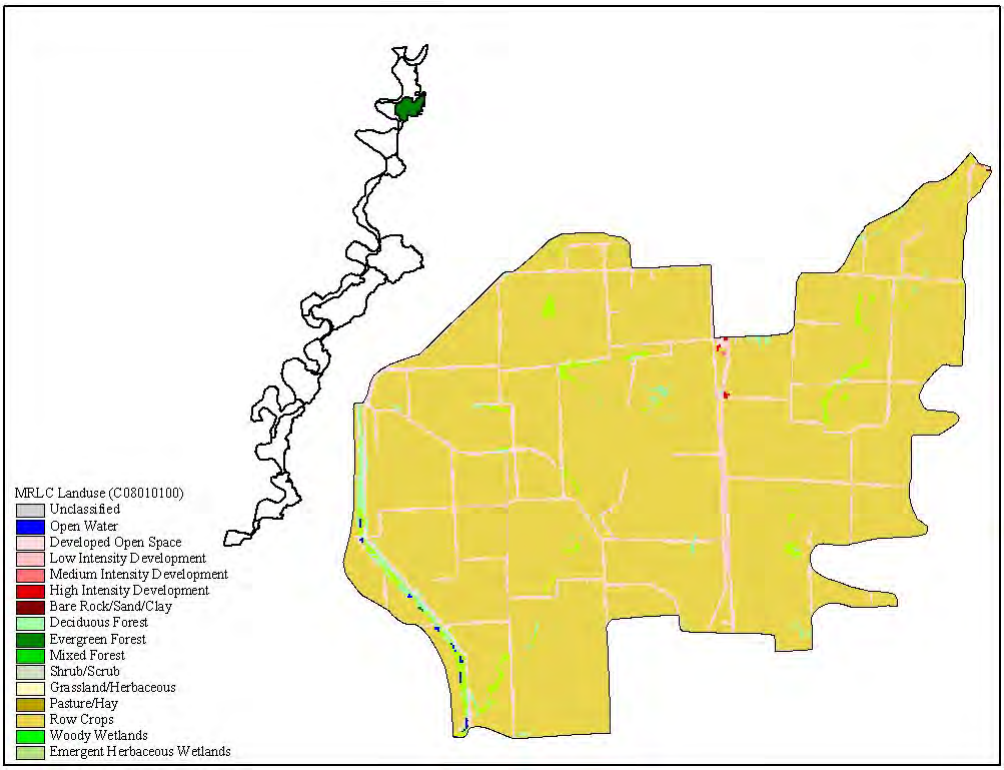


Figure 4-27. Illustration of Land Use Distribution in Subwatershed 080101000203.

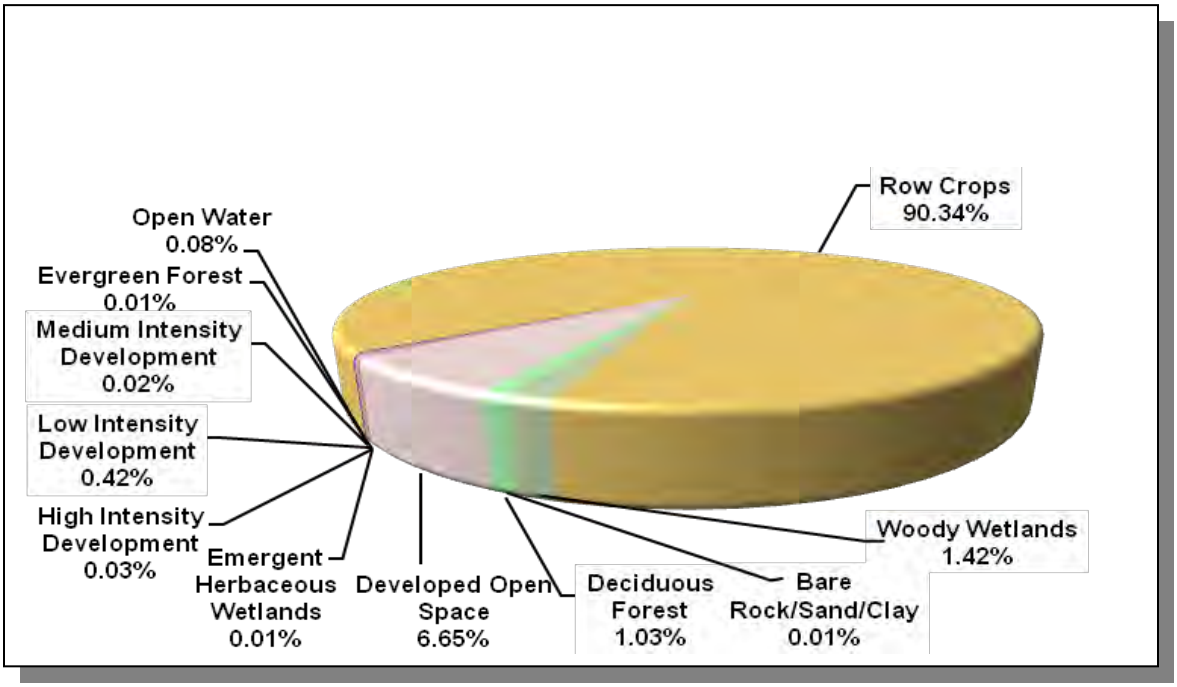


Figure 4-28. Land Use Distribution in Subwatershed 080101000203. *More information is provided in Appendix IV.*

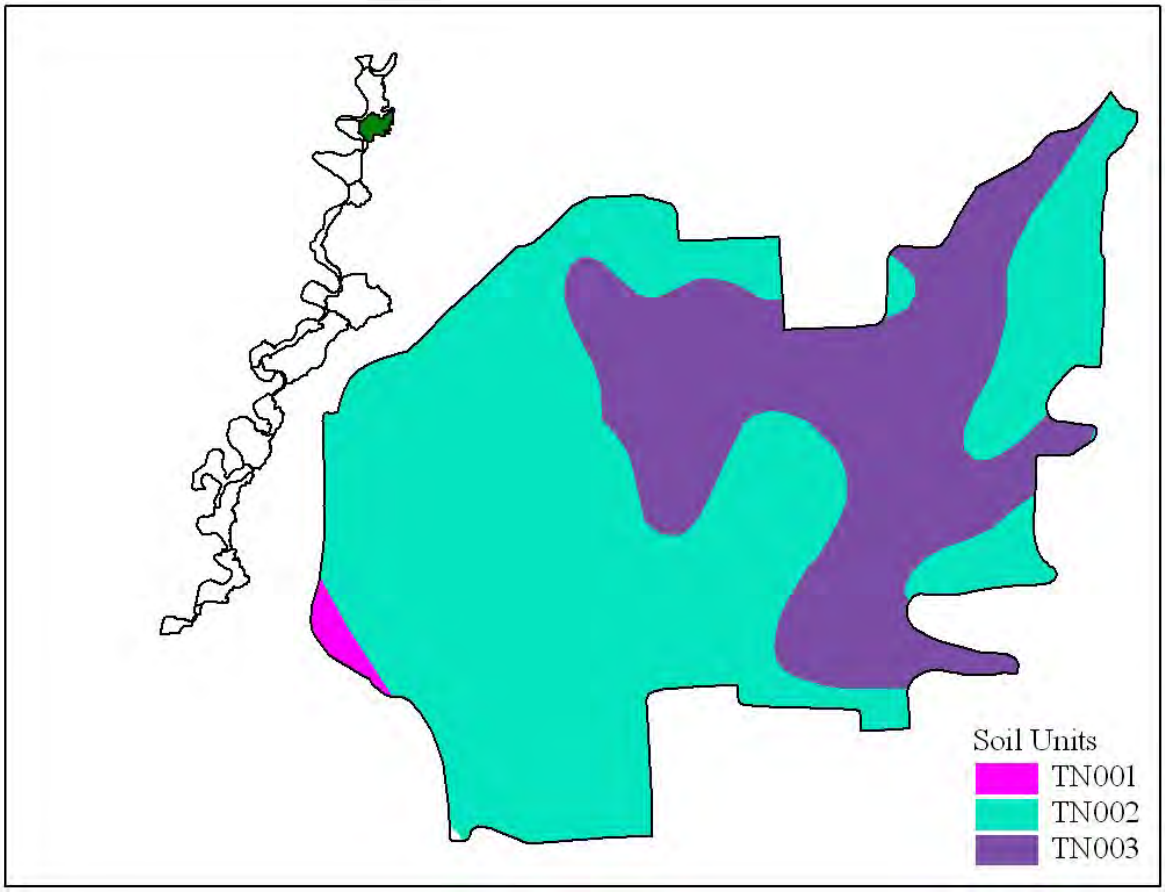


Figure 4-29. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000203.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN001	14.00	C	2.31	7.00	Silty Loam	0.33
TN002	26.00	C	2.02	6.52	Silty Clay Loam	0.34
TN003	62.00	C	0.50	6.65	Silty Clay	0.33

Table 4-16. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000203. *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)
Lake	7,129	8,177	7,954	11.19	798	915	890	11.50

Table 4-17. Population Estimates in Subwatershed 080101000203.

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

There are no USGS continuous record gaging stations located in subwatershed 080101000203.

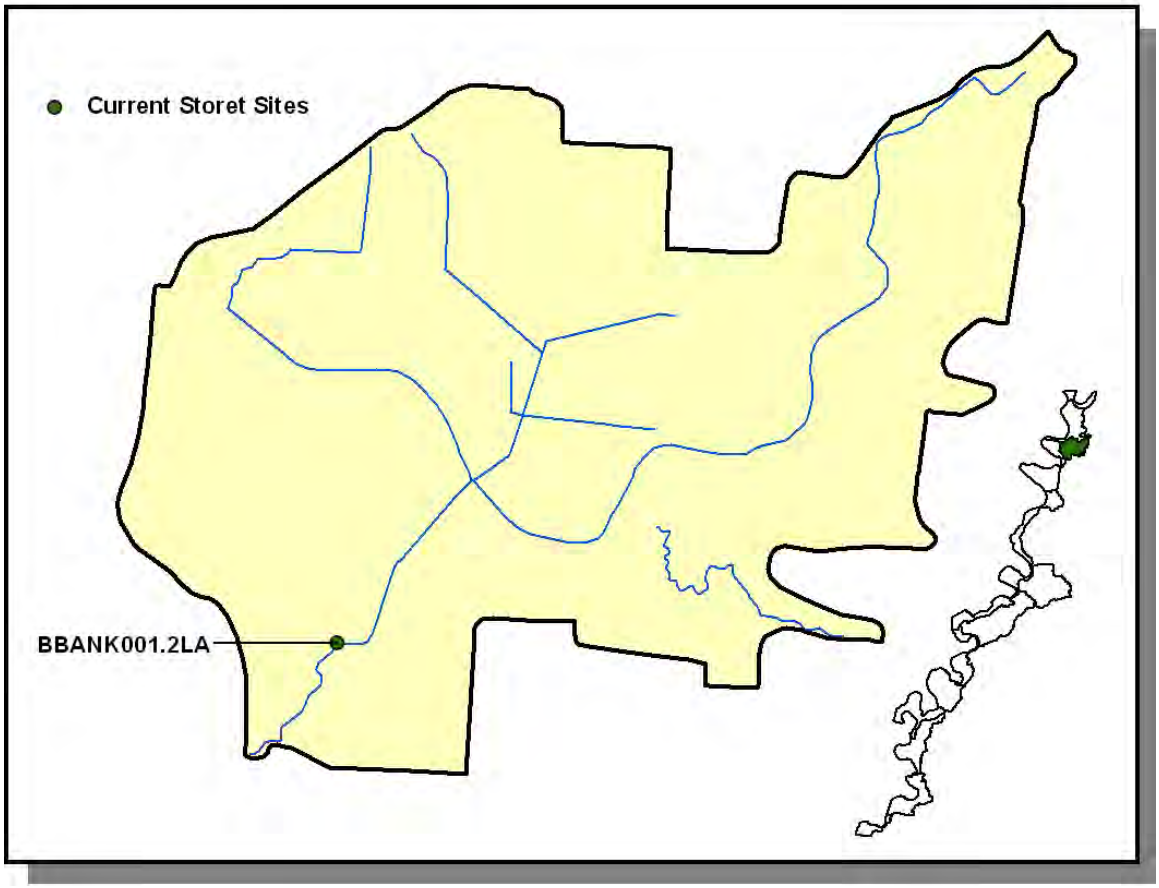


Figure 4-30. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080101000203. *More information, including site names and locations, is provided in Appendix IV.*

4.2.D.iii. Permitted Activities.

There are no permitted activities located in subwatershed 080101000203 as of June 30th, 2007.

4.2.D.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Lake	641	986				

Table 4-18. 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)
Lake	18.0	18.0	3.3	15.6

Table 4-19. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Farmsteads and Ranch Headquarters	3.34
Cotton (Row Crops)	2.47
Soybeans (Row Crops)	2.44
Sorghum (Row Crops)	1.88
Corn (Row Crops)	1.66
Wheat (Close Grown Cropland)	1.66
Conservation Reserve Program Land	0.08
Grass Forbs Legumes Mixed (Pastureland)	0.07
Other Land in Farms	0.06
Grass (Hayland)	0.04

Table 4-20. Annual Estimated Total Soil Loss in Subwatershed 080101000203.

4.2.E. 080101000204 (Mississippi River).

4.2.E.i. General Description.

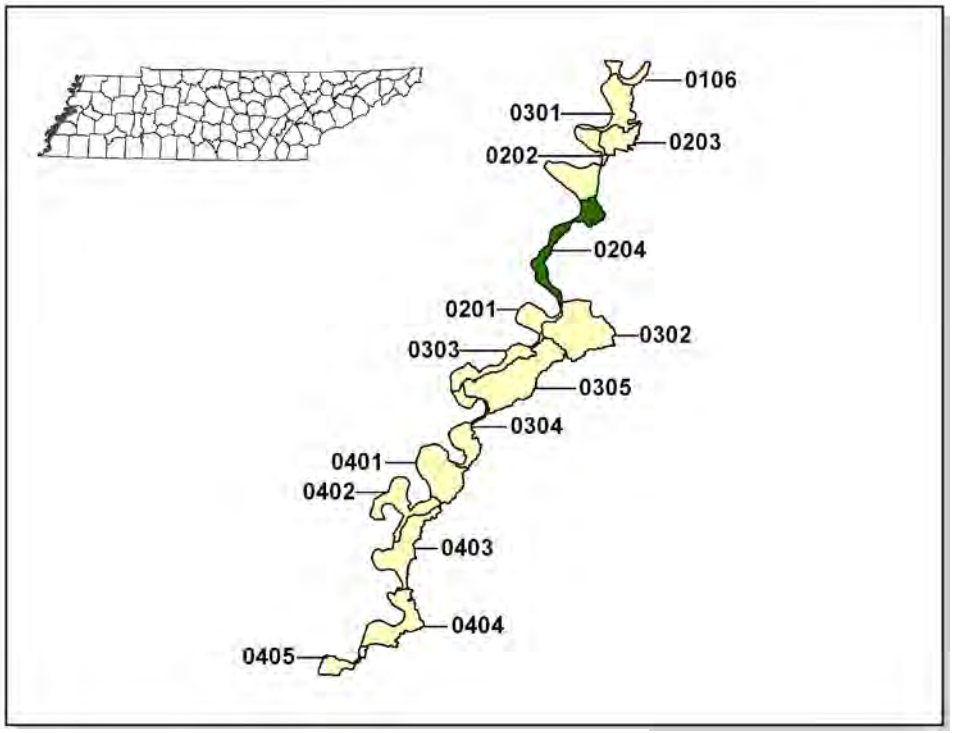


Figure 4-31. Location of Subwatershed 080101000204. *All Mississippi River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

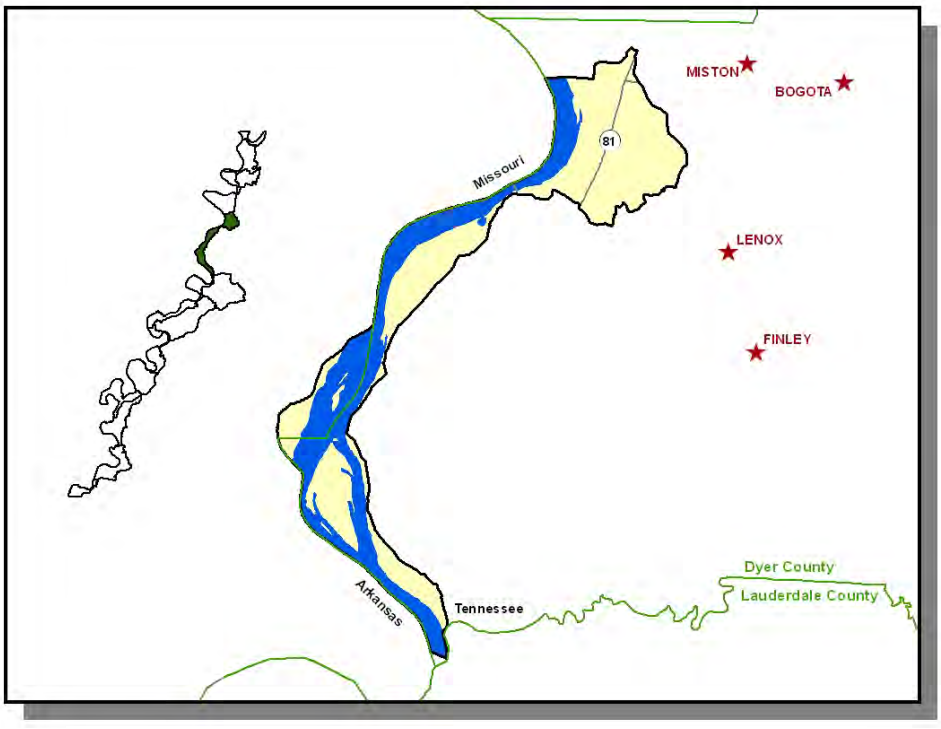


Figure 4-32. Locational Details of Subwatershed 080101000204.

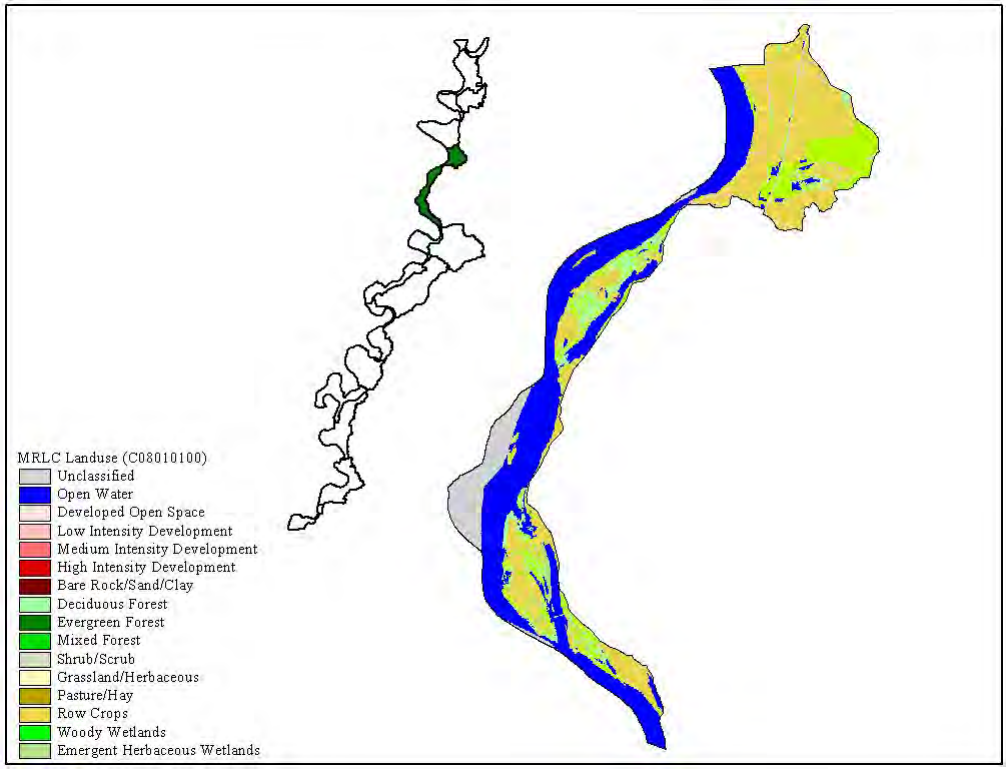


Figure 4-33. Illustration of Land Use Distribution in Subwatershed 080101000204.

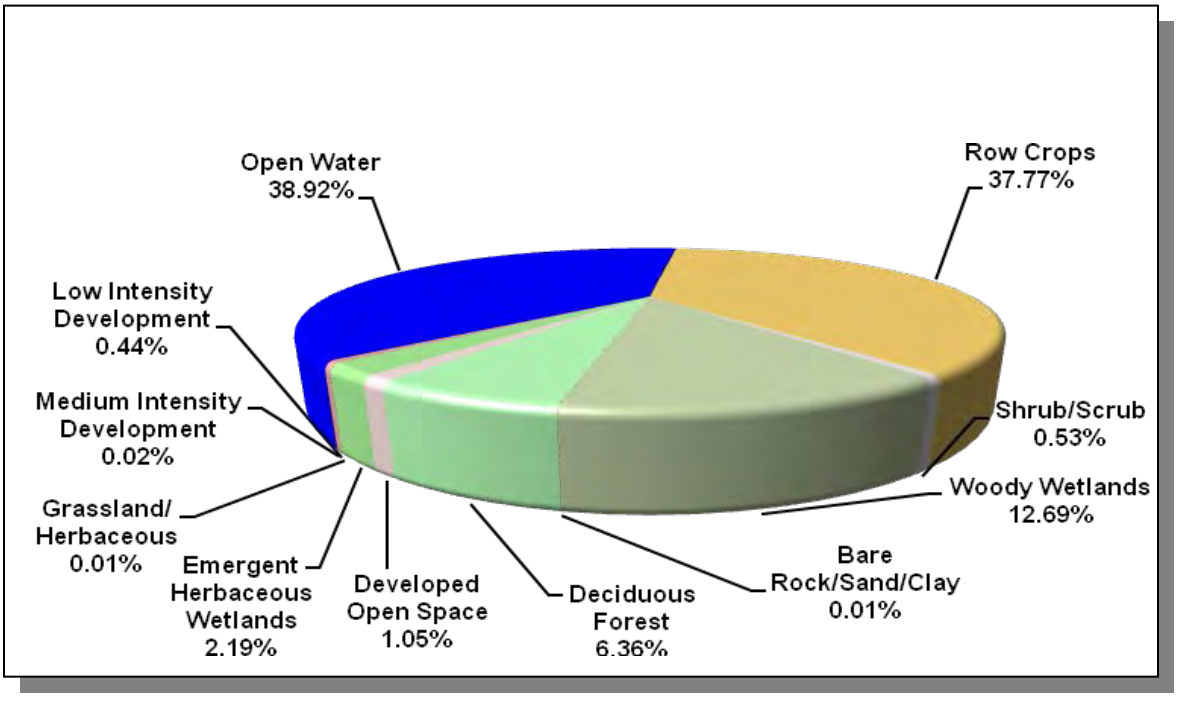


Figure 4-34. Land Use Distribution in Subwatershed 080101000204. *More information is provided in Appendix IV.*

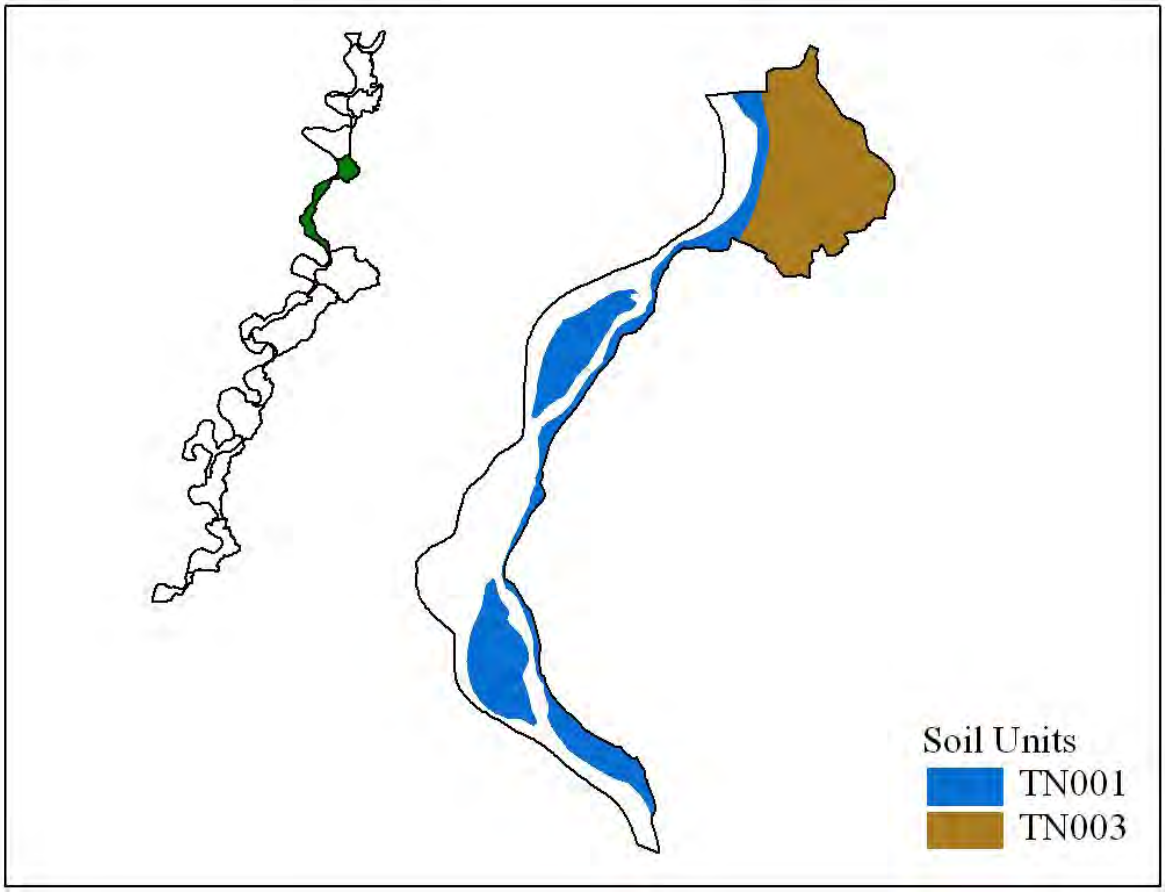


Figure 4-35. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000204.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN001	14.00	C	2.31	7.00	Silty Loam	0.33
TN003	62.00	C	0.50	6.65	Silty Clay	0.33

Table 4-21. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000204. *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)
Dyer	34,854	36,465	37,279	6.33	2,206	2,308	2,359	6.90
Lauderdale	23,491	24,128	27,101	0.02	4	4	5	25.00
Totals	**58,345**	**60,593**	**64,380**		**2,210**	**2,312**	**2,364**	**7.00**

Table 4-22. Population Estimates in Subwatershed 080101000204.

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

There are no USGS continuous record gaging stations or STORET sites located in subwatershed 080101000204.

4.2.E.iii. Permitted Activities.

There are no permitted activities located in subwatershed 080101000204 as of June 30th, 2007.

4.2.E.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Dyer		10,982		12	1,311	
Lauderdale		8,739		243	2355	11

Table 4-23. 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)
Dyer	40.4	40.4	0.8	2.8

Table 4-24. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Summer Fallow (Other Cropland)	8.70
Corn (Row Crops)	7.46
Sorghum (Row Crops)	5.90
Soybeans (Row Crops)	5.63
Cotton (Row Crops)	5.32
Other Vegetable and Truck Crop	4.00
Wheat (Close Grown Cropland)	3.90
Oats (Close Grown Cropland)	3.34
Grass (Pastureland)	1.66
Other Cropland not Planted	1.36
Farmsteads and Ranch Headquarters	1.23
Legume (Hayland)	0.65
Legume Grass (Hayland)	0.58
Conservation Reserve Program Land	0.39
Grass Forbs Legumes Mixed (Pastureland)	0.37
Grass (Hayland)	0.14
Other Land in Farms	0.05

Table 4-25. Annual Estimated Total Soil Loss in Subwatershed 080101000204.

4.2.F. 080101000301 (Mississippi River).

4.2.F.i. General Description.

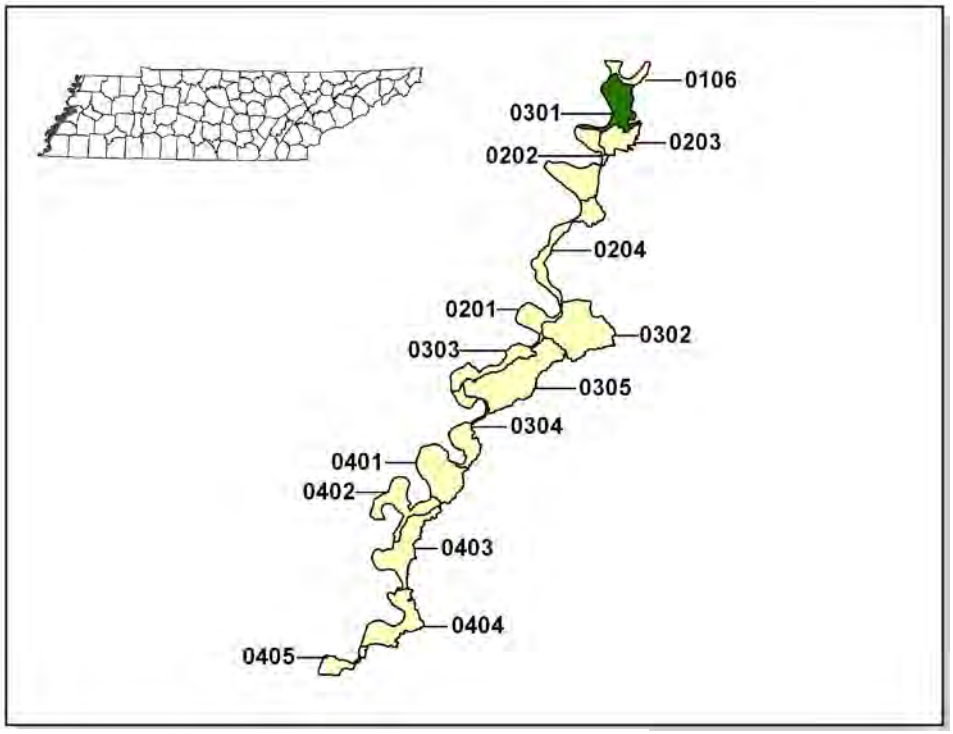


Figure 4-36. Location of Subwatershed 080101000301. *All Mississippi River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

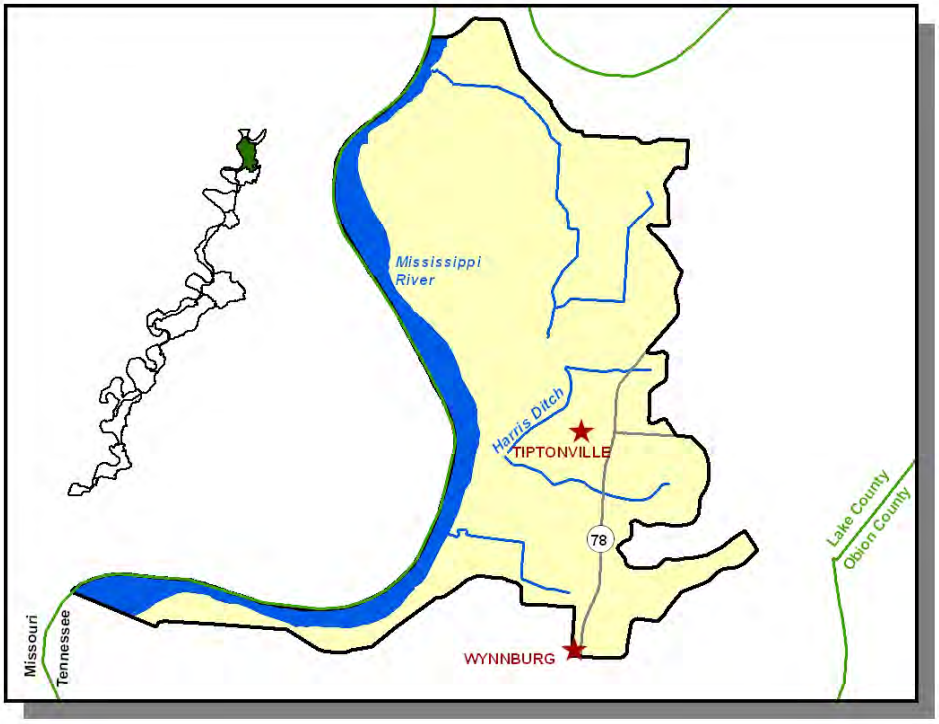


Figure 4-37. Locational Details of Subwatershed 080101000301.

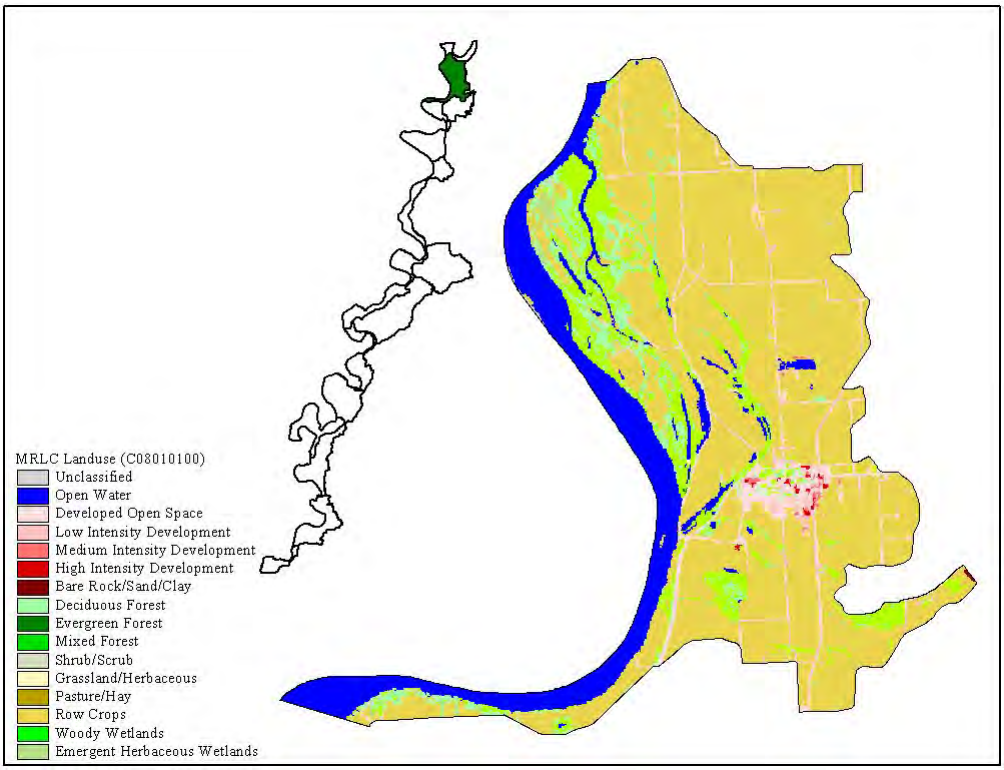


Figure 4-38. Illustration of Land Use Distribution in Subwatershed 080101000301.

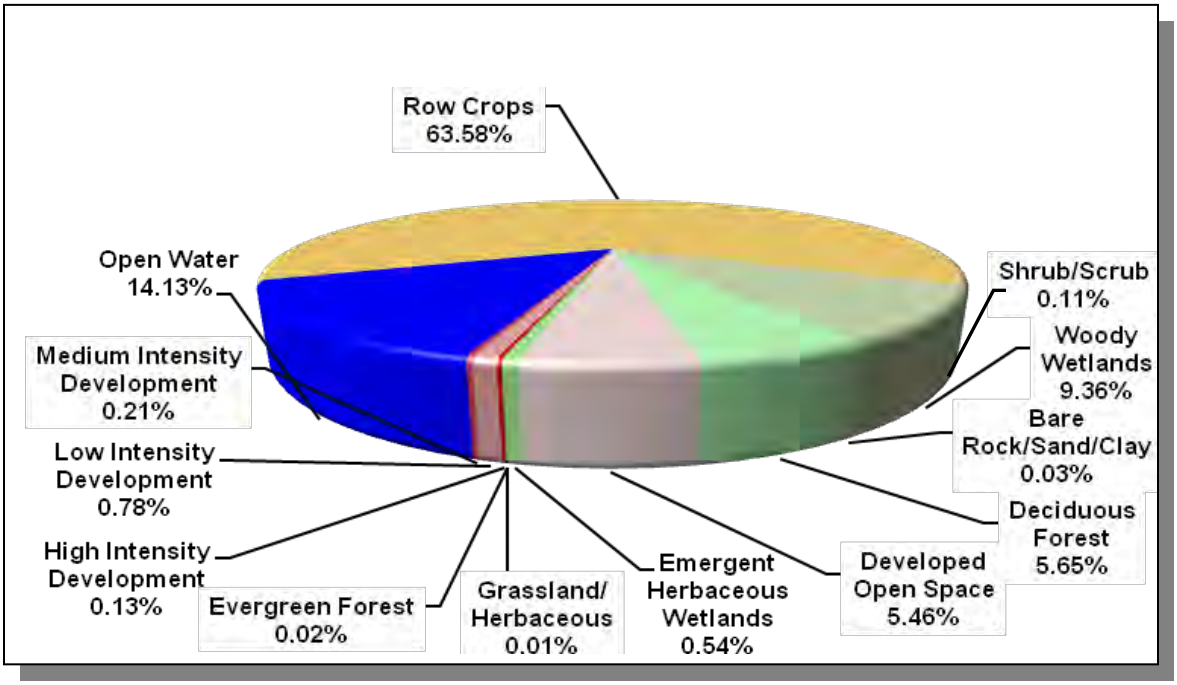


Figure 4-39. Land Use Distribution in Subwatershed 080101000301. *More information is provided in Appendix IV.*

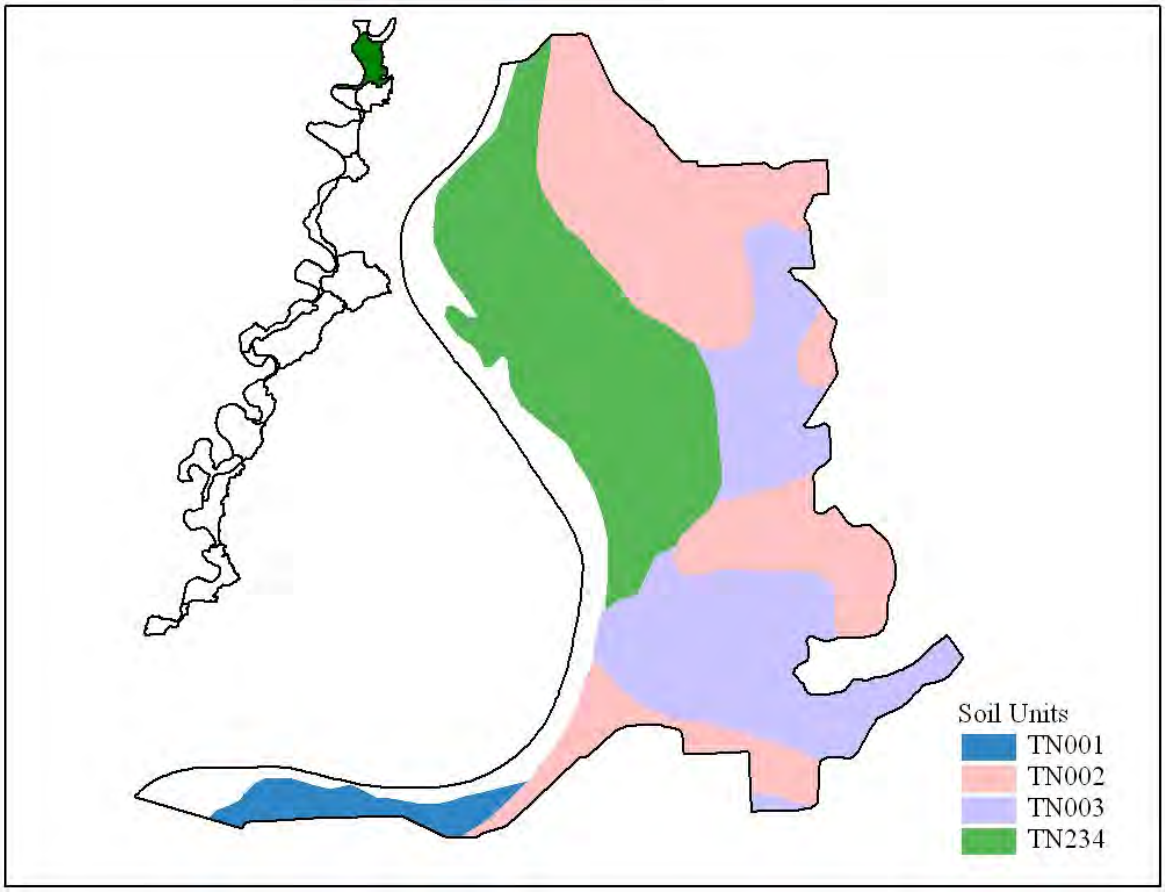


Figure 4-40. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000301.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN001	14.00	C	2.31	7.00	Silty Loam	0.33
TN002	26.00	C	2.02	6.52	Silty Clay Loam	0.34
TN003	62.00	C	0.50	6.65	Silty Clay	0.33
TN234	48.00	B	2.97	7.01	Loam	0.31

Table 4-26. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000301. *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)
Lake	7,129	8,177	7,954	17.96	1,280	1,468	1,428	11.60

Table 4-27. Population Estimates in Subwatershed 080101000301.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Tiptonville	Lake	2,208	868	802	44	22

Table 4-28. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 080101000301.

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

There are no USGS continuous record gaging stations located in subwatershed 080101000301.

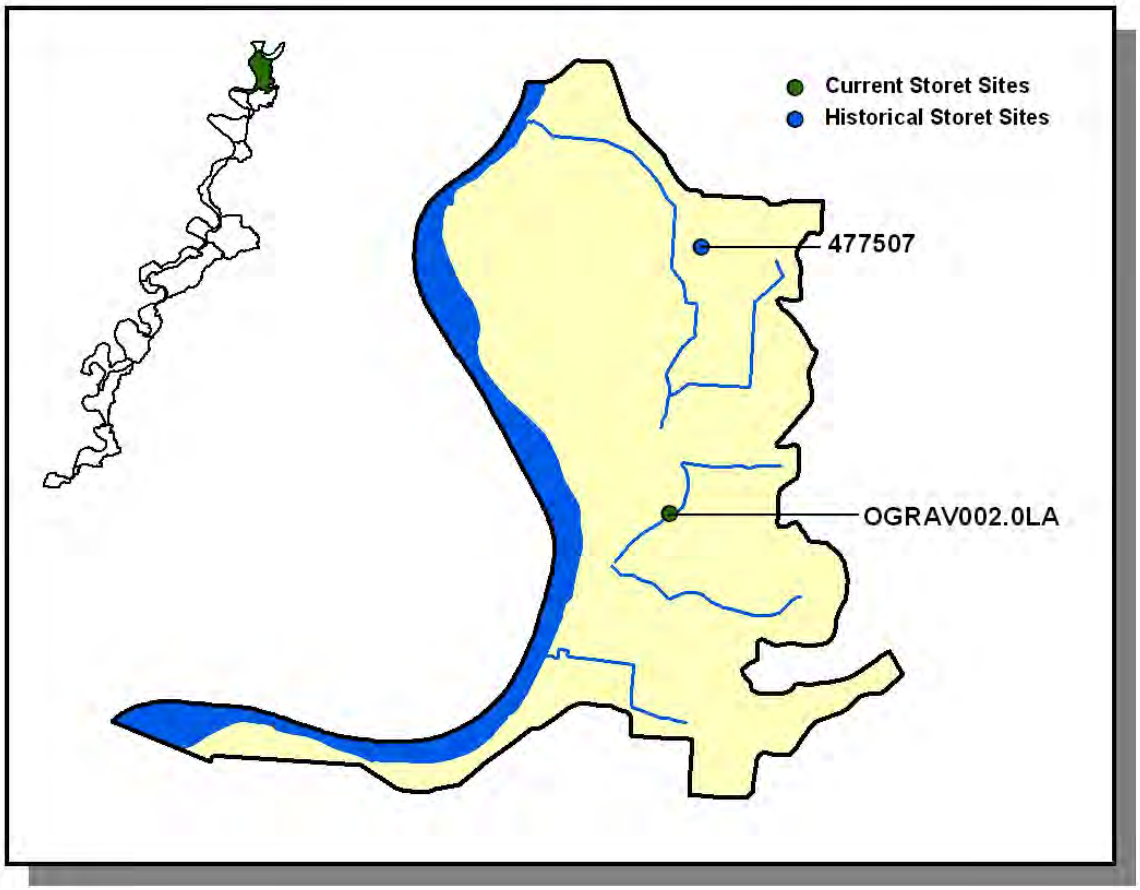


Figure 4-41. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080101000301. *More information, including site names and locations, is provided in Appendix IV.*

4.2.F.iii. Permitted Activities.

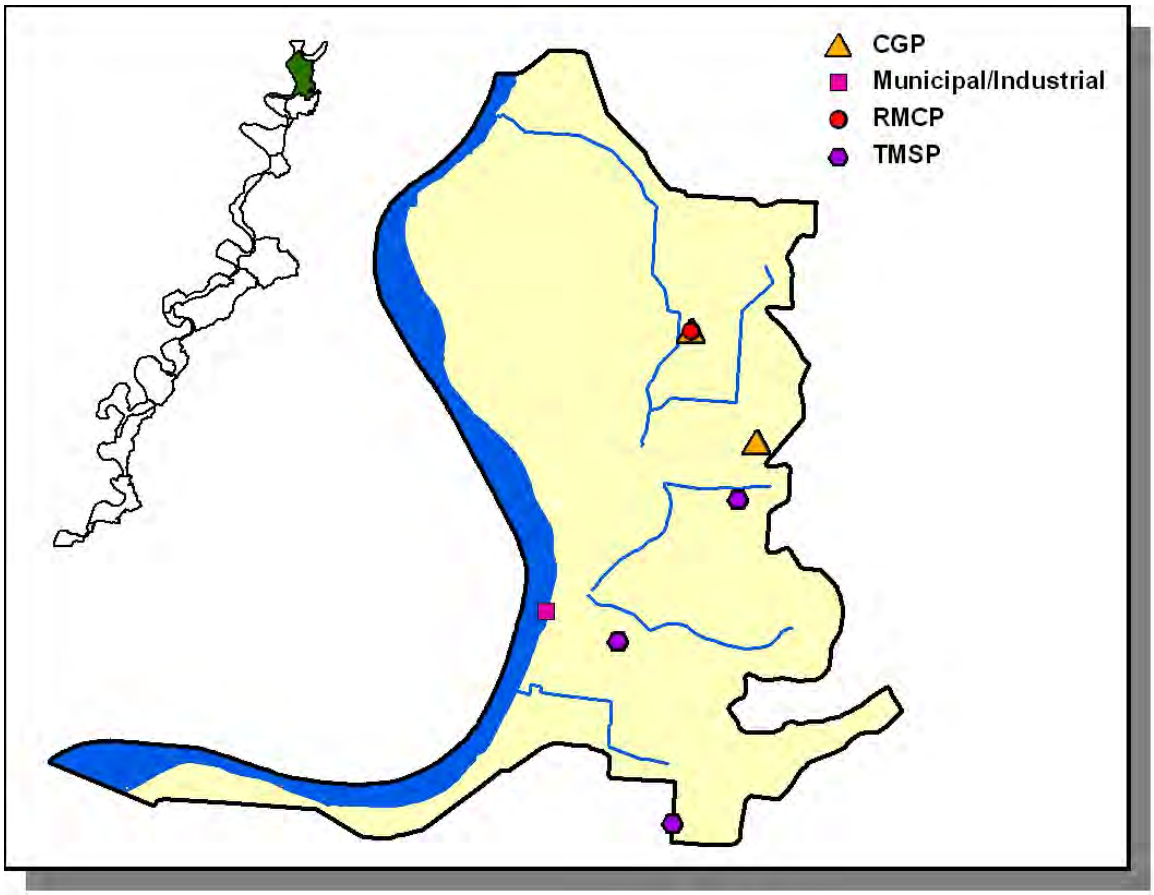


Figure 4-42. Location of Permits Issued in Subwatershed 080101000301. *More information, including the names of facilities, is provided in Appendix IV.*

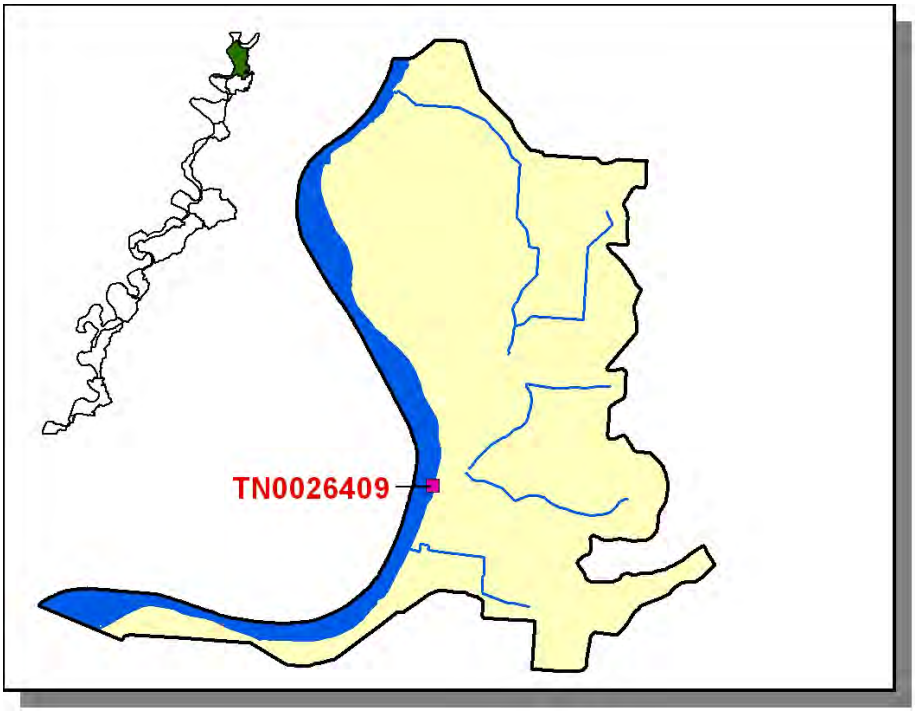


Figure 4-43. Location of CGP (Construction General Permit) Sites in Subwatershed 080101000301. *More information is provided in Appendix IV.*

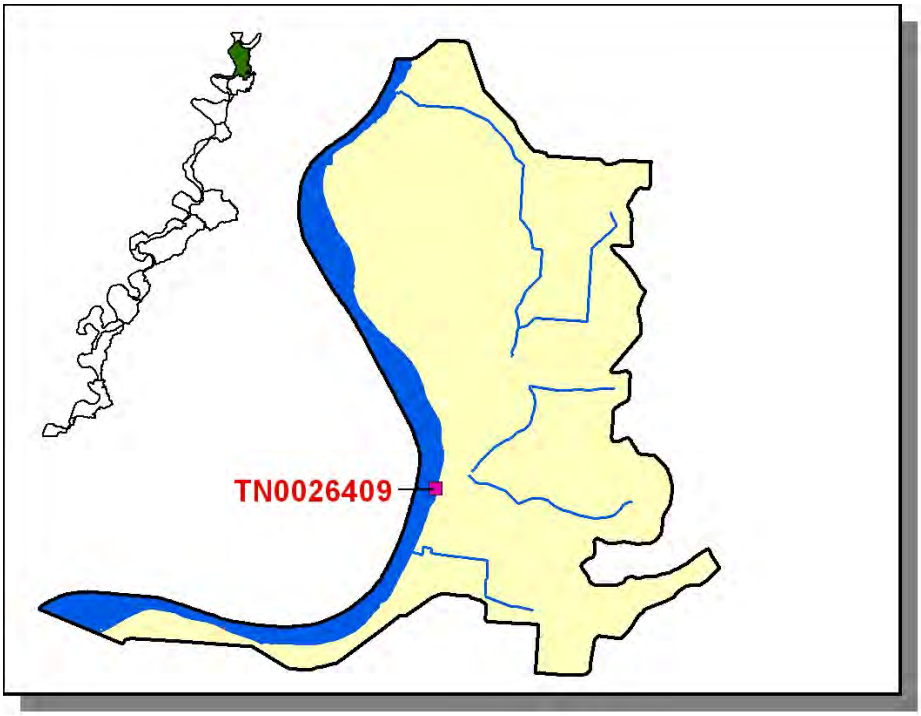


Figure 4-44. Location of Permitted Municipal and Industrial Facilities in Subwatershed 080101000301. *Permit numbers in red indicate that the facility discharges to a stream listed on the 2006 303(d) list. More information, including the name of the facility is provided in Appendix IV.*

PERMIT #	7Q10	DISCHARGE FLOW
TN0026409	70,459.0	0.67

Table 4-29. Receiving Stream Flow Information Used for Limit Calculations for NPDES Dischargers to Waterbodies Listed on the 2006 303(d) List in Subwatershed 080101000301. *Data are in million gallons per day (MGD).Data were obtained from permit files.*

PERMIT #	BOD_5	BOD % REMOVAL	DO	E. *coli*	FLOW	TSS	TRC	pH
TN0026409	X	X	X	X	X	X	X	X

Table 4-30. Parameters Monitored for Limits for NPDES Dischargers to Waterbodies Listed on the 2006 303(d) List in Subwatershed 080101000301. *BOD_5, Biochemical Oxygen Demand (5-Day); DO, Dissolved Oxygen; TSS, Total Suspended Solids; TRC, Total Residual Chlorine.*

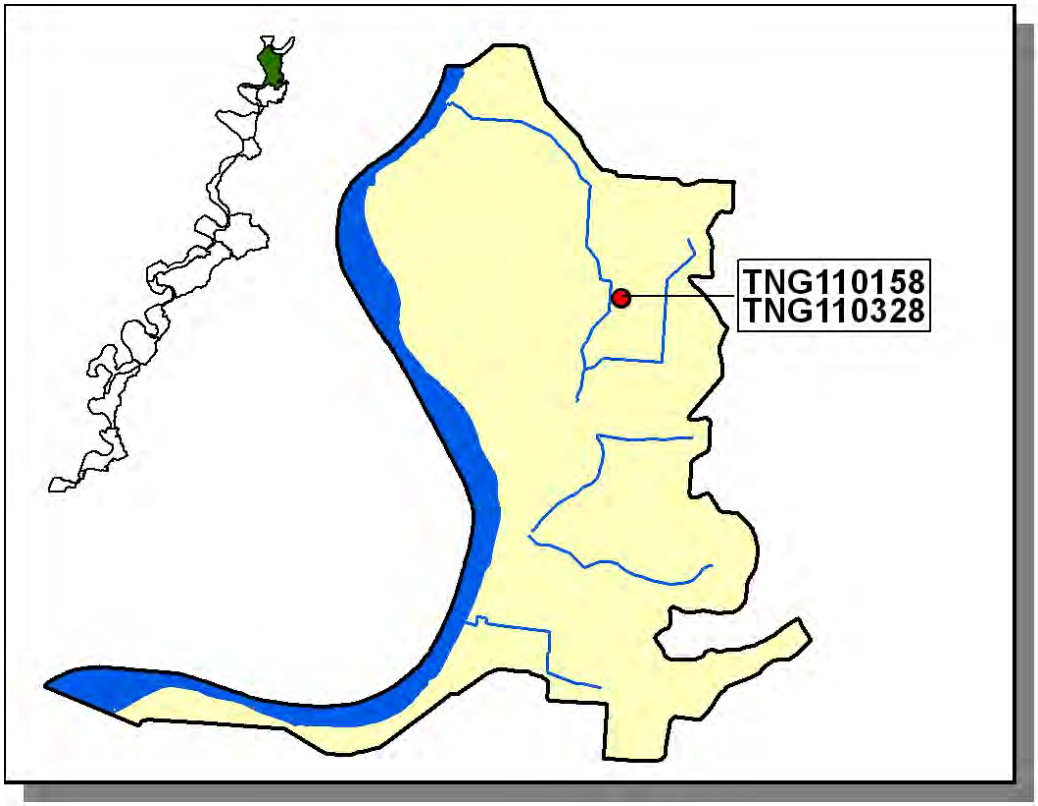


Figure 4-45. Location of RMCP (Ready Mix Concrete Plant) facilities in Subwatershed 080101000301. *More information, including the names of facilities, is provided in Appendix IV.*

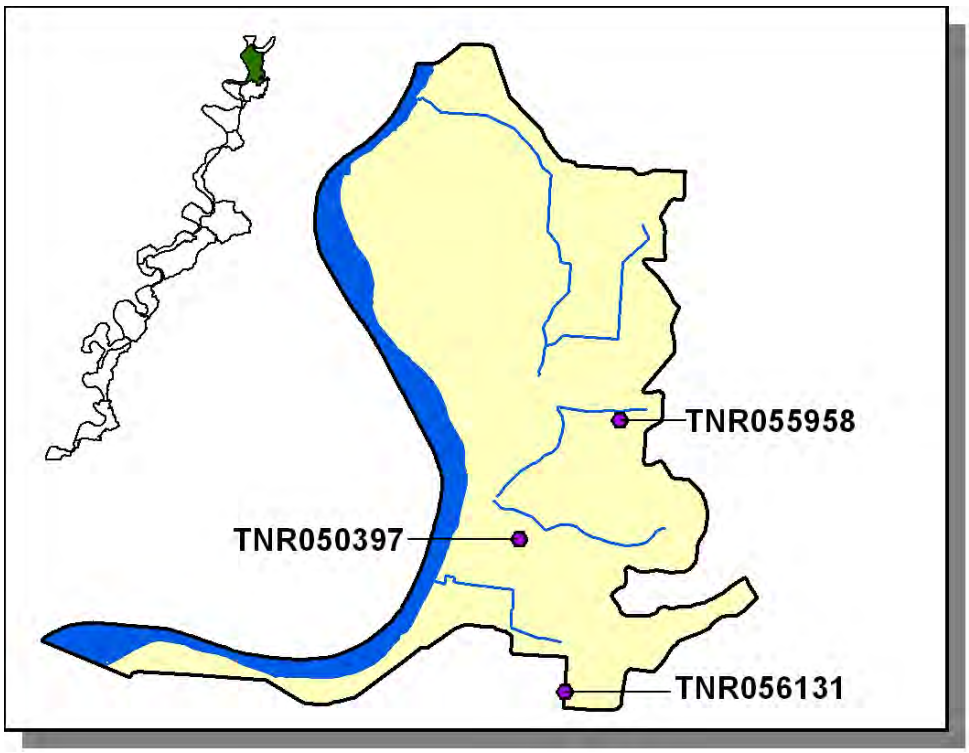


Figure 4-46. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 080101000301. *More information is provided in Appendix IV.*

4.2.F.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Lake	641	986				

Table 4-31. 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)
Lake	18.0	18.0	3.3	15.6

Table 4-32. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Farmsteads and Ranch Headquarters	3.34
Cotton (Row Crops)	2.47
Soybeans (Row Crops)	2.44
Sorghum (Row Crops)	1.88
Corn (Row Crops)	1.66
Wheat (Close Grown Cropland)	1.66
Conservation Reserve Program Land	0.08
Grass Forbs Legumes Mixed (Pastureland)	0.07
Other Land in Farms	0.06
Grass (Hayland)	0.04

Table 4-33. Annual Estimated Total Soil Loss in Subwatershed 080101000301.

4.2.G. 080101000302 (Middle Forked Deer River).

4.2.G.i. General Description.

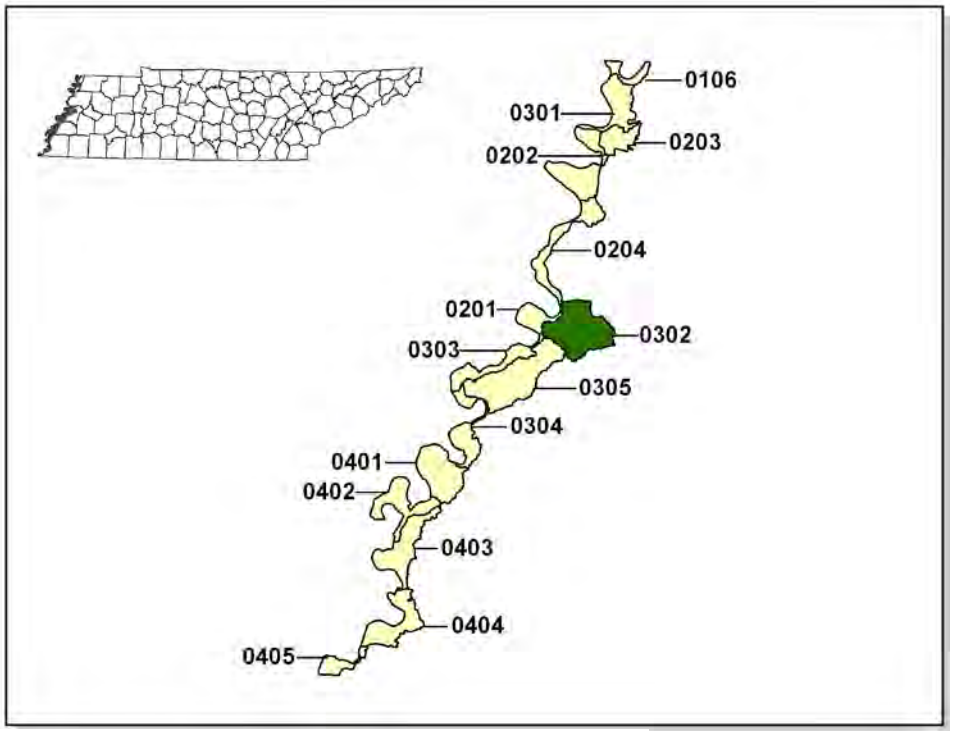


Figure 4-47. Location of Subwatershed 080101000302. *All Mississippi River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

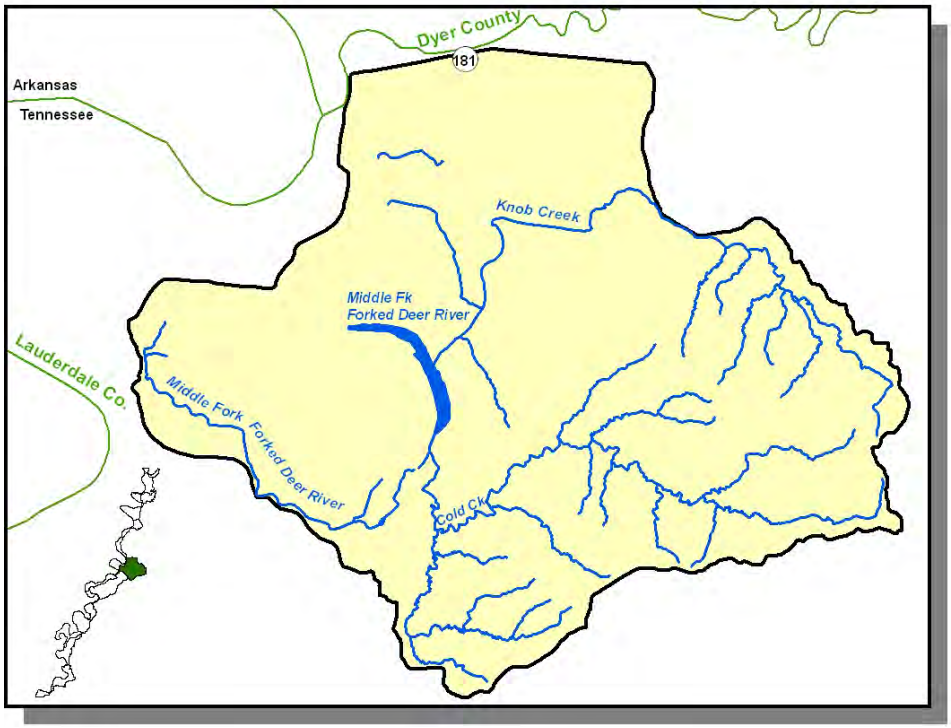


Figure 4-48. Locational Details of Subwatershed 080101000302.

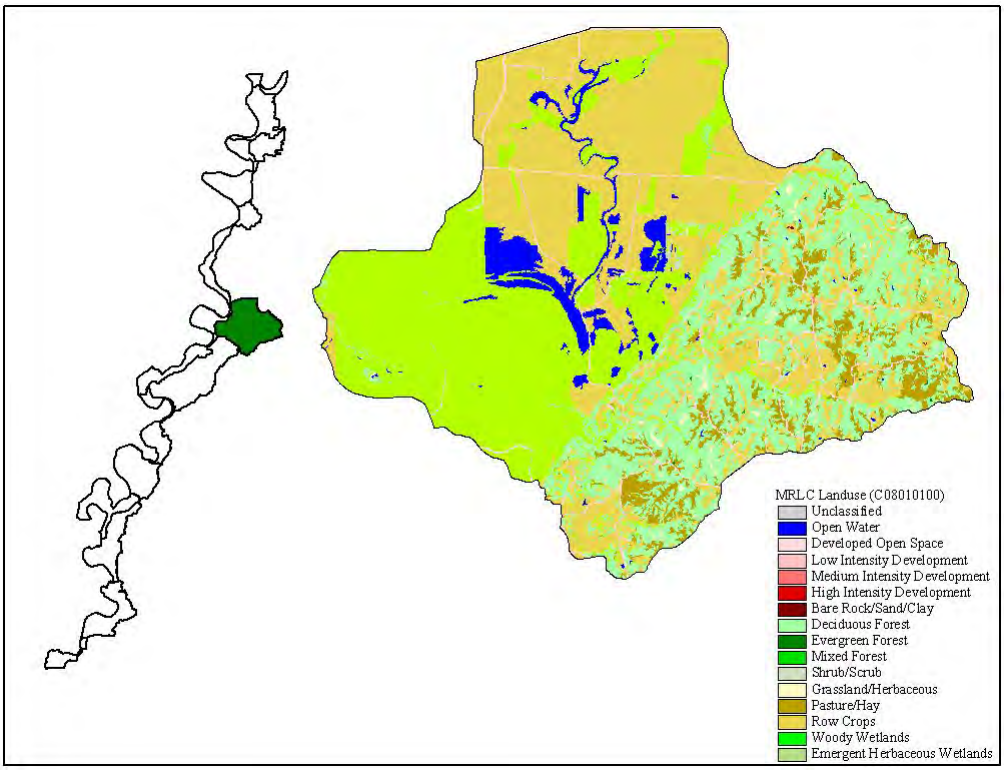


Figure 4-49. Illustration of Land Use Distribution in Subwatershed 080101000302.

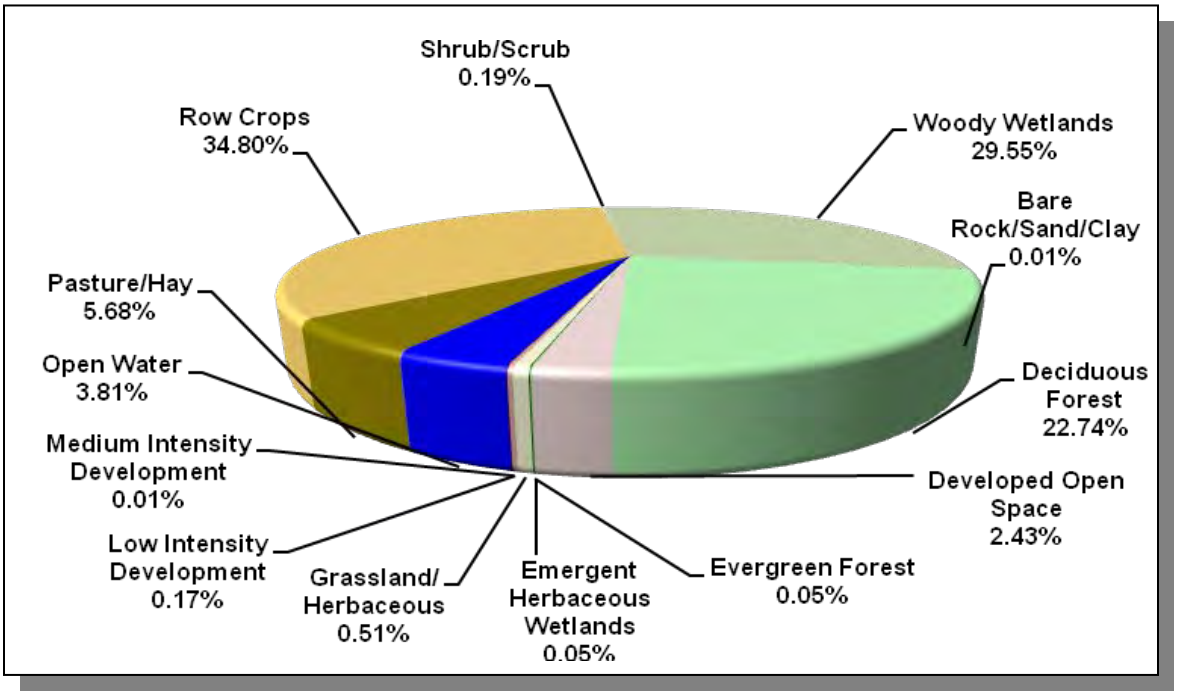


Figure 4-50. Land Use Distribution in Subwatershed 080101000302. *More information is provided in Appendix IV.*

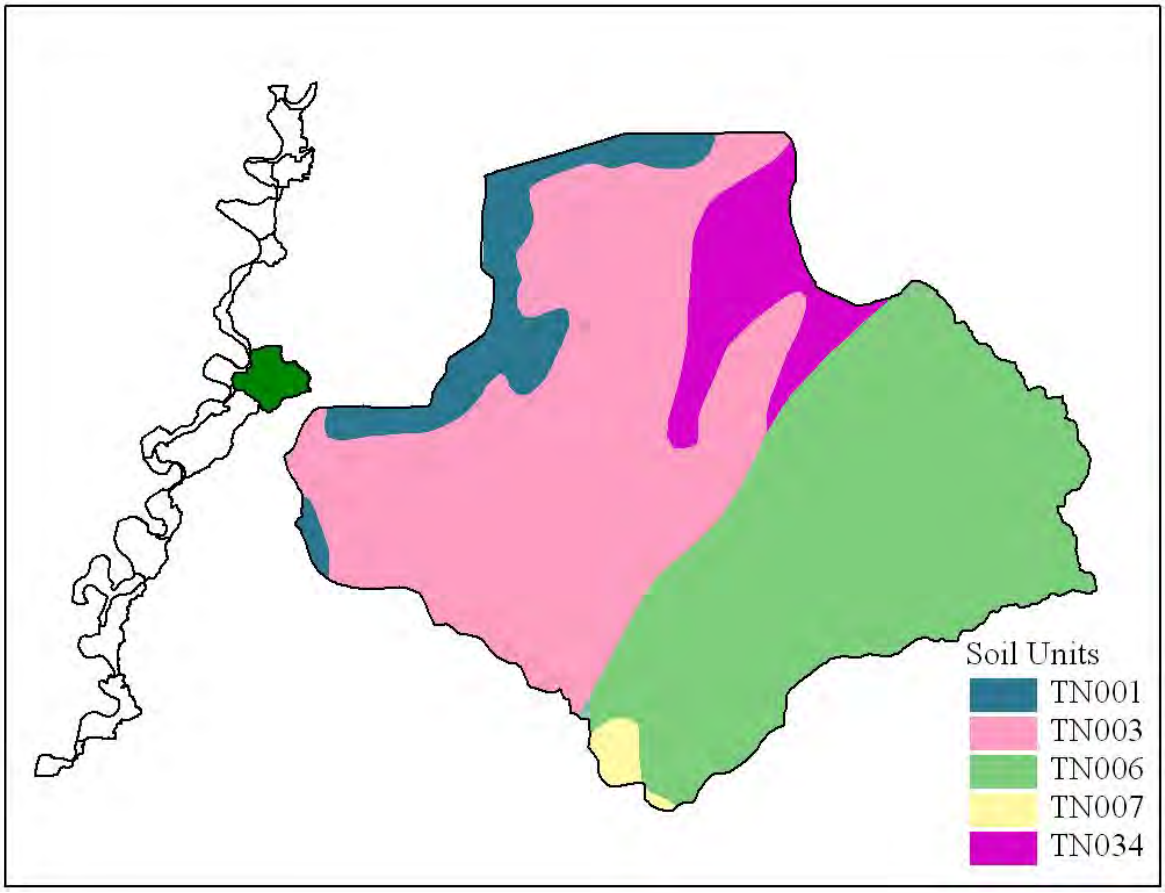


Figure 4-51. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000302.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN001	14.00	C	2.31	7.00	Silty Loam	0.33
TN003	62.00	C	0.50	6.65	Silty Clay	0.33
TN006	0.00	C	1.30	5.42	Silty Loam	0.48
TN007	29.00	C	1.30	5.36	Silty Loam	0.48
TN034	36.00	D	0.48	6.07	Silty Clay Loam	0.35

Table 4-34. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000302. *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)
Lauderdale	23,491	24,128	27,101	14.32	3,365	3,456	3,882	15.40

Table 4-35. Population Estimates in Subwatershed 080101000302.

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

There are no USGS continuous record gaging stations located in subwatershed 080101000302.

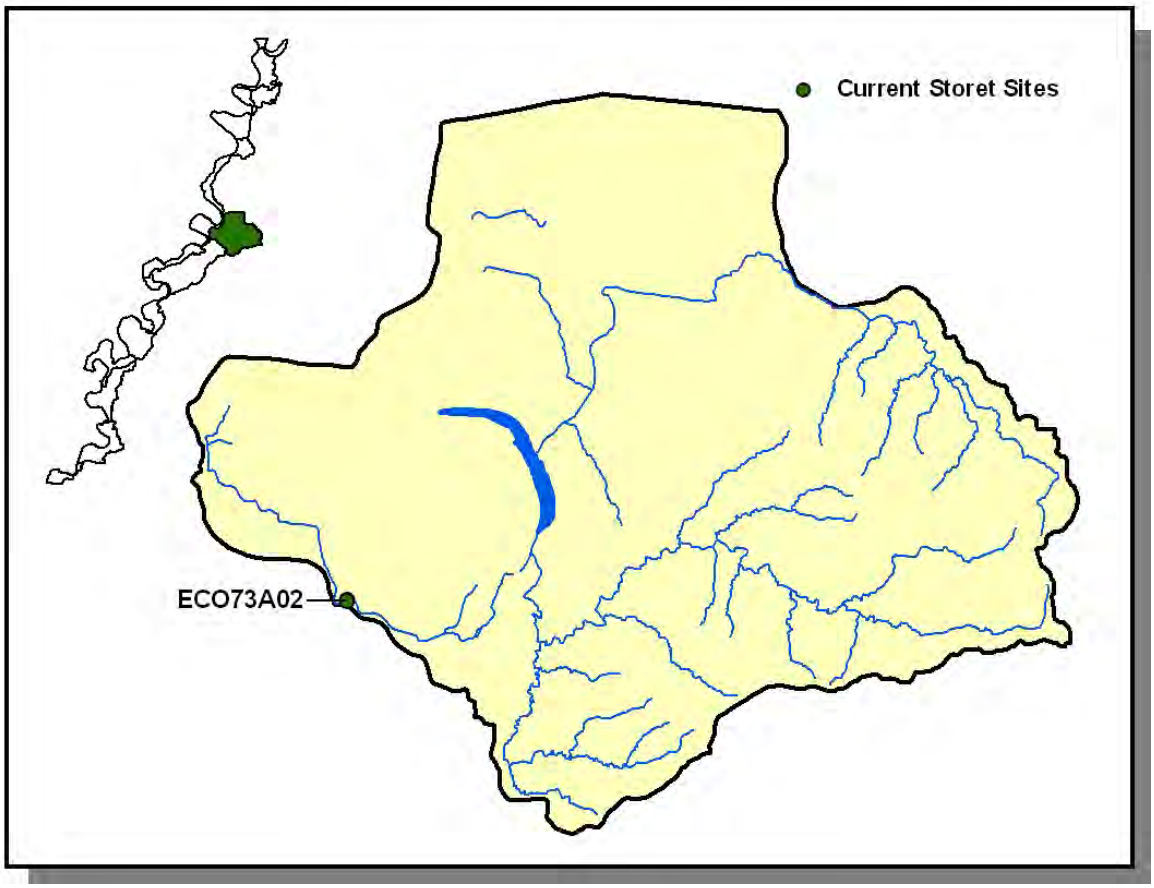


Figure 4-52. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080101000302. *More information, including site names and locations, is provided in Appendix IV.*

4.2.G.iii. Permitted Activities.

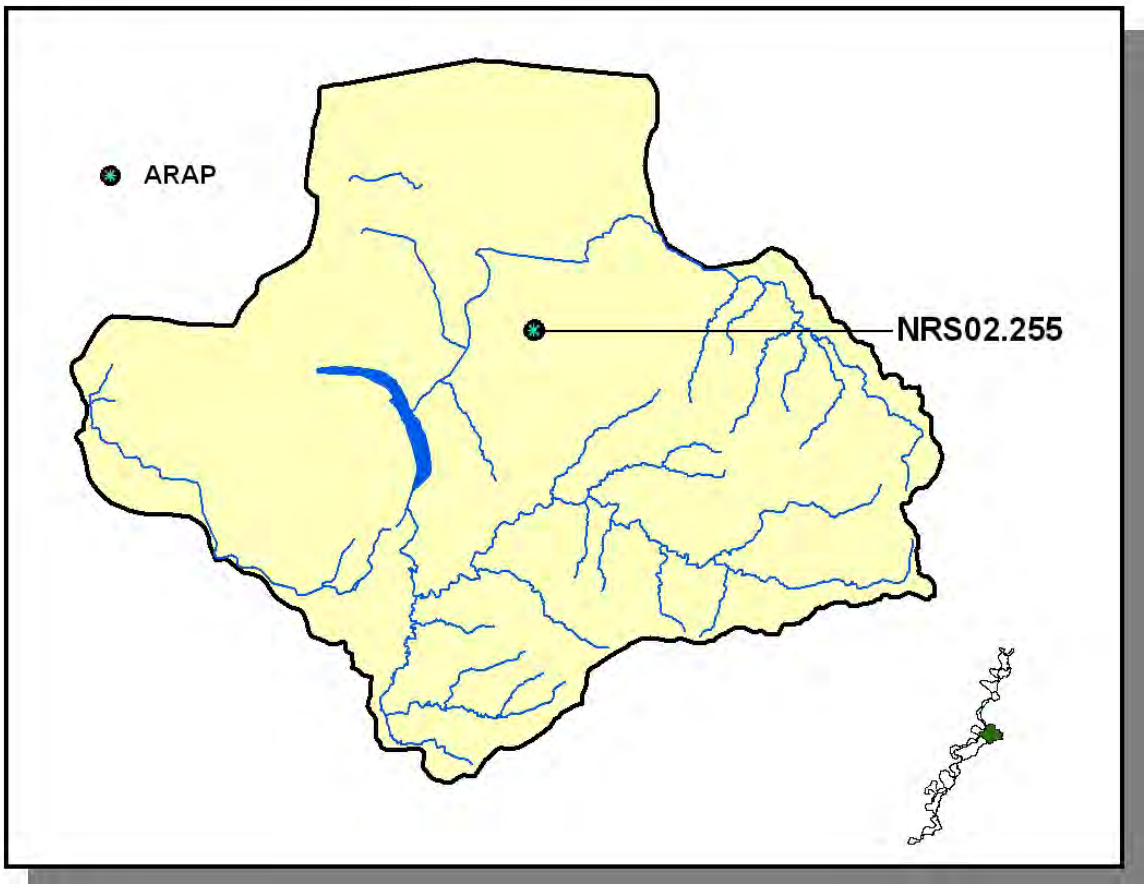


Figure 4-53. Location of Permits Issued in Subwatershed 080101000302. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.G.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Lauderdale		8,739		243	2,355	11

Table 4-36. 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
Corn (Row Crops)	14.77
Cotton (Row Crops)	13.53
Soybeans (Row Crops)	13.51
Wheat (Close Grown Cropland)	9.27
Summer Fallow (Other Cropland)	8.70
Other Vegetable and Truck Crop	4.00
Grass Forbs Legumes Mixed (Pastureland)	2.40
Grass (Pastureland)	2.27
Conservation Reserve Program Land	1.79
Legume (Hayland)	0.65
Legume Grass (Hayland)	0.58
Grass (Hayland)	0.37
Farmsteads and Ranch Headquarters	0.09
Other Land in Farms	0.05

Table 4-37. Annual Estimated Total Soil Loss in Subwatershed 080101000302.

4.2.H. 080101000303 (Mississippi River).

4.2.H.i. General Description.

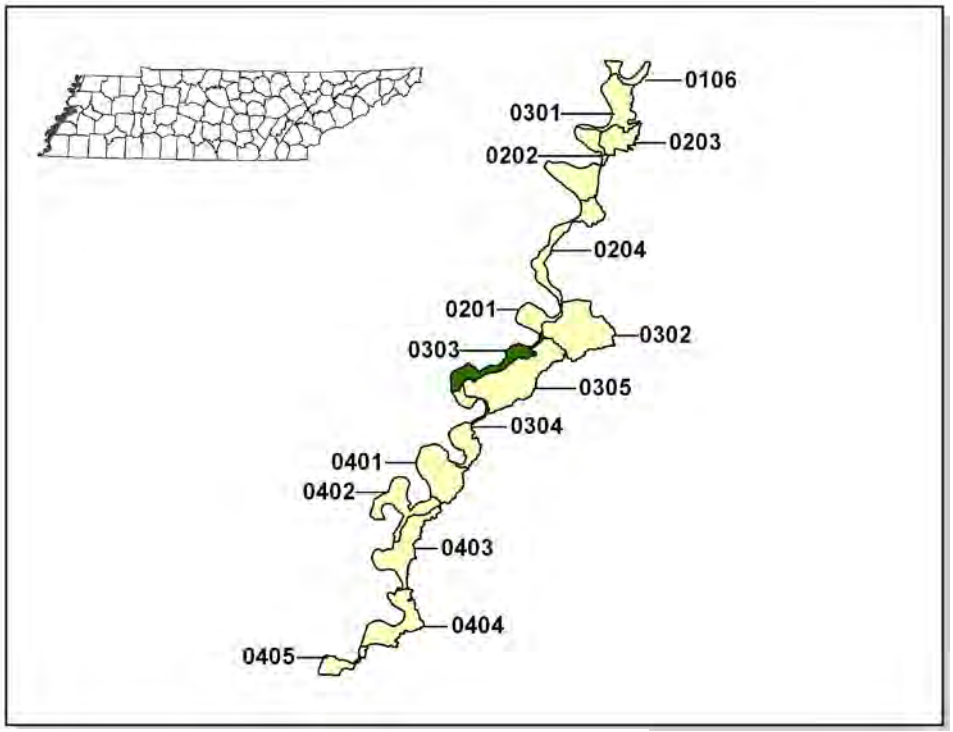


Figure 4-54. Location of Subwatershed 080101000303. *All Mississippi River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

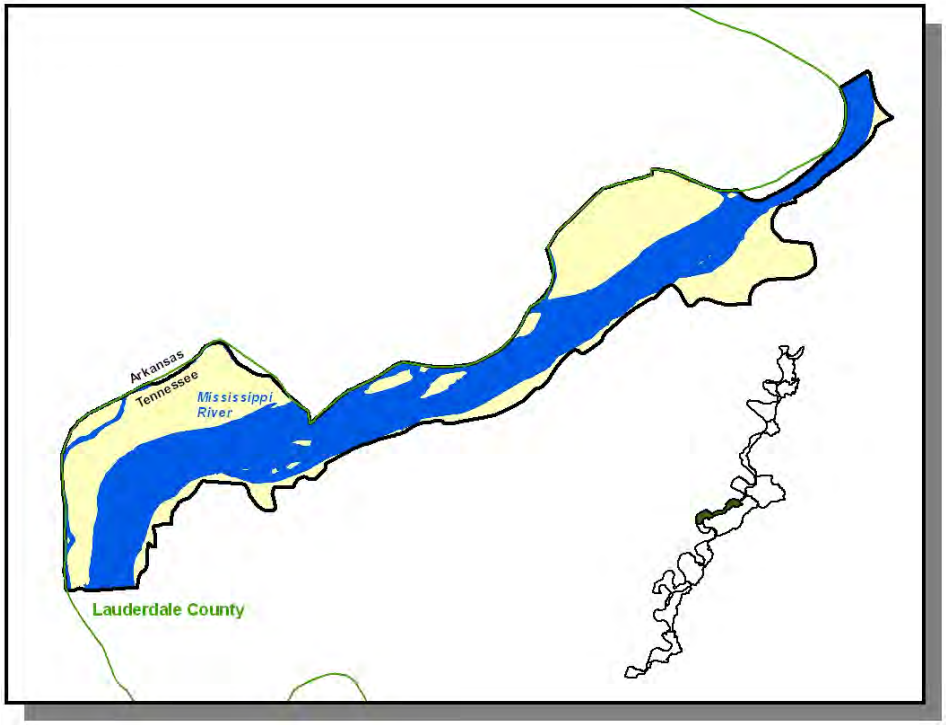


Figure 4-55. Locational Details of Subwatershed 080101000303.

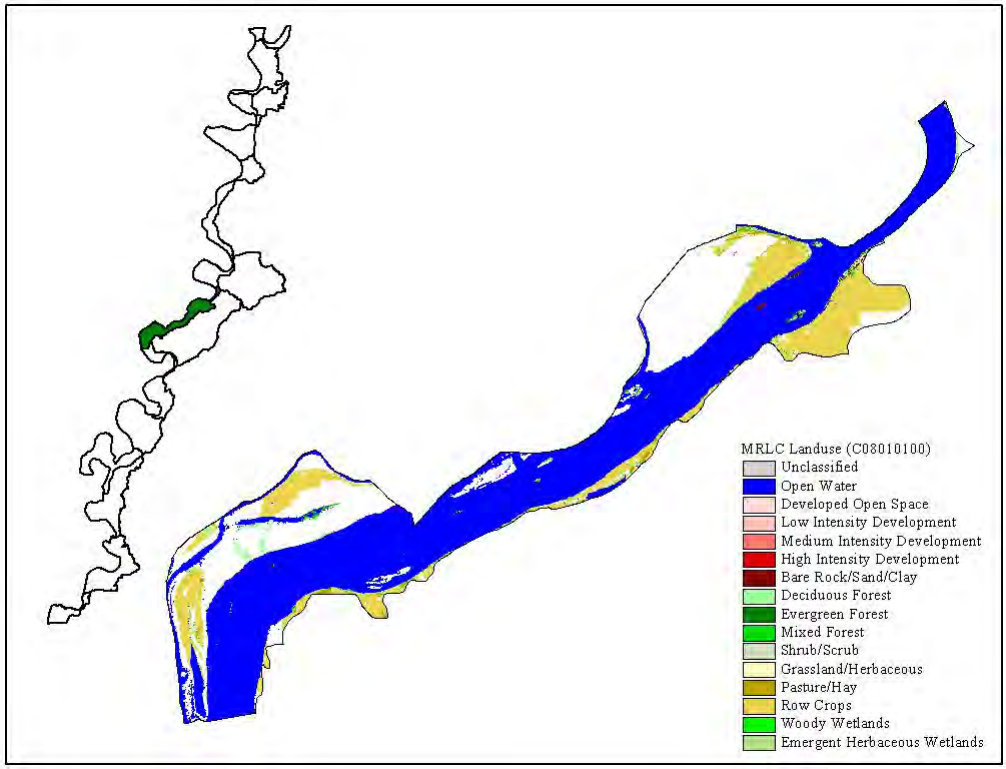


Figure 4-56. Illustration of Land Use Distribution in Subwatershed 080101000303.

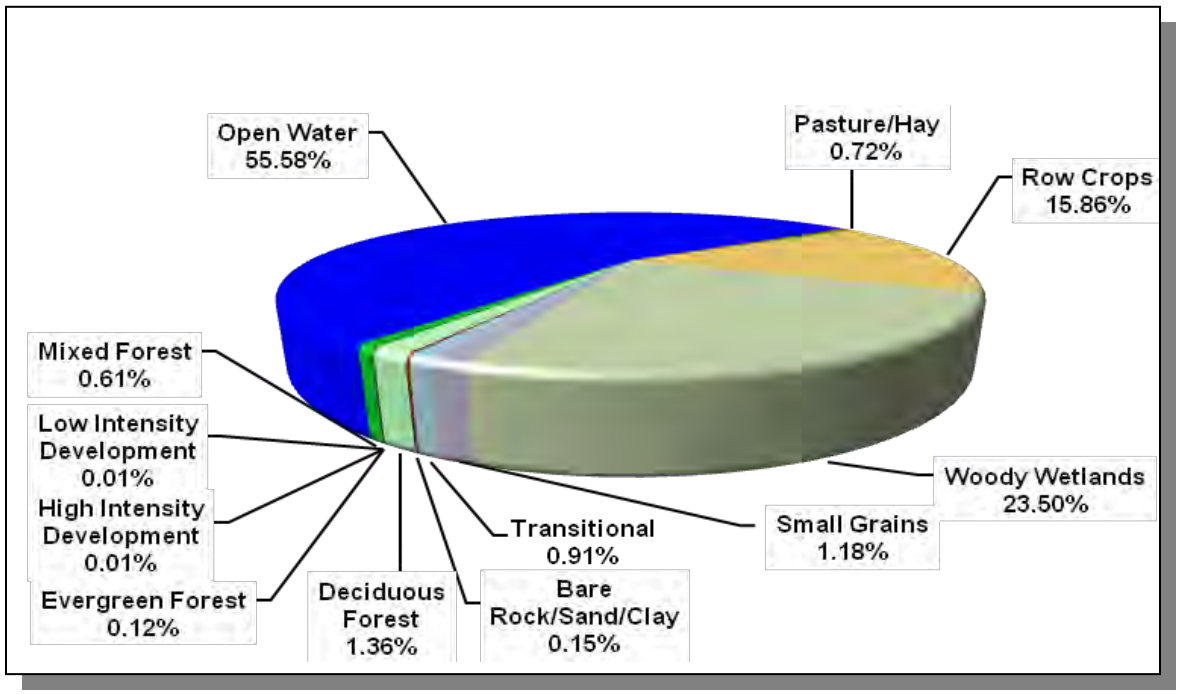


Figure 4-57. Land Use Distribution in Subwatershed 080101000303. *More information is provided in Appendix IV.*

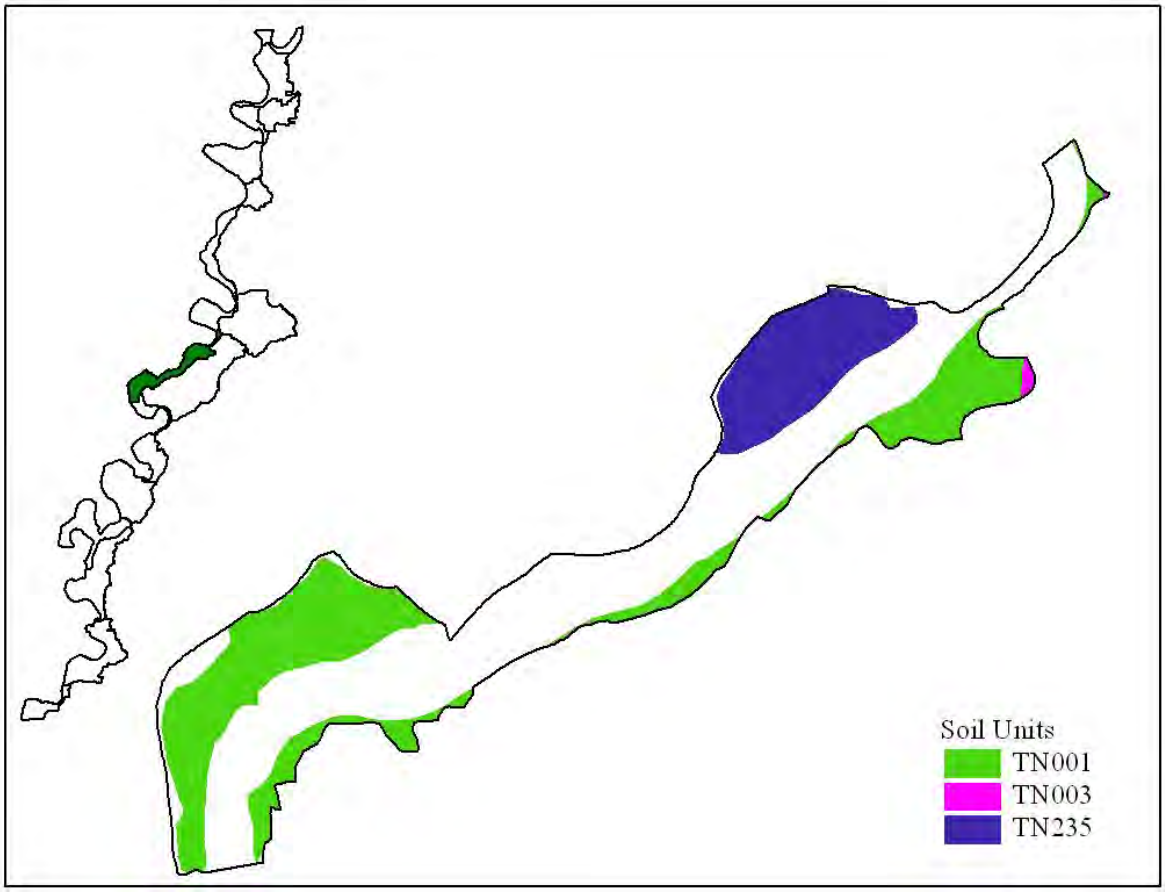


Figure 4-58. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000303.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN001	14.00	C	2.31	7.00	Silty Loam	0.33
TN003	62.00	C	0.50	6.65	Silty Clay	0.33
TN235	63.00	C	1.70	5.26	Silty Clay Loam	0.31

Table 4-38. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000303. *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)
Lauderdale	23,491	24,128	27,101	5.45	1,280	1,314	1,476	15.30

Table 4-39. Population Estimates in Subwatershed 080101000303.

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

There are no USGS continuous record gaging stations or STORET sites located in subwatershed 080101000303.

4.2.H.iii. Permitted Activities.

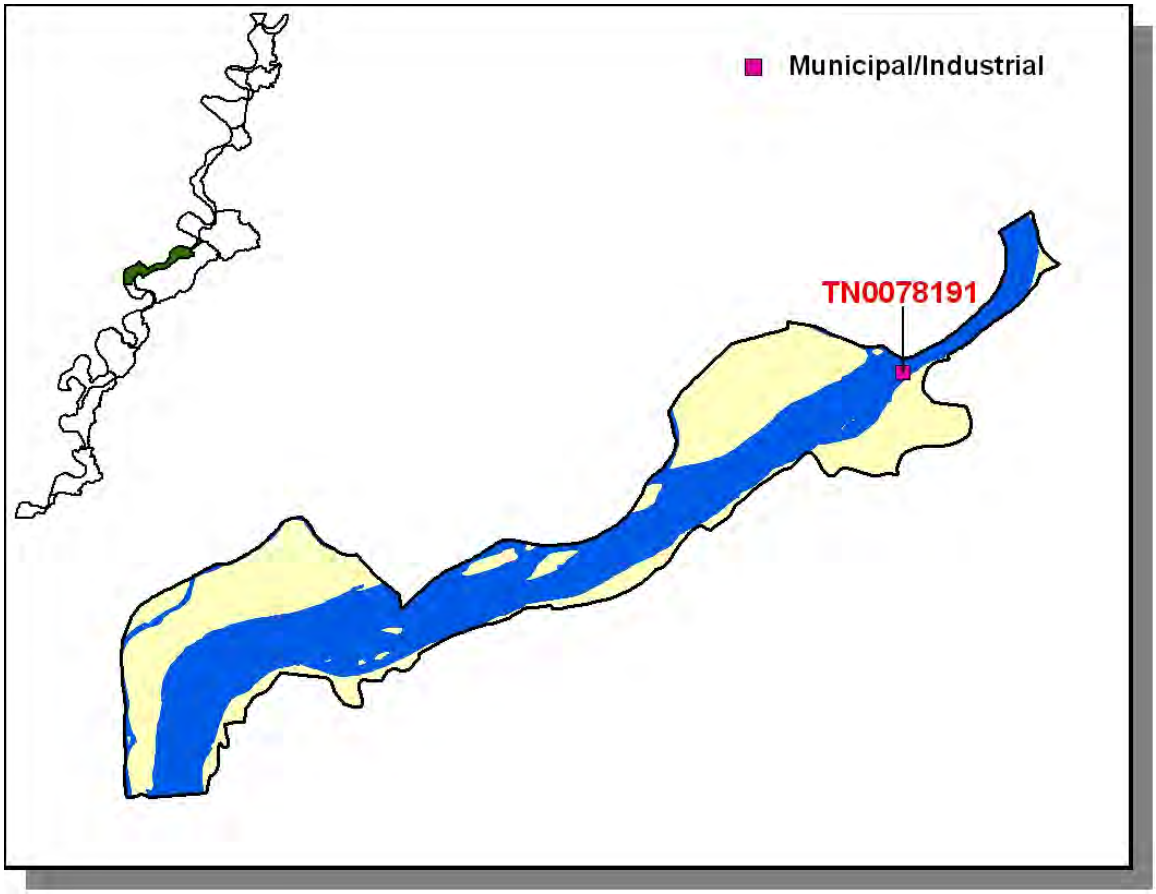


Figure 4-59. Location of Permits Issued in Subwatershed 080101000303. *Permit numbers in red indicate that the facility discharges to a stream listed on the 2006 303(d) list. More information, including the names of facilities, is provided in Appendix IV.*

PERMIT #	1Q10	DISCHARGE FLOW
TN0078191	67,000.0	3.1

Table 4-40. Receiving Stream Flow Information Used for Limit Calculations for NPDES Dischargers to Waterbodies Listed on the 2006 303(d) List in Subwatershed 080101000303. *Data are in million gallons per day (MGD).Data were obtained from permit files.*

PERMIT #	$CBOD_5$	AMMONIA AS N TOTAL	CHLORINE FREE AVAILABLE	NITRITE + NITRATE TOTAL	PHOSPHORUS TOTAL	TKN
TN0078191	X	X	X	X	X	X

Table 4-41. Parameters Monitored for Limits for NPDES Dischargers to Waterbodies Listed on the 2006 303(d) List in Subwatershed 080101000303. *$CBOD_5$, Carbonaceous Biochemical Oxygen Demand (5-Day); TKN, Total Kjeldahl Nitrogen.*

PERMIT #	WET	DO	E. *coli*	FLOW	SS	TSS	pH
TN0078191	X	X	X	X	X	X	X

Table 4-42. Parameters Monitored for Limits for NPDES Dischargers to Waterbodies Listed on the 2006 303(d) List in Subwatershed 080101000303. *DO, Dissolved Oxygen; SS, Settleable Solids; TSS, Total Suspended Solids.*

4.2.H.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Lauderdale		8,739		243	2,355	11

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

CROPS	TONS/ACRE/YEAR
Corn (Row Crops)	14.77
Cotton (Row Crops)	13.53
Soybeans (Row Crops)	13.51
Wheat (Close Grown Cropland)	9.27
Summer Fallow (Other Cropland)	8.70
Other Vegetable and Truck Crop	4.00
Grass Forbs Legumes Mixed (Pastureland)	2.40
Grass (Pastureland)	2.27
Conservation Reserve Program Land	1.79
Legume (Hayland)	0.65
Legume Grass (Hayland)	0.58
Grass (Hayland)	0.37
Farmsteads and Ranch Headquarters	0.09
Other Land in Farms	0.05

Table 4-44. Annual Estimated Total Soil Loss in Subwatershed 080101000303.

4.2.I. 080101000304 (Mississippi River).

4.2.I.i. General Description.

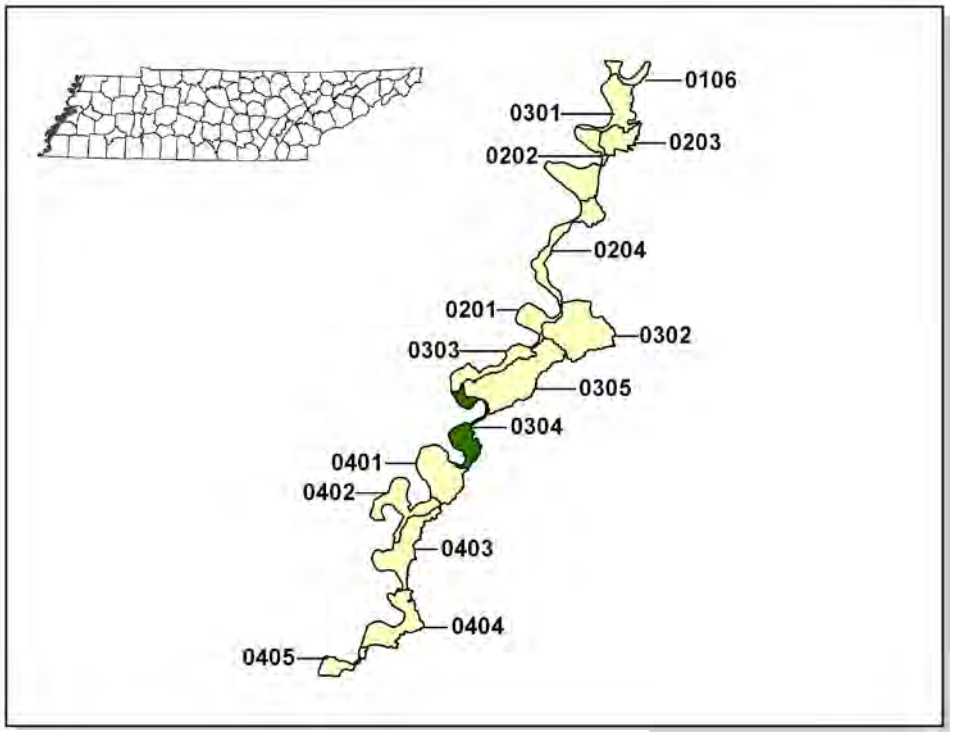


Figure 4-60. Location of Subwatershed 080101000304. *All Mississippi River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

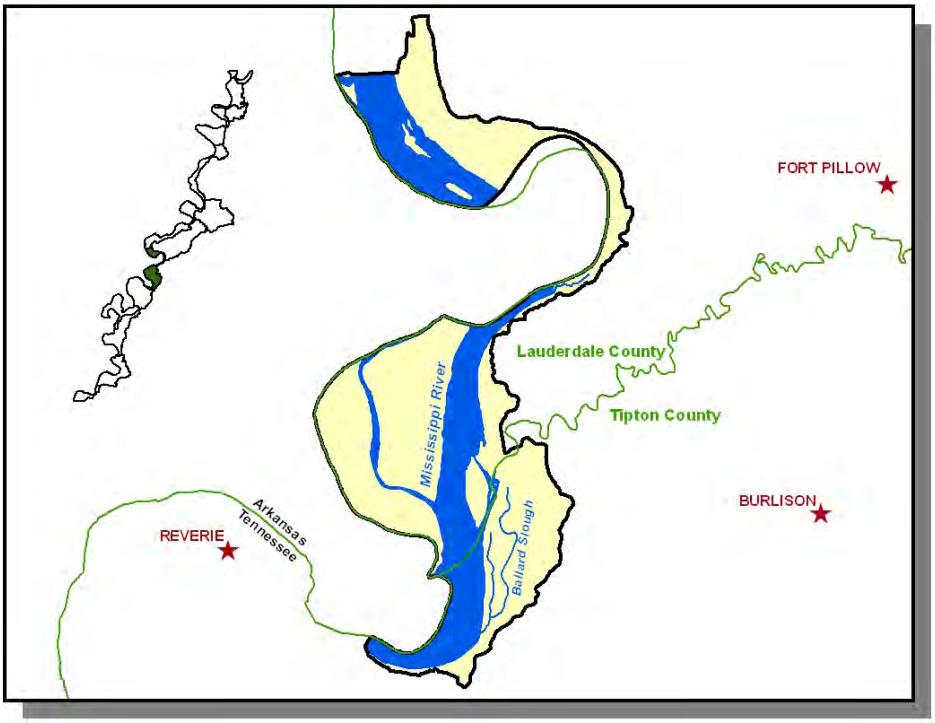


Figure 4-61. Locational Details of Subwatershed 080101000304.

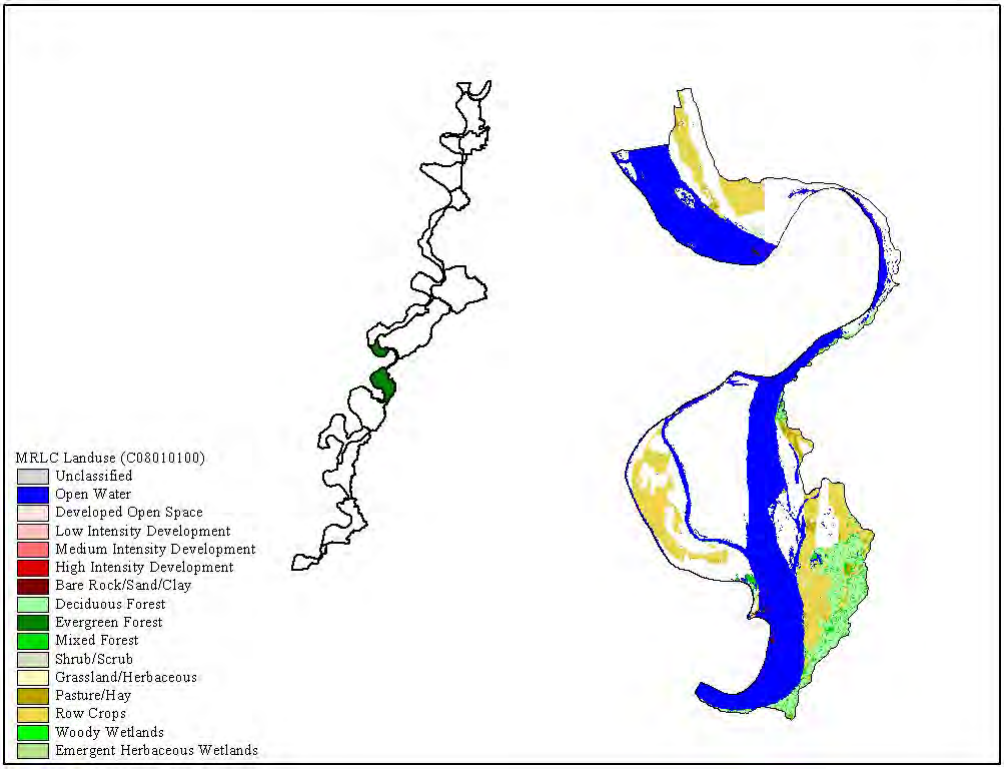


Figure 4-62. Illustration of Land Use Distribution in Subwatershed 080101000304.

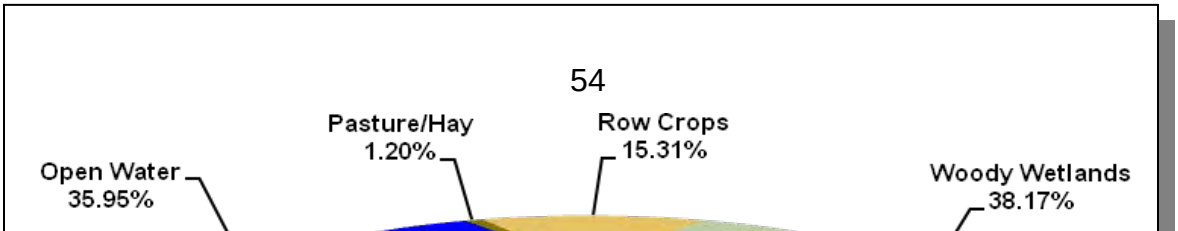


Figure 4-63. Land Use Distribution in Subwatershed 080101000304. *More information is provided in Appendix IV.*

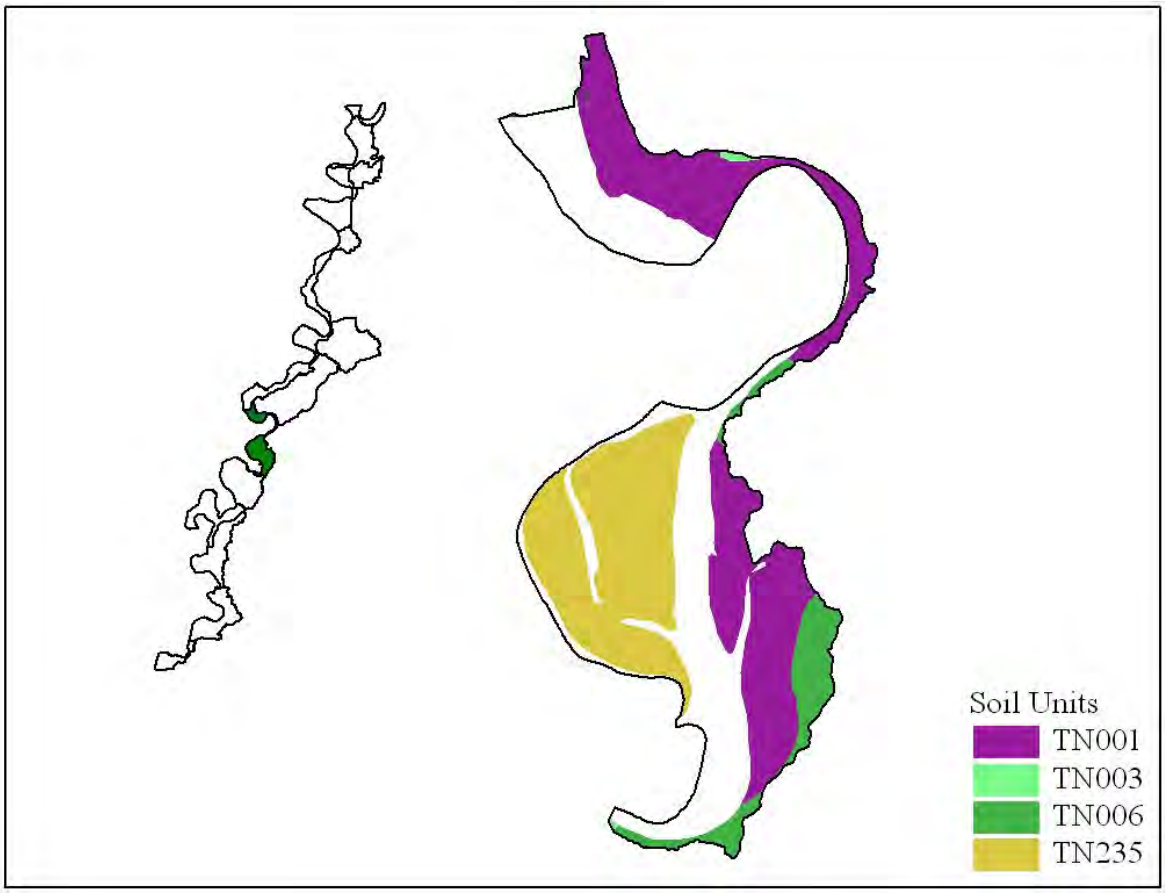


Figure 4-64. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000304.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN001	14.00	C	2.31	7.00	Silty Loam	0.33
TN003	62.00	C	0.50	6.65	Silty Clay	0.33
TN006	0.00	C	1.30	5.42	Silty Loam	0.48
TN235	63.00	C	1.70	5.26	Silty Clay Loam	0.31

Table 4-45. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000304. *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)
Lauderdale	23,491	24,128	27,101	3.94	926	951	1,069	15.40
Tipton	37,568	45,986	51,271	1.98	745	912	1,017	36.50
Totals	**61,059**	**70,114**	**78,372**		**1,671**	**1,863**	**2,086**	**24.80**

Table 4-46. Population Estimates in Subwatershed 080101000304.

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

There are no USGS continuous record gaging stations located in subwatershed 080101000304.

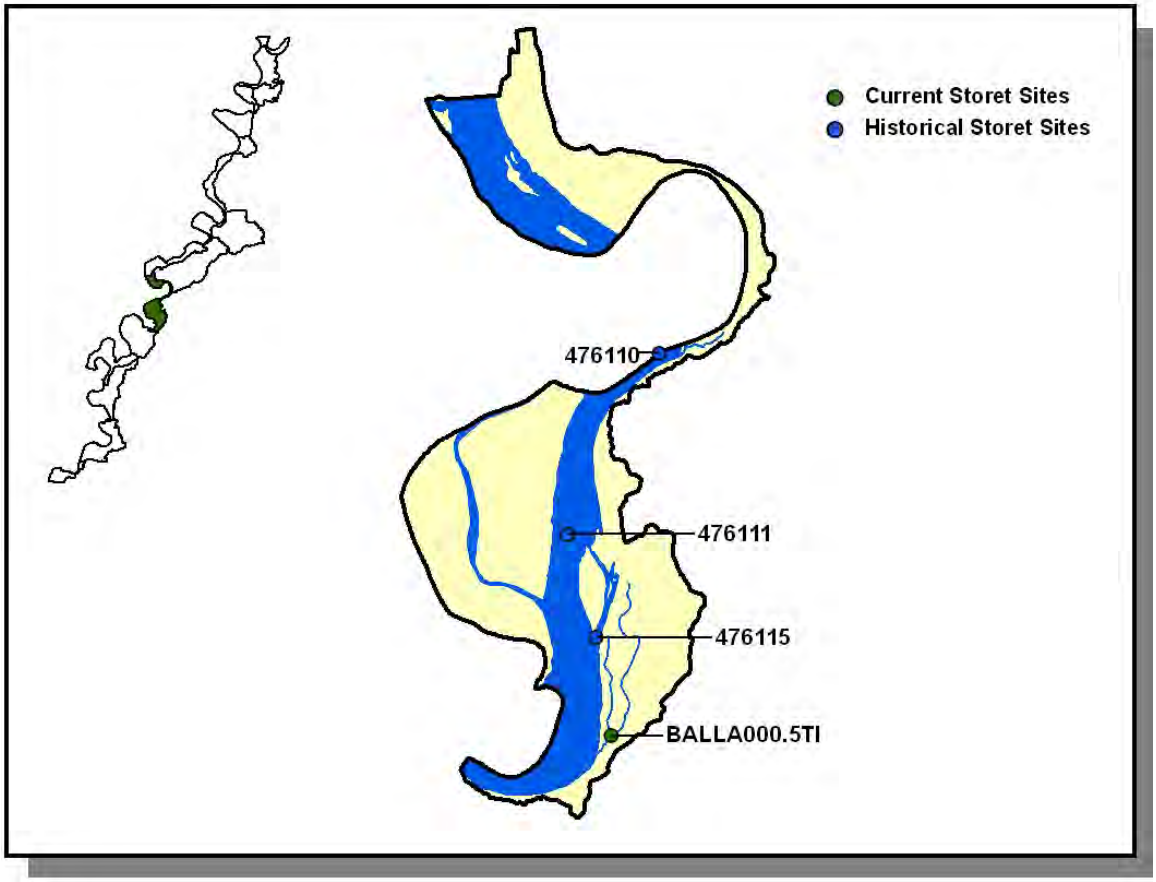


Figure 4-65. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080101000304. *More information, including site names and locations, is provided in Appendix IV.*

4.2.I.iii. Permitted Activities.

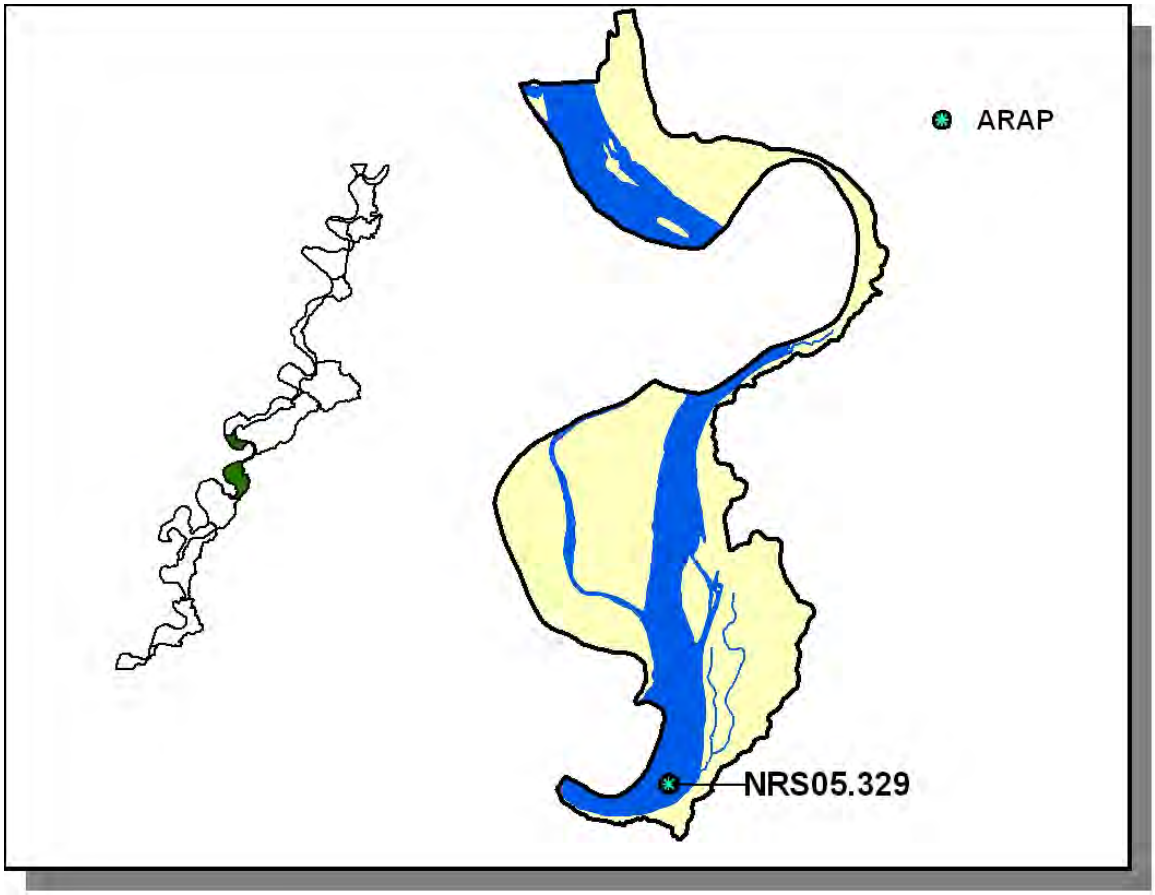


Figure 4-66. Location of Permits Issued in Subwatershed 080101000304. *ARAP, Aquatic Resourcse Alteration permit. More information, including the names of facilities, is provided in Appendix IV.*

4.2.I.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Lauderdale		8,739		243	2,355	11
Tipton	5,422	9,796	14	334	251	86

Table 4-47. 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)
Tipton	50.9	50.9	1.0	5.6

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

CROPS	TONS/ACRE/YEAR
Soybeans (Row Crops)	15.12
Corn (Row Crops)	14.77
Cotton (Row Crops)	14.47
Other Vegetable and Truck Crop	9.37
Wheat (Close Grown Cropland)	9.27
Summer Fallow (Other Cropland)	8.70
Grass Forbs Legumes Mixed (Pastureland)	1.98
Grass (Pastureland)	1.83
Conservation Reserve Program Land	1.56
Grass (Hayland)	0.90
Legume (Hayland)	0.62
Legume Grass (Hayland)	0.58
Farmsteads and Ranch Headquarters	0.27
Other Cropland not Planted	0.22
Other Land in Farms	0.05

Table 4-49. Annual Estimated Total Soil Loss in Subwatershed 080101000304.

4.2.J. 080101000305 (Cold Creek).

4.J.i. General Description.

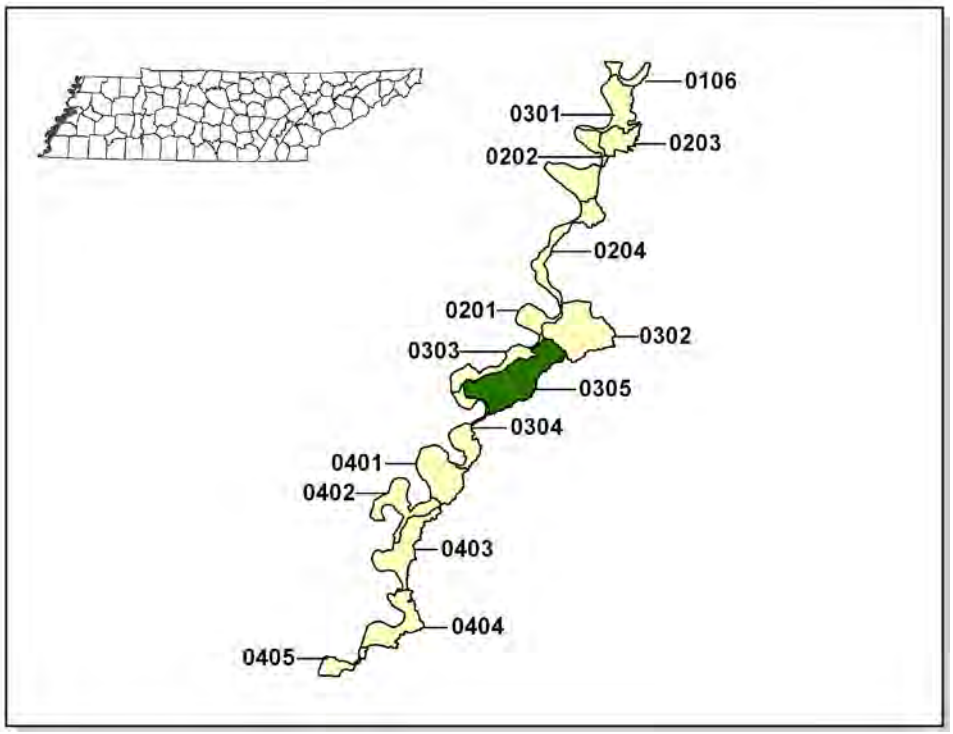


Figure 4-67. Location of Subwatershed 080101000305. *All Mississippi River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

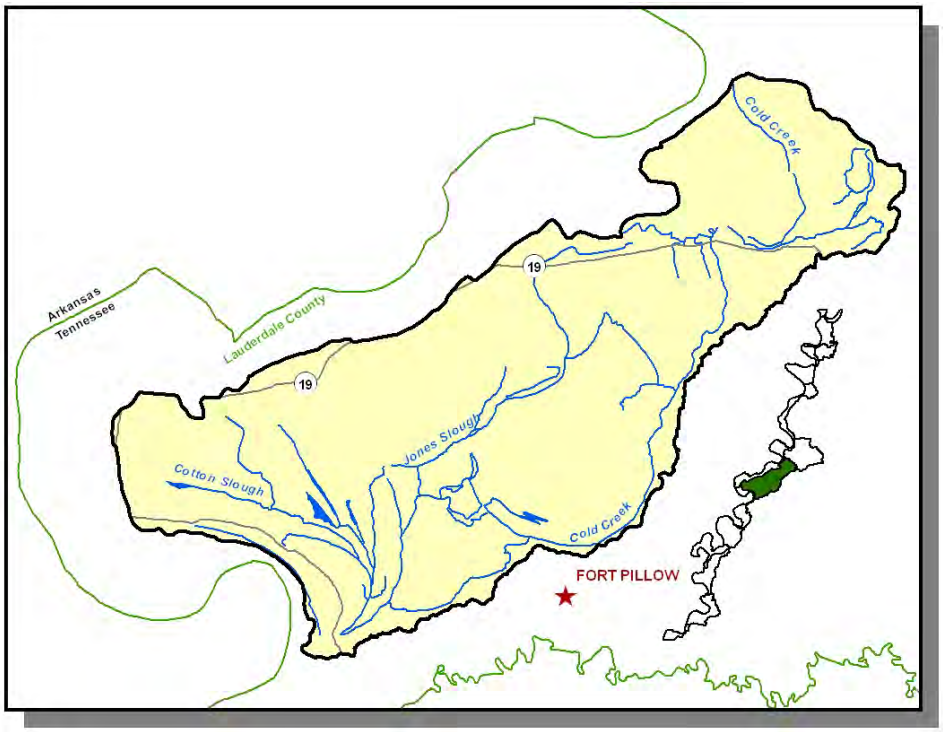


Figure 4-68. Locational Details of Subwatershed 080101000305.

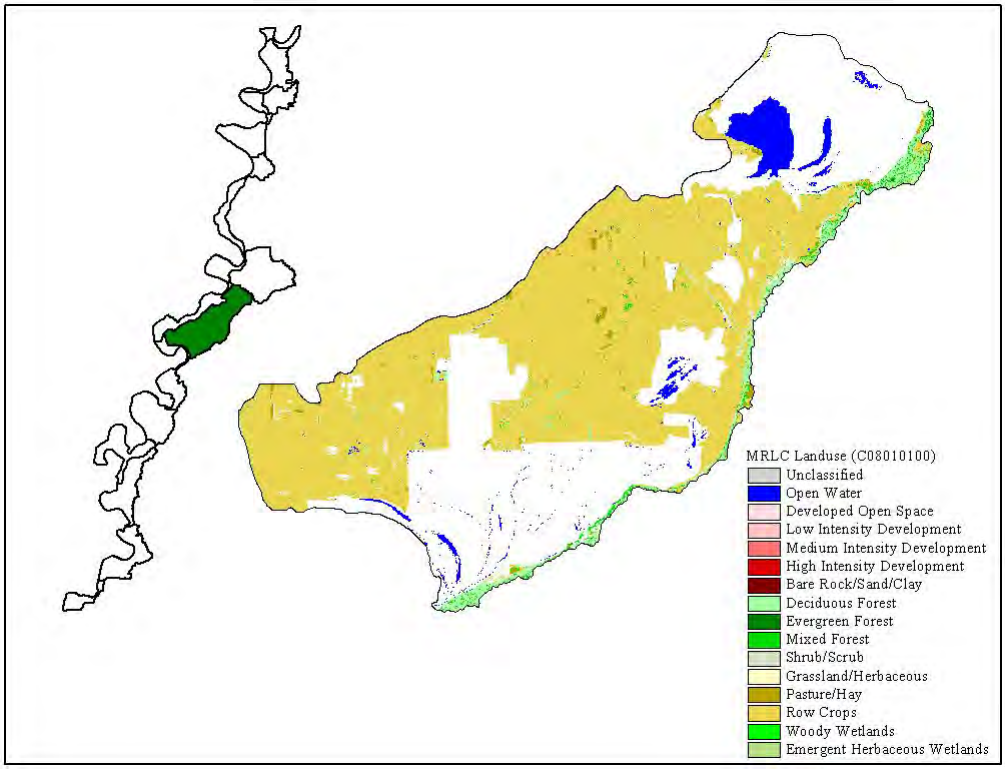


Figure 4-69. Illustration of Land Use Distribution in Subwatershed 080101000305.

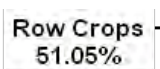


Figure 4-70. Land Use Distribution in Subwatershed 080101000305. *More information is provided in Appendix IV.*

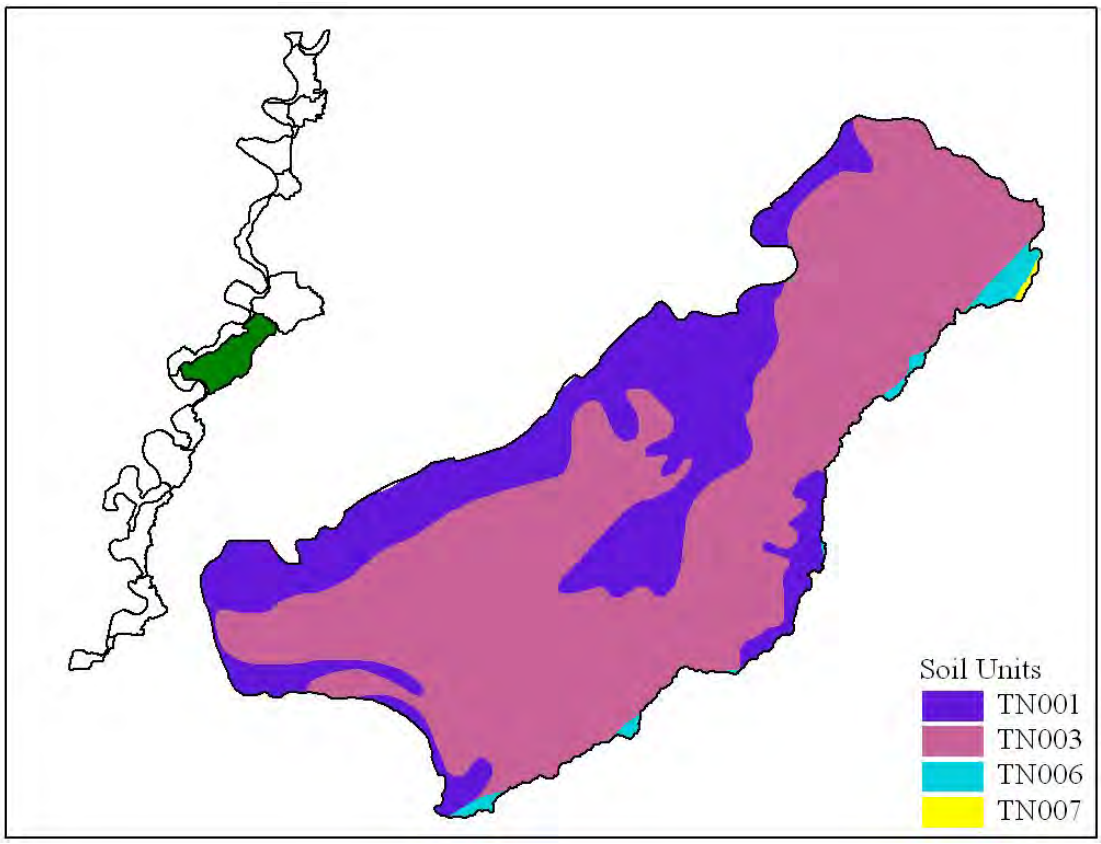


Figure 4-71. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000305.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN001	14.00	C	2.31	7.00	Silty Loam	0.33
TN003	62.00	C	0.50	6.65	Silty Clay	0.33
TN006	0.00	C	1.30	5.42	Silty Loam	0.48
TN007	29.00	C	1.30	5.36	Silty Loam	0.48

Table 4-50. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000305. *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)
Lauderdale	23,491	24,128	27,101	17.01	3,995	4,104	4,609	15.40

Table 4-51. Population Estimates in Subwatershed 080101000305.

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

There are no USGS continuous record gaging stations located in subwatershed 080101000305.

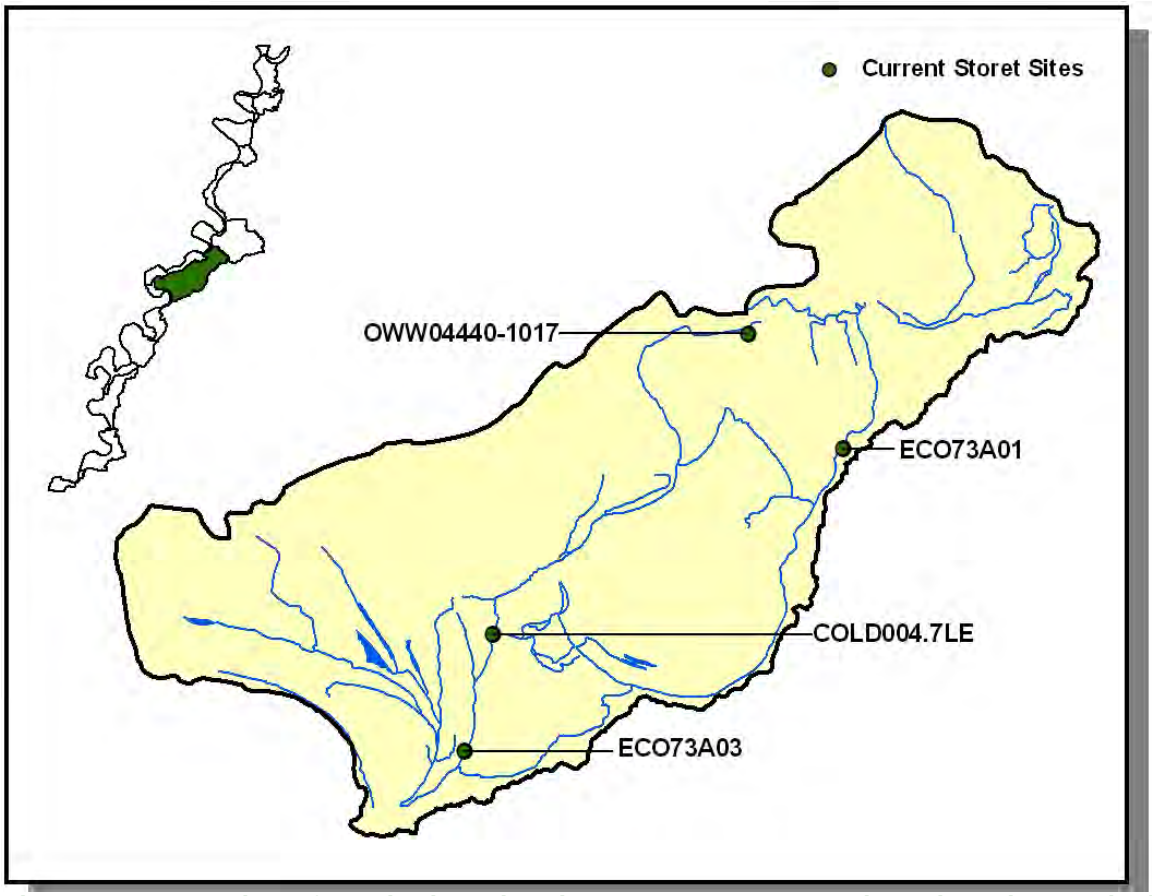


Figure 4-72. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080101000305. *More information, including site names and locations, is provided in Appendix IV.*

4.2.J.iii. Permitted Activities.

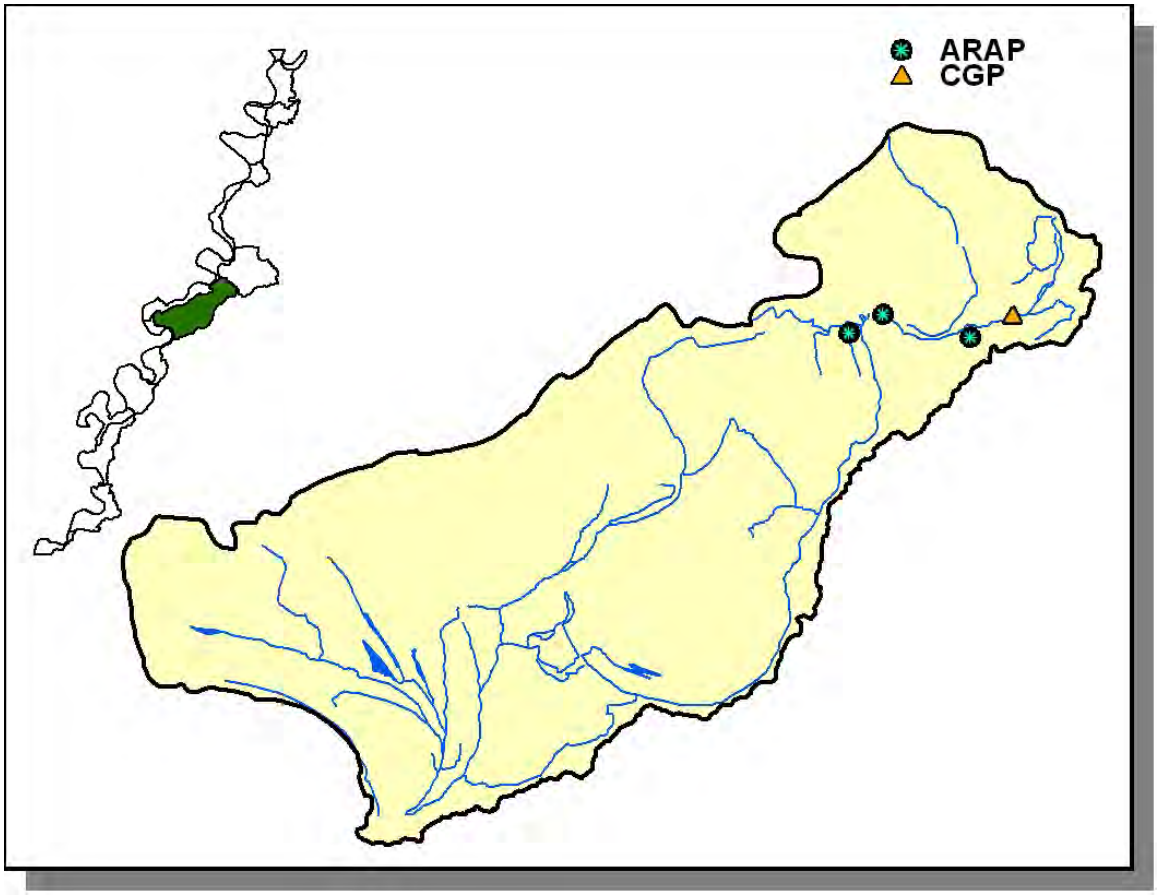


Figure 4-73. Location of Permits Issued in Subwatershed 080101000305. *More information, including the names of facilities, is provided in Appendix IV.*

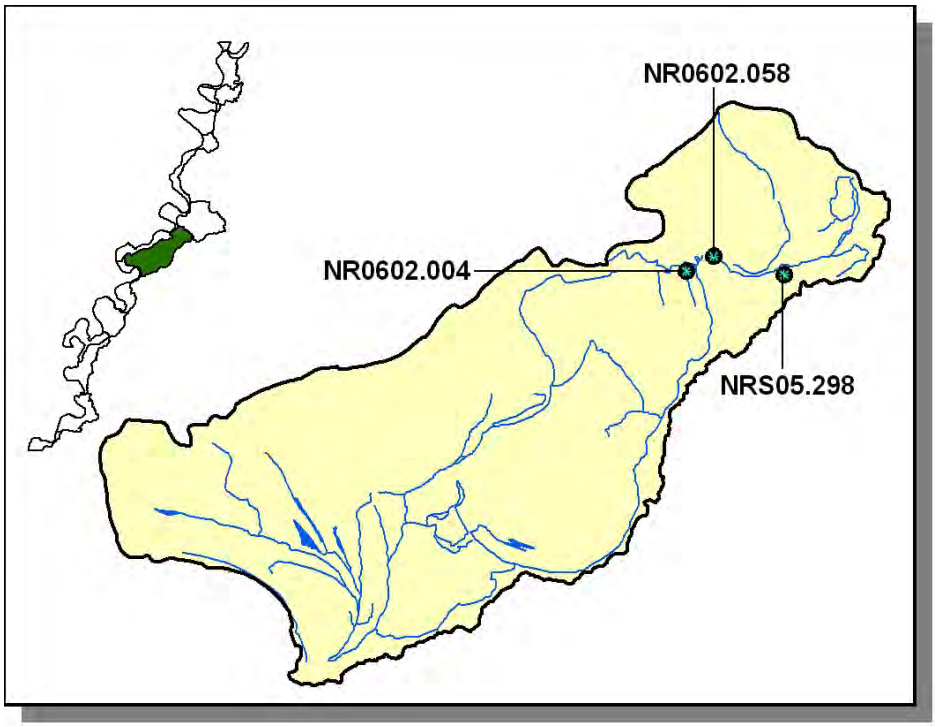


Figure 4-74. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 080101000305. *More information is provided in Appendix IV.*

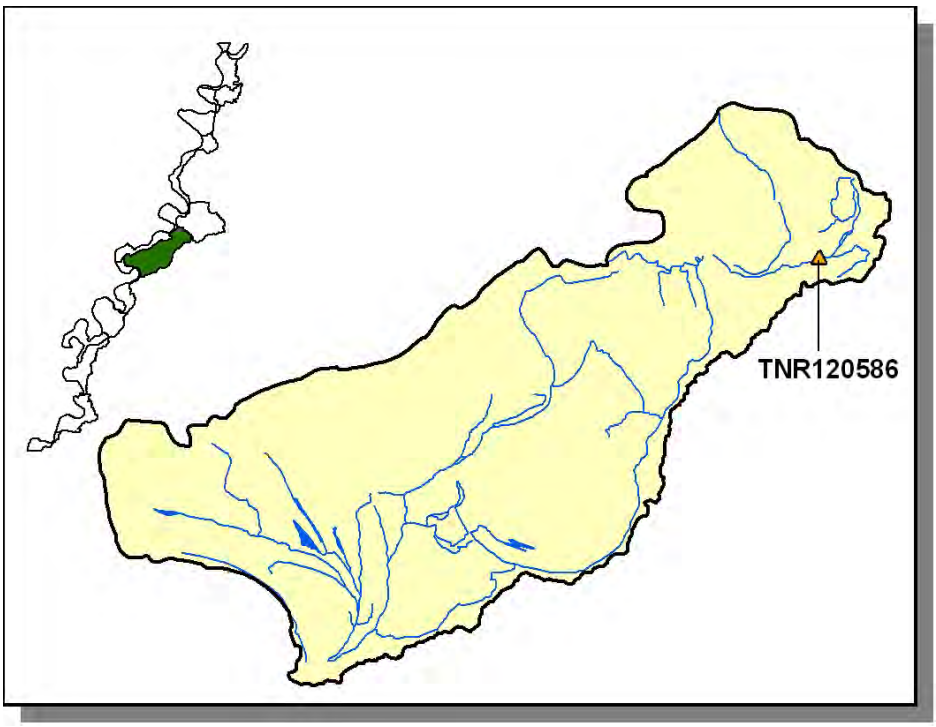


Figure 4-75. Location of CGP (Construction General Permit) Sites in Subwatershed 080101000305. *More information is provided in Appendix IV.*

4.2.J.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS				
County	Cattle	Chickens (Layers)	Hogs	Sheep
Lauderdale	8,739	243	2,355	11

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.*

CROPS	TONS/ACRE/YEAR
Corn (Row Crops)	14.77
Cotton (Row Crops)	13.53
Soybeans (Row Crops)	13.51
Wheat (Close Grown Cropland)	9.27
Summer Fallow (Other Cropland)	8.70
Other Vegetable and Truck Crop	4.00
Grass Forbs Legumes Mixed (Pastureland)	2.40
Grass (Pastureland)	2.27
Conservation Reserve Program Land	1.79
Legume (Hayland)	0.65
Legume Grass (Hayland)	0.58
Grass (Hayland)	0.37
Farmsteads and Ranch Headquarters	0.09
Other Land in Farms	0.05

Table 4-53. Annual Estimated Total Soil Loss in Subwatershed 080101000305.

4.2.K. 080101000401 (Mississippi River).

4.2.K.i. General Description.

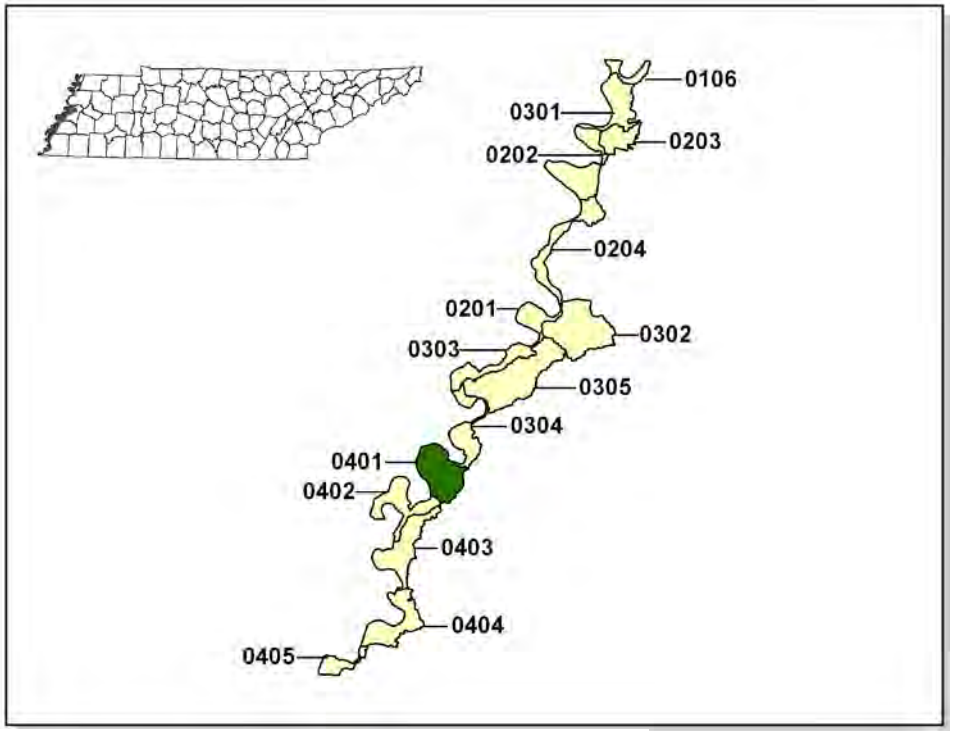


Figure 4-76. Location of Subwatershed 080101000401. *All Mississippi River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

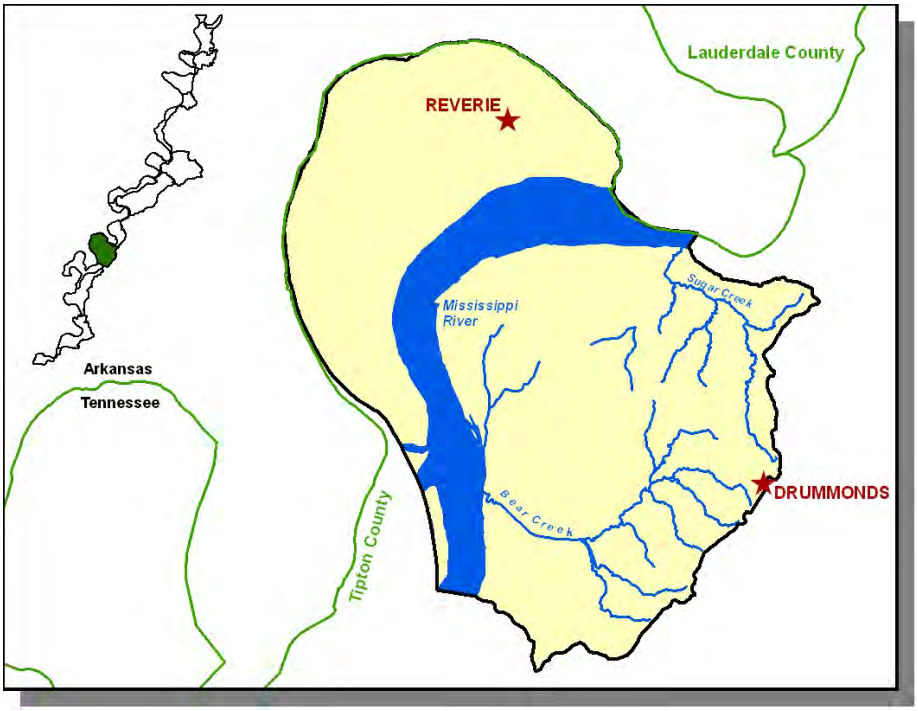


Figure 4-77. Locational Details of Subwatershed 080101000401.

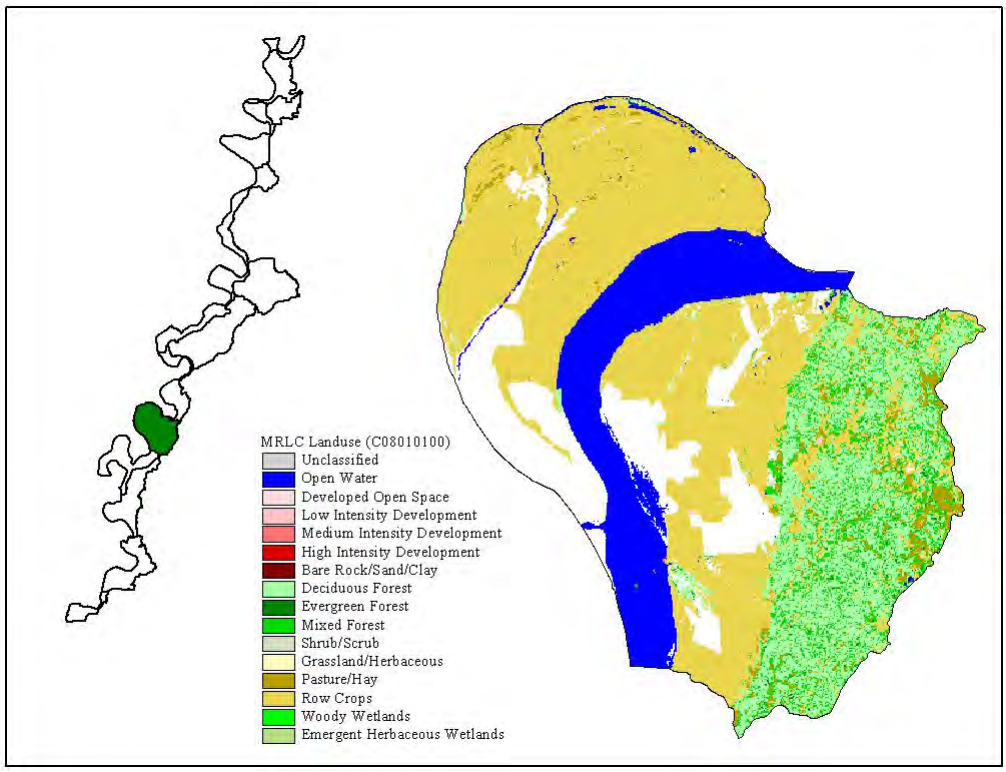


Figure 4-78. Illustration of Land Use Distribution in Subwatershed 080101000401.

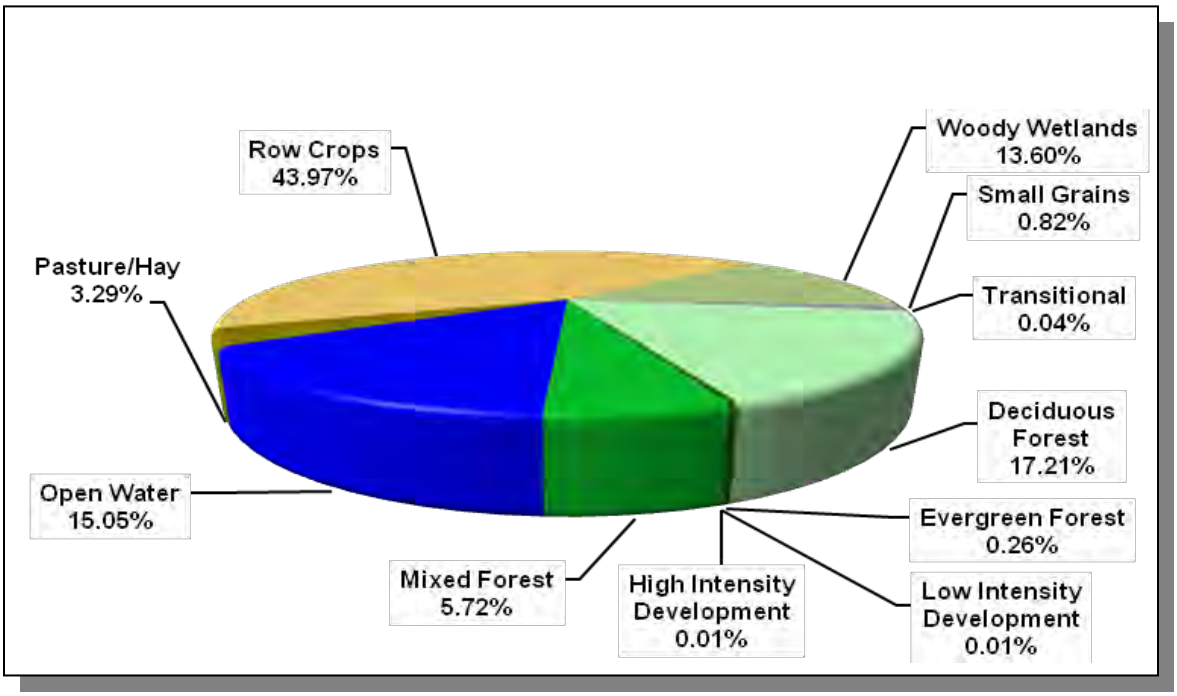


Figure 4-79. Land Use Distribution in Subwatershed 080101000401. *More information is provided in Appendix IV.*

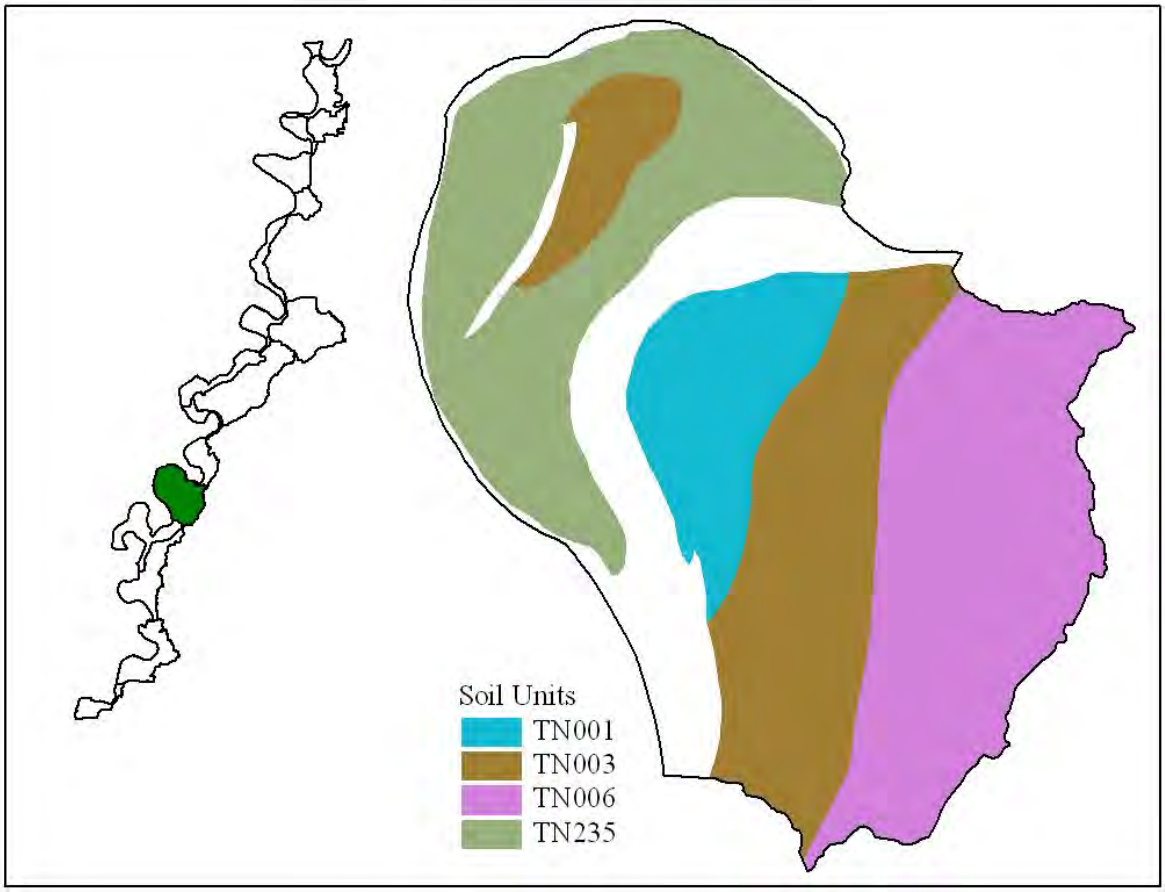


Figure 4-80. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000401.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN001	14.00	C	2.31	7.00	Silty Loam	0.33
TN003	62.00	C	0.50	6.65	Silty Clay	0.33
TN006	0.00	C	1.30	5.42	Silty Loam	0.48
TN235	63.00	C	1.70	5.26	Silty Clay Loam	0.31

Table 4-54. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000401. *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)
Tipton	37,568	45,986	51,271	10.83	4,070	4,982	5,555	36.50

Table 4-55. Population Estimates in Subwatershed 080101000401.

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

There are no USGS continuous record gaging stations located in subwatershed 080101000401.

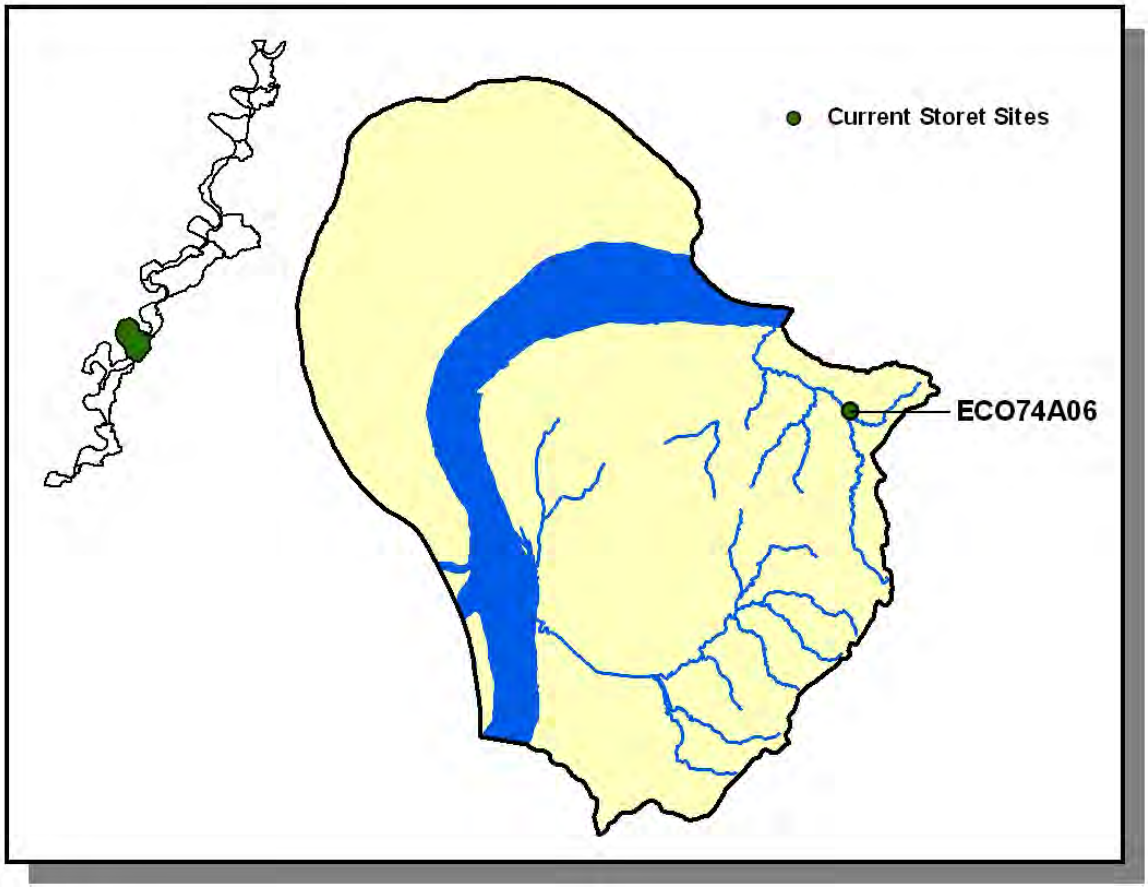


Figure 4-81. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080101000401. *More information, including site names and locations, is provided in Appendix IV.*

4.2.K.iii. Permitted Activities.

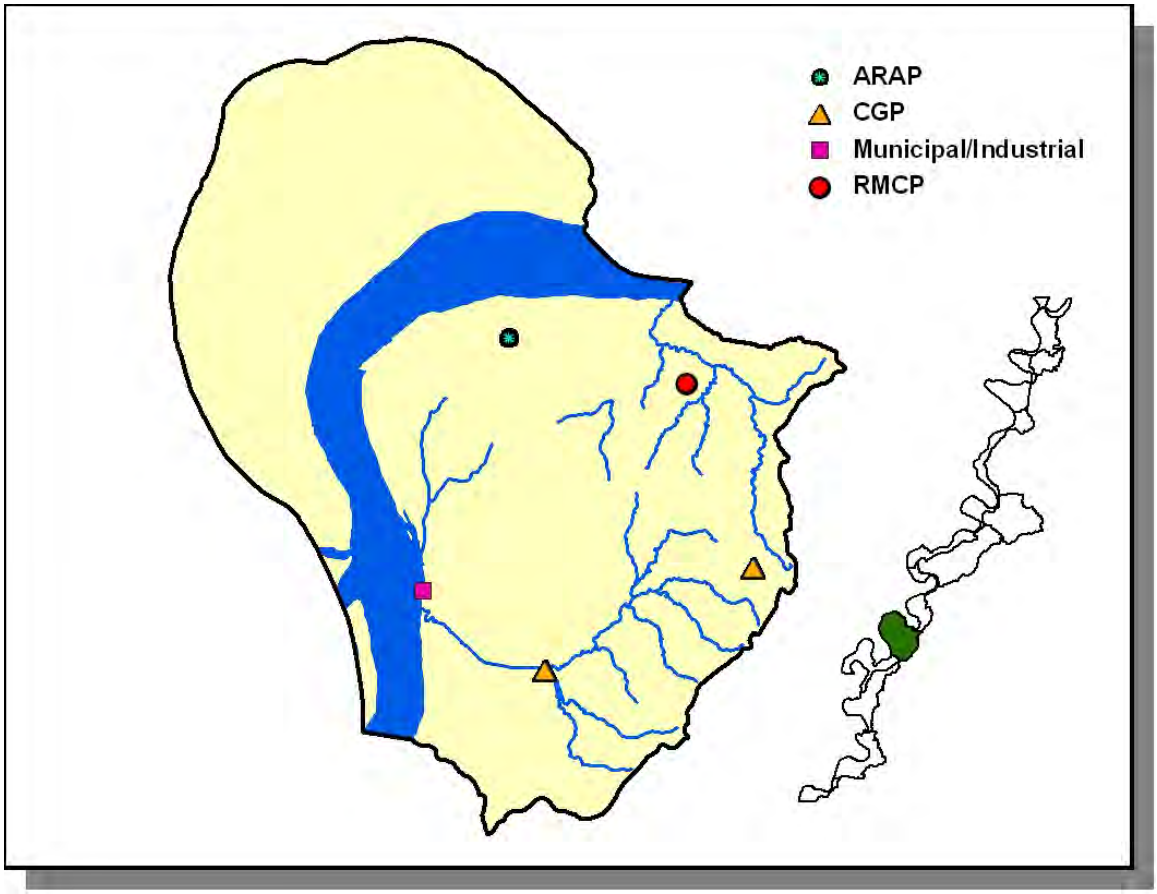


Figure 4-82. Location of Permits Issued in Subwatershed 080101000401. *More information, including the names of facilities, is provided in Appendix IV.*

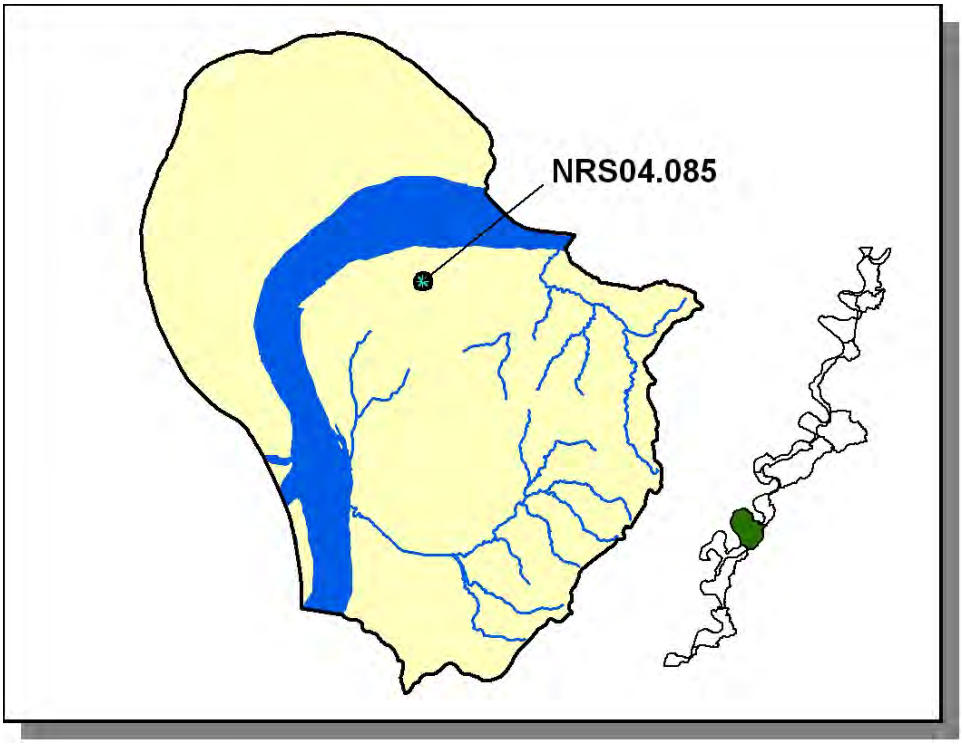


Figure 4-83. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 080101000401. *More information is provided in Appendix IV.*

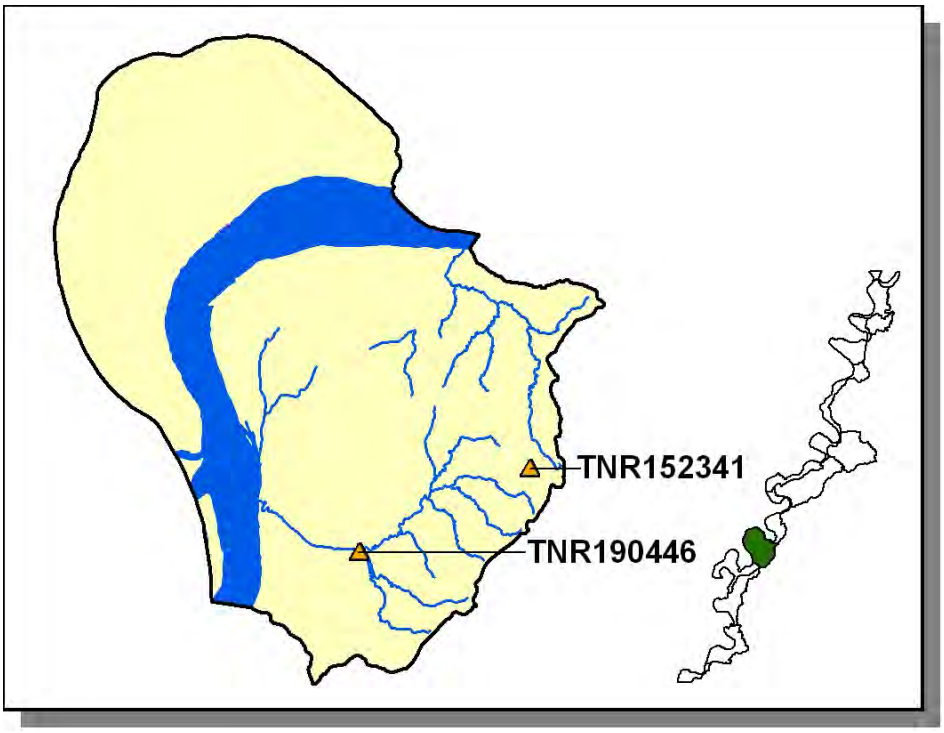


Figure 4-84. Location of CGP (Construction General Permit) Sites in Subwatershed 080101000401. *More information is provided in Appendix IV.*

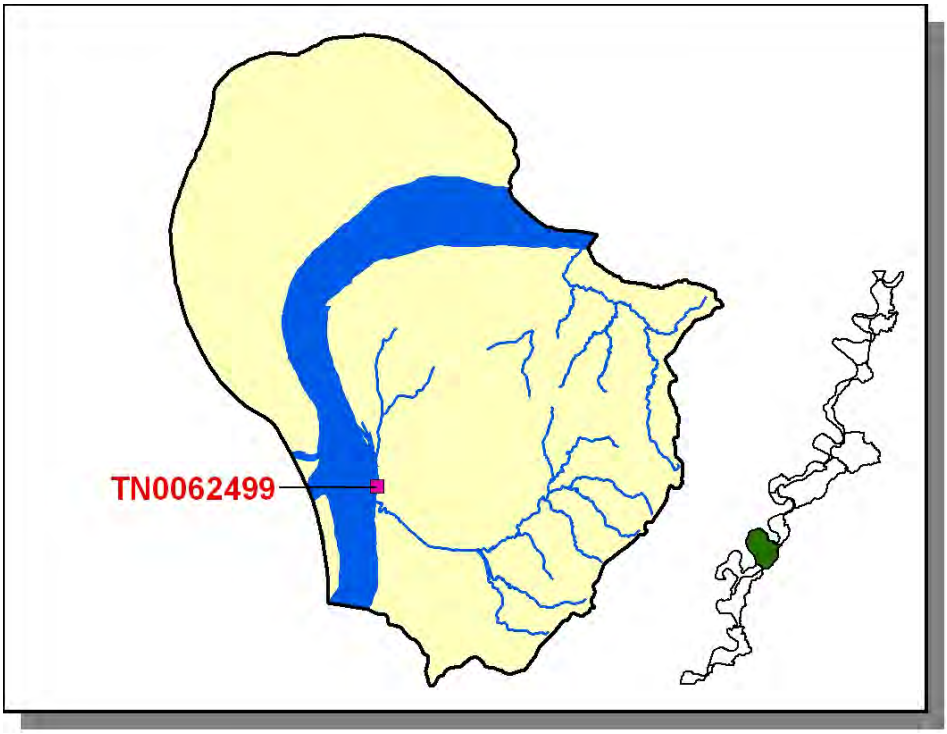


Figure 4-85. Location of Permitted Municipal and Industrial Facilities in Subwatershed 080101000401. *Permit numbers in red indicate that the facility discharges to a stream listed on the 2006 303(d) list. More information, including the name of the facility is provided in Appendix IV.*

PERMIT #	1Q10	DISCHARGE FLOW
TN0062499	67,000.0	2.0

Table 4-56. Receiving Stream Flow Information Used for Limit Calculations for NPDES Dischargers to Waterbodies Listed on the 2006 303(d) List in Subwatershed 080101000401. *Data are in million gallons per day (MGD).Data were obtained from permit files.*

PERMIT #	BOD_5	BOD % REMOVAL	DO	E. *coli*	FLOW	SS	TSS	pH
TN0062499	X	X	X	X	X	X	X	X

Table 4-57. Parameters Monitored for Limits for NPDES Dischargers to Waterbodies Listed on the 2006 303(d) List in Subwatershed 080101000401. *BOD_5, Biochemical Oxygen Demand (5-Day); DO, Dissolved Oxygen; SS, Settleable Solids; TSS, Total Suspended Solids.*

PERMIT #	WET	AMMONIA AS N (TOTAL)	NITRITE + NITRATE TOTAL	PHOSPHORUS TOTAL	TKN
TN0062499	X	X	X	X	X

Table 4-58. Parameters Monitored for Limits for NPDES Dischargers to Waterbodies Listed on the 2006 303(d) List in Subwatershed 080101000401. *WET, Whole Effluent Toxicity; TKN, Total Kjeldahl Nitrogen.*

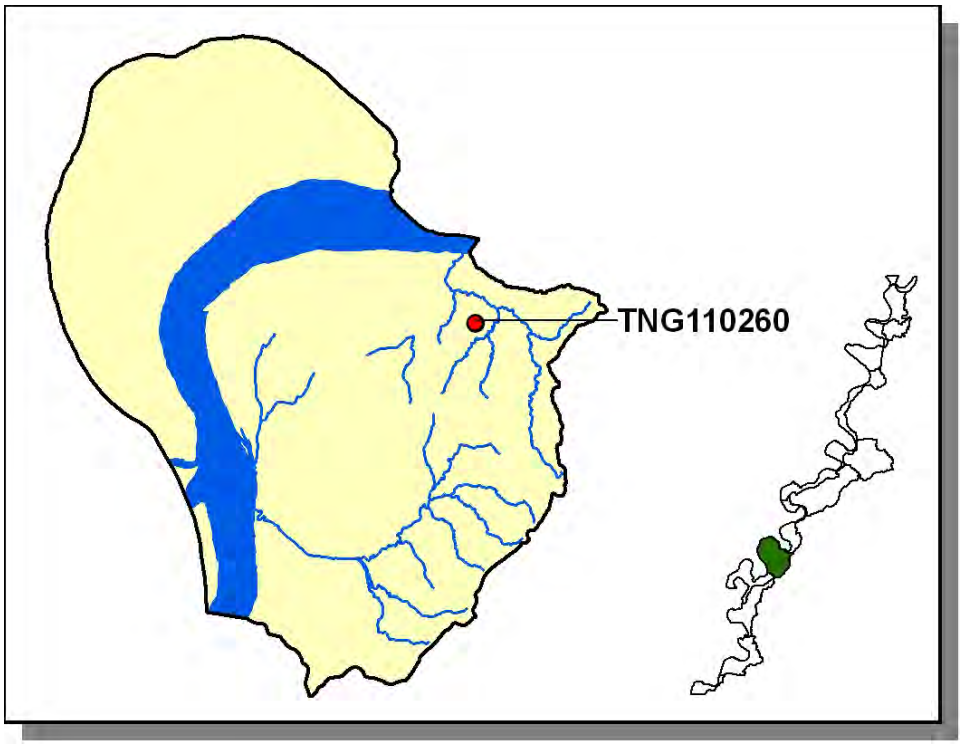


Figure 4-86. Location of RMCP (Ready Mix Concrete Plant) facilities in Subwatershed 080101000401. *More information, including the names of facilities, is provided in Appendix IV.*

4.2.K.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Tipton	5,422	9,796	14	334	251	86

Table 4-59. 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)
Tipton	50.9	50.9	1.0	5.6

Table 4-60. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Other Vegetable and Truck Crop	21.48
Soybeans (Row Crops)	18.74
Cotton (Row Crops)	16.59
Grass (Hayland)	2.09
Conservation Reserve Program Land	1.05
Grass Forbs Legumes Mixed (Pastureland)	1.01
Grass (Pastureland)	0.84
Farmsteads and Ranch Headquarters	0.69
Legume (Hayland)	0.54
Other Cropland not Planted	0.22

Table 4-61. Annual Estimated Total Soil Loss in Subwatershed 080101000401.

4.2.L. 080101000402 (Mississippi River).

4.2.L.i. General Description.

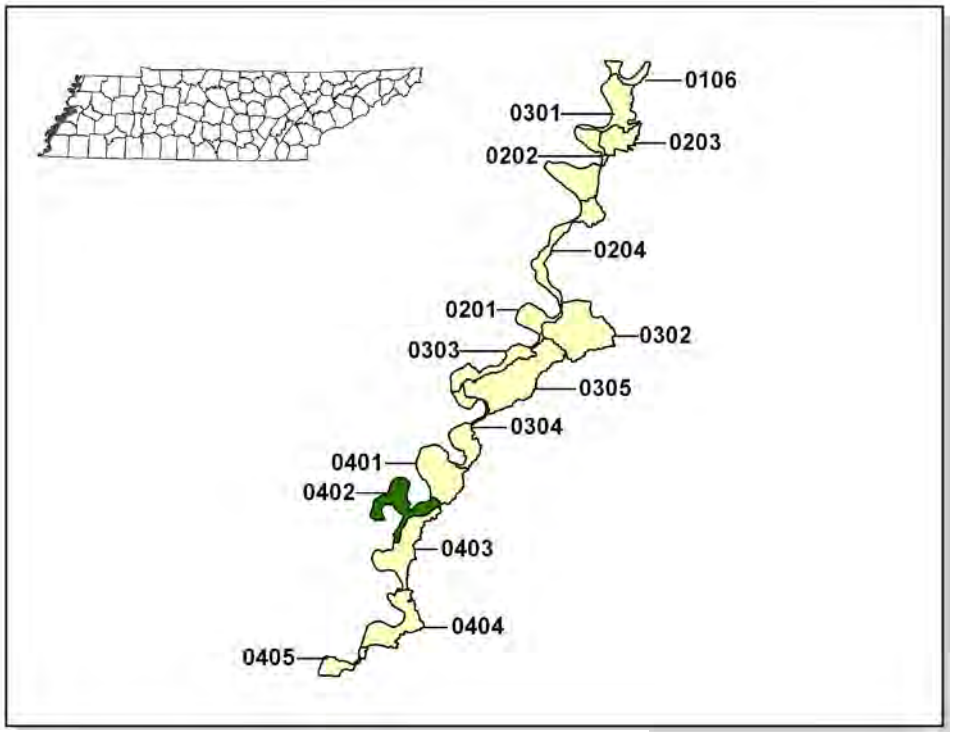


Figure 4-87. Location of Subwatershed 080101000402. *All Mississippi River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

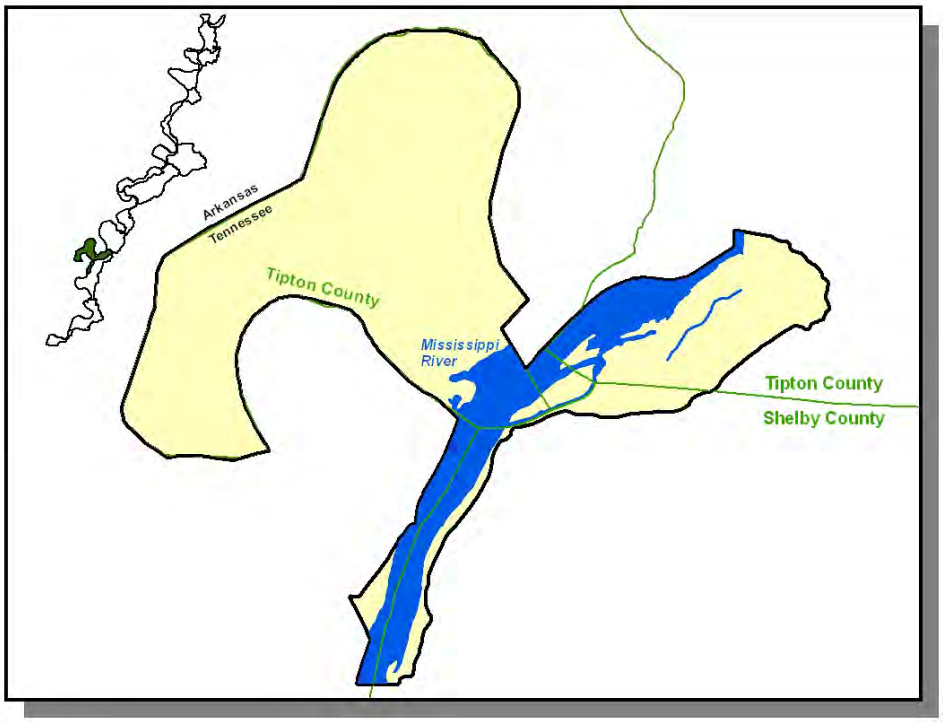


Figure 4-88. Locational Details of Subwatershed 080101000402.

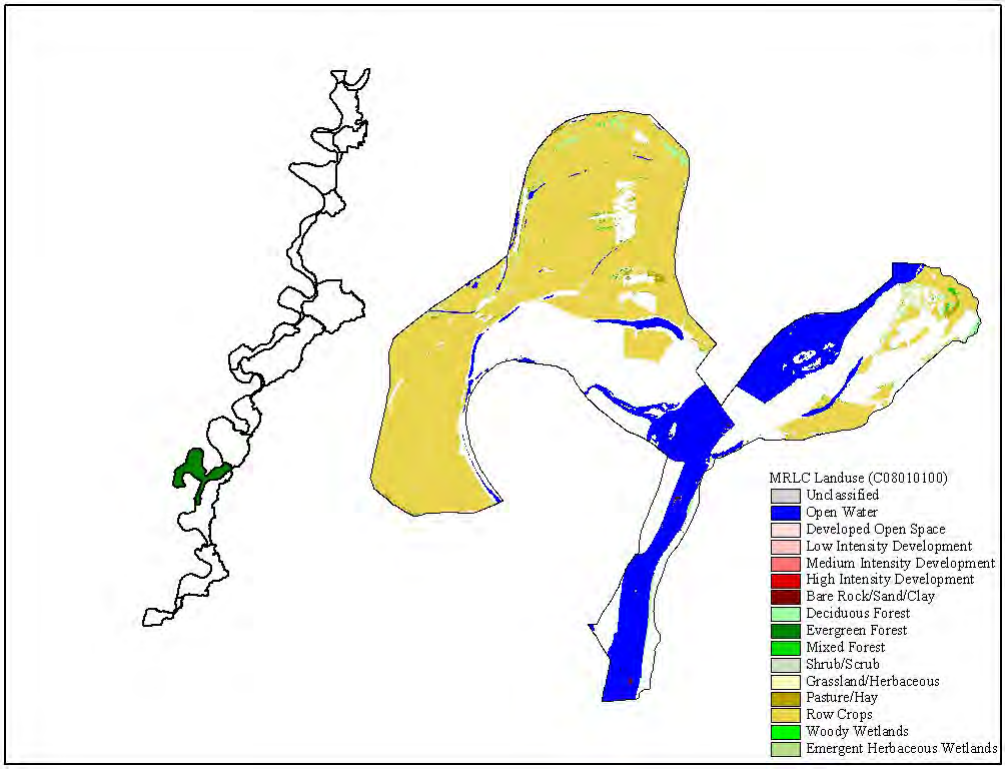


Figure 4-89. Illustration of Land Use Distribution in Subwatershed 080101000402.

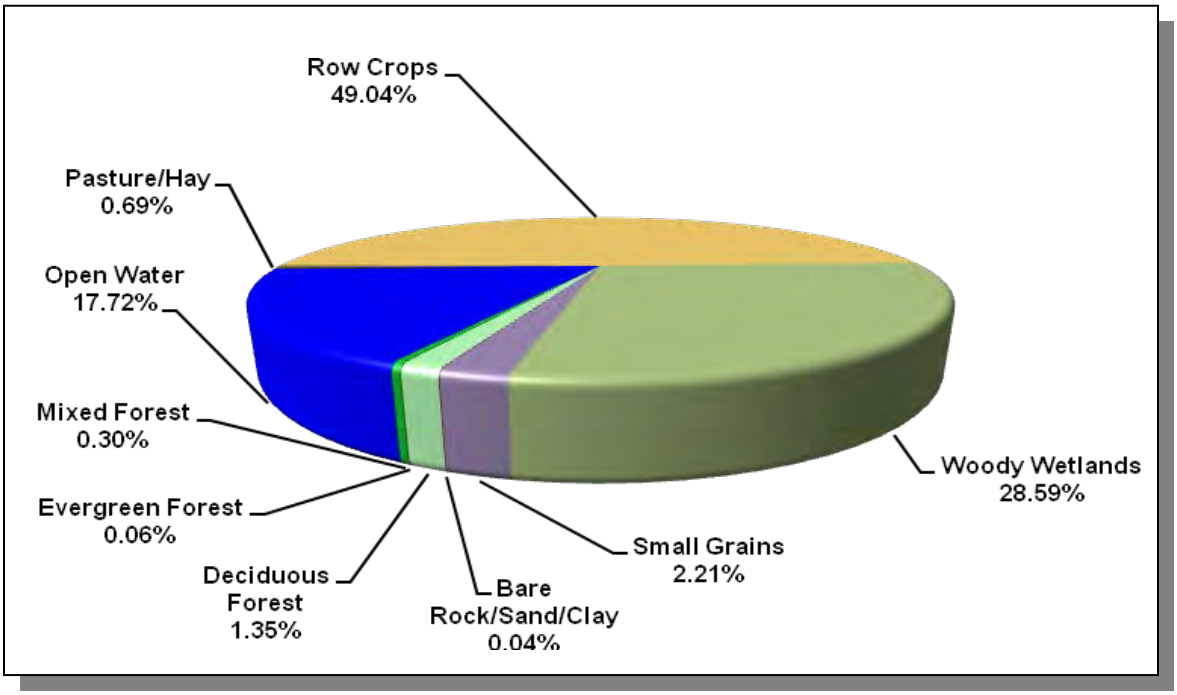


Figure 4-90. Land Use Distribution in Subwatershed 080101000402. *More information is provided in Appendix IV.*

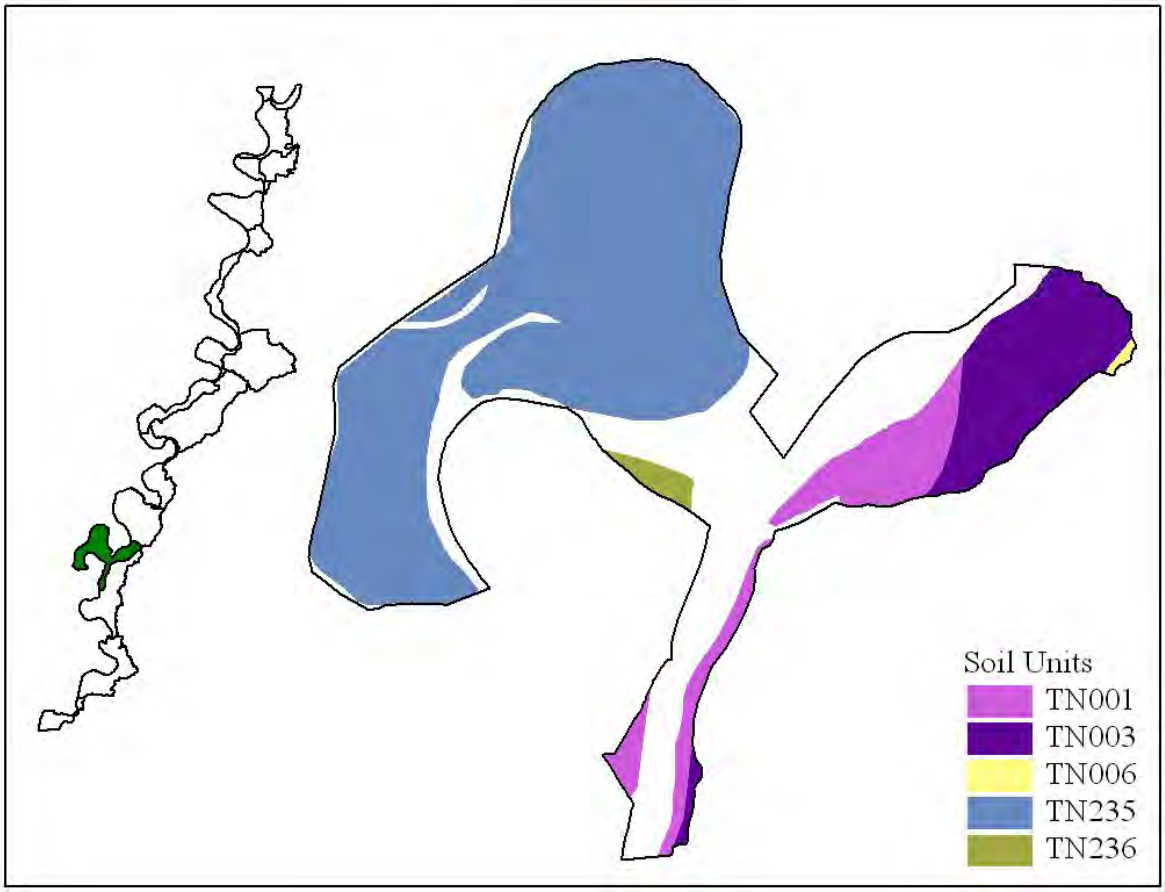


Figure 4-91. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000402.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN001	14.00	C	2.31	7.00	Silty Loam	0.33
TN003	62.00	C	0.50	6.65	Silty Clay	0.33
TN006	0.00	C	1.30	5.42	Silty Loam	0.48
TN235	63.00	C	1.70	5.26	Silty Clay Loam	0.31
TN236	76.00	D	0.54	6.30	Silty Clay	0.30

Table 4-62. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000402. *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)
Shelby	826,330	865,318	897,472	3.15	26,025	27,253	28,265	8.60
Tipton	37,568	45,986	51,271	1.46	549	672	749	36.40
Totals	**863,898**	**911,304**	**948,743**		**26,574**	**27,925**	**29,014**	**9.20**

Table 4-63. Population Estimates in Subwatershed 080101000402.

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

There are no USGS continuous record gaging stations located in subwatershed 080101000402.

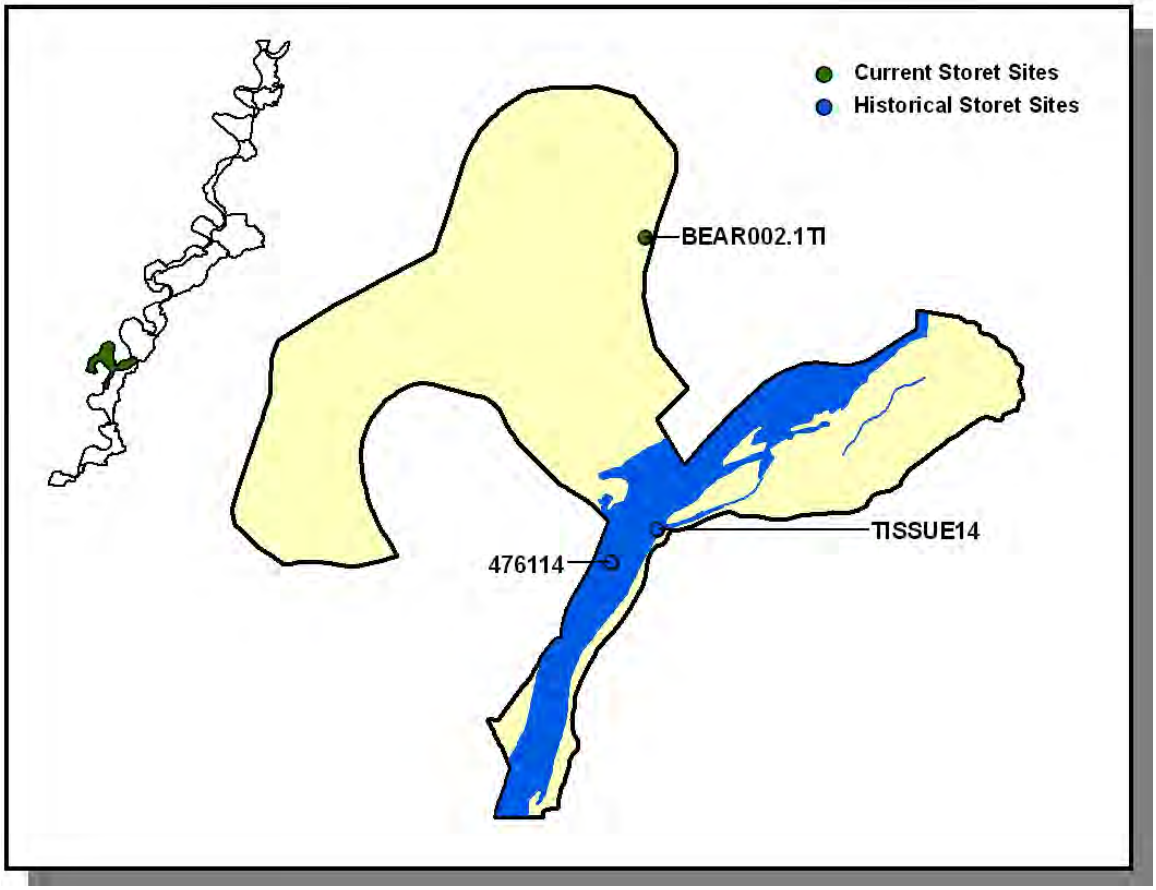


Figure 4-92. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080101000402. *More information, including site names and locations, is provided in Appendix IV.*

4.2.L.iii. Permitted Activities.

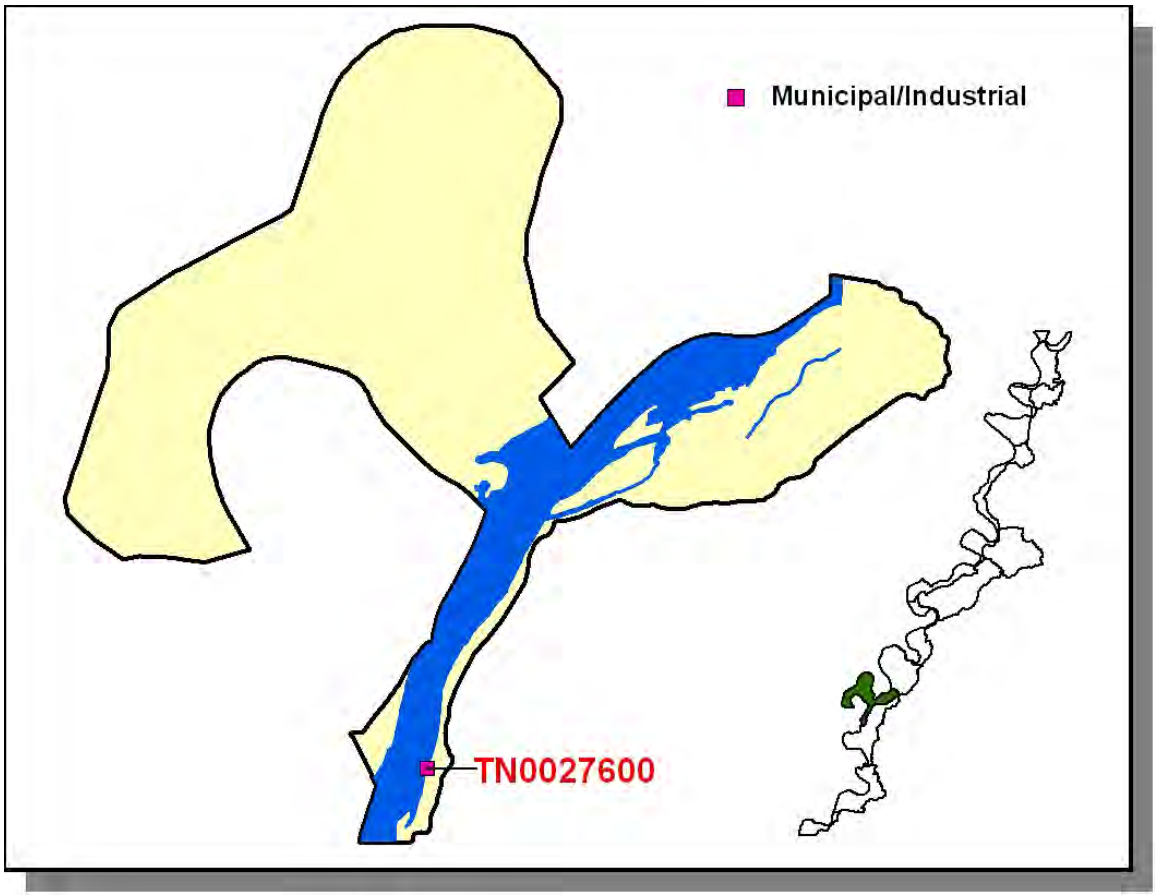


Figure 4-93. Location of Permits Issued in Subwatershed 080101000402. *Permit numbers in red indicate that the facility discharges to a stream listed on the 2006 303(d) list. More information, including the names of facilities, is provided in Appendix IV.*

PERMIT #	7Q10	DISCHARGE FLOW
TN0027600	109,000.0	0.05

Table 4-64. Receiving Stream Flow Information Used for Limit Calculations for NPDES Dischargers to Waterbodies Listed on the 2006 303(d) List in Subwatershed 080101000402. *Data are in million gallons per day (MGD).Data were obtained from permit files.*

PERMIT #	BOD_5	DO	FLOW	SS	TSS	pH
TN0027600	X	X	X	X	X	X

Table 4-65. Parameters Monitored for Limits for NPDES Dischargers to Waterbodies Listed on the 2006 303(d) List in Subwatershed 080101000402. *BOD_5, Biochemical Oxygen Demand (5-Day); DO, Dissolved Oxygen; SS, Settleable Solids; TSS, Total Suspended Solids.*

4.2.L.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Shelby	4,980	8,628	42	484	335	148
Tipton	5,422	9,796	14	334	251	86

Table 4-66. 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)
Shelby	111.6	111.6	0.0	0.0
Tipton	50.9	50.9	1.0	5.6

Table 4-67. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Soybeans (Row Crops)	13.44
Summer Fallow (Other Cropland)	12.43
Cotton (Row Crops)	11.87
Other Vegetable and Truck Crop	9.08
Other Cropland not Planted	6.73
Corn (Row Crops)	5.91
Sorghum (Row Crops)	4.91
Wheat (Close Grown Cropland)	4.24
Legume (Hayland)	3.68
Conservation Reserve Program Land	0.84
Grass (Hayland)	0.50
Farmsteads and Ranch Headquarters	0.50
Grass (Pastureland)	0.46
Grass Forbs Legumes Mixed (Pastureland)	0.39

Table 4-68. Annual Estimated Total Soil Loss in Subwatershed 080101000402.

4.2.M. 080101000403 (Mississippi River).

4.2.M.i. General Description.

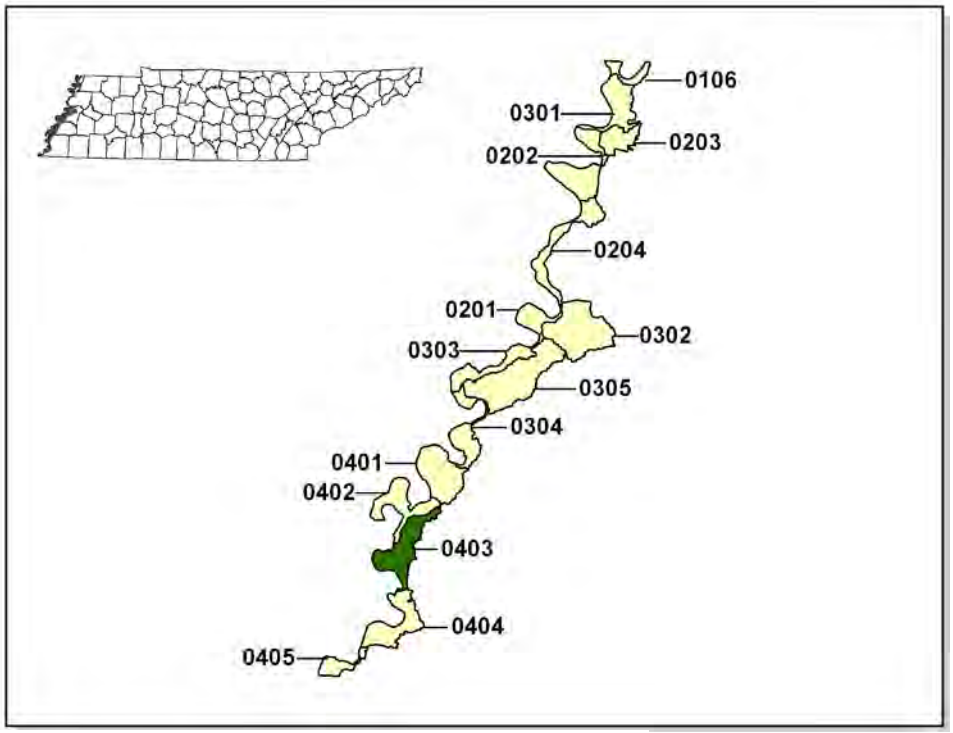


Figure 4-94. Location of Subwatershed 080101000403. *All Mississippi River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

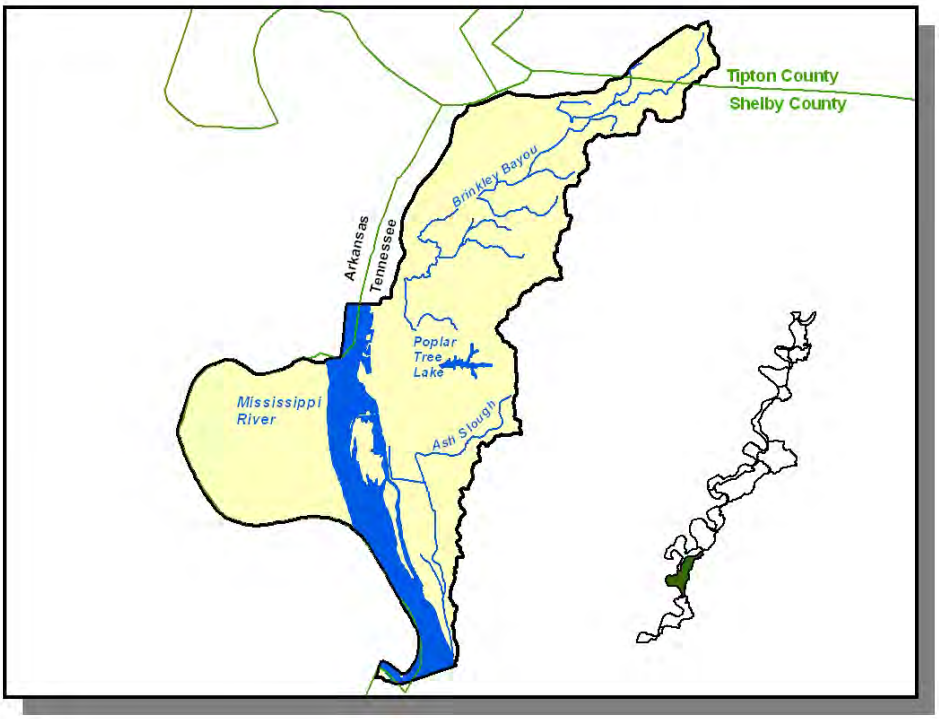


Figure 4-95. Locational Details of Subwatershed 080101000403.

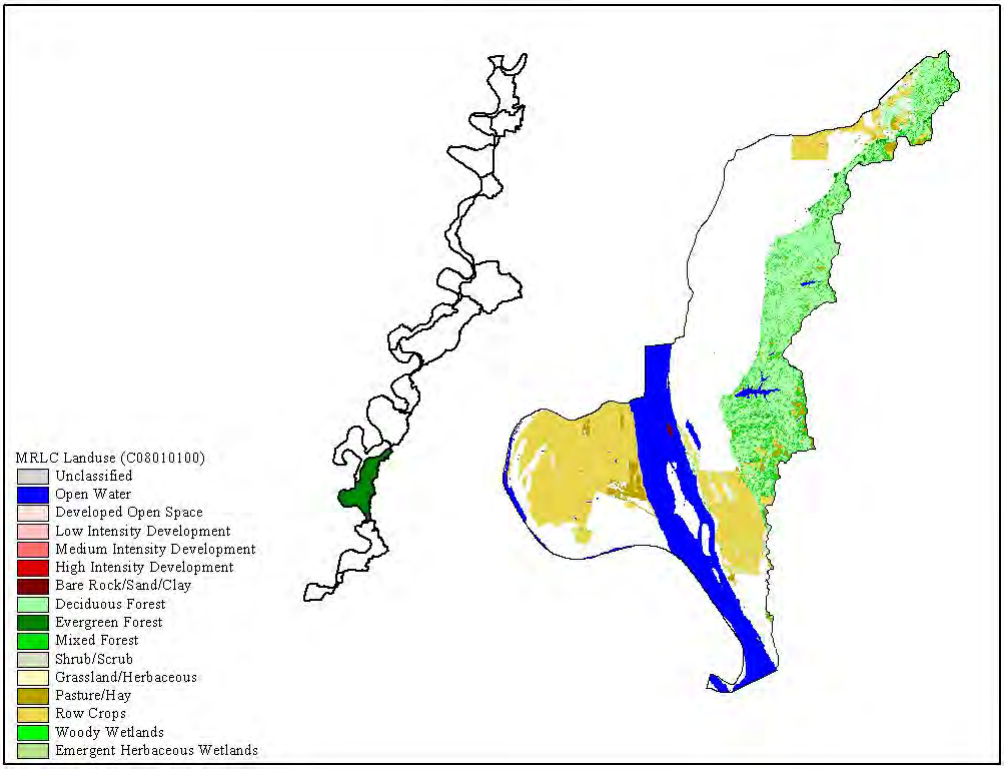


Figure 4-96. Illustration of Land Use Distribution in Subwatershed 080101000403.

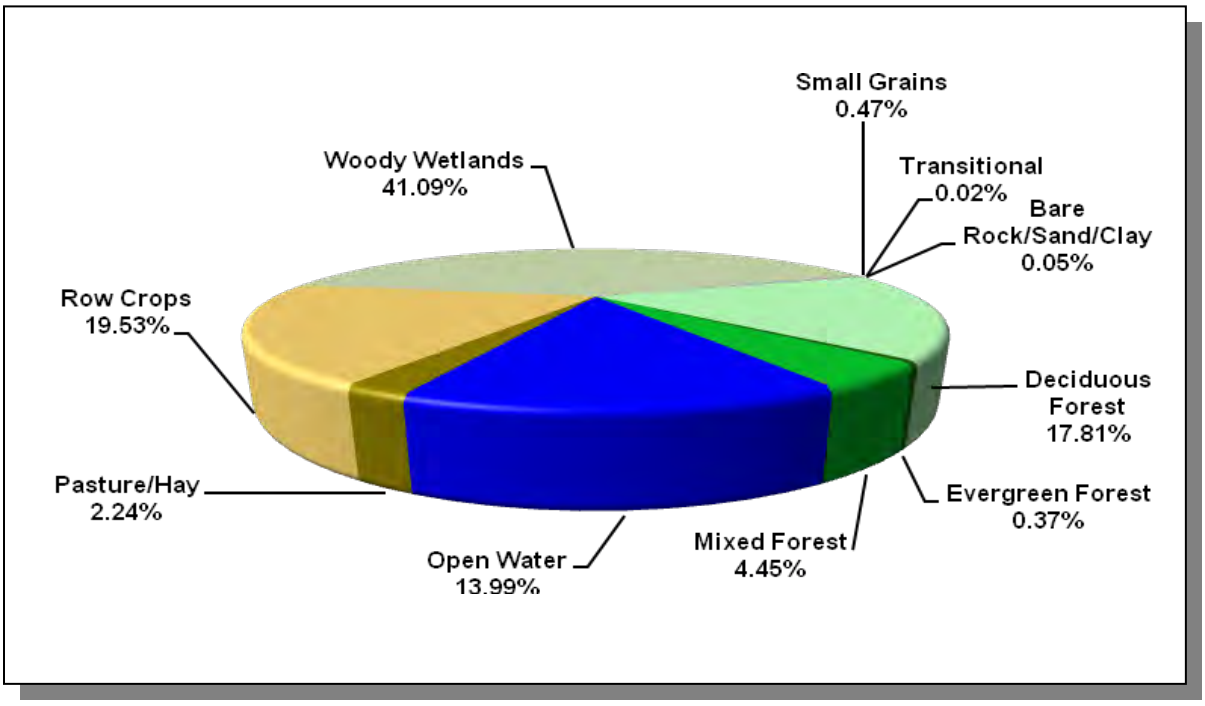


Figure 4-97. Land Use Distribution in Subwatershed 080101000403. *More information is provided in Appendix IV.*

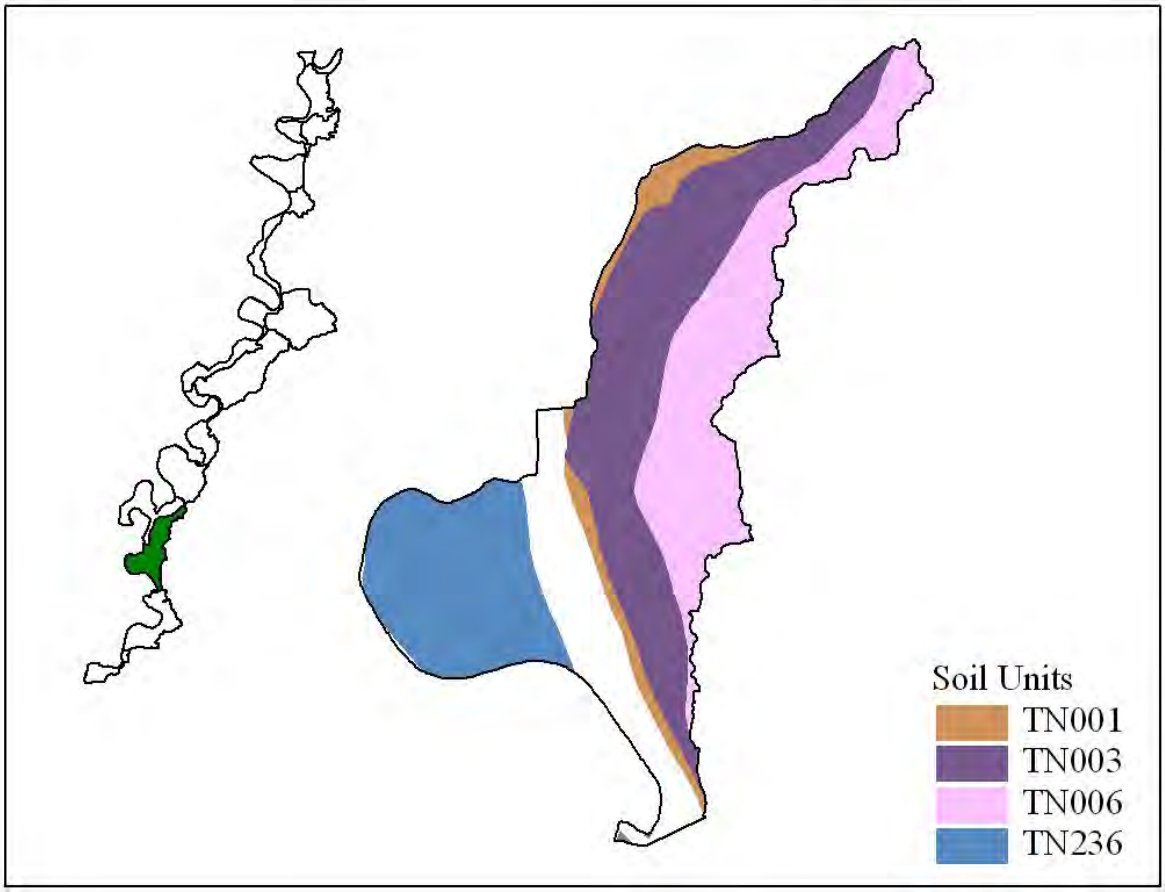


Figure 4-98. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000403.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN001	14.00	C	2.31	7.00	Silty Loam	0.33
TN003	62.00	C	0.50	6.65	Silty Clay	0.33
TN006	0.00	C	1.30	5.42	Silty Loam	0.48
TN236	76.00	D	0.54	6.30	Silty Clay	0.30

Table 4-69. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000403. *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)
Shelby	826,330	865,318	897,472	5.28	43,594	45,651	47,347	8.60
Tipton	37,568	45,986	51,271	0.39	147	180	201	36.70
Totals	**863,898**	**911,304**	**948,743**		**43,741**	**45,831**	**47,548**	**8.70**

Table 4-70. Population Estimates in Subwatershed 080101000403.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Memphis	Shelby	610,337	248,573	247,138	793	642

Table 4-71. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 080101000403.

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

There are no USGS continuous records gaging stations located in subwatershed 080101000403.

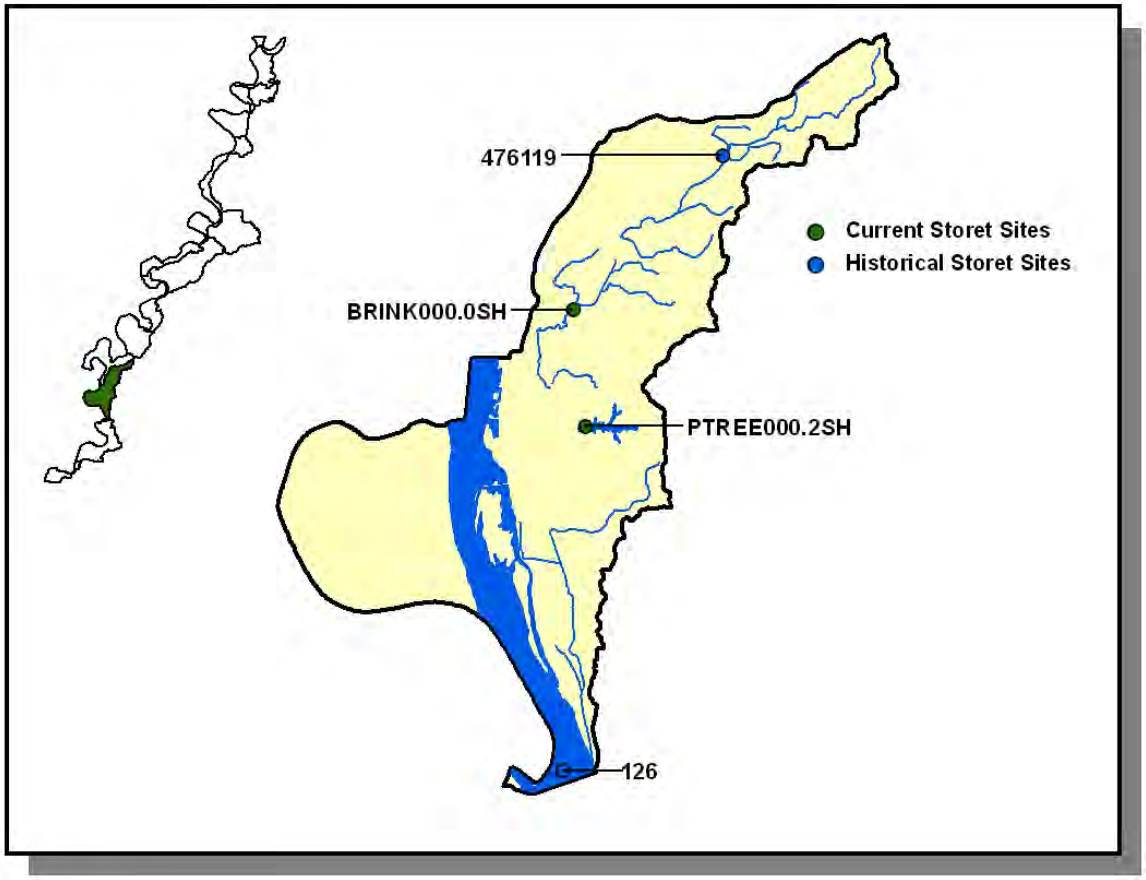


Figure 4-99. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080101000403. *More information, including site names and locations, is provided in Appendix IV.*

4.2.M.iii. Permitted Activities.

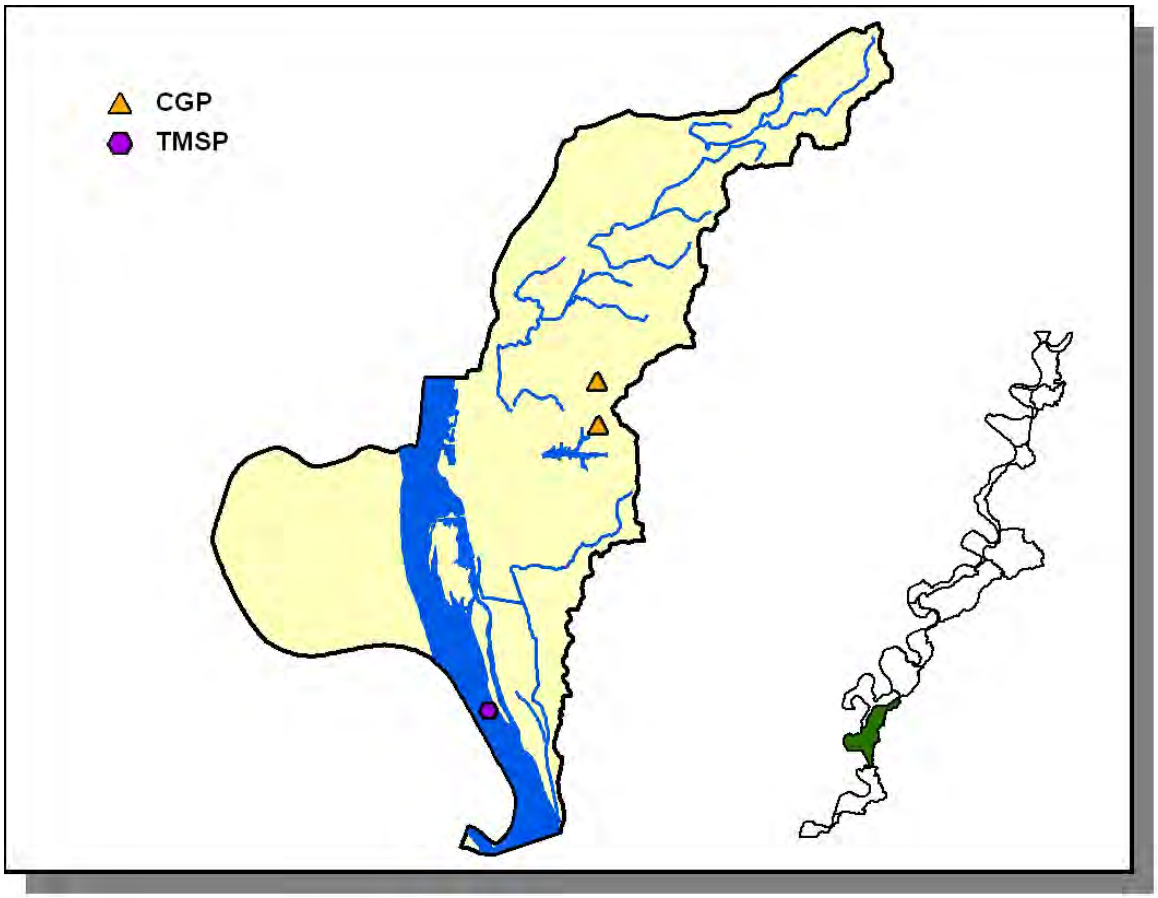


Figure 4-100. Location of Permits Issued in Subwatershed 080101000403. *More information, including the names of facilities, is provided in Appendix IV.*

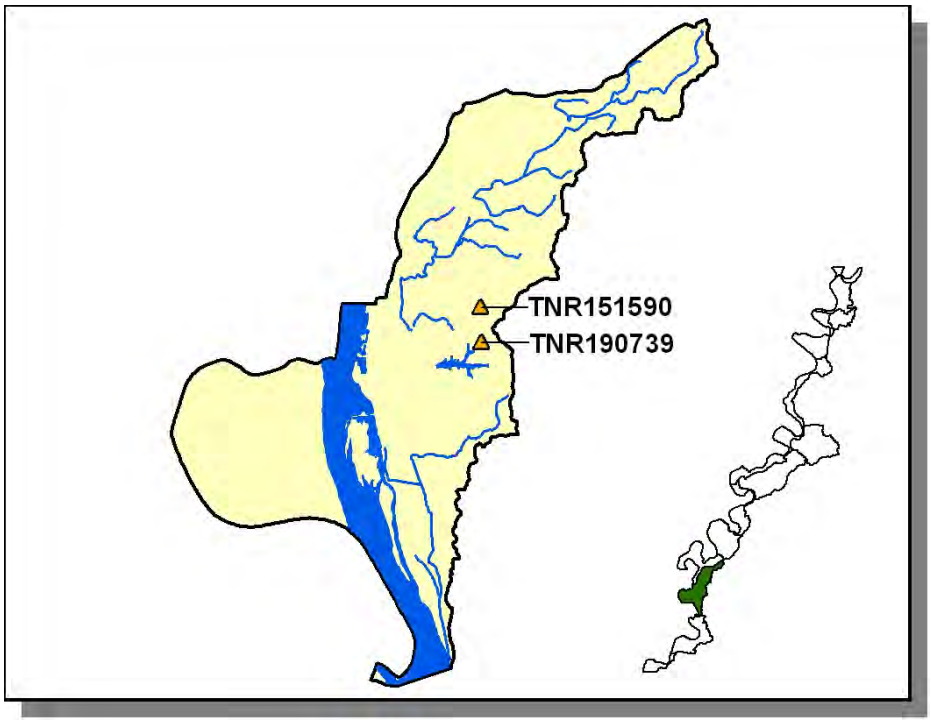


Figure 4-101. Location of CGP (Construction General Permit) Sites in Subwatershed 080101000403. *More information is provided in Appendix IV.*

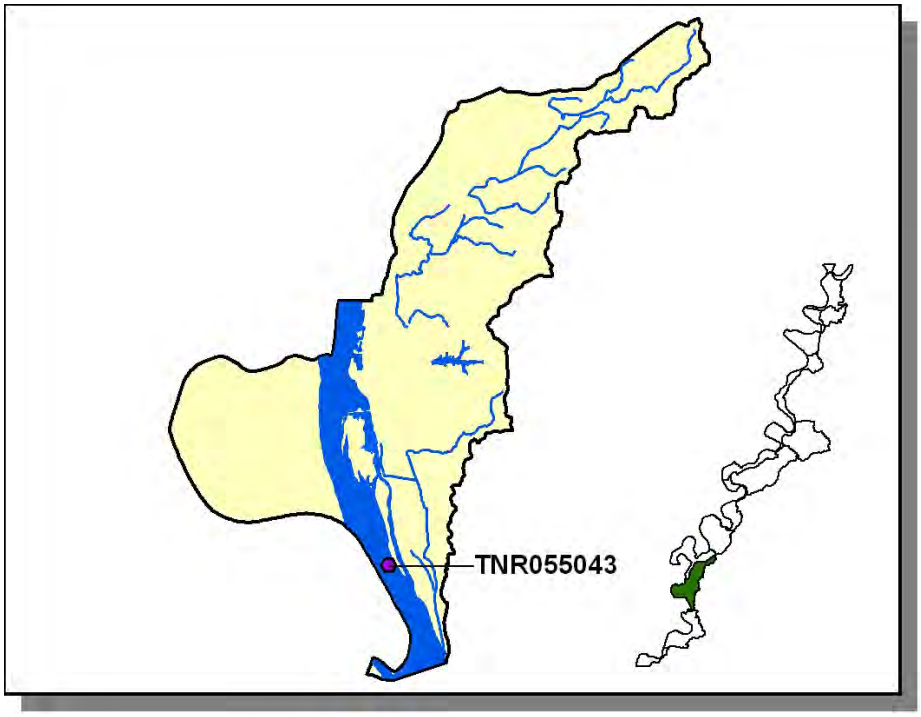


Figure 4-102. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 080101000403. *More information is provided in Appendix IV.*

4.2.M.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Shelby	4,980	8,628	42	484	335	148
Tipton	5,422	9,796	14	334	251	86

Table 4-72. 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)
Shelby	111.6	111.6	0.0	0.0
Tipton	50.9	50.9	1.0	5.6

Table 4-73. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Summer Fallow (Other Cropland)	12.43
Soybeans (Row Crops)	12.33
Cotton (Row Crops)	10.88
Other Cropland not Planted	8.09
Other Vegetable and Truck Crop	6.49
Corn (Row Crops)	5.91
Sorghum (Row Crops)	4.91
Legume (Hayland)	4.33
Wheat (Close Grown Cropland)	4.24
Conservation Reserve Program Land	0.80
Farmsteads and Ranch Headquarters	0.46
Grass (Pastureland)	0.38
Grass Forbs Legumes Mixed (Pastureland)	0.26
Grass (Hayland)	0.17

Table 4-74. Annual Estimated Total Soil Loss in Subwatershed 080101000403.

4.2.N. 080101000404 (Mississippi River).

4.2.N.i. General Description.

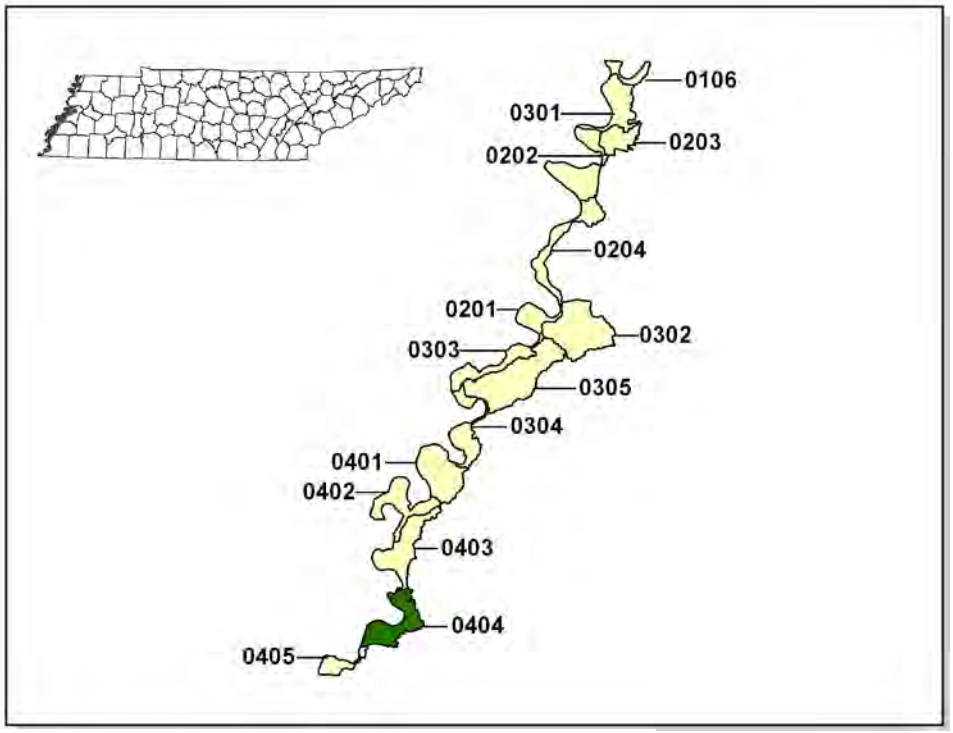


Figure 4-103. Location of Subwatershed 080101000404. *All Mississippi River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

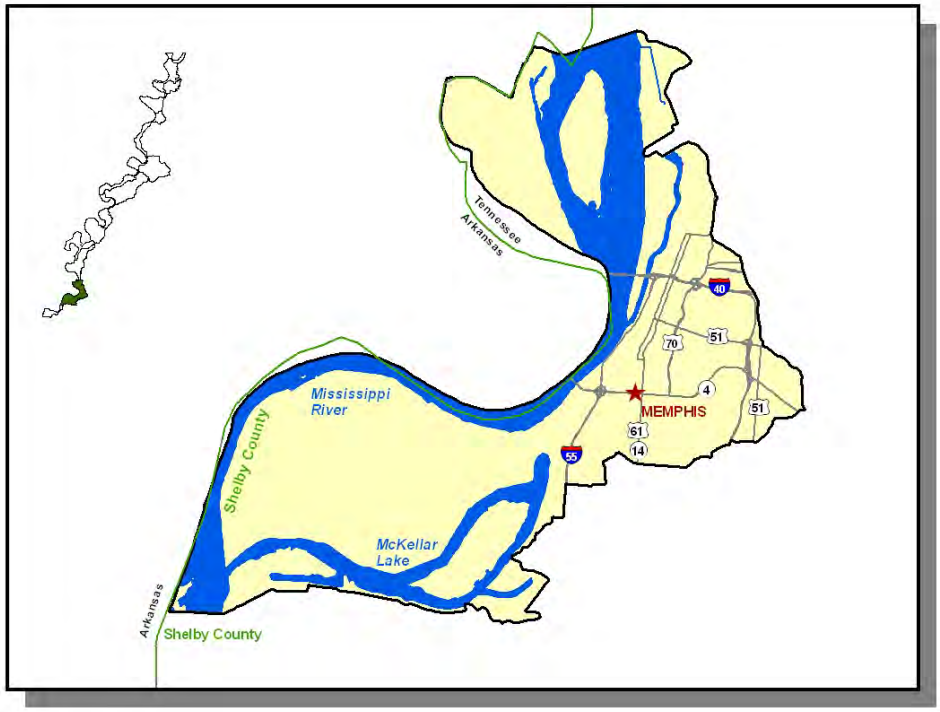


Figure 4-104. Locational Details of Subwatershed 080101000404.

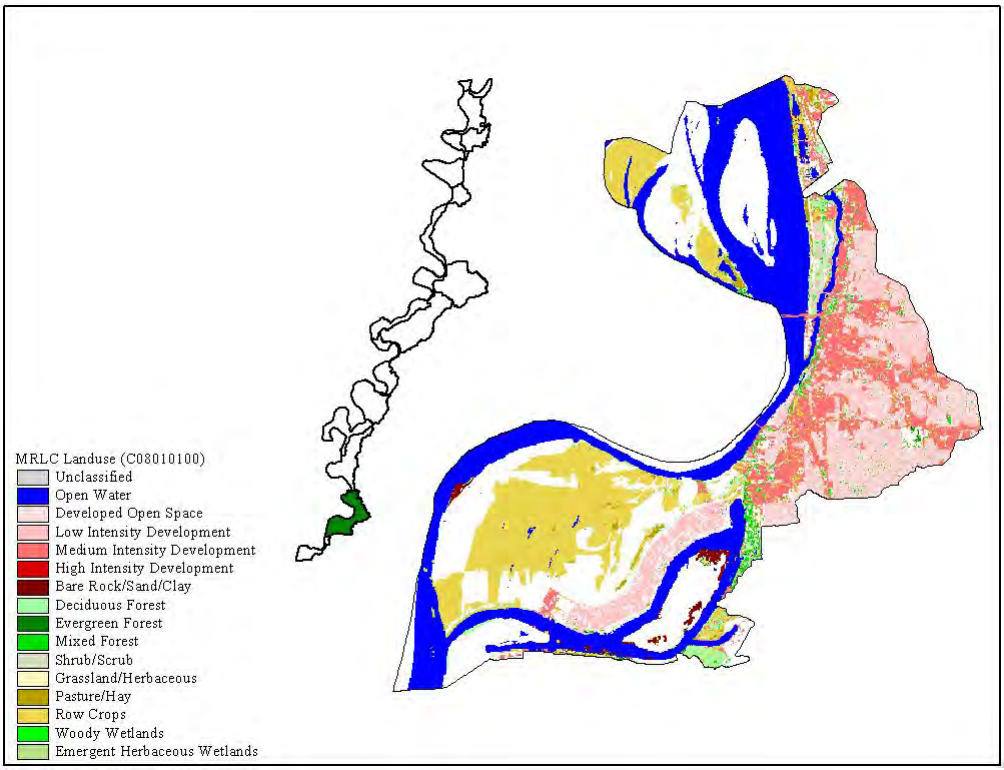


Figure 4-105. Illustration of Land Use Distribution in Subwatershed 080101000404.

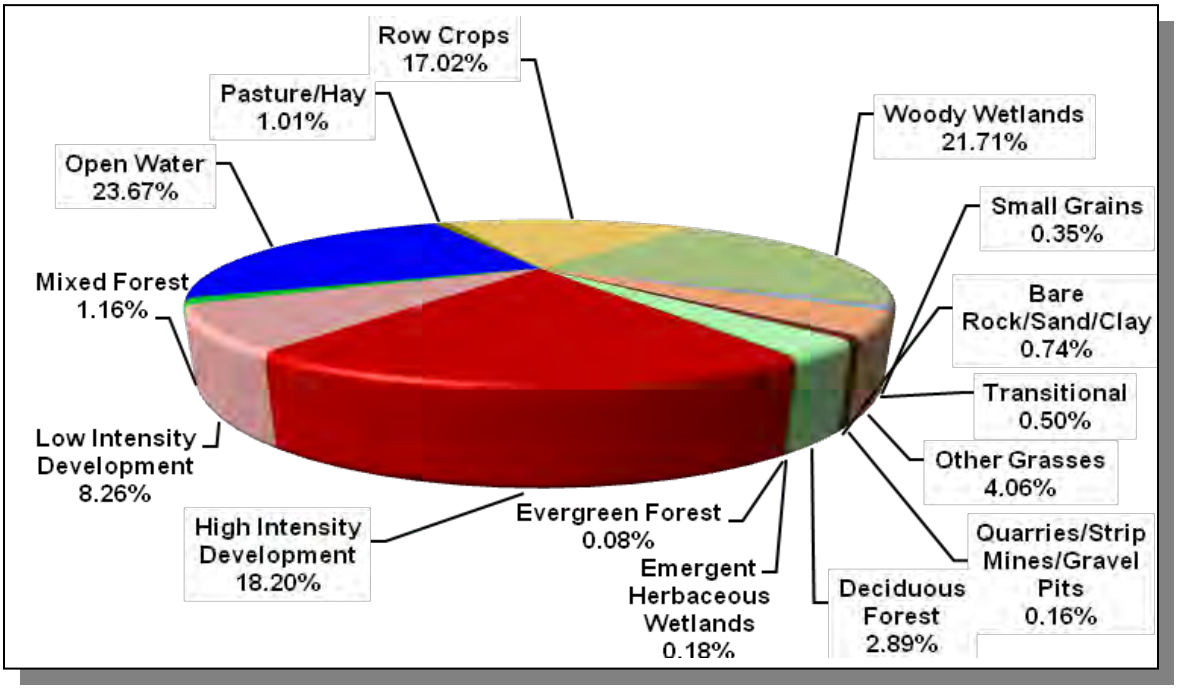


Figure 4-106. Land Use Distribution in Subwatershed 080101000404. *More information is provided in Appendix IV.*

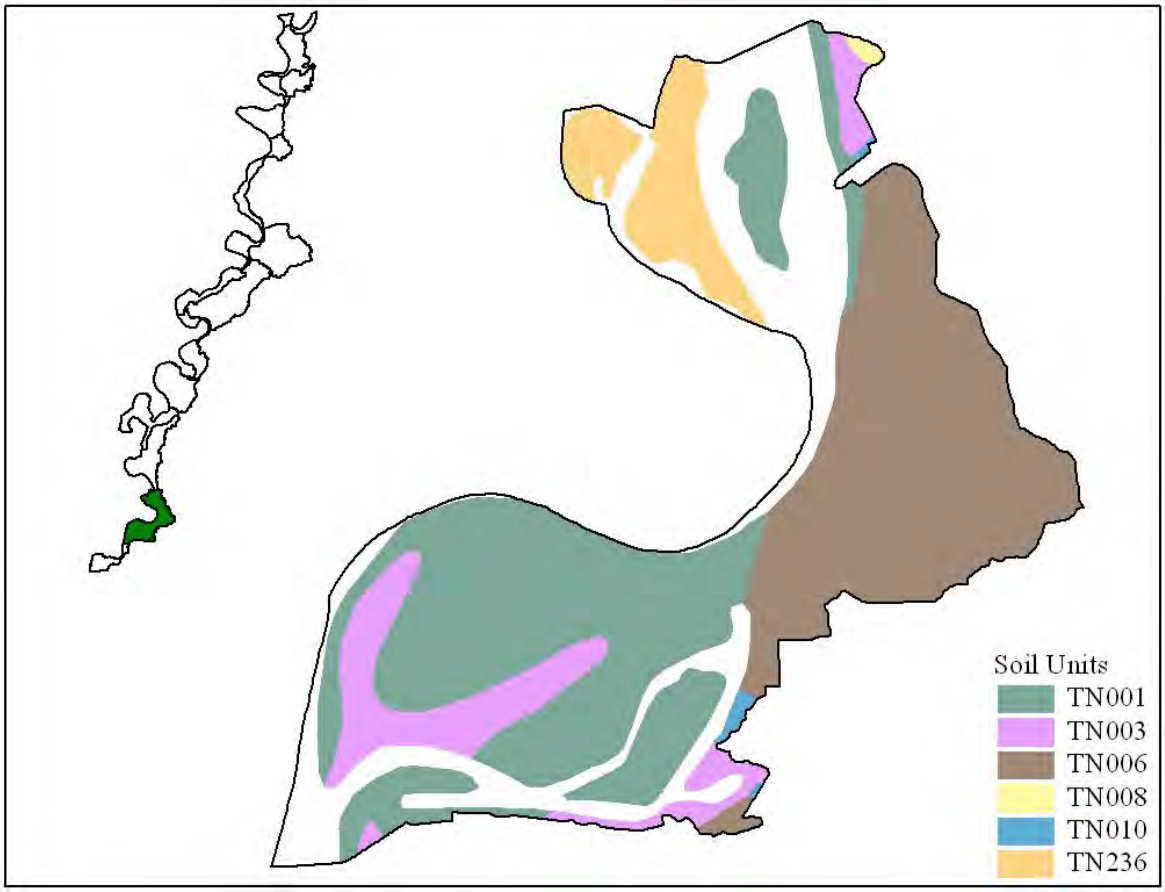


Figure 4-107. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000404.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN001	14.00	C	2.31	7.00	Silty Loam	0.33
TN003	62.00	C	0.50	6.65	Silty Clay	0.33
TN006	0.00	C	1.30	5.42	Silty Loam	0.48
TN008	2.00	C	1.38	5.20	Silty Loam	0.48
TN010	81.00	C	1.33	5.11	Silty Loam	0.44
TN236	76.00	D	0.54	6.30	Silty Clay	0.30

Table 4-75. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000404. *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)
Shelby	826,330	865,318	897,472	4.44	36,679	38,410	39,837	8.60

Table 4-76. Population Estimates in Subwatershed 080101000404.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Memphis	Shelby	610,337	248,573	247,138	793	642

Table 4-77. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 080101000404.

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

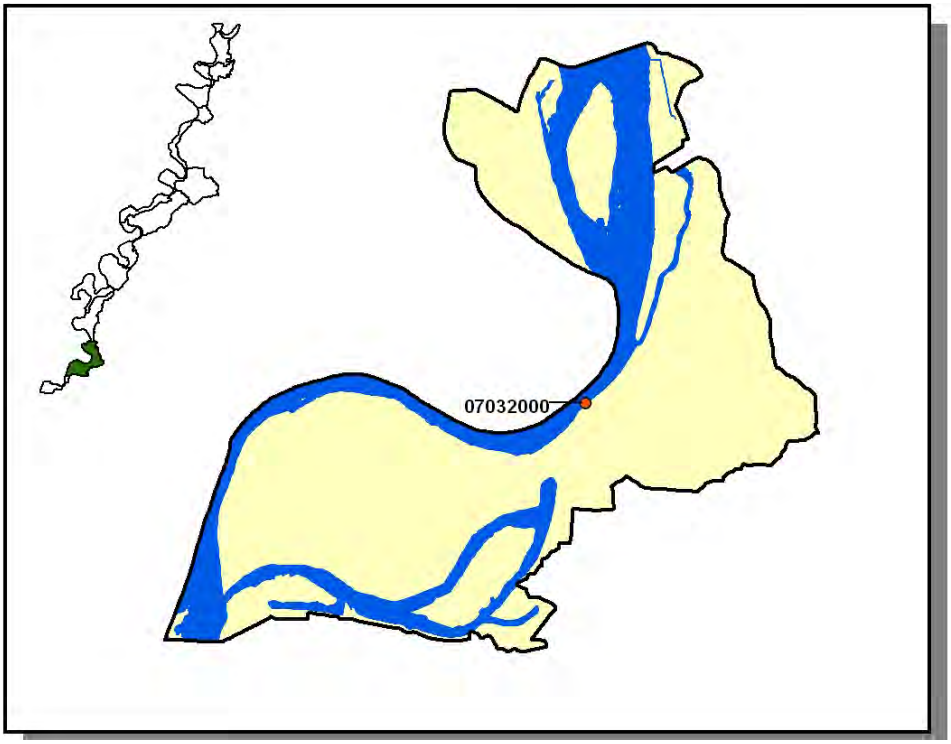


Figure 4-108. Location of USGS Continuous Record Gaging Stations in Subwatershed 080101000404. *More information is provided in Appendix IV.*

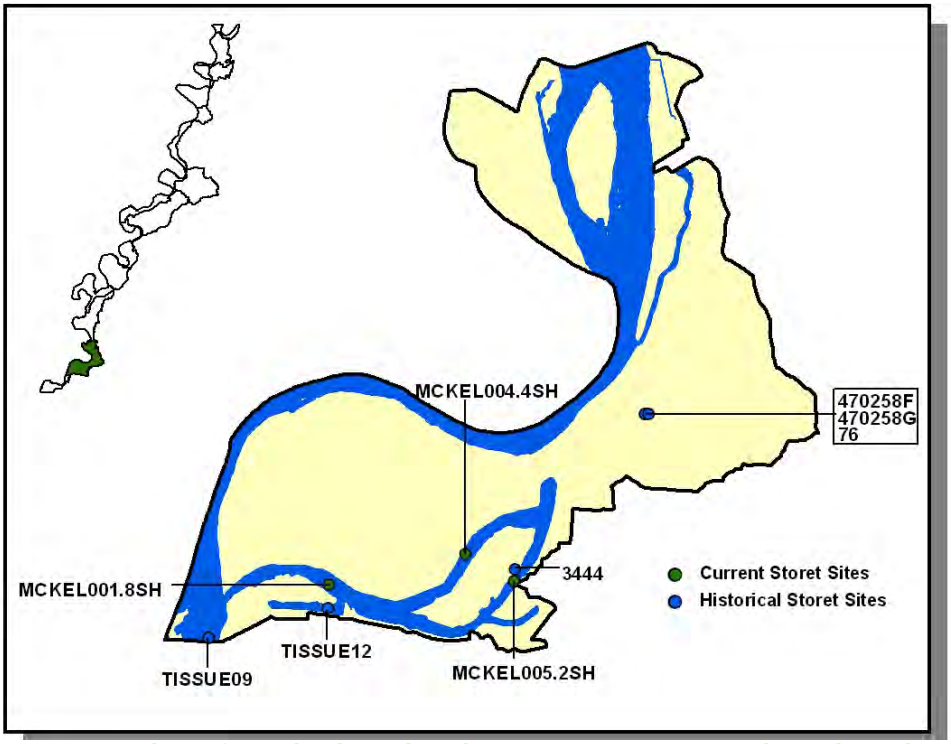


Figure 4-109. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080101000404. *More information, including site names and locations, is provided in Appendix IV.*

4.2.N.iii. Permitted Activities.

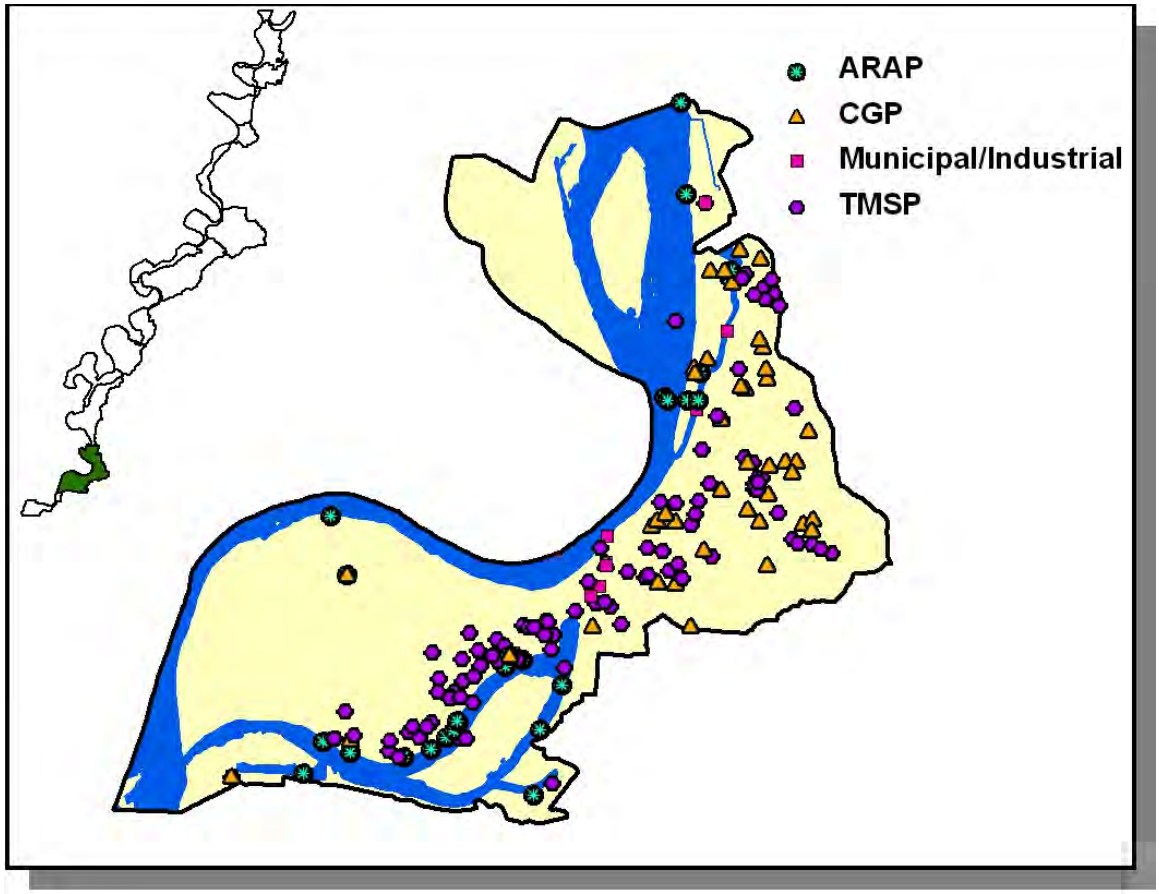


Figure 4-110. Location of Permits Issued in Subwatershed 080101000404. *More information, including the names of facilities, is provided in Appendix IV.*

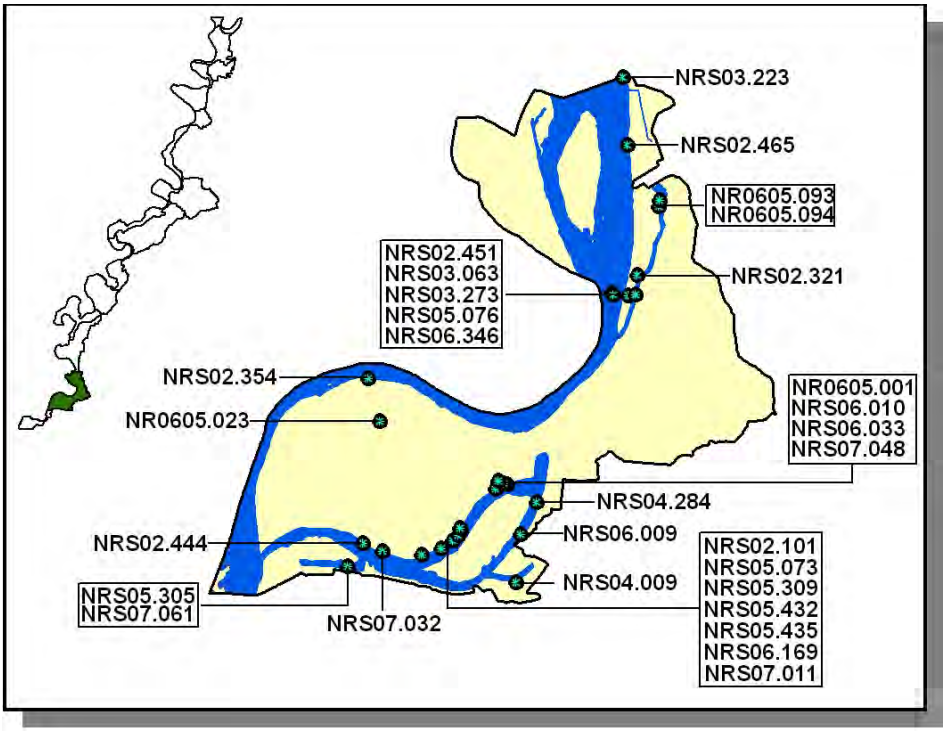


Figure 4-111. Location of ARAP (Aquatic Resource Alteration Permit) Sites in Subwatershed 080101000404. *More information is provided in Appendix IV.*

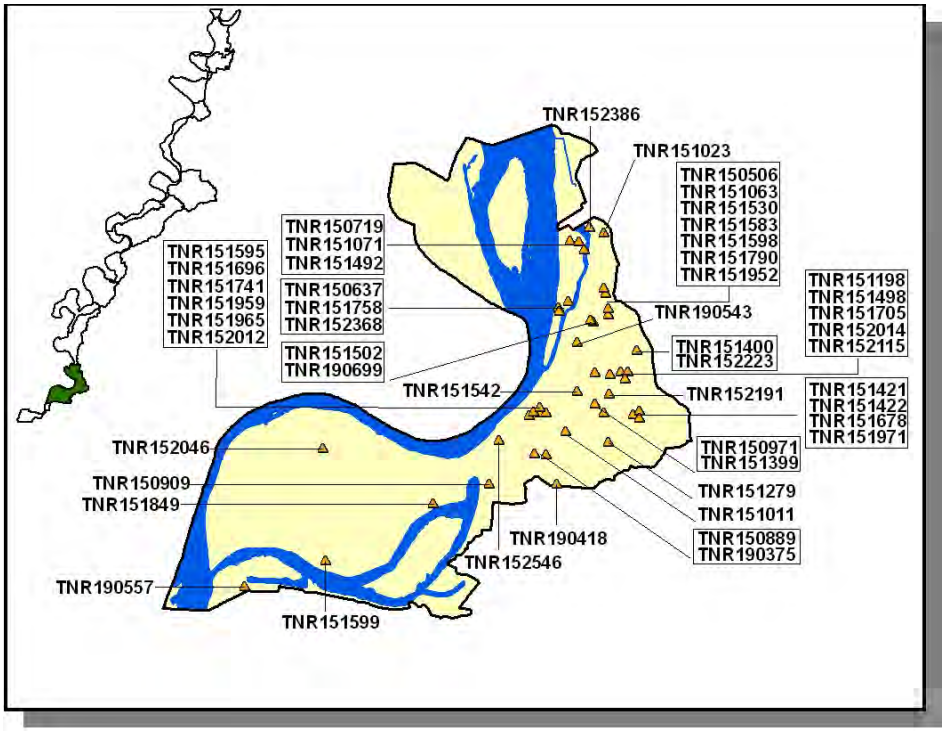


Figure 4-112. Location of CGP (Construction General Permit) Sites in Subwatershed 080101000404. *More information is provided in Appendix IV.*

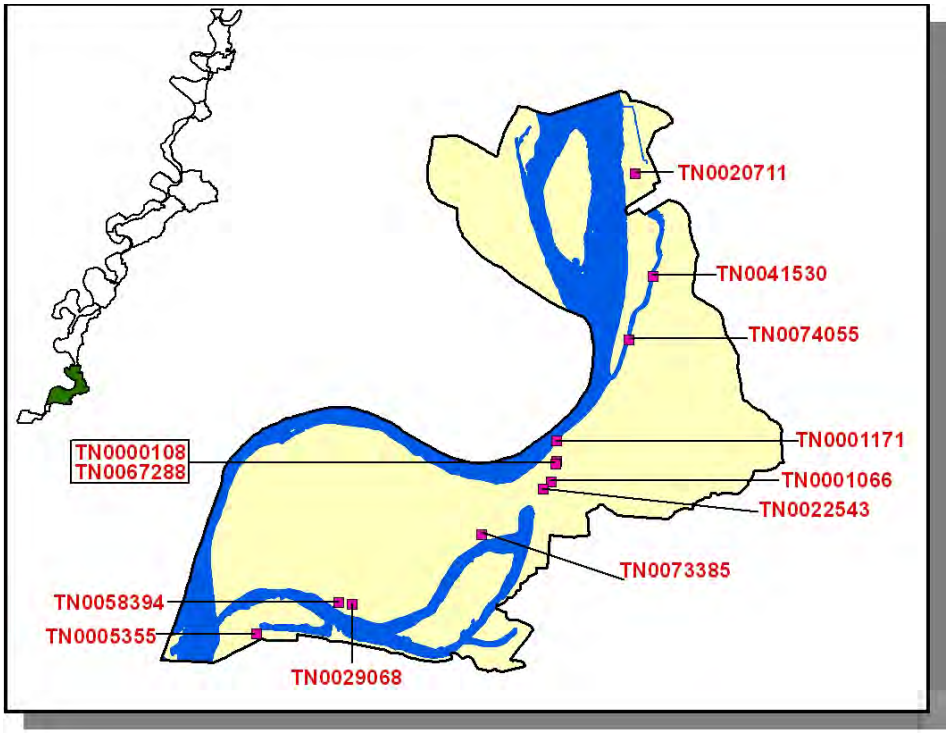


Figure 4-113. Location of Permitted Municipal and Industrial Facilities in Subwatershed 080101000404. *Permit numbers in red indicate that the facility discharges to a stream listed on the 2006 303(d) list. More information, including the name of the facility is provided in Appendix IV.*

PERMIT #	1Q10	7Q10	30Q2	30Q5	DISCHARGE FLOW
TN0000108	67,226.0			89,850	0.0346
TN0001066	0.0	0.0			VARIES
TN0001171	67,236.0		117,016.5		0.0063
	5-10 TIMES DISCHARGE				OUTFALL 001: 8.5950
	67,236.0		117,017.0		OUTFALL 002: -0.0310 OUTFALL 003: 507.635
TN0005355	0		0.0		OUTFALL 010:0.0770
TN0020711		70,500.0		89,900.0	135.0
TN0022543	67,236.0	70,468.5	117,016.5		OUTFALL 001: 0.1440 OUTFALL 002: 0.4320
TN0029068					0.9000
TN0041530					0.0336
TN0058394					0.8512
TN0067288	0.0		0.0		0.0320
TN0073385		0.0			0.0144
TN0074055	0.0	0.0	0.0		0.0200

Table 4-78. Receiving Stream Flow Information Used for Limit Calculations for NPDES Dischargers to Waterbodies Listed on the 2006 303(d) List in Subwatershed 080101000404. *Data are in million gallons per day (MGD).Data were obtained from permit files.*

PERMIT #	DO	FLOW	SS	TSS	TSS % REMOVAL	pH	WET	TEMPERATURE
TN0000108		X	X	X		X		
TN0001066		X	X	X		X		
TN0001171		X	X	X		X		
TN0005355		X		X		X	X	X
TN0020711	X	X	X	X	X	X		
TN0022543		X	X	X		X		
TN0029068		X				X		X
TN0041530		X						X
TN0058394		X				X		X
TN0067288		X	X	X		X		
TN0073385		X		X		X	X	
TN0074055		X						X

Table 4-79. Parameters Monitored for Limits for NPDES Dischargers to Waterbodies Listed on the 2006 303(d) List in Subwatershed 080101000404. *DO, Dissolved Oxygen; SS, Settleable Solids; TSS, Total Suspended Solids; WET, Whole Effluent Toxicity.*

PERMIT #	COD	BOD_5	BOD % REMOVAL	AMMONIA AS N (TOTAL)	OXIDANTS	TRC	TOC
TN0001066		X					
TN0001171	X	X				X	X
TN0005355				X	X		
TN0020711		X	X				
TN0029068						X	
TN0073385		X					

Table 4-80. Parameters Monitored for Limits for NPDES Dischargers to Waterbodies Listed on the 2006 303(d) List in Subwatershed 080101000404. *COD, Chemical Oxygen Demand; BOD_5, Biochemical Oxygen Demand (5-Day); TRC, Total Residual Chlorine; TOC, Total Organic Carbon.*

PERMIT #	BENZENE	TOLUENE	ETHYLBENZENE	XYLENE	OIL AND GREASE
TN0000108	X	X	X	X	X
TN0001066	X	X	X	X	X
TN0001171	X	X	X	X	X
TN0005355					X
TN0022543	X	X	X	X	X
TN0029068					X
TN0067288	X	X	X	X	X
TN0073385	X	X	X	X	X

Table 4-81. Parameters Monitored for Limits for NPDES Dischargers to Waterbodies Listed on the 2006 303(d) List in Subwatershed 080101000404.

PERMIT #	Hg	Mn	Pb	Se	Ag	Cu	Fe	Cd	Cr
TN0000108			X						
TN0005355	X	X	X	X	X	X	X	X	X
TN0073385			X						

Table 4-82. Metal Parameters Monitored for Limits for NPDES Dischargers to Waterbodies Listed on the 2006 303(d) List in Subwatershed 080101000404.

PERMIT #	ORGANIC PESTICIDE CHEMICALS	DIELDRIN	DIOXIN	DDT
TN0020711	X	X	X	X

Table 4-83. Parameters Monitored for Limits for NPDES Dischargers to Waterbodies Listed on the 2006 303(d) List in Subwatershed 080101000404.

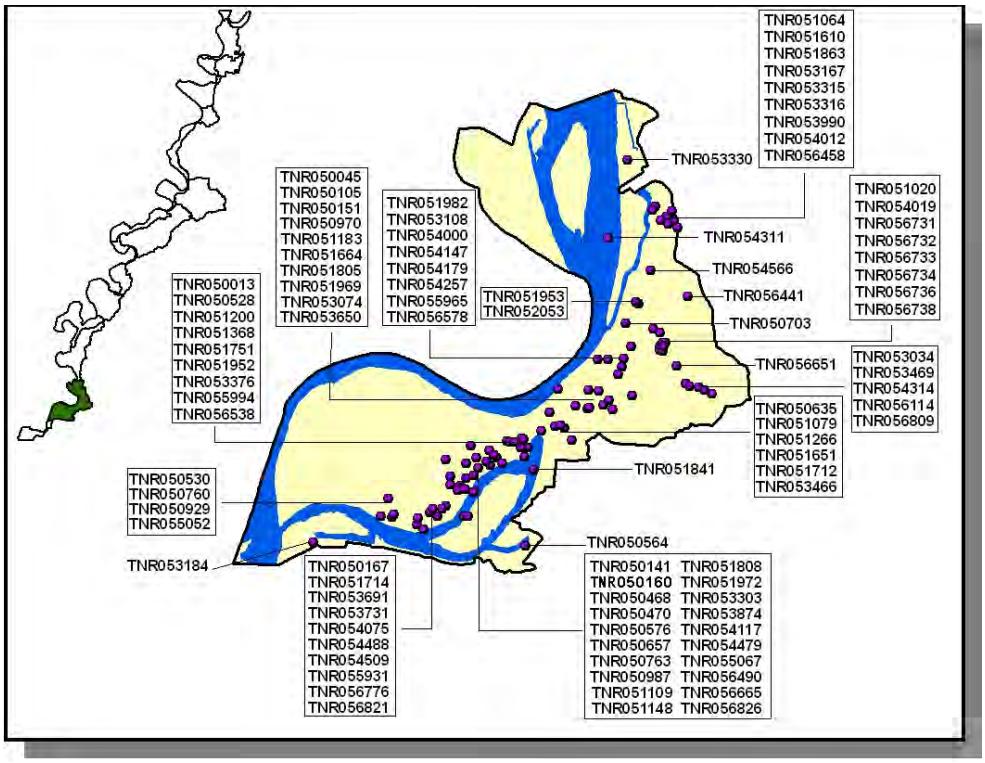


Figure 4-114. Location of TMSP (Tennessee Multi Sector Permit) Sites in Subwatershed 080101000404. *More information is provided in Appendix IV.*

4.2.N.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Shelby	4,980	8,628	42	484	335	148

Table 4-84. 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)
Shelby	111.6	111.6	0.0	0.0

Table 4-85. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Summer Fallow (Other Cropland)	12.43
Soybeans (Row Crops)	12.07
Cotton (Row Crops)	10.64
Other Cropland not Planted	8.41
Corn (Row Crops)	5.91
Other Vegetable and Truck Crop	5.87
Sorghum (Row Crops)	4.91
Legume (Hayland)	4.49
Wheat (Close Grown Cropland)	4.24
Conservation Reserve Program Land	0.79
Farmsteads and Ranch Headquarters	0.45
Grass (Pastureland)	0.36
Grass Forbs Legumes Mixed (Pastureland)	0.23
Grass (Hayland)	0.09

Table 4-86. Annual Estimated Total Soil Loss in Subwatershed 080101000404.

4.2.O. 080101000405 (Mississippi River).

4.2.O.i. General Description.

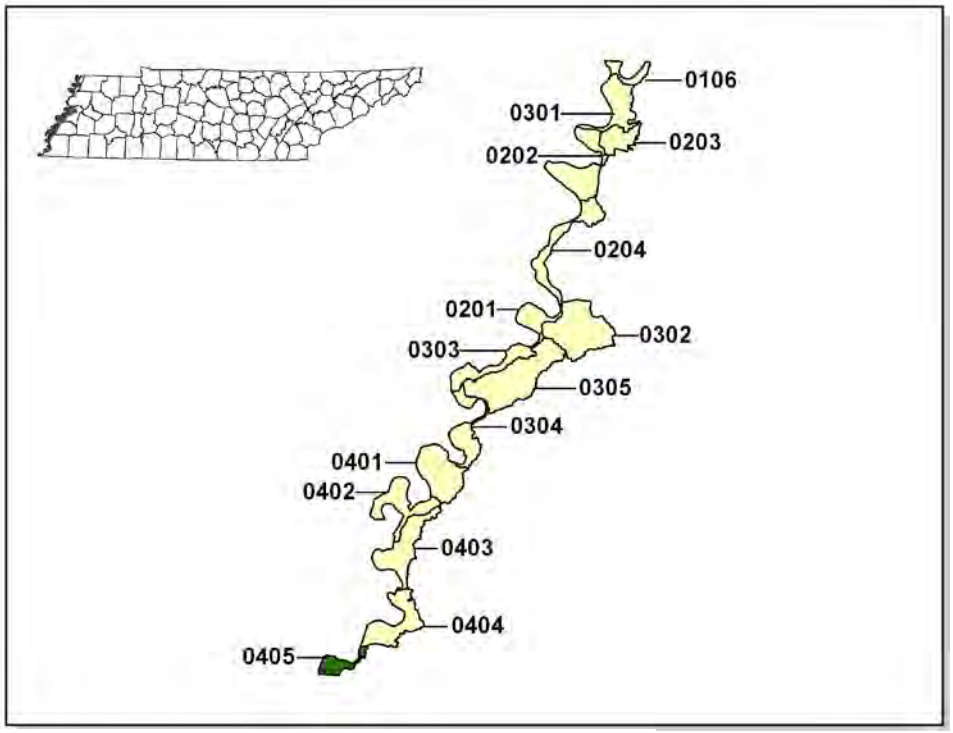


Figure 4-115. Location of Subwatershed 080101000405. *All Mississippi River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

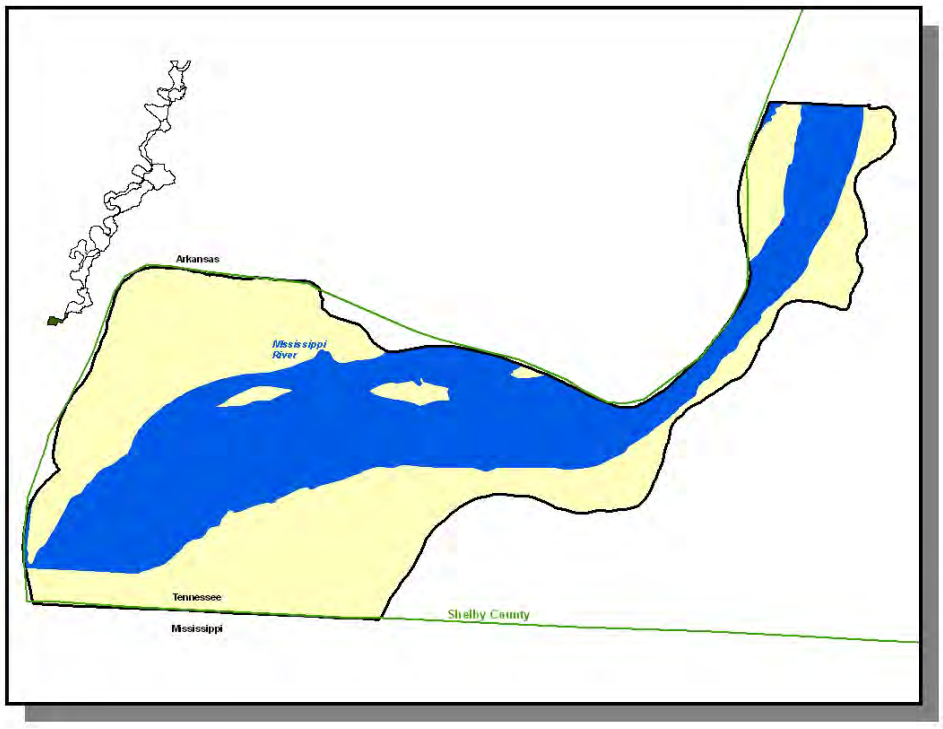


Figure 4-116. Locational Details of Subwatershed 080101000405.

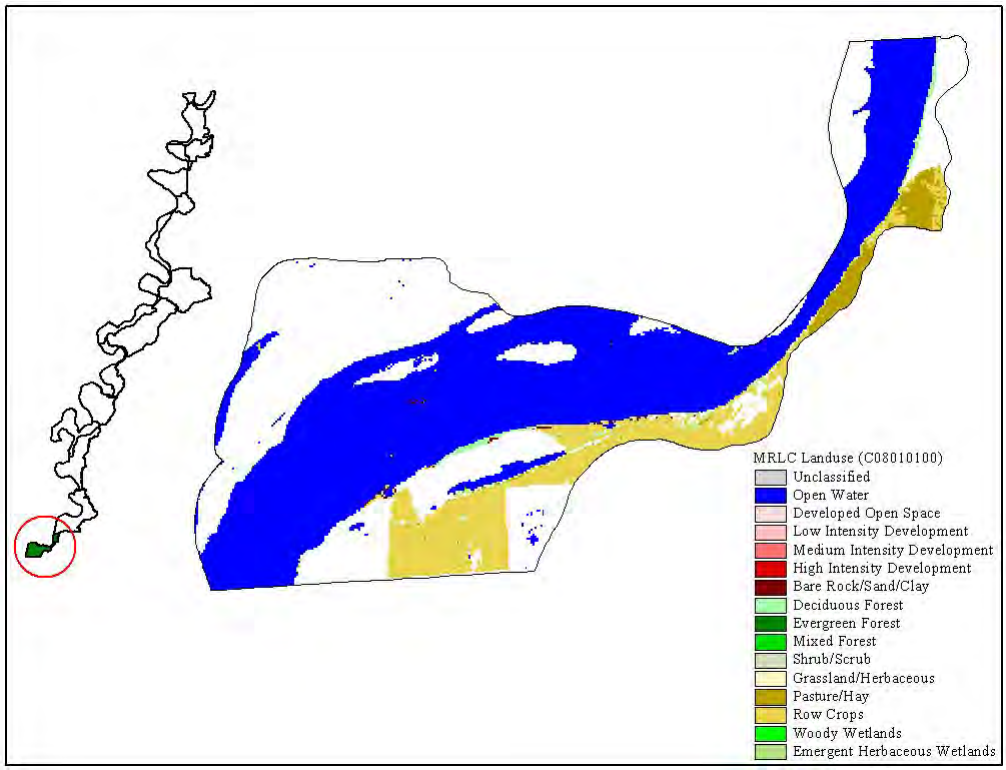


Figure 4-117. Illustration of Land Use Distribution in Subwatershed 080101000405.

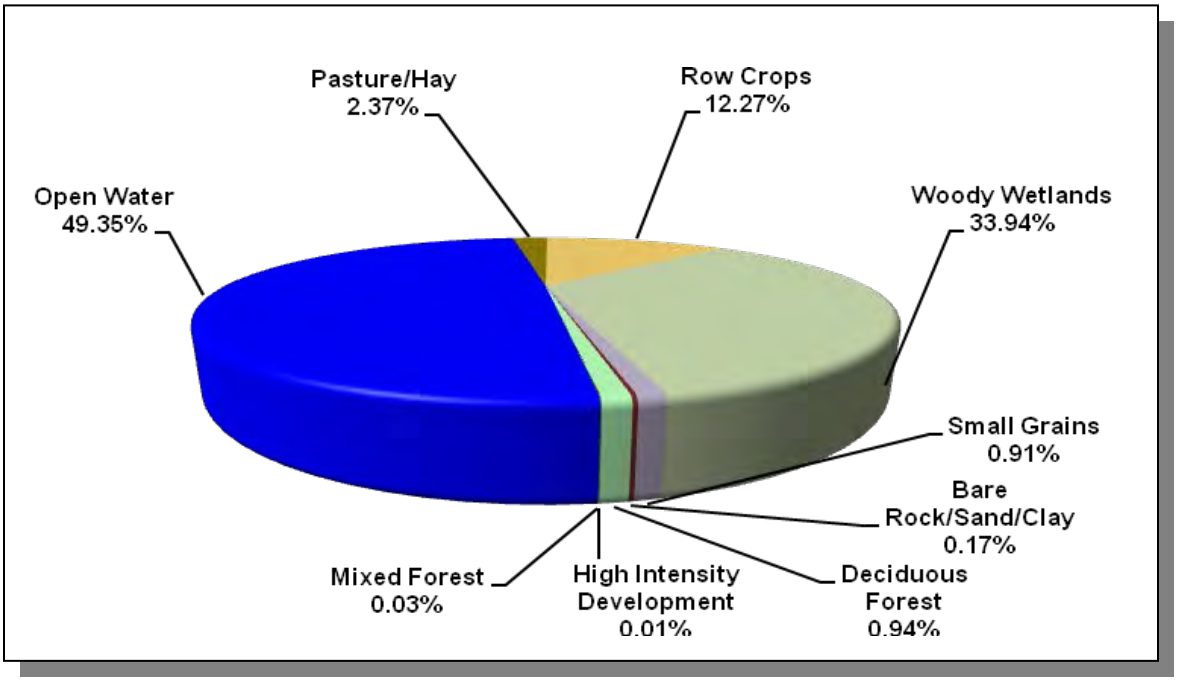


Figure 4-118. Land Use Distribution in Subwatershed 080101000405. *More information is provided in Appendix IV.*

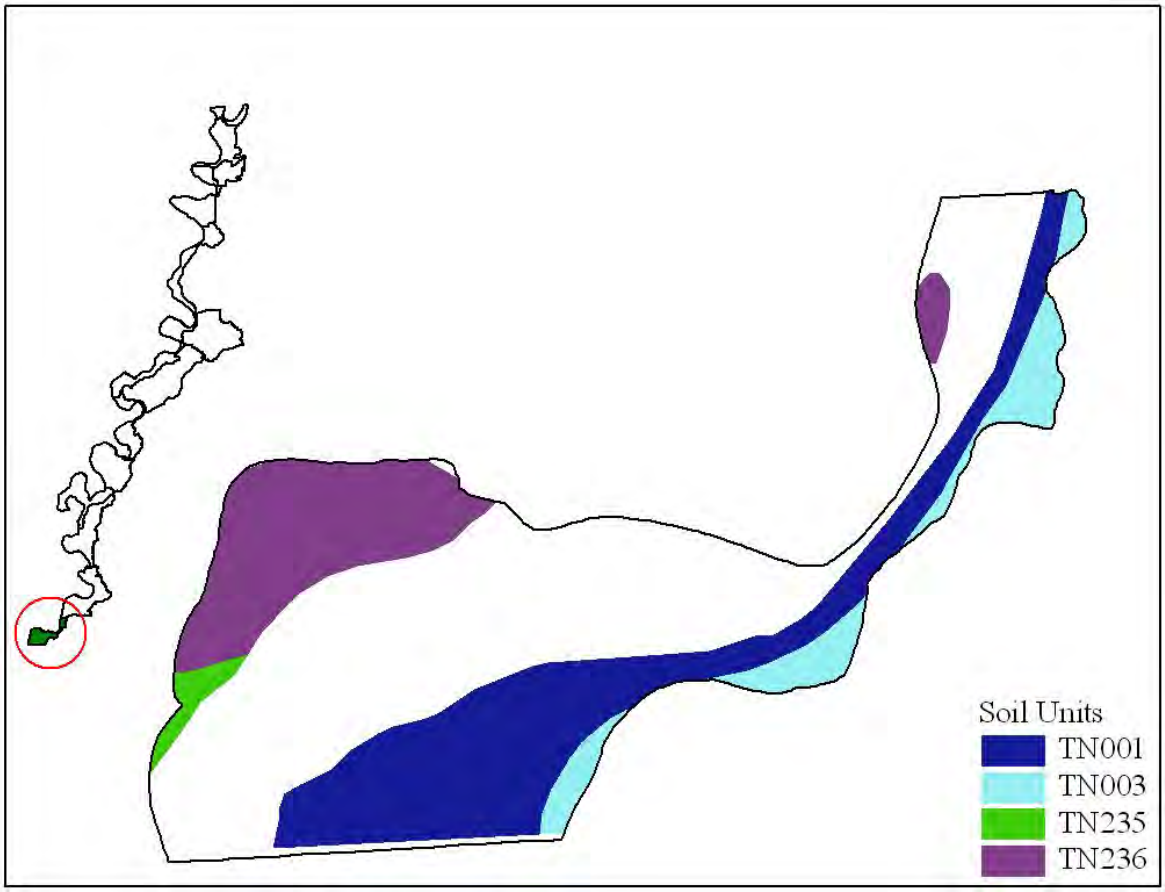


Figure 4-119. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000405.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN001	14.00	C	2.31	7.00	Silty Loam	0.33
TN003	62.00	C	0.50	6.65	Silty Clay	0.33
TN235	63.00	C	1.70	5.26	Silty Clay Loam	0.31
TN236	76.00	D	0.54	6.30	Silty Clay	0.30

Table 4-87. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080101000405. *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)
Shelby	826,330	865,318	897,472	1.59	13,115	13,734	14,245	8.60

Table 4-88. Population Estimates in Subwatershed 080101000405.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Memphis	Shelby	610,337	248,573	247,138	793	642

Table 4-89. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 080101000405.

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

There are no USGS continuous records gaging stations located in subwatershed 080101000405.

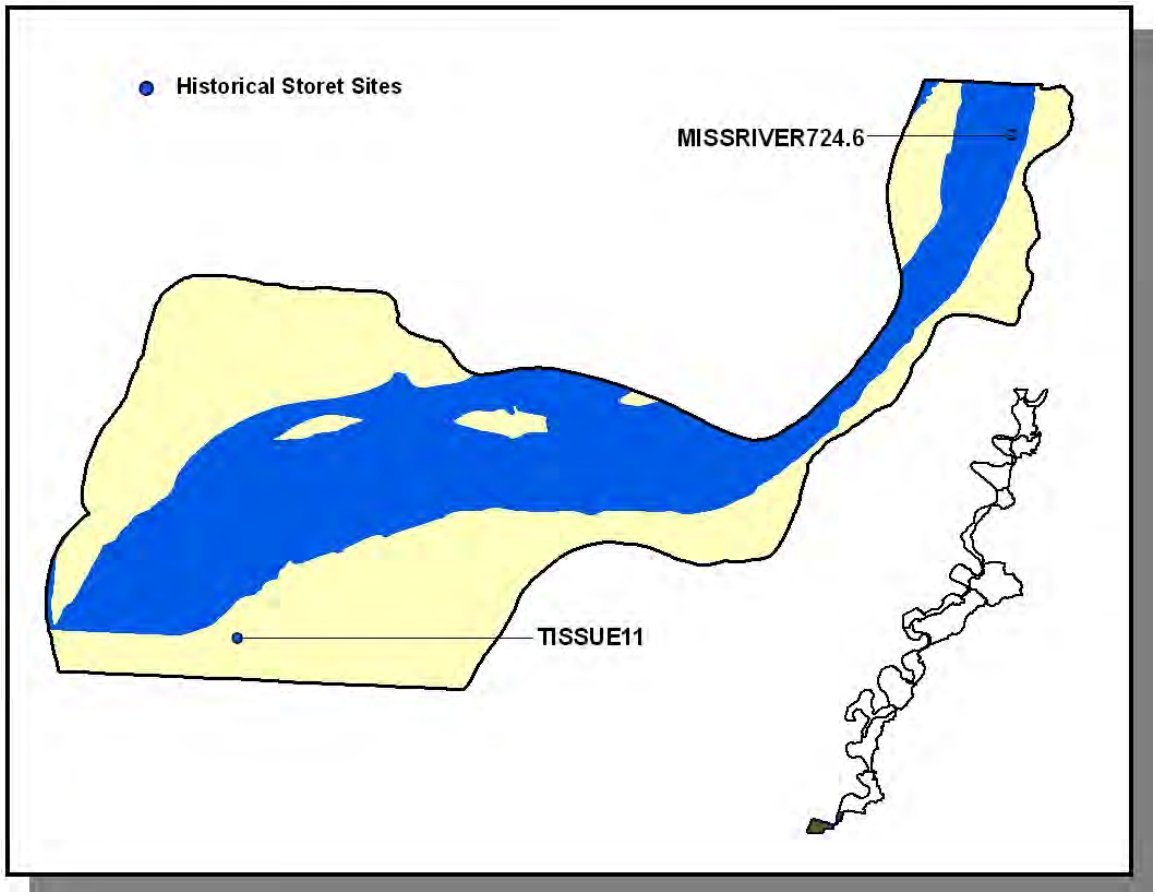


Figure 4-120. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080101000405. *More information, including site names and locations, is provided in Appendix IV.*

4.2.O.iii. Permitted Activities.

There are no permitted activities located in subwatershed 080101000405 as of June 30th, 2007.

4.2.O.iv. Nonpoint Source Contributions.

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
De Soto	6,849	13,429	322	956		153
Shelby	4,980	8,628	42	484	335	148

Table 4-90. 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)
De Soto	109.0	109.0	2.9	15.6
Shelby	111.6	111.6	0.0	0.0

Table 4-91. Forest Acreage and Annual Removal Rates (1987-1994) by County.

CROPS	TONS/ACRE/YEAR
Summer Fallow (Other Cropland)	12.43
Soybeans (Row Crops)	11.68
Cotton (Row Crops)	10.41
Other Cropland not Planted	9.06
Corn (Row Crops)	6.21
Other Vegetable and Truck Crop	5.87
Sorghum (Row Crops)	4.91
Legume (Hayland)	4.49
Wheat (Close Grown Cropland)	4.24
Rice (Close Grown Cropland)	3.26
Farmsteads and Ranch Headquarters	1.60
Conservation Reserve Program Land	1.32
Grass (Pastureland)	0.58
Grass (Hayland)	0.33
Grass Forbs Legumes Mixed (Pastureland)	0.29

Table 4-92. Annual Estimated Total Soil Loss in Subwatershed 080101000405.

CHAPTER 5

WATER QUALITY PARTNERSHIPS IN THE MISSISSIPPI RIVER WATERSHED

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

- Partnerships between agencies
- Partnerships between agencies and landowners

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

5.2. FEDERAL PARTNERSHIPS.

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

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

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

Conservation Practice	Feet	Acres
Conservation Buffers	14,279	19
Erosion Control		5,882
Nutrient Management		12,257
Pest Management		12,143
Grazing / Forages		44
Tree and Shrub Practices		7,823
Wetlands		7,048
Tillage and Cropping		19,855
Wildlife Habitat Management		9,943

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

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

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 groundwater levels statewide, and analyzes the physical, chemical, and biologic characteristics of surface and groundwaters. In addition, the Water Science Center compiles annual water-use records for the State of Tennessee and collects a variety of data in support of national USGS baseline and other networks. More information pertaining to USGS activities in Tennessee can be accessed at http://tn.water.usgs.gov .

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

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

Endangered Species Program

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

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

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

Federally endangered (E) and threatened (T) species in the Mississippi River Watershed include the bald eagle (*Haliaeetus leucocephalus*) (T), interior least tern (*Sterna antillarum athalassos*) (E), pallid sturgeon (*Scaphirhynchus albus*) (E), and winged mapleleaf (*Quadrula fragosa*) (E). Since 1996, the Memphis District of U. S. Army Corps of Engineers has hosted annual meetings to discuss dike construction projects in the Mississippi River. The meetings were a result of section 7 consultations with the Service because of the dike's potentially adverse effects to the least tern and pallid sturgeon. The meetings are held to discuss on-going dike construction projects in the river and develop recommendations for modifications to avoid adverse effects to these species. The primary modification is notching the dikes, which maintain river flows in back chutes that serve as important fish nursery areas in the Mississippi River. Dike notching also

keeps sandbars isolated from the riverbanks. To date, the Corps has modified almost 100 dikes. Plans for new proposed dikes include these modifications when possible. Due to maintenance of isolated sandbar nesting habitat, annual counts of least tern colonies on the lower Mississippi River have steadily increased from fewer than 3,000 birds in 1987 to more than 10,000 in 2005. 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. Unites States Army Corps of Engineers-Memphis District. Memphis is one of six districts in the Mississippi Valley Division of the Corps of Engineers. The District's area of responsibility encompasses 25,000 square miles, portions of six states, 15 major drainage basins, and approximately 3 million citizens. Responsibilities also include maintaining a 355-mile, 9-feet deep, and 300-feet wide Mississippi River channel from Cairo, Illinois to the mouth of the White River in Arkansas.

The Memphis District serves the Nation by planning, designing, constructing and operating high quality and reasonably priced Civil Works water resource projects, primarily in the major mission areas of flood damage reduction, navigation, and environmental restoration and stewardship. The Corps' ongoing Civil Works responsibilities date back to the early 1800's when Congress authorized the removal of navigation hazards and obstacles in the early years of the nation's development. Over the years, succeeding Administrations and Congresses have expanded the Corps' missions to include most water-related planning, development, and construction areas where a Federal interest is involved. Funds for Civil Works are provided through annual Energy and Water Appropriations Acts and through contributions from non-Federal entities for planning and/or construction of specific projects. All Civil Works projects involve a non-Federal, cost sharing sponsor.

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 resource projects for specific purposes and with specified spending limits. The CAP projects are implemented in a faster time frame, are limited in complexity, have Federal cost limits determined by the specific authority, are approved by the Division Commander, and do not need Congressional authorization.

The Memphis District routinely coordinates its navigation mission with the Tennessee Wildlife Resources Agency and the U.S. Fish and Wildlife Service. This consultation has resulted in designing and constructing navigation structures that benefit ecological resources as well as navigation interests in the Lower Mississippi River. These structures include dike notching that allows connectivity of backwater areas with the main stem river and isolates sand bars which increases habitat for the endangered least tern, constructing hard points and multiple round points to increase aquatic diversity, and modifying revetments to allow for macroinvertebrate colonization.

Congress has authorized the Lower Mississippi River Resource Assessment (LMRRA). The study area covers portions of 7 states and 235 counties and parishes. It is made up of river reaches and adjacent floodplains within the Lower Mississippi River alluvial valley (LMRAV) having commercial navigation channels on the Mississippi main stem and tributaries south of Cairo, Illinois, and the Atchafalaya basin floodway system. The active floodplain encompasses approximately 1.8 million acres; including 1,600 lakes, 145 river side channels and contains the largest natural wetlands in North America. The LMRAV supports 241 species of fish, 50 species of mammals, 45 species of reptiles and amphibians and 37 species of mussels. Scientists estimate that nearly 40% of North

America's waterfowl and 60% of all bird species migrate through the river valley. The LMRAV also provides employment opportunities for over 572,000 residents and recreation activities such as boating, hunting, fishing, wildlife viewing and camping. Tourists spend over $11 billion annually to support the economy of the region. The Lower Mississippi River Resource Assessment (LMRRA) will provide a vehicle for multi-agency collaborative planning and the resultant report to Congress could provide a platform to make recommendations for long-term institutional measures, to forecast data needs, determine recreational demand, explore habitat restoration opportunities, ascertain financial resource needs and influence public policy directives.

To obtain additional information about the District, please refer to the home page at: http://www.mvm.usace.army.mil, or contact the following offices:

Public Affairs Office (General Information):	(901) 544-3348
Regulatory Branch:	(901) 544-3473
Planning, Programs, and Project Management Branch:	(901) 544-0658
Continuing Authorities Program:	(901) 544-0798
Environmental Analysis Branch:	(901) 544-3857

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.

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 basically funds three types of programs:

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

- Monitoring Projects. Up to 20% of the available grant funds are used to assist the water quality monitoring efforts in Tennessee streams, both in the state's 5-year watershed monitoring program, and also in performing before-and-after BMP installation, so that water quality improvements can be verified. Some monitoring in the Tennessee portion of the Mississippi River Watershed was funded under an agreement with the Tennessee Department of Agriculture, Nonpoint Source Program (U.S. Environmental Protection Agency Assistance Agreement C99944674-04-0 and C99944674-05-0).

- 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

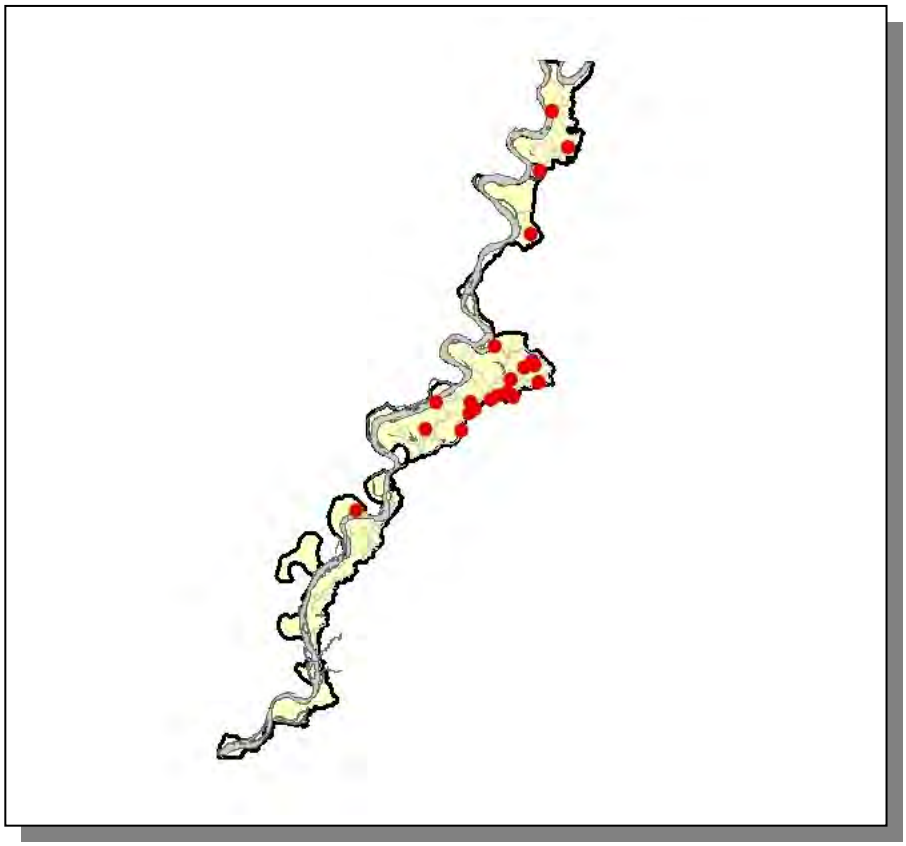


Figure 5-1. Location of BMPs installed from 2002 through 2006 in the Tennessee Portion of the Mississippi River Watershed with Financial Assistance from the Tennessee Department of Agriculture's Nonpoint Source and Agricultural Resources Conservation Fund Grant Programs. *More information is provided in Appendix V.*

5.3.D. Tennessee Wildlife Resources Agency. The Tennessee Wildlife Resources Agency (TWRA) conducts a variety of activities related to watershed conservation and management. Fish management activities include documentation of fish and aquatic life through stream sampling and stocking of both warm water and cold-water sport fish. 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 on 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.

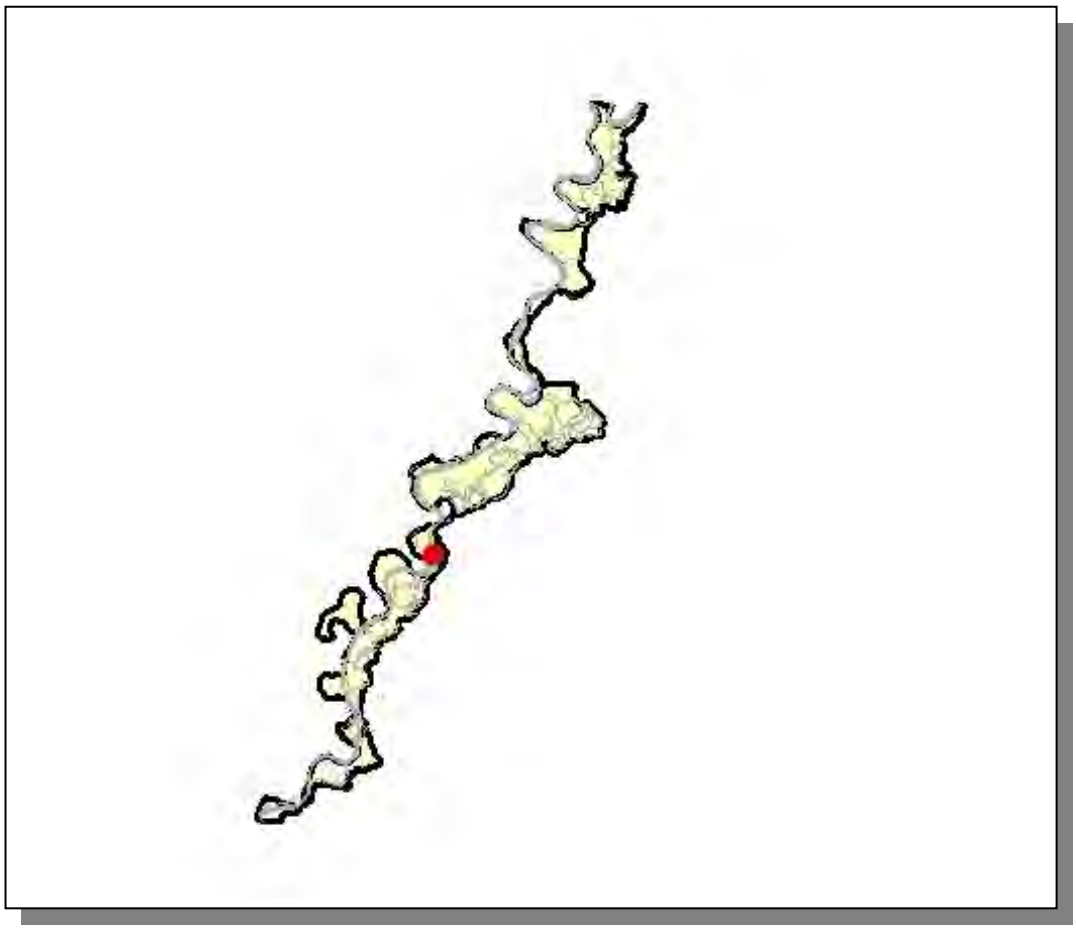


Figure 5-2. Location of TWRA TADS Sampling Sites in the Tennessee Portion of the Mississippi River Watershed from 1987-2005. *More information is provided in Appendix V.*

Tennessee State Wildlife Action Plan (SWAP)

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

GIS model based upon relative differences in species rarity, population viability, and potential mobility of species across habitat units.

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

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

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

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

5.3.E. West Tennessee River Basin Authority. The West Tennessee River Basin Authority, an agency of the Department of Environment and Conservation, is responsible for the preservation of the natural flow and function of rivers and streams in the Forked Deer, Obion and Mississippi River Basins. As a Water Quality Partner, the Basin Authority conducts a variety of activities directly related to the conservation of resources in these river basins. In carrying out its mission the Basin Authority:

- Pursues and implements meandering stream and river restoration projects, with the goal of restoring natural floodplain dynamics and the associated riverine ecosystems.
- Implements watershed level projects designed to reduce the volume of sediment entering streams, and rivers. Excessive sedimentation can severely impair water quality as well as aquatic and floodplain habitats.
- Performs environmentally sensitive removal of logjams and obstructions to flow in streams and rivers, resulting in the preservation of environmental and economic resources.
- Maintains 120 Flood Control and Sediment Retention Structures, designed to increase flood storage capacity and to improve water quality through removal of suspended sediments.
- In support of its work, receives donations of Conservation Easements on Bottomland Hardwood Timber and other Wetlands. To date, over 23 square miles have been donated to the Basin Authority by private landowners.
- Maintains several large Bank Stabilization Projects, designed to prevent severe bank erosion. Where feasible, the Basin Authority utilizes bioengineering techniques to stabilize river banks, while, at the same time, reestablishing the riparian corridor.
- Maintains several Grade Control Structures designed to prevent further vertical degradation of altered streams and rivers. These structures, not only protect vital infrastructure, but also help prevent the release of large volumes of sediment.

Through its efforts, the West Tennessee River Basin Authority will remain a strong advocate for the conservation and sustainable utilization of the resources within the Mississippi, Obion and Forked Deer River Basins.

The West Tennessee River Basin Authority office is located at 3628 East End Drive in Humboldt, Tennessee. For additional information or assistance, call 731/784-8173.

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

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

Benefits to the people of Kentucky include:

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

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

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

Watershed Framework activities in Red River watershed are coordinated through the Four Rivers Basin Team. The Four River Basin Team is a multi-agency task force that meets regularly to help in development of monitoring strategies, education and outreach, prioritization of issues and watersheds within the basin, planning, and networking among technical staff and local leaders to apply agency resources to implement fixes. For more info about the Four Rivers Basin Team contact 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/

Mississippi River (08010100)

Hazel Creek (08010100010)
Shawnee Creek (08010100020)
Mississippi River/Kentucky Bend (08010100050)
Mississippi River, below Hickman (08010100040)
Mississippi River, below Sandy Branch (08010100030)

Geography

These subwatersheds represent three segments of the Mississippi River main stem from the mouth of Mayfield Creek to the Tennessee state line, as well as two significant tributaries: Hazel Creek and Shawnee Creek. Three other large tributaries, Obion Creek, Mayfield Creek and Bayou de Chien are separate hydrologic units not discussed.

The watershed boundaries along the Mississippi main stem are occasionally very narrow with river bottomlands rising quickly along steep slopes or bluffs to narrow ridge tops. A flood levee represents the eastern boundary of the watershed from Hickman downstream into Tennessee. An isolated portion of land known as Kentucky Bend is located in this watershed.

Hazel Creek is a small stream that arises in western Ballard County and flows westward into the Axe Lake wetlands. Along Hazel Creek the valley is narrow and rises gradually to broader ridges and rolling plains. Once the stream reaches Axe Lake the terrain becomes an area of rolling bottomland known as Barlow Bottoms.

Shawnee Creek arises in western Ballard County and flows westward into Fish Lake. Along Shawnee Creek the valley is fairly narrow and rises to narrow ridges. Just before the stream reaches Fish Lake the terrain drops along a steep river terrace and becomes an area of rolling bottomland known as Barlow Bottoms. The terrace height ranges from 40 feet near Barlow to over 150 feet near Wickliffe. Terrain around the Buzzard Creek and Cane Creek is more rugged with steeper slopes rising 50-100 feet to narrow ridges.

Waterways

These watersheds drain about 185 square miles and contain about 226 total stream/lake miles. A 2.0-mile segment of the Mississippi River in the upper portion of the segment is Outstanding Resource Water.

There are a number of lakes and significant wetlands in the watershed including: Axe Lake, Minor Lake, Grassy Lake, First Lake, Clear Pond, Crooked Lake, Indian Camp Lake, Fish Lake, Black Lake, Clear Lake, Swan Pond, Hunters Pond, Lost Pond, and Twin Pond. Swan Pond is Outstanding Resource Water.

Obion Creek, Mayfield Creek and Bayou de Chien are major tributaries in this watershed but are discussed as a separate hydrologic unit. Sandy Branch is the only other significant tributary in this watershed. There are 5 KPDES permits recorded for this watershed; including wastewater treatment facilities at Columbus and Barlow.

Land cover/land use

Land out of the floodplain is used predominately for row crop agriculture as well as poultry and swine production. Lands near the Mississippi River are also used for row crop agriculture and for tree plantations. Around Axe Lake and many of the sloughs are significant wetlands that remain mostly forested. Much of the wetland areas are part of the Barlow Bottoms and Westvaco Wildlife Management Areas.

Agency Data Assessment

During the 2000 water quality assessment a 3.7-mile segment of Hazel Creek was assessed from the Axe Lake wetland ponds upstream to an unnamed tributary. The segment was assessed for fish and was judged not supporting for aquatic life. An aquatic habitat survey for the segment yielded a score in the not supporting range due to poor bank stability and heavy sediment deposition.

Shawnee Creek Slough was assessed in three segments for a total of 13.0 miles. A 3.0-mile segment from Twin Lake to Fish Lake was assessed for water quality and fecal coliform bacteria. The segment was judged fully supporting for primary contact recreation but not supporting for aquatic life. A 1.0-mile segment upstream of Fish Lake was also assessed for water quality and fecal coliform bacteria. The segment was judged partially supporting for aquatic life and primary contact recreation. The next 9.0 miles were assessed for fish, macroinvertebrates, and algae. The segment was judged partially supporting for aquatic life.

The lower 3.8 miles of Cane Creek were assessed for fish and were judged partially supporting for aquatic life.

Swan Pond was also assessed as part of the Clean Lakes Program. The waterbody was judged to be not supporting for aquatic life due to low dissolved oxygen levels. The suspected cause of this impairment is agriculture and natural sources.

Watershed Efforts in the Mississippi River

The Wetland Reserve Program (WRP) dominates water protection efforts in the Mississippi River watershed. According to USDA Natural Resources Conservation Service (NRCS), the Wetlands Reserve Program is a voluntary program that offers landowners an opportunity to establish long-term conservation and wildlife practices and protection. NRCS provides technical and financial support to help landowners with their wetland restoration efforts. Efforts involve the restoration of hydrologic functions and tree planting. The goal is to achieve the greatest wetland functions and values, along with optimum wildlife habitat, on every acre enrolled in the program.

In the KY bend, 1,774 acres are permanently enrolled in WRP. Acreage in the Mississippi River watershed below Hickman and below Sandy Branch in Fulton County is permanently enrolled as well. Additionally, acreage in the Hazel Creek and Shawnee Creek sub-watersheds in western Ballard County is enrolled in WRP in perpetuity.

5.4. LOCAL INITIATIVES.

5.4.A. Friends of West TN Refuges. The Friends of West TN Refuges is a non-profit organization designed to help the refuges of Tennessee through fundraising and volunteer work. Their mission is to promote and enhance the integrity of the West Tennessee National Wildlife Refuges through activities that advance public understanding, awareness, appreciation, and enjoyment of the natural environment. Their goals are to support refuge activities and events, increase awareness of West Tennessee Refuges, educate the public about The U.S. Fish & Wildlife Service's mission, and to increase fundraising to support refuge programs. They have achieved funding for our Backyard Habitat, Junior Ranger Program, water delivery systems, and 3 observation towers.

Contact : Dick Preston (901) 837-3360

CHAPTER 6

RESTORATION STRATEGIES IN THE MISSISSIPPI RIVER WATERSHED

6.1. BACKGROUND.

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

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

This Chapter addresses point and nonpoint source approaches to water quality problems in the Tennessee Portion of the Mississippi River 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 Mississippi River Watershed public meeting was held jointly with the North Fork Obion River and South Fork Obion River Watersheds on October 9, 2000, at the Union City Municipal Building. 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

- Silt and sediment in Relfoot Lake and Bayou du Chien should be monitored

6.2.B. Year 3 Public Meeting. The second Mississippi River Watershed public meeting was held jointly with the North Fork Obion River and South Fork Obion River Watersheds on October 24, 2002 at the University of Tennessee-Martin campus. 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

- Flooding occurs more often
- Flooding occurs less often
- The COE allows levees without concern for the river (does not allow for return of natural meander) or people down stream (increased flooding).
- Rainwater (storm water) clears off the land quickly, but silt from upstream (where there are levees) comes later and persists.
- Chicken litter application stinks and puts nutrients in streams, especially near Dresden (Mud Creek)
- The Obion River is getting shallower (due to siltation), so it floods nearby woodlands and farms.

6.2.C. Year 5 Public Meeting. The third scheduled Mississippi River Watershed public meeting was held October 7, 2008 at the UT-Martin Reed Center in Martin. The meeting was held jointly with the Obion River (North Fork) and the Obion River (South Fork) Watersheds and featured six educational components:

- Overview of watershed approach flash video
- Benthic macroinvertebrate specimens and interpretation
- "Is Your Stream Healthy" self-guided slide show
- "Why We Do Biological Sampling" self-guided slide show
- GIS (Geographic Information Systems) inventory of the watershed
- Water quality and land use maps

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

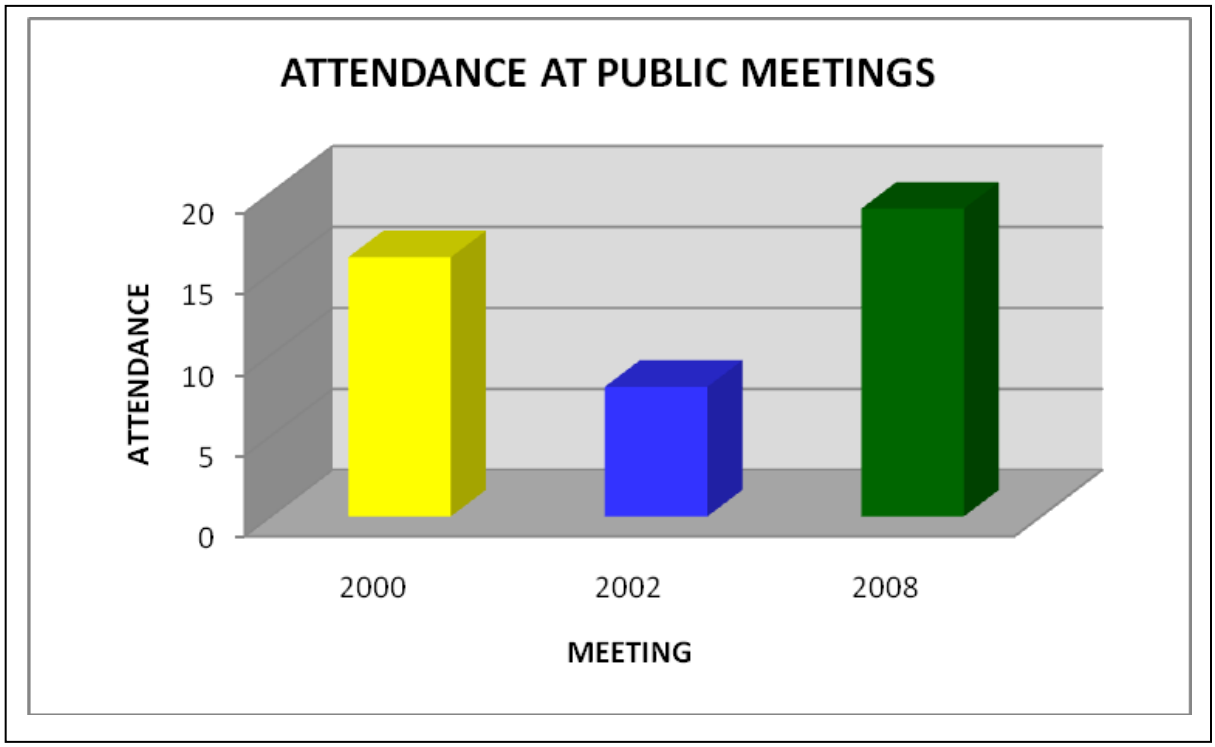


Figure 6-1. Attendance at the Mississippi River, North Fork Obion River, and South Fork Obion River Watersheds Joint Public Meetings. *Attendance numbers do not include TDEC personnel.*

Figure 6-2. Jackson Environmental Field Office Manager Pat Patrick Brings the Watershed Meeting to Order.

Figure 6-3. At Watershed Meetings, Citizens Learn About Benthic Macroinvertebrates (Small Invertebrates that Live on the Bottom of the Streams) in Their Watershed.

Figure 6-4. At Watershed Meetings, Participants from the Private Sector Have an Opportunity to Talk Informally with the Jackson Environmental Field Office Manager.

Figure 6-5. Maps are an Effective Way to Illustrate Water Quality Improvements in the Watershed.

6.3. APPROACHES USED.

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

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

Approved TMDLs:

Lower French Broad Watershed - Total Maximum Daily Load for Pathogens in the Lower French Broad Watershed in Cocke, Jefferson and Sevier Counties. Approved 12/20/2005

http://www.state.tn.us/environment/wpc/tmdl/approvedtmdl/LowerFrenchPath.pdf

Mississippi River Watershed - Total Maximum Daily Load for Chlordane, Dioxins, and Polychlorinated Biphenyls (PCBs) in the Mississippi River Watershed in Dyer, Lake, Lauderdale, Tipton and Shelby Counties. Approved 07/25/2008.

http://www.state.tn.us/environment/wpc/tmdl/approvedtmdl/mississippi_pcb.pdf

TMDLs are prioritized for development based on many factors.

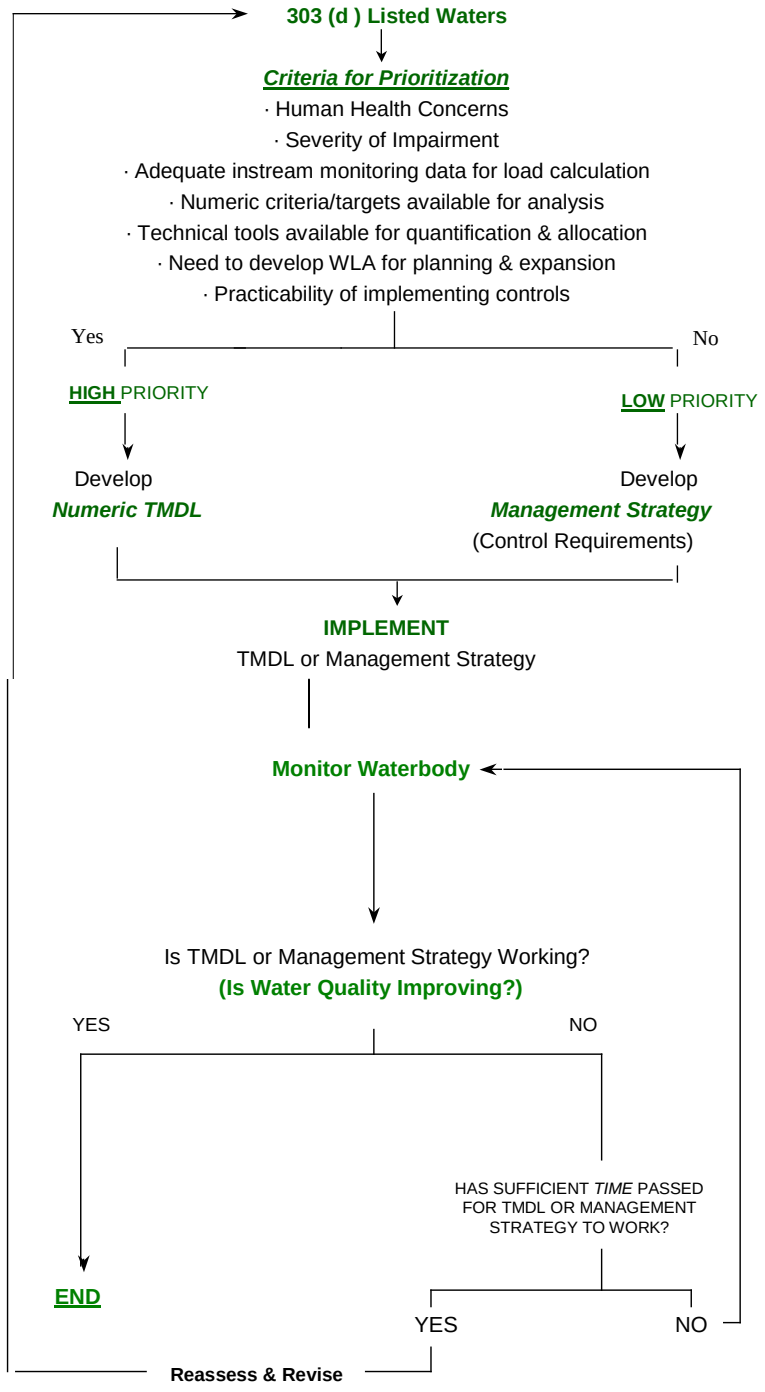


Figure 6-2. Prioritization Scheme for TMDL Development.

A few permitted discharges within the Tennessee Portion of the Mississippi River Watershed, including Tiptonville, Ridgely, Ripley, Munford and Memphis discharge suspended solids under the conditions of an NPDES permit and are reviewed during the watershed cycle for reissuance. A few also have limits on settleable solids, including Munford and the two Memphis treatment plants.

6.3.B. Nonpoint Sources

For the purpose of this management plan, the Tennessee Portion of the Mississippi River Watershed excludes the larger tributaries such as the Obion, Hatchie, Wolf and Forked Deer Rivers, which have their own management plans. The tributaries addressed in this plan are usually small, of very low gradient and, except in the Memphis area, drain agricultural land. Many are located between the river and the flood levees. Because of their low flow and slow velocities, most cannot assimilate much biodegradable waste. Common nonpoint sources of pollution in the Mississippi River Watershed include urban storm water runoff, riparian vegetation removal, agricultural practices and other habitat alterations. Since nonpoint pollution exists essentially everywhere rain falls, existing point source regulations can have only a limited effect.

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

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

6.3.B.i. Siltation.

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.

In 2003 the EPA and the state expanded the number of municipalities required to obtain coverage under a permit designed to address nonpoint runoff issues: the General NPDES Municipal Separate Storm Sewer System Permit, commonly known as Phase II MS4. This permit requires the holder to develop a comprehensive storm water management program, including the adoption of local regulatory ordinances, regular inspection of construction sites and other discharges into their storm sewers, and a variety of educational, mapping, and monitoring activities. The state issues the permits, audits and oversees these local MS4 programs. The City of Memphis was already required to have a Phase I MS4 permit. Due to the rural nature of much of the rest of the watershed, and lack of large high density population centers, only a small area of unincorporated Shelby County, which has a Phase II MS4 permit, is in the Mississippi River Watershed within Tennessee.

Construction sites within a sediment-impaired watershed may also have higher priority for inspections by WPC and MS4 personnel, and are likely to have enforcement actions for failure to control erosion.

6.3.B.i.b. From Channel and/or Bank Erosion. Many streams within the Tennessee Portion of the Mississippi River Watershed suffer from varying degrees of streambank erosion. The Mississippi River and many of its tributaries have been channelized. When steam channels are altered, banks can become unstable and highly erodible. Most of the tributaries between the river and the levees are low gradient and therefore have low velocities. However, they are subject to flooding.

Some inappropriate agricultural practices have impacted the hydrology and morphology of stream channels in the Mississippi River Watershed.

The Army Corps of Engineers continues efforts to stabilize the banks of the Mississippi River and to maintain a navigation channel for shipping. They also maintain the flood levees.

The smaller tributaries that have lost their riparian zone would benefit from landowner efforts to re-establish bank vegetation. Harris Ditch, Graveyard Slough, and Sugar Creek are examples of streams that would benefit.

Regulatory Strategies

- Require post-construction run-off rates to be no greater than pre-construction rates in order to avoid in-channel erosion.
- Limit the impact of road and utility crossings of streams through better design principles.
- Restrict the use of off-highway vehicles on stream banks and in stream channels. (Example: Sugar Creek)
- Limit clearing and alteration of stream banks. Examples of streams that might benefit are Blue Bank Bayou and the many un-named tributaries in the farmed areas. *Note: Permits may be required for any work along streams.*
- Encourage or require strong local buffer ordinances.

Additional Strategies

- Better community planning and MS4 oversight for the impacts of development on small streams, especially development in growing areas such as Union 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. Lack of vegetated buffers along stream corridors is a problem in some areas of the Tennessee Portion of the Mississippi River Watershed, due both to agricultural and residential/commercial land uses. Many streams, like Blue Bank Bayou, could benefit from the establishment of more extensive riparian buffer zones.

6.3.B.ii. Pathogen Contamination.

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

Permits issued by the Division of Water Pollution Control regulate discharges from point sources and require adequate control for these sources. Individual homes are required to have subsurface, on-site treatment (i.e., septic tank and field lines) if public sewers are not available. The Division of Ground Water Protection within the Jackson Environmental Field Office regulates septic tanks and field lines. The Shelby County Health Department performs this regulatory function in Shelby County. 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 the McKellar Lake portion of the Tennessee Portion of the Mississippi River Watershed is known to have excessive pathogen contamination. It is impacted by urban areas, with contributions of bacterial contamination possibly coming from storm water runoff, sewage collection system leaks, or treatment plant operation failures. Some measures that may be necessary to control pathogens are:

Voluntary Activities

- Clean up pet waste.
- Repair failed septic systems.

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.
- Develop and enforce leash laws and controls on pet fecal material.

Additional Strategies

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

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

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

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

Some sources of nutrients can be addressed by:

Voluntary Activities

- Educate homeowners and lawn care companies in the proper application of fertilizers.
- Encourage landowners, developers, and builders to leave stream buffer zones. Streamside vegetation can filter out many nutrients and other pollutants before

they reach the stream. These riparian buffers are also vital along livestock pastures. Many streams in the Mississippi River Watershed within agricultural areas would benefit from additional riparian buffers.
- Use grassed drainage ways that can remove fertilizer before it enters streams.
- Use native plants for landscaping since they don't require as much fertilizer and water.
- Develop better overall storm water management in urban, residential or rural areas, including retrofitting existing commercial lots, homes, roadways or agricultural areas with BMPS that address both storm water quality and quantity. This would especially improve the streams and lakes currently polluted by excessive nutrient inputs, such as Poplar Tree Lake.

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

- Maintain shade over a stream. Cooler water can hold more oxygen and retard the growth of algae. As a general rule, all stream channels suffer from some canopy removal. An intact riparian zone also acts as a buffer to filter out nutrient loads before they enter the water.
- Discourage impoundments. Ponds and lakes do not aerate water, and cause many water quality problems downstream. There are a number of wildlife management areas and refuges within the Mississippi River Watershed. Most are located around lakes formed from old ox-bows of the river. Any new impoundments must be carefully located and designed. *Note: Permits* are *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.
- Support and train local MS4 programs within municipalities to deal with storm water pollution issues and require additional storm runoff quality control measures.
- Require nutrient management plans for all golf courses.

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

6.3.B.iv. Toxins and Other Materials.

Although some toxic substances are discharged directly into waters of the state from a point source, many of these materials are washed in during rainfalls from an upland location, or via improper waste disposal that contaminates groundwater. In the Tennessee Portion of the Mississippi River Watershed, a relatively small number of

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. An example of a water body that would benefit from these measures is McKellar Lake.

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.

Some of these problems can be addressed by:

Voluntary Activities

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

Regulatory Strategies

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

6.3.B.v. Habitat Alteration.

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

Many streams within the Tennessee Portion of the Mississippi River Watershed suffer from some degree of habitat alteration, especially riparian loss and bank disturbances from agricultural practices. Although large-scale public projects such as highway construction can alter significant portions of streams, individual landowners and developers are responsible for the vast majority of stream alterations. Some measures that can help address these problems are:

Voluntary Activities

- Sponsor litter pickup days to remove litter that might enter streams
- Organize stream cleanups removing trash, limbs and debris before they cause blockage. Graveyard Slough in Tiptonville is an example of a stream that would benefit.

- Avoid use of heavy equipment to "clean out" streams (*Instream work other than debris removal will require an Aquatic Resource Alteration Permit (ARAP).*
- Plant native vegetation along streams to stabilize banks and provide habitat
- Encourage developers to avoid extensive use of culverts in streams.

Regulatory Strategies

- Restrict modification of streams by means such as culverting, lining, or impounding.
- Require mitigation for impacts to streams and wetlands when modifications are allowed.
- Increased enforcement may be needed when violations of current regulations occur.

6.3.B.vi. Storm Water.

MS4 discharges are regulated through the Phase I or II NPDES-MS4 permits. These permits require the development and implementation of a Storm Water Management Program (SWMP) that will reduce the discharge of pollutants to the maximum extent practicable and not cause or contribute to violations of state water quality standards. The NPDES General Permit for Discharges from Phase I and II MSF facilities can be found at:

http://www.state.tn.us/environment/wpc/stormh2o/.

For discharges into impaired waters, the MS4 General Permit requires that SWMPs include a section describing how discharges of pollutants of concern will be controlled to ensure that they do not cause or contribute to instream exceedences of water quality standards. Specific measurements and BMPs to control pollutants of concern must also be identified. In addition, MS4s must implement the proposed waste load allocation provisions of an applicable TMDL (i.e., siltation/habitat alteration, pathogens) and describe methods to evaluate whether 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.

Only the City of Memphis and Shelby County have MS4 permits that include areas in the Tennessee Portion of the Mississippi River watershed.

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

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

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

6.4.A. Municipal Permits

TN0026409 Tiptonville-City Lagoon

Discharger rating: Minor
City: Tiptonville
County: Lake
EFO Name: Jackson
Issuance Date: 5/31/06
Expiration Date: 10/31/10
Receiving Stream(s): Mississippi River at mile 872.5
HUC-12: 080101000301
Effluent Summary: Treated domestic wastewater from Outfall 001
Treatment system: Lagoon system

SEGMENT	TN08010100001_4000
Name	Mississippi River
Size	74
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Domestic Water Supply (Supporting), Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Sedimentation/Siltation, Polychlorinated biphenyls, Chlordane, Physical substrate habitat alterations, Nitrates, Dioxin (including 2,3,7,8-TCDD)
Sources	Grazing in Riparian or Shoreline Zones, Non-irrigated Crop Production, Sources Outside State Juristiction or Borders, Dredging (e.g., for Navigation Channels), Contaminated Sediments

Table 6-1. Stream Segment Information for Tiptonville-City Lagoon.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD % removal	All Year	65	Percent	MAvg % Removal	3/Week	Calculated	% Removal
BOD5	All Year	65	mg/L	DMax Conc	Weekly	Composite	Effluent
BOD5	All Year	363	lb/day	DMax Load	Weekly	Composite	Effluent
BOD5	All Year	279	lb/day	WAvg Load	Weekly	Composite	Effluent
BOD5	All Year	251	lb/day	MAvg Load	Weekly	Composite	Effluent
BOD5	All Year	50	mg/L	WAvg Conc	Weekly	Composite	Effluent
BOD5	All Year	45	mg/L	MAvg Conc	Weekly	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	487	#/100mL	MAvg Ari Mean	Monthly	Grab	Effluent
Flow	All Year		MGD	DMax Load	Weekdays	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Weekdays	Continuous	Effluent
Overflow Use Occurences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Non Wet Weather
Overflow Use Occurences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
Settleable Solids	All Year	1	mL/L	DMax Conc	Weekly	Composite	Effluent
TRC	All Year	2	mg/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	120	mg/L	DMax Conc	Weekly	Composite	Effluent
TSS	All Year	559	lb/day	MAvg Load	Weekly	Composite	Effluent
TSS	All Year	670	lb/day	DMax Load	Weekly	Composite	Effluent
TSS	All Year	615	lb/day	DMax Load	Weekly	Composite	Effluent
TSS	All Year	100	mg/L	MAvg Conc	Weekly	Composite	Effluent
TSS	All Year	110	mg/L	WAvg Conc	Weekly	Composite	Effluent
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-2. Permit Limits for Tiptonville-City Lagoon.

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

- 4 Dissolved Oxygen
- 1 Total Suspended Solids (TSS)
- 1 Biological Oxygen Demand

Enforcement:
NOV for late permit application on 8/31/05.

Comments:
Compliance Evaluation Inspection on 5/18/07: Tiptonville has changed their plan to upgrade their treatment facility. They now want to divide their existing lagoon into four cells with aeration in each cell. The also want to patch the existing lagoon liner and switch from gas chlorine to sodium hypochlorite. The thermometers in the composite samplers are in process of being installed. Outfall sign is in process of installation and the flow meters are to be replaced with the upcoming projects.

A new port is being built in Tiptonville. The facility has a new operator and inflow and infiltration problems within the collection system are expected to improve.

TN0062529 Ridgley STP

Discharger rating: Minor
City: Ridgely
County: Lake
EFO Name: Jackson
Issuance Date: 1/31/06
Expiration Date: 1/31/10
Receiving Stream(s): Mississippi River Mile 857.5
HUC-12: 080101000301
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: Lagoon system

SEGMENT	TN08010100001_4000
Name	Mississippi River
Size	74
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Domestic Water Supply (Supporting), Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Sedimentation/Siltation, Polychlorinated biphenyls, Chlordane, Physical substrate habitat alterations, Nitrates, Dioxin (including 2,3,7,8-TCDD)
Sources	Grazing in Riparian or Shoreline Zones, Non-irrigated Crop Production, Sources Outside State Juristiction or Borders, Dredging (e.g., for Navigation Channels), Contaminated Sediments

Table 6-3. Stream Segment Information for Ridgley STP.

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	65	mg/L	DMax Conc	Weekly	Grab	Effluent
BOD5	All Year	108	lb/day	DMax Load	Weekly	Grab	Effluent
BOD5	All Year	83	lb/day	WAvg Load	Weekly	Grab	Effluent
BOD5	All Year	75	lb/day	MAvg Load	Weekly	Grab	Effluent
BOD5	All Year		mg/L	MAvg Conc	Weekly	Grab	Influent (Raw Sewage)
BOD5	All Year		mg/L	DMax Conc	Weekly	Grab	Influent (Raw Sewage)
BOD5	All Year	50	mg/L	WAvg Conc	Weekly	Grab	Effluent
BOD5	All Year	45	mg/L	MAvg Conc	Weekly	Grab	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	Weekly	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	Weekly	Grab	Effluent
Flow	All Year		MGD	MAvg Load	Weekdays	Instantaneous	Effluent
Flow	All Year		MGD	DMax Load	Weekdays	Instantaneous	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	2/Week	Grab	Effluent
TRC	All Year	2	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	120	mg/L	DMax Conc	Weekly	Grab	Effluent
TSS	All Year	200	lb/day	DMax Load	Weekly	Grab	Effluent
TSS	All Year	183	lb/day	WAvg Load	Weekly	Grab	Effluent
TSS	All Year	100	mg/L	MAvg Conc	Weekly	Grab	Effluent
TSS	All Year	167	lb/day	MAvg Load	Weekly	Grab	Effluent
TSS	All Year	110	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 6-4. Permit Limits for Ridgley STP.

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

- 37 Biological Oxygen Demand (BOD)
- 12 Total Suspended Solids (TSS)
- 1 Dissolved Oxygen

Comments:
None

TN0078191 City of Ripley Wastewater Lagoon

Discharger rating: Minor
City: Ripley
County: Lake
EFO Name: Jackson
Issuance Date: 3/31/06
Expiration Date: 5/31/10
Receiving Stream(s): Mississippi River Mile 800.5
HUC-12: 080101000303
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: Lagoon system

SEGMENT	TN08010100001_3000
Name	Mississippi River
Size	45.2
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting), Domestic Water Supply (Supporting)
Causes	Nitrates, Physical substrate habitat alterations, Sedimentation/Siltation, Chlordane, Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls
Sources	Grazing in Riparian or Shoreline Zones, Non-irrigated Crop Production, Sources Outside State Juristiction or Borders, Dredging (e.g., for Navigation Channels), Contaminated Sediments

Table 6-5. Stream Segment Information for City of Ripley Wastewater Lagoon.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
48hr LC50: *Ceriodaphnia Dubia*	All Year		Percent	DMin Conc	See Permit	Grab	
48hr LC50: Fathead Minnows	All Year		Percent	DMin Conc	See Permit	Grab	
Ammonia as N (Total)	All Year		mg/L	DMax Conc	Semi-annually	Grab	Effluent
Ammonia as N (Total)	All Year		lb/day	DMax Load	Semi-annually	Grab	Effluent
Bypass of Treatment (occurrences)	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
CBOD5	All Year	65	Percent	MAvg % Removal	Monthly	Calculated	Effluent
CBOD5	All Year	30	mg/L	MAvg Conc	3/Week	Grab	Effluent
CBOD5	All Year	45	mg/L	WAvg Conc	3/Week	Grab	Effluent
CBOD5	All Year	1551	lb/day	DMax Load	3/Week	Grab	Effluent
CBOD5	All Year	60	mg/L	DMax Conc	3/Week	Grab	Effluent
CBOD5	All Year	1163	lb/day	WAvg Load	3/Week	Grab	Effluent
CBOD5	All Year	776	lb/day	MAvg Load	3/Week	Grab	Effluent
CBOD5	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
Chlorine Free Available	All Year	2	mg/L	DMax Conc	Weekdays	Grab	Effluent
D.O.	All Year	1	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	941	#/100mL	DMax Conc	3/Week	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Flow	All Year		MGD	MAvg Conc	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg Conc	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	DMax Conc	Daily	Continuous	Effluent
Flow	All Year		MGD	DMax Conc	Daily	Continuous	Influent (Raw Sewage)
Nitrite + Nitrate Total (as N)	All Year		mg/L	DMax Conc	Semi-annually	Grab	Effluent
Nitrite + Nitrate Total (as N)	All Year		lb/day	DMax Load	Semi-annually	Grab	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
Phosphorus Total	All Year		mg/L	DMax Conc	Semi-annually	Grab	Effluent
Phosphorus Total	All Year		lb/day	DMax Load	Semi-annually	Grab	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	Weekdays	Grab	Effluent
TKN: Total Kjeldahl Nitrogen	All Year		mg/L	DMax Conc	Semi-annually	Grab	Effluent
TKN: Total Kjeldahl Nitrogen	All Year		lb/day	DMax Load	Semi-annually	Grab	Effluent
TSS	All Year	55	mg/L	MAvg Conc	3/Week	Grab	Effluent
TSS	All Year	80	mg/L	WAvg Conc	3/Week	Grab	Effluent
TSS	All Year	110	mg/L	DMax Conc	3/Week	Grab	Effluent
TSS	All Year	2844	lb/day	DMax Load	3/Week	Grab	Effluent
TSS	All Year	2068	lb/day	WAvg Load	3/Week	Grab	Effluent
TSS	All Year	1422	lb/day	MAvg Load	3/Week	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekdays	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent

Table 6-6. Permit Limits for City of Ripley Wastewater Lagoon.

Comments:
New wastewater treatment lagoon and outfall to serve future growth and needs of local industry. Will replace existing mechanical treatment plant and municipal and industrial discharges to Cane Creek and its tributaries.

Compliance Evaluation Inspection on March 14, 2007: The plant has been in operation for approximately 4 months. Although there is still a problem with the influent flow meter and aerators in the first cell, the lagoon is operating well within its limits.

TN0020729 Memphis-TE Maxson STP South Plant

Discharger rating: Major
City: Ripley
County: Lake
EFO Name: Jackson
Issuance Date: 4/01/00
Expiration Date: 3/31/05
Receiving Stream(s): Mississippi River at Mile 725
HUC-12: 080101000303
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: Waste Activated Sludge to anaerobic dig to sludge lagoon; primary to belt press

SEGMENT	TN08010100001_1000
Name	Mississippi River
Size	24.9
Unit	Miles
First Year on 303(d) List	1990
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Physical substrate habitat alterations, Sedimentation/Siltation, Chlordane, Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls, Nitrates
Sources	Discharges from Municipal Separate Storm Sewer Systems (MS4), Grazing in Riparian or Shoreline Zones, Non-irrigated Crop Production, Sources Outside State Juristiction or Borders, Dredging (e.g., for Navigation Channels), Contaminated Sediments

Table 6-7. Stream Segment Information for Memphis-TE Maxson STP So Plant.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD % removal	All Year	40	Percent	DMin % Removal	Daily	Calculated	% Removal
BOD % removal	All Year	85	Percent	MAvg % Removal	Daily	Calculated	% Removal
BOD5	All Year	84	mg/L	DMax Conc	Daily	Composite	Effluent
BOD5	All Year		mg/L	DMax Conc	Daily	Composite	Influent (Raw Sewage)
BOD5	All Year	47288	lb/day	DMax Load	Daily	Composite	Effluent
BOD5	All Year	63	mg/L	MAvg Conc	Daily	Composite	Effluent
BOD5	All Year	31525	lb/day	MAvg Load	Daily	Composite	Effluent
BOD5	All Year		mg/L	MAvg Conc	Daily	Composite	Influent (Raw Sewage)
BOD5	All Year	42	mg/L	WAvg Conc	Daily	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	Daily	Grab	Effluent
Dioxin	All Year		PCI/L	DMax Conc	Annually	Grab	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
Organic Pesticide Chemicals (40cfr455)	All Year		PCI/L	DMax Conc	Annually	Grab	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	Daily	Composite	Effluent
TSS	All Year	96	mg/L	DMax Conc	Daily	Composite	Effluent
TSS	All Year	36029	lb/day	MAvg Load	Daily	Composite	Effluent
TSS	All Year		mg/L	DMax Conc	Daily	Composite	Influent (Raw Sewage)
TSS	All Year	54043	lb/day	DMax Load	Daily	Composite	Effluent
TSS	All Year	48	mg/L	WAvg Conc	Daily	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	Daily	Composite	Influent (Raw Sewage)
TSS	All Year	72	mg/L	MAvg Conc	Daily	Composite	Effluent
TSS % Removal	All Year	40	Percent	DMin % Removal	Daily	Calculated	% Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	Daily	Calculated	% Removal
pH	All Year	9	SU	DMax Conc	Daily	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Daily	Grab	Effluent

Table 6-8. Permit Limits for Memphis-TE Maxson STP So Plant.

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

- 4 Total Suspended Solids (TSS)
- 8 Biological Oxygen Demand (BOD)
- 1 Dissolved Oxygen
- 1524 Overflows

Comments:
This is Memphis' south plant and TDEC is working on their new permit. It hasn't gone out for public notice yet. We are also working on their north plant permit renewal (M.C. Stiles STP TN0020711) - not on public notice as of 7/3/07. Memphis will be setting up a study to determine whether or not STPs need to disinfect effluent discharged into the Mississippi River.

4/10/06 Compliance Evaluation Inspection: In Compliance

11/07/05 Compliance Evaluation Inspection: In Compliance

TN0020711 Memphis-Maynard C. Stiles STP

Discharger rating: Minor
City: Memphis
County: Shelby
EFO Name: Memphis
Issuance Date: 4/01/00
Expiration Date: 3/31/05
Receiving Stream(s): Mississippi River at Mile 738.8
HUC-12: 080101000303
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: Waste Activated Sludge to anaerobic lagoons to belt press to dedicated site

SEGMENT	TN08010100001_1000
Name	Mississippi River
Size	24.9
Unit	Miles
First Year on 303(d) List	1990
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Physical substrate habitat alterations, Sedimentation/Siltation, Chlordane, Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls, Nitrates
Sources	Discharges from Municipal Separate Storm Sewer Systems (MS4), Grazing in Riparian or Shoreline Zones, Non-irrigated Crop Production, Sources Outside State Juristiction or Borders, Dredging (e.g., for Navigation Channels), Contaminated Sediments

Table 6-9. Stream Segment Information for Memphis-Maynard C. Stiles STP.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD % removal	All Year	40	Percent	DMin % Removal	Daily	Calculated	% Removal
BOD % removal	All Year	85	Percent	MAvg % Removal	Daily	Calculated	% Removal
BOD5	All Year	90	mg/L	DMax Conc	Daily	Composite	Effluent
BOD5	All Year		mg/L	DMax Conc	Daily	Composite	Influent (Raw Sewage)
BOD5	All Year	76561	lb/day	DMax Load	Daily	Composite	Effluent
BOD5	All Year	68	mg/L	MAvg Conc	Daily	Composite	Effluent
BOD5	All Year	50666	lb/day	MAvg Load	Daily	Composite	Effluent
BOD5	All Year		mg/L	MAvg Conc	Daily	Composite	Influent (Raw Sewage)
BOD5	All Year	45	mg/L	WAvg Conc	Daily	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	Daily	Grab	Effluent
DDT	All Year	0.000001	mg/L	MAvg Conc	Annually	Composite	Effluent
Dieldrin	All Year	1.4E-06	mg/L	MAvg Conc	Annually	Composite	Effluent
Dioxin	All Year		mg/L	DMax Conc	Annually	Composite	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
Organic Pesticide Chemicals (40cfr455)	All Year		mg/L	DMax Conc	Annually	Grab	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	Daily	Composite	Effluent
TSS	All Year	104	mg/L	DMax Conc	Daily	Composite	Effluent
TSS	All Year	58547	lb/day	MAvg Load	Daily	Composite	Effluent
TSS	All Year		mg/L	DMax Conc	Daily	Composite	Influent (Raw Sewage)
TSS	All Year	87820	lb/day	DMax Load	Daily	Composite	Effluent
TSS	All Year	52	mg/L	WAvg Conc	Daily	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	Daily	Composite	Influent (Raw Sewage)
TSS	All Year	78	mg/L	MAvg Conc	Daily	Composite	Effluent
TSS % Removal	All Year	40	Percent	DMin % Removal	Daily	Calculated	% Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	Daily	Calculated	% Removal
pH	All Year	9	SU	DMax Conc	Daily	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Daily	Grab	Effluent

Table 6-10. Permit Limits for Memphis-Maynard C. Stiles STP.

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

- 13 Biological Oxygen Demand (BOD)
- 4 Total Suspended Solids (TSS)
- 3 Suspended Solids % Removal
- 3 Settleable Solids
- 1553 Overflows
- 4 Bypasses

Comments:
Staff is working on their north plant permit renewal (M.C. Stiles STP TN0020711) - not on public notice (as of 7/3/07). Memphis will be setting up a study to determine whether or not STPs need to disinfect effluent discharged into the Mississippi River.

4/10/06 Compliance Evaluation Inspection: In Compliance

10/24/05 Compliance Evaluation Inspection: In Compliance

TN0062499 Munford Sewer Department Lagoon

Discharger rating: Major
City: Munford
County: Tipton
EFO Name: Memphis
Issuance Date: 4/01/06
Expiration Date: 5/31/10
Receiving Stream(s): Mississippi River Mile 761
HUC-12: 080101000401
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: Lagoon system

SEGMENT	TN08010100001_2000
Name	Mississippi River
Size	40
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Irrigation (Supporting), Livestock Watering and Wildlife (Supporting), Recreation (Non-Supporting), Fish and Aquatic Life (Non-Supporting), Domestic Water Supply (Supporting)
Causes	Polychlorinated biphenyls, Sedimentation/Siltation, Physical substrate habitat alterations, Dioxin (including 2,3,7,8-TCDD), Nitrates, Chlordane
Sources	Grazing in Riparian or Shoreline Zones, Non-irrigated Crop Production, Dredging (e.g., for Navigation Channels), Sources Outside State Jurisdiction or Borders, Contaminated Sediments

Table 6-11. Stream Segment Information for Munford Sewer Department Lagoon.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
48hr LC50: Fathead Minnows	All Year		Percent	DMin Conc	Quarterly	Grab	Effluent
Ammonia as N (Total)	All Year		mg/L	DMax Conc	Semi-annually	Grab	Effluent
Ammonia as N (Total)	All Year		lb/day	DMax Load	Semi-annually	Grab	Effluent
BOD % removal	All Year	65	Percent	MAvg % Removal	Weekly	Calculated	% Removal
BOD5	All Year	60	mg/L	DMax Conc	3/Week	Grab	Effluent
BOD5	All Year	1001	lb/day	DMax Load	3/Week	Grab	Effluent
BOD5	All Year	751	lb/day	WAvg Load	3/Week	Grab	Effluent
BOD5	All Year	500	lb/day	MAvg Load	3/Week	Grab	Effluent
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	WAvg Conc	3/Week	Grab	Effluent
BOD5	All Year	30	mg/L	MAvg Conc	3/Week	Grab	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	126	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
E. coli	All Year	941	#/100mL	DMax Conc	3/Week	Grab	Effluent
Flow	All Year		MGD	MAvg Conc	Daily	Continuous	Effluent
Flow	All Year		MGD	DMax Conc	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg Conc	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	DMax Conc	Daily	Continuous	Influent (Raw Sewage)
Nitrite + Nitrate Total (as N)	All Year		mg/L	DMax Conc	Semi-annually	Grab	Effluent
Nitrite + Nitrate Total (as N)	All Year		lb/day	DMax Load	Semi-annually	Grab	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
Phosphorus Total	All Year		mg/L	DMax Conc	Semi-annually	Grab	Effluent
Phosphorus Total	All Year		lb/day	DMax Load	Semi-annually	Grab	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	Weekdays	Grab	Effluent
TKN: Total Kjeldahl Nitrogen	All Year		lb/day	DMax Load	Semi-annually	Grab	Effluent
TKN: Total Kjeldahl Nitrogen	All Year		mg/L	DMax Conc	Semi-annually	Grab	Effluent
TSS	All Year	110	mg/L	DMax Conc	3/Week	Grab	Effluent
TSS	All Year	1334	lb/day	WAvg Load	3/Week	Grab	Effluent
TSS	All Year	55	mg/L	MAvg Conc	3/Week	Grab	Effluent
TSS	All Year	917	lb/day	MAvg Load	3/Week	Grab	Effluent
TSS	All Year	80	mg/L	WAvg Conc	3/Week	Grab	Effluent
TSS	All Year	1835	lb/day	DMax Load	3/Week	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-12. Permit Limits for Munford Sewer Department Lagoon.

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

- 10 Biological Oxygen Demand (BOD)
- 1 Escherichia coli

Comments:
0.8 MGD to 2.0 MGD. Plans received 3/6/07 prepared by King Engineering Consultants, for addition of a hypochlorine disinfection system. Plant was upgraded from a minor to a major.

12/19/06 Compliance Evaluation Inspection: A screen will be installed at the weir to prevent debris from entering outfall. Munford consultant engineer is working on disinfection plan. Disinfection at the lagoon will be implemented within one year of permit issuance.

TN0027600 TDEC Meeman-Shelby State Park

Discharger rating: Major
City: Millington
County: Shelby
EFO Name: Memphis
Issuance Date: 6/01/06
Expiration Date: 4/29/10
Receiving Stream(s): Mississippi River at mile 750.0
HUC-12: 080101000402
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: The new system will be three aerated cell lagoon

SEGMENT	TN08010100001_2000
Name	Mississippi River
Size	40
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Irrigation (Supporting), Livestock Watering and Wildlife (Supporting), Recreation (Non-Supporting), Fish and Aquatic Life (Non-Supporting), Domestic Water Supply (Supporting)
Causes	Polychlorinated biphenyls, Sedimentation/Siltation, Physical substrate habitat alterations, Dioxin (including 2,3,7,8-TCDD), Nitrates, Chlordane
Sources	Grazing in Riparian or Shoreline Zones, Non-irrigated Crop Production, Dredging (e.g., for Navigation Channels), Sources Outside State Juristiction or Borders, Contaminated Sediments

Table 6-13. Stream Segment Information for TDEC Meeman-Shelby State Park.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD5	All Year	70	mg/L	DMax Conc	2/Month	Grab	Effluent
BOD5	All Year	45	mg/L	MAvg Conc	2/Month	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
TSS	All Year	100	mg/L	DMax Conc	2/Month	Grab	Effluent
TSS	All Year	65	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 6-14. Permit Limits for TDEC Meeman-Shelby State Park.

Comments:
Three cell aerated lagoon system (0.05 MGD) will replace an activated sludge plant (0.1 MGD).

6.4.B. Industrial Permits

TN0000108 ExxonMobil Oil Corporation - Memphis Terminal

Discharger rating: Minor
City: Memphis
County: Shelby
EFO Name: Memphis
Issuance Date: 7/01/05
Expiration Date: 5/31/10
Receiving Stream(s): Mississippi River at mile 734
HUC-12: 080101000404
Effluent Summary: Storm water runoff, tank water draw-off, tank hydrostatic testing water, rack/pump/equipment wash water, truck rinse, monitoring well purge, remediation system water and dock wash water from Outfall 001
Treatment system: Oil/water separator, flow equalization tank, and carbon adsorber

SEGMENT	TN08010100001_1000
Name	Mississippi River
Size	24.9
Unit	Miles
First Year on 303(d) List	1990
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Physical substrate habitat alterations, Sedimentation/Siltation, Chlordane, Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls, Nitrates
Sources	Discharges from Municipal Separate Storm Sewer Systems (MS4), Grazing in Riparian or Shoreline Zones, Non-irrigated Crop Production, Sources Outside State Juristiction or Borders, Dredging (e.g., for Navigation Channels), Contaminated Sediments

Table 6-15. Stream Segment Information for ExxonMobil Oil Corporation - Memphis Terminal.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Benzene	All Year	0.5	mg/L	DMax Conc	Monthly	Grab	Effluent
Ethylbenzene	All Year	0.2	mg/L	DMax Conc	Monthly	Grab	Effluent
Flow	All Year		MGD	DMax Load	Monthly	Totalizer	Effluent
Flow	All Year		MGD	MAvg Load	Monthly	Totalizer	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	Monthly	Grab	Effluent
Pb (T)	All Year	0.1	mg/L	DMax Conc	Monthly	Composite	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Monthly	Composite	Effluent
Toluene	All Year	1	mg/L	DMax Conc	Monthly	Grab	Effluent
Xylene	All Year	0.5	mg/L	DMax Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Monthly	Grab	Effluent

Table 6-16. Permit Limits for ExxonMobil Oil Corporation - Memphis Terminal.

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

- 2 Settleable Solids

Comments:
A marine terminal that stores and distributes refined petroleum products.

TN0005355 TVA - Allen Fossil Plant

Discharger rating:	Minor
City:	Memphis
County:	Shelby
EFO Name:	Memphis
Issuance Date:	9/04/05
Expiration Date:	8/30/10
Receiving Stream(s):	McKellar Lake to mile 725.6 of the Mississippi River (Outfalls 001 and 010), Horn Lake cutoff to McKellar Lake (001A), and Mississippi River at mile 725.0 (002, 003)
HUC-12:	080101000404
Effluent Summary:	Ash transport water, treated chemical and nonchemical metal cleaning wastewaters, coal pile runoff, low volume wastes, and storm water runoff from Outfalls 001 and 01A (emergency only), ash transport water, treated chemical and nonchemical metal cleaning wastewaters, precipitator & precipitator pad washdown, low volume wastes, and storm water runoff from Outfall 002 (during interim rerouting period), once through condenser cooling water, miscellaneous equipment cooling and lubricating water, air preheater wash water, selective catalytic reduction water and chemical and nonchemical metal cleaning wastewaters (IMP 006) and reverse osmosis reject wastewater from Outfall 003 and intake screen backwash water from Outfall 010
Treatment system:	Lagoon system

SEGMENT	TN08010100001_1100
Name	McKellar Lake
Size	13
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Sedimentation/Siltation, Polychlorinated biphenyls, Escherichia coli, Chlordane, Oxygen, Dissolved, Dioxin (including 2,3,7,8-TCDD)
Sources	Sanitary Sewer Overflows (Collection System Failures), Dredging (e.g., for Navigation Channels), Contaminated Sediments, Discharges from Municipal Separate Storm Sewer Systems (MS4)

Table 6-17. Stream Segment Information for Outfall 001, 006 and 101 at TVA-Allen Fossil Plant.

SEGMENT	TN08010211001_0100
Name	Horn Lake Cutoff
Size	16.4
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Fish and Aquatic Life (Supporting), Recreation (Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	N/A
Sources	N/A

Table 6-18. Stream Segment Information for Outfall 01A at TVA-Allen Fossil Plant.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
48hr LC50: *Ceriodaphnia Dubia*	All Year	100	Percent	DMin Conc	Annually	Grab	Effluent
48hr LC50: Fathead Minnows	All Year	100	Percent	DMin Conc	Annually	Grab	Effluent
Ag (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Ammonia as N (Total)	All Year		mg/L	DMax Conc	2/Month	Grab	Intake
Ammonia as N (Total)	All Year		mg/L	DMax Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	All Year		mg/L	DMax Conc	2/Month	Calculated	Effluent net value
Ammonia as N (Total)	All Year		lb/day	DMax Load	2/Month	Calculated	Effluent net value
Ammonia as N (Total)	All Year		lb/day	DMax Load	2/Month	Grab	Effluent
Ammonia as N (Total)	All Year		lb/day	DMax Load	2/Month	Grab	Intake
Cd (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Cr (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Cu (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	Annually	Grab	Effluent
Mn (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Oil and Grease (Freon EM)	All Year	20	mg/L	DMax Conc	Monthly	Grab	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	MAvg Conc	Monthly	Grab	Effluent
Pb (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Se (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
TSS	All Year	100	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	Weekly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekly	Grab	Effluent

Table 6-19. Permit Limits for Outfall 001 at TVA-Allen Fossil Plant.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ag (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Cd (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Cr (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Cu (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	Estimate	Effluent
Flow	All Year		MGD	MAvg Load	Weekly	Estimate	Effluent
Hg (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Mn (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Oil and Grease (Freon EM)	All Year	20	mg/L	DMax Conc	Monthly	Grab	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	MAvg Conc	Monthly	Grab	Effluent
Pb (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Se (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
TSS	All Year	100	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	Weekly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekly	Grab	Effluent

Table 6-20. Permit Limits for Outfall 002 at TVA-Allen Fossil Plant.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Duration of Discharge	All Year	120	Min/Day	DMax Conc	Daily	Pump Log	Effluent
Flow	All Year		MGD	DMax Load	Daily	Estimate	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Estimate	Effluent
Oxidants Total Residual	All Year	0.2	mg/L	DMax Conc	Weekly	Grab	Effluent
Temperature (°C)	All Year		Deg. C	DMax Conc	Daily	Grab	Intake
Temperature (°C)	All Year	44.4	Deg. C	DMax Conc	Daily	Calculated	Effluent
Temperature (°C)	All Year		Deg. C	MAvg Conc	Daily	Grab	Intake

Tables 6-21. Permit Limits for Outfall 003 at TVA-Allen Fossil Plant.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	All Year		mg/L	DMax Conc	1/Batch	Grab	Effluent
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	DMax Load	1/Batch	Estimate	Effluent
Flow	All Year		MGD	MAvg Load	1/Batch	Estimate	Effluent
Oil and Grease (Freon EM)	All Year	20	mg/L	DMax Conc	1/Batch	Grab	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	MAvg Conc	1/Batch	Grab	Effluent
TSS	All Year	100	mg/L	DMax Conc	1/Batch	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	1/Batch	Grab	Effluent
pH	All Year	9	SU	DMax Conc	1/Batch	Grab	Effluent
pH	All Year	6	SU	DMin Conc	1/Batch	Grab	Effluent

Tables 6-22. Permit Limits for Outfall 006 at TVA-Allen Fossil Plant.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
48hr LC50: Ceriodaphnia Dubia	All Year	100	Percent	DMin Conc	Annually	Grab	Effluent
48hr LC50: Fathead Minnows	All Year	100	Percent	DMin Conc	Annually	Grab	Effluent
Ag (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Ammonia as N (Total)	All Year		mg/L	DMax Conc	2/Month	Grab	Intake
Ammonia as N (Total)	All Year		mg/L	DMax Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	All Year		mg/L	DMax Conc	2/Month	Calculated	Effluent net value
Ammonia as N (Total)	All Year		lb/day	DMax Load	2/Month	Calculated	Effluent net value
Ammonia as N (Total)	All Year		lb/day	DMax Load	2/Month	Grab	Effluent
Ammonia as N (Total)	All Year		lb/day	DMax Load	2/Month	Grab	Intake
Cd (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Cr (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Cu (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	Annually	Grab	Effluent
Mn (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Oil and Grease (Freon EM)	All Year	20	mg/L	DMax Conc	Monthly	Grab	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	MAvg Conc	Monthly	Grab	Effluent
Pb (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
Se (T)	All Year		mg/L	DMax Conc	Annually	Grab	Effluent
TSS	All Year	100	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	Weekly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekly	Grab	Effluent

Table 6-23. Permit Limits for Outfall 01A at TVA-Allen Fossil Plant.

Comments:
Fossil-fueled steam-electric generating plant with 3 coal-fired units and 20 combustion turbines.

June 11,2007: Modification to remove compliance date, January 7, 2008, for complete Compliance Data System 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."

TN0029068 Cargill Incorporated

Discharger rating: Minor
City: Memphis
County: Shelby
EFO Name: Memphis
Issuance Date: 4/01/05
Expiration Date: 2/28/10
Receiving Stream(s): Lake McKellar at mile 2.8
HUC-12: 080101000404
Effluent Summary: Non-contact cooling water from Outfall 001
Treatment system:

SEGMENT	TN08010100001_1100
Name	McKellar Lake
Size	13
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Sedimentation/Siltation, Polychlorinated biphenyls, Escherichia coli, Chlordane, Oxygen, Dissolved, Dioxin (including 2,3,7,8-TCDD)
Sources	Sanitary Sewer Overflows (Collection System Failures), Dredging (e.g., for Navigation Channels), Contaminated Sediments, Discharges from Municipal Separate Storm Sewer Systems (MS4)

Table 6-24. Stream Segment Information for Cargill Incorporated.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Flow	All Year		MGD	DMax Load	Monthly	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Monthly	Instantaneous	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	Monthly	Grab	Effluent
TRC	All Year		mg/L	DMax Conc	Monthly	Grab	Effluent
Temperature (°C)	All Year		°C	DMax Conc	Monthly	Grab	Effluent
Temperature (°C)	All Year		°C	WAvg Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Monthly	Grab	Effluent

Table 6-25. Permit Limits for Cargill Incorporated.

Comments:
A wet corn milling plant that produces corn syrup, cornstarch, corn oil and animal feed from corn.

TN0022543 The Premcor Refining Group, Inc. - Valero Riverside Terminal

Discharger rating: Minor
City: Memphis
County: Shelby
EFO Name: Memphis
Issuance Date: 4/01/05
Expiration Date: 2/28/10
Receiving Stream(s): Mississippi River at mile 734
HUC-12: 080101000404
Effluent Summary: Storm water runoff and hydrostatic test water through Outfall 001, storm water runoff, loading rack washwater, hydrostatic tank test water and tank bottom water through Outfall 002 and storm water runoff through Outfall SW3
Treatment system:

SEGMENT	TN08010100001_1000
Name	Mississippi River
Size	24.9
Unit	Miles
First Year on 303(d) List	1990
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Physical substrate habitat alterations, Sedimentation/Siltation, Chlordane, Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls, Nitrates
Sources	Discharges from Municipal Separate Storm Sewer Systems (MS4), Grazing in Riparian or Shoreline Zones, Non-irrigated Crop Production, Sources Outside State Juristiction or Borders, Dredging (e.g., for Navigation Channels), Contaminated Sediments

Table 6-26. Stream Segment Information for the Premcor Refining Group, Inc. - Valero Riverside Terminal.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Benzene	All Year	0.5	mg/L	DMax Conc	Quarterly	Grab	Effluent
Ethylbenzene	All Year	0.2	mg/L	DMax Conc	Quarterly	Grab	Effluent
Flow	All Year		MGD	DMax Load	Quarterly	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Quarterly	Instantaneous	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	Quarterly	Grab	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Quarterly	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Quarterly	Grab	Effluent
Toluene	All Year	1	mg/L	DMax Conc	Quarterly	Grab	Effluent
Xylene	All Year	0.5	mg/L	DMax Conc	Quarterly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Quarterly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Quarterly	Grab	Effluent

Table 6-27. Permit Limits for Outfall 001 at the Premcor Refining Group, Inc. - Valero Riverside Terminal.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Benzene	All Year	0.5	mg/L	DMax Conc	Quarterly	Grab	Effluent
Ethylbenzene	All Year	0.2	mg/L	DMax Conc	Quarterly	Grab	Effluent
Flow	All Year		MGD	DMax Load	Quarterly	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Quarterly	Instantaneous	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	Quarterly	Grab	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Quarterly	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Quarterly	Grab	Effluent
Toluene	All Year	1	mg/L	DMax Conc	Quarterly	Grab	Effluent
Xylene	All Year	0.5	mg/L	DMax Conc	Quarterly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Quarterly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Quarterly	Grab	Effluent

Table 6-28. Permit Limits for Outfall 002 at the Premcor Refining Group, Inc. - Valero Riverside Terminal.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Benzene	All Year		mg/L	DMax Conc	Quarterly	Grab	Effluent
Ethylbenzene	All Year		mg/L	DMax Conc	Quarterly	Grab	Effluent
Flow	All Year		GPD	DMax Load	Quarterly	Instantaneous	Effluent
Flow	All Year		GPD	MAvg Load	Quarterly	Instantaneous	Effluent
Oil and Grease (Freon EM)	All Year		mg/L	DMax Conc	Quarterly	Grab	Effluent
Settleable Solids	All Year		mL/L	DMax Conc	Quarterly	Grab	Effluent
TSS	All Year		mg/L	DMax Conc	Quarterly	Grab	Effluent
Toluene	All Year		mg/L	DMax Conc	Quarterly	Grab	Effluent
Xylene	All Year		mg/L	DMax Conc	Quarterly	Grab	Effluent
pH	All Year		SU	DMax Conc	Quarterly	Grab	Effluent
pH	All Year		SU	DMin Conc	Quarterly	Grab	Effluent

Table 6-29. Permit Limits for Outfall SW3 at the Premcor Refining Group, Inc. - Valero Riverside Terminal.

Comments:

Storage and distribution terminal for light petroleum oils (distributes aviation gas and diesel fuel wholesale customers). The facility has doubled its capacity.

5/8/06 Compliance Evaluation Inspection: In compliance.

TN0001066 Petroleum Fuel & Terminal Company

Discharger rating: Minor
City: Memphis
County: Shelby
EFO Name: Memphis
Issuance Date: 11/01/05
Expiration Date: 9/30/10
Receiving Stream(s): Unnamed tributary to the Mississippi River at mile 734.0
HUC-12: 080101000404
Effluent Summary: Storm water runoff from loading pad through Outfall 001 and storm water runoff through tank farm through Outfall 002
Treatment system: Lagoon system

SEGMENT	TN08010100001_1000
Name	Mississippi River
Size	24.9
Unit	Miles
First Year on 303(d) List	1990
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Physical substrate habitat alterations, Sedimentation/Siltation, Chlordane, Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls, Nitrates
Sources	Discharges from Municipal Separate Storm Sewer Systems (MS4), Grazing in Riparian or Shoreline Zones, Non-irrigated Crop Production, Sources Outside State Juristiction or Borders, Dredging (e.g., for Navigation Channels), Contaminated Sediments

Table 6-30. Stream Segment Information for Petroleum Fuel & Terminal Company.

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
Benzene	All Year	0.5	mg/L	DMax Conc	Monthly	Grab	Effluent
Ethylbenzene	All Year	0.2	mg/L	DMax Conc	Monthly	Grab	Effluent
Flow	All Year		MGD	MAvg Load	Monthly	Instantaneous	Effluent
Flow	All Year		MGD	DMax Load	Monthly	Instantaneous	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	Monthly	Grab	Effluent
Oil and Grease (Freon EM)	All Year	10	mg/L	MAvg Conc	Monthly	Grab	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Monthly	Grab	Effluent
Toluene	All Year	1	mg/L	DMax Conc	Monthly	Grab	Effluent
Xylene	All Year	0.5	mg/L	DMax Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Monthly	Grab	Effluent

Table 6-31. Permit Limits for Outfall 001 at Petroleum Fuel & Terminal Company.

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
Benzene	All Year	0.5	mg/L	DMax Conc	Monthly	Grab	Effluent
Ethylbenzene	All Year	0.2	mg/L	DMax Conc	Monthly	Grab	Effluent
Flow	All Year		MGD	MAvg Load	Monthly	Instantaneous	Effluent
Flow	All Year		MGD	DMax Load	Monthly	Instantaneous	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	Monthly	Grab	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Monthly	Grab	Effluent
Toluene	All Year	1	mg/L	DMax Conc	Monthly	Grab	Effluent
Xylene	All Year	0.5	mg/L	DMax Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Monthly	Grab	Effluent

Table 6-32. Permit Limits for Outfall 002 at Petroleum Fuel & Terminal Company.

Comments:

Receives, stores and distributes petroleum products.

3/26/06 Compliance Evaluation Inspection: In compliance

TN0041530 Lafarge North America

Discharger rating: Minor
City: Memphis
County: Shelby
EFO Name: Memphis
Issuance Date: 10/01/05
Expiration Date: 8/31/10
Receiving Stream(s): Wolf River lagoon to Mississippi River
HUC-12: 080101000404
Effluent Summary: Non-contact cooling water from Outfall 001

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Flow	All Year		MGD	MAvg Load	Quarterly	Instantaneous	Effluent
Flow	All Year		MGD	DMax Load	Quarterly	Instantaneous	Effluent
Temperature Diff. Downstrm & Upstrm (°C)	All Year		°C	DMax Load	Quarterly	Grab	Effluent

Table 6-33. Permit Limits for Lafarge North America.

Comments:
Finished cement is unloaded from barges to silos for later transloading into bulk tanker trucks.

TN0001171 ACL Transportation Services LLC

Discharger rating: Minor
City: Memphis
County: Shelby
EFO Name: Memphis
Issuance Date: 11/01/05
Expiration Date: 9/30/10
Receiving Stream(s): Mississippi River at mile 734.4
HUC-12: 080101000404
Effluent Summary: Storm water runoff, hydrostatic test water, tank bottoms and cleaning water through Outfall 001; hydrostatic test water, treated bilge water, tank bottoms and cleaning water through Outfall 002; treated wash water generated from cleaning inland river tank barges through Outfall 003
Treatment system: Lagoon system

SEGMENT	TN08010100001_1000
Name	Mississippi River
Size	24.9
Unit	Miles
First Year on 303(d) List	1990
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Physical substrate habitat alterations, Sedimentation/Siltation, Chlordane, Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls, Nitrates
Sources	Discharges from Municipal Separate Storm Sewer Systems (MS4), Grazing in Riparian or Shoreline Zones, Non-irrigated Crop Production, Sources Outside State Juristiction or Borders, Dredging (e.g., for Navigation Channels), Contaminated Sediments

Table 6-34. Stream Segment Information for ACL Transportation Services LLC.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD5	All Year		mg/L	DMax Conc	Quarterly	Composite	Effluent
Benzene	All Year		mg/L	DMax Conc	See Permit	Grab	Effluent
COD	All Year		mg/L	DMax Conc	Monthly	Composite	Effluent
Ethylbenzene	All Year		mg/L	DMax Conc	See Permit	Grab	Effluent
Flow	All Year		MGD	DMax Load	Monthly	Calculated	Effluent
Flow	All Year		MGD	MAvg Load	Monthly	Calculated	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	Monthly	Grab	Effluent
Oil and Grease (Freon EM)	All Year	10	mg/L	MAvg Conc	Monthly	Grab	Effluent
Oil and Grease Visual	All Year		YES=1 NO=0	DMax Conc	Monthly	Visual	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Monthly	Grab	Effluent
TOC	All Year		mg/L	DMax Conc	See Permit	Grab	Effluent
TRC	All Year		mg/L	DMax Conc	See Permit	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Monthly	Composite	Effluent
Toluene	All Year		mg/L	DMax Conc	See Permit	Grab	Effluent
Xylene	All Year		mg/L	DMax Conc	See Permit	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Monthly	Grab	Effluent

Table 6-35. Permit Limits for Outfall 001 at ACL Transportation Services LLC.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD5	All Year		mg/L	DMax Conc	Quarterly	Composite	Effluent
Benzene	All Year		mg/L	DMax Conc	See Permit	Grab	Effluent
COD	All Year		mg/L	DMax Conc	Monthly	Composite	Effluent
Ethylbenzene	All Year		mg/L	DMax Conc	See Permit	Grab	Effluent
Flow	All Year		MGD	DMax Load	Monthly	Calculated	Effluent
Flow	All Year		MGD	MAvg Load	Monthly	Calculated	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	Monthly	Grab	Effluent
Oil and Grease (Freon EM)	All Year	10	mg/L	MAvg Conc	Monthly	Grab	Effluent
Oil and Grease Visual	All Year		YES=1 NO=0	DMax Conc	Monthly	Visual	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Monthly	Grab	Effluent
TOC	All Year		mg/L	DMax Conc	See Permit	Grab	Effluent
TRC	All Year		mg/L	DMax Conc	See Permit	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Monthly	Composite	Effluent
Toluene	All Year		mg/L	DMax Conc	See Permit	Grab	Effluent
Xylene	All Year		mg/L	DMax Conc	See Permit	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Monthly	Grab	Effluent

Table 6-36. Permit Limits for Outfall 002 at ACL Transportation Services LLC.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
BOD5	All Year		mg/L	DMax Conc	Quarterly	Composite	Effluent
Benzene	All Year		mg/L	DMax Conc	See Permit	Grab	Effluent
COD	All Year		mg/L	DMax Conc	Monthly	Composite	Effluent
Ethylbenzene	All Year		mg/L	DMax Conc	See Permit	Grab	Effluent
Flow	All Year		MGD	DMax Load	Monthly	Calculated	Effluent
Flow	All Year		MGD	MAvg Load	Monthly	Calculated	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	Monthly	Grab	Effluent
Oil and Grease (Freon EM)	All Year	10	mg/L	MAvg Conc	Monthly	Grab	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Monthly	Grab	Effluent
TOC	All Year		mg/L	DMax Conc	See Permit	Grab	Effluent
TRC	All Year		mg/L	DMax Conc	See Permit	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Monthly	Composite	Effluent
Toluene	All Year		mg/L	DMax Conc	See Permit	Grab	Effluent
Xylene	All Year		mg/L	DMax Conc	See Permit	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Monthly	Grab	Effluent

Table 6-37. Permit Limits for Outfall 003 at ACL Transportation Services LLC.

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

- 1 Oil & Grease

Comments:
Transfer (by rail or truck) and storage of bulk petroleum and edible oils with loading and unloading capability between terminal and barge.

5/11/07 Compliance Evaluation Inspection: Minor deficiency noted.

TN0058394 Vertex Chemical Corporation

Discharger rating: Minor
City: Memphis
County: Shelby
EFO Name: Memphis
Issuance Date: 11/01/05
Expiration Date: 9/29/10
Receiving Stream(s): McKellar Lake at approximate mile 4.0
HUC-12: 080101000404
Effluent Summary: Non-contact cooling water from Outfall 001
Treatment system: Lagoon system

SEGMENT	TN08010100001_1100
Name	McKellar Lake
Size	13
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Sedimentation/Siltation, Polychlorinated biphenyls, Escherichia coli, Chlordane, Oxygen, Dissolved, Dioxin (including 2,3,7,8-TCDD)
Sources	Sanitary Sewer Overflows (Collection System Failures), Dredging (e.g., for Navigation Channels), Contaminated Sediments, Discharges from Municipal Separate Storm Sewer Systems (MS4)

Table 6-38. Stream Segment Information for Vertex Chemical Corporation.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Flow	All Year		MGD	MAvg Load	2/Month	Instantaneous	Effluent
Flow	All Year		MGD	DMax Load	2/Month	Instantaneous	Effluent
Temperature (°C)	All Year		°C	DMax Conc	2/Month	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Month	Grab	Effluent
pH	All Year	6	SU	DMin Conc	2/Month	Grab	Effluent

Table 6-39. Permit Limits for Vertex Chemical Corporation.

Comments:
Manufacturer of sodium hypochlorite

TN0074055 Lone Star Industries, Inc. d/b/a Buzzi Unicem USA – Memphis

Discharger rating: Minor
City: Memphis
County: Shelby
EFO Name: Memphis
Issuance Date: 4/01/05
Expiration Date: 2/28/10
Receiving Stream(s): Wolf River Lagoon
HUC-12: 080101000404
Effluent Summary: Non-contact cooling water from Outfall 001
Treatment system: Lagoon system

SEGMENT	TN08010100001_1000
Name	Mississippi River
Size	24.9
Unit	Miles
First Year on 303(d) List	1990
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Physical substrate habitat alterations, Sedimentation/Siltation, Chlordane, Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls, Nitrates
Sources	Discharges from Municipal Separate Storm Sewer Systems (MS4), Grazing in Riparian or Shoreline Zones, Non-irrigated Crop Production, Sources Outside State Juristiction or Borders, Dredging (e.g., for Navigation Channels), Contaminated Sediments

Table 6-40. Stream Segment Information for Lone Star Industries, Inc. d/b/a Buzzi Unicem USA.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Flow	All Year		MGD	DMax Load	Quarterly	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Quarterly	Instantaneous	Effluent
Temperature (°C)	All Year		°C	DMax Conc	Quarterly	Grab	Effluent
Temperature (°C)	All Year		°C	MAvg Conc	Quarterly	Grab	Effluent

Table 6-41. Permit Limits for Lone Star Industries, Inc. d/b/a Buzzi Unicem USA.

Comments:
Receive and unload barges of portland cement in silos, and load cement into bags or bulk trucks.

TN0067342 Ensley Engineer Yard

Discharger rating: Minor
City: Memphis
County: Shelby
EFO Name: Memphis
Issuance Date: 6/29/06
Expiration Date: 6/30/10
Receiving Stream(s): Horn Lake Cutoff of McKellar Lake to Mississippi River
HUC-12: 080101000404
Effluent Summary: Industrial storm water runoff from Outfalls SW1, SW2, SW3, SW4 and SW5
Treatment system: Lagoon system

SEGMENT	TN08010211001_0100
Name	Horn Lake Cutoff
Size	16.4
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Fish and Aquatic Life (Supporting), Recreation (Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	N/A
Sources	N/A

Table 6-42. Stream Segment Information for Ensley Engineer Yard.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
COD	All Year		mg/L	DMax Conc	Semi-annually	Grab	Effluent
Flow	All Year		MGD	DMax Load	Semi-annually	Estimate	Effluent
Flow	All Year		MGD	MAvg Load	Semi-annually	Estimate	Effluent
Oil and Grease (Freon EM)	All Year		mg/L	DMax Conc	Semi-annually	Grab	Effluent
TSS	All Year		mg/L	DMax Conc	Semi-annually	Grab	Effluent
pH	All Year		SU	DMax Conc	Semi-annually	Grab	Effluent
pH	All Year		SU	DMin Conc	Semi-annually	Grab	Effluent

Table 6-43. Permit Limits for all Outfalls at Ensley Engineer Yard.

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

- 3 Total Suspended Solids

Comments:
Marine maintenance and repair facility for U.S. Army Corps of Engineers. Memphis District floating plant (boats, dredge, barges, etc.) and construction equipment (trucks, cranes, dozers, etc.) are repaired and stored onsite.

Facility failed Whole Effluent Toxicity test in July 2003; as a result, they replaced water-cooled with an air-cooled air compressor. As a result, elimination of Outfall 001 was requested.

TN0073385 Cummings Marine, Inc.

Discharger rating: Minor
City: Memphis
County: Shelby
EFO Name: Memphis
Issuance Date: 2/01/06
Expiration Date: 2/28/10
Receiving Stream(s): McKellar Lake
HUC-12: 080101000404
Effluent Summary: Process wastewater through Outfall 001
Treatment system: Lagoon system

SEGMENT	TN08010100001_1100
Name	McKellar Lake
Size	13
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Sedimentation/Siltation, Polychlorinated biphenyls, Escherichia coli, Chlordane, Oxygen, Dissolved, Dioxin (including 2,3,7,8-TCDD)
Sources	Sanitary Sewer Overflows (Collection System Failures), Dredging (e.g., for Navigation Channels), Contaminated Sediments, Discharges from Municipal Separate Storm Sewer Systems (MS4)

Table 6-44. Stream Segment Information for Cummings Marine, Inc.

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
Benzene	All Year	0.005	mg/L	DMax Conc	2/Month	Grab	Effluent
Ethylbenzene	All Year	0.01	mg/L	DMax Conc	2/Month	Grab	Effluent
Flow	All Year		MGD	DMax Load	2/Month	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	1/Batch	Instantaneous	Effluent
IC25 7day *Ceriodaphnia dubia*	All Year	100	Percent	DMin Conc	Semi-annually	Composite	Effluent
IC25 7day Fathead Minnows	All Year	100	Percent	DMin Conc	Semi-annually	Composite	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	2/Month	Grab	Effluent
Oil and Grease (Freon EM)	All Year	10	mg/L	MAvg Conc	2/Month	Grab	Effluent
Pb (T)	All Year	0.03	mg/L	DMax Conc	2/Month	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	2/Month	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	2/Month	Grab	Effluent
Toluene	All Year	0.01	mg/L	DMax Conc	2/Month	Grab	Effluent
Xylene	All Year	0.01	mg/L	DMax Conc	2/Month	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Month	Grab	Effluent
pH	All Year	6	SU	DMin Conc	2/Month	Grab	Effluent

Table 6-45. Permit Limits for Cummings Marine, Inc.

Comments: Treatment system mounted on barge.

TN0067288 Lion Oil Company-Memphis

Discharger rating: Minor
City: Memphis
County: Shelby
EFO Name: Memphis
Issuance Date: 7/01/05
Expiration Date: 5/31/10
Receiving Stream(s): Incline Bayou to Mississippi River at mile 734.0
HUC-12: 080101000404
Effluent Summary: Storm water from tank farm, VRU/pump pads, and loading rack; spills/leaks from rack; effluent from treatment system (includes storm water from additive pad/loading pump pad/vapor recovery pad and tank farm areas), wastewater from tank water draws and truck rack from Outfall 001
Treatment system: Storm water from pads treated in oil/water separator with effluent combined with storm water from tank farm areas along with wastewater in equalization tank followed by two oil water separators and three in-series activated carbon columns.

SEGMENT	TN08010100001_1000
Name	Mississippi River
Size	24.9
Unit	Miles
First Year on 303(d) List	1990
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Physical substrate habitat alterations, Sedimentation/Siltation, Chlordane, Dioxin (including 2,3,7,8-TCDD), Polychlorinated biphenyls, Nitrates
Sources	Discharges from Municipal Separate Storm Sewer Systems (MS4), Grazing in Riparian or Shoreline Zones, Non-irrigated Crop Production, Sources Outside State Juristiction or Borders, Dredging (e.g., for Navigation Channels), Contaminated Sediments

Table 6-46. Stream Segment Information for Lion Oil Company-Memphis.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Benzene	All Year	0.5	mg/L	DMax Conc	Monthly	Grab	Effluent
Ethylbenzene	All Year	0.2	mg/L	DMax Conc	Monthly	Grab	Effluent
Flow	All Year		MGD	DMax Load	2/Month	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	2/Month	Instantaneous	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	2/Month	Grab	Effluent
Oil and Grease (Freon EM)	All Year	10	mg/L	MAvg Conc	2/Month	Grab	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	2/Month	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Monthly	Grab	Effluent
Toluene	All Year	1	mg/L	DMax Conc	Monthly	Grab	Effluent
Xylene	All Year	0.5	mg/L	DMax Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Month	Grab	Effluent
pH	All Year	6	SU	DMin Conc	2/Month	Grab	Effluent

Table 6-47. Permit Limits for Lion Oil Company-Memphis.

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

- 3 Total Suspended Solids
- 1 Oil & Grease
- 1 Benzene

Comments:
Wholesale distribution of diesel fuel and gasoline

2/5/07 Compliance Evaluation Inspection: Minor deficiency noted (update storm water plan per NPDES Permit requirements)

APPENDIX II

ID	NAME	HAZARD
277004	JONES FARM POND	L
497012	CANE CREEK #5	N
797003	REELFOOT-INDIAN CREEK	3
707004	PIERSOL LAKE	3
797008	MITCHELL #3	L
797062	CHASE #3	L
797091	CUMBERLAND LAKE #2	3
797101	NORTH FORK CREEK #5	1
497014	OSAGE	3

Table A2-1. Inventoried Dams in the Tennessee Portion of the Mississippi River Watershed. *Hazard Codes: (H, 1), High; (S, 2), Significant; (L, 3), Low. TDEC only regulates dams indicated by a numeric hazard score.*

LAND COVER/LAND USE	ACRES	% OF WATERSHED
Deciduous Forest	26191	6.9%
Emergent Herbaceous Wetlands	2873	0.8%
Evergreen Forest	662	0.2%
Evergreen Shrubland	5138	1.4%
Grassland/Herbaceous	241	0.1%
High Intensity Commercial/Industrial/Transportation	3575	0.9%
High Intensity Residential	2373	0.6%
Low Intensity Residential	5877	1.6%
Open Water	27352	7.2%
Pasture/Hay	3022	0.8%
Row Crops	81186	21.5%
Unclassified	184512	48.8%
Wetlands	34931	9.2%
Total	378166	100%

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

ECOREGION	REFERENCE STREAM	WATERSHED	(HUC)
Northern Mississippi Alluvial Plain (73a)	Cold Creek (73a01)	Mississippi River	08010100
	Middle Fork Forked Deer River (73a02)	Mississippi River	08010100
	Cold Creek (73a01)	Mississippi River	08010100
	Bayou du Chien (73A04)	Obion River	08010202
Bluff Hills (74a)	Sugar Creek (74a06)	Mississippi River	08010100
	Paw Paw Creek (74a08)	Obion River	08010202
Loess Plains (74b)	Terrapin Creek (74b01)	Obion River	08010202
	Powell Creek (74b04)	Obion River	08010202
	Wolf River (74b12)	Wolf River	08010210
	Wolf River (74b12a)	Wolf River	08010211

Table A2-3. Ecoregion Monitoring Sites in Ecoregions 73a, 74a and 74b.

CODE	NAME	AGENCY	AGENCY ID
3	TDEC/DNH WHITES LAKE SITE	TDEC/DNH	S.USTNHP 322
36	TDEC/DNH ANDERSON-TULLY STATE WILDLIFE MGMT SITE	TDEC/DNH	S.USTNHPP 232
146	TDEC/DNH MEEMAN-SHELBY FOREST SITE	TDEC/DNH	S.USTNHP 35
150	TDEC/DNH MUSTIN BOTTOMS SITE	TDEC/DNH	S.USTNHP 183
168	TDEC/DNH SUNK LAKE STATE NATURAL AREA SITE	TDEC/DNH	S.USTNHP 402
193	TDEC/DNH FORT PILLOW STATE PARK SITE	TDEC/DNH	KESEL REPORT
414	TDOT BARR ROAD PERMIT SITE	TDOT	
431	TDEC/WPC MISSISSIPPI RIVER WPC PERMIT SITE	TDEC/WPC	
854	USFWS PERRY BUTLER WRP SITE	USFWS	TRACT 125
855	USFWS TWRA WRP SITE	USFWS	TRACT 54
856	USFWS JERE THOMAS KIRK WRP SITE	USFWS	TRACT 49
888	USFWS TOM YARBRO WRP SITE	USFWS	TRACT 15
889	USFWS AMELIA ELLIS WRP SITE	USFWS	TRACT 21
1094	BRAD BINGHAM THESIS: SITE 1 KNOB CREEK QUAD	USFWS	BINGHAM-KNOB CREEK.1
1095	BRAD BINGHAM THESIS: SITE 2 KNOB CREEK QUAD	USFWS	BINGHAM-KNOB CREEK.2
1096	BRAD BINGHAM THESIS: SITE 3 KNOB CREEK QUAD	USFWS	BINGHAM-KNOB CREEK.3
1097	BRAD BINGHAM THESIS: SITE 4 KNOB CREEK QUAD	USFWS	BINGHAM-KNOB CREEK.4
1098	BRAD BINGHAM THESIS: SITE 5 KNOB CREEK QUAD	USFWS	BINGHAM-KNOB CREEK.5
1102	BRAD BINGHAM THESIS: SITE 9 KNOB CREEK QUAD	USFWS	BINGHAM-KNOB CREEK.9
1107	BRAD BINGHAM THESIS: SITE 14 KNOB CREEK QUAD	USFWS	BINGHAM-KNOB CREEK.14
1108	BRAD BINGHAM THESIS: SITE 15 KNOB CREEK QUAD	USFWS	BINGHAM-KNOB CREEK.15
1109	BRAD BINGHAM THESIS: SITE 16 KNOB CREEK QUAD	USFWS	BINGHAM-KNOB CREEK.16
1118	BRAD BINGHAM THESIS: SITE 25 KNOB CREEK QUAD	USFWS	BINGHAM-KNOB CREEK.25
1119	BRAD BINGHAM THESIS: SITE 26 KNOB CREEK QUAD	USFWS	BINGHAM-KNOB CREEK.26
1120	BRAD BINGHAM THESIS: SITE 27 KNOB CREEK QUAD	USFWS	BINGHAM-KNOB CREEK.27
1121	BRAD BINGHAM THESIS: SITE 28 KNOB CREEK QUAD	USFWS	BINGHAM-KNOB CREEK.28
1124	BRAD BINGHAM THESIS: SITE 31 KNOB CREEK QUAD	USFWS	BINGHAM-KNOB CREEK.31
1126	BRAD BINGHAM THESIS: SITE 33 KNOB CREEK QUAD	USFWS	BINGHAM-KNOB CREEK.33
1127	BRAD BINGHAM THESIS: SITE 34 KNOB CREEK QUAD	USFWS	BINGHAM-KNOB CREEK.34
1130	BRAD BINGHAM THESIS: SITE 37 KNOB CREEK QUAD	USFWS	BINGHAM-KNOB CREEK.37
1132	BRAD BINGHAM THESIS: SITE 39 KNOB CREEK QUAD	USFWS	BINGHAM-KNOB CREEK.39

Table A2-4a.

CODE	NAME	AGENCY	AGENCY ID
1246	TWRA OPEN LAKE SITE	TWRA	
1250	TWRA SITE	TWRA	
1259	USACOE-MEMPHIS ASH SLOUGH SITE	USACOE-MEMPHIS	
1267	USACOE COLD CREEK 96-011 [TD] SITE	USACOE-MEMPHIS	
1325	USACOE MCKELLAR LAKE 95-006 [TF] SITE	USACOE-MEMPHIS	
1327	USACOE MCKELLAR LAKE 96-000 [TF] SITE	USACOE-MEMPHIS	
1330	USACOE M. FORK FORKED DEER RIVER 94-001 [TD] SITE	USACOE-MEMPHIS	
1338	USACOE MISSISSIPPI RIVER-518 SITE	USACOE-MEMPHIS	
1339	USACOE MISSISSIPPI RIVER 94-005 [TD] SITE	USACOE-MEMPHIS	
1340	USACOE MISSISSIPPI RIVER 94-020 [TD] SITE	USACOE-MEMPHIS	
1341	USACOE MISSISSIPPI RIVER 95-012 [TS] SITE	USACOE-MEMPHIS	
1386	USACOE OLD FORKED DEER R-1 (TD) SITE	USACOE-MEMPHIS	
1453	USACOE FORKED DEER RIVER 95-002 SITE	USACOE-MEMPHIS	
1517	USACOE-LMM FORKED DEER RIVER-96-000 9JTS0 SITE	USFWS	
1518	NRCS SITE	USFWS	
1591	USACOE HATCHIE RIVER-34 SITE	USACOE-MEMPHIS	
1637	USACOE OBION RIVER-10 SITE	USACOE-MEMPHIS	
1653	USACOE WOLF RIVER HARBOR-91 SITE	USACOE-MEMPHIS	
1657	USACOE OBION RIVER-28 SITE	USACOE-MEMPHIS	
1661	USACOE MCKELLAR LAKE-2 SITE	USACOE-MEMPHIS	
1662	USACOE MCKELLAR LAKE-10 SITE	USACOE-MEMPHIS	
1670	USACOE OPEN LAKE-1 SITE	USACOE-MEMPHIS	
1671	USACOE OPEN LAKE-2 SITE	USACOE-MEMPHIS	
1672	USACOE COLD CREEK-1 SITE	USACOE-MEMPHIS	
1673	USACOE COLD CREEK/SUNK LAKE-2 SITE	USACOE-MEMPHIS	
1720	USACOE WOLF RIVER-41 SITE	USACOE-MEMPHIS	
1777	USACOE WOLF RIVER HARBOR-90 SITE	USACOE-MEMPHIS	
1778	USACOE WOLF RIVER HARBOR-92 SITE	USACOE-MEMPHIS	
1814	NRCS SITE	NRCS STATE OFFICE	
1815	NRCS SITE	NRCS STATE OFFICE	
1816	NRCS SITE	NRCS STATE OFFICE	
1817	NRCS SITE	NRCS STATE OFFICE	
1818	NRCS SITE	NRCS STATE OFFICE	
1840	TDEC/WPC BIRMINGHAM STEEL CORP./MISS RIVER 95-039	TDEC/WPC	96.157
1844	NRCS SITE	NRCS STATE OFFICE	
1871	NRCS SITE	NRCS STATE OFFICE	
1872	TWRA CHICKASAW SITE	TWRA	
1873	TWRA CHICKASAW-ANDERSON TULLY SITE	TWRA	

Table A2-4b.

CODE	NAME	AGENCY	AGENCY ID
1874	TWRA CHICKASAW SITE	TWRA	
1875	TWRA CHICKASAW SITE	TWRA	
1876	TWRA CHICKASAW SITE	TWRA	
1877	TWRA CHICKASAW SITE	TWRA	
1878	TWRA CHICKASAW SITE	TWRA	
1879	TWRA CHICKASAW SITE	TWRA	
1880	TWRA CHICKASAW REFUGE SITE	TWRA	
1883	TWRA CHICKASAW SITE	TWRA	
1932	TWRA WHITE LAKE SITE	TWRA	
1975	TWRA EAGLE LAKE SITE	TWRA	
1976	TWRA EAGLE LAKE SITE	TWRA	
1977	TWRA EAGLE LAKE SITE	TWRA	
2050	TWRA WHITE LAKE REFUGE SITE	TWRA	
2051	TWRA WHITE LAKE R.O.W. SITE	TWRA	
2060	TWRA CHICKASAW SITE	TWRA	
2061	TWRA CHICKASAW NATIONAL WILDLIFE REFUGE SITE	TWRA	
2120	TWRA WHITES LAKE SITE	TWRA	
2121	TWRA WHITES LAKE SITE	TWRA	
2122	TWRA WHITES LAKE SITE	TWRA	
2123	TWRA WHITES LAKE SITE	TWRA	
2124	TWRA WHITES LAKE SITE	TWRA	
2125	TWRA WHITES LAKE SITE	TWRA	
2185	TWRA COLD CREEK SITE	TWRA	
2186	TWRA COLD CREEK SITE	TWRA	
2187	TWRA COLD CREEK SITE	TWRA	
2188	TWRA COLD CREEK SITE	TWRA	
2189	TWRA COLD CREEK SITE	TWRA	
2190	TWRA COLD CREEK SITE	TWRA	
2191	TWRA COLD CREEK SITE	TWRA	
2192	TWRA COLD CREEK SITE	TWRA	
2193	TWRA COLD CREEK SITE	TWRA	
2194	TWRA COLD CREEK SITE	TWRA	
2195	TWRA COLD CREEK SITE	TWRA	
2196	TWRA COLD CREEK SITE	TWRA	
2197	TWRA EAGLE LAKE SITE	TWRA	
2198	TWRA EAGLE LAKE SITE	TWRA	
2199	TWRA EAGLE LAKE SITE	TWRA	
2200	TWRA NORTH SHELBY FOREST SITE	TWRA	
2201	TWRA NORTH SHELBY FOREST SITE	TWRA	
2202	TWRA NORTH SHELBY FOREST SITE	TWRA	
2203	TWRA NORTH SHELBY FOREST SITE	TWRA	
2225	TWRA CHICKASAW SITE	TWRA	
2227	TWRA CHICKASAW SITE	TWRA	

Table A2-4c.

CODE	NAME	AGENCY	AGENCY ID
2228	TWRA CHICKASAW SITE	TWRA	
2441	TWRA WHITE LAKE SITE	TWRA	
2442	TWRA WHITE LAKE SITE	TWRA	
2443	TWRA WHITE LAKE SITE	TWRA	
2444	TWRA WHITE LAKE SITE	TWRA	
2446	TWRA WHITE LAKE SITE	TWRA	
2447	TWRA WHITE LAKE SITE	TWRA	
2448	TWRA WHITE LAKE SITE	TWRA	
2560	TWRA WILLOW LAKE SITE	TWRA	
2561	TWRA WILLOW LAKE SITE	TWRA	
2562	TWRA WILLOW LAKE SITE	TWRA	
2582	TWRA SITE	TWRA	
2583	TWRA SITE	TWRA	
2584	TWRA SITE	TWRA	
2586	TWRA SITE	TWRA	
2587	TWRA SITE	TWRA	
2600	TWRA COLD CREEK SITE	TWRA	
2603	TWRA LOWER ANDERSON-TULLY SITE	TWRA	
2679	NRCS SITE	NRCS STATE OFFICE	
2699	TDEC/DNH CARNEY WOODS TNC SITE	TDEC/DNH	S.USTNHP 516
2782	USACOE LOOSAHATCHIE RIVER 96-000 [TD] SITE	USACOE-MEMPHIS	960280000

Table A2-4d.

Table A2-4a-d. Wetland Sites in the Tennessee Portion of the Mississippi River 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)
Ballard Slough	TN08010100001_0500	5.8
Bear Creek	TN08010100001_0700	18.2
Brinkley Bayou	TN08010100001_0800	23.1
Cold Creek	TN08010100001_0400	49.7
Middle Fork Forked Deer River	TN08010100001_0300	23.2
Sugar Creek	TN08010100001_0600	13.1

Table A3-1. Streams Fully Supporting the Designated Use of Recreation in the Tennessee Portion of the Mississippi River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
McKellar Lake	TN08010100001_1100	13.0
Mississippi River	TN08010100001_5000	10.2
Mississippi River	TN08010100001_1000	24.9
Mississippi River	TN08010100001_2000	40.0
Mississippi River	TN08010100001_3000	45.2
Mississippi River	TN08010100001_4000	74.0

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

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Ash Slough	TN08010100001_0900	10.1
Blue Bank Bayou	TN08010100001_0200	15.5
Cold Creek	TN08010100001_0320	42.2
Cotton Slough	TN08010100001_0410	20.2
Harris Ditch	TN08010100001_0100	10.1
Jones Slough	TN08010100001_0420	17.1
Knob Creek	TN08010100001_0310	19.8
Misc Tribs to Mississippi River	TN08010100001_0999	38.5
Mooring Bayou	TN08010100001_0210	10.0

Table A3-3. Streams Not Assessed for the Designated Use of Recreation in the Tennessee Portion of the Mississippi River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Ash Slough	TN08010100001_0900	10.1
Ballard Slough	TN08010100001_0500	5.8
Bear Creek	TN08010100001_0700	18.2
Brinkley Bayou	TN08010100001_0800	23.1
Cold Creek	TN08010100001_0400	49.7
Jones Slough	TN08010100001_0420	17.1
Middle Fork Forked Deer River	TN08010100001_0300	23.2
Sugar Creek	TN08010100001_0600	13.1

Table A3-4. Streams Fully Supporting the Designated Use of Fish & Aquatic life in the Tennessee Portion of the Mississippi River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Blue Bank Bayou	TN08010100001_0200	15.46
McKellar Lake	TN08010100001_1100	13.0
Mississippi River	TN08010100001_2000	40.0
Mississippi River	TN08010100001_4000	74.0
Mississippi River	TN08010100001_3000	45.2
Mississippi River	TN08010100001_5000	10.2
Mississippi River	TN08010100001_1000	24.9

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

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Ash Slough	TN08010100001_0900	10.1
Cold Creek	TN08010100001_0320	42.2
Cotton Slough	TN08010100001_0410	20.2
Harris Ditch	TN08010100001_0100	10.1
Jones Slough	TN08010100001_0420	17.1
Knob Creek	TN08010100001_0310	19.8
Misc Tribs to Mississippi River	TN08010100001_0999	38.5
Mooring Bayou	TN08010100001_0210	10.0

Table A3-6. Streams Not Assessed for the Designated Use of Fish & Aquatic Life in the Tennessee Portion of the Mississippi River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Poplar Tree Lake	TN08010100POPLARTLK_1000	125

Table A3-7. Lake Not Assessed for the Designated Use of Recreation in the Tennessee Portion of the Mississippi River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Poplar Tree Lake	TN08010100POPLARTLK_1000	125

Table A3-8. Lake Not Supporting the Designated Use of Fish & Aquatic life in the Tennessee Portion of the Mississippi River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Blue Bank Bayou	TN08010100001_0200	15.46
Mississippi River	TN08010100001_2000	40.0
Mississippi River	TN08010100001_4000	74.0
Mississippi River	TN08010100001_3000	45.2
Mississippi River	TN08010100001_5000	10.2
Mississippi River	TN08010100001_1000	24.9

Table A3-9. Stream Segments Impaired Due to Nutrients in the Tennessee Portion of the Mississippi River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Blue Bank Bayou	TN08010100001_0200	15.46
McKellar Lake	TN08010100001_1100	13.0
Mississippi River	TN08010100001_5000	10.2
Mississippi River	TN08010100001_1000	24.9
Mississippi River	TN08010100001_2000	40.0
Mississippi River	TN08010100001_3000	45.2
Mississippi River	TN08010100001_4000	74.0

Table A3-10. Stream Segments Impaired Due to Siltation in the Tennessee Portion of the Mississippi River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
McKellar Lake	TN08010100001_1100	13.0
Mississippi River	TN08010100001_5000	10.2
Mississippi River	TN08010100001_1000	24.9
Mississippi River	TN08010100001_2000	40.0
Mississippi River	TN08010100001_3000	45.2
Mississippi River	TN08010100001_4000	74.0

Table A3-11. Stream Segments Impaired Due to PCBs and Dioxins in the Tennessee Portion of the Mississippi River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (ACRES)
Poplar Tree Lake	TN08010100POPLARTLK_1000	125

Table A3-12. Lake Impairment Due to Nutrients in the Tennessee Portion of the Mississippi River Watershed.

WATERBODY ID	WATERBODY NAME	TOTAL SEGMENT MILES IMPAIRED	HUC-12
TN08010100001_0320	Cold Creek	42.2	080101000302

Table A3-13. Streams Added to the 2008 303(d) List in the Tennessee Portion of the Mississippi River Watershed. *For more information see Tennessee's 2008 303(d) List at: http://www.state.tn.us/environment/wpc/publications/2008_303d.pdf .*

WATERBODY ID	WATERBODY NAME	TOTAL SEGMENT MILES/ACRES IMPAIRED	CAUSE/POLLUTANT	HUC-12
TN08010100001_4000	Mississippi River	74.0	Nitrate, Siltation	080101000106
TN08010100001_5000	Mississippi River	10.2	Nitrate, Siltation	080101000106
TN08010100001_3000	Mississippi River	45.2	Nitrate, Siltation	080101000201
TN08010100001_4000	Mississippi River	74.0	Nitrate, Siltation	080101000202
TN08010100001_4000	Mississippi River	74.0	Nitrate, Siltation	080101000204
TN08010100001_4000	Mississippi River	74.0	Nitrate, Siltation	080101000301
TN08010100001_3000	Mississippi River	45.2	Nitrate, Siltation	080101000303
TN08010100001_2000	Mississippi River	40.0	Nitrate, Siltation	080101000304
TN08010100001_2000	Mississippi River	40.0	Nitrate, Siltation	080101000304
TN08010100001_3000	Mississippi River	45.2	Nitrate, Siltation	080101000304
TN08010100001_2000	Mississippi River	40.0	Nitrate, Siltation	080101000401
TN08010100001_2000	Mississippi River	40.0	Nitrate, Siltation	080101000402
TN08010100001_2000	Mississippi River	40.0	Nitrate, Siltation	080101000403
TN08010100POPLARTLK_1000	Poplar Tree Lake	125.0 ac	Nutrients	080101000403
TN08010100001_1000	Mississippi River	24.9	Nitrate, Siltation	080101000404
TN08010100001_2000	Mississippi River	40.0	Nitrate, Siltation	080101000404
TN08010100001_1000	Mississippi River	24.9	Nitrate, Siltation	080101000405

Table A3-14. Streams (or pollutants) Delisted Since the 2006 303(d) List in the Tennessee Portion of the Mississippi River Watershed. *For more information see Tennessee's 2008 303(d) List at http://www.state.tn.us/environment/wpc/publications/2008_303d.pdf .*

WATERBODY	DESCRIPTION	BASIS FOR	HUC-12
Barnishee Bayou	Portion in Meeman Shelby Forest State Natural Area.	Meeman Shelby Forest State Natural Area	080101000403
Barnishee Bayou UT*	Portion in Meeman Shelby Forest State Natural Area.	Meeman Shelby Forest State Natural Area	080101000403
Big Cypress Slough	Portion in Meeman Shelby Forest State Natural Area.	Meeman Shelby Forest State Natural Area	080101000403
Big Cypress Slough*	Portion in Meeman Shelby Forest State Natural Area.	Meeman Shelby Forest State Natural Area	080101000403
Brinkley Bayou	Shelby Forest State Natural Area.	Shelby Forest State Natural Area	080101000403
Camp Slough	Portion in Chickasaw NWR.	Chickasaw NWR	080101000305
Dry Arm	Portion in Chickasaw NWR.	Chickasaw NWR	080101000302
Dry Bayou	Portion in Meeman Shelby Forest State Natural Area.	Meeman Shelby Forest State Natural Area.	080101000403
Dry Bayou UT*	Portion in Meeman Shelby Forest State Natural Area.	Meeman Shelby Forest State Natural Area.	080101000403
Eagle Lake	Portion in Meeman Shelby Forest State Natural Area.	Meeman Shelby Forest State Natural Area.	080101000403
Grassy Lake	Entire Lake is in Chickasaw NWR.	Chickasaw NWR	080101000302
Grassy Lake	Entire lake is in Meeman Shelby Forest State Natural Area.	Meeman Shelby Forest State Natural Area.	080101000403
Grassy Lake UT*			080101000403
Hatchie River	Portion in Tennessee (from confluence with Mississippi River to Mississippi State Line).	State threatened Blue Sucker. Designated a State Scenic River. Portions located in Hatchie and Lower Hatchie NWRs and Fort Pillow SHP.	080101000304
Little Cypress Slough	Portion in Meeman Shelby Forest State Natural Area.	Meeman Shelby Forest State Natural Area.	080101000403
Lost Lake	Portion in Chickasaw NWR.	Chickasaw NWR	080101000302
Marie Lake	Portion in Meeman-Shelby Forest State Park.	Meeman-Shelby Forest State Park.	080101000403
Middle Fork Forked Deer River	From Mississippi River to Chisholm Lake.	Exceptional biological diversity. WPC ecoregion reference stream for 73a. Chickasaw NWR	080101000201
Middle Fork Forked Deer River	From Mississippi River to Chisholm Lake.	Exceptional biological diversity. WPC ecoregion reference stream for 73a. Chickasaw NWR	080101000302
Mississippi River	Portion in Tennessee	Federal endangered Pallid Sturgeon, state threatened Blue Sucker.	080101000106
Mississippi River	Portion in Tennessee	Federal endangered Pallid Sturgeon, state threatened Blue Sucker.	080101000201
Mississippi River	Portion in Tennessee	Federal endangered Pallid Sturgeon, state threatened Blue Sucker.	080101000202
Mississippi River	Portion in Tennessee	Federal endangered Pallid Sturgeon, state threatened Blue Sucker.	080101000204
Mississippi River	Portion in Tennessee	Federal endangered Pallid Sturgeon, state threatened Blue Sucker.	080101000301
Mississippi River	Portion in Tennessee	Federal endangered Pallid Sturgeon, state threatened Blue Sucker.	080101000303

Table A3-15a.

WATERBODY	DESCRIPTION	BASIS FOR	HUC-12
Mississippi River	Portion in Tennessee	Federal endangered Pallid Sturgeon, state threatened Blue Sucker.	080101000304
Mississippi River	Portion in Tennessee	Federal endangered Pallid Sturgeon, state threatened Blue Sucker.	080101000401
Mississippi River	Portion in Tennessee	Federal endangered Pallid Sturgeon, state threatened Blue Sucker.	080101000402
Mississippi River	Portion in Tennessee	Federal endangered Pallid Sturgeon, state threatened Blue Sucker.	080101000403
Mississippi River	Portion in Tennessee	Federal endangered Pallid Sturgeon, state threatened Blue Sucker.	080101000404
Mississippi River	Portion in Tennessee	Federal endangered Pallid Sturgeon, state threatened Blue Sucker.	080101000405
Piersol Lake	Portion in Meeman-Shelby Forest State Park.	Meeman-Shelby Forest State Park.	080101000403
Rush Slough	Portion in Chickasaw NWR.	Chickasaw NWR	080101000305
Sugar Creek	From Copper Road to headwaters.	Exceptional biological diversity. WPC ecoregion reference stream for 74a.	080101000401
Sunk Lake	Includes several small lakes in Sunk Lake SNA.	Sunk Lake State Natural Area	080101000305
Swan Lake	Portion in Chickasaw NWR.	Chickasaw NWR	080101000302
The Reach Coker Slough	Portion in Chickasaw NWR.	Chickasaw NWR	080101000305
Wardlows Pocket	Portion in Chickasaw NWR	Chickasaw NWR	080101000201
Whites Lake	Portion in White Lake Refuge.	White Lake Refuge	080101000204

Table A3-15b.

Table A3-15a-b. Known High Quality Waters in the Tennessee Portion of the Mississippi River Watershed as of September 2008. *The most recently published list is available at www.state.tn.us/environment/wpc/publications/hqwlist.mht. NWR, National Wildlife Refuge; WPC, Water Pollution Control; *Located within state or federally protected lands.*

APPENDIX IV

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0106	0201	0202	0203	0204
Bare Rock/Sand/Clay	2	3	22	1	2
Deciduous Forest	373	755	2,693	148	1,428
Developed Open Space	176	4	505	956	236
Emergent Herbaceous Wetlands	239	576	1,208	1	492
Evergreen Forest		1	3	1	1
Grassland/Herbaceous	1				2
High Intensity Development				4	1
Low Intensity Development	4	2	14	60	99
Medium Intensity Development		1		3	5
Mixed Forest					
Open Water	2,943	2,305	5,953	11	8,741
Pasture/Hay					
Row Crops	2,472	3,970	14,257	12,993	8,483
Shrub/Scrub		487	120		119
Woody Wetlands	1,115	1,799	5,443	204	2,850
Total	**7,325**	**9,903**	**30,218**	**14,382**	**24,459**

Table A4-1a.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0301	0302	0303	0304	0305
Bare Rock/Sand/Clay	6	4	28	40	3
Deciduous Forest	1,319	10,436	256	1,409	1,869
Developed Open Space	1,276	1,115			
Emergent Herbaceous Wetlands	126	23			
Evergreen Forest	4	23	22	10	75
Grassland/Herbaceous	2	232			
High Intensity Development	30		1	1	6
Low Intensity Development	183	79	1	1	1
Medium Intensity Development	49	4			
Mixed Forest			115	380	525
Open Water	3,300	1,749	10,442	7,406	1,790
Pasture/Hay		2,608	135	248	545
Row Crops	14,854	15,968	2,980	3,154	27,818
Shrub/Scrub	26	89			
Small Grains			221	70	302
Transitional			171	17	2
Woody Wetlands	2,186	13,561	4,414	7,862	21,554
Total	**23,361**	**45,891**	**18,786**	**20,598**	**54,490**

Table A4-1b.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0401	0402	0403	0404	0405
Bare Rock/Sand/Clay		10	15	202	16
Deciduous Forest	5,606	317	5,388	787	90
Developed Open Space					
Emergent Herbaceous Wetlands				48	
Evergreen Forest	85	14	113	22	
Grassland/Herbaceous					
High Intensity Development	4		1	4,953	1
Low Intensity Development	4			2,249	
Medium Intensity Development					
Mixed Forest	1,864	70	1,346	317	3
Open Water	4,900	4,176	4,232	6,442	4,718
Other Grasses	1	1		1,105	
Pasture/Hay	1,071	162	677	274	227
Quarries/Strip Mines/Gravel Pits				44	
Row Crops	14,319	11,554	5,908	4,632	1,173
Shrub/Scrub					
Small Grains	267	521	141	96	87
Transitional	14		5	137	
Woody Wetlands	4,430	6,736	12,432	5,909	3,245
Total	**32,565**	**23,561**	**30,258**	**27,217**	**9,560**

Table A4-1c.

Tables A4-1a-c Land Use Distribution in the Tennessee Portion of the Mississippi River Watershed by HUC-12. *Data are from 1992 or 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
07032000	Mississippi River	080101000404	932,800.00	95,000.0000	99,000.0000	

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

AGENCY	STATION	LOCATION	HUC_12
TVA	477504	Mississippi River @ RM 898.9	080101000106
TVA	477505	Mississippi River @ RM 900.4	080101000106
TVA	477506	Mississippi River @ RM 901.3	080101000106
USEPA	2191	Mississippi River	080101000202
TDEC	BBANK001.2LA	Blue Bank Bayou	080101000203
TVA	477507		080101000301
TDEC	OGRAV002.0LA	Old Graveyard Slough	080101000301
TDEC	ECO73A02	Middle Forked Deer River	080101000302
TVA	476110	Mississippi River @ RM 779.0	080101000304
TVA	476111	Mississippi River @ RM 775.0	080101000304
TVA	476115	Mississippi River @ RM 0.01	080101000304
TDEC	BALLA000.5TI	Ballard Slough	080101000304
TDEC	COLD004.7LE	Cold Creek @ RM 4.7	080101000305
TDEC	ECO73A01	Cold Creek	080101000305
TDEC	ECO73A03	Cold Creek	080101000305
EPA National Aquatic Resource Survey	OWW04440-1017	Lower Forked Deer River	080101000305
TDEC	ECO74A06	Sugar Creek	080101000401
TVA	476114	Mississippi River @ RM 753.0	080101000402
TDEC	BEAR002.1TI	Bear Creek @ RM 2.1	080101000402
TDEC	TISSUE14	Mississippi River	080101000402
USEPA	126	Mississippi River	080101000403
TVA	476119	Barnishee Bayou	080101000403
TDEC	BRINK000.0SH	Brinkley Bayou	080101000403
TDEC	PTREE000.2SH	Impounded UT to Dry Bayou	080101000403
USEPA	3444	Nonconnah Creek	080101000404
USEPA	470258F		080101000404
USEPA	470258G		080101000404
USEPA	76		080101000404
TDEC	MCKEL001.8SH	McKellar Lake @ RM 1.2	080101000404
TDEC	MCKEL004.4SH	McKellar Lake @ RM 4.4	080101000404
TDEC	MCKEL005.2SH	McKellar Lake @ RM 5.2	080101000404
TDEC	TISSUE09	Mississippi River @ RM 725.0	080101000404
TDEC	TISSUE12	McKellar Lake	080101000404
TDEC	MISSRIVER724.6	Mississippi River @ RM 724.6	080101000405
TDEC	TISSUE11	Mississippi River	080101000405

Table A4-4. STORET Water Quality Monitoring Stations in the Mississippi River Watershed. *TDEC, Tennessee Department of Environment and Conservation; TVA;, Tennessee Valley Authority; USEPA, United States Environmental Protection Agency; UT, Unnamed Tributary.*

PERMIT NUMBER	COUNTY	DESCRIPTION	WATERBODY	HUC-12
NRS04.123	Lake	Channel Dredging, Rip Rap Installation, and Alterations to Wetlands	Mississippi River	080101000106
NRS04.232	Lake	Barge Ramp Construction	Mississippi River	080101000106
NRS03.094N	Shelby	SR 385 Road Alignment	UT to Cypress Creek Canal	080101000202
NRS02.255	Lauderdale	Waterfowl Impoundment	Old Bed Forked Deer River	080101000302
NRS05.329	Tipton	Sand Mining	Mississippi River	080101000304
NR0602.004	Lauderdale	Utility Line Crossings	Cold Creek Overflow	080101000305
NR0602.058	Lauderdale	Temporary Road Crossing	The Reach-Open Lake	080101000305
NRS05.298	Lauderdale	Utility Line Crossings	The Reach, Cold Creek,& Cypress Hole Creek	080101000305
NRS04.085	Shelby	Minor Alterations to Wetlands	Wetlands	080101000401
NR0605.001	Shelby	Utility Line Crossings	McKellar Lake	080101000404
NR0605.023	Shelby	Utility Line Crossings	Mississippi River	080101000404
NR0605.093	Shelby	Emergency Road Repair	Wolf River Harbor	080101000404
NR0605.094	Shelby	Emergency Road Repair	Wolf River Harbor	080101000404
NRS02.101	Shelby	Dredging	McKellar Lake & Mississippi River	080101000404
NRS02.321	Shelby	Wolf River Harbor Mud Slide Removal	Mississippi River	080101000404
NRS02.354	Shelby	Maintenance Dredging	Mississippi River	080101000404
NRS02.444	Shelby	Hydraulic Dredging	McKellar Lake	080101000404
NRS02.451	Shelby	Seismic Retrofit Project 2B	Mississippi River	080101000404
NRS02.465	Shelby	Dredging	Mississippi River	080101000404
NRS03.063	Shelby	Bridge Repairs	Mississippi River	080101000404
NRS03.223	Shelby	Dredging	Mississippi River	080101000404
NRS03.273	Shelby	Bridge Repairs	Mississippi River	080101000404
NRS04.009	Shelby	Grade Control Structure	UT to McKellar Lake	080101000404
NRS04.284	Shelby	Sediment Dredging	McKellar Lake	080101000404
NRS05.073	Shelby	Maintenance Dredging	McKellar Lake	080101000404
NRS05.076	Shelby	Bridge Repairs	Mississippi River	080101000404
NRS05.305	Shelby	Maintenance Dredging	McKellar Lake	080101000404
NRS05.309	Shelby	Hydraulic Dredging	McKellar Lake	080101000404
NRS05.432	Shelby	Dredging	McKellar Lake	080101000404
NRS05.435	Shelby	Sediment Dredging	McKellar Lake	080101000404
NRS06.009	Shelby	Sediment Dredging	McKellar Lake	080101000404
NRS06.010	Shelby	Sediment Dredging	McKellar Lake	080101000404
NRS06.033	Shelby	Sediment Dredging	McKellar Lake Harbor	080101000404
NRS06.169	Shelby	Sediment Dredging	McKellar Lake Harbor	080101000404
NRS06.346	Shelby	Bridge Repairs	Mississippi River	080101000404
NRS07.011	Shelby	Maintenance Dredging	McKellar Lake	080101000404
NRS07.032	Shelby	Maintenance Dredging	McKellar Lake	080101000404
NRS07.048	Shelby	Maintenance Dredging	McKellar Lake	080101000404
NRS07.061	Shelby	Minor Dredging and Filling	McKellar Lake	080101000404

Table A4-5. ARAPs (Aquatic Resource Alteration Permit) issued June 2002 through June 2007 in the Tennessee Portion of the Mississippi River Watershed. UT, Unnamed Tributary.

PERMIT NUBMER	COUNTY	PERMITTEE: DESCRIPTION	AREA	WATERBODY	HUC-12
TNR120673	Lake	U.S. Army Corps of Engineers: Northwest Tennessee Regional Harbor	2.70	Mississippi River	080101000106
TNR120516	Lake	U. S. Army Corps of Engineers: Culvert Replacement	1.00	UT to Mississippi River	080101000202
TNR120491	Lake	Town of Tiptonville: Sewer Force Main	5.00	UT Graveyard Slough	080101000301
TNR120730	Lake	Forcum-Lannom, Inc.: Frocum-Lannom Ready Mixed Concrete	1.90	UT to Old Graveyard Slough	080101000301
TNR120586	Lauderdale	City of Ripley: Sewer Force Main	11.50	UT to Cane Creek, Cold Creek, The Reach, Lower Forked Deer River, & Mississippi River	080101000305
TNR152341	Tipton	Taylor Made Homes: Richardson Lakes Subdivision	36.00	Sugar Creek	080101000401
TNR190446	Tipton	TDOT: Herring Hill	1.15	UT to Bear Creek	080101000401
TNR151590	Shelby	State of Tennessee Capital Projects Management: Wastewater Lagoon	2.20	Mississippi River	080101000403
TNR190739	Shelby	Meeman-Shelby Forest State Park: Multi-Use Trail	5.80	Poplar Tree Lake	080101000403
TNR150506	Shelby	Lauderdale Greenlaw, LLC: Hurt Village Demolition	24.09	Wolf River Lagoon	080101000404
TNR150637	Shelby	Island Properties: Harbor Town Subdivision	3.78	Wolf River Lagoon	080101000404
TNR150719	Shelby	Kevin Hyneman Companies: Island View Subdivision	10.00	Wolf River Lagoon	080101000404
TNR150889	Shelby	Knob Hill, L.P.: Florida/Kentucky Subdivision	4.20	UT to Mississippi River	080101000404
TNR150909	Shelby	City of Memphis: King Riverside Golf Clubhouse	5.10	UT to McKellar Lake	080101000404
TNR150971	Shelby	Memphis Housing Authority: Cleaborn Subdivision	4.80	Mississippi River	080101000404
TNR151011	Shelby	Memphis Housing Authority: Fowler and Latham Terrace	8.13	Mississippi River	080101000404
TNR151023	Shelby	City of Memphis Building Design & Construction: Stable for Mounted Unit for the Division of Police Services	8.00	Wolf River Lagoon	080101000404
TNR151063	Shelby	Lauderdale Greenlaw, LLC: Uptown Village Subdivision	31.00	Wolf River Lagoon	080101000404
TNR151071	Shelby	Island Park, LLC: Island Point Subdivision	19.50	Mississippi River	080101000404
TNR151198	Shelby	Memphis Biotech Foundation: Baptist Research Park	1.40	Mississippi River	080101000404
TNR151279	Shelby	Memphis Housing Authority: LeMoyne Gardens Subdivision	3.20	Old Desoto Bayou	080101000404

Table A4-6a.

PERMIT NUBMER	COUNTY	PERMITTEE: DESCRIPTION	AREA	WATERBODY	HUC-12
TNR151399	Shelby	Memphis Housing Authority: Cleaborn Homes Site Improvements	20.00	Wolf River Lagoon	080101000404
TNR151400	Shelby	Memphis Housing Authority: Dixie Homes Site Improvements	5.50	Wolf River Lagoon	080101000404
TNR151421	Shelby	Memphis Housing Authority: Lamar Terrace Remediation and Demolition	10.60	Mississippi River	080101000404
TNR151422	Shelby	Memphis Housing Authority: Lamar Terrace Remediation and Demolition	15.00	Mississippi River	080101000404
TNR151492	Shelby	Riverpoint Development Company, LLC: Riverpoint Subdivision	20.82	Wolf River Lagoon	080101000404
TNR151498	Shelby	The University of Tennessee Health Science Center: Monroe Avenue Closure	3.60	Mississippi River	080101000404
TNR151502	Shelby	St. Jude Children's Research Hospital: Parking Garage	2.00	Wolf River Lagoon	080101000404
TNR151530	Shelby	Hargett Homes, Inc.: Uptown Village	0.35	Wolf River Lagoon - Gayoso Bayou	080101000404
TNR151542	Shelby	Streets Ministries: Seminary Campus	2.40	UT to Mississippi River	080101000404
TNR151583	Shelby	FaxonGillis Homes, Inc.: Uptown Village	0.00	Wolf River Lagoon	080101000404
TNR151595	Shelby	City of Memphis: Front Street Extension	1.63	Mississippi River	080101000404
TNR151598	Shelby	City of Memphis Building Design & Construction: Bickford Park Improvements	1.81	Wolf River Lagoon	080101000404
TNR151599	Shelby	Cargill, Inc.: Railroad Spur Installation	2.00	McKellar Lake	080101000404
TNR151678	Shelby	Memphis Housing Authority: Demolition	16.30	Mississippi River	080101000404
TNR151696	Shelby	State Place, LLC: State Place Subdivision	3.40	Mississippi River	080101000404
TNR151705	Shelby	Shelby County Health Care Corporation: Demolition	2.10	Mississippi	080101000404
TNR151741	Shelby	Burton Capital, LLC Harrison Kerr Tigrett Trust: The Ivy at South End Subdivision	1.51	Mississippi River	080101000404
TNR151758	Shelby	City of Memphis: Mud Island Roundabout	2.20	Mississippi River	080101000404
TNR151790	Shelby	April Woods Apartments, LP: April Woods Apartments West	1.23	Wolf River Lagoon	080101000404
TNR151849	Shelby	WesPac Pipeline LTD: WesPac Jet Fuel Pipeline	7.60	Nonconnah Creek & McKellar Lake	080101000404
TNR151952	Shelby	FaxonGillis Homes, Inc.: Uptown Village	0.00	Wolf River Lagoon	080101000404

Table A4-6b.

PERMIT NUBMER	COUNTY	PERMITTEE: DESCRIPTION	AREA	WATERBODY	HUC-12
TNR151959	Shelby	Sovereign Builders: Main and Carolina Subdivision	1.80	Mississippi River	080101000404
TNR151965	Shelby	Beazer Homes Corporation: State Place Subdivision	0.00	UT to Mississippi River	080101000404
TNR151971	Shelby	MBA Development Corporation: Lamar Terrace Remediation and Demolition	12.20	Mississippi River	080101000404
TNR152012	Shelby	Faxon Gillis: Carolina Lofts	2.66	Mississippi River	080101000404
TNR152014	Shelby	State of Tennessee: Memphis Mental Health Institute	2.06	UT to Mississippi River	080101000404
TNR152046	Shelby	T.E. Products Pipeline Company, LP: Jet Fuel Pipeline	15.60	Mississippi River	080101000404
TNR152115	Shelby	Monroe Properties, LLC: The Coleman Subdivision	1.01	Storm Drain to Mississippi River	080101000404
TNR152191	Shelby	CD Champion Hotels, Inc.: Microtel Inn and Suites	1.40	Bayou Gayoso	080101000404
TNR152223	Shelby	Memphis Housing Authority: Dixie Homes Site Improvements	38.43	Wolf River Lagoon	080101000404
TNR152368	Shelby	Rivertown, LLC: Rivertown at the Island	11.70	Wolf River Lagoon	080101000404
TNR152386	Shelby	Harbor View Properties, Inc.: Court Manor	8.50	Wolf River Lagoon	080101000404
TNR152546	Shelby	Exxon Mobil Corporation: Containment Dike	1.50	Mississippi River	080101000404
TNR190375	Shelby	TDOT: McLemore Avenue Bridge and Approaches	2.67	Mississippi River	080101000404
TNR190418	Shelby	TDOT: South Parkway Bridge	4.49	Mississippi River & Nonconnah Creek	080101000404
TNR190543	Shelby	TDOT: ITS (Smartway)	70.00	Headwaters & UTs to Ten Mile Bayou, Fifteen Mile Bayou, Mississippi River, Wolf River, Cypress Creek, Nonconnah Creek, Fletcher Creek, Harrison Creek & Days Creek	080101000404
TNR190557	Shelby	TVA: Allen Fossil Plant	6.30	Mississippi River	080101000404
TNR190699	Shelby	TDOT: SR 1 Resurface, Widening, and Realignment	14.50	Bayou Gayoso, Wolf River, & Mississippi River.	080101000404

Table A4-6c.

Tables A4-6a-c. CGPs (Construction General Permit) issued June 2002 through June 2007 in the Tennessee Portion of the Mississippi River Watershed. Area, Acres of Property Associated with Construction Activity; UT, Unnamed Tributary.

PERMIT NUBER	PERMITTEE	SIC	SIC NAME	MADI	WATERBODY	HUC-12
TN0026409	Tiptonville-City Lagoon	4952	Sewerage Systems	Minor	Mississippi River @ RM 872.5	080101000301
TN0078191	City of Ripley Wastewater Lagoon	4952	Sewerage Systems	Major	Mississippi River @ RM 800.5	080101000303
TN0062499	Munford Sewer Department Lagoon	4952	Sewerage Systems	Major	Mississippi River @ RM 761	080101000401
TN0027600	TDEC Meeman Shelby State Park	4952	Sewerage Systems	Minor	Mississippi River @ RM 750.0	080101000402
TN0000108	ExxonMobil Oil Corporation Memphis Terminal	5171	Petroleum Bulk Stations and Terminals	Minor	Mississippi River @ RM 734	080101000404
TN0001066	Petroleum Fuel & Terminal Company	5171, 4226	Petroleum Bulk Stations and Terminals, Special Warehousing and Storage	Minor	UT to Mississippi River @ RM 734.0	080101000404
TN0001171	ACL Transportation Services, LLC	4491	Marine Cargo and Handling	Minor	Mississippi River @ RM 734.4	080101000404
TN0005355	TVA Allen Fossil Plant	4911	Electric Services	Major	McKellar Lake to Mississippi River @ RM 725.6, Horn Lake Cutoff to McKellar Lake, & Mississippi River @ RM 725.0	080101000404
TN0020711	Memphis Maynard C. Stiles STP	4952	Sewerage Systems	Major	Mississippi River @ RM 738.8	080101000404
TN0022543	The Premcor Refining Group, Inc. - Valero Riverside Terminal	5171	Petroleum Bulk Stations and Terminals	Minor	Mississippi River @ RM 734	080101000404
TN0029068	Cargill Incorporated	2046	Wet Corn Milling	Minor	McKellar Lake @ RM 2.8	080101000404
TN0041530	Lafarge North America	5032	Brick, Stone, and Related Construction Materials	Minor	Wolf River Lagoon to Mississippi River	080101000404
TN0058394	Vertex Chemical Corporation	2819	Industrial Inorganic Chemicals, NEC	Minor	McKellar Lake @ RM 4.0	080101000404
TN0067288	Lion Oil Company-Memphis	5171	Petroleum Bulk Stations and Terminals	Minor	Incline Bayou to Mississippi River @ RM 734.0	080101000404
TN0073385	Cummings Marine, Inc.	4491	Marine Cargo and Handling	Minor	McKellar Lake	080101000404
TN0074055	Lone Star Industries, Inc. d/b/a Buzzi Unicem USA - Memphis	5039	Construction Materials	Minor	Wolf River Lagoon	080101000404

Table A4-7 Municipal and Industrial Permittees in the Tennessee Portion of the Mississippi River Watershed. SIC, Standard Industrial Code; MADI, Major Discharge Indicator; UT, Unnamed Tributary.

PERMIT NUMBER	PERMITTEE	WATERBODY	HUC-12
TNG110158	Forcum Lannom Materials	Lewis Creek	080101000301
TNG110328	Forcum-Lannom, Inc.	Mississippi River	080101000301
TNG110260	Mississippi Limestone Corporation	Not Identified	080101000401

Table A4-8. RMCP (Ready Mix Concrete Plant) Permittees in the Tennessee Portion of the Mississippi River Watershed.

PERMIT NUMBER	PERMITTEE	SECTOR	WATERBODY	AREA	HUC-12
TNR050397	Georgia Gulf Chemicals &Vinyls, Inc.	Y	Harris Ditch	7.00	080101000301
TNR055958	Hyde's Auto & Salvage	M	UT to Mississippi River	4.00	080101000301
TNR056131	Goodman's Salvage	M	Groundwater	1.50	080101000301
TNR055043	Ampro Industries, Inc.	C	UT to Todd Creek to Loosa/Mississippi River	4.64	080101000403
TNR050013	Great Dane Trailers	AB	Mississippi River @ RM 733.5	7.50	080101000404
TNR050045	Bailey-Parks Urethane, Inc.	Y	Memphis Storm Sewer System to Mississippi River	1.60	080101000404
TNR050105	Memphis Wire & Iron Works, Inc.	AA	Not Identified	1.00	080101000404
TNR050141	Cargill Grain Elevator	P	McKellar Lake	5.20	080101000404
TNR050151	Hershey - Memphis	U	Memphis Storm Sewer to Mississippi River	19.60	080101000404
TNR050160	Keeler Iron Works, Inc.	AA	Harbor Channel of McKellar Lake to Mississippi River	10.00	080101000404
TNR050167	Williams Machine Works, Inc.	AB	McKellar Lake to Mississippi River	3.00	080101000404
TNR050468	CPI Concrete Products Inc	E	Mississippi River	15.50	080101000404
TNR050470	Flint Ink North America Corporation (Manders Premier, Inc.)	C	Nonconnah Creek	0.92	080101000404
TNR050528	BCS Industries, LLC	F	McKellar Lake	14.50	080101000404
TNR050530	Vertex Chemical Corporation	C	McKellar Lake	24.00	080101000404
TNR050564	Fleischmann's Yeast	U	Mississippi River	7.54	080101000404
TNR050576	Ergon Trucking, Inc.	P	Mississippi River	2.00	080101000404
TNR050635	Waxler Towing Company, Inc.	Q	Mississippi River	9.93	080101000404
TNR050657	W. M. Barr & Company, Inc.	C	McKellar Lake	3.50	080101000404
TNR050703	Lone Star Industries, Inc. d/b/a Buzzi Unicem USA - Memphis	AD	Wolf River	5.00	080101000404
TNR050760	Sonoco Products Company PI Facility	AA	Mississippi River	10.00	080101000404
TNR050763	Paulo Products Company	F	Harbor Channel to Mississippi River	1.40	080101000404
TNR050929	Cargill Incorporated	U	McKellar Lake	67.47	080101000404
TNR050970	Trumbo, Inc.	AA	Mississippi River	4.00	080101000404
TNR050987	Jones Fiber Products, Inc. Memphis	V	McKellar Lake	20.00	080101000404

Table A4-9a.

PERMIT NUMBER	PERMITTEE	SECTOR	WATERBODY	AREA	HUC-12
TNR051020	River City Chrome, Inc.	AA	Wolf River Lagoon	0.60	080101000404
TNR051064	Hawkins Machinery, Inc.	M	Wolf River	5.00	080101000404
TNR051079	Grief Brothers Corporation	AA	Not Identified	6.00	080101000404
TNR051109	Marshall Steel Inc Memphis	AB	Memphis Storm Sewer System to McKellar Lake to Mississippi River	4.00	080101000404
TNR051148	Lucite International, Inc.	C	Shelby County Sewer System	7.97	080101000404
TNR051183	G & W Diesel Service, Inc.	P	Mississippi River	10.00	080101000404
TNR051200	Kinder Morgan River Terminals, LLC	Q	McKellar Lake	25.00	080101000404
TNR051266	Bryce LLC	X	McKellar Lake	7.89	080101000404
TNR051368	Empire Express, Inc.	P	McKellar Lake to Mississippi River	2.68	080101000404
TNR051610	Anderson - Tully Company	A	Willow Branch to Wolf River Lagoon to Mississippi River	21.60	080101000404
TNR051651	General Electric Memphis Lamp Plant	AC	McKellar Lake	5.40	080101000404
TNR051664	ANR Advance Transportation Memphis	P	Mississippi River	4.70	080101000404
TNR051712	General Electric Memphis Lamp Plant	L	McKellar Lake	6.60	080101000404
TNR051714	Memphis Solutions Company	C	McKellar Lake to Mississippi River	3.70	080101000404
TNR051751	CTL Distribution, Inc.	P	Harbor Channel to Mississippi River	2.20	080101000404
TNR051805	Worley's City Iron & Metal, Inc.	M	Mississippi River	3.28	080101000404
TNR051808	Metal Prep - Memphis	AA	UT to Mississippi River	5.00	080101000404
TNR051841	T & B Trucking	P	McKellar Lake to Mississippi River	9.50	080101000404
TNR051863	Jorgensen-Bennett Mfg Company	A	Marble Creek	6.50	080101000404
TNR051952	APAC Tennessee, Inc.	D	Mississippi River	48.00	080101000404
TNR051953	American Lubricating Company, Inc.	D	McKellar Lake to Mississippi River	1.00	080101000404
TNR051969	Keystone Laboratories, Inc.	C	McKellar Lake to Mississippi River	2.50	080101000404
TNR051972	D & J Metal Products, Inc.	AA	Harbor Channel of Lake McKellar	2.06	080101000404
TNR051982	Tri Chem Products, Inc.	C	Memphis Storm Sewer System to Mississippi River	0.70	080101000404
TNR052053	UPS Ground Freight, Inc.	P	Days Creek	20.00	080101000404
TNR053034	Memphis Recycling Services	N	Memphis Storm Sewer System to Mississippi River	2.10	080101000404
TNR053074	Cooper Air Freight Service, Inc.	P	Memphis Storm Sewer System to Mississippi River	3.21	080101000404

Table A4-9b.

PERMIT NUMBER	PERMITTEE	SECTOR	WATERBODY	AREA	HUC-12
TNR053108	Memphis VMF	P	Mississippi River	4.25	080101000404
TNR053167	Westway Terminal Co.	U	Wolf River	7.80	080101000404
TNR053184	TVA Allen Fossil Plant	O	Mississippi River	2.19	080101000404
TNR053303	Miller Transporters - Memphis	P	Mississippi River	4.50	080101000404
TNR053315	Metal Management Memphis, L.L.C.	N	Wolf River	30.05	080101000404
TNR053316	Lazarov Brothers Tin Compress (d/b/a Perlco, LLC)	N	Wolf River	1.00	080101000404
TNR053330	Maynard C. Stiles Wastewater Facility	T	Wolf River & Mississippi	43.70	080101000404
TNR053376	Bluff City Steel	F	McKellar Lake to Mississippi River	4.00	080101000404
TNR053466	A. Karchmer and Son, Inc.	N	McKellar Lake to Mississippi River	8.00	080101000404
TNR053469	Paper Stock Dealers, Inc.	N	Not Identified	1.20	080101000404
TNR053650	Wooten Transports, Inc.	P	Memphis Storm Sewer System	4.50	080101000404
TNR053691	Block Drug Company, Inc.	AD	Land Discharge to North Side of Presidents Island	20.10	080101000404
TNR053731	HPD Laboratories, Inc.	C	Memphis Storm Sewer System to McKellar Lake	12.17	080101000404
TNR053874	Ergon Asphalt & Emulsions, Inc.- Technical Coatings Division	D	Memphis Storm Sewer System	3.20	080101000404
TNR053990	Owens Laminated Flooring	A	Willow Branch, Wolf River Lagoon, Mississippi River, & Memphis Storm Sewer System	21.60	080101000404
TNR054000	AMTRK Station	P	UTs to Mississippi River	16.59	080101000404
TNR054012	Iskiwitz Metals	N	Mississippi River	3.47	080101000404
TNR054019	Interstate Brands Corporation (Wonder - Hostess)	U	Memphis Storm Sewer System	4.20	080101000404
TNR054075	Martin Marietta Materials, Inc.	J	McKellar Lake	34.00	080101000404
TNR054117	Ledbetter Packing Company	U	Harbor Channel of McKellar Lake to Mississippi River	11.20	080101000404
TNR054147	Sugar Services Corporation	U	Mississippi River	8.00	080101000404
TNR054179	Tri Chem Products, Inc.		Not Identified	0.69	080101000404
TNR054257	Farrell-Calhoun Paint, Inc.	C	Memphis Storm Sewer System to Mississippi River	4.13	080101000404
TNR054311	Yarbrough Cable Service, LLC	AA	Memphis Storm Sewer System	1.47	080101000404
TNR054314	Americraft Carton, Inc.	B	Mississippi River	4.00	080101000404
TNR054479	S & W Machine Works, Inc.	AB	Groundwater	1.41	080101000404
TNR054488	Phoenix Manufacturing Company	AA	Memphis Storm Sewer System to McKellar Lake	4.59	080101000404

Table A4-9c.

PERMIT NUMBER	PERMITTEE	SECTOR	WATERBODY	AREA	HUC-12
TNR054509	Walter M Fields Lumber Company	A	Memphis Storm Sewer System	5.90	080101000404
TNR054566	Edge Biologicals, Inc.	C	Mississippi River	0.50	080101000404
TNR055052	Tomsin Steel Processing, Inc.	F	McKellar Lake	6.20	080101000404
TNR055067	Jones Fiber Products, Inc.	V	McKellar Lake	5.00	080101000404
TNR055931	J.L. Schranz Trucking	P	Mississippi River	1.90	080101000404
TNR055965	Amtrak	P	UTs to Mississippi River	0.10	080101000404
TNR055994	The Gromoor Company	C	McKellar Lake	0.75	080101000404
TNR056114	East Street Automotive	M	Not Identified	2.00	080101000404
TNR056441	Dunlap Street Used Auto Parts	M	Memphis Storm Sewer System to Mississippi River	23.89	080101000404
TNR056458	Levee Auto Parts and Salvage, Inc.	M	WWC to Mississippi River	4.50	080101000404
TNR056490	Siemens Water Technologies Corporation	N	McKellar Lake	2.00	080101000404
TNR056538	SemMaterials, L.P.	D	McKellar Industrial Harbor	14.00	080101000404
TNR056578	National Railroad Passenger Corporation- Memphis	P	Mississippi River	23.89	080101000404
TNR056651	Pyramid Sign & Awning, Inc.	Y	Mississippi River	0.50	080101000404
TNR056665	Ergon Terminaling, Inc. - Memphis		McKellar Lake to Mississippi River	39.00	080101000404
TNR056731	MLGW	AD	Mississippi River	0.69	080101000404
TNR056732	MLGW	AD	Mississippi River	2.23	080101000404
TNR056733	MLGW-Beaver Building	AD	Mississippi River	0.68	080101000404
TNR056734	MLGW-Body Shop	AD	Mississippi River	1.63	080101000404
TNR056736	MLGW-Central Shops	AD	Mississippi River	2.35	080101000404
TNR056738	MLGW-Heavy Equipment Building	AD	Mississippi River	2.41	080101000404
TNR056776	Drexel Chemical Company	C	McKellar Lake	2.00	080101000404
TNR056809	City of Memphis Asphalt Plant	D	Mississippi River	3.00	080101000404
TNR056821	Remarket, Inc.	F	McKellar Lake	5.50	080101000404
TNR056826	Tangent Rail Products	C	McKellar Lake	10.00	080101000404

Table A4-9d.

Tables A4-9a-d. TMSPs (Tennessee Multi Sector Permit) issued in the Tennessee Portion of the Mississippi River Watershed. Area, Acres of Property Associated with Industrial Activity; WWC, Wet Weather Conveyance; UT Unnamed Tributary. See Table A4-10 for Sector Details.

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 A4-10. TMSP Sectors and Descriptions.

APPENDIX V

LAND TREATMENT – CONSERVATION BUFFERS			
	Field Borders (feet)	Filter Strip (feet)	Riparian Forest Buffer (acres)
FY 2002		25	
FY 2003		4	19
FY 2005	6000		
FY 2006	8250		

Table A5-1a. Land Treatment Conservation Practices (Conservation Buffers), in Partnership with NRCS in the Tennessee Portion of the Mississippi River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2002 to 2006.*

EROSION CONTROL		
	Est. soil saved (tons/year)	Land Treated with erosion control measures (acres)
FY 2002	33006	3350
FY 2003	19383	2532

Table A5-1b. Erosion Control Conservation Practices, in Partnership with NRCS in the Tennessee Portion of the Mississippi River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2002 to 2006.*

NUTRIENT MANAGEMENT			
	AFO Nutrient Mgmt Applied (acres)	Non-AFO Nutrient Mgmt. Applied (acres)	Total Applied (acres)
FY 2002	14		14
FY 2003	14	2018	2032
FY 2005	4440		4440
FY 2006	5771		5771

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

PEST MANAGEMENT	
	Pest Mgmt. Systems (acres)
FY 2003	1900
FY 2005	4440
FY 2006	5803

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

GRAZING/FORAGES		
	Prescribed Grazing (acres)	Pasture and Hay Planting (acres)
FY 2004		30
FY 2005	8	
FY 2006		6

Table A5-1e. Grazing/Forages Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Mississippi River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2002 to 2006.*

TREE AND SHRUB PRACTICES					
	Land 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	1412		1740		
FY 2003			652		
FY 2004			1523	1523	
FY 2005		57	49	107	304
FY 2006	132	1465	153	1618	336

Table A5-1f. Tree and Shrub Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Mississippi River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2002 to 2006.*

LAND TREATMENT – TILLAGE AND CROPPING			
	Residue Mgmt, No-till, Strip till (acres)	Tillage & Residue Mgmt Systems (acres)	Conservation Crop Rotation (acres)
FY 2002	1825	1825	
FY 2003	2109	2109	
FY 2005	1352	1352	3597
FY 2006	4985	4985	5987

Table A5-1g. Land Treatment Conservation Practices (Tillage and Cropping), in Partnership with NRCS in the Tennessee Portion of the Mississippi River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2002 to 2006.*

WETLANDS	
	Wetlands Created or Restored (acres)
FY 2002	3264
FY 2003	1598
FY 2004	1956
FY 2005	40
FY 2006	190

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

WILDLIFE HABITAT MANAGEMENT			
	Upland Habitat Mgmt (acres)	Wetland Habitat Mgmt (acres)	Total Wildlife Habitat Mgmt Applied (acres)
FY 2003	330	1359	1689
FY 2004	194	1956	2150
FY 2005	1644	40	1684
FY 2006	4230	190	4420

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

PRACTICE	NRCS CODE	NUMBER OF BMPs
Dike	356	4
Grade Stabilization Structure	410	5
Pasture & Hayland Establishment	512	1
Terrace	600	1
Water/Sediment Control Basin	638	2
Total BMPs		**13**

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

SITE ID	WATER BODY	YEAR
119990301	Hatchie River	1999

Table A5-3. TWRA TADS Sampling Sites in the Tennessee Portion of the Mississippi River Watershed.