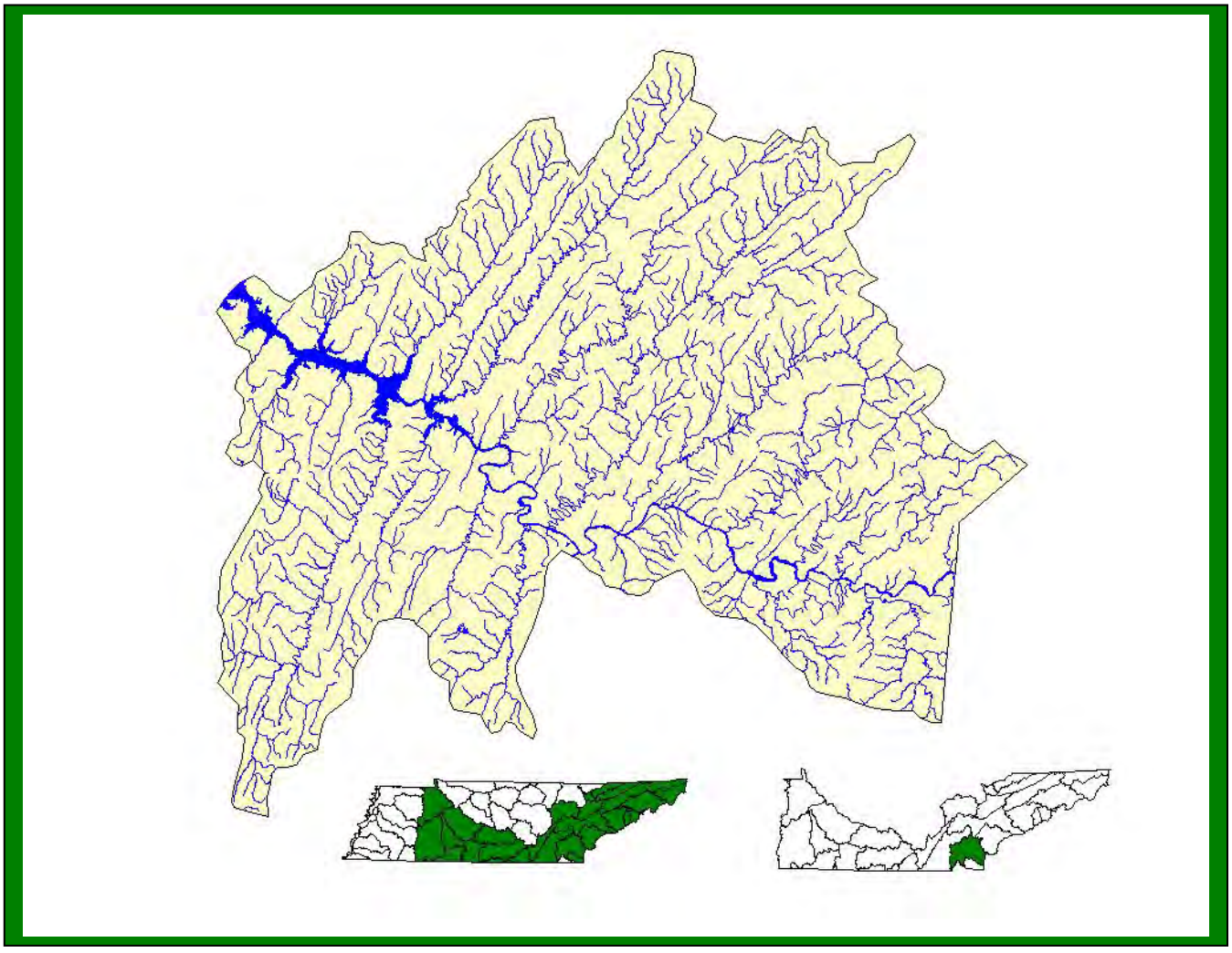
HIWASSEE RIVER WATERSHED (06020002) OF THE TENNESSEE RIVER BASIN

WATERSHED WATER QUALITY MANAGEMENT PLAN



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

2003

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

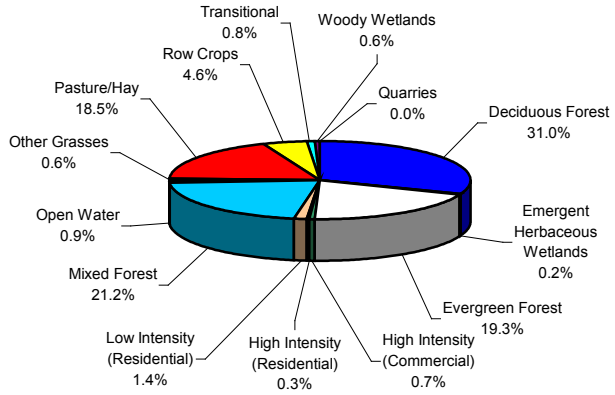
Summary – Hiwassee River

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 Hiwassee 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.

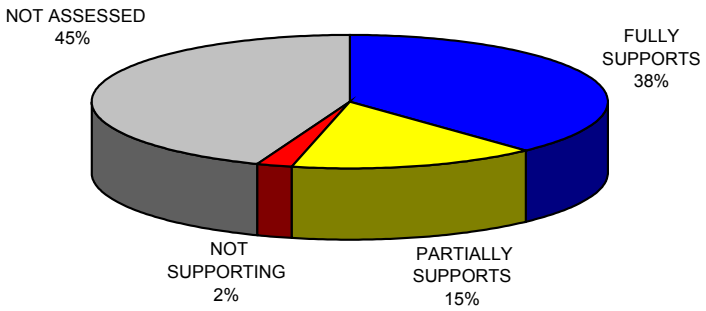
A detailed description of the watershed can be found in Chapter 2. The Tennessee Portion of the Hiwassee River Watershed is approximately 1,011 square miles and includes parts of six Tennessee counties. A part of the Tennessee River drainage basin, the watershed has 1,657 stream miles.



Land Use in the Tennessee portion of the Hiwassee River Watershed is based on MRLC Satellite Imagery.

One Greenway, four interpretive areas, and eight wildlife management areas are located in the watershed. Sixty-two rare plant and animal species have been documented in the watershed, including four rare fish species and three rare mussel species. Portions of two streams in the Tennessee portion of the Hiwassee River Watershed are listed in the National Rivers Inventory as having one or more outstanding natural or cultural values.

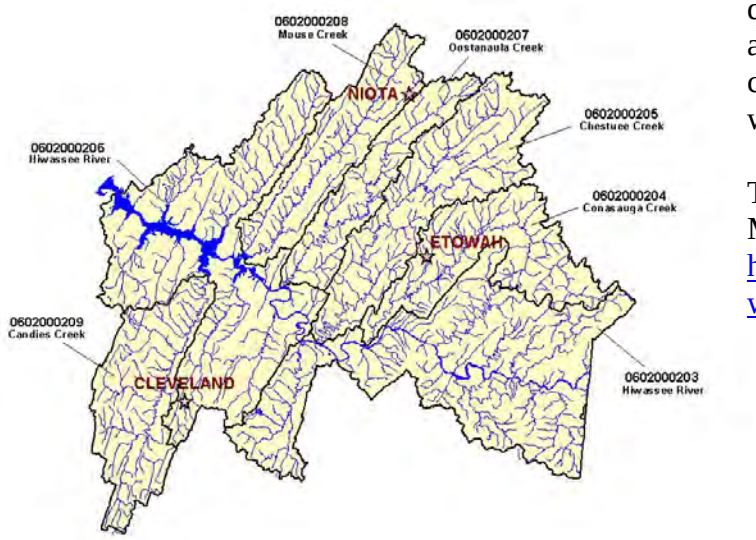
A review of water quality sampling and assessment is presented in Chapter 3. Using the Watershed Approach to Water Quality, 34 sampling sites were utilized in the Hiwassee River Watershed. These were ambient, ecoregion, special survey or watershed monitoring sites. Monitoring results support the conclusion that 38% of total stream miles (based on RF3) fully support designated uses.



Water Quality Assessment in theTennessee portion of the Hiwassee River Watershed is Based on the 1998 303(d) List.

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 (pollutants) such as Pathogens, Habitat Alteration and Siltation.

Point and Nonpoint Sources are addressed in Chapter 4, which is organized by HUC-10 subwatersheds. Maps illustrating the locations of STORET monitoring sites and USGS stream gauging stations are presented in each subwatershed.



HUC-10 Subwatersheds in the Tennessee portion of the Hiwassee River Watershed.

Point source contributions to the Hiwassee River Watershed consist of 14 individual NPDES-permitted facilities, seven of which discharge into streams that have been listed on the 1998 303(d) list. Other point source permits in the watershed are Aquatic Resource Alteration Permits (15), Tennessee Multi-Sector Permits (78), Mining Permits (6), and Water Treatment Plant Permits (1). Agricultural operations include cattle, chicken, hog, and sheep farming. Maps illustrating the locations of NPDES and ARAP permit sites are presented in each subwatershed.

Chapter 5 is entitled *Water Quality Partnerships in the Hiwassee 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, Tennessee Valley Authority, U.S.D.A. Forest Service), and state agencies (TDEC Division of Community Assistance, TDEC Division of Water Supply, Tennessee Department of Agriculture, North Carolina Department of Environment and Natural Resources) are summarized. Local initiatives of active watershed organizations (Hiwassee River Watershed Coalition) are also described.

Point and Nonpoint source approaches to water quality problems in the Hiwassee River Watershed are addressed in Chapter 6. Chapter 6 also includes comments received during public meetings, along with an assessment of needs for the watershed.

The full Hiwassee 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.

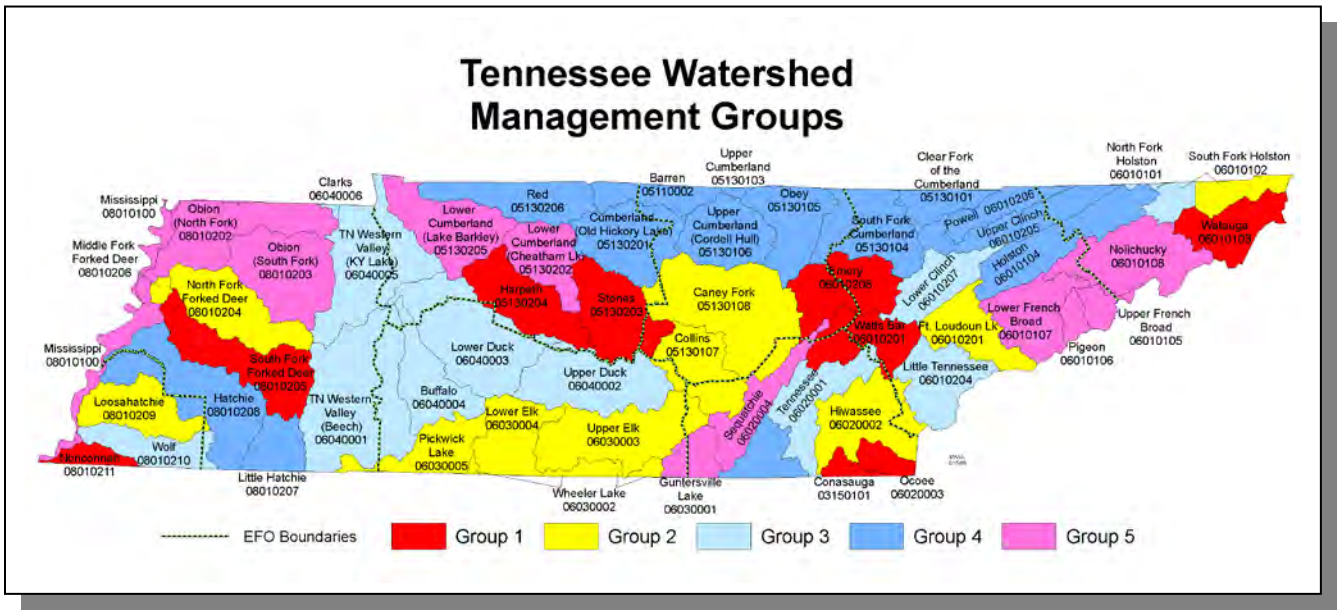


Figure 1-1. Watershed Groups in Tennessee's Watershed Approach to Water Quality.

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.

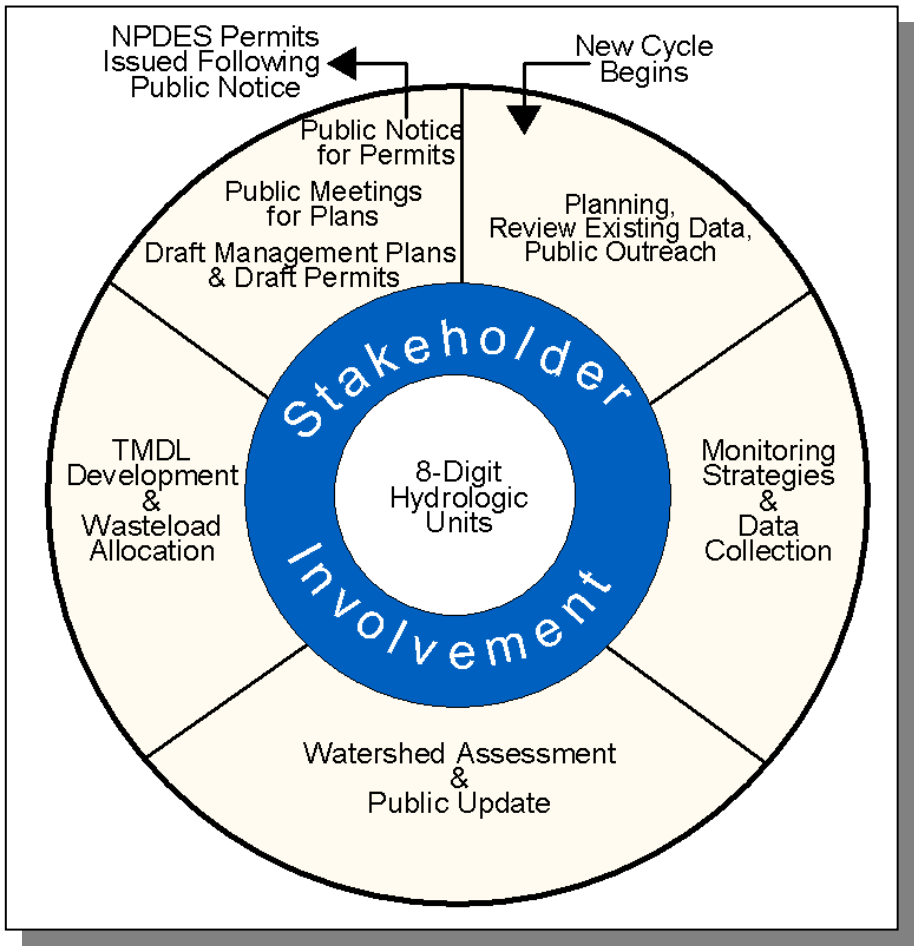


Figure 1-2. The Watershed Approach Cycle.

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 HIWASSEE RIVER WATERSHED

2.1. BACKGROUND. The name "Hiwassee" is taken from the Cherokee word "Aye-Hawsasi", which means "meadow along the stream." The area is characterized by forested slopes, high gradient, clear streams, and rugged terrain. There is great aquatic habitat diversity in the watershed.

Part of the Hiwassee River is included in the State Scenic River System due to its scenic and pastoral nature. The Hiwassee was the first river managed in the State Scenic River Program. The many river outfitters along the Hiwassee River indicate its popularity among recreational boaters. Hunting and fishing are popular in the Cherokee National Forest.

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

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. The Hiwassee River Watershed is located in East Tennessee and North Carolina. The Tennessee portion includes parts of Bradley, Hamilton, McMinn, Meigs, Monroe, and Polk Counties.

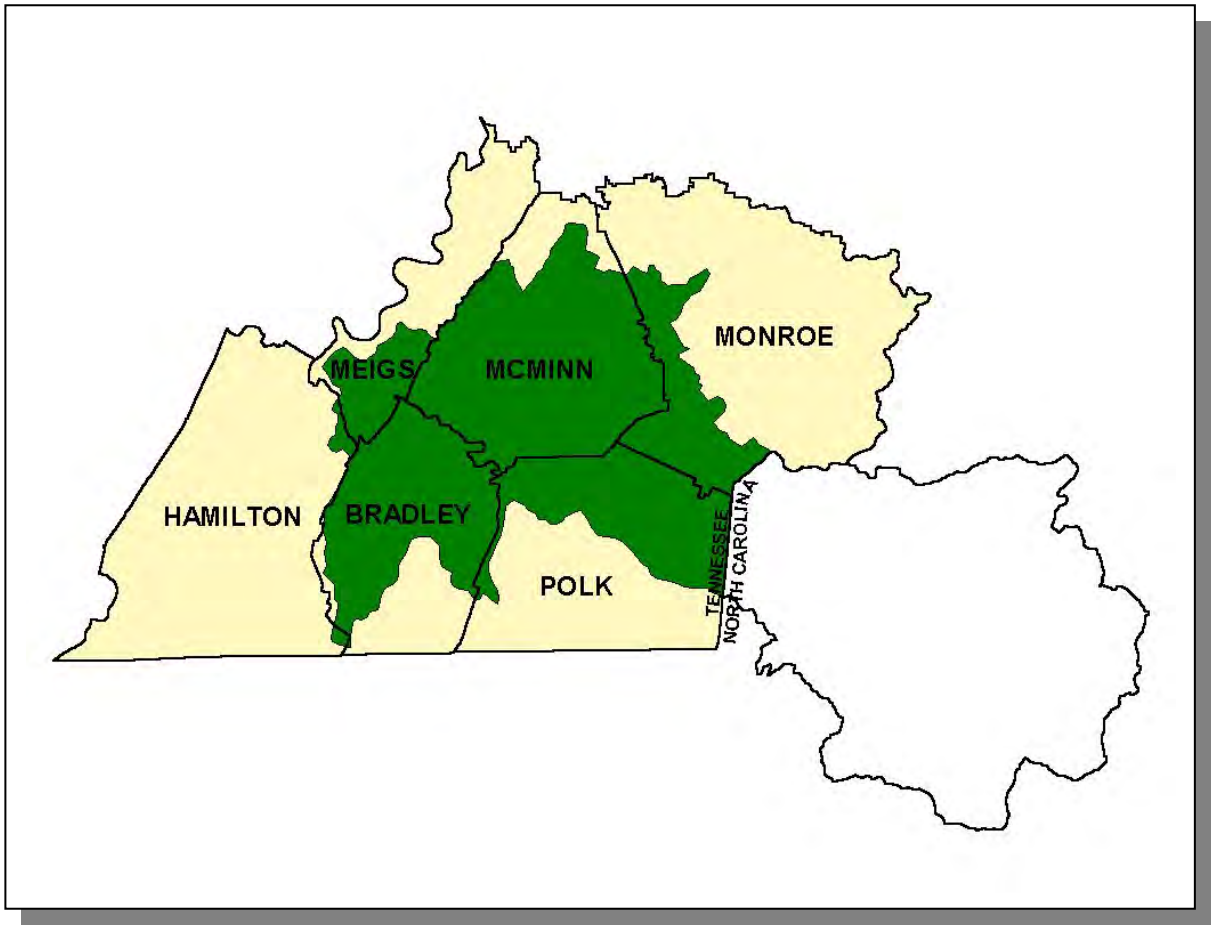


Figure 2-1. General Location of the Hiwassee River Watershed.

COUNTY	% OF WATERSHED IN EACH COUNTY
Bradley	23.4
Hamilton	1.0
Meigs	6.7
McMinn	37.6
Monroe	12.3
Polk	19.0

Table 2-1. The Hiwassee River Watershed Includes Parts of Six East Tennessee Counties.

2.2.B. Population Density Centers. Eight state highways and two interstates serve the major communities in the Hiwassee River Watershed.

Figure 2-2. Municipalities and Roads in the Tennessee Portion of the Hiwassee River Watershed.

MUNICIPALITY	POPULATION	COUNTY
Cleveland*	33,503	Bradley
Athens*	13,340	McMinn
Etowah	3,875	McMinn
Englewood	1,704	McMinn
Niota	795	McMinn
Charleston	648	Bradley
Calhoun	575	McMinn

Table 2-2. Municipalities in the Tennessee Portion of the Hiwassee River Watershed. *Population based on 1996 census (Tennessee Blue Book). Asterisk (*) indicates county seat.*

2.3. GENERAL HYDROLOGIC DESCRIPTION.

2.3.A. Hydrology. The Hiwassee River Watershed, designated 06020002 by the USGS, drains approximately 2,099 square miles, 1,011 square miles of which are in Tennessee, and empties to Chickamauga Reservoir (Tennessee River).

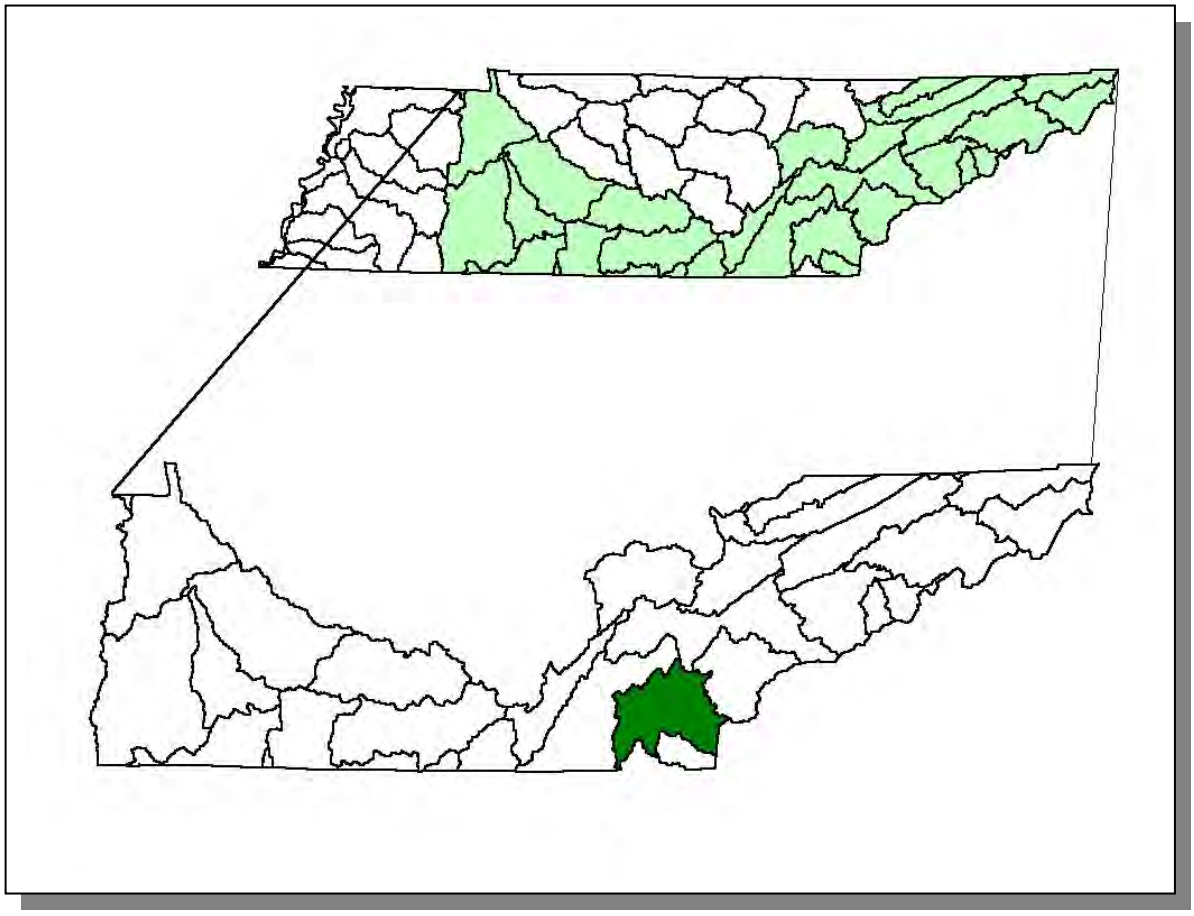


Figure 2-3. The Hiwassee River Watershed is Part of the Tennessee River Basin.

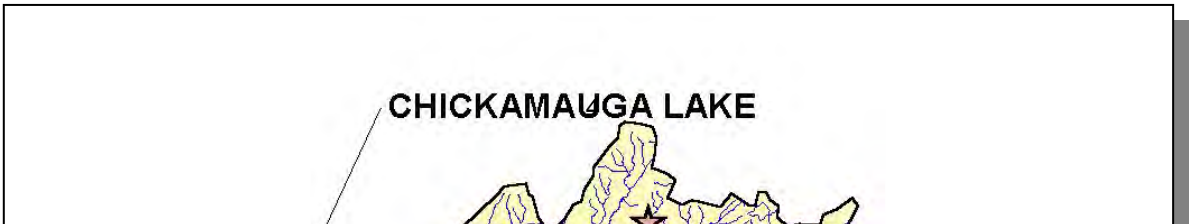


Figure 2-4. Hydrology in the Tennessee Portion of the Hiwassee River Watershed. *There are 3,113 total stream miles recorded in River Reach File 3 in the Hiwassee River Watershed. 1,657 stream miles are recorded in Tennessee. Location of the Hiwassee River, Chickamauga Lake, and the cities of Cleveland, Etowah, and Niota are shown for reference.*

2.3.B. Dams. There are 24 dams inventoried by TDEC Division of Water Supply in the Hiwassee River Watershed. These dams either retain 30 acre-feet of water or have structures at least 20 feet high.

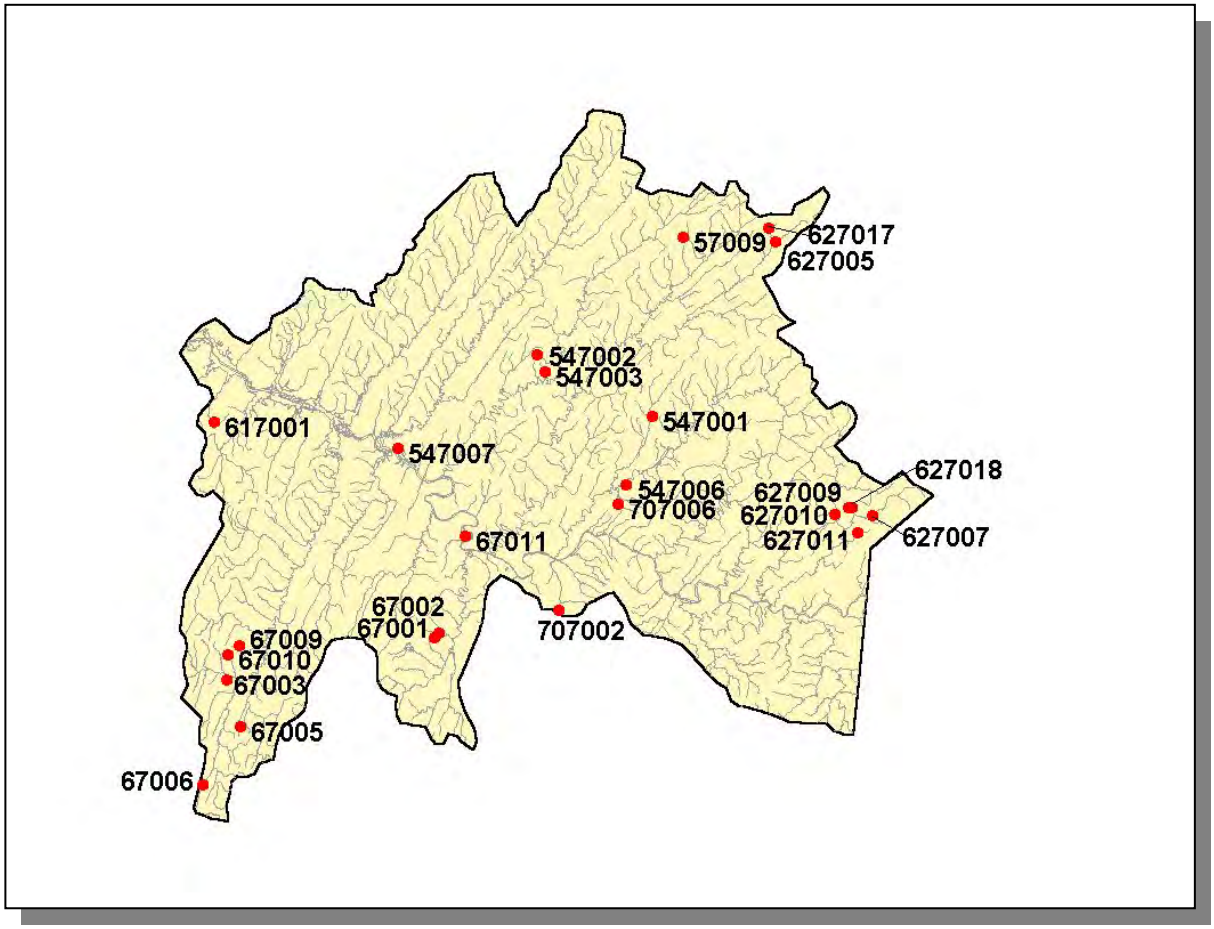


Figure 2-5. Location of Inventoried Dams in the Tennessee Portion of the Hiwassee River Watershed. *More information is provided in Hiwassee-Appendix II and on the TDEC homepage at http://gwidc.gwi.memphis.edu/website/dams/viewer.htm*

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.

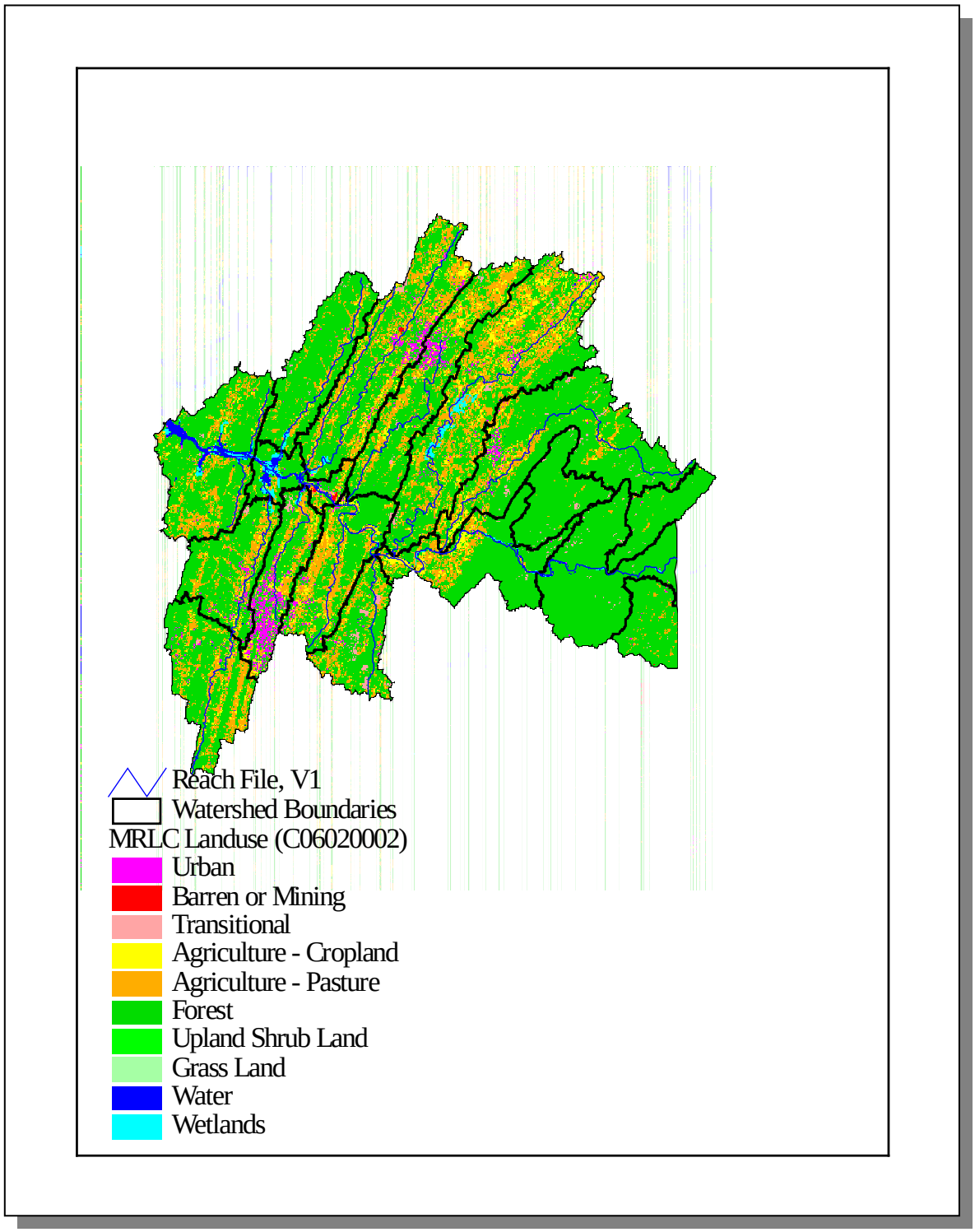


Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery.

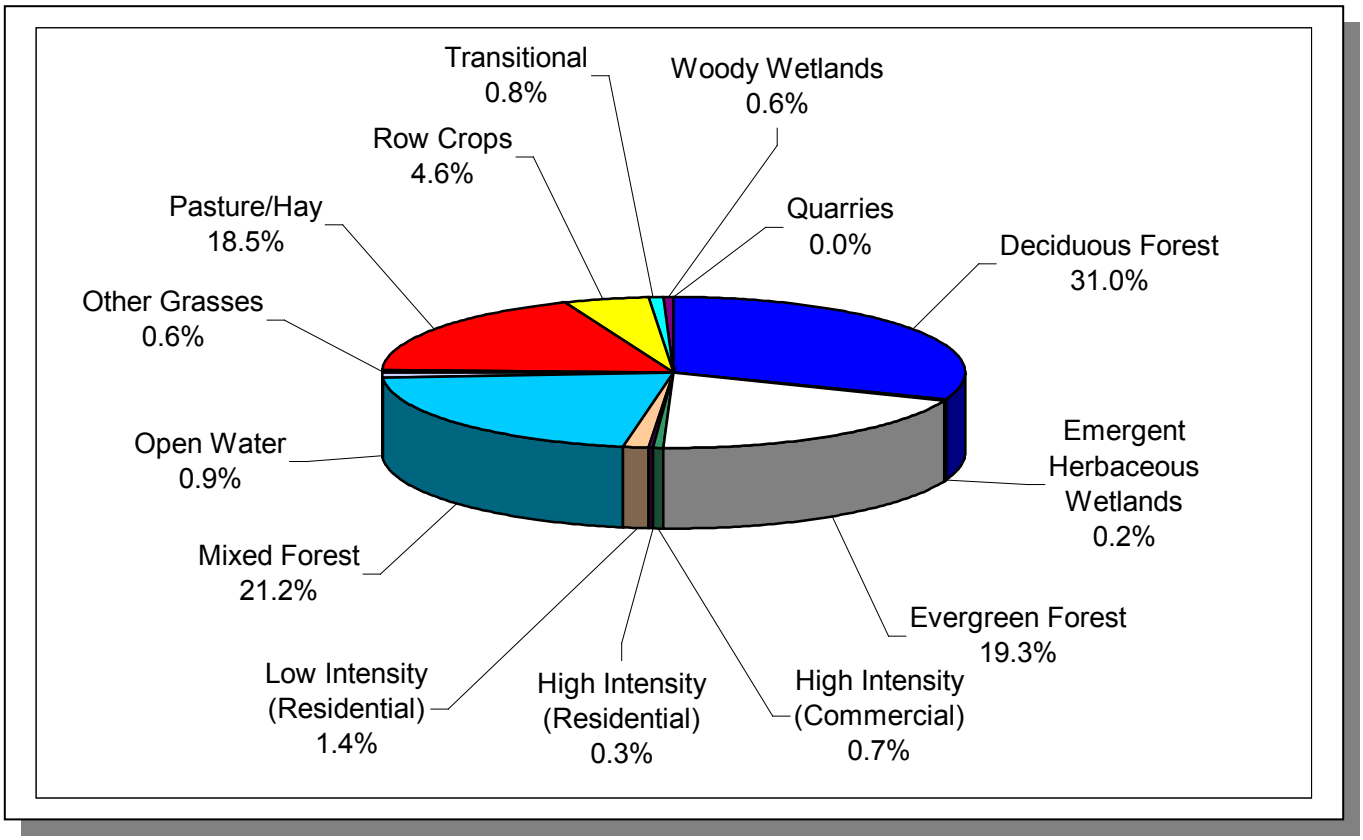


Figure 2-7. Land Use Distribution in the Tennessee Portion of the Hiwassee River Watershed. *More information is provided in Hiwassee-Appendix II.*

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 Hiwassee River Watershed lies within 2 Level III ecoregions (Blue Ridge Mountains and Ridge and Valley) and contains 6 Level IV subecoregions (Griffen, Omernik, Azavedo):

- The Southern Sedimentary Ridges (66e) in Tennessee include some of the westernmost foothill areas of the Blue Ridge Mountains ecoregion, such as the Bean, Starr, Chilhowee, English, Stone, Bald, and Iron Mountain areas. Slopes are steep, and elevations are generally 1000-4500 feet. The rocks are primarily Cambrian-age sedimentary (shale, sandstone, siltstone, quartzite, conglomerate), although some lower stream reaches occur on limestone.

Soils are predominantly friable loams and fine sandy loams with variable amounts of sandstone rock fragments, and support mostly mixed oak and oak-pine forests.

- Southern Metasedimentary Mountains (66g) are steep, dissected, biologically diverse mountains that include Clingman's Dome (6643 feet), the highest point in Tennessee. The Precambrian-age metamorphic and sedimentary geologic materials are generally older and more metamorphosed than the Southern Sedimentary Ridges to the west and north. The Appalachian oak forests and, at higher elevations, the northern hardwoods forests include a variety of oaks and pines, as well as silverbell, hemlock, yellow poplar, basswood, buckeye, yellow birch, and beech. Spruce-fir forests, found generally above 5500 feet, have been affected greatly over the past twenty-five years by the balsam wooly aphid. The Copper Basin, in the southeast corner of Tennessee, was the site of copper mining and smelting from the 1850's to 1987, and once left more than fifty square miles of eroded bare earth.

- The Southern Limestone/Dolomite Valleys and Low Rolling Hills (67f) form a heterogeneous region composed predominantly of limestone and cherty dolomite. Landforms are mostly low rolling ridges and valleys, and the soils vary in their productivity. Landcover includes intensive agriculture, urban and industrial, or areas of thick forest. White oak forests, bottomland oak forests, and sycamore-ash-elm riparian forests are the common forest types, and grassland barrens intermixed with cedar-pine glades also occur here.

- The Southern Shale Valleys (67g) consist of lowlands, rolling valleys, and slopes and hilly areas that are dominated by shale materials. The northern areas are associated with Ordovician-age calcareous shale, and the well-drained soils are often slightly acid to neutral. In the south, the shale valleys are associated with Cambrian-age shales that contain some narrow bands of limestone, but the soils tend to be strongly acid. Small farms and rural residences subdivide the land. The steeper slopes are used for pasture or have reverted to brush and forested land, while small fields of hay, corn, tobacco, and garden crops are grown on the foot slopes and bottom land.

- The Southern Sandstone Ridges (67h) ecoregion encompasses the major sandstone ridges, but these ridges also have areas of shale and siltstone. The steep, forested ridges have narrow crests, and the soils are typically stony, sandy, and of low fertility. The chemistry of streams flowing down the ridges can vary greatly depending on the geologic material. The higher elevation ridges are in the north, including Wallen Ridge, Powell Mountain, Clinch Mountain, and Bays Mountain. White Oak Mountain in the south has some sandstone on the west side, but abundant shale and limestone as well. Grindstone Mountain, capped by the Gizzard Group sandstone, is the only remnant of Pennsylvanian-age strata in the Ridge and Valley of Tennessee.

- The Southern Dissected Ridges and Knobs (67i) contain more crenulated, broken, or hummocky ridges, compared to the smoother, more sharply pointed sandstone ridges, Although shale is common, there is a mixture and

interbedding of geologic materials. The ridges on the east side of Tennessee's Ridge and Valley tend to be associated with the Ordovician-age Sevier shale, Athens shale, and Holston and Lenoir limestones. These can include calcareous shale, limestone, siltstone, sandstone, and conglomerate. In the central and western part of the ecoregion, the shale ridges are associated with the Cambrian-age Rome Formation: shale and siltstone with beds of sandstone. Chestnut oak forests and pine forests are typical for the higher elevations of the ridges, with areas of white oak, mixed mesophytic forest, and tulip poplar on the lower slopes, knobs, and draws.

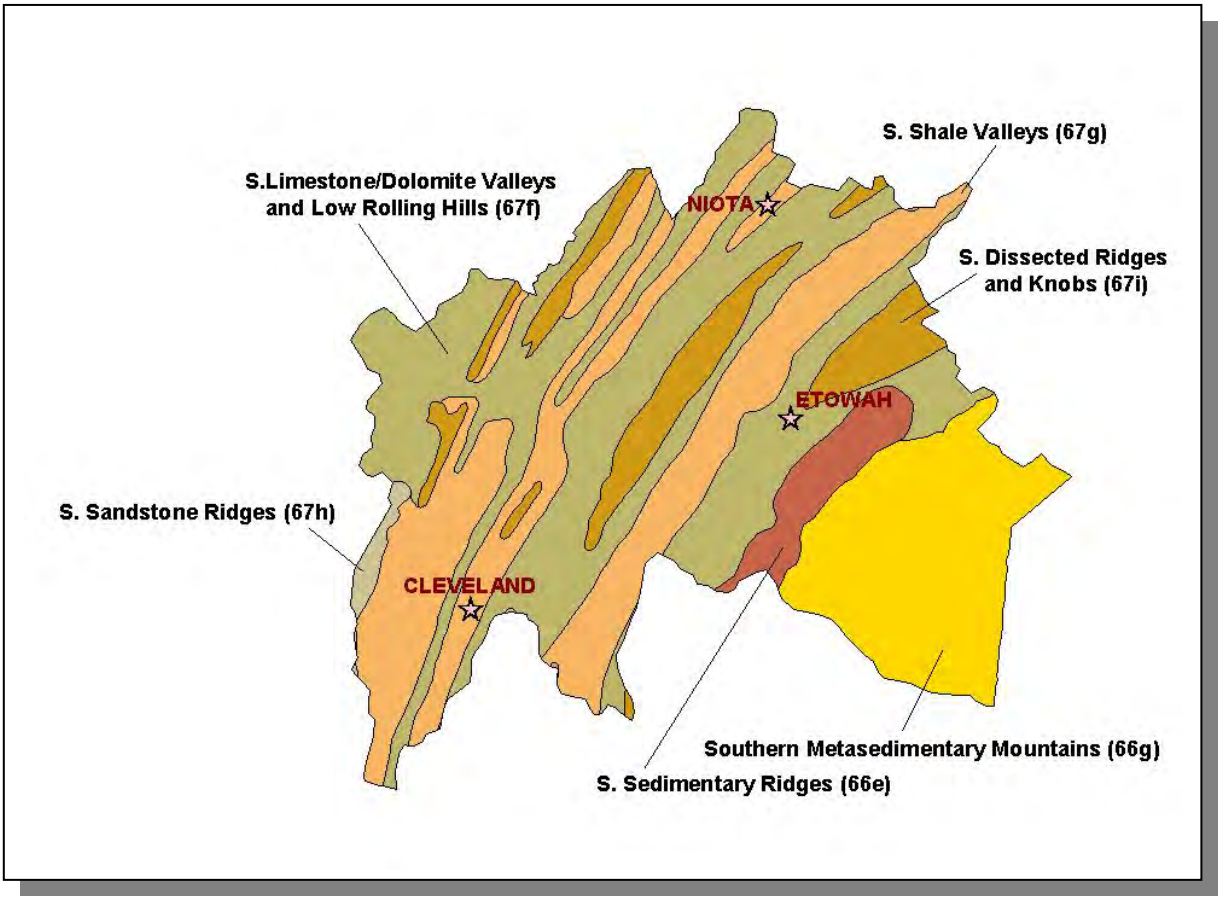


Figure 2-8. Level IV Ecoregions in the Tennessee Portion of the Hiwassee River Watershed. *Locations of Cleveland, Etowah, and Niota are shown for reference.*

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.

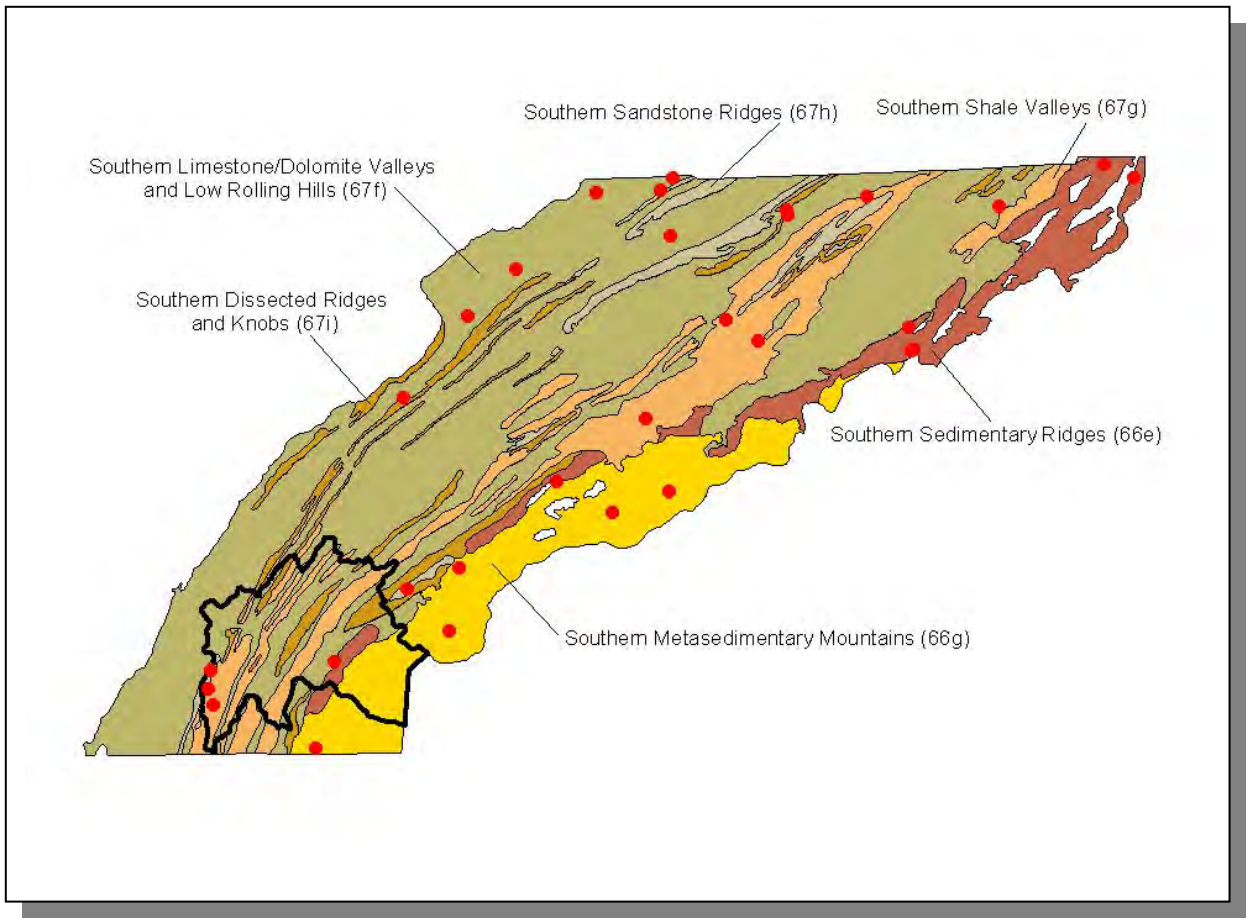


Figure 2-9. Ecoregion Monitoring Sites in Blue Ridge Mountains (66) and Ridge and Valley (67) Ecoregions in Tennessee. *The Hiwassee River Watershed is shown for reference. More information is provided in Hiwassee-Appendix II.*

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	0
Insects	0
Mussels	3
Snails	0
Amphibians	2
Birds	1
Fish	4
Mammals	1
Reptiles	0
Plants	51
Total	**62**

Table 2-3. There are 62 Rare Plant and Animal Species in the Tennessee Portion of the Hiwassee River Watershed.

In the Tennessee Portion of the Hiwassee River Watershed, there are four rare fish species and three rare mussel species.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
Acipenser fluvescens	Lake sturgeon	MC	E
Percina burtoni	Blotchside darter	MC	D
Carpiodes velifer	Highfin carpsucker		D
Percina tanasi	Snail darter	LT	T
Epioblasma florentina walkeri	Tan riffleshell	LE	E
Villosa travalis	Cumberland bean	LE	E
Lexingtonia dolabelloides	Slabside pearlymussel	C	

Table 2-4. Rare Aquatic Species in the Tennessee Portion of the Hiwassee River Watershed. *Federal Status: LE, Listed Endangered by the U.S. Fish and Wildlife Service, MC, Management Concern for U.S. Fish and Wildlife Service; C, Candidate species proposed for listing by the U.S. Fish and Wildlife Service . State Status: E, Listed Endangered by the Tennessee Wildlife Resources Agency; T, Listed Threatened by the Tennessee Wildlife Resources Agency; D, Deemed in Need of Management by the Tennessee Wildlife Resources Agency. More information may be found at* http://www.state.tn.us/environment/nh/tnanimal.html

2.6.B. Wetlands. The Division of Natural Heritage 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/epo/wetlands/strategy.zip.

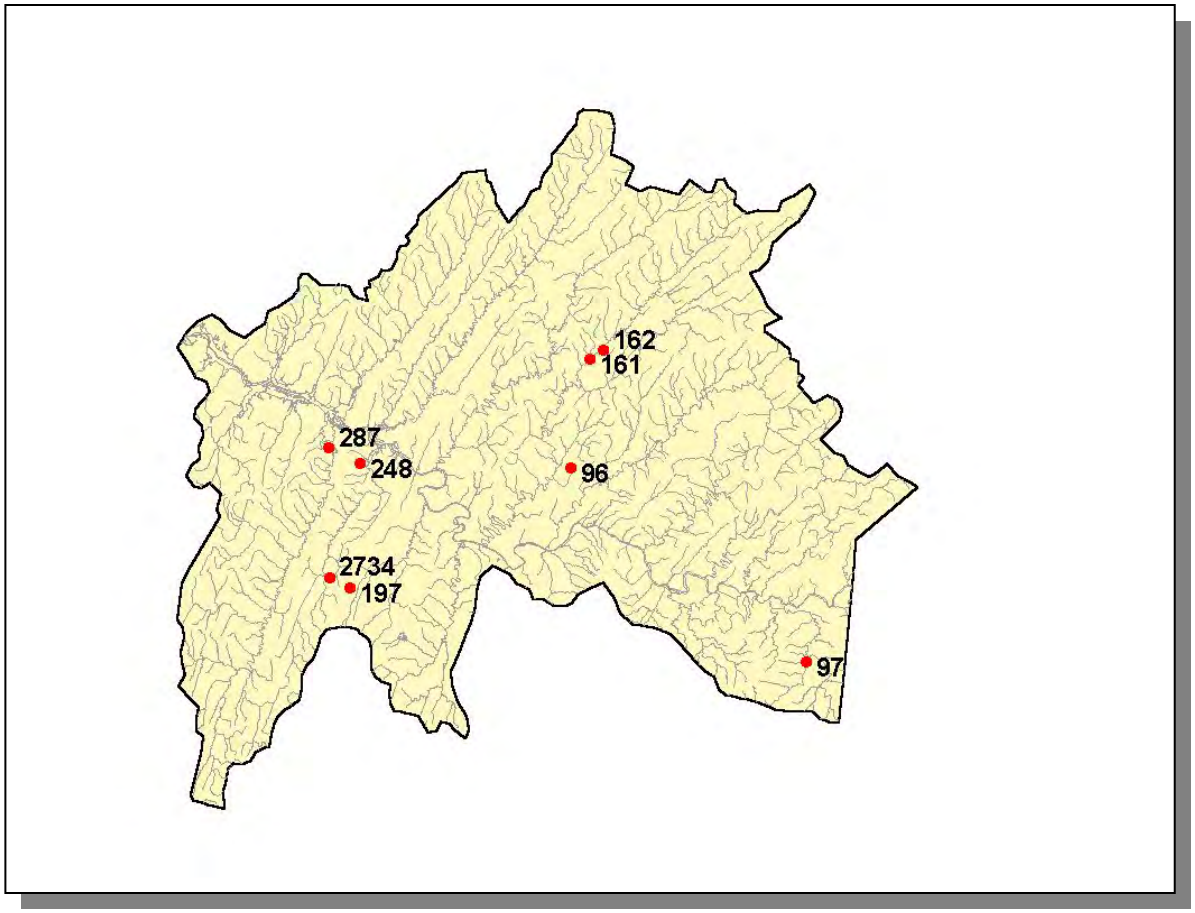


Figure 2-10. Location of Wetland Sites in TDEC Division of Natural Heritage Database in the Tennessee Portion of the Hiwassee River Watershed. ***This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands****. More information is provided in Hiwassee-Appendix II.*

2.7. CULTURAL RESOURCES.

2.7.A. State Scenic River. A portion of the Hiwassee River has been designated as a State Scenic River. Only the segment in Polk County from U.S. 411 bridge upstream to the North Carolina-Tennessee state line. This segment of the Hiwassee River has been designated as a Class I. The Tennessee Scenic Rivers Act of 1968 defines Class I as natural river areas.

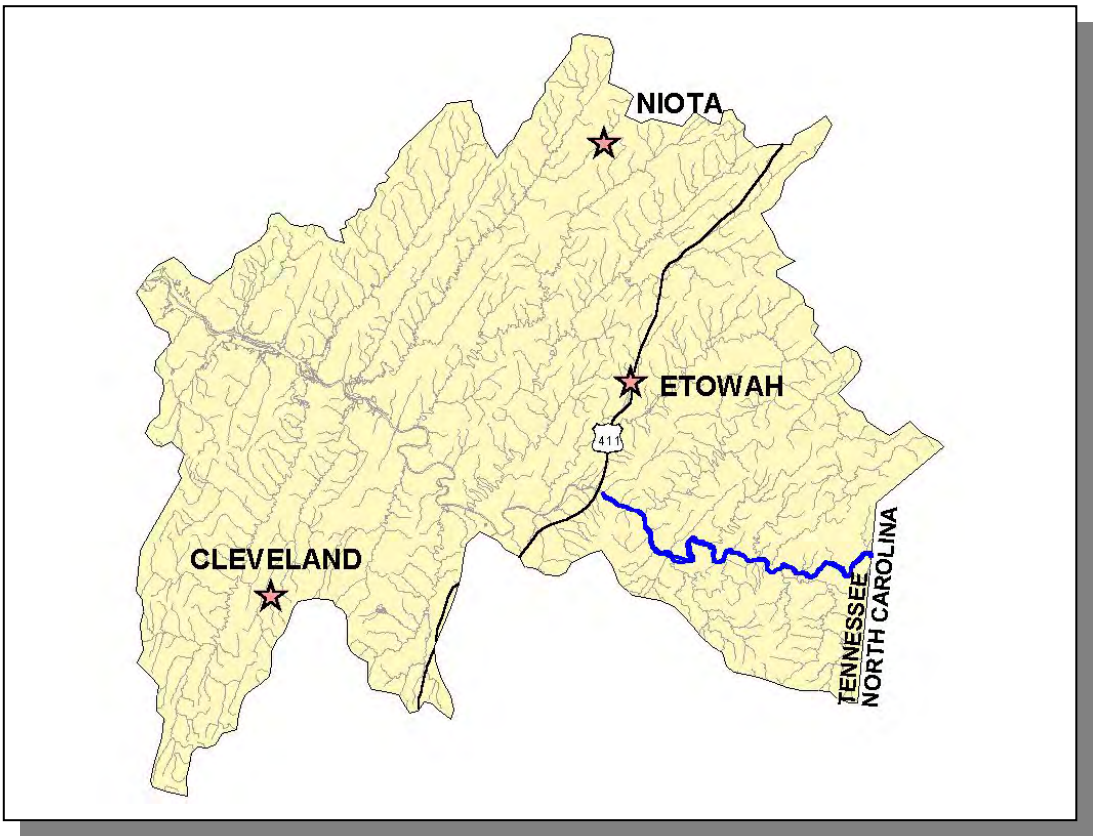


Figure 2-11. A Portion of the Hiwassee River is Designated as a State Scenic River. *Locations of Cleveland, Etowah, and Niota are shown for reference.*

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

or mitigate actions that would have an adverse effect on Nationwide Rivers Inventory segments.

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

> Hiwassee Creek, a popular scenic float stream; supports excellent game fishing; numerous rapids in beautiful mountainous setting.
>
> Hiwassee River, popular for canoeing, kayaking, rafting, and fishing in scenic mountain setting. Excellent game fishing.

RIVER	SCENIC	RECREATION	GEOLOGIC	FISH	WILDLIFE	HISTORIC	CULTURAL
Hiwassee Creek	X	X	X	X	X	X	X
Hiwassee River	X	X					

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

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

2.7.C. Greenways. The Cleveland Downtown Historic Greenway begins in Johnson Park in the heart of Cleveland's downtown and includes 20 historic sites.

2.7.D. Interpretive Areas. Some sites representative of the cultural heritage are under state or federal protection:

- Hiwassee River State Park, includes a stretch of river and offers canoeing, rafting, fishing, hiking, and nature photography in a scenic river gorge.
- Cherokee National Forest, a vast outdoor playground with lakes, rivers, trails, and scenic drives.
- Red Clay State Historic Park, site of the last Cherokee Council before the infamous Trail of Tears, contains interpretive trails.
- Gee Creek State Park, located along the Hiwassee River, features hiking trails.

In addition, many local interpretive areas are common, most notably, the historic farming community of Reliance.

2.7.E. Wildlife Management Area. The Tennessee Wildlife Resources Agency manages eight wildlife management areas in the Hiwassee Watershed and jointly manages the Cherokee National Forest with U.S. Forest Service.

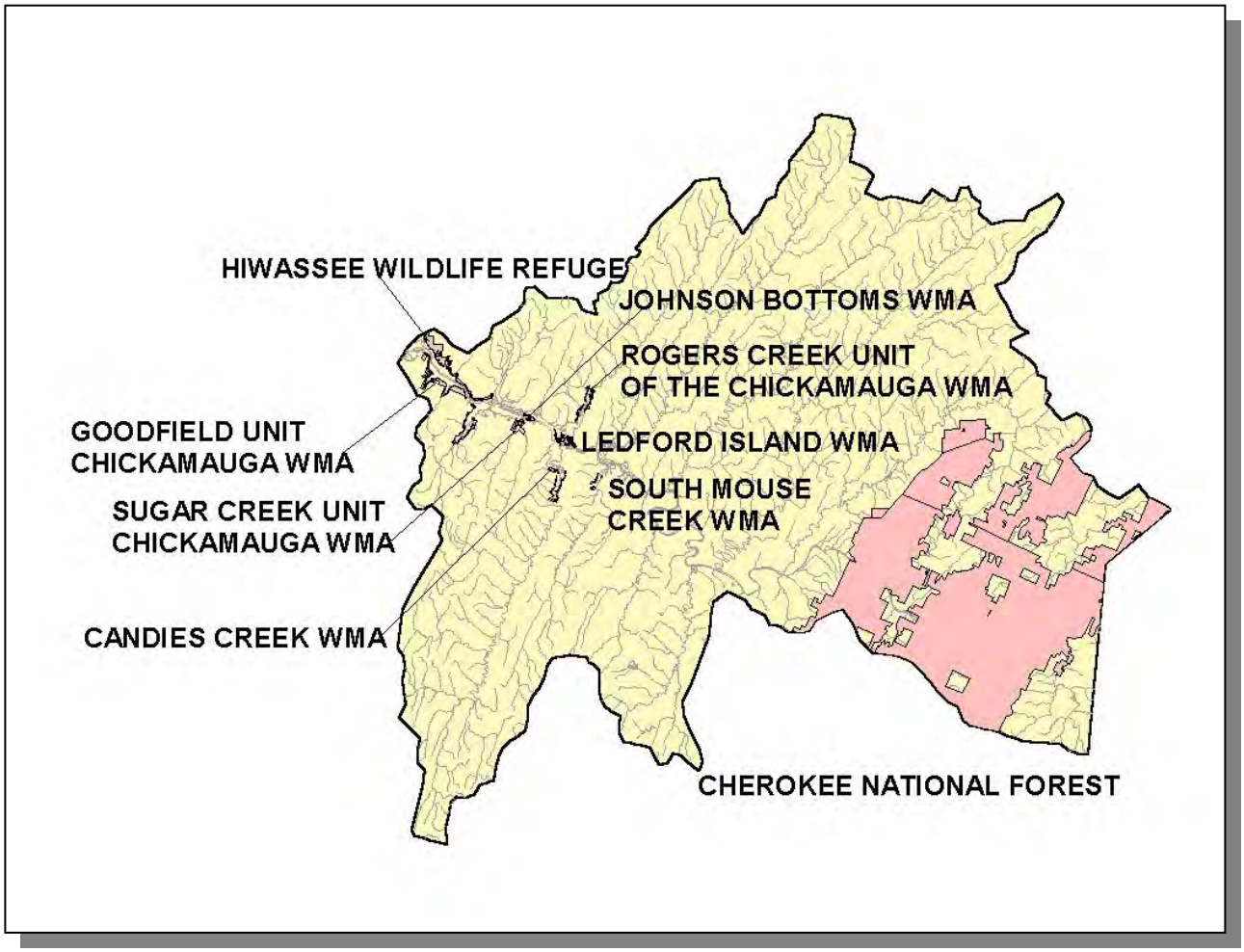


Figure 2-13. TWRA Manages Wildlife Management Areas in the Hiwassee River Watershed.

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
Agency Creek	2		3	Lick Creek			2
Big Lost Creek	1	2	1	North Mouse Creek	3	2	
Bullett Creek	2		3	Oostanaula Creek	3	3	
Candies Creek	2	2		Price Creek	2		
Chatata Creek	2	3	2	Rogers Creek	3	3	
Chestuee Creek	3	3		South Chestuee Creek	2	3	
Childers Creek		1		South Mouse Creek	4	3	
Coker Creek	2		1	Spring Creek (Eastern)	3	3	
Conasauga Creek	3	3	1	Spring Creek (Western)	2		3
Coppinger Creek	4			Sugar Creek	3		
Gunstocker Creek	3	1,2	2	Towee Creek	2		3
Hiwassee River	2,3		1,3	Turtletown Creek			1

Table 2-6. Stream Scoring from the Tennessee Rivers Assessment Project.

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 HIWASSEE 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 2002 305(b) Report):

1. Assess the general water quality conditions of rivers, streams, lakes and wetlands

2. Identify causes of water pollution and the sources of pollutants

3. Specify waters which have been found to pose human health risks due to elevated bacteria levels or contamination of fish

4. Highlight areas of improved water quality

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://www.epa.gov/surf/

The 303(d) list is a compilation of the waters of Tennessee that are water quality limited and fail to meet some or all of their classified uses. Water quality limited streams are those that have one or more properties that violate water quality standards. Therefore, the water body is considered to be impacted by pollution and is not fully meeting its designated uses. The 303(d) list does not include streams determined to be fully supporting designated uses as well as 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://www.state.tn.us/environment/wpc/publications/2002303dpropfinal.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 Hiwassee River Watershed, summarizes data collection and assessment results, and describes impaired waters.

3.2. DATA COLLECTION. Comprehensive water quality monitoring in the Hiwassee River Watershed was conducted in 1999. Data were collected from 34 sites and are from one of four types of sites: 1)Ambient sites, 2)Ecoregion sites, 3)Watershed sites or 4)Special Survey sites.

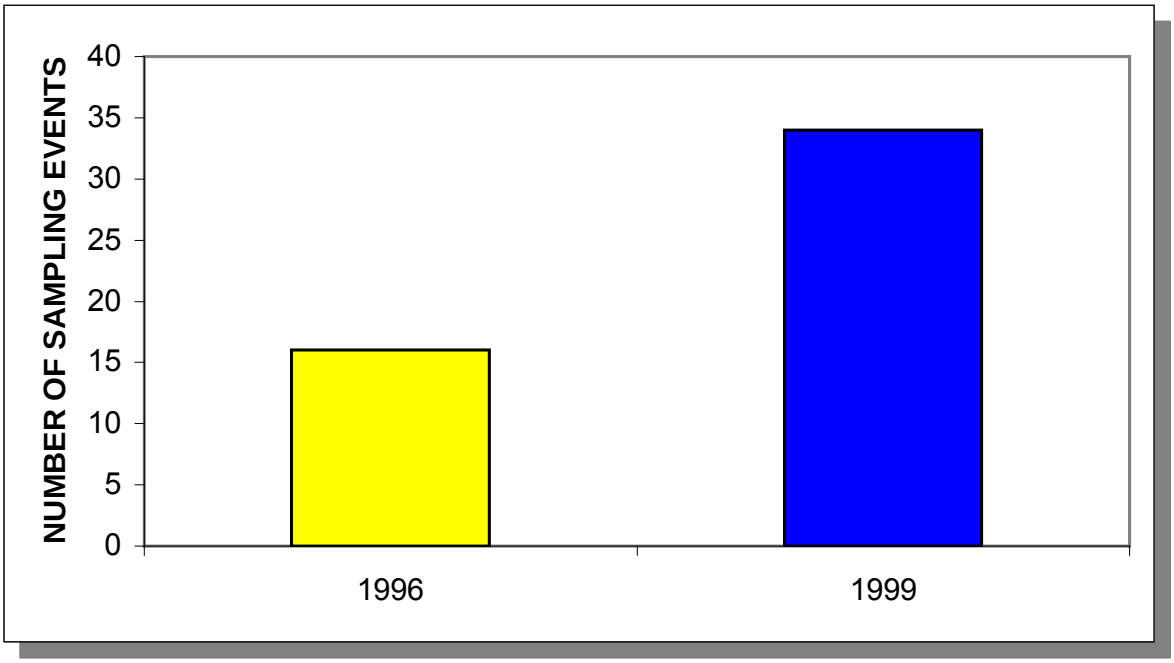


Figure 3-1. Number of Sampling Events Using the Traditional Approach (1996) and Watershed Approach (1999) in the Hiwassee River Watershed.

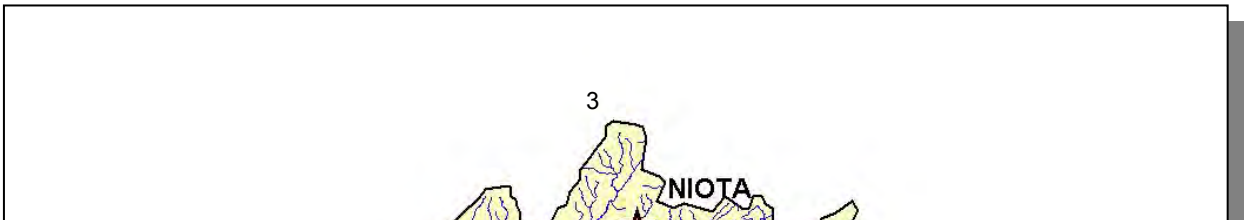


Figure 3-2. Location of Monitoring Sites in the Tennessee Portion of the Hiwassee River Watershed. *Red, Watershed Monitoring Sites; Black, Special Survey Sites; Green, Ambient Monitoring Sites, Orange, Ecoregion Sites. Locations of Cleveland, Etowah, and Niota are shown for reference.*

TYPE	NUMBER	TOTAL NUMBER OF SAMPLING EVENTS		
		CHEMICAL ONLY	BIOLOGICAL ONLY	BIOLOGICAL PLUS CHEMICAL (FIELD PARAMETERS)
Ambient	3	24		
Ecoregion	2	12		
Special Survey				8
Watershed	29	80	12	4
Totals	**34**	**116**	**12**	**12**

Table 3-1. Monitoring Sites in the Tennessee Portion of the Hiwassee River Watershed During the Data Collection Phase of the Watershed Approach.

In addition to the 34 sampling events, 130 complaints were investigated from 1998 to 2002.

3.2.A. Ambient Monitoring Sites. These fixed-station chemical monitoring sites are sampled quarterly or monthly by the Environmental Assistance Center-Chattanooga 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 Hiwassee River Watershed are provided in Hiwassee-Appendix IV.

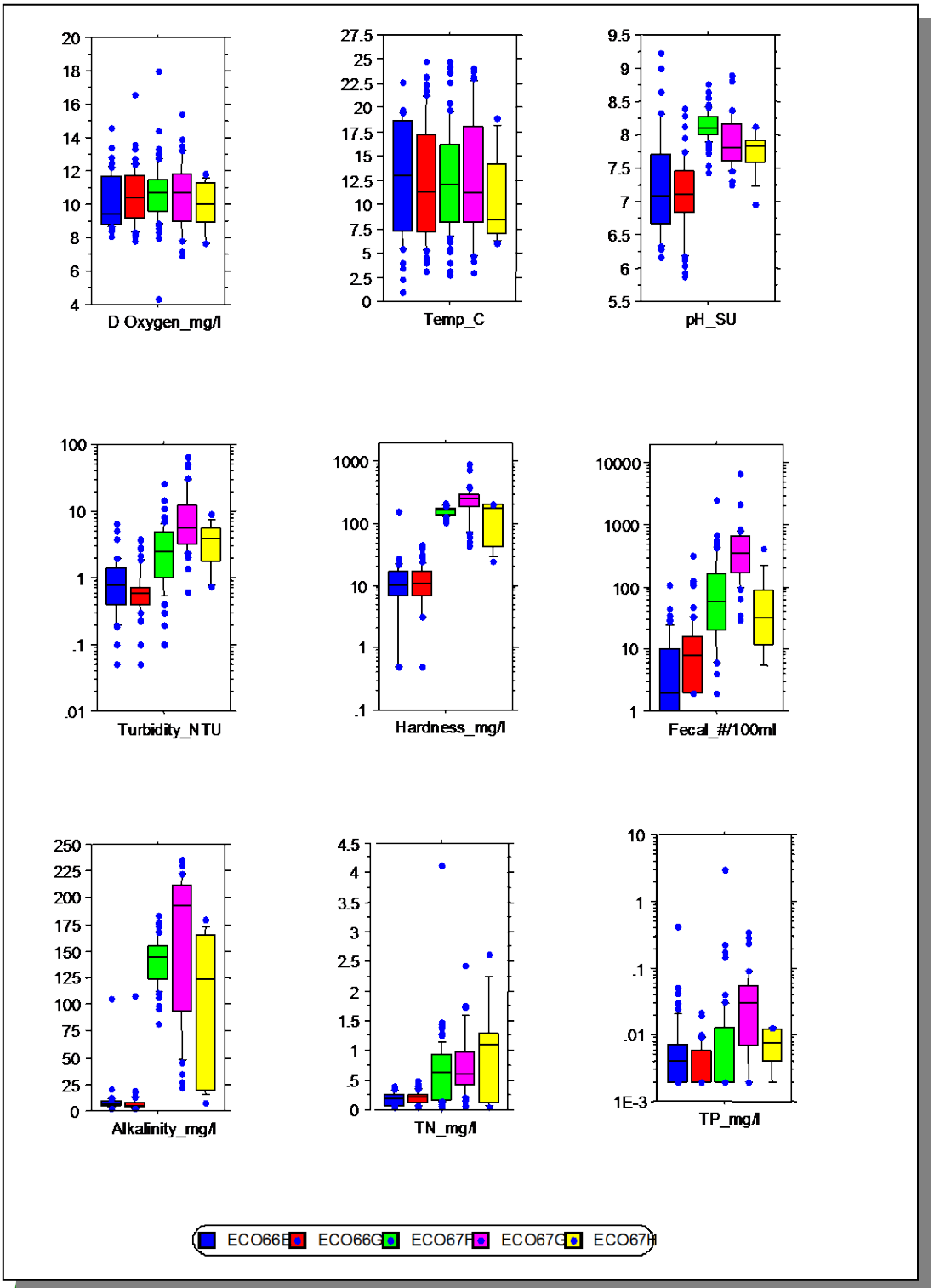
Data from ambient monitoring stations are entered into the STORET (Storage and Retrieval) system administered by EPA. Some ambient monitoring stations are scheduled to be monitored as watershed sampling sites.

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 Hiwassee River Watershed lies within 2 Level III ecoregions (Blue Ridge Mountains, Ridge and Valley) and contains 6 subecoregions (Level IV):

- Southern Sedimentary Ridges (66e)
- Southern Metasedimentary Mountains (66g)
- Southern Limestone/Dolomite Valleys and Low Rolling Hills (67f)
- Southern Shale Valleys (67g)
- Southern Sandstone Ridges (67h)
- Southern Dissected Ridges and Knobs (67i)

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 as Watershed sampling sites.



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.

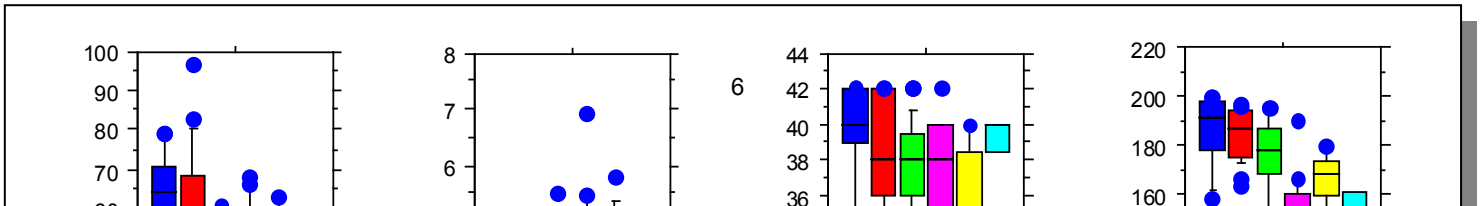


Figure 3-4. Benthic Macroinvertebrate and Habitat Scores for Tennessee Portion of Hiwassee River Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th percentiles. Extreme values are also shown as dots. NCBI, North Carolina Biotic Index. Index Score and Habitat Riffle/Run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

3.2.C. Watershed Screening Sites. Activities that take place at watershed sites are benthic macroinvertebrate stream surveys, physical habitat determinations and/or chemical monitoring. Following review of existing data, watershed sites are selected in

Year 1 of the watershed approach when preliminary monitoring strategies are developed.
.

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 Assistance Centers, 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.

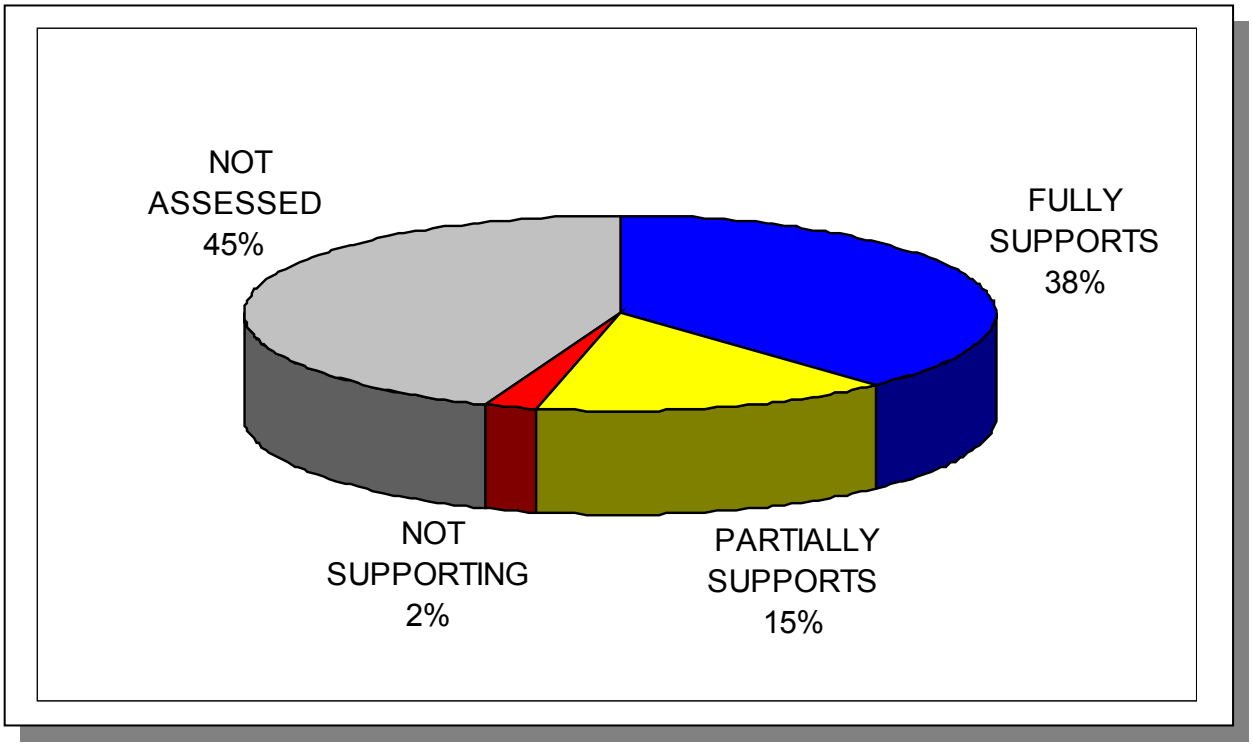


Figure 3-5. Water Quality Assessment for Streams and Rivers in the Tennessee Portion of the Hiwassee River Watershed. *Assessment data are based on the 2000 Water Quality Assessment. More information is provided in Hiwassee-Appendix III.*

3.3.A. Assessment Summary.

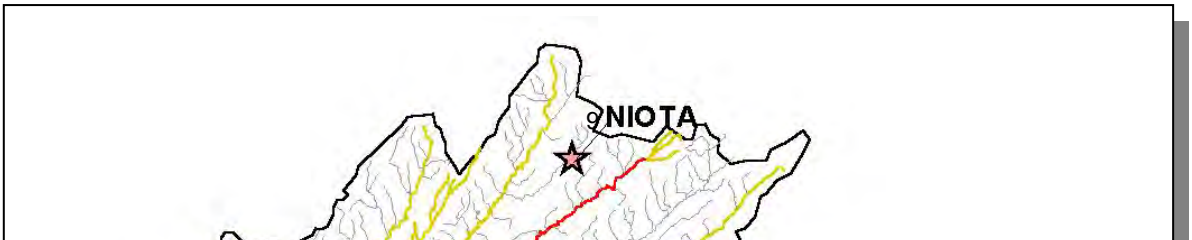


Figure 3-6a. Overall Use Support Attainment in the Tennessee Portion of the Hiwassee River Watershed. *Assessment data are based on the 2000 Water Quality Assessment. Blue, Fully Supports Designated Use; Yellow, Partially Supports Designated Use; Red, Does Not Support Designated Use; Gray, Not Assessed. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Cleveland, Etowah, and Niota are shown for reference. More information is provided in Hiwassee-Appendix III.*

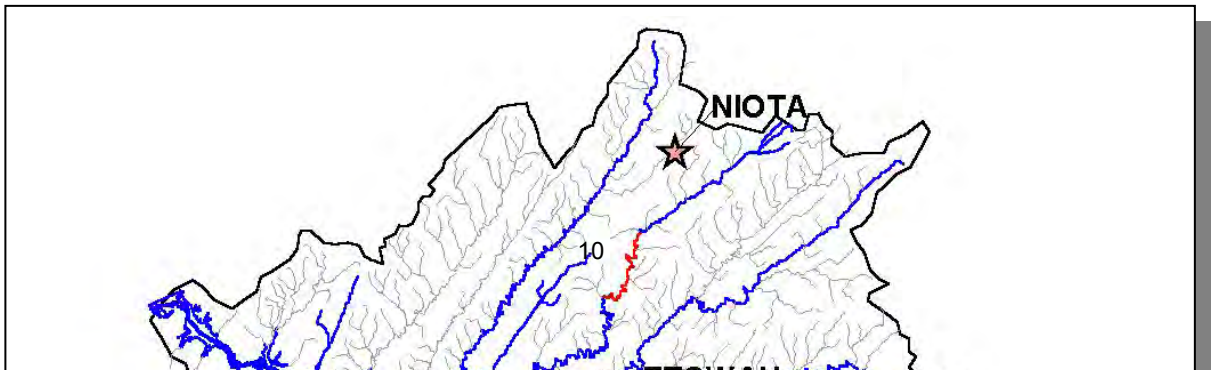


Figure 3-6b. Fish and Aquatic Life Use Support Attainment in the Tennessee Portion of the Hiwassee River Watershed. *Assessment data are based on the 2000 Water Quality Assessment. Blue, Fully Supports Designated Use; Yellow, Partially Supports Designated Use; Red, Does Not Support Designated Use; Gray, Not Assessed. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Cleveland, Etowah, and Niota are shown for reference. More information is provided in Hiwassee-Appendix III.*

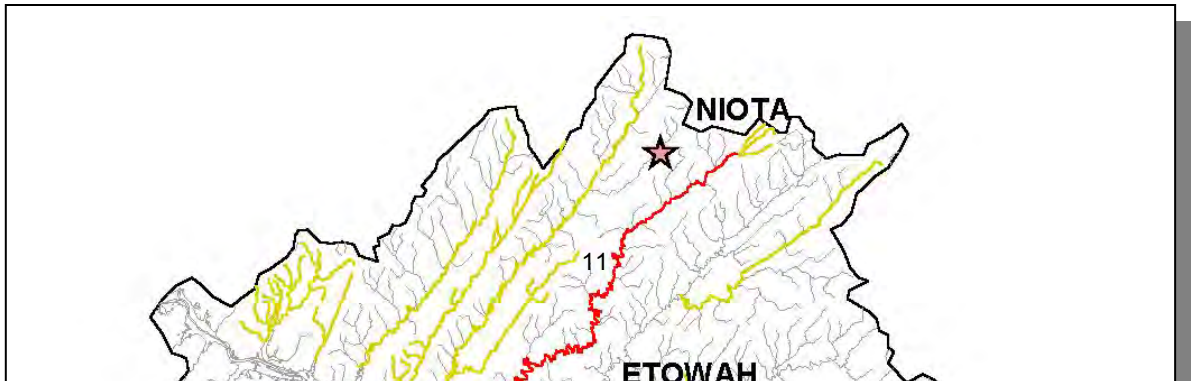


Figure 3-6c. Recreation Use Support Attainment in the Tennessee Portion of the Hiwassee River Watershed. *Assessment data are based on the 2000 Water Quality Assessment; Yellow, Partially Supports Designated Use; Red, Does Not Support Designated Use; Gray, Not Assessed. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Cleveland, Etowah, and Niota are shown for reference. More information is provided in Hiwassee-Appendix III.*

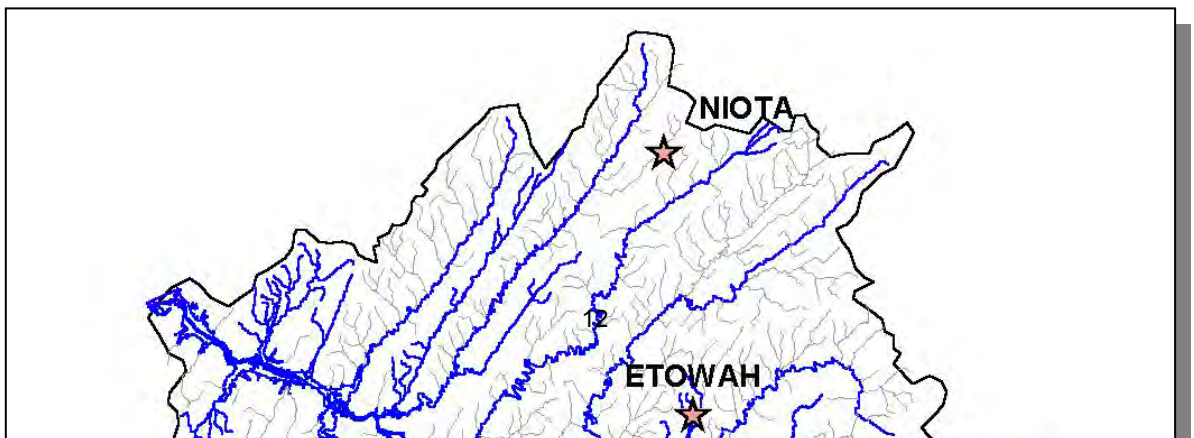


Figure 3-6d. Irrigation Use Support Attainment in the Tennessee Portion of the Hiwassee River Watershed. *Assessment data are based on the 2000 Water Quality Assessment. Blue, Fully Supports Designated Use; Gray, Not Assessed. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Cleveland, Etowah, and Niota are shown for reference. More information is provided in Hiwassee-Appendix III.*

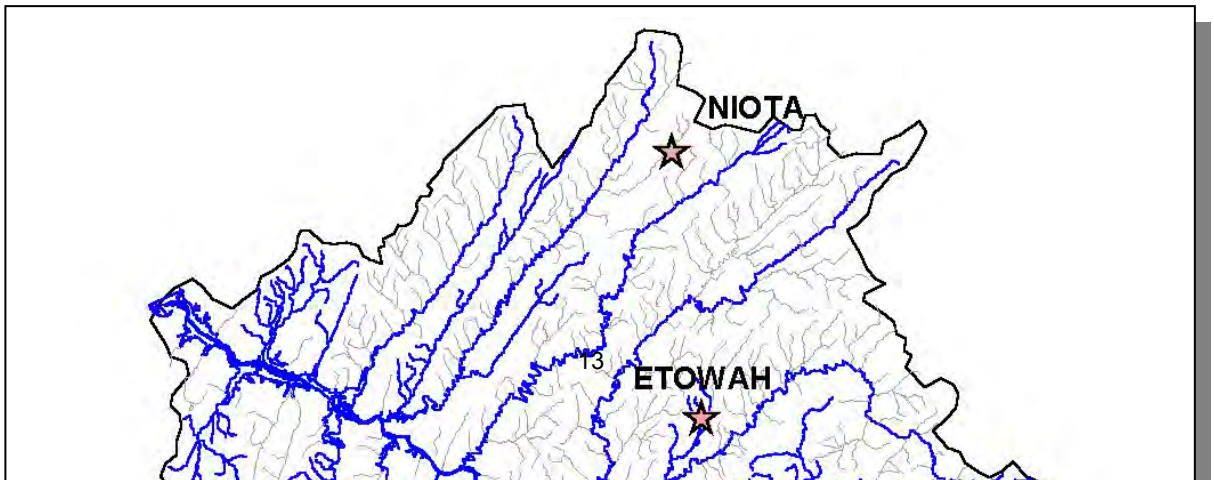


Figure 3-6e. Livestock Watering and Wildlife Use Support Attainment in the Tennessee Portion of the Hiwassee River Watershed. *Assessment data are based on the 2000 Water Quality Assessment. Blue, Fully Supports Designated Use; Gray, Not Assessed. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Cleveland, Etowah, and Niota are shown for reference. More information is provided in Hiwassee-Appendix III.*

3.3.B. Use Impairment Summary.

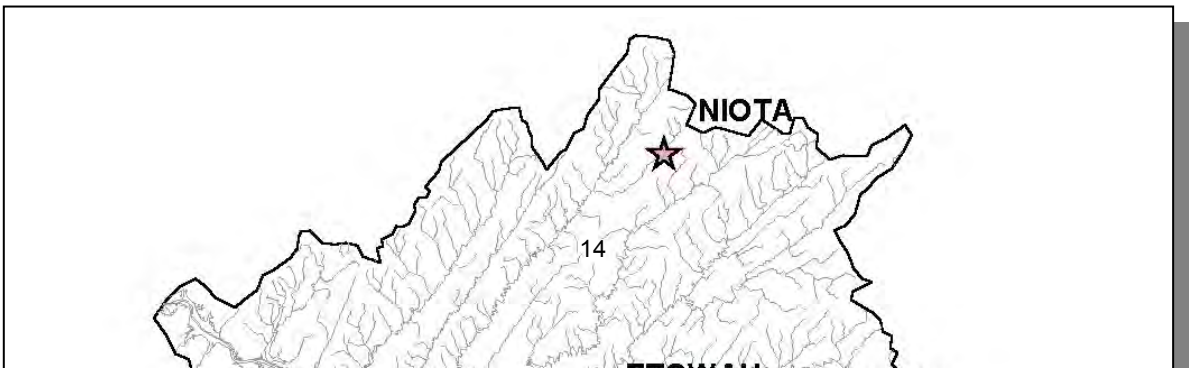


Figure 3-7a. Impaired Streams Due to Habitat Alteration in the Tennessee Portion of the Hiwassee River Watershed. *Assessment data are based on the 2000 Water Quality Assessment.; Yellow, Partially Supports Designated Use; Cleveland, Etowah, and Niota are shown for reference. More information is provided in Hiwassee-Appendix III.*

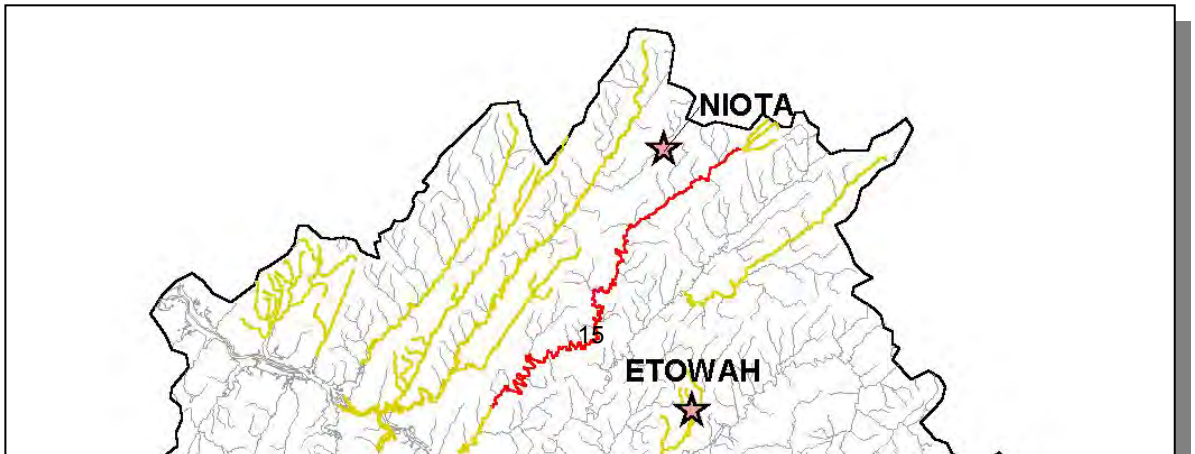


Figure 3-7b. Impaired Streams Due to Pathogens in the Tennessee Portion of the Hiwassee River Watershed. *Assessment data are based on the 2000 Water Quality Assessment. Yellow, Partially Supports Designated Use; Red, Does Not Support Designated Use; Cleveland, Etowah, and Niota are shown for reference. More information is provided in Hiwassee-Appendix III.*

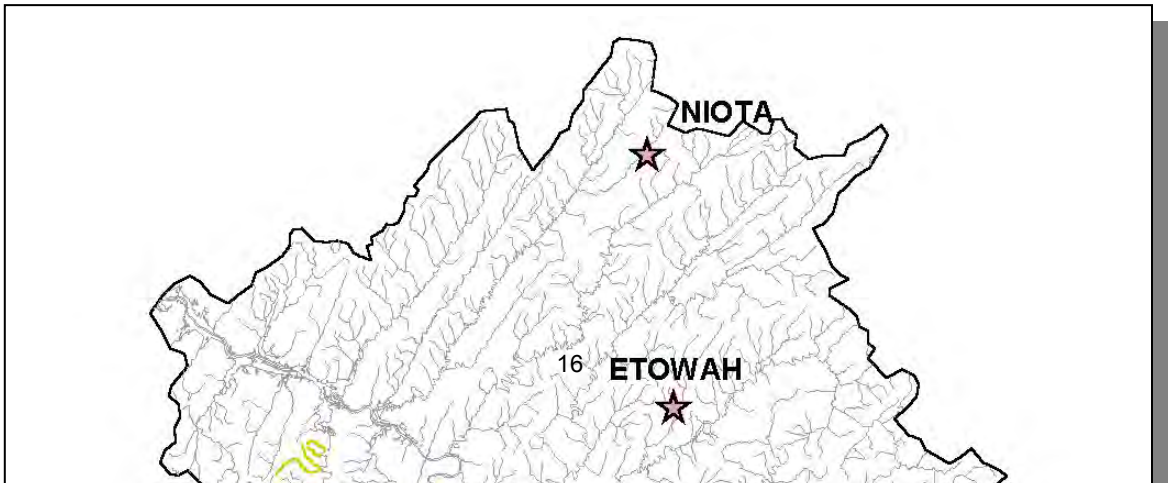


Figure 3-7c. Impaired Streams Due to Siltation in the Tennessee Portion of the Hiwassee River Watershed. *Assessment data are based on the 2000 Water Quality Assessment. Yellow, Partially Supports Designated Use. Cleveland, Etowah, and Niota are shown for reference. More information is provided in Hiwassee-Appendix III.*

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

In the year 2002 and beyond, the 303(d) list will be 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 conducted 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://www.state.tn.us/environment/water.htm, Summary maps of each watershed may be viewed at http://www.state.tn.us/environment/wpc/watershed/mapsummary.htm.

3.4. Fluvial Geomorphology. Stream width, depth, and cross-sectional dimensions at bankful discharge are key parameters used in characterizing the shape and stability of rivers. Characterization of streams using the fluvial geomorphic stream classification system, which allows prediction of stream stability and physical evolution, is a valuable management tool (Rosgen, 1996).

A fluvial geomorphic curve illustrates relationships between drainage area, bankful dimensions of width, depth and cross-sectional area, and bankful discharge of stream systems that are in dynamic equilibrium. It is a tool to evaluate and predict the physical

impacts of channel modifications, flow alterations, and other watershed changes, as well as determining appropriate physical parameters for stream and riparian restoration. Regional curves have been developed and applied in various regions of the country since the mid-1970's (Dunne and Leopold, 1978).

There are several benefits to using regional curves:

- Serving as a valuable regional-specific database for watershed management
- Providing an unbiased, scientific evaluation of the environmental impacts of proposed ARAP and other permitted activities
- Providing a scientific foundation for evaluating and documenting long-term geomorphic and hydrologic changes in the region
- Quantifying environmental impacts
- Suggesting the best approach to restore streams that have been modified

Ultimately, a regional curve will be created that illustrates the relationship between bankful width and drainage area.

CHAPTER 4

POINT AND NONPOINT SOURCE CHARACTERIZATION OF THE HIWASSEE RIVER WATERSHED

4.1. BACKGROUND. This chapter is organized by HUC-10 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 1998 303(d) list
iii. Description of nonpoint source contributions

The Hiwassee River Watershed (HUC 06020002) has been delineated into seven HUC 10- digit 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 1.1 beta (developed by Tetra Tech, Inc for EPA Region 4) released in 2000.

WCS integrates with ArcView® v3.2 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.

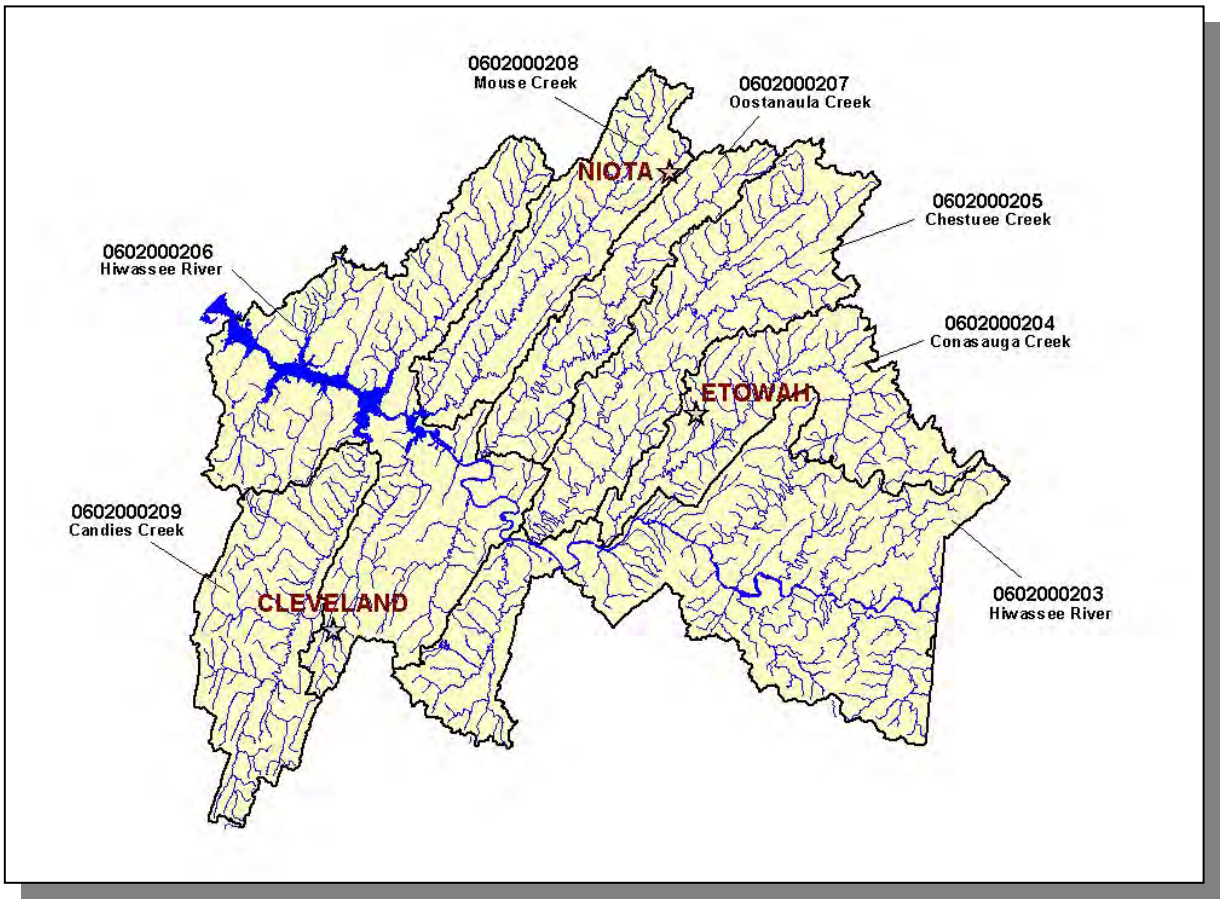


Figure 4-1. The Tennessee Portion of the Hiwassee River Watershed is Composed of Seven USGS-Delineated Subwatersheds (10-Digit Subwatersheds). *Locations of Cleveland, Etowah, and Niota are shown for reference.*

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 Hiwassee River Watershed.

HUC-10	HUC-12
0602000203	060200020301 (Hiwassee River)
	060200020302 (Turtletown Creek)
	060200020303 (Coker Creek)
	060200020304 (Spring Creek)
	060200020305 (Hiwassee River)
	060200020306 (South Chestuee Creek)
0602000204	060200020401 (Upper Conasauga Creek)
	060200020402 (Lower Conasauga Creek)
0602000205	060200020501 (Upper Chestuee Creek)
	060200020502 (Middle Creek)
	060200020503 (Lower Chestuee Creek)
0602000206	060200020601 (Hiwassee River)
	060200020602 (Hiwassee River)
	060200020603 (South Mouse Creek)
	060200020604 (Rogers Creek)
	060200020605 (Hiwassee River)
0602000207	060200020701 (Upper Oostanaula Creek)
	060200020702 (Lower Oostanaula Creek)
0602000208	060200020801 (Upper Mouse Creek)
	060200020802 (Lower Mouse Creek)
	060200020803 (Spring Creek)
0602000209	060200020901 (Upper Candies Creek)
	060200020902 (Middle Candies Creek)
	060200020903 (Lower Candies 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. 0602000203.

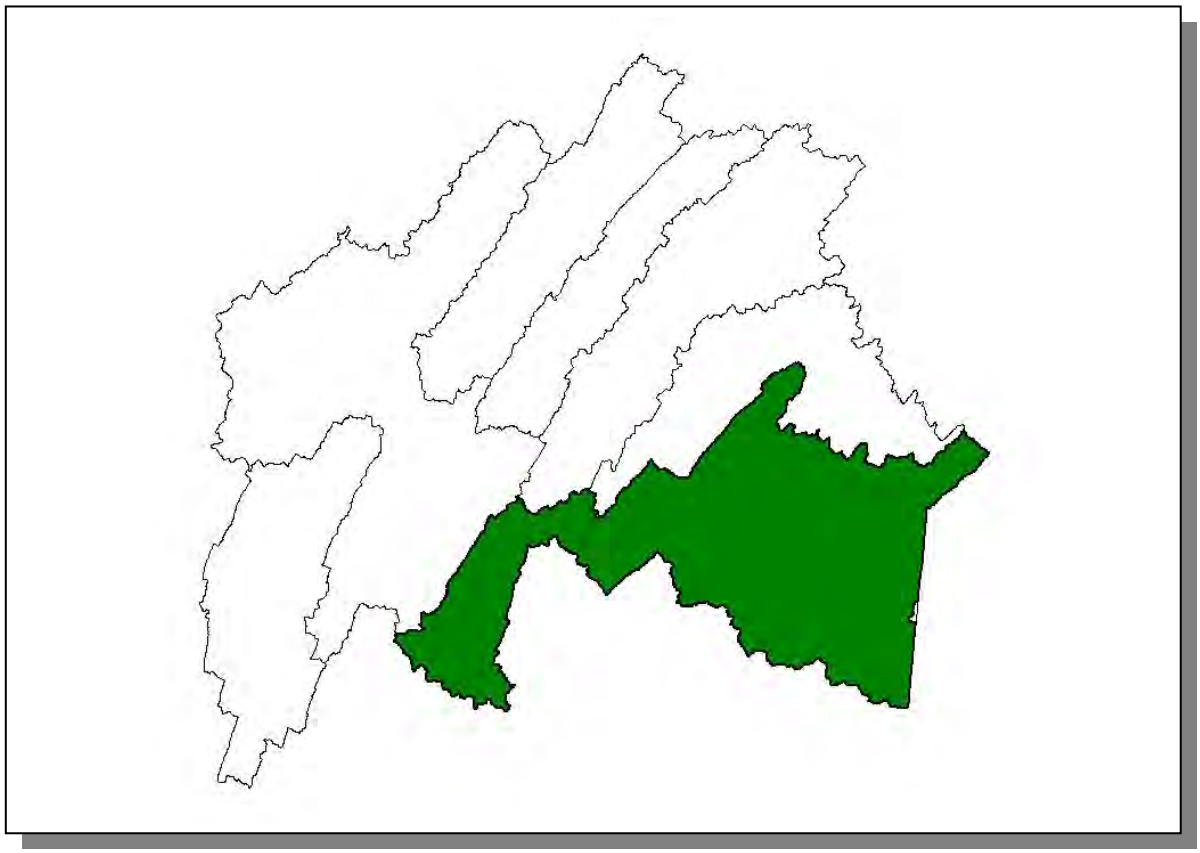


Figure 4-2. Location of Subwatershed 0602000203. *All Hiwassee HUC-10 subwatershed boundaries are shown for reference.*

4.2.A.i. General Description.

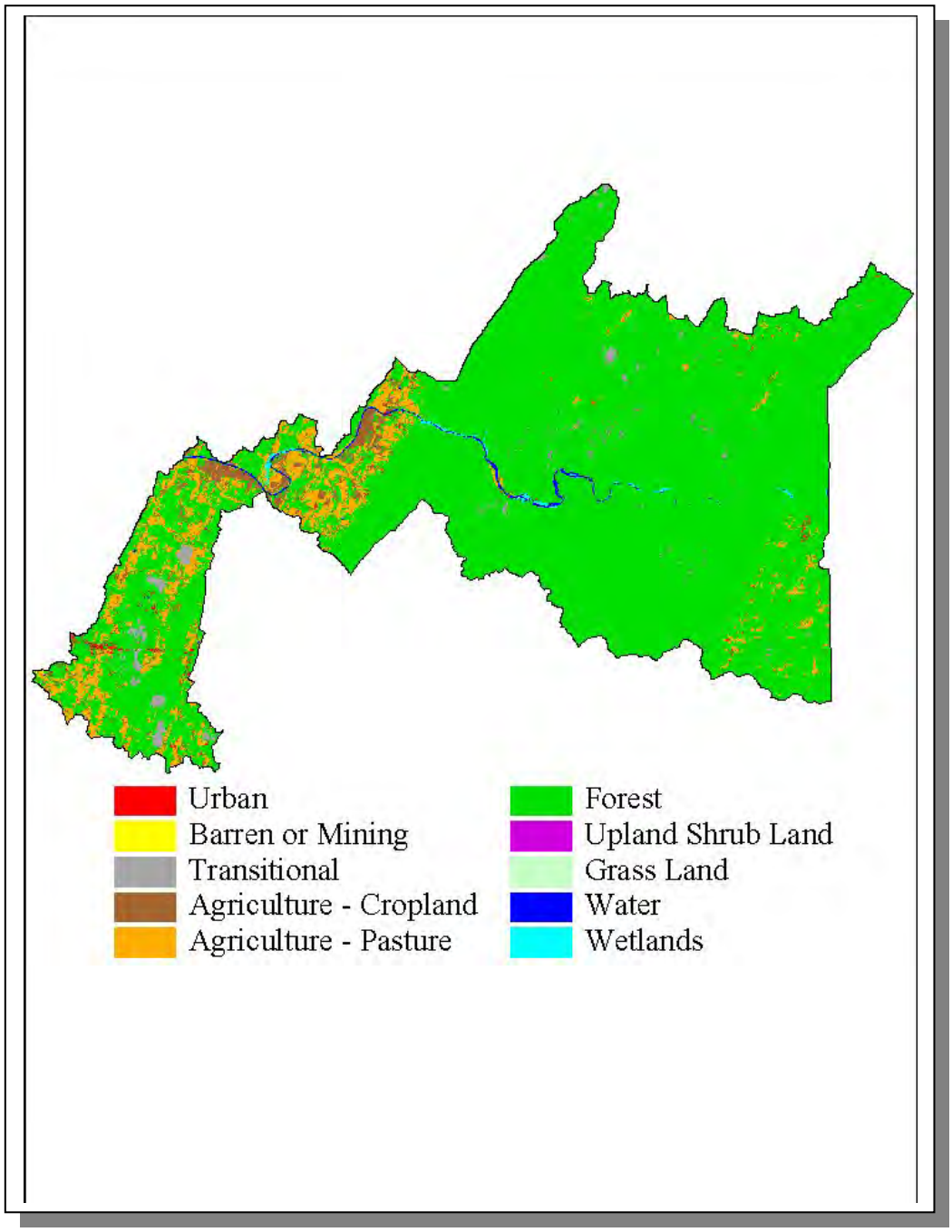


Figure 4-3. Illustration of Land Use Distribution in Subwatershed 0602000203.

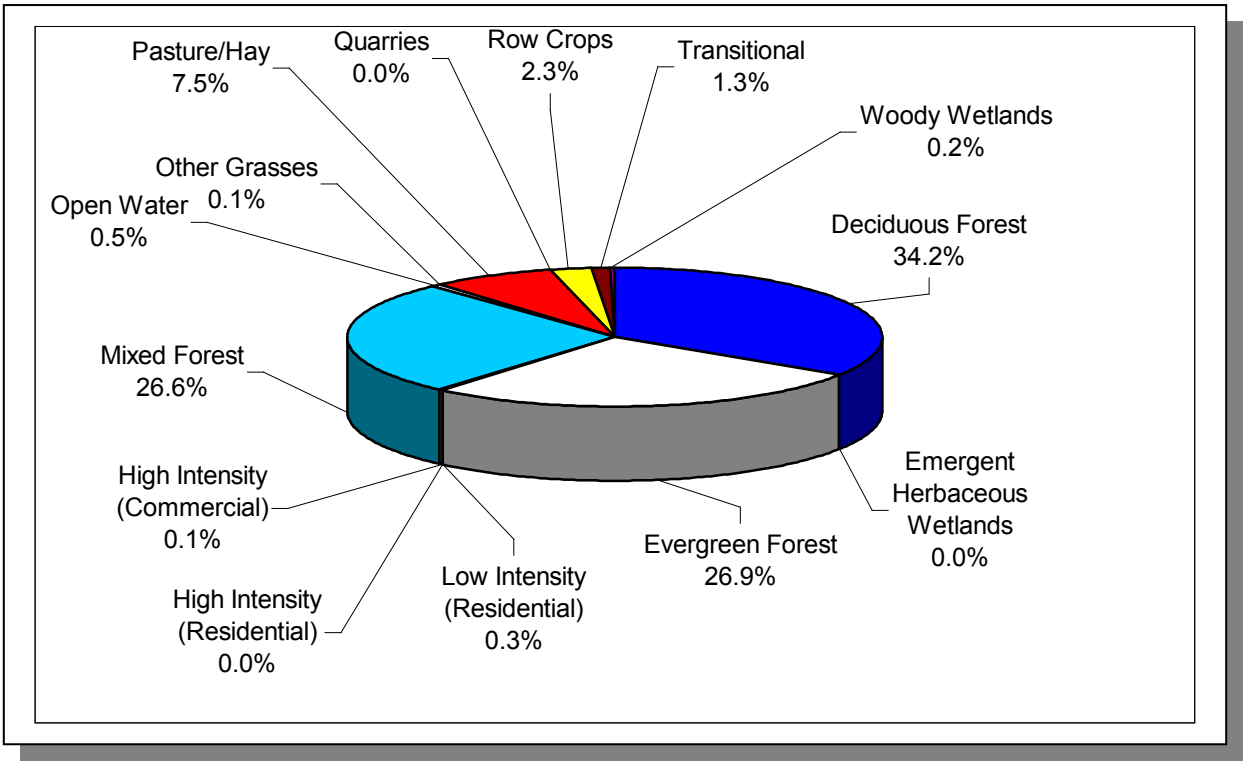


Figure 4-4. Land Use Distribution in Subwatershed 0602000203. *More information is provided in Hiwassee-Appendix IV.*

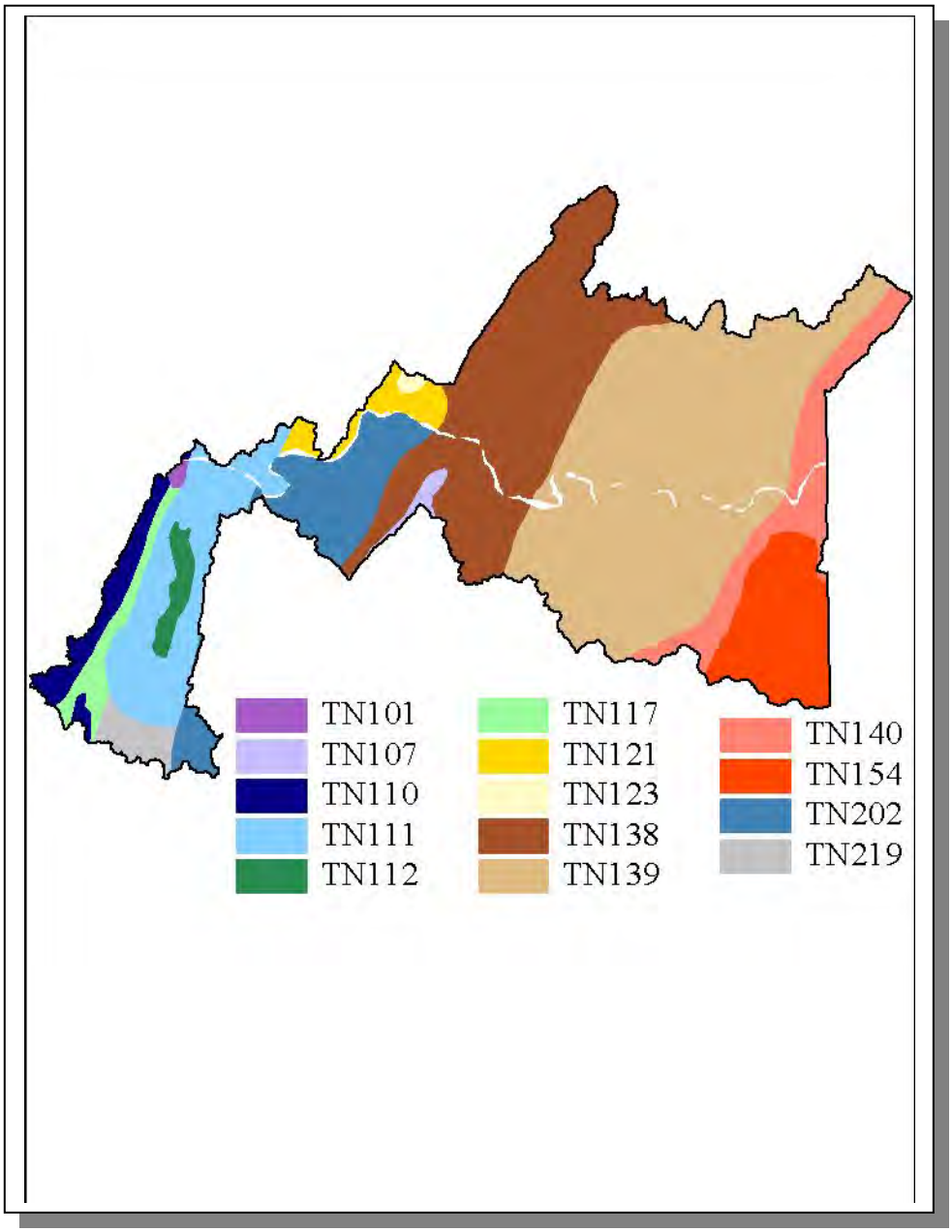


Figure 4-5. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0602000203.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN101	0.00	B	1.71	5.39	Loam	0.35
TN107	1.00	C	6.34	4.84	Loam	0.28
TN110	0.00	B	2.22	4.96	Loam	0.31
TN111	0.00	C	1.41	5.10	Loam	0.34
TN112	2.00	C	2.36	5.09	Loam	0.35
TN117	1.00	C	2.06	5.16	Loam	0.37
TN121	0.00	B	1.30	5.21	Loam	0.33
TN123	6.00	C	1.30	5.81	Silty Loam	0.37
TN138	0.00	C	2.48	4.26	Sandy Loam	0.22
TN139	0.00	C	11.84	4.82	Loam	0.20
TN140	0.00	B	3.85	4.85	Sandy Loam	0.21
TN154	9.00	B	2.64	4.66	Loam	0.23
TN202	0.00	B	1.30	5.00	Loam	0.33
TN219	0.00	C	1.35	4.95	Loam	0.33

Table 4-2. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 06020002030. *More details are provided in Hiwassee-Appendix IV.*

	COUNTY POPULATION			ESTIMATED POPULATION IN WATERSHED		% CHANGE
County	1990	1997 Est.	Portion of Watershed (%)	1990	1997	
Bradley	73,712	80,800	10.84	7,994	8,762	9.6
McMinn	42,383	46,000	0.24	100	108	8.0
Monroe	30,541	33,953	5.56	1,700	1,889	11.1
Polk	13.643	14,666	40.87	5,576	5,994	7.5
Totals	**160,279**	**175,419**		**15,370**	**16,753**	**9.0**

Table 4-3. Population Estimates in Subwatershed 0602000203.

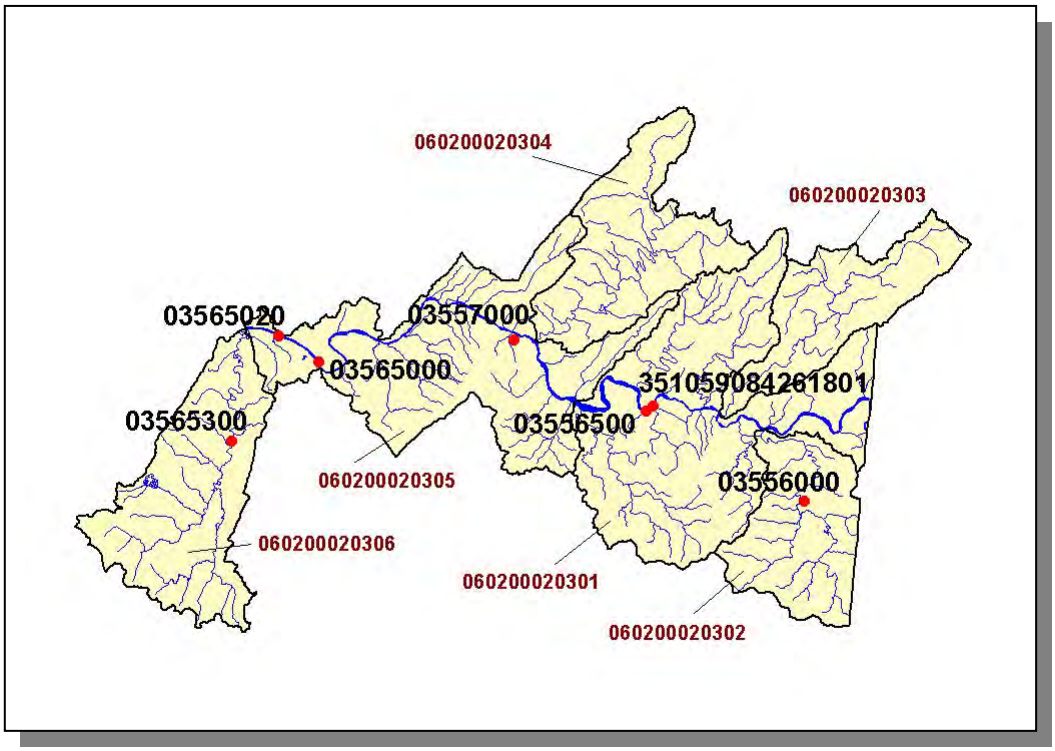


Figure 4-6. Location of Historical Streamflow Data Collection Sites in Subwatershed 0602000203. *Subwatershed 060200020301, 060200020302, 060200020303, 060200020304, 060200020305 and 060200020306 boundaries are shown for reference. More information is provided in Hiwassee-Appendix IV.*

4.2.A.ii Point Source Contributions.

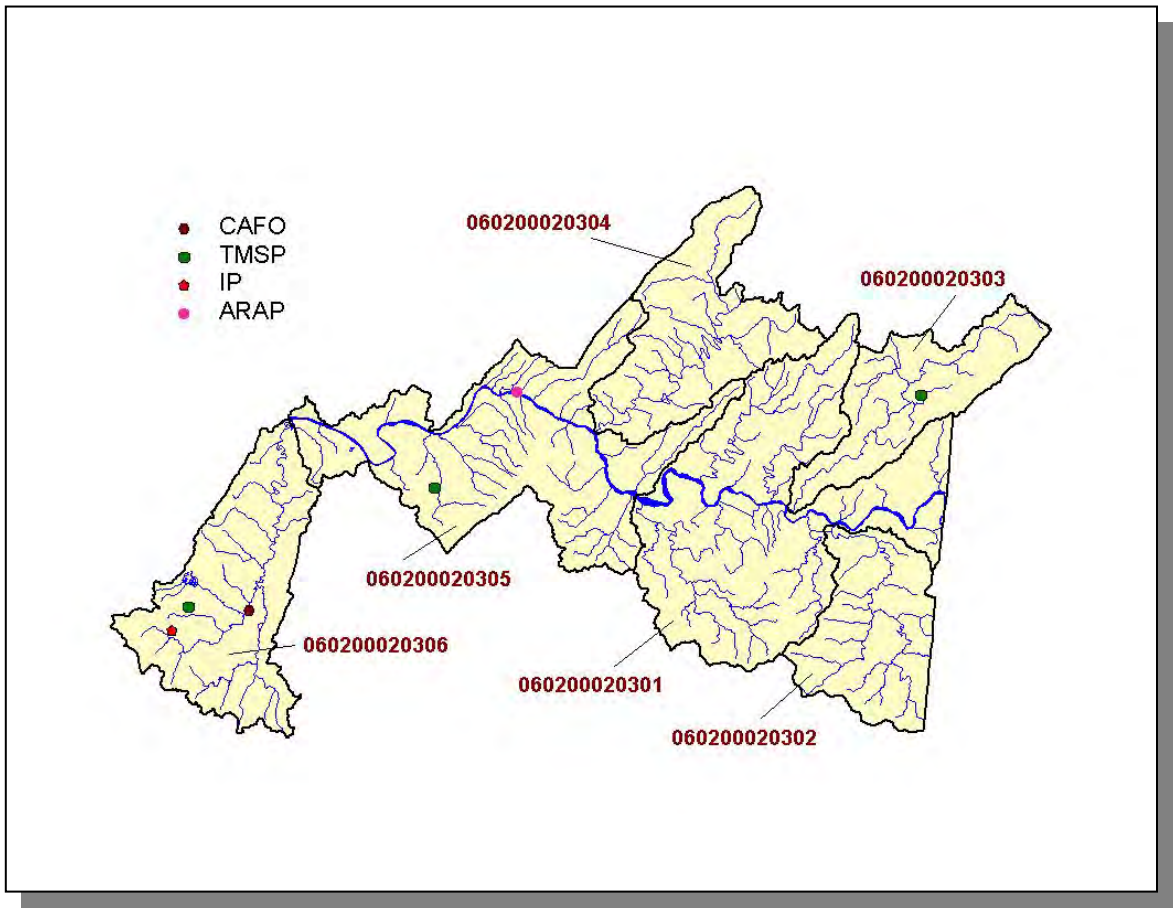


Figure 4-7. Location of Active Point Source Facilities in Subwatershed 0602000203. *Subwatershed 060200020301, 060200020302, 060200020303, 060200020304, 060200020305 and 060200020306 boundaries are shown for reference. More information is provided in the following figures.*

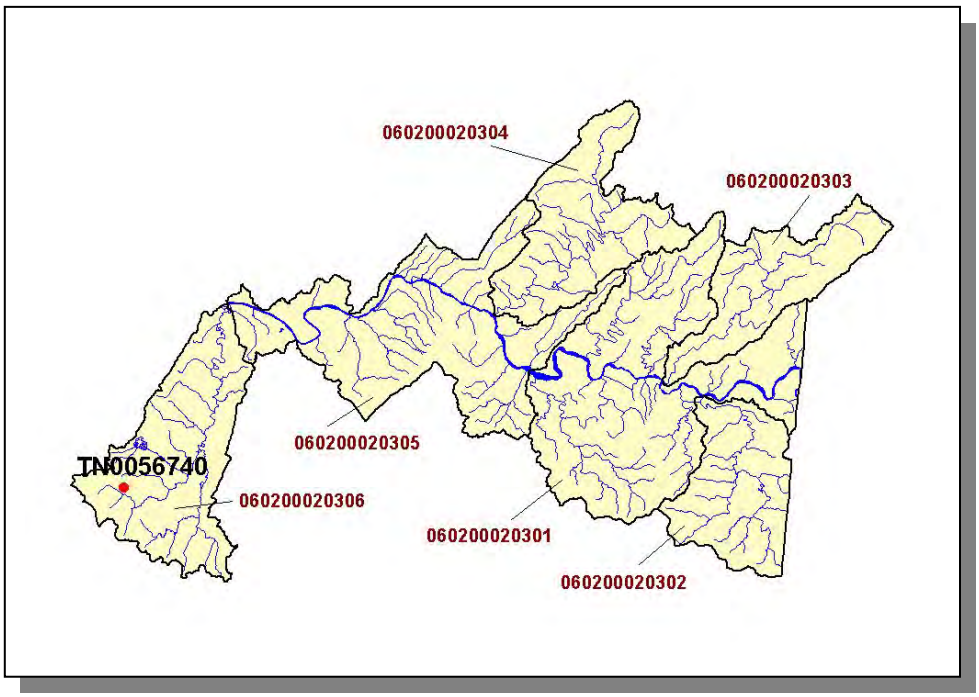


Figure 4-8. Location of Active Point Source Facilities (Individual Permits) in Subwatershed 0602000203. *Subwatershed 060200020301, 060200020302, 060200020303, 060200020304, 060200020305 and 060200020306 boundaries are shown for reference. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

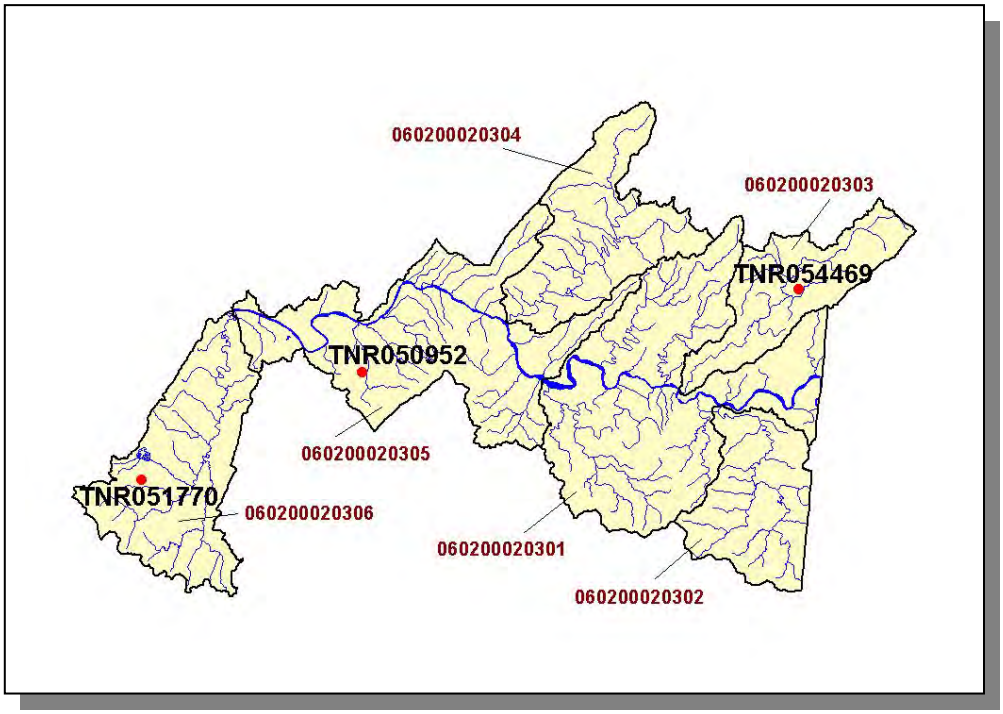


Figure 4-9. Location of TMSP Facilities in Subwatershed 0602000203. *Subwatershed 060200020301, 060200020302, 060200020303, 060200020304, 060200020305 and 060200020306 boundaries are shown for reference. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

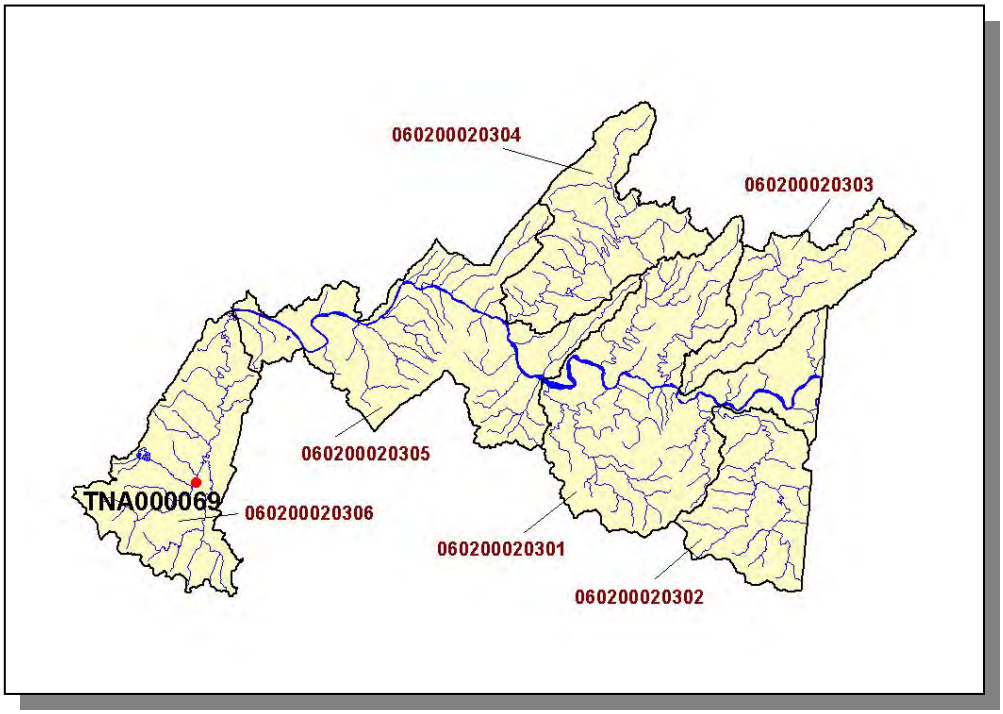


Figure 4-10. Location of CAFO Facilities in Subwatershed 0602000203. *Subwatershed 060200020301, 060200020302, 060200020303, 060200020304, 060200020305 and 060200020306 boundaries are shown for reference. CAFO rules may be found at http://cfpub.epa.gov/npdes/afo/cafofinalrule.cfm. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

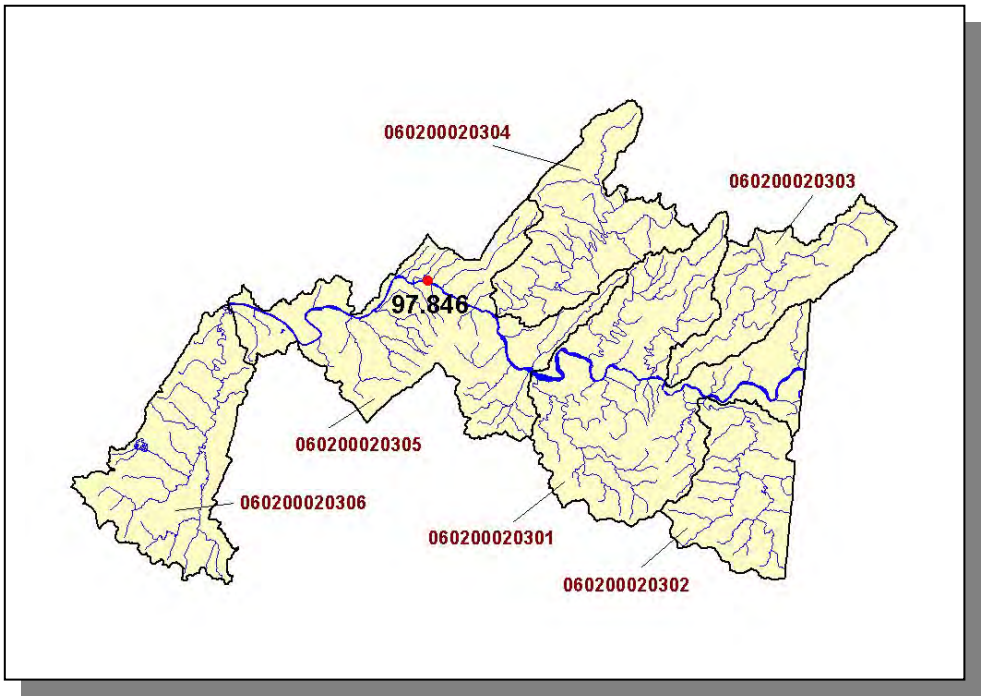


Figure 4-11. Location of ARAP Sites (Individual Permits) in Subwatershed 0602000203. *Subwatershed 060200020301, 060200020302, 060200020303, 060200020304, 060200020305 and 060200020306 boundaries are shown for reference. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

4.2.A.iii. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens	Chickens Sold	Hogs	Sheep
2,017	6,560	1,309	10	5,233,413	26	13

Table 4-4. Summary of Livestock Count Estimates in Subwatershed 0602000203. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Bradley	92.5	92.5	8.2	18.1
Macon	77.0	77.0	0.6	2.3
Monroe	301.5	279.1	7.4	21.4
Polk	224.7	214.1	6.2	21.1
Totals	**695.7**	**662.7**	**22.4**	**62.9**

Table 4-5. Forest Acreage and Annual Removal Rates (1987-1994) in Subwatershed 0602000203.

CROPS	TONS/ACRE/YEAR
Corn (Row Crops)	7.83
Soybeans (Row Crops)	4.11
Grass (Hayland)	0.26
Legume/Grass (Hayland)	0.14
Grass (Pastureland)	0.96
Grass,Forbs, Legumes (Mixed Pasture)	1.14
Forest Land (Grazed)	0.00
Forest Land (Not Grazed)	0.00
Farmsteads and Ranch Headquarters	0.66
Nonagricultural Land Use	0.00
Conservation Reserve Program Land	0.27
Tobacco (Row Crops)	5.65
Wheat (Close Grown Cropland)	6.20
Fruit (Horticultural)	0.19
Other Cropland (Not Planted)	2.93

Table 4-6. Annual Estimated Total Soil Loss in Subwatershed 0602000203.

4.2.B. 0602000204.

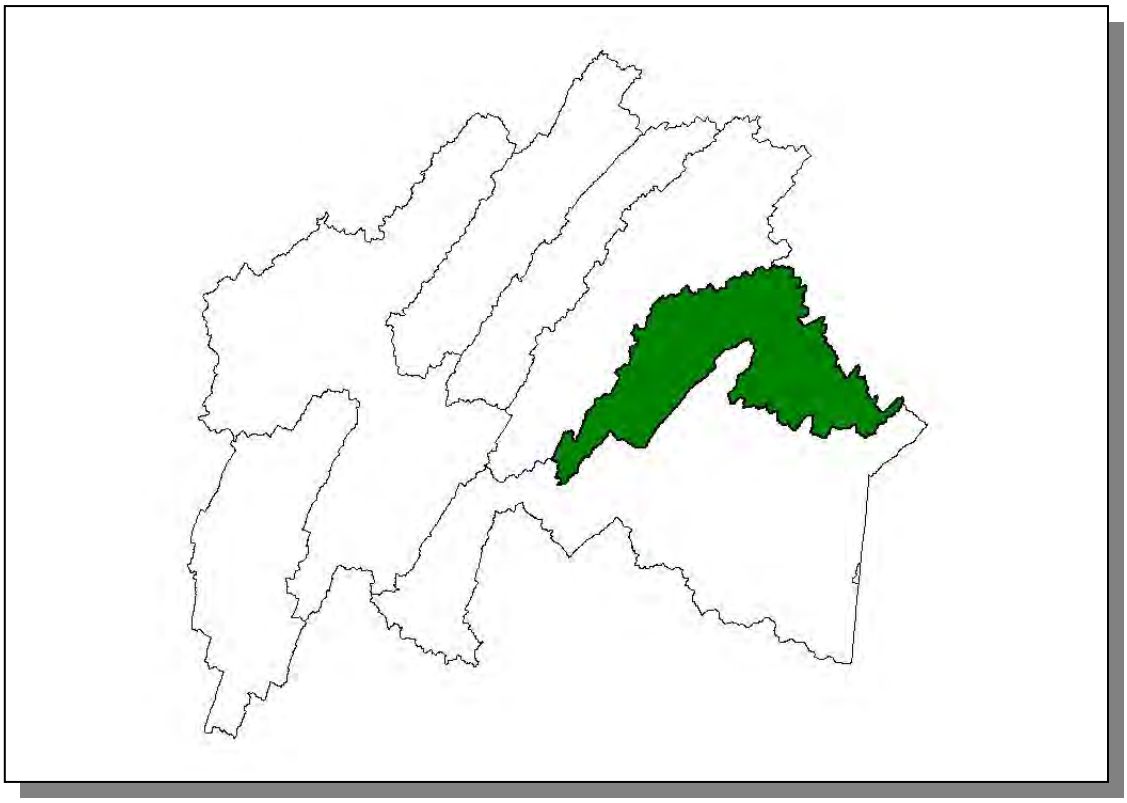


Figure 4-12. Location of Subwatershed 0602000204. *All Hiwassee HUC-10 subwatershed boundaries are shown for reference.*

4.2.B.i. General Description.

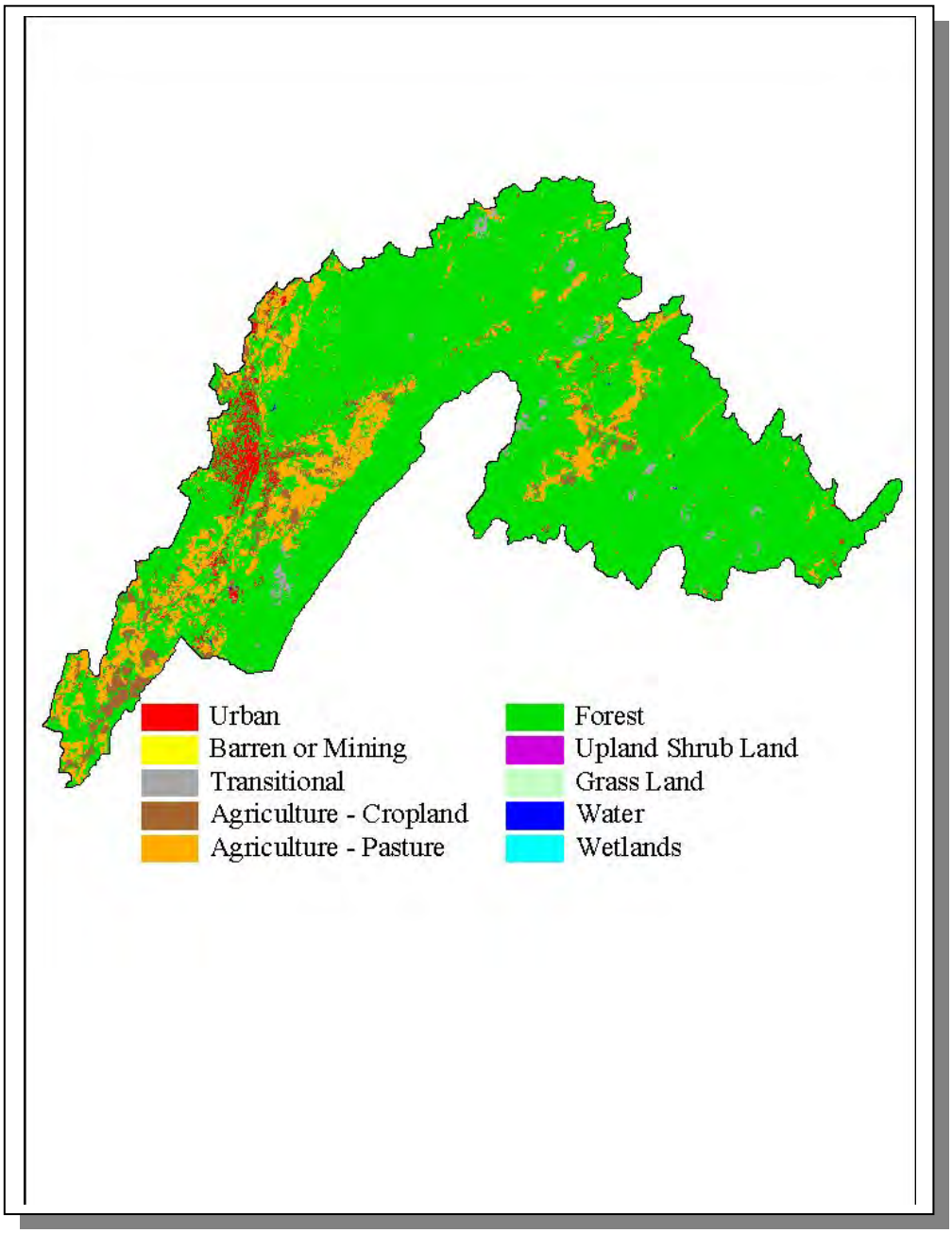


Figure 4-13. Illustration of Land Use Distribution in Subwatershed 0602000204.

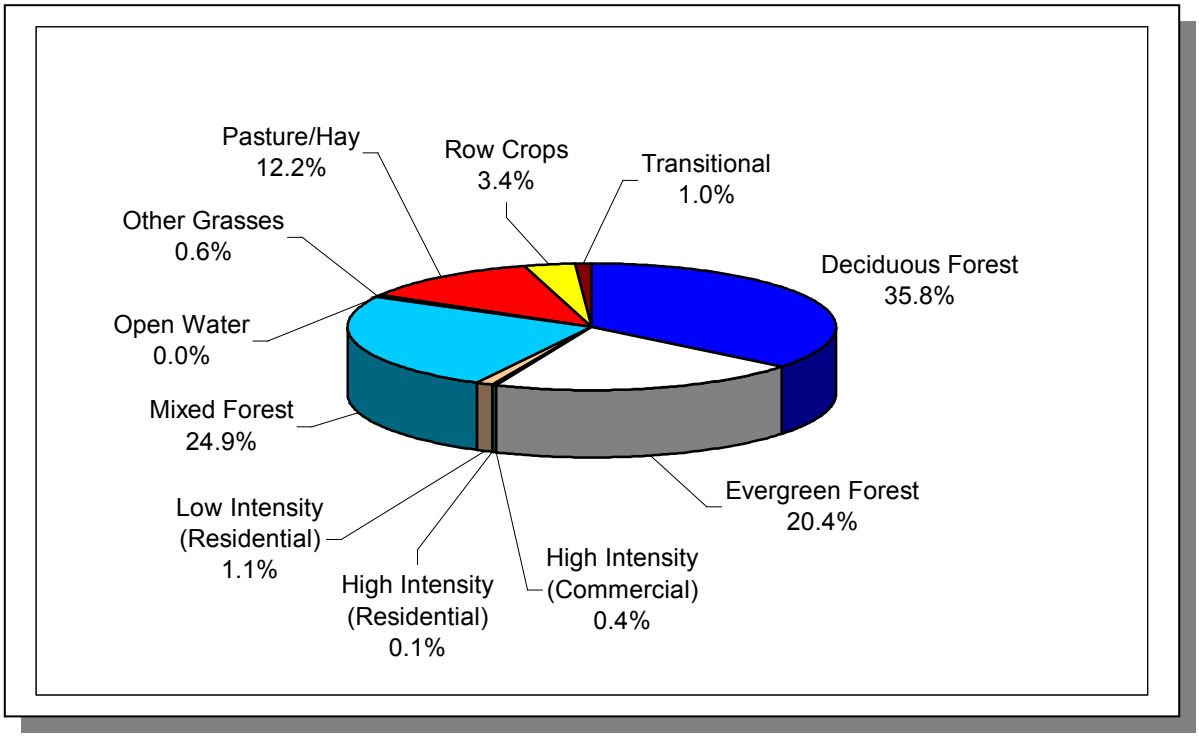


Figure 4-14. Land Use Distribution in Subwatershed 0602000204. *More information is provided in Hiwassee-Appendix IV.*

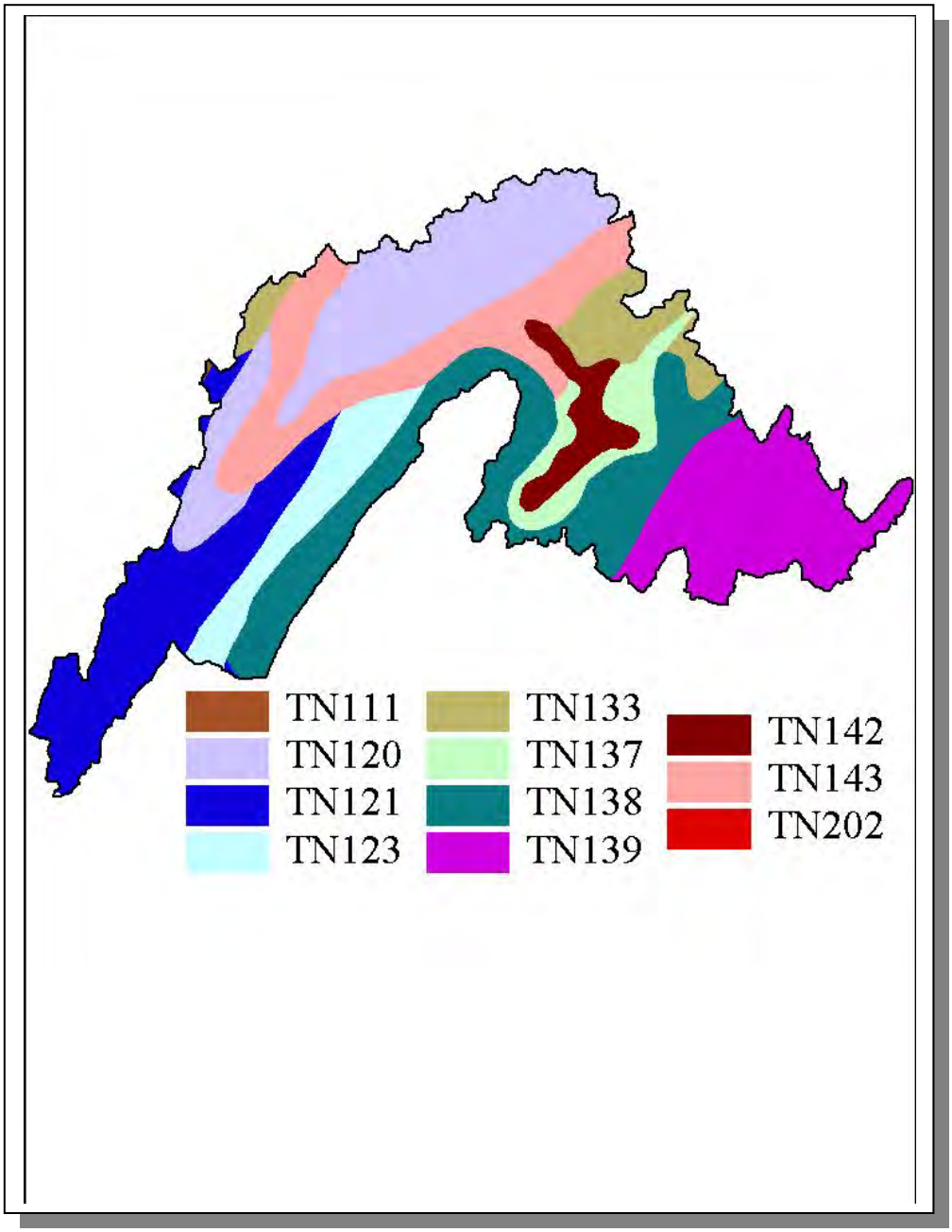


Figure 4-15. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0602000204.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN111	0.00	C	1.41	5.10	Loam	0.34
TN120	0.00	B	1.68	5.11	Loam	0.27
TN121	0.00	B	1.30	5.21	Loam	0.33
TN123	6.00	C	1.30	5.81	Silty Loam	0.37
TN133	0.00	C	1.35	6.04	Clayey Loam	0.27
TN137	0.00	C	3.41	5.34	Silty Loam	0.26
TN138	0.00	C	2.48	4.26	Sandy Loam	0.22
TN139	0.00	C	11.84	4.82	Loam	0.20
TN142	0.00	B	2.20	5.78	Loam	0.31
TN143	0.00	C	1.22	6.44	Loam	0.32
TN202	0.00	B	1.30	5.00	Loam	0.33

Table 4-7. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0602000204. *More information is provided in Hiwassee-Appendix IV.*

	COUNTY POPULATION			ESTIMATED POPULATION IN WATERSHED		% CHANGE
County	1990	1997 Est.	Portion of Watershed (%)	1990	1997	
McMinn	42,383	46,000	11.27	4,776	5,184	8.5
Monroe	30,541	33,953	7.29	2,227	2,476	11.2
Polk	13,643	14,666	1.72	235	253	7.7
Total	**86,567**	**94,619**		**7,238**	**7,913**	**9.3**

Table 4-8. Population Estimates in Subwatershed 0602000204.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Etowah	**McMinn**	**3,815**	**1,737**	**1,606**	**131**	**0**

Table 4-9. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 0602000204.

Figure 4-16. Location of STORET Monitoring Sites in Subwatershed 0602000204. *Subwatershed 060200020401 and 060200020402 boundaries are shown for reference. More information is provided in Hiwassee-Appendix IV.*

4.2.B.ii. Point Source Contributions.

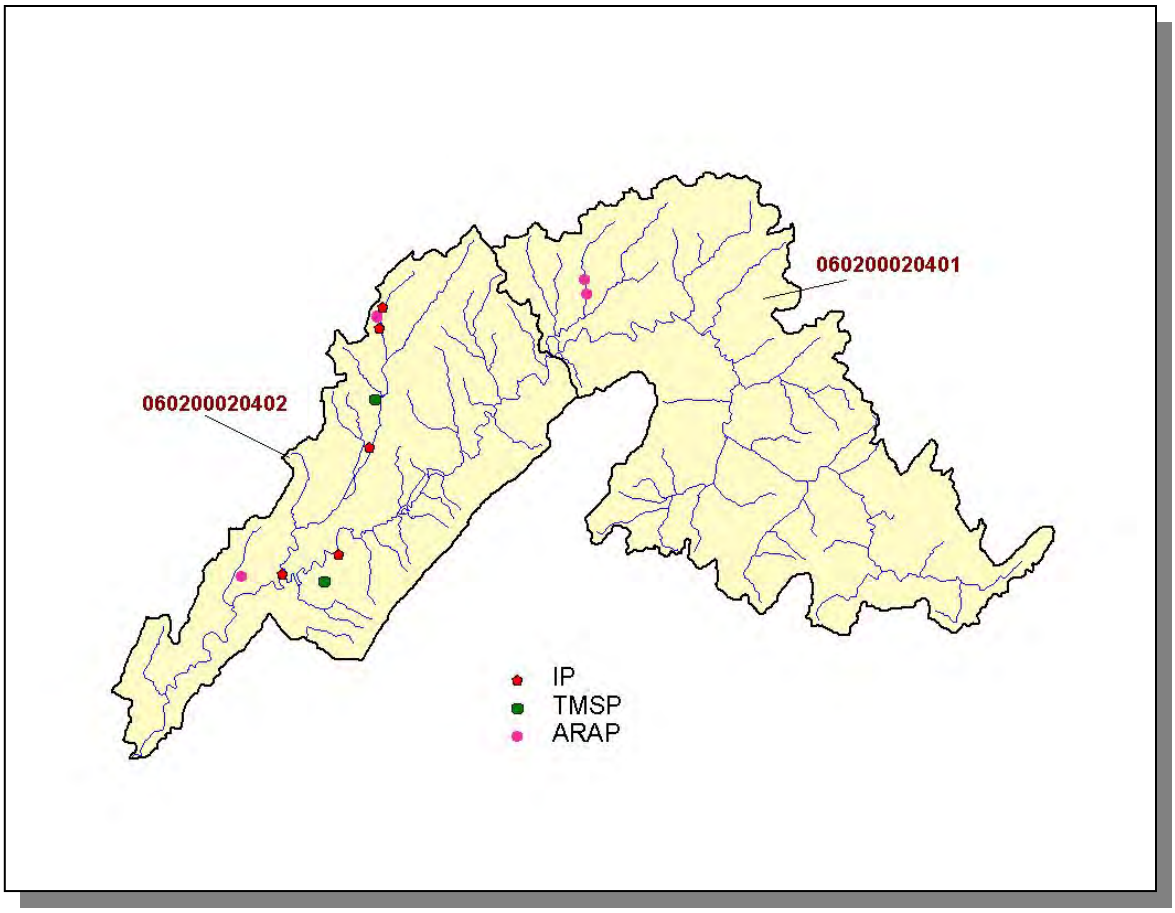


Figure 4-17. Location of Active Point Source Facilities in Subwatershed 0602000204. *Subwatershed 060200020401 and 060200020402 boundaries are shown for reference. More information is provided in the following figures.*

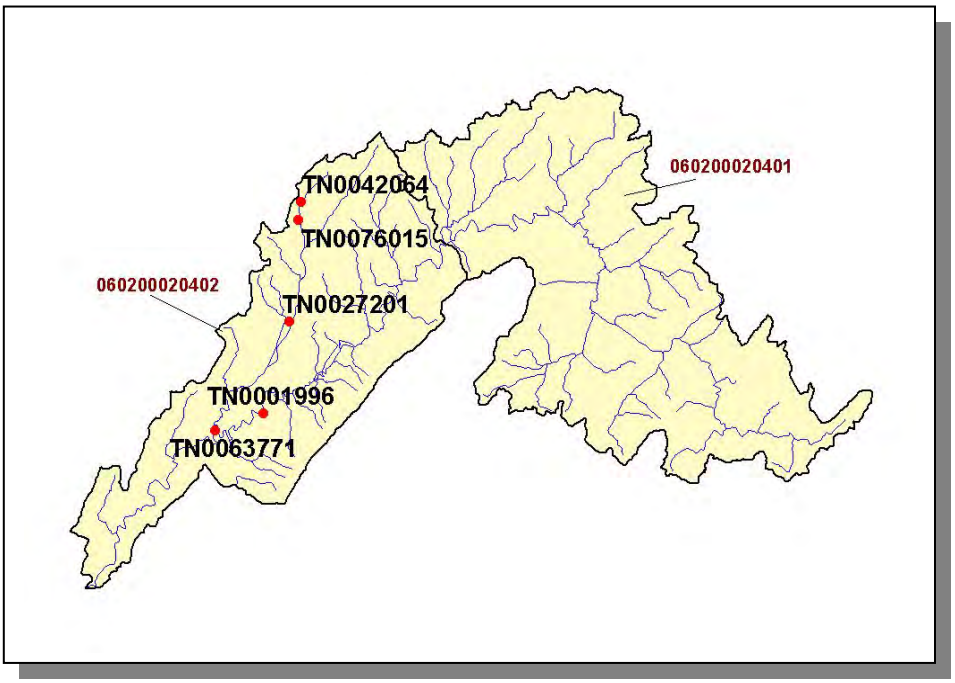


Figure 4-18. Location of Active Point Source Facilities (Individual Permits) in Subwatershed 0602000204. *Subwatershed 060200020401 and 060200020402 boundaries are shown for reference. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

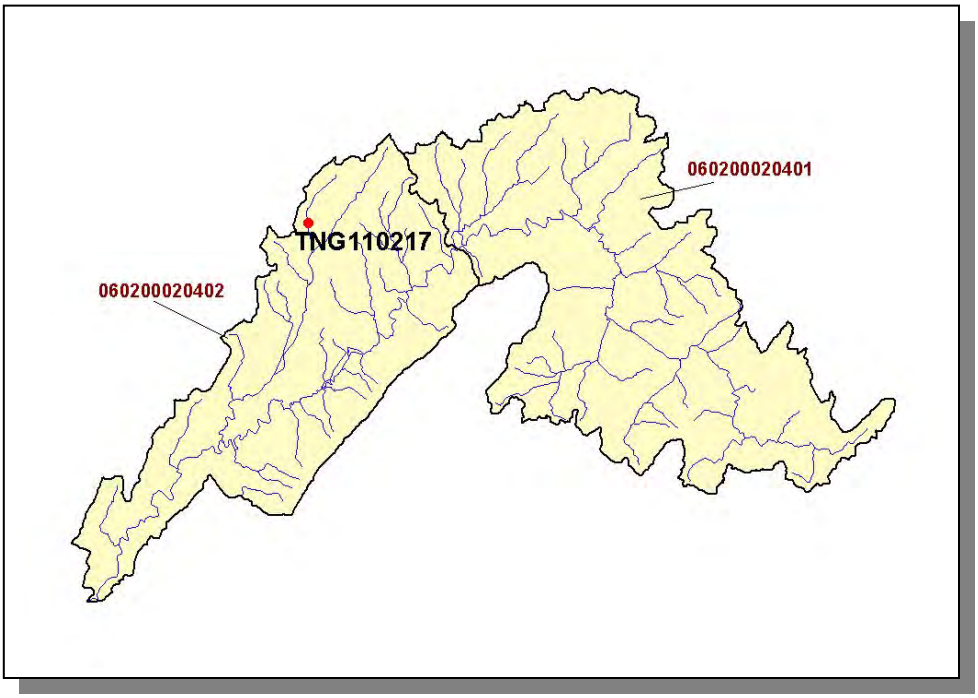


Figure 4-19. Location of Ready Mix Concrete Facilities in Subwatershed 0602000204. *Subwatersheds 060200020401 and 060200020402 are shown for reference. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

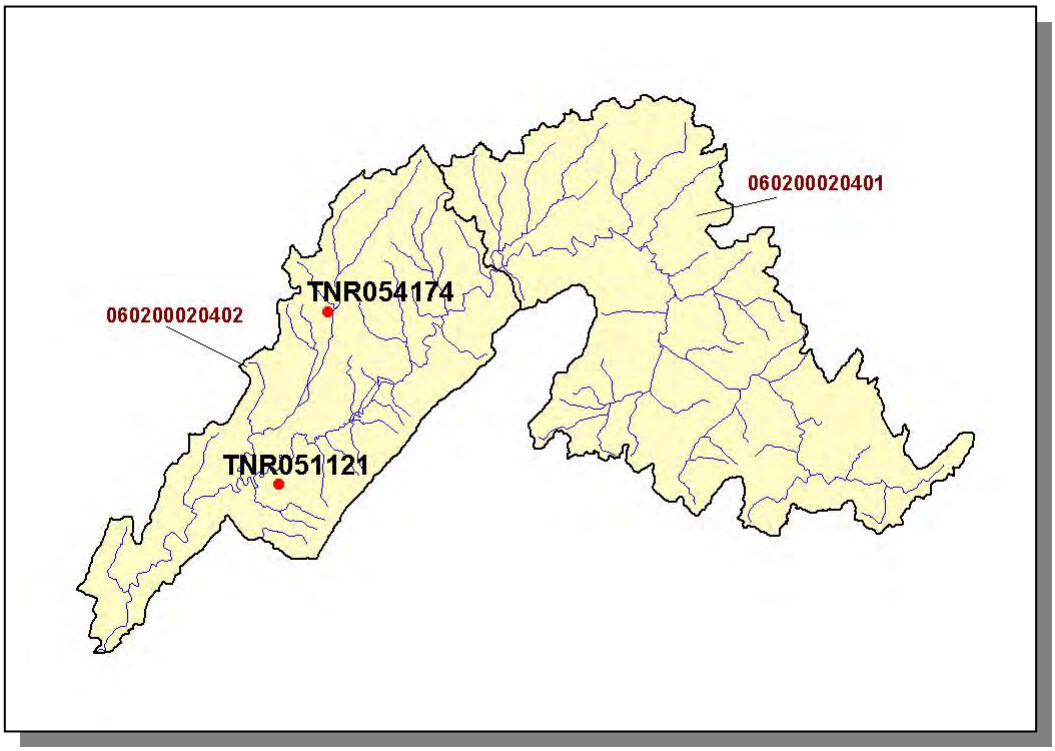


Figure 4-20. Location of TMSP Facilities in Subwatershed 0602000204. *Subwatershed 060200020401 and 060200020402 boundaries are shown for reference. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

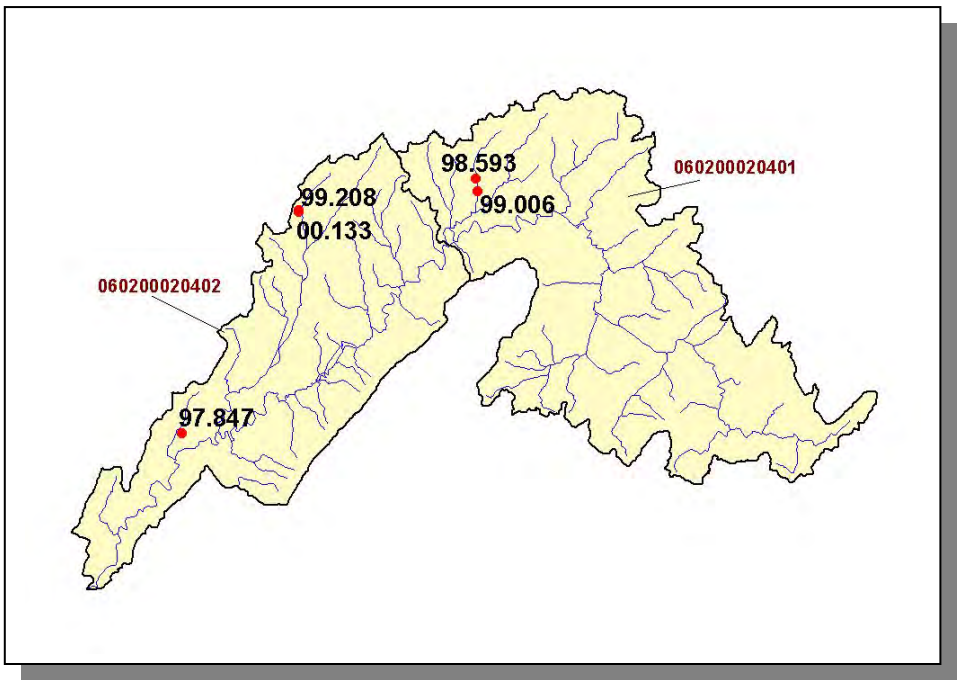


Figure 4-21. Location of ARAP Sites (Individual Permits) in Subwatershed 0602000204. *Subwatershed 060200020401 and 060200020402 boundaries are shown for reference. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

4.2.A.ii.a. Dischargers to Water Bodies Listed on the 1998 303(d) List

There are three NPDES facilities discharging to water bodies listed on the 1998 303(d) list in Subwatershed 0602000204:

- TN0027201 (CSX Transportation) discharges to Cane Creek @ RM 4.5
- TN0042064 (Johns Manville) discharges to Crockett Springs Branch @ RM 1.2
- TN0076015 (Waupaca Foundry) discharges to Crockett Springs Branch

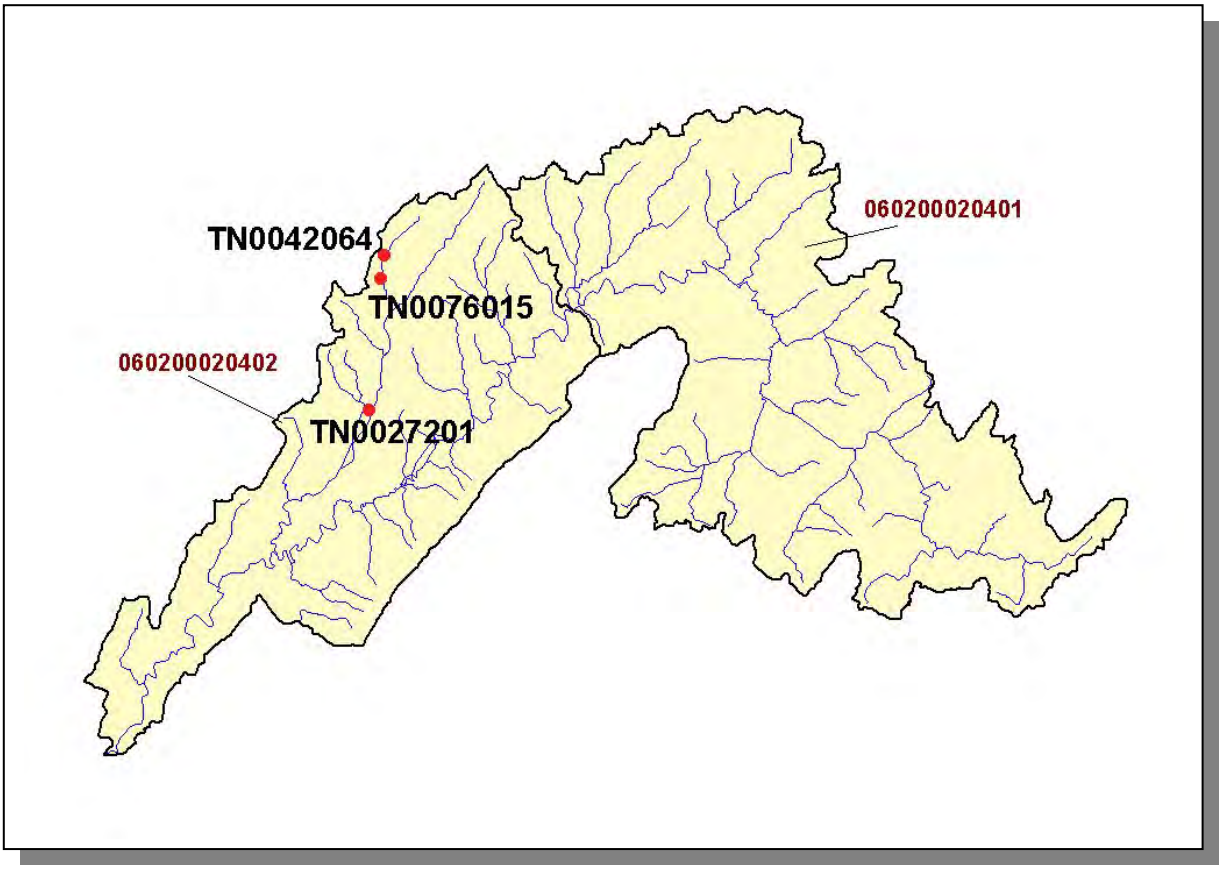


Figure 4-22. Location of NPDES Dischargers to Water Bodies Listed on the 1998 303(d) List in Subwatershed 0602000204. *Subwatershed 060200020401 and 060200020402 boundaries are shown for reference. The names of facilities are provided in Hiwassee-Appendix IV.*

PERMIT #	1Q10	3Q10	7Q10	3Q20	QDESIGN
TN0027201	0.33	0.34	0.35	0.32	0.02750
TN0042064				0.07	0.09688
TN0076015	0.00	0.00	0.00	0.00	1.94000

Table 4-10. Receiving Stream Flow Information for NPDES Dischargers to Waterbodies Listed on the 1998 303(d) List in Subwatershed 0602000204. *Data are in million gallons per day (MGD). Data were obtained from the USGS publication Flow Duration and Low Flows of Tennessee Streams Through 1992 or from permit files.*

PERMIT #	COD	Al	Fe	Cu	Zn
TN0027201	X				
TN0076015		X	X	X	X

Table 4-11. Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 1998 303(d) List in Subwatershed 0602000204. *COD, Chemical Oxygen Demand.*

PERMIT #	TSS	pH	WET	NH_3	Cu	OIL and GREASE	TSS	DO	BOD_5
TN0027201	X	X				X			
TN0042064		X	X	X	X		X	X	X
TN0076015		X	X			X	X		

Table 4-12. Parameters Monitored for Daily Maximum (mg/L) Limits for NPDES Dischargers to Waterbodies Listed on the 1998 303(d) List in Subwatershed 0602000204. *TSS, Total Suspended Solids; WET, Whole Effluent Toxicity; TSS, Total Suspended Solids; DO, Dissolved Oxygen; BOD_5, Biochemical Oxygen Demand (5-Day).*

4.2.B.iii. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens	Chickens Sold	Hogs	Sheep
1,762	4,817	860	6	987,001	38	6

Table 4-13. Summary of Livestock Count Estimates in Subwatershed 0602000204. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Monroe	301.5	279.1	7.4	21.4
Polk	224.7	214.1	6.2	21.1
Total	**526.2**	**493.2**	**13.6**	**42.5**

Table 4-14. Forest Acreage and Average Annual Removal Rates (1987-1994) in Subwatershed 0602000204.

CROPS	TONS/ACRE/YEAR
Legume Grass (Hayland)	0.53
Forest Land (Grazed)	0.00
Forest Land (Not Grazed)	0.00
Farmsteads and Ranch Headquarters	0.67
Non Agricultural Land Use	0.00
Corn (Row Crops)	15.72
Soybeans (Row Crops)	11.39
Tobacco (Row Crops)	5.65
Wheat (Close Grown Cropland)	6.20
Grass (Hayland)	0.36
Fruit (Horticulture)	0.19
Grass (Pastureland)	0.52
Grass, Forbs, Legumes (Mixed Pasture)	0.60

Table 4-15. Annual Estimated Total Soil Loss in Subwatershed 0602000204.

4.2.C. 0602000205.

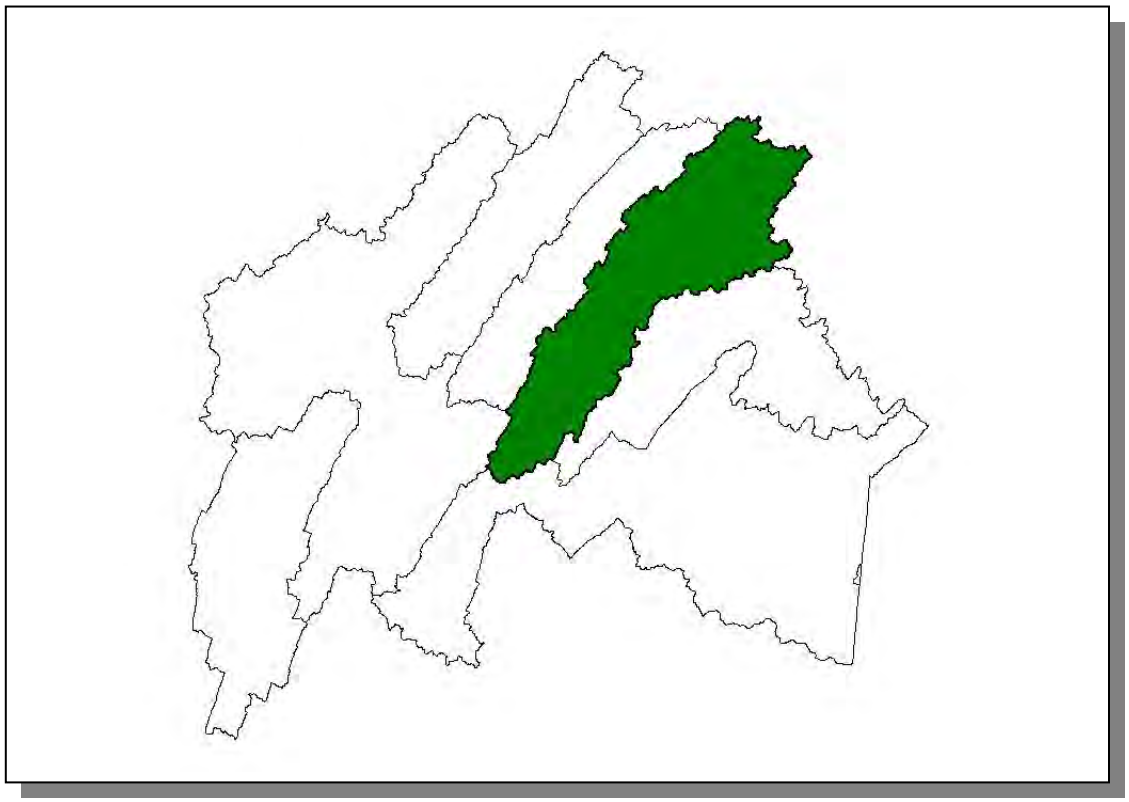


Figure 4-23. Location of Subwatershed 0602000205. *All Hiwassee HUC-10 subwatershed boundaries are shown for reference.*

4.2.C.i. General Description.

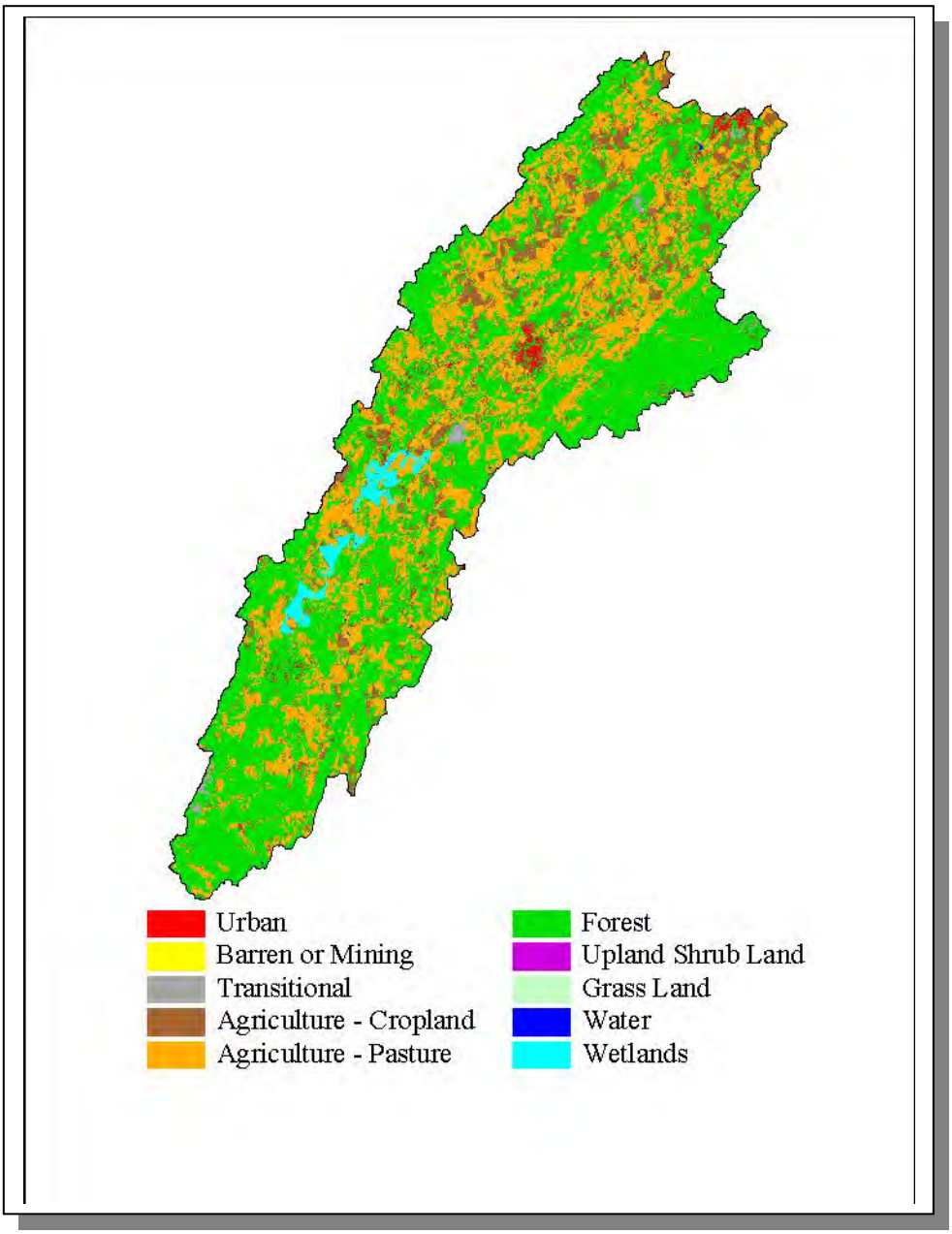


Figure 4-24. Illustration of Land Use Distribution in Subwatershed 0602000205.

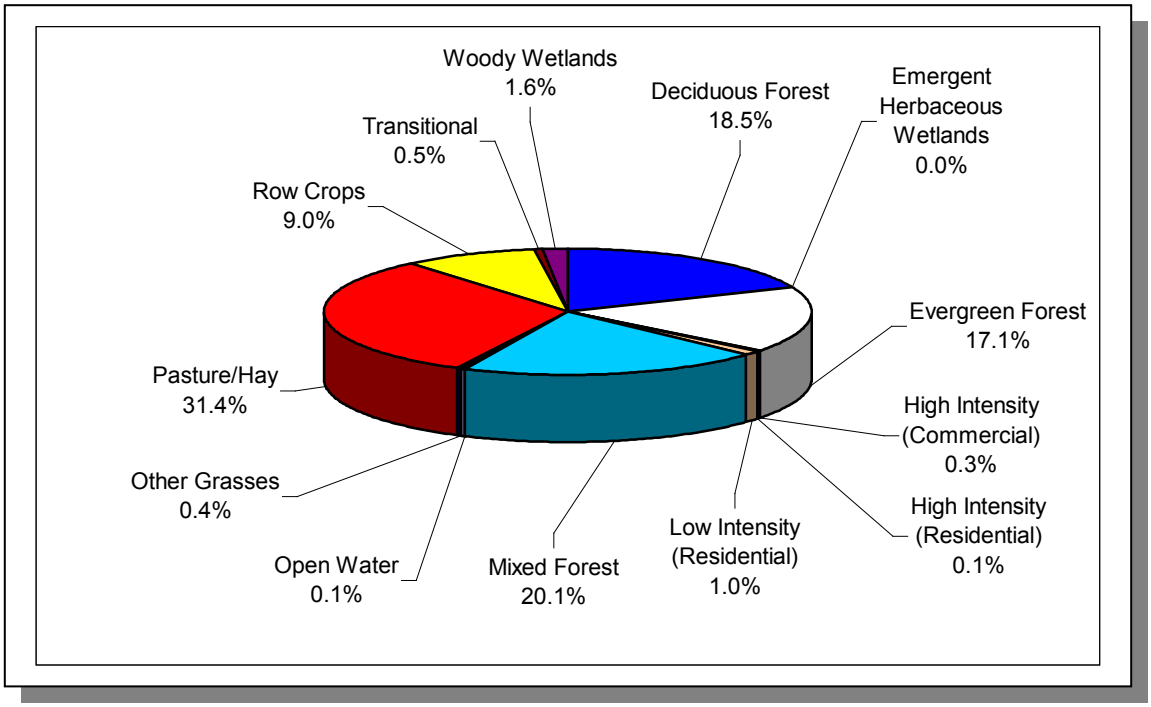


Figure 4-25. Land Use Distribution in Subwatershed 0602000205. *More information is provided in Hiwassee-Appendix IV.*

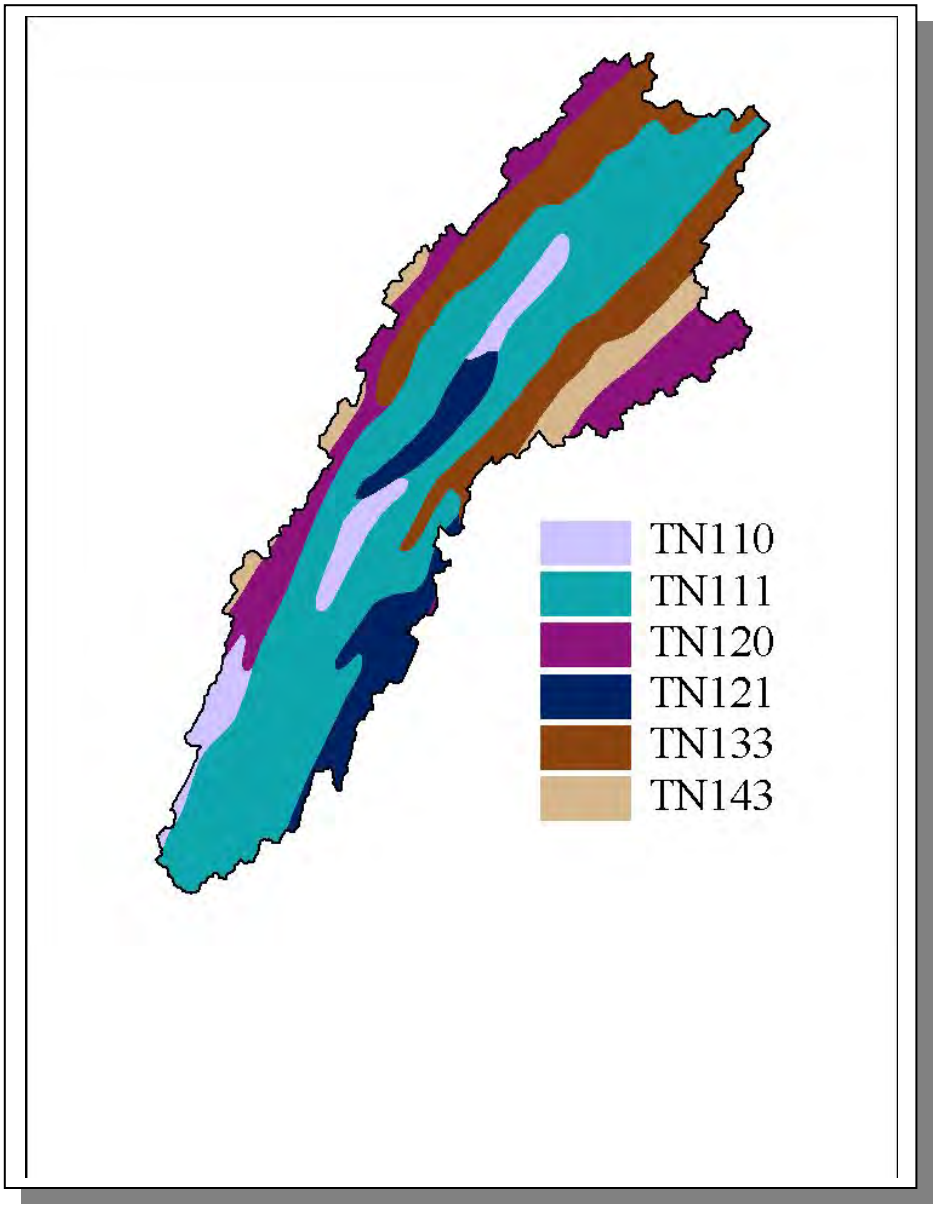


Figure 4-26. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0602000205.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN110	0.00	B	2.22	4.96	Loam	0.31
TN111	0.00	C	1.41	5.10	Loam	0.34
TN120	0.00	B	1.68	5.11	Loam	0.27
TN121	0.00	B	1.30	5.21	Loam	0.33
TN133	0.00	C	1.35	6.04	Clayey Loam	0.27
TN143	0.00	C	1.22	6.44	Loam	0.32

Table 4-16. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0602000205. *More information is provided in Hiwassee-Appendix IV.*

	COUNTY POPULATION			ESTIMATED POPULATION IN WATERSHED		% CHANGE
County	1990	1997 Est.	Portion of Watershed (%)	1990	1997	
Bradley	73,712	80,800	0.01	5	6	20.0
McMinn	42,383	46,000	21.55	9,131	9,911	8.5
Monroe	30,541	33,953	4.76	1,454	1,616	11.1
Polk	13,643	14,666	2.03	277	298	7.6
Total	**160, 279**	**175,419**		**10,867**	**11,831**	**8.9**

Table 4-17. Population Estimates in Subwatershed 0602000205.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Madisonville	Monroe	3,137	1,360	893	467	0
Etowah	McMinn	3,815	1,737	1,606	131	0
Totals		**6,952**	**3,097**	**2,499**	**598**	**0**

Table 4-18. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 0602000205.

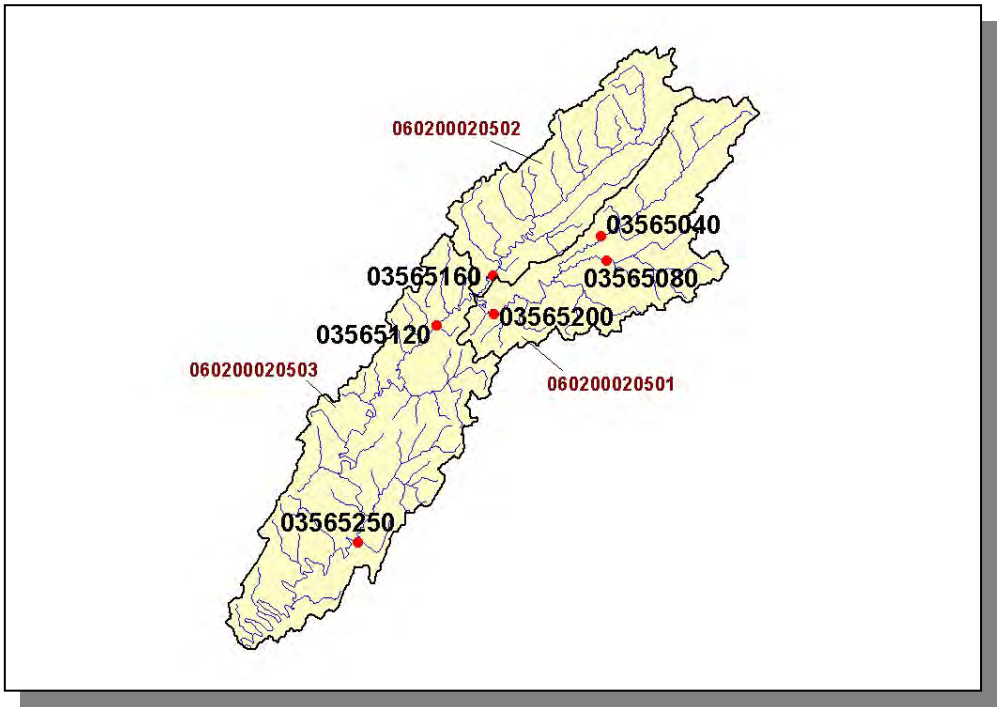


Figure 4-27. Location of Historical Streamflow Data Collection Sites in Subwatershed 0602000205. *Subwatershed 060200020501, 060200020502 and 060200020503 boundaries are shown for reference. More information is provided in Hiwassee-Appendix IV.*

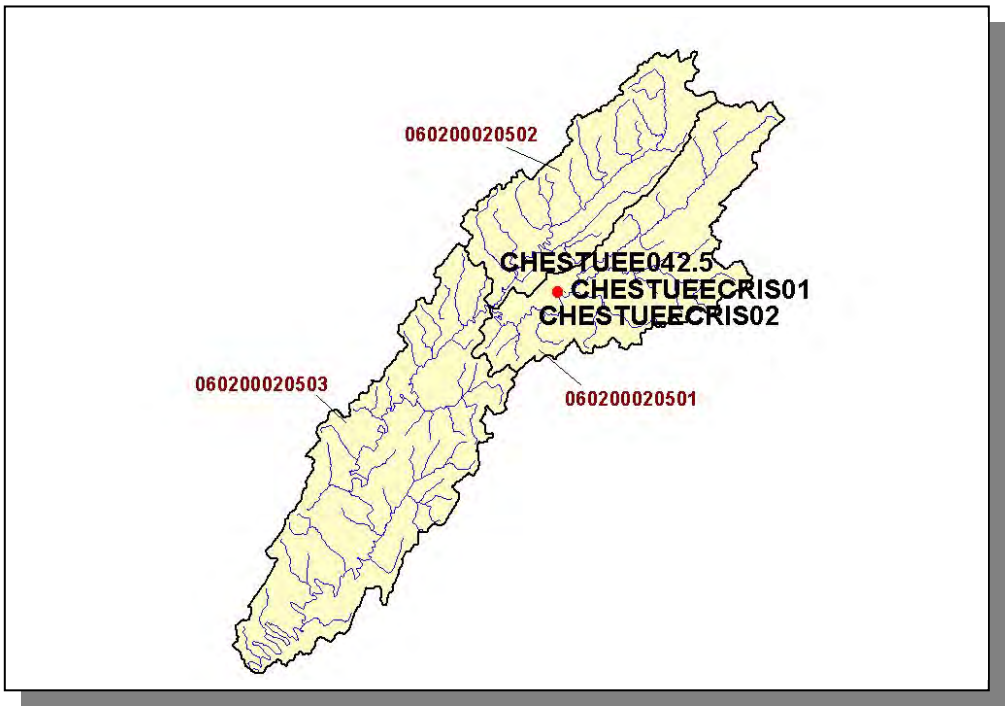


Figure 4-28. Location of Storet Monitoring Sites in Subwatershed 0602000205. *Subwatershed 060200020501, 060200020502 and 060200020503 boundaries are shown for reference. More information is provided in Hiwassee-Appendix IV.*

4.2.C.ii. Point Source Contributions.

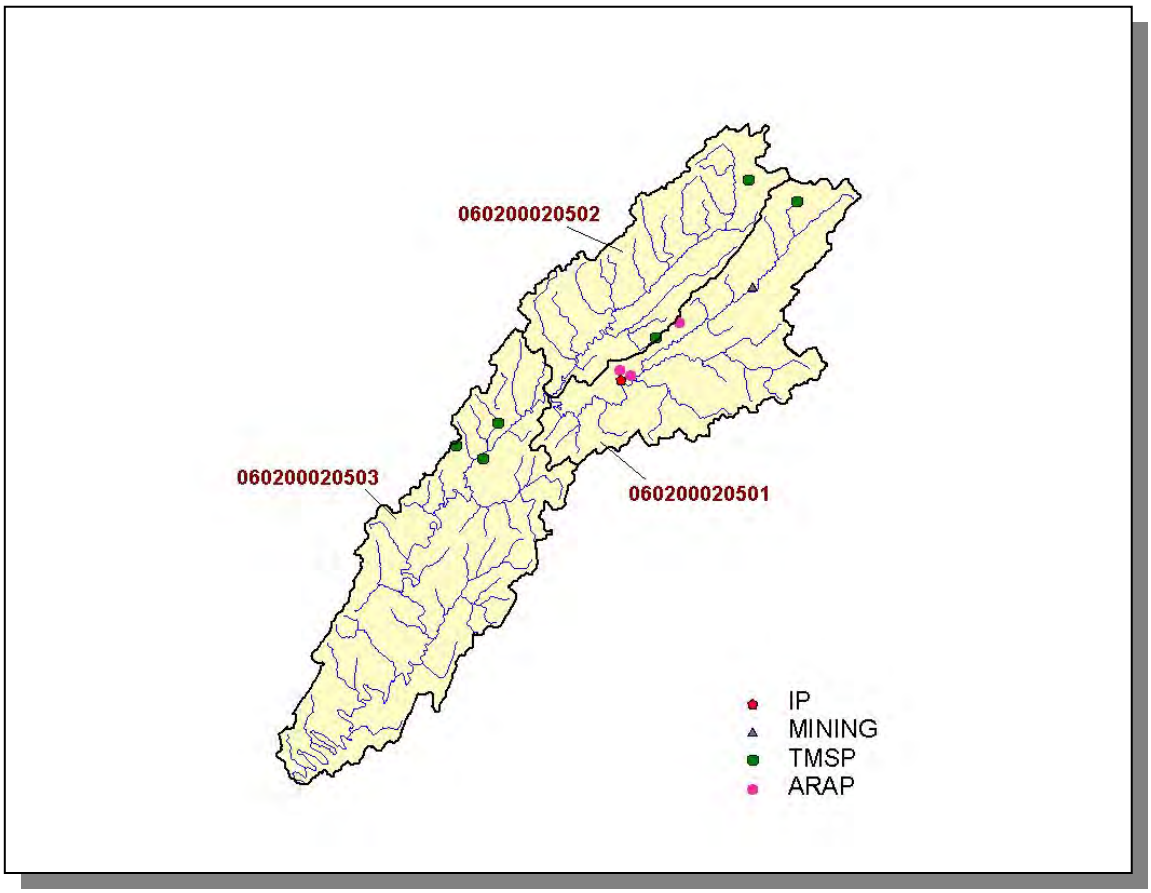


Figure 4-29. Location of Active Point Source Facilities in Subwatershed 0602000205. *Subwatershed 060200020501, 060200020502, and 060200020503 boundaries are shown for reference. More information is provided in the following figures.*

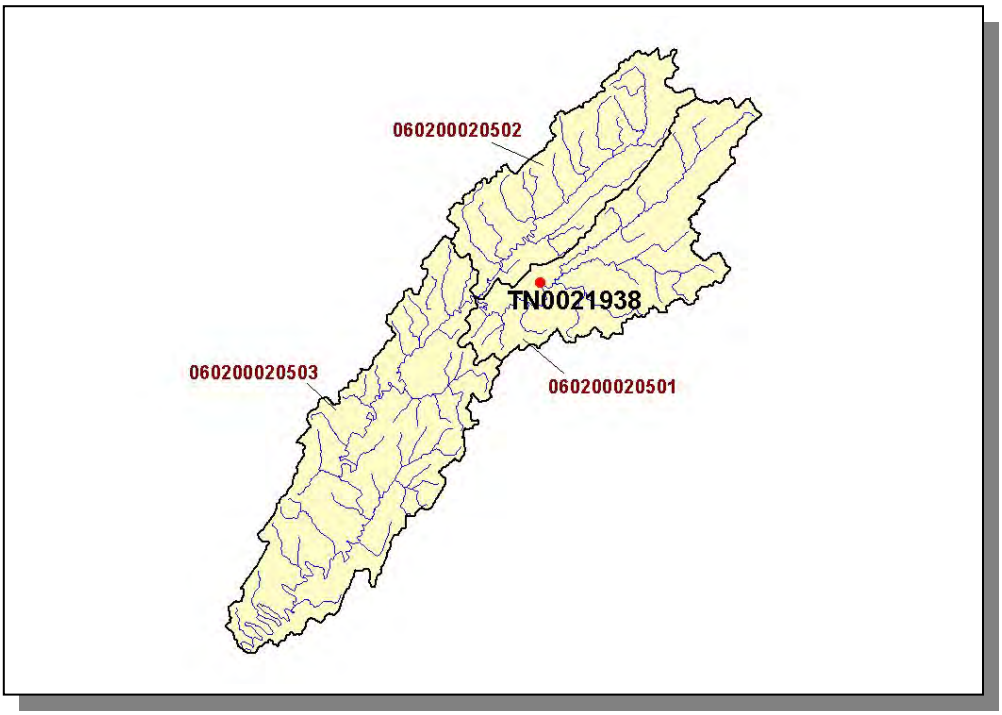


Figure 4-30. Location of Active Point Source Facilities (Individual Permits) in Subwatershed 0602000205. *Subwatershed 060200020501, 060200020502, and 060200020503 boundaries are shown for reference. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

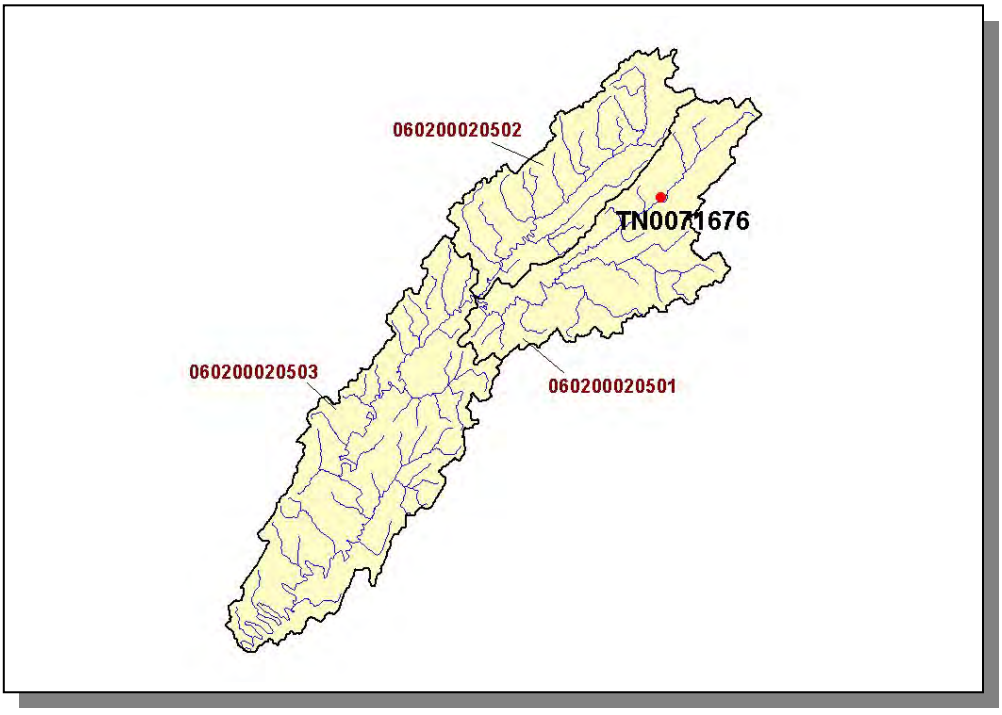


Figure 4-31. Location of Active Mining Sites in Subwatershed 0602000205. *Subwatershed 060200020501, 060200020502, and 060200020503 boundaries are shown for reference. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

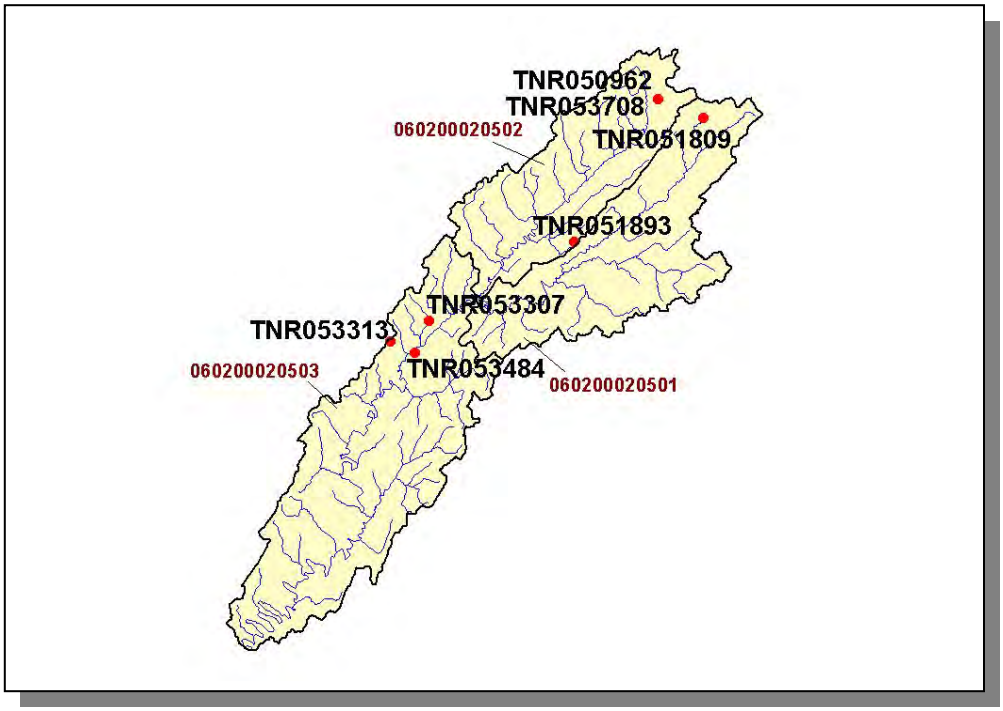


Figure 4-32. Location of TMSP Facilities in Subwatershed 0602000205. *Subwatershed 060200020501, 060200020502, and 060200020503 boundaries are shown for reference. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

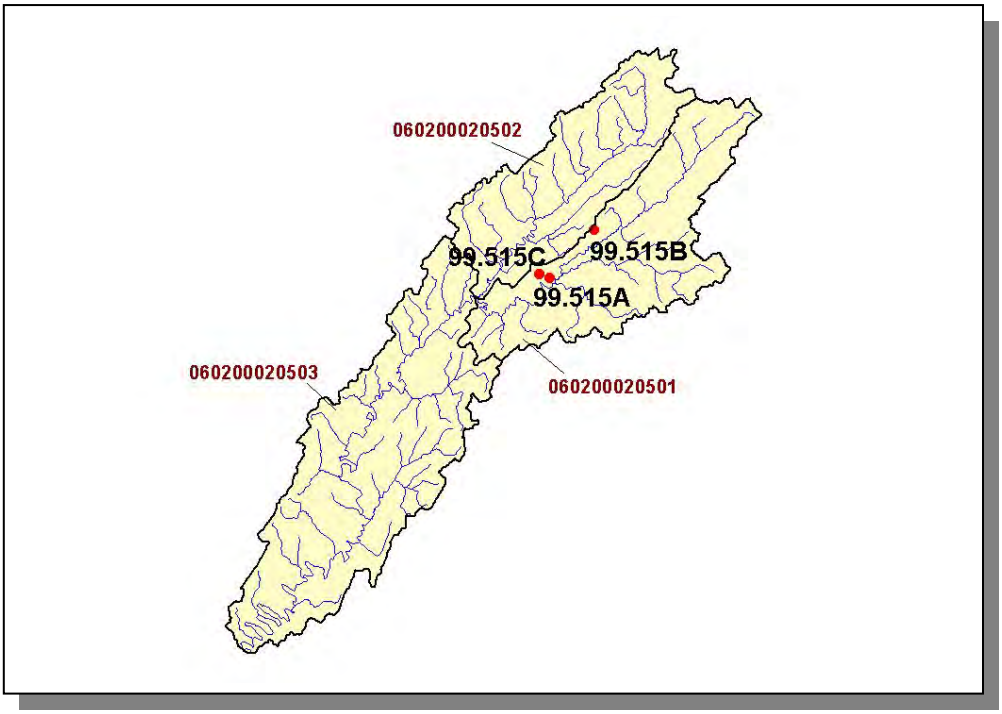


Figure 4-33. Location of ARAP Sites (Individual Permits) in Subwatershed 0602000205. *Subwatershed 060200020501, 060200020502, and 060200020503 boundaries are shown for reference. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

4.2.C.iii. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens	Chickens Sold	Hogs	Sheep
6,081	16,043	2,690	17	1,861,245	144	19

Table 4-19. Summary of Livestock Count Estimates in Subwatershed 0602000205. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Bradley	92.5	92.5	8.2	18.1
Monroe	301.5	279.1	7.4	21.4
Polk	224.7	214.1	6.2	21.1
Totals	**618.7**	**585.7**	**21.8**	**60.6**

Table 4-20. Forest Acreage and Average Annual Removal Rates (1987-1994) in Subwatershed 0602000205.

CROPS	TONS/ACRE/YEAR
Soybeans (Row Crops)	10.50
Nonagricultural Land Use	0.00
Legume (Hayland)	0.36
Grass (Pastureland)	0.47
Grass, Forbs, Legumes (Mixed Pasture)	0.65
Forest Land (Grazed)	0.00
Forest Land (Not Grazed)	0.00
Farmsteads and Ranch Headquarters	0.85
Corn (Row Crops)	14.79
Legume Grass (Hayland)	0.48
Tobacco (Row Crops)	5.65
Wheat (Close Grown Cropland)	6.20
Conservation Reserve Program Land	0.27

Table 4-21. Annual Estimated Total Soil Loss in Subwatershed 0602000205.

4.2.D. 0602000206.

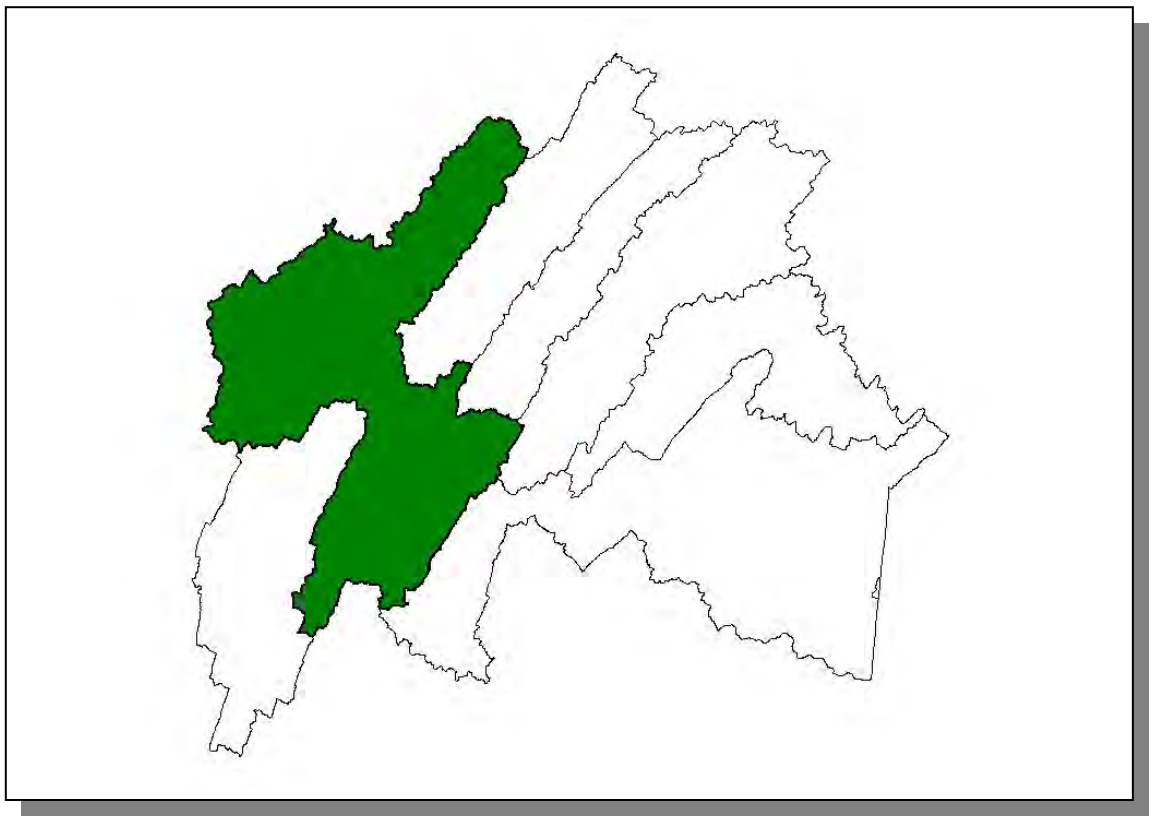


Figure 4-34. Location of Subwatershed 0602000206. *All Hiwassee HUC-10 subwatershed boundaries are shown for reference.*

4.2.D.i. General Description.

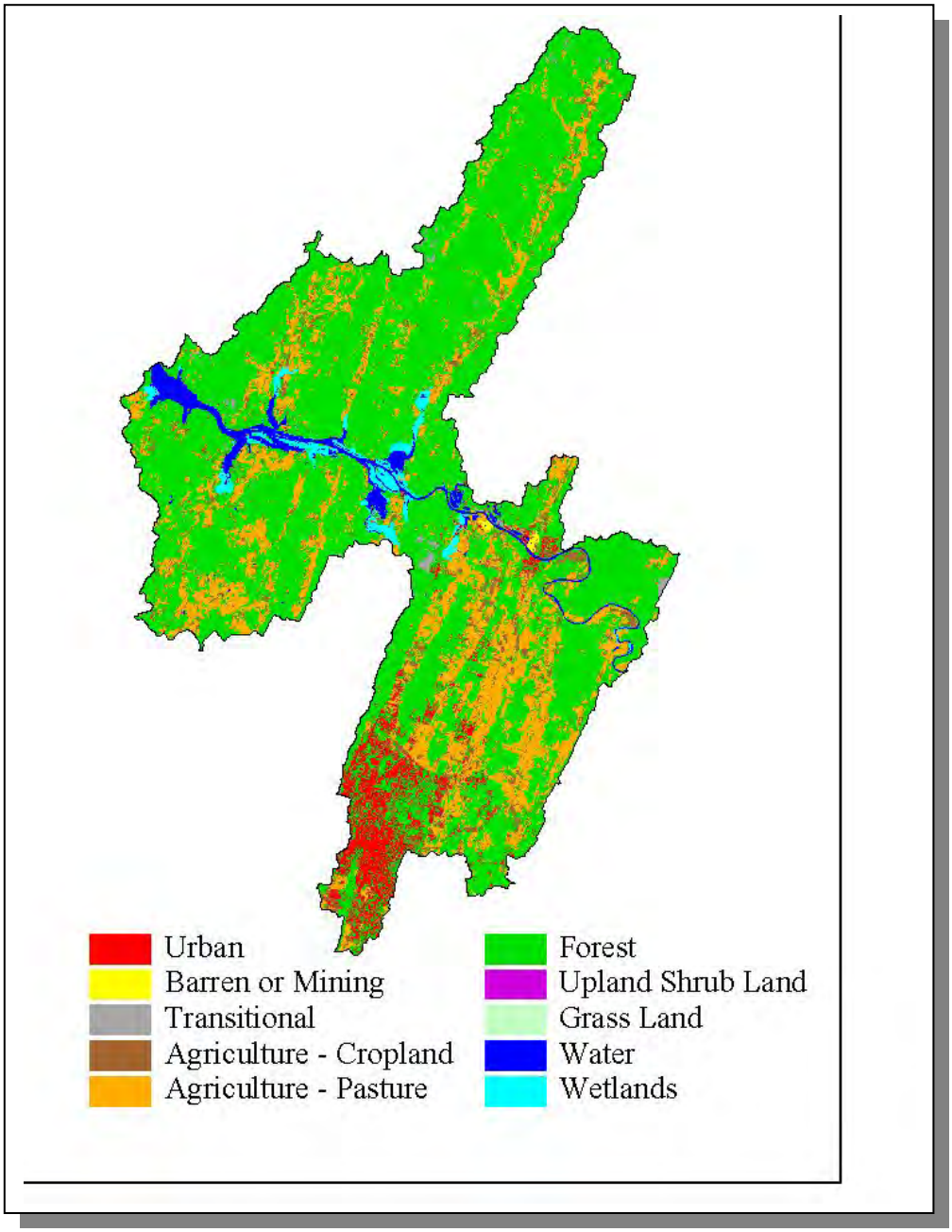


Figure 4-35. Illustration of Land Use Distribution in Subwatershed 0602000206.

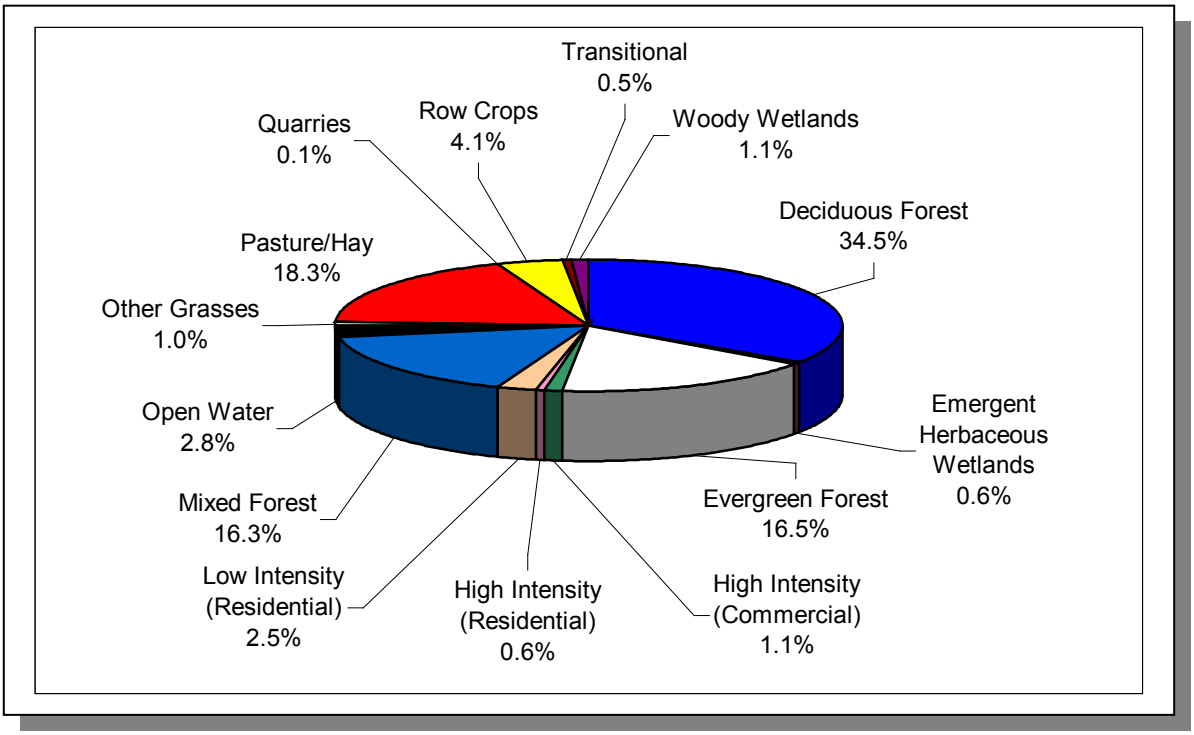


Figure 4-36. Land Use Distribution in Subwatershed 0602000206. *More information is provided in Hiwassee-Appendix IV.*

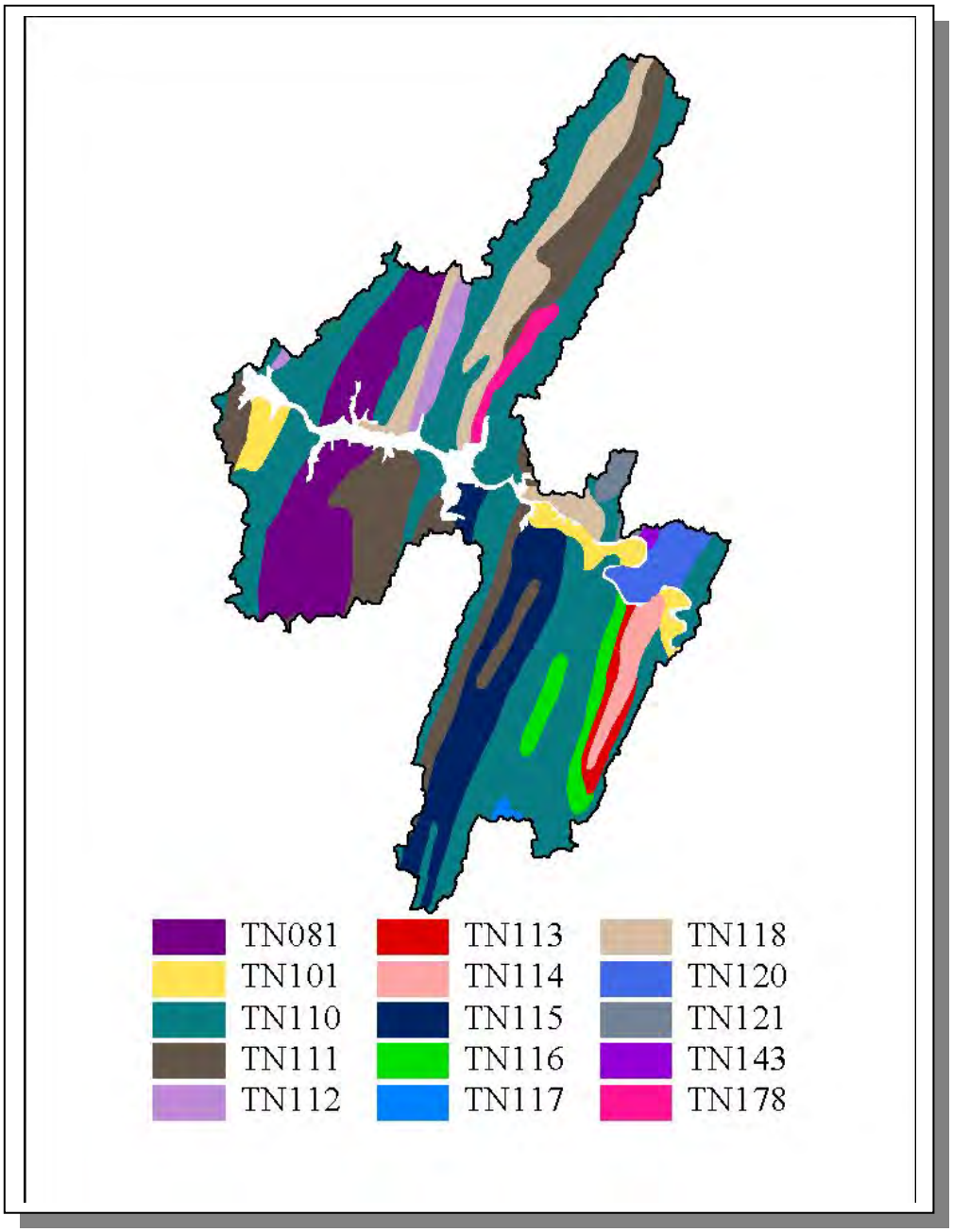


Figure 4-37. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0602000206.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN081	2.00	C	1.41	5.48	Silty Loam	0.35
TN101	0.00	B	1.71	5.39	Loam	0.35
TN110	0.00	B	2.22	4.96	Loam	0.31
TN111	0.00	C	1.41	5.10	Loam	0.34
TN112	2.00	C	2.36	5.09	Loam	0.35
TN113	0.00	C	1.29	6.52	Sandy Clay	0.22
TN114	1.00	B	1.31	5.11	Loam	0.27
TN115	0.00	C	1.41	5.15	Silty Loam	0.36
TN116	2.00	B	1.57	5.59	Loam	0.33
TN117	1.00	C	2.06	5.16	Loam	0.37
TN118	0.00	C	6.52	5.12	Loam	0.29
TN120	0.00	B	1.68	5.11	Loam	0.27
TN121	0.00	B	1.30	5.21	Loam	0.33
TN143	0.00	C	1.22	6.44	Loam	0.32
TN178	8.00	C	1.46	5.45	Loam	0.28

Table 4-22. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0602000206. *More information is provided in Hiwassee-Appendix IV.*

	COUNTY POPULATION			ESTIMATED POPULATION IN WATERSHED		% CHANGE
County	1990	1997 Est.	Portion of Watershed (%)	1990	1997	
Bradley	73,712	80,800	32.65	24,064	26,378	9.6
Hamilton	285,536	294,865	2.31	6,585	6,800	3.3
McMinn	42,383	46,000	16.13	6,836	7,420	8.5
Meigs	8,033	9,690	26.31	2,113	2,549	20.6
Polk	13,643	14,666	0.11	15	16	6.7
Total	**423,307**	**446,021**		**39,613**	**43,163**	**9.0**

Table 4-23. Population Estimates in Subwatershed 0602000206.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Calhoun	McMinn	570	222	3	217	2
Charleston	Bradley	661	276	15	259	2
Cleveland	Bradley	30,333	13,045	12,033	1,007	5
Total		**31,564**	**13,543**	**12,051**	**1,483**	**9**

Table 4-24. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 0602000206.

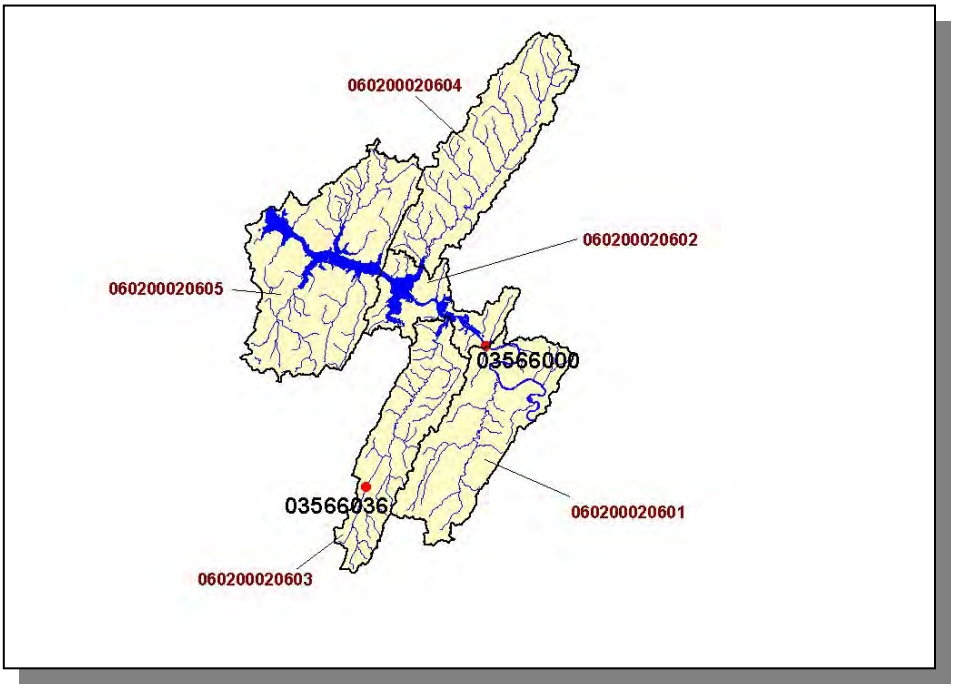


Figure 4-38. Location of Historical Streamflow Data Collection Sites in Subwatershed 0602000206. *Subwatershed 060200020601, 060200020602, 060200020603, 060200020604 and 060200020605 boundaries are shown for reference. More information is provided in Hiwassee-Appendix IV.*

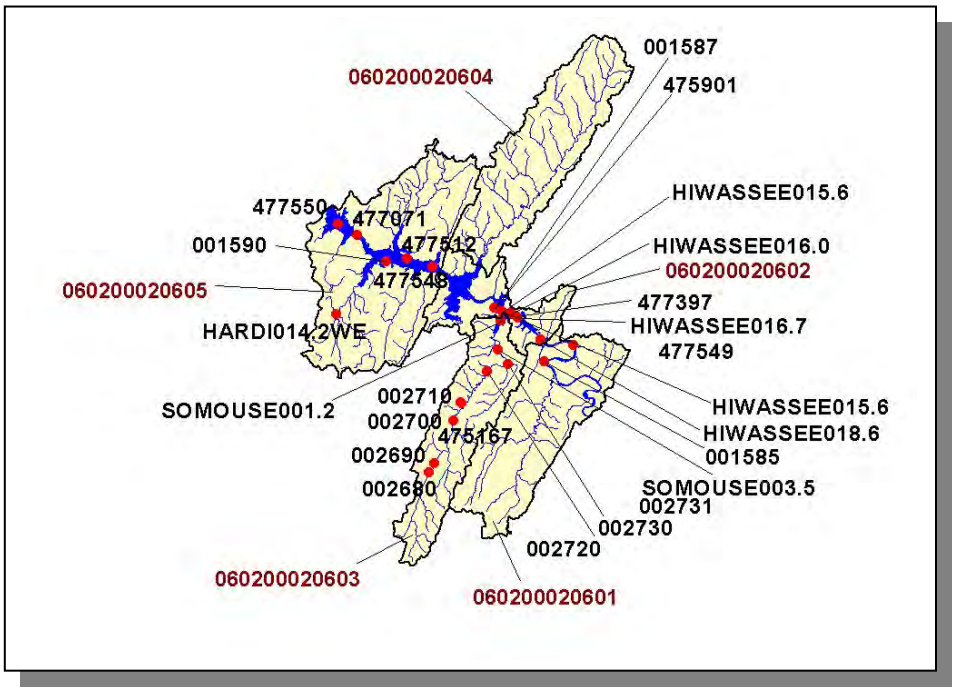


Figure 4-39. Location of STORET Monitoring Sites in Subwatershed 0602000206. *Subwatershed 060200020601, 060200020602, 060200020603, 060200020604 and 060200020605 boundaries are shown for reference. More information is provided in Hiwassee-Appendix IV.*

4.2.D.ii. Point Source Contributions.

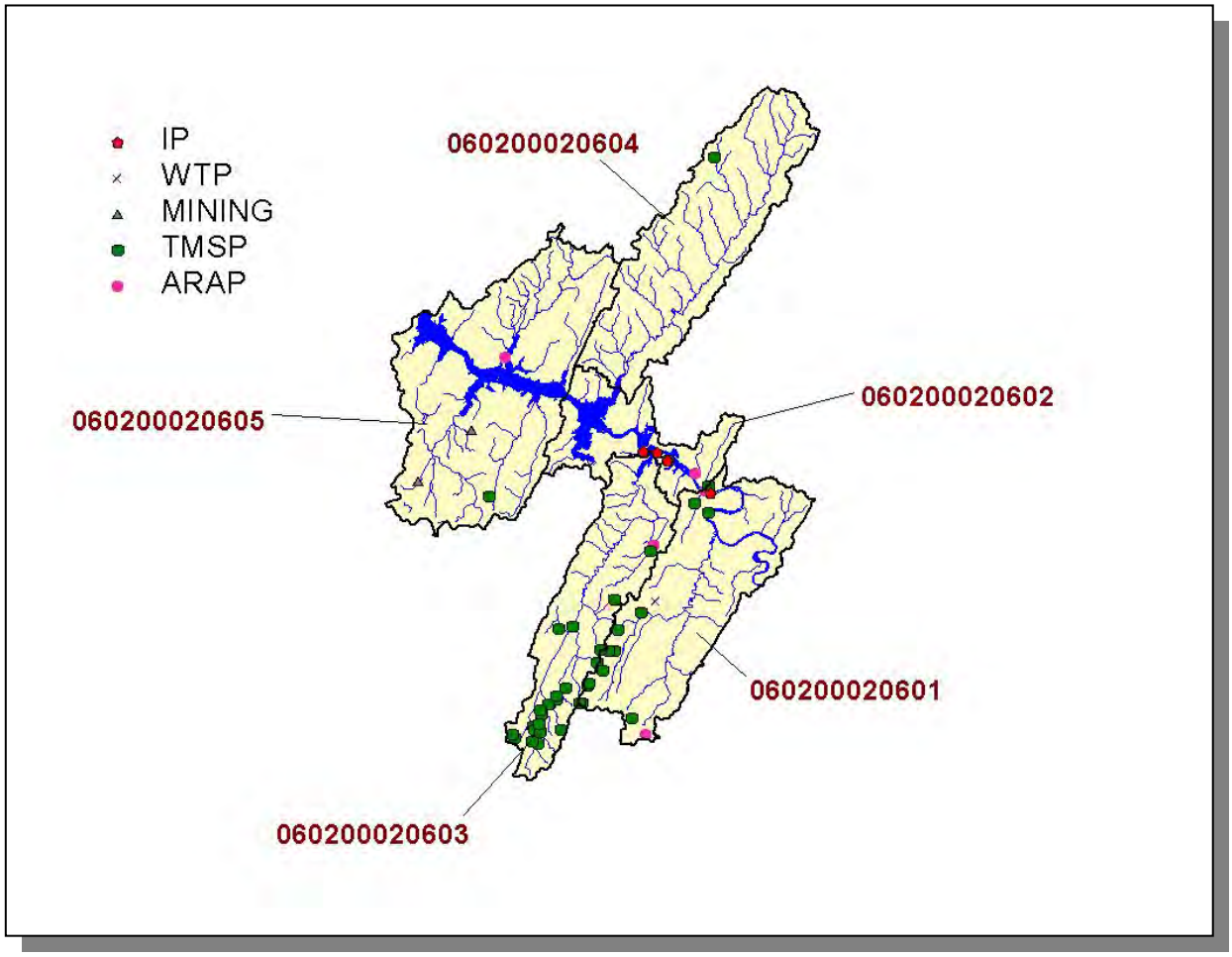


Figure 4-40. Location of Active Point Source Facilities in Subwatershed 0602000206. *Subwatershed 060200020601, 060200020602, 060200020603, 060200020604 and 060200020605 boundaries are shown for reference. Purple crosses. More information is provided in the following figures.*

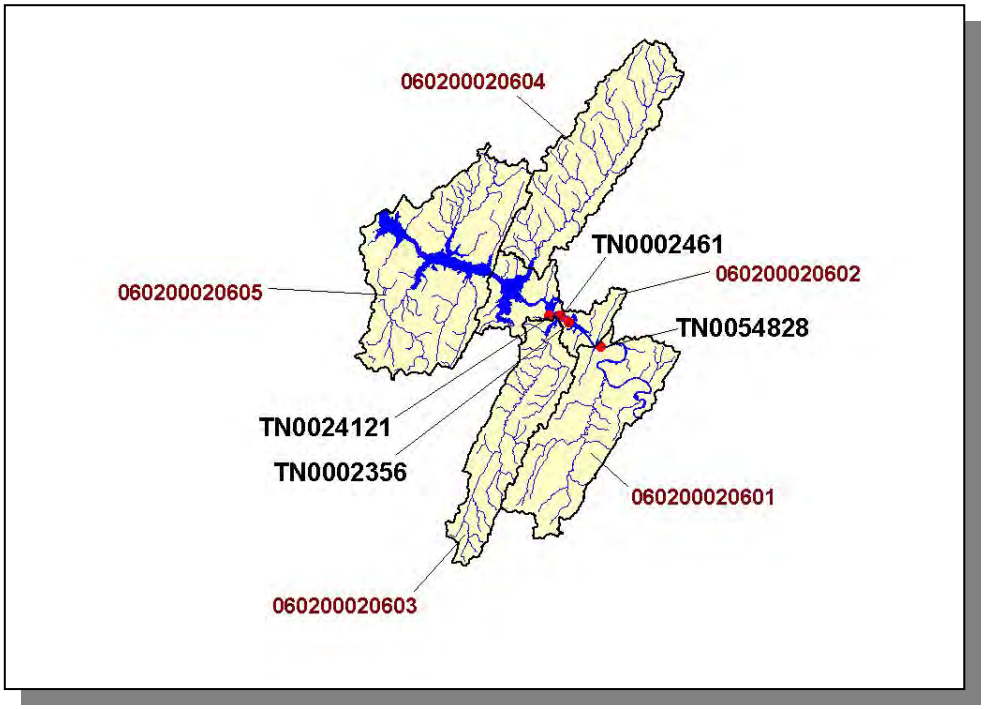


Table 4-25. Location of Active Point Source Facilities (Individual Permits) in Subwatershed 0602000206. *Subwatershed 060200020601, 060200020602, 060200020603, 060200020604 and 060200020605 boundaries are shown for reference. More information is provided in Hiwassee-Appendix IV.*

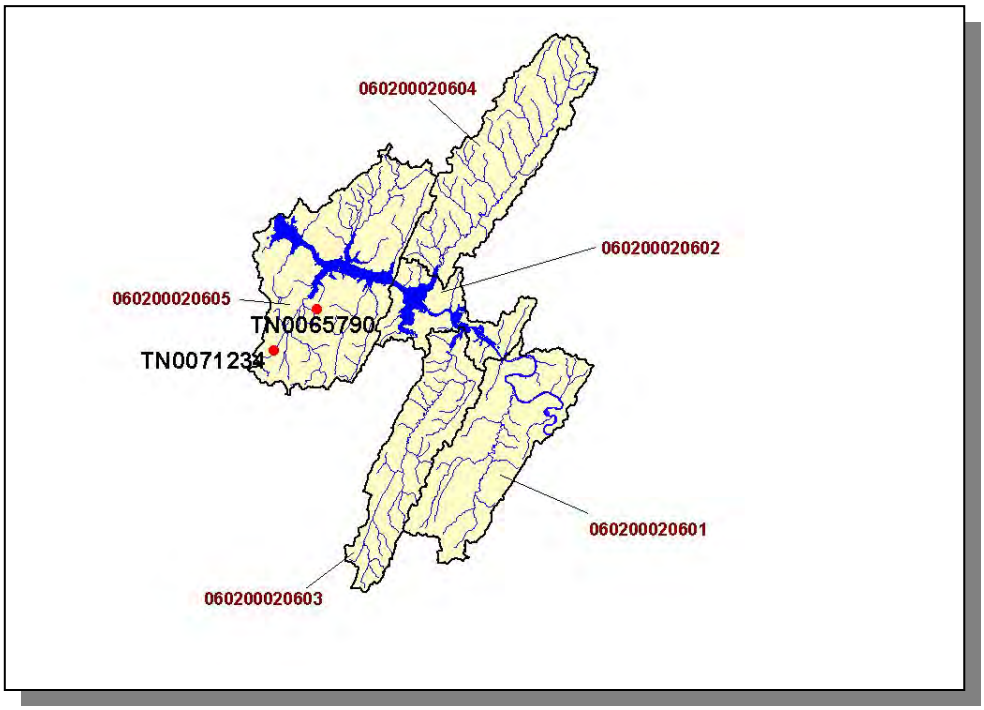


Figure 4-41. Location of Active Mining Sites in Subwatershed 0602000206. *Subwatershed 060200020601, 060200020602, 060200020603, 060200020604 and 060200020605 boundaries are shown for reference. More information is provided in Hiwassee-Appendix IV.*

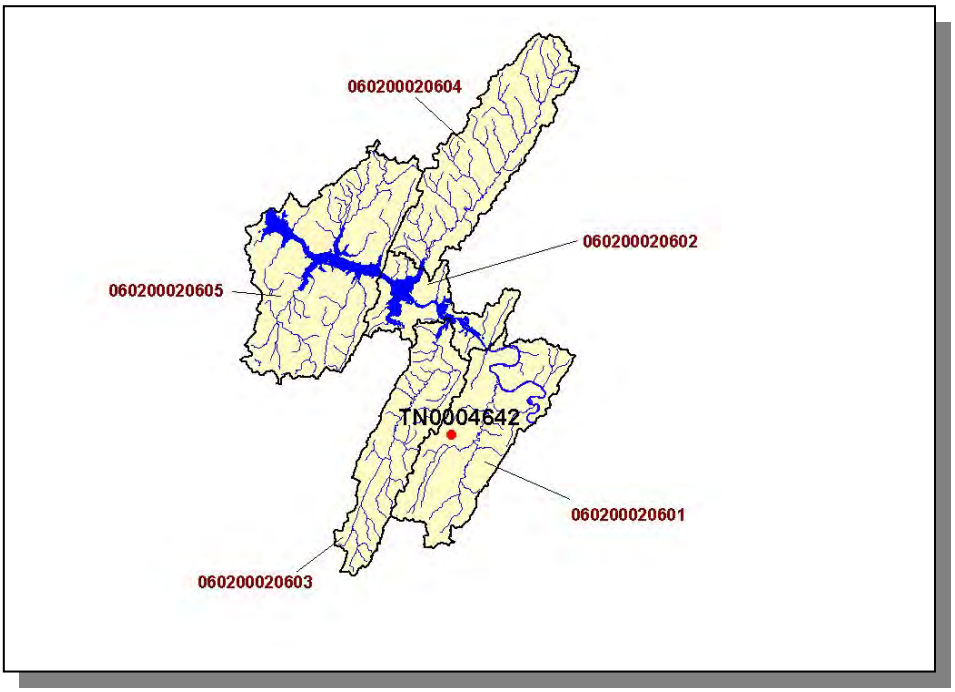


Figure 4-42. Location of Water Treatment Plant Sites in Subwatershed 0602000206. *Subwatershed 060200020601, 060200020602, 060200020603, 060200020604 and 060200020605 boundaries are shown for reference. More information is provided in Hiwassee-Appendix IV.*

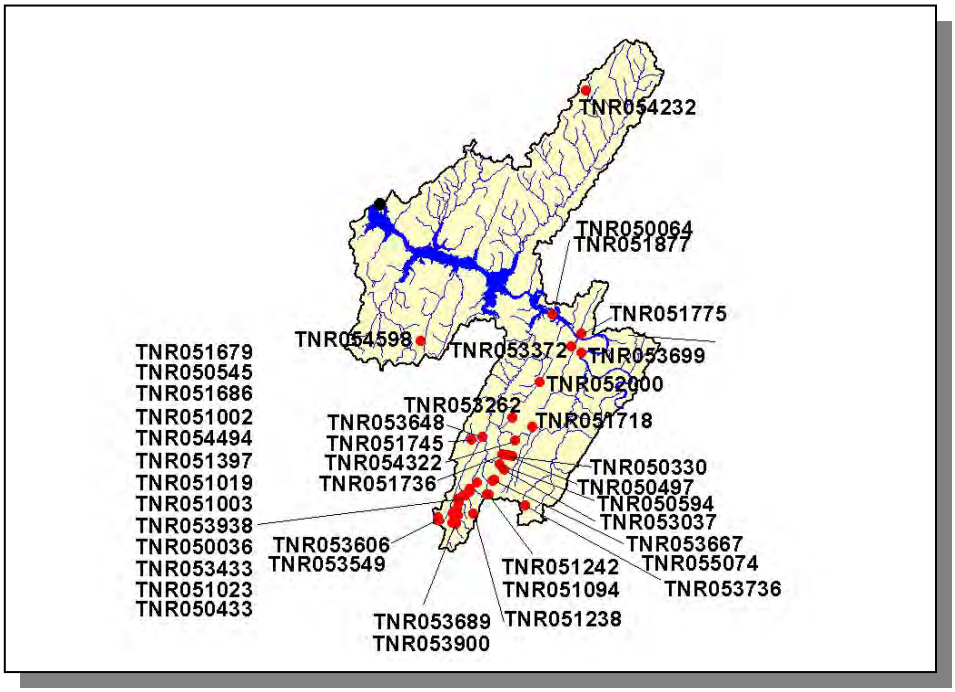


Figure 4-43. Location of TMSP Facilities in Subwatershed 0602000206. *Subwatershed 060200020601, 060200020602, 060200020603, 060200020604 and 060200020605 boundaries are shown for reference. More information is provided in Hiwassee-Appendix IV.*

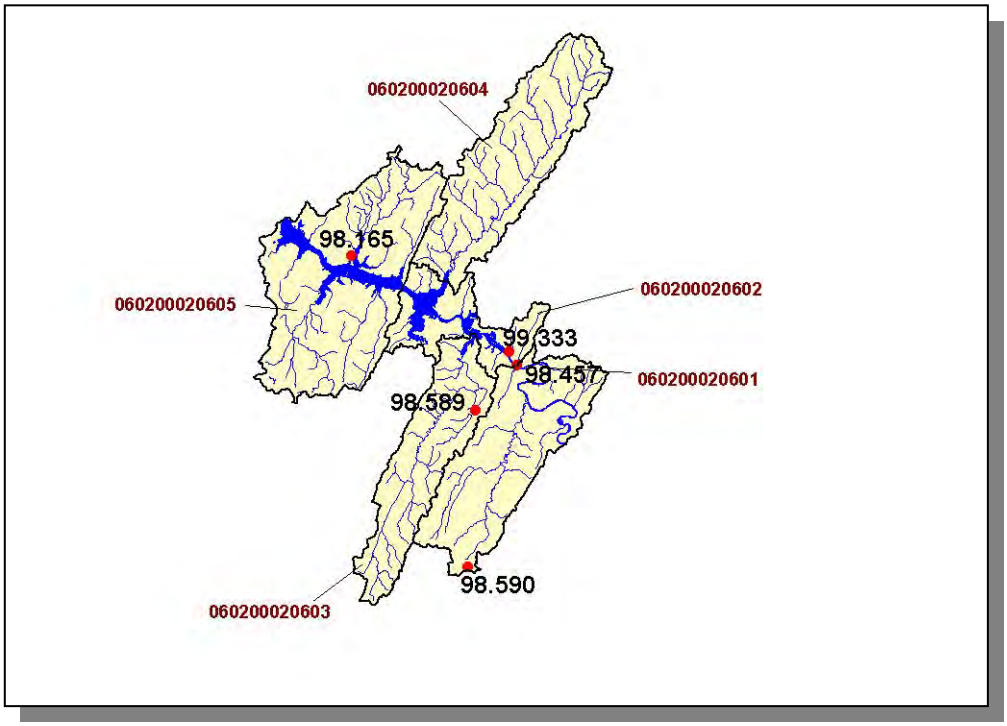


Figure 4-44. Location of ARAP Sites (Individual Permits) in Subwatershed 0602000206. *Subwatershed 060200020601, 060200020602, 060200020603, 060200020604 and 060200020605 boundaries are shown for reference. More information is provided in Hiwassee-Appendix IV.*

4.2.A.ii.a. Dischargers to Water Bodies Listed on the 1998 303(d) List

There are four NPDES facilities discharging to water bodies listed on the 1998 303(d) list in Subwatershed 0602000206:

- TN0002356 (Bowater Newsprint) discharges to the Hiwassee River @ RM22.7, RM 18.1, RM 16.5, and RM 15.0
- TN0002461 (Olin Corporation) discharges to the Hiwassee River @ RM 16.8, RM 16.6, and RM 15.8
- TN0024121 (Cleveland Utilities STP) discharges to the Hiwassee River @ RM 15.4
- TN0054828 (Calhoun School) discharges to the Hiwassee River @ RM 19.1

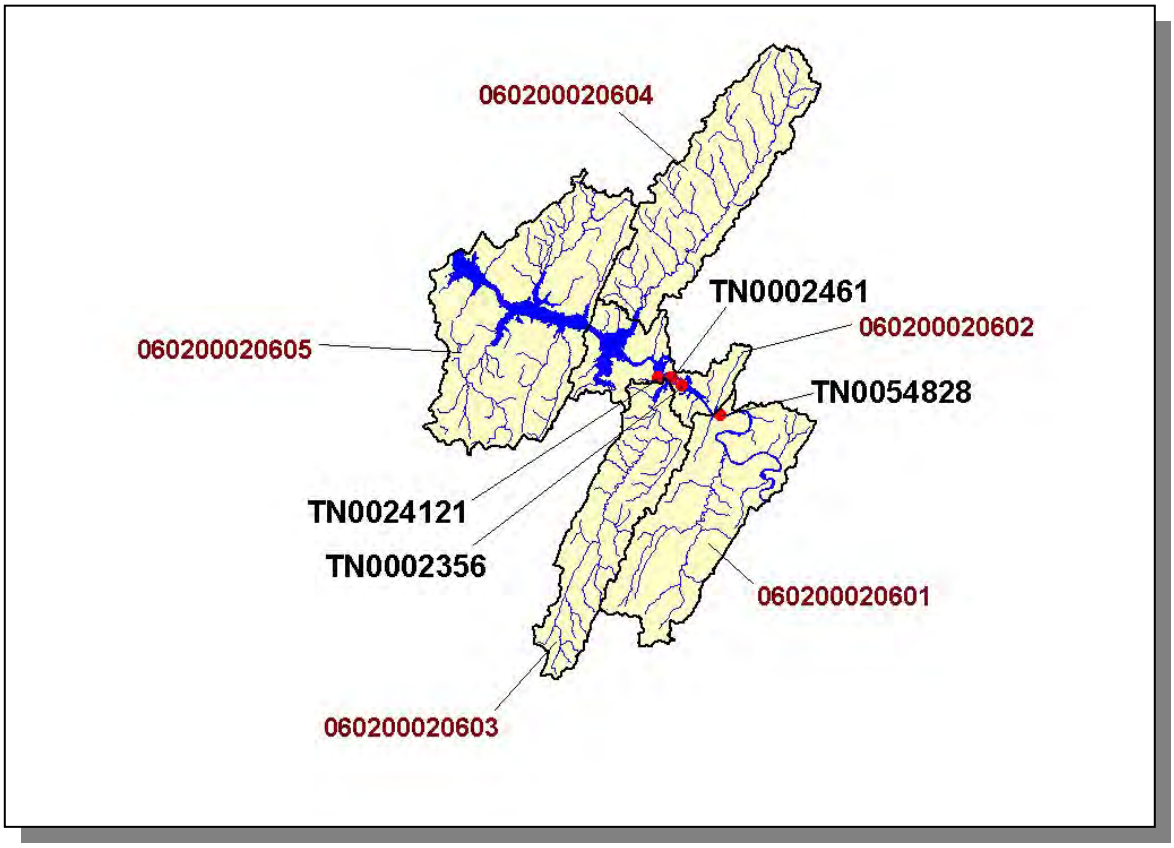


Figure 4-45. Location of NPDES Dischargers to Water Bodies Listed on the 1998 303(d) List in Subwatershed 0602000206. *Subwatershed 060200020601, 060200020602, 060200020603, 060200020604, and 060200020605 boundaries are shown for reference. The names of facilities are provided in Hiwassee-Appendix IV.*

PERMIT #	1Q10	3Q10	7Q10	3Q20	QDESIGN
TN0002356	418.17	556.48	743.26	455.01	49.43400
TN002461	418.17	556.48	743.26	455.01	3.92700
TN0024121	418.17	556.48	743.26	455.01	21.6000
TN0054828	418.17	556.48	743.26	455.01	0.01200

Table 4-26. Receiving Stream Flow Information for NPDES Dischargers to Waterbodies Listed on the 1998 303(d) List in Subwatershed 0602000206. *Data are in million gallons per day (MGD). Data were obtained from the USGS publication Flow Duration and Low Flows of Tennessee Streams Through 1992 or from permit files.*

PERMIT #	FECAL	Zn	PHENOL
TN0002356	X	X	X

Table 4-27. Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 1998 303(d) List in Subwatershed 0602000206.

PERMIT #	WET	FECAL	Hg	NH_3	TRC	TDS	TSS	DO	$CBOD_5$	BOD	SETTLEABLE SOLIDS	pH	AOX
TN0002356	X			X		X	X			X		X	X
TN0002461		X	X		X	X	X					X	
TN0024121	X			X	X		X	X	X		X	X	
TN0054828		X		X	X		X	X	X		X	X	

Table 4-28. Inorganic Parameters Monitored for Daily Maximum (mg/L) Limits for NPDES Dischargers to Waterbodies Listed on the 1998 303(d) List in Subwatershed 0602000206. *WET, Whole Effluent Toxicity, TRC, Total Residual Chlorine; TDS, Total Dissolved Solids; TSS, Total Suspended Solids; CBOD5, Carbonaceous Biochemical Oxygen Demand (5-Day); AOX, Adsorbable Organic Halides.*

PERMIT #	OIL and GREASE	DIOXIN
TN0002356	X	X

Table 4-29. Organic Parameters Monitored for Daily Maximum (mg/L) Limits for NPDES Dischargers to Waterbodies Listed on the 1998 303(d) List in Subwatershed 0602000206.

4.2.D.iii. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Milk Cow	Cattle	Chickens	Chickens Sold	Hogs	Sheep
6,733	1,954	16,876	21	6,988,516	192	50

Table 4-30. Summary of Livestock Count Estimates in Subwatershed 0602000206. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Bradley	92.5	92.5	8.2	18.1
Hamilton	210.7	210.7	2.2	6.0
Meigs	83.0	83.0	0.2	0.0
Polk	224.7	214.1	6.2	21.1
Total	**610.9**	**600.3**	**16.8**	**45.2**

Table 4-31. Forest Acreage and Average Annual Removal Rates (1987-1994) in Subwatershed 0602000206.

CROPS	TONS/ACRE/YEAR
Forest Land (Grazed)	0.00
Forest Land (Not Grazed)	0.00
Farmsteads and Ranch Headquarters	0.94
Non Agricultural Land Use	0.00
Corn (Row Crops)	4.93
Soybeans (Row Crops)	2.33
Tobacco (Row Crops)	5.65
Wheat (Close Grown Cropland)	3.14
Oats (Close Grown Cropland)	3.13
All Other Close Grown Cropland	1.99
Grass (Hayland)	0.49
Legume (Hayland)	0.13
Other Cropland not Planted	2.93
Grass (Pastureland)	0.35
Grass, Forbs, Legumes (Mixed Pasture)	0.65
Other Land in Farms	0.00
Conservation Reserve Program Land	0.27
Legume (Pastureland)	0.07
Fruit (Horticulture)	0.19

Table 4-32. Annual Soil Loss in Subwatershed 0602000206.

4.2.E. 0602000207.

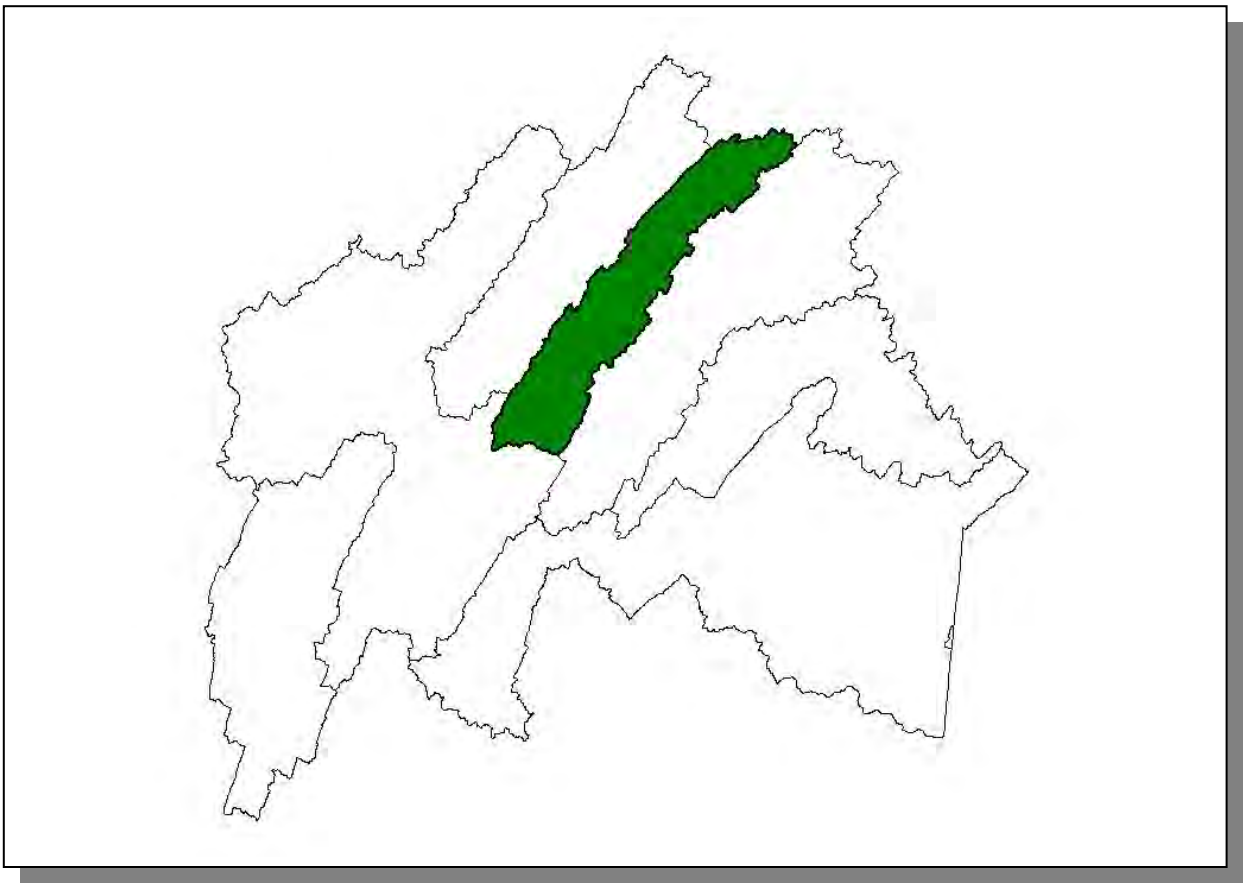


Figure 4-46. Location of Subwatershed 0602000207. *All Hiwassee HUC-10 subwatershed boundaries are shown for reference.*

4.2.E.i. General Description.

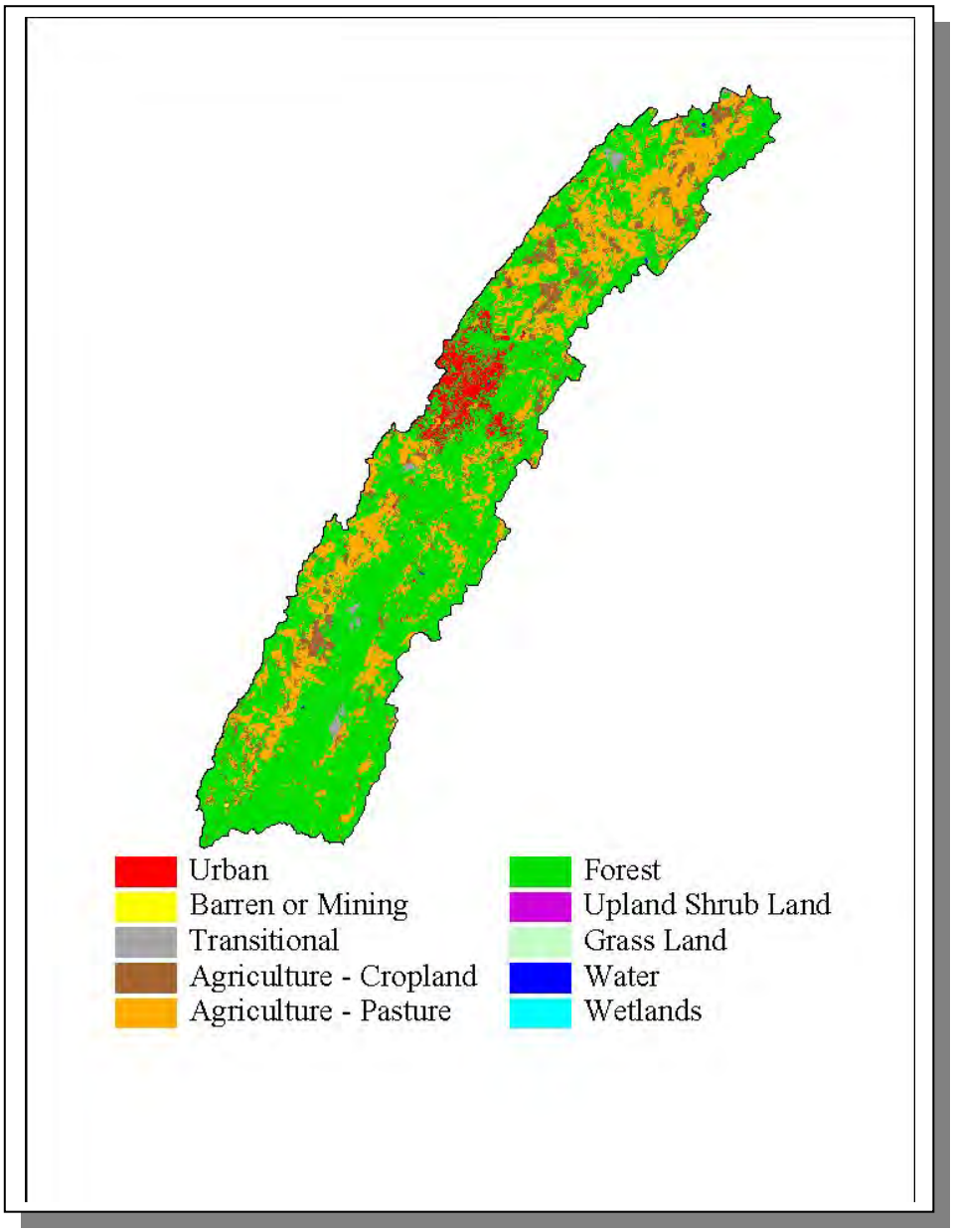


Figure 4-47. Illustration of Land Use Distribution in Subwatershed 0602000207.

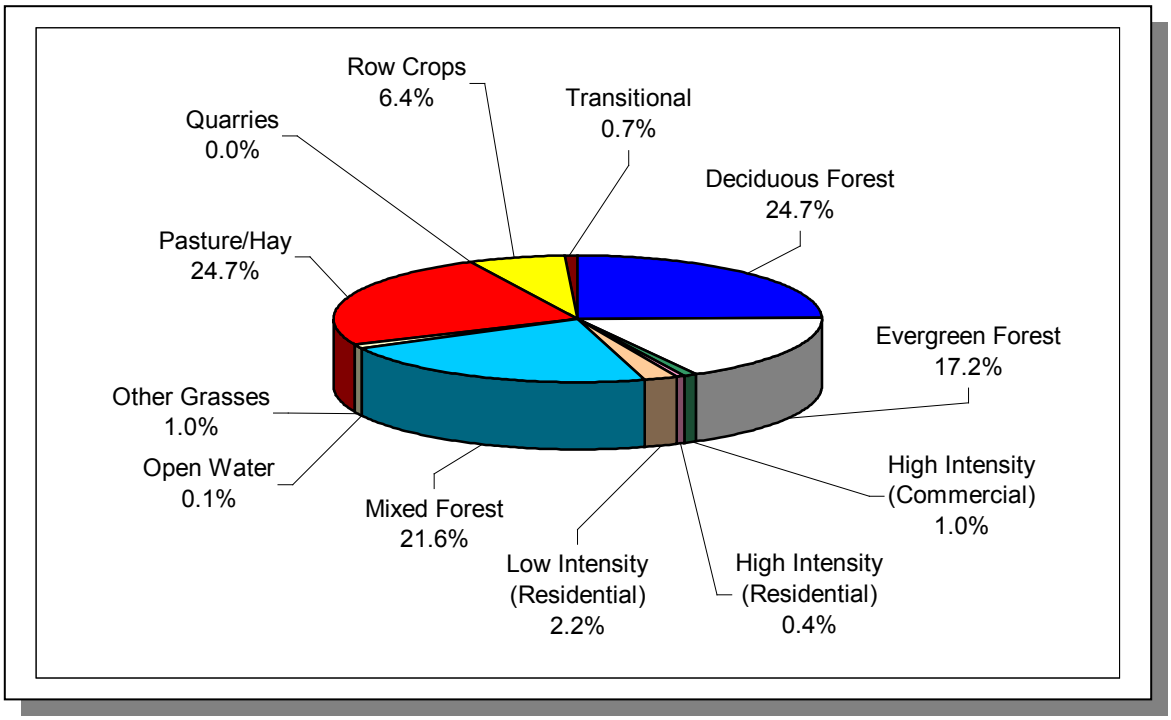


Figure 4-48. Land Use Distribution in Subwatershed 0602000207. *More information is provided in Hiwassee-Appendix IV.*

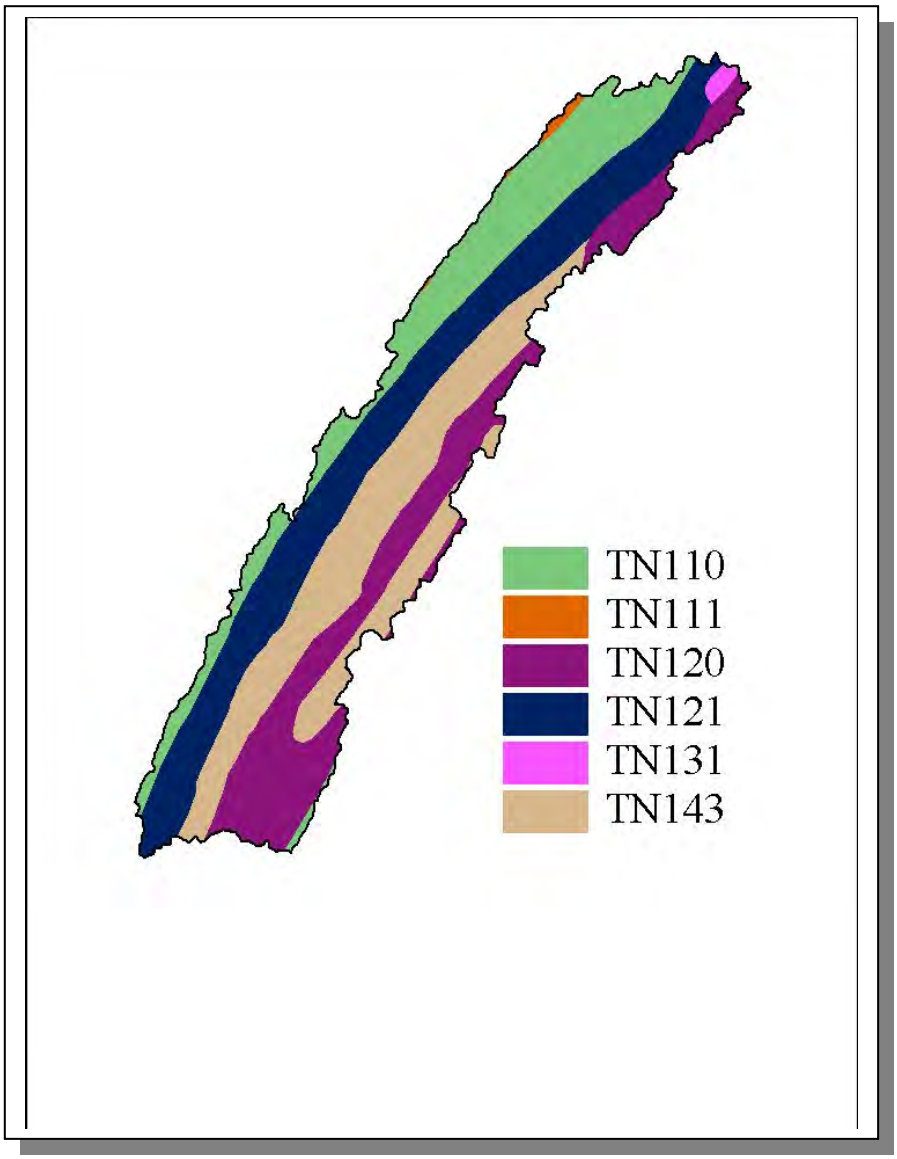


Figure 4-49. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0602000207.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hr)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN110	0.00	B	2.22	4.96	Loam	0.31
TN111	0.00	C	1.41	5.10	Loam	0.34
TN120	0.00	B	1.68	5.11	Loam	0.27
TN121	0.00	B	1.30	5.21	Loam	0.33
TN131	0.00	C	1.17	4.95	Silty Loam	0.33
TN143	0.00	C	1.22	6.44	Loam	0.32

Table 4-33. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0602000207. *More information is provided in Hiwassee-Appendix IV.*

	COUNTY POPULATION			ESTIMATED POPULATION IN WATERSHED		% CHANGE
County	1990	1997 Est.	Portion of Watershed (%)	1990	1997	
Bradley	73,712	80,800	0.01	4	5	25.0
McMinn	42,383	46,000	15.92	6,745	7,321	8.5
Monroe	30,541	33,953	0.33	100	111	11.0
Total	**146,636**	**160753**		**6,849**	**7,437**	**8.6**

Table 4-34. Population Estimates in Subwatershed 0602000207.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Athens	McMinn	12,954	5,184	4,947	237	0
Niota	McMinn	769	364	289	75	0
Totals		**13,723**	**5,548**	**5,236**	**312**	**0**

Table 4-35. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 0602000207.

Figure 4-50. Location of Historical Streamflow Data Collection Sites in Subwatershed 0602000207. *More information is provided in Hiwassee-Appendix IV.*

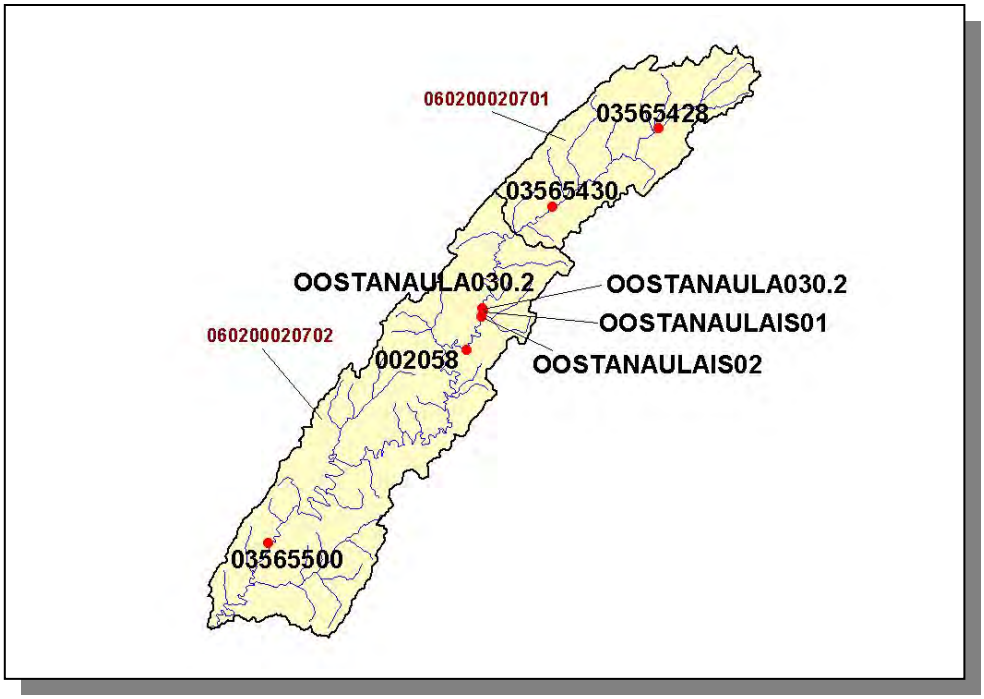


Figure 4-51. Location of STORET Monitoring Sites in Subwatershed 0602000207. *Subwatershed 060200020701 and 060200020702 boundaries are shown for reference. More information is provided in Hiwassee-Appendix IV.*

4.2.E.ii. Point Source Contributions.

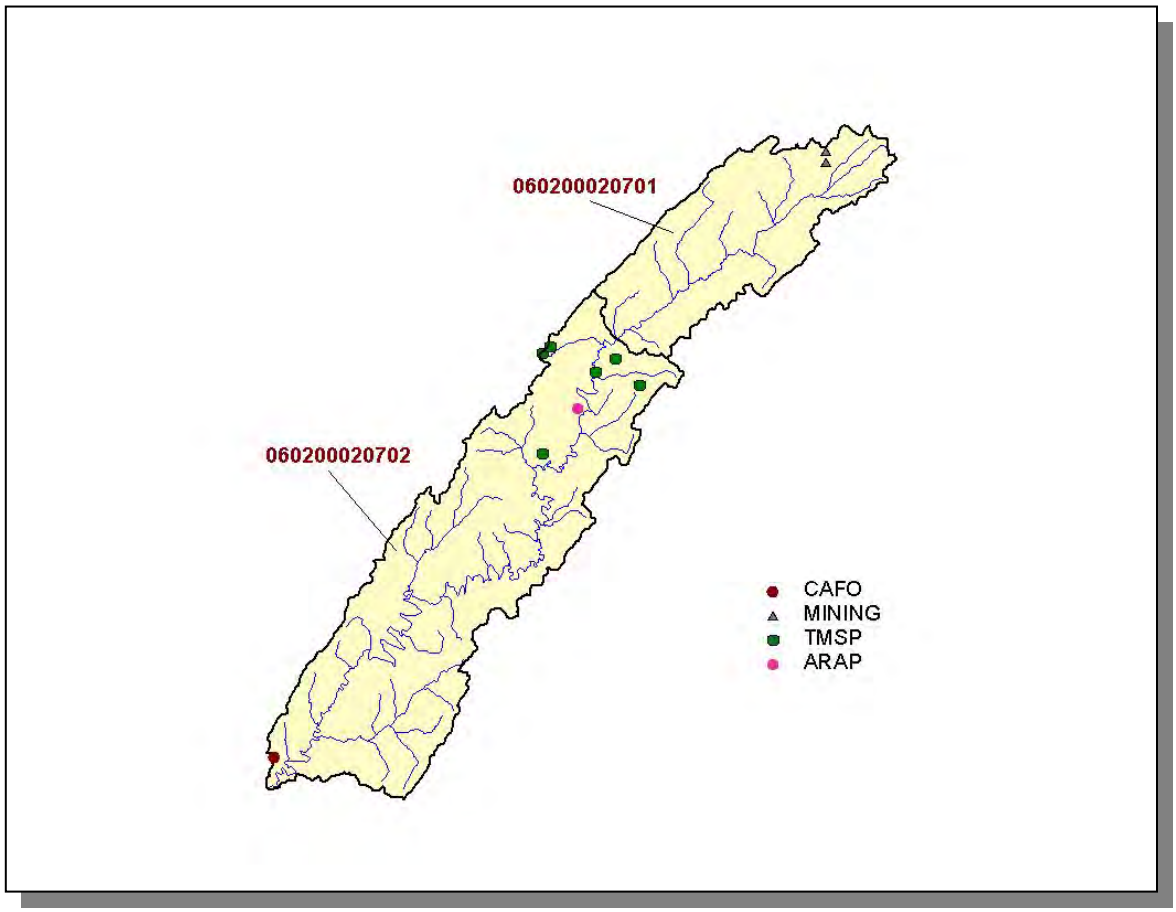


Figure 4-52. Location of Active Point Source Facilities in Subwatershed 0602000207. *Subwatershed 060200020701 and 060200020702 boundaries are shown for reference. More information is provided in the following figures.*

Figure 4-53. Location of Active Mining Sites in Subwatershed 0602000207. *Subwatershed 060200020701 and 060200020702 boundaries are shown for reference. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

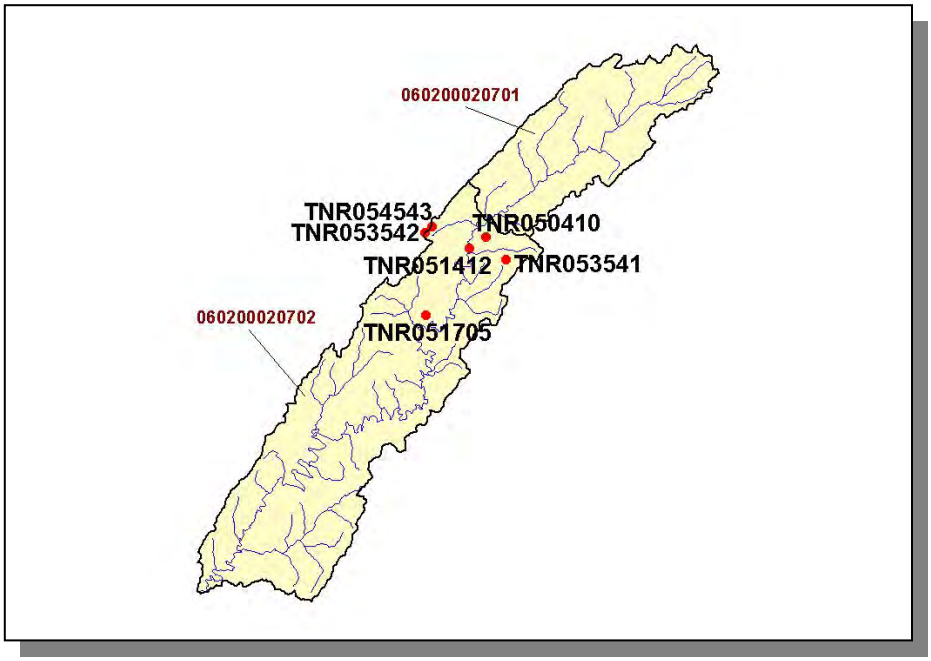


Figure 4-54. Location of TMSP Facilities in Subwatershed 0602000207. *Subwatershed 060200020701 and 060200020702 boundaries are shown for reference. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

Figure 4-55. Location of CAFO Facilities in Subwatershed 0602000207. *Subwatershed 060200020701, and 060200020702 boundaries are shown for referenceCAFO rules may be found at http://cfpub.epa.gov/npdes/afo/cafofinalrule.cfm. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

Figure 4-56. Location of ARAP Sites (Individual Permits) in Subwatershed 0602000207. *Subwatershed 060200020701 and 060200020702 boundaries are shown for reference. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

4.2.E.iii. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Milk Cow	Cattle	Chickens	Chickens Sold	Hogs	Sheep
2,488	1,084	6,533	7	786,620	64	5

Table 4-36. Summary of Livestock Count Estimates in Subwatershed 0602000207. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Bradley	92.5	92.5	8.2	18.1
Monroe	301.5	279.1	7.4	21.4
Totals	**394.0**	**371.6**	**15.6**	**39.5**

Table 4-37. Forest Acreage and Annual Removal Rates (1987-1994) in Subwatershed 0602000207.

CROPS	TONS/ACRE/YEAR
Soybeans (Row Crops)	12.82
Grass (Pastureland)	0.39
Non Agricultural Land Use	0.00
Grass (Hayland)	0.36
Grass, Forbs, Legumes (Mixed Pasture)	0.66
Farmsteads and Ranch Headquarters	1.05
Legume Grass (Hayland)	0.60
Forest Land (Grazed)	0.00
Forest Land (Not Grazed)	0.00
Corn (Row Crops)	17.07
Tobacco (Row Crops)	5.65
Wheat (Close Grown Cropland)	6.20
Conservation Reserve Program Land	0.27

Table 4-38. Annual Estimated Soil Loss in Subwatershed 0602000207.

4.2.F. 0602000208

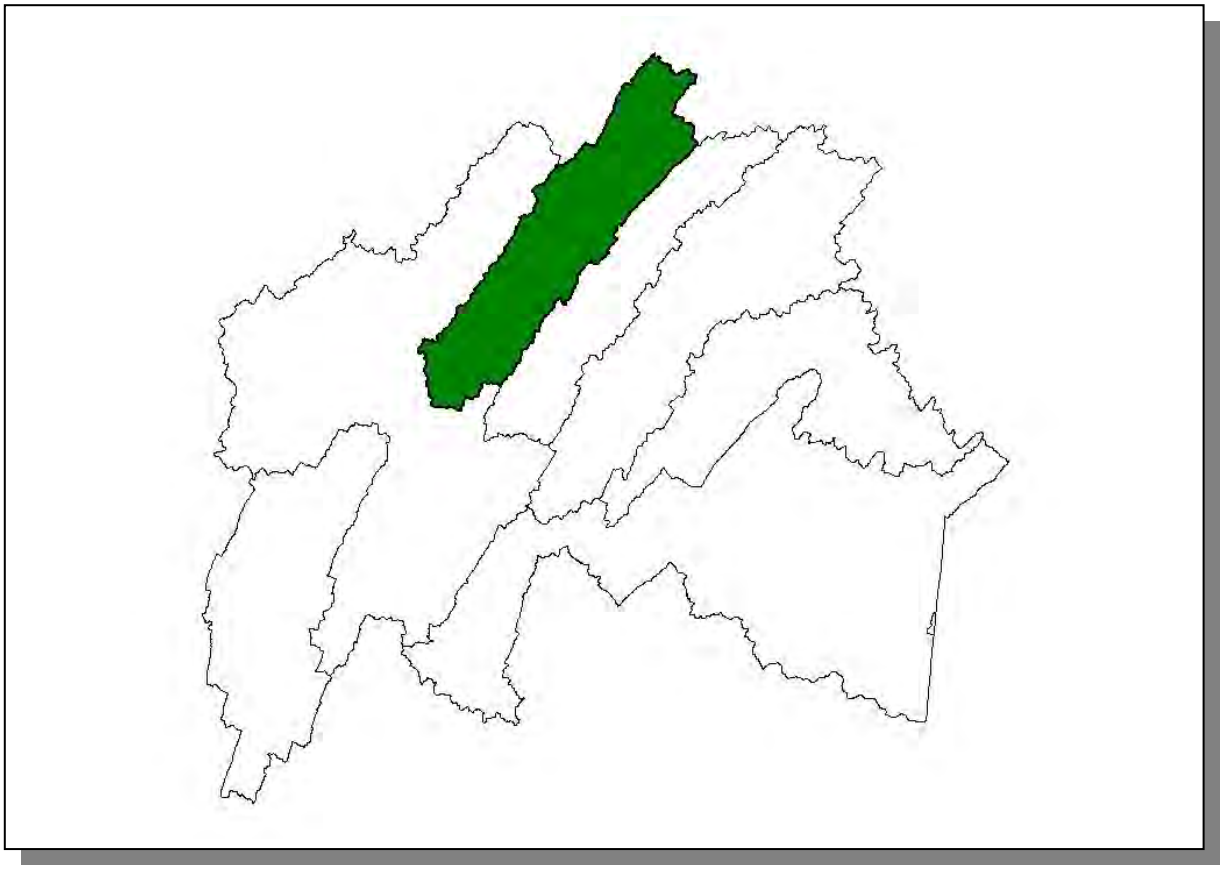


Figure 4-57. Location of Subwatershed 0602000208. *All Hiwassee HUC-10 subwatershed boundaries are shown for reference.*

4.2.F.i. General Description.

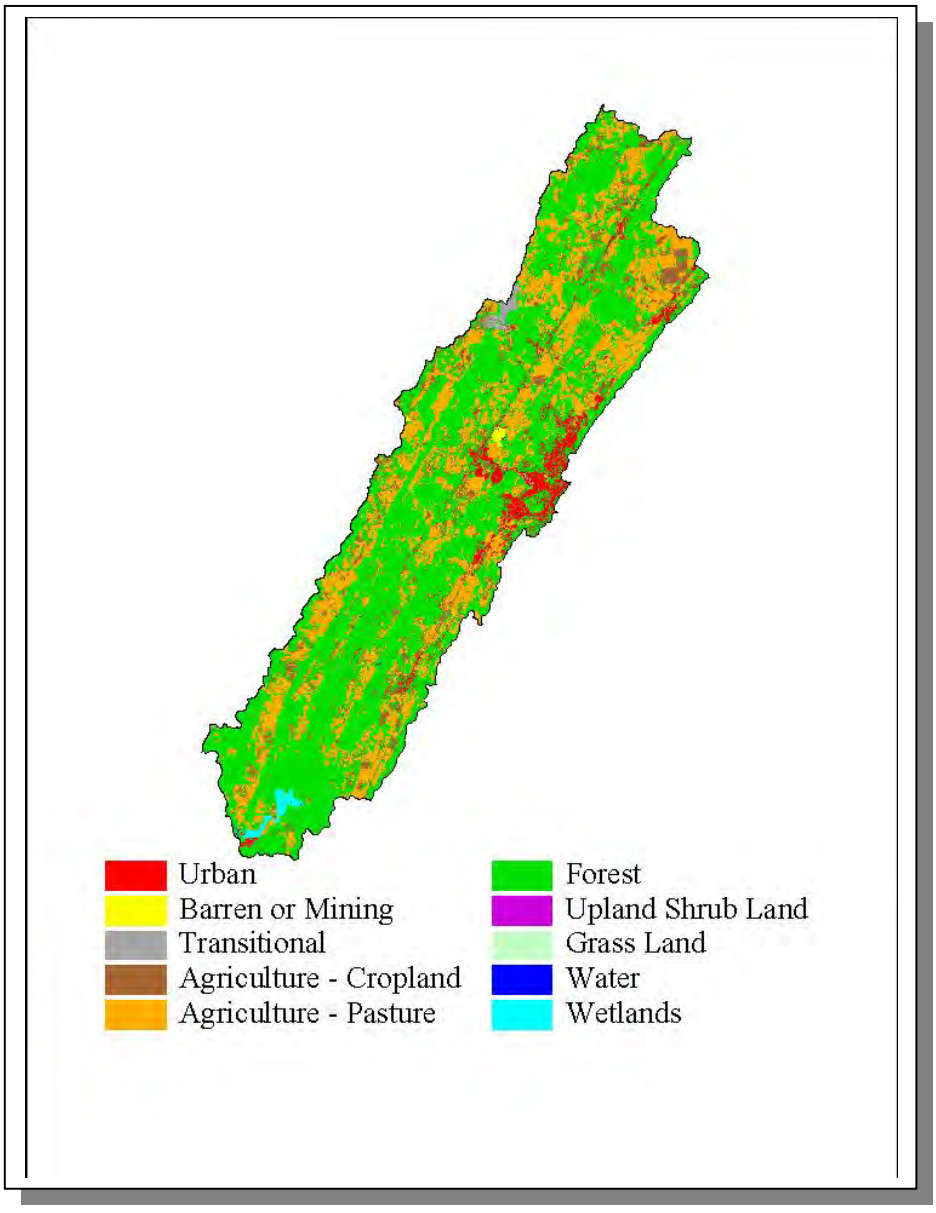


Figure 4-58. Illustration of Land Use Distribution in Subwatershed 0602000208.

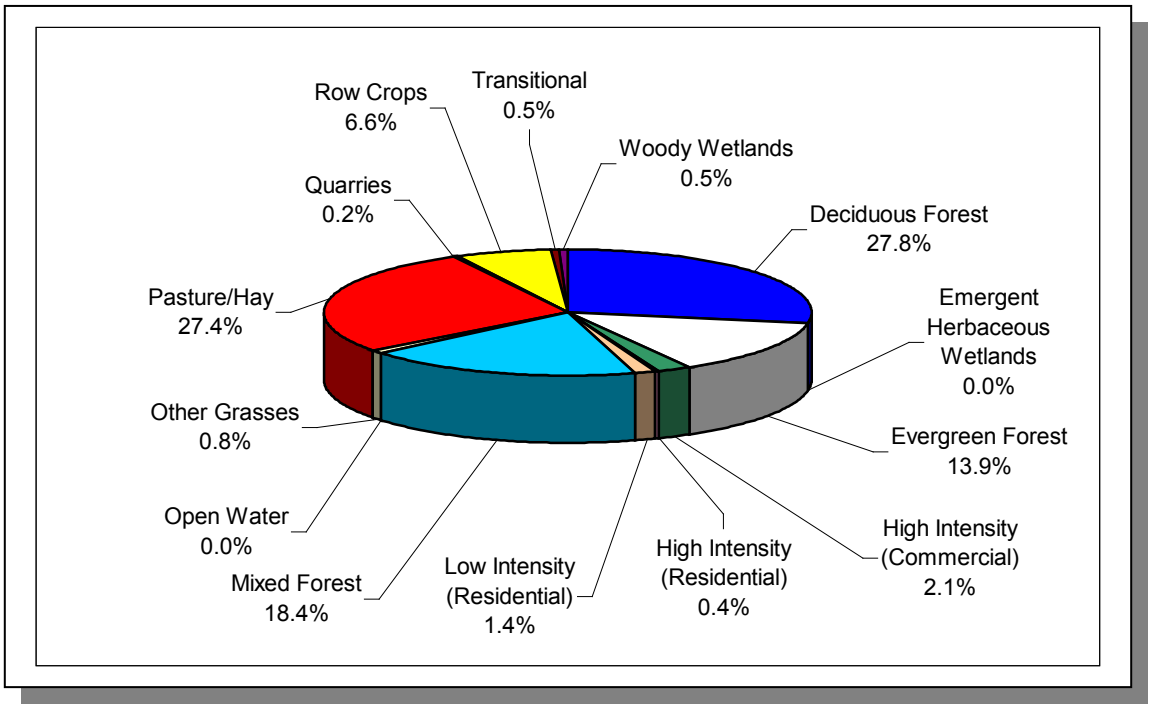


Figure 4-59. Land Use Distribution in Subwatershed 0602000208. *More information is provided in Hiwassee-Appendix IV.*

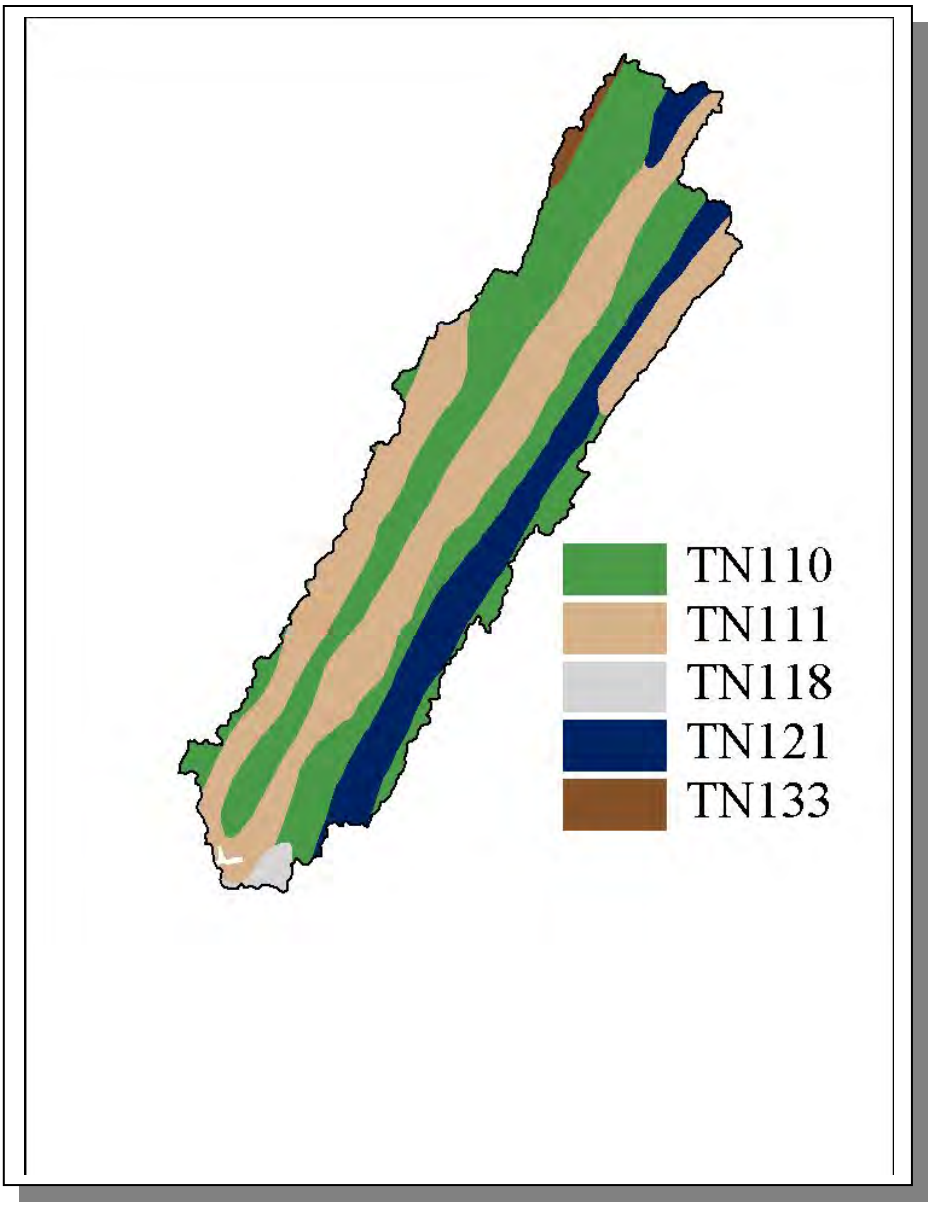


Figure 4-60. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0602000208.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hr)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN110	0.00	B	2.22	4.96	Loam	0.31
TN111	0.00	C	1.41	5.10	Loam	0.34
TN118	0.00	C	6.52	5.12	Loam	0.29
TN121	0.00	B	1.30	5.21	Loam	0.33
TN133	0.00	C	1.35	6.04	Clayey Loam	0.27

Table 4-39. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0602000208. *More information is provided in Hiwassee-Appendix IV.*

	TOTAL COUNTY POPULATION			ESTIMATED POPULATION IN WATERSHED		PERCENT CHANGE
County	1990	1997 Est.	Portion of Watershed (%)	1990	1997	
Bradley	73,712	80,800	0.00	2	2	0.0
McMinn	42,383	46,000	21.73	9,210	9,996	8.5
Totals	**116,095**	**126,800**		**9,212**	**9,998**	**8.5**

Table 4-40. Population Estimates in Subwatershed 0602000208.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Athens	McMinn	12,054	5,184	4,947	237	0
Niota	McMinn	769	364	289	75	0
Totals		**12,823**	**5,548**	**5,236**	**312**	**0**

Table 4-41. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 0602000208.

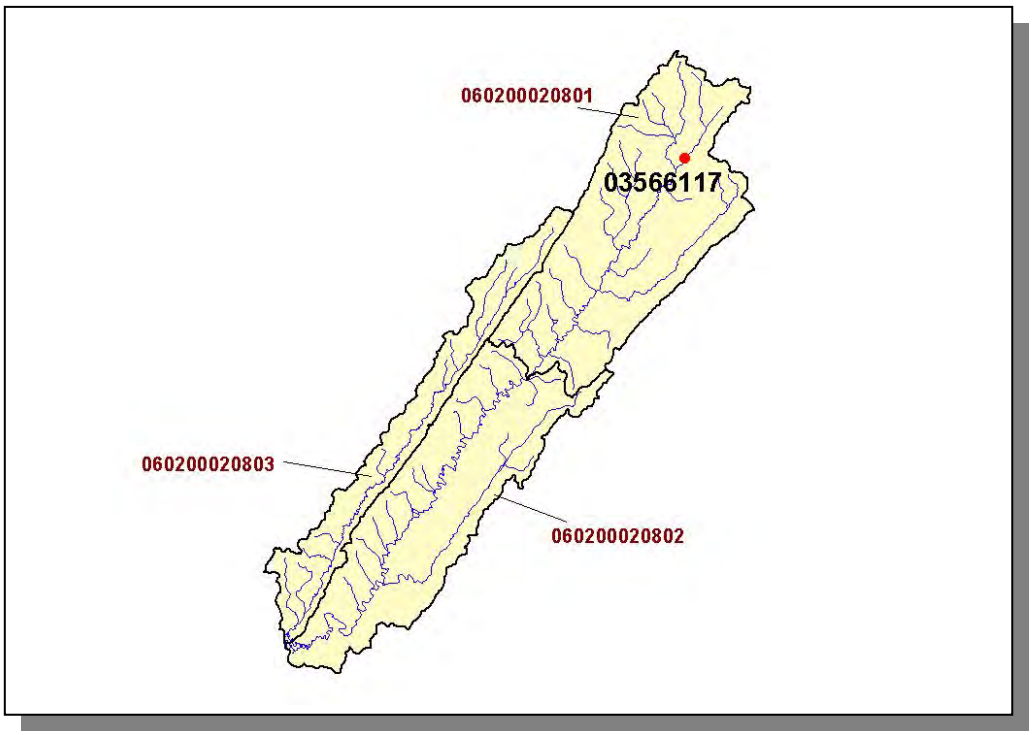


Figure 4-61. Location of Historical Streamflow Data Collection Sites in Subwatershed 0602000208. *Subwatershed 060200020801, 060200020802, and 060200020803 boundaries are shown for reference. More information is provided in Hiwassee-Appendix IV.*

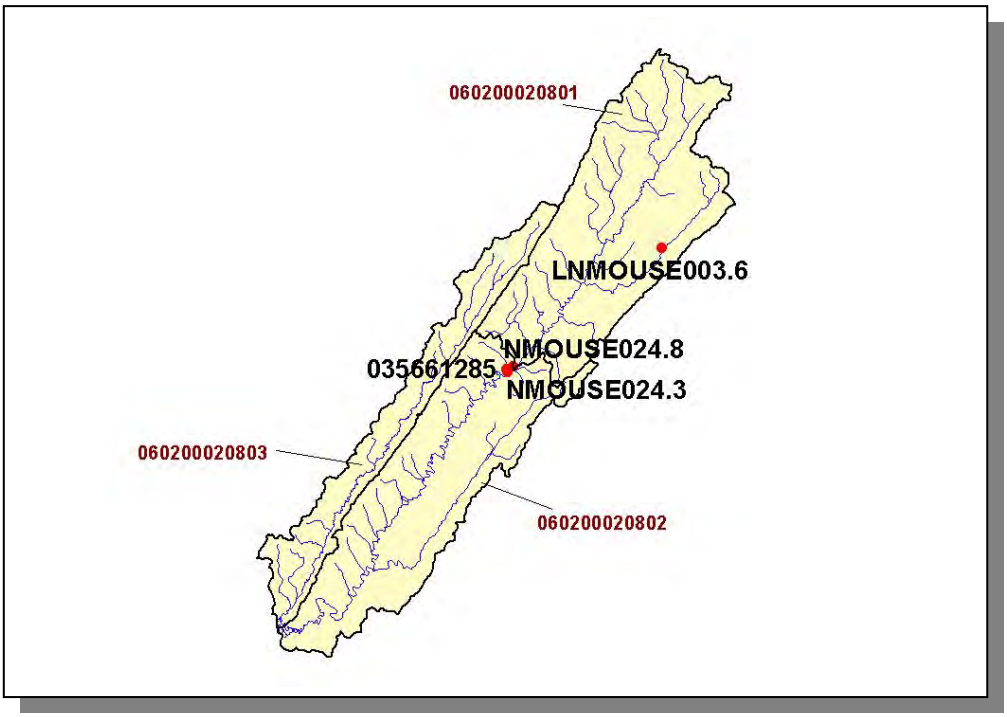


Figure 4-62. Location of STORET Monitoring Sites in Subwatershed 0602000208. *Subwatershed 060200020801, 060200020802, and 060200020803 boundaries are shown for reference. More information is provided in Hiwassee-Appendix IV.*

4.2.F.ii. Point Source Contributions.

Figure 4-63. Location of Active Point Source Facilities in Subwatershed 0602000208. *Subwatershed 060200020801, 060200020802, and 060200020803 boundaries are shown for reference. More information is provided in the following figures.*

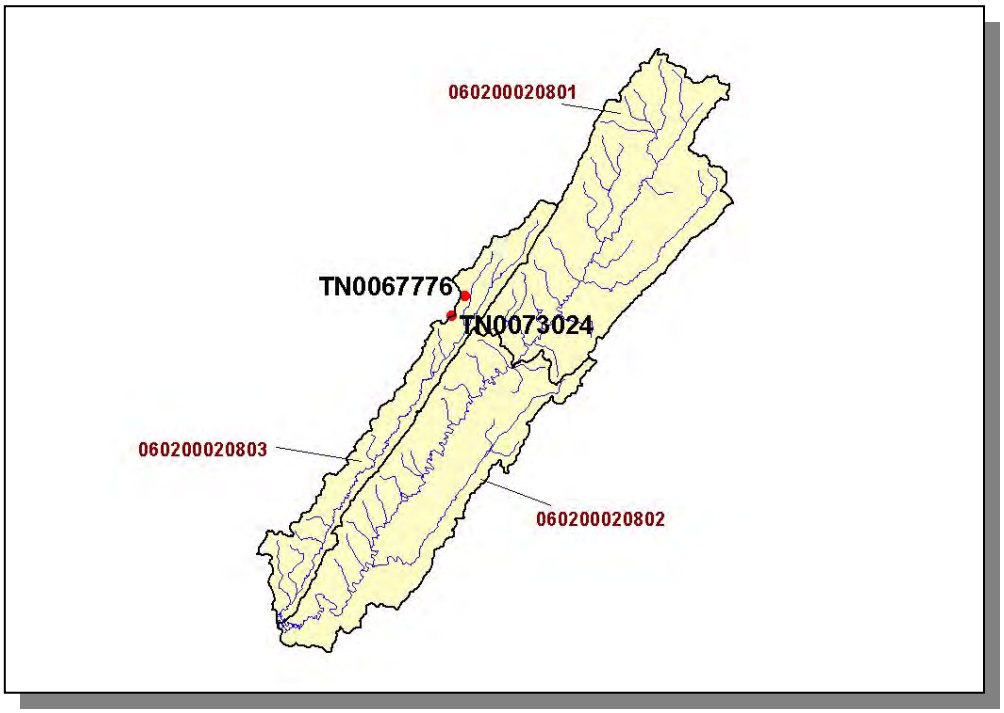


Figure 4-64. Location of Active Point Source Facilities (Individual Permits) in Subwatershed 0602000208. *Subwatershed 060200020801, 060200020802, and 060200020803 boundaries are shown for reference. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

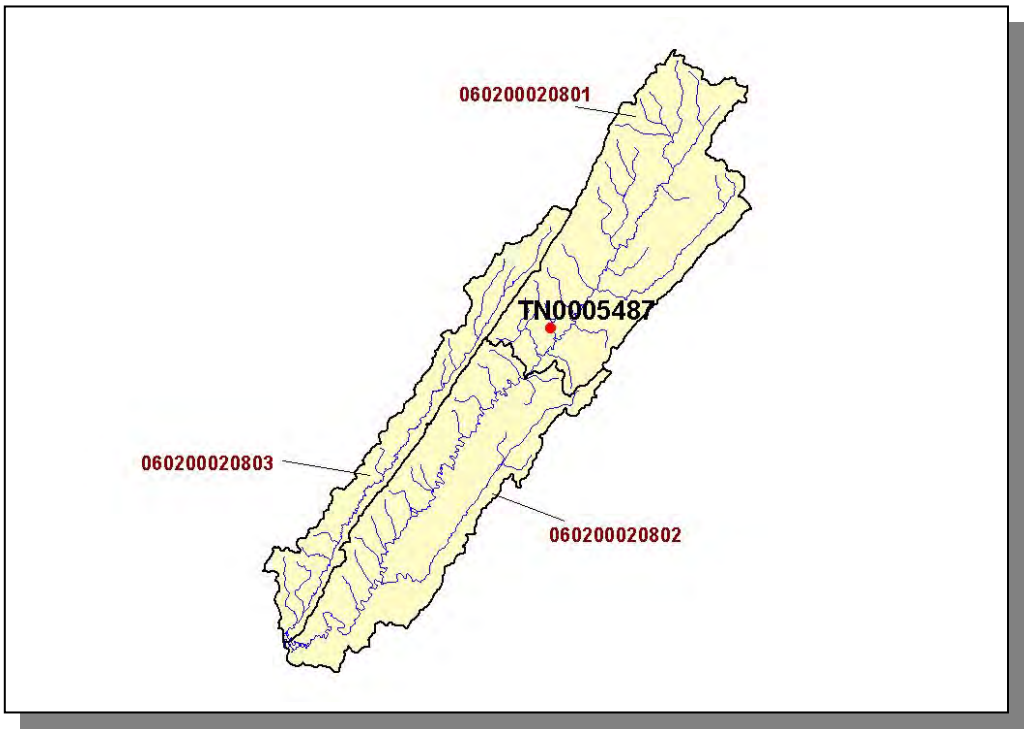


Figure 4-65. Location of Active Mining Sites in Subwatershed 0602000208. *Subwatershed 060200020801, 060200020802, and 060200020803 boundaries are shown for reference. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

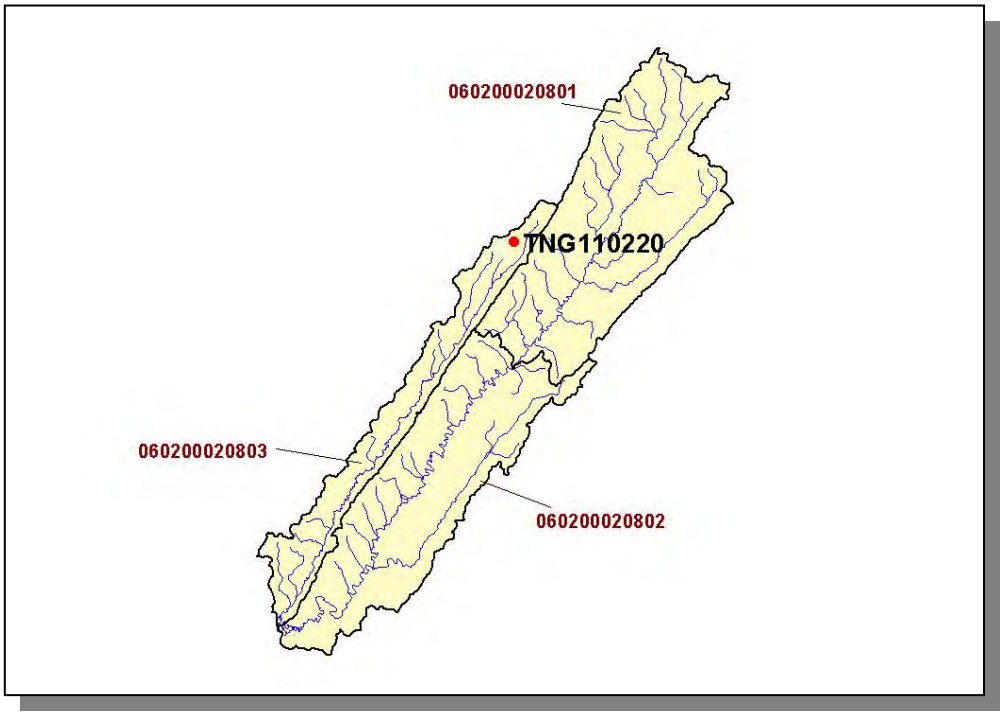


Figure 4-66. Location of Ready Mix Concrete Facilities in Subwatershed 0602000208. *Subwatershed 060200020801, 060200020802, and 060200020803 boundaries are shown for reference. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

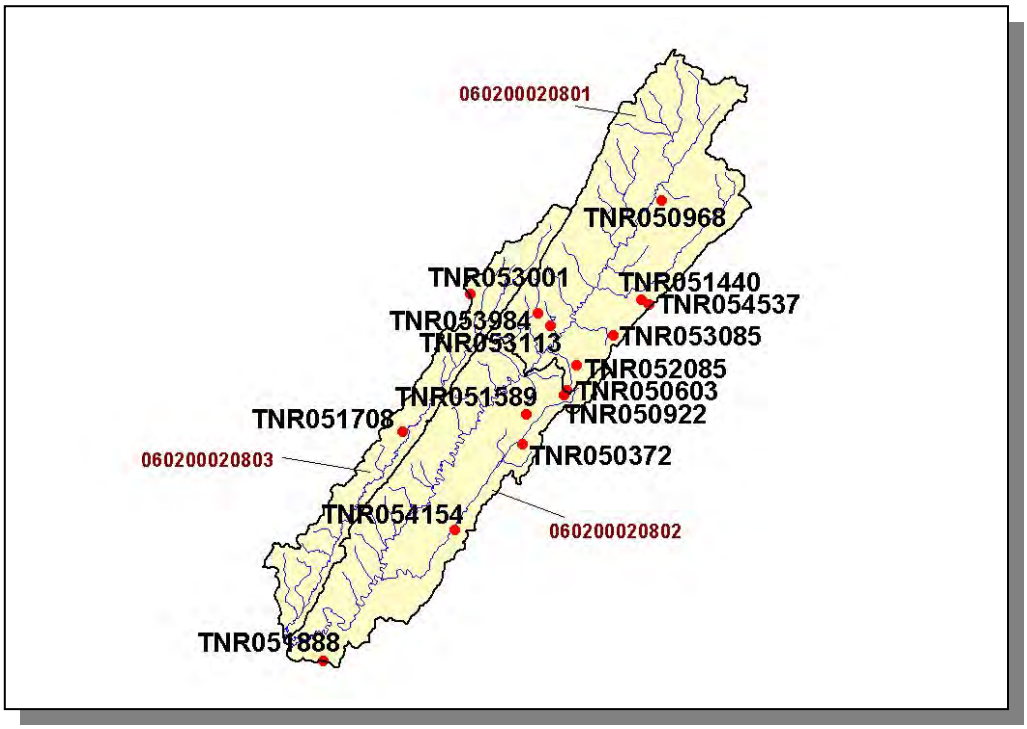


Figure 4-67. Location of TMSP Facilities in Subwatershed 0602000208. *Subwatershed 060200020801, 060200020802, and 060200020803 boundaries are shown for reference. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

4.2.F.iii. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Milk Cow	Cattle	Chickens	Chickens Sold	Hogs	Sheep
3,625	1,581	9,523	11	1,189,471	95	6

Table 4-42. Summary of Livestock Count Estimates in Subwatershed 0602000208. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Bradley	92.5	92.5	8.2	18.1

Table 4-43. Forest Acreage and Average Annual Removal Rates (1987-1994) in Subwatershed 0602000208.

CROPS	TONS/ACRE/YEAR
Non Agricultural Land Use	0.00
Grass (Hayland)	0.36
Legume (Hayland)	0.11
Grass (Pastureland)	0.38
Grass, Forbs, Legumes (Mixed (Pasture)	0.67
Forest Land (Grazed)	0.00
Forest Land (Not Grazed)	0.00
Farmsteads and Ranch Headquarters	1.07
Corn (Row Crops)	5.26
Tobacco (Row Crops)	5.65
Conservation Reserve Program Land	0.27

Table 4-44. Annual Estimated Total Soil Loss in Subwatershed 0602000208.

4.2.G. 0602000209.

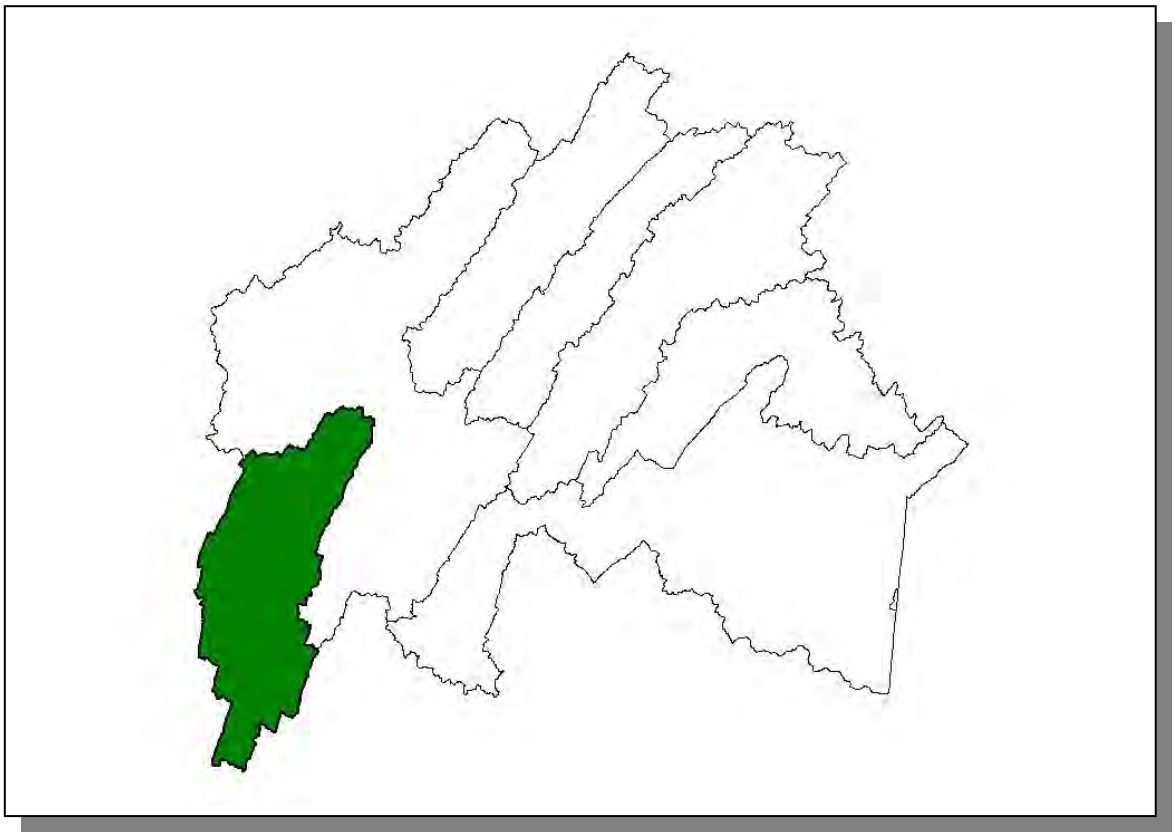


Figure 4-68. Location of Subwatershed 0602000209. *All Hiwassee HUC-10 subwatershed boundaries are shown for reference.*

4.2.G.i. General Description.

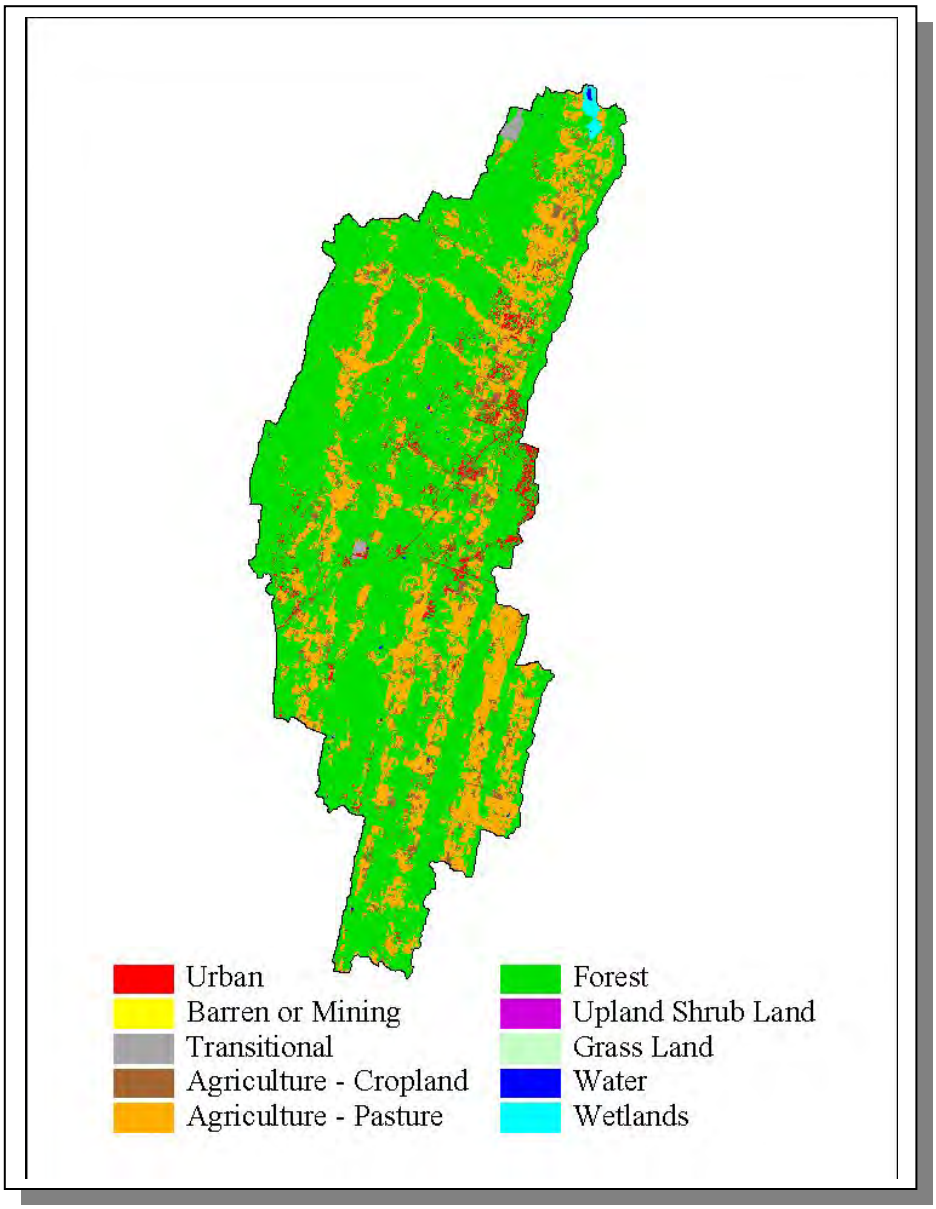


Figure 4-69. Illustration of Land Use Distribution in Subwatershed 0602000209.

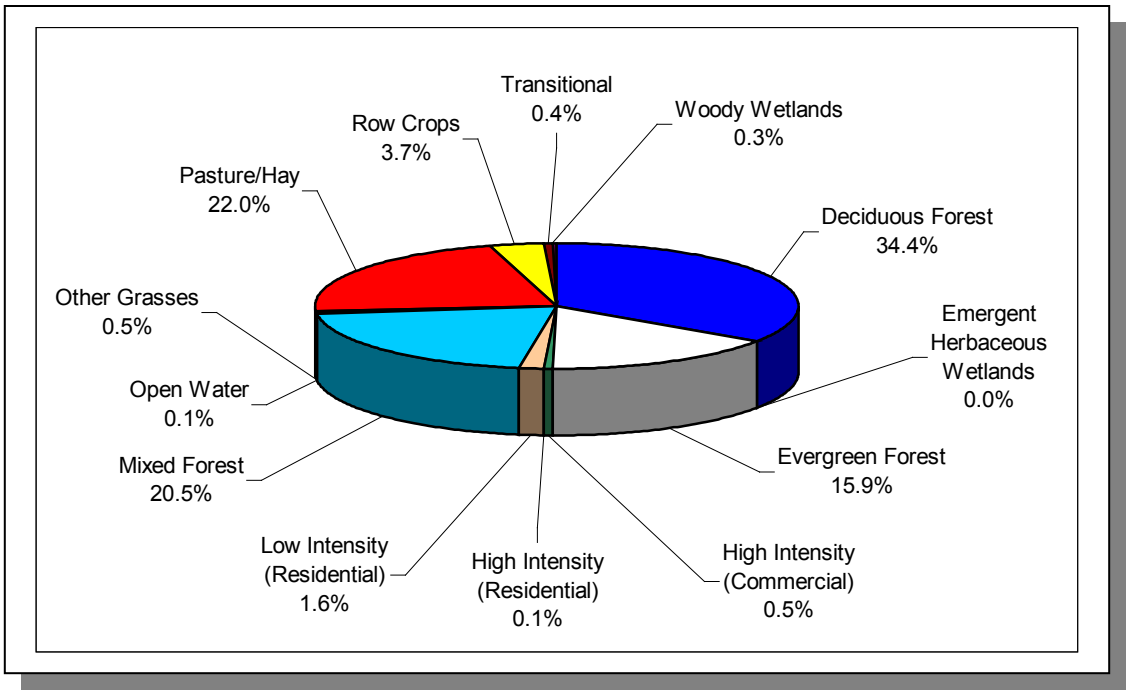


Figure 4-70. Land Use Distribution in Subwatershed 0602000209. *More information is provided in Hiwassee-Appendix IV.*

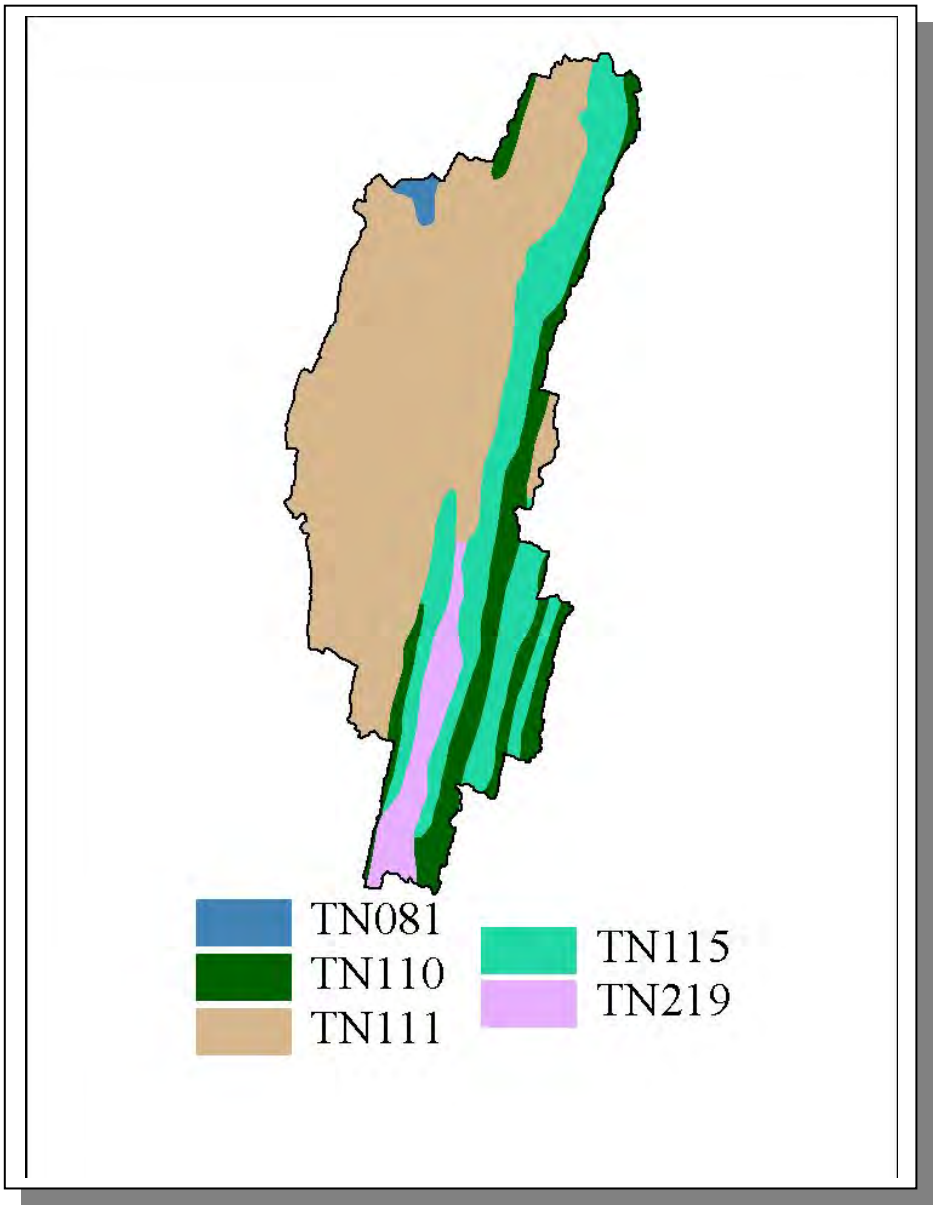


Figure 4-71. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0602000209.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hr)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN081	2.0	C	1.41	5.48	Silty Loam	0.35
TN110	0.0	B	2.22	4.96	Loam	0.31
TN111	0.00	C	1.41	5.10	Loam	0.34
TN115	0.00	C	1.41	5.15	Silty Loam	0.36
TN219	0.00	C	1.35	4.95	Loam	0.33

Table 4-45. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0602000209. *More information is provided in Hiwassee-Appendix IV.*

	COUNTY POPULATION			ESTIMATED POPULATION IN WATERSHED		% CHANGE
County	1990	1997 Est.	Portion of Watershed (%)	1990	1997	
Bradley	73,712	80,800	30.23	22,284	24,426	9.6
Hamilton	285,536	294,865	0.88	2,500	2,581	3.2
Totals	**359,248**	**375,665**		**24,784**	**27,007**	**9.0**

Table 4-46. Population Estimates in Subwatershed 0602000209.

NUMBER OF HOUSING UNITS						
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Cleveland	Bradley	30,333	13,045	12,033	1,007	5

Table 4-47. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 0602000209.

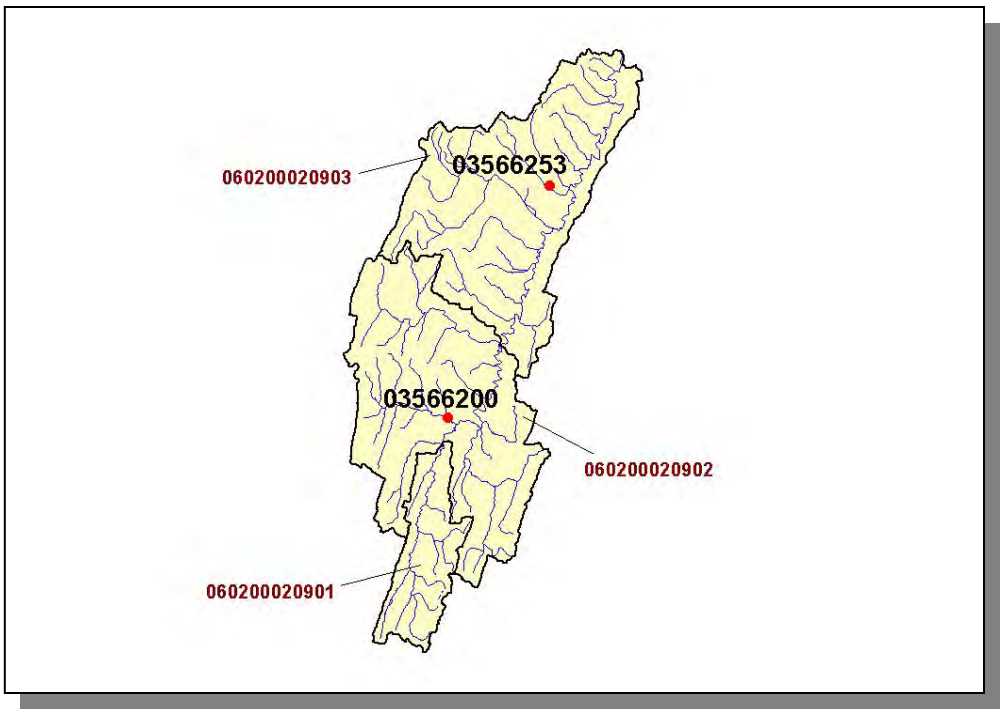


Figure 4-72. Location of Historical Streamflow Data Collection Sites in Subwatershed 0602000209. *Subwatershed 060200020901, 060200020902, and 060200020903 boundaries are shown for reference. More information is provided in Hiwassee-Appendix IV.*

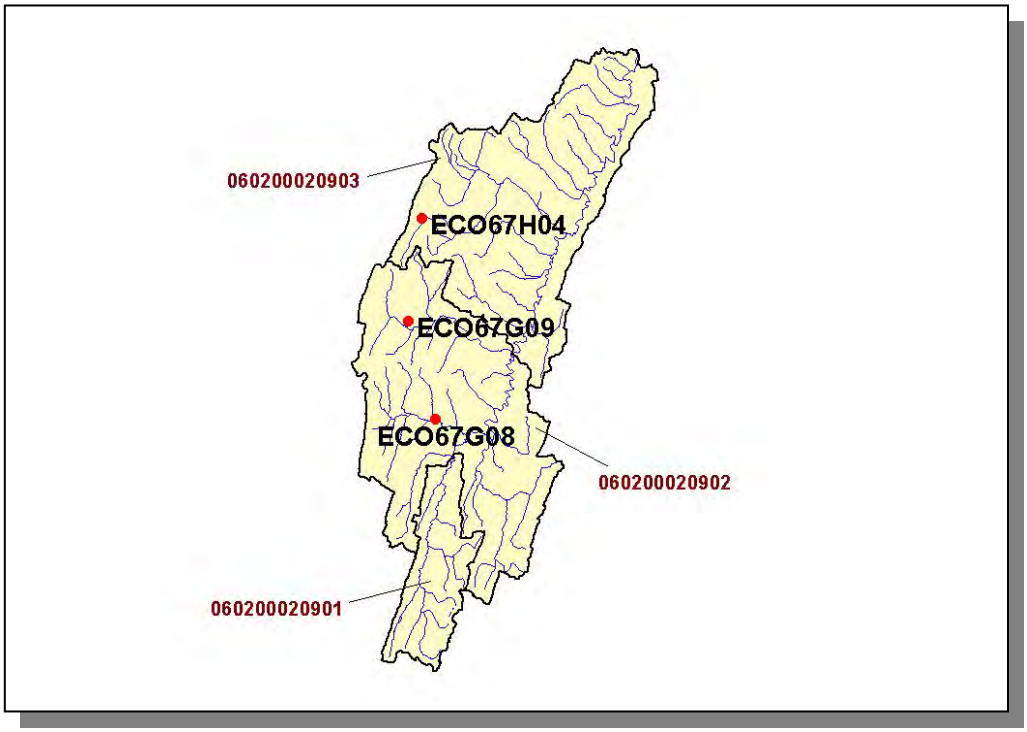


Figure 4-73. Location of STORET Monitoring Sites in Subwatershed 0602000209. *Subwatershed 060200020901, 060200020902, and 060200020903 boundaries are shown for reference. More information is provided in Hiwassee-Appendix IV.*

4.2.G.ii. Point Source Contributions.

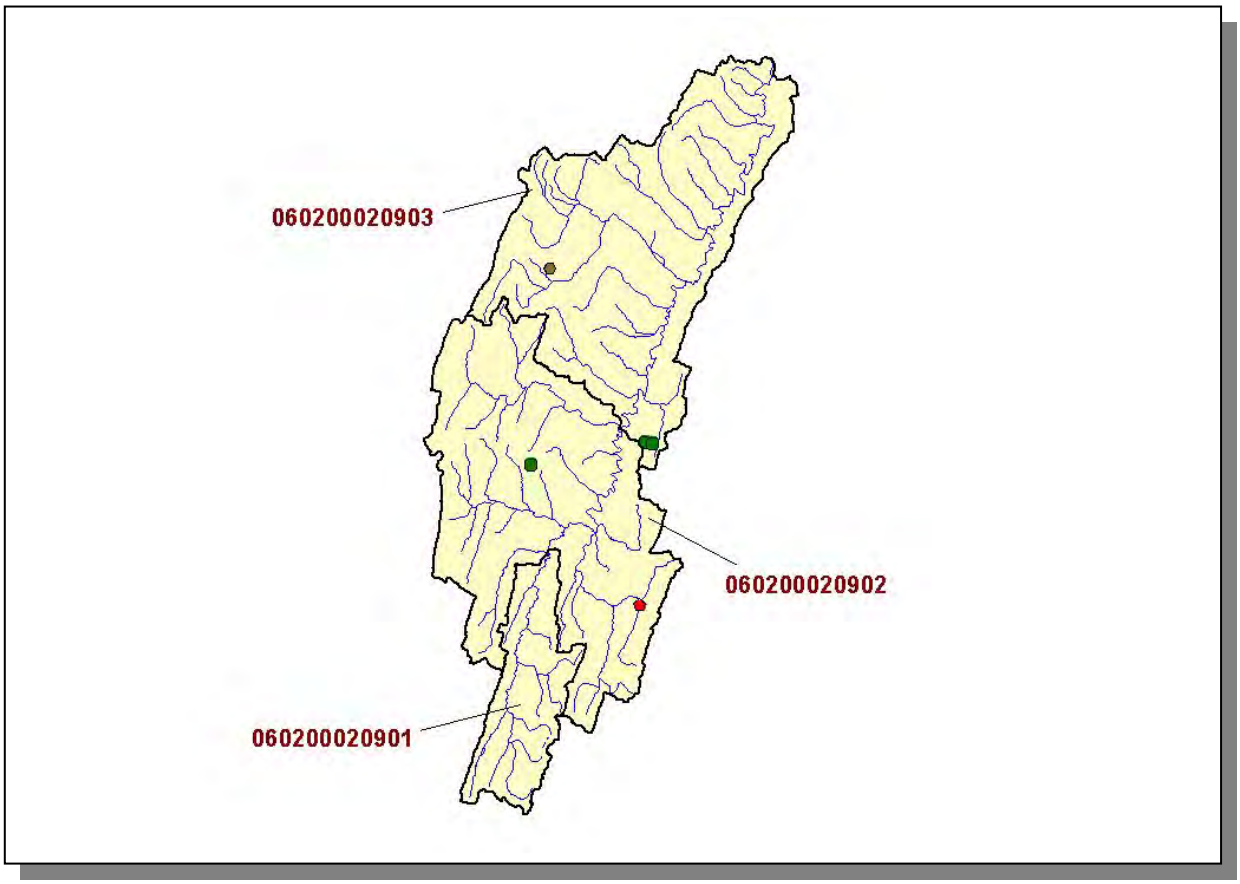


Figure 4-74. Location of Active Point Source Facilities in Subwatershed 0602000209. *Subwatershed 060200020901, 060200020902, and 060200020903 boundaries are shown for reference. More information is provided in the following figures.*

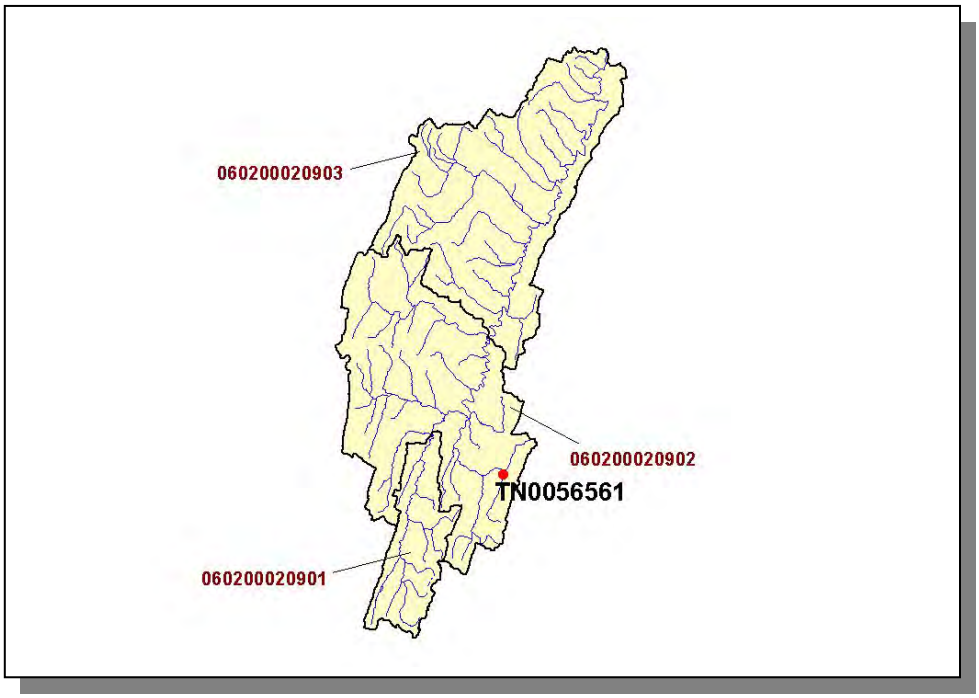


Figure 4-75. Location of Active Point Source Facilities (Individual Permits) in Subwatershed 0602000209. *Subwatershed 060200020901, 060200020902, and 060200020903 boundaries are shown for reference. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

Figure 4-76. Location of TMSP Facilities in Subwatershed 0602000209. *Subwatershed 060200020901, 060200020902, and 060200020903 boundaries are shown for reference. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

Figure 4-77. Location of CAFO Facilities in Subwatershed 0602000209. *Subwatershed 060200020901, 060200020902, and 060200020903 boundaries are shown for reference. CAFO rules may be found at http://cfpub.epa.gov/npdes/afo/cafofinalrule.cfm. More information, including the names of facilities, is provided in Hiwassee-Appendix IV.*

4.2.G.iii. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens	Chickens Sold	Hogs	Sheep
3,046	8,470	1,059	10	5,801,466	82	36

Table 4-48. Summary of Livestock Count Estimates in Subwatershed 0602000209. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older; "Chickens Sold" are all chickens used to produce meat.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Bradley	92.5	92.5	8.2	18.1
Hamilton	210.7	210.7	2.2	6.0
Totals	**303.2**	**303.2**	**10.4**	**24.1**

Table 4-49. Forest Acreage and Average Removal Rates (1987-1994) in Subwatershed 0602000209.

CROPS	TONS/ACRE/YEAR
Grass (Hayland)	0.45
Legume (Hayland)	0.12
Grass (Pastureland)	0.41
Grass, Forbs, Legumes (Mixed Pasture)	0.90
Forest Land (Grazed)	0.00
Forest Land (Not Grazed)	0.00
Farmsteads and Ranch Headquarters	1.21
Corn (Row Crops)	5.27
Conservation Reserve Program Land	0.27
Nonagricultural Land Use	0.00
Wheat (Close Grown Cropland)	3.14
Oats (Close Grown Cropland)	3.13
All Other Close Grown Cropland	1.99
Other Land in Farms	0.00
Legume (Pastureland)	0.07

Table 4-50. Annual Estimated Total Soil Loss in Subwatershed 0602000209.

CHAPTER 5

WATER QUALITY PARTNERSHIPS IN THE HIWASSEE 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 Hiwassee 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 Measurement System (PRMS) 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 PRMS may be viewed at http://prms.nrcs.usda.gov/prms. From the opening menu, select "Reports," then select the Conservation Treatment of interest on the page that comes up. Select the desired location and time period from the drop down menus and choose "Refresh." Choose "by HUC" in the "Location" option and choose "Refresh" again.

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	TOTAL
Comprehensive Nutrient Management Plans (Number)	0
Conservation Buffers (Acres)	75
Erosion Reduction (Tons/Year)	10,937
Inventory and Evaluations (Number)	2
Irrigation Management (Acres)	0
Nutrient Management (Acres)	3,059
Pest Management (Acres)	2,745
Prescribed Grazing (Acres)	293
Residue Management (Acres)	1,186
Tree and Shrub Practices (Acres)	65
Waste Management (Number)	2
Wetlands Created, Restored, or Enhanced (Acres)	0
Wildlife Habitat (Acres)	1,045

Table 5-1. Landowner Conservation Practices in Partnership with NRCS in the Tennessee Portion of Hiwassee River Watershed. *Data are from PRMS for October 1, 2001 through September 30, 2002 reporting period. More information is provided in Hiwassee-Appendix V.*

5.2.B. United States Geological Survey Water Resources Programs – Tennessee District**.** The U.S. Geological Survey (USGS) provides relevant and objective scientific studies and information for public use to evaluate the quantity, quality, and use of the Nation's water resources. In addition to providing National assessments, the USGS also conducts hydrologic studies in cooperation with numerous Federal, State, and local agencies to address issues of National, regional, and local concern. Please visit http://water.usgs.gov/ for an overview of the USGS, Water Resources Discipline.

The USGS collects hydrologic data to document current conditions and provide a basis for understanding hydrologic systems and solving hydrologic problems. In Tennessee, the USGS records streamflow continuously at more than 89 gaging stations equipped with recorders and makes instantaneous measurements of streamflow at many other locations. Ground-water levels are monitored Statewide, and the physical, chemical, and biologic characteristics of surface and ground waters are analyzed. USGS activities also include the annual compilation of water-use records and collection of data for National baseline and water-quality networks. National programs conducted by the USGS include the National Atmospheric Deposition Program (http://bqs.usgs.gov/acidrain/), National Stream Quality Accounting Network (http://water.usgs.gov/nasqan/), and the National Water-Quality Assessment Program (http://water.usgs.gov/nawqa/).

USGS Water Resources Information on the Internet. Real-time and historical streamflow, water levels, and water-quality data at sites operated by the Tennessee District can be accessed 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. Contact Donna Flohr at (615) 837-4730 or dfflohr@usgs.gov for specific information about streamflow data.

Recent publications by the USGS staff in Tennessee can be accessed by visiting http://tn.water.usgs.gov/pubpg.html. This web page provides searchable bibliographic information to locate reports and other products about specific areas.

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 the Hiwassee River watershed, please visit the Service's website at http://www.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. Within the watershed, the Service has been actively involved in the propagation of the Federally endangered tan riffleshell (*Epioblasma florentina walkeri*). Individual juveniles were released into the Hiwassee River, in the vicinity of Appalachia Dam, to augment the existing population and to determine if propagated juvenile mussels would survive when placed in the wild.

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

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

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

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

How To Participate:

- Interested landowners contact a “Partners for Fish and Wildlife” Biologist to discuss the proposed project and establish a site visit.
- A visit to the site is then used to determine which activities the landowner desires and how those activities will enhance habitat for trust resources. Technical advice on proposed activities is provided by the Service, as appropriate.
- Proposed cost estimates are discussed by the Service and landowner.

- A detailed proposal which describes the proposed activities is developed by the Service biologist and the landowner. Funds are competitive, therefore the proposal is submitted to the Service's Ecosystem team for ranking and then to the Regional Office for funding.
- After funding is approved, the landowner and the Service co-sign a Wildlife Extension Agreement (minimum 10-year duration).
- Project installation begins.
- When the project is completed, the Service reimburses the landowner after receipts and other documentation are submitted according to the Wildlife Extension Agreement.

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

5.2.D. Tennessee Valley Authority (TVA). TVA's vision for the 21st century is to generate prosperity for the Tennessee Valley by promoting economic development, supplying low-cost, reliable power, and supporting a thriving river system. TVA is committed to the sustainable development of the region and is engaged in a wide range of watershed protection activities. To assist communities across the Tennessee Valley actively develop and implement protection and restoration activities in their local watersheds, TVA formed multidisciplinary Watershed Teams. These teams work in partnership with business, industry, government agencies, and community groups to manage, protect, and improve the quality of the Tennessee River and its tributaries for fishing, swimming, drinking, and recreational uses. TVA also operates a comprehensive monitoring program to provide real time information to the Watershed Teams and other entities about the conditions of these resources. The following is a summary of TVA's resource stewardship activities in the Hiwassee River watershed.

MONITORING

Fixed Station Monitoring. TVA monitors 18 major tributaries to the Tennessee River to determine the quality of water flowing out of each major watershed into the reservoir system. Half of these sites are monitored each year and provide a data base to evaluate long-term conditions. River assessments are based on fish community evaluations, benthic macroinvertebrate studies, habitat assessment, and quarterly water chemistry monitoring.

Comment [t1]:

Comment [t2]:

Comment [t3]:

- Fish community evaluation - Backpack shockers are used to temporarily stun fish in the sample area so they can be collected in a net, identified, counted, and checked for disease. Key indicators include the number of different species and the presence of pollution-sensitive species.
- Benthic macroinvertebrate studies - Submerged rocks, logs, leaves and other bottom materials are examined to evaluate the populations of insects, mollusks, crustaceans and other invertebrates at the site.

- Habitat assessment - We check the amount of oxygen in the water and look for vegetated banks, pools and riffles, undercut banks, woody debris, spaces between rocks, and other indicators of good aquatic habitat.
- Water chemistry monitoring - Quarterly physical and chemical samples are collected. Parameters include temperature, dissolved oxygen, pH, conductivity, nutrients, metals, TSS, TDS, and TOC.

The latest evaluations and assessments of the fixed station site on Hiwassee River (River Mile 36.9) were during 2001. The site is scheduled for re-evaluation during 2003. Results from the biological analyses are rolled into the stream bioassessment database. The most recent water chemistry results from the site are:

Total Ca	Total Mn	Total Solids	Dissolved Solids	Dissolved Oxygen	Total Fe	Total P
7.4	18	50	< 1.	12	85	< 0.01
5.7	88	50	< 1.	7.7	180	0.02
4	43	30	< 1.	7.9	110	0.03
5.6	28	40	1	9	120	0.04

Total Mg	Total Cu	TOC	Organic Nitrogen	NO2+NO3-N	Temp (°C)	Hardness
2.1	< 10.	1.4		0.14	6.9	27
1.8	< 10.	4.4	0.45	0.14	21.7	22
1.2	12	1.8	0.13	0.16	20.5	15
1.5	< 10.	2.3	0.62	0.086	13.2	20.2

Total Al	Total Zn	pH	Total Nitrogen-K	NH3-N	Cond.
< 50	< 10.	7.6		0.01	66
52	170	6.9	0.47	0.02	80
< 50	13	7	0.18	0.05	42
< 50	< 10.	6.6	0.64	0.016	49

Further information on Vital Signs Monitoring can be obtained by writing to Tyler Baker at: Tennessee Valley Authority, 1101 Market Street, PSC 1X, Chattanooga, Tennessee, 37402 or calling him at 423/876-6733. E-mail address is tfbaker@tva.gov

Bacteriological sampling. Ten water samples from three sites on the Hiwassee River were analyzed for fecal coliform, and one site was also analyzed for *E. coli* in 2002. Tennessee's current water quality criteria for contact recreation are based on levels of total fecal coliform and E. coli (200 and 126 colonies 100 ml, respectively as a geometric

mean). The geometric means for all sites did not exceed state water quality criteria for water contact recreation. Currently, there are no State of Tennessee swimming advisories on the Hiwassee River. Samples were collected at the following locations:

River	Site Name	Analyses	Location	Type of Site
Hiwassee	Agency Creek	Fecal Coliform	HRM 7.3	Swim
Hiwassee	Hwy 411 Access	Fecal Coliform	HRM 42.6	Canoe access
Hiwassee	Reliance Access	Fecal Coliform, *e.coli*	HRM 48.1	Canoe access

Swimming beaches are scheduled for sampling every year and boat/canoe access every other year. Data from this sampling effort is shared in a timely manner with TDEC's Division of Water Pollution Control.

Further information on Bacteriological Sampling can be obtained by writing to Rebecca Hayden at: Tennessee Valley Authority, 1101 Market Street, PSC 1X, Chattanooga, Tennessee, 37402 or calling her at 423-876-6736. Email address is rlhayden@tva.gov

Fish Flesh Toxic Contaminants. There are no fish consumption advisories for the Hiwassee River. TVA collected channel catfish and largemouth bass from Hiwassee River at HRM 36.9 for tissue analysis in 2001. All contaminant levels were either below detectable levels or below the levels used by the states to issue fish consumption advisories.

STREAM BIOASSESSMENT

Conditions of water resources in the Hiwassee River watershed streams were measured using three independent methods; Index of Biotic Integrity (IBI), number of mayfly, stonefly, and caddisfly taxa (EPT), and Habitat Assessment. Not all of these tools were used at each stream sample site.

IBI. The index of biotic integrity (IBI) assesses the quality of water resources in flowing water by examining a stream's fish assemblage. Fish are useful in determining long-term (several years) effects and broad habitat conditions because they are relatively long-lived and mobile. Twelve metrics address species richness and composition, trophic structure (food preferences), fish abundance, and fish condition. Each metric reflects the condition of one aspect of the fish assemblage and is scored against reference streams known to be of very high quality. Potential scores for each of the twelve metrics are 1-poor, 3-intermediate, or 5-the best to be expected. Scores for the 12 metrics are summed to produce the IBI for the site. The following table associates IBI ranges with attributes of fish assemblages.

Attributes Range	IBI
Comparable to the best situations without influence of man; all regionally expected species for the habitat and stream size, including the most intolerant forms, are present with full array of age and sex classes; balanced trophic structure.	58-60
Species richness somewhat below expectation, especially due to loss of most intolerant forms; some species with less than optimal abundance or size distribution; trophic structure shows some signs of stress.	48-52
Signs of additional deterioration include fewer intolerant forms, more skewed trophic structure (e.g., increasing frequency of omnivores); older age classes of top predators may be rare.	40-44
Dominated by omnivores, pollution-tolerant forms, and habitat generalists; few top carnivores; growth rates and condition factors commonly depressed; hybrids and diseased fish often present.	28-34
Few fish present, mostly introduced or tolerant forms; hybrids common; disease, parasites, fin damage, and other anomalies regular.	12-22

EPT. As with fish, the number and types of aquatic insects are indicative of the general quality of the environment in which they live. Unlike fish, aquatic insects are useful in determining short-term and localized impacts because they are short-lived and have limited mobility. The assessment method TVA uses involves only qualitative sampling and field identification of mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Trichoptera) to the family taxonomic level (EPT). The score for each site is simply the number of EPT families. The higher EPT scores are indicative of high quality streams because these insect larvae are intolerant of poor water quality.

Habitat Assessment. The quality and quantity of habitat (physical structure) directly affect aquatic communities. Habitat assessments are done at most stream sampling sites to help interpret IBI and EPT results. If habitat quality at a site is similar to that found at a good reference site, any impacts identified by IBI and EPT scores can reasonably be attributed to water quality problems. However, if habitat at the sample site differs considerably from that at a reference site, lower than expected IBI and EPT scores might be due to degraded habitat rather than water quality impacts.

The habitat assessment method used by TVA (modified EPA protocol) compares observed instream, channel, and bank characteristics at a sample site to those expected at a similar high-quality stream in the region. Each of the stream attributes listed below

is given a score of 1 (poorest condition) to 4 (best condition). The habitat score for the sample site is simply the sum of these attributes. Scores can range from a low of 10 to a high of 40.

1. Instream cover (fish)
2. Epifaunal substrate
3. Embeddedness
4. Channel Alteration
5. Sediment Deposition
6. Frequency of Riffle
7. Channel Flow Status
8. Bank vegetation protection - Left bank and right bank, separately
9. Bank stability - Left bank and right bank, separately
10. Riparian vegetation zone width - Left bank and right bank, separately

Stream Bioassessment Results. Between 1991 and 2001, TVA conducted 58 bioassessments on the Tennessee portion of the Hiwassee River and its tributaries. The lowermost site sampled on the Hiwassee River, HRM 37, is monitored every two years. The remaining sites are monitored on a five year rotational schedule. Several additional sites in the Hiwassee basin have been assessed for special project level activities.

The fish community at the lowermost site on the mainstem Hiwassee River, HRM 37, remained fairly consistent from 1991 through 2001, with IBI scores ranging from 42 to 48. The benthic community was sampled in 1999 and 2001 with 12 and 14 (EPT families found in those years, respectively. Several sites sampled on the Hiwassee River from below Appalachia Dam down to just above the embayed portion of the river have received fish IBI scores ranging from 38 to 54. Lower scores are encountered around HRM 63, and appear to improve downstream around mile 57, and improve still more at HRM 54 and HRM 45. Benthic communities at most of these sites rate either fair or good. The best IBI score, 54 was reported from a March 2001 sample on the Hiwassee River at Reliance Bridge, HRM 45. Diversity was excellent, with 31 native species observed, including 6 species of darters, 8 sucker species, smallmouth bass, largemouth bass, rockbass, rainbow trout, and brown trout. Greater than expected proportion of omnivores and stonerollers, and fewer than expected proportion of specialized insectivores were the only measures that didn't meet full criteria. The benthic community here, represented by 13 EPT families, also received a good rating.

Over the past 10 years several other sites on the Hiwassee and its tributaries have been sampled, but not with the frequency of the lowermost site (HRM 37). Many of these sites have been sampled only once, with a few exceptions for certain streams with historically poor water quality. Fifteen larger tributaries and four sites on the mainstem of the Hiwassee River are on the TVA five year rotational monitoring schedule and have been monitored at least two times, most recently in 2001. Most streams draining into the Hiwassee River, especially in the Polk County portion, support fair to good benthic communities. Moving downstream into Bradley and McMinn Counties the benthic community begins to show signs of degradation with a decrease in the diversity of EPT families, and an increase in the abundance of tolerant organisms, such as bloodworms, blackflies, and leeches.

Tributaries to the uppermost portion of the Hiwassee River in Tennessee are in the Blue Ridge Ecoregion and drain the Cherokee National Forest. TVA monitors three of the larger tributaries, Coker Creek, Turtletown Creek, and Spring Creek. Turtletown Creek and Spring Creek support healthy, diverse fish communities and typically receive good IBI scores. Coker Creek has had a wider variance of IBI scores over the last 8 years; in 1993 the IBI was 46; in 2000 the IBI was 52,; and in 2002 the IBI was 42. Habitat degradation in the form of increased siltation and sedimentation may be responsible for the lower IBI scores.

Moving downstream into McMinn and Bradley Counties, agricultural activities, with some urban areas, dominate land use. TVA routinely monitors the following major tributaries: Conasauga Creek, Oostanaula Creek, Chatata Creek, Chestuee Creek, South Chestuee Creek, North Mouse Creek, South Mouse Creek, Rogers Creek, Candies Creek, Gunstocker Creek, Agency Creek, Price Creek, and Sugar Creek. Most of the tributaries in this area have fish IBI scores ranging from 26 to 38. Common denominators resulting in low IBI scores are decreased overall diversity, increased abundance of tolerant species and omnivores, and higher than expected incidence of anomalies and disease. Poor habitat conditions and nutrient enrichment are the primary causes of fish community degradation. Extremely low catch rates in many of these streams also indicate some type of unidentified toxicity, perhaps associated with assorted agricultural runoff pollutants. Several of the streams in this area are also impacted from urban issues, including South Mouse Creek, North Mouse Creek, Candies Creek, and Oostanaula Creek. One bright spot in this area is Candies Creek, upstream of Cleveland near the Black Fox community. In 2001, the IBI score for this site was 54, up from its 1995 rating of 36. The diverse fish community was well represented by darters, suckers, and other species intolerant of pollution. Lower than expected catch rate and less than expected proportion of piscivores were the only measures that did not meet criteria.

Details about Stream Bioassessment sampling sites and scores can be obtained by writing Amy Wales at Tennessee Valley Authority, 1101 Market Street, PSC 1X, Chattanooga, TN 37402, or calling her at 423/876-6748. E-mail address is akwales@tva.gov

WATERSHED ASSISTANCE

Outreach. The National Clean Boating Campaign is a partnership program which highlights the importance of clean water so boating will continue to be fun for future generations. The program demonstrates how boaters can be good stewards of their water environment through best boating and marina practices. The Clean Boating Campaign on the Hiwassee River will consist of distributing materials to local marinas that expressed an interest in the program. TVA plans to continue this partnership in upcoming years by working with the marinas and other concerned individuals.

The Tennessee Valley Clean Marina Initiative is an effort by TVA to promote environmentally-responsible marina practices. This voluntary program, established in support of the National Clean Boating Campaign, will help marina operators protect the resource that provides them with their livelihood. Plans are to implement this program

on the Hiwassee River reservoirs and continue as long as it brings about positive change.

There are many special interest groups in the Hiwassee River watershed that are striving to protect the valuable land and water-based resources in the watershed through grassroot efforts. TVA is supporting these groups by providing speakers for their meetings, detailed technical support, and limited financial support for resource improvement activities. TVA is providing assistance to the North Mouse Creek/Spring Creek Watershed District. The District is undertaking efforts to improve water quality in the North Mouse Creek watershed by cooperatively funding water quality improvement activities in the rural community.

Protection and restoration activities. TVA is applying the Integrated Pollutant Source Identification (IPSI) process to various Hiwassee River tributary watersheds. IPSI is a geographic database and set of tools designed to aid citizens and planners in implementing water quality improvement and protection projects within a watershed. It is also designed to aid water quality agencies in implementing the water quality based approach to pollution control. The geographic data base consists of information on watershed features, such as land use/land cover, stream and road bank erosion sites, and other known or suspected sources of nonpoint pollution. This process has already been completed on North Mouse and Oostanaula Creeks to look and urban and rural impacts to water quality. Over the next few years, IPSI will likely be implemented in South Mouse, Candies and Chatata Creeks.

During 2002, TVA undertook a program to analyze riparian zone and stream bank conditions along South Mouse Creek. Backlying land uses, vegetation type and locations of pipes were used to score the riparian zones. Substrate type and aesthetics were used to score streambanks. The scores are being utilized as a “low tech” method to develop cost-effective riparian zone and streambank enhancements programs.

Further information on Watershed Assistance can be obtained by writing to Gary Springston at: Tennessee Valley Authority, 1101 Market Street, PSC 1X, Chattanooga, Tennessee, 37402 or calling him at 423/876-6746. E-mail address is glspringston@tva.gov

5.2.E. USDA – Forest Service. The USDA Forest Service manages approximately 640,000 acres in Tennessee (Cherokee National Forest (CNF)). This ownership includes about 81,000 acres within the Hiwassee River Watershed in Tennessee. The general mission of the Forest Service is to achieve an ecological and sustainable multiple use approach to land management that meets the diverse needs of people. In order to achieve this mission, a watershed-based approach to ecosystem management has been adopted.

A variety of management activities occur within the Hiwassee River watershed on national forest lands. Some of these include:

Ecosystem Management and Restoration. Prescribe burning and vegetation treatments are used to meet a variety of ecosystem-based management objectives. Each year, prescribed fire is used to reduce hazardous fuel loads and improve wildlife habitat

conditions within the watershed on CNF lands. Thinning and regeneration cuts are also used on selected areas where timber harvest is necessary to achieve restoration objectives. The Hiwassee River Watershed has been severely impacted by the southern pine beetle in the past three years. In the foreseeable future, restoration efforts will focus on needs associated with stands damaged by the southern pine beetle.

Inventory and Monitoring. There are 67 perennial streams capable of supporting fish and approximately double that number of perennial and intermittent streams that support other aquatic organisms in the Hiwassee River Watershed on National Forest system lands. Three-pass electrofishing and instream habitat surveys are conducted within each stream approximately once every ten years. Since 1997, twenty surveys have been conducted in the Hiwassee River Watershed. A total of 77 species of fish have been documented in these streams including three federally listed species: Cumberland bean pearly mussel, tan riffleshell mussel, and snail darter. These rare species are monitored every year using snorkeling and dead shell collecting. Other rare species have been identified as extirpated from a portion of the watershed (blotchside logperch and several mussels). Re-introduction proposals are being developed for some of these species.

The aquatic habitat surveys document physical characteristics in the stream. Degraded conditions are identified and corrected as needed. The most frequently documented degradation is a lack of large wood in the stream channel. Twenty log structures have been installed into Smith Creek to alleviate a portion of this problem.

In addition to the habitat surveys conducted in association with the electrofishing surveys, the Forest Service occasionally conducts basin wide surveys. These surveys evaluate the same physical characteristics but cover the entire watershed. In 2001 Spring Creek and Gee Creek were surveyed.

Other Management Activities. A variety of additional management activities occur within the Hiwassee River watershed on national forest lands. These include:

- Collaborative planning with a variety of other Federal, State and local agencies and private individuals to identify and prioritize watershed improvement needs on public and private lands
- Watershed improvements including road and trail decommissioning to reduce soil loss and sediment yield
- Providing a variety of land and water-based recreation opportunities such as hunting, fishing, sightseeing, trail use and whitewater sports
- Environmental education programs with school, scouting and other groups

Further information about the Cherokee National Forest can be found on its homepage at http://www.southernregion.fs.fed.us/cherokee.

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 are 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.

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

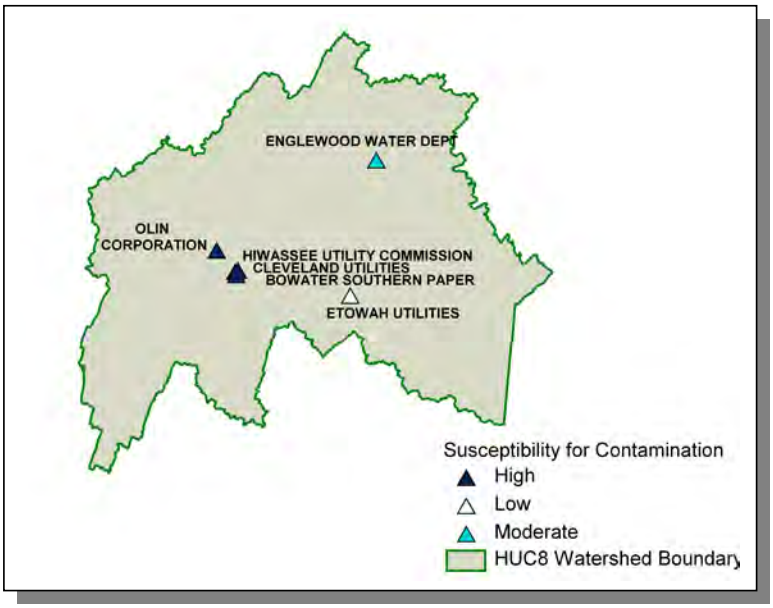


Figure 5-1. Susceptibility for Contamination in the Hiwassee River Watershed.

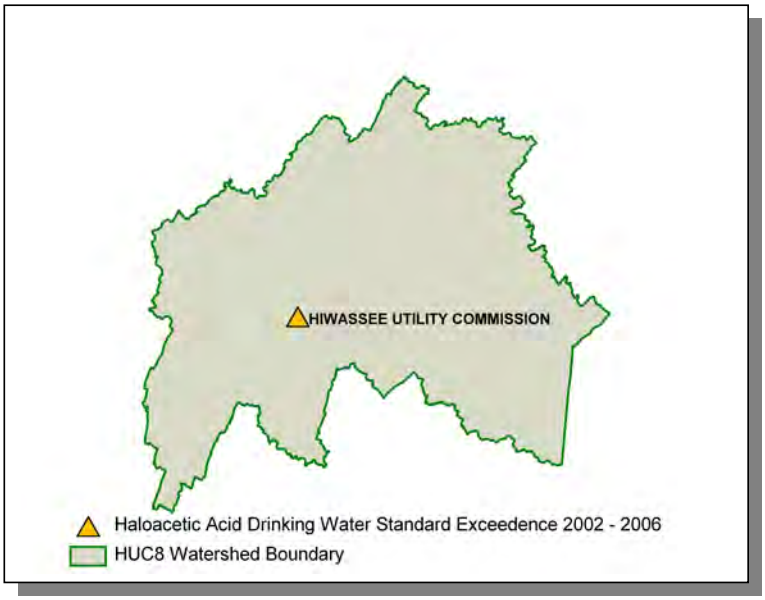


Figure 5-2. Exceedences of the Haloacetic Acid Drinking Water Standard in the Hiwassee River Watershed.

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

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

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

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

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

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

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

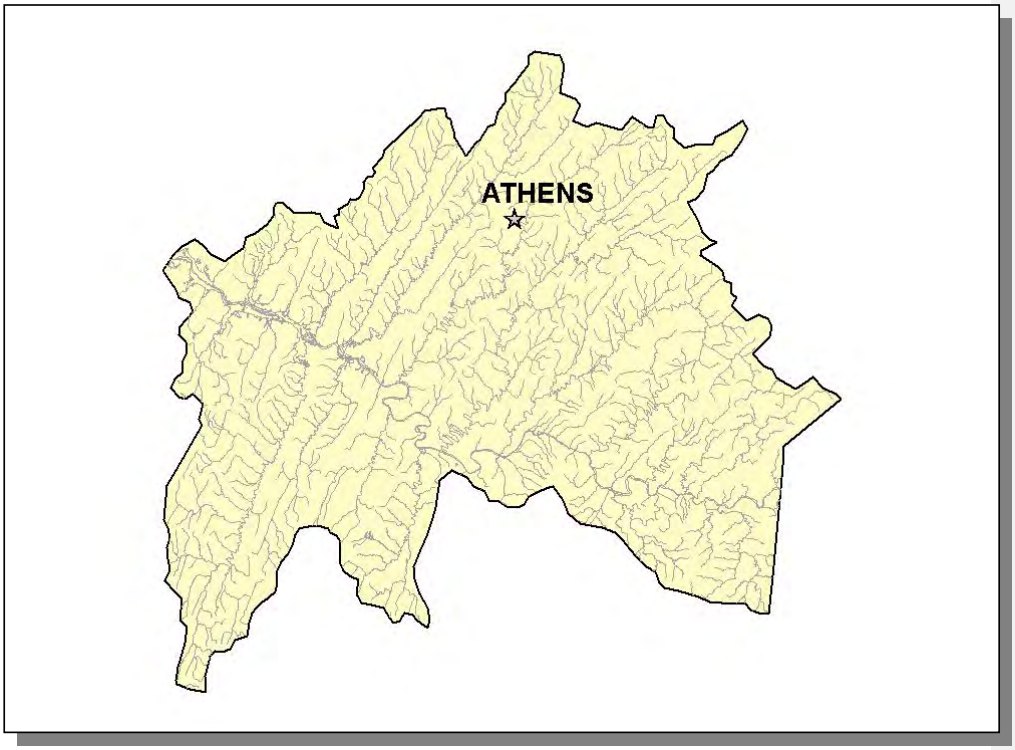


Figure 5-3. Location of Communities Receiving SRF Loans or Grants in the Tennessee portion of the Hiwassee River Watershed. *More information is provided in Hiwassee-Appendix V.*

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 Hiwassee River Watershed was funded under an agreement with the Tennessee Department of Agriculture, Nonpoint Source Program, and the U.S. Environmental Protection Agency Assistance Agreements C9994674-99-0, C9994674-00-0, and C9994674-01-0.

- 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 about the joint policy to address Bad Actors in forestry operations is available at http://www.state.tn.us/environment/news/release/jan99/badact.htm

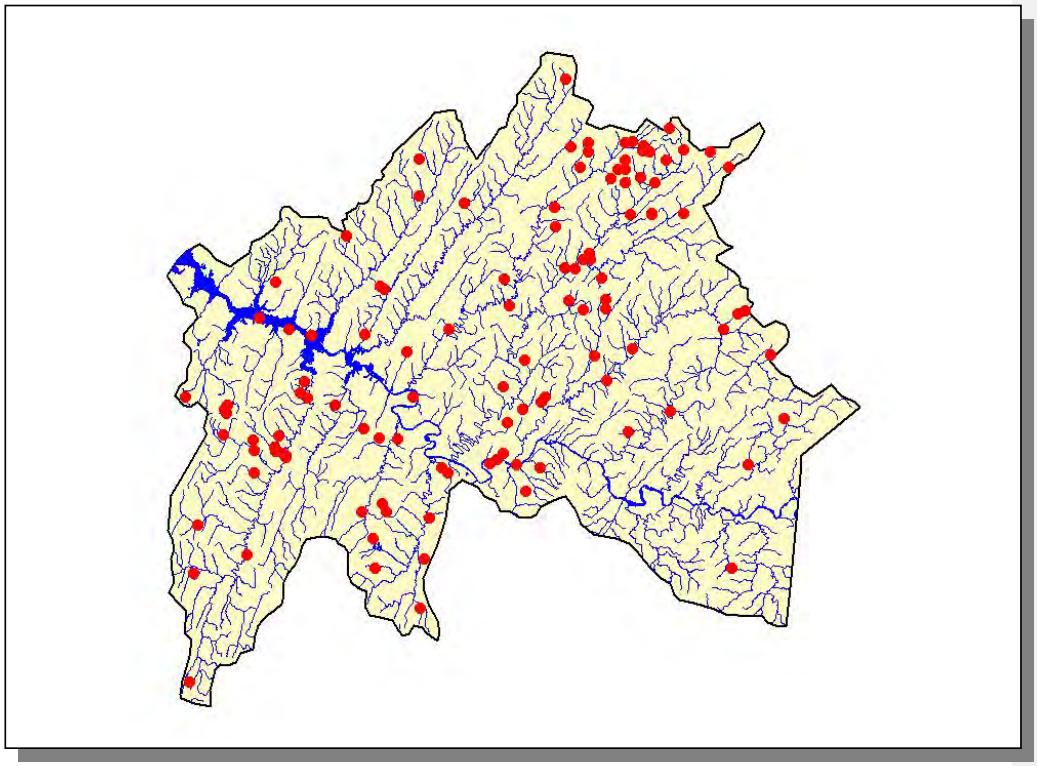


Figure 5-4. Location of BMPs installed from 1999 through 2002 in the Tennessee Portion of the Hiwassee River Watershed with Financial Assistance from the Tennessee Department of Agriculture's Nonpoint Source and Agricultural Resources Conservation Fund Grant Programs.

5.3.D. North Carolina Department of Environment and Natural Resources, Division of Water Quality. Basinwide planning is a non-regulatory watershed-based approach to restoring and protecting the quality of North Carolina's surface waters. In an approach similar to that employed in the State of Tennessee, the North Carolina Division of Water Quality (DWQ) prepares water quality plans for each of 17 major river basins in the state according to a defined schedule. The plans are prepared in order to communicate to policymakers, the regulated community and the general public the state's rationale, approaches and long-term management strategies for each river basin. Each plan is circulated for public review and presented at public meetings in the basin. After implementation, the plans are re-evaluated, based on follow-up water quality monitoring, and updated at five-year intervals.

DWQ initiated basinwide planning activities in 1990, when it began conducting water quality monitoring for the first basinwide plan, published in 1993. Since then, DWQ has produced plans for all 17 river basins and has begun to update those plans for each basin. The new plans emphasize changes in water quality and give the status of recommendations made in the previous plan. The first *Hiwassee River Basinwide Water Quality Management Plan* was published in 1997; DWQ updated this plan in 2002.

Overview of the North Carolina Portion of the Hiwassee River Basin. In the North Carolina portion of the basin, the Hiwassee River and its two major tributaries, the Nottely and Valley Rivers, drain more than 400,000 acres (644 square miles) of Clay and Cherokee counties in the southwestern corner of the state. Water flow is regulated by the Tennessee Valley Authority (TVA) for flood control and the production of hydroelectric power via three impoundments: Chatuge Lake on the Georgia-North Carolina state line near Hayesville; Hiwassee Lake near Murphy; and Apalachia Lake adjacent to the Tennessee border.

Almost 70 percent of the basin is forested, and only about three percent of land falls into the urban/built-up category. Over a 15-year period between 1982 and 1997, the amount of forest and cultivated cropland in the basin decreased significantly, while the amount of developed land more than doubled (+14,700 acres). Land used for pasture also increased over the 15-year time frame (+4,000 acres). Population of the basin, based on 2000 census data, is estimated to be 31,271. Population is expected to increase approximately 28 percent to 40,063 over the next twenty years. While the resident population may be fairly low, the basin experiences significant seasonal population fluctuations from recreation and tourist travel.

The Hiwassee River basin contains 72 plant and animal species that are endangered, threatened, of special concern, or considered significantly rare by the NC Natural Heritage Program. Twenty-five of these are aquatic, including several endemic species that rely on good water quality as well as the basin's unique ecological conditions.

Assessment of Water Quality. In a manner similar to that employed by TDEC, surface waters in North Carolina are classified according to their best intended uses. Determining how well a waterbody supports its uses (*use support* status) is an important method of interpreting water quality data and assessing water quality. Surface waters are rated *fully supporting* (FS), *partially supporting* (PS) or *not supporting* (NS). The ratings refer to whether the classified uses of the water (i.e., aquatic life protection, primary recreation and water supply) are being met. For example, waters classified for

fish consumption, aquatic life protection and secondary recreation (Class C for freshwater) are rated FS if data used to determine use support meet certain criteria. However, if these criteria were not met, then the waters would be rated as PS or NS, depending on the degree of degradation. Waters rated PS or NS are considered to be impaired. Waters lacking data, having inconclusive data, or for which criteria have not been developed, are listed as not rated (NR).

DWQ also assesses ecosystem health and human health risk through the development of use support ratings for six categories: aquatic life and secondary recreation, fish consumption, shellfish harvesting, primary recreation, water supply and "other" uses. These categories are tied to the uses associated with the primary classifications applied to NC rivers and streams. A single water could have more than one use support rating corresponding to one or more of the six use support categories. For many waters, a use support category will not be applicable (N/A) to the use classification of that water (e.g., drinking water supply is only applied to Class WS waters).

Currently, there are no impaired waters in the North Carolina portion of the Hiwassee River basin (Figure 5-5).

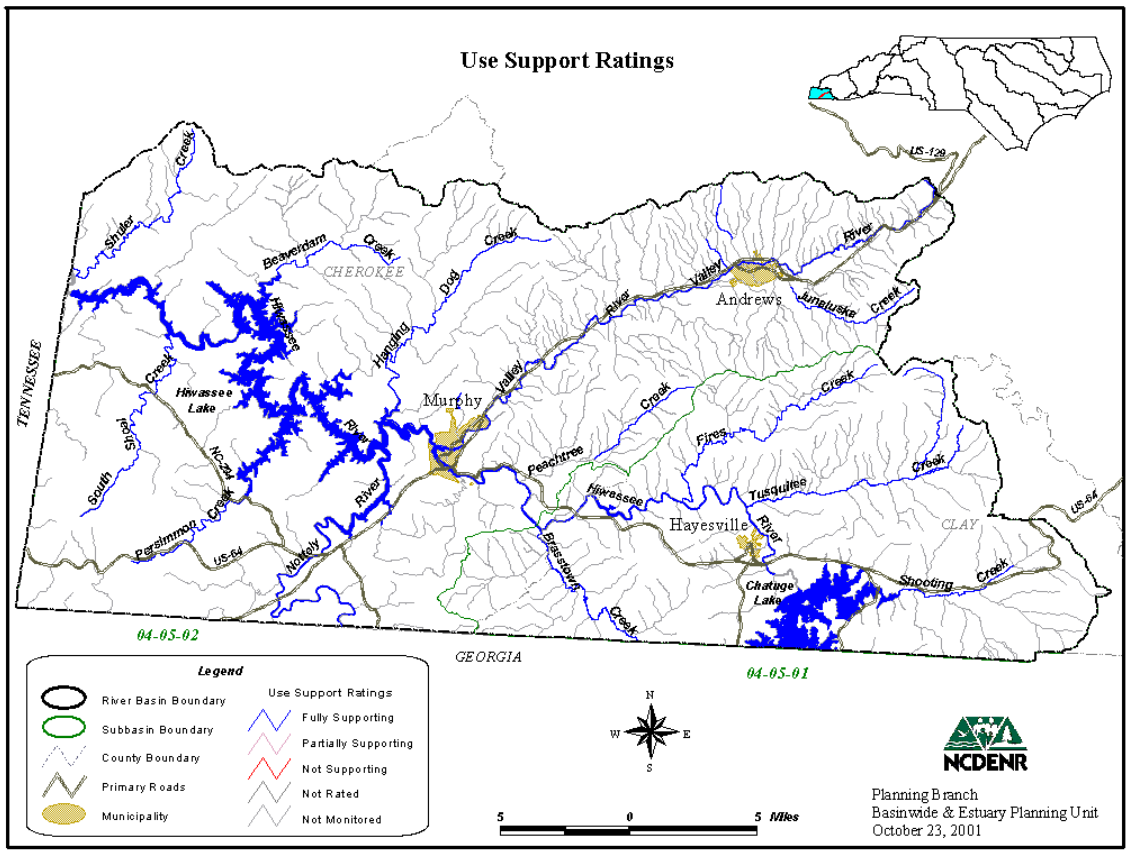


Figure 5-5. Use Support Ratings in the North Carolina Portion of the Hiwassee River Basin.

Aquatic Life/Secondary Recreation. The aquatic life/secondary recreation use support category is applied to all waters in North Carolina. Therefore, this category is applied to the total number of stream miles (967.6) and lake acres (10,847.8) in the North Carolina portion of the Hiwassee River basin. Approximately 21 percent of stream miles (204.3) and 100 percent of lake acres were monitored for the protection of aquatic life and secondary recreation by DWQ during this basinwide planning cycle. In this category, there are currently no impaired waters in the North Carolina portion of the Hiwassee River basin. A basinwide summary of current aquatic life/secondary recreation use support ratings is presented in Figures 5-4 and 5-5.

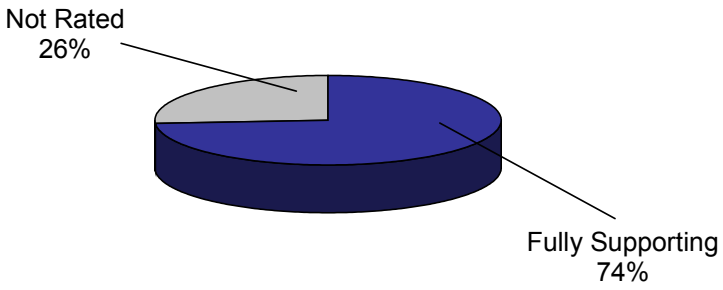


Figure 5-6. Aquatic Life/Secondary Recreation Use Support Ratings for Streams in the North Carolina portion of the Hiwassee River Basin (1999)

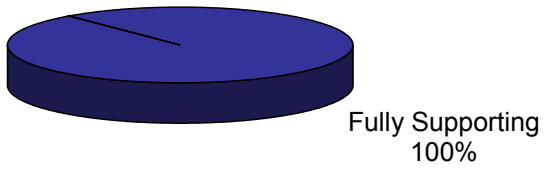


Figure 5-7. Aquatic Life/Secondary Recreation Use Support Ratings for Lakes in the North Carolina portion of the Hiwassee River Basin (1999)

Fish Consumption. Like the aquatic life/secondary recreation use support category, fish consumption is also applied to all waters in the state. Fish consumption use support ratings are based on fish consumption advisories issued by the NC Department of Health and Human Services. Currently, there are no fish consumption advisories specific to the NC portion of the basin. Therefore, all waters are considered to be fully supporting the fish consumption category. No waters were monitored for fish

consumption during this basinwide cycle because of the lack of any significant contaminant concerns in the Hiwassee River basin.

Primary Recreation. There are 30.3 stream miles and 10,847.8 lake acres currently classified for primary recreation (Class B) in the Hiwassee River basin. All (100 percent) were monitored by DWQ and the Tennessee Valley Authority over the past five years. Primary recreation use support ratings are based on swimming advisories issued by the NC Department of Health and Human Services (NCDHHS). Currently, there are no swimming advisories in the Hiwassee River basin and all waters classified for primary recreation are fully supporting. A basinwide summary of current use support ratings for primary recreation waters is presented in Figure 5-6.

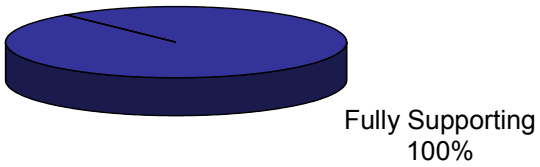


Figure 5-8. Primary Recreation Use Support Summary Information for All Class B Waters in the Hiwassee River Basin (1999)

Water Supply. There are 163.3 stream miles currently classified for water supply in the Hiwassee River basin. Approximately 79 percent of stream miles (128.4) were monitored within the past five years; all are fully supporting the water supply use. A basinwide summary of current water supply use support ratings is presented in Figure 5-7.

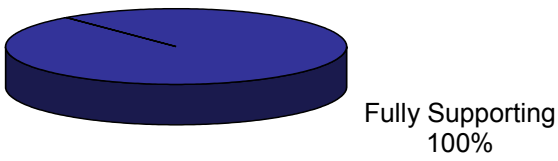


Figure 5-9. Water Supply Use Support Summary Information for All Class WS Waters in the Hiwassee River Basin (1999)

Strategies for Addressing Notable Water Quality Impacts in Unimpaired Waters. Often during DWQ's use support assessment, water quality concerns are documented for waters that are fully supporting designated uses. While these waters are not considered impaired, attention and resources should be focused on these waters over the next basinwide planning cycle to prevent additional degradation or to facilitate water quality improvement. Waters with notable water quality concerns in the Hiwassee River basin include Town Creek, Shooting Creek, Little Brasstown Creek, Valley River and Nottely River.

The most pressing water quality concern for these streams and throughout the Hiwassee River basin is habitat degradation. Habitat degradation includes sedimentation, bank erosion, channelization, lack of riparian vegetation, loss of pools or riffles, loss of woody habitat, and streambed scour. It is attributed to nonpoint source pollution. The primary sources of nonpoint source pollution in the Hiwassee River basin are runoff from construction sites, pasturelands, roads and developed areas. The task of quantifying nonpoint sources of pollution and developing management strategies for these waters is resource intensive. DWQ plans to notify local agencies and others of water quality concerns for these waters and work with them to conduct further monitoring and to locate sources of water quality protection funding for these unimpaired waters.

Local Water Quality Improvement Initiatives. There are several initiatives in the Hiwassee River basin dedicated to improving and protecting water quality. The Hiawassee River Watershed Coalition is a nonprofit, grassroots organization made up of citizens from both Georgia and North Carolina, with a mission to improve water quality in the upper Hiwassee River basin. The Coalition received a grant for $2.1 million from the Clean Water Management Trust Fund in 1998 for restoration work in the Brasstown Creek watershed. The benthic macroinvertebrate bioclassification for Brasstown Creek improved from Fair in 1994 to Good in 1999. The Coalition is now turning its focus toward the Valley River watershed.

In 1998, the Hiwassee River Basin Nonpoint Source Team (made up primarily of local natural resource agency staff) chose projects in the Town Creek and Little Brasstown Creek watersheds to implement nonpoint source pollution demonstration projects using Section 319 funds. The Clay County school system has been a particularly committed participant in the Hiwassee River Basin Nonpoint Source Team.

Additionally, there is a federally initiated interagency team of natural resource professionals in the Hiwassee River basin. The Hiwassee Interagency Team is made up primarily of federal and state agency staff from North Carolina, Tennessee, and Georgia. The team meets quarterly to discuss water quality concerns and improvement projects in the entire Hiwassee River basin. DWQ participates on this team and has found that it allows a good mechanism for coordination of monitoring and sharing of information.

Because local natural resource agency staff participate with each of these groups, there is opportunity for them to guide citizens toward real water quality improvement in the Hiwassee River basin. The work that these groups do then enhances daily agency program activities. DWQ is just one (often small) partner working to reduce nonpoint source pollution and improve water quality in this basin.

For more information concerning water quality in the Hiwassee River basin in North Carolina, visit the Basinwide Planning Program website:

http://h2o.enr.state.nc.us/basinwide/

or contact the Hiwassee River Basin Planner:

Hiwassee River Basin Planner
NC Division of Water Quality
Planning Branch
1617 Mail Service Center
Raleigh, North Carolina, 27699-1617
Phone (919) 733-5083 ext. 583
FAX (919) 715-5637

5.4. LOCAL INITIATIVES.

5.4.A. Hiwassee River Watershed Coalition The Hiwassee River Watershed Coalition is a nonprofit, grassroots organization made up of citizens from both Georgia and North Carolina. The Coalition's mission is to facilitate and coordinate water quality efforts throughout the upper Hiwassee River watershed, across political boundaries, while still honoring local initiatives. Recognizing that growth and development are increasing, the coalition promotes and encourages good development practices to maintain water quality for the future.

In 1999, the Coalition was awarded a three-year, $2.1 million grant from the North Carolina Clean Water Management Trust Fund (CWMTF) for stream and riparian restoration projects in the Brasstown Creek watershed. The coalition and its partners achieved more than 90 percent of the goals set forth in the grant proposal within the first two years of work. In 2001, the Georgia legislature awarded the Coalition a two-year grant to determine causes of environmental degradation in Chatuge and Nottely Reservoirs. The Coalition partnered with the Tennessee Valley Authority to begin work on this grant in the fall of 2001. Most recently, the Coalition received a second CWMTF grant in 2002 for stream and riparian restoration projects in the Valley River watershed.

The Coalition also partners with the Volunteer Water Information Network for a volunteer monitoring program in the basin and provides environmental education information and outreach activities in the area. Additionally, the Coalition participates with both the Hiwassee River Nonpoint Source Team and the Hiwassee Interagency Team. For more information about the Hiawassee River Watershed Coalition, contact the Executive Director:

Callie Dobson
Hiawassee River Watershed Coalition
1467 Mining Gap Road
Young Harris, GA 30582
(706) 896-8091 – Phone & Fax
cleanh2o@alltel.net

CHAPTER 6

FUTURE DIRECTIONS IN THE HIWASSEE 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 stormwater rules (implemented under the NPDES program) are transitioning from Phase 1 to Phase 2. More information on stormwatrer rules may be found at: http://www.state.tn.us/environment/wpc/stormh2o/MS4.htm.

This Chapter addresses point and nonpoint source approaches to water quality problems in the Hiwassee River Watershed as well as specific NPDES permittee information.

6.2. COMMENTS FROM PUBLIC MEETINGS. Watershed meetings are open to the public, and most meetings were represented by citizens who live in the watershed, NPDES permitees, business people, farmers, and local river conservation interests. Locations for meetings were frequently 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/public.htm.

6.2.A. Year 1 Public Meeting. The first Hiwassee River Watershed public meeting was held April 10, 1997 in Cleveland. 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 nongovernment organization partners, 3)review water quality monitoring strategies, and 4)solicit input from the public.

Major Concerns/Comments

- Effects of polluted waters flowing into Tennessee from out of state
- Need to increase public participation at meetings
- Need more river access for recreation
- Trash (litter)
- Erosion and the resulting sediment getting into rivers
- Effect of 319 Program's move to Department of Agriculture
- Water withdrawals

6.2.B. Year 3 Public Meeting. The second Hiwassee River Watershed public meeting was held August 10, 1999 in Athens (Tennessee Wesleyan College). 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

- Nonpoint sources of pollution have to be addressed if the TMDL is to be thorough
- Municipalities will be asked to shoulder the burden of the cost of clean water while agriculture does nor
- Fairness to tacxpayers of paying for water quality improvements when most problems are due to agriculture

6.2.C. Year 3 Public Meeting. The third scheduled Hiwassee River Watershed public meeting was held November 6, 2003 at Tennessee Wesleyan University in Athens. The meeting featured six educational components:

- Overview of draft Watershed Water Quality Management Plan slide show
- Benthic macroinvertebrate samples and interpretation
- SmartBoard™ with interactive GIS maps
- "How We Monitor Streams" self-guided slide show
- "Why We Do Biological Sampling" self-guided slide show
- UT-Extension Service Display
- Tennessee Valley Authority Display

In addition, citizens had the opportunity to make formal comments on the draft Watershed Water Quality Management Plan and to rate the effectiveness of the meeting.

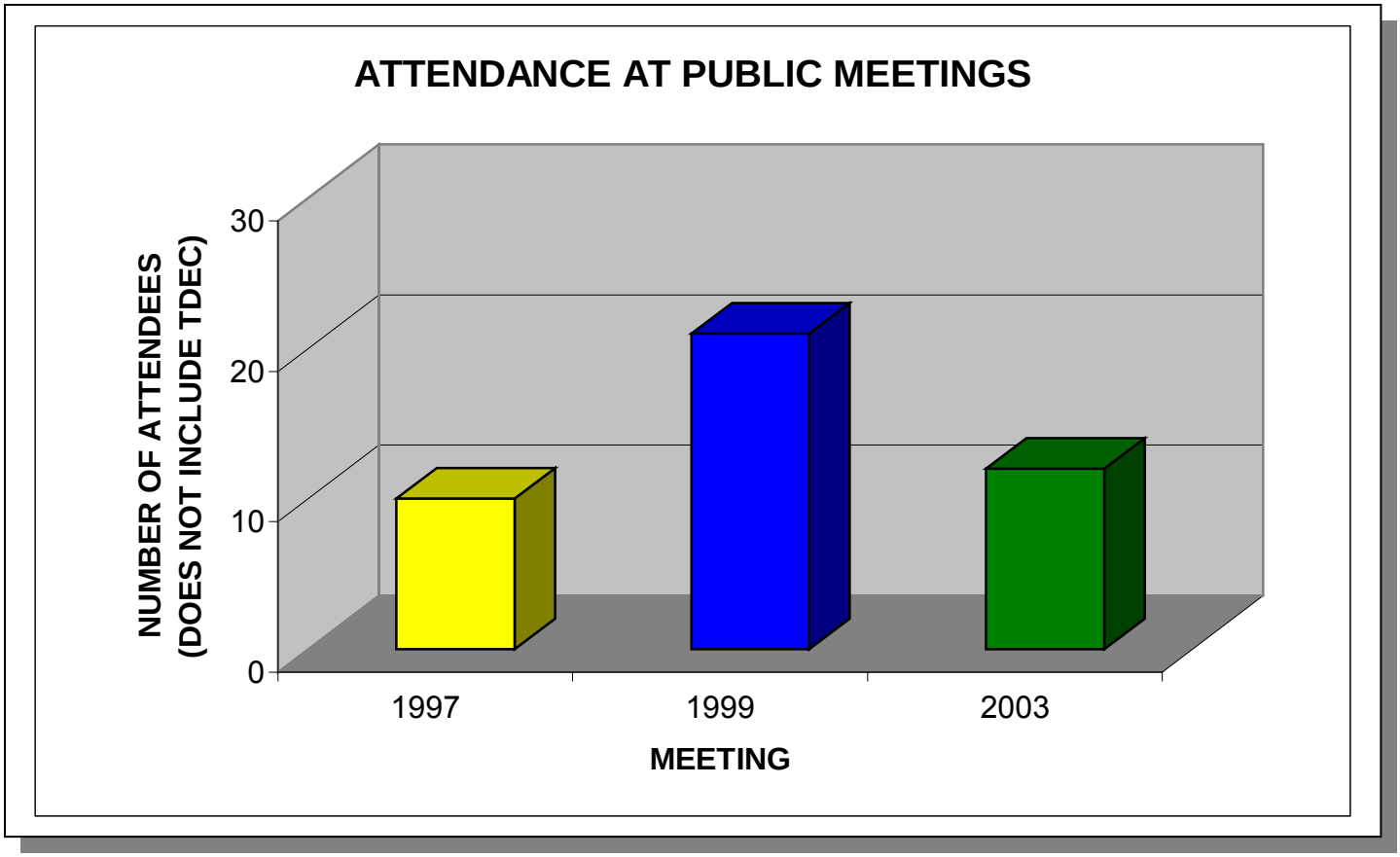


Figure 6-1. Attendance at Public Meetings in the Hiwassee River Watershed.

Figure 6-2. Watershed meetings with an educational slide program about the watershed and a review of the draft Watershed Water Quality Management Plan.

Figure 6-3. The SmartBoard™ is an effective interactive tool to teach citizens about the power of GIS.

Figure 6-4. Microscopes and hand lenses help Environmental Specialist Steve Winesett teach participants about the relationship between aquatic insects and water quality.

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.php

Approved TMDL:

Oostanaula Creek TMDL. TMDL for fecal coliform in the Hiwassee River Watershed approved September 20, 2002:
http://www.state.tn.us/environment/wpc/OostF2.pdf

Cane Creek TMDL. Total Maximum Daily Load for fecal coliform in Cane Creek, Hiwassee River Watershed, McMinn County, Tennessee:
http://www.state.tn.us/environment/wpc/tmdl/approvedtmdl/CaneF3.pdf

TMDLs are prioritized for development based on many factors.

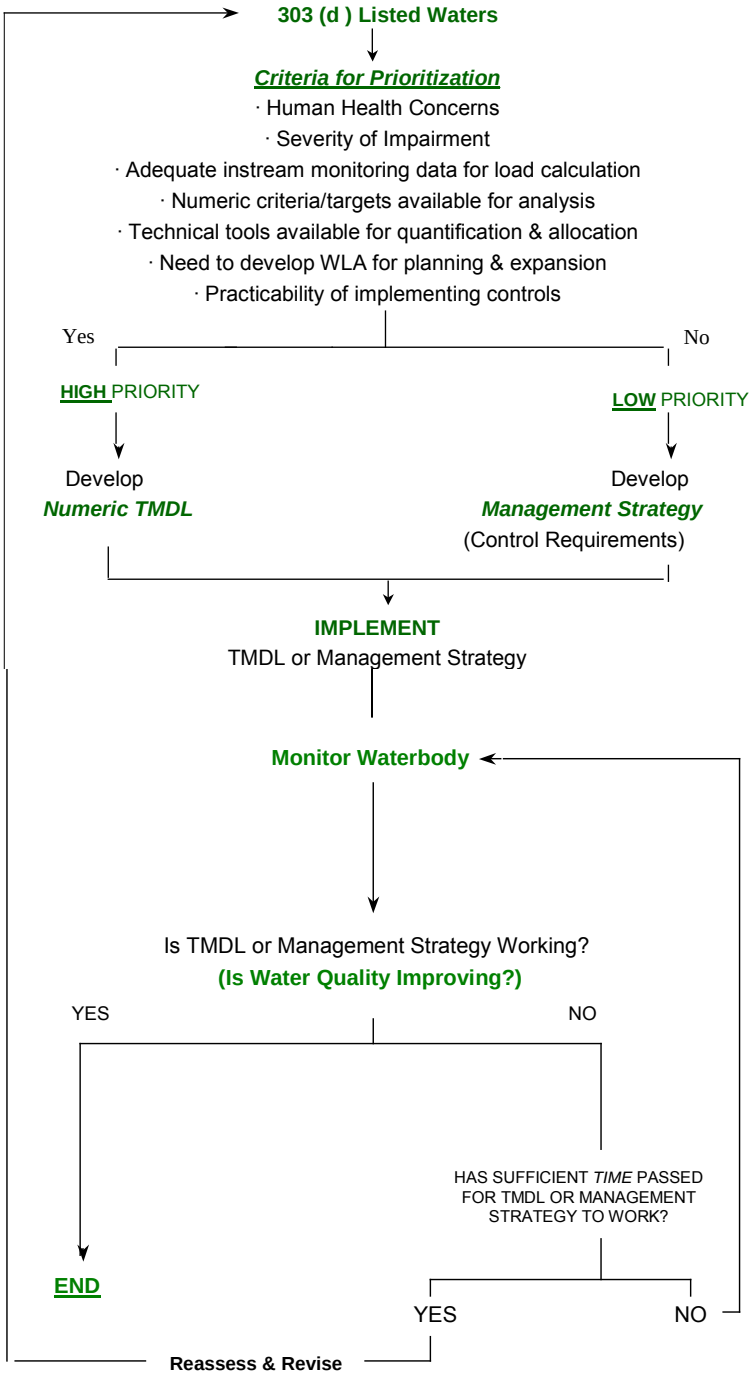


Figure 6.5. Prioritization scheme for TMDL Development.

6.3.B. Nonpoint Sources

Common nonpoint sources of pollution include urban runoff, riparian vegetation removal, and inappropriate land development, agricultural, and road construction practices. Since nonpoint pollution exists essentially everywhere rain falls and drains to a stream, existing point source regulations can have only a limited effect, so other measures are necessary.

There are several state and federal regulations that address some of the contaminants impacting waters in the Hiwassee River watershed. Most of these are limited to only 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 voluntary efforts by landowners and volunteer groups, while others may involve new regulations. Many agencies, including the Tennessee Department of Agriculture and 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 certain types of impairments, causes, suggested improvement measures, and control strategies. The suggested measures and streams are only examples and efforts should not be limited to only those streams and measures mentioned.

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 are disturbed. In the spring of 2003, that threshold became 1 acre. The general permit issued for such construction sites sets out conditions for maintenance of the sites to minimize pollution from stormwater runoff, including requirements for installation and inspection of erosion controls. Also, the general permit imposes more stringent inspection and self-monitoring requirements on sites in the watershed of streams that are already impaired due to sedimentation. Examples in the Hiwassee River Watershed are Conasauga Creek and Candies Creek. Regardless of the size, no construction site is allowed to cause a condition of pollution.

Construction sites within a sediment-impaired watershed may also have higher priority for inspections by WPC personnel, and are likely to have enforcement actions for failure to control erosion.
The same requirements apply to sites in the drainage of high quality waters. Blackburn Creek and Gee Creek are examples of high quality streams in the Hiwassee River Watershed.

6.3.B.i.b. From Channel and/or Bank Erosion. Due to the past channelization of Oostanaula Creek, Candies Creek, and other Hiwassee River tributaries, the channels are unstable. Several agencies are working to stabilize portions of stream banks.

These include NRCS and the Tennessee Valley Authority, as well as citizen groups. Other methods or controls that might be necessary to address common problems are:

Voluntary activities

- Re-establishment of bank vegetation (example: tributaries of Candies Creek).
- Establish off-channel watering areas for cattle by moving watering troughs and feeders back from stream banks (examples: Chatata Creek and Agency Creek).
- Limit cattle access to streams and bank vegetation (example: Hawkins Branch).

Additional strategies

- Increase efforts in the Master Logger program to recognize impaired streams and require more effective management practices.
- Better community planning for the impacts of development on small streams, especially development in growing areas (examples: South Mouse Creek, Oostanaula Creek, and Cane Creek).
- Limit livestock access to streams and bank vegetation (example: Hawkins Branch and tributaries of Candies Creek).
- Restrictions requiring post-construction run-off rates to be no greater than pre-construction rates in order to avoid in-channel erosion (examples: South Mouse Creek and Oostanaula Creek).
- Additional restrictions on logging in streamside management zones.
- Prohibition on clearing of stream and ditch banks (example: Conasauga Creek). *Note: Permits may be required for any work along streams.*
- Additional restriction to road and utilities crossings of streams.
- Restrictions on the use of off-highway vehicles on stream banks and in stream channels.

6.3.B.i.c. From Agriculture and Silviculture. Even though there is an exemption in the Water Quality Control Act which states that normal agricultural and silvicultural practices which do not result in a point source discharge do not have to obtain a permit, efforts are being made to address impacts due to these practices.

The Master Logger Program has been in place for several years to train loggers how to plan their logging activities and to install Best management Practices that lessen the impact of logging activities. Recently, laws and regulations were enacted which established the expected BMPs to be used and allows the Commissioners of the Departments of Environment and Conservation and of Agriculture to stop a logging operation that has failed to install these BMPs and so are impacting streams.

Since the Dust Bowl era, the agriculture community has strived to protect the soil from wind and soil erosion. Agencies such as the Natural resources Conservation Service (NRCS), the University of Tennessee Agricultural Extension Service, and the Tennessee department of Agriculture have worked 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. Oostanaula Creek would benefit from the installation of several BMPs to address the sediment lost from fields in this watershed.

6.3.B.ii. Pathogen Contamination.

Possible sources of pathogens are inadequate or failing septic tank systems, overflows or breaks in public sewer collection systems, poorly disinfected discharges from sewage treatment plants, and fecal matter in streams and storm drains due to pets, livestock and wildlife. 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. Septic tank and field lines are regulated by the Division of Ground Water Protection within the Chattanooga Environmental Assistance Center and by delegated county health departments. In addition to discharges to surface waters, businesses may employ either subsurface or surface disposal of wastewater. The Division of Water Pollution Control regulates surface disposal.

Other measures that may be necessary to control pathogens are:

Voluntary activities

- Off-channel watering of livestock (examples: tributaries of Candies Creek, Hawkins Branch, and Dairy Creek).
- Limiting livestock access to streams (examples: Chatata Creek and Hawkins Branch).
- Proper management of animal waste from feeding operations.

Enforcement strategies

- Greater enforcement of regulations governing on-site wastewater treatment.
- Timely and appropriate enforcement for non-complying sewage treatment plants, large and small, and their collection systems.
- Identification of Concentrated Animal Feeding Operations not currently permitted, and enforcement of current regulations.

Additional strategies

- Restrict development in areas where sewer is not available and treatment by subsurface disposal is not an option due to poor soils, floodplains, or high water tables.
- Develop and enforce leash laws and controls on pet fecal material (example: South Mouse Creek).
- Greater efforts by sewer utilities to identify leaking lines or overflowing manholes, (example: Chestuee Creek).

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 and from fertilized lawns and croplands.

Other 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 (examples of streams that could benefit are Candies Creek, tributaries of Conasauga Creek, and areas along stream channels). 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.

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.
- Discourage impoundments. Ponds and lakes do not aerate water. *Note: Permits may be required for any work on a stream, including impoundments.*

6.3.B.iv. Toxins and Other Materials.

Many materials enter our streams due to apathy, or lack of civility or knowledge by the public. Litter in roadside ditches, garbage bags tossed over bridge railings, paint brushes washed off over storm drains, and oil drained into ditches are all examples of pollution in streams. Some can be addressed by:

Voluntary activities

- Providing public education.
- Painting warnings on storm drains that connect to a stream (This would benefit South Mouse Creek, Cane Creek, and Oostanaula Creek).
- Sponsoring community clean-up days (This would benefit South Mouse Creek).
- Landscaping of public areas.
- Encouraging public surveillance of their streams and reporting of dumping activities to their local authorities.

Needing regulation

- Prohibition of illicit discharges to storm drains.
- Litter laws and strong enforcement at the local level.

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.

Measures that can help address this problem are:

Voluntary activities

- Sponsoring litter pickup days to remove litter that might enter streams (examples: Oostanaula Creek and South Mouse Creeks).
- Organizing stream cleanups removing trash, limbs and debris before they cause blockage.
- Avoiding use of heavy equipment to "clean out" streams.
- Planting vegetation along streams to stabilize banks and provide habitat (example: tributaries of Candies Creek).
- Encouraging developers to avoid extensive culverts in streams.

Current regulations

- Restrict modification of streams by such means as culverting, lining, or impounding.
- Require mitigation for impacts to streams and wetlands when modifications are allowed.

Additional Enforcement

- Increased enforcement may be needed when violations of current regulations occur.

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

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

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

6.4.A. Municipal Permits

TN0024121 Cleveland Utilities Sewage Treatment Plant

Discharger rating: Minor
City: Cleveland
County: Bradley
EFO Name: Chattanooga
Issuance Date: 6/30/04
Expiration Date: 1/30/09
Receiving Stream(s): Hiwassee River Mile 15.4
HUC-12: 060200020602
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: ICEAS(TM) activated sludge process preceded by mechanical bar screening and grit removal and followed by chlorination and dechlorination. Sludge is anaerobically digested, dewatered by centrifuge and land applied.

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
Ammonia as N (Total)	All Year	20	mg/L	DMax Conc	Weekdays	Composite	Effluent
Ammonia as N (Total)	All Year	2702	lb/day	DMax Load	Weekdays	Composite	Effluent
Ammonia as N (Total)	All Year	15	mg/L	MAvg Conc	Weekdays	Composite	Effluent
Ammonia as N (Total)	All Year	10	mg/L	WAvg Conc	Weekdays	Composite	Effluent
Ammonia as N (Total)	All Year	1801	lb/day	MAvg Load	Weekdays	Composite	Effluent
Bypass of Treatment (occurrences)	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
CBOD % Removal	All Year	40	Percent	DMin % Removal	Weekdays	Calculated	% Removal
CBOD % Removal	All Year	85	Percent	MAvg % Removal	Weekdays	Calculated	% Removal
CBOD5	All Year	40	mg/L	DMax Conc	Weekdays	Composite	Effluent
CBOD5	All Year	25	mg/L	DMin Conc	Weekdays	Composite	Effluent
CBOD5	All Year		mg/L	MAvg Conc	Weekdays	Composite	Influent (Raw Sewage)
CBOD5	All Year	4504	lb/day	MAvg Load	Weekdays	Composite	Effluent
CBOD5	All Year	35	mg/L	MAvg Conc	Weekdays	Composite	Effluent
CBOD5	All Year	6305	lb/day	DMax Load	Weekdays	Composite	Effluent
CBOD5	All Year		mg/L	DMax Conc	Weekdays	Composite	Influent (Raw Sewage)
D.O.	All Year	1	mg/L	DMin Conc	Daily	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	Daily	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	Daily	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	Daily	Grab	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg 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)

Table 6-1a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
IC25 7day Ceriodaphnia Dubia	All Year	5	Percent	DMin Conc	Continuous	Composite	Effluent
IC25 7day Fathead Minnows	All Year	5	Percent	DMin Conc	Continuous	Composite	Effluent
Overflow Use Occurences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
Overflow Use Occurences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Non Wet Weather
Settleable Solids	All Year	1	mL/L	DMax Conc	Weekdays	Composite	Effluent
Silver Total Recoverable	All Year	0.0047	mg/L	DMax Conc	Monthly	Composite	Effluent
TRC	All Year	0.4	mg/L	DMax Conc	Daily	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	Weekdays	Composite	Effluent
TSS	All Year		mg/L	DMax Conc	Weekdays	Composite	Influent (Raw Sewage)
TSS	All Year	7206	lb/day	DMax Load	Weekdays	Composite	Effluent
TSS	All Year	40	mg/L	MAvg Conc	Weekdays	Composite	Effluent
TSS	All Year	5404	lb/day	MAvg Load	Weekdays	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	Weekdays	Composite	Influent (Raw Sewage)
TSS	All Year	30	mg/L	WAvg Conc	Weekdays	Composite	Effluent
TSS % Removal	All Year	40	Percent	DMin % Removal	Weekdays	Calculated	% Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	Weekdays	Calculated	% Removal
pH	All Year	9	SU	DMax Conc	Daily	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Daily	Grab	Effluent

Table 6-1b. Permit Limits for Cleveland Utilities Sewage Treatment Plant.

Tables 6-1a-b. Permit Limits for Cleveland Utilities Sewage Treatment Plant.

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

- 9 Fecal Coliform
- 1 CBOD
- 9 COD
- 4 TSS
- 1 Settleable Solids
- 226 Overflows
- 14 Bypasses

Enforcement:
Agreed Order #05-0399
Notes from Database: Cleveland Utility District is not a direct part of Cleveland City Government so there will not be any discussions with the City. Cleveland is on the EPA Watch List. For the last couple of years before Fred Murphy retired from Cleveland Utilities, the EFO told him that they would likely be subject to an Order due to their continuation of overflows, even though they had an I&I Program in place. Their program was neither aggressive nor was it achieving progress for all of the effort that was occurring - they were basically point-fixing their clay pipe system.

They have had many years to fix their overflow problems. Overflows continue to occur in the same places and Cleveland Utilities has failed to abide by their NPDES Permit and place connection moratoriums on those portions of their collection system that experiences these continual overflows. Instead they continue to add more and more hook-ups without regard for system capacity.

South Mouse Creek, comprises a major portion of the Cleveland Utility Districts collection system, is an impaired stream - pathogens, siltation, toxicity, and physical substrate habitat alterations. The Pathogens TMDL for South Mouse Creek requires greater than 92% removal of pathogens to meet water quality criteria. Consequently, there are multiple reasons for Cleveland Utilities to be encouraged to be more aggressive in correcting long-standing problems with their collection system.

Bill Penny is representing the Respondents in negotiating the appeal. The negotiation process has continued for an extended period of time and the US EPA has now sent an information request (308 letter) to Cleveland Utilities requiring information by the end of January 2006 or EPA will consider taking enforcement action.

Resolved as AO 05-0399 on 1/24/06 and entered at Secretary of State's Office on 1/25/06.

CAP received on 4/26/06.

The Municipal Facilities Section sent a letter to Cleveland on 5/12/06 stating that CAP/ER lacks some of the elements in the Order.

Received MOMs Program from Cleveland on 6/22/06.

Received publisher's affidavit for public review and comment of SORP Section XVI, Paragraph 6(a) of Order on 08/15/06.

EFO Comments:
The Plant itself is in great shape. The collection system is the problem. They have built an Equalization Tank to handle some of the overflow issues.

TN0024201 AUB-Oostanaula Creek Sewage Treatment Plant

Discharger rating: Minor
City: Athens
County: McMinn
EFO Name: Chattanooga
Issuance Date: 10/31/03
Expiration Date: 5/31/07
Receiving Stream(s): Oostanaula Creek Mile 30.1
HUC-12: 060200020702
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: "oxidation ditch" activated sludge process (a form of extended aeration activated sludge) with tertiary filtration and post aeration

Segment	TN06020002083_3000
Name	Oostanaula Creek
Size	7.4
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Livestock Watering and Wildlife (Supporting), Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting)
Causes	Escherichia coli, Phosphate, Sedimentation/Siltation
Sources	Municipal Point Source Discharges, Discharges from Municipal Separate Storm Sewer Systems (MS4)

Table 6-2. Stream Segment Information for AUB-Oostanaula Creek Sewage Treatment Plant.

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
48hr LC50: Ceriodaphnia Dubia	All Year	100	Percent	DMin Conc	Quarterly	Grab	Effluent
48hr LC50: Fathead Minnows	All Year	100	Percent	DMin Conc	Quarterly	Grab	Effluent
Ammonia as N (Total)	Summer	4	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	71	lb/day	DMax Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	2	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	47	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	3	mg/L	MAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	9	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	160	lb/day	DMax Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	4.5	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	106	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	6.8	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	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
CBOD % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
CBOD5	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)

Table 6-3a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
CBOD5	Summer	25	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	Summer	354	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	Summer	472	lb/day	DMax Load	3/Week	Composite	Effluent
CBOD5	Summer	20	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	Summer	15	mg/L	DMin Conc	3/Week	Composite	Effluent
CBOD5	Winter	40	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	Winter	35	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	Winter	590	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	Winter	826	lb/day	DMax Load	3/Week	Composite	Effluent
CBOD5	Winter	25	mg/L	DMin Conc	3/Week	Composite	Effluent
D.O.	All Year	6	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	3/Week	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	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)
Nitrogen Total (as N)	All Year		mg/L	DMax Conc	2/Week	Composite	Effluent
Nitrogen Total (as N)	All Year	336	lb/day	MAvg Load	2/Week	Composite	Effluent
Nitrogen Total (as N)	All Year		mg/L	MAvg Conc	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		mg/L	DMax Conc	2/Week	Composite	Effluent
Phosphorus, Total	All Year		mg/L	MAvg Conc	2/Week	Composite	Effluent
Phosphorus, Total	All Year	184	lb/day	MAvg Load	2/Week	Composite	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	3/Week	Composite	Effluent
TRC	All Year	0.04	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	944	lb/day	DMax Load	3/Week	Composite	Effluent
TSS	All Year	40	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS	All Year	709	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year	30	mg/L	WAvg Conc	3/Week	Composite	Effluent
TSS % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-3b.

Tables 6-3a-b. Permit Limits for AUB-Oostanaula Creek Sewage Treatment Plant.

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

- 137 Overflows
- 159 Bypasses

EFO Comments:
Modification of the municipal wastewater treatment facility permit from 2.83 to 6.0 MGD. This is a brand new plant – in great shape. The collection system has serious issues. Several pump stations are in need of repair.

TN0025470 Niota Sewage Treatment Plant

Discharger rating: Minor
City: Niota
County: McMinn
EFO Name: Chattanooga
Issuance Date: 7/31/02
Expiration Date: 7/31/07
Receiving Stream(s): Little North Mouse Creek mile 3.5
HUC-12: 060200020801
Effluent Summary: Treated domestic wastewater from Outfall 001
Treatment system: Biological treatment of domestic wastewater

Segment	TN06020002084_0500
Name	Dry Valley Creek
Size	13.3
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Fish and Aquatic Life (Not Assessed), Livestock Watering and Wildlife (Not Assessed), Recreation (Not Assessed), Irrigation (Not Assessed)
Causes	N/A
Sources	N/A

Table 6-4. *Stream Segment Information for Niota Sewage Treatment Plant.*

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
Ammonia as N (Total)	All Year	7	mg/L	DMax Conc	3/Week	Composite	
Ammonia as N (Total)	All Year	18	lb/day	DMax Load	3/Week	Composite	
Ammonia as N (Total)	All Year	5.3	mg/L	MAvg Conc	3/Week	Composite	
Ammonia as N (Total)	All Year	3.5	mg/L	WAvg Conc	3/Week	Composite	
Ammonia as N (Total)	All Year	12	lb/day	MAvg Load	3/Week	Composite	
Ammonia as N (Total)	Summer	4	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	3	mg/L	MAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	6.7	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	2	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	10	lb/day	DMax Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	7	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	18	lb/day	DMax Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	3.5	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	12	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	5.3	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	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
CBOD % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
CBOD5	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)

Table 6-5a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
CBOD5	All Year	83	lb/day	MAvg Load	3/Week	Composite	
CBOD5	All Year	40	mg/L	DMax Conc	3/Week	Composite	
CBOD5	All Year	25	mg/L	DMin Conc	3/Week	Composite	
CBOD5	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
CBOD5	All Year	35	mg/L	MAvg Conc	3/Week	Composite	
CBOD5	All Year	117	lb/day	DMax Load	3/Week	Composite	
CBOD5	Summer	35	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	Summer	83	lb/day	DMax Load	3/Week	Composite	Effluent
CBOD5	Summer	20	mg/L	DMin Conc	3/Week	Composite	Effluent
CBOD5	Summer	67	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	Summer	25	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	Winter	40	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	Winter	35	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	Winter	83	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	Winter	25	mg/L	DMin Conc	3/Week	Composite	Effluent
CBOD5	Winter	117	lb/day	DMax Load	3/Week	Composite	Effluent
D.O.	All Year	5	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	3/Week	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	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)
IC25 7day Ceriodaphnia Dubia	All Year	100	Percent	DMin Conc	Continuous	Composite	Effluent
IC25 7day Fathead Minnows	All Year	100	Percent	DMin Conc	Continuous	Composite	Effluent
Overflow Use Occurences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
Overflow Use Occurences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Non Wet Weather
Settleable Solids	All Year	1	mL/L	DMax Conc	3/Week	Composite	Effluent
TRC	All Year	0.03	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	133	lb/day	DMax Load	3/Week	Composite	Effluent
TSS	All Year	40	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS	All Year	100	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year	30	mg/L	WAvg Conc	3/Week	Composite	Effluent
TSS % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	%Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	%Removal
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-5b.

Tables 6-5a-b. Permit Limits on Niota Sewage Treatment Plant.

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

- 1 pH
- 2 TSS
- 2 CBOD
- 2 Ammonia
- 3 % Suspended Solids Removal
- 6 Overflows
- 10 Bypasses

EFO Comments:
No serious issues at this plant.

TN0028886 Athens Ramada Inn

Discharger rating: Minor
City: Athens
County: McMinn
EFO Name: Chattanooga
Issuance Date: 7/31/02
Expiration Date: 6/30/07
Receiving Stream(s): Mile 0.6 of Liberty Branch which enters North Mouse Creek at mile 30.8
HUC-12: 060200020801
Effluent Summary: Treated domestic wastewater from Outfall 001
Treatment system: Extended aeration

Segment	TN06020002084_1000
Name	North Mouse Creek
Size	38.36
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Fish and Aquatic Life (Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Escherichia coli
Sources	Discharges from Municipal Separate Storm Sewer Systems (MS4), Grazing in Riparian or Shoreline Zones

Table 6-6. Stream Segment Information for Athens Ramada Inn.

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
Ammonia as N (Total)	All Year	10	mg/L	DMax Conc	2/Month	Grab	Effluent
Ammonia as N (Total)	All Year	5	mg/L	MAvg Conc	2/Month	Grab	Effluent
BOD5	All Year	45	mg/L	DMax Conc	2/Month	Grab	Effluent
BOD5	All Year	30	mg/L	MAvg Conc	2/Month	Grab	Effluent
D.O.	All Year	3	mg/L	DMin Conc	Weekdays	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	2/Month	Grab	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Week	Grab	Effluent
TRC	All Year	0.5	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	2/Month	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	2/Month	Grab	Effluent
pH	All Year	8.5	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	2/Week	Grab	Effluent

Table 6-7. Permit Limits for Athens Ramada Inn.

EFO Comments:
Tiny package plant. No issues.

TN0029122 Bachman Academy

Discharger rating: Minor
City: McDonald
County: Bradley
EFO Name: Chattanooga
Issuance Date: **5**/31/02
Expiration Date: 5/31/07
Receiving Stream(s): Overland flow 600 feet to mile 0.4 of unnamed tributary to Brymer Creek at mile 0.3
HUC-12: 060200020902
Effluent Summary: Treated domestic wastewater from Outfall 001
Treatment system: Activated sludge

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
BOD5	All Year	45	mg/L	DMax Conc	Monthly	Grab	Effluent
D.O.	All Year	3	mg/L	DMin Conc	Weekdays	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	Monthly	Grab	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Week	Grab	Effluent
TRC	All Year	2	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6	SU	DMin Conc	2/Week	Grab	Effluent

Table 6-8. Permit Limits for Bachman Academy.

EFO Comments:

EFO noticed suspicious numbers on Monthly Operating Reports (MORs). Site inspection revealed a small package plant in bad condition. Gate was wide open, blackberry bushes growing in the treatment area, rotted out boards, and fence was down. EFO sent an NOV, Operator was dismissed and the plant was taken over temporarily by Cleveland STP (Mike Ward). The plant has been cleaned up since.

TN0029483 E. K. Baker School

Discharger rating: Minor
City: Athens
County: McMinn
EFO Name: Chattanooga
Issuance Date: 10/31/02
Expiration Date: 10/31/07
Receiving Stream(s): Spring Creek at mile18.7
HUC-12: 060200020803
Effluent Summary: Treated domestic wastewater from Outfall 001
Treatment system: Extended aeration

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
TSS	All Year	45	mg/L	DMax Conc	2/Month	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	2/Month	Grab	Effluent

Table 6-9. Permit Limits for E.K. Baker School

EFO Comments:
No issues.

TN0029491 Riceville Elementary School

Discharger rating: Minor
City: Riceville
County: McMinn
EFO Name: Chattanooga
Issuance Date: 10/31/02
Expiration Date: 10/31/07
Receiving Stream(s): Unnamed tributary at mile 0.3 to Dry Valley Branch at mile 5.4
HUC-12: 060200020702
Effluent Summary: treated domestic wastewater from Outfall 001
Treatment system: Activated sludge

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
TSS	All Year	45	mg/L	DMax Conc	2/Month	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	2/Month	Grab	Effluent

Table 6-10. Permit Limits for Riceville Elementary School.

EFO Comments:
Poorly operated, small Package Plant. They have received a grant to connect a sewer line to AUB.

TN0054828 Calhoun School

Discharger rating: Minor
City: Calhoun
County: McMinn
EFO Name: Chattanooga
Issuance Date: 10/31/02
Expiration Date: 10/10/07
Receiving Stream(s): Hiwassee River at mile 19.1
HUC-12: 060200020601
Effluent Summary: Treated domestic wastewater from Outfall 001
Treatment system: Extended aeration plant

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
TSS	All Year	45	mg/L	DMax Conc	2/Month	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	2/Month	Grab	Effluent

Table 6-11. Permit Limits for Calhoun School.

EFO Comments:
No Issues.

TN0021938 Englewood Sewage Treatment Plant

Discharger rating: Major
City: Englewood
County: McMinn
EFO Name: Chattanooga
Issuance Date: 5/31/02
Expiration Date: 5/31/07
Receiving Stream(s): Chestuee Creek Mile 42.4
HUC-12: 060200020501
Effluent Summary: Treated domestic wastewater from Outfall 001
Treatment system: Extended aeration plant

Segment	TN06020002082_2000
Name	Chestuee Creek
Size	17.9
Unit	Miles
First Year on 303(d) List	2002
Designated Uses	Fish and Aquatic Life (Not Assessed), Livestock Watering and Wildlife (Supporting), Recreation (Non-Supporting), Irrigation (Supporting)
Causes	Escherichia coli
Sources	Grazing in Riparian or Shoreline Zones

Table 6-12. Stream Segment Information for Englewood Sewage Treatment Plant.

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
BOD % removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
BOD % removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
BOD5	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
BOD5	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
BOD5	All Year	83	lb/day	DMax Load	3/Week	Composite	Effluent
BOD5	All Year	40	mg/L	MAvg Conc	3/Week	Composite	Effluent
BOD5	All Year	63	lb/day	MAvg Load	3/Week	Composite	Effluent
BOD5	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
BOD5	All Year	30	mg/L	WAvg Conc	3/Week	Composite	Effluent
Bypass of Treatment (occurrences)	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
D.O.	All Year	1	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	3/Week	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Influent (Raw Sewage)
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Influent (Raw Sewage)

Table 6-13a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Overflow Use Occurences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Wet Weather
Overflow Use Occurences	All Year		Occurences/Month	MAvg Load	Continuous	Visual	Non Wet Weather
Settleable Solids	All Year	1	mL/L	DMax Conc	3/Week	Composite	Effluent
TRC	All Year	0.3	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year	63	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year		mg/L	DMax Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year	83	lb/day	DMax Load	3/Week	Composite	Effluent
TSS	All Year	30	mg/L	WAvg Conc	3/Week	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	3/Week	Composite	Influent (Raw Sewage)
TSS	All Year	40	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-13b.

Tables 6-13a-b. Permit Limits for Englewood Sewage Treatment Plant.

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

- 6 BOD
- 5 pH
- 9 % of Suspended Solids Removal
- 1 Fecal Coliform
- 2 Chlorine
- 2 Suspended Solids
- 18 Overflows
- 1 Bypass

Enforcement:
Database notes:
01/27/05--Effluent problems as well as management and maintenance problems resulting in visible plume in receiving stream. No penalty assessed.
Received CAP/ER on 9/23/05.
On 10/27/05, Municipal Facilities Section sent Englewood a letter approving the CAP/ER. The contingency dates will be set accordingly.
02/07/06 -- Received letter dated 01/30/06 from Englewood in appreciation of 01/27/06 assistance meeting with WPC staff and Englewood officials; letter contains proposal for plant improvements.

EFO Comments:
Plant Operator has STP in good shape now. Collection system has problems.

TN0023396 Cumberland Mobile Home Park

Discharger rating: Minor
City: Englewood
County: McMinn
EFO Name: Chattanooga
Issuance Date: 11/27/02
Expiration Date: 11/30/07
Receiving Stream(s): Unnamed tributary at mile 0.8 to Chestuee Creek at mile 35.5
HUC-12: 060200020503
Effluent Summary: Treated domestic wastewater from Outfall 001
Treatment system: Activated sludge

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
Ammonia as N (Total)	Summer	4	mg/L	DMax Conc	Monthly	Grab	Effluent
Ammonia as N (Total)	Winter	10	mg/L	DMax Conc	Monthly	Grab	Effluent
BOD5	All Year	20	mg/L	DMax Conc	Monthly	Grab	Effluent
D.O.	All Year	6	mg/L	DMin Conc	Weekdays	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	Monthly	Grab	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Week	Grab	Effluent
TRC	All Year	2	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6	SU	DMin Conc	2/Week	Grab	Effluent

Tables 6-14. Permit Limits for Cumberland Mobile Home Park.

EFO Comments:
No issues.

TN0067539 AUB- North Mouse Creek Sewage Treatment Plant

Discharger rating: Minor
City: Athens
County: McMinn
EFO Name: Chattanooga
Issuance Date: 4/30/02
Expiration Date: 4/30/07
Receiving Stream(s): North Mouse Creek at mile 24.7
HUC-12: 060200020802
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: WAS to thickener to anaerobic digester

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
Ammonia as N (Total)	Summer	4	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	30	lb/day	DMax Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	3	mg/L	MAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	2	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	20	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	6	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	30	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	45	lb/day	DMax Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	3	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter	4.5	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
CBOD % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
CBOD5	Summer	21	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	Summer	12.5	mg/L	DMin Conc	3/Week	Composite	Effluent
CBOD5	Summer	170	lb/day	DMax Load	3/Week	Composite	Effluent
CBOD5	Summer	17	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	Summer	125	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	Winter	34	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	Winter	200	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	Winter	27	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	Winter	270	lb/day	DMax Load	3/Week	Composite	Effluent
CBOD5	Winter	20	mg/L	DMin Conc	3/Week	Composite	Effluent
D.O.	All Year	6	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	3/Week	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
IC25 7day Ceriodaphnia Dubia	All Year	52.6	Percent	DMin Conc	Quarterly	Composite	Effluent
IC25 7day Fathead Minnows	All Year	52.6	Percent	DMin Conc	Quarterly	Composite	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year	400	lb/day	DMax Load	3/Week	Composite	Effluent
TSS	All Year	30	mg/L	WAvg Conc	3/Week	Composite	Effluent

Table 6-15a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
TSS	All Year	300	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year	40	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-15b.

Tables 6-15a-b. Permit Limits for AUB- North Mouse Creek STP.

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

- 23 Overflows
- 9 Bypasses

EFO Comments:
Beautiful, well-maintained, clean plant.

TN0067555 Rogers Creek Elementary School

Discharger rating: Minor
City: Athens
County: McMinn
EFO Name: Chattanooga
Issuance Date: 9/30/02
Expiration Date: 9/30/07
Receiving Stream(s): Rogers Creek at mile 12.5
HUC-12: 060200020604
Effluent Summary: Treated domestic wastewater from Outfall 001
Treatment system: Septic tank and recirculating sand filter

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
BOD5	All Year	45	mg/L	DMax Conc	2/Month	Grab	Effluent
BOD5	All Year	30	mg/L	MAvg Conc	2/Month	Grab	Effluent
D.O.	All Year	1	mg/L	DMin Conc	Weekdays	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	2/Month	Grab	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	2/Week	Grab	Effluent
TRC	All Year	2	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	2/Month	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	2/Month	Grab	Effluent
pH	All Year	9	SU	DMax Conc	2/Week	Grab	Effluent
pH	All Year	6	SU	DMin Conc	2/Week	Grab	Effluent

Table 6-16. Permit Limits for Rogers Creek Elementary School.

EFO Comments:
No issues.

TN0056561 Blue Springs Elementary School

Discharger rating: Minor
City: Cleveland
County: Bradley
EFO Name: Chattanooga
Issuance Date: 10/31/02
Expiration Date: 9/30/07
Receiving Stream(s): Blue Springs Branch at mile 1.1 to unnamed tributary to Black Fox Creek to Candies Creek
HUC-12: 060200020902
Effluent Summary: Treated domestic wastewater from Outfall 001
Treatment system: Extended aeration

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
TSS	All Year	45	mg/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	30	mg/L	MAvg Conc	Monthly	Grab	Effluent

Table 6-17. Permit Limits for Blue Springs Elementary School.

EFO Comments:
None.

TN0063771 Etowah Sewage Treatment Plant

Discharger rating: Major
City: Etowah
County: McMinn
EFO Name: Chattanooga
Issuance Date: 5/31/03
Expiration Date: 5/30/08
Receiving Stream(s): Conasauga Creek at mile 8.0
HUC-12: 060200020402
Effluent Summary: Treated municipal wastewater from Outfall 001
Treatment system: WAS to aerobic digester to drying beds to landfill

Segment	TN06020002081_1000
Name	Conasauga Creek
Size	33.99
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Recreation (Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting), Fish and Aquatic Life (Non-Supporting)
Causes	Sedimentation/Siltation
Sources	Discharges from Municipal Separate Storm Sewer Systems (MS4), Grazing in Riparian or Shoreline Zones

Table 6-18. Stream Segment Information for Etowah Sewage Treatment Plant.

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
Ammonia as N (Total)	Summer	15	mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	75	lb/day	DMax Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	7.5	mg/L	MAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	5	mg/L	WAvg Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Summer	50	lb/day	MAvg Load	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter		mg/L	DMax Conc	3/Week	Composite	Effluent
Ammonia as N (Total)	Winter		mg/L	WAvg Conc	3/Week	Composite	Effluent
CBOD % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
CBOD % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
CBOD5	All Year	40	mg/L	DMax Conc	3/Week	Composite	Effluent
CBOD5	All Year	35	mg/L	MAvg Conc	3/Week	Composite	Effluent
CBOD5	All Year	250	lb/day	MAvg Load	3/Week	Composite	Effluent
CBOD5	All Year	25	mg/L	DMin Conc	3/Week	Composite	Effluent
CBOD5	All Year	350	lb/day	DMax Load	3/Week	Composite	Effluent
D.O.	All Year	6	mg/L	DMin Conc	Weekdays	Grab	Effluent
E. coli	All Year		#/100mL	DMax Conc	3/Week	Grab	Effluent
E. coli	All Year		#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	3/Week	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	3/Week	Grab	Effluent
IC25 7day Ceriodaphnia Dubia	All Year	12	Percent	DMin Conc	Quarterly	Composite	Effluent

Table 6-19a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
IC25 7day Fathead Minnows	All Year	12	Percent	DMin Conc	Quarterly	Composite	Effluent
Settleable Solids	All Year	1	mL/L	DMax Conc	3/Week	Composite	Effluent
TRC	All Year	0.17	mg/L	DMax Conc	Weekdays	Grab	Effluent
TSS	All Year	45	mg/L	DMax Conc	3/Week	Composite	Effluent
TSS	All Year	400	lb/day	DMax Load	3/Week	Composite	Effluent
TSS	All Year	30	mg/L	WAvg Conc	3/Week	Composite	Effluent
TSS	All Year	300	lb/day	MAvg Load	3/Week	Composite	Effluent
TSS	All Year	40	mg/L	MAvg Conc	3/Week	Composite	Effluent
TSS % Removal	All Year	40	Percent	DMin % Removal	3/Week	Calculated	% Removal
TSS % Removal	All Year	85	Percent	MAvg % Removal	3/Week	Calculated	% Removal
pH	All Year	9	SU	DMax Conc	Weekdays	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Weekdays	Grab	Effluent

Table 6-19b.

Table 6-19a-b. Permit Limits for Etowah Sewage Treatment Plant.

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

- 18 TSS
- 2 Settleable Solids
- 10 Chlorine
- 4 Suspended Solids.
- 5 Overflows
- 1 Bypass

EFO Comments:
No issues.

6.4.B. Industrial Permits

TN0001996 J.M. Huber Corporation

Discharger rating: Minor
City: Etowah
County: McMinn
EFO Name: Chattanooga
Issuance Date: 7/31/04
Expiration Date: 3/30/07
Receiving Stream(s): Wet weather conveyance at mile 1.0 to Conasauga Creek at mile 10.7
HUC-12: 060200020402
Effluent Summary: Treated non-contact cooling water, evaporative recovery, process wastewater, stormwater, condensate, and contact cooling water from Outfall 001
Treatment system: Settling, coagulation, multimedia filtration, neutralization.

Segment	TN06020002081_1000
Name	Conasauga Creek
Size	33.99
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Recreation (Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting), Fish and Aquatic Life (Non-Supporting)
Causes	Sedimentation/Siltation
Sources	Discharges from Municipal Separate Storm Sewer Systems (MS4), Grazing in Riparian or Shoreline Zones

Table 6-20. Stream Segment Information for J.M. Huber Corporation.

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
Al (T)	All Year	3.95	mg/L	DMax Conc	2/Month	Composite	Effluent
Al (T)	All Year		mg/L	MAvg Conc	2/Month	Composite	Effluent
Flow	All Year		MGD	DMax Load	Daily	Continuous	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Continuous	Effluent
IC25 7day Ceriodaphnia Dubia	All Year	6.5	Percent	DMin Conc	Semi-annually	Composite	Effluent
IC25 7day Fathead Minnows	All Year	6.5	Percent	DMin Conc	Semi-annually	Composite	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	2/Month	Grab	Effluent
Sulfate (T)	All Year	20000	lb/day	DMax Load	Daily	Composite	Effluent
Sulfate (T)	All Year	17500	lb/day	MAvg Load	Daily	Composite	Effluent
TSS	All Year	40	mg/L	DMax Conc	Daily	Composite	Effluent
TSS	All Year	30	mg/L	MAvg Conc	Daily	Composite	Effluent
pH	All Year	9	SU	DMax Conc	Daily	Continuous	Effluent
pH	All Year	6	SU	DMin Conc	Daily	Continuous	Effluent

Table 6-21. Permit Limits for J.M. Huber Corporation.

Enforcement:

Case # 05-0040
Database Notes: Violation of NPDES permit protocol. Sampling, reporting, etc.. Utilized self-policing and voluntary disclosure policy.
Received correspondence dated 09/24/04, regarding 09/2004 discharge and ethics policy literature.
Received notification of TRE/TIE initiated on Outfall 001on 11/3/05.
OGC is still in negotiations on the Huber case and are awaiting federal action.

Comments:
Production of silica and silicates (sodium aluminosilicates, silicon dioxides, and hydrotalcite) for use as food additives and for rubber, plastics, wire and cable applications. An upgrade of the WWTS proposed in Fall 2005, with construction date of 12/05. Improved effluent quality, but Outfall location and nature of discharge unchanged; therefore, permit modification not required

TN0076015 Waupaca Foundry, Inc. - Plant #6

Discharger rating: Minor
City: Etowah
County: McMinn
EFO Name: Chattanooga
Issuance Date: 9/30/02
Expiration Date: 9/30/07
Receiving Stream(s): Crockett Springs Branch to Cane Creek
HUC-12: 060200020402
Effluent Summary: Noncontact-cooling water from Outfall 001 and storm water runoff from Outfalls SW1 and SW2
Treatment system: None

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
Flow	All Year		MGD	DMax Load	Monthly	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Monthly	Instantaneous	Effluent
IC25 7day Ceriodaphnia Dubia	All Year	100	Percent	DMin Conc	Monthly	Composite	Effluent
IC25 7day Fathead Minnows	All Year	100	Percent	DMin Conc	Monthly	Composite	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Monthly	Grab	Effluent
Temperature (°C)	All Year		°C	DMax Conc	Monthly	Grab	Effluent
Temperature (°C)	All Year		°C	DMax Conc	Monthly	Grab	Effluent
Temperature (°C)	All Year		°C	MAvg Conc	Monthly	Grab	Effluent
Temperature (°C)	All Year		°C	MAvg Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Monthly	Grab	Effluent

Table 6-22. Permit Limits for Waupaca Foundry, Inc. - Plant #6

Compliance History:
None noted in PCS.

EFO Comments:
Producer of gray and ductile iron castings. A 'greenfield' operation. Facility sends wastewater through pretreatment to Etowah STP.

TN0002461 Olin Corporation

Discharger rating: Major
City: Charlston
County: Bradley
EFO Name: Chattanooga
Issuance Date: 12/31/03
Expiration Date: 10/31/07
Receiving Stream(s): Hiwassee River at mile 15.8 (Outfall 001) and mile 16.7 (Outfall 003)
HUC-12: 060200020602
Effluent Summary: Sanitary wastewater (IMP 01A), process wastewater, miscellaneous non-process wastewater, and storm water runoff (Outfall 001), and combined non-contact cooling water and storm water runoff (Outfall 003)
Treatment system: None

Segment	TN06020002008_1000
Name	Hiwassee River
Size	7.7
Unit	Miles
First Year on 303(d) List	1992
Designated Uses	Livestock Watering and Wildlife (Supporting), Irrigation (Supporting), Recreation (Non-Supporting), Fish and Aquatic Life (Supporting), Domestic Water Supply (Supporting), Industrial Water Supply (Supporting)
Causes	Escherichia coli
Sources	Grazing in Riparian or Shoreline Zones, Sanitary Sewer Overflows (Collection System Failures)

Table 6-23. Stream Segment Information for Olin Corporation

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
% of time exceeding pH limits	All Year	1	Percent	DMax Conc	Monthly	Calculated	Effluent
Dissolved Solids, Total (TDS)	All Year	60000	mg/L	DMax Conc	Daily	Composite	Effluent
E. coli	All Year	126	#/100mL	MAvg Geo Mean	2/Month	Grab	Effluent
Fecal Coliform	All Year	1000	#/100mL	DMax Conc	2/Month	Grab	Effluent
Fecal Coliform	All Year	200	#/100mL	MAvg Geo Mean	2/Month	Grab	Effluent
Flow	All Year		MGD	DMax Load	Continuous	Recorder	Effluent
Flow	All Year		MGD	MAvg Load	Continuous	Recorder	Effluent
Hg (T)	All Year	0.511	mg/L	DMax Conc	Daily	Composite	Effluent
Hg (T)	All Year	0.018	mg/L	MAvg Conc	Daily	Composite	Effluent
Hg (T)	All Year	0.13	lb/day	MAvg Load	Daily	Composite	Effluent
Hg (T)	All Year	0.15	lb/day	MAvg Load	Daily	Composite	Effluent
Hg (T)	All Year	0.018	mg/L	MAvg Conc	Daily	Composite	Effluent
Hg (T)	All Year	0.35	lb/day	DMax Load	Daily	Composite	Effluent

Table 6-24a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Hg (T)	All Year	0.511	mg/L	DMax Conc	Daily	Composite	Effluent
Hg (T)	All Year	0.31	lb/day	DMax Load	Daily	Composite	Effluent
Length of Longest pH Excursion	All Year	60	Minutes	DMax Conc	Monthly	Calculated	Effluent
Production divided by days operated in month	All Year		lb/day	MAvg Load	Monthly	Calculated	Effluent
TRC	All Year	1.838	mg/L	DMax Conc	Daily	Grab	Effluent
TRC	All Year	1.064	mg/L	MAvg Conc	Daily	Grab	Effluent
TRC	All Year	2.53	lb/day	MAvg Load	Daily	Grab	Effluent
TRC	All Year	2.85	lb/day	MAvg Load	Daily	Grab	Effluent
TRC	All Year	1.064	mg/L	MAvg Conc	Daily	Grab	Effluent
TRC	All Year	4.8	lb/day	DMax Load	Daily	Grab	Effluent
TRC	All Year	1.838	mg/L	DMax Conc	Daily	Grab	Effluent
TRC	All Year	4.26	lb/day	DMax Load	Daily	Grab	Effluent
TSS	All Year		mg/L	DMax Conc	Daily	Composite	Effluent
TSS	All Year		mg/L	DMax Conc	Daily	Composite	Effluent
TSS	All Year	851	lb/day	DMax Load	Daily	Composite	Effluent
TSS	All Year	960	lb/day	DMax Load	Daily	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	Daily	Composite	Effluent
TSS	All Year	480	lb/day	MAvg Load	Daily	Composite	Effluent
TSS	All Year	426	lb/day	MAvg Load	Daily	Composite	Effluent
TSS	All Year		mg/L	MAvg Conc	Daily	Composite	Effluent
pH	All Year	9	SU	DMax Conc	Continuous	Recorder	Effluent
pH	All Year	6	SU	DMin Conc	Continuous	Recorder	Effluent

Table 6-24b.

Tables 6-24a-b. Permit Limits for Olin Corporation.

EFO Comments:
Alkalies and Chlorine (2812) and Industrial Inorganic Chemicals (2819). No issues.

2/21/07 - Olin operates in compliance with mercury permit (Daily Banner)
Olin Chlor-Alkali spent $7.6 million dollars in the past two years and $54 million in the last eight years in capital improvements for personnel and environmental safety programs at the company's Charleston plant. "The capital improvement projects include $2.6 million in new emission-control equipment to further reduce mercury emissions, which have already fallen 87 percent since 1987," plant manager Tom Tirabassi said recently during a meeting of the Community Advisory Panel. "Our company has a strong commitment to the modernization of the facility and technology." The Community Advisory Panel is a cross-section of community members and Olin representatives. The panel meets monthly to discuss plant operations, environmental concerns, safety, emergency preparedness, community involvement and other important issues. Tisha Calabrese-Benton, deputy communications director of Tennessee Department of Environment and Conservation, said the Charleston plant operates under permits regulating emissions into the air and into the Hiwassee River.

http://www.clevelandbanner.com/NF/omf/daily_banner/news_story.html?rkey=0064649+cr=gdn

TN0030155 TVA Apalachia Hydro Plant

Discharger rating: Minor
City: Farner
County: Polk
EFO Name: Chattanooga
Issuance Date: 6/30/02
Expiration Date: 6/30/07
Receiving Stream(s): Hiwassee River at mile 53.6
HUC-12: 060200020301
Effluent Summary: Cooling water from Outfall 001
Treatment system: None

Permit Limits:
No Limits in Permstat.

Comments:
Electric services

TN0042064 Johns Manville

Discharger rating: Minor
City: Etowah
County: McMinn
EFO Name: Chattanooga
Issuance Date: 8/30/02
Expiration Date: 8/30/07
Receiving Stream(s): Crockett Spring Branch at mile 1.2
HUC-12: 060200020402
Effluent Summary: Treated process wastewater, non-process wastewater, and treated landfill leachate
Treatment system: -

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
Ammonia as N (Total)	Summer	4.2	mg/L	DMax Conc	2/Week	Composite	Effluent
Ammonia as N (Total)	Summer	2.1	mg/L	MAvg Conc	2/Week	Composite	Effluent
Ammonia as N (Total)	Winter	8.2	mg/L	DMax Conc	2/Week	Composite	Effluent
Ammonia as N (Total)	Winter	4.1	mg/L	MAvg Conc	2/Week	Composite	Effluent
BOD5	All Year	45	mg/L	DMax Conc	2/Week	Composite	Effluent
BOD5	All Year	37.5	lb/day	DMax Load	2/Week	Composite	Effluent
BOD5	All Year	30	mg/L	MAvg Conc	2/Week	Composite	Effluent
BOD5	All Year	25	lb/day	MAvg Load	2/Week	Composite	Effluent
Cu (T)	Winter	0.1	mg/L	DMax Conc	2/Month	Composite	Effluent
Cu (T)	Winter	0.06	mg/L	MAvg Conc	2/Month	Composite	Effluent
D.O.	Winter	5	mg/L	DMin Conc	3/Week	Grab	Effluent
Flow	Winter		MGD	DMax Load	Weekly	Instantaneous	Effluent
Flow	Winter		MGD	MAvg Load	Weekly	Instantaneous	Effluent
IC25 7day Ceriodaphnia Dubia	All Year	49	Percent	DMin Conc	Continuous	Composite	Effluent
IC25 7day Fathead Minnows	All Year	49	Percent	DMin Conc	Continuous	Composite	Effluent
TSS	All Year	40	mg/L	DMax Conc	2/Week	Composite	Effluent
TSS	All Year	33.4	lb/day	DMax Load	2/Week	Composite	Effluent
pH	All Year	9	SU	DMax Conc	3/Week	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	3/Week	Grab	Effluent

Table 6-25. Permit Limits for Johns Manville.

Compliance History:
None noted in PCS.

Comments:
Fiberglass mat is manufactured for the roofing industry. This facility sends its wastewater through pretreatment to Etowah STP. Keeping their permit active as an option if necessary.

TN0002356 Bowater Newsprint Calhoun Operations

Discharger rating: Minor
City: Calhoun
County: McMinn
EFO Name: Chattanooga
Issuance Date: 8/15/02
Expiration Date: 6/30/07
Receiving Stream(s): Hiwassee River at mile 16.5 and 15.0 (Outfalls 001 and 006, respectively), the Hiwassee River at mile 18.1 (Outfall 003), and the Hiwassee River at miles 18.1 and 22.7 (Outfalls 004 & 005, respectively)
HUC-12: 060200020602
Effluent Summary: Treated process wastewater (Internal Monitoring Points 01A and 01B), treated domestic wastewater (Internal Monitoring Point 02A), coal pile runoff, and storm water runoff from Outfalls 001 and 006, noncontact cooling water from Outfall 003, and traveling screen filter backwash and pump cooling water through Outfalls 004 and 005
Treatment system: Neutralization, primary clarification, stabilization, sludge lagoons, aerated lagoons, screw presses and landfill

Segment	TN06020002008_2000
Name	Hiwassee River
Size	5.5
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Fish and Aquatic Life (Supporting), Recreation (Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	N/A
Sources	N/A

Table 6-26. Stream Segment Information for Bowater Newsprint Calhoun Operations.

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
Adsorbable Organic Halides (AOX)	All Year	2176	lb/day	DMax Load	Daily	Grab or Composite	Effluent
Adsorbable Organic Halides (AOX)	All Year	1425	lb/day	MAvg Load	Daily	Grab or Composite	Effluent
Ammonia as N (Total)	All Year	20	mg/L	DMax Conc	Weekly	Composite	Effluent
Ammonia as N (Total)	All Year	10	mg/L	MAvg Conc	Weekly	Composite	Effluent
BOD5	All Year	56551	lb/day	DMax Load	Daily	Composite	Effluent
BOD5	All Year	29670	lb/day	MAvg Load	Daily	Composite	Effluent
Color (Pt-Co Units)	All Year	40	Pt-Co Units	DMax Conc	See Permit	Grab	Effluent
Dillution Ratio for Effluent	All Year	5	Percent	DMax Conc	Daily	Calculated	Effluent
Dioxin	All Year	36	pg/L	DMax Conc	Annually	Composite	Effluent
Dioxin	All Year	36	pg/L	MAvg Conc	Annually	Composite	Effluent

Table 6-27a.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Dissolved Solids, Total (TDS)	All Year	9968	mg/L	DMax Conc	Daily	Composite	Effluent
Dissolved Solids, Total (TDS)	All Year	1000000	lb/day	DMax Load	Daily	Composite	Effluent
Fecal Coliform	All Year		#/100mL	DMax Conc	Weekly	Grab	Effluent
Fecal Coliform	All Year		#/100mL	MAvg Geo Mean	Weekly	Grab	Effluent
Flow	All Year		MGD	DMax Load	Continuous	Recorder	Effluent
Flow	All Year		MGD	MAvg Load	Continuous	Recorder	Effluent
IC25 7day Ceriodaphnia Dubia	All Year	5	Percent	DMin Conc	Monthly	Composite	Effluent
IC25 7day Fathead Minnows	All Year	5	Percent	DMin Conc	Monthly	Composite	Effluent
Stream Flow Instantaneous	All Year		MGD	DMax Load	Continuous	Recorder	Effluent
TSS	All Year	95541	lb/day	DMax Load	Daily	Composite	Effluent
TSS	All Year	57436	lb/day	MAvg Load	Daily	Composite	Effluent
pH	All Year	9	SU	DMax Conc	Daily	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Daily	Grab	Effluent

Table 6-27b.

Table 6-27a-b. Permit Limits for Outfall 001 at Bowater Newsprint Calhoun Operations.

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

Table 6-28. *Permit Limits for Outfall 003 at Bowater Newsprint Calhoun Operations.*

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Flow	All Year		MGD	DMax Load	Monthly	Instantaneous	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	Monthly	Grab	Effluent
Temperature (°C)	All Year		Deg. C	DMax Conc	Monthly	Grab	Effluent

Table 6-29. Permit Limits for Outfall 004 at Bowater Newsprint Calhoun Operations.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Flow	All Year		MGD	DMax Load	Monthly	Instantaneous	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	Monthly	Grab	Effluent
Temperature (°C)	All Year		Deg. C	DMax Conc	Monthly	Grab	Effluent

Table 6-30. Permit Limits for Outfall 005 at Bowater Newsprint Calhoun Operations.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Adsorbable Organic Halides (AOX)	All Year	2176	lb/day	DMax Load	Daily	Grab or Composite	Effluent
Adsorbable Organic Halides (AOX)	All Year	1425	lb/day	MAvg Load	Daily	Grab or Composite	Effluent
Ammonia as N (Total)	All Year	20	mg/L	DMax Conc	Weekly	Composite	Effluent
Ammonia as N (Total)	All Year	10	mg/L	MAvg Conc	Weekly	Composite	Effluent
BOD5	All Year	56551	lb/day	DMax Load	Daily	Composite	Effluent
BOD5	All Year	29670	lb/day	MAvg Load	Daily	Composite	Effluent
Color (Pt-Co Units)	All Year	40	Pt-Co Units	DMax Conc	See Permit	Grab	Effluent
Dillution Ratio for Effluent	All Year	5	Percent	DMax Conc	Daily	Calculated	Effluent
Dioxin	All Year	36	pg/L	DMax Conc	Annually	Composite	Effluent
Dioxin	All Year	36	pg/L	MAvg Conc	Annually	Composite	Effluent
Dissolved Solids, Total (TDS)	All Year	9968	mg/L	DMax Conc	Daily	Composite	Effluent
Dissolved Solids, Total (TDS)	All Year	1000000	lb/day	DMax Load	Daily	Composite	Effluent
Fecal Coliform	All Year		#/100mL	DMax Conc	Weekly	Grab	Effluent
Fecal Coliform	All Year		#/100mL	MAvg Geo Mean	Weekly	Grab	Effluent
Flow	All Year		MGD	DMax Load	Daily	Instantaneous	Effluent
Flow	All Year		MGD	MAvg Load	Daily	Instantaneous	Effluent
IC25 7day Ceriodaphnia Dubia	All Year	5	Percent	DMin Conc	Monthly	Composite	Effluent
IC25 7day Fathead Minnows	All Year	5	Percent	DMin Conc	Monthly	Composite	Effluent
Stream Flow Instantaneous	All Year		MGD	DMax Load	Continuous	Recorder	Effluent
Stream Flow Instantaneous	All Year		MGD	MAvg Load	Continuous	Recorder	Effluent
TSS	All Year	95541	lb/day	DMax Load	Daily	Composite	Effluent
TSS	All Year	57436	lb/day	MAvg Load	Daily	Composite	Effluent
pH	All Year	9	SU	DMax Conc	Daily	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Daily	Grab	Effluent

Table 6-31. Permit Limits for Outfall 006 at Bowater Newsprint Calhoun Operations.

Comments:

Paper Mill. No issues.

TN0073024 Coker Millwrights Landfill

Discharger rating: Minor
City: Calhoun
County: McMinn
EFO Name: Chattanooga
Issuance Date: 8/15/02
Expiration Date: 6/30/07
Receiving Stream(s): Unnamed tributary to Rogers Creek (Outfalls 001, 002 and 003) and unnamed tributary to Meadow Branch (Outfall 005)
HUC-12: 060200020604
Effluent Summary: Storm water runoff from Outfalls 001, 002 and 003 and landfill leachate and storm water runoff from Outfall 005
Treatment system: Sedimentation pond, spray irrigation.

Segment	TN06020002087_1000
Name	Rogers Creek
Size	21.6
Unit	Miles
First Year on 303(d) List	2004
Designated Uses	Fish and Aquatic Life (Non-Supporting), Recreation (Non-Supporting), Irrigation (Supporting), Livestock Watering and Wildlife (Supporting)
Causes	Alteration in stream-side or littoral vegetative covers, Escherichia coli
Sources	Grazing in Riparian or Shoreline Zones

Table 6-32. Stream Segment Information for Coker Millwrights Landfill.

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
48hr LC50: Ceriodaphnia Dubia	All Year		Percent	DMin Conc	Semi-annually	Grab	Effluent
Ammonia as N (Total)	Summer	2.2	mg/L	DMax Conc	Monthly	Grab	Effluent
Ammonia as N (Total)	Winter	4.2	mg/L	DMax Conc	Monthly	Grab	Effluent
B (T)	All Year		mg/L	DMax Conc	Semi-annually	Grab	Effluent
Ba (T)	All Year		mg/L	DMax Conc	Semi-annually	Grab	Effluent
CBOD5	All Year	38	mg/L	DMax Conc	Semi-annually	Grab	Effluent
Chloride (as Cl)	All Year	860	mg/L	DMax Conc	Semi-annually	Grab	Effluent
Flow	All Year		MGD	DMax Load	Semi-annually	Estimate	Effluent
Phosphorus, Total	All Year	2	mg/L	DMax Conc	Semi-annually	Grab	Effluent
Sulfate (T)	All Year	500	mg/L	DMax Conc	Semi-annually	Grab	Effluent
TSS	All Year		mg/L	DMax Conc	Semi-annually	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Semi-annually	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Semi-annually	Grab	Effluent

Table 6-33. Permit Limits for Outfall 001 at Coker Millwrights Landfill.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
48hr LC50: Ceriodaphnia Dubia	All Year	100	Percent	DMin Conc	Quarterly	Grab	Effluent
48hr LC50: Fathead Minnows	All Year	100	Percent	DMin Conc	Quarterly	Grab	Effluent
Ammonia as N (Total)	Summer	2.2	MGD	DMax Conc	Monthly	Grab	Effluent
Ammonia as N (Total)	Winter	4.2	mg/L	DMax Conc	Monthly	Grab	Effluent
B (T)	All Year		mg/L	DMax Conc	Monthly	Grab	Effluent
Ba (T)	All Year		mg/L	DMax Conc	Monthly	Grab	Effluent
CBOD5	All Year	38	mg/L	DMax Conc	Monthly	Grab	Effluent
Cd (T)	All Year	0.005	mg/L	DMax Conc	Monthly	Grab	Effluent
Chloride (as Cl)	All Year	860	mg/L	DMax Conc	Monthly	Grab	Effluent
Dissolved Solids, Total (TDS)	All Year		mg/L	DMax Conc	Monthly	Grab	Effluent
Flow	All Year		MGD	DMax Load	Monthly	Instantaneous	Effluent
Hg (T)	All Year	0.004	mg/L	DMax Conc	Monthly	Grab	Effluent
Mn (T)	All Year	10	mg/L	DMax Conc	Monthly	Grab	Effluent
Pb (T)	All Year	0.101	mg/L	DMax Conc	Monthly	Grab	Effluent
Phosphorus, Total	All Year	2	mg/L	DMax Conc	Monthly	Grab	Effluent
Sulfate (T)	All Year	500	mg/L	DMax Conc	Monthly	Grab	Effluent
TOC	All Year		mg/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year		mg/L	DMax Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Monthly	Grab	Effluent

Table 6-34. Permit Limits for Outfall 002 at Coker Millwrights Landfill.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
48hr LC50: Ceriodaphnia Dubia	All Year		Percent	MAvg Conc	Semi-annually	Grab	Effluent
Ammonia as N (Total)	Summer	2.2	mg/L	DMax Conc	Monthly	Grab	Effluent
Ammonia as N (Total)	Winter	4.2	mg/L	DMax Conc	Monthly	Grab	Effluent
B (T)	All Year		mg/L	DMax Conc	Semi-annually	Grab	Effluent
Ba (T)	All Year		mg/L	DMax Conc	Semi-annually	Grab	Effluent
CBOD5	All Year	38	mg/L	DMax Conc	Semi-annually	Grab	Effluent
Chloride (as Cl)	All Year	860	mg/L	DMax Conc	Semi-annually	Grab	Effluent
Flow	All Year		MGD	DMax Load	Semi-annually	Estimate	Effluent
Phosphorus, Total	All Year	2	mg/L	DMax Conc	Semi-annually	Grab	Effluent
Sulfate (T)	All Year	500	mg/L	DMax Conc	Semi-annually	Grab	Effluent
TSS	All Year		mg/L	DMax Conc	Semi-annually	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Semi-annually	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Semi-annually	Grab	Effluent

Table 6-35. Permit Limits for Outfall 003 at Coker Millwrights Landfill.

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
48hr LC50: Ceriodaphnia Dubia	All Year		Percent	MAvg Conc	Semi-annually	Grab	Effluent
Ammonia as N (Total)	Summer	2.2	mg/L	DMax Conc	Monthly	Grab	Effluent
Ammonia as N (Total)	Winter	4.2	mg/L	DMax Conc	Monthly	Grab	Effluent
B (T)	All Year		mg/L	DMax Conc	Semi-annually	Composite	Effluent
Ba (T)	All Year		mg/L	DMax Conc	Semi-annually	Composite	Effluent
CBOD5	All Year	38	mg/L	DMax Conc	Semi-annually	Composite	Effluent
Chloride (as Cl)	All Year	860	mg/L	DMax Conc	Semi-annually	Grab	Effluent
Flow	All Year		MGD	DMax Load	Semi-annually	Estimate	Effluent
Phosphorus, Total	All Year	2	mg/L	DMax Conc	Semi-annually	Composite	Effluent
Sulfate (T)	All Year	500	mg/L	DMax Conc	Semi-annually	Grab	Effluent
TSS	All Year		mg/L	DMax Conc	Semi-annually	Composite	Effluent

Table 6-36. Permit Limits for Outfall 005 at Coker Millwrights Landfill.

EFO Comments:

Inactive fiberglass and fiberglass mat manufacturing monofill landfill with final cover. In good shape.

TN0067776 Waste Connections of TN, Inc., Meadow Branch Landfill

Discharger rating: Minor
City: Athens
County: McMinn
EFO Name: Chattanooga
Issuance Date: 3/3/06
Expiration Date: 3/2/09
Receiving Stream(s): Unnamed tributary to Meadow Branch (Outfalls S1A and S1B) and an unnamed tributary to Rogers Creek (Outfall SW2)
HUC-12: 060200020803
Effluent Summary: Industrial stormwater runoff from Outfalls S1A, S1B and SW2
Treatment system: -

Segment	TN06020002085_1000
Name	Spring Creek
Size	33.8
Unit	Miles
First Year on 303(d) List	2000
Designated Uses	Fish and Aquatic Life (Supporting), Livestock Watering and Wildlife (Supporting), Irrigation (Supporting), Recreation (Non-Supporting)
Causes	Escherichia coli
Sources	Grazing in Riparian or Shoreline Zones

Table 6-37. Stream Segment Information for Waste Connections of TN, Inc., Meadow Branch Landfill

PARAMETER	SEASON	LIMIT	UNITS	SAMPLE DESIGNATOR	MONITORING FREQUENCY	SAMPLE TYPE	MONITORING LOCATION
Ag (T)	All Year	0.032	mg/L	DMax Conc	Monthly	Grab	Effluent
Ammonia as N (Total)	All Year	4	mg/L	DMax Conc	Monthly	Grab	Effluent
As (T)	All Year	0.169	mg/L	DMax Conc	Monthly	Grab	Effluent
CBOD5	All Year	30	mg/L	DMax Conc	Monthly	Grab	Effluent
Cd (T)	All Year	0.016	mg/L	DMax Conc	Monthly	Grab	Effluent
Fe (T)	All Year	5	mg/L	DMax Conc	Monthly	Grab	Effluent
Hg (T)	All Year	0.002	mg/L	DMax Conc	Monthly	Grab	Effluent
Oil and Grease (Freon EM)	All Year	15	mg/L	DMax Conc	Monthly	Grab	Effluent
Oil and Grease Visual	All Year		YES=1 NO=0	DMax Load	Monthly	Grab	Effluent
Pb (T)	All Year	0.082	mg/L	DMax Conc	Monthly	Grab	Effluent
Se (T)	All Year	0.239	mg/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	200	mg/L	DMax Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	5	SU	DMin Conc	Monthly	Grab	Effluent

Table 6-38. Permit Limits for Waste Connections of TN, Inc., Meadow Branch Landfill

EFO Comments:
No issues.

6.4.B. Water Treatment Plant Permits

TN0004642 Cleveland Utilities Water Treatment Plant

Discharger rating: Minor
City: Cleveland
County: Bradley
EFO Name: Jackson
Issuance Date: 6/30/03
Expiration Date: 6/30/08
Receiving Stream(s): Wet weather conveyance at mile 0.53 to Little Chatata Creek at mile 1.6
HUC-12: 0060200020601
Effluent Summary: Treated drinking water that does not meet turbidity limits from Outfall 001
Treatment system: Flash mix, flocculation, settling basins, rapid sand filtration

Segment	TN06020002012_0100
Name	Five Mile Branch
Size	4.02
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Fish and Aquatic Life (Not Assessed), Recreation (Not Assessed), Irrigation (Not Assessed), Livestock Watering and Wildlife (Not Assessed)
Causes	N/A
Sources	N/A

Table 6-39. Stream Segment Information for Cleveland Utilities Water Treatment Plant.

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
TRC	All Year	1.5	mg/L	DMax Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6	SU	DMin Conc	Monthly	Grab	Effluent

Table 6-40. Permit Limits for Cleveland Utilities Water Treatment Plant.

EFO Comments:
No issues.

TN0074632 Ocoee Utility District

Discharger rating: Minor
City: Cleveland
County: Bradley
EFO Name: Jackson
Issuance Date: 9/27/04
Expiration Date: 9/29/09
Receiving Stream(s): Carpenter Springs into unnamed tributary to London Branch
HUC-12: 0060200020306
Effluent Summary: Filter backwash and/or sedimentation basin washdown from Outfall 001
Treatment system: Chlorine gas and aluminum sulfate

Segment	TN06020002014_0200
Name	London Branch
Size	5.1
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Fish and Aquatic Life (Not Assessed), Livestock Watering and Wildlife (Not Assessed), Irrigation (Not Assessed), Recreation (Not Assessed)
Causes	N/A
Sources	N/A

Table 6-41. Stream Segment Information for Ocoee Utility District.

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

Table 6-42. Permit Limits for Ocoee Utility District.

EFO Comments:
Turbidity removal Water Treatment Plant. No issues.

TN0074993 Hiwassee Utility Commission

Discharger rating: Minor
City: Charlston
County: Bradley
EFO Name: Chattanooga
Issuance Date: 9/27/04
Expiration Date: 9/29/09
Receiving Stream(s): Hiwassee River at river mile 23.2
HUC-12: 060200020601
Effluent Summary: Filter backwash and/or sedimentation basin washdown from Outfall 001
Treatment system: Aluminum sulfate and polymer for coagulation; chlorine, fluoride, lime, phosphates added post filtration.

Segment	TN06020002008_1000
Name	Hiwassee River
Size	7.7
Unit	Miles
First Year on 303(d) List	1992
Designated Uses	Livestock Watering and Wildlife (Supporting), Irrigation (Supporting), Recreation (Non-Supporting), Fish and Aquatic Life (Supporting), Domestic Water Supply (Supporting), Industrial Water Supply (Supporting)
Causes	Escherichia coli
Sources	Grazing in Riparian or Shoreline Zones, Sanitary Sewer Overflows (Collection System Failures)

Table 6-43. Stream Segment Information for Hiwassee Utility Commission.

PARAMETER	*SEASON*	*LIMIT*	*UNITS*	*SAMPLE DESIGNATOR*	*MONITORING FREQUENCY*	*SAMPLE TYPE*	*MONITORING LOCATION*
Al (T)	All Year	10	mg/L	DMax Conc	Monthly	Grab	Effluent
Flow	All Year		MGD	DMax Load	Monthly	Instantaneous	Effluent
Settleable Solids	All Year	0.5	mL/L	DMax Conc	Monthly	Grab	Effluent
TRC	All Year	1	mg/L	DMax Conc	Monthly	Grab	Effluent
TSS	All Year	40	mg/L	DMax Conc	Monthly	Grab	Effluent
pH	All Year	9	SU	DMax Conc	Monthly	Grab	Effluent
pH	All Year	6.5	SU	DMin Conc	Monthly	Grab	Effluent

Table 6-44. Permit Limits for Hiwassee Utility Commission.

EFO Comments:
Turbidity removal Water Treatment Plant. No issues.

TN0079952 Carpenter Spring Water Treatment Plant

Discharger rating: Minor
City: Cleveland
County: Bradley
EFO Name: Chattanooga
Issuance Date: 8/10/06
Expiration Date: 9/29/09
Receiving Stream(s): London Branch
HUC-12: 060200020601
Effluent Summary: Filter backwash and/or sedimentation basin washdown from Outfall 001
Treatment system: -

Segment	TN06020002014_0200
Name	London Branch
Size	5.1
Unit	Miles
First Year on 303(d) List	-
Designated Uses	Fish and Aquatic Life (Not Assessed), Livestock Watering and Wildlife (Not Assessed), Irrigation (Not Assessed), Recreation (Not Assessed)
Causes	N/A
Sources	N/A

Table 6-45. Stream Segment Information for Carpenter Spring Water Treatment Plant.

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

Table 6-46. Permit Limits for Carpenter Spring Water Treatment Plant.

EFO Comments:
Turbidity removal Water Treatment Plant. No issues.

APPENDIX II

ID	NAME	HAZARD
57009	Calderwood	F
67001	Dogwood Estates	2
67002	Hoskins	3
67003	Johnston	3
67005	Davis	S
67006	Hidden Valley	3
67009	Stone	3
67010	Johnston Woods	3
67011	River Pointe Lake Dam	3
547001	L & N Reservoir	3
547002	Browder	3
547003	Chilohowee Rod & Gun Club	3
547006	Huber Effluent Pond #5	X
547007	Bowater Dam #4	3
617001	Mungers Pond	2
627005	Madisonville Lake	B
627007	Unicoi Lake	L
627009	Twin Lake #1	S
627010	Yellar Nugget	L
627011	Smokey Mtn Christian Camp	3
627017	Estes Kefauver	2
627018	Twin Lake #2	L
707002	Lake Agape	3
707006	Delano Mill Pond	S

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

LAND COVER/LAND USE	ACRES	% OF WATERSHED
Open Water	5,990	0.9
Other Grasses	3,848	0.6
Pasture/Hay	119,489	18.5
Row Crops	29,578	4.6
Woody Wetlands	3,978	0.6
Emergent Herbaceous Wetlands	1,241	0.2
Deciduous Forest	200,349	31.0
Mixed Forest	137,283	21.2
Evergreen Forest	125,008	19.3
High Intensity: Commercial/Industrial	4,490	0.7
High Intensity: Residential	1,625	0.3
Low Intensity: Residential	8,959	1.4
Quarries/Strip Mines/Gravel Pits	304	0.0
Transitional	4,968	0.8
Total	**647,109**	**100.1**

Figure A2-2. Land Use Distribution in the Tennessee Portion of the Hiwassee 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)
Southern Sedimentary Ridges (66e)	Gentry Creek Clark Creek Lower Higgins Creek Double Branch Gee Creek	SF Holston River Nolichucky River Nolichucky River Watts Bar/Fort Loudoun Lake Hiwassee River	06010102 06010108 06010108 06010201 06020002
Southern Metasedimentary Mountains (66g)	Middle Prong Little Pigeon Little River Citico Creek North River Sheeds Creek	Lower French Broad Watts Bar/Fort Loudoun Lake Little Tennessee Little Tennessee Conasauga River	06010107 06010201 06010204 06010204 03150101
Southern Limestone/Dolomite Valleys and Low Rolling Hills (67f)	Clear Creek White Creek Powell River Hardy Creek Big War Creek Martin Creek Powell River	Lower Clinch River Upper Clinch River Powell River Powell River Upper Clinch River Powell River Powell River	06010207 06010205 06010206 06010206 06010205 06010206 06010206
Southern Shale Valleys (67g)	Little Chuckey Creek Bent Creek Brymer Creek Harris Creek Flat Creek	Nolichucky River Nolichucky River Hiwassee River Hiwassee River Lower Clinch River	06010108 06010108 06020002 06020002 06010107
Southern Sandstone Ridges (67h)	Blackburn Creek Laurel Creek Parker Branch	Hiwassee River Little Tennessee Little Tennessee	06020002 06010204 06010104
Southern Dissected Ridges and Knobs (67i)	Mill Branch	Lower Clinch River	06010207

Table A2-3. Ecoregion Monitoring Sites in Ecoregions 66e, 66g, 67f, 67g, 67h, and 67i.

.

CODE	NAME	AGENCY	AGENCY ID
96	TDEC/DNH TREW BRANCH SWAMP SITE	TDEC/DNH	
97	TDEC/DNH TURTLETOWN RAILROAD WETLANDS SITE	TDEC/DNH	
161	TDEC/DNH BETHSALEM SWAMP SITE	TDEC/DNH	
162	TDEC/DNH OLD HIGHWAY 30 SWAMP SITE	TDEC/DNH	
197	USACOE-NASHVILLE CLIENT SITE	USACOE-N	
248	USACOE-NASHVILLE CLIENT SITE	USACOE-N	
287	TDOT CANDIES CREEK MITIGATION SITE	TDOT	
2734	USACOE FAIRFIELD DEVELOPMENT SITE	USACOE-N	960047737

Table A2-4. Wetland Sites in the Tennessee Portion of the Hiwassee River Watershed in TDEC Database. *TDEC, Tennessee Department of Environment and Conservation; USACOE-N, United States Army Corps of Engineers-Nashville District; WPC, Water Pollution Control; TDOT, Tennessee Department of Transportation' USFWS, United States Fish and Wildlife Service; TWRA, Tennessee Wildlife Resources Agency; DNH, Division of Natural Heritage.* ***This table represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands in the watershed.***

APPENDIX III

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Big Lost Creek	TN06020002018_0900	34.2
Brymer Creek	TN06020002005_0300	18.1
Bullet Creek	TN06020002018_0210	8.9
Chestuee Creek	TN06020002082_1000	37.1
Childers Creek	TN06020002018_0300	8
Coker Creek	TN06020002018_0600	32.3
Conasauga Creek	TN06020002081_1000	34.1
Conasauga Creek	TN06020002081_2000	8
Gee Creek	TN06020002018_0100	6.7
Gunstocker Creek	TN06020002001_0200	25
Harris Creek	TN06020002005_0100	19.5
Hiwassee River	TN06020002001_1000	57.2
Hiwassee River	TN06020002008_3000	21.9
Hiwassee River	TN06020002018_2000	10.9
Hiwassee River	TN06020002018_1000	5.3
Hiwassee River	TN06020002008_2000	5.5
Loss Creek	TN06020002018_0500	14.4
Lower Candies Creek	TN06020002005_1000	20.8
Misc. Tribs. To Hiwassee River	TN06020002018_0999	86.6
South Chestuee Creek	TN06020002014_1000	18.2
South Chestuee Creek	TN06020002014_2000	26.6
South Mouse Creek	TN06020002009_1000	12.1
Spring Creek	TN06020002018_0200	42.7
Towee Creek	TN06020002018_0400	23.1
Turtletown Creek	TN06020002018_0700	43.3
Wolf Creek	TN06020002018_0800	11.3

Table A3-1a. Streams Fully Supporting Designated Uses in the Tennessee Portion of the Hiwassee River Watershed. *Data are based on Year 2000 Water Quality Assessment.*

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Agency Creek	TN06020002001_0100	32.7
Cane Creek	TN06020002081_0100	13.7
Chatata Creek	TN06020002012_1000	27.6
Chestuee Creek	TN06020002082_2000	17.9
Hiwassee River	TN06020002008_1000	7.7
Hiwassee River	TN06020002018_3000	11.4
Little North Mouse Creek	TN06020002084_0500	8.5
Lower Oostanaula Creek	TN06020002083_1000	5.7
North Mouse Creek	TN06020002084_1000	45.2
Oostanaula Creek	TN06020002083_5000	6.2
Price Creek	TN06020002088_1000	6.9
Rogers Creek	TN06020002087_1000	21.6
South Mouse Creek	TN06020002009_2000	6.5
Spring Creek	TN06020002085_1000	33.8
Unnamed Trib to Hiwassee River	TN06020002008_0100	2.9
Unnamed Tribs to lower Candies Creek	TN06020002005_0200	6.7

Table A3-1b. Streams Partially Supporting Designated Uses in the Tennessee Portion of the Hiwassee River Watershed. *Data are based on Year 2000 Water Quality Assessment.*

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Oostanaula Creek	TN06020002083_4000	8.5
Oostanaula Creek	TN06020002083_3000	7.4
Oostanaula Creek	TN06020002083_2000	21.1

Table A3-1c. Streams Not Supporting Designated Uses in the Tennessee Portion of the Hiwassee River Watershed. *Data are based on Year 2000 Water Quality Assessment.*

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Big Foot Branch	TN06020002082_0500	16
Blair Branch	TN06020002082_0400	13.1
Blue Spring Branch	TN06020002084_0100	5.3
Brush Creek	TN06020002087_0200	11.8
Burger Branch	TN06020002082_0300	6.4
Cane Creek	TN06020002081_0110	7
Dry Creek	TN06020002081_0200	12.9
Dry Valley Creek	TN06020002084_0400	13.3
East Fork North Mouse Creek	TN06020002084_0300	5.4
Fillauer Creek	TN06020002009_0200	7.4
Latham Spring Branch	TN06020002084_0200	9
Lick Creek	TN06020002002_1000	8.8
Little Chatata Creek	TN06020002012_0100	14.3
Little Chestuee Creek	TN06020002082_0200	13.3
Little Chestuee Creek	TN06020002014_0100	16.5
Little South Mouse Creek	TN06020002009_0100	7.3
London Branch	TN06020002014_0200	5.1
Meadow Fork Creek	TN06020002083_0100	13.5
Middle Creek	TN06020002082_0100	15.5
Misc tribs to Chestuee Creek	TN06020002082_0999	54.3
Misc tribs to Conasauga Creek	TN06020002081_1999	69.8
Misc tribs to Middle Creek	TN06020002082_0199	34.3
Misc tribs to North Mouse Creek	TN06020002084_0999	34.4
Misc tribs to Oostanaula Creek	TN06020002083_0999	52.4
Misc tribs to Rogers Creek	TN06020002087_0999	28.8
Misc tribs to South Mouse Creek	TN06020002009_0999	28
Misc tribs to Upper Conasauga Creek	TN06020002081_2999	16.4
Misc. Tribs	TN06020002008_0999	24.9
Misc. tribs to Candies Creek	TN06020002005_0999	57.5
Misc. Tribs to Candies Creek	TN06020002005_2999	48.6
Misc. Tribs to Hiwassee River	TN06020002001_0999	20.6
Possum Creek	TN06020002087_0500	6.3
Rock Creek	TN06020002087_0400	7.8
Rocky Branch	TN06020002082_0110	8.8
Shoal Creek	TN06020002087_0300	5.6
Short Creek	TN06020002087_0100	7.4
Sugar Creek	TN06020002002_0100	9
Upper Candies Creek	TN06020002005_2000	16.4

Table A3-1d. Streams Not Assessed in the Tennessee Portion of the Hiwassee River Watershed. *Data are based on Year 2000 Water Quality Assessment.*

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)	SUPPORT DESCRIPTION
Chatata Creek	TN06020002012_1000	27.6	Partial
South Mouse Creek	TN06020002009_2000	6.5	Partial
Unnamed Tribs to lower Candies Creek	TN06020002005_0200	6.7	Partial

Table A3-2a. Stream Impairment Due to Habitat Alterations in the Tennessee Portion of the Hiwassee River Watershed. *Data are based on Year 2000 Water Quality Assessment.*

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)	SUPPORT DESCRIPTION
Agency Creek	TN06020002001_0100	32.7	Partial
Cane Creek	TN06020002081_0100	13.7	Partial
Chatata Creek	TN06020002012_1000	27.6	Partial
Chestuee Creek	TN06020002082_2000	17.9	Partial
Hiwassee River	TN06020002008_1000	7.7	Partial
Little North Mouse Creek	TN06020002084_0500	8.5	Partial
Lower Oostanaula Creek	TN06020002083_1000	5.7	Partial
North Mouse Creek	TN06020002084_1000	45.2	Partial
Oostanaula Creek	TN06020002083_3000	7.4	Not supporting
Oostanaula Creek	TN06020002083_4000	8.5	Not supporting
Oostanaula Creek	TN06020002083_2000	21.1	Not supporting
Oostanaula Creek	TN06020002083_5000	6.2	Partial
Price Creek	TN06020002088_1000	6.9	Partial
Rogers Creek	TN06020002087_1000	21.6	Partial
Spring Creek	TN06020002085_1000	33.8	Partial
Unnamed Trib to Hiwassee River	TN06020002008_0100	2.9	Partial

Table A3-2b. Stream Impairment Due to Pathogens in the Tennessee Portion of the Hiwassee River Watershed. *Data are based on Year 2000 Water Quality Assessment.*

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)	SUPPORT DESCRIPTION
Chatata Creek	TN06020002012_1000	27.6	Partial
South Mouse Creek	TN06020002009_2000	6.5	Partial
Unnamed Tribs to lower Candies Creek	TN06020002005_0200	6.7	Partial

Table A3-2c. Stream Impairment Due to Siltation in the Tennessee Portion of the Hiwassee River Watershed. *Data are based on Year 2000 Water Quality Assessment.*

APPENDIX IV

LAND USE/LAND COVER	AREAS IN HUC-10 SUBWATERSHEDS (ACRES)						
	03	04	05	06	07	08	09
Deciduous Forest	55,589	23,866	15,673	54,741	11,114	16,530	23,210
Emergent Herbaceous Wetlands	48		37	1,004		18	9
Evergreen Forest	43,675	13,596	14,511	26,118	7,714	8,258	10,693
High Intensity: Commercial/Industrial/Transportation	154	258	227	1,806	434	1,251	320
High Intensity: Residential	9	76	61	982	174	223	92
Low Intensity: Residential	419	759	819	3,924	998	862	1,101
Mixed Forest	43,200	16,615	17,033	25,787	9,734	10,956	13,835
Open Water	885	18	49	4,433	32	29	66
Other Grasses: Urban/Recreational	186	377	377	1,560	469	471	326
Pasture/Hay	12,154	8,140	26,691	28,961	11,126	16,289	14,827
Row Crops	3,760	2,271	7,653	6,487	2,872	3,917	2,516
Transitional	2,134	637	428	840	300	310	256
Woody Wetlands	344		1,356	1,672		287	202
Quarries/Strip Mines	20			197	6	94	
Total	**162,576**	**66,612**	**84,914**	**158,514**	**44,974**	**59,495**	**67,453**

Table A4-1. Land Use Distribution in the Tennessee Portion of Hiwassee River Watershed by HUC-10. *Data are from 1992 Multi-Resolution Land Characterization (MRLC) derived by applying a generalized Anderson Level II system to mosaics of Landsat thematic mapper images collected every five years.*

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

Table A4-2. Hydrologic Soil Groups in Tennessee as Described in WCS.

STATION	HUC-10	AGENCY	NAME	AREA (SQ MILES)	LOW FLOW (CFS)		
					1Q10	7Q10	3Q20
03557000	0602000203	USGS	Hiwassee River	1,223	480	490	410
03565020	0602000203	USGS	Hiwassee River				
03565000	0602000203	USGS	Hiwassee River	2,001.0	544	1,220	817
351059084261801	0602000203	TVA	Hiwassee River				
03556500	0602000203	USGS	Hiwassee River	1,136.0	59.1	167	76.7
03565300	0602000203	USGS	South Chestuee Creek	31.8	2.49	2.70	2.29
03556000	0602000203	USGS	Turtletown Creek	26.9	12.7	13.1	11.6
03565040	0602000205	USGS	Chestuee Creek	14.8	2.0	2.2	2.0
03565080	0602000205	USGS	Little Chestuee Creek	8.24	2.08	2.15	1.98
03565160	0602000205	USGS	Middle Creek	32.7	7.4	7.5	7.1
03565120	0602000205	USGS	Chestuee Creek	37.8	7.1	7.4	6.9
03565200	0602000205	USGS	Chestuee Creek				
03565250	0602000205	USGS	Chestuee Creek	114.0	22.0	22.0	21.0
03566000	0602000206	USGS	Hiwassee River	2,298.0	647	1,150	704
03566036	0602000206	USGS	South Mouse Creek				
03565500	0602000207	USGS	Oostanaula Creek	57.0	14.0	15.0	12.0
03566117	0602000208	USGS	East Fork North Mouse Creek	2.87	0.11	0.13	0.10
03566253	0602000209	USGS	Greasy Creek	3.12			0
03566200	0602000209	USGS	Brymer Creek	9.68	0.80	0.87	0.68

Table A4-3. Historical Streamflow Data Summary Based on Mean Daily Flows in Hiwassee River Watershed*. USGS, United States Geological Survey; TVA, Tennessee Valley Authority.*

PARAMETER	SUBWATERSHED						
	03	04	05	06	07	08	09
E. coli	G	I, K, O	R, S	U, V, W, X, Y, $, β, ¢	§	◊, ¶, »	~
Fecal Coliform		I, K, O	R	U, V, W, X, Y, $, β	§	◊, ¶, »	€, ~, ?
Enterococcus	G	I, K, O	R, S	U, V, W, X, Y, $, β, ¢	§	◊, ¶, »	~
Fecal Streptococcus				Y, ¢			
Total Coliform		I, K	R	U, V, W, X, Y, $, β, ¢	§	◊, ¶, »	
Alkalinity (Total)	G		S	$		◊	€, ~, ?
BOD_5		I, O	R	U, V, W, X, Y, $, β, ¢	§	◊, ¶, »	
BOD (C)		K	R, S	U, V, W, X, Y, β, ¢	§	◊, ¶, »	
Color (Apparent)	G						~
Color (True)	G						~
Conductivity (Field)	G	I, K, O	R, S	U, V, W, X, Y, $, β, ¢	§	◊, ¶, »	€, ~, ?
COD (Low)		I		U, V, W, X, Y, $, β, ¢		¶	
DO	G	I, K, O	R, S	U, V, W, X, Y, $, β, ¢	§	◊, ¶, »	€, ~, ?
Flow	G			Y, β		◊, »	€, ?
Hardness (Total)	G	I, K, O	R, S	U, V, W, X, Y, $, β, ¢	§	◊, ¶, »	€, ~, ?
pH (Field)	G	I, K, O	R, S	U, V, W, X, Y, $, β, ¢	§	◊, ¶, »	€, ~, ?
Residue (Dissolved)	G			V, W, X, Y, $, β	§		€, ~, ?
Residue (Settlable)			S				
Residue (Suspended)	G	I, K, O	R, S	U, V, W, X, Y, $, β, ¢	§	◊, ¶, »	€, ~, ?
Temperature	G	I, K, O	R, S	U, V, W, X, Y, $, β, ¢	§	◊, ¶, »	€, ~, ?
Total Dissolved Solids (Field)				B			
Turbidity	G						€, ~, ?
RBP III	G						
Ag		K, O		U, V, W, X, Y, $, β	§	◊, »	
Ammonia N	G	I, O	R, S	U, V, W, X, Y, $, β, ¢	§	◊, ¶, »	€, ~, ?
As	G	I, K	S	U, Y, β, ¢	§	◊, ¶, »	€, ~, ?
Ca				$			
Cd	G	I, K, O	S	U, V, W, X, Y, $, β, ¢	§	◊, ¶, »	€, ~, ?
Cl^-	G						?
CN^-	G	O		V, W, X, Y	§	◊, »	?
Cr (Total)	G	I, K, O	S	U, V, W, X, Y, $, β, ¢	§	◊, ¶, »	€, ~, ?
Cu	G	I, K, O	S	U, V, W, X, Y, $, β, ¢	§	◊, ¶, »	€, ~, ?
Fe	G		S				€, ~, ?
Hg	G	I, K, O		U, V, W, X, Y, $, β, ¢	§	◊, ¶, »	
Mn	G		S				€, ~, ?
N (Total Kjeldahl)	G	I, K	R	U, $, β, ¢	§	◊, ¶, »	€, ~, ?
Ni	G	I, K, O		U, V, W, X, Y, $, β, ¢	§	◊, ¶, »	
NO_2+NO_3	G	I, K	R, S	U, $, β, ¢	§	◊, ¶, »	€, ~, ?
P (Total)	G	I, K	R, S	U, $, β, ¢	§	◊, ¶, »	€, ~, ?
Pb	G	I, K, O	S	U, V, W, X, Y, $, β, ¢	§	◊, ¶, »	€, ~, ?
SO_4	G	K					
TOC	G						€, ~, ?
Zn	G	I, K, O	S	U, V, W, X, Y, $, β, ¢	§	◊, ¶, »	€, ~, ?

Table A4-4a. Water Quality Parameters Monitored in the Tennessee Portion of the Hiwassee River Watershed. *Codes are described in Table A4-4b.*

CODE	STATION	ALIAS	AGENCY	LOCATION
A	HIWAS053.2PO	001580	TDEC	Hiwassee River @ RM 53.2
B	47558		TVA	Appalachia Powerhouse
C	477369		TVA	New Bridge above Guinn Island
D	477401		TVA	Above McClary Islands
E	477620		TVA	Appalachia Dam Tailrace
F	477620C		TVA	Appalachia Dam Tailrace (Continuous)
G	ECO66E18		TDEC	Gee Creek
H	BIG001.2MM	ECO67I05	TDEC	Big Branch @ RM 1.2
I	CANE001.5MM	000425	TDEC	Cane Creek @ RM 1.5
J	CONAS006.2MM	CONASAUGACRIS01	TDEC	Conasauga Creek @ RM 6.2
K	CONAS009.8MM	CONASAUGCK009.8	TDEC	Conasauga Creek @ RM 9.8
L	CONAS018.7MM	CONASAUGACRIS02	TDEC	Conasauga Creek @ RM 18.7
M	CONAS024.1MO	CONASAUGACRIS03	TDEC	Conasauga Creek @ RM 24.1
N	ECO67I11	CHESTUEECRIS02	TDEC	Thompson Branch @ RM 0.5
O	CONASAUGCK008.1MM	CONASAUGCK008.1	TDEC	Conasuga Creek @ RM 8.1
P	CHEST042.37MM	CHESTUEECRIS02	TDEC	Chestuee Creek @ RM 42.37
Q	CHEST042.46MM	CHESTUEECRIS01	TDEC	Chestuee Creek @ RM 42.46
R	CHEST042.5MM	CHESTUEE42.5	TDEC	Chestuee Creek @ RM 42.42.5
S	HARDI014.2WE		TDEC	Hardin Creek @ RM 14.2
T	HIWAS007.4ME	001590	TDEC	Hiwassee River @ RM 7.4
U	HIWAS013.4MM	001587	TDEC	Hiwassee River @ RM 15.0
V	HIWAS015.6MM	HIWASSEE015.6	TDEC	Hiwassee River @ RM 15.6
W	HIWAS016.0MM	HIWASSEE16.0	TDEC	Hiwassee River @ RM 16.0
X	HIWAS016.7MM	HIWASSEE016.7	TDEC	Hiwassee River @ RM 16.7
Y	HIWAS018.6MM	HIWASSEE018.6	TDEC	Hiwassee River @ RM 18.6
Z	HIWAS023.08MM	001585	TDEC	Hiwassee River @ RM 23.0
$	SMOUS001.2BR	SOMOUSE001.2	TDEC	South Mouse Creek @ RM 1.2
α	SMOUS003.4BR	002731	TDEC	South Mouse Creek @ RM 3.4
β	SMOUS003.5BR	SOMOUSE003.5	TDEC	South Mouse Creek @ RM 3.5
γ	SMOUS004.2BR	002730	TDEC	South Mouse Creek @ RM 4.2
δ	SMOUS006.0BR	002720	TDEC	South Mouse Creek @ RM 6.0
λ	SMOUS009.5BR	002710	TDEC	South Mouse Creek @ RM 9.5
π	SMOUS009.7BR	002700	TDEC	South Mouse Creek @ RM 9.7
ψ	SMOUS014.2BR	002690	TDEC	South Mouse Creek @ RM 14.2
■	SMOUS014.8BR	002680	TDEC	South Mouse Creek @ RM 14.8
▲	475167		TVA	
♠	475901		TVA	
♣	477071		TVA	Chickamauga Reservoir
♥	477397		TVA	
♦	477512		TVA	Chickamauga Reservoir above Hwy 58
♫	477548		TVA	Chickamauga Reservoir Mouth of Price Creek
Ω	477549		TVA	Chickamauga Reservoir
∆	477550		TVA	Chickamauga Reservoir
√	001587		TVA	Hiwassee River @ RM 15.0
¥	HIWASSEE015.6		TVA	Hiwassee River upstream of Cleveland
£	HIWASSEE016.0		TVA	Hiwassee River upstream of Olin
@	HIWASSEE016.7		TVA	Hiwassee River upstream of Bowater
&	HIWASSEE018.6		TVA	Hiwassee River upstream of Hwy 111
¢	OOSTA028.4MM	002058	TDEC	Oostanaula Creek @ RM 28.4

§	OOSTA030.2MM	OOSTANAULA030.2	TDEC	Oostanaula Creek @ RM 30.2
±	OOSTA031.0MM	OOSTANAULAIS02	TDEC	Oostanaula Creek @ RM 31.0
≠	OOSTA031.2MM	OOSTANAULAIS01	TDEC	Oostanaula Creek @ RM 31.2
≡	03565428		USGS	Oostanaula Creek near Sweetwater
≤	03565430		USGS	Oostanaula Creek below Johnson Bridge
≥	03565500		USGS	Oostanaula Creek near Sanford
◊	LNMOU003.6MM	LNMOUSE003.6	TDEC	Little North Mouse Creek @ RM 3.6
»	NMOUS024.8MM	NMOUSE024.8	TDEC	North Mouse Creek @ RM 24.8
Φ	035661285		USGS	North Mouse Creek near Athens
₪	NMOUSE024.3		TDEC	North Mouse Creek @ RM 24.3
€	ECO67G08		TDEC	Brymer Creek @ RM 1.3
~	ECO67G09		TDEC	Harris Creek @ RM 4.8
?	ECO67H04		TDEC	Blackburn Creek

Table A4-4b. Water Quality Monitoring Stations in the Tennessee Portion of the Hiwassee River Watershed*. TDEC, Tennessee Department of Environment and Conservation; USGS, United States Geologic Survey; TVA, Tennessee Valley Authority; NPS, National Park Service.*

FACILITY NUMBER	FACILITY NAME	SIC	SIC NAME	MADI	WATERBODY	HUC-10
TN0056740	Taylors Elementary School	4952	Sewerage Systems	Minor	Ditch to Kinser Creek @ RM 0.6	0602000203
TN0001996	J.M. Huber Corporation	2819	Inorganic Dyes	Minor	WWC to Conasauga Creek @ RM 10.7	0602000204
TN0027201	CSX Transportation	4011	Railroads	Minor	Cane Creek @ RM 4.5	0602000204
TN0042064	Johns Manville	3229	Pressed and Blown Glassware	Minor	Crockett Spring Branch @ RM 1.2	0602000204
TN0063771	Etowah STP	4952	Sewerage Systems	Major	Conasauga Creek @ RM 8.0	0602000204
TN0076015	Waupaca Foundry	3321	Gray and Ductile Iron Foundry	Minor	Crockett Springs Branch	0602000204
TN0021938	Englewood STP	4952	Sewerage Systems	Minor	Chestuee Creek @ RM 42.4	0602000205
TN0002356	Bowater Newsprint	2621	Newsprint Mills	Major	Hiwassee River @ RM 22.7, 18.1, 16.5, and 15.0	0602000206
TN0002461	Olin Corporation	2819	Inorganic Dyes	Major	Hiwassee River @ RM 16.8, 16.6, and 15.8	0602000206
TN0024121	Cleveland Utilities STP	4952	Sewerage Systems	Major	Hiwassee River @ RM 15.4	0602000206
TN0054828	Calhoun School	4952	Sewerage Systems	Minor	Hiwassee River @ RM 19.1	0602000206
TN0067776	Meadow Branch Landfill	4953	Other Waste Collection when Combined with Disposal	Minor	Unnamed Trib to Meadow Branch, Unnamed Trib to Rogers Creek	0602000208
TN0073024	Coker Millwrights Landfill	4953	Other Waste Collection when Combined with Disposal	Minor	Unnamed Trib to Meadow Branch, Unnamed Trib to Rogers Creek	0602000208
TN0056561	Blue Springs Elementary School	4952	Sewerage Systems	Minor	Blue Springs Branch @ RM 1.1	0602000209

Table A4-5. Active Permitted Point Source Facilities in the Tennessee Portion of the Hiwassee River Watershed. *SIC, Standard Industrial Classification; MADI, Major Discharge Indicator.*

FACILITY NUMBER	PERMITEE	SIC	SIC NAME	WATERBODY	HUC-10
TN0071676	Rogers Group	1422	Crushed and Broken Limestone	Chestuee Ck	0602000205
TN0071234	T.C. Stone, Inc.	1422	Crushed and Broken Limestone	West Fork Gunstocker Ck	0602000206
TN0065790	Vulcan Const. Materials	1422	Crushed and Broken Limestone	Unnamed Trib to Gunstocker Creek	0602000206
TN0071048	Yates Construction Co.	1479	Barite Mining	Swale to Oostanaula Cr	0602000207
TN0071056	Yates Construction Co.	1479	Barite Mining	Swale to Oostanaula Cr	0602000207
TN0005487	Vulcan Construction Co.	1422	Crushed and Broken Limestone	Unnamed Trib to Mouse Creek	0602000208

Table A4-6. Active Permitted Mining Sites in the Tennessee Portion of the Hiwassee River Watershed. *SIC, Standard Industrial Classification.*

FACILITY NUMBER	FACILITY NAME	SECTOR	RECEIVING STREAM	AREA*	HUC-10
TNR050952	Raines Auto Parts, Inc.	M, K	Unnamed Trib to Horton Br.	8.0	0602000203
TNR051770	Strickland Auto Parts	M	Fivemile Creek	6.0	0602000203
TNR054469	Wapaca Foundry	F	Chestuee Creek	132.0	0602000203
TNR051121	J.M. Huber Corporation	C	Conasauga Creek	92.2	0602000204
TNR054174	Williams Monument Works	E	Cane Creek	0.3	0602000204
TNR050962	Farner Auto Parts	M	WWC to Unnamed Trib to Dancer Branch	8.1	0602000205
TNR051809	Hiwassee Furniture Manuf.	W	Bat Creek	15.0	0602000205
TNR051893	Tellico Culvert Company	AA	Sinkhole	25.0	0602000205
TNR053307	McMinn County Airport	S	Unnamed Trib and WWC to Chestuee Creek	0.5	0602000205
TNR053313	McMinn County Landfill	L	Dry Branch	133.0	0602000205
TNR053484	P-I Incorporated	Y	Mouse Creek	7.0	0602000205
TNR053708	Service Transport, Inc.	P	Bear Creek	13.5	0602000205
TNR050036	Pasco Products, Inc.	P	Ditch to Unnamed Trib to Mouse Creek	1.1	0602000206
TNR050064	Olin Corporation	C	Hiwassee River	100.0	0602000206
TNR050330	Hardwood Frames	A	Little Chatata Creek	12.2	0602000206
TNR050433	Weyerhaeuser Company	B	Little Chatata Creek	5.9	0602000206
TNR050497	Manufacture Chemical	C	Little Chatata Creek	7.5	0602000206
TNR050545	Brown Stone Works, Inc.	AC, P	Flaner Branch	30.0	0602000206
TNR050594	Sun Chemical GPI	C	Little Chatata Creek	7.7	0602000206
TNR051002	Maytag Plant #3	AC	South Mouse Creek	13.2	0602000206
TNR051003	Maytag Plant #1	AC, P	E.F. South Mouse Creek	38.4	0602000206
TNR051019	Bradley Tank and Pipe	E	Mouse Creek	1.5	0602000206
TNR051023	Specialty Chemical Co.	AD	Unnamed Trib to South Mouse Creek	2.6	0602000206
TNR051094	Ballard's Auto Parts	M	Little Chatata Creek	5.0	0602000206
TNR051238	White's Used Cars	M	Ditch to Unnamed Trib to South Mouse Creek	4.0	0602000206
TNR051242	Wampler's Used Auto Parts	M	Ditch to Coahulla Creek	2.0	0602000206
TNR051397	Maytag Truck Terminal	AC	South Mouse Creek	3.9	0602000206
TNR051679	Bradley Block Company	E	East Gopher Creek	10.0	0602000206
TNR051686	ADM Milling Company	U	Woolen Mill Branch	3.0	0602000206
TNR051718	Cleveland Recycled Paper	N	Little Chatata Creek	4.0	0602000206
TNR051736	Randy Goins Used Cars	M	Fivemile Creek	1.0	0602000206
TNR051745	M&M Mars, Incorporated	U	South Mouse Creek	29.0	0602000206
TNR051775	Southern Ionics, Inc.	C	Hiwassee River	3.2	0602000206
TNR051877	Smoky Mtn Transfer Corp.	Q	Hiwassee River	5.7	0602000206
TNR052000	Polymer Components	Y	Unnamed Trib to Mouse Creek	1.5	0602000206
TNR053037	Precision SE Service Ctr.	AA	Unnamed Trib to Little Chatata Creek	1.8	0602000206
TNR053262	Cleveland Municipal Airport	S	Mouse Creek	63.0	0602000206
TNR053372	Coleen McClendon Trucking Company	P	Unnamed Trib to Hiwassee River	18.3	0602000206

TNR053433	Federal Express	S, P	South Mouse Creek	0.7	0602000206
TNR053549	United Parcel Service	P	Mouse Creek	1.1	0602000206
TNR053606	United Knitting, Inc.	V	Unnamed Trib to South Mouse Creek	12.8	0602000206
TNR053648	Duracell USA	AC	Mouse Creek	7.5	0602000206
TNR053667	Rubbermaid Commercial Products, Incorporated	V	Little Chatata Creek	16.6	0602000206
TNR053689	BFI Waste Systems	P	Candies Creek	7.0	0602000206
TNR053699	Calhoun Transportation Service, Incorporated	P	Unnamed Trib to Hiwassee River	5.0	0602000206
TNR053736	Westvaco Consumer Packaging Division	X	Little Chatata Creek	9.8	0602000206
TNR053900	Bradley Farmers Co-Op	AD	South Mouse Creek	12.0	0602000206
TNR053938	Maytag Plant #2	AC	East Fork Mouse Creek	5.6	0602000206
TNR054232	Timber tech	A	Rock Creek	10.0	0602000206
TNR054322	Custom Mechanical Contractors	AA	Little Chatata Creek	5.2	0602000206
TNR054494	Bishop Baking Company	U	Mouse Creek	5.0	0602000206
TNR054598	JBK Enterprises, Inc.	AA	Gunstocker Creek	4.4	0602000206
TNR055074	ASTEC	AA	Little Chatata Creek	10.0	0602000206
TNR050410	Johnson Controls, Inc.	AA	Oostanaula Creek	4.1	0602000207
TNR051412	Mayfield Dairy	U	Oostanaula Creek	30.0	0602000207
TNR051705	Athens Woodcrafters	W	Oostanaula Creek	0.5	0602000207
TNR053541	Athens Furniture, Inc.	W	Oostanaula Creek	27.0	0602000207
TNR053542	Athens Furniture, Inc.	W	Oostanaula Creek	11.0	0602000207
TNR054543	Athens plow Company	AB	Metro Storm Sewer System	5.3	0602000207
TNR050372	Curtis Auto Parts	M	WWC to unnamed Trib to South Mouse Creek	4.4	0602000208
TNR050603	Thomas and Betts	AC, AA	Dry Valley Creek North Mouse Creek	24.0	0602000208
TNR050922	P-I, Incorporated	Y	Unnamed Trib to Dry Creek	10.0	0602000208
TNR050968	Niota WWTP	L	Little North Mouse Creek	10.0	0602000208
TNR051440	Heil Trailer International	AB	Little Mouse Creek	40.0	0602000208
TNR051589	PFC Incorporated/Pioneer	W	Unnamed Trib to Dry Valley Creek	7.8	0602000208
TNR051708	Vaughn Bros. Auto Salvage	M	Spring Creek	3.0	0602000208
TNR051888	Bowater, Incorporated	A	Unnamed Tribs to Mouse Creek and Hiwassee River	9.6	0602000208
TNR052085	Textron Automotive Co.	Y, AB	Unnamed Trib to Little Mouse Creek	100.0	0602000208
TNR053001	Environmental Trust Landfill	L	Unnamed Trib to Rogers Creek	164.4	0602000208
TNR053085	Sequatchie Concrete Svcs.	E	None	7.5	0602000208
TNR053113	McMinn County Hwy Dept.	D	Mouse Creek	0.2	0602000208
TNR053984	Denso Manufacturing TN	AB	Blue Springs Brook	100.0	0602000208
TNR054154	Omni Services, Inc.	C	Dry Valley Creek	29.0	0602000208
TNR054537	Mills Products, Inc.	AA	Metro Storm Sewer System	7.3	0602000208
TNR051237	Coca-Cola Enterprises, Inc.	U, AD, P	Hiwassee River	26.0	0602000209
TNR051335	Bradley County Landfill	L	Harris Creek	107.0	0602000209
TNR051680	Clonts Used Auto Parts	M	Unnamed Trib to Beech Springs Branch	2.3	0602000209

TNR051890	Bradley County Landfill Extension	L	Harris Creek	62.8	0602000209

Table A4-7. Active Permitted TMSP Facilities in the Tennessee Portion of the Hiwassee River Watershed. *Area, acres of property associated with industrial activity; WWC, Wet Weather Conveyance. Sector details may be found in Table A4-8.*

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 A4-8. TMSP Sectors and Descriptions.

FACILITY NUMBER	PERMITEE	COUNTY	LIVESTOCK	WATERBODY	HUC-10
TNA000069	Jimmy Bilbo	Bradley	Poultry	Chestuee Creek	0602000203
TNA000039	Rollins Farm	Bradley	Poultry	Black Burn Creek	0602000109

Table A4-9. CAFO Sites in the Tennessee Portion of the Hiwassee River Watershed.

LOG NUMBER	COUNTY	DESCRIPTION	WATERBODY	HUC-10
97.846	Polk	Bridge Construction	Hiwassee River	0602000203
97.847	Polk	Road Crossing	Hiwassee River	0602000204
98.593	McMinn	Rip-Rap	Elliot Branch	0602000204
99.006	McMinn	Box Culvert	Elliot Branch	0602000204
99.208	McMinn	Culvert	Crockett Spring	0602000204
00.133	McMinn	Culvert	Crockett Spring	0602000204
99.515A	McMinn	Road Construction	Unnamed Trib to Chestuee Creek	0602000205
99.515B	McMinn	Road Construction	Unnamed Trib to Chestuee Creek	0602000205
99.515C	McMinn	Road Construction	Unnamed Trib to Chestuee Creek	0602000205
98.165	Meigs	Launch Ramp Extension	Hiwassee River	0602000206
98.457	Bradley	RR Bridge Replacement	Hiwassee River	0602000206
98.589	Bradley	Bridge Scour Repair	Unnamed Trib to Mouse Creek	0602000206
98.590	Bradley	Bridge Scour repair	Five-Mile Creek	0602000206
99.333	McMinn	Culvert	Unnamed Trib to Hiwassee River	0602000206
98.181	McMinn	Bridge Construction	Oostanaula Creek	0602000207

Table A4-10. Individual ARAP Permits Issued January 1994 Through June 2000 in the Tennessee Portion of the Hiwassee River Watershed.

APPENDIX V

CONSERVATION PRACTICE	UNITS	AMOUNT
Alley Cropping	Acres	0
Contour Buffer Strips	Acres	0
Crosswind Trap Strips	Acres	0
Field Borders	Feet	0
Filter Strips	Acres	7
Grassed Waterways	Acres	0
Riparian Forest Buffers	Acres	65
Streambank and Shoreline Protection	Feet	7,125
Windbreaks and Shelterbelts	Feet	0
Hedgerow Plantings	Feet	0
Herbaceous Wind Barriers	Feet	0
Total Conservation Buffers	Acres	75

Table A5-1a. Conservation Buffers Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Hiwassee River Watershed. *Data are from Performance & Results Measurement System (PRMS) for October 1, 2001 through September 30, 2002 reporting period.*

PARAMETER	TOTAL
Erosion Reduction Applied (Acres)	1,528
Highly Erodible Land With Erosion Control Practices (Acres)	1,394
Estimated Annual Soil Saved By Erosion Control Measures (Tons/Year)	10,937
Total Estimated Soil Saved (Tons/Year)	10,937

Table A5-1b. Erosion Control Conservation Practices in Partnership with NRCS in the Tennessee Portion of the Hiwassee River Watershed. *Data are from PRMS for October 1, 2001 through September 30, 2002 reporting period.*

PARAMETER	TOTAL
Acres of AFO Nutrient Management Applied	262
Acres of Non-AFO Nutrient Management Applied	2,797
Total Acres Applied	3,059

Table A5-1c. Nutrient Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of Hiwassee River Watershed. *Data are from PRMS for October 1, 2001 through September 30, 2002 reporting period.*

PARAMETER	TOTAL
Acres of Pest Management Systems Applied	2,745

Table A5-1d. Pest Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of Hiwassee River Watershed. *Data are from PRMS for October 1, 2001 through September 30, 2002 reporting period.*

CONSERVATION PRACTICE	ACRES
Acres Prepared for Revegetation of Forestland	0
Acres Improved Through Forest Stand Improvement	0
Acres of Tree and Shrub Establishment	65

Table A5-1e. Tree and Shrub Conservation Practices in Partnership with NRCS in the Tennessee Portion of Hiwassee River Watershed. *Data are from PRMS for October 1, 2001 through September 30, 2002 reporting period.*

CONSERVATION PRACTICE	ACRES
Acres of Upland Habitat Management	1,045
Acres of Wetland Habitat Management	0
Total Acres Wildlife Habitat Management	1,045

Table A5-1f. Wildlife Habitat Management Conservation Practices in Partnership with NRCS in Hiwassee River Watershed. *Data are from PRMS for October 1, 2001 through September 30, 2002 reporting period.*

COMMUNITY	PROJECT DESCRIPTION	AWARD DATE	AWARD AMOUNT
Athens	Wastewater Treatment Plant	03/09/92	$4,204,848

Table A5-2. Communities in the Tennessee Portion of Hiwassee River Watershed Receiving SRF Grants or Loans.

NRCS CODE	PRACTICE	NUMBER OF BMPs
312	Waste Management System	7
342	Critical Area Treatment	4
382	Fencing	7
391	Riparian Buffer	8
410	Grade Stabilization	1
412	Heavy Use Area	1
472	Use Exclusion	1
512	Pasture and Hayland Planting	45
516	Pipeline	2
561	Heavy Use Area	59
576	Stream Crossing	3
580	Streambank Protection	3
590	Nutrient Management	2
614	Trough or Tank	4
633	Waste Utilization	13

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