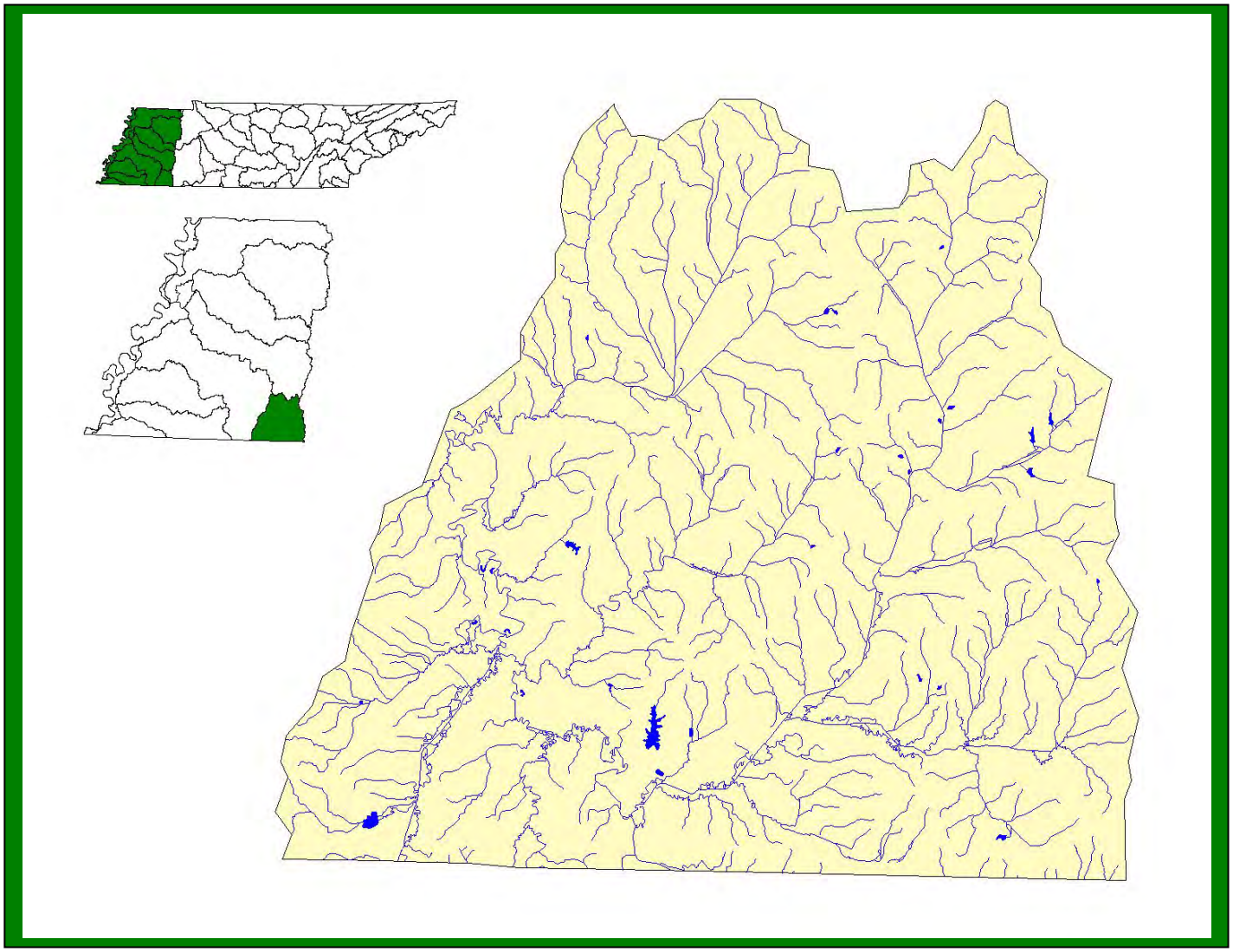
UPPER HATCHIE RIVER WATERSHED (08010207) OF THE MISSISSIPPI RIVER BASIN

WATERSHED WATER QUALITY MANAGEMENT PLAN



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

Presented to the people of the Upper Hatchie River Watershed by the Division of Water Pollution Control October 11, 2007.

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UPPER HATCHIE RIVER WATERSHED
WATER QUALITY MANAGEMENT PLAN

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GLOSSARY

1Q20. The lowest average 1 consecutive days flow with average recurrence frequency of once every 20 years.

30Q2. The lowest average 3 consecutive days flow with average recurrence frequency of once every 2 years.

7Q10. The lowest average 7 consecutive days flow with average recurrence frequency of once every 10 years.

303(d). The section of the federal Clean Water Act that requires a listing by states, territories, and authorized tribes of impaired waters, which do not meet the water quality standards that states, territories, and authorized tribes have set for them, even after point sources of pollution have installed the minimum required levels of pollution control technology.

305(b). The section of the federal Clean Water Act that requires EPA to assemble and submit a report to Congress on the condition of all water bodies across the Country as determined by a biennial collection of data and other information by States and Tribes.

AFO. Animal Feeding Operation.

Ambient Sites. Those sites established for long term instream monitoring of water quality.

ARAP. Aquatic Resource Alteration Permit.

Assessment. The result of an analysis of how well streams meet the water quality criteria assigned to them.

Bankfull Discharge. The momentary maximum peak flow before a stream overflows its banks onto a floodplain.

Basin. An area that drains several smaller watersheds to a common point. Most watersheds in Tennessee are part of the Cumberland, Mississippi, or Tennessee Basin (The Conasauga River and Barren River Watersheds are the exceptions).

Benthic. Bottom dwelling.

Biorecon. A qualitative multihabitat assessment of benthic macroinvertebrates that allows rapid screening of a large number of sites. A Biorecon is one tool used to recognize stream impairment as judged by species richness measures, emphasizing the presence or absence of indicator organisms without regard to relative abundance.

BMP. An engineered structure or management activity, or combination of these, that eliminates or reduces an adverse environmental effect of a pollutant.

BOD. Biochemical Oxygen Demand. A measure of the amount of oxygen consumed in the biological processes that break down organic and inorganic matter.

CAFO. Concentrated Animal Feeding Operation.

Designated Uses. The part of Water Quality Standards that describes the uses of surface waters assigned by the Water Quality Control Board. All streams in Tennessee are designated for Recreation, Fish and Aquatic Life, Irrigation, and Livestock Watering and Wildlife. Additional designated uses for some, but not all, waters are Drinking Water Supply, Industrial Water Supply, and Navigation.

DMR. Discharge Monitoring Report. A report that must be submitted periodically to the Division of Water Pollution Control by NPDES permitees.

DO. Dissolved oxygen.

EPA. Environmental Protection Agency. The EPA Region 4 web site is http://www.epa.gov/region4/

Field Parameter. Determinations of water quality measurements and values made in the field using a kit or probe. Common field parameters include pH, DO, temperature, conductivity, and flow.

Fluvial Geomorphology. The physical characteristics of moving water and adjoining landforms, and the processes by which each affects the other.

HUC-8. The 8-digit Hydrologic Unit Code corresponding to one of 54 watersheds in Tennessee.

HUC-10. The 10-digit NRCS Hydrologic Unit Code. HUC-10 corresponds to a smaller land area than HUC-8.

HUC-12. The 12-digit NRCS Hydrologic Unit Code. HUC-12 corresponds to a smaller land area than HUC-10.

MRLC. Multi-Resolution Land Classification.

MS4. Municipal Separate Storm Sewer System.

Nonpoint Source (NPS). Sources of water pollution without a single point of origin. Nonpoint sources of pollution are generally associated with surface runoff, which may carry sediment, chemicals, nutrients, pathogens, and toxic materials into receiving waterbodies. Section 319 of the Clean Water Act of 1987 requires all states to assess the impact of nonpoint source pollution on the waters of the state and to develop a program to abate this impact.

NPDES. National Pollutant Discharge Elimination System. Section 402 of the Clean Water Act of 1987 requires dischargers to waters of the U.S. to obtain NPDES permits.

NRCS. Natural Resources Conservation Service. NRCS is part of the federal Department of Agriculture. The NRCS home page is http://www.nrcs.usda.gov

Point Source. Any discernable, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture (Clean Water Act Section 502(14)).

Q Design. The average daily flow that a treatment plant or other facility is designed to accommodate.

Reference Stream (Reference Site). A stream (site) judged to be least impacted. Data from reference streams are used for comparisons with similar streams.

SBR. Sequential Batch Reactor.

Stakeholder. Any person or organization affected by the water quality or by any watershed management activity within a watershed.

STATSGO. State Soil Geographic Database. STATSGO is compiled and maintained by the Natural Resources Conservation Service.

STORET. The EPA repository for water quality data that is used by state environmental agencies, EPA and other federal agencies, universities, and private citizens. STORET (Storage and Retrieval of National Water Quality Data System) data can be accessed at http://www.epa.gov/storet/

TDA. Tennessee Department of Agriculture. The TDA web address is http://www.state.tn.us/agriculture

TDEC. Tennessee Department of Environment and Conservation. The TDEC web address is http://www.tdec.net

TMDL. Total Maximum Daily Load. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of the amount to the pollutant's sources. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. The calculation includes a margin of safety to ensure that the waterbody can be used for the purposes the State has designated. The calculation must also account for seasonal variation in water quality. A TMDL is required for each pollutant in an impaired stream as described in Section 303 of the Federal Clean Water Act of 1987. Updates and information on Tennessee's TMDLs can be found at http://www.tdec.net/wpc/tmdl/

TMSP. Tennessee Multi-Sector Permit.

USGS. United States Geological Survey. USGS is part of the federal Department of the Interior. The USGS home page is http://www.usgs.gov/.

WAS. Waste Activated Sludge.

Water Quality Standards. A triad of designated uses, water quality criteria, and antidegradation statement. Water Quality Standards are established by Tennessee and approved by EPA.

Watershed. A geographic area which drains to a common outlet, such as a point on a larger stream, lake, underlying aquifer, estuary, wetland, or ocean.

WET. Whole Effluent Toxicity.

WWTP. Waste Water Treatment Plant

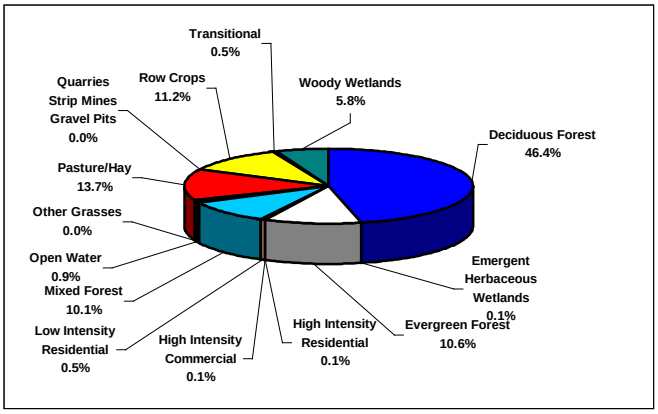
Summary – Upper Hatchie River Watershed (08010207)

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 Upper Hatchie River Watershed Water Quality Management Plan discusses the Watershed Approach and emphasizes that the Watershed Approach is not a regulatory program or an EPA mandate; rather it is a decision-making process that reflects a common strategy for information collection and analysis as well as a common understanding of the roles, priorities, and responsibilities of all stakeholders within a watershed. Traditional activities like permitting, planning and monitoring are also coordinated in the Watershed Approach.

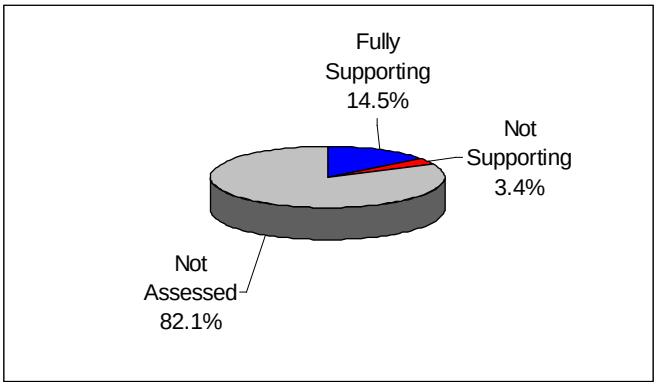
A detailed description of the watershed can be found in Chapter 2. The Upper Hatchie River Watershed is approximately 1,461 square miles (1,446 mi^2 in Tennessee) and includes parts of three Tennessee counties. A part of the Mississippi River drainage basin, the watershed has 752.5 stream miles.



Land Use Distribution in the Tennessee Portion of the Upper Hatchie River Watershed.

One state scenic river segment and one state environmental education area are located in the watershed. Twenty-three rare plant and animal species have been documented in the watershed, including three rare fish species and one rare crustacean species.

A review of water quality sampling and assessment is presented in Chapter 3. Using the Watershed Approach to Water Quality, 126 sampling events occurred in the Upper Hatchie River Watershed in 2000-2005. These were conducted at ambient, ecoregion or watershed monitoring sites. Monitoring results support the conclusion that 81.0% of stream miles assessed fully support one or more designated uses.



Water Quality Assessment of Streams and Rivers in the Tennessee Portion of the Upper Hatchie River Watershed. Assessment data are based on the 2004 Water Quality Assessment of 752.5 stream miles in the watershed.

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

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

HUC-10	HUC-12
0801020702	080102070202 (Bridge Creek)
	080102070203 (Cain Creek)
	080102070208 (Tuscumbia Creek)
0801020704	080102070401 (Hatchie River)
	080102070408 Hatchie River)
	080102070409 (Mosses Creek)
0801020705	080102070501 (Muddy Creek)
0801020706	080102070601 (Upper Cypress Creek)
	080102070602 (Muddy Creek)
	080102070603 (Lower Cypress Creek)
0801020707	080102070701 (Upper Little Hatchie Creek)
	080102070702 (Lower Little Hatchie Creek)

The Tennessee Portion of the Upper Hatchie River Watershed is Composed of twelve USGS-Delineated Subwatersheds (12-Digit Subwatersheds).

Point source contributions to the Tennessee portion of the Upper Hatchie River Watershed consist of two individual NPDES-permitted facilities. Other point source permits in the watershed (as of October 11, 2007) are Tennessee Multi-Sector Permits (9), Aquatic Resource Alteration Permits (3), Mining Permits (2), and Ready Mix Concrete Plant Permits (1). Agricultural operations include cattle, hog, and sheep farming. Maps illustrating the locations of permit sites and tables summarizing livestock practices are presented in each subwatershed.

Chapter 5 is entitled *Water Quality Partnerships in the Upper Hatchie 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 Mississippi Department of Environmental Quality) are summarized. Local initiatives of organizations active in the watershed (Friends of West Tennessee Refuges, The Nature Conservancy, and Chickasaw-Shiloh RC&D Council) are also described.

Point and Nonpoint source approaches to water quality problems in the Upper Hatchie 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 Upper Hatchie 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.

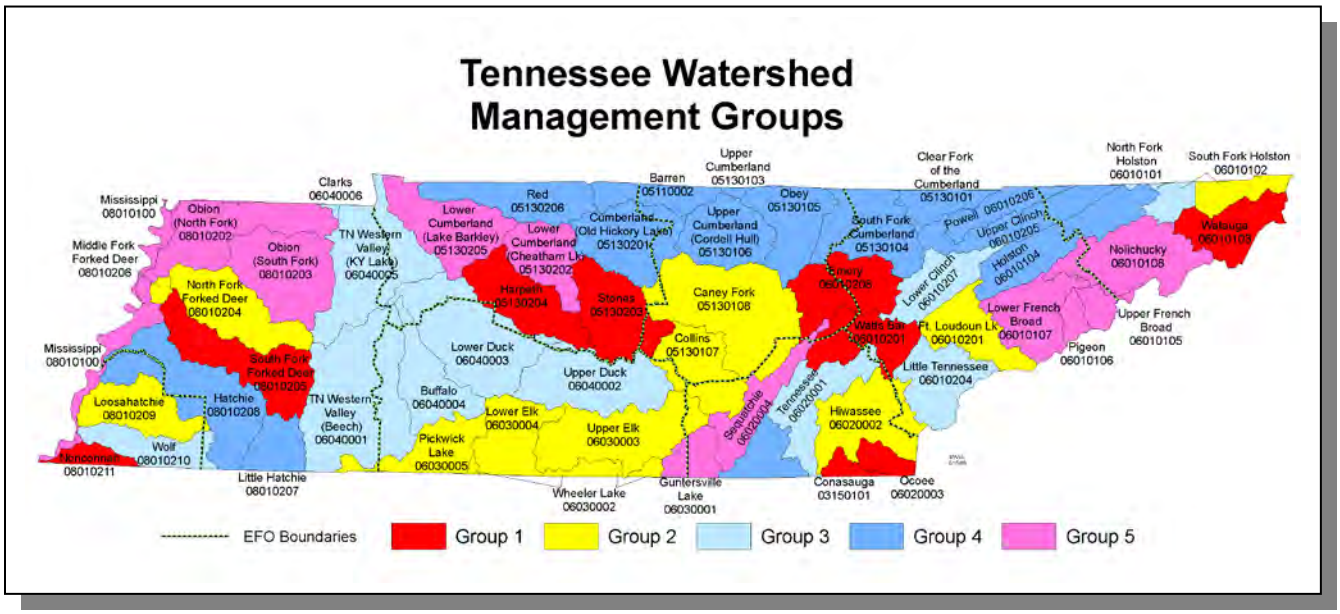


Figure 1-1. Watershed Groups in Tennessee's Watershed Approach to Water Quality.

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.

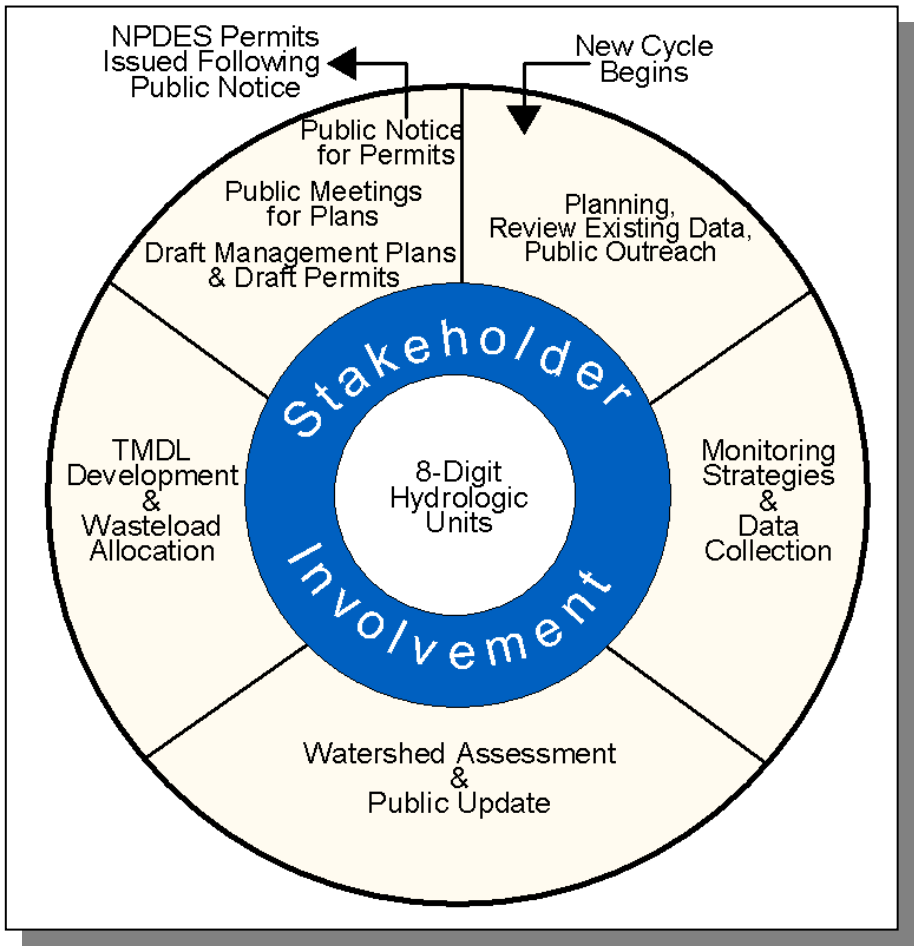


Figure 1-2. The Watershed Approach Cycle.

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 UPPER HATCHIE RIVER WATERSHED

2.1. BACKGROUND. The Hatchie (and Little Hatchie) River and Watershed derive their name from the Chickasaw Native Americans (the syllable "Chie" is believed to mean flowing water).

The Hatchie River is a major watercourse of southwestern Tennessee. It is of considerable geographic, cultural, and historic significance. In large measure this is due to the fact that it is the only major stream of West Tennessee that has never been impounded, channelized, or otherwise modified by human activity to any major degree, although several of its tributaries have. Its environs are indicative of what much of West Tennessee must have resembled prior to the time of pioneer settlement in the early 19th century.

The Hatchie River originates in northern Mississippi and crosses into Hardeman County, TN near the community of Pocahontas. The Hatchie flows north, in a very

roundabout, sinuous way, then turns northwest toward the Hardeman County seat of Bolivar. While there is usually a discernable main channel, the Hatchie at this point is largely a zone of wetlands approximately one mile wide. Bolivar was the head of navigation for small, shallow-draught steamboats in the 19th century.

From Bolivar, the Hatchie continues generally northwest, crossing into Haywood County and the southwestern corner of Madison County. At this point it enters the Hatchie National Wildlife Refuge. The rest of the stream course from this point generally trends west. There is a "bow" to the north in the final part of the stream course, which forms the line between Tipton County and Lauderdale County. The Hatchie enters the Mississippi River just north of the Hatchie Towhead and just south of the Lower Hatchie National Refuge. The Hatchie is designated as a "scenic river" under the Tennessee Wild and Scenic Rivers Act.

This Chapter describes the location and characteristics of the Upper Hatchie River Watershed.

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. The Tennessee portion of the Upper Hatchie River Watershed is located in West Tennessee and includes parts of Chester, Hardeman, and McNairy Counties.

Figure 2-1. General Location of the Upper Hatchie River Watershed.

COUNTY	% OF WATERSHED IN EACH COUNTY
McNairy	76.4
Hardeman	19.2
Chester	4.4

Table 2-1. The Tennessee Portion of the Upper Hatchie River Watershed Includes Parts of Three West Tennessee Counties.

2.2.B. Population Density Centers. Seven highways serve the major communities in the Tennessee portion of the Upper Hatchie River Watershed.

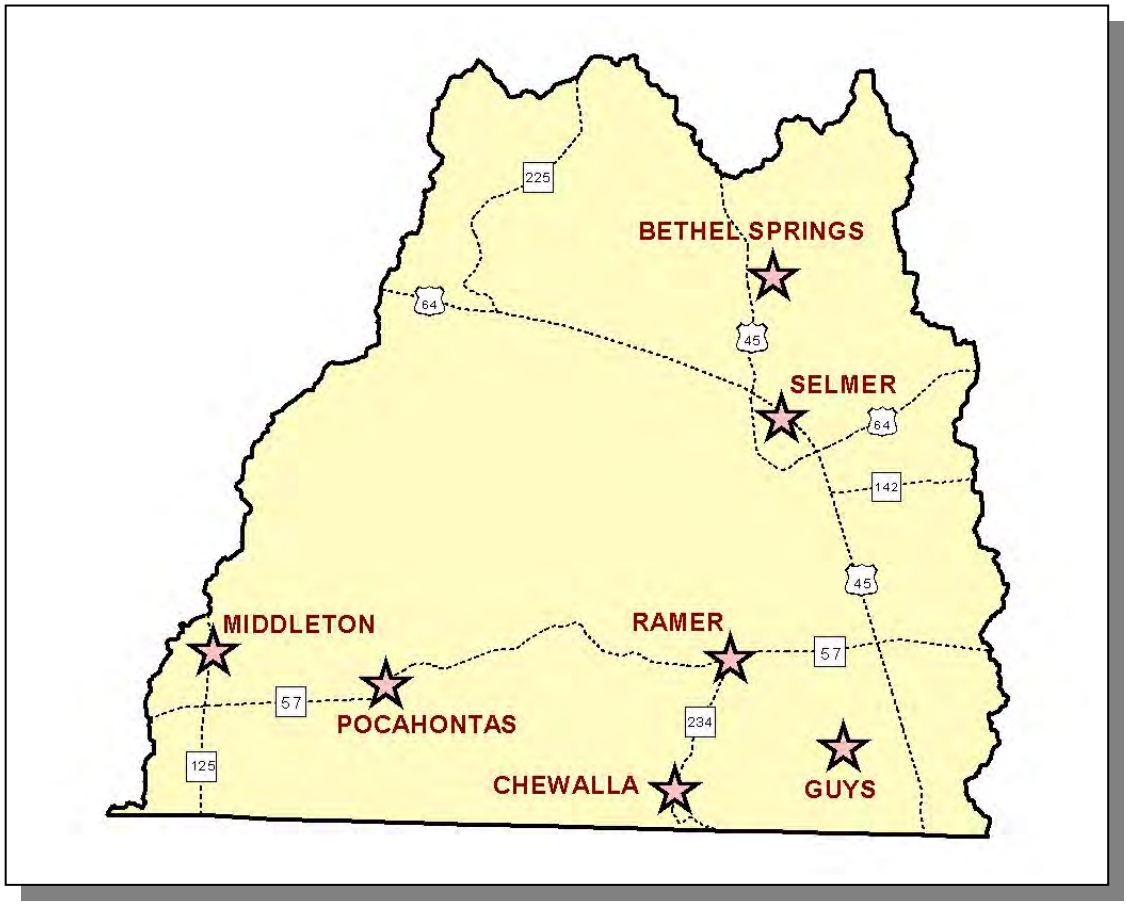


Figure 2-2. Communities and Roads in the Tennessee Portion of the Upper Hatchie River Watershed.

MUNICIPALITY	POPULATION	COUNTY
Selmer*	4,541	McNairy
Bethel Springs	763	McNairy
Middleton	670	Hardeman
Guys	483	McNairy
Ramer	354	McNairy

Table 2-2. Municipalities in the Tennessee Portion of the Upper Hatchie 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 Upper Hatchie River Watershed, designated 08010207 by the USGS, is approximately 1,461 square miles (1,446 square miles in Tennessee) and drains to the Hatchie River.

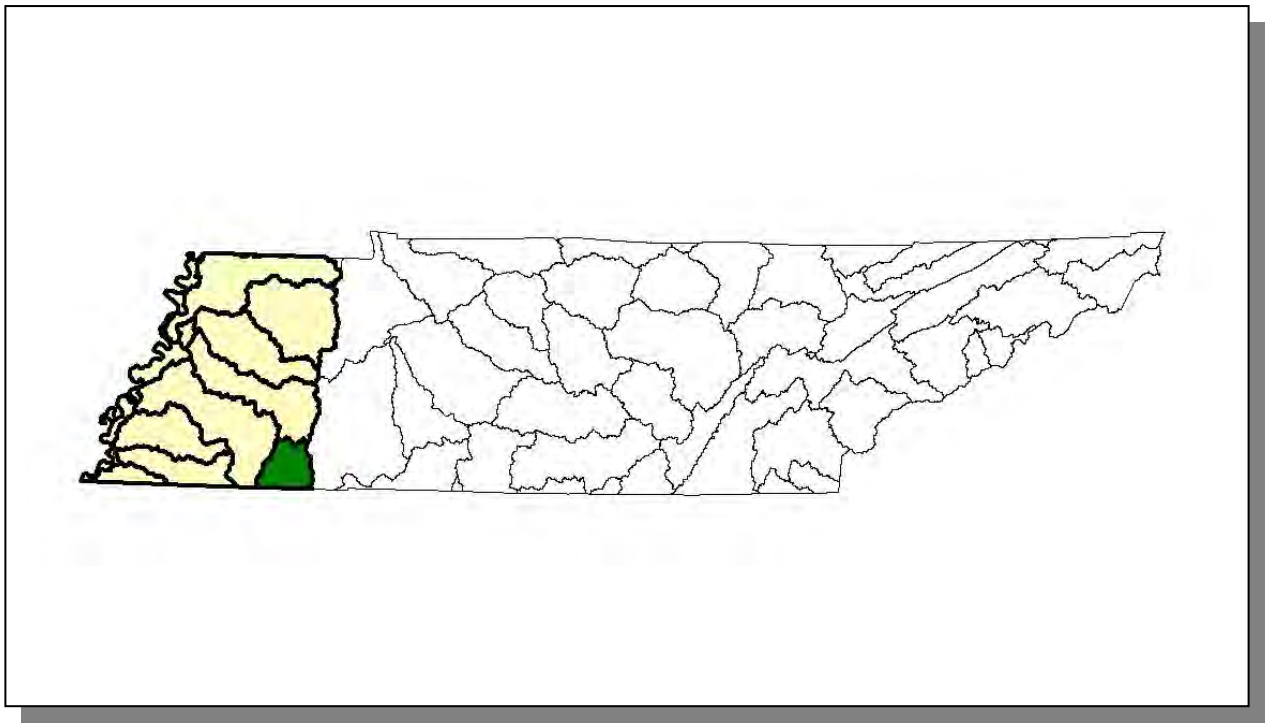


Figure 2-3. The Upper Hatchie River Watershed is Part of the Mississippi River Basin.

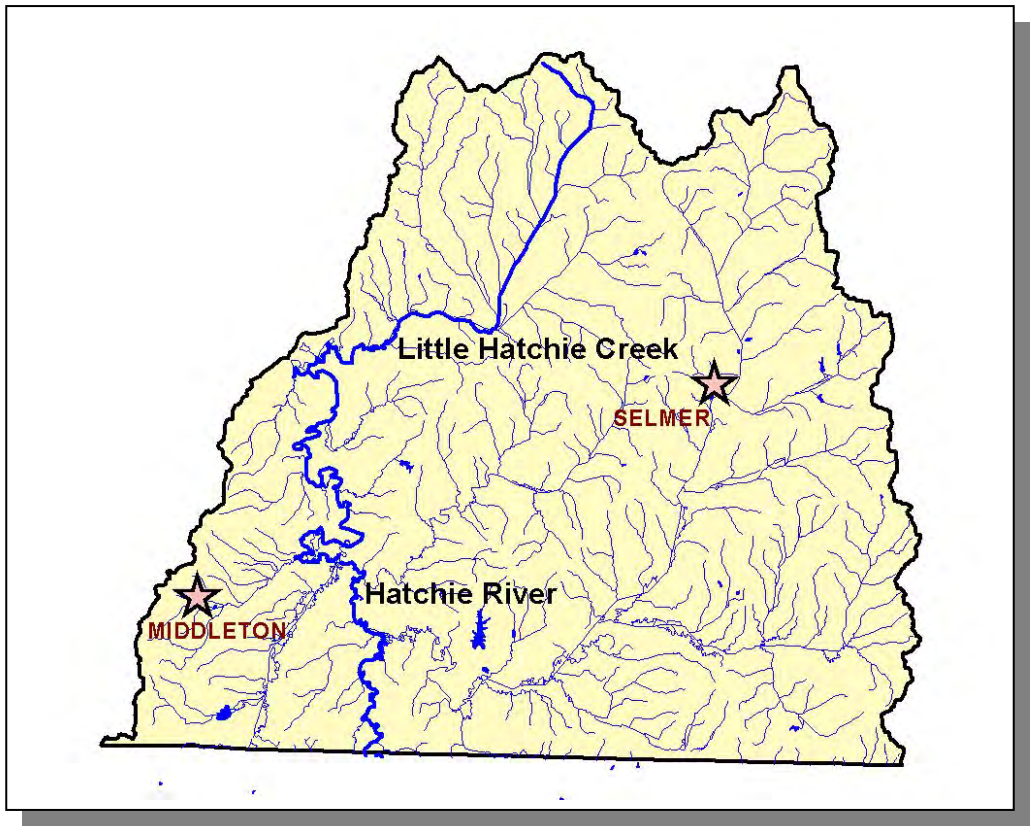


Figure 2-4. Hydrology in the Tennessee Portion of the Upper Hatchie River Watershed. *There are 752.5 stream miles recorded in River Reach File 3 in the Tennessee portion of the Upper Hatchie River Watershed. Location of the Hatchie River and Little Hatchie Creek, and the cities of Middleton and Selmer are shown for reference.*

2.3.B. Dams. There are 18 dams inventoried by TDEC Division of Water Supply in the Tennessee portion of the Upper Hatchie River Watershed. These dams either retain 30 acre-feet of water or have structures at least 20 feet high.

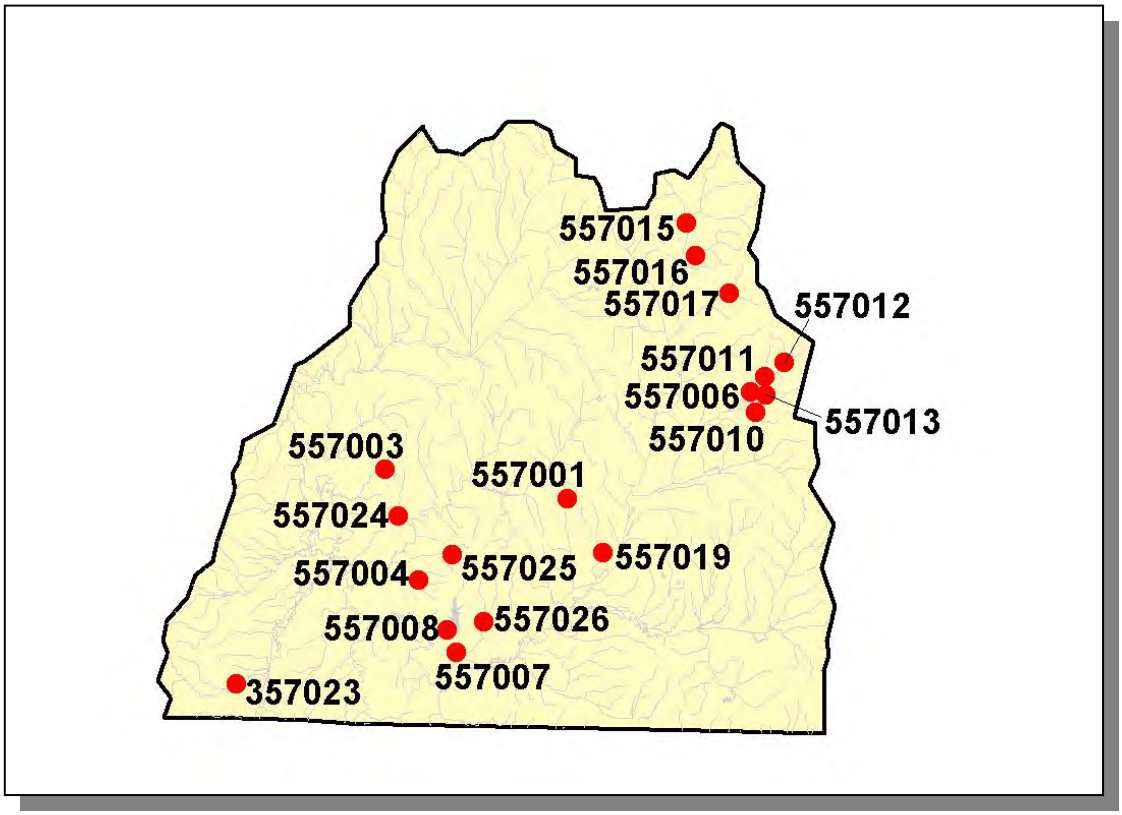


Figure 2-5. Location of Inventoried Dams in the Tennessee Portion of the Upper Hatchie River Watershed. *More information, including identification of inventoried dams labeled, is provided in Appendix II and at http://gwidc.memphis.edu/website/dams/viewer.htm.*

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

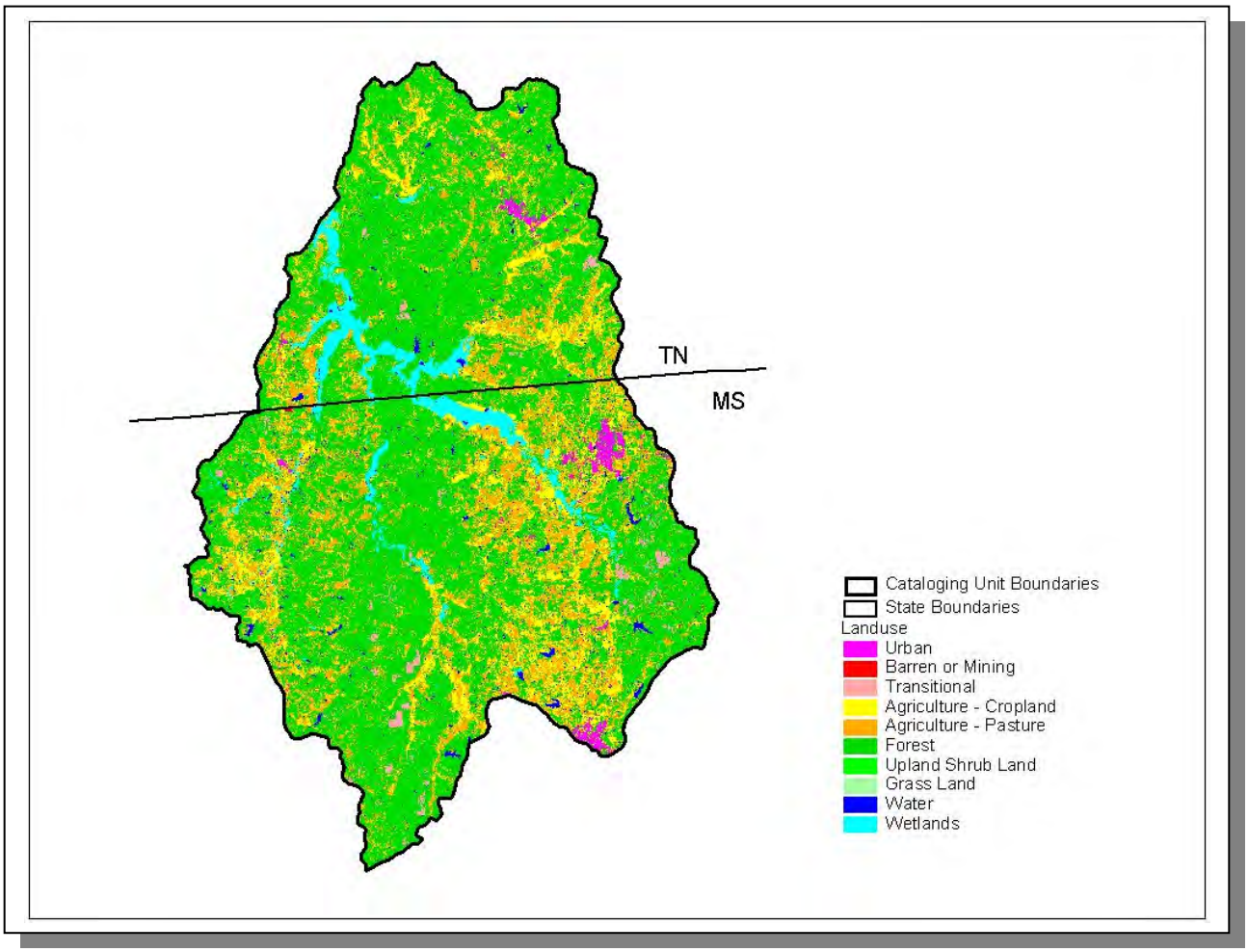


Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery.

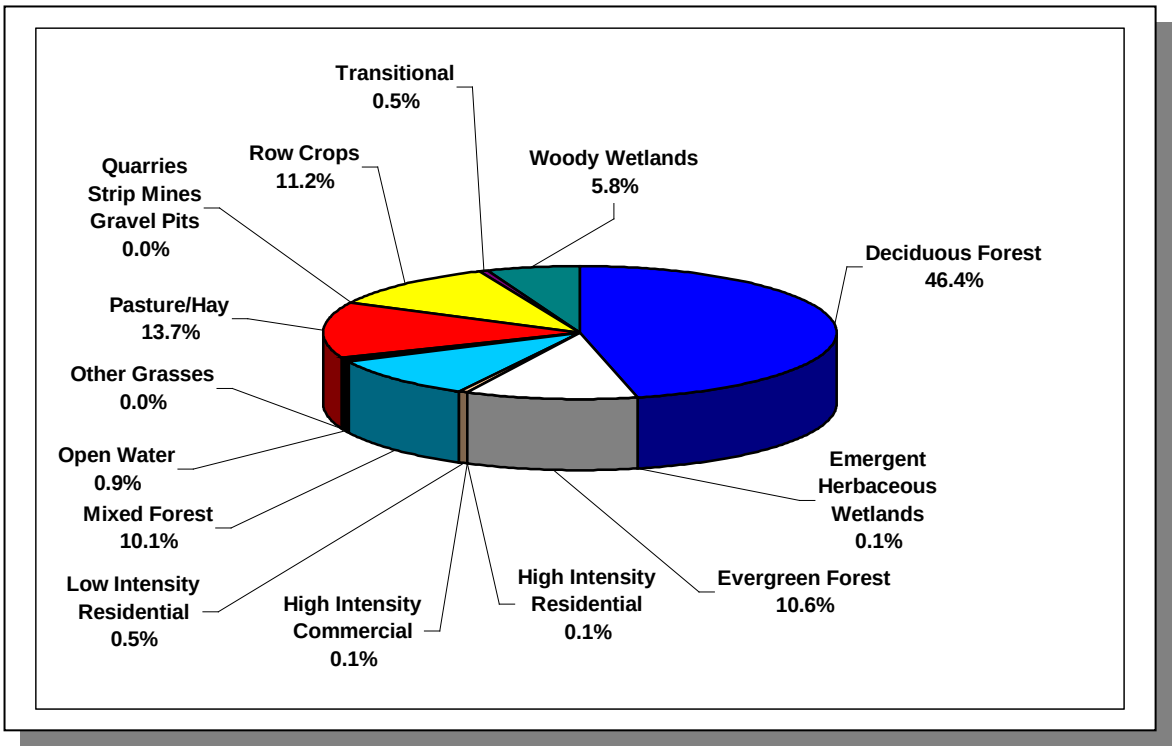


Figure 2-7. Land Use Distribution in the Tennessee Portion of the Upper Hatchie River Watershed. *More information is provided in Appendix II.*

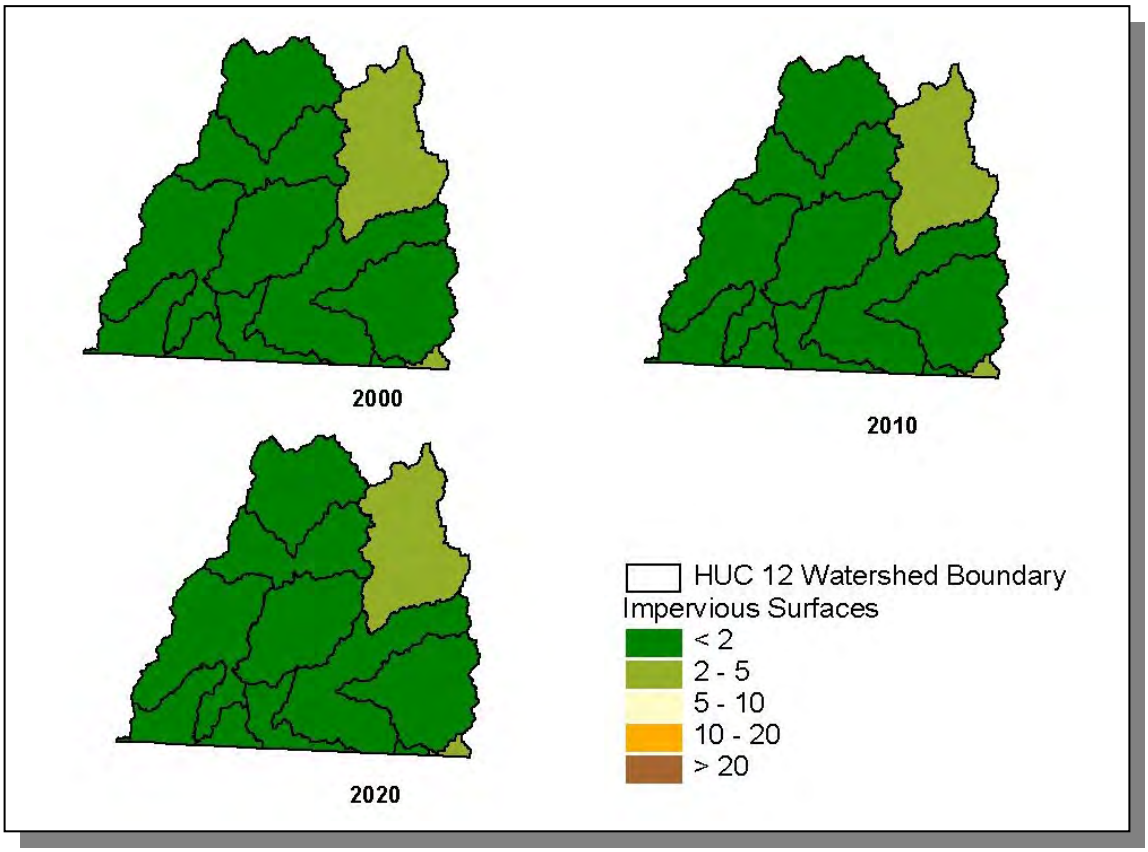


Figure 2-8. Illustration of Total Impervious Area in the Tennessee Portion of the Upper Hatchie River Watershed. *All HUC-12 subwatersheds are shown. Current and projected total impervious cover (percent of total area) is provided by EPA Region 4. More information can be found at: http://www.epa.gov/ATHENS/research/impervious/*

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

There are eight Level III Ecoregions and twenty-five Level IV subecoregions in Tennessee. The Tennessee portion of the Upper Hatchie River Watershed lies within 1 Level III ecoregion (Southeastern Plains) and contains 3 Level IV subecoregions:

- The **Blackland Prairie Ecoregion (65a)**, extending north from Mississippi, is a flat to undulating lowland region covering only a small portion of McNairy County, Tennessee. Although there is some Cretaceous-age chalk, marl, and calcareous clay that characterizes the region in Mississippi and Alabama, the northern extent of the Blackland Prairie in Tennessee is not distinct. To the south, the natural vegetation had dominant trees of sweetgum, post oak, and red cedar, along with patches of bluestem prairie. Today, the area is mostly in cropland and pasture, with small patches of mixed hardwoods.

- The **Flatwoods / Alluvial Prairie Margins (65b)** extend north from Mississippi, but the distinctiveness of this narrow ecoregion belt fades quickly from Ripley, Mississippi north into Tennessee. In Mississippi and Alabama, this is a transition region between the Blackland Prairie and the more forested plains and hills. Some areas, such as the Flatwoods name implies, are heavily forested, but the prairie and alluvial areas now have significant amounts of cropland and pasture. In Tennessee, the small region stands out as lower, less hilly agricultural land compared to the forested Southeastern Plains and Hills (65e) that surround it.

- The **Southeastern Plains and Hills (65e)** contain north-south trending bands of sand and clay formations. Tertiary-age sand, clay, and lignite are to the west, with Cretaceous fine sand, fossiliferous micaceous sand, and silty clays to the east. Elevations reach over 650 feet with more rolling topography and relief than the Loess Plains (74b) to the west. Streams have increased gradient, sandy substrates, and distinct faunal characteristics. Natural vegetation is oak-hickory forest, grading into oak-hickory-pine to the south.

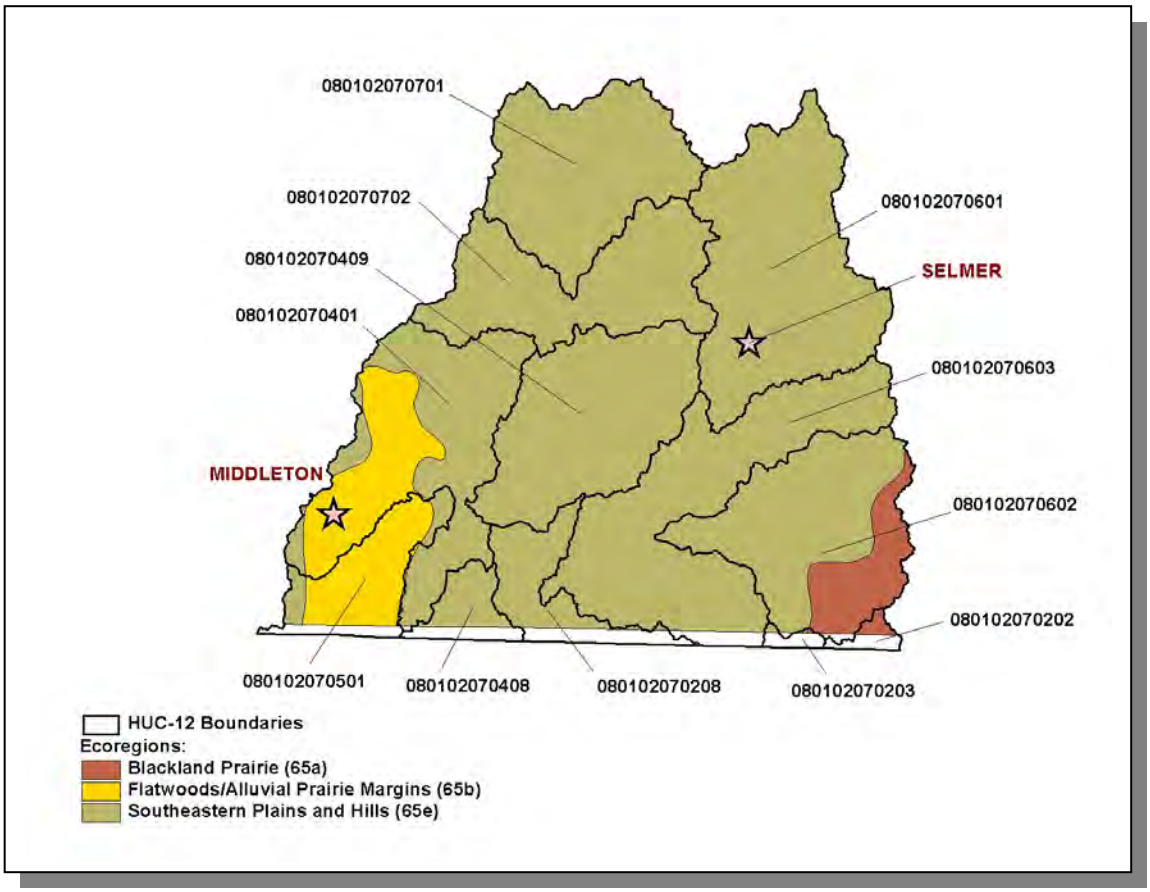


Figure 2-9. Level IV Ecoregions in the Tennessee Portion of the Upper Hatchie River Watershed. *HUC-12 subwatersheds and locations of Middleton and Selmer are shown for reference.*

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

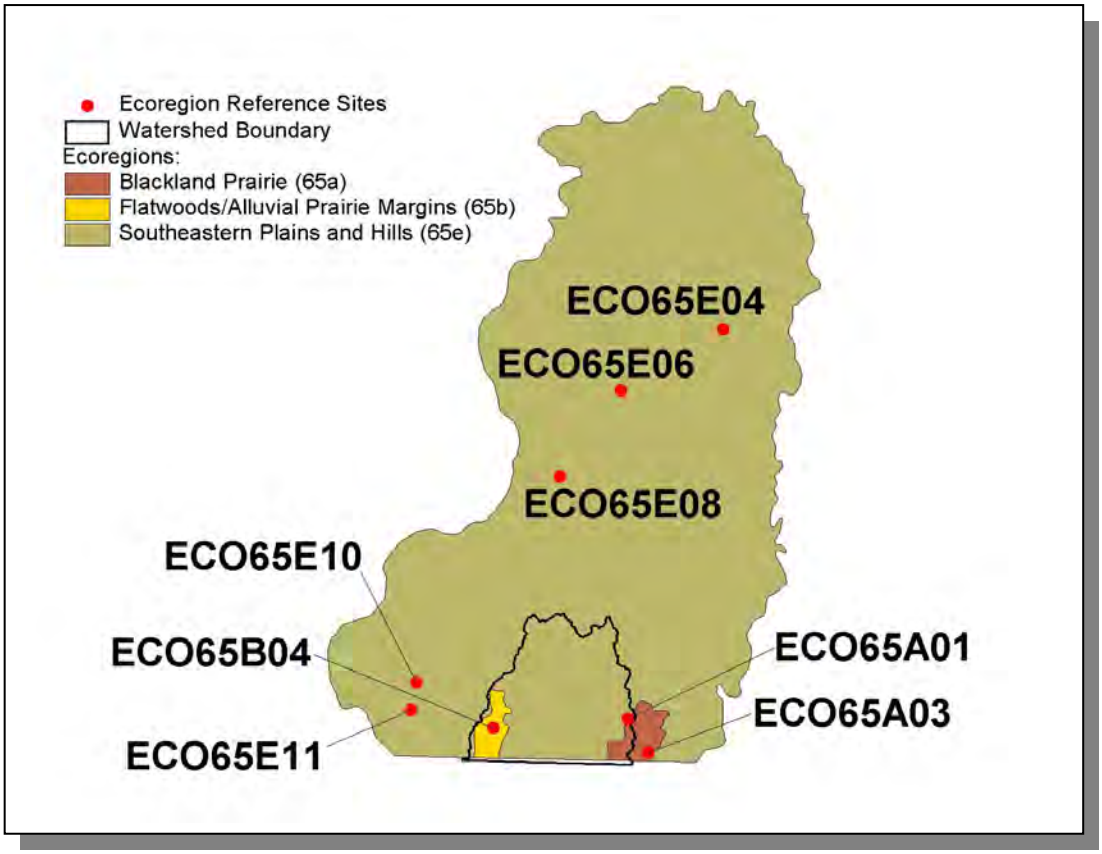


Figure 2-10. Ecoregion Monitoring Sites in Level IV Ecoregions 65a, 65b, and 65e. *The Tennessee portion of the Upper Hatchie River Watershed is shown for reference. More information, including which ecoregion reference sites were inactive or dropped prior to 01/01/2006, is provided in Appendix II.*

2.6. NATURAL RESOURCES.

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

GROUPING	NUMBER OF RARE SPECIES
Crustaceans	1
Birds	3
Fish	3
Mammals	2
Reptiles	2
Plants	12
Total	**23**

Table 2-3. There are 23 Known Rare Plant and Animal Species in the Tennessee Portion of the Upper Hatchie River Watershed.

In the Tennessee portion of the Upper Hatchie River Watershed, there are three known rare fish species and one known rare crustacean species.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
Ammocrypta beani	Naked sand darter		D
Ammocrypta vivax	Sealy sand darter		D
Noturus stigmosus	Northern madtom		D
Falicambarus hortoni	Hatchie burrowing crayfish		E

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

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

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

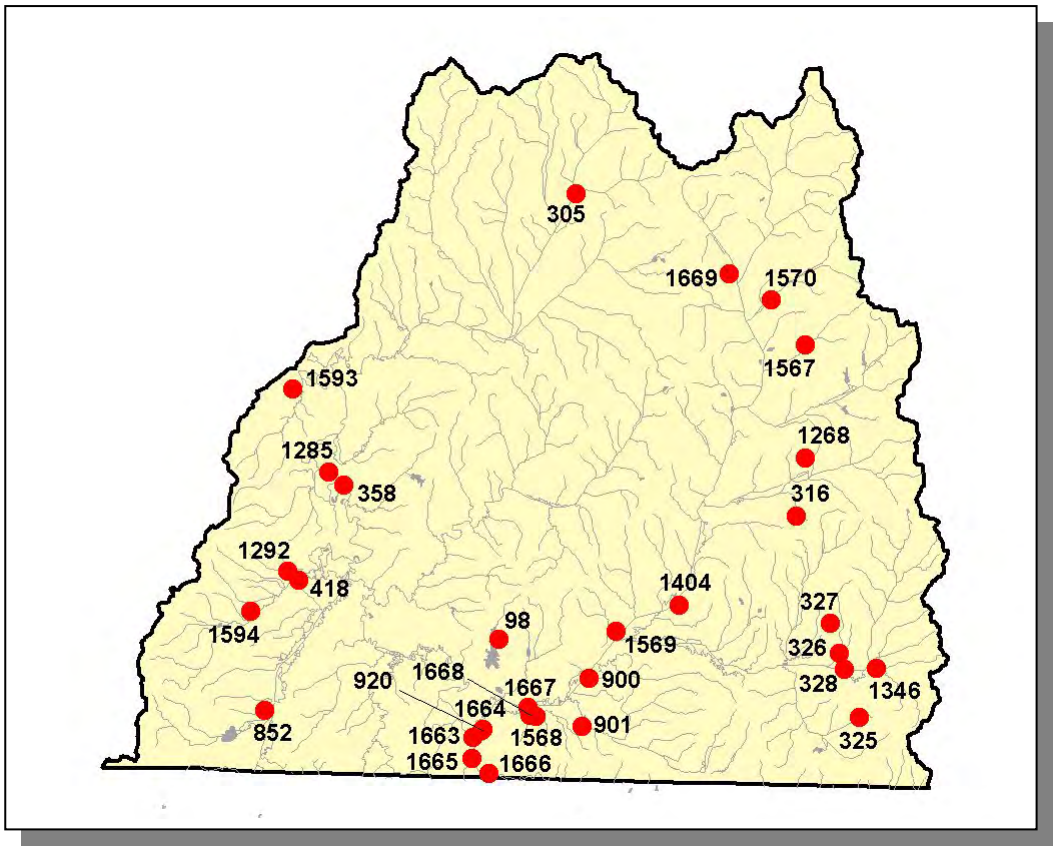


Figure 2-11. Location of Wetland Sites in TDEC Division of Natural Heritage Database in the Tennessee Portion of the Upper Hatchie River Watershed. ***This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands.*** *There may be additional 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. State Scenic River. The Hatchie River is designated as a State Scenic River.

Hatchie River is designated as a Class I Natural River Area as a swamp river.

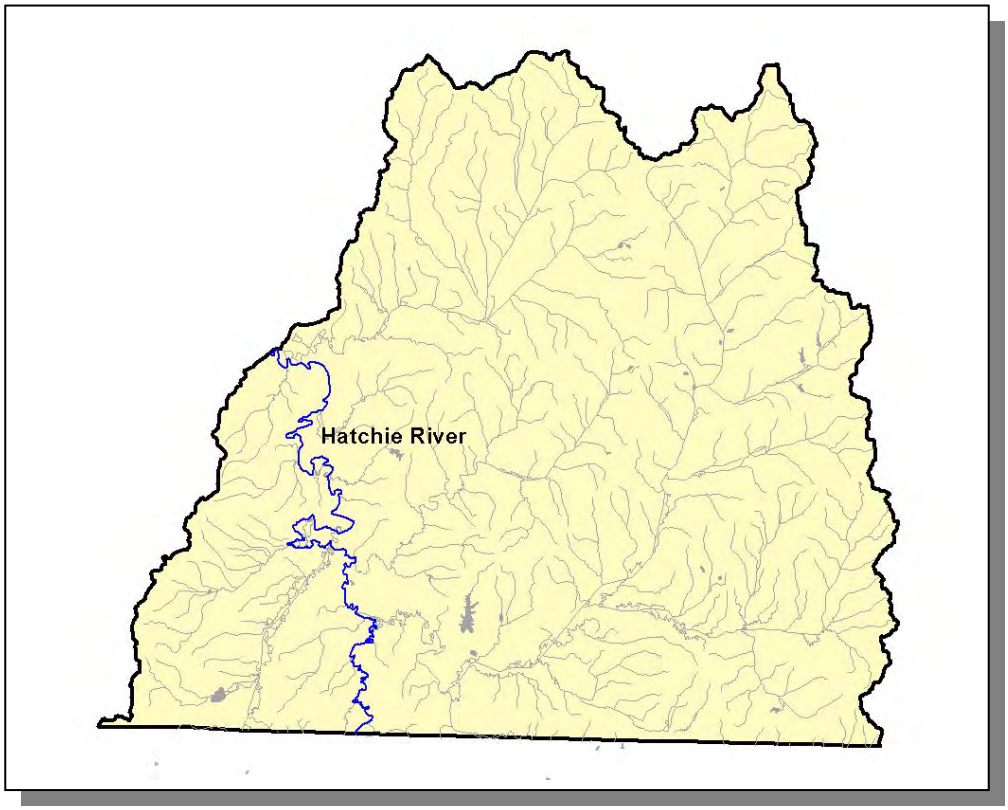


***Figure 2-12. The Hatchie River is Designated a State Scenic River**. More information can be found at http://www.state.tn.us/environment/nh/scenicrivers/.*

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

- Big Hill Pond State Environmental Education Area is a 5,000-acre state park located in McNairy County. More information may be found at http://www.state.tn.us/environment/parks/parks/BigHillPond.

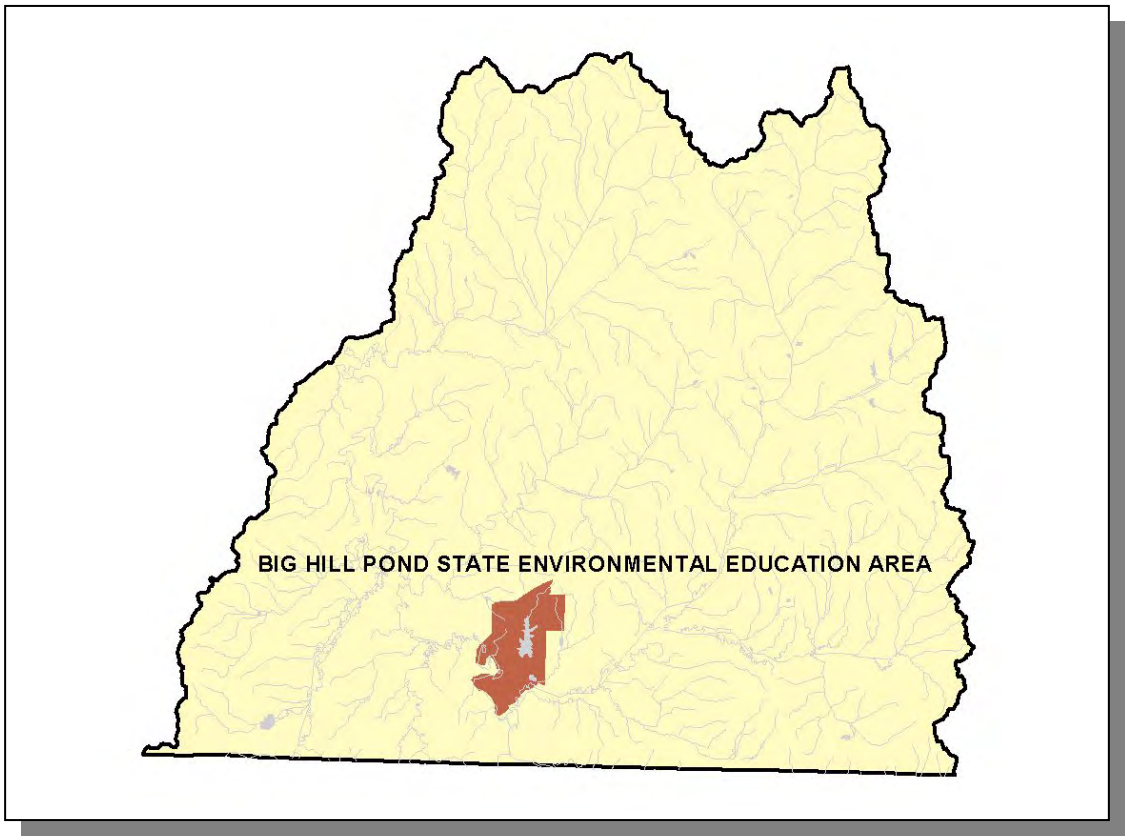


Figure 2-13. Public Lands in the Tennessee Portion of the Upper Hatchie River Watershed. *Data are from Tennessee Wildlife Resources Agency.*

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
Crooked Creek	4			Nail Creek)	3		
Cypress Creek	3	2	2	North Fork Oxford Creek	4		
Hadger Creek	4			Oxford Creek	3		
Hamstring Creek	4			Roland Creek	4		
Hatchie River	1	2	1	Rose Creek	3		
Indian Creek	4			Sandy Creek	4		
Kise Creek	3			South Fork Oxford Creek	4		
Little Hatchie River	3,4			Turkey Creek	3		
Mosses Creek	3			Tuscumbia River	1	2	
Muddy Creek (East)	4			Unnamed Trib to Cypress Creek			
Muddy Creek (West)				Wilson Creek	4		

Table 2-5. Tennessee Rivers Assessment Project Stream Scoring in the Upper Hatchie 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 UPPER HATCHIE RIVER WATERSHED.

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

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

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

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

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

1. Describe the water quality assessment process

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

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

4. Provide detailed information on each watershed

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

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

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

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

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

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

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

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

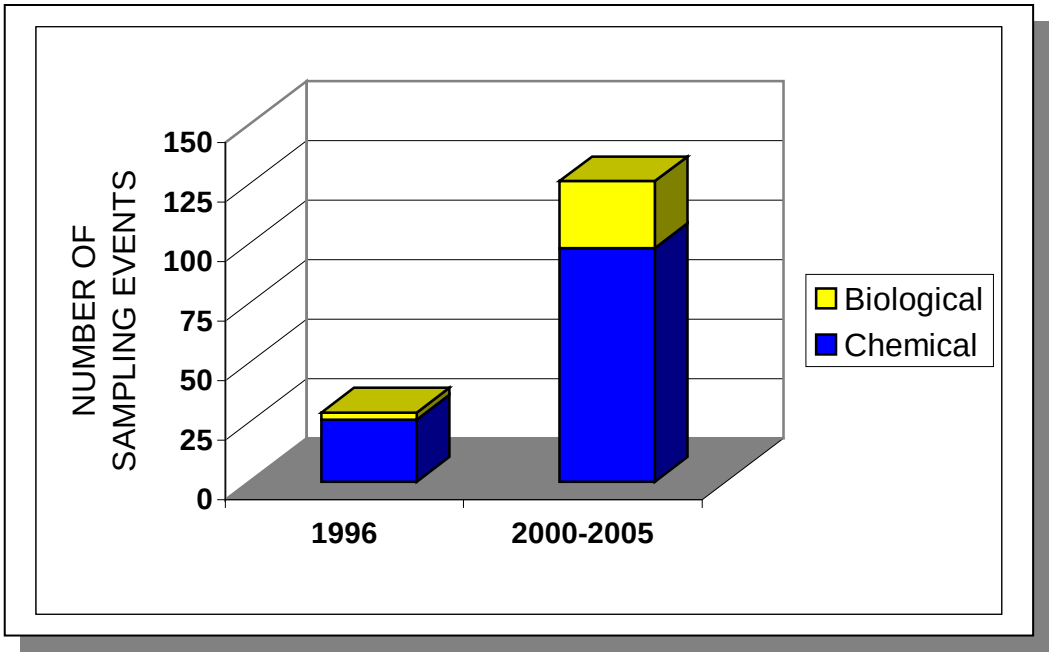


Figure 3-1. Number of Sampling Events Using the Traditional Approach (1996) and Watershed Approach (July 1, 2000 through June 30, 2005) in the Tennessee Portion of the Upper Hatchie River Watershed.

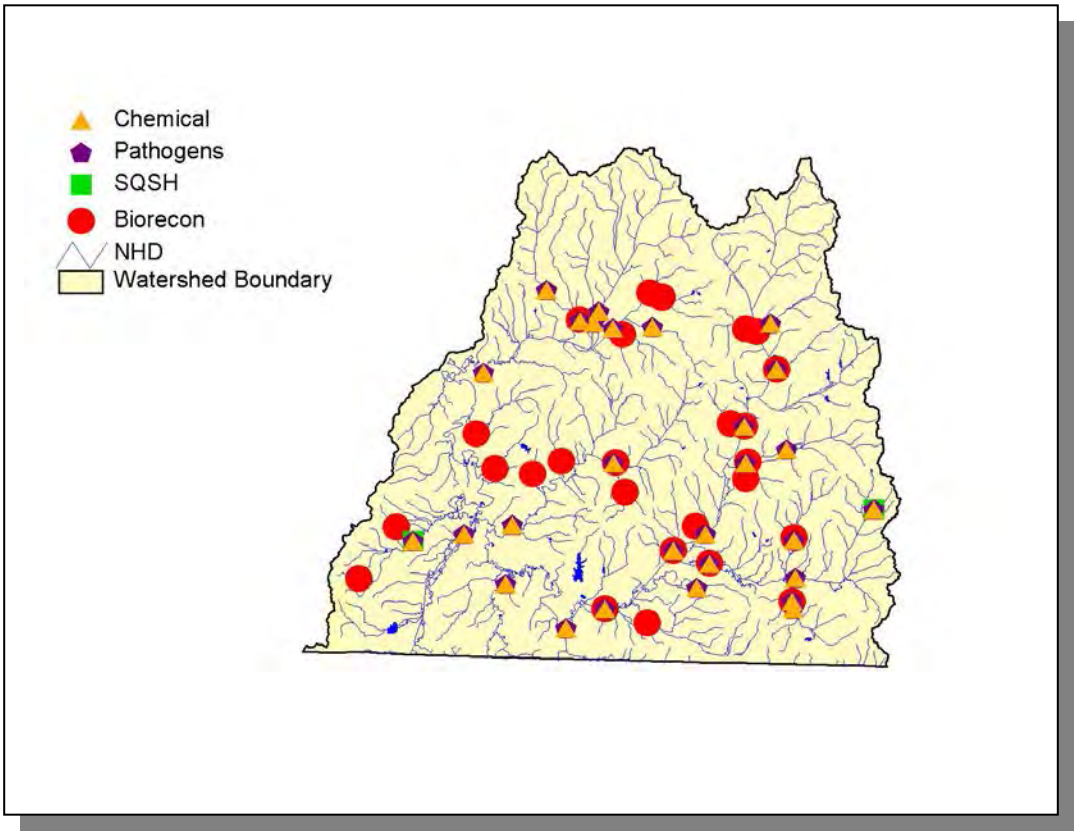


Figure 3-2. Location of Monitoring Sites in the Tennessee Portion of the Upper Hatchie River Watershed (July 1, 2000 through June 30, 2005). *Pathogens include E. coli and fecal coliform; NHD, National Hydrography Dataset of Streams; SQSH, Semi-Quantitative Single Habitat.*

	1996	2000-2005
Biological	3	28
Chemical	26	98
Total	**29**	**126**

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

3.2.A. Ambient Monitoring Sites. These fixed-station chemical monitoring sites are sampled quarterly or monthly by the Environmental Field Office-Jackson staff (this is in addition to samples collected by water and wastewater treatment plant operators). Samples are analyzed by the Tennessee Department of Health, Division of Environmental Laboratory Services. Ambient monitoring data are used to assess water quality in major bodies of water where there are NPDES facilities and to identify trends in water quality. Water quality parameters traditionally measured at ambient sites in the Tennessee portion of the Upper Hatchie 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 Upper Hatchie River Watershed lies within 1 Level III ecoregion (Southeastern Plains) and contains 3 subecoregions (Level IV):

- Blackland Prairie (65a)
- Flatwoods/Alluvial Prairie Margins (65b)
- Southeastern Plains and Hills (65e)

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.

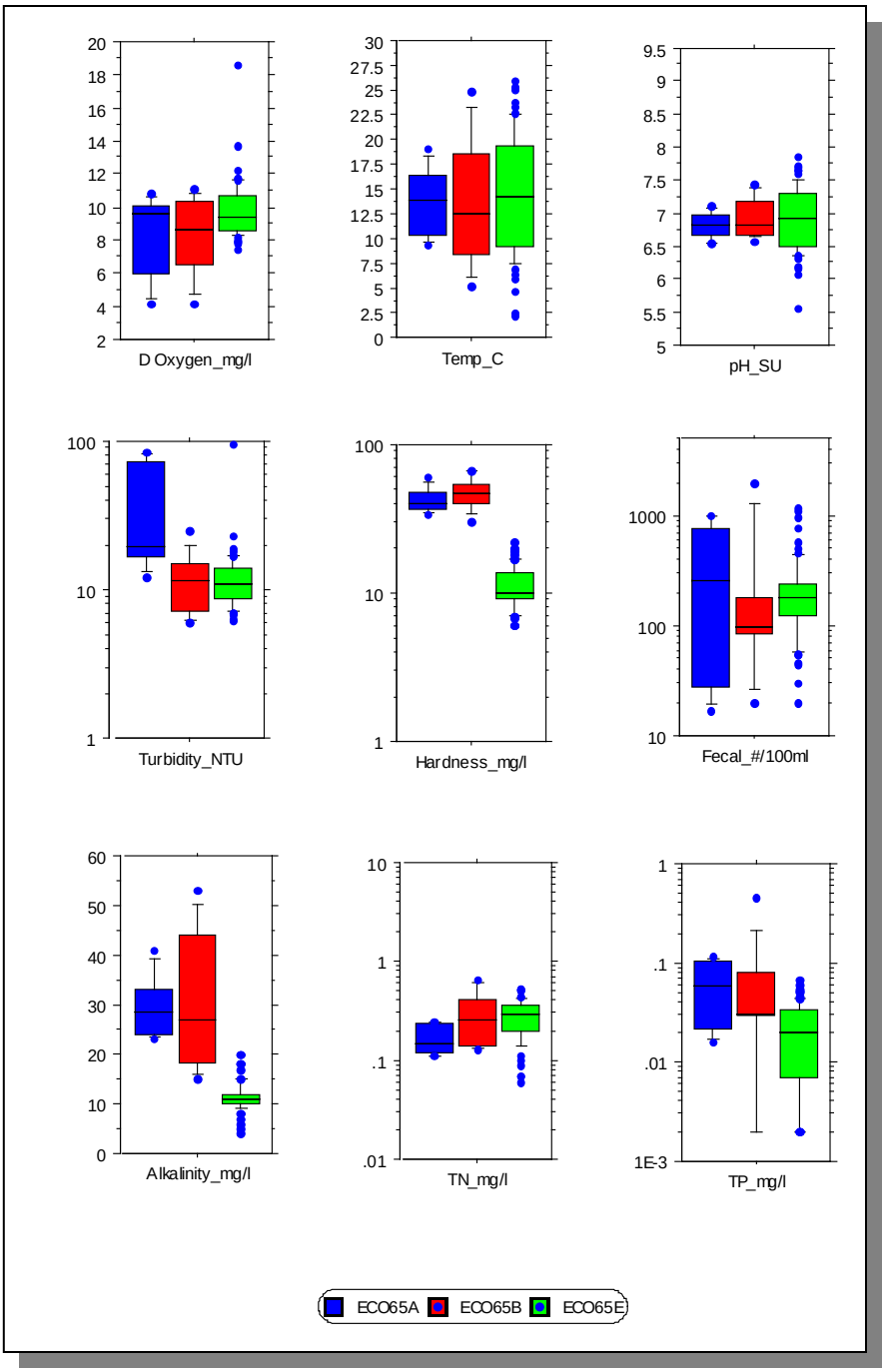


Figure 3-3. Select Chemical Data Collected in the Tennessee Portion of Upper Hatchie River Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th percentiles. Extreme values are also shown as dots. Fecal, fecal coliform bacteria; TN, Total Nitrogen; TP, Total Phosphorus.*

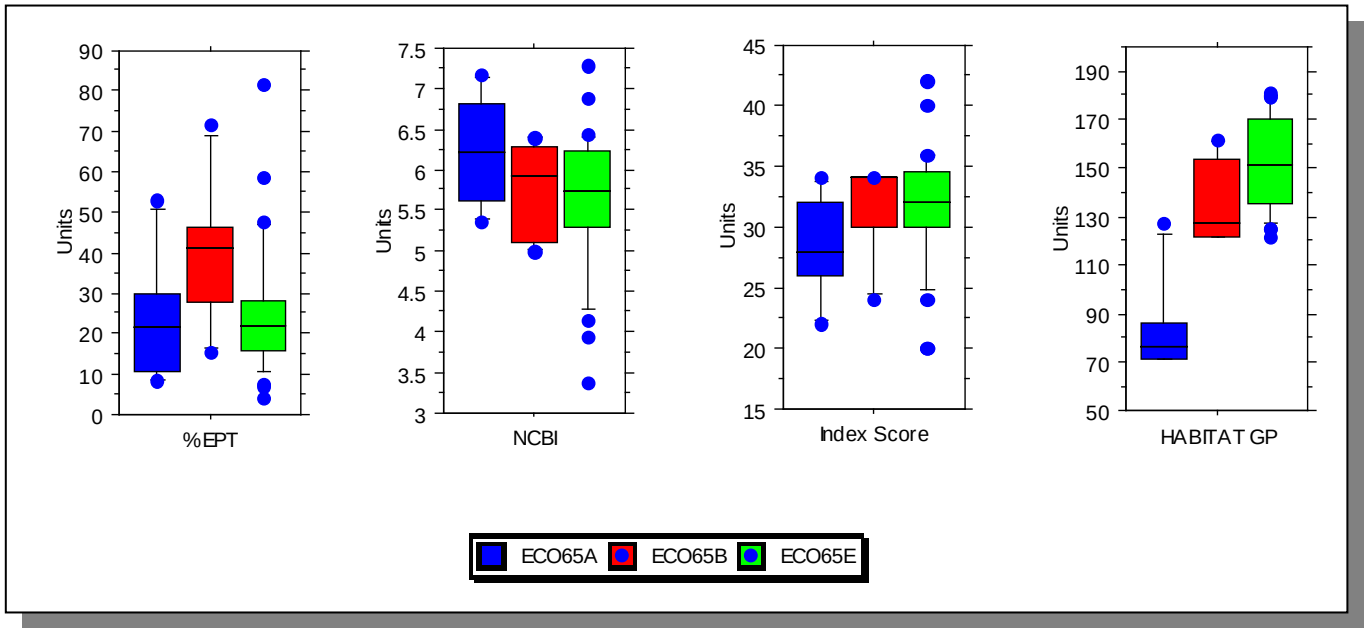


Figure 3-4. Benthic Macroinvertebrate and Habitat Scores for the Tennessee Portion of Upper Hatchie Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th percentiles. Extreme values are also shown as dots. NCBI, North Carolina Biotic Index. Index Score and Habitat Riffle/Run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

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

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

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

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

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

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

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

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

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

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

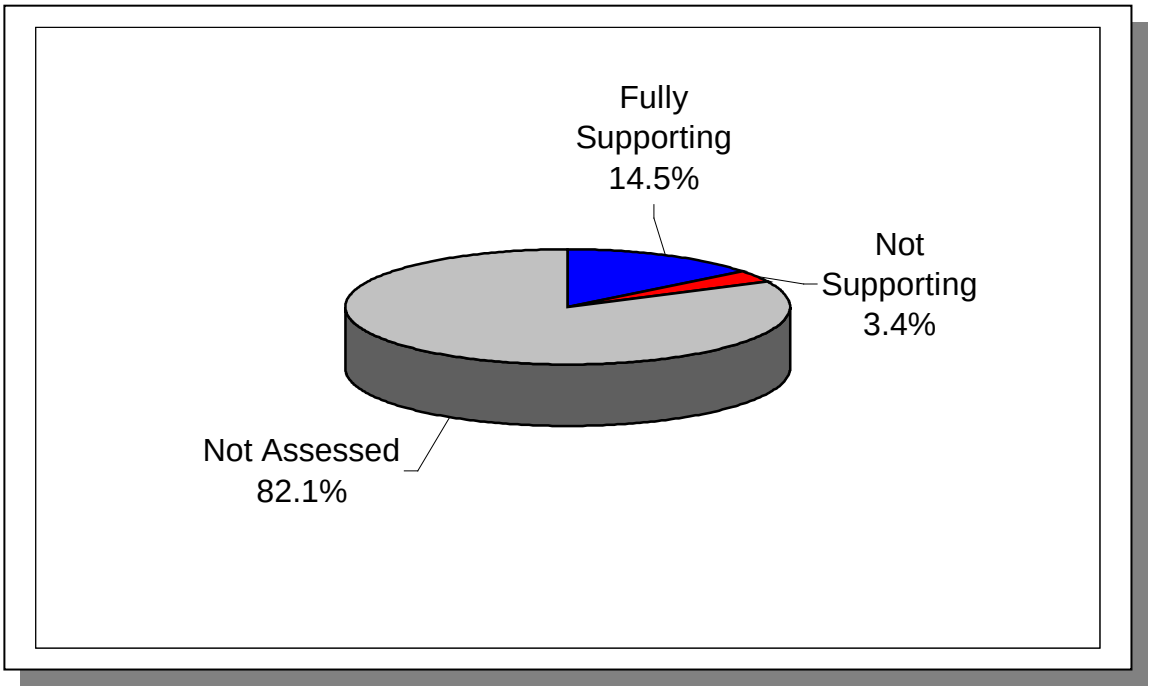


Figure 3-5. Water Quality Assessment of Streams in the Tennessee Portion of the Upper Hatchie River Watershed. *Assessment data are based on the 2004 Water Quality Assessment of 752.5 stream miles in the watershed. More information is provided in Appendix III.*

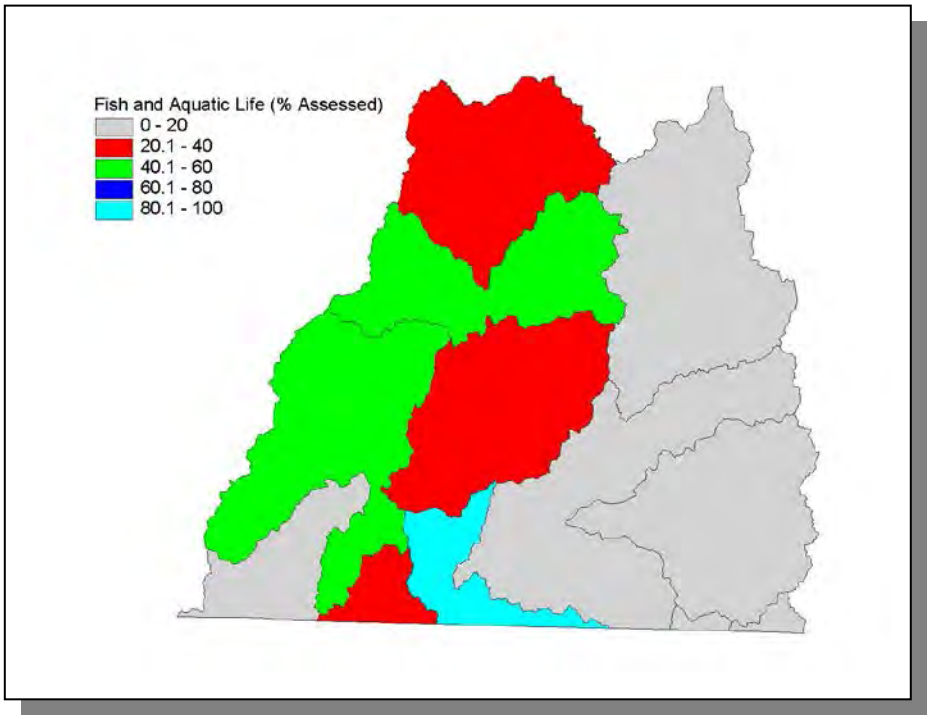


Figure 3-6. Percentage of Stream Miles Assessed for Support of Fish and Aquatic Life Designated Use in HUC-12 Subwatersheds in the Tennessee Portion of the Upper Hatchie River Watershed.

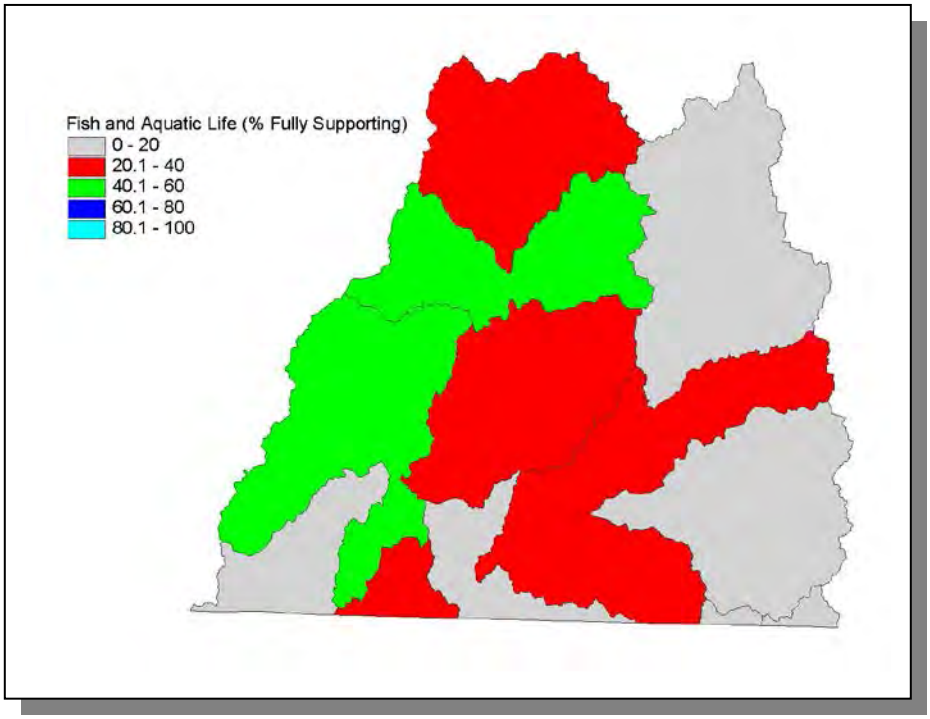


Figure 3-7. Percentage of Stream Miles Fully Supporting for Fish and Aquatic Life Designated Use in HUC-12 Subwatersheds in the Tennessee Portion of the Upper Hatchie River Watershed.

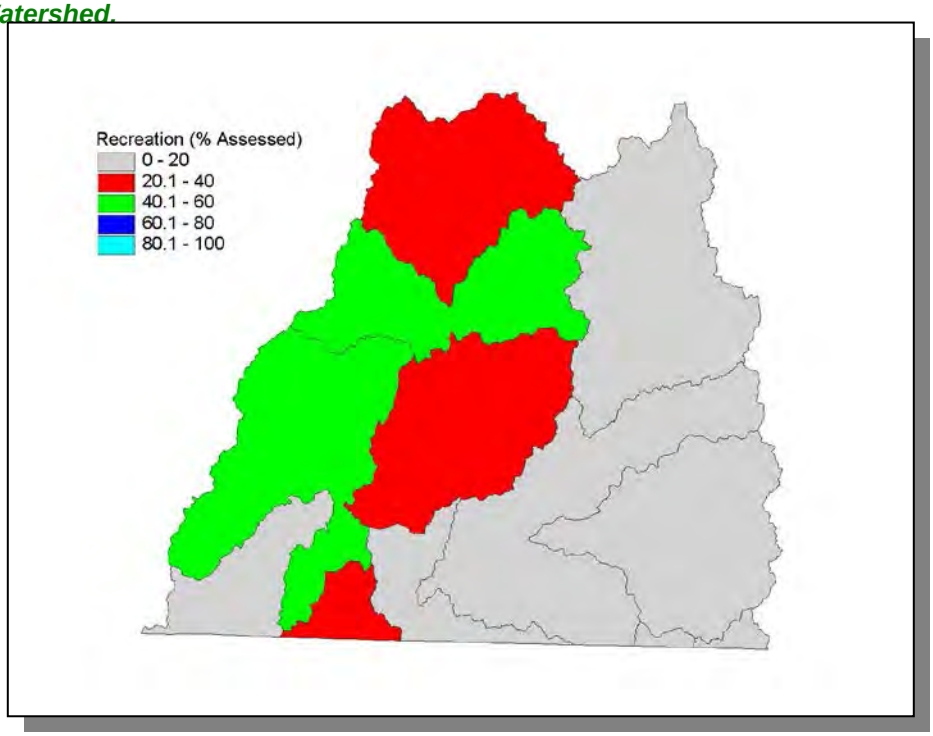


Figure 3-8. Percentage of Stream Miles Assessed for Support of Recreation Designated Use in HUC-12 Subwatersheds in the Tennessee Portion of the Upper Hatchie River Watershed.

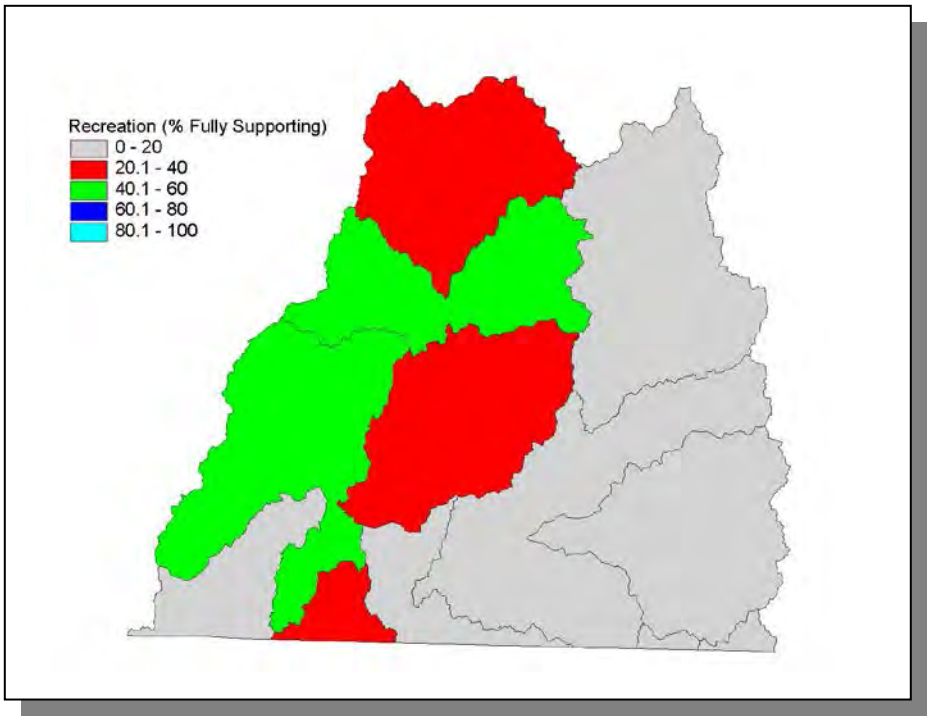


Figure 3-9. Percentage of Stream Miles Fully Supporting for Recreation Designated Use in HUC-12 Subwatersheds in the Tennessee Portion of the Upper Hatchie River Watershed.

3.3.A. Assessment Summary.

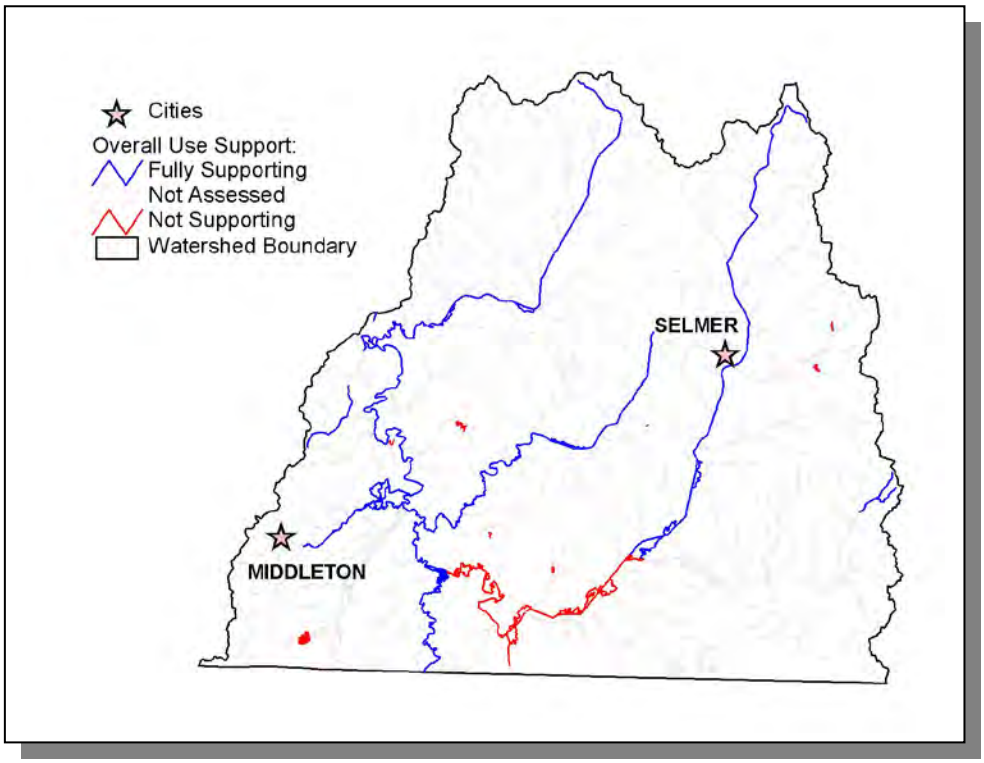


Figure 3-10. Overall Use Support Attainment in the Tennessee Portion of the Upper Hatchie River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of and Middleton and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

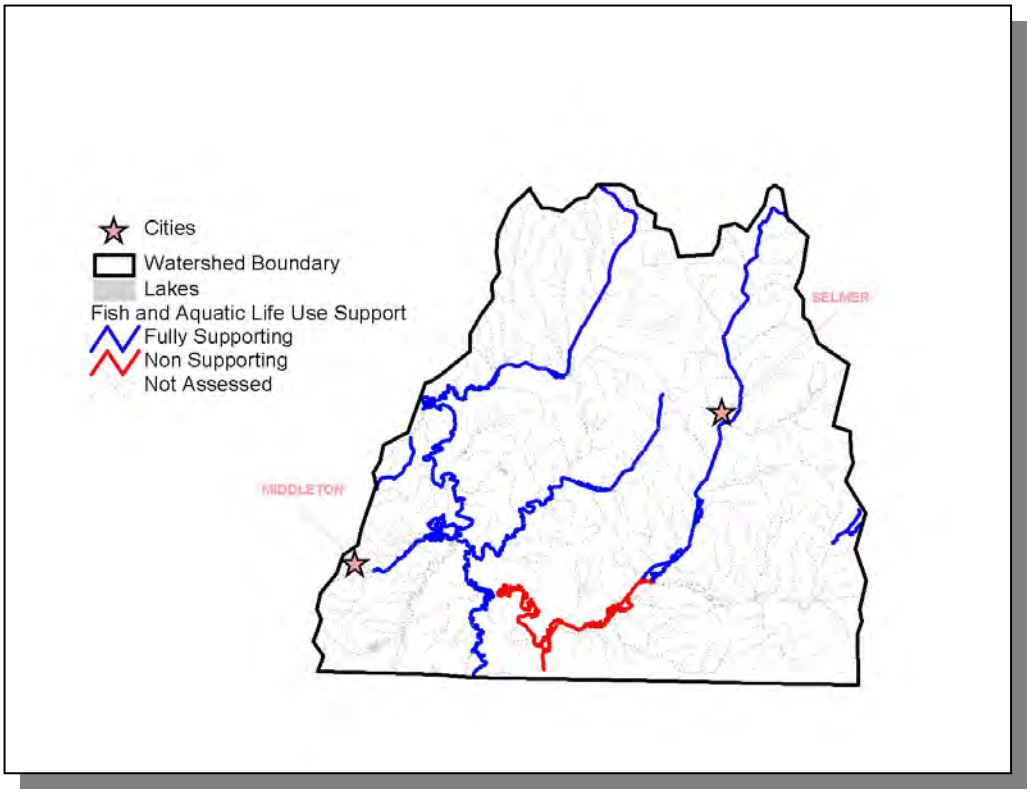


Figure 3-11. Fish and Aquatic Life Use Support Attainment in the Tennessee Portion of the Upper Hatchie River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of and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

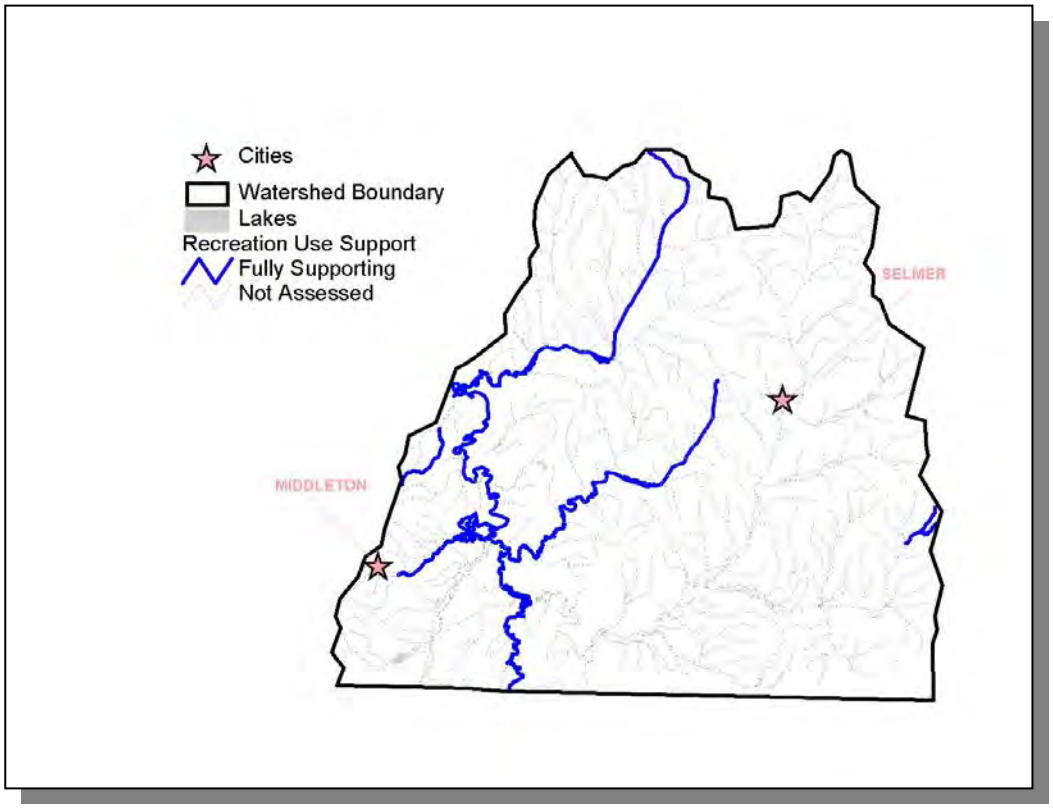


Figure 3-12. Recreation Use Support Attainment in the Tennessee Portion of the Upper Hatchie River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Middleton and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

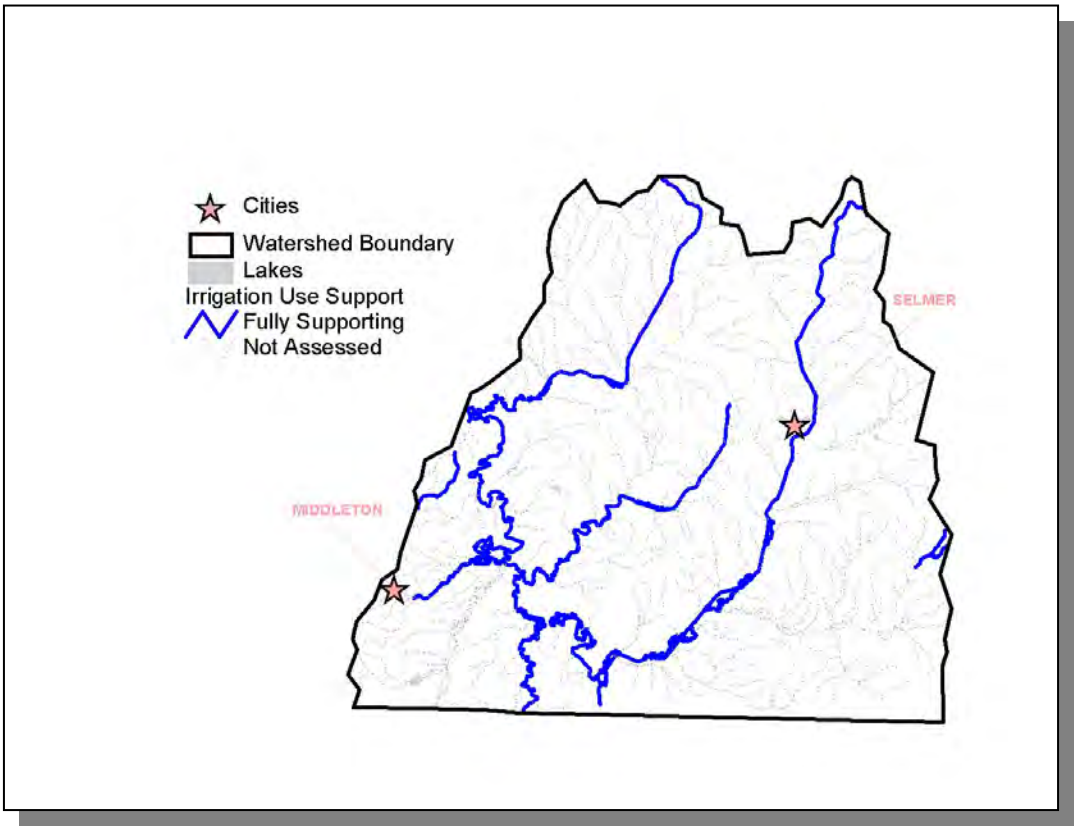


Figure 3-13. Irrigation Use Support Attainment in the Tennessee Portion of the Upper Hatchie River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Middleton and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

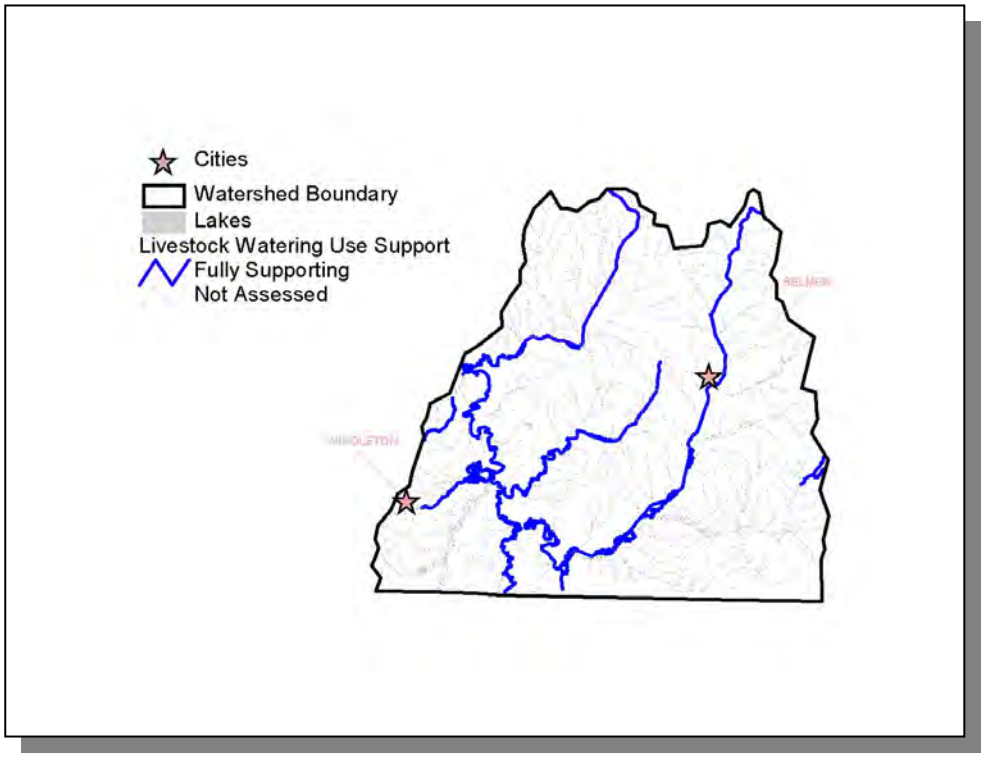


Figure 3-14. Livestock Watering and Wildlife Use Support Attainment in the Tennessee Portion of the Upper Hatchie River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations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

3.3.B. Use Impairment Summary.

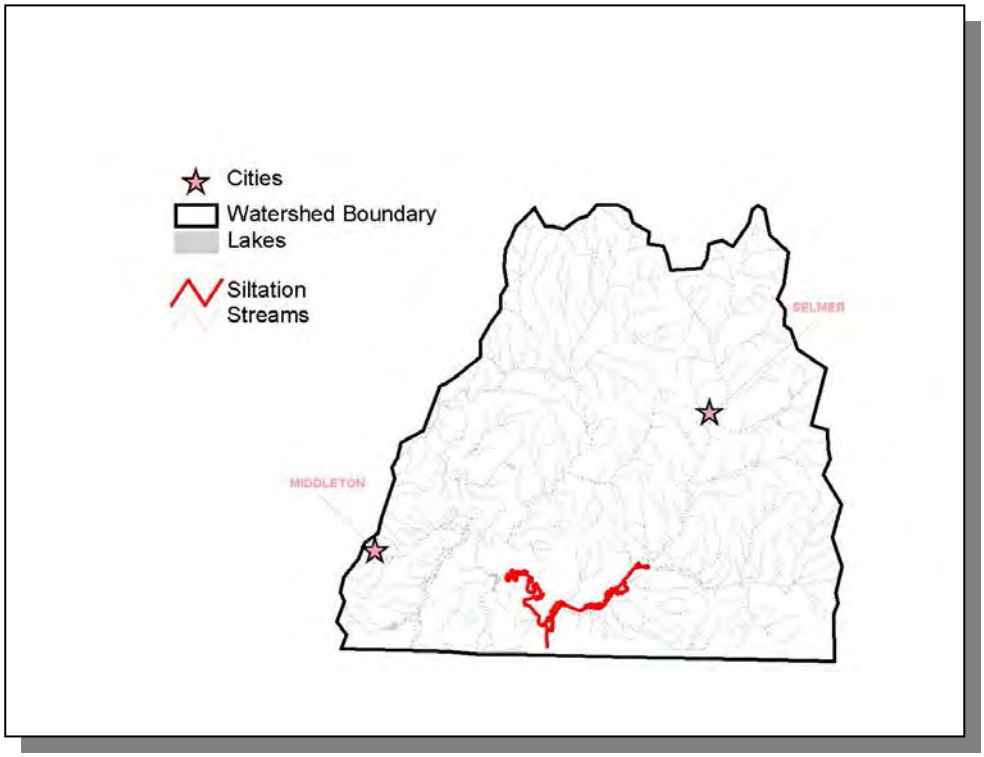


Figure 3-15. Impaired Streams Due to Siltation in the Tennessee Portion of the Upper Hatchie River Watershed. *Assessment data are based on the 2004 Water Quality Assessment. Locations of Middleton and Selmer are shown for reference. More information is provided in Appendix III.*

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

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

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

CHAPTER 4

POINT AND NONPOINT SOURCE CHARACTERIZATION OF THE LITTLE HATCHIE RIVER WATERSHED

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

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

The Tennessee portion of the Little Hatchie River Watershed (HUC 08010207) has been delineated into five HUC 10 (10-digit) subwatersheds, each of which is composed of one or more HUC-12 subwatersheds.

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

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

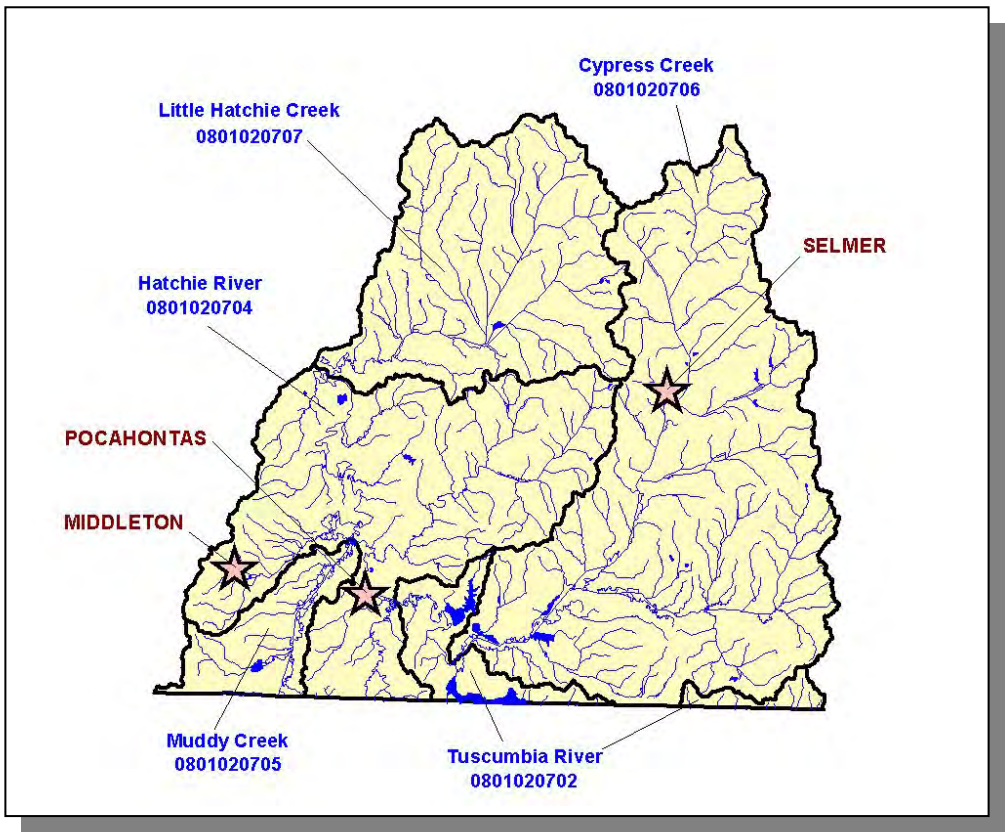


Figure 4-1. The Tennessee Portion of the Little Hatchie River Watershed is Composed of Five USGS-Delineated Subwatersheds (10-Digit Subwatersheds). *Locations of Middleton, Pocahontas, and Selmer are shown for reference.*

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

HUC-10	HUC-12
0801020702	080102070202 (Bridge Creek)
	080102070203 (Cain Creek)
	080102070208 (Tuscumbia Creek)
0801020704	080102070401 (Hatchie River)
	080102070408 Hatchie River)
	080102070409 (Mosses Creek)
0801020705	080102070501 (Muddy Creek)
0801020706	080102070601 (Upper Cypress Creek)
	080102070602 (Muddy Creek)
	080102070603 (Lower Cypress Creek)
0801020707	080102070701 (Upper Little Hatchie Creek)
	080102070702 (Lower Little Hatchie Creek)

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

4.2.A. 0801020702.

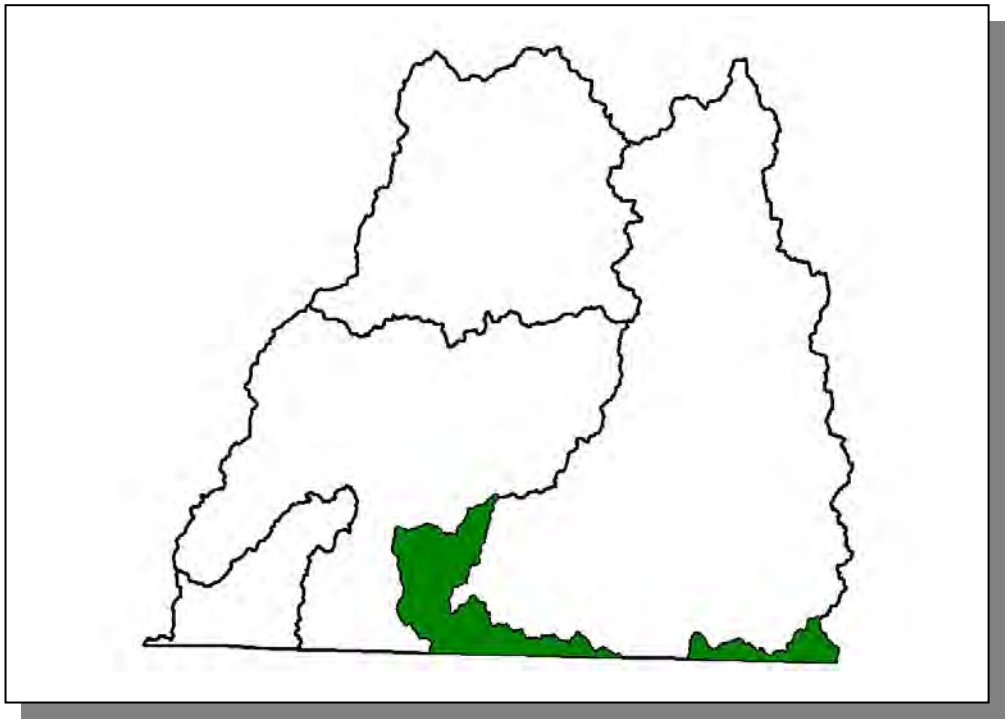


Figure 4-2. Location of Subwatershed 0801020702. *All Little Hatchie River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.A.i. 080102070202 (Bridge Creek).

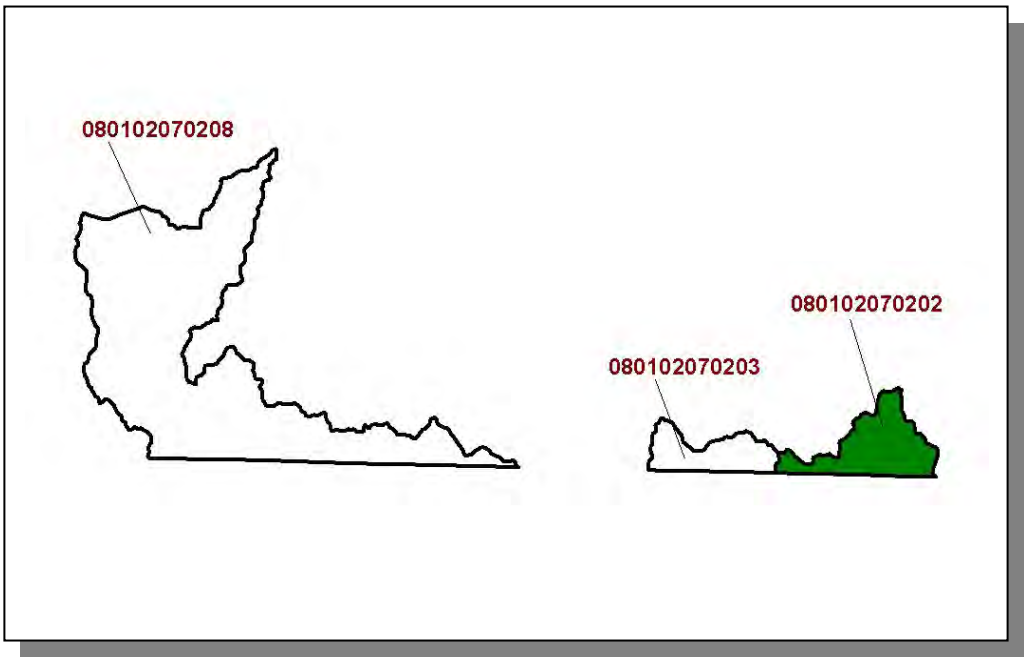


Figure 4-3. Location of Subwatershed 080102070202. *All HUC-12 subwatershed boundaries are shown for reference.*

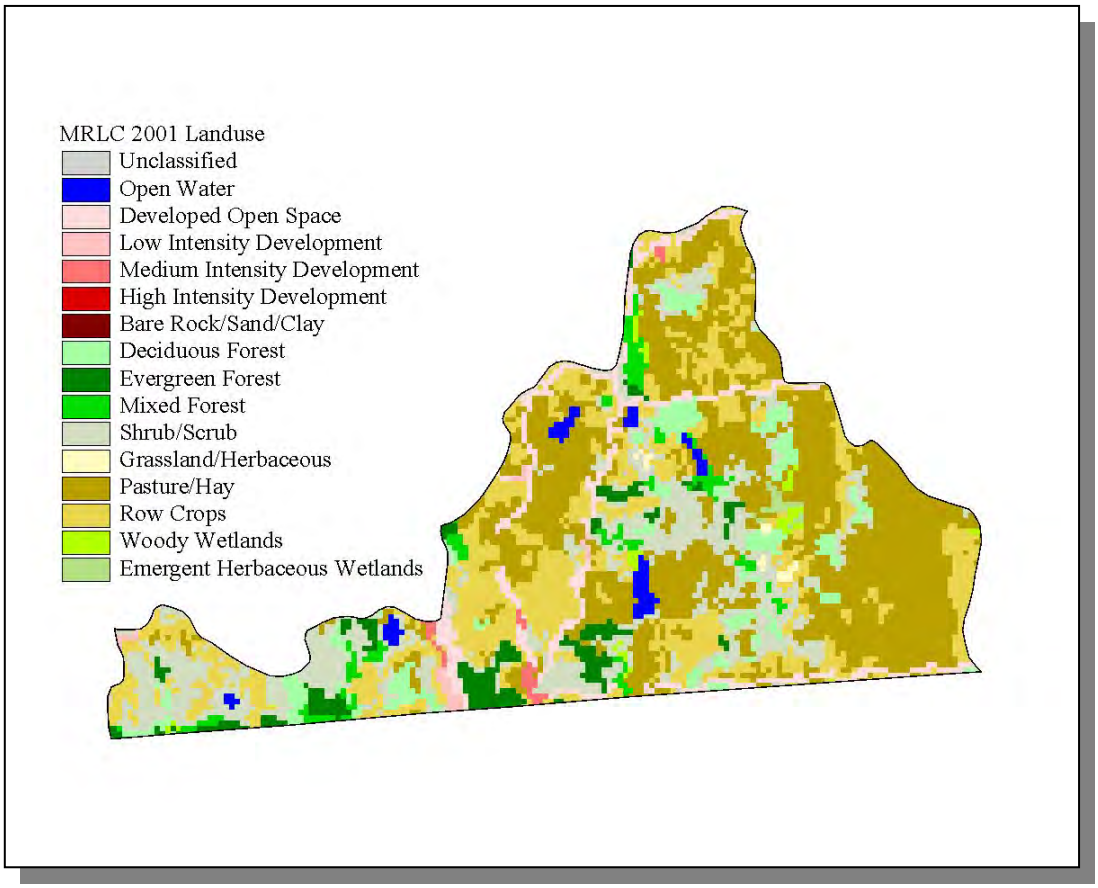


Figure 4-4. Illustration of Land Use Distribution in Subwatershed 080102070202.

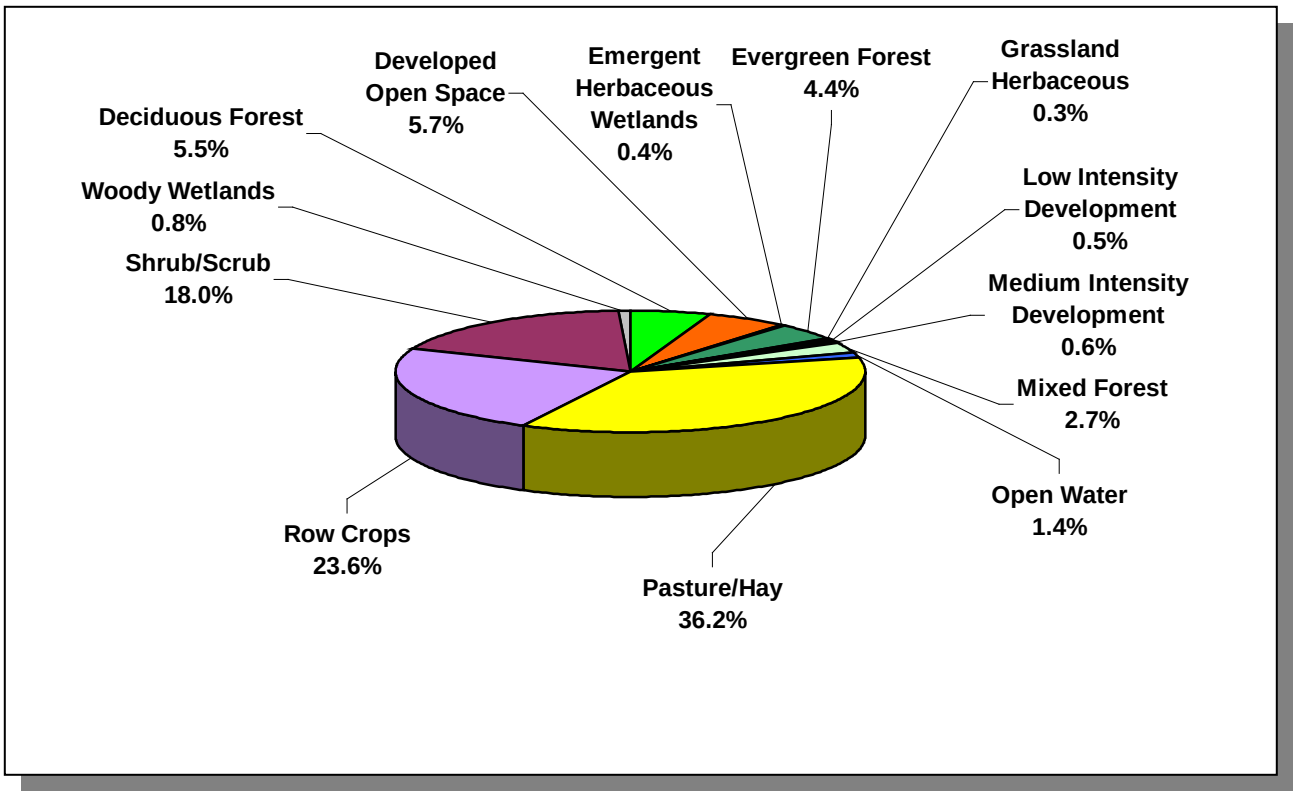


Figure 4-5. Land Use Distribution in Subwatershed 080102070202. *More information is provided in Appendix IV.*

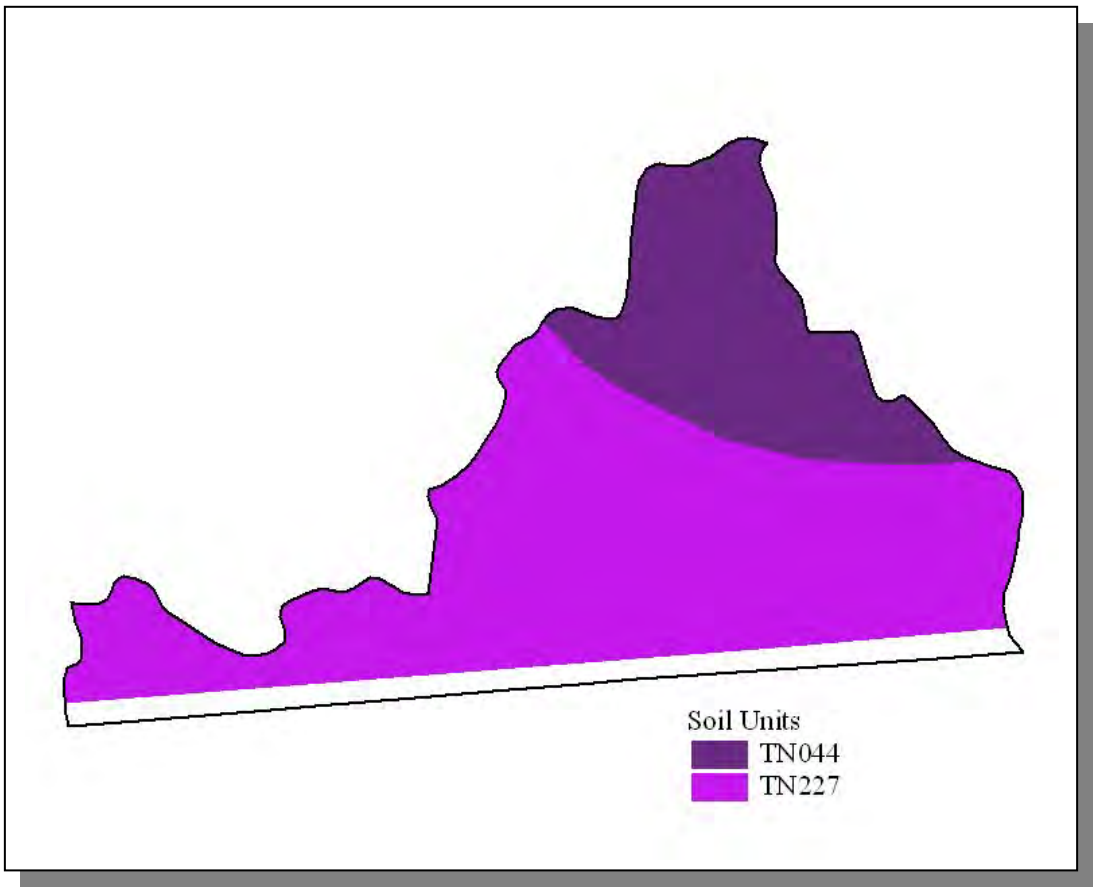


Figure 4-6. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070202.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN044	0.00	C	1.48	5.32	Silty Loam	0.42
TN227	0.00	C	2.41	5.03	Silty Loam	0.38

Table 4-2. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070202. *The definition of "Hydrologic Group" is provided in Appendix IV.*

.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
McNairy	22,422	23,678	24,653	0.16	37	39	41	10.8

Table 4-3. Population Estimates in Subwatershed 080102070202.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Guys	Mcnairy	492	194	4	182	8

Table 4-4. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 080102070202.

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

There are no point source contributions in this subwatershed.

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

LIVESTOCK COUNTS			
Beef Cow	Cattle	Hogs	Sheep
70	136	77	<5

Table 4-5. Summary of Livestock Count Estimates in Subwatershed 080102070202. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
McNairy	5,659	10,365	7	491	11,346	98

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

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.61
Grass (Hayland)	0.88
Legumes, Grass (Hayland)	0.07
Legumes (Hayland)	0.12
Grass, Forbs, Legumes (Mixed Pasture)	0.87
Corn (Row Crops)	8.76
Cotton (Row Crops)	11.84
Sorghum (Row Crops)	3.62
Soybeans (Row Crops)	8.00
Wheat (Close-Grown Cropland)	1.92
Other Cropland not Planted	1.98
Conservation Reserve Program Lands	0.23
Farmsteads and Ranch Headquarters	0.09

Table 4-7. Annual Estimated Total Soil Loss in Subwatershed 080102070202.

4.2.A.ii. 080102070203 (Cain Creek).

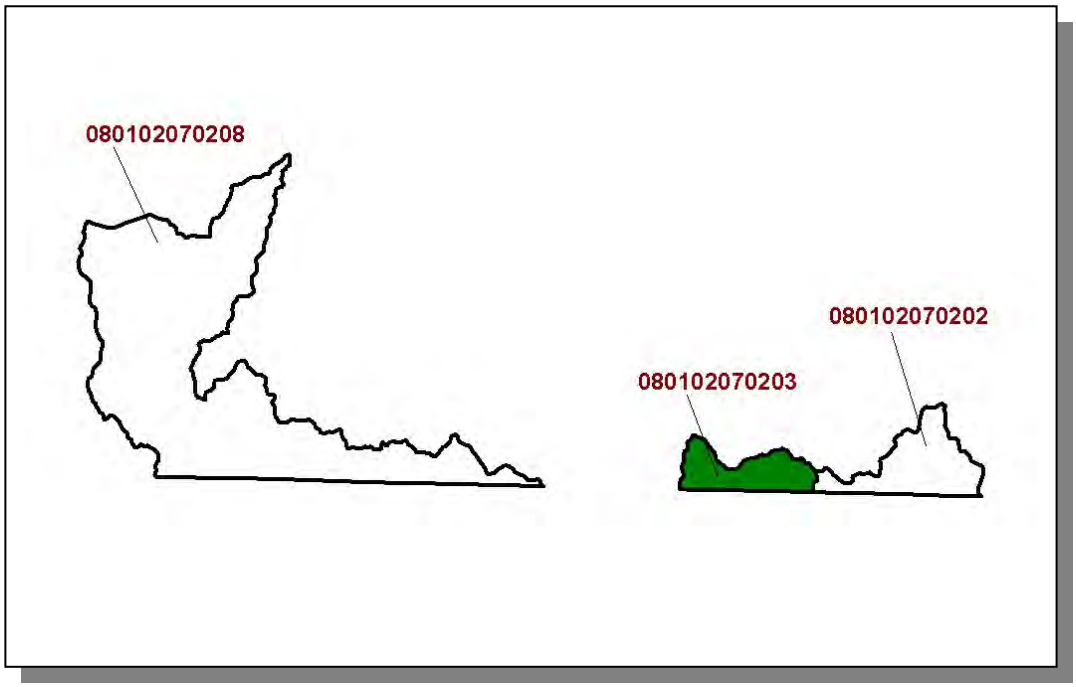


Figure 4-7. Location of Subwatershed 080102070203. *All HUC-12 subwatershed boundaries are shown for reference.*

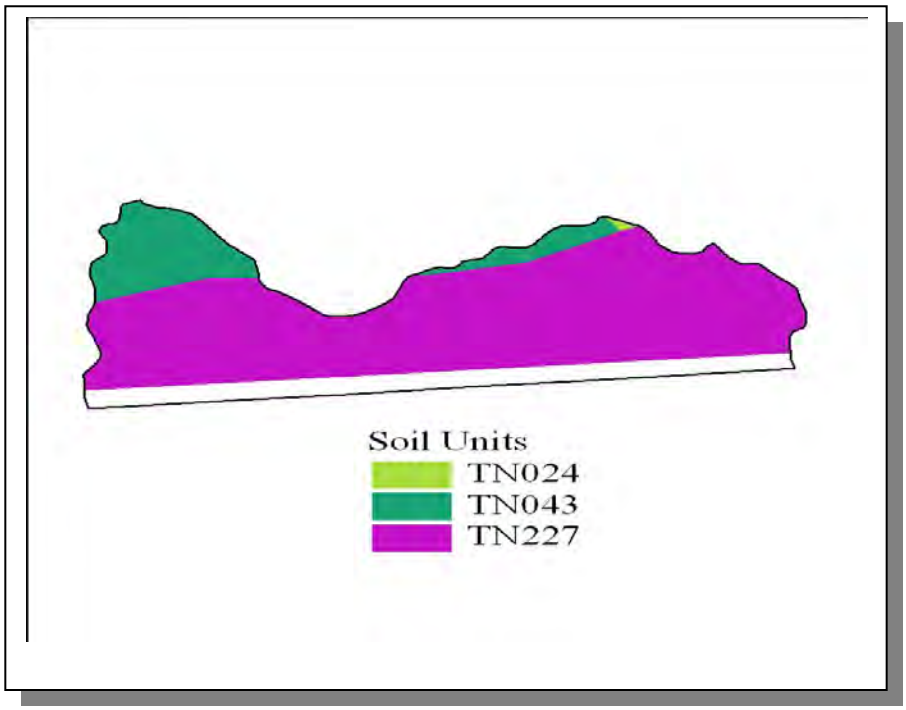


Figure 4-8. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070203.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN024	61.00	D	2.18	5.35	Loam	0.29
TN043	0.00	C	2.70	5.02	Loam	0.30
TN227	0.00	C	2.41	5.03	Silty Loam	0.38

Table 4-8. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070203. *The definition of "Hydrologic Group" is provided in Appendix IV.*

.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
McNairy	22,422	23,678	24,653	0.04	10	10	11	10.0

Table 4-9. Population Estimates in Subwatershed 080102070203.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Guys	McNairy	492	194	4	182	8

Table 4-10. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 080102070203.

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

There are no point source contributions in this subwatershed.

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

LIVESTOCK COUNTS		
Beef Cow	Cattle	Hogs
12	23	6

Table 4-11. Summary of Livestock Count Estimates in Subwatershed 080102070203. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
McNairy	5,659	10,365	7	491	11,346	98

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

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.63
Grass (Hayland)	1.17
Legumes, Grass (Hayland)	0.07
Legumes (Hayland)	0.12
Grass, Forbs, Legumes (Mixed Pasture)	0.97
Corn (Row Crops)	7.94
Cotton (Row Crops)	14.17
Sorghum (Row Crops)	3.61
Soybeans (Row Crops)	7.36
Wheat (Close-Grown Cropland)	1.92
Other Cropland not Planted	1.87
Conservation Reserve Program Lands	0.21
Farmsteads and Ranch Headquarters	0.08

Table 4-13. Annual Estimated Total Soil Loss in Subwatershed 080102070203.

4.2.A.iii. 080102070208 (Tuscumbia Creek).

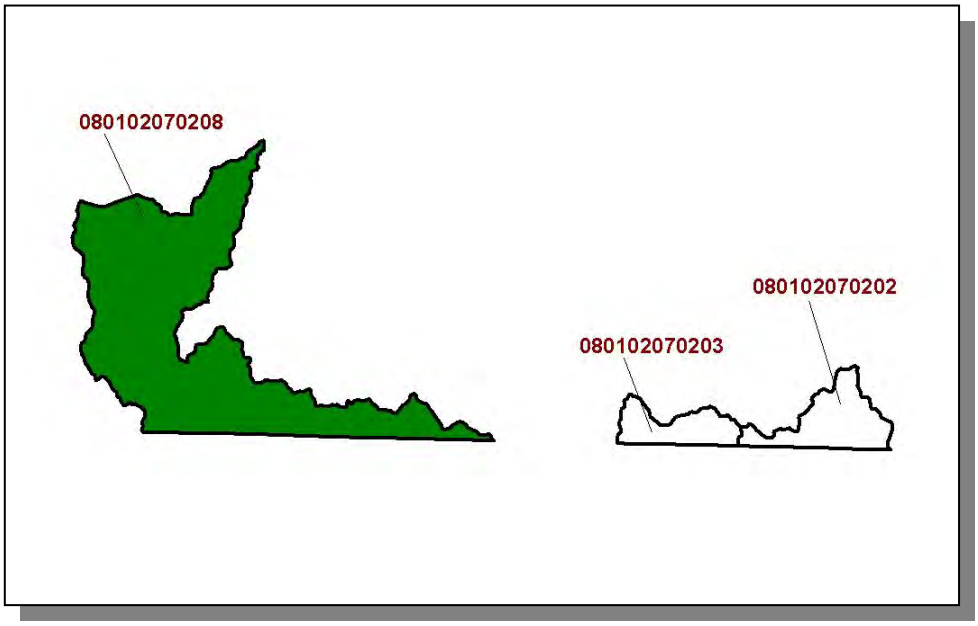


Figure 4-9. Location of Subwatershed 080102070208. *All HUC-12 subwatershed boundaries are shown for reference.*

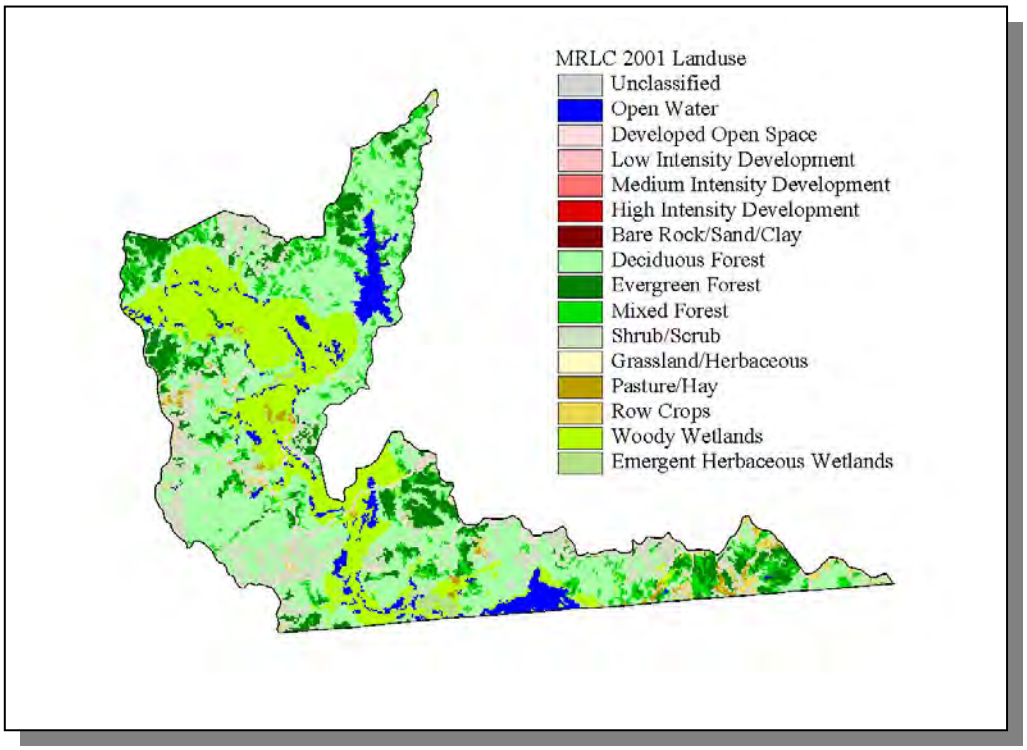


Figure 4-10. Illustration of Land Use Distribution in Subwatershed 080102070208.

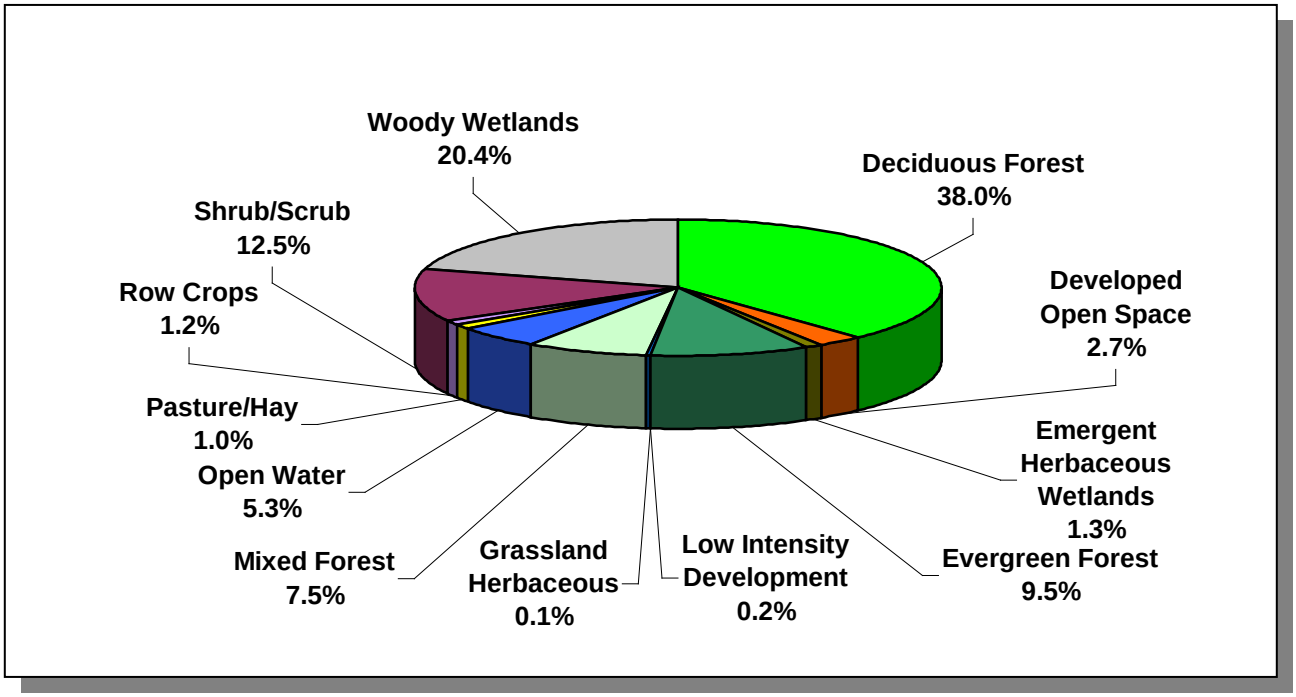


Figure 4-11. Land Use Distribution in Subwatershed 080102070208. *More information is provided in Appendix IV.*

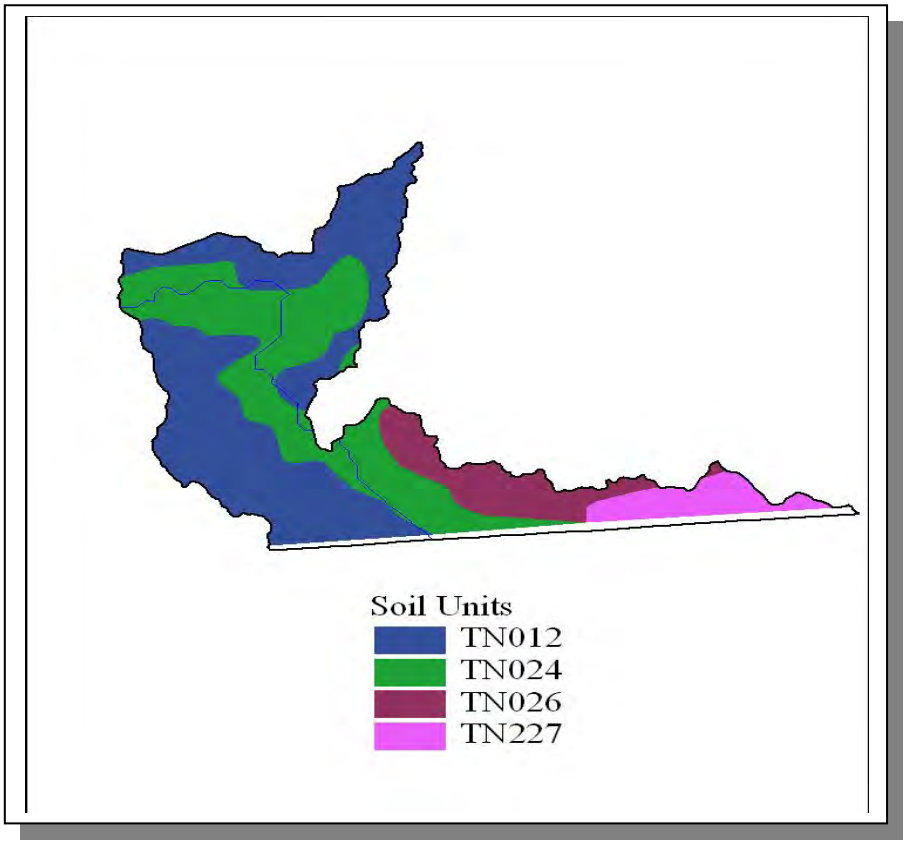


Figure 4-12. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070208.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN012	1.00	C	2.52	5.13	Silty Loam	0.39
TN024	61.00	D	2.18	5.35	Loam	0.29
TN026	0.00	B	1.52	5.13	Silty Loam	0.40
TN227	0.00	C	2.41	5.03	Silty Loam	0.38

Table 4-14. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070208. *The definition of "Hydrologic Group" is provided in Appendix IV.*

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	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
McNairy	22,422	23,678	24,653	2.32	520	549	572	10.0

Table 4-15. Population Estimates in Subwatershed 080102070208.

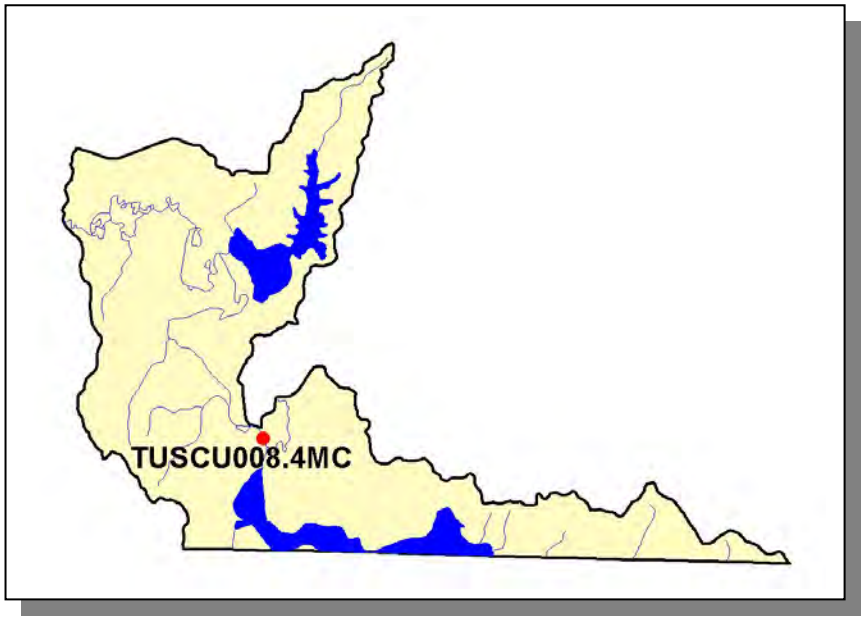

Figure 4-13. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080102070208. *More information, including site names and locations, is provided in Appendix IV.*

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

There are no point source contributions in this subwatershed.

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

LIVESTOCK COUNTS		
Beef Cow	Cattle	Hogs
25	49	22

Table 4-16. Summary of Livestock Count Estimates in Subwatershed 080102070208. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
McNairy	5,659	10,365	7	491	11,346	98

Table 4-17. Summary of Livestock Count Estimates in McNairy County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.57
Grass (Hayland)	0.35
Legumes, Grass (Hayland)	0.07
Legumes (Hayland)	0.12
Grass, Forbs, Legumes (Mixed Pasture)	0.69
Corn (Row Crops)	10.22
Cotton (Row Crops)	7.72
Sorghum (Row Crops)	3.61
Soybeans (Row Crops)	9.14
Wheat (Close-Grown Cropland)	1.92
Other Cropland not Planted	2.17
Conservation Reserve Program Lands	0.26
Farmsteads and Ranch Headquarters	0.10

Table 4-18. Annual Estimated Total Soil Loss in Subwatershed 080102070208.

4.2.B. 0801020704.

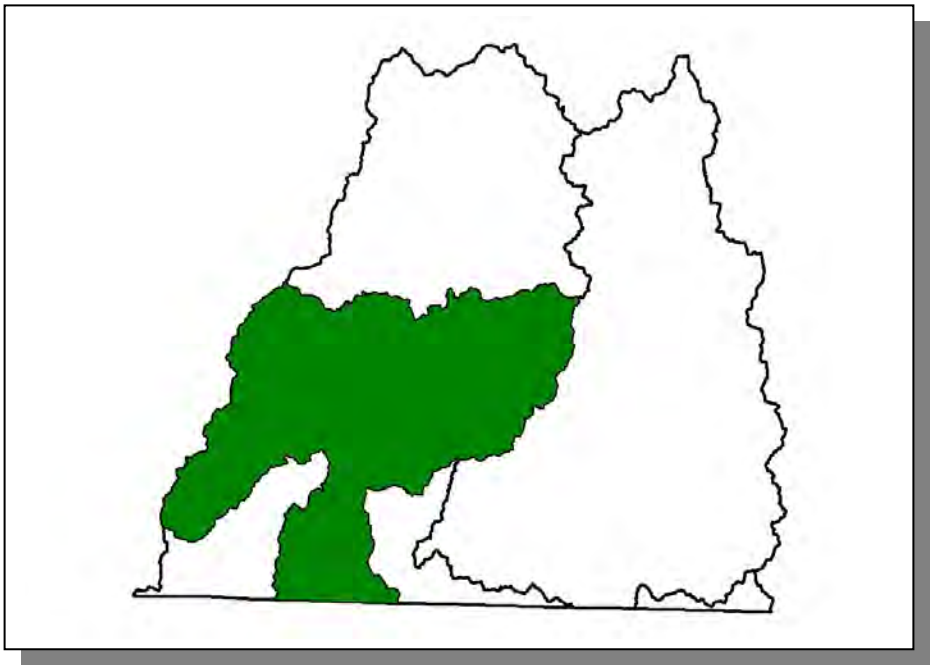

Figure 4-14. Location of Subwatershed 0801020704. *All Little Hatchie River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.B.i. 080102070401 (Hatchie River).

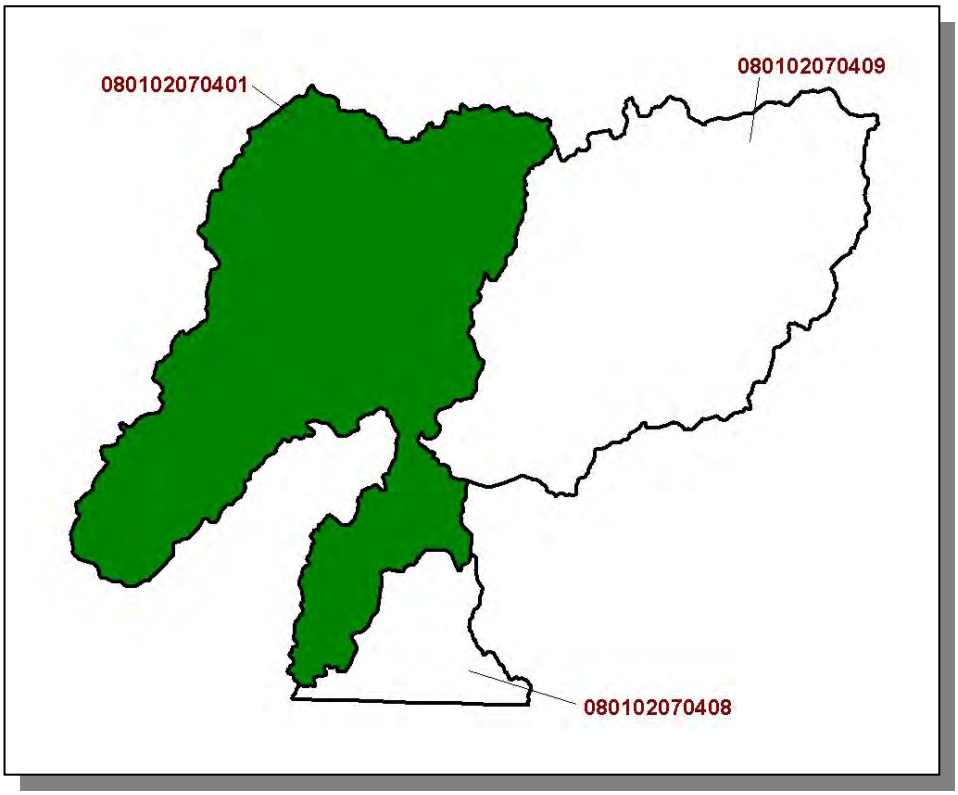

Figure 4-15. Location of Subwatershed 080102070401. *All HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

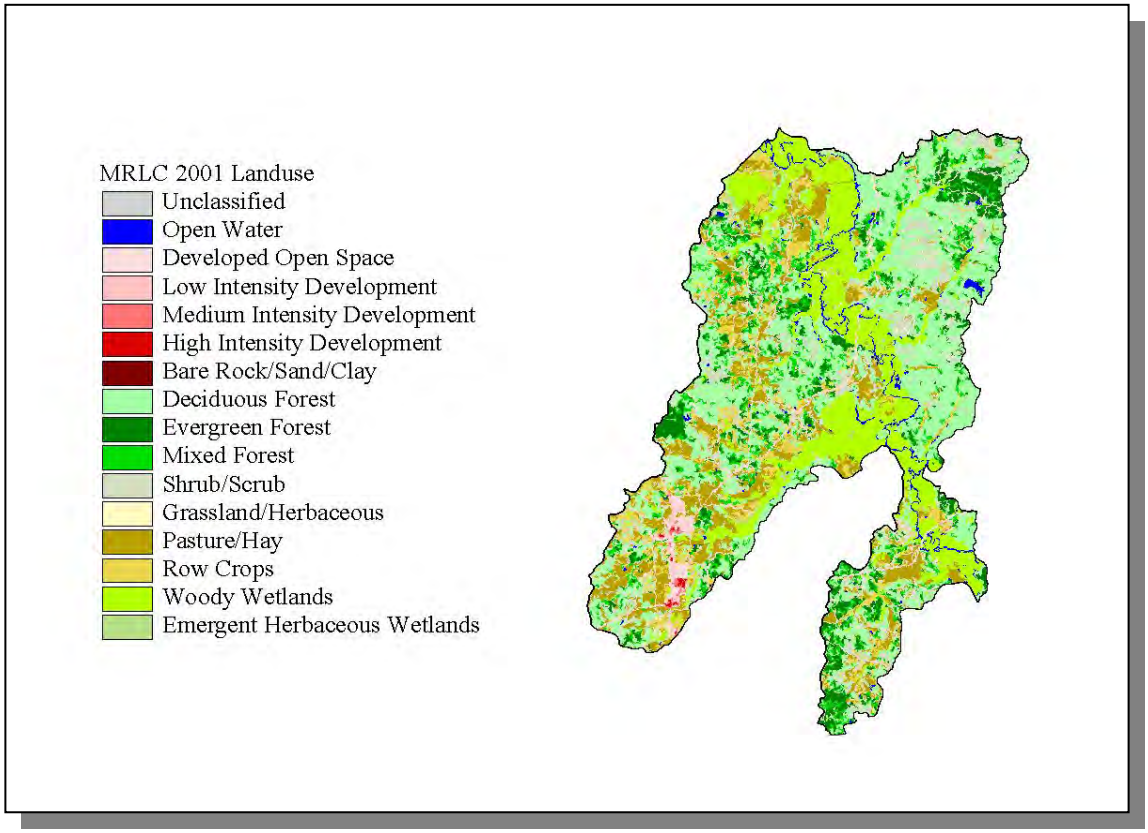

Figure 4-16. Illustration of Land Use Distribution in Subwatershed 080102070401.

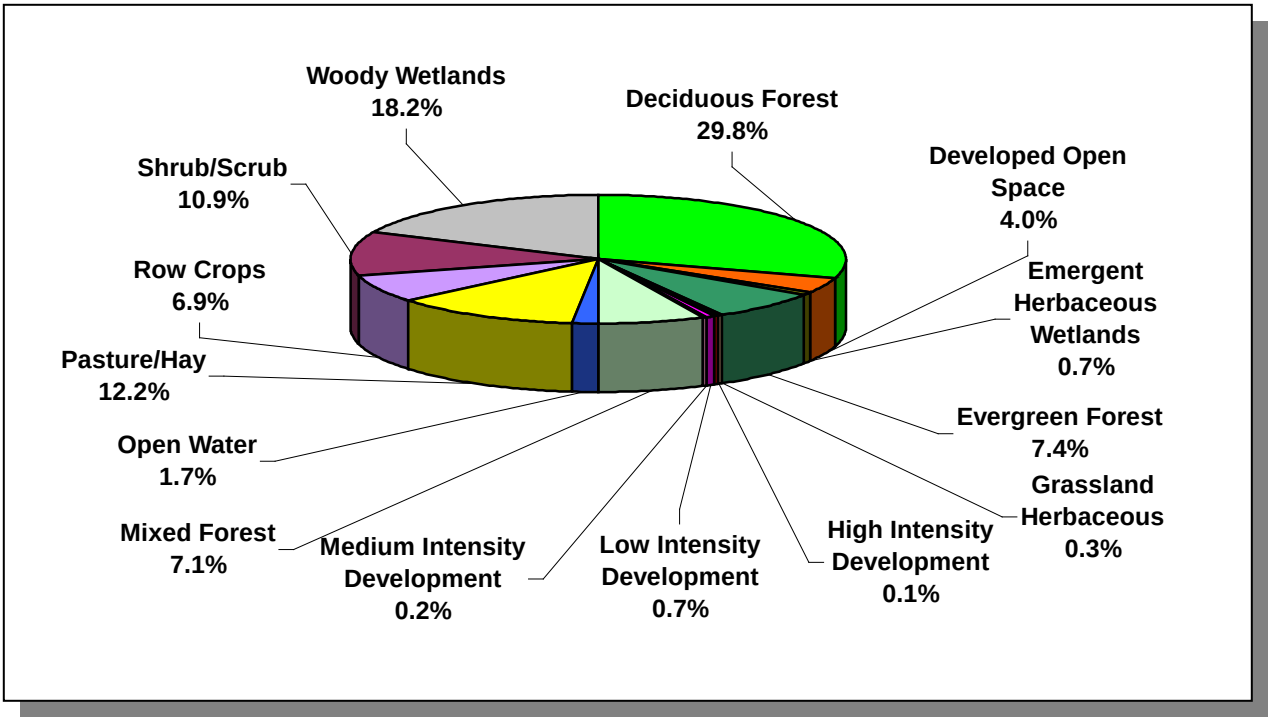

Figure 4-17. Land Use Distribution in Subwatershed 080102070401. *More information is provided in Appendix IV.*

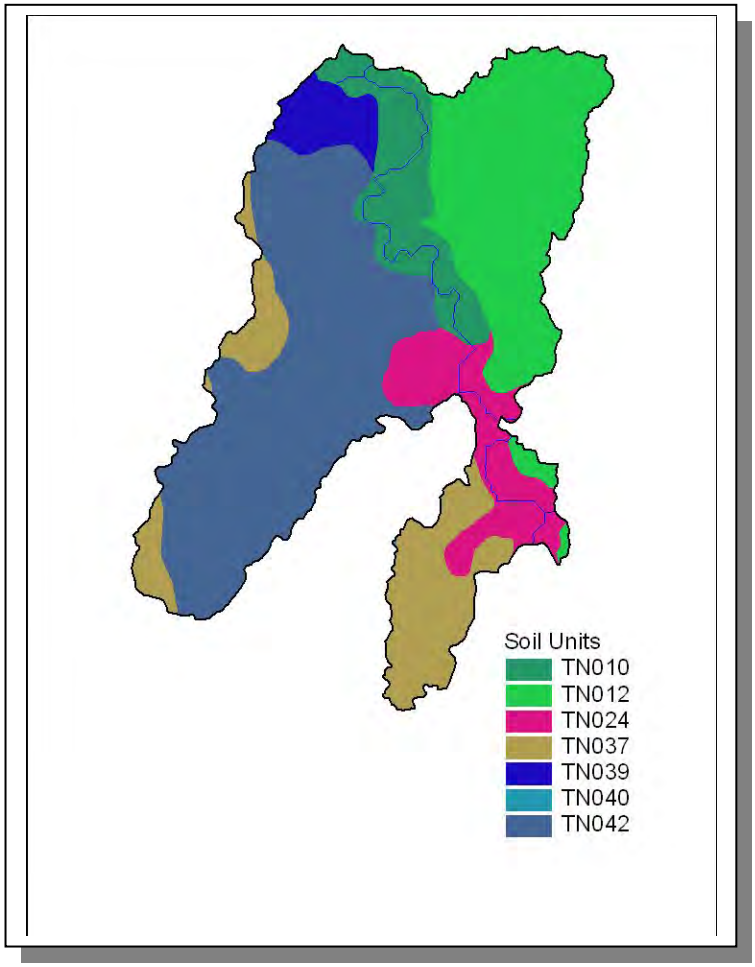

Figure 4-18. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070401.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN010	81.00	C	1.33	5.11	Silty Loam	0.44
TN012	1.00	C	2.52	5.13	Silty Loam	0.39
TN024	61.00	D	2.18	5.35	Loam	0.29
TN037	0.00	C	3.51	4.86	Sandy Loam	0.27
TN039	24.00	C	1.35	5.20	Silty Loam	0.47
TN040	40.00	C	1.33	5.18	Silty Loam	0.38
TN042	0.00	C	2.53	5.11	Silty Loam	0.34

Table 4-19. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070401. *The definition of "Hydrologic Group" is provided in Appendix IV.*

.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Hardeman	23,377	24,702	28,105	7.79	1,820	1,923	2,188	20.2
Mcnairy	22,422	23,678	24,653	1.31	293	310	322	9.9
Total	**45,799**	**48,380**	**52,758**		**2,113**	**2,233**	**2,510**	**18.8**

Table 4-20. Population Estimates in Subwatershed 080102070401.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Middleton	Hardeman	531	258	213	45	0

Table 4-21. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 080102070401.

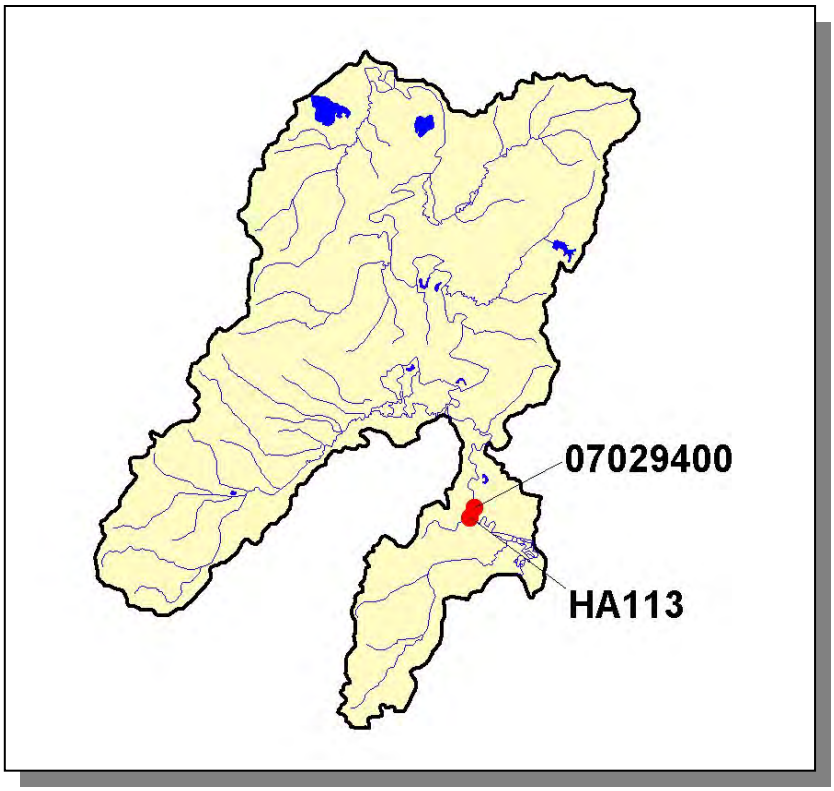

Figure 4-19. Location of Historical Streamflow Data Collection Sites in Subwatershed 080102070401. *More information is provided in Appendix IV.*

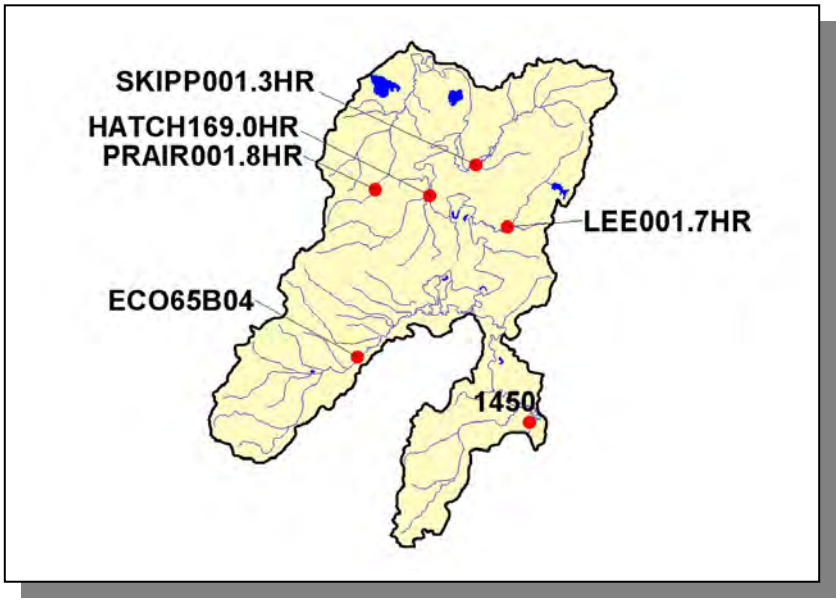

Figure 4-20. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080102070401. *More information, including site names and locations, is provided in Appendix IV.*

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

There are no point source contributions in this subwatershed.

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
1,306	2,258	9	<5	754	20

Table 4-22. Summary of Livestock Count Estimates in Subwatershed 080102070401. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Hardeman	9,184	15,877	62	28	5,221	144
McNairy	5,659	10,365	7	491	11,346	98

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

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.15
Grass (Hayland)	0.35
Legumes, Grass (Hayland)	0.07
Legumes (Hayland)	0.13
Grass, Forbs, Legumes (Mixed Pasture)	1.01
Corn (Row Crops)	11.35
Cotton (Row Crops)	23.26
Sorghum (Row Crops)	3.11
Soybeans (Row Crops)	12.49
Wheat (Close-Grown Cropland)	13.42
Summer Fallow (Other Cropland)	6.11
Other Cropland not Planted	3.99
Conservation Reserve Program Lands	0.28
Farmsteads and Ranch Headquarters	0.86

Table 4-24. Annual Estimated Total Soil Loss in Subwatershed 080102070401.

4.2.B.ii. 080102070408 (Hatchie River).

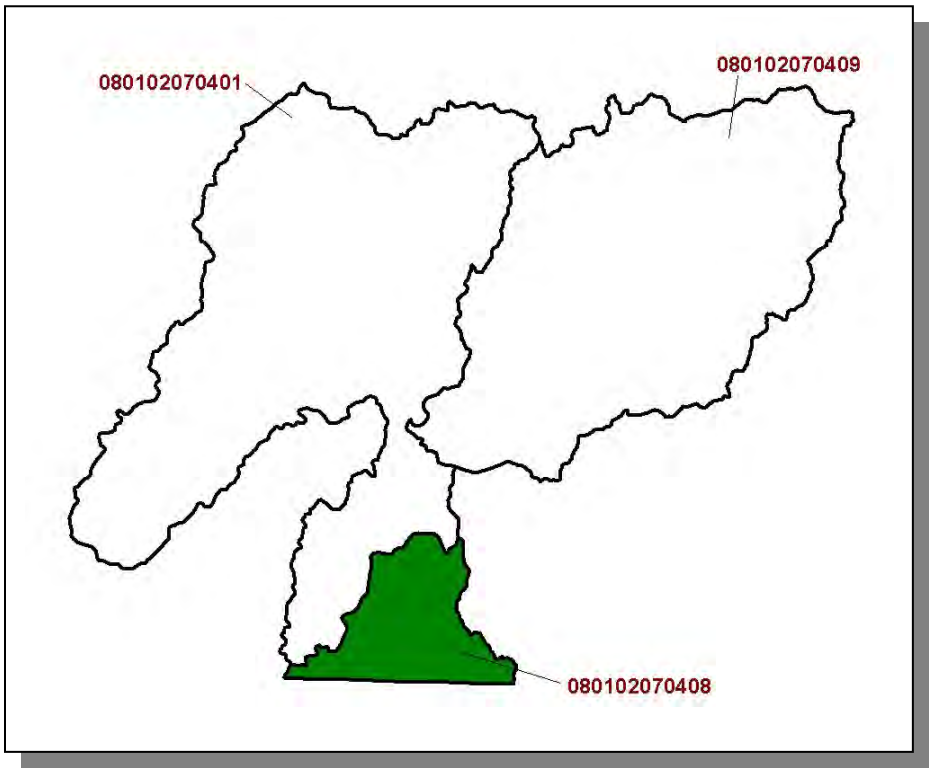

Figure 4-21. Location of Subwatershed 080102070408. *All HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

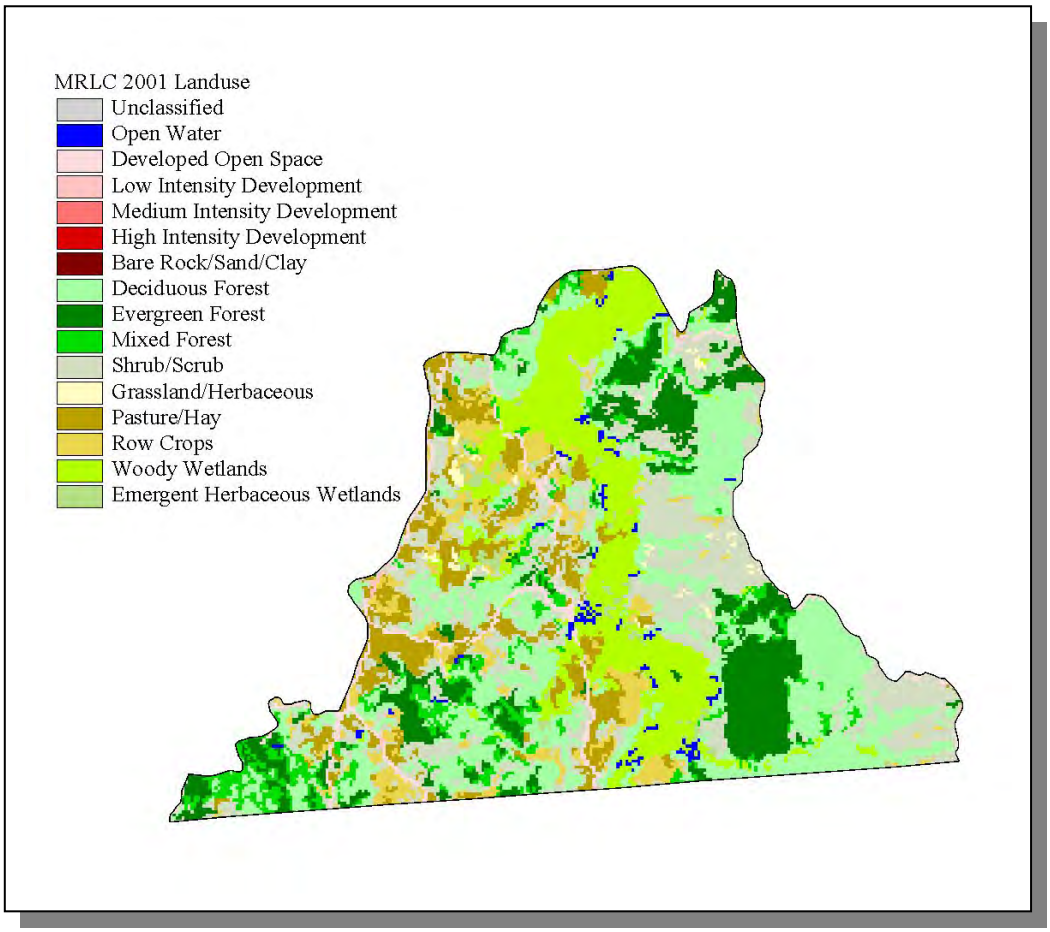

Figure 4-22. Illustration of Land Use Distribution in Subwatershed 080102070408.

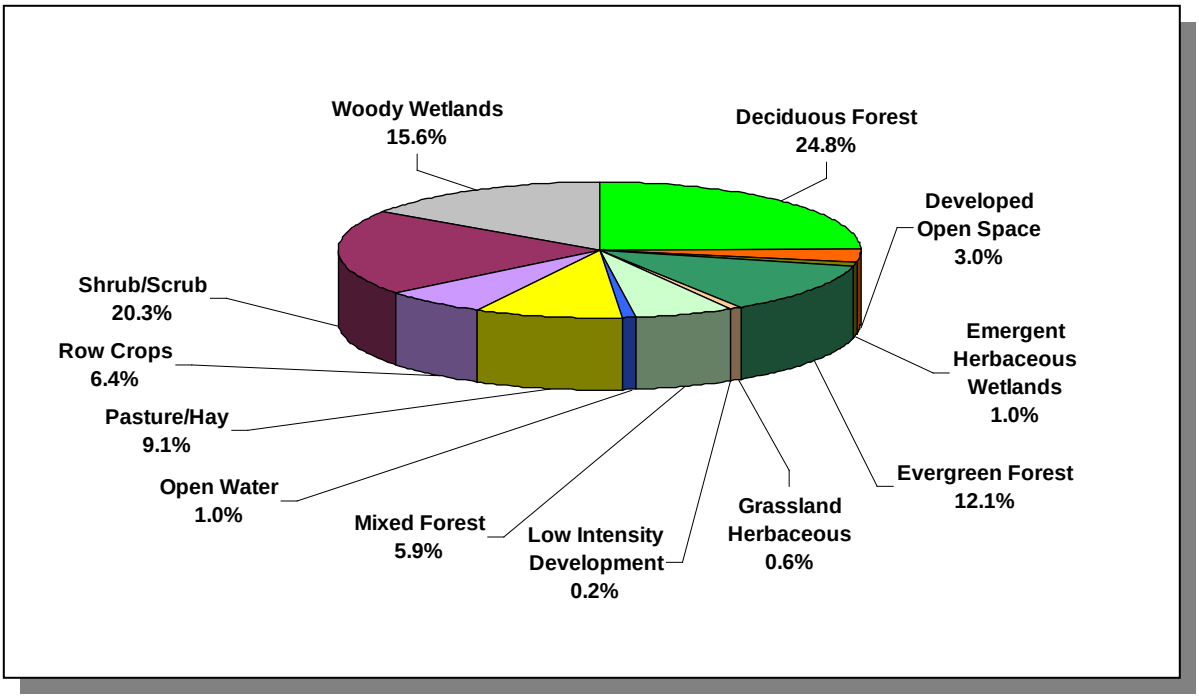

Figure 4-23. Land Use Distribution in Subwatershed 080102070408. *More information is provided in Appendix IV.*

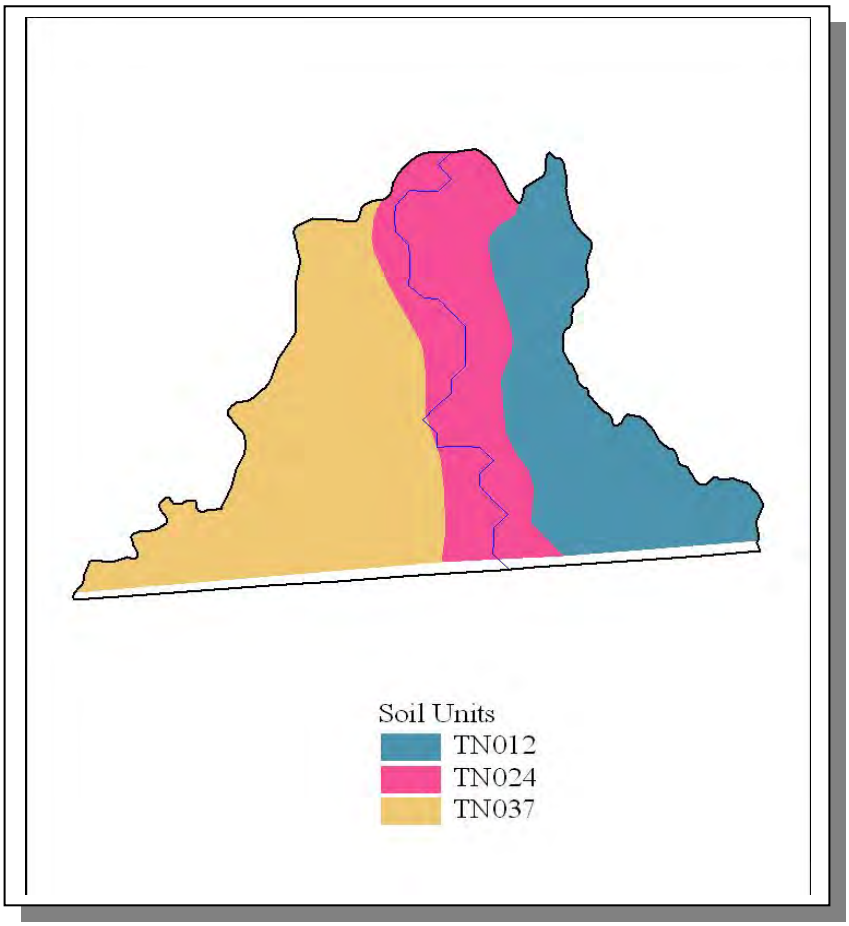

Figure 4-24. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070408.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN012	1.00	C	2.52	5.13	Silty Loam	0.39
TN024	61.00	D	2.18	5.35	Loam	0.29
TN037	0.00	C	3.51	4.86	Sandy Loam	0.27

Table 4-25. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070408. *The definition of "Hydrologic Group" is provided in Appendix IV.*

.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Hardeman	23,377	24,702	28,105	0.61	142	150	171	20.4
McNairy	22,422	23,678	24,653	0.33	75	79	82	9.3
Total	**45,799**	**48,380**	**52,758**		**217**	**229**	**253**	**16.6**

Table 4-26. Population Estimates in Subwatershed 080102070408.

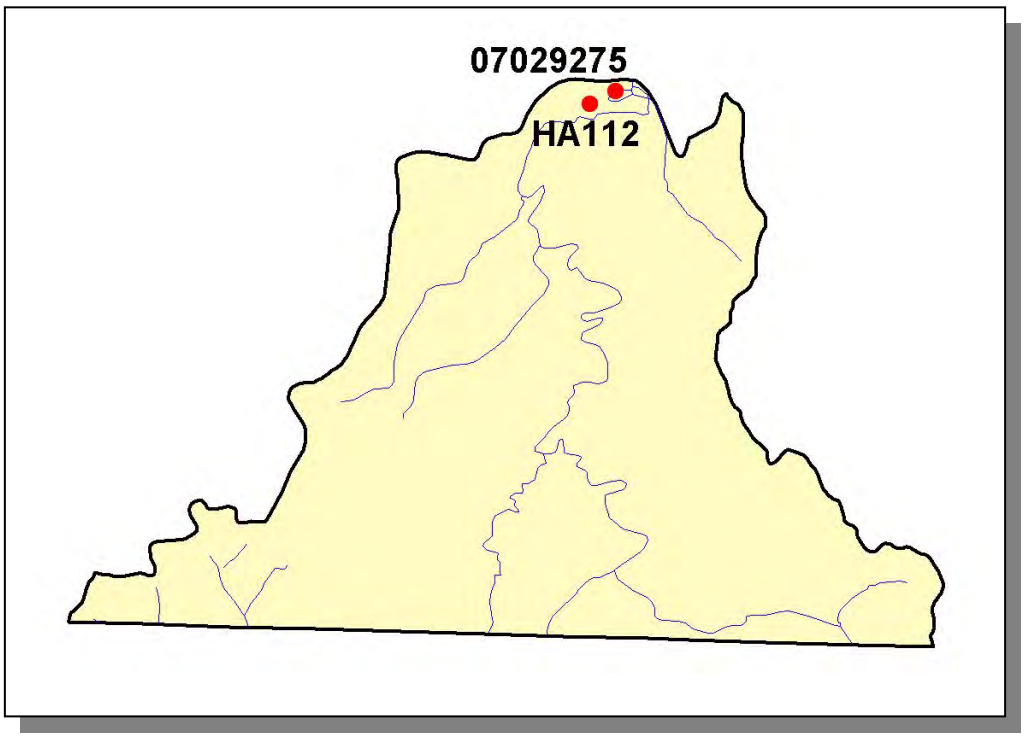

Figure 4-25. Location of Historical Streamflow Data Collection Sites in Subwatershed 080102070408. *More information is provided in Appendix IV.*

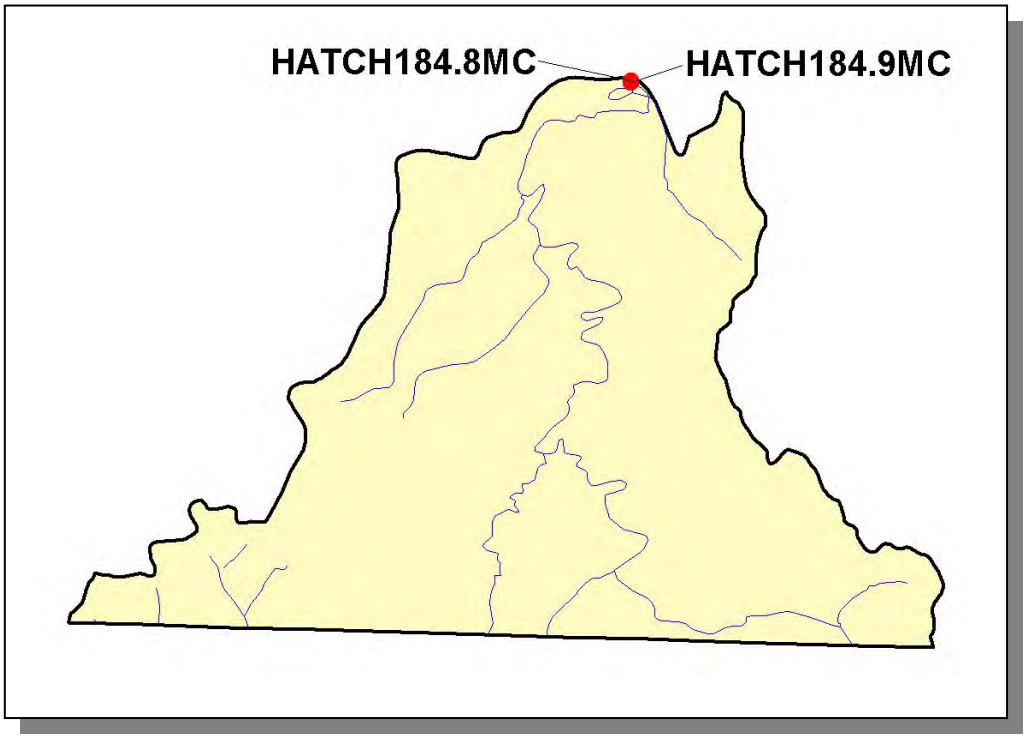

Figure 4-26. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080102070408. *More information, including site names and locations, is provided in Appendix IV.*

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

There are no point source contributions in this subwatershed.

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
177	309	<5	<5	95	<5

Table 4-27. Summary of Livestock Count Estimates in Subwatershed 080102070408. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Hardeman	9,184	15,877	62	28	5,221	144
McNairy	5,659	10,365	7	491	11,346	98

Table 4-28. Summary of Livestock Count Estimates in Hardeman and McNairy Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.95
Grass (Hayland)	0.53
Legumes, Grass (Hayland)	0.07
Legumes (Hayland)	0.40
Grass, Forbs, Legumes (Mixed Pasture)	0.94
Corn (Row Crops)	9.76
Cotton (Row Crops)	17.22
Sorghum (Row Crops)	3.22
Soybeans (Row Crops)	10.19
Wheat (Close-Grown Cropland)	10.90
Summer Fallow (Other Cropland)	6.11
Other Cropland not Planted	3.09
Conservation Reserve Program Lands	0.68
Farmsteads and Ranch Headquarters	0.56

Table 4-29. Annual Estimated Total Soil Loss in Subwatershed 080102070408.

4.2.B.iii. 080102070409 (Mosses Creek).

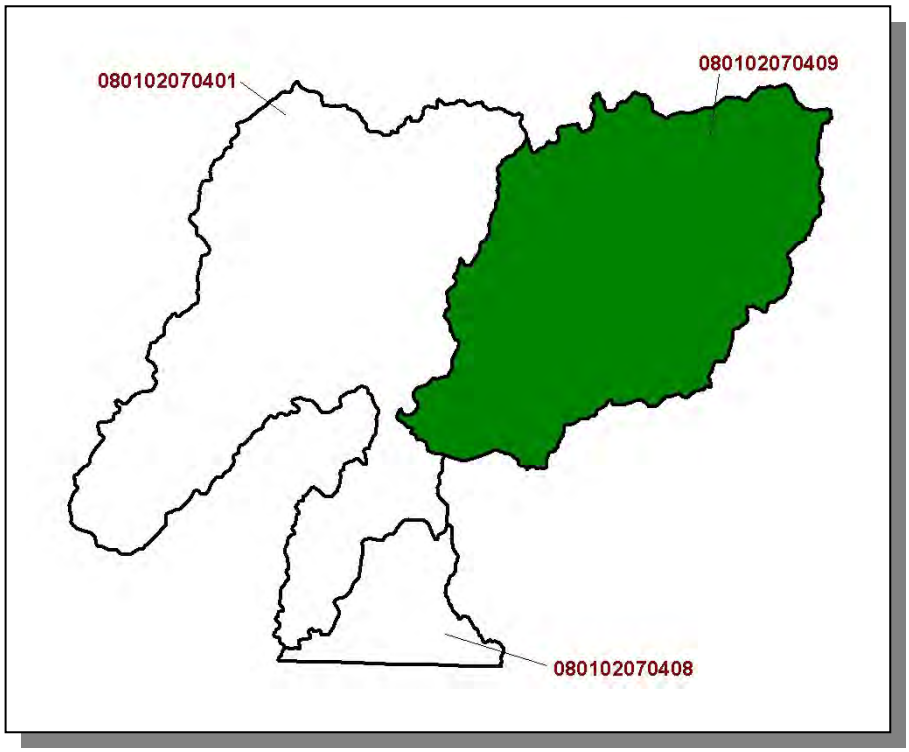

Figure 4-27. Location of Subwatershed 080102070409. *All HUC-12 subwatershed boundaries are shown for reference.*

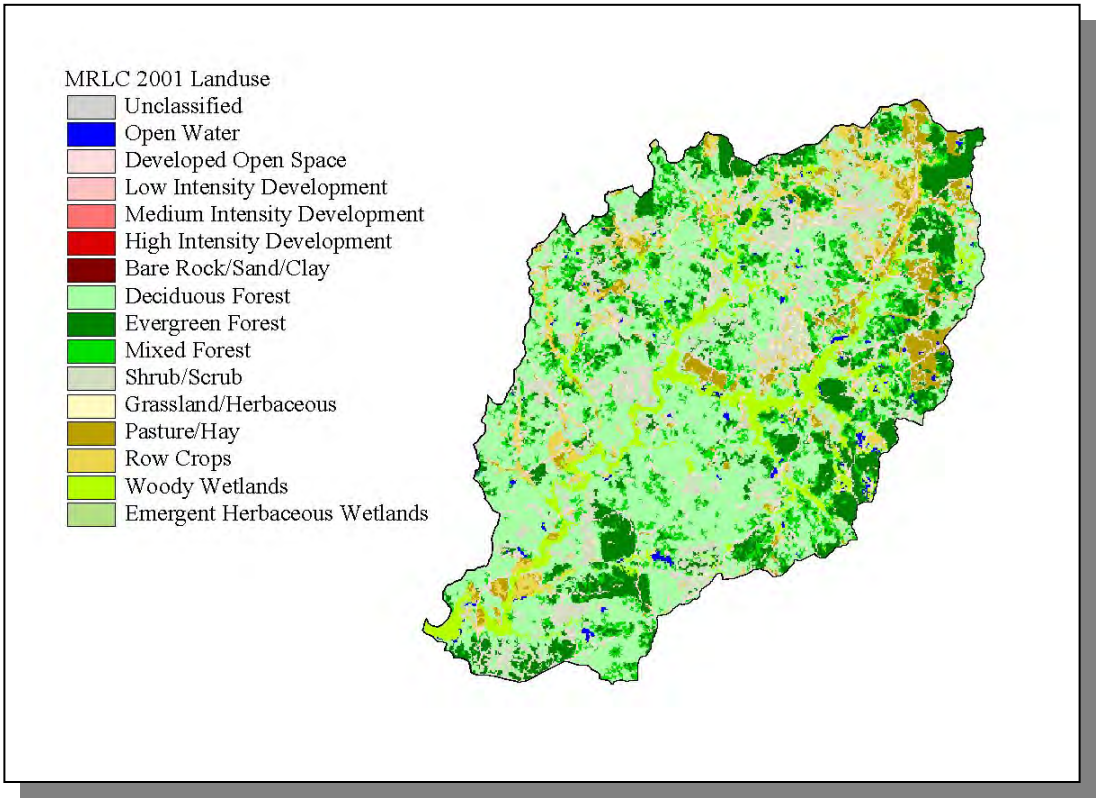

Figure 4-28. Illustration of Land Use Distribution in Subwatershed 080102070409.

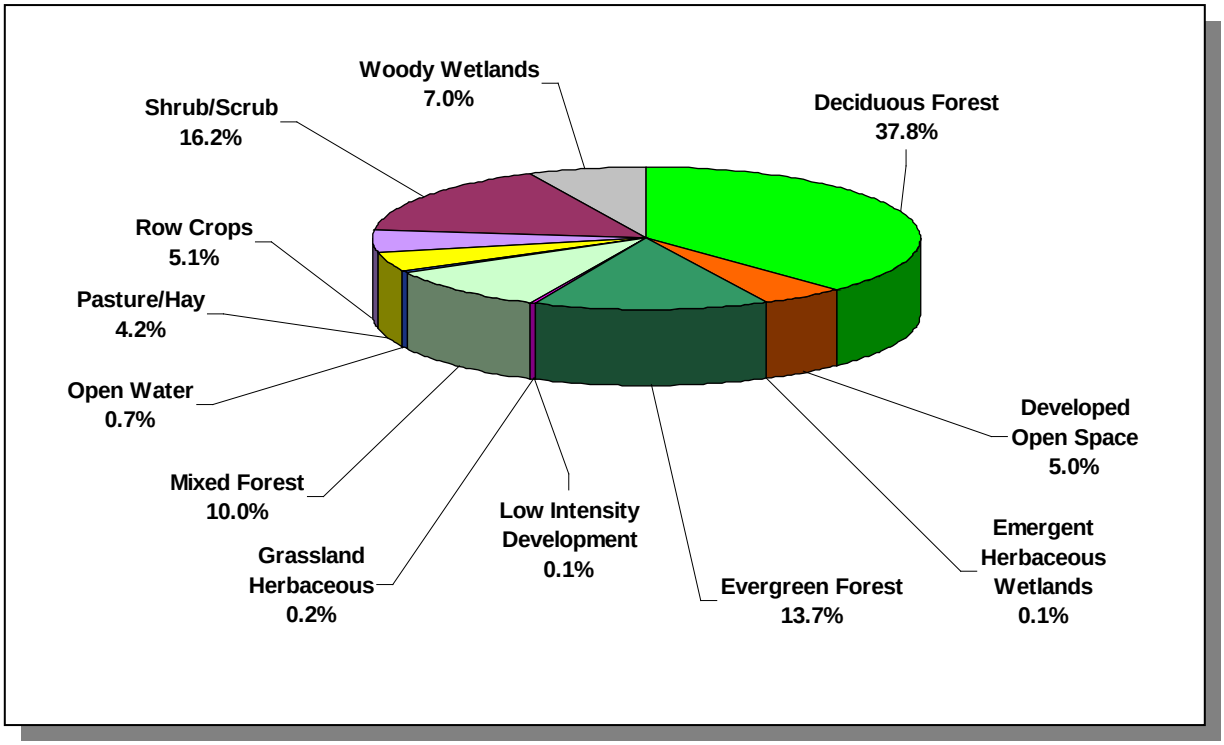

Figure 4-29. Land Use Distribution in Subwatershed 080102070409. *More information is provided in Appendix IV.*

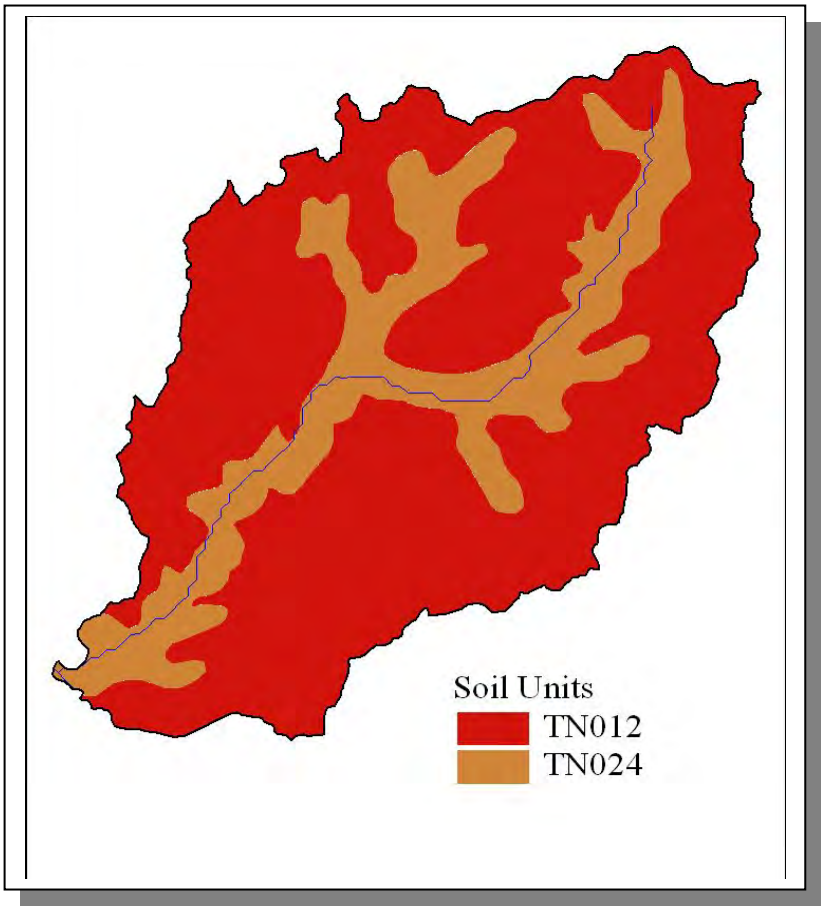

Figure 4-30. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070409.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN012	1.00	C	2.52	5.13	Silty Loam	0.39
TN024	61.00	D	2.18	5.35	Loam	0.29

Table 4-30. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070409. *The definition of "Hydrologic Group" is provided in Appendix IV.*

.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Hardeman	23,377	24,702	28,105	0.06	15	16	18	20
McNairy	22,422	23,678	24,653	8.61	1,932	2,040	2,124	9.9
Total	**45,799**	**48,380**	**52,758**		**1,947**	**2,056**	**2,142**	**10.0**

Table 4-31. Population Estimates in Subwatershed 080102070409.

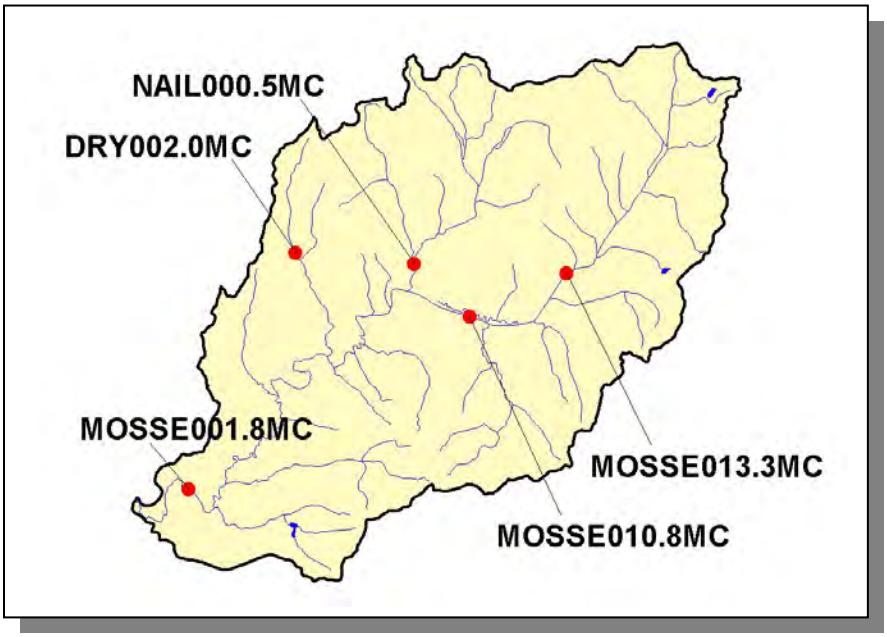

Figure 4-31. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080102070409. *More information, including site names and locations, is provided in Appendix IV.*

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

There are no point source contributions in this subwatershed.

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

LIVESTOCK COUNTS				
Beef Cow	Cattle	Chickens (Layers)	Hogs	Sheep
254	465	<5	506	<5

Table 4-32. Summary of Livestock Count Estimates in Subwatershed 080102070409. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Hardeman	9,184	15,877	62	28	5,221	144
McNairy	5,659	10,365	7	491	11,346	98

Table 4-33. Summary of Livestock Count Estimates in Hardeman and McNairy Counties. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.56
Grass (Hayland)	0.06
Legumes, Grass (Hayland)	0.07
Legumes (Hayland)	0.12
Grass, Forbs, Legumes (Mixed Pasture)	0.59
Corn (Row Crops)	11.03
Cotton (Row Crops)	5.63
Sorghum (Row Crops)	3.61
Soybeans (Row Crops)	9.79
Wheat (Close-Grown Cropland)	2.03
Summer Fallow (Other Cropland)	6.11
Other Cropland not Planted	2.29
Conservation Reserve Program Lands	0.28
Farmsteads and Ranch Headquarters	0.11

Table 4-34. Annual Estimated Total Soil Loss in Subwatershed 080102070409.

4.2.C. 0801020705.

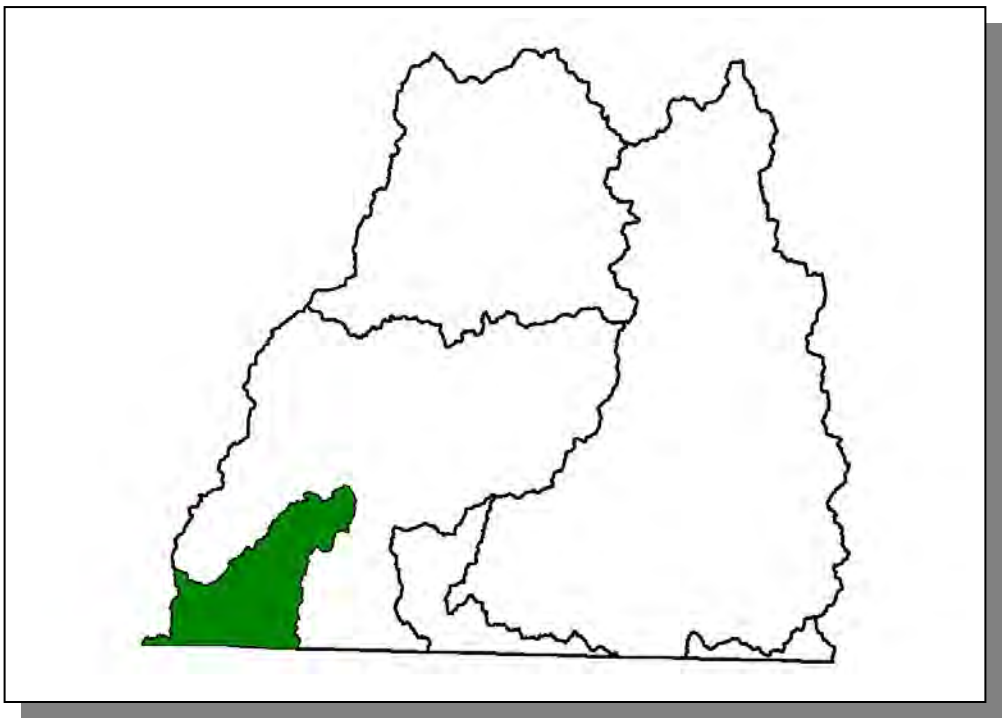

Figure 4-32. Location of Subwatershed 0801020705. *All Little Hatchie River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.C.i. 080102070501 (Muddy Creek).

Figure 4-33. Location of Subwatershed 080102070501. *All HUC-12 subwatershed boundaries are shown for reference.*

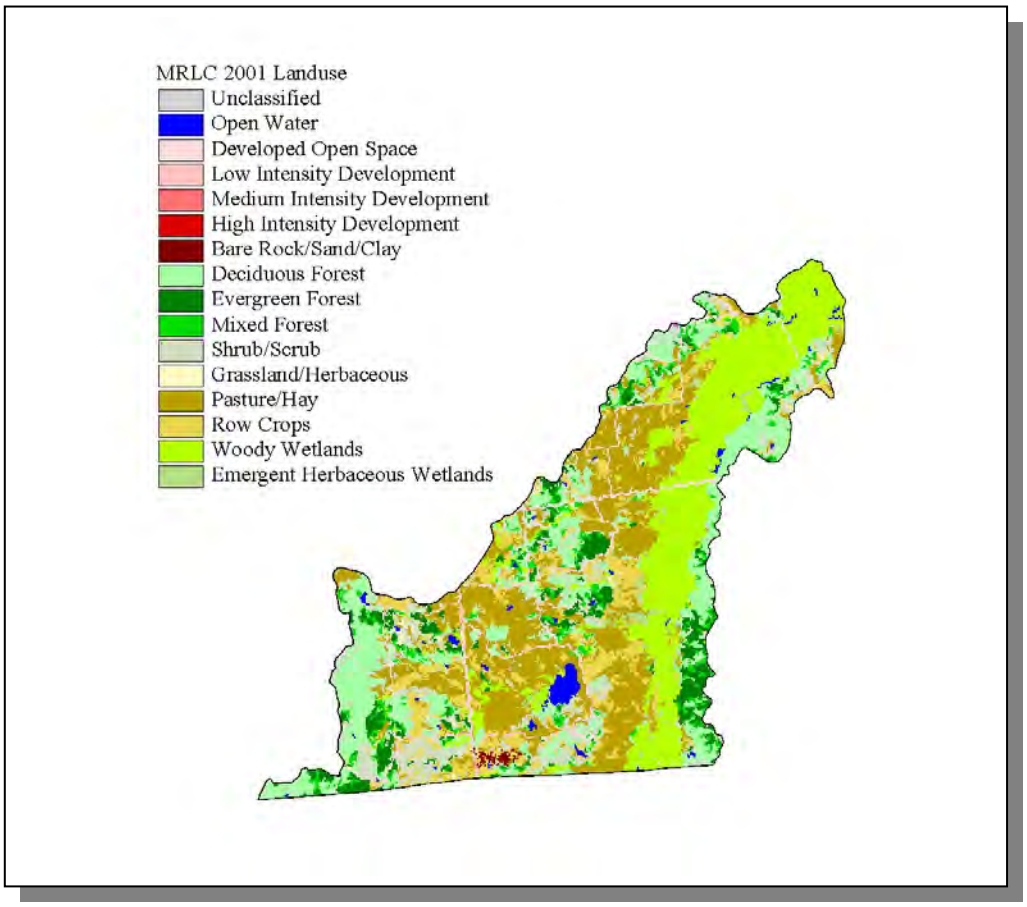

Figure 4-34. Illustration of Land Use Distribution in Subwatershed 080102070501.

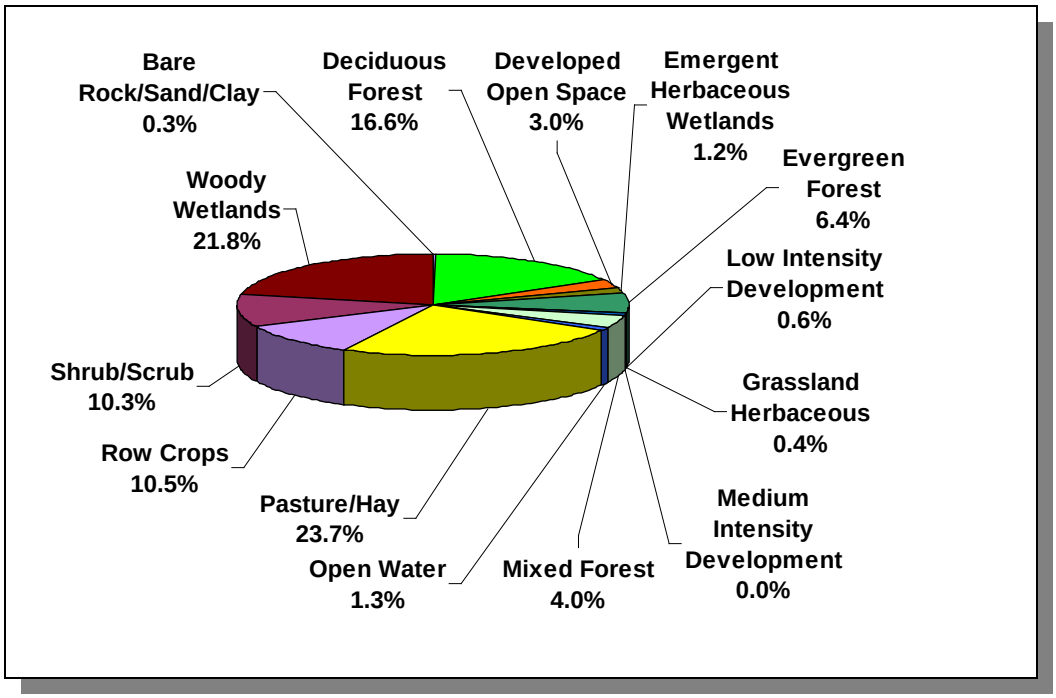

Figure 4-35. Land Use Distribution in Subwatershed 080102070501. *More information is provided in Appendix IV.*

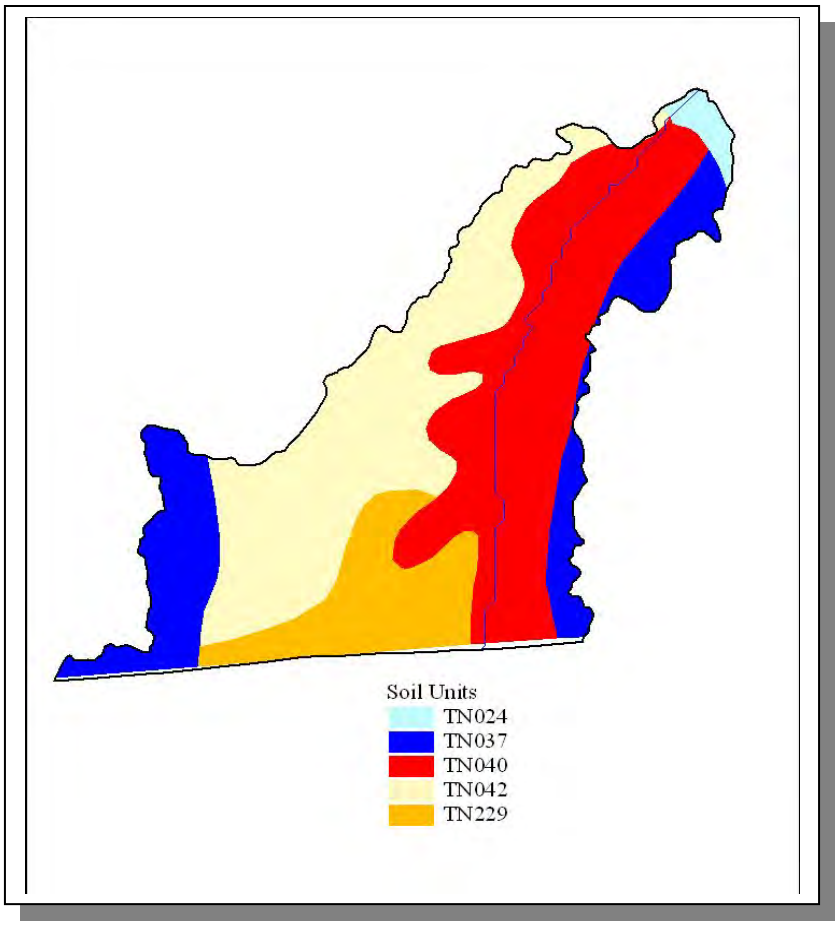

Figure 4-36. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070501.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN024	61.00	D	2.18	5.35	Loam	0.29
TN037	0.00	C	3.51	4.86	Sandy Loam	0.27
TN040	40.00	C	1.33	5.18	Silty Loam	0.38
TN042	0.00	C	2.53	5.11	Silty Loam	0.34
TN229	2.00	C	0.72	5.03	Silty Loam	0.39

Table 4-35. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070501. *The definition of "Hydrologic Group" is provided in Appendix IV.*

.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Hardeman	23,377	24,702	28,105	2.71	634	670	763	20.3

Table 4-36. Population Estimates in Subwatershed 080102070501.

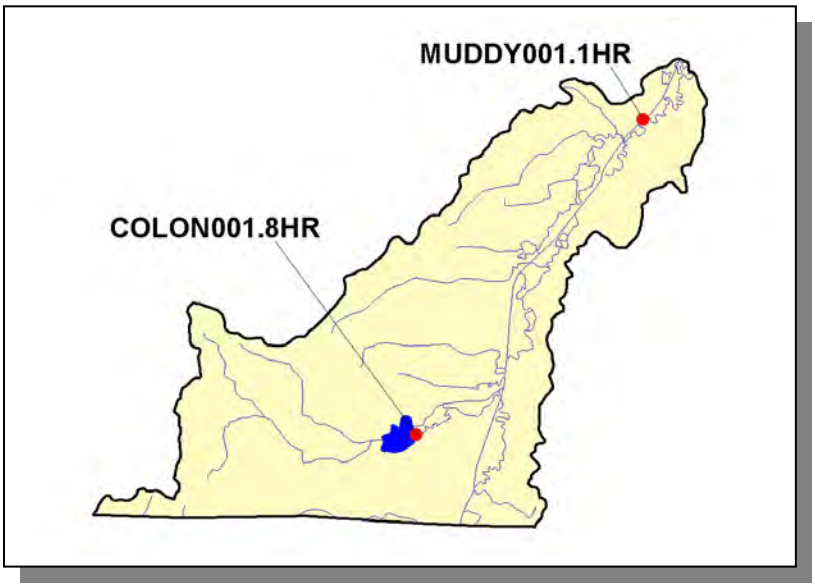

Figure 4-37. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080102070501. *More information, including site names and locations, is provided in Appendix IV.*

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

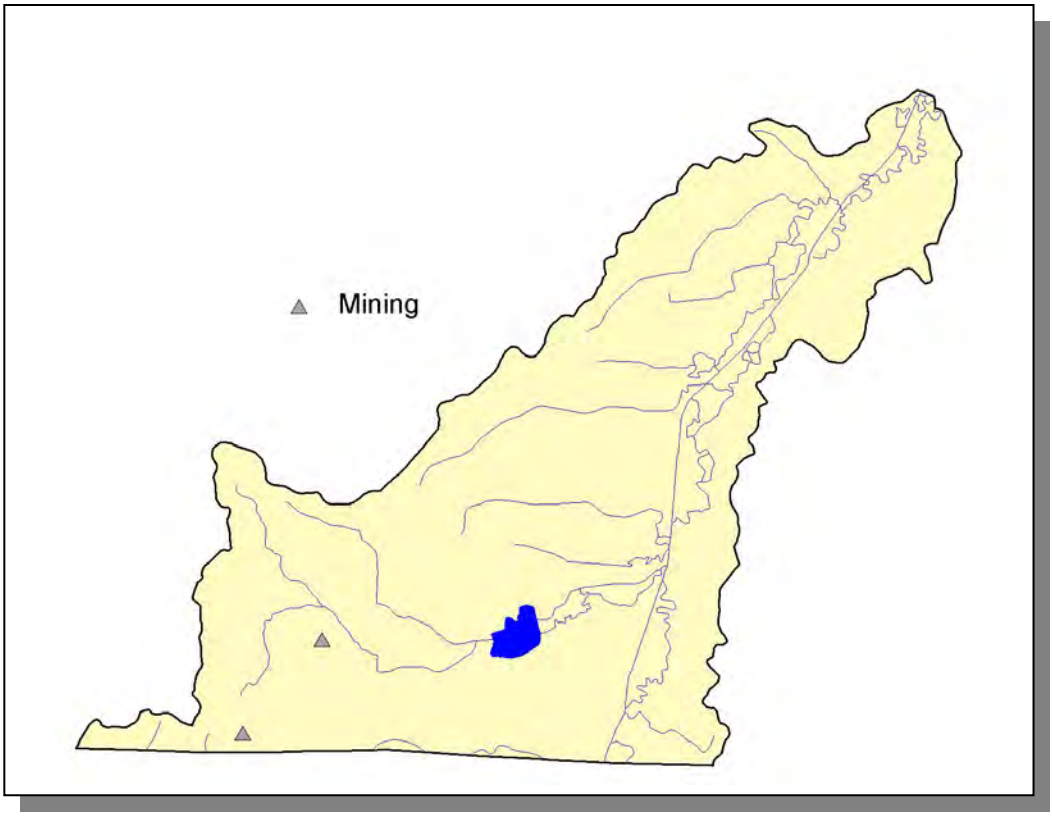

Figure 4-38. Location of Permits Issued in Subwatershed 080102070501. *More information, including the names of facilities, is provided in Appendix IV.*

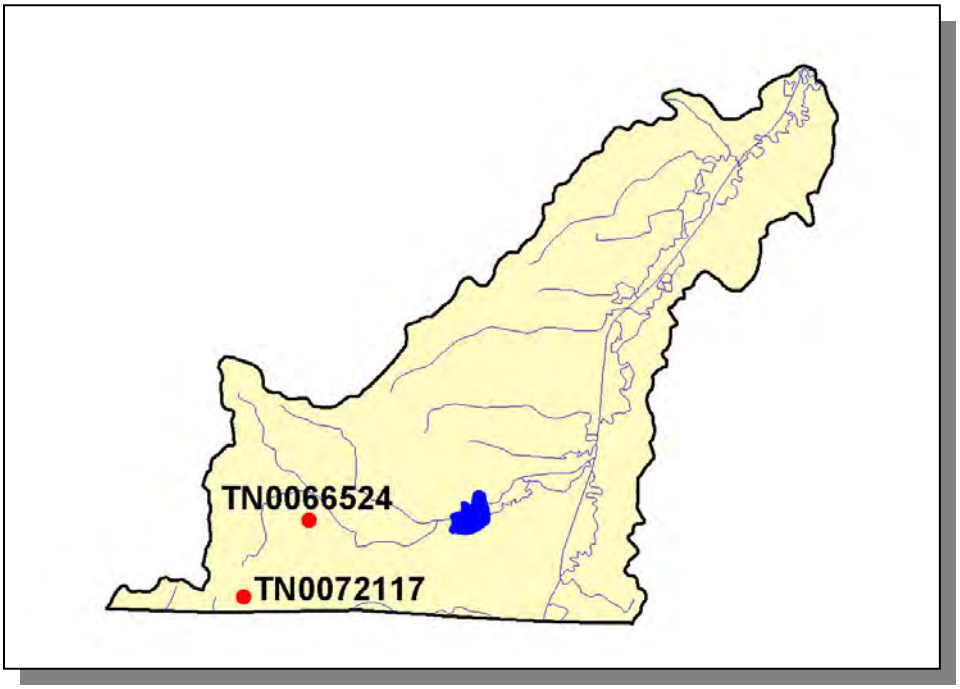

Figure 4-39. Location of Active Mining Sites in Subwatershed 080102070501. *More information, including the names of mining operations, is provided in Appendix IV.*

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
796	1,378	6	<5	440	12

Table 4-37. Summary of Livestock Count Estimates in Subwatershed 080102070501. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Hardeman	9,184	15,877	62	28	5,221	144

Table 4-38. Summary of Livestock Count Estimates in Hardeman 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)
Hardeman	247.1	247.1	5.0	18.6

Table 4-39. Forest Acreage and Annual Removal Rates (1987-1994) in Hardeman County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.22
Grass (Hayland)	0.40
Legumes (Hayland)	1.14
Grass, Forbs, Legumes (Mixed Pasture)	1.06
Corn (Row Crops)	10.45
Cotton (Row Crops)	23.16
Sorghum (Row Crops)	3.04
Soybeans (Row Crops)	11.89
Wheat (Close-Grown Cropland)	15.03
Summer Fallow (Other Cropland)	6.11
Other Cropland not Planted	3.98
Conservation Reserve Program Lands	0.85
Farmsteads and Ranch Headquarters	0.93

Table 4-40. Annual Estimated Total Soil Loss in Subwatershed 080102070501.

4.2.D. 0801020706

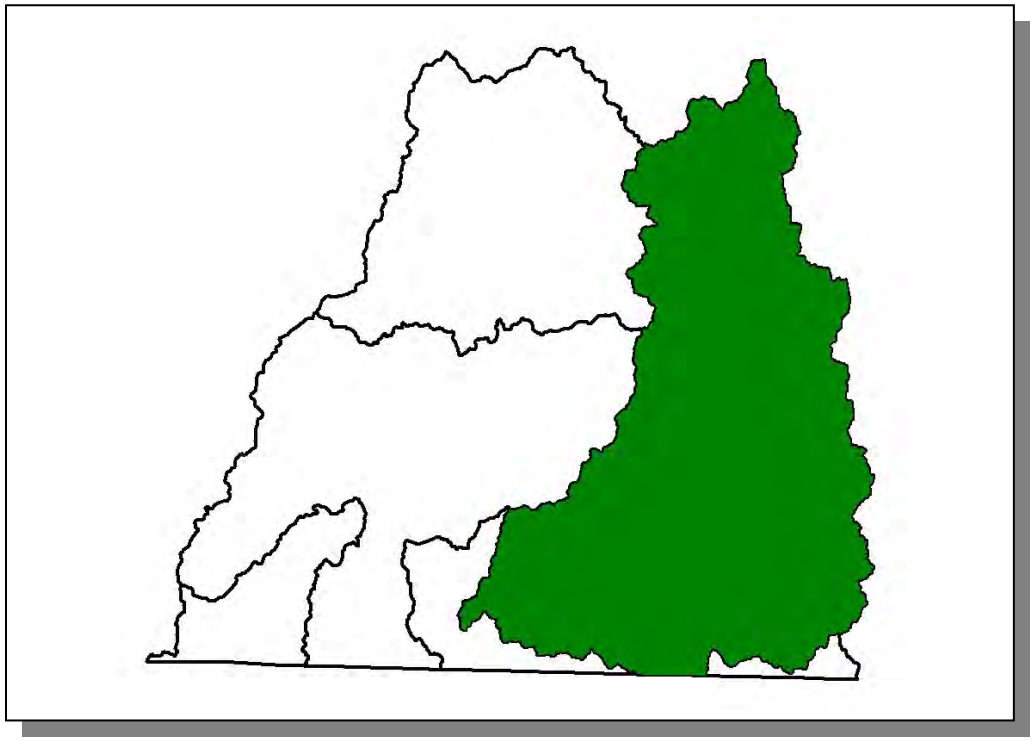

Figure 4-40. Location of Subwatershed 0801020706. *All Little Hatchie River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.D.i. 080102070601 (Upper Cypress Creek).

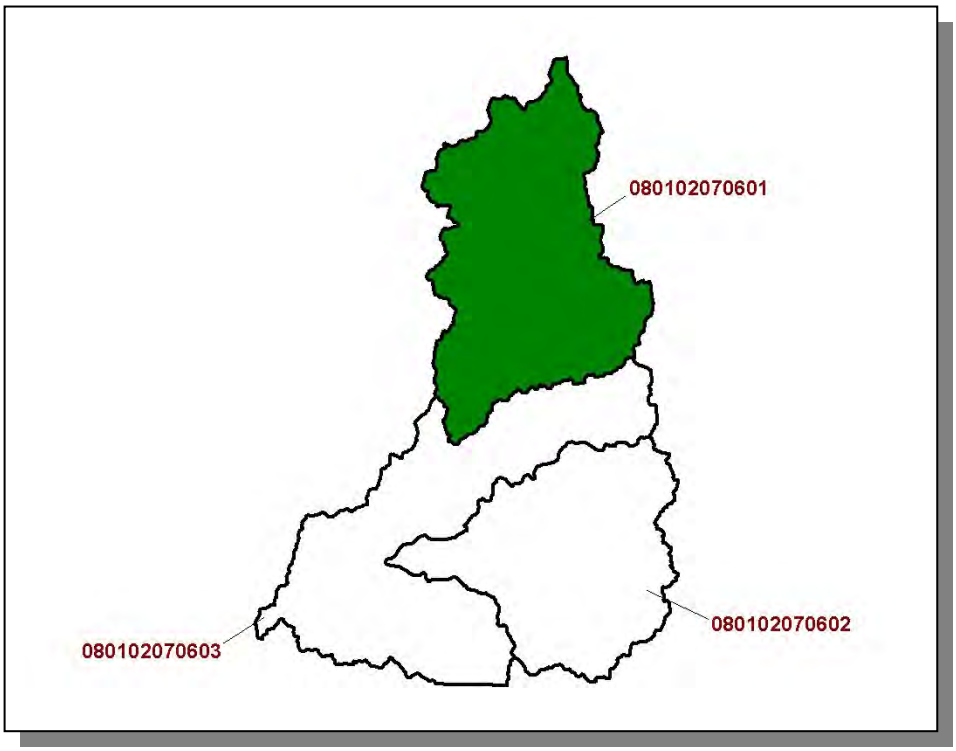

Figure 4-41. Location of Subwatershed 080102070601. *All HUC-12 subwatershed boundaries are shown for reference.*

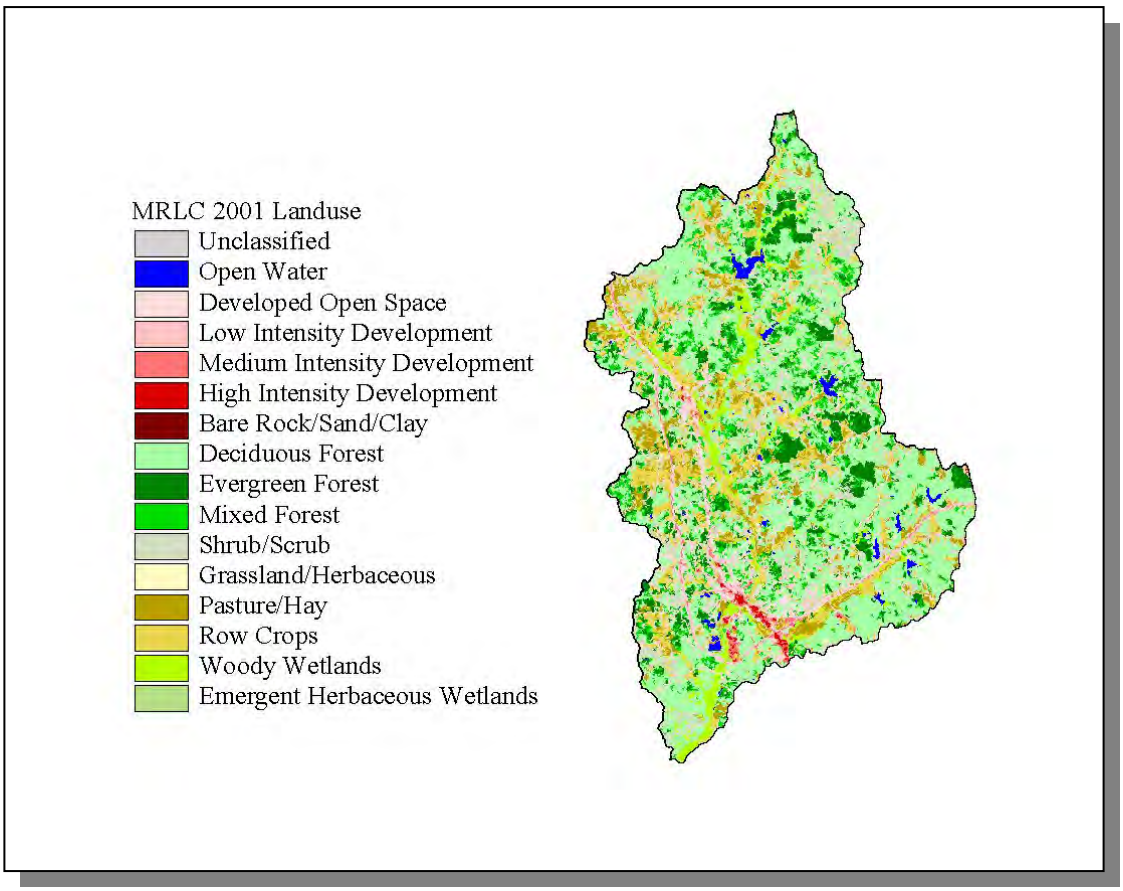

Figure 4-42. Illustration of Land Use Distribution in Subwatershed 080102070601.

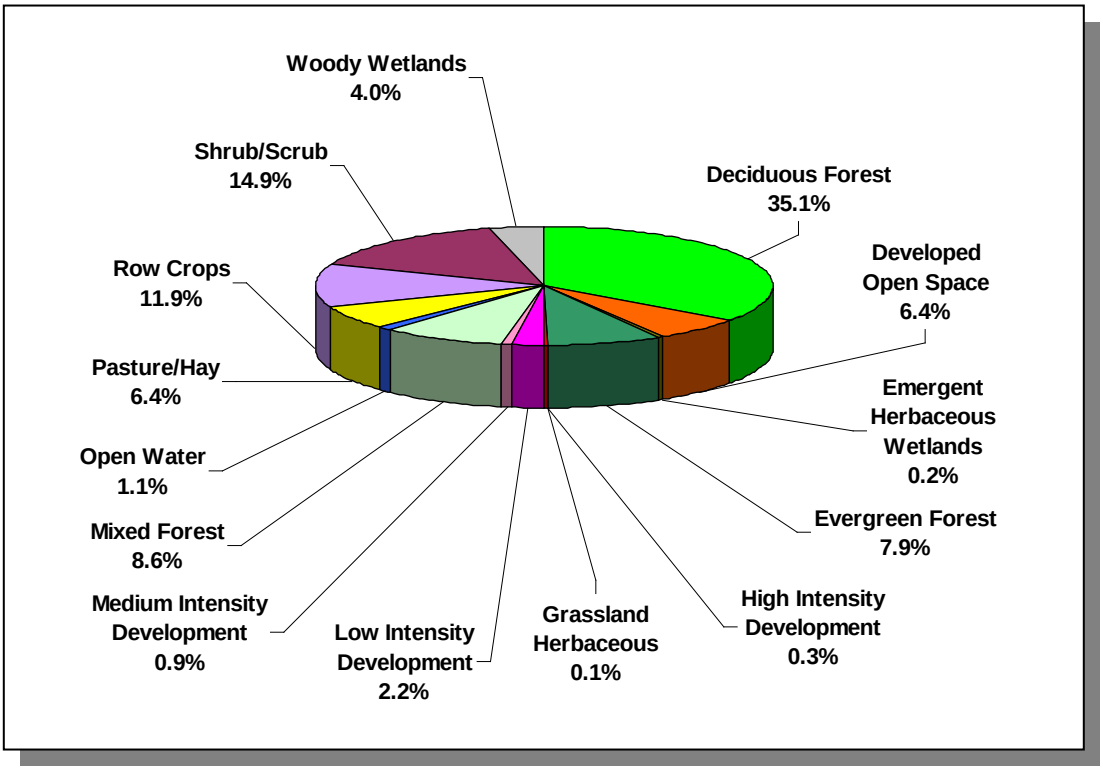

Figure 4-43. Land Use Distribution in Subwatershed 080102070601. *More information is provided in Appendix IV.*

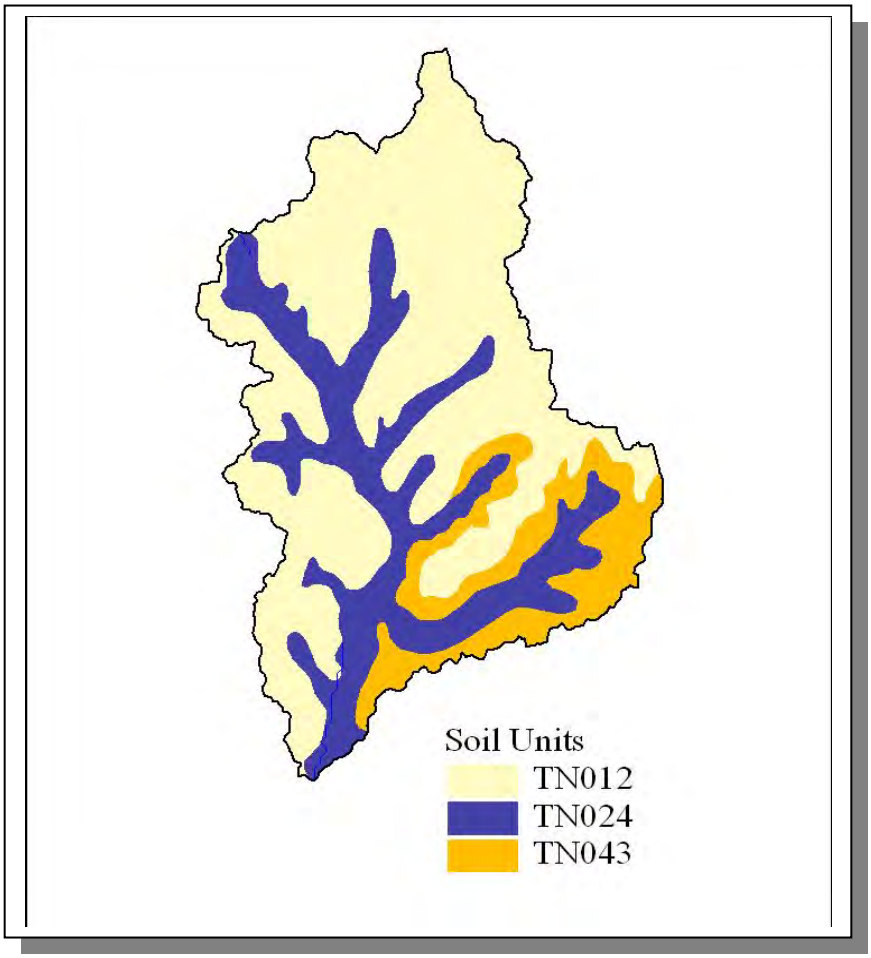

Figure 4-44. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070601.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN012	1.00	C	2.52	5.13	Silty Loam	0.39
TN024	61.00	D	2.18	5.35	Loam	0.29
TN043	0.00	C	2.70	5.02	Loam	0.30

Table 4-41. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070601. *The definition of "Hydrologic Group" is provided in Appendix IV.*

.

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
McNairy	22,422	23,678	24,653	11.63	2,609	2,755	2,868	9.9

Table 4-42. Population Estimates in Subwatershed 080102070601.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Bethel Springs	McNairy	765	347	9	334	4
Selmer	McNairy	3,838	1,780	1,593	155	32
Total		**4,603**	**2,127**	**1,602**	**489**	**36**

Table 4-43. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 080102070601.

Figure 4-45. Location of Historical Streamflow Data Collection Sites in Subwatershed 080102070601. *More information is provided in Appendix IV.*

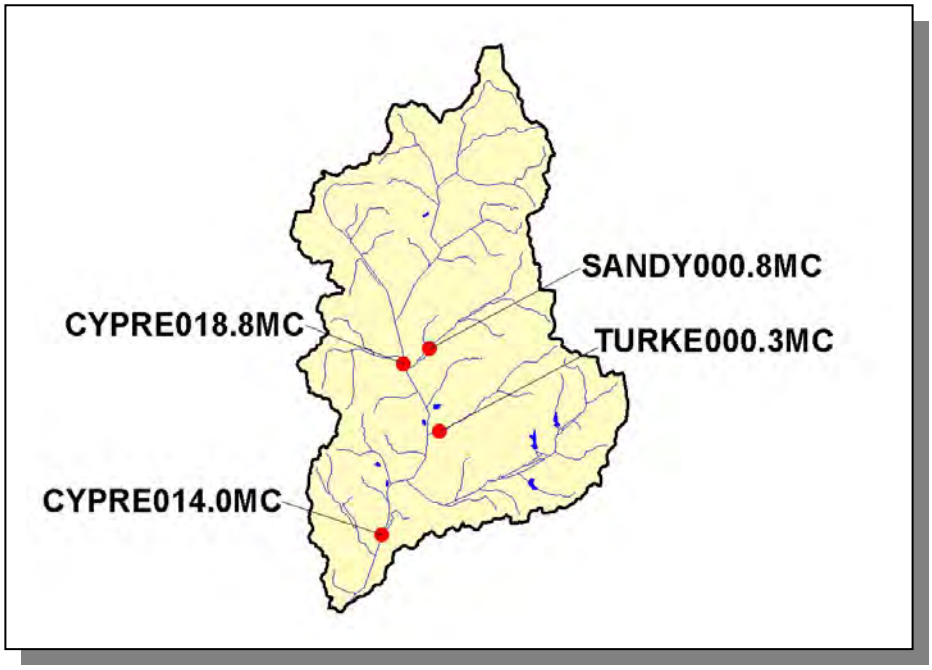

Figure 4-46. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080102070601. *More information, including site names and locations, is provided in Appendix IV.*

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

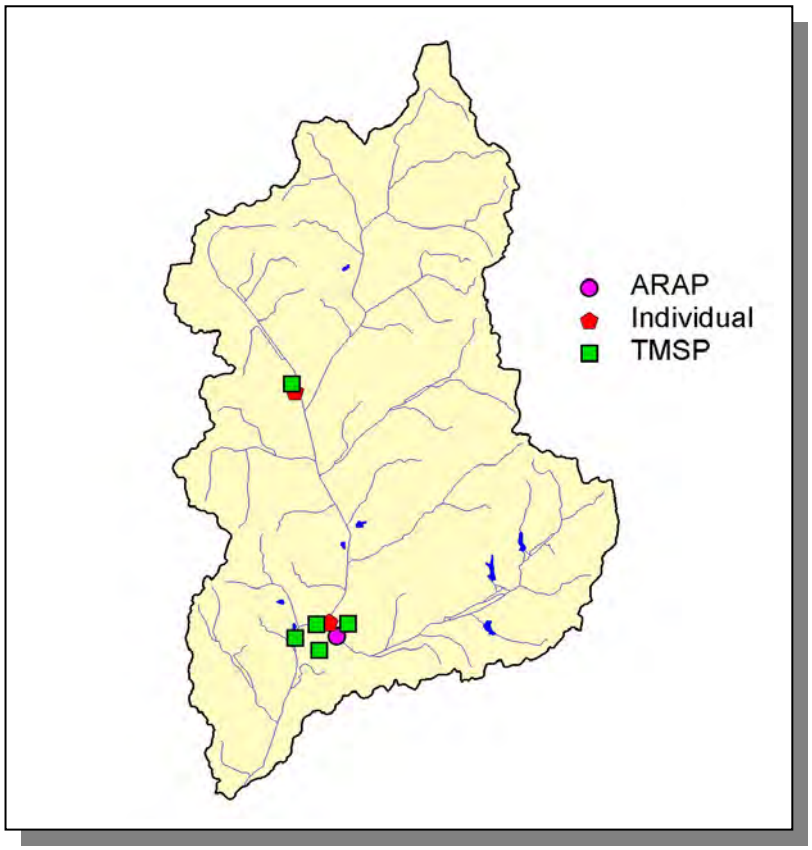

Figure 4-47. Location of Permits Issued in Subwatershed 080102070601. *More information, including the names of facilities, is provided in Appendix IV.*

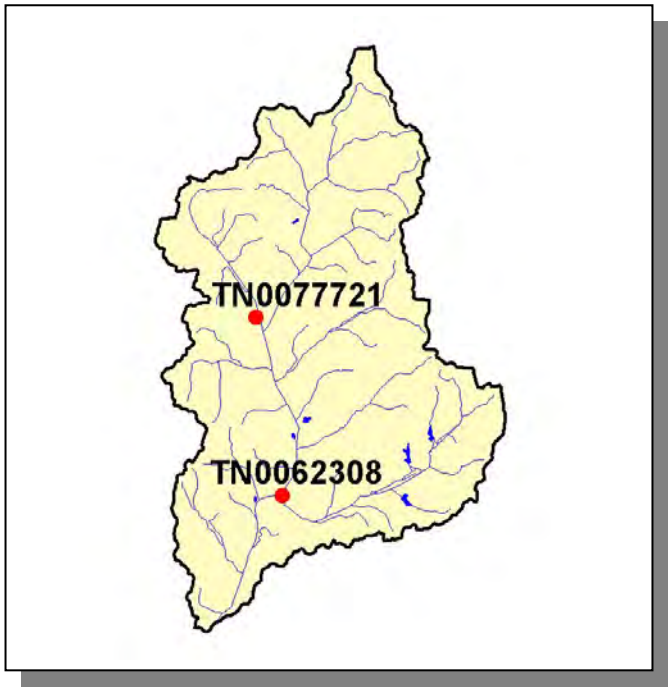

Figure 4-48. Location of Active NPDES Sites in Subwatershed 080102070601. *More information, including the names of facilities, is provided in Appendix IV.*

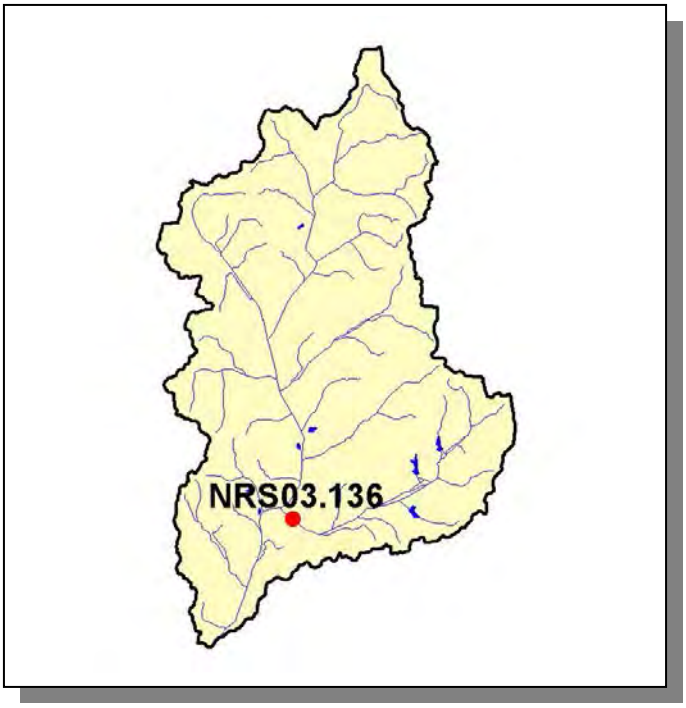

Figure 4-49. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 080102070601. *More information is provided in Appendix IV.*

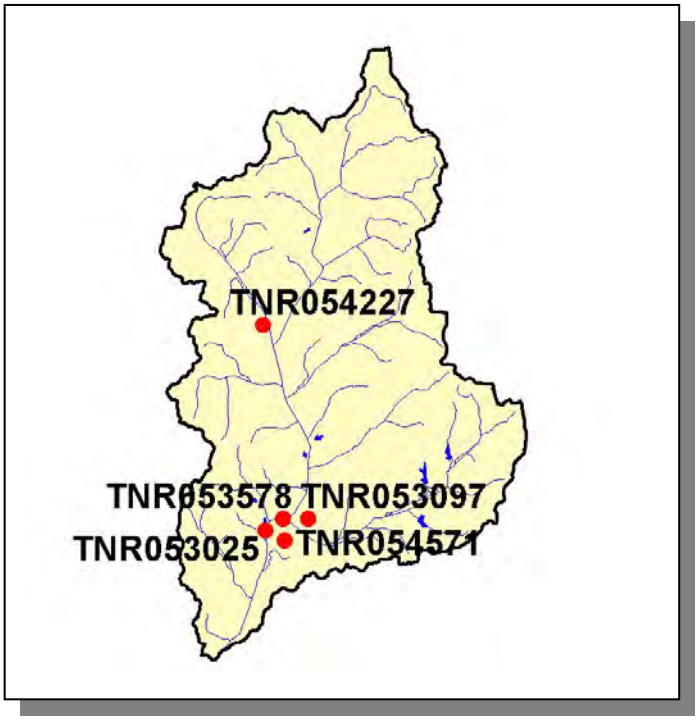

Figure 4-50. Location of TMSP Sites in Subwatershed 080102070601. *More information, including the names of facilities, is provided in Appendix IV.*

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
535	981	<5	<5	1,073	9

Table 4-44. Summary of Livestock Count Estimates in Subwatershed 080102070601. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
McNairy	5,659	10,365	7	491	11,346	98

Table 4-45. Summary of Livestock Count Estimates in McNairy County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.55
Grass (Hayland)	0.06
Legumes, Grass (Hayland)	0.07
Legumes (Hayland)	0.12
Grass, Forbs, Legumes (Mixed Pasture)	0.58
Corn (Row Crops)	11.02
Cotton (Row Crops)	5.45
Sorghum (Row Crops)	3.62
Soybeans (Row Crops)	9.77
Wheat (Close-Grown Cropland)	1.92
Other Cropland not Planted	2.27
Conservation Reserve Program Lands	0.28
Farmsteads and Ranch Headquarters	0.11

Table 4-46. Annual Estimated Total Soil Loss in Subwatershed 080102070601.

4.2.D.ii. 080102070602 (Muddy Creek).

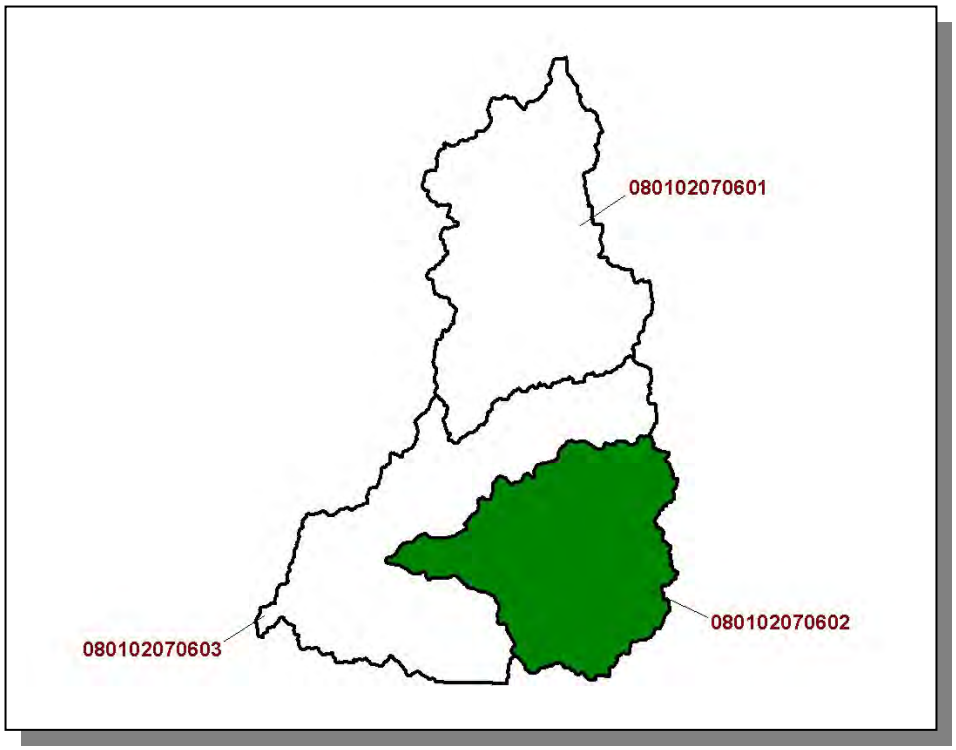

Figure 4-51. Location of Subwatershed 080102070602. *All HUC-12 subwatershed boundaries are shown for reference.*

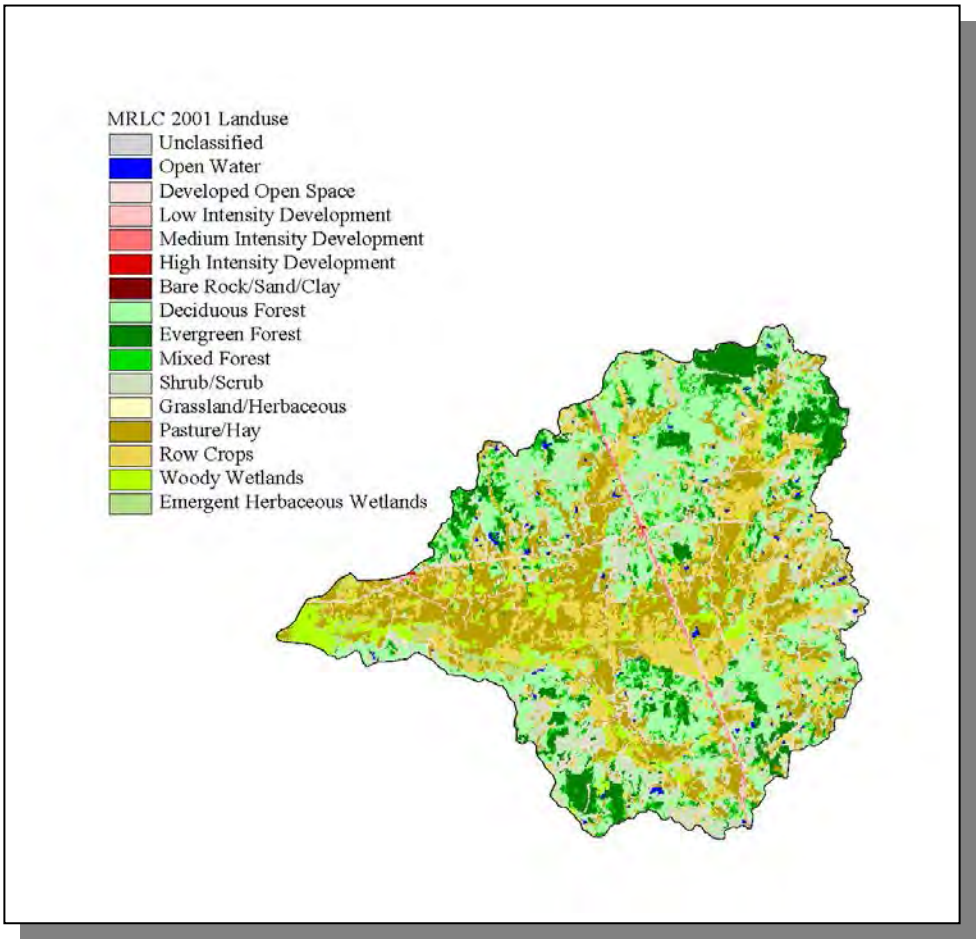

Figure 4-52. Illustration of Land Use Distribution in Subwatershed 080102070602.

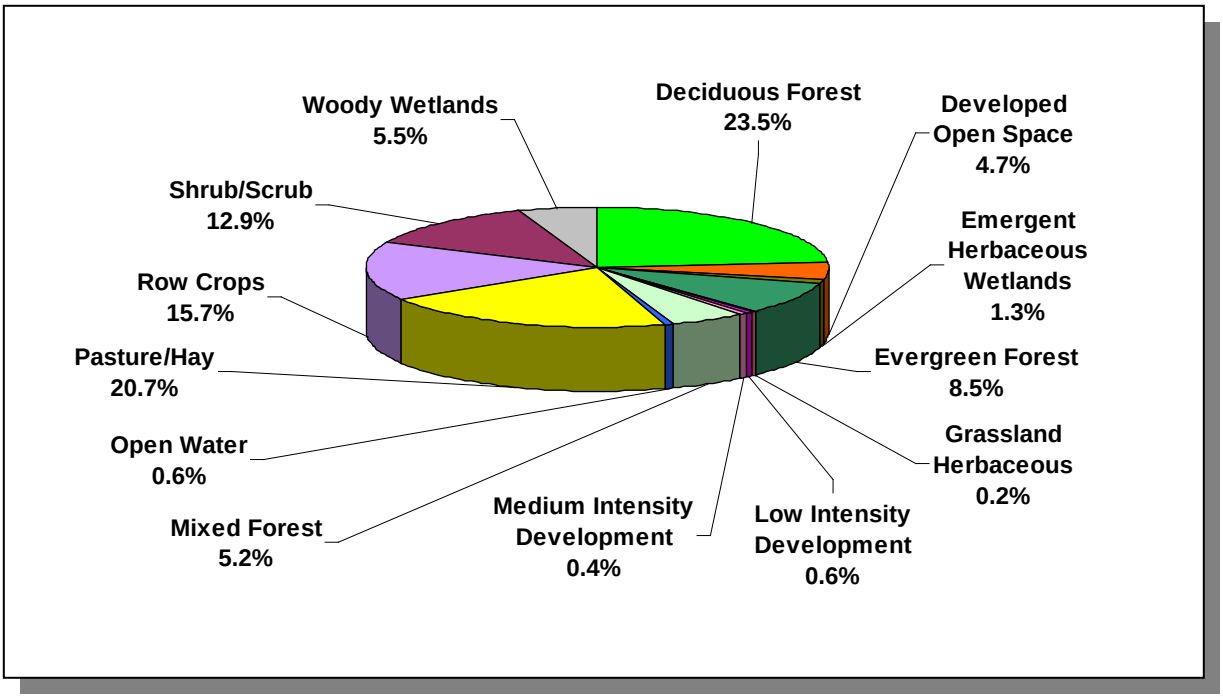

Figure 4-53. Land Use Distribution in Subwatershed 080102070602. *More information is provided in Appendix IV.*

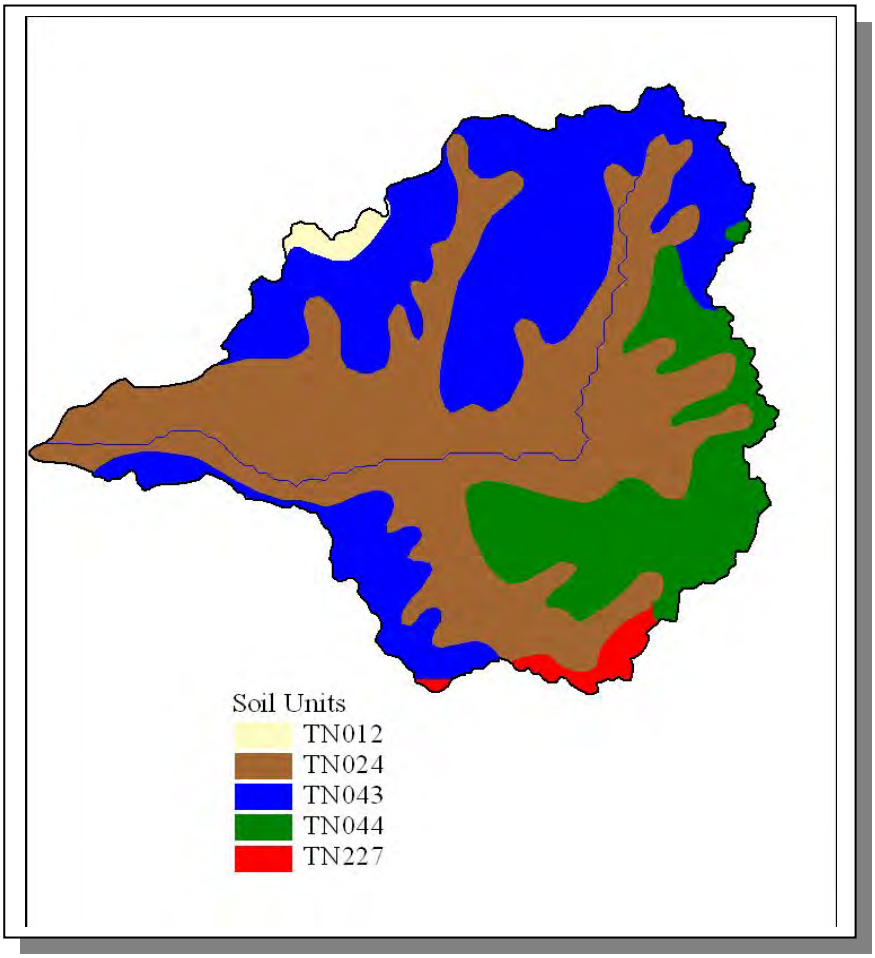

Figure 4-54. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070602.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN012	1.00	C	2.52	5.13	Silty Loam	0.39
TN024	61.00	D	2.18	5.35	Loam	0.29
TN043	0.00	C	2.70	5.02	Loam	0.30
TN044	0.00	C	1.48	5.32	Silty Loam	0.42
TN227	0.00	C	2.41	5.03	Silty Loam	0.38

Table 4-47. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070602. *The definition of "Hydrologic Group" is provided in Appendix IV.*

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	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
McNairy	22,422	23,678	24,653	9.13	2,047	2,162	2,251	10.0

Table 4-48. Population Estimates in Subwatershed 080102070602.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Eastview	McNairy	561	264	7	255	2
Ramer	McNairy	344	145	9	130	6
Total		**905**	**409**	**16**	**385**	**8**

Table 4-49. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 080102070602.

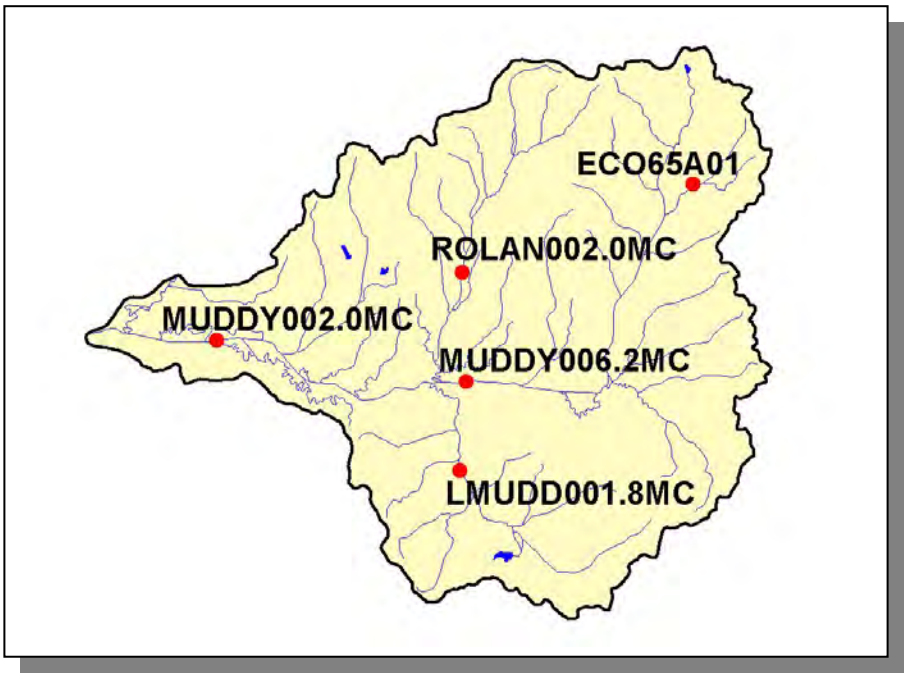

Figure 4-55. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080102070602. *More information, including site names and locations, is provided in Appendix IV.*

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

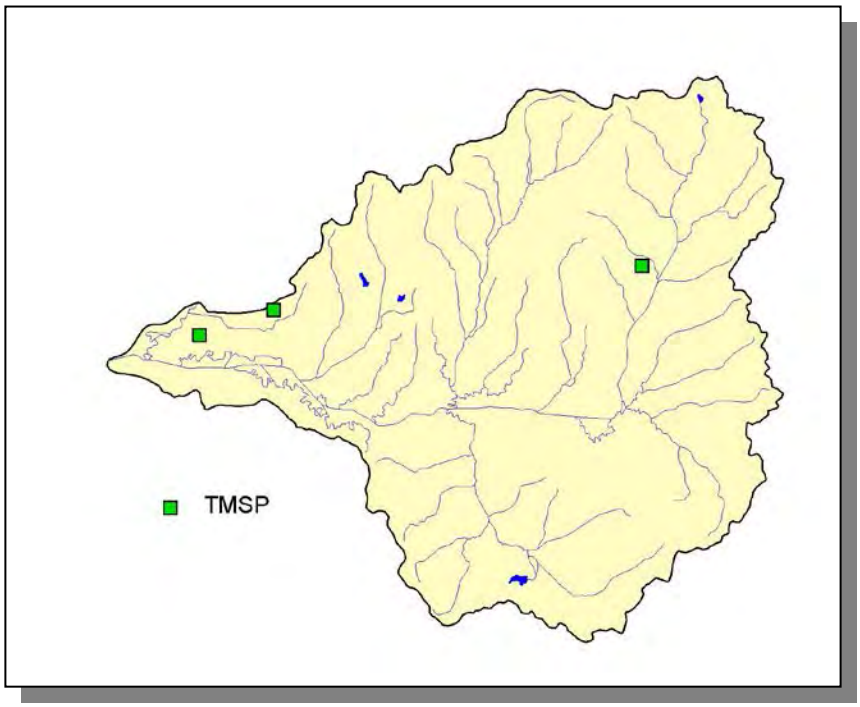

Figure 4-56. Location of Permits Issued in Subwatershed 080102070602. *More information, including the names of facilities, is provided in Appendix IV.*

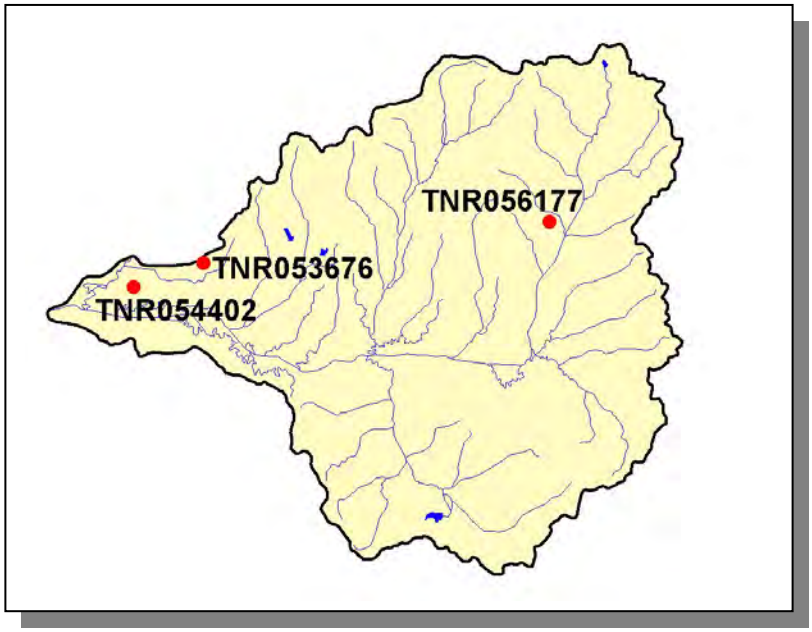

Figure 4-57. Location of TMSP Sites in Subwatershed 080102070602. *More information, including the names of facilities, is provided in Appendix IV.*

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
884	1,620	<5	<5	1,770	15

Table 4-50. Summary of Livestock Count Estimates in Subwatershed 080102070602. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
McNairy	5,659	10,365	7	491	11,346	98

Table 4-51. Summary of Livestock Count Estimates in McNairy County. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.55
Grass (Hayland)	0.07
Legumes, Grass (Hayland)	0.07
Legumes (Hayland)	0.07
Grass, Forbs, Legumes (Mixed Pasture)	0.59
Corn (Row Crops)	10.99
Cotton (Row Crops)	5.54
Sorghum (Row Crops)	3.62
Soybeans (Row Crops)	9.74
Wheat (Close-Grown Cropland)	1.92
Other Cropland not Planted	2.27
Conservation Reserve Program Lands	0.28
Farmsteads and Ranch Headquarters	0.10

Table 4-52. Annual Estimated Total Soil Loss in Subwatershed 080102070602.

4.2.D.iii. 080102070603 (Lower Cypress Creek).

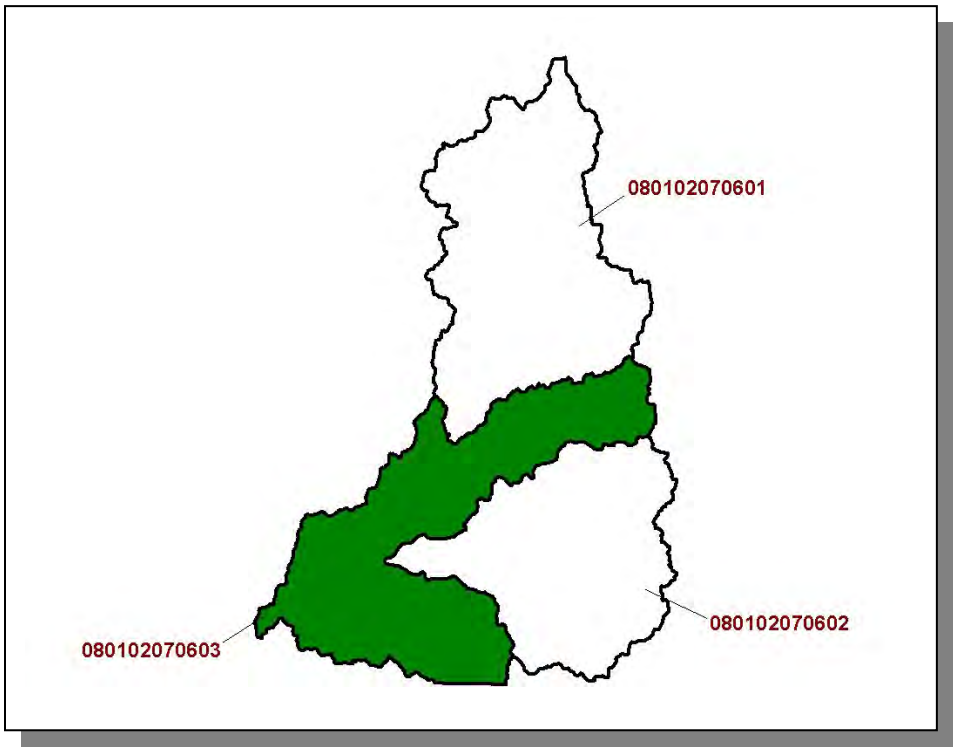

Figure 4-58. Location of Subwatershed 080102070603. *All HUC-12 subwatershed boundaries are shown for reference.*

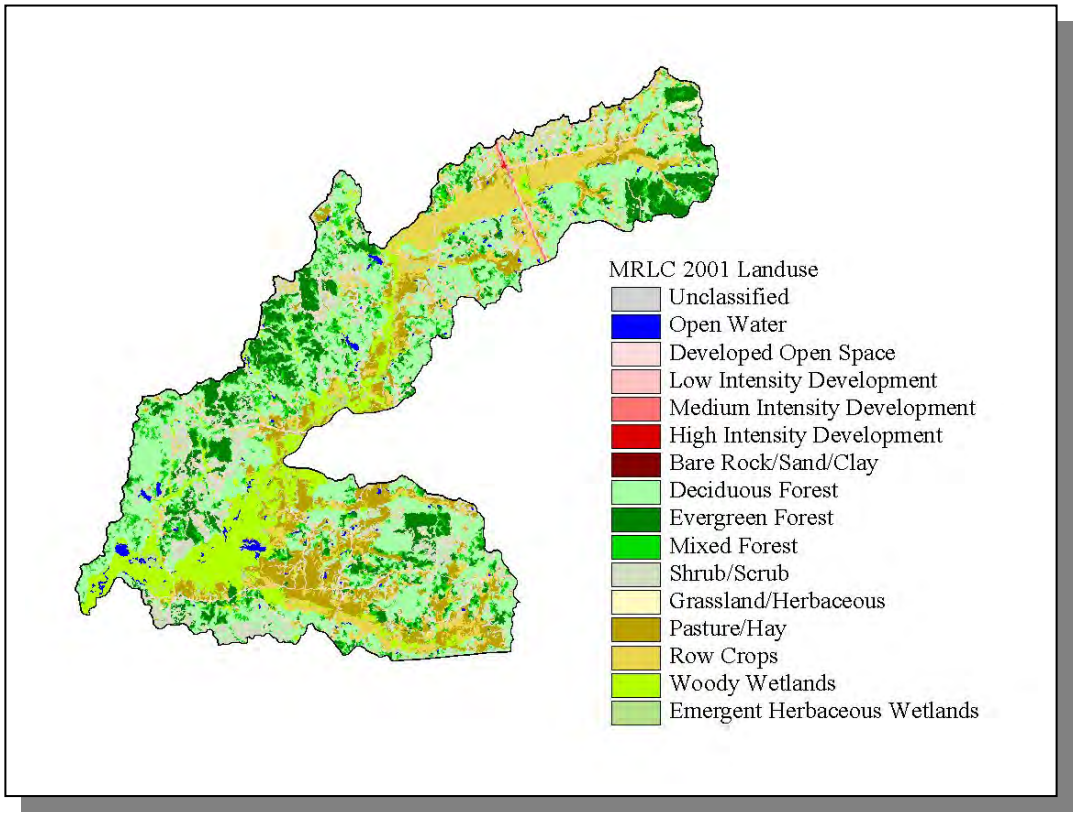

Figure 4-59. Illustration of Land Use Distribution in Subwatershed 080102070603.

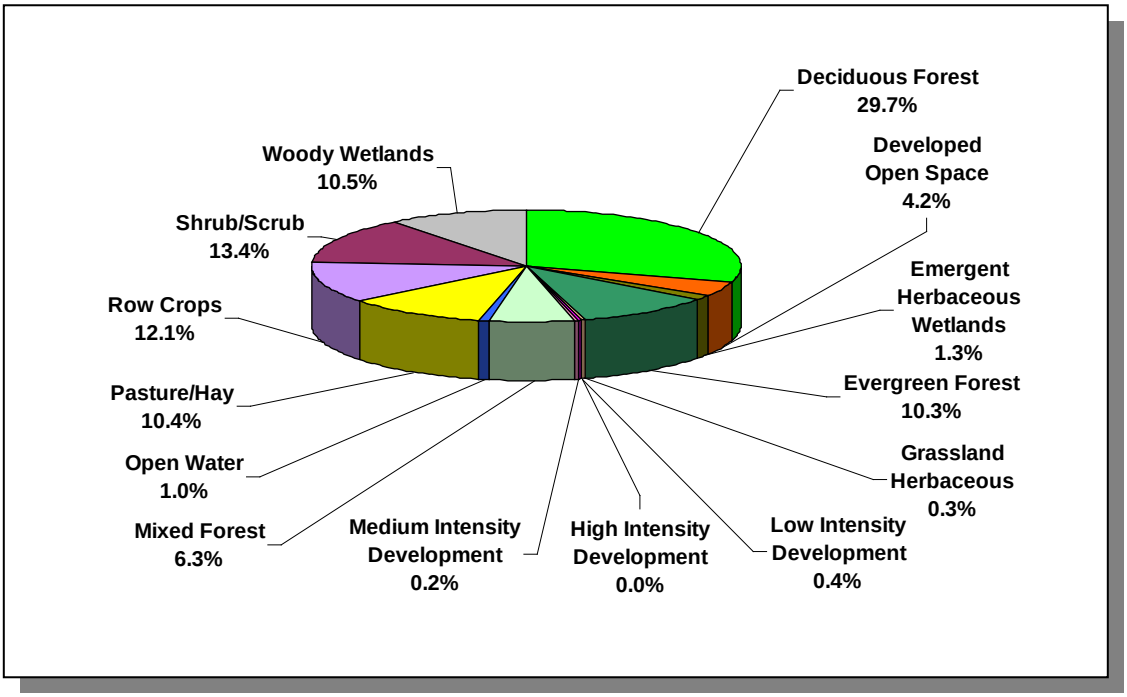

Figure 4-60. Land Use Distribution in Subwatershed 080102070603. *More information is provided in Appendix IV.*

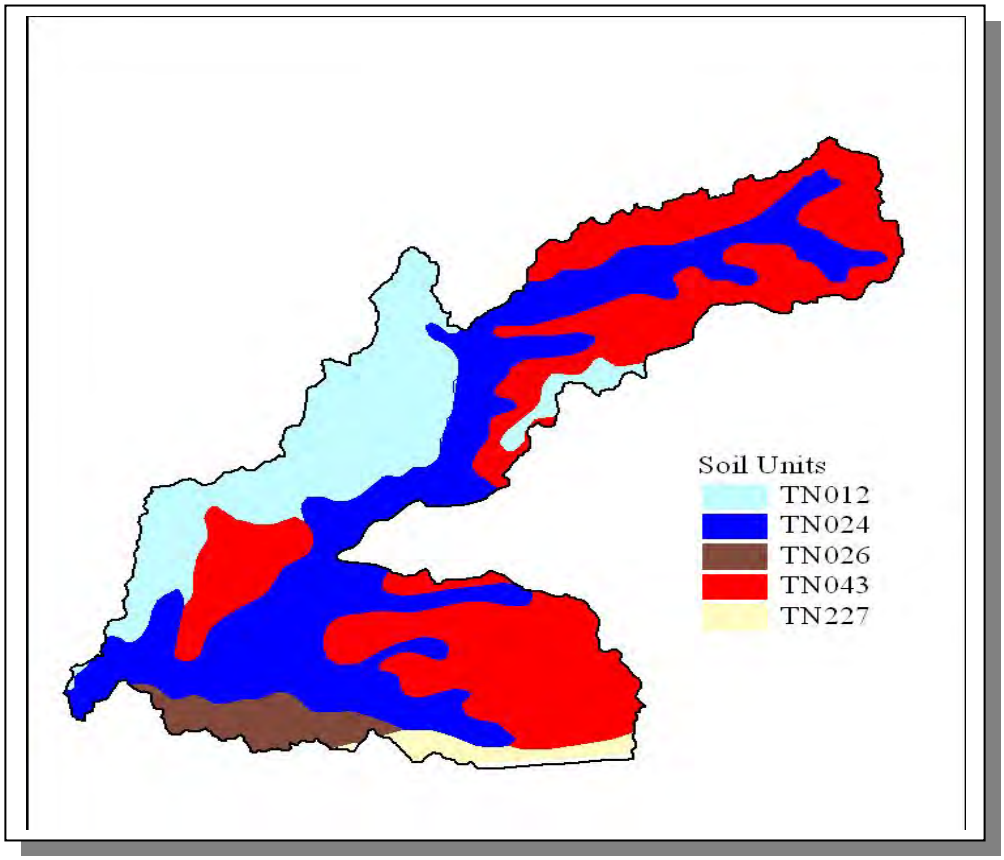

Figure 4-61. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070603.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN012	1.00	C	2.52	5.13	Silty Loam	0.39
TN024	61.00	D	2.18	5.35	Loam	0.29
TN026	0.00	B	1.52	5.13	Silty Loam	0.40
TN043	0.00	C	2.70	5.02	Loam	0.30
TN227	0.00	C	2.41	5.03	Silty Loam	0.38

Table 4-53. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070603. *The definition of "Hydrologic Group" is provided in Appendix IV.*

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	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
McNairy	22,422	23,678	25,653	11.05	2,477	2,615	2,723	9.9

Table 4-54. Population Estimates in Subwatershed 080102070603.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Eastview	Mcnairy	561	264	7	255	2
Ramer	McNairy	344	145	9	130	6
Selmer	Mcnairy	3,838	1,780	1,593	155	32
Total		**4,743**	**4,446**	**1,609**	**540**	**40**

Table 4-55. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 080102070603.

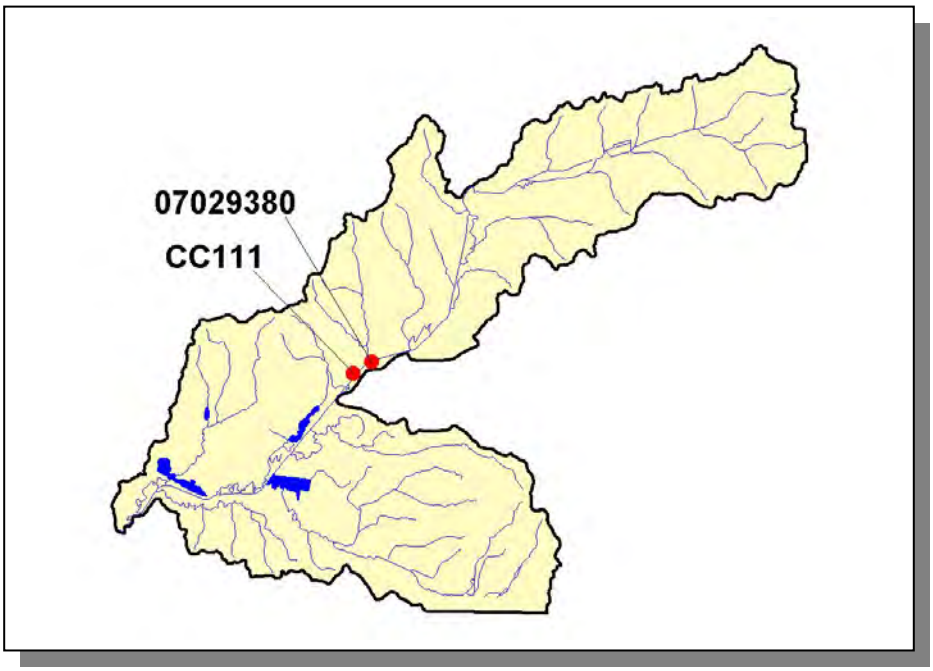

Figure 4-62. Location of Historical Streamflow Data Collection Sites in Subwatershed 080102070603. *More information is provided in Appendix IV.*

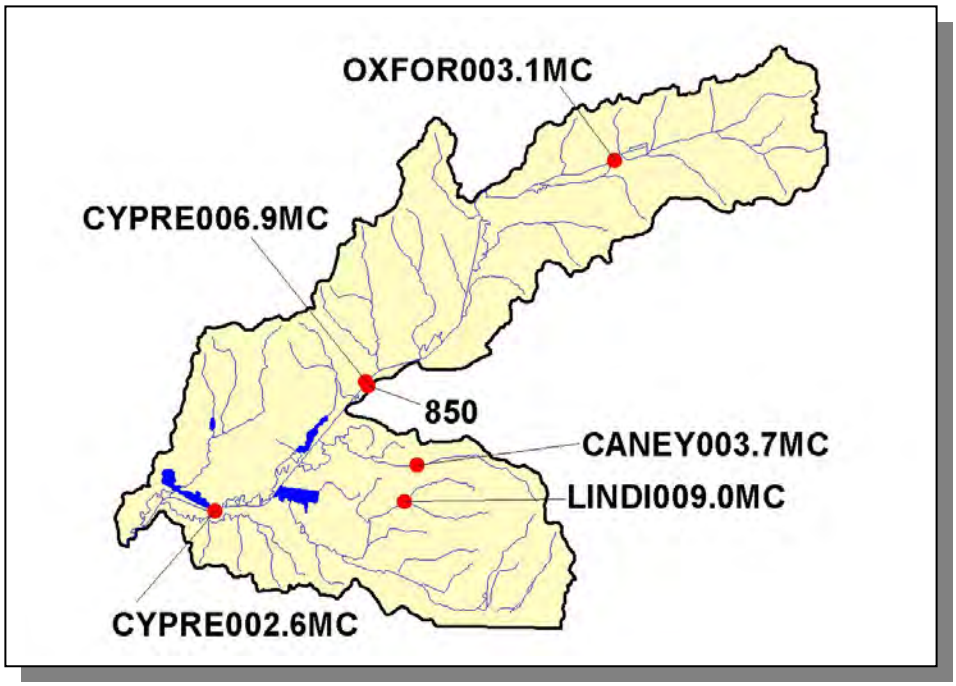

Figure 4-63. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080102070603. *More information, including site names and locations, is provided in Appendix IV.*

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

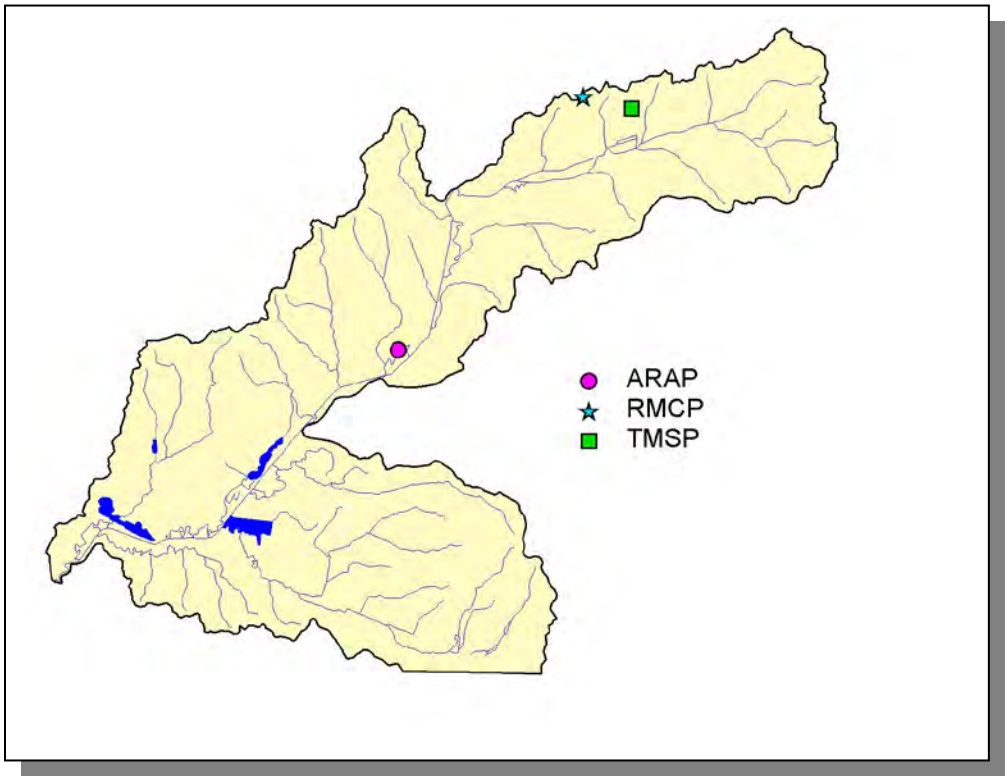

Figure 4-64. Location of Permits Issued in Subwatershed 080102070603. *More information, including the names of facilities, is provided in Appendix IV.*

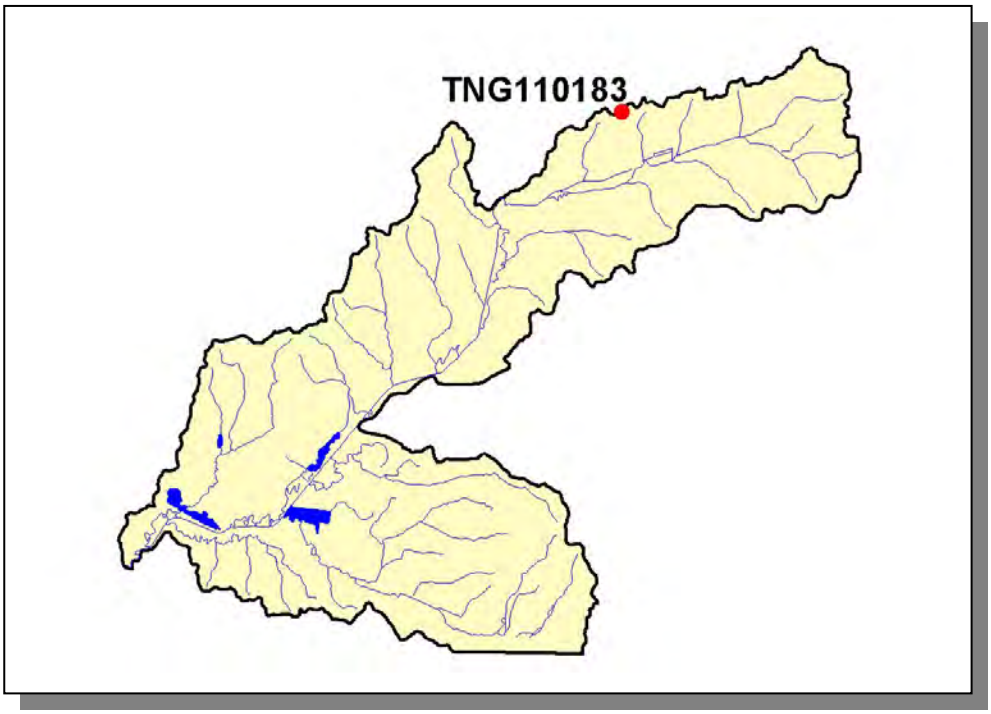

Figure 4-65. Location of Ready Mix Concrete Plants (RMCP) in Subwatershed 080102070603. *More information is provided in Appendix IV.*

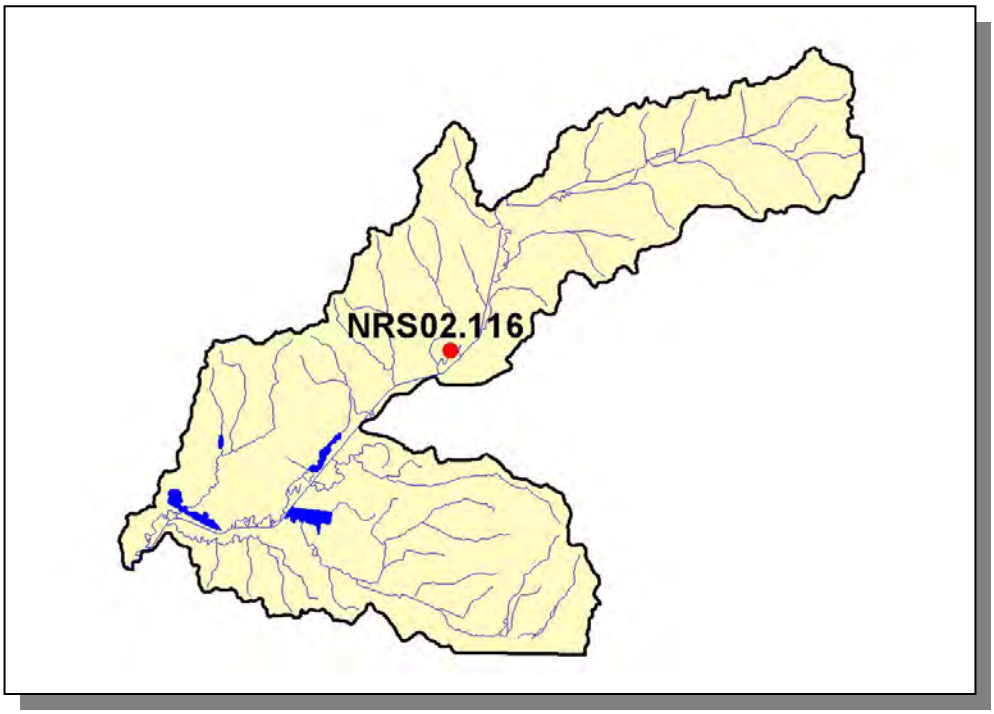

Figure 4-66. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 080102070603. *More information is provided in Appendix IV.*

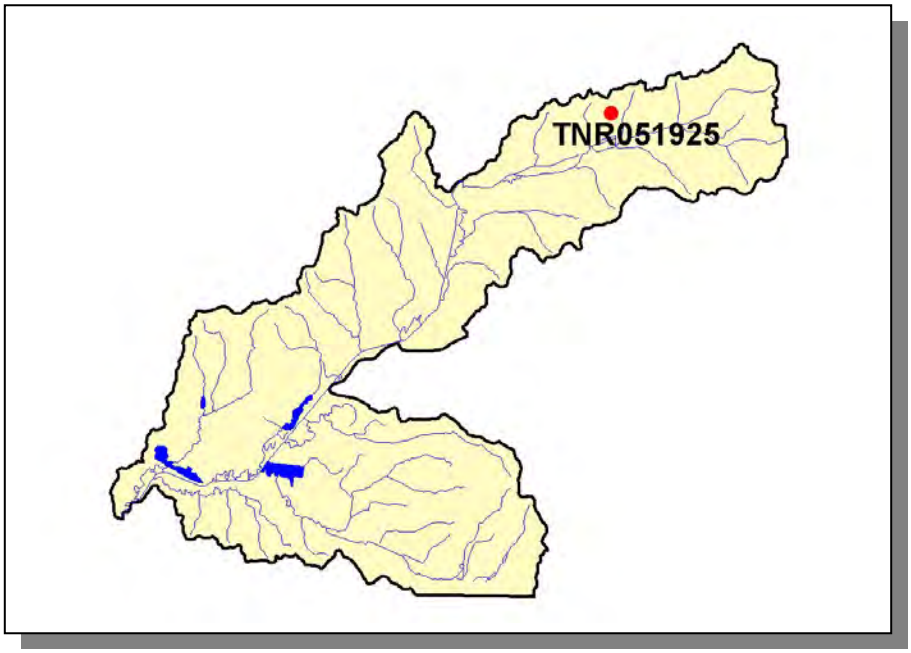

Figure 4-67. Location of TMSP Sites in Subwatershed 080102070603. *More information, including the names of facilities, is provided in Appendix IV.*

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
626	1,154	<5	<5	1,181	10

Table 4-56. Summary of Livestock Count Estimates in Subwatershed 080102070603. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
McNairy	5,659	10,365	7	491	11,346	98

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

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.55
Grass (Hayland)	0.10
Legumes, Grass (Hayland)	0.07
Legumes (Hayland)	0.12
Grass, Forbs, Legumes (Mixed Pasture)	0.60
Corn (Row Crops)	10.91
Cotton (Row Crops)	5.77
Sorghum (Row Crops)	3.62
Soybeans (Row Crops)	9.68
Wheat (Close-Grown Cropland)	1.92
Other Cropland not Planted	2.26
Conservation Reserve Program Lands	0.28
Farmsteads and Ranch Headquarters	0.10

Table 4-58. Annual Estimated Total Soil Loss in Subwatershed 080102070603.

4.2.E. 0801020707.

Figure 4-68. Location of Subwatershed 0801020707. *All Little Hatchie River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.E.i. 080102070701 (Upper Little Hatchie Creek).

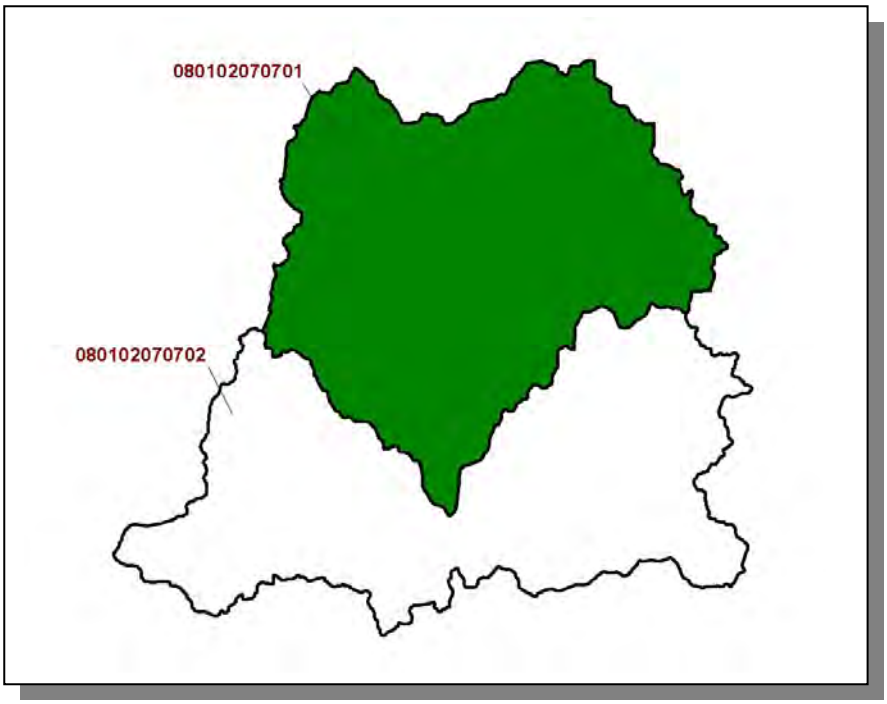

Figure 4-69. Location of Subwatershed 080102070701. *All HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

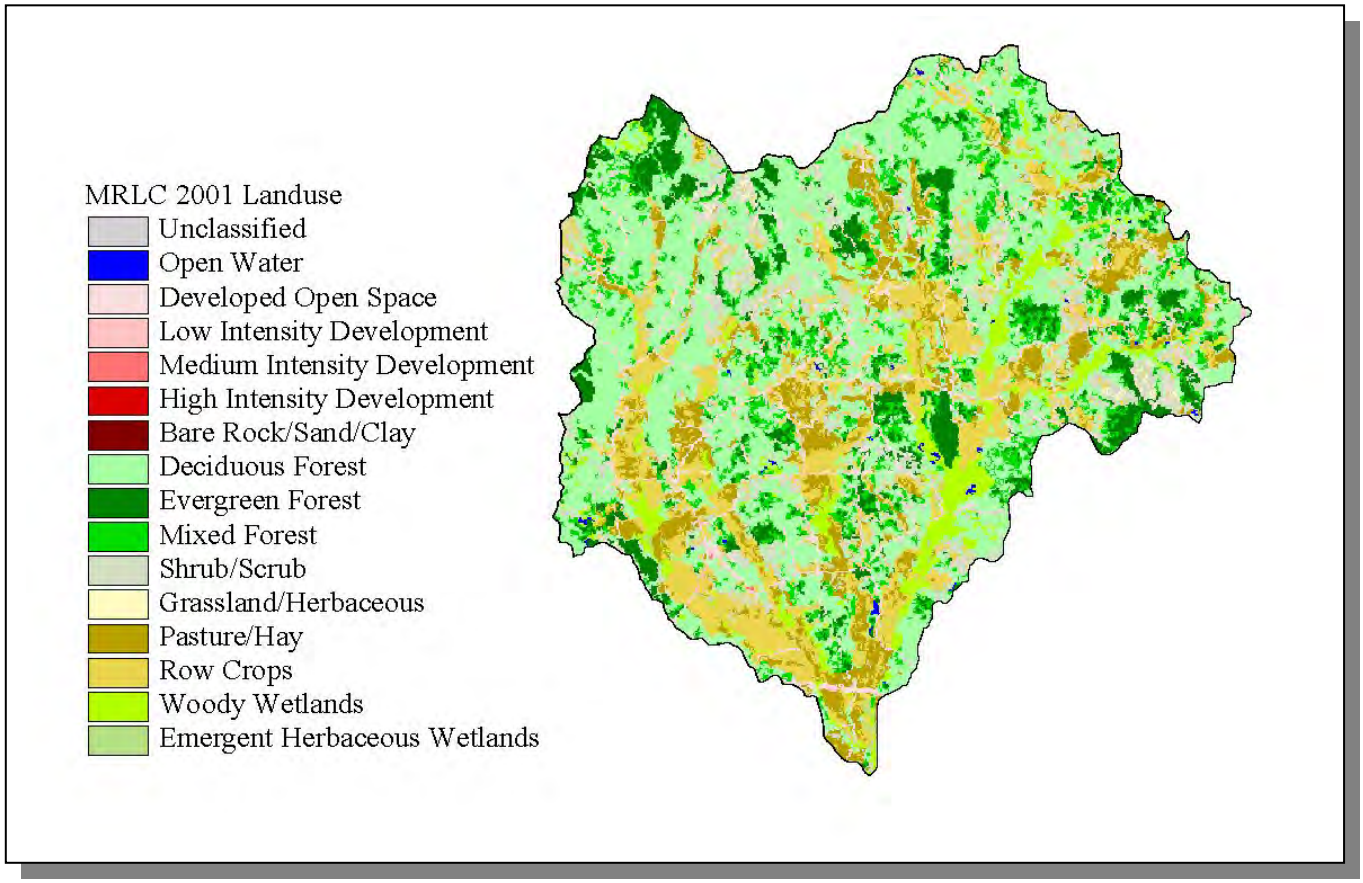

Figure 4-70. Illustration of Land Use Distribution in Subwatershed 080102070701.

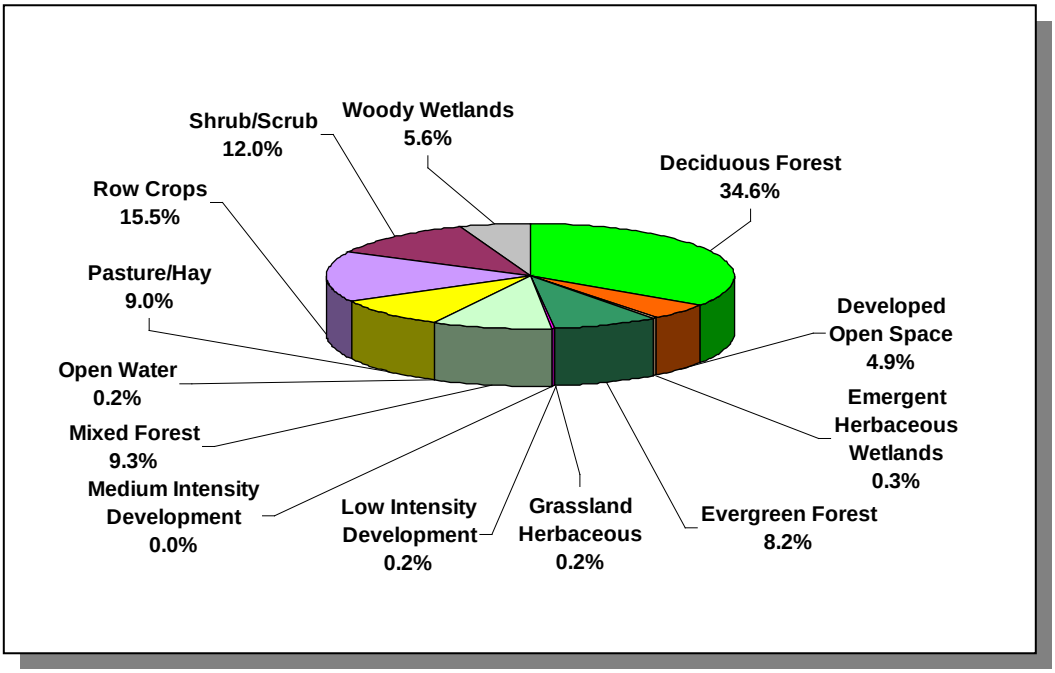

Figure 4-71. Land Use Distribution in Subwatershed 080102070701. *More information is provided in Appendix IV.*

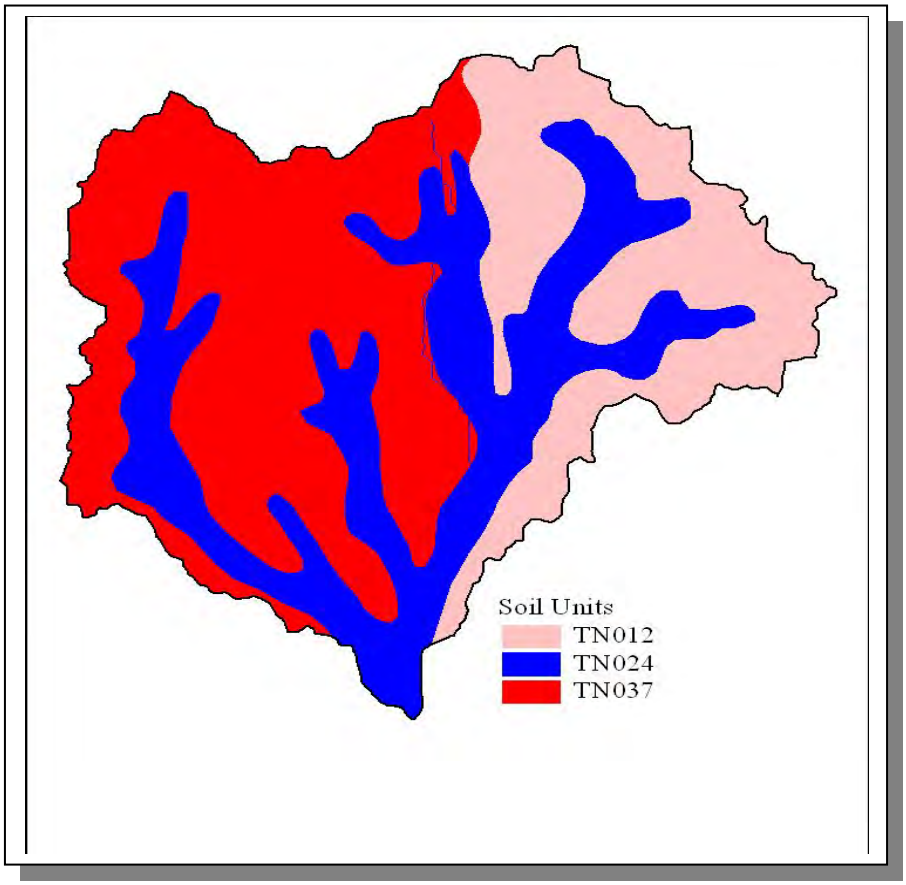

Figure 4-72. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070701.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN012	1.00	C	2.52	5.13	Silty Loam	0.39
TN024	61.00	D	2.18	5.35	Loam	0.29
TN037	0.00	C	3.51	4.86	Sandy Loam	0.27

Table 4-59. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070701. *The definition of "Hydrologic Group" is provided in Appendix IV.*

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	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Chester	12,819	14,469	15,540	6.46	828	934	1,003	21.1
Hardeman	23,377	24,702	28,105	0.03	8	8	9	12.5
McNairy	22,422	23,678	24,653	4.8	1,076	1,137	1.183	9.9
Total	**58,618**	**62,849**	**68,298**		**1,912**	**2,079**	**2,195**	**14.8**

Table 4-60. Population Estimates in Subwatershed 080102070701.

Figure 4-73. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080102070701. *More information, including site names and locations, is provided in Appendix IV.*

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

There are no point source contributions in this subwatershed.

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

LIVESTOCK COUNTS				
Beef Cow	Cattle	Chickens (Layers)	Hogs	Sheep
221	2,671	<5	774	4

Table 4-61. Summary of Livestock Count Estimates in Subwatershed 080102070701. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Chester	0	9,108	0	14	1,334	0
Hardeman	9,184	15,877	62	28	5,221	144
McNairy	5,659	10,365	7	491	11,346	98

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

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.47
Grass (Hayland)	0.16
Legumes, Grass (Hayland)	0.12
Legumes (Haylandd)	0.12
Grass, Forbs, Legumes (Mixed Pasture)	0.51
Corn (Row Crops)	10.61
Cotton (Row Crops)	11.33
Sorghum (Row Crops)	3.61
Soybeans (Row Crops)	8.29
Wheat (Close-Grown Cropland)	5.51
Other Vegetable and Truck Crops	28.15
Summer Fallow (Other Cropland)	6.11
Other Cropland not Planted	1.43
Conservation Reserve Program Lands	0.35
Farmsteads and Ranch Headquarters	0.10

Table 4-63. Annual Estimated Total Soil Loss in Subwatershed 080102070701.

4.2.E.ii. 080102070702 (Lower Little Hatchie Creek).

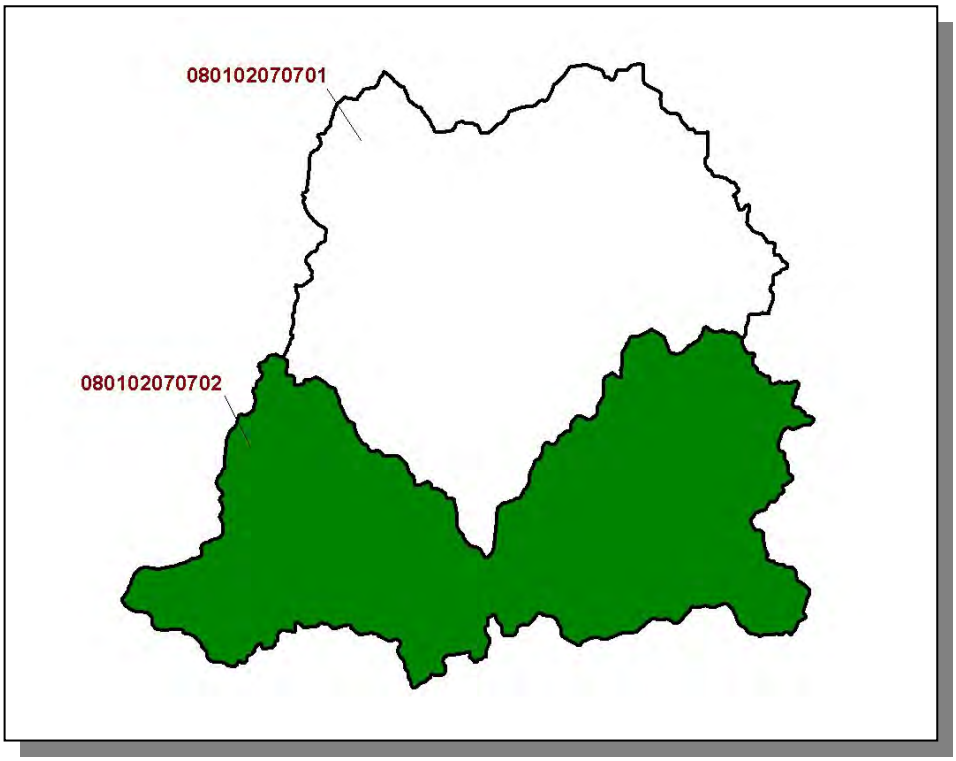

Figure 4-74. Location of Subwatershed 080102070702. *All Little Hatchie HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

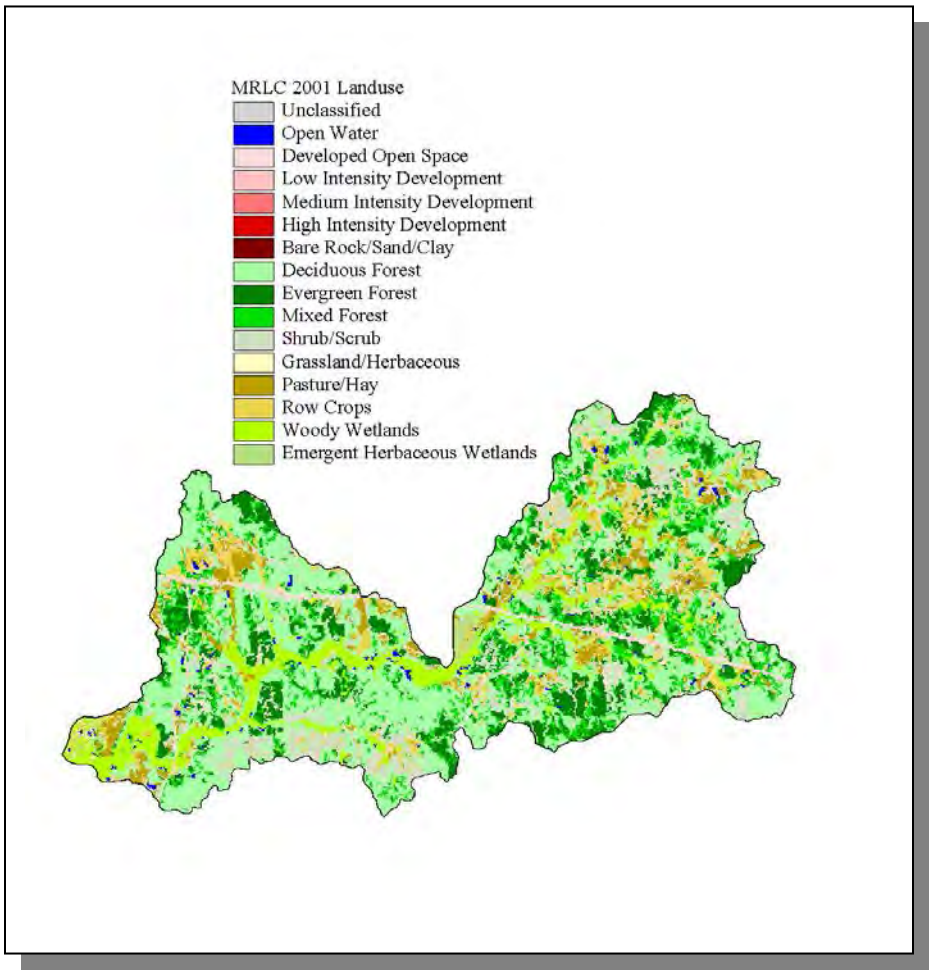

Figure 4-75. Illustration of Land Use Distribution in Subwatershed 080102070702.

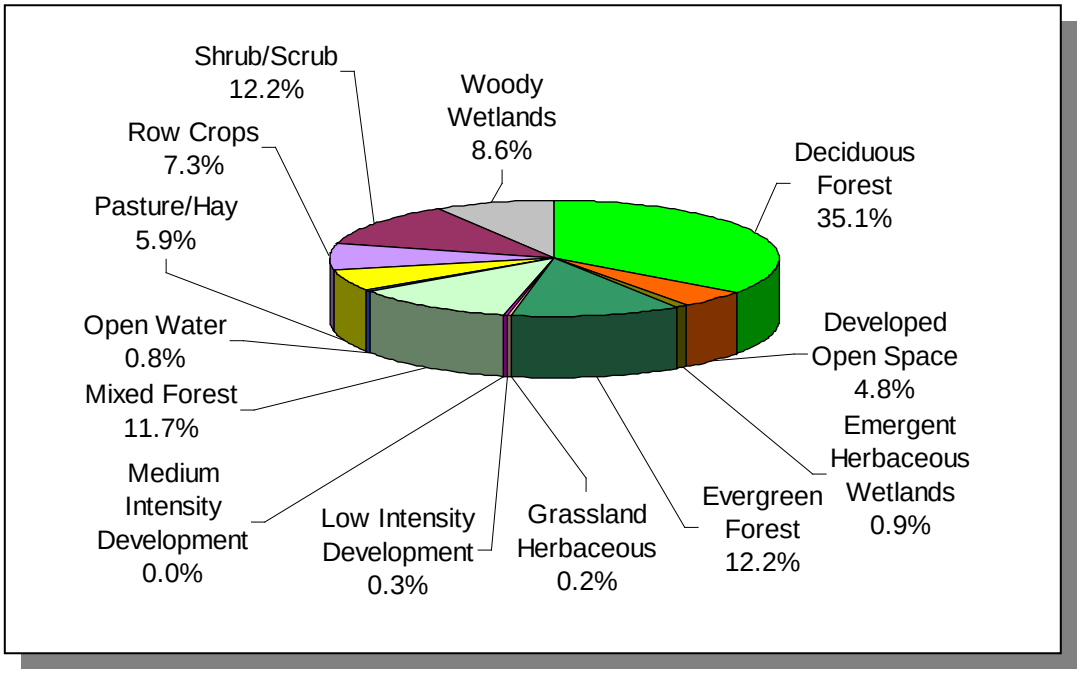

Figure 4-76. Land Use Distribution in Subwatershed 080102070202. *More information is provided in Appendix IV.*

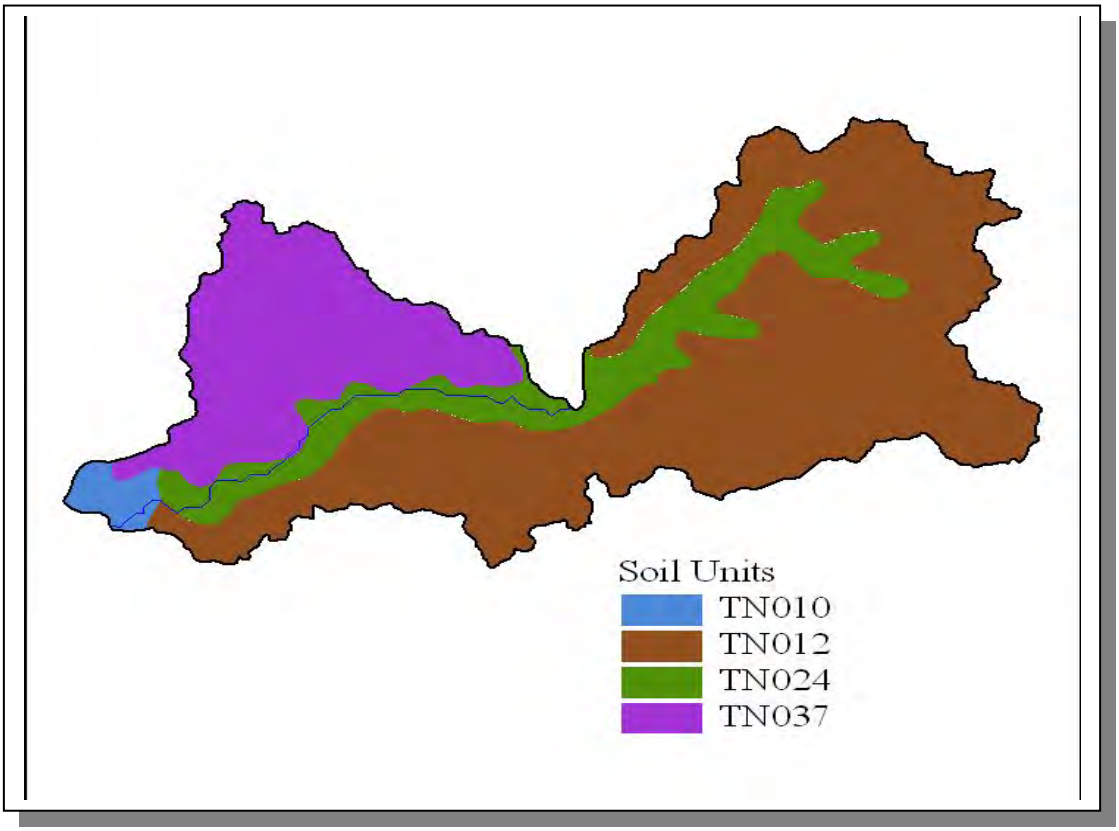

Figure 4-77. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070702.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN010	81.00	C	1.33	5.11	Silty Loam	0.44
TN012	1.00	C	2.52	5.13	Silty Loam	0.39
TN024	61.00	D	2.18	5.35	Loam	0.29
TN037	0.00	C	3.51	4.86	Sandy Loam	0.27

Table 4-64. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 080102070702. *The definition of "Hydrologic Group" is provided in Appendix IV.*

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	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Hardeman	23,377	24,702	28,105	1.24	289	306	348	20.4
McNairy	22,422	23,678	24,653	6.13	1,376	1,453	1,512	9.9
Total	**45,799**	**48,380**	**52,758**		**1,665**	**1,759**	**1,860**	**11.7**

Table 4-65. Population Estimates in Subwatershed 080102070702.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Bethel Springs	McNairy	765	347	9	334	4
Selmer	McNairy	3,838	1,780	1,593	155	32
Hornsby	Hardeman	293	128	8	115	5
Total		**4,896**	**2,255**	**1,610**	**604**	**41**

Table 4-66. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 080102070702.

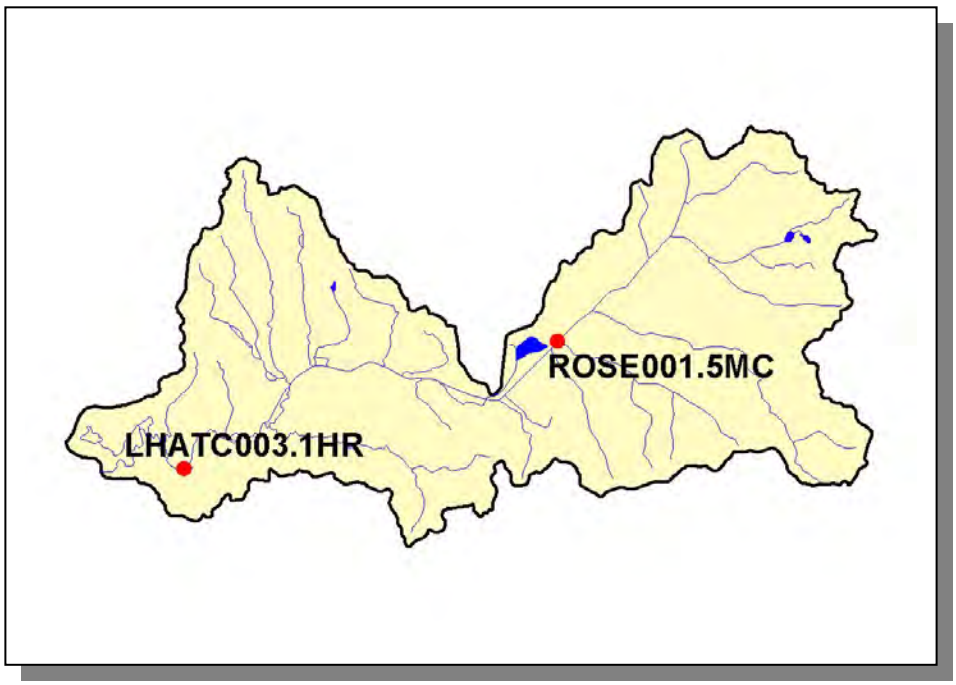


Figure 4-78. Location of Monitoring Sites in EPA's STORET Database in Subwatershed 080102070702. *More information, including site names and locations, is provided in Appendix IV.*

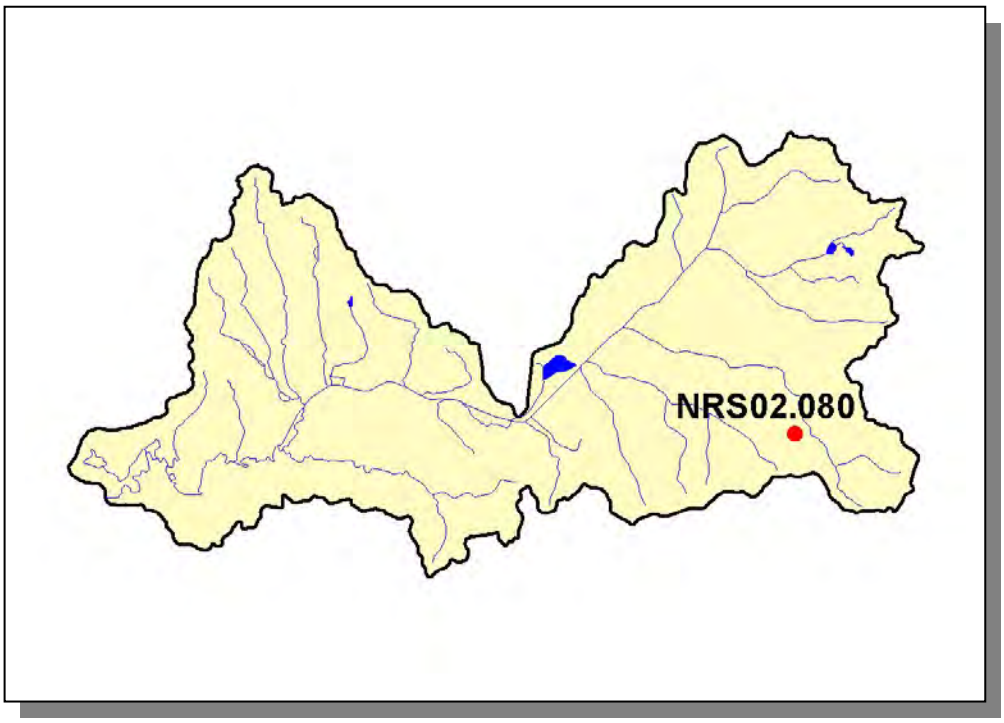


Figure 4-79. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 080102070702. *More information is provided in Appendix IV.*

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

There are no point source contributions in this subwatershed.

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

LIVESTOCK COUNTS					
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
374	671	<5	<5	551	6

Table 4-67. Summary of Livestock Count Estimates in Subwatershed 080102070702. *According to the 1997 Census of Agriculture (http://www.agcensus.usda.gov/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS						
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs	Sheep
Hardeman	9,184	15,877	62	28	5,221	144
McNairy	5,659	10,365	7	491	11,346	98

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

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	0.68
Grass (Hayland)	0.12
Legumes, Grass (Hayland)	0.07
Legumes (Hayland)	0.12
Grass, Forbs, Legumes (Mixed Pasture)	0.68
Corn (Row Crops)	11.10
Cotton (Row Crops)	9.41
Sorghum (Row Crops)	3.50
Soybeans (Row Crops)	10.37
Wheat (Close-Grown Cropland)	4.47
Summer Fallow (Other Cropland)	6.11
Other Cropland not Planted	2.65
Conservation Reserve Program Lands	0.28
Farmsteads and Ranch Headquarters	0.27

Table 4-69. Annual Estimated Total Soil Loss in Subwatershed 080102070702.

CHAPTER 5

WATER QUALITY PARTNERSHIPS IN THE UPPER HATCHIE 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 Upper Hatchie River Watershed. The information presented is provided by the agencies and organizations described.

5.2. FEDERAL PARTNERSHIPS.

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

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

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

Conservation Practice	Feet	Acres	Number
Conservation Buffers	115,722	31	
Erosion Control		2,821	
Nutrient Management		6,290	
Pest Management		5,660	13
Grazing / Forages		646	
Tree and Shrub Practices		1,621	
Tillage and Cropping		3,065	
Wildlife Habitat Management		1,775	

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

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

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

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

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

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

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

Endangered Species Program

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

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

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

Partners for Fish and Wildlife Program

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

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

HOW TO PARTICIPATE ...

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

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

5.2.D. 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 all 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.

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 (901) 544- 0658
Project Management Branch:
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 spring), since the differentiation between ground water and surface water is sometimes nearly impossible. What is surface water can become ground water in the distance of a few feet and vice versa.

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

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

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

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

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

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

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

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

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

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

5.3.C. Tennessee Department of Agriculture. The Tennessee Department of Agriculture's Water Resources Section consists of the federal Section 319 Nonpoint Source Program and the Agricultural Resources Conservation Fund Program. Both of these are grant programs which award funds to various agencies, non-profit

organizations, and universities that undertake projects to improve the quality of Tennessee's waters and/or educate citizens about the many problems and solutions to water pollution. Both programs fund projects associated with what is commonly known as "nonpoint source pollution."

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

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

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

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

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

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

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

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

The complaint form is available at:

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

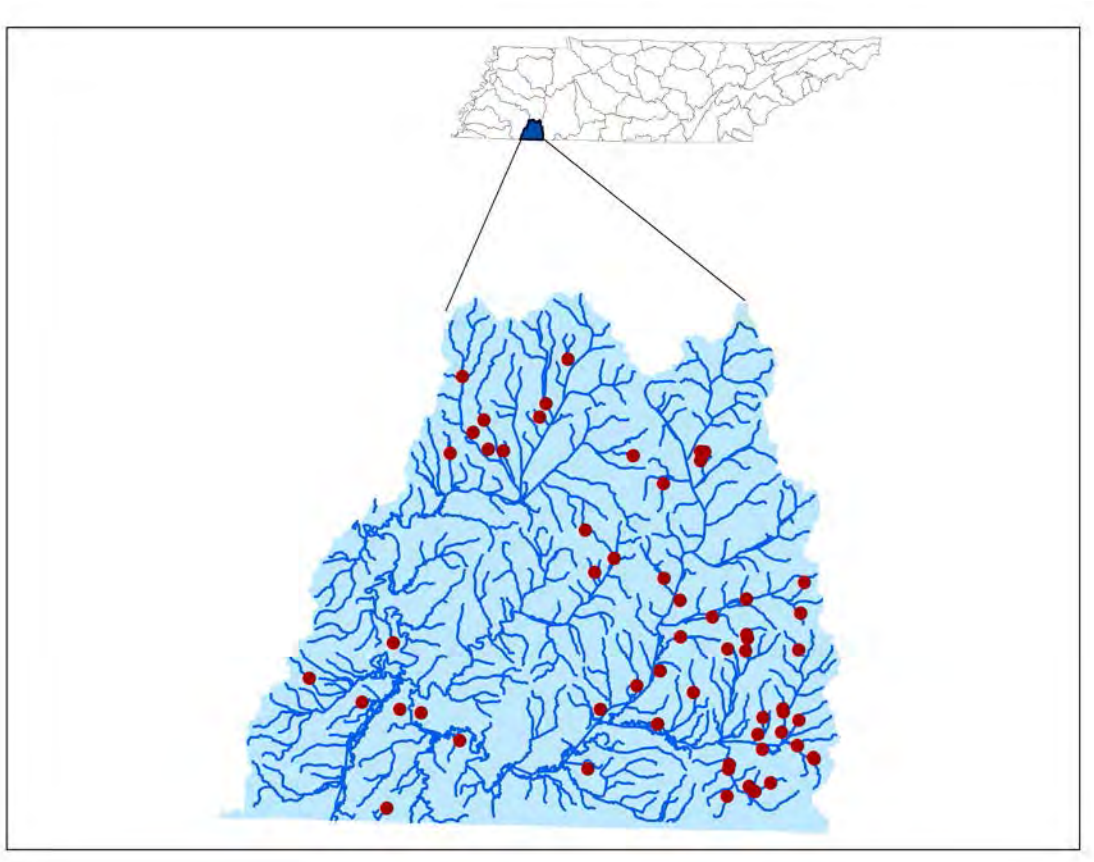


Figure 5-1. Location of BMPs installed from 1999 through 2005 in the Tennessee Portion of the Upper Hatchie River Watershed with Financial Assistance from the Tennessee Department of Agriculture's Nonpoint Source and Agricultural Resources Conservation Fund Grant Programs. *More information is provided in Appendix V.*

5.3.D. 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 Hatchie 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, the Basin Authority 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 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 Hatchie, Obion and Forked Deer River Basins.

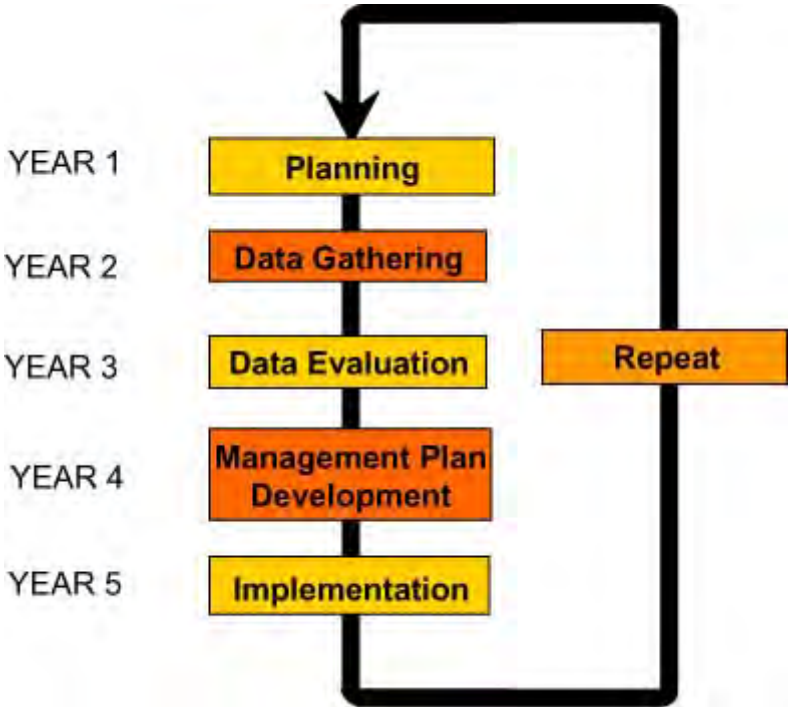
The West Tennessee River Basin Authority office is located at 3628 East End Drive in Humboldt, Tennessee. For additional information or assistance, call 731/784-8173.

5.3.E. Mississippi Department of Environmental Quality (MDEQ) - Basin Management Approach. The purpose of Mississippi's Basin Management Approach is to foster stewardship of Mississippi's water resources through collaborative watershed planning, education, protection and restoration initiatives. Over 50 state and federal agencies and stakeholder organizations are working together with local watershed teams to implement the Basin Management Approach.

How Does It Work?

There are ten major drainage basins in Mississippi. Teams of water resources experts from state and federal agencies and stakeholder organizations work together in each basin. A Basin Coordinator from MDEQ leads each team. The role of each team is to take its basin through a five-step process known as the Basin Management Cycle. The cycle involves planning, data gathering, data evaluation, management plan development and implementation of the plan. The cycle is repeated every five years.

Basin Management Cycle



The Hatchie River watershed in Mississippi's is in the North Independent Streams basin. Basin Management Approach planning activities are scheduled to begin in the North Independent Streams Basin in 2007.

What are the Benefits of Participating in Mississippi's Basin Management Approach?

- The approach identifies and targets our greatest water quality problems and focuses efforts and funding on solving them.
- The approach provides more opportunities for direct involvement by you and other Mississippians in developing and implementing solutions to our water quality problems.
- The approach creates a more direct pathway for you and other basin stakeholders to access available technical assistance and funding resources.
- The approach lessens the need for future environmental regulation.
- The approach increases the likelihood of good quality water resources for future generations.

How Can You Participate?

Successfully managing water resources requires the input of all citizens in a basin - from homeowners to farmers to businesses to local officials. Mississippi's Basin Management Approach provides opportunities for all to participate in decision-making efforts and in shaping the future of water quality. Remember, this is your basin. Take ownership of it and join the effort to protect its water resources.

There are several ways you can participate in the Basin Management Approach.

- Participate in local stakeholder meetings.
- Join a local watershed group or start one of your own.
- Contact your Basin Coordinator about water quality concerns and how you can get involved.

For more information on water quality or the basin management approach in the Upper Hatchie River Watershed, visit Mississippi's Basin Management website or contact the Basin Management Section Chief.

http://www.deq.state.ms.us/MDEQ.nsf/page/WMB_Basin_Management_Approach

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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

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

For complete information about the Tennessee SWAP, please visit:
http://www.state.tn.us/twra/cwcs/cwcsindex.html to read or download the full report.

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

5.4.C. The Chickasaw-Shiloh Resource Conservation and Development (RC&D) Council. The Chickasaw Shiloh RC&D Council was authorized for operation on April 28, 1976. Since that time the Council has assisted the citizens of our area develop and implement a wide array of projects totaling over $50,000,000. These works of improvement would not have been possible without the cooperation of the citizens of our area, local, state and federal agencies and organizations.

The Chickasaw-Shiloh RC&D area covers 4,768 square miles or 3,051,520 acres. The area includes Chester, Decatur, Fayette, Hardeman, Hardin, Haywood, Henderson, McNairy and Madison Counties, Tennessee. The western boundary of the area adjoins Shelby County, Tennessee, the largest and most heavily populated county in Tennessee.

Issues of water quality due to excessive erosion are common throughout the area. The Council has assisted numerous groups and agencies carry out watershed plans to improve the water quality of the area. The Council has received over $1,000,000 through grants and then distributed to landowners to implement best management practices.

CHAPTER 6

RESTORATION STRATEGIES IN THE UPPER HATCHIE 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 Upper Hatchie River Watershed.

6.2. COMMENTS FROM PUBLIC MEETINGS. Watershed meetings are open to the public, and most meetings were represented by citizens who live in the watershed, NPDES permitees, business people, farmers, and local river conservation interests. Locations for meetings were chosen after consulting with people who live and work in the watershed. Everyone with an interest in clean water is encouraged to be a part of the public meeting process. The times and locations of watershed meetings are posted at: http://www.state.tn.us/environment/wpc/watershed/public.shtml.

6.2.A. Year 1 Public Meeting. The first Upper Hatchie River Watershed public meeting was held jointly with the Hatchie Watershed on September 16, 1999 at the Brownsville Utility 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

- Garbage, especially trash in the stream
- Growth restrictions due to efforts directed at clean water
- Fish safe to eat
- Changes in hydrology seen in the last fifteen years
- Sediment in the Hatchie River from Mississippi
- Accelerated timber harvests due to fear of timber loss where floodplain is standing water (due to hydrological modification)

6.2.B. Year 3 Public Meeting. The second Upper Hatchie River Watershed public meeting was held jointly with the Hatchie Watershed December 6, 2001 at The Nature Conservancy Office in Brownsville. 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

- Poor logging practices along the Hatchie lead to increases in sediment load
- Increased pesticides in water from poor agricultural practices
- Hatchie River has less water than it did 50 years ago (pools are shallower due to more sediment)
- Tree tops left in the river after timber harvesting capture sediment so the river is filling in
- Increased frequency of cutting timber early to avoid dead timber after flooding

6.2.C. Year 5 Public Meeting. The third scheduled Upper Hatchie River Watershed public meeting was held October 11, 2007 at the City Hall in Bolivar. The meeting was held jointly with the Hatchie River Watershed and featured nine educational components:

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

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

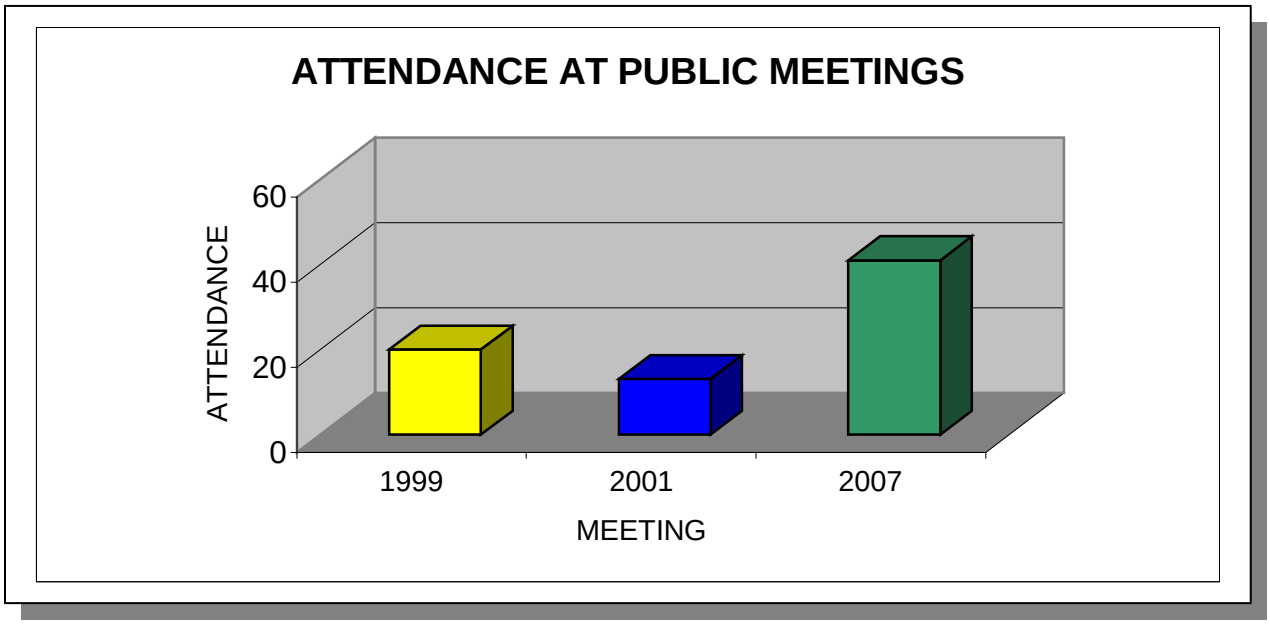

Figure 6-1. Attendance at the Upper Hatchie River and Lower Hatchie River Watersheds Joint Public Meetings. *Attendance numbers do not include TDEC personnel.*

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

Figure 6-3. Displays by NGOs, Like The Nature Conservancy, Attract Interest at the Watershed Meeting.

Figure 6-4. The SmartBoard™ is an Effective Interactive Tool to Teach Citizens About the Power of GIS.

Figure 6-5. Local Groups, Like the Hatchie River Conservancy, Have an Opportunity to Talk About Their Work with Citizens at the Watershed Meeting.

6.3. APPROACHES USED.

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

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

TMDLs are prioritized for development based on many factors.

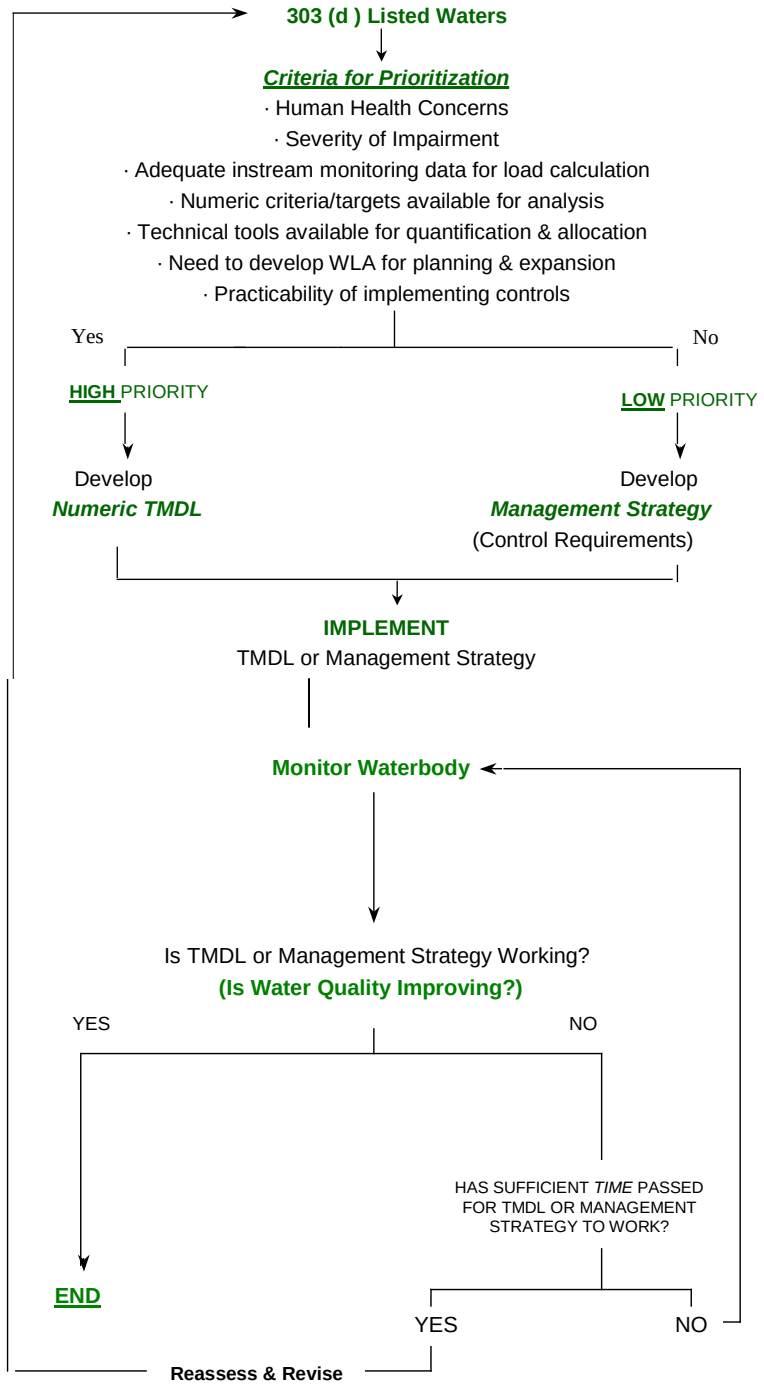

Figure 6-6. Prioritization Scheme for TMDL Development.

6.3.B. Nonpoint Sources

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

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

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

6.3.B.i. Sedimentation.

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

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

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

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

Several agencies such as the NRCS and TDA, as well as citizen watershed groups, are working to stabilize portions of stream banks using bioengineering and other techniques. Many of the affected streams could benefit from these types of projects.

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

Voluntary Activities

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

Regulatory Strategies.

- Increase efforts in the Master Logger program to recognize impaired streams and require more effective management practices.
- Require post-construction run-off rates to be no greater than pre-construction rates in order to avoid in-channel erosion.
- Encourage or require strong local buffer ordinances.
- Implement additional restrictions on logging in streamside management zones.
- Restrict the use of off-highway vehicles on stream banks and in stream channels.

Additional Strategies

- Better community planning for the impacts of development on small streams, especially development in growing areas
- Limit clearing of stream and ditch banks or other alterations. *Note: Permits may be required for any work along streams.*
- Limit road and utility crossings of streams through better site design.

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

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

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

Many sediment problems traceable to agricultural practices also involve riparian loss due to close row cropping or pasture clearing for grazing. Lack of vegetated buffers along stream corridors is a problem in some areas of the Upper Hatchie River Watershed, due both to agricultural and residential/commercial land uses. Many streams could benefit from the establishment of more extensive riparian buffer zones.

6.3.B.ii. Pathogen Contamination.

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

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

Some measures that may be necessary to control pathogens are:

Voluntary Activities

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

Regulatory Strategies

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

Additional strategies

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

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

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

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

Some sources of nutrients can be addressed by:

Voluntary Activities

- Educate homeowners and lawn care companies in the proper application of fertilizers.
- Encourage landowners, developers, and builders to leave stream buffer zones. Streamside vegetation can filter out many nutrients and other pollutants before they reach the stream. These riparian buffers are also vital along livestock pastures.
- 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 Impose tmanagement in urban and residential areas, including retrofitting existing commercial lots, homes, and roadways with storm water quality and quantity BMPs. This would especially improve the urban streams and lakes currently polluted by excessive nutrient inputs.

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

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

Regulatory Strategies.

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

Additional Strategies.

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

6.3.B.iv. Toxins and Other Materials.

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

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

Some of these problems can be addressed by:

Voluntary Activities

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

Regulatory Strategies

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

6.3.B.v. Habitat Alteration.

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

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

Voluntary Activities

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

Regulatory Strategies

- Restrict modification of streams by means such as culverting, lining, or impounding.
- Require mitigation for impacts to streams and wetlands when modifications are allowed.
- Require permitting of all rock harvesting operations.
- Increased enforcement may be needed when violations of current regulations occur, especially for illicit gravel dredging.

6.3.B.vi. Storm Water.

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

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

For discharges into impaired waters, the MS4 General Permit requires that SWMPs include a section describing how discharges of pollutants of concern will be controlled to ensure that they do not cause or contribute to instream exceedances of water quality standards. Specific measurements and BMPs to control pollutants of concern must also be identified. In addition, MS4s must implement the proposed waste load allocation provisions of an applicable TMDL (i.e., siltation/habitat alteration, pathogens) and describe methods to evaluate whether storm water controls are adequate to meet the waste load allocation. In order to evaluate SWMP effectiveness and demonstrate compliance with specified waste load allocations, MS4s must develop and implement appropriate monitoring programs.

Some storm sewer discharges are not regulated through the NPDES MS4 program. Strategies to address runoff from in these urban areas include adapting Tennessee Growth Readiness Program (TGRP) educational materials to the watershed. TGRP is a statewide program built on existing best management practices from the Nonpoint Education for Municipal Officials program and the Center for Watershed Protection. TGRP developed the program to provide communities and counties with tools to design economically viable and watershed friendly developments. The program assists

community leaders in reviewing current land use practices, determining impacts of imperviousness on watershed functions, and allowing them to understand the economics of good watershed management and site design.

6.4. PERMIT REISSUANCE PLANNING

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

The following three sections provide specific information on municipal, industrial, and water treatment plant active permit holders in the Upper Hatchie River Watershed. Compliance information was obtained from EPA's Permit Compliance System (PCS). All data was queried for a five-year period between August 1, 2002 and July 31, 2007. PCS can be accessed publicly through EPA's Envirofacts website. This website provides access to several EPA databases to provide the public with information about environmental activities that may affect air, water, and land anywhere in the United States:

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

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

6.4.A. Municipal Permits

TN0077917 City of Bolivar STP

Discharger rating: Minor
City: Bolivar
County: Hardeman
EFO Name: Jackson
Issuance Date: 5/1/07
Expiration Date: 2/27/10
Receiving Stream(s): Hatchie River at mile 131.0
HUC-12: 080102080105
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: Lagoon with complete mix aeration cells, polishing ponds, and chlorination.

Segment	TN08010207001_1000
Name	Hatchie River
Size	22.7
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Domestic Water Supply (Supporting), Industrial Water Supply (Supporting), Fish and Aquatic Life (Supporting), Recreation (Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	N/A
Sources	N/A

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

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	All Year	24	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	210	lb/day	WAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	280	lb/day	DMax Load	3/Week	Composite	Effluent net value
Ammonia as N (Total)	All Year	140	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	18	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	All Year	12	mg/L	MAvg Conc	3/Week	Composite	Effluent
Bypass of Treatment (occurrences)	All Year		Occurences/ Month	MAvg Load	Continuous	Visual	Wet Weather
CBOD % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	Percent Removal
CBOD5	All Year	35	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year	261	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	All Year	29	mg/L	WAvg Conc	3/Week	Composite	Effluent
CBOD5	All Year	22	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year	338	lb/day	WAvg Load	3/Week	Composite	Effluent
CBOD5	All Year	404	lb/day	DMax Load	3/Week	Composite	Effluent net value
D.O.	All Year	3	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	487	#/100mL	DMax Conc	3/Week	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
IC25 7day Ceriodaphnia Dubia	All Year	1.67	Percent	DMin Conc	Monthly	Composite	Effluent
IC25 7day Fathead Minnows	All Year	1.67	Percent	DMin Conc	Monthly	Composite	Effluent
Nitrogen Total (as N)	All Year	39.4	mg/L	MAvg Conc	2/Week	Composite	Effluent
Nitrogen Total (as N)	All Year	460	lb/day	MAvg Load	2/Week	Composite	Effluent
Overflow Use Occurences	All Year		Occurences/ Month	MAvg Load	Continuous	Visual	Wet Weather
Overflow Use Occurences	All Year		Occurences/ Month	MAvg Load	Continuous	Visual	Non Wet Weather
Phosphorus, Total	All Year	1.1	mg/L	MAvg Conc	2/Week	Composite	Effluent
Phosphorus, Total	All Year	13	lb/day	MAvg Load	2/Week	Composite	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	Weekdays	Composite	Effluent

Table 6-2a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
TRC	All Year	1	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year	467	lb/day	WAvg Load	3/Week	Composite	Effluent
TSS	All Year	35	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS	All Year	40	mg/L	WAvg Conc	3/Week	Composite	Effluent
TSS	All Year	409	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year	525	lb/day	DMax Load	3/Week	Composite	Effluent net value
TSS % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	Percent Removal
pH	All Year	8.5	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-2b.

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

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

9 Total Phosphorus
8 Carbonaceous Biological Oxygen Demand
2 Suspended Solids % Removal
2 Total Chlorine
3 Total Suspended Solids
1 Carbonaceous Oxygen Demand
1 pH

Comments:
1-17-07, Bolivar has built a larger lagoon system (TN0077917) on the site of TN0025275 to replace both TN0025275 and TN0062189.

5/1/07 Reconnaissance Inspection:
Grass in spots on the inside of the dikes needs to be cut. Effluent sampling continues to show high phosphorous. Bolivar reported that money is available and will be spent to install a chemical feed system in the third pond to remove phosphorous.

TN0077721 Bethel Springs STP

Discharger rating: Minor
City: Bethel Springs
County: McNairy
EFO Name: Jackson
Issuance Date: 1/1/03
Expiration Date: 11/27/07
Receiving Stream(s): Unnamed tributary at mile 0.2 to Cypress Creek at mile 19.8
HUC-12: 080102070601
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: Septic Tank Effluent Pump (STEP) collection system

Segment	TN08010207031_0600
Name	Unnamed Trib to Cypress Creek
Size	10.6
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Recreation (Not Assessed), Fish and Aquatic Life (Not Assessed), Livestock Watering and Wildlife (Not Assessed), Irrigation (Not Assessed)
Causes	N/A
Sources	N/A

Table 6-3. Stream Segment Information for Bethel Springs STP.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	All Year	2	mg/L	DMax Conc	Weekly	Grab	Effluent
Ammonia as N (Total)	All Year	1	mg/L	WAvg Conc	Weekly	Grab	Effluent
Ammonia as N (Total)	All Year	0.8	lb/day	MAvg Load	Weekly	Grab	Effluent
Ammonia as N (Total)	All Year	1.5	mg/L	MAvg Conc	Weekly	Grab	Effluent
CBOD % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	Percent Removal
CBOD5	All Year	20	mg/L	DMax Conc	Weekly	Grab	Effluent
CBOD5	All Year	15	mg/L	MAvg Conc	Weekly	Grab	Effluent
CBOD5	All Year	5	lb/day	MAvg Load	Weekly	Grab	Effluent
CBOD5	All Year	10	mg/L	DMin Conc	Weekly	Grab	Effluent
CBOD5	All Year	7.5	lb/day	DMax Load	Weekly	Grab	Effluent
D.O.	All Year	6	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	Weekly	Grab	Effluent
Fecal Coliform	All Year	100	#/100mL	DMax Conc	Weekly	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	Weekly	Grab	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Influent (Raw Sewage)
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Week	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	Weekly	Grab	Effluent
TSS	All Year		mg/L	DMax Conc	Weekly	Grab	Influent (Raw Sewage)
TSS	All Year	20	lb/day	DMax Load	Weekly	Grab	Effluent
TSS	All Year		mg/L	WAvg Conc	Weekly	Grab	Influent (Raw Sewage)
TSS	All Year	15	lb/day	MAvg Load	Weekly	Grab	Effluent
TSS	All Year	40	mg/L	MAvg Conc	Weekly	Grab	Effluent
TSS	All Year	30	mg/L	WAvg Conc	Weekly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	2/Week	Grab	Effluent

Table 6-4. Permit Limits for Bethel Springs STP.

Comments:
None.

TN0062642 Middleton Wastewater Lagoon

Discharger rating: Minor
City: Middleton
County: Hardeman
EFO Name: Jackson
Issuance Date: 10/1/05
Expiration Date: 8/30/09
Receiving Stream(s): Hatchie River mile 174.2
HUC-12: 080102070401
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: Lagoon system

Segment	TN08010207001_1000
Name	Hatchie River
Size	22.7
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Domestic Water Supply (Supporting), Industrial Water Supply (Supporting), Fish and Aquatic Life (Supporting), Recreation (Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	N/A
Sources	N/A

Table 6-5. Stream Segment Information for Middleton Wastewater Lagoon.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
48hr LC50: Ceriodaphnia Dubia	All Year	1.8	Percent	DMin Conc	Quarterly	Grab	Effluent
48hr LC50: Fathead Minnows	All Year	1.8	Percent	DMin Conc	Quarterly	Grab	Effluent
Ammonia as N (Total)	Summer	10	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	12	lb/day	WAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	5	mg/L	MAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	17	lb/day	DMax Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	8	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	7.5	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	20	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	17	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	15	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	33	lb/day	DMax Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	25	lb/day	WAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	10	mg/L	MAvg Conc	3/Week	Composite	Effluent
Bypass of Treatment (occurrences)	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
CBOD % Removal	All Year	65	Percent	MAvg % Removal	3/Week	Calculated	Percent Removal
CBOD5	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year	30	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	All Year	42	lb/day	WAvg Load	3/Week	Composite	Effluent
CBOD5	All Year	25	mg/L	WAvg Conc	3/Week	Composite	Effluent
CBOD5	All Year	33	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	All Year	20	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	All Year	50	lb/day	DMax Load	3/Week	Composite	Effluent
CBOD5	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
D.O.	All Year	3	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	487	#/100mL	DMax Conc	3/Week	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	DMax Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	DMax Load	Daily	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	Weekdays	Grab	Effluent

Table 6a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
TRC	All Year	2	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	60	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year	100	lb/day	DMax Load	3/Week	Composite	Effluent
TSS	All Year	92	lb/day	WAvg Load	3/Week	Composite	Effluent
TSS	All Year	55	mg/L	WAvg Conc	3/Week	Composite	Effluent
TSS	All Year	83	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year	50	mg/L	MAvg Conc	3/Week	Composite	Effluent
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6a.

Tables 6-6a-b. Permit Limits for Middleton Wastewater Lagoon.

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

20 Overflows

Comments:
10/17/07 Compliance Evaluation Inspection:
With one exception, all lift stations were found to be in good operating condition. The shroud on the Thyssen-Krupp station was unlocked, the alarm light had not been installed on the outside, the check valve arms were not working and the station needed to be cleaned.

One of the ten horsepower aerators at the lagoon was out of service.

Grant money is coming to provide for the replacement of the Country Kitchen and lagoon influent lift stations.

10/17/06 Compliance Evaluation Inspection:
Not all lift stations were locked and the drive to the Dover station was muddy and in need of gravel. Influent flow was not being measured correctly and a thermometer should be placed in the composite samplers.

TN0062308 Selmer STP

Discharger rating: Minor
City: Selmer
County: McNairy
EFO Name: Jackson
Issuance Date: 1/1/06
Expiration Date: 10/30/10
Receiving Stream(s): Cypress Creek at mile 14.5
HUC-12: 080102070601
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: Oxidation ditch activated sludge with chlorination

Segment	TN08010207031_3000
Name	Cypress Creek
Size	6.7
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Recreation (Not Assessed), Irrigation (Supporting), Fish and Aquatic Life (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	N/A
Sources	N/A

Table 6-7. Stream Segment Information for Selmer STP.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ammonia as N (Total)	Summer	7.1	mg/L	DMax Conc	Weekly	Grab	Effluent
Ammonia as N (Total)	Summer	106	lb/day	DMax Load	Weekly	Grab	Effluent
Ammonia as N (Total)	Summer	5.3	mg/L	WAvg Conc	Weekly	Grab	Effluent
Ammonia as N (Total)	Summer	106	lb/day	DMax Load	Weekly	Grab	Effluent
Ammonia as N (Total)	Summer	3.54	mg/L	MAvg Conc	Weekly	Grab	Effluent
Ammonia as N (Total)	Summer	53	lb/day	MAvg Load	Weekly	Grab	Effluent
Ammonia as N (Total)	Winter	21.7	mg/L	DMax Conc	Weekly	Grab	Effluent
Ammonia as N (Total)	Winter	10.86	mg/L	MAvg Conc	Weekly	Grab	Effluent
Ammonia as N (Total)	Winter	163	lb/day	MAvg Load	Weekly	Grab	Effluent
Ammonia as N (Total)	Winter	16.3	mg/L	WAvg Conc	Weekly	Grab	Effluent
Ammonia as N (Total)	Winter	326	lb/day	DMax Load	Weekly	Grab	Effluent
Ammonia as N (Total)	Winter	244.7	lb/day	WAvg Load	Weekly	Grab	Effluent
Bypass of Treatment (occurrences)	All Year		Occurrences/Month	MAvg Load	Continuous	Visual	Wet Weather
CBOD % Removal	All Year	65	Percent	MAvg % Removal	Weekly	Calculated	%Removal
CBOD5	All Year		mg/L	DMax Conc	Weekly	Composite	Influent (Raw Sewage)
CBOD5	All Year		mg/L	MAvg Conc	Weekly	Composite	Influent (Raw Sewage)
CBOD5	Summer	45	mg/L	DMax Conc	Weekly	Grab	Effluent
CBOD5	Summer	30	mg/L	DMin Conc	Weekly	Grab	Effluent
CBOD5	Summer	450	lb/day	MAvg Load	Weekly	Grab	Effluent
CBOD5	Summer	40	mg/L	MAvg Conc	Weekly	Grab	Effluent
CBOD5	Summer	600	lb/day	DMax Load	Weekly	Grab	Effluent
CBOD5	Summer	675	lb/day	DMax Load	Weekly	Grab	Effluent
CBOD5	Winter	60	mg/L	DMax Conc	Weekly	Grab	Effluent
CBOD5	Winter	901	lb/day	DMax Load	Weekly	Grab	Effluent
CBOD5	Winter	40	mg/L	DMin Conc	Weekly	Grab	Effluent
CBOD5	Winter	600	lb/day	MAvg Load	Weekly	Grab	Effluent
CBOD5	Winter	50	mg/L	MAvg Conc	Weekly	Grab	Effluent
CBOD5	Winter	751	lb/day	DMax Load	Weekly	Grab	Effluent
Cu (T)	All Year	0.029	mg/L	DMax Conc	Monthly	Composite	Effluent
Cyanide, Total (CN-)	All Year	0.012	mg/L	DMax Conc	Monthly	Grab	Effluent
D.O.	All Year	5.5	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	DMax Load	Weekdays	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Weekdays	Continuous	Effluent
Flow	All Year		MGD	DMax Load	Weekdays	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Weekdays	Continuous	Influent (Raw Sewage)

Table 6-8a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
IC25 7day Ceriodaphnia dubia	All Year	27	Percent	DMin Conc	Monthly	Composite	Effluent
IC25 7day Fathead Minnows	All Year	27	Percent	DMin Conc	Monthly	Composite	Effluent
Overflow Use Occurrences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
Overflow Use Occurrences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Non Wet Weather
Pb (T)	All Year	0.009	mg/L	MAvg Conc	Monthly	Grab	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Week	Grab	Effluent
TRC	All Year	0.08	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	120	mg/L	DMax Conc	Weekly	Grab	Effluent
TSS	All Year	1651	lb/day	DMax Load	Weekly	Grab	Effluent
TSS	All Year	1801	lb/day	DMax Load	Weekly	Grab	Effluent
TSS	All Year	100	mg/L	WAvg Conc	Weekly	Grab	Effluent
TSS	All Year	1501	lb/day	MAvg Load	Weekly	Grab	Effluent
TSS	All Year	110	mg/L	MAvg Conc	Weekly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekdays	Grab	Effluent
pH	Summer	10	SU	DMax Conc	Weekdays	Grab	Effluent
pH	Winter	9	SU	DMax Conc	Weekdays	Grab	Effluent

Table 6-8b.

Tables 6-8a-b. Permit Limits for Selmer STP.

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

28 pH
16 Total Silver
1 Total Suspended Solids
1 Total Cyanide
3 Carbonaceous Biological Oxygen Demand
1 Carbonaceous Oxygen Demand
2 Fecal Coliform
3 Ammonia
1 Total Copper

Enforcement:
6/17/04 Consent Order #04-0012 for violation of silver limits in Dec '02, Jan '03, March '03, and April '03.

Comments:
3/22/07 Reconnaissance Inspection
Because it is a lagoon, there are high pH results sometimes, especially in the summer. Selmer has also had trouble meeting its silver limit and is working with the pretreatment section to correct the problem. There are other occasional permit exceedances and it was suggested that perhaps replacing the curtains would help.

2/21/07 Reconnaissance Inspection
Selmer has finished its sewer system rehabilitation project. Selmer voted a year or two ago to take and treat Bethel Springs wastewater. Bethel Springs has since had second thoughts and is once again considering building its own wastewater treatment facility. An NPDES permit was issued to Bethel Springs in 2003.

6/22/06 Pretreatment Inspection
Selmer's pretreatment program was in order. The files were well maintained and information was readily accessible. Silver is still an issue that the city is dealing with. However, it appears that WPC's Permit Section has concluded during the reissuance of their NPDES permit that the very small limit sent to Selmer for Silver may be in error. A higher limit appears to be applicable. If change is made in the reissued permit, several pretreatment compliance issues will be resolved.

APPENDIX II

ID	NAME	HAZARD
557010	Cane Creek #15	1
357023	Porters Creek #7	3
557001	Lost Creek	S
557003	Logans Lake	3
557004	Madison Lake	B
557006	Blasingame #1	2
557007	Twin Springs	0
557008	Big Hill Pond	2
557011	Commerce Park	1
557012	Mcnairy Cypress Creek	1
557013	Mcnairy Cypress Creek	1
557016	Pin Oak Lake	2
557017	Mcnairy Cypress Creek	2
557015	Clear Creek	1
557019	Mud Creek #7	3
557024	Tosh #2	L
557025	Dunlap	3
557026	Burks	L

Table A2-1. Inventoried Dams in the Tennessee Portion of the Upper Hatchie River Watershed. *Hazard Codes: 1, High; (S, 2), Significant; (L, 3), Low; B, Breached, 0, Too small to regulate. TDEC only regulates dams indicated by a numeric hazard score.*

LAND COVER/LAND USE	ACRES	% OF WATERSHED
Bare Rock/Sand/Clay	33	0.0
Deciduous Forest	84,913	31.2
Developed Open Space	12,702	4.7
Emergent Herbaceous Wetland	2,064	0.8
Evergreen Forest	25,681	9.4
Grassland/Herbaceous	608	0.2
High Intensity Development	169	0.1
Low Intensity Development	1,852	0.7
Medium Intensity Development	683	0.3
Mixed Forest	21,271	7.8
Open Water	3,024	1.1
Pasture/Hay	28,148	10.4
Row Crops	28,001	10.3
Shrub/Scrub	36,121	13.3
Woody Wetlands	26,651	9.8
Total	**271,921**	**100.0**

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

ECOREGION	REFERENCE STREAM	WATERSHED (HUC 8)	
Blackland Prairie (65a)	UT to Muddy Creek (65A01)	Little Hatchie River	08010207
	Wardlow Creek (65A03)	TWV-Beech River	06040001
Flatwoods/Alluvial Prairie Margins (65b)	Cypress Creek (65B04)	Little Hatchie River	08010207
Southeastern Plains and Hills (65e)	Blunt Creek (65E04)	TWV-Kentucky Lake	06040005
	Griffen Creek (65E06)	NF Forked Deer River	08010204
	Harris Creek (65E08)	SF Forked Deer River	08010205
	Marshall Creek (65E10)	Hatchie River	08010208
	West Fork Spring Creek (65E11)	Hatchie River	08010208

Table A2-3. Ecoregion Monitoring Sites in Ecoregions 65a, 65b, and 65e.

CODE	NAME	AGENCY	AGENY ID
98	TDEC/DNA Big Hill Pond State Park Site	TDEC/DNA	M.USTNNHP 190
305	TDOT Kirby Road Mitigation/Permit Site	TDOT	
316	TDOT US 45 Mitigation/Permit Site	TDOT	
325	TDOT SR 5 Mitigation/Permit Site	TDOT	
326	TDOT SR 5 Mitigation/Permit Site	TDOT	
327	TDOT SR 5 Mitigation/Permit Site	TDOT	
328	TDOT SR 5 Mitigation/Permit Site	TDOT	
358	TDOT Powells Chapel Road Mitigation/Permit Site	TDOT	
418	TDOT Pea Vine Road Permit Site	TDOT	
852	USFWS Craig Howell WRP Site	USFWS	
900	USFWS Willie R. Teague WRP Site	USFWS	Tract 647, Farm 1072
901	USFWS Willie R. Teague WRP Site	USFWS	Tract 665, Farm 1072
920	USFWS Tuscumbia River Bottoms Site	USFWS	
1268	USACOE Crooked Creek (TN) 95-003[Tf] Site	USACOE-Memphis	
1285	USACOE Hatchie River Site	USACOE-Memphis	
1292	USACOE Hatchie River 95-018 [Td] Site	USACOE-Memphis	
1346	USACOE Muddy Creek Site	USACOE-Memphis	
1404	USACOE Tuscumbia River 95-020 [Td] Site	USACOE-Memphis	
1567	USACOE Hatchie River/Turkey Creek-54 Site	USACOE-Memphis	
1568	USACOE Hatchie River/Turkey Creek-54a Mitigation	USACOE-Memphis	
1569	USACOE Hatchie River/Turkey Creek-54a Mitigation-2	USACOE-Memphis	
1570	USACOE Hatchie River/Cypress Creek-57 Site	USACOE-Memphis	
1593	USACOE Hatchie River-42 Site	USACOE-Memphis	
1594	USACOE Cypress Creek/Hatchie River-43 Site	USACOE-Memphis	
1663	USACOE Tuscumbia River-4 Site	USACOE-Memphis	
1664	USACOE Tuscumbia River-5 Site	USACOE-Memphis	
1665	USACOE Tuscumbia River-9 Site	USACOE-Memphis	
1666	USACOE Tuscumbia River-13-Dm Site	USACOE-Memphis	
1667	USACOE Cypress Creek-4 Site	USACOE-Memphis	
1668	USACOE Cypress Creek, Tn-6 Site	USACOE-Memphis	
1669	USACOE Cypress Creek/Tuscumbia-7 Site	USACOE-Memphis	

Table A2-4. Wetland Sites in the Upper Hatchie River Watershed in TDEC Database. *TDEC, Tennessee Department of Environment and Conservation; DNA, Division of Natural Areas; TDOT, Tennessee Department of Transportation; USACOE, US Army Corps of Engineers; USFWS, US Fish and Wildlife Service.* ***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)
Cypress Creek	TN08010207031_2000	10.7
Cypress Creek	TN08010207031_3000	6.7
Cypress Creek	TN08010207031_4000	9.2
Cypress Creek	TN08010207072_1000	6.0
Hatchie River	TN08010207001_1000	22.7
Hatchie River	TN08010207001_2000	7.6
Little Hatchie Creek	TN08010207035_1000	20.5
Mosses Creek	TN08010207034_1000	18.7
Prairie Branch	TN08010207001_0410	3.5
Unnamed Trib to Muddy Creek	TN08010207031_1540	3.2

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

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Boles Branch	TN08010207031_0100	9.0
Brushy Branch	TN08010207031_1530	4.4
Caney Creek	TN08010207031_1600	7.6
Chapel Branch	TN08010207035_0620	6.1
Colonel Fork	TN08010207003_0100	10.8
Crooked Creek	TN08010207031_1200	16.7
Crystal Spring Branch	TN08010207072_0100	6.1
Cypress Creek	TN08010207035_0700	5.3
Dry Branch	TN08010207034_0200	5.5
Fish Branch	TN08010207035_0100	9.3
Gooch Branch	TN08010207034_0100	2.5
Hamstring Creek	TN08010207035_0300	14.2
Hardcastle Creek	TN08010207001_0300	8.3
Hendrix Branch	TN08010207031_0500	6.1
Hodger Branch	TN08010207035_0400	13.0
Indian Creek	TN08010207031_1700	16.6
Keith Branch	TN08010207035_0630	2.3
Kirk Branch	TN08010207034_0600	4.5
Kise Creek	TN08010207035_0200	21.8
Larue Branch	TN08010207031_0700	3.7
Lee Creek	TN08010207001_0200	6.5
Little Indian Creek	TN08010207031_1710	8.3
Little Muddy Creek	TN08010207031_1550	17.4

Table A3-2a

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Magbee Branch	TN08010207001_0400	9.6
Maxedon Branch	TN08010207035_0611	6.8
Misc Tribs to Cypress Creek	TN08010207031_0999	35.4
Misc Tribs to Cypress Creek	TN08010207072_0999	17.5
Misc Tribs to Little Hatchie Creek	TN08010207035_0999	25.9
Misc Tribs to Mosses Creek	TN08010207034_0999	27.2
Misc Tribs to Muddy Creek	TN08010207003_0999	10.3
Misc Tribs to Muddy Creek	TN08010207031_1599	33.9
Misc Tribs to Tuscumbia River	TN08010207044_0999	6.4
Morphis Branch	TN08010207034_0500	5.5
Muddy Creek	TN08010207003_1000	9.0
Muddy Creek	TN08010207031_1500	13.3
Nail Creek	TN08010207034_0300	17.3
Neatherly Branch	TN08010207034_0400	6.8
Oxford Creek	TN08010207031_1300	22.6
Prairie Branch	TN08010207031_1510	7.6
Ramer Branch	TN08010207031_0300	4.8
Reedy Branch	TN08010207031_0200	6.2
Roland Creek	TN08010207031_1520	23.2
Rose Creek	TN08010207035_0600	10.9
Sandy Creek	TN08010207031_0900	9.4
Simpson Branch	TN08010207031_0400	4.9
Skipper Creek	TN08010207001_0100	12.6
Swain Creek	TN08010207035_0500	7.9
Tacker Creek	TN08010207031_0800	5.1
Talley Spring Branch	TN08010207072_0200	4.3
Turkey Creek	TN08010207031_1100	5.1
Unnamed Trib to Cypress Creek	TN08010207031_0600	10.6
Unnamed Tribs to Cypress Creek	TN08010207031_1800	8.8
Wilson Creek	TN08010207035_0610	6.7
Wolf Branch	TN08010207031_1400	4.2
Woodville Creek	TN08010207035_0210	6.4

Table A3-2b.

Table A3-2a-b. Streams Not Assessed for Fish and Aquatic Life Designated Use in the Tennessee Portion of the Upper Hatchie River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Cypress Creek	TN08010207031_2000	10.7
Cypress Creek	TN08010207031_3000	6.7
Cypress Creek	TN08010207031_4000	9.2
Cypress Creek	TN08010207072_1000	6.0
Hatchie River	TN08010207001_1000	22.7
Hatchie River	TN08010207001_2000	7.6
Little Hatchie Creek	TN08010207035_1000	20.5
Mosses Creek	TN08010207034_1000	18.7
Prairie Branch	TN08010207001_0410	3.5
Unnamed Trib to Muddy Creek	TN08010207031_1540	3.2

Table A3-3. Streams Fully Supporting Recreation Designated Use in the Tennessee Portion of the Upper Hatchie River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Boles Branch	TN08010207031_0100	9.0
Brushy Branch	TN08010207031_1530	4.4
Caney Creek	TN08010207031_1600	7.6
Chapel Branch	TN08010207035_0620	6.1
Colonel Fork	TN08010207003_0100	10.8
Crooked Creek	TN08010207031_1200	16.7
Crystal Spring Branch	TN08010207072_0100	6.1
Cypress Creek	TN08010207031_1000	16.7
Cypress Creek	TN08010207031_2000	10.7
Cypress Creek	TN08010207031_3000	6.7
Cypress Creek	TN08010207031_4000	9.2
Cypress Creek	TN08010207035_0700	5.3
Dry Branch	TN08010207034_0200	5.5
Fish Branch	TN08010207035_0100	9.3
Gooch Branch	TN08010207034_0100	2.5
Hamstring Creek	TN08010207035_0300	14.2
Hardcastle Creek	TN08010207001_0300	8.3
Hendrix Branch	TN08010207031_0500	6.1
Hodger Branch	TN08010207035_0400	13.0
Indian Creek	TN08010207031_1700	16.6
Keith Branch	TN08010207035_0630	2.3
Kirk Branch	TN08010207034_0600	4.5
Kise Creek	TN08010207035_0200	21.8
Larue Branch	TN08010207031_0700	3.7
Lee Creek	TN08010207001_0200	6.5

Table A3-4a

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Little Indian Creek	TN08010207031_1710	8.3
Little Muddy Creek	TN08010207031_1550	17.4
Magbee Branch	TN08010207001_0400	9.6
Maxedon Branch	TN08010207035_0611	6.8
Misc Tribs to Cypress Creek	TN08010207031_0999	35.4
Misc Tribs to Cypress Creek	TN08010207072_0999	17.5
Misc Tribs to Little Hatchie Creek	TN08010207035_0999	25.9
Misc Tribs to Mosses Creek	TN08010207034_0999	27.2
Misc Tribs to Muddy Creek	TN08010207003_0999	10.3
Misc Tribs to Muddy Creek	TN08010207031_1599	33.9
Misc Tribs to Tuscumbia River	TN08010207044_0999	6.4
Morphis Branch	TN08010207034_0500	5.5
Muddy Creek	TN08010207003_1000	9.0
Muddy Creek	TN08010207031_1500	13.3
Nail Creek	TN08010207034_0300	17.3
Neatherly Branch	TN08010207034_0400	6.8
Oxford Creek	TN08010207031_1300	22.6
Prairie Branch	TN08010207031_1510	7.6
Ramer Branch	TN08010207031_0300	4.8
Reedy Branch	TN08010207031_0200	6.2
Roland Creek	TN08010207031_1520	23.2
Rose Creek	TN08010207035_0600	10.9
Sandy Creek	TN08010207031_0900	9.4
Simpson Branch	TN08010207031_0400	4.9
Skipper Creek	TN08010207001_0100	12.6
Swain Creek	TN08010207035_0500	7.9
Tacker Creek	TN08010207031_0800	5.1
Talley Spring Branch	TN08010207072_0200	4.3
Turkey Creek	TN08010207031_1100	5.1
Tuscumbia River	TN08010207044_1000	8.9
Unnamed Trib to Cypress Creek	TN08010207031_0600	10.6
Unnamed Tribs to Cypress Creek	TN08010207031_1800	8.8
Wilson Creek	TN08010207035_0610	6.7
Wolf Branch	TN08010207031_1400	4.2
Woodville Creek	TN08010207035_0210	6.4

Table A3-4b.

Table A3-4a-b. Streams Not Assessed for Recreation Designated Use in the Tennessee Portion of the Upper Hatchie River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Boles Branch	TN08010207031_0100	9.0
Brushy Branch	TN08010207031_1530	4.4
Caney Creek	TN08010207031_1600	7.6
Colonel Fork	TN08010207003_0100	10.8
Crooked Creek	TN08010207031_1200	16.7
Cypress Creek	TN08010207031_1000	16.7
Cypress Creek	TN08010207031_2000	10.7
Cypress Creek	TN08010207031_3000	6.7
Cypress Creek	TN08010207031_4000	9.2
Dry Branch	TN08010207034_0200	5.5
Fish Branch	TN08010207035_0100	9.3
Gooch Branch	TN08010207034_0100	2.5
Hardcastle Creek	TN08010207001_0300	8.3
Hatchie River	TN08010207001_1000	22.7
Hatchie River	TN08010207001_2000	7.6
Hendrix Branch	TN08010207031_0500	6.1
Indian Creek	TN08010207031_1700	16.6
Kirk Branch	TN08010207034_0600	4.5
Kise Creek	TN08010207035_0200	21.8
Larue Branch	TN08010207031_0700	3.7
Lee Creek	TN08010207001_0200	6.5
Little Indian Creek	TN08010207031_1710	8.3
Little Muddy Creek	TN08010207031_1550	17.4
Magbee Branch	TN08010207001_0400	9.6
Morphis Branch	TN08010207034_0500	5.5
Mosses Creek	TN08010207034_1000	18.7
Muddy Creek	TN08010207031_1500	13.3
Nail Creek	TN08010207034_0300	17.3
Neatherly Branch	TN08010207034_0400	6.8
Oxford Creek	TN08010207031_1300	22.6
Prairie Branch	TN08010207001_0410	3.5
Prairie Branch	TN08010207031_1510	7.6
Ramer Branch	TN08010207031_0300	4.8
Reedy Branch	TN08010207031_0200	6.2
Roland Creek	TN08010207031_1520	23.2
Sandy Creek	TN08010207031_0900	9.4
Simpson Branch	TN08010207031_0400	4.9
Skipper Creek	TN08010207001_0100	12.6
Tacker Creek	TN08010207031_0800	5.1
Turkey Creek	TN08010207031_1100	5.1
Unnamed Trib to Cypress Creek	TN08010207031_0600	10.6
Unnamed Trib to Muddy Creek	TN08010207031_1540	3.2
Unnamed Tribs to Cypress Creek	TN08010207031_1800	8.8
Wolf Branch	TN08010207031_1400	4.2

Table A3-5a

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Woodville Creek	TN08010207035_0210	6.4
Boles Branch	TN08010207031_0100	9.0
Chapel Branch	TN08010207035_0620	6.1
Colonel Fork	TN08010207003_0100	10.8
Crooked Creek	TN08010207031_1200	16.7
Crystal Spring Branch	TN08010207072_0100	6.1
Cypress Creek	TN08010207035_0700	5.3
Cypress Creek	TN08010207072_1000	6.0
Cypress Creek	TN08010207031_1000	16.7
Hardcastle Creek	TN08010207001_0300	8.3
Hodger Branch	TN08010207035_0400	13.0
Keith Branch	TN08010207035_0630	2.3
Kirk Branch	TN08010207034_0600	4.5
Little Hatchie Creek	TN08010207035_1000	20.5
Maxedon Branch	TN08010207035_0611	6.8
Misc Tribs to Cypress Creek	TN08010207031_0999	35.4
Misc Tribs to Cypress Creek	TN08010207072_0999	17.5
Misc Tribs to Hatchie River	TN08010207001_0999	25.9
Misc Tribs to Little Hatchie Creek	TN08010207035_0999	25.9
Misc Tribs to Mosses Creek	TN08010207034_0999	27.2
Misc Tribs to Muddy Creek	TN08010207003_0999	10.3
Misc Tribs to Muddy Creek	TN08010207031_1599	33.9
Misc Tribs to Tuscumbia River	TN08010207044_0999	6.4
Oxford Creek	TN08010207031_1300	22.6
Rose Creek	TN08010207035_0600	10.9
Swain Creek	TN08010207035_0500	7.9
Talley Spring Branch	TN08010207072_0200	4.3
Tuscumbia River	TN08010207044_1000	8.9
Wilson Creek	TN08010207035_0610	6.7

Table A3-5b

Table A3-5a-b. Stream Impairment Due to Siltation in the Tennessee Portion of the Upper Hatchie River Watershed.

APPENDIX IV

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0202	0203*	0208	0401	0408
Deciduous Forest	85		4,041	11,307	1,337
Developed Open Space	88		288	1,503	161
Emergent Herbaceous Wetlands	6		141	248	55
Evergreen Forest	68		1,014	2,804	654
Grassland/Herbaceous	5		10	108	32
High Intensity Development				33	
Low Intensity Development	8		19	262	11
Medium Intensity Development	9		1	66	
Mixed Forest	42		802	2,686	319
Open Water	22		568	645	52
Pasture/Hay	564		110	4,628	491
Row Crops	367		129	2,629	343
Shrub/Scrub	281		1,333	4,151	1,093
Woody Wetlands	12		2,172	6,892	843
Total	**1,558**		**10,629**	**37,961**	**5,391**

Table A4-1a.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)				
	0409	0501	0601	0602	0603
Bare Rock/Sand/Clay		33			
Deciduous Forest	11,704	2,168	14,556	7,717	12,089
Developed Open Space	1,550	389	2,667	1,556	1,703
Emergent Herbaceous Wetlands	37	158	93	435	540
Evergreen Forest	4,240	841	3,280	2,807	4,178
Grassland/Herbaceous	68	49	37	70	105
High Intensity Development			124	6	7
Low Intensity Development	45	79	904	209	168
Medium Intensity Development		3	384	144	70
Mixed Forest	3,086	525	3,573	1,723	2,544
Open Water	214	172	475	201	409
Pasture/Hay	1,296	3,096	2,648	6,802	4,231
Row Crops	1,585	1,376	4,934	5,140	4,909
Shrub/Scrub	5,009	1,347	6,182	4,228	5,429
Woody Wetlands	2,165	2,854	1,646	1,804	4,273
Total	**30,999**	**13,090**	**41,503**	**32,841**	**40,656**

Table A4-1b.

LAND USE/LAND COVER	AREAS IN HUC-12 SUBWATERSHEDS (ACRES)	
	0701	0702
Deciduous Forest	10,062	9,530
Developed Open Space	1,417	1,315
Emergent Herbaceous Wetlands	101	249
Evergreen Forest	2,373	3,308
Grassland/Herbaceous	56	61
Low Intensity Development	65	76
Medium Intensity Development	5	1
Mixed Forest	2,715	3,174
Open Water	58	206
Pasture/Hay	2,606	1,606
Row Crops	4,515	1,979
Shrub/Scrub	3,493	3,315
Woody Wetlands	1,635	2,348
Total	**29,099**	**27,169**

Table A4-1c.

Table A4-1a-c. Land Use Distribution in the Upper Hatchie River Watershed by HUC-12. *Data are from 1992 Multi-Resolution Land Characterization (MRLC) derived by applying a generalized Anderson Level II system to mosaics of Landsat thematic mapper images collected every five years. *, No data available.*

HYDROLOGIC SOIL GROUPS
GROUP A SOILS have low runoff potential and high infiltration rates even when wet. They consist chiefly of sand and gravel and are well to excessively drained.
GROUP B SOILS have moderate infiltration rates when wet and consist chiefly of soils that are moderately deep to deep, moderately to well drained, and moderately coarse to coarse textures.
GROUP C SOILS have low infiltration rates when wet and consist chiefly of soils having a layer that impedes downward movement of water with moderately fine to fine texture.
GROUP D SOILS have high runoff potential, very low infiltration rates, and consist chiefly of clay soils.

Table A4-2. Hydrologic Soil Groups in Tennessee as Described in WCS. *Soils are grouped into four hydrologic soil groups that describe a soil's permeability and, therefore, its susceptibility to runoff.*

STATION	HUC 10	STREAM	AREA (MI^2)	DAILY FLOW			3Q2	1Q10	3Q10	7Q10	3Q20
				AVG	MAX	MIN					
07029400	0801020704	Hatchie River	837	1379	47600	36	na	na	na	54.6	na
07029380	0801020706	Cypress Creek	94.8	155.5	4810	5	na	na	na	6.93	na

Table A4-3. Stream Flow Data from USGS Gaging Stations in the Upper Hatchie River Watershed. *Data are in cubic feet per second (CFS). Data were obtained from the USGS web application StreamStats at http://water.usgs.gov/osw/streamstats. (na, data not available)*

AGENCY	STATION	LOCATION	HUC-12
TDECWPC	TUSCU008.4MC	Tuscumbia River @ RM 8.4	080102070208
TDECWPC	ECO65B04	Cypress Creek @ RM 5.5	080102070401
TDECWPC	HATCH169.0HR	Hatchie River @ RM 169.0	080102070401
TDECWPC	LEE001.7HR	Lee Creek @ RM 1.7	080102070401
TDECWPC	PRAIR001.8HR	Prairie Branch @ 1.8	080102070401
TDECWPC	SKIPP001.3HR	Skipper Creek @ RM 1.3	080102070401
TDECWPC	HATCH184.8MC	Hatchie River @ RM 184.8	080102070408
TDECWPC	HATCH184.9MC	Hatchie River @ RM 184.9	080102070408
TDECWPC	DRY002.0MC	Dry Branch @ RM 2.0	080102070409
TDECWPC	MOSSE001.8MC	Mosses Creek @ RM 1.8	080102070409
TDECWPC	MOSSE010.8MC	Mosses Creek @ RM 10.8	080102070409
TDECWPC	MOSSE013.3MC	Mosses Creek @ RM 13.3	080102070409
TDECWPC	NAIL000.5MC	Nail Creek @ RM 0.5	080102070409
TDECWPC	COLON001.8HR	Colonel Fork @ RM 1.8	080102070501
TDECWPC	MUDDY001.1HR	Muddy Creek @ RM 1.1	080102070501
TDECWPC	CYPRE014.0MC	Cypress Creek @ RM 14.0	080102070601
TDECWPC	CYPRE018.8MC	Cypress Creek @ RM 18.8	080102070601
TDECWPC	SANDY000.8MC	Sandy Creek @ RM 0.8	080102070601
TDECWPC	TURKE000.3MC	Turkey Creek @ RM 0.3	080102070601
TDECWPC	ECO65A01	Muddy Creek @ RM 0.68	080102070602
TDECWPC	LMUDD001.8MC	Little Muddy Creek @ RM 1.8	080102070602
TDECWPC	MUDDY002.0MC	Muddy Creek @ RM 2.0	080102070602
TDECWPC	MUDDY006.2MC	Muddy Creek @ RM 6.2	080102070602
TDECWPC	ROLAN002.0MC	Roland Creek @ RM 2.0	080102070602
TDECWPC	CANEY003.7MC	Caney Creek @ RM 3.7	080102070603
TDECWPC	CYPRE002.6MC	Cypress Creek @ RM 2.6	080102070603
TDECWPC	CYPRE006.9MC	Cypress Creek @ 6.9	080102070603
TDECWPC	LINDI009.0MC	Little Indian Creek @ RM 9.0	080102070603
TDECWPC	OXFOR003.1MC	Oxford Creek @ RM 3.1	080102070603
TDECWPC	KISE001.0MC	Kise Creek @ RM 1.0	080102070701
TDECWPC	KISE003.1MC	Kise Creek @ RM 3.1	080102070701
TDECWPC	LHATC010.8MC	Little Hatchie Creek @ RM 10.8	080102070701
TDECWPC	LHATC003.1HR	Little Hatchie @ RM 3.1	080102070702

Table A4-4. STORET Water Quality Monitoring Stations in the Upper Hatchie River Watershed*. TDECWPC, Tennessee Department of Environment and Conservation Division of Water Pollution Control; UT, Unnamed Tributary.*

FACILITY NUMBER	FACILITY NAME	SIC	SIC NAME	MADI	WATERBODY	HUC-12
TN0062308	Selmer STP	4952	Sewerage System	Major	Cypress Creek @ RM 14.5	080102070601
TN0077721	Bethel Springs STP	4952	Sewerage System	Minor	UT @ RM 0.2 to Cypress Creek @ RM 19.8	080102070601

Table A4-5. NPDES Permittees in the Upper Hatchie River Watershed. *SIC, Standard Industrial Classification; MADI, Major Discharge Indicator; UT, Unnamed Tributary.*

FACILITY NUMBER	PERMITEE	SIC	SIC NAME	WATERBODY	HUC-12
TN0066524	Moltan Company (Mine #3)	1459	Clay, Ceramic, and Refractory Minerals	Colonel Fork	080102070501
TN0072117	Moltan Compant (Mine #4)	1459	Clay, Ceramic, and Refractory Minerals	UT to Colonel Fork	080102070501

Table A4-6. Active Permitted Mining Sites in the Upper Hatchie River Watershed. *SIC, Standard Industrial Classification; UT, Unnamed Tributary.*

FACILITY NUMBER	FACILITY NAME	WATERBODY	HUC-12
TNG110183	River City Concrete, Inc.	WWC to Dyford Creek	080102070603

Table A4-7. Ready Mix Concrete Plants in the Upper Hatchie River Watershed. *WWC, Wet Weather Conveyance.*

LOG NUMBER	COUNTY	DESCRIPTION	WATERBODY	HUC-12
NRS03.136	McNairy	Replace Interceptor Sewer	Cypress Creek and Crooked Creek	080102070601
NRS02.116	McNairy	Bridge and Approach Repair	Cypress Creek Overflow	080102070603
NRS02.080	McNairy	Gas Pipeline	Rose Creek	080102070702

Table A4-8. Individual ARAP Permits Issued January 2000 Through June 2004 in Upper Hatchie River Watershed.

FACILITY NUMBER	FACILITY NAME	SECTOR	RECEIVING STREAM	AREA*	HUC-12
TNR053025	General Electric Company	AC	Cypress Creek	14.58	080102070601
TNR053097	United Parcel Service	P	Cypress Creek	1.37	080102070601
TNR053578	SMC recycling, Incorporated	N, P	Cypress Creek	14	080102070601
TNR054227	Midwest Woodworking	W	Cypress Creek	7.3	080102070601
TNR054571	Connector Castings, Inc.	AC	Cypress Creek	1	080102070601
TNR053676	Custom Woodwork, Inc.	A	UT to Cypress Creek	23.89	080102070602
TNR054402	Ramer Wood Products, Inc.	A	Muddy Creek	2.5	080102070602
TNR056177	J and B Auto Salvage	M	Little Muddy Creek	23.89	080102070602
TNR051925	Graham Lumber Company	A, P	Oxford Creek	32	080102070603

Table A4-9. Active Permitted TMSP Facilities in Upper Hatchie River Watershed. *Area, acres of property associated with industrial activity; UT, Unnamed Tributary. Sector details may be found in Table A4-11.*

SECTOR	TMSP SECTOR NAME
A	Timber Products Facilities
AA	Facilities That Manufacture Metal Products including Jewelry, Silverware and Plated Ware
AB	Facilities That Manufacture Transportation Equipment, Industrial or Commercial Machinery
AC	Facilities That Manufacture Electronic and Electrical Equipment and Components, Photographic and Optical Goods
AD	Facilities That Are Not Covered Under Sectors A Thru AC (Monitoring Required)
AE	Facilities That Are Not Covered Under Sectors A Thru AC (Monitoring Not Required)
B	Paper and Allied Products Manufacturing Facilities
C	Chemical and Allied Products Manufacturing Facilities
D	Asphalt Paving, Roofing Materials, and Lubricant Manufacturing Facilities
E	Glass, Clay, Cement, Concrete, and Gypsum Product Manufacturing Facilities
F	Primary Metals Facilities
G	Metal Mines (Ore Mining and Dressing) (RESERVED)
H	Inactive Coal Mines and Inactive Coal Mining-Related Facilities
I	Oil or Gas Extraction Facilities
J	Construction Sand and Gravel Mining and Processing and Dimension Stone Mining and Quarrying Facilities
K	Hazardous Waste Treatment Storage or Disposal Facilities
L	Landfills and Land Application Sites
M	Automobile Salvage Yards
N	Scrap Recycling and Waste and Recycling Facilities
O	Steam Electric Power Generating Facilities
P	Vehicle Maintenance or Equipment Cleaning areas at Motor Freight Transportation Facilities, Passenger Transportation Facilities, Petroleum Bulk Oil Stations and Terminals, the United States Postal Service, or Railroad Transportation Facilities
Q	Vehicle Maintenance Areas and Equipment Cleaning Areas of Water Transportation Facilities
R	Ship or Boat Building and Repair Yards
S	Vehicle Maintenance Areas, Equipment Cleaning Areas or From Airport Deicing Operations located at Air Transportation Facilities
T	Wastewater Treatment Works
U	Food and Kindred Products Facilities
V	Textile Mills, Apparel and other Fabric Product Manufacturing Facilities
W	Furniture and Fixture Manufacturing Facilities
X	Printing and Platemaking Facilities
Y	Rubber and Miscellaneous Plastic Product Manufacturing Facilities
Z	Leather Tanning and Finishing Facilities

Table A4-10. TMSP Sectors and Descriptions.

APPENDIX V

Land Treatment - Conservation Buffers			
	Field Borders (feet)	Filter Strip (feet)	Riparian Forest Buffer (acres)
FY 2001			
FY 2002	25264	36	
FY 2003	300	48	16
FY 2004			
FY 2005	90030	44	15

Table A5-1a. Land Treatment Conservation Practices (Conservation Buffers), in Partnership with NRCS in the Tennessee Portion of the Upper Hatchie River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Erosion Control		
	Est. soil saved (tons/year)	Land Treated with erosion control measures (acres)
FY 2001	1307	560
FY 2002	12387	1430
FY 2003	4740	831
FY 2004		
FY 2005		

Table A5-1b. Erosion Control Conservation Practices, in Partnership with NRCS in the Tennessee Portion of the Upper Hatchie River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Nutrient Management			
	AFO Nutrient Mgmt Applied (acres)	Non-AFO Nutrient Mgmt. Applied (acres)	Total Applied (acres)
FY 2001		1436	1436
FY 2002		1721	1721
FY 2003	28	919	947
FY 2004	292		292
FY 2005	1894		1894

Table A5-1c. Comprehensive Nutrient Management plans, Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Upper Hatchie River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Pest Management		
	Pest Mgmt. Systems (number)	Pest Mgmt. Systems (acres)
FY 2001	13	946
FY 2002		1615
FY 2003		919
FY 2004		268
FY 2005		1912

Table A5-1d. Pest Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Upper Hatchie River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Grazing / Forages		
	Prescribed Grazing (acres)	Pasture and Hay Planting (acres)
FY 2001	262	
FY 2002	199	
FY 2003		
FY 2004	148	37
FY 2005		

Table A5-1e. Grazing/Forages Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Upper Hatchie River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Tree & Shrub Practices					
	Land Prepared for revegetation of Forest (acres)	Land Improved through Forest Stand improvement (acres)	Total Tree & Shrub Estab. (acres)	Forestland Re-established or improved (acres)	Use Exclusion (acres)
FY 2001					
FY 2002			90	90	
FY 2003	25	58	104	162	
FY 2004	153	84	219	302	116
FY 2005	68		135	135	570

Table A5-1f. Tree and Shrub Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Upper Hatchie River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Land Treatment - Tillage & Cropping				
	Residue Mgmt, No-till, Strip till (acres)	Tillage & Residue Mgmt Systems (acres)	Conservation Crop Rotation (acres)	Cover Crop (acres)
FY 2001				
FY 2002				
FY 2003	255	255		
FY 2004				
FY 2005	1376	1376	1022	412

Table A5-1g. Land Treatment Conservation Practices (Tillage and Cropping), in Partnership with NRCS in the Tennessee Portion of the Upper Hatchie River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

Wildlife Habitat Management			
	Upland Habitat Mgmt (acres)	Wetland Habitat Mgmt (acres)	Total Wildlife Habitat Mgmt Applied (acres)
FY 2001	146	75	221
FY 2002	148		148
FY 2003	621		621
FY 2004	296		296
FY 2005	489		489

Table A5-1h. Waste Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Upper Hatchie River Watershed. *Data are from Performance & Results Measurement System (PRMS) for each fiscal year reporting period (October 1 through September 30) from 2001 to 2005.*

COMMUNITY	AWARD DATE	AWARD AMOUNT
EASTVIEW	01/28/99	$ 71,408
BROWNSVILLE	07/13/00	$ 3,730,000

Table A5-2. Communities in the Tennessee Portion of the Tennessee Portion of the Upper Hatchie River Watershed that have received Clean or Drinking Water State Revolving Fund Grants or Loans since the inception of the program.

PRACTICE	NRCS CODE	NUMBER OF BMPs
Conservation Tillage	329	8
Dike	356	1
Diversion	362	2
Grade Stabilization Structure	410	11
Pasture/Hay Planting	512	33
Heavy Use Area	561	1
Terrace	600	1
Tree Planting	612	4
Watering Facility	614	1
Water/Sediment Control Basin	638	3
TOTAL BMPs	**-**	**65**

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