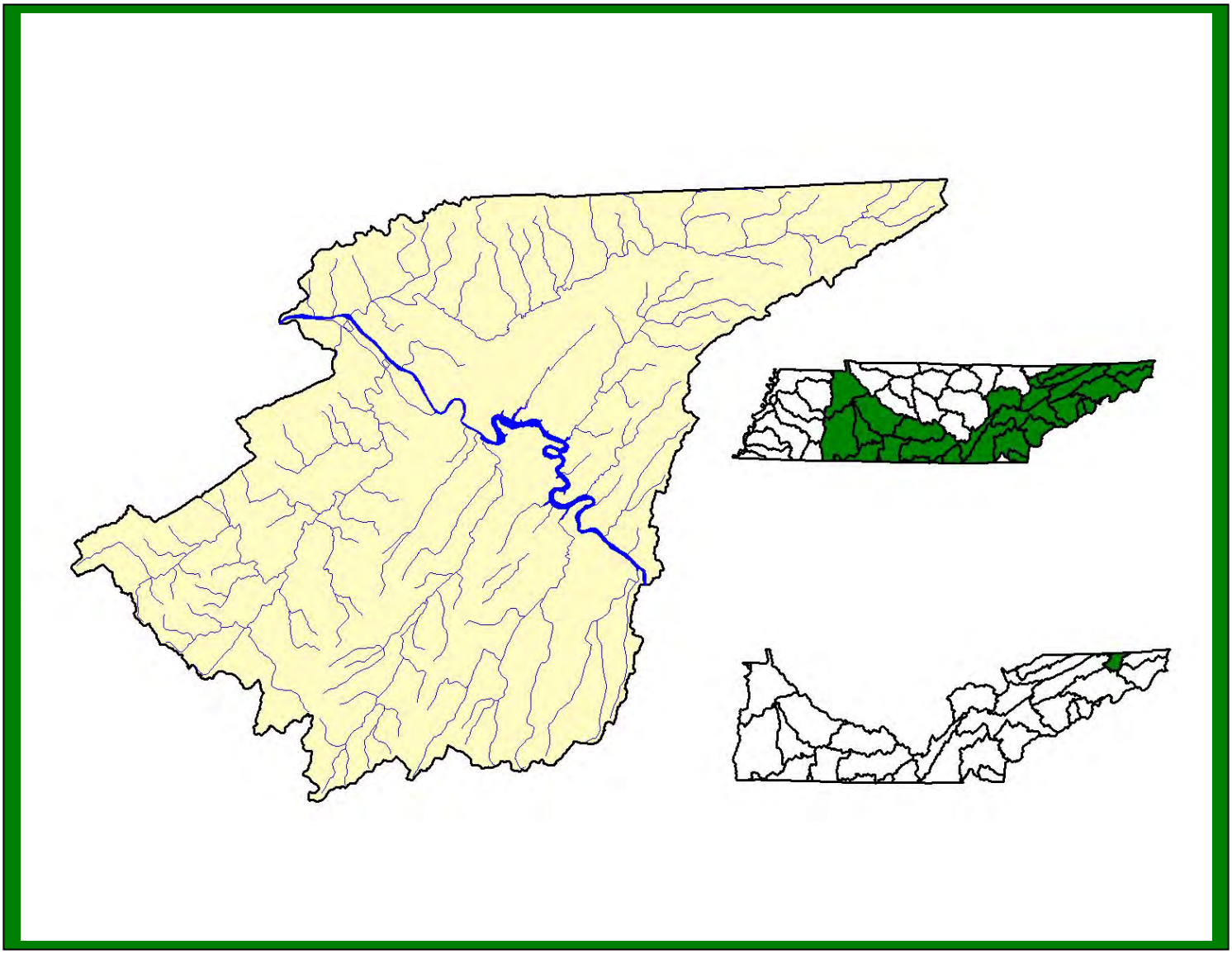
SOUTH FORK HOLSTON RIVER WATERSHED (06010102) OF THE TENNESSEE RIVER BASIN

WATERSHED WATER QUALITY MANAGEMENT PLAN



TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER POLLUTION CONTROL
WATERSHED MANAGEMENT SECTION
2006

SOUTH FORK HOLSTON RIVER WATERSHED (GROUP 3)
WATER QUALITY MANAGEMENT PLAN

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GLOSSARY

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

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

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

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

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

AFO. Animal Feeding Operation.

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

ARAP. Aquatic Resource Alteration Permit.

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

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

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

Benthic. Bottom dwelling.

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

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

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

CAFO. Concentrated Animal Feeding Operation.

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

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

DO. Dissolved oxygen.

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

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

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

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

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

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

MRLC. Multi-Resolution Land Classification.

MS4. Municipal Separate Storm Sewer System.

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

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

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

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

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

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

SBR. Sequential Batch Reactor.

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

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

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

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

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

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

TMSP. Tennessee Multi-Sector Permit.

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

WAS. Waste Activated Sludge.

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

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

WET. Whole Effluent Toxicity.

WWTP. Waste Water Treatment Plant

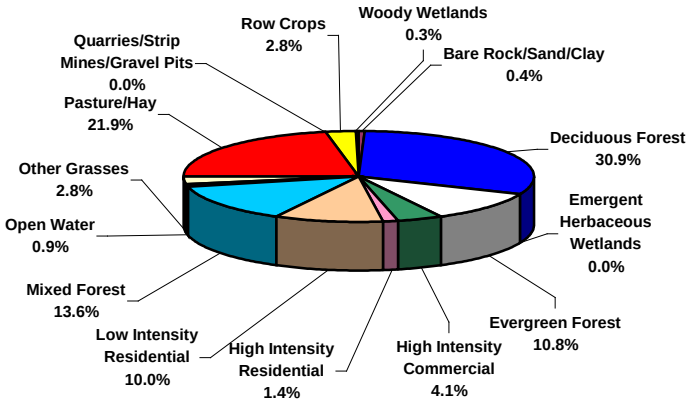
Summary – South Fork Holston River

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 South Fork Holston 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.

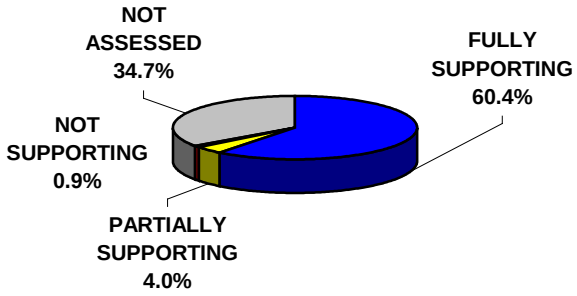
A detailed description of the watershed can be found in Chapter 2, to include information on location, population, hydrology, land use and natural and cultural resources. The Group 3 Portion of the Tennessee portion of the South Fork Holston River Watershed is approximately 559 square miles and includes parts of four East Tennessee counties. A part of the Tennessee River drainage basin, the watershed has 286 stream miles in the Group 3 Portion in Tennessee.



Land Use Distribution in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed.

There are three greenways and three interpretive areas located in the watershed. Over 100 rare plant and animal species have been documented in the watershed, including six rare fish species, three rare mussel species, and two rare snail species.

A review of water quality sampling and assessment is presented in Chapter 3. Using the Watershed Approach to Water Quality, 170 sampling events occurred in the Tennessee portion of the South Fork Holston River Watershed in 1999 and 2000. These were conducted at ambient, ecoregion or watershed monitoring sites. Monitoring results support the conclusion that the 60.4% of total stream miles assessed are not supporting designated uses.



Water Quality Assessment of Streams and Rivers in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. Assessment data are based on the 2002 Water Quality Assessment of 285.7 miles in the watershed.

Also in Chapter 3, a series of maps illustrate Overall Use Support in the watershed, as well as Use Support for the individual uses of Fish and Aquatic Life Support, Recreation, Irrigation, and Livestock Watering and Wildlife. Another series of maps illustrate streams that are listed for impairment by specific causes (pollutants) such as Flow Alteration/Thermal Modification, Organic Enrichment/Low Dissolved Oxygen, and Habitat Alteration.

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

The Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed is Composed of one USGS-Delineated Subwatershed (10-Digit Subwatersheds)

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Point source contributions to the Group 3 Portion of the Tennessee portion of the South Fork Holston River Watershed consist of 17 individual NPDES-permitted facilities, 10 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 (11), Tennessee Multi-Sector Permits (25), Mining Permits (2), Ready-Mix Concrete Plant Permits (5) and Water Treatment Plant Permits (2). Agricultural operations include cattle, chicken, hog, and sheep farming. Maps illustrating the locations of NPDES permit sites are presented in each subwatershed.

Chapter 5 is entitled *Water Quality Partnerships in the South Fork Holston 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, Tennessee Valley Authority, U.S. Fish and Wildlife Service, U.S. Geological Survey), and state agencies (TDEC Division of Community Assistance, TDEC Division of Water Supply, Tennessee Department of Agriculture and Virginia Department of Environmental Quality) are summarized. Local initiatives of active watershed organizations (Kingsport Citizens for a Cleaner Environment, Friends of Fort Patrick Henry and Holston River Watershed Alliance) are also described.

Point and Nonpoint source approaches to water quality problems in the Group 3 Portion of the Tennessee portion of the South Fork Holston 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 South Fork Holston 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.

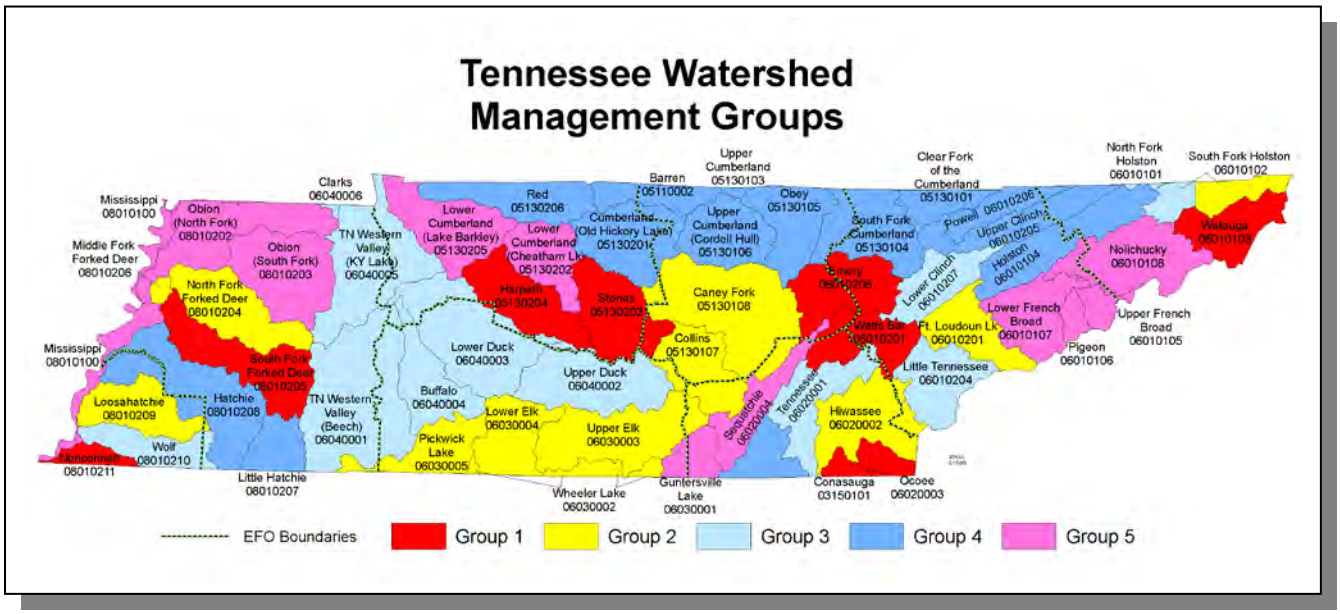


Figure 1-1. Watershed Groups in Tennessee's Watershed Approach to Water Quality.

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.

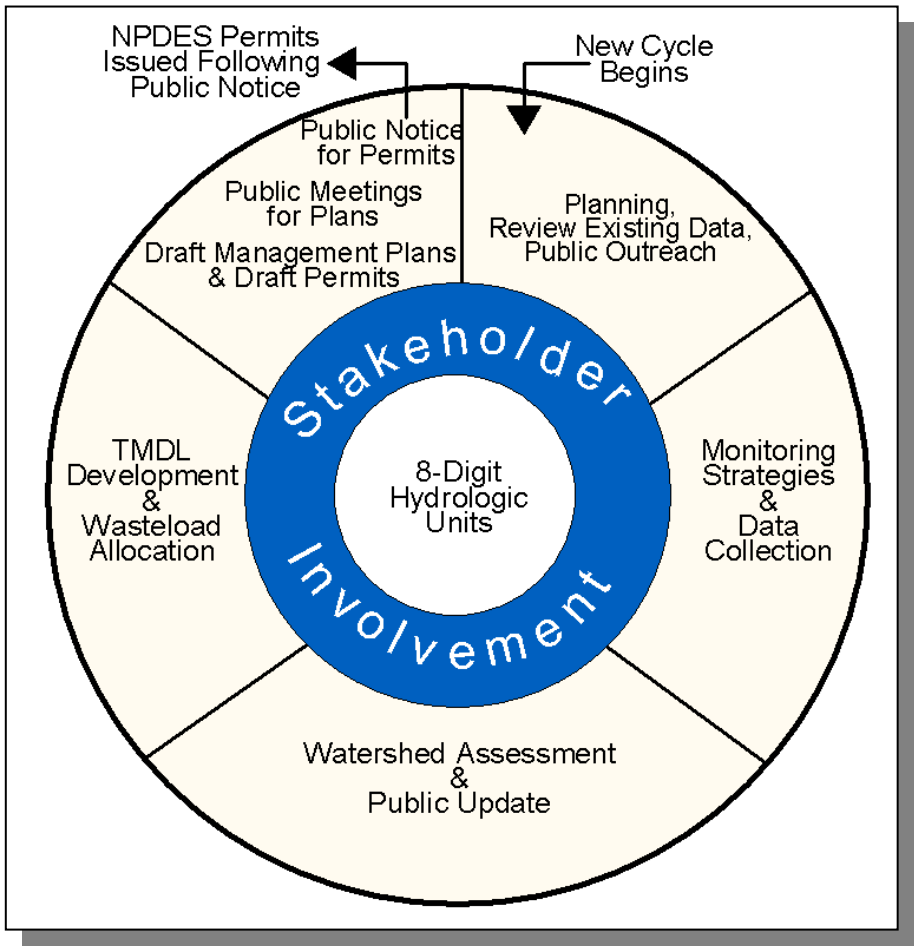


Figure 1-2. The Watershed Approach Cycle.

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 SOUTH FORK HOLSTON RIVER WATERSHED

2.1. BACKGROUND. Native Americans called the Holston River "Hogoheegee." Early explorers called it "Indian River" and French traders called it the "Cherokee River." Today, the Holston River is named in honor of Stephen Holston (also spelled Holstein). Holston, an early explorer and surveyor with The Expedition of 1748, was the first settler to explore the Holston River system, including South Fork of the Holston River.

This Chapter describes the location and characteristics of the Group 3 portion of the Tennessee portion of the South Fork Holston River Watershed.

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. The South Fork Holston River Watershed is located in Tennessee and Virginia. The Group 3 portion of the Tennessee portion of the South Fork Holston River Watershed (34.9% of the entire Tennessee portion; 16.8% of the entire watershed) includes parts of Greene, Hawkins, Sullivan, and Washington Counties.

Figure 2-1. General Location of the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *Dark green, Group 3 portion of the Tennessee portion (194 square miles); light green, Group 2 (363 square miles) and Virginia (619 square miles) portions.*

COUNTY	% OF WATERSHED IN EACH COUNTY
Sullivan	75.9
Washington	22.8
Hawkins	0.9
Greene	0.3

Table 2-1. The Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed Includes Parts of Four East Tennessee Counties. *Percentages are calculated for the Group 3 portion of the Tennessee portion of watershed.*

2.2.B. Population Density Centers. Three state highways and one interstate serve the major communities in the Group 3 portion of the Tennessee Portion of the South Fork Holston River Watershed.

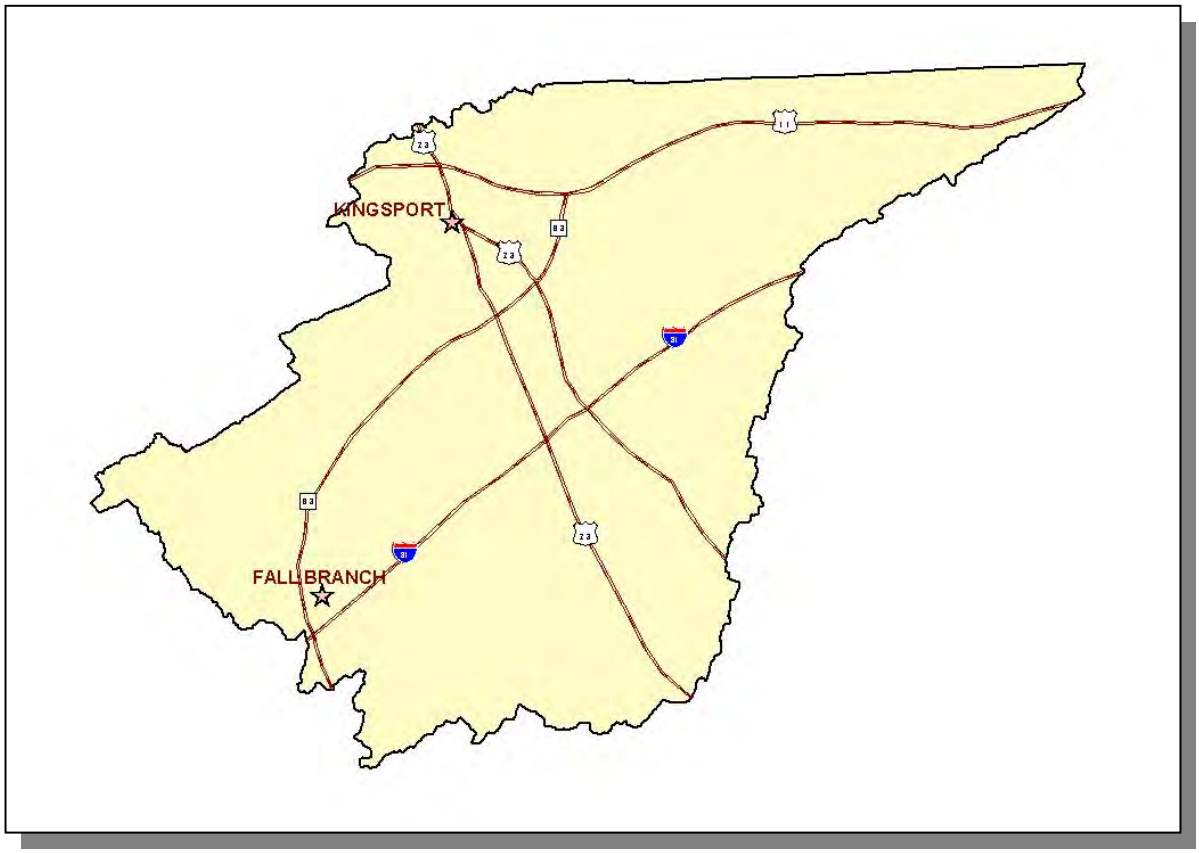


Figure 2-2. Municipalities and Roads in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed.

MUNICIPALITY	POPULATION	COUNTY
Kingsport	42,769	Sullivan

Table 2-2. Communities and Populations in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *Population based on 1999 census (Tennessee 2001/2002 Blue Book).*

2.3. GENERAL HYDROLOGIC DESCRIPTION.

2.3.A. Hydrology. The South Fork Holston River Watershed, designated 06010102 by the USGS, drains approximately 1,179 square miles, 559 square miles of which are in Tennessee (194 square miles of which are Group 3), and empties to the Holston River watershed (06010104).

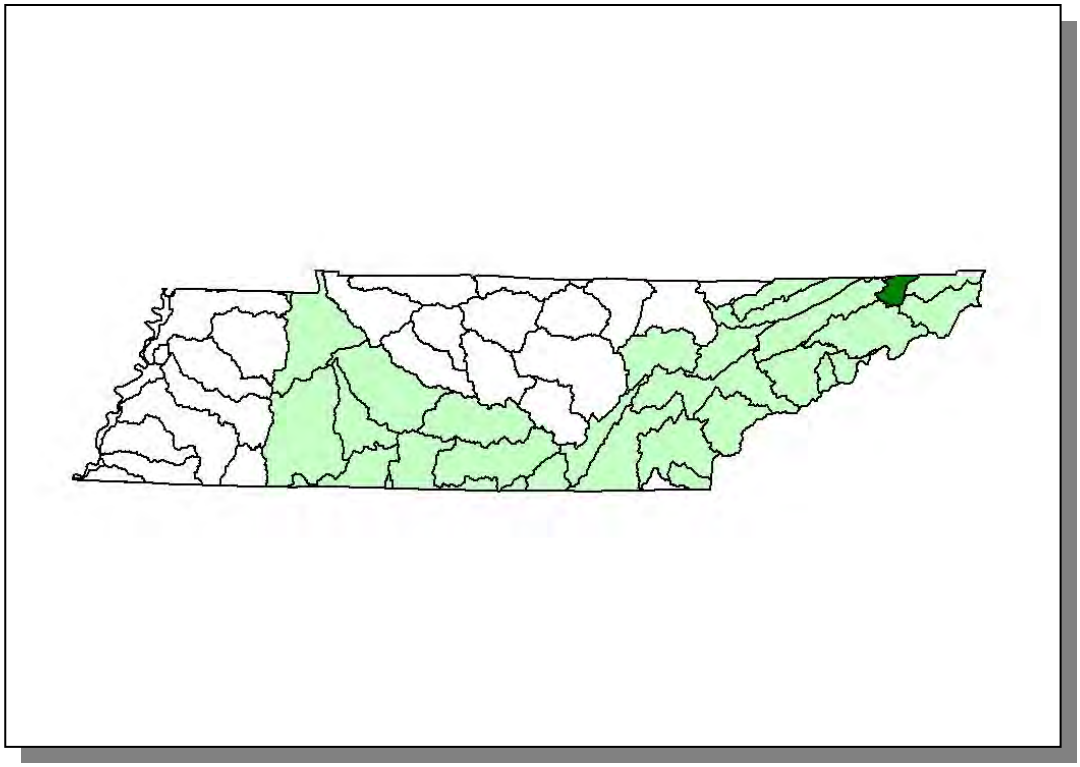


Figure 2-3. The South Fork Holston River Watershed is Part of the Tennessee River Basin. *The Group 3 portion is shown in dark green.*

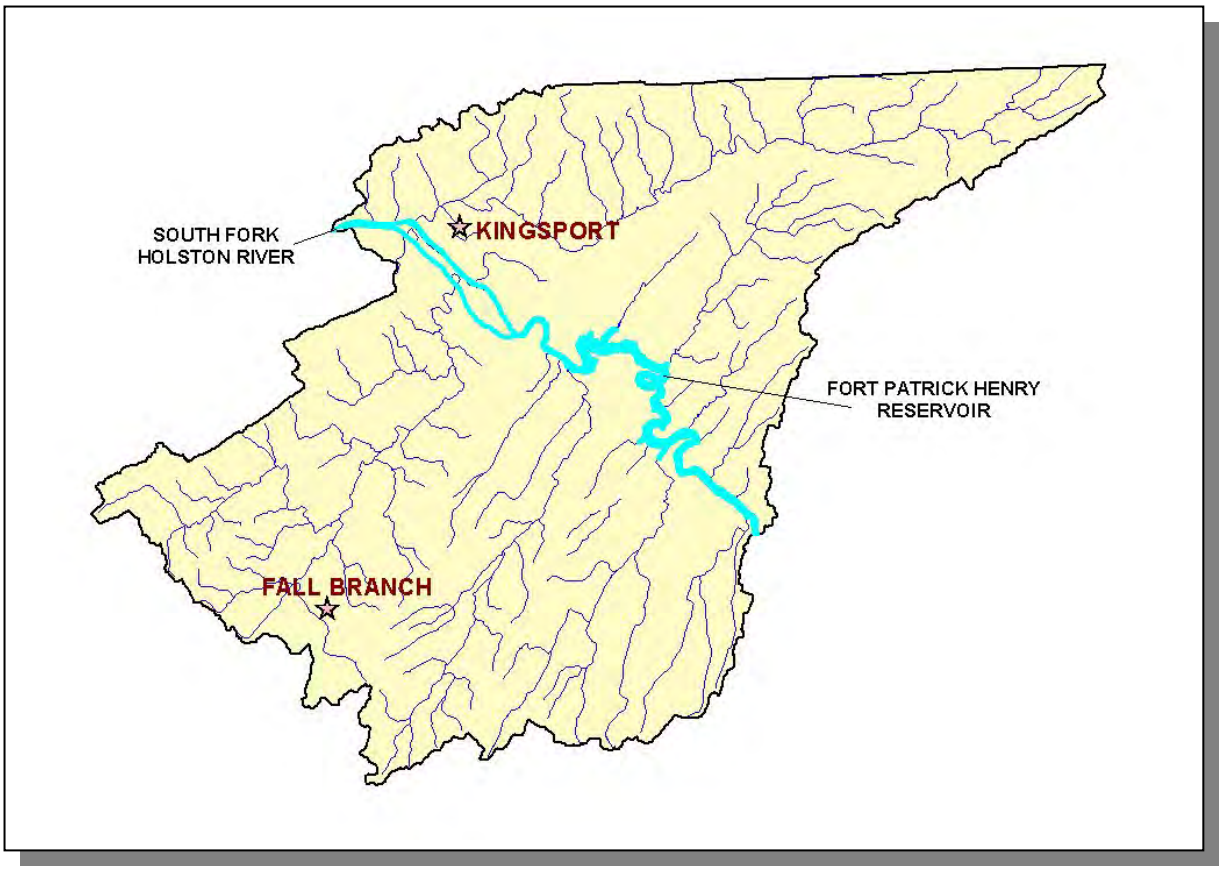


Figure 2-4. Hydrology in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *There are 300 stream miles as catalogued in the River Reach File 3 database in the Group 3 portion of the Tennessee portion of the South Fork Holston River Watershed. An additional 550 stream miles are located in the Group 2 portion of the Tennessee portion of the watershed, and 942 stream miles are located in the Virginia portion of the watershed as catalogued in the River Reach File 3 database. 12,884 lake acres are located in the Tennessee portion of the entire watershed. Location of the South Fork Holston River and Fort Patrick Henry Reservoir, and the cities of Fall Branch and Kingsport are shown for reference.*

2.3.B. Dams. There are 2 dams inventoried by TDEC Division of Water Supply in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. These dams either retain 30 acre-feet of water or have structures at least 20 feet high.

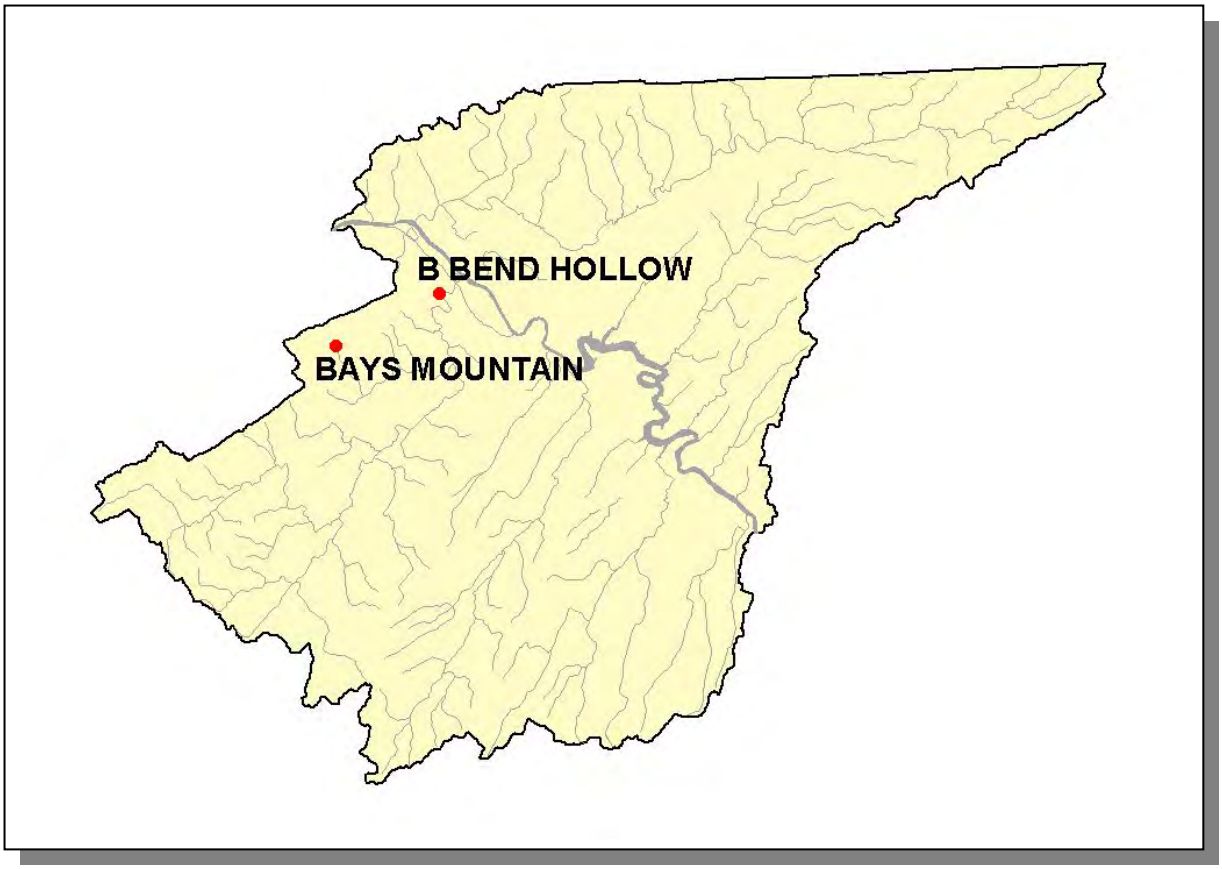


Figure 2-5. Location of Inventoried Dams in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *More information is provided in Appendix II and on the TDEC homepage at http://gwidc.memphis.edu/website/dws/.*

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.

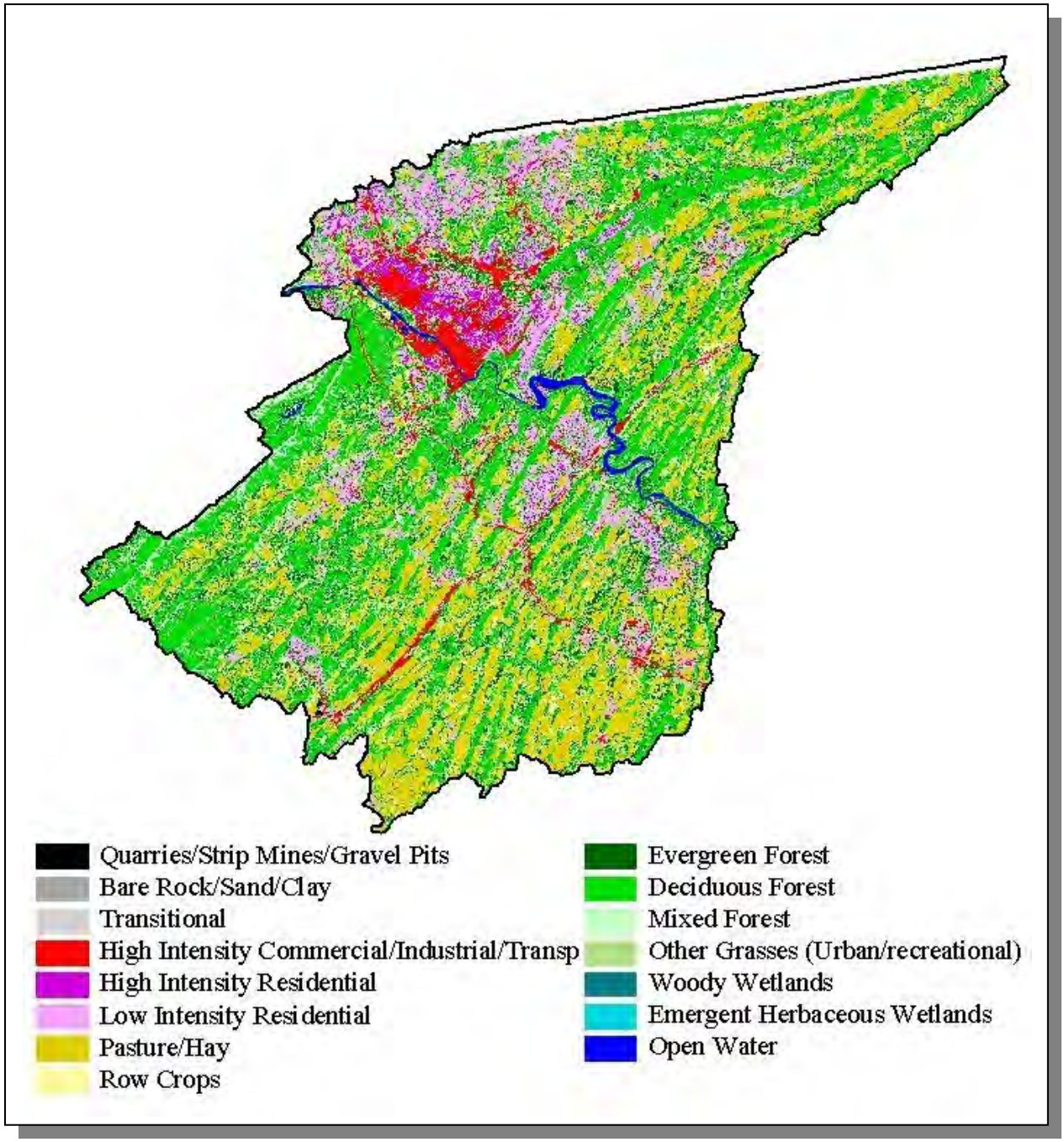


Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed.

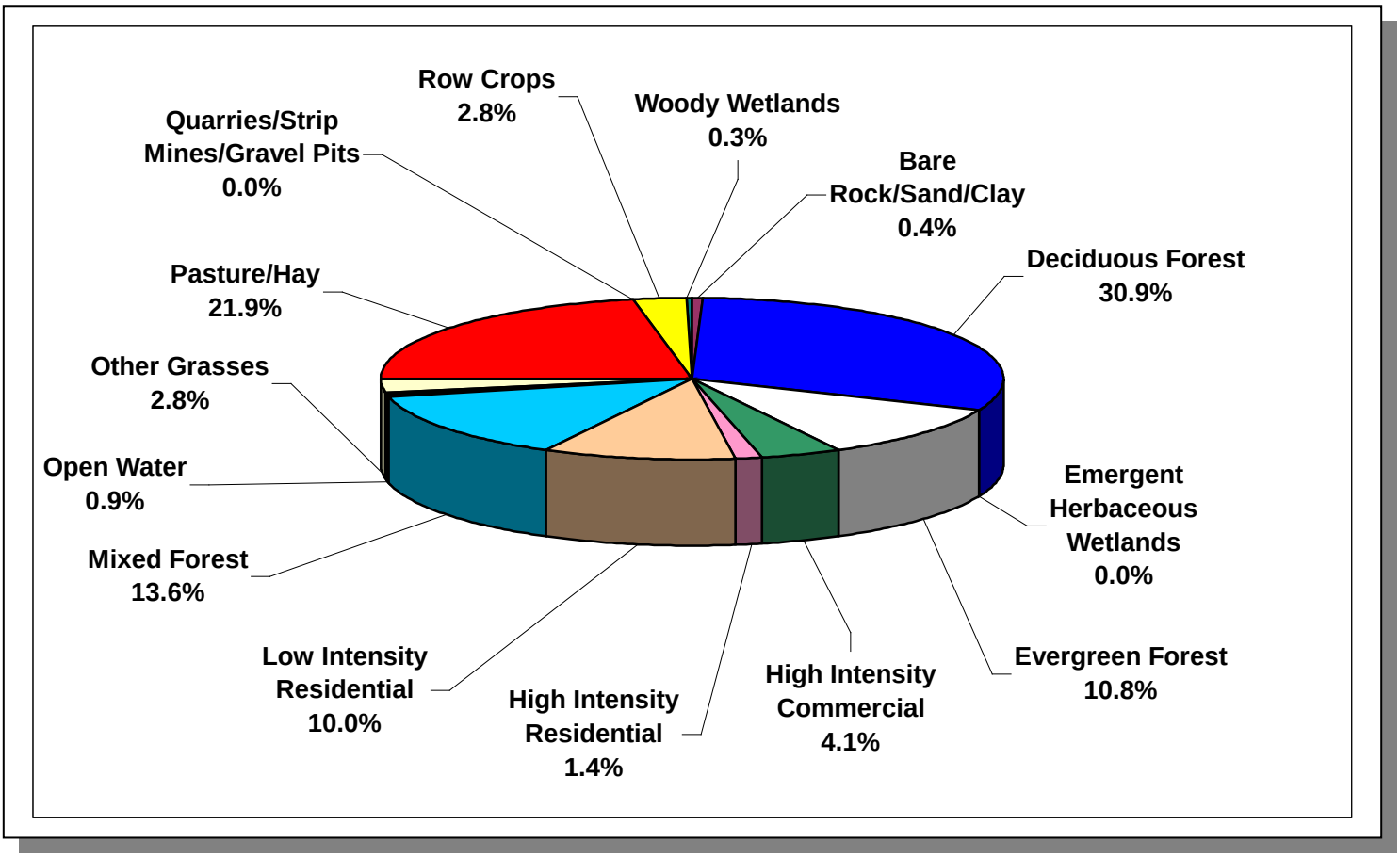


Figure 2-7. Land Use Distribution in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *More information is provided in Appendix II.*

Sinkholes, springs, disappearing streams and caves characterize karst topography. The term “karst” describes a distinctive landform that indicates dissolution of underlying soluble rocks by surface water or ground water. Although commonly associated with limestone and dolomite (carbonate rocks), other highly soluble rocks such as gypsum and rock salt can be sculpted into karst terrain. In karst areas, the ground water flows through solution-enlarged channels, bedding planes and microfractures within the rock. The characteristic landforms of karst regions are: closed depressions of various size and arrangement; disrupted surface drainage; and caves and underground drainage systems. The term “karst” is named after a famous region in the former country of Yugoslavia.

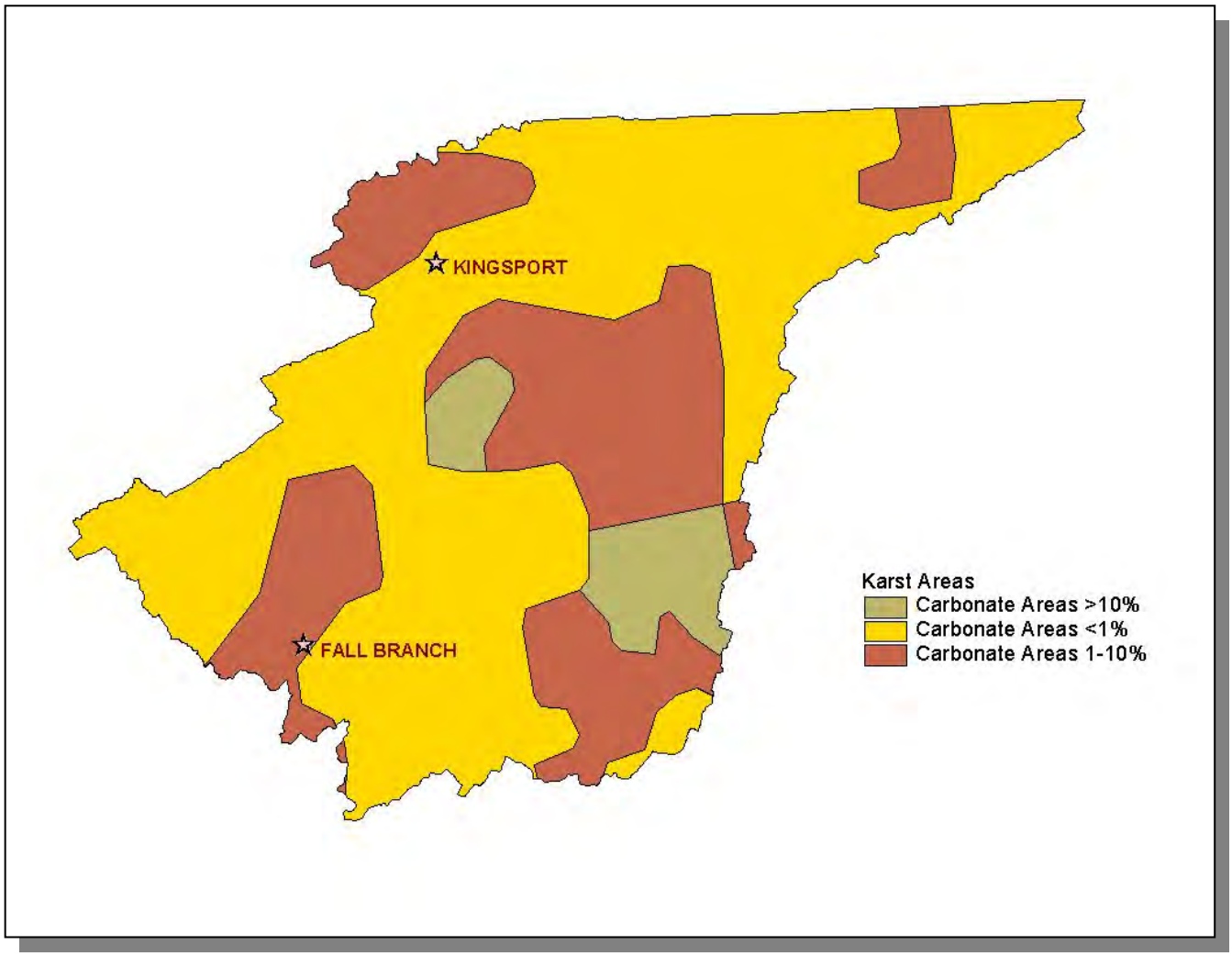


Figure 2-8. Illustration of Karst Areas in Group 3 Portion of Tennessee Portion of South Fork Holston River Watershed. *Locations of Fall Branch and Kingsport are shown for reference.*

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 Group 3 portion of the Tennessee portion of the South Fork Holston River Watershed lies within a single Level III ecoregion (Ridge and Valley) and contains 4 Level IV subecoregions:

- **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 uses, as well as areas of thick forest. White oak forest, bottomland oak forest, and sycamore-ash-elm riparian forests are the common forest types. Grassland barrens intermixed with cedar-pine glades also occur here.

- **Southern Shale Valleys (67g)** consist of lowlands, rolling valleys, 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.

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

- **Southern Dissected Ridges and Knobs (67i)** contain crenulated, broken, or hummocky ridges. The ridges on the east side of Tennessee's Ridge and Valley tend to be associated with the Ordovician 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 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 white oak, mixed mesophytic forest, and tulip poplar on the lower slopes, knobs, and draws.

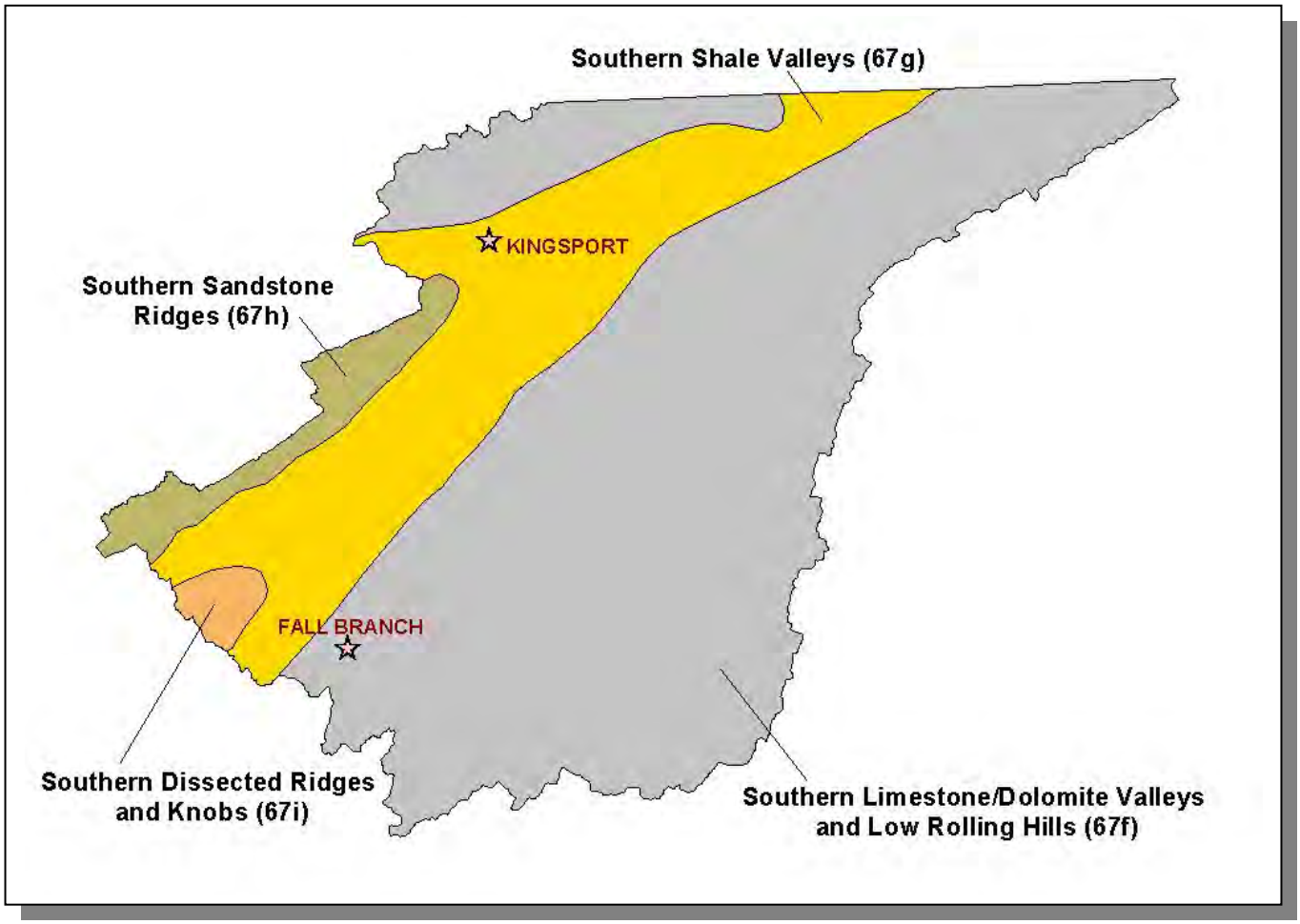


Figure 2-9. Level IV Ecoregions in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *Locations of Fall Branch and Kingsport are shown for reference.*

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

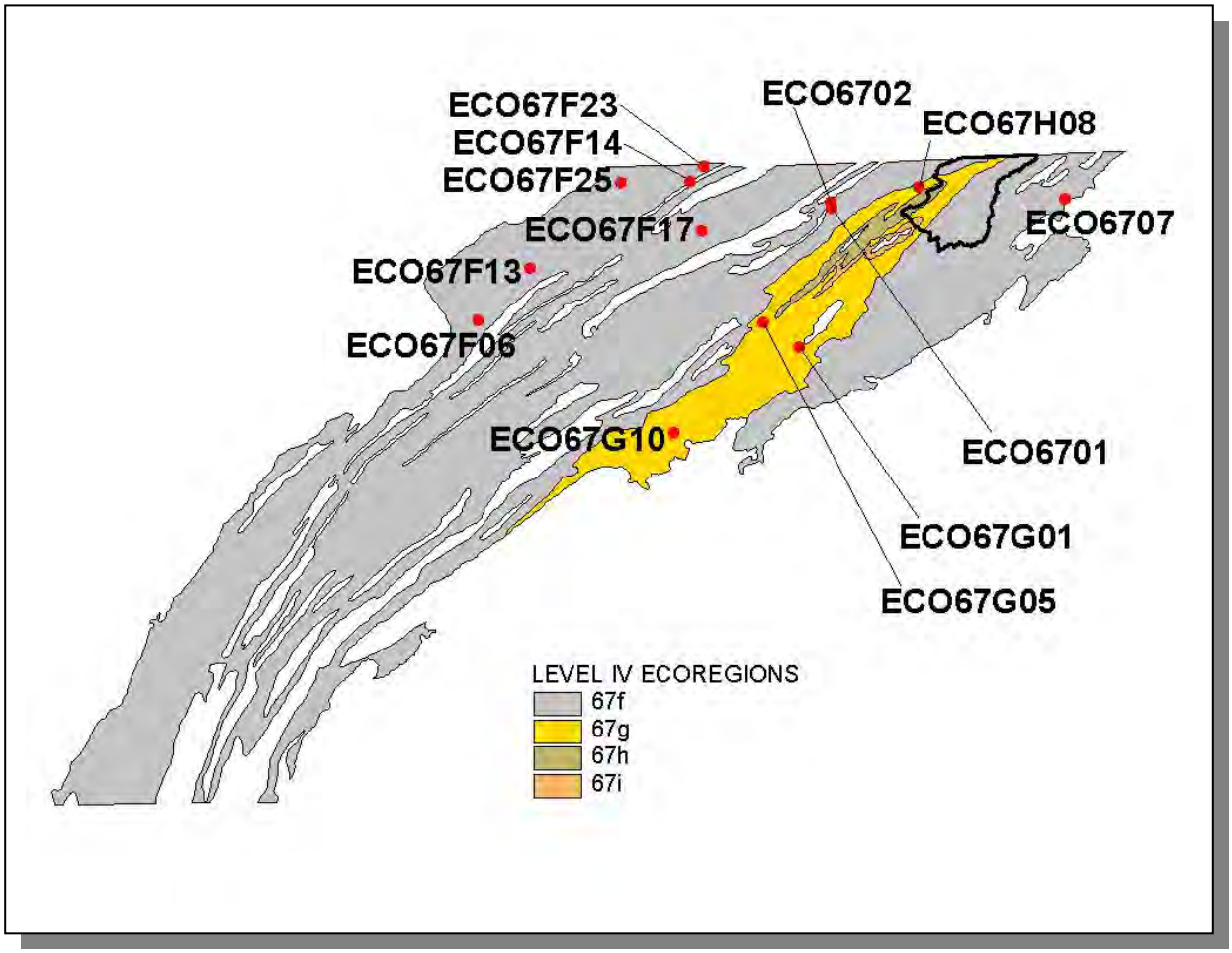


Figure 2-10. Ecoregion Monitoring Sites in Level IV Ecoregions 67f, 67g, 67h, and 67i in Tennessee. *The Group3 portion of the Tennessee portion of the South Fork Holston River Watershed boundary is shown for reference. More information is provided in Appendix II.*

2.6. NATURAL RESOURCES.

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

GROUPING	NUMBER OF RARE SPECIES
Insects and Spiders	3
Mussels	3
Snails	2
Amphibians	2
Birds	9
Fish	6
Mammals	10
Reptiles	1
Plants	78
Total	**114**

Table 2-3. There are 114 Known Rare Plant and Animal Species in the Tennessee Portion (Groups 2 and 3) of the South Fork Holston River Watershed.

In the Tennessee Portion of the South Fork Holston River Watershed (Groups 2 and 3 portions), there are 6 rare fish species, 4 rare mussel species, and 2 rare snail species.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
Cyprinella monacha	Spotfin Chub	LT	T
Etheostoma acuticeps	Sharphead Darter		
Etheostoma percnurum	Duskytail Darter	LE	E
Percina burtoni	Blotchside Darter	MC	D
Percina macrocephala	Longhead Darter		T
Phoxinus tennesseensis	Tennessee Dace		D
Epioblasma florentina walkeri	Tan Riffleshell	LE	E
Pegias fibula	Little-Wing Pearly Mussel	LE	E
Quadrula intermedia	Cumberland Monkeyface	LE	E
Helicodiscus notius specus	A Land Snail		
Io fluvialis	Spiny Riversnail		

Table 2-4. Rare Aquatic Species in the Tennessee Portion of the South Fork Holston River Watershed. *Federal Status: LE, Listed Endangered by the U.S. Fish and Wildlife Service; LT, Listed Threatened by the U.S. Fish and Wildlife Service; MC, Management Concern for 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/data.php.*

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/nh/wetlands/

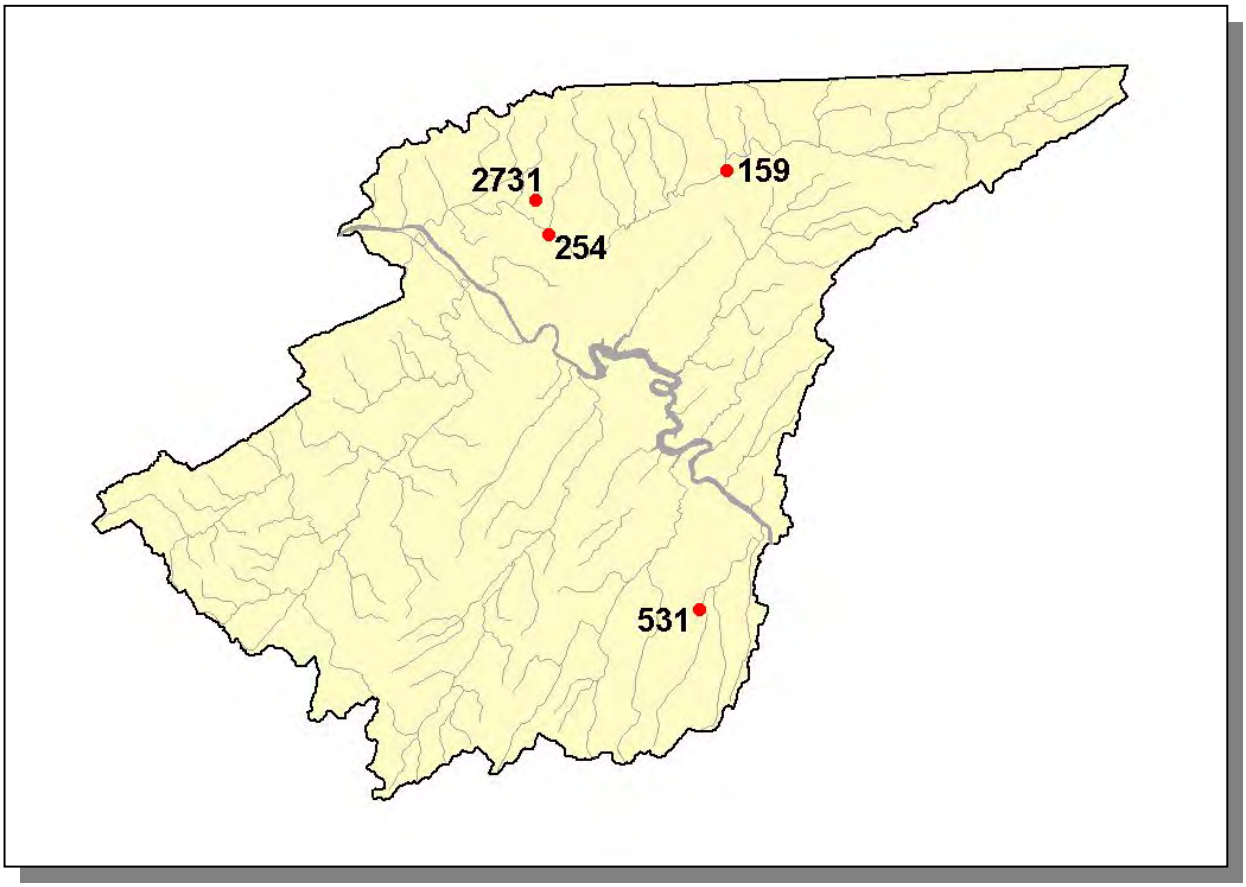


Figure 2-11. Location of Wetland Sites in TDEC Division of Natural Heritage Database in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands*. More information is provided in Appendix II.*

2.7. CULTURAL RESOURCES.

2.7.A. Greenways. The Group 3 portion of the Tennessee portion of the South Fork Holston River Watershed has at least three greenways/trails:

- Borden Park Trail in Kingsport
- Kingsport Greenbelt
- Memorial Park Trail in Kingsport

More information about greenways and trails in the watershed may be found at:

http://www2.state.tn.us/tdec/GREENWAYS/tnmap.htm

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

- Boone Reservation is located along both banks of the South Holston River (Mile 18.6 to 35.0), Watauga River, and Beaver Creek. The reservation has several privately-owned commercial marinas and docks on the lake. The site is managed by TVA.
- Fort Patrick Henry is named after the colonial fort in honor of the revolutionary war era Virginian. Also called Long Island Station, the original fort is located where Kingsport is today. The site is managed by TVA.
- Warrior's Path State Park is named for the nearby war and trading path used by the Cherokee. The 950-acre park on Patrick Henry Reservoir was acquired from TVA in 1952. The site is managed by the state of Tennessee.

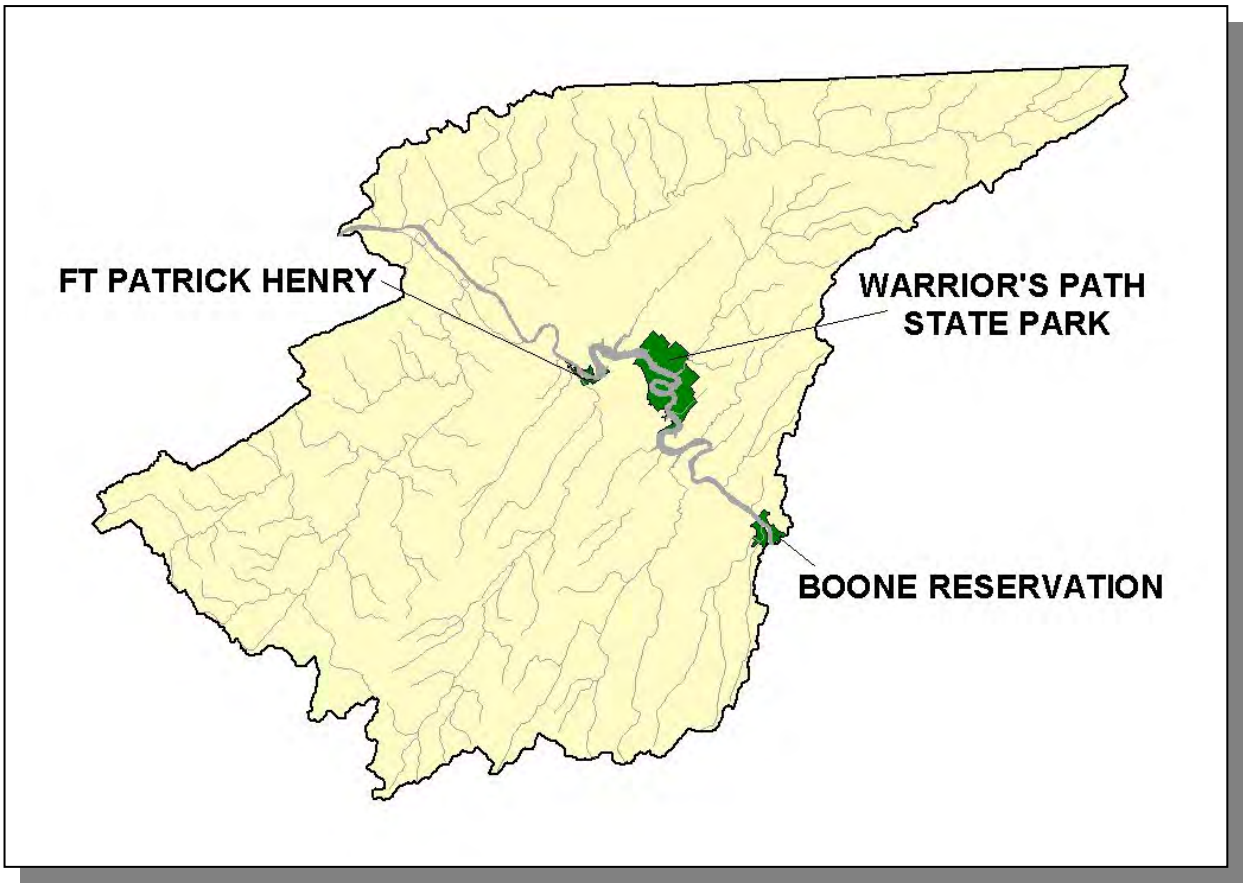


Figure 2-12. Locations of State- and Federally-Managed Lands in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed.

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
Cedar Creek	3,4		3		Reedy Creek	4		2
Fall Creek			3		Rock Springs Creek	4		
Ford Creek	3				Sinking Creek	3		
Horse Creek	3				South Fork Holston River	3,4	2	
Kendrick Creek	3							

Table 2-5. Stream Scoring from the Tennessee Rivers Assessment Project in the Group 3 Portion of the South Fork Holston River Watershed.

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

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

CHAPTER 3

WATER QUALITY ASSESSMENT OF THE SOUTH FORK HOLSTON 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 fail to support some or all of their classified uses. The 303(d) list does not include streams determined to be fully supporting designated uses 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/2004_303dlist.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 Group 3 portion of the Tennessee portion of the South Fork Holston River Watershed, summarizes data collection and assessment results, and describes impaired waters.

3.2. DATA COLLECTION. Comprehensive water quality monitoring in the South Fork Holston River Watershed was conducted in 1999-2000. Data are from one of four site types: (1) Ambient sites, (2) Ecoregion sites, (3) Watershed sites, or (4) Tier Evaluation sites.

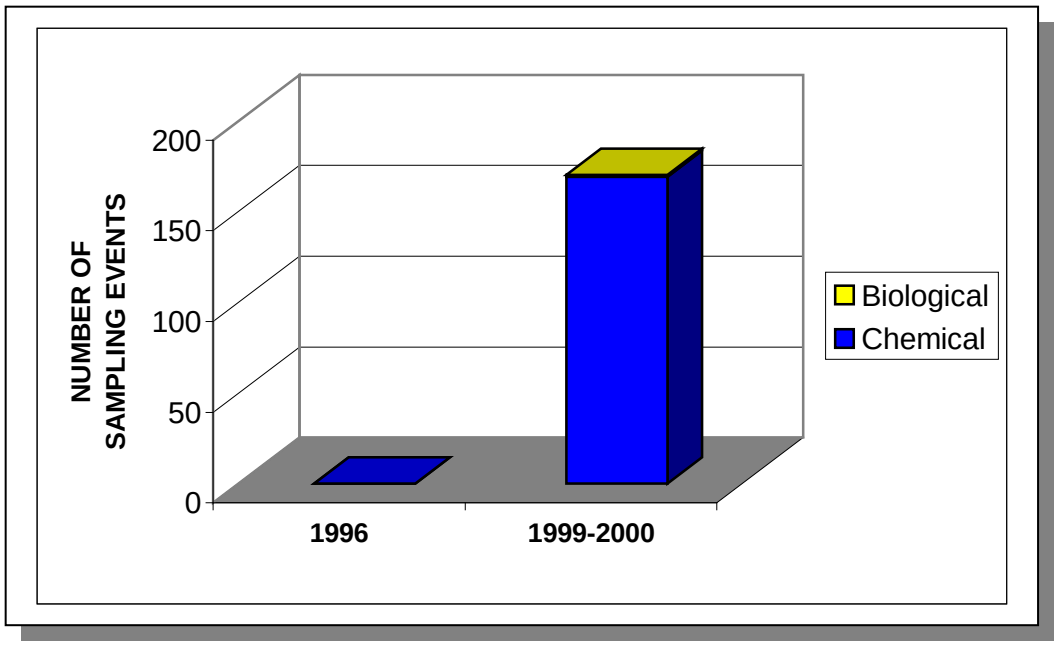


Figure 3-1. Number of Sampling Events Using the Traditional Approach (1996) and Watershed Approach (1999-2000) in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed.

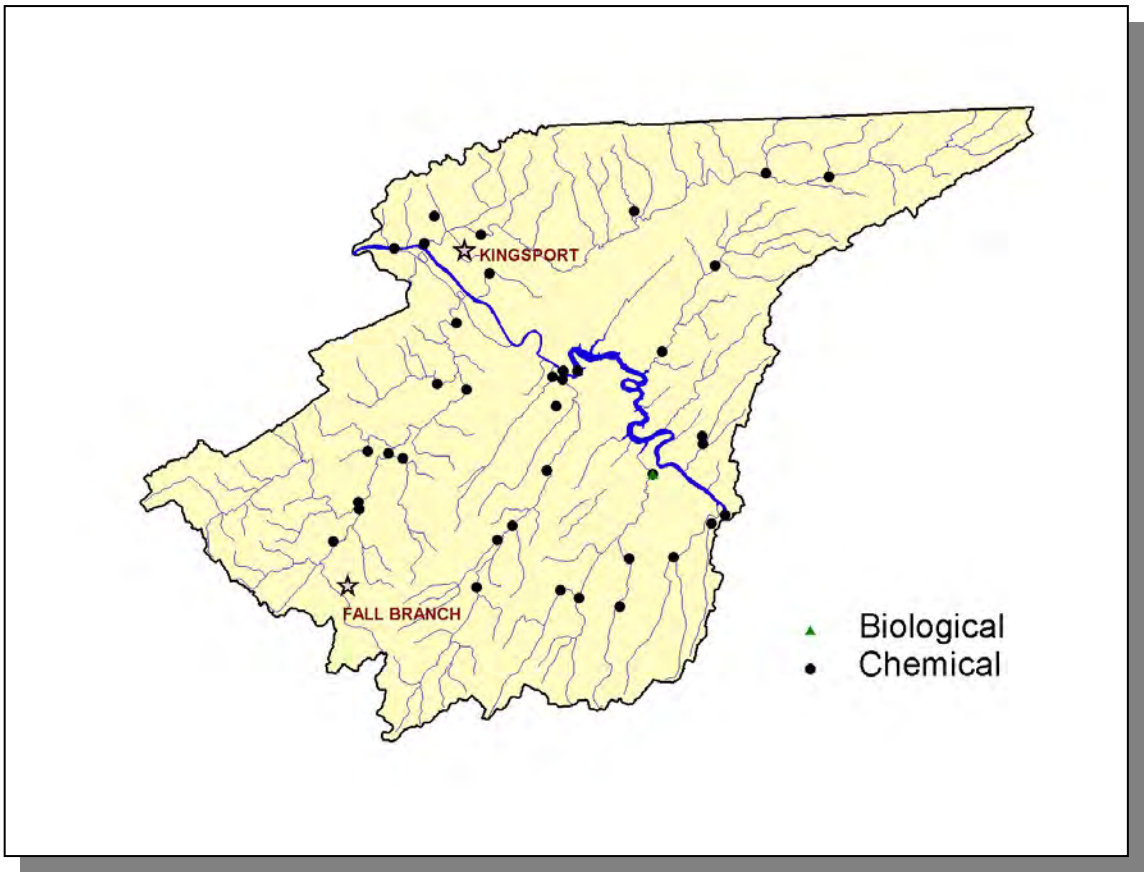


Figure 3-2. Location of Monitoring Sites in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *Locations of fall Branch and Kingsport are shown for reference.*

	1996	1999-2000
Biological	0	1
Chemical	0	169
Total	**0**	**170**

Table 3-1. Number of Sampling Events in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed During the Data Collection Phase of the Watershed Approach.

3.2.A. Ambient Monitoring Sites. These fixed-station chemical monitoring sites are sampled quarterly or monthly by the Environmental Field Office-Johnson City 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 Group 3 portion of the Tennessee portion of the South Fork Holston River Watershed are provided in Appendix IV.

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

3.2.B. Ecoregion Sites. Ecoregions are relatively homogeneous areas of similar geography, topography, climate and soils that support similar plants and animals. The delineation phase of the Tennessee Ecoregion Project was completed in 1997 when the ecoregions and subecoregions were mapped and summarized (EPA/600/R-97/022). There are eight Level III Ecoregions and twenty-five Level IV subecoregions in Tennessee (see Chapter 2 for more details). The Tennessee portion of the South Fork Holston River Watershed lies within 1 Level III ecoregion (Ridge and Valley) and contains 4 subecoregions (Level IV):

- 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 during the watershed sampling time period.

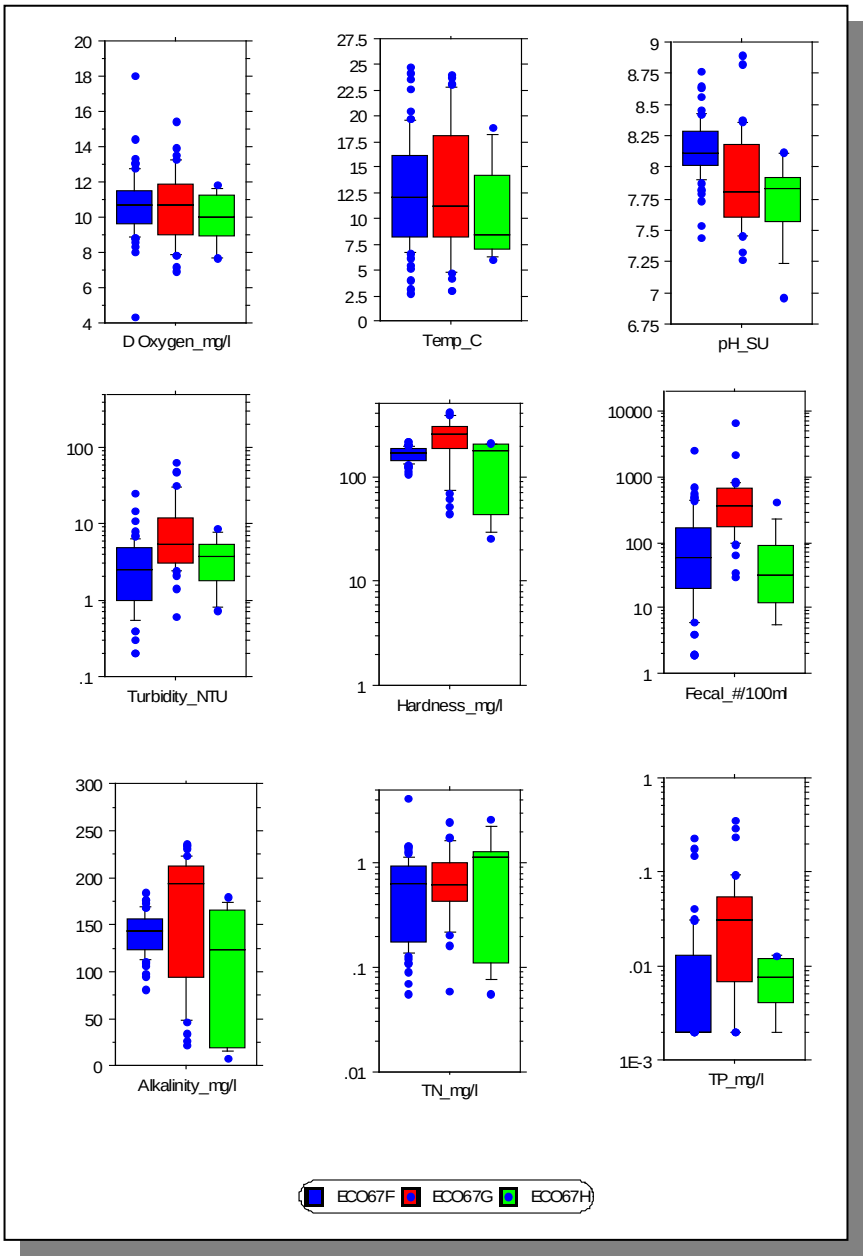


Figure 3-3. Select Chemical Data Collected in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th percentiles. Extreme values are also shown as dots. Fecal, fecal coliform bacteria; TN, Total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

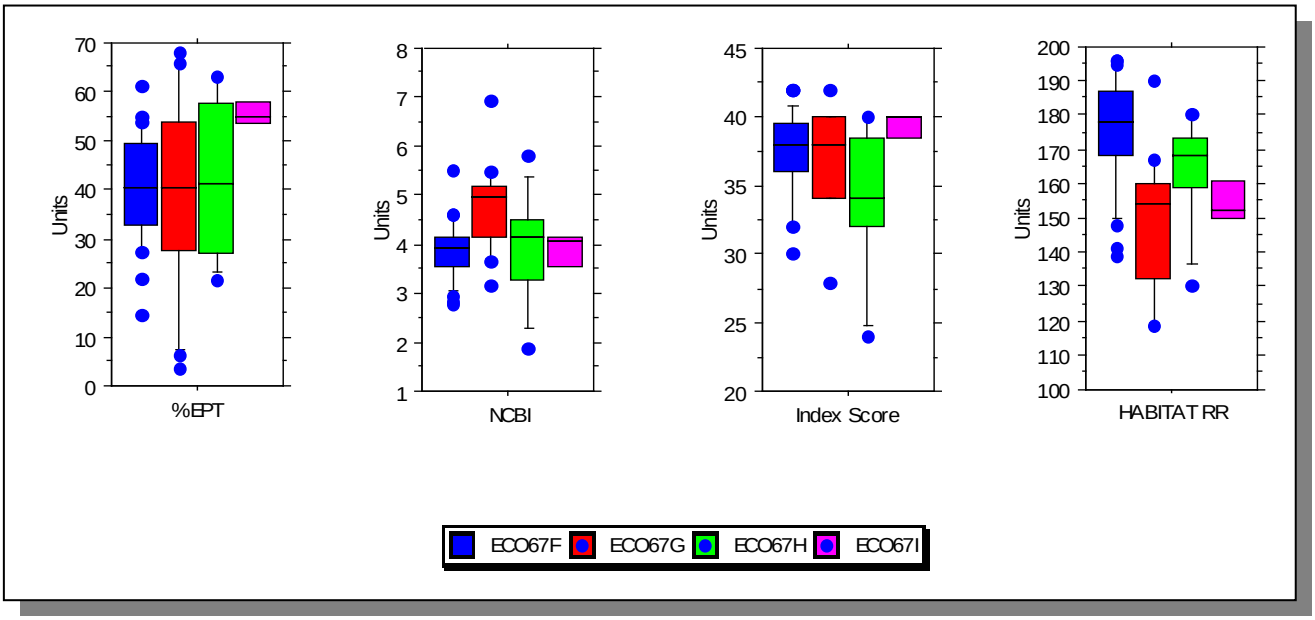


Figure 3-4. Benthic Macroinvertebrate and Habitat Scores for the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed Ecoregion Sites. *Boxes and bars illustrate 10th, 25th, median, 75th, and 90th percentiles. Extreme values are also shown as dots. NCBI, North Carolina Biotic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

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

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

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

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

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

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

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

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

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

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

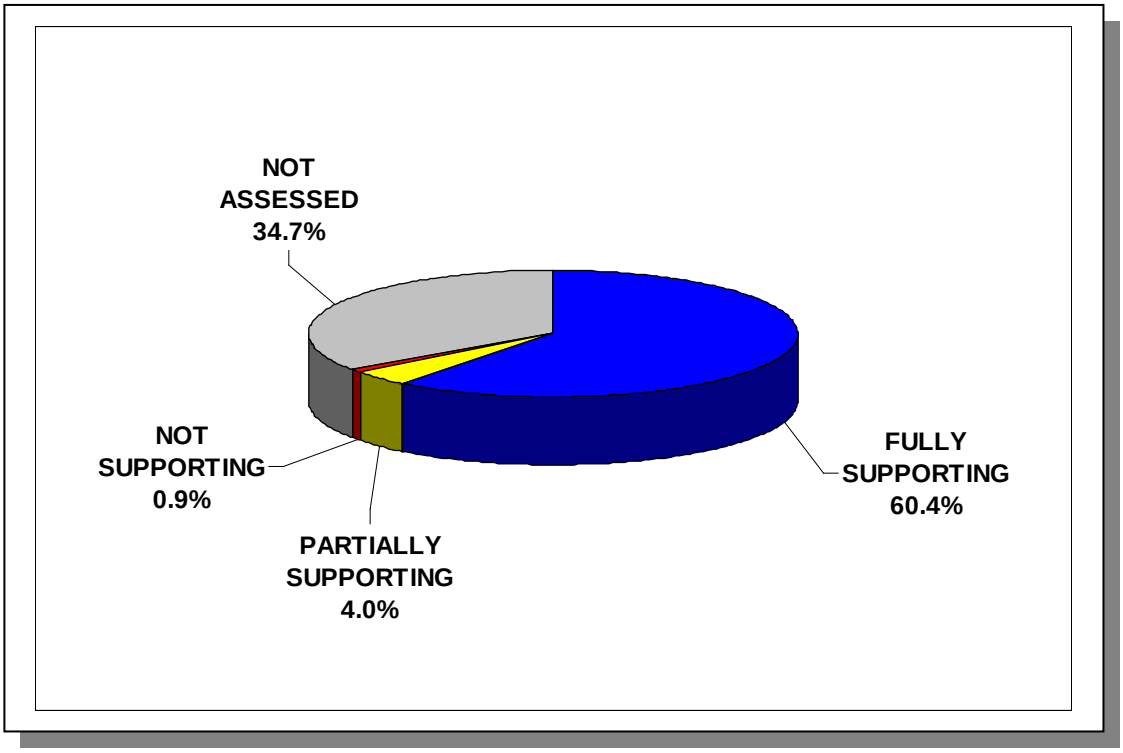


Figure 3-5a. Water Quality Assessment of Streams and Rivers in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *Assessment data are based on the 2002 Water Quality Assessment of 285.7 miles in the watershed. More information is provided in Appendix III.*

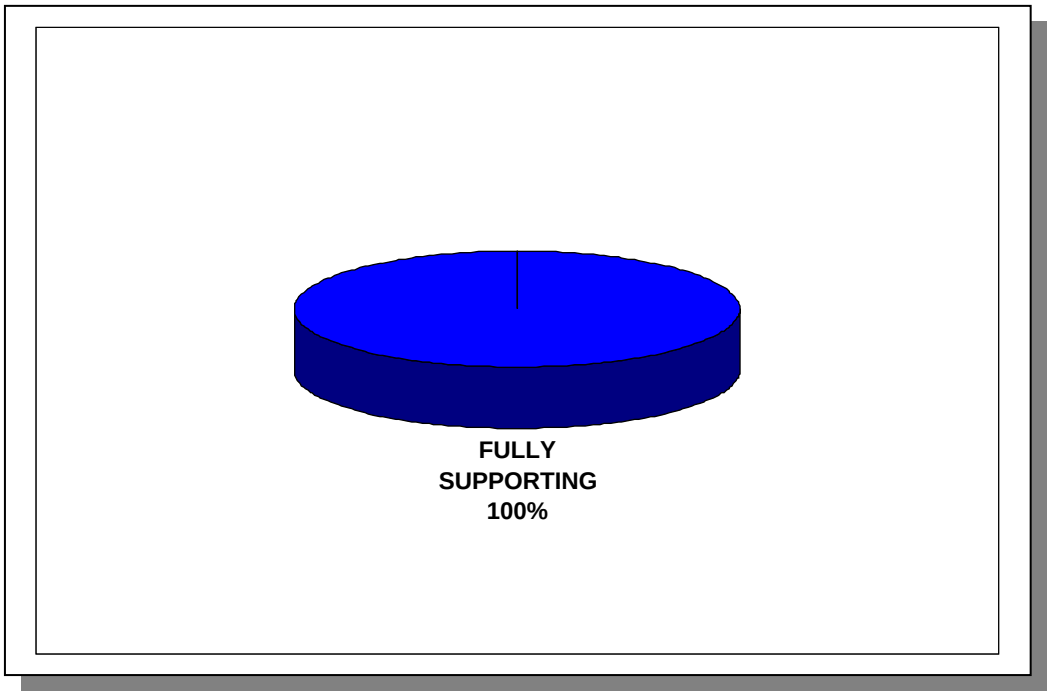


Figure 3-5b. Water Quality Assessment of Lakes in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *Assessment data are based on the 2002 Water Quality Assessment of 872 lake acres in the watershed. More information is provided in Appendix III.*

3.3.A. Assessment Summary.

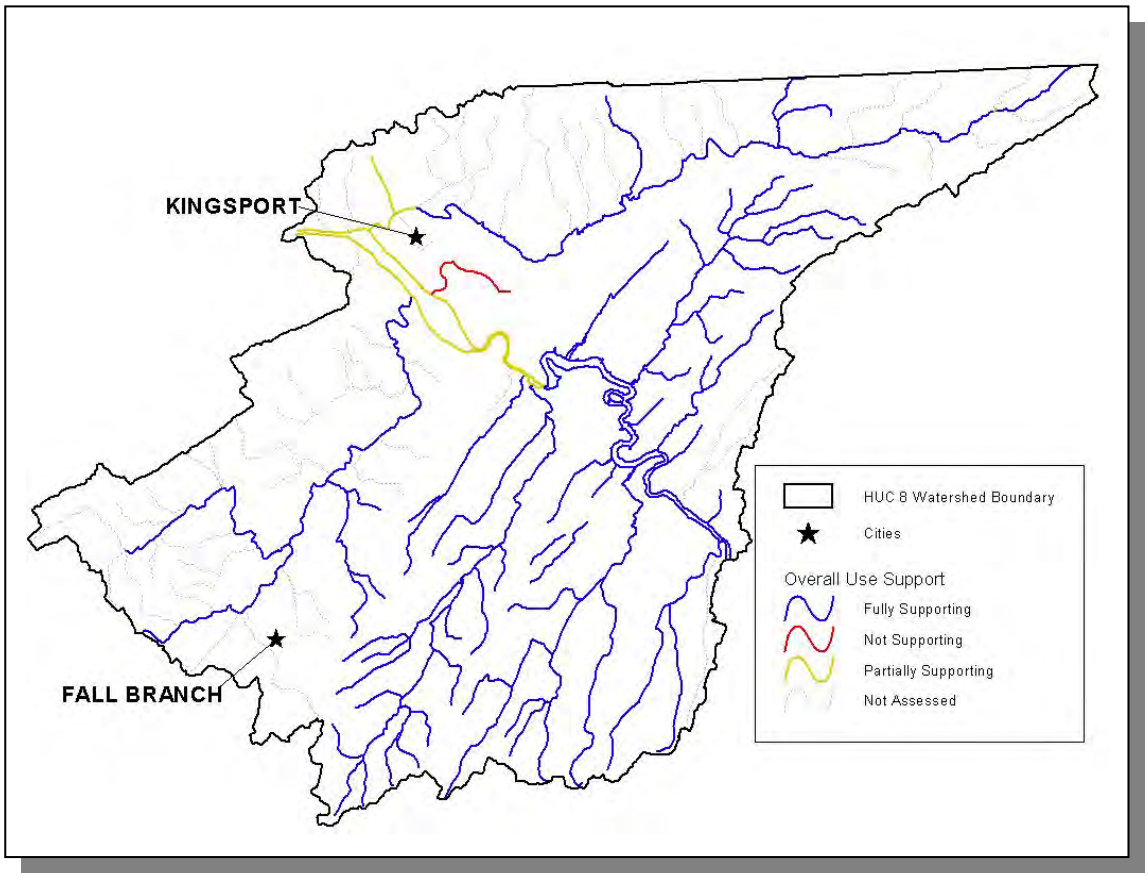


Figure 3-6a. Overall Use Support Attainment in the Group 3 Portion of theTennessee Portion of the South Fork Holston River Watershed. *Assessment data are based on the 2002 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Fall Branch and Kingsport are shown for reference. More information is provided in Appendix III.*

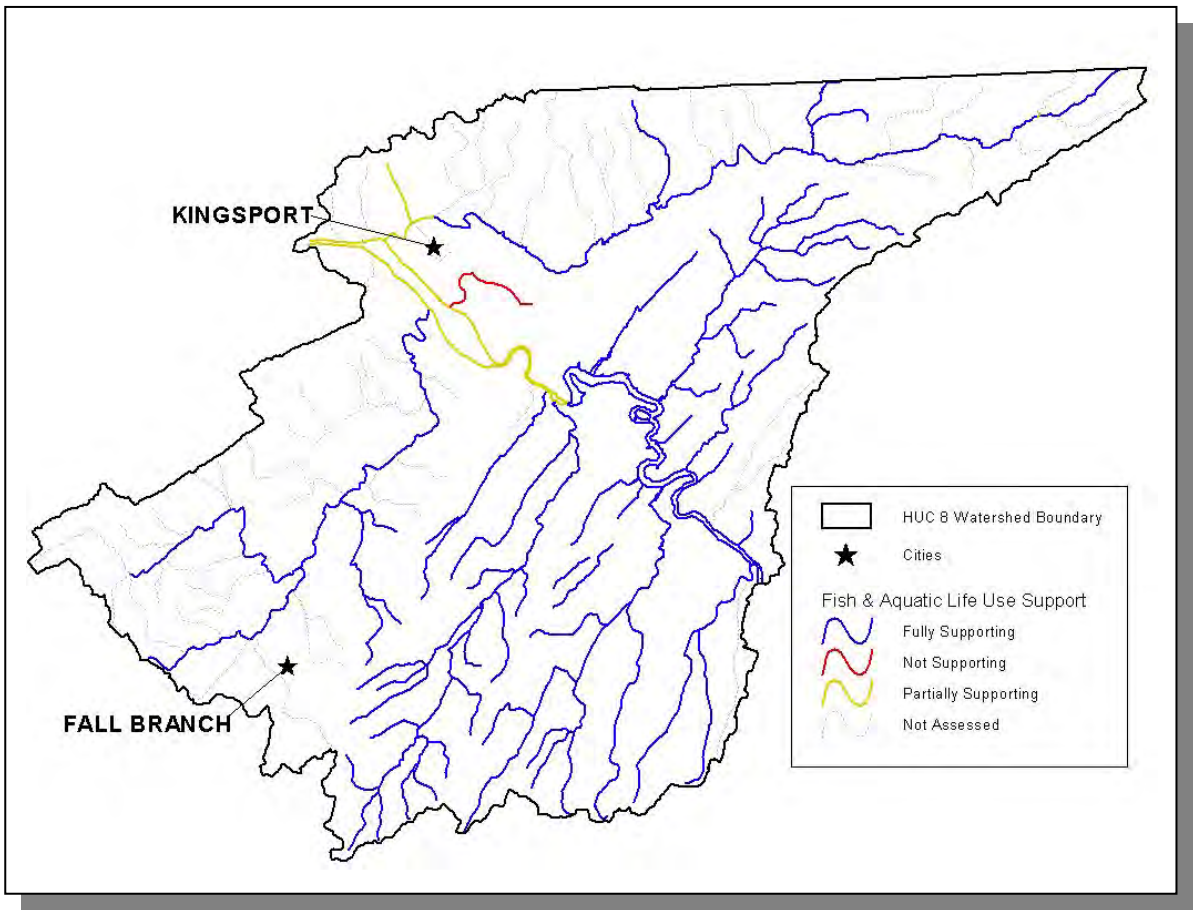


Figure 3-6b. Fish and Aquatic Life Use Support Attainment in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *Assessment data are based on the 2002 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Fall Branch and Kingsport are shown for reference. More information is provided in Appendix III.*

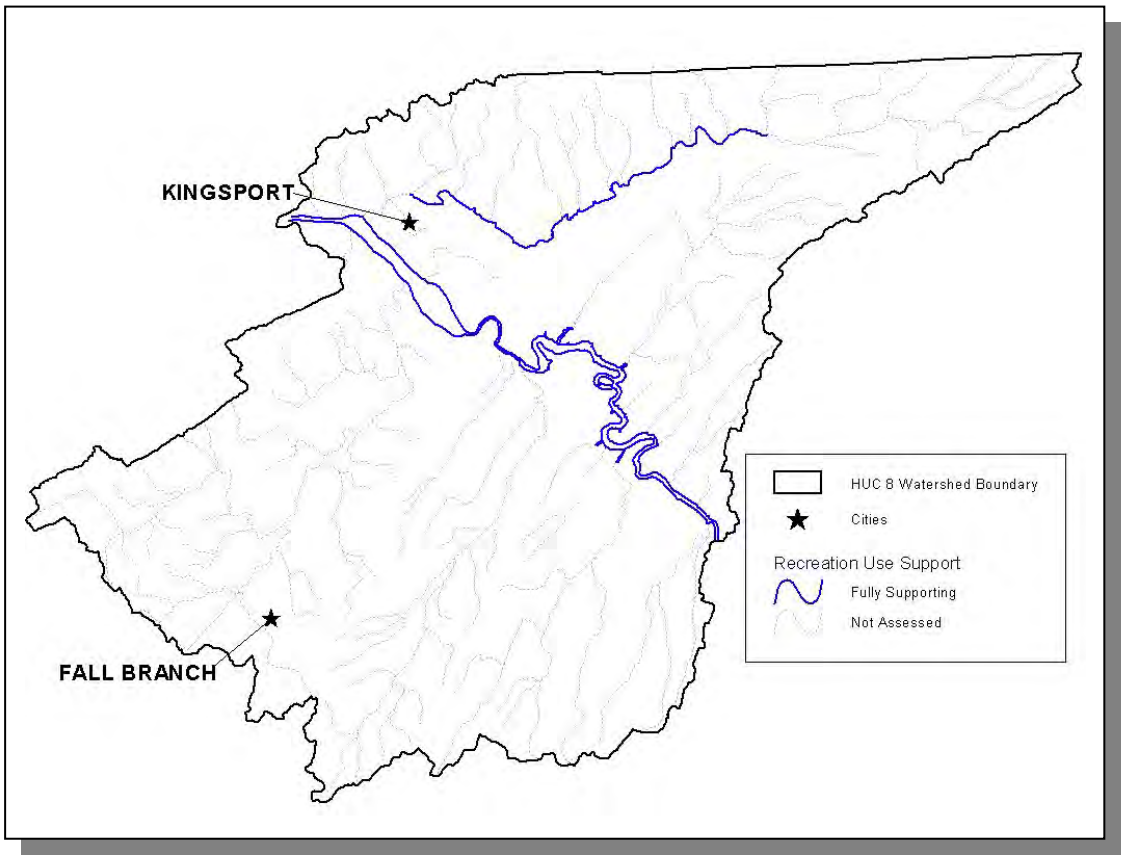


Figure 3-6c. Recreation Use Support Attainment in the Group 3 Portion of theTennessee Portion of the South Fork Holston River Watershed. *Assessment data are based on the 2002 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Fall Branch and Kingsport are shown for reference. More information is provided in Appendix III.*

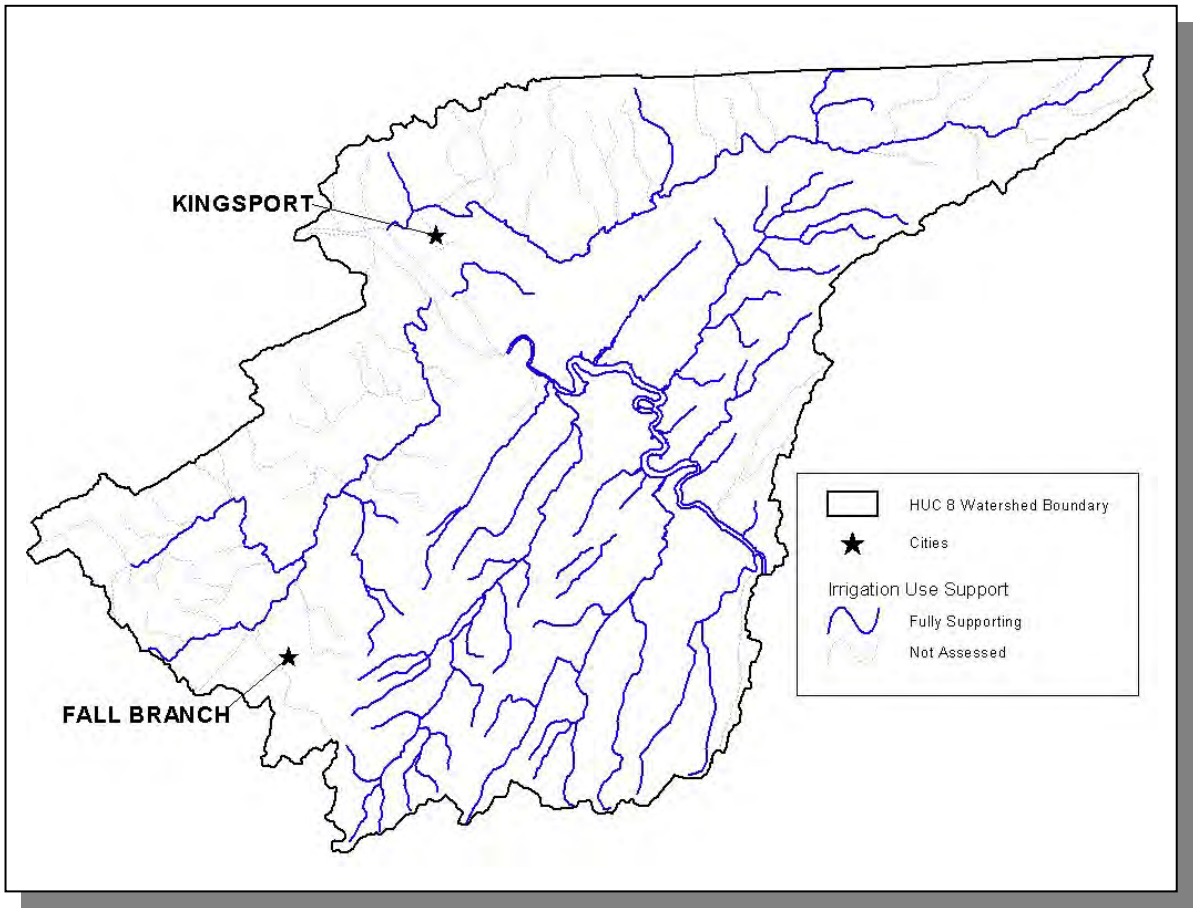


Figure 3-6d. Irrigation Use Support Attainment in the Group 3 Portion of theTennessee Portion of the South Fork Holston River Watershed. *Assessment data are based on the 2002 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Fall Branch and Kingsport are shown for reference. More information is provided in Appendix III.*

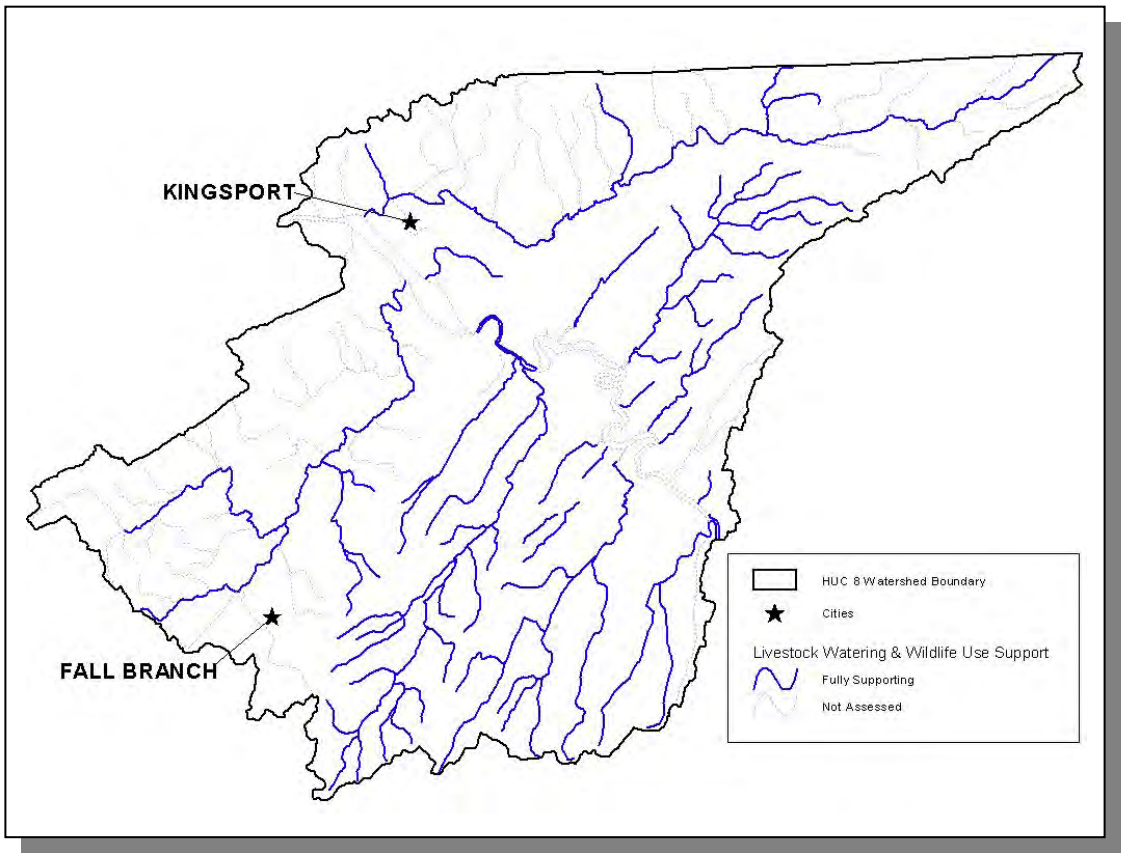


Figure 3-6e. Livestock Watering and Wildlife Use Support Attainment in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *Assessment data are based on the 2002 Water Quality Assessment. Water Quality Standards are described at http://www.state.tn.us/sos/rules/1200/1200-04/1200-04.htm. Locations of Fall Branch and Kingsport are shown for reference. More information is provided in Appendix III.*

3.3.B. Use Impairment Summary.

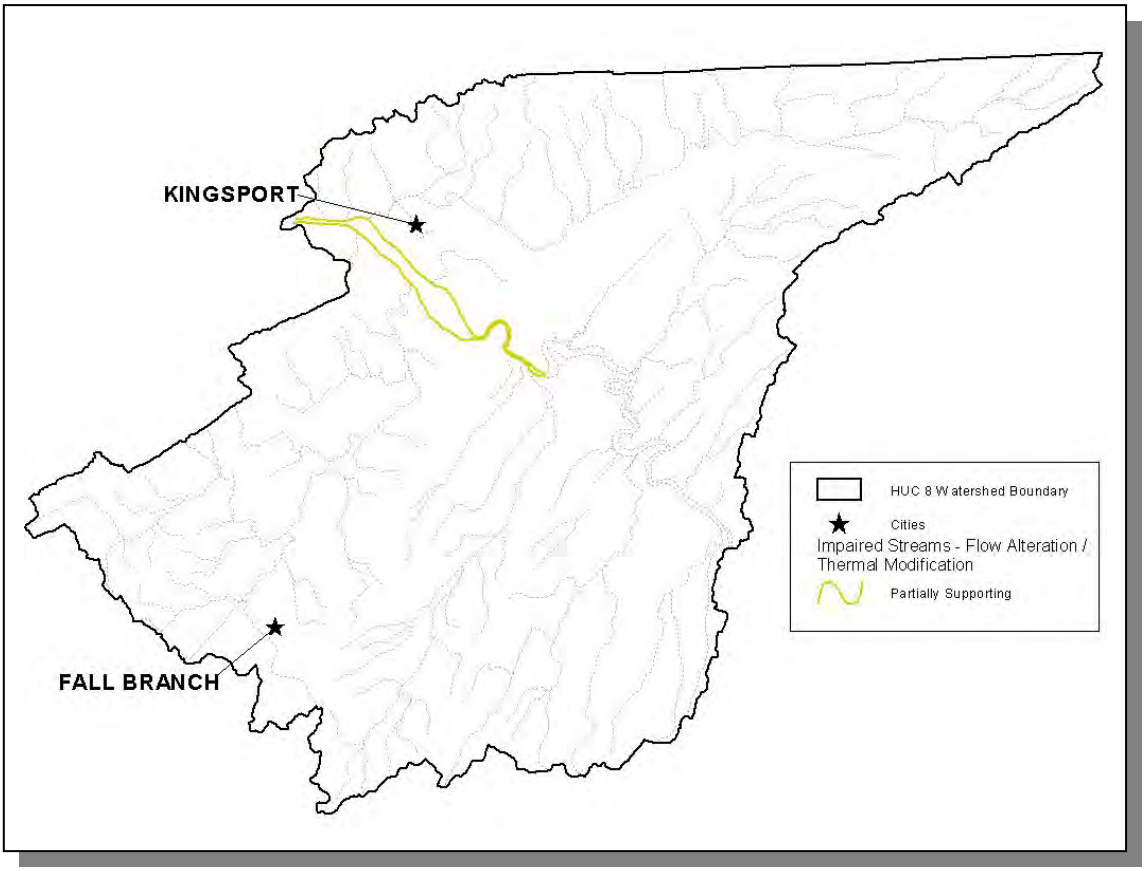


Figure 3-7a. Impaired Streams Due to Flow Alteration/Thermal Modification in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *Assessment data are based on the 2002 Water Quality Assessment. Locations of Fall Branch and Kingsport are shown for reference. More information is provided in Appendix III.*

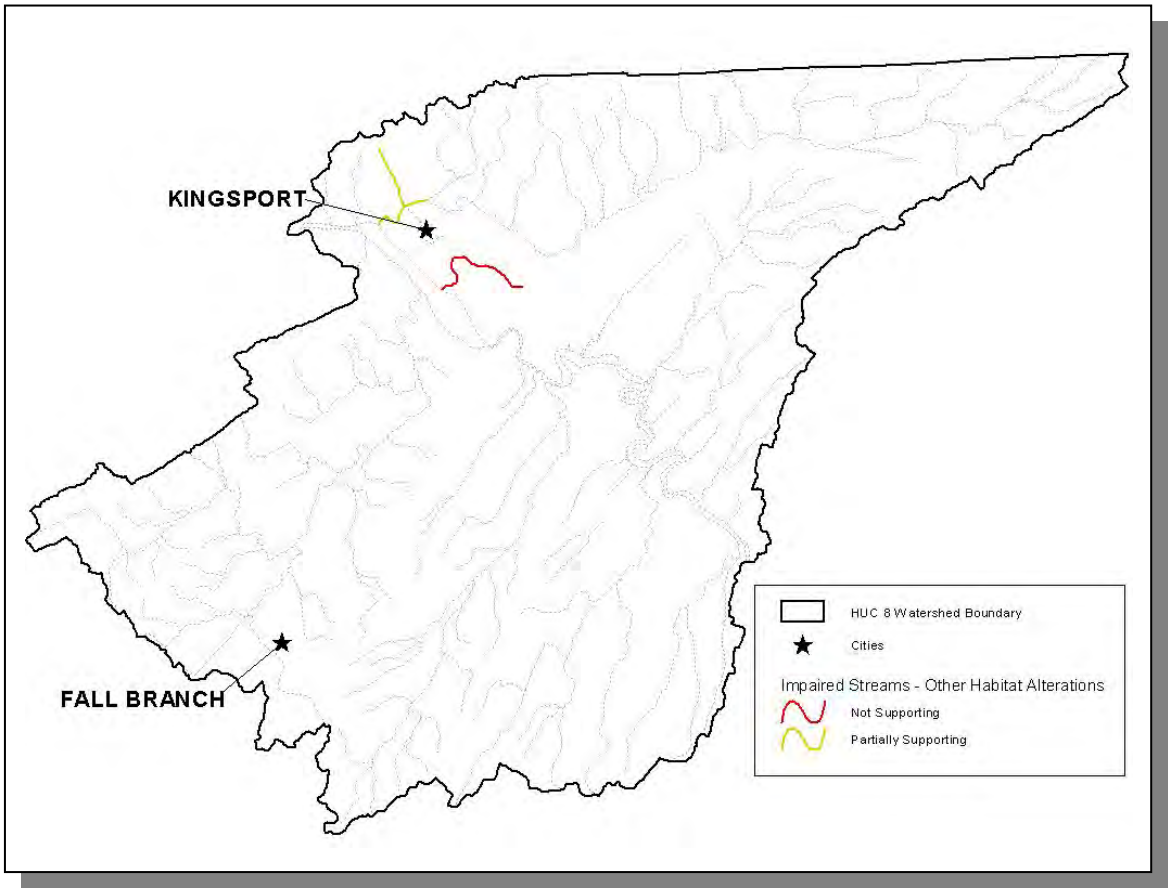


Figure 3-7b. Impaired Streams Due to Habitat Alterations in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *Assessment data are based on the 2002 Water Quality Assessment. Locations of Fall Branch and Kingsport are shown for reference. More information is provided in Appendix III.*

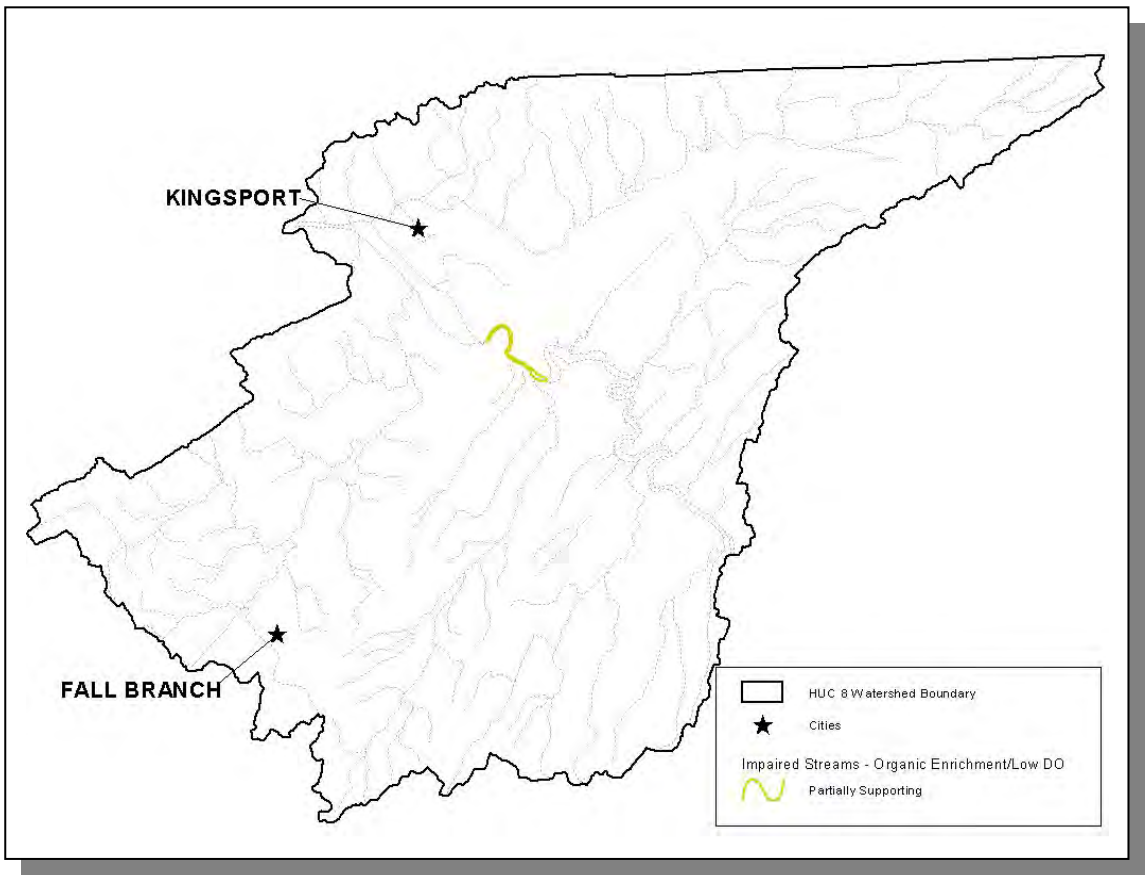


Figure 3-7c. Impaired Streams Due to Organic Enrichment or Low Dissolved Oxygen in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *Assessment data are based on the 2002 Water Quality Assessment. Locations of Fall Branch and Kingsport are shown for reference. More information is provided in Appendix III.*

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

Since the year 2002, the 303(d) list is compiled by using EPA's ADB (Assessment Database) software developed by RTI (Research Triangle Institute). The ADB allows for

a more detailed segmentation of waterbodies. While this results in a more accurate description of the status of water quality, it makes it difficult when comparing water quality assessments with and without using this tool. A more meaningful comparison will be between assessments 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,

CHAPTER 4

POINT AND NONPOINT SOURCE CHARACTERIZATION OF THE SOUTH FORK HOLSTON 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 2002 303(d) list
iii. Description of nonpoint source contributions

There is one HUC 10-digit subwatershed in the Tennessee portion of the Group 3 portion of the Tennessee portion of the Holston River Watershed (HUC 06010102).

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

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

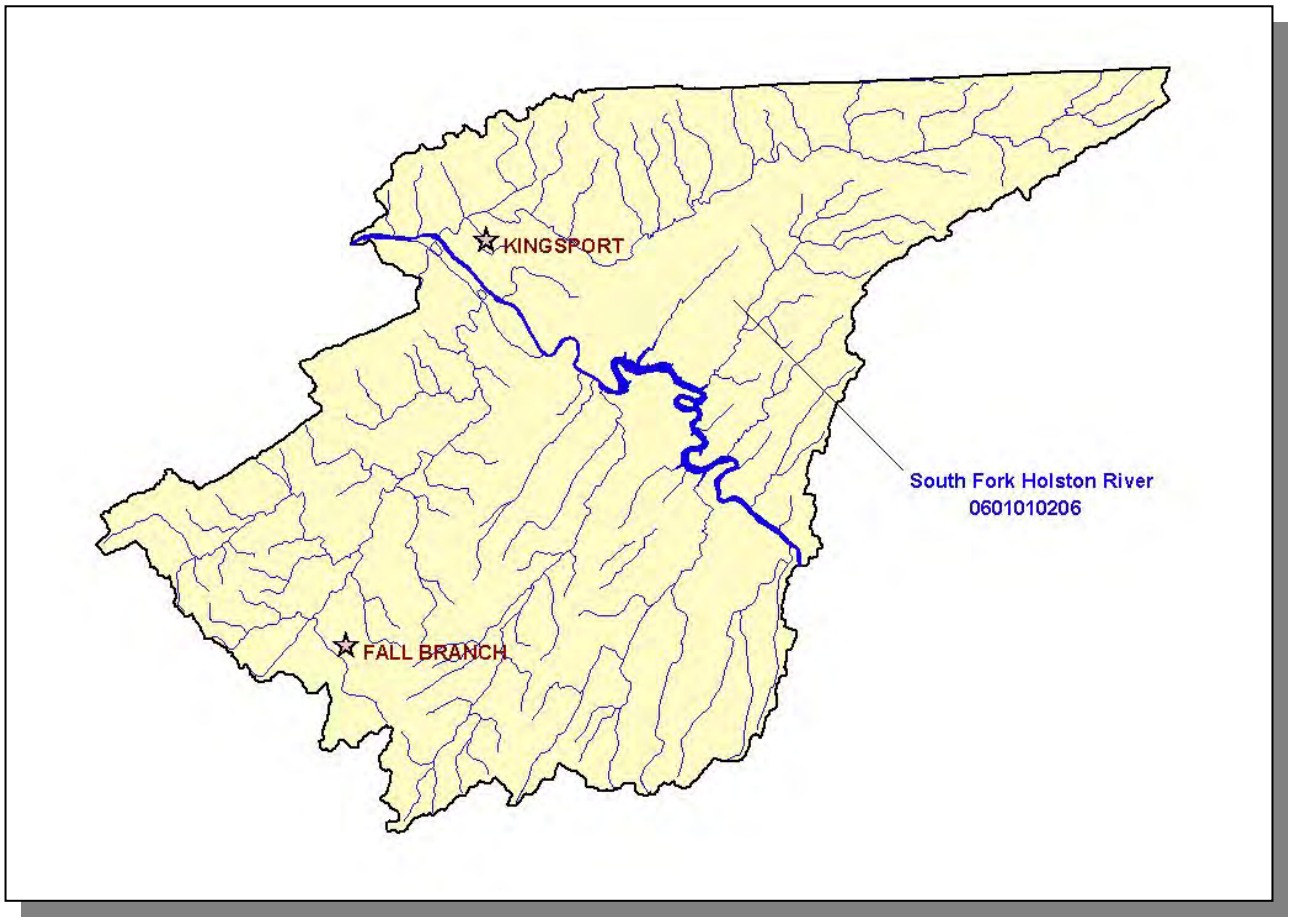


Figure 4-1. The Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed is Composed of one USGS-Delineated Subwatershed (10-Digit Subwatersheds). *Locations of Fall Branch and Kingsport are shown for reference.*

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 Group 3 portion of the Tennessee portion of the South Fork Holston River Watershed.

HUC-10	HUC-12
0601010206	060101020601 (Fort Patrick Henry Lake)
	060101020602 (South Fork Holston River)
	060101020603 (Horse Creek)
	060101020604 (Reedy 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. 0601010206 (South Fork Holston River).

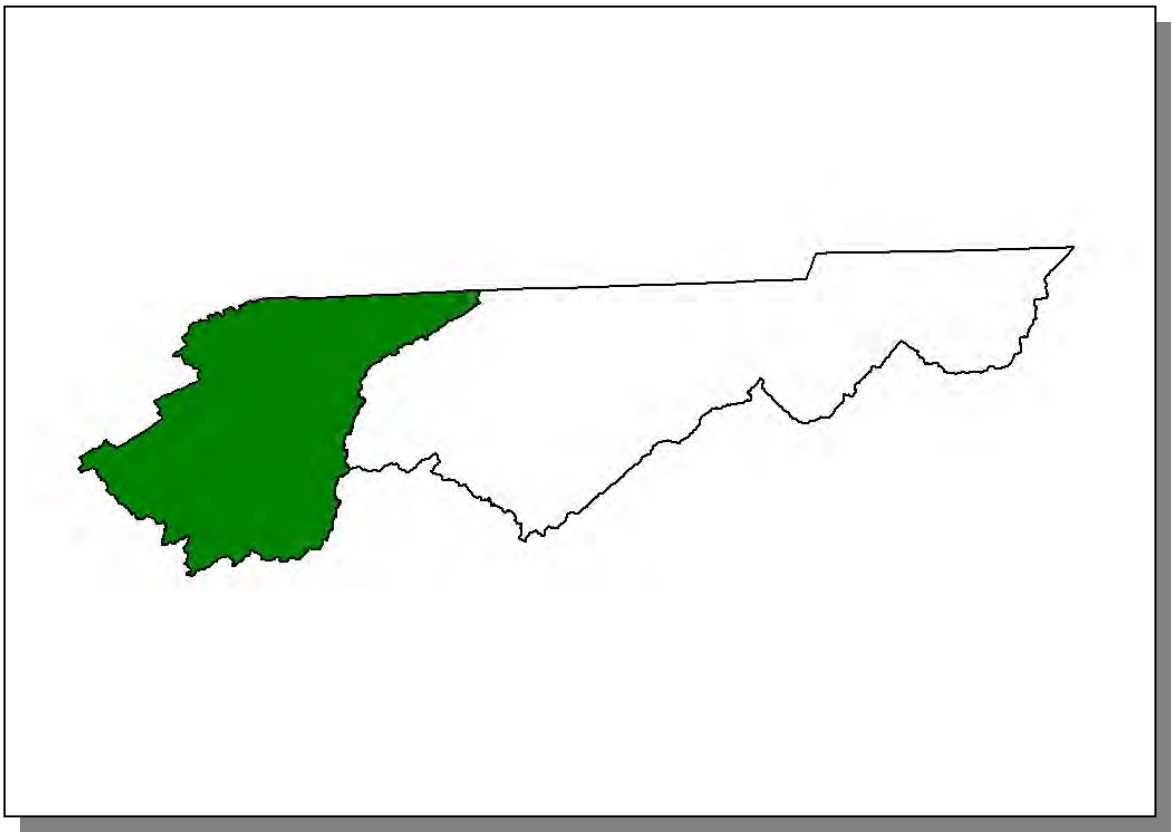


Figure 4-2. Location of the Group 3 Portion of the Tennessee Portion of the Subwatershed 0601010206. *The entire South Fork Holston River Watershed (HUC 8) boundary in Tennessee is shown for reference.*

4.2.A.i. General Description.

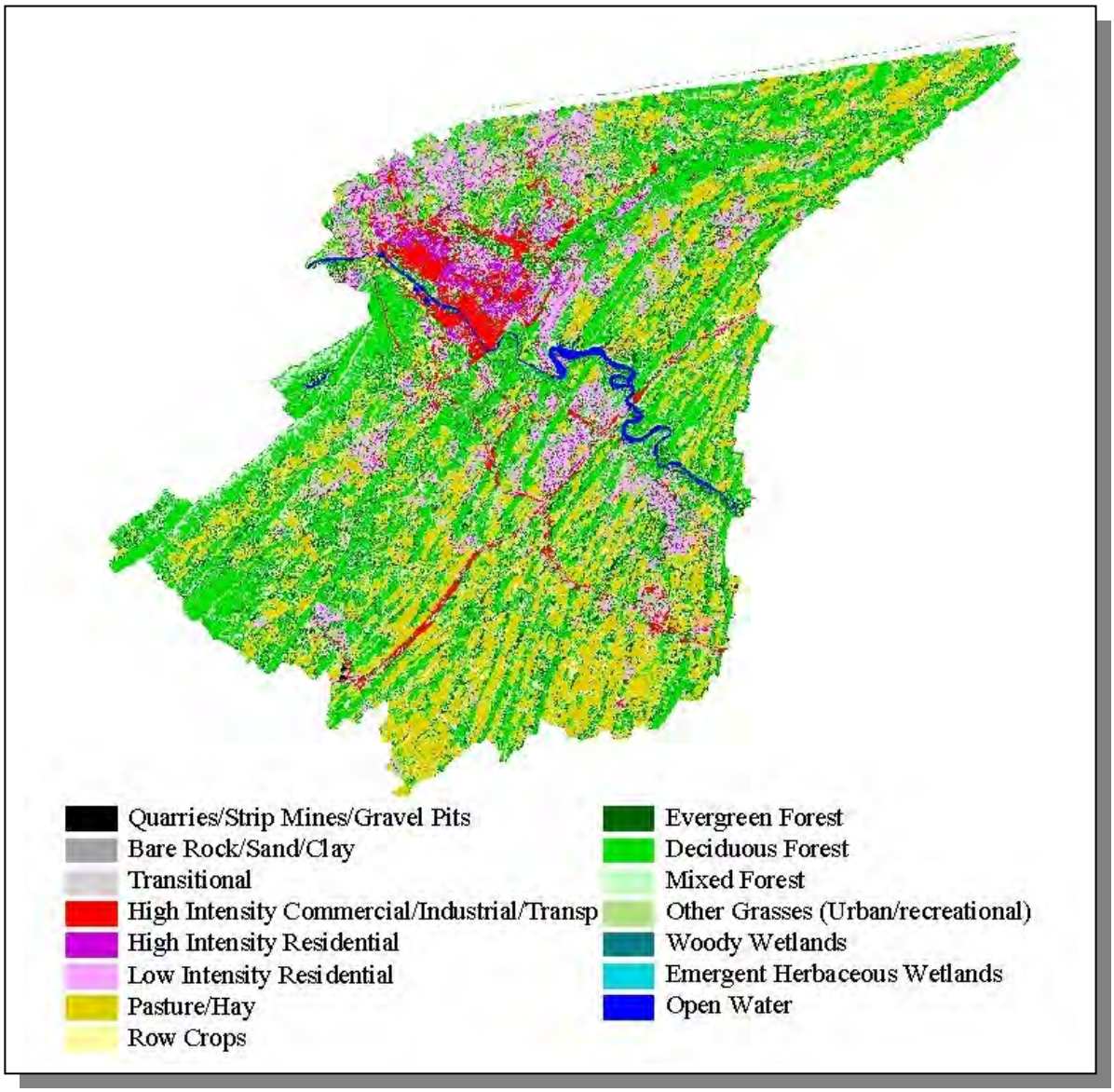


Figure 4-3. Illustration of Land Use Distribution in Subwatershed 0601010206.

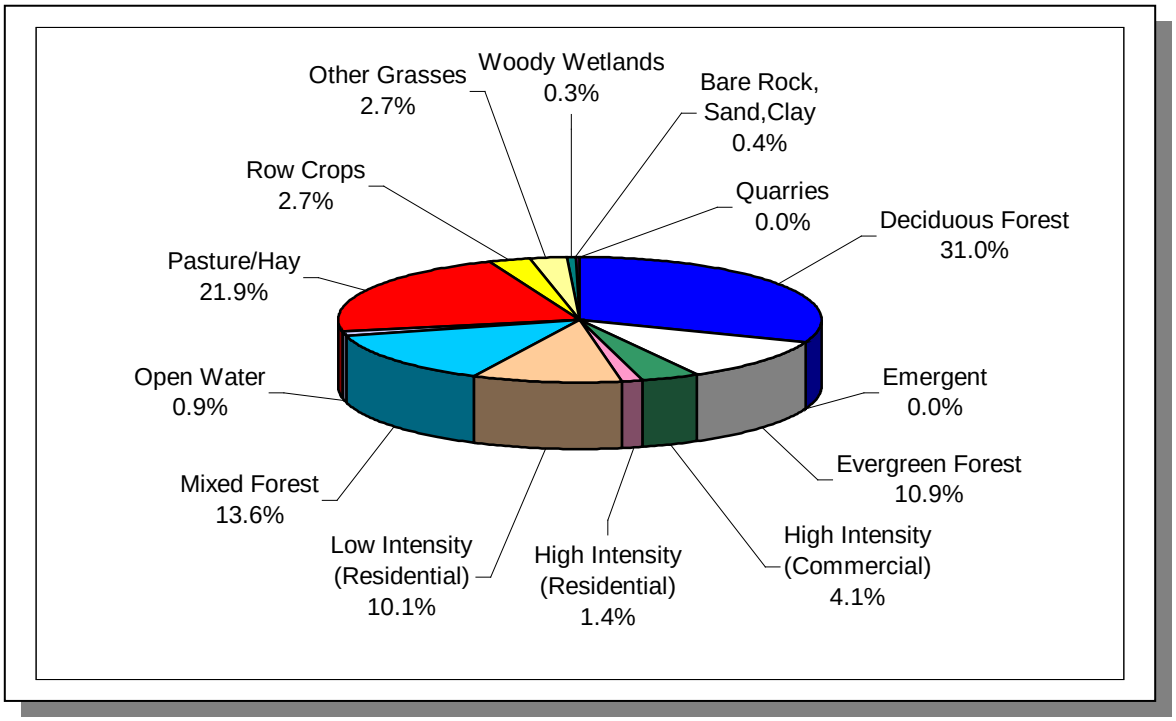


Figure 4-4. Land Use Distribution in Subwatershed 0601010206. *More information is provided in Appendix IV.*

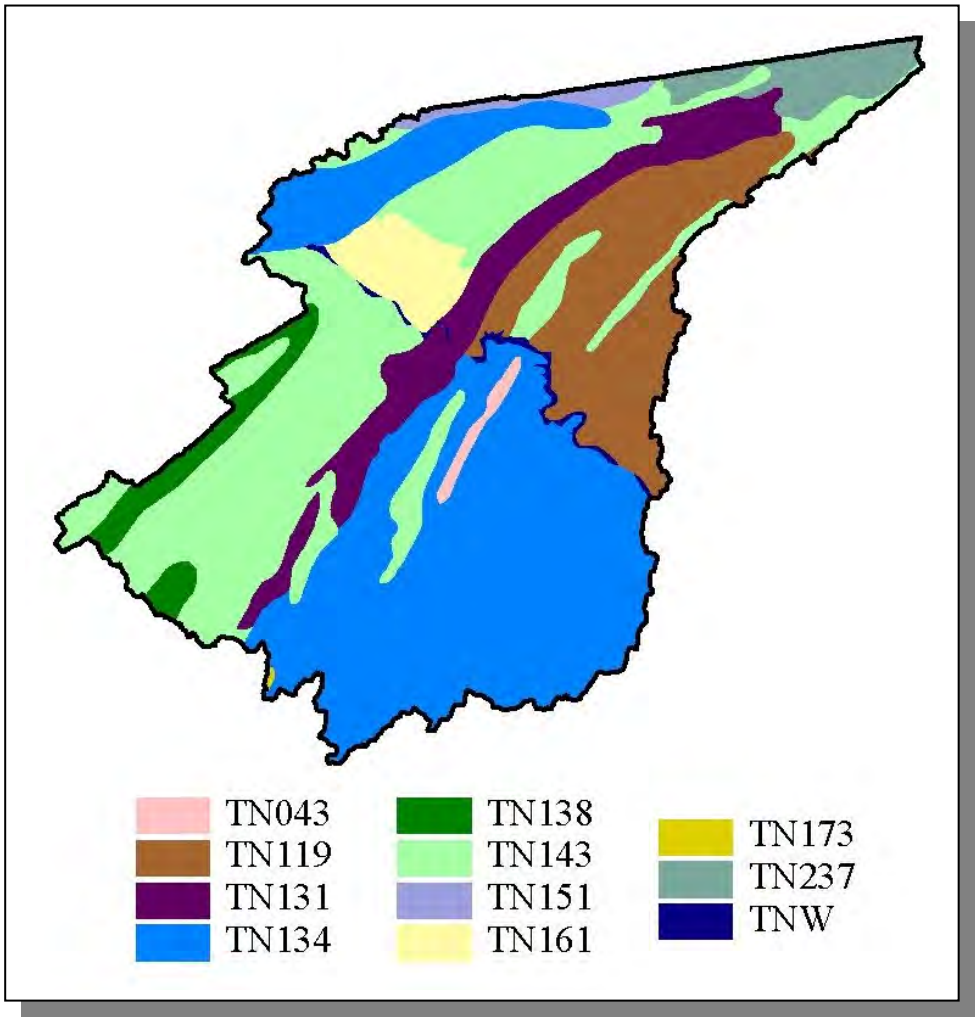


Figure 4-5. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0601010206.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN043	0.00	C	2.70	5.02	Loam	0.30
TN119	0.00	C	1.08	5.15	Loam	0.33
TN131	0.00	C	1.17	4.95	Silty Loam	0.33
TN134	0.00	B	1.38	5.18	Loam	0.31
TN138	0.00	C	2.48	4.26	Sandy Loam	0.22
TN143	0.00	C	1.22	6.44	Loam	0.32
TN151	0.00	C	2.88	4.75	Loam	0.40
TN161	6.00	C	1.41	5.11	Loam	0.31
TN173	0.00	C	0.56	2.26	Loam	0.14
TN237	0.00	B	3.36	5.40	Silty Loam	0.32

Table 4-2. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 0601010206. *More details are provided in Appendix IV.*

	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-1997)
Greene	55,853	59,369	62,909	0.09	53	56	60	13.2
Hawkins	44,565	48,821	53,563	0.37	166	182	200	20.5
Sullivan	143,596	150,371	153,048	33.8	48,540	50,831	51,736	6.6
Washington	92,315	101,368	107,198	13.6	12,558	13,789	14,582	16.1
Totals	**336,329**	**359,929**	**376,718**		**61,317**	**64,858**	**66,578**	**8.6**

Table 4-3. Population Estimates in Subwatershed 0601010206.

			NUMBER OF HOUSING UNITS			
Populated Place	County	Population	Total	Public Sewer	Septic Tank	Other
Johnson City	Washington	273	123	21	101	1
Kingsport	Sullivan	14,939	6,542	5,833	695	14
Totals		**15,212**	**6,665**	**5,854**	**796**	**15**

Table 4-4. Housing and Sewage Disposal Practices of Select Communities in Subwatershed 0601010206.

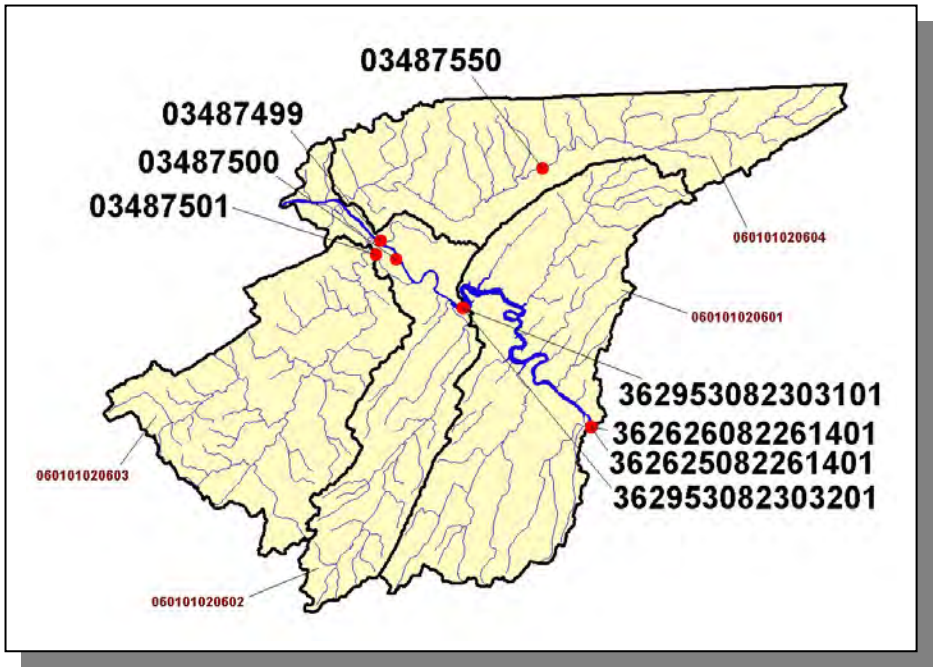


Figure 4-6. Location of Historical Streamflow Data Collection Sites in Subwatershed 0601010206. *Subwatershed 060101020601, 060101020602, 060101020603, and 060101020604 boundaries are shown for reference. More information, including site names and locations, is provided in Appendix IV.*

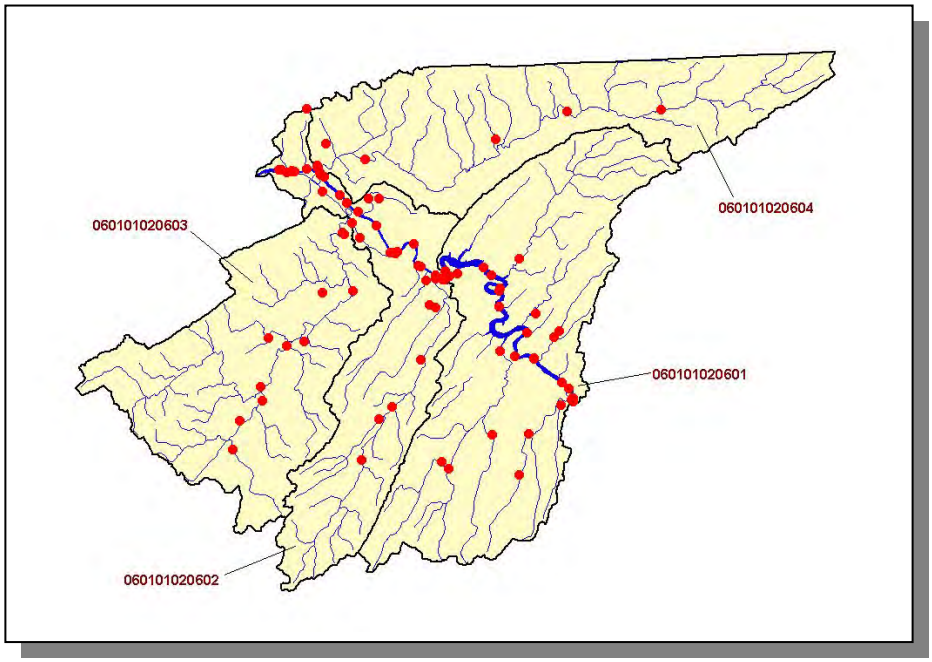


Figure 4-7. Location of STORET Monitoring Sites in Subwatershed 0601010206. *Subwatershed 060101020601, 060101020602, 060101020603, and 060101020604 boundaries are shown for reference. More information, including site names and locations, is provided in Appendix IV.*

4.2.A.ii Point Source Contributions.

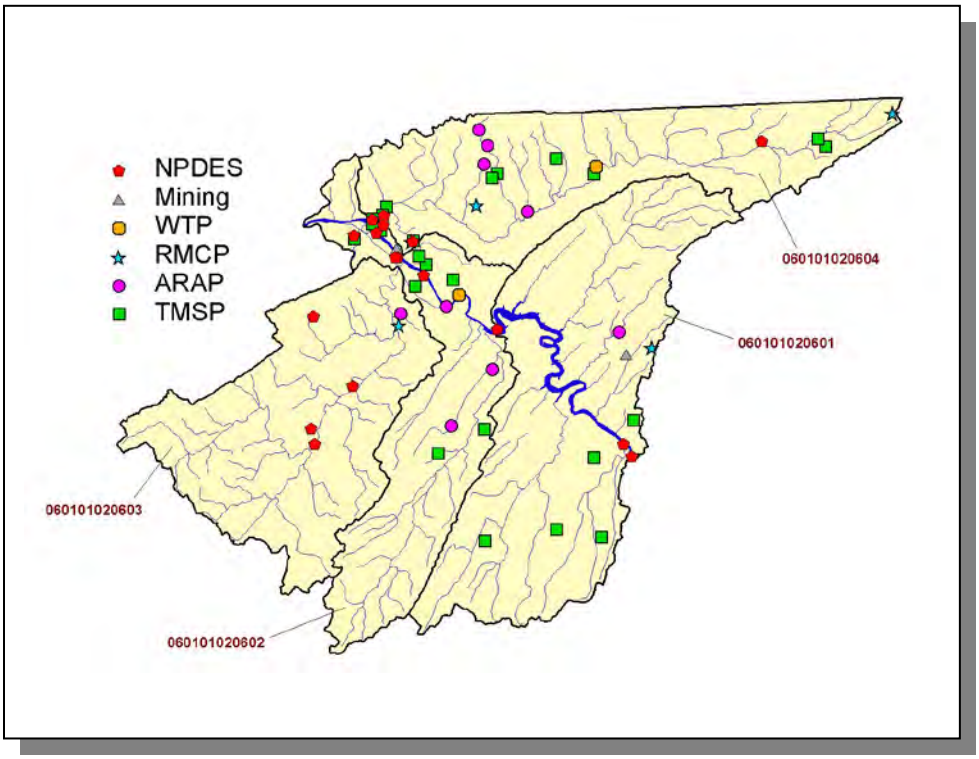


Figure 4-8. Location of Active Point Source Facilities in Subwatershed 0601010206. *Subwatershed 060101020601, 060101020602, 060101020603, and 060101020604 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.*

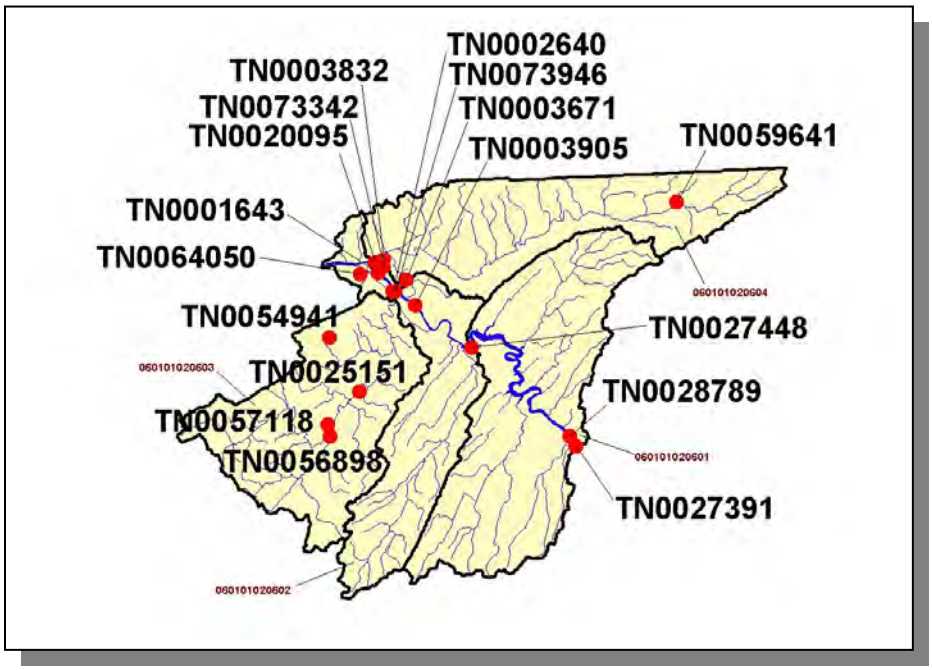


Figure 4-9. Location of NPDES Facilities in Subwatershed 0601010206. *Subwatershed 060101020601, 060101020602, 060101020603, and 060101020604 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.*

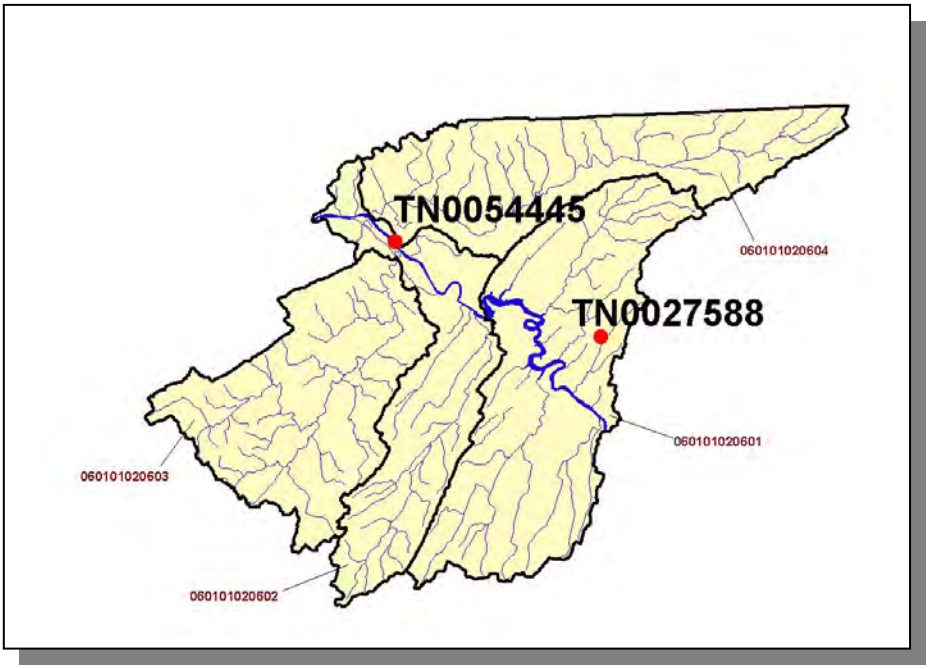


Figure 4-10. Location of Active Mining Facilities in Subwatershed 0601010206. *Subwatershed 060101020601, 060101020602, 060101020603, and 060101020604 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.*

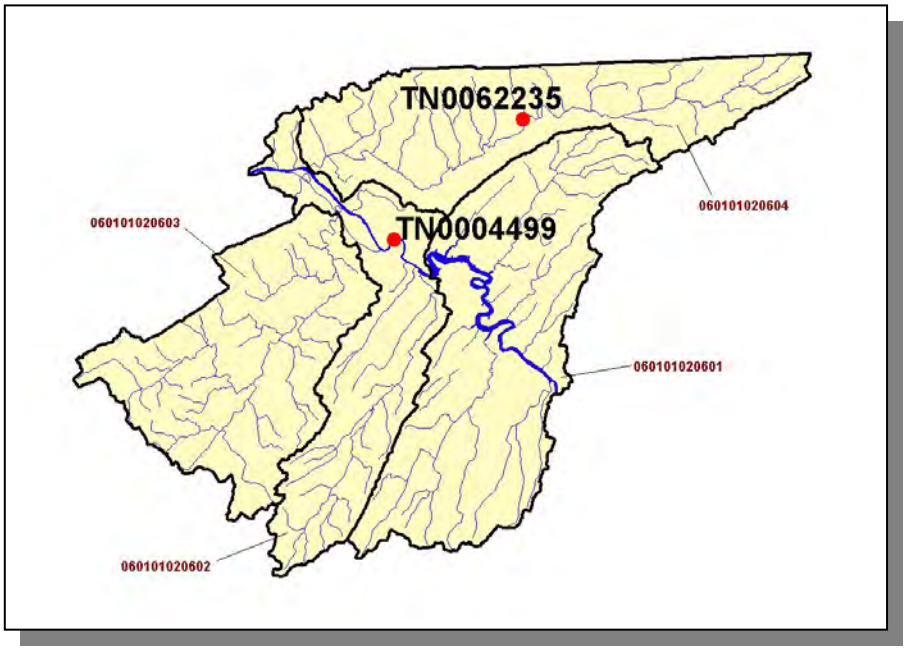


Figure 4-11. Location of Water Treatment Plants in Subwatershed 0601010206. *Subwatershed 060101020601, 060101020602, 060101020603, and 060101020604 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.*

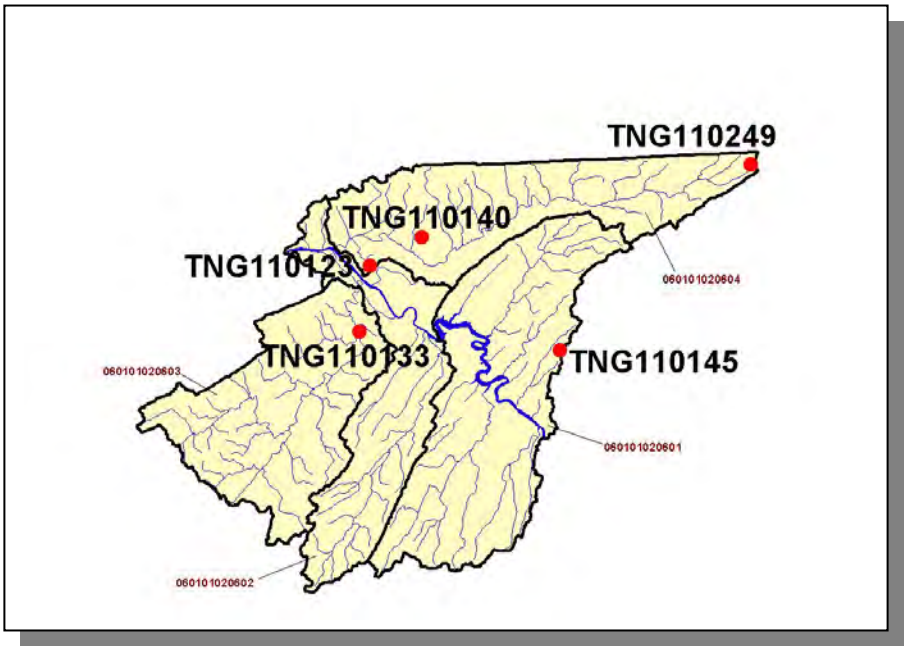


Figure 4-12. Location of Ready Mix Concrete Plants in Subwatershed 0601010206. *Subwatershed 060101020601, 060101020602, 060101020603, and 060101020604 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.*

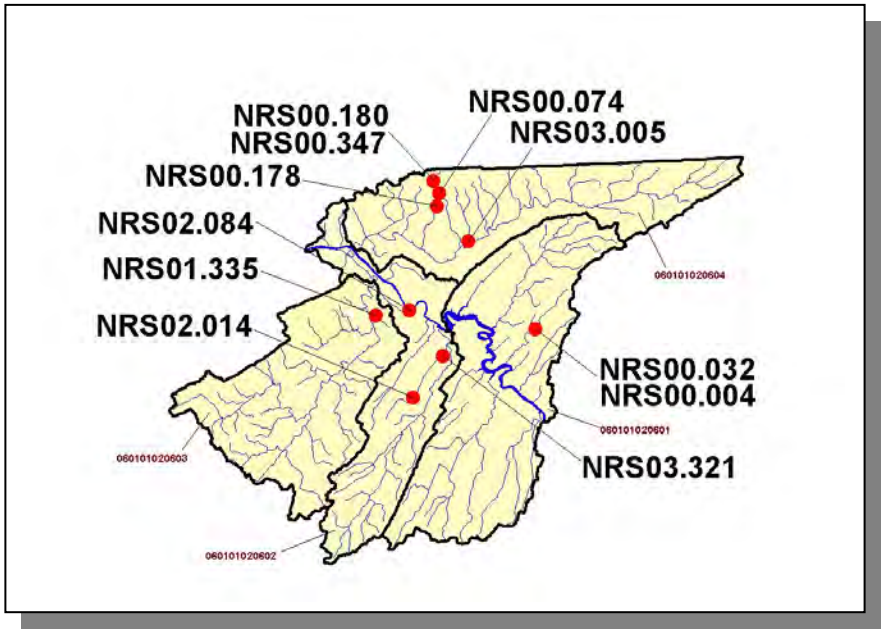


Figure 4-13. Location of ARAP Sites (Individual Permits) in Subwatershed 0601010206. *Subwatershed 060101020601, 060101020602, 060101020603, and 060101020604 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.*

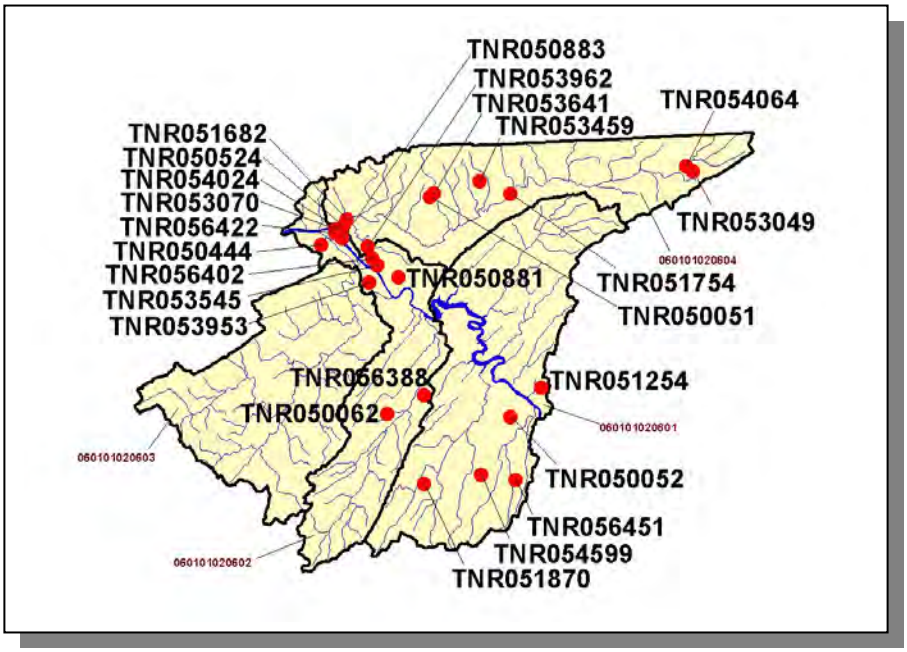


Figure 4-14. Location of TMSP Facilities in Subwatershed 0601010206. *Subwatershed 060101020601, 060101020602, 060101020603, and 060101020604 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.*

4.2.A.ii.a. Dischargers to Water Bodies Listed on the 2002 303(d) List

There are ten NPDES facilities discharging to water bodies listed on the 2002 303(d) list in Subwatershed 0601010206:

- TN0027448 (TVA Fort Patrick Henry Hydro Plant) discharges to Holston River @ RM 8.1
- TN0003905 (AFG Industries) discharges to South Fork Holston River @ RM 2.3 and Madd Branch to South Fork Holston River @ RM 4.3
- TN0003671 (BAE Systems Ordinance) discharges to South Fork Holston River, Holston River, and Madd Branch
- TN0073946 (Eastman Chemical Company B-280 Office Complex) discharges to Storm Sewer to South Fork Holston River
- TN0002640 (Tennessee Eastman Division) discharges to South Fork Holston River @ RM 142.2, Big Sluice of South Fork Holston River, and Horse Creek
- TN0003832 (Quebecor Printing) discharges to Storm Sewer to Reedy Creek @ RM 0.5
- TN0073342 (CEMEX, Inc.) dischages to Ditch to South Fork Holston River @ RM 2.5
- TN0001643 (Weyerhaeuser Company) discharges to South Fork Holston River @ RM 2.3
- TN0020095 (Kingsport STP) discharges to South Fork Holston River @ RM 2.2
- TN00645050 (Portola Packaging) discharges to South Fork Holston River Sluice @ RM 0.4

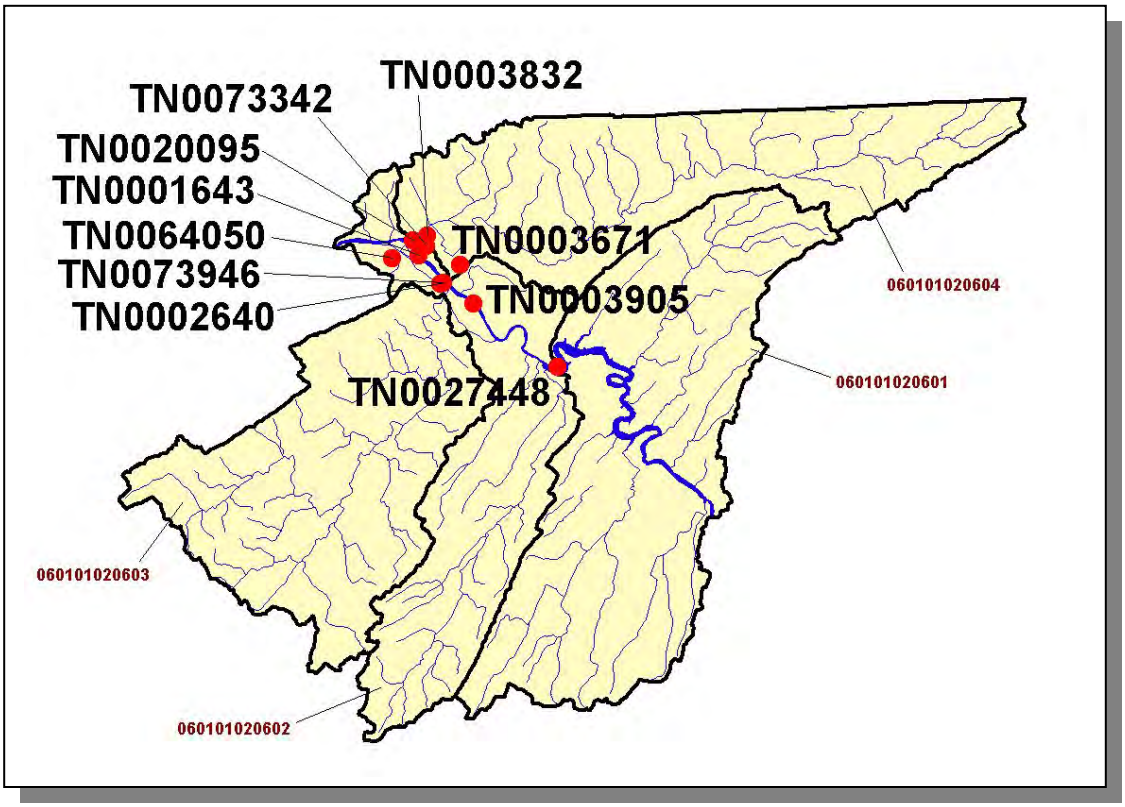


Figure 4-15. Location of NPDES Dischargers to Water Bodies Listed on the 2002 303(d) List in Subwatershed 0601010206. *Subwatershed 060101020601, 060101020602, 060101020603, and 060101020604 boundaries are shown for reference. More information, including the names of facilities, is provided in Appendix IV.*

PERMIT #	1Q10	3Q10	7Q10	3Q20	QDESIGN
TN0027448	441	469	494	444	
TN0003905	396	433	550	382	0.45/0.35
TN0003671	396	433	550	382	
TN0073946	441	469	494	444	
TN0002640	396	433	550	382	
TN0003832	4.73	5.20	5.52	3.16	
TN0073342	396	433	550	382	
TN0001643	396	433	550	382	
TN0020095	396	433	550	382	12.4
TN0064050	396	433	550	382	

Table 4-5. Receiving Stream Flow Information for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0601010206. *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 #	TSS	OIL and GREASE	pH	Zn	COD
TN003905	X	X			
TN0003671			X		
TN0003671	X				
TN0002640	X		X	X	
TN0003832					X

Table 4-6. Monitoring Requirements for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0601010206. *TSS, Total Suspended Solids; COD, Chemical Oxygen Demand.*

PERMIT #	WET	$CBOD_5$	COD	NH_3	NO_3	TRC	TSS	TDS	SETTLEABLE SOLIDS	CN	P	DO	pH
TN0027448							X						
TN0003905						X	X						X
TN0003671	X	X	X	X	X	X	X		X	X		X	X
TN0073946						X	X						X
TN0002640	X	X		X		X	X			X			X
TN0003832	X	X				X	X						X
TN0073342						X	X						X
TN0001643	X	X		X			X	X			X		
TN0020095		X				X	X		X			X	X
TN0064050						X							X

Table 4-7. Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0601010206. *WET, Whole Effluent Toxicity; $CBOD_5$, Carbonaceous Biochemical Oxygen Demand (5-Day); TRC, Total Residual Chlorine; TSS, Total Suspended Solids; COD, Chemical Oxygen Demand; TDS, Total Dissolved Solids.*

PERMIT #	Al	Cr	Cu	Pb	Ni	Zn	Fe
TN0003905	X						
TN0003671		X	X	X	X	X	
TN0002640		X	X	X	X	X	X

Table 4-8. Metals Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0601010206.

PERMIT #	FECAL COLIFORM	*E. COLI*
TN0003671	X	X
TN0020095	X	X

Table 4-9. Pathogens Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0601010206.

PERMIT #	OIL and GREASE	PCB
TN0027448		X
TN0003905	X	
TN0003832	X	
TN0073342	X	

Table 4-10. Organic Parameters Monitored for Daily Maximum Limits for NPDES Dischargers to Waterbodies Listed on the 2002 303(d) List in Subwatershed 0601010206.

4.2.A.iii. Nonpoint Source Contributions.

LIVESTOCK (COUNTS)						
Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Chickens (Broilers Sold)	Hogs	Sheep
12,460	28,189	2,123	25	48,458	127	141

Table 4-11. Summary of Livestock Count Estimates in Subwatershed 0601010206. *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)
Greene	180.0	171.8	2.0	10.5
Hawkins	177.4	177.4	0.4	2.1
Sullivan	123.7	123.7	0.1	0.3
Washington	54.8	50.3	0.3	0.2
Total	**535.9**	**523.2**	**2.8**	**13.1**

Table 4-12. Forest Acreage and Annual Removal Rates (1987-1994) in Subwatershed 0601010206.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.18
Legumes (Hayland)	0.16
Grass (Hayland)	0.42
Grass, Forbs, Legumes (Mixed Pasture)	1.61
Forest Land (Not Grazed)	0.00
Forest Land (Grazed)	0.00
Corn (Row Crops)	8.20
Tobacco (Row Crops)	3.62
Non-Agricultural Land Use	0.00
Other Land in Farms	0.02
Farmsteads and Ranch Headquarters	0.32

Table 4-13. Annual Estimated Total Soil Loss in Subwatershed 0601010206.

CHAPTER 5

WATER QUALITY PARTNERSHIPS IN THE SOUTH FORK HOLSTON 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 Group 3 portion of the Tennessee portion of the South Fork Holston River Watershed. The information presented is provided by the agencies and organizations described.

5.2. FEDERAL PARTNERSHIPS.

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

Performance Results System (PRS) is a Web-based database application providing USDA Natural Resources Conservation Service, conservation partners, and the public fast and easy access to accomplishments and progress toward strategies and performance. The PRS may be viewed at http://prms.nrcs.usda.gov/prs. From the opening menu, select "Reports" in the top tool bar. Next, select "2004 Reports" if it's active, and "2003 PRMS Reports" if it's not. Pick the conservation treatment of interest on the page that comes up and reset the date to 2004 Reports if it is not set there. Pick the conservation practice of interest. In the location drop box of the page that comes up, select "Tennessee" and click on the "Refresh" button. In the "By" drop box that comes up, select "Hydrologic Unit" and click on the "Refresh" button. The report of interest can now be viewed.

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	
	FEET	ACRES
Comprehensive Nutrient Management Plans		78
Pest Management		935
Grazing/Forages Practices		436

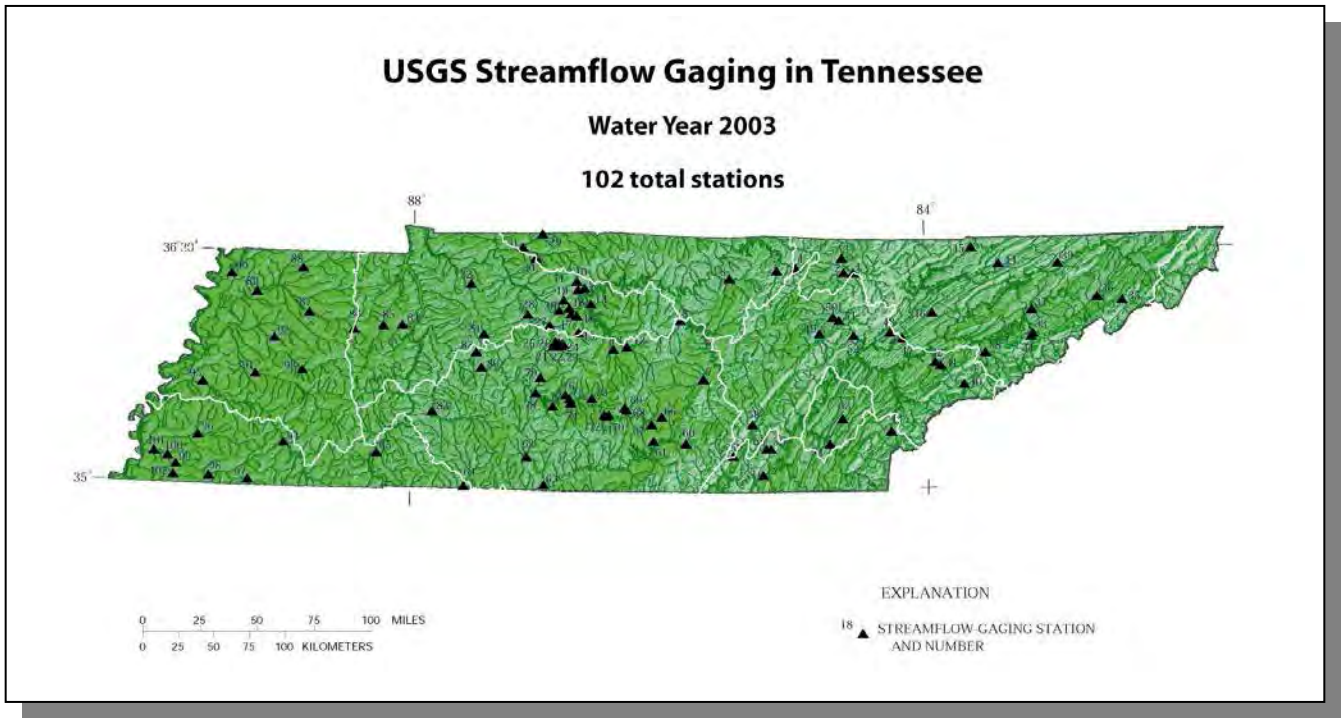
Table 5-1. Landowner Conservation Practices in Partnership with NRCS in the Tennessee Portion of the South Fork Holston River Watershed. *Data are from PRMS for October 1, 2003 through September 30, 2004 reporting period. More information is provided in Appendix V.*

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 102 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/). For specific information on the Upper and Lower Tennessee NAWQA studies, please visit http://tn.water.usgs.gov/lten/tenn.html

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 Tennessee, please visit the Service's website at http://www.fws.gov/cookeville/.

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

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

In an effort to preclude the listing of a rare species, the Service engages in proactive conservation efforts for unlisted species. The program covers not only formal candidates, but also 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 that benefit native fishes and wildlife. The

program adheres to the concept that restoring or enhancing habitats such as wetlands or other unique habitat types will substantially benefit federal trust species on private lands by providing food and cover or other essential needs. Federal trust species include threatened and endangered species, as well as migratory birds (e.g. waterfowl, wading birds, shorebirds, neotropical migratory songbirds).

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

The Service is actively involved with the Smoky Mountain Resource Conservation and Development District and private landowners in the South Fork Holston River watershed to protect riparian habitats. Specific projects have included the installation of livestock exclusion fencing and alternate water supply sources.

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 Tennessee Ecological Services Field Office at (931)-528-6481 or visit their website at http://www.fws.gov/cookeville/.

5.2.D. Tennessee Valley Authority (TVA). TVA's goals for the 21st century are 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. TVA has 7 multidisciplinary Watershed Teams to help communities across the Tennessee Valley actively develop and implement protection and restoration activities in their local watersheds. 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. 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 South Fork Holston watershed.

Monitoring

Reservoir Monitoring

Reservoir Ecological Health: TVA's Reservoir Ecological Health Monitoring program is designed to provide the necessary information from five key ecological indicators (dissolved oxygen, chlorophyll, fish community, bottom life, and sediment contaminants [PCBs, Pesticides, and Metals]) to evaluate current conditions, provide data for comparing future water quality conditions, and provide for assessments as needed for current and future operations and development.

A part of this monitoring program has been to communicate the data in an easily understandable format. TVA's approach has been to use a Reservoir Ecological Health Score. The ecological health scoring process is designed such that results from each of the five indicators are evaluated based on TVA's reservoir evaluation system and assigned a rating ranging from 1 (poor) to 5 (excellent). To arrive at an overall health evaluation for a reservoir, the sum of the ratings from all sites are totaled, divided by the maximum possible rating for that reservoir, and expressed as a percentage.

TVA monitors ecological conditions at 69 sites on 31 reservoirs. TVA monitored the quality of water resources in Fort Patrick Henry Reservoir annually from 1993 through 1997 to establish baseline data on the reservoir's ecological health under a range of weather and flow conditions. Fort Patrick Henry is now monitored every other year. Monitoring is conducted at the forebay near Fort Patrick Henry Dam (SFHRM 8.2).

The following chart present Reservoir Ecological Health scores for each year for which data are comparable.

The good rating in 2003 was a slight improvement over previous years. The main issues in Fort Patrick Henry are consistent from year to year—generally high chlorophyll concentrations and fair to poor ratings for fish, bottom life and sediment. Average chlorophyll concentrations in 2003 were the lowest to date and rated good for the first time. Chlorophyll has typically rated poor.

Figure 5-1. Vital Signs Monitoring for Fort Patrick Henry Reservoir (1994-2003)

Public and Industrial Water Supplies: Adequate water of good quality is essential for sustained population growth and economic development. In conjunction with routine water quality monitoring efforts conducted as part of Reservoir Ecological Health Monitoring, TVA collects additional water samples to be analyzed for parameters of interest to public and industrial water supplies. The purpose of these additional collections is to provide data for use in siting new water supply facilities and determining appropriate design for treatment components. Also, data are available to domestic water suppliers to assist in water treatment operations and diagnosis of abnormal conditions. By combining with routine monitoring, TVA can make these valuable data available to others and incur only the incremental cost associated with laboratory analyses.

More information about Reservoir Ecological Health Monitoring on Fort Patrick Henry Reservoir can be obtained by contacting Tyler Baker at (423)-876-6733) or tfbaker@tva.gov or http://www.tva.gov .

Bacteriological Monitoring: Recreation is one of TVA's major objectives of the integrated river resource management system. TVA develops, maintains, and promotes public use of several recreational sites. Increased public knowledge about bacterial contamination has heightened the interest in bacteriological levels in recreational waters by both TVA and our stakeholders. Each summer, about 250 swimming areas and informal water contact recreational sites throughout the Tennessee Valley are tested for fecal coliform and/or Escherichia coli (*E. coli*) bacteria by TVA's Resource Stewardship. These sites include those operated by TVA and many operated by other agencies. The site list is reexamined annually by the appropriate watershed teams and other TVA organizations

to ensure the most heavily used sites are monitored. Bacteriological water sampling is conducted between Memorial Day and Labor Day when people are most likely to be recreating. Data from this sampling effort is shared in a timely manner with TDEC's Division of Water Pollution Control.

There are no state advisories against swimming in Fort Patrick Henry Reservoir. *E. coli* bacteria levels in samples collected on the reservoir in 2003 were within the state of Tennessee's guidelines for water contact. The locations sampled were Warrior Path State Park beach, Warrior Path Marina boat ramp, and Warrior Path State informal swim area on Duck Island.

Fish Flesh Toxic Contaminants: State agencies are responsible for advising the public of health risks from eating contaminated fish. TVA assists the states by collecting fish from TVA reservoirs and checking the tissue for metals, pesticides, PCBs, and other chemicals that could affect human health. There are no fish consumption advisories on Fort Patrick Henry Reservoir. The last time TVA sampled channel catfish and largemouth bass from Fort Patrick Henry Reservoir was in autumn 2001. All contaminant levels were either below detectable levels or below the levels used by the state of Tennessee to issue fish consumption advisories. TVA will analyze fish from Fort Patrick Henry again in the autumn of 2005.

More information on bacteriological and fish tissue monitoring on Fort Patrick Henry Reservoir can be obtained by contacting Rebecca Hallman at (423)876-6736 or rlhallman@tva.gov or http://www.tva.gov .

Stream Bioassessment

Condition of water resources in South Fork Holston watershed streams is 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 (structure of the food chain), fish abundance, and fish health. Each metric reflects the condition of one aspect of the fish assemblage and is scored against reference streams in the region 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	IBI Range
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 - The number and types of aquatic insects, like fish, 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 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

Sample Site Selection - EPT sampling and fish community assessment (IBI) are conducted at the same sites. Site selection is governed primarily by study objectives, stream physical features, and stream access. TVA's objective is to characterize the quality of water resources within a watershed (11-digit hydrologic unit). Sites are typically located in the lower end of sub-watersheds and at intervals on the mainstem to integrate the effects of land use. A total of 3 sites are sampled in the South Holston drainage. These sites are typically sampled every five years to keep a current picture of watershed condition.

Details about stream bioassessment sampling sites and scores can be obtained by writing Charles Saylor at Tennessee Valley Authority, PO Box 920, Ridge Way Road, Norris, TN 37828 or calling him at 865-632-1779. Email address is cfsaylor@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 and safe 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 Fort Patrick Henry Reservoir began in 2000. Materials were distributed at local marinas that expressed an interest in the program and at public access areas. TVA plans to continue this partnership in upcoming years by working with the marinas and Friends of Fort Patrick Henry.

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

Friends of Fort Patrick Henry is an organization dedicated to improving water quality in Fort Patrick Henry Reservoir. The group is made up of property owners, citizens, and local government agencies. Cleanups are held several times a year. For further information, contact Harry Miles at 423-239-8242, or hmiles@chartertn.net

The Holston River Watershed Alliance was established in February 2000 by TVA and has developed a shared vision for improved water quality for the greater Kingsport area. For information on how to become involved in this partnership effort, contact Sam Jones (Chairman) 423-239-8225 or Liesa Jenkins 423-246-2017.

Protection and Restoration Activities

TVA provides funding and technical assistance for protection and restoration activities to various organizations in the South Fork Holston River Watershed. TVA supports the Keep Kingsport Beautiful Team in all of its Keep America Beautiful endeavors. TVA supported the 4th Annual Fort Patrick Henry Lake Cleanup during 2004. Additional cleanups were conducted on Transbarger Branch, Madd Branch, and Reedy Creek. A shoreline stabilization project was completed at Warriors' Path State Park on Fort Patrick Henry Reservoir.

5.3. STATE PARTNERSHIPS.

5.3.A. TDEC Division of Water Supply. The Source Water Protection Program, authorized by the 1996 Amendments to the Safe Drinking Water Act, outline a comprehensive plan to achieve maximum public health protection. According to the plan, it is essential that every community take these six steps:

1) Delineate the drinking water source protection area
2) Inventory known and potential sources of contamination within these areas
3) Determine the susceptibility of the water supply system to these contaminants
4) Notify and involve the public about threats identified in the contaminant source inventory and what they mean to their public water system
5) Implement management measures to prevent, reduce or eliminate threats
6) Develop contingency planning strategies to deal with water supply contamination or service interruption emergencies (including natural disaster or terrorist activities).

Source water protection has a simple objective: to prevent the pollution of the lakes, rivers, streams, and ground water (wells and springs) that serve as sources of drinking water before they become contaminated. This objective requires locating and addressing potential sources of contamination to these water supplies. There is a growing recognition that effective drinking water system management includes addressing the quality and protection of the water sources.

Source Water Protection has a significant link with the Watershed Management Program goals, objectives and management strategies. Watershed Management looks at the health of the watershed as a whole in areas of discharge permitting, monitoring and protection. That same protection is important to protecting drinking water as well. Communication and coordination with a multitude of agencies is the most critical factor in the success of both Watershed Management and Source Water Protection.

Watershed management plays a role in the protection of both ground water and surface water systems. Watershed Management is particularly important in areas with karst (limestone characterized by solution features such as caves and sinkholes as well as disappearing streams and spring), since the differentiation between ground water and surface water is sometimes nearly impossible. What is surface water can become ground water in the distance of a few feet and vice versa.

Source water protection is not a new concept, but an expansion of existing wellhead protection measures for public water systems relying on ground water to now include surface water. This approach became a national priority, backed by federal funding, when the Safe Drinking Water Act amendments (SDWA) of 1996 were enacted. Under this Act, every public drinking water system in the country is scheduled to receive an assessment of both the sources of potential contamination to its water source of the threat these sources may pose by the year 2003 (extensions were available until 2004). The assessments are intended to enhance the protection of drinking water supplies within existing programs at the federal, state and local levels. Source water assessments were mandated and funded by Congress. Source water protection will be

left up to the individual states and local governments without additional authority from Congress for that progression.

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

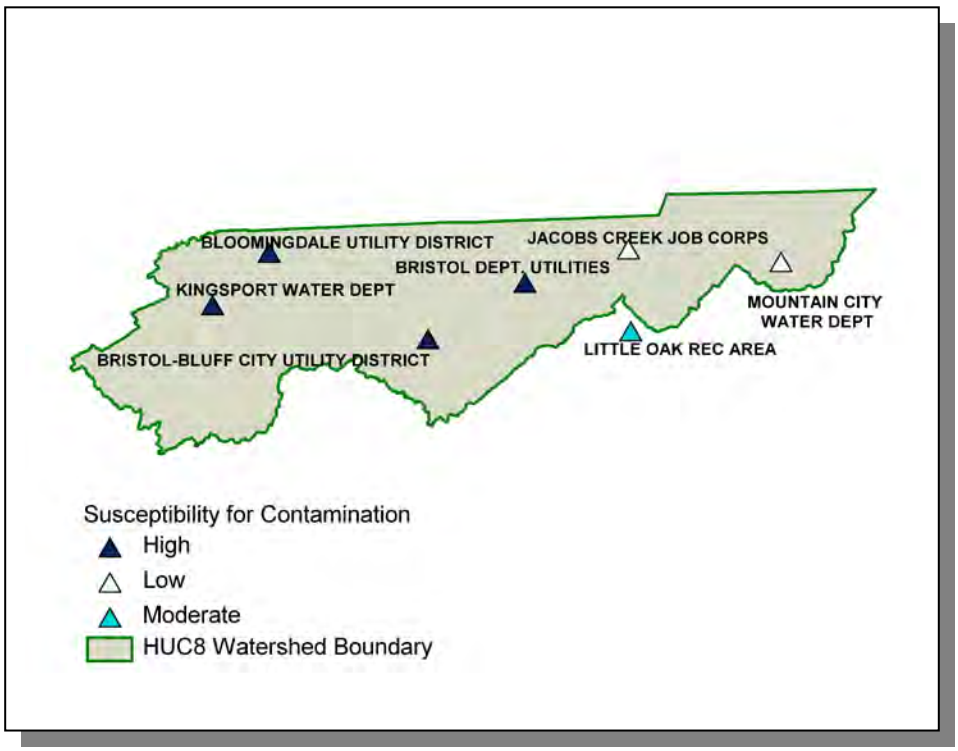


Figure 5-2. Susceptibility for Contamination in the South Fork Holston River Watershed.

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.

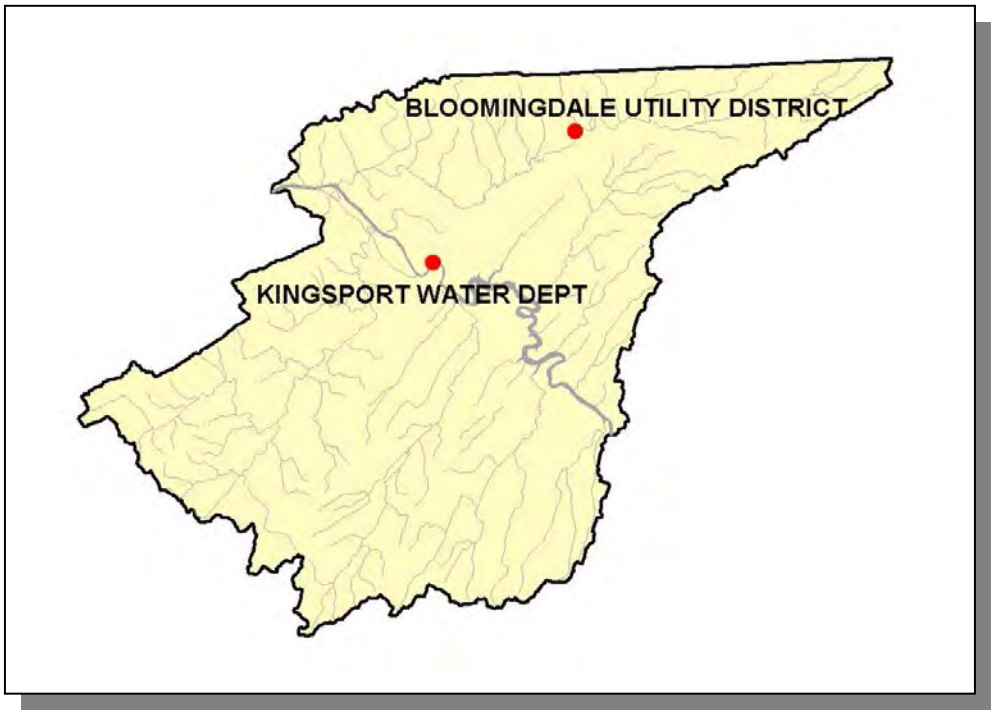


Figure 5-3. Locations of Community and Non-Community Public Water Supply Intakes in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed.

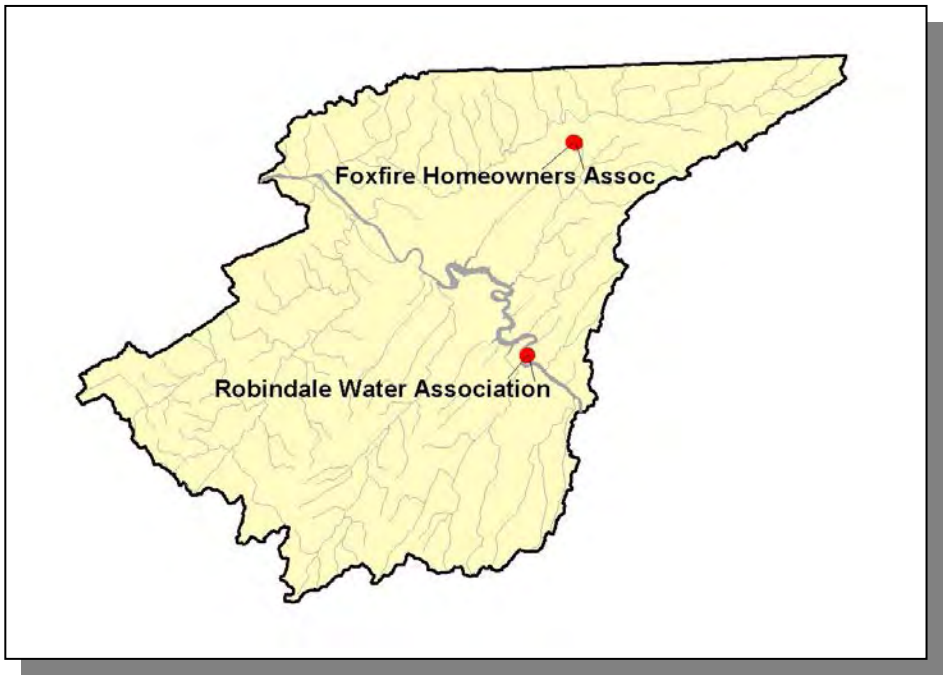


Figure 5-4. Locations of Community and Public Groundwater Supply Intakes in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed.

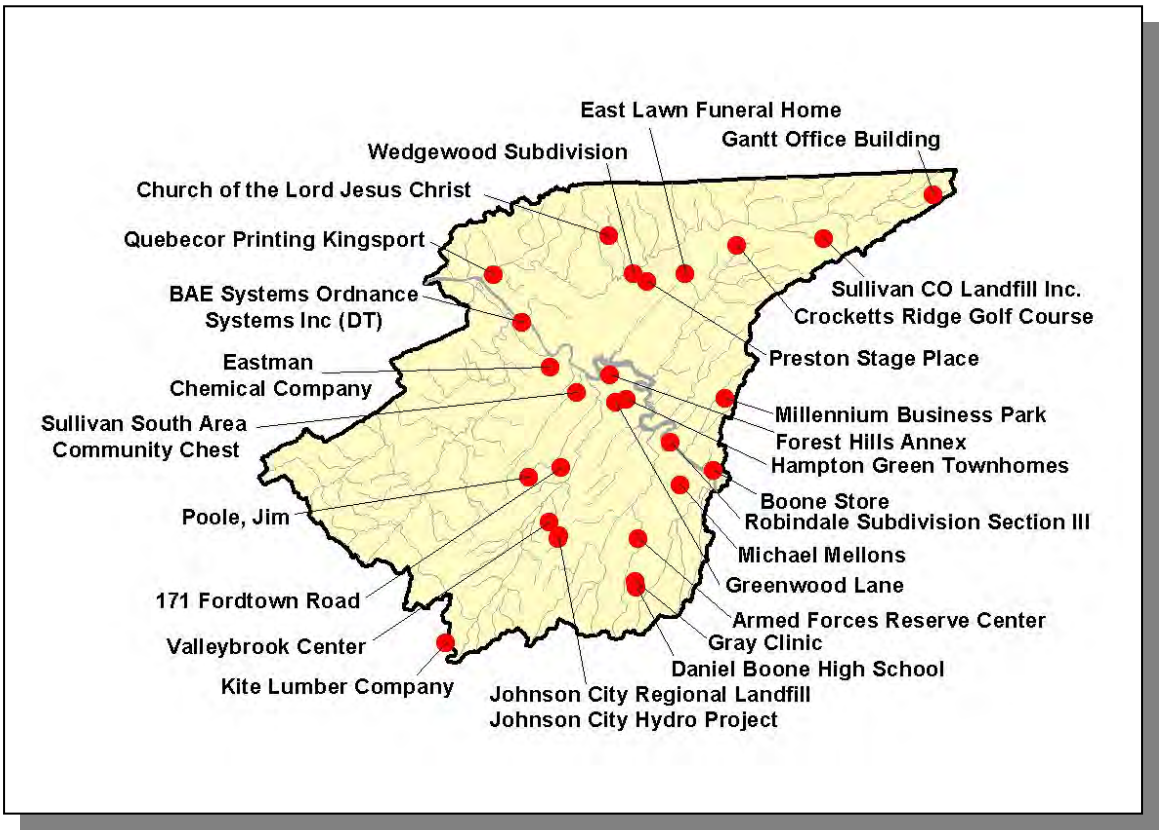


Figure 5-5. Locations of UIC (Underground Injection Control) Sites in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *Injection wells include stormwater sinkholes modified for drainage, commercial/industrial septic tanks, and large capacity septic tanks.*

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.

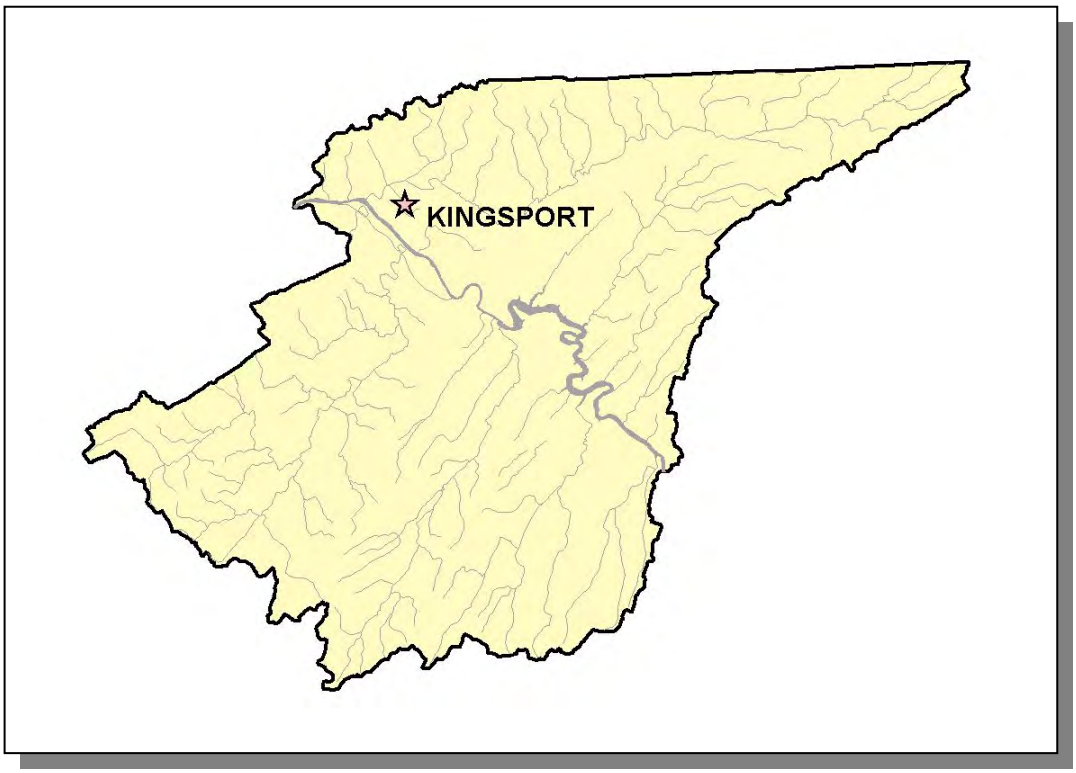


Figure 5-6. Location of Communities Receiving SRF Loans or Grants in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *More information is provided in Appendix V.*

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 South Fork Holston River Watershed was funded under an agreement with the Tennessee Department of Agriculture, Nonpoint Source Program (U.S. Environmental Protection Agency Assistance Agreements C9994674-00-0, C9994674-01-0, and C9994674-02-0).

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

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

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

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

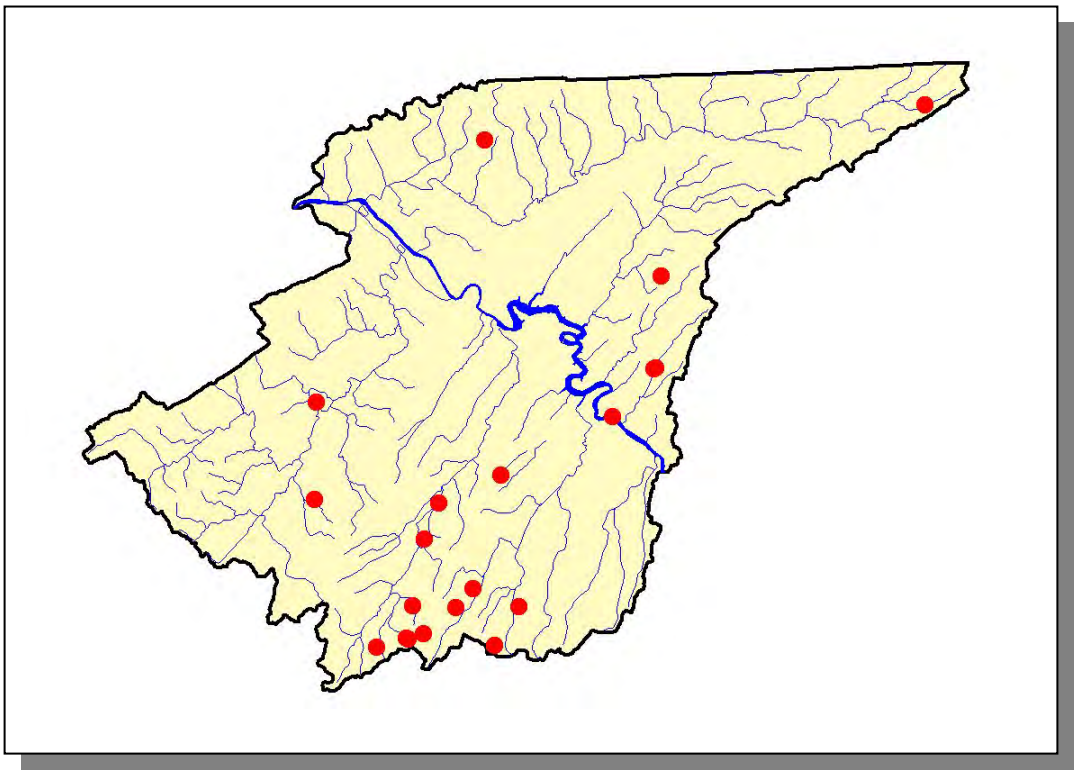


Figure 5-7. Location of BMPs installed from 1999 through 2003 in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed with Financial Assistance from the Tennessee Department of Agriculture's Nonpoint Source and Agricultural Resources Conservation Fund Grant Programs. *More information is provided in Appendix V.*

5.3.D. Virginia Department of Environmental Quality. Water quality management planning in Virginia began in 1972, with the passage of the Clean Water Act. Section 303(e) of the law required development of water quality management plans that focused on pollution control and set strategies for its prevention and control on a basin-wide basis. Section 208 of PL 92-500 required area-wide waste treatment management planning for areas having industrial concentrations or having other factors.

The State Water Control Board (SWCB) originally adopted the Tennessee–Big Sandy Water Quality Management Plan (WQMP) in 1977 as a regulatory document. The plan was later amended in 1980. In 2003, the Tennessee-Big Sandy WQMP was de-regulated. A Water Quality Management Plan Regulation was put in place after all basin plans were de-regulated. Serving as a repository for EPA approved TMDL Reports for each impaired segment, the WQMP regulation also includes wasteload allocations for permitted dischargers within the Commonwealth. It is the intention of the Virginia Department of Environmental Quality to update and amend the Water Quality Management Plan Regulation as more TMDL's are approved by EPA or as new wastewater treatment plants are constructed and permitted in the Commonwealth.

Authority for Water Quality Management Planning. State Law; Section 62.1-44.15(13) of the Code of Virginia authorizes the SWCB to establish policies and programs for effective area wide and basin wide water quality control and management. Section 62.1-44.19:7 of the Code of Virginia authorizes the SWCB to develop and implement a plan to achieve fully supporting status for impaired waters of the state.

Federal Law: Water quality management plans are required by Section 303(e) of the Clean Water Act (CWA) as implemented by 40 CFR 130. In 2002, EPA emphasized the Continuous Planning Process and watershed planning.

Purpose of the Plan. Plans are intended to provide a management tool for assisting the Commonwealth, local governments, industries and agricultural interests in anticipating, achieving and maintaining applicable water quality goals in the river basins. Plans need to meet all applicable requirements of 40 CFR 130 for water quality management plans and meet the requirements of the Virginia Water Quality Monitoring, Information and Restoration Act, Section 62.1-44.19-4 et seq. of the Code of Virginia.

Holston River Basin Total Maximum Daily Load Reports. There are three completed and approved TMDL reports in this river basin. The first recreational use TMDL report that was approved was for Hutton, Hall/Byers and Cedar Creeks in 2001. These streams are tributaries to Middle Fork Holston River in Washington County, Virginia. In 2003, additional work was completed to address aquatic life use impairments in the three creeks as well. The three creeks watershed was one of the first Implementation Plans completed in Virginia. The implementation plan has been funded and implemented over the past 2 years. In 2001, a TMDL study for recreational use impairment was completed on Little Creek in Bristol. Little Creek is a tributary to Beaver Creek. In 2004, a TMDL study was approved for aquatic life use and recreational use impairments on Beaver Creek in Bristol. Beaver Creek flows to Boone Lake in Tennessee. The Virginia Department of Conservation and Recreation is planning to develop an Implementation Plan for both Beaver Creek and Little Creek in 2005. The TMDL reports for these stream segments are available on the DEQ website: http://www.deq.virginia.gov.

Implementation Plans. In 1998, implementation plans for approved TMDL studies were mandated in the Water Quality Monitoring, Improvement and Restoration Act. The Department of Conservation and Recreation, through a memorandum of understanding with the Department of Environmental Quality, have taken the lead role in instances where the sources of impairment are due to nonpoint influences.

Beginning in June 2000, the Department of Conservation and Recreation held meetings with grassroot public participation to develop an Upper Tennessee River Watershed Strategic Plan. The purpose of this document was to assess the quality of waters and to identify ways to make them comply with water quality standards. An umbrella group, Upper Tennessee River Roundtable, is using this document as a spring-board for writing grant applications to implement some of the recommended strategies. In 2004, this group, in cooperation with Tennessee and North Carolina, successfully wrote a million dollar grant to undertake demonstration projects and provide educational opportunities in the Tennessee River Basin.

Future TMDL Studies for the Holston River Watershed. There is a Mercury impaired segment on North Fork Holston River that is scheduled for TMDL development within the

next 4 years. To find out about other impaired segments, visit the DEQ website, http://www.deq.virginia.gov and search on TMDLs. For questions about impaired segments of the Upper Tennessee River Basin located in Virginia, you may contact Nancy T. Norton, P.E. at (276)676-4807 or by email at ntnorton@deq.virginia.gov.

5.4. LOCAL INITIATIVES.

5.4.A. Kingsport Citizens for a Cleaner Environment. Kingsport Citizens for a Cleaner Environment (KCCE) is a new organization situated in the South Fork Holston River Watershed. Chartered in late 2001, we are committed to improving, protecting and preserving the region in which we live, work, and play.

Our organization is concerned about the quality of our air, land and water. We also believe in strong citizen input regarding issues that affect us all. Because the South Fork of the Holston River flows through a heavily industrialized area of Tennessee, our group takes a keen interest in keeping the river as clean and unharmed as possible.

In the past year we have partnered with the Holston Watershed Alliance (HWA) and the Tennessee Valley Authority's Resource Stewardship project to make the South Fork and mainstem Holston River Watersheds one of the best in Tennessee.

The water bodies that we are particularly concerned about are Madd Branch, Horse Creek, Tranbarger Branch, and Reedy Creek, all of which have a geographical relationship with Kingsport and the South Fork Holston itself.

Regarding Madd Branch, KCCE joined with the Dobyns-Bennett High School Geography class each spring from (2002 to 2004) to clean out the hundreds of bags of garbage found in less than a mile of that stream. During recent clean-ups, we have noticed that ducks, including newly hatched ducklings, have been coming back to the stream. Students also witnessed turtles and other signs of improved conditions that support aquatic life in the creek. At our Clean Air Conference and Youth Forum in 2002, students planted trees along the banks. Nevertheless, much more needs to be done, including persuading homeowners along the creek to use less chemicals on their yards (which wash into the creek), causing choking growths of algae in the summer months.

In the fall of 2003, KCCE worked with Kingsport's Girls, Inc., Dobyns-Bennett High School's Stone Soup group, and Sullivan County's Middle School 4-Hers to monitor more than 20 streams, most in the South Fork of the Holston Watershed. This project was carried out as part of the World Water Monitoring Day activities throughout the world. Students found a wide variety of stream qualities in their testings, which included pH, turbidity, dissolved oxygen, water temperatures, etc. Results are listed along with other Tennessee water quality results at http://www.worldwatermonitoringday.org.

For more information, contact:

Rachael Bliss, Program Director
Kingsport Citizens for a Cleaner Environment
108 East Main Street
Kingsport, TN 37660
(423)-247-2481
kingcitizens@cs.com

5.4.B. Friends of Fort Patrick Henry. Friends of Fort Patrick Henry is a tax-exempt organization dedicated to improving water quality in Fort Patrick Henry Reservoir. The group is made up of property owners, citizens, and local agencies. Cleanups to remove man-made trash are held twice a year in cooperation with TVA, local governments, and public agencies. Water quality testing is conducted and an ongoing Lake Watch effort is ongoing. For further information contact Harry Miles at 423-239-8242, or hmiles@chartertn.net

5.4.C. Holston River Watershed Alliance. The Holston River Watershed Alliance was formed in March 2000 by TVA and local stakeholders to define a vision for the watershed and to involve key partnerships in a sustainable coalition advancing that vision. Kingsport Tomorrow, a citizen-based action organization, TVA, business and government leaders from Kingsport, Sullivan and Hawkins Counties and the State of Tennessee are active participants in the effort. Recent focus has been on projects to remove impacted waters from the State's list. For information on how to become involved in this partnership effort, contact Sam Jones (Chairman) 423-239-8225 or Susan LaGuardia 423-246-2017, or by email: (slaguardia@kingsporttomorrow.org).

5.4.D. Overmountain Chapter Trout Unlimited. The Overmountain Chapter of Trout Unlimited is dedicated to conserving, protecting and restoring cold water habitats.

We believe that:

- Trout fishing is fishing for sport, rather than food, where true enjoyment of the sport lies in the challenge, the lore and the battle of wits, not necessarily the full creel.
- It's the feeling of satisfaction that comes from participation, not from killing your limit.
- It's communing with nature where the chief reward is a refreshed body and a contented soul, where a license is a permit to use, not abuse; to enjoy, not destroy our trout waters.
- We believe that we can give back to the future by working together to conserve and improve cold-water fisheries today.

Projects Currently Supported by the Overmountain Chapter:

- Tennessee Bottle Bill http://www.tnbottlebill.org/
- Back the Brookies http://www.brookie.org/
- Stop Aquatic Hitchhikers http://www.protectyourwaters.net/hitchhikers/
- Boone Watershed Partnership http://www.geocities.com/rainforest/vines/6411/
- TU Embrace-A-Stream Program

http://www.tu.org/site/pp.asp?c=7dJEKTNuFmG&b=277882

- The Didymosphenia Symposium sponsored by the EPA
- Stream sampling conducted by the TWRA

In addition the Overmountain Chapter sponsors five stream clean-ups and a Youth Flyfishing Class which emphasizes the importance of our mission.

The Overmountain Chapter of Trout Unlimited meets monthly in Johnson City. If you are interested in joining or would like to learn more about us, visit http://www.omtu.org.

CHAPTER 6

RESTORATION PRIORITIES IN THE SOUTH FORK HOLSTON RIVER WATERSHED

6.1. BACKGROUND.

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

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

This Chapter addresses point and nonpoint source approaches to water quality problems in the Group 3 portion of the Tennessee portion of the South Fork Holston River Watershed.

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

6.2.A. Year 1 Public Meeting. The first South Fork Holston River Watershed public meeting was held September 24, 1998 at the courthouse in Kingsport. 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

- Water quality should be high enough to support all instream aquatic life and to promote public health
- Toxic substances should be reduced
- Exposure of contaminated silt during lake draw downs, and movement of these toxics downstream after heavy rains, should be minimized
- More education, including the advantages of vegetated buffer strips, should be promoted
- Failing septic tanks
- Inappropriate land use
- More and better testing of water quality
- Better public advertising for meetings should be developed
- Pollution trading credits should be avoided

6.2.B. Year 3 Public Meeting. The second South Fork Holston River Watershed public meeting was held April 16, 2001 at the Kingsport Public Library. 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.

6.2.C. Year 5 Public Meeting. The third scheduled South Fork Holston River Watershed public meeting was held January 23, 2006 at the Renaissance Center in Kingsport. The meeting was held jointly with the North Fork Holston River Watershed and featured six educational components:

- Overview of draft Watershed Water Quality Management Plan slide show
- SmartBoard™ with interactive GIS maps
- Benthic macroinvertebrate samples and interpretation
- "How We Monitor Streams" self-guided slide show
- "Why We Do Biological Sampling" self-guided slide show
- Boone Partnership display

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

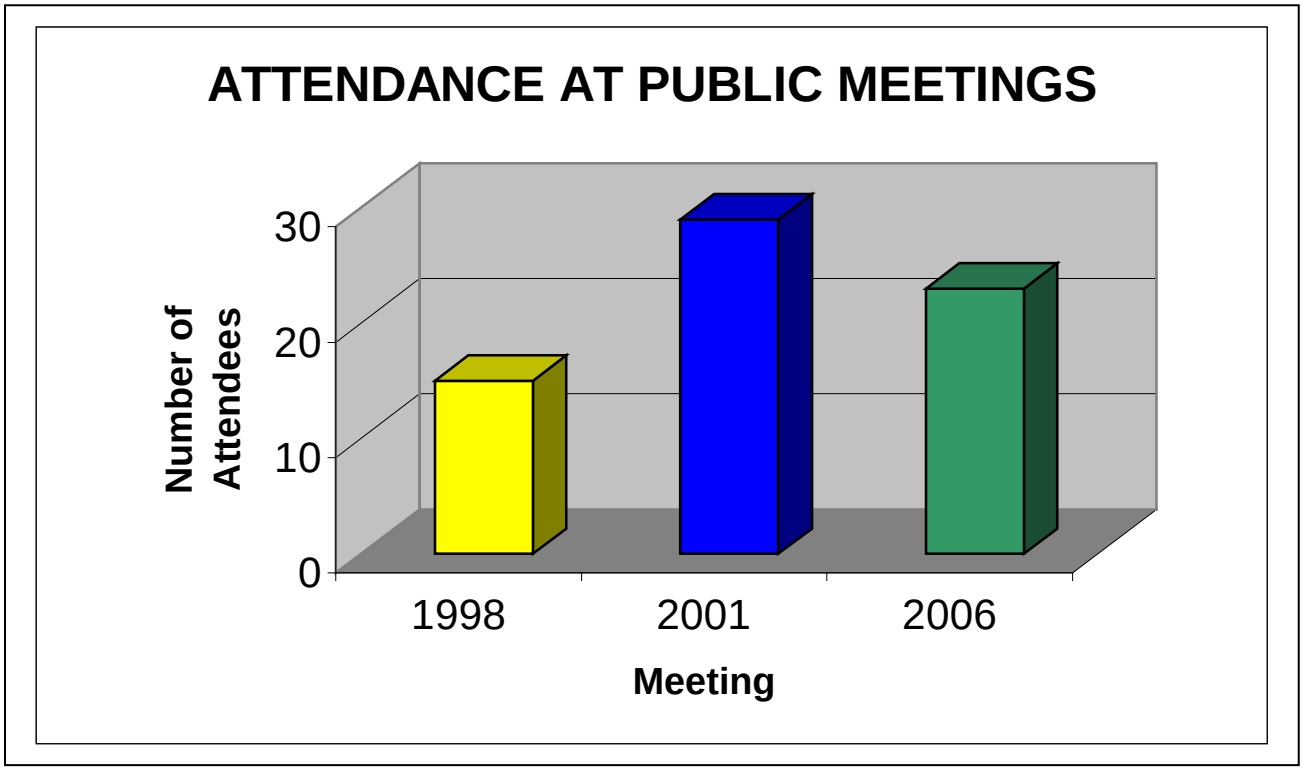


Figure 6-1. Attendance at Public Meetings in the South Fork Holston River Watershed. *Meeting attendance numbers represent South Fork Holston River and North Fork Holston River Watersheds joint meetings. Attendance numbers do not include TDEC personnel.*

Figure 6-2. Informal Discussions Among Residents of the Watershed Are an Important Part of TDEC's Watershed Meetings.

Figure 6-3. The SmartBoard™ is an Effective Interactive Tool to Teach Citizens About the Power of GIS.

Figure 6-4. The Watershed Meetings are a Good Opportunity for Local Citizen-Based Watershed Groups to Share What They are Doing to Promote Clean Water.

6.3. APPROACHES USED.

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

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

TMDLs are prioritized for development based on many factors.

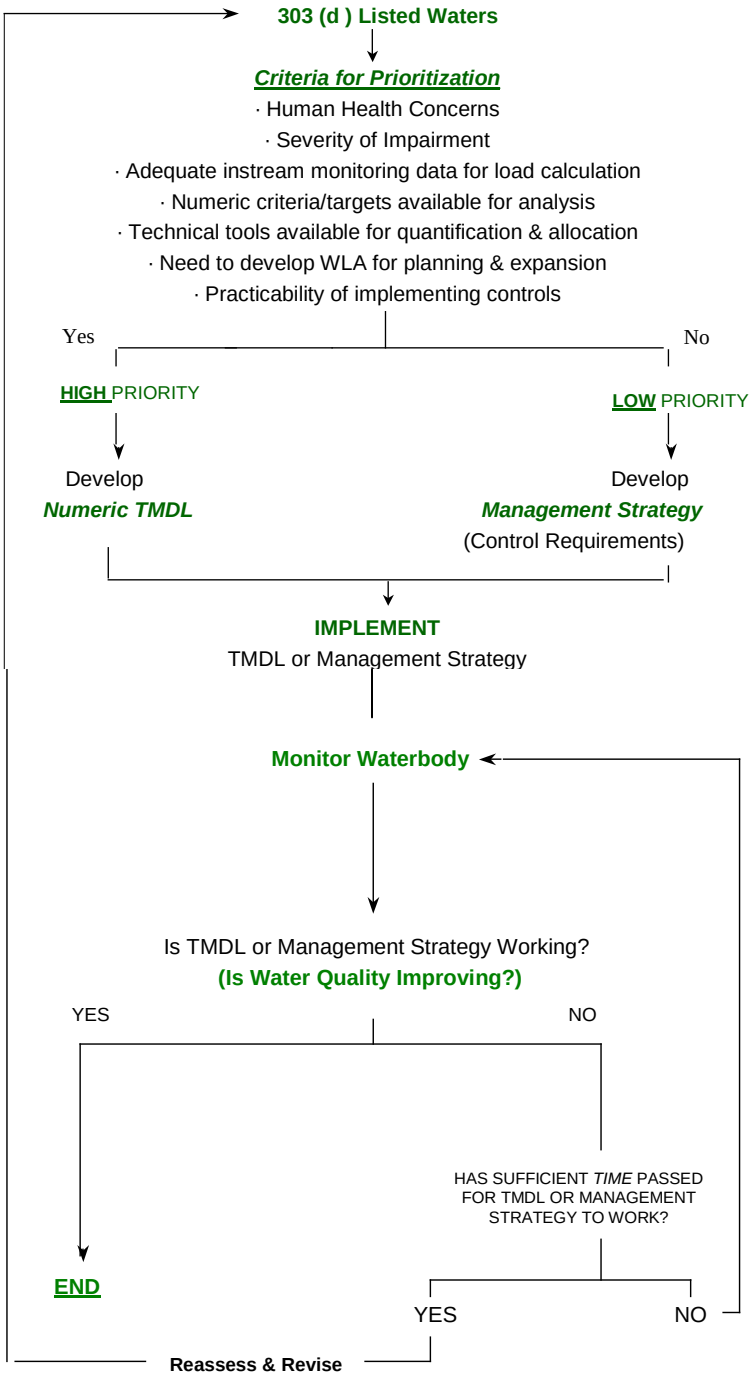


Figure 6.5. Prioritization Scheme for TMDL Development.

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, existing point source regulations can have only a limited effect. Other measures are, therefore, necessary.

There are several state and federal regulations that address some of the contaminants impacting waters in the South Fork Holston 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 efforts by landowners and volunteer groups and the possible implementation of new regulations. Many agencies, such as the Tennessee Department of Agriculture (TDA) and the Natural Resources Conservation Service (NRCS), offer financial assistance to landowners for corrective actions (like Best Management Practices) that may be sufficient for recovery of impacted streams. Many nonpoint problems will require an active civic involvement at the local level geared towards establishment of improved zoning guidelines, building codes, streamside buffer zones and greenways, and general landowner education.

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

6.3.B.i. Sedimentation.

6.3.B.i.a. From Construction Sites. Construction activities have historically been considered “nonpoint sources.” In the late 1980’s, EPA designated them as being subject to NPDES regulation if more than 5 acres were being disturbed. In the spring of 2003, that threshold became 1 acre. The general permit issued for such construction sites establishes conditions for maintenance of the sites to minimize pollution from storm water runoff, including requirements for installation and inspection of erosion 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 Group 3 portion of the South Fork Holston River Watershed are Cedar Creek, Fall Creek, and Gaines Branch. 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.

6.3.B.i.b. From Channel and/or Bank Erosion. Many streams within the South Fork Holston River Watershed exhibit streambank erosion. When steam channels are altered, or large tracts of land are cleared, storm water runoff will cause banks to become unstable and highly erodable. Heavy livestock traffic can also severely disturb banks. Destabilized banks contribute to sediment load and to the loss of beneficial riparian

vegetation to the stream. This cycle is especially problematic in certain areas of the South Fork Holston River Watershed where the very erodable soils and shallow rooted trees are especially vulnerable. Some inappropriate agricultural practices have impacted the hydrology and morphology of stream channels in this watershed.

Several agencies such as the NRCS and TDA, as well as watershed citizen groups, are working to stabilize portions of stream banks using bioengineering and other techniques. Many of the affected streams, like Cedar Creek, Fall Creek, Horse Creek, and Reedy Creek would benefit from these types of projects. Other methods or controls that might be necessary to address common problems are:

Voluntary activities

- Re-establish bank vegetation (example: Kendrick Creek).
- Establish out-of-stream watering areas for livestock by moving watering troughs and feeders back from stream banks (examples: tributaries of Reedy Creek, and Horse Creek).
- Limit cattle access to streams and bank vegetation (examples: Fall Creek and Kendrick Creek).

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: Reedy Creek, Fall Creek, Cedar Creek, and Straight Branch).
- Limit livestock access to streams and bank vegetation (example: Cedar Creek).
- Require post-construction run-off rates to be no greater than pre-construction rates in order to reduce in-stream erosion (examples: Straight Branch, Rock Springs Creek, and Horse Creek).
- Implement additional restrictions on logging in streamside management zones.
- Limit clearing of stream and ditch banks (examples: Fall Creek and Possum Creek). *Note: Permits may be required for any work along streams.*
- Limit 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. The Water Quality Control Act exempts normal agricultural and silvicultural practices that do not result in a point source discharge. Nevertheless, efforts are being made to address impacts due to these exempted practices.

The Master Logger Program has been in place for several years to train loggers how to install Best Management Practices that lessen the impact of logging activities on streams. Recently, laws and regulations were enacted which established that these BMPs must be used or the Commissioners of the Departments of Environment and Conservation and of Agriculture would be permitted to stop the logging operation that, upon failing to install these BMPs, was causing impacts to streams. Timber harvests in the Group 3 portion of the Tennessee portion of the South Fork Holston River Watershed are small and isolated.

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 (TDA) 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.

Many sediment problems traceable to agricultural practices also involve riparian loss due to close row cropping or pasture clearing for grazing. Agriculturally impacted streams that could benefit from the establishment of riparian buffer zones include Bear Creek, Fall Creek, Kendrick Creek, and Horse Creek.

6.3.B.ii. Pathogen Contamination.

Possible sources of pathogens are inadequate or failing septic tank systems, overflows or breaks in public sewer collection systems, poorly disinfected discharges from sewage treatment plants, and fecal matter from pets, livestock and wildlife washed into streams and storm drains. Permits issued by the Division of Water Pollution Control regulate discharges from point sources and require adequate control for these sources. Individual homes are required to have subsurface, on-site treatment (i.e., septic tank and field lines) if public sewers are not available. The Division of Ground Water Protection within the Johnson City Field Office and delegated county health departments regulate septic tanks and field lines. 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 water disposal.

Currently, most of the urbanized streams in the Group 3 portion of the Tennessee portion of the South Fork Holston River Watershed are known to have pathogen contamination. Madd Branch and Reedy Creek and its tributaries are substantially impacted by urban runoff, with contributions of bacterial contamination coming from storm water runoff, failing septic systems, and sewage collection system failures.

Measures that may be necessary to control pathogens are:

Voluntary activities

- Off-channel watering of livestock (examples: tributaries of Reedy Creek and Horse Creek).
- Limit livestock access to streams (examples: Kendrick Creek and Cedar Creek).
- Improve and educate on the proper management of animal waste from feeding operations.

Enforcement strategies

- Strengthen enforcement of regulations governing on-site wastewater treatment.
- Determine timely and appropriate enforcement for non-complying sewage treatment plants, large and small, and their collection systems.
- Identify Concentrated Animal Feeding Operations not currently permitted.

Additional strategies

- Develop intensive planning in areas where sewer is not available and treatment by subsurface disposal is not an option due to poor soils, floodplains, or high water tables.
- Discourage the creation of "duck holes" that attract waterfowl.
- Develop and enforce leash laws and controls on pet fecal material (example: Madd Branch).
- Implement greater efforts by sewer utilities to identify leaking lines or overflowing manholes (examples: Madd Branch and Reedy 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, from fertilized lawns and croplands, and faulty sewage disposal processes. Nutrients are often transported with sediment, so many of the measures designed to reduce sediment runoff will also aid in preventing organic enrichment of streams and lakes.

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. Streamside vegetation can filter out many nutrients and other pollutants before they reach the stream. These riparian buffers are also vital along livestock pastures. Examples of streams that could benefit are Cedar Creek, Reedy Creek, and areas along any stream channels.
- 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. An intact riparian zone also acts as a buffer to filter out nutrient loads before they enter the water.
- Discourage impoundments. Ponds and lakes do not aerate water. *Note: Permits may be required for any work on a stream, including impoundments.*

Regulatory strategies.

- Greater enforcement of regulations governing on-site wastewater treatment.
- Impose more stringent permit limits for nutrients discharged from sewage treatment plants.
- Timely and appropriate enforcement for noncomplying sewage treatment plants, large and small, and their collection system.
- Identify Concentrated Animal Feeding Operations not currently permitted.

6.3.B.iv. Toxins and Other Materials.

Although some toxic substances are discharged directly into waters of the state from a point source, much of these materials are washed in during rainfalls from an upland location, or via improper waste disposal that contaminates groundwater. In the South Fork Holston River Watershed, streams are damaged by storm water runoff from industrial facilities or urban areas. More stringent inspection and regulation of permitted industrial facilities, and local strormawter quality initiatives and regulations, could help reduce the amount of contaminated runoff reaching state waters. Examples of streams that could benefit from these measures include the many small, urbanized tributaries such as Reedy Creek, Madd Branch, Horse Creek, and Kendrick Creek.

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 blatant examples of pollution in streams.

Some of these problems can be addressed by:

Voluntary activities

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

Enforcement strategies

- Prohibit illicit discharges to storm drains.
- Strengthen litter law 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. Examples include Horse Creek, Reedy Creek, and Cedar Creek.

Individual landowners and developers are responsible for the vast majority of stream alterations. Some measures that can help address these problems are:

Voluntary activities

- Sponsor litter pickup days to remove litter that might enter streams
- Organize stream cleanups removing trash, limbs and debris before they cause blockage.
- Avoid use of heavy equipment to “clean out” streams.
- Plant native vegetation along streams to stabilize banks and provide habitat.
- Encourage developers to avoid extensive use of culverts in streams.

Enforcement strategies

- 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.

APPENDIX II

ID	NAME	HAZARD
827001	Bays Mountain	1
827006	B Bend Hollow	1

Table A2-1. Inventoried Dams in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *Hazard Codes: 1, High. TDEC only regulates dams indicated by a numeric hazard score.*

LAND COVER/LAND USE	ACRES	% OF WATERSHED
Open Water	1,116	0.91
Other Grasses	3,403	2.78
Pasture/Hay	26,797	21.88
Row Crops	3,369	2.75
Woody Wetlands	367	0.30
Emergent Herbaceous Wetlands	44	0.04
Deciduous Forest	37,877	30.93
Mixed Forest	16,664	13.61
Evergreen Forest	13,278	10.84
High Intensity: Commercial/Industrial	4,967	4.06
High Intensity: Residential	1,748	1.43
Low Intensity: Residential	12,275	10.02
Quarries/Strip Mines/Gravel Pits	22	0.02
Bare Rock/Sand/Clay	535	0.44
Transitional	0	0.00
Total	**122,462**	**100.00**

Table A2-2. Land Use Distribution in the Group 3 Portion of the Tennessee Portion of the South Fork Holston 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)	
Ridge and Valley (67)	Big Creek (6701)	Holston River	06010104
Ridge and Valley (67)	Fisher Creek (6702)	Holston River	06010104
Ridge and Valley (67)	Possum Creek (6707)	South Fork Holston	06010102
Southern Limestone/Dolomite Valleys and Low Rolling Hills (67f)	Clear Creek (67F06)	Lower Clinch River	06010207
	White Creek (67F13)	Upper Clinch River	06010205
	Powell River (67F14)	Powell River	06010206
	Big War Creek (67F17)	Upper Clinch River	06010205
	Martin Creek (67F23)	Powell River	06010206
	Powell River (67F25)	Powell River	06010206
Southern Shale Valleys (67g)	Little Chuckey Creek (67G01)	Nolichucky River	06010108
	Bent Creek (67G05)	Nolichucky River	06010108
Southern Sandstone Ridges (67h)	Parker Branch (67H08)	Holston River	06010104

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

CODE	NAME	AGENCY	AGENCY ID
159	TDEC/DNH Reedy Creek Cove Site	TDEC/DNH	S.USTNHP 318
254	USACOE_Nashville Client Site	USACOE-Nashville	
531	TDOT SR 75 Permit Site	TDOT	
2731	USACOE Reedy Creek 3.2 R Site	USACOE-Nashville	960047955

Table A2-4. Wetland Sites in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed in TDEC Database. *TDEC, Tennessee Department of Environment and Conservation; USACOE-Nashville, United States Army Corps of Engineers-Nashville District; TDOT, Tennessee Department of Transportation; 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)
Boozy Creek	TN06010102046_0500	3.5
Cedar Creek	TN06010102702_1000	10.1
Fall Creek	TN06010102045_1000	22.0
Ford Creek	TN06010102047_0100	5.5
Fort Patrick Henry Reservoir tribs.	TN06010102004T_0999	9.5
Gaines Branch	TN06010102046_0300	2.7
Horse Creek	TN06010102003_1000	6.8
Horse Creek	TN06010102003_2000	7.1
Kendrick Creek	TN06010102057_1000	27.7
Mill Creek	TN06010102003_0100	6.6
Red River	TN06010102047_0200	6.6
Reedy Creek	TN06010102046_2000	11.6
Reedy Creek	TN06010102046_3000	6.0
Rock Springs Branch	TN06010102729_1000	6.6
Russell Branch	TN06010102004T_0100	5.5
Sinking Creek	TN06010102047_1000	16.5
South Fork Holston River	TN06010102005_1000	0.6
Straight Creek	TN06010102057_0200	4.5
Unnamed trib to Kendrick Creek	TN06010102057_0100	7.0
Walker Fork Creek	TN06010102003_0400	6.3

Table A3-1a. Streams Fully Supporting Designated Uses in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Reedy Creek	TN06010102046_1000	2.0
South Fork Holston River	TN06010102001_1000	5.5
South Fork Holston River	TN06010102001_2000	2.4
Transbarger Branch	TN06010102046_0100	1.4

Table A3-1b. Streams Partially Supporting Designated Uses in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Madd Branch	TN06010102001_0100	2.7

Table A3-1c. Streams Not Supporting Designated Uses in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)
Fall Branch	TN06010102003_0300	3.4
Gravelly Creek	TN06010102046_0200	4.9
Little Horse Creek	TN06010102003_0600	7.9
Misc tribs to Horse Creek	TN06010102003_0999	10.4
Misc tribs to Reedy Creek	TN06010102046_0999	19.8
Misc tribs to Reedy Creek	TN06010102046_3999	11.5
Misc. tribs to South Fork Holston River	TN06010102001_0999	5.2
Possum Creek	TN06010102702_0100	3.9
Timbertree Branch	TN06010102046_0400	2.0
Tribs to Walker Fork Creek	TN06010102003_0498	8.3
Tribs to Walker Fork Creek	TN06010102003_0499	7.6
Unnamed trib to Horse Creek	TN06010102003_0200	3.8
Unnamed trib to Horse Creek	TN06010102003_0500	4.6
Unnamed trib to South Holston Reservoir	TN06010102004T_0200	5.7

Table A3-1d. Streams Not Assessed in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (ACRES)
Fort Patrick Henry Reservoir	TN06010102004_1000	872

Table A3-1e Lakes Fully Supporting Designated Uses in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)	SUPPORT DESCRIPTION
South Fork Holston River	TN06010102001_1000	5.5	Partial
South Fork Holston River	TN06010102001_2000	2.4	Partial

Table A3-2a. Stream Impairment due to Flow Alterations/Thermal Modifications in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)	SUPPORT DESCRIPTION
Madd Branch	TN06010102001_0100	2.7	Not supporting
Reedy Creek	TN06010102046_1000	2.0	Partial
Transbarger Branch	TN06010102046_0100	1.4	Partial

Table A3-2b. Stream Impairment due to Other Habitat Alterations in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed.

SEGMENT NAME	WATERBODY SEGMENT ID	SEGMENT SIZE (MILES)	SUPPORT DESCRIPTION
South Fork Holston River	TN06010102001_2000	2.4	Partial

Table A3-2c. Stream Impairment due to Other Habitat Alterations in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed.

APPENDIX IV

LAND USE/LAND COVER	AREAS IN HUC-10 SUBWATERSHEDS (ACRES)
	06
Bare Rock/Sand/Clay	535
Deciduous Forest	37,877
Emergent Herbaceous Wetlands	44
Evergreen Forest	13,278
High Intensity: Commercial/Industrial/Transportation	4,967
High Intensity: Residential	1,748
Low Intensity: Residential	12,275
Mixed Forest	16,664
Open Water	1,116
Other Grasses: Urban/Recreational	3,403
Pasture/Hay	26,797
Row Crops	3,369
Transitional	367
Quarries	22
Total	**122,463**

Table A4-1. Land Use Distribution in the Group 3 Portion of the Tennessee Portion of the South Fork Holston 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	STREAM NAME	AREA (SQ MILES)	LOW FLOW (CFS)		
					1Q10	7Q10	3Q20
03487499	0601010206	USGS	South Fork Holston River				
03487500	0601010206	USGS	South Fork Holston River	1,931	396	550	382
03487501	0601010206	USGS	South Fork Holston River				
03487550	0601010206	USGS	Reedy Creek	36.3	3.0	3.5	2.0
362625082261401	0601010206	TVA	South Fork Holston River				
362626082261401	0601010206	TVA	South Fork Holston River				
362953082303101	0601010206	TVA	South Fork Holston River				
362953082303201	0601010206	TVA	South Fork Holston River				

Table A4-3. Historical Streamflow Data Summary Based on Mean Daily Flows in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed*. USGS, United States Geological Survey; TVA, Tennessee Valleu Authority. Additional information may be found at* http://nwis.waterdata.usgs.gov/tn/nwis/discharge

AGENCY	STATION	ALIAS	LOCATION	HUC-10
TDEC	BEAR000.2SU		Bear Creek @ RM 0.2	0601010206
TDEC	BEULA001.0SU		Beulah Church Creek @ RM 1.0	0601010206
TDEC	SFHOL1T1.0SU		Beulah Church Creek @ RM 1.0	0601010206
TDEC	BOOZY000.1SU		Boozy Creek @ RM 0.1	0601010206
TDEC	CEDAR002.1WN		Cedar Creek @ RM 2.1	0601010206
TDEC	CEDAR003.9WN		Cedar Creek @ RM 3.9	0601010206
TDEC	FALL000.5SU		Fall Creek @ RM 0.5	0601010206
TDEC	FALL000.6WN		Fall Creek @ RM 0.6	0601010206
TDEC	FORD000.6WN		Ford Creek @ RM 0.6	0601010206
TDEC	SFHOL008.4SU	FTPATHENRY01	Fort Patrick Henry Reservoir at Dam	0601010206
TDEC	FTPATHENRY02		Fort Patrick Henry Reservoir at Fordtown Bridge	0601010206
TDEC	GAINE000.1SU	GAINS000.1SU	Gains Branch @ RM 0.1	0601010206
TDEC	HORSE000.9SU		Horse Creek @ RM 0.9	0601010206
TDEC	HORSE010.6SU		Horse Creek @ RM 10.6	0601010206
TDEC	HORSE004.0SU		Horse Creek @ RM 4.0	0601010206
TDEC	HORSE007.3SU		Horse Creek @ RM 7.3	0601010206
TDEC	HORSE009.5SU		Horse Creek @ RM 9.5	0601010206
TDEC	KENDR000.2SU		Kendrick Creek @ RM 0.2	0601010206
TDEC	KENDR003.3SU		Kendrick Creek @ RM 3.3	0601010206
TDEC	KENDR005.3SU		Kendrick Creek @ RM 5.3	0601010206
TDEC	KENDR007.4WN		Kendrick Creek @ RM 7.4	0601010206
TDEC	LHORS000.5SU		Little Horse Creek @ RM 0.5	0601010206
TDEC	MADD001.2SU		Madd Branch @ RM 1.2	0601010206
TDEC	MADD000.5SU	MADD00.5	Madd River @ RM 0.5	0601010206
TDEC	MILL000.5SU		Mill Creek @ RM 0.5	0601010206
TDEC	POSSU000.5WN		Possum Creek @ RM 0.5	0601010206
TDEC	RED000.2WN		Red River @ RM 0.2	0601010206
TDEC	REEDY000.1SU		Reedy Creek @ RM 0.1	0601010206
TDEC	REEDY000.2SU	REEDY00.2	Reedy Creek @ RM 0.2	0601010206
TDEC	REEDY015.5SU		Reedy Creek @ RM 15.5	0601010206
TDEC	REEDY002.2SU		Reedy Creek @ RM 2.2	0601010206
TDEC	RSPRI000.4SU	ROCKS000.4SU	Rock Springs Branch @ RM 0.4	0601010206
TDEC	RUSSE000.7SU		Russell Creek @ RM 0.7	0601010206
TDEC	SINKI001.0SU		Sinking Creek @ RM 1.0	0601010206
TDEC	SINKI005.0WN		Sinking Creek @ RM 5.0	0601010206
TDEC	SFHOL005.7SU	002610	South Fork Holston River @RM 5.7	0601010206
TDEC	SFHOL002.3SU	002620	South Fork Holston River @ RM 2.3	0601010206
TDEC	SFHOL001.1SU	002630	South Fork Holston River @ RM 1.1	0601010206
TDEC	SFHOL018.5SU		South Fork Holston River @ RM 18.5	0601010206
TDEC	SFHOL005.5SU	HOLSUR16	South Fork Holston River @ RM 5.5	0601010206
TDEC	SFHOL005.5SU		South Fork Holston River @ RM 5.5	0601010206
TDEC	SFHOL007.7SU		South Fork Holston River @ RM 7.7	0601010206
TDEC	SFHOL007.9SU	HOLSUR17	South Fork Holston River @ RM 7.9	0601010206
TDEC	SFHOL008.5SU		South Fork Holston River @ RM 8.5	0601010206

AGENCY	STATION	ALIAS	LOCATION	HUC-10
TDEC	STRAI000.2SU		Straight Branch @ RM 0.2	0601010206
TDEC	TRANS000.7SU		Transbarger Branch @ RM 0.7	0601010206
TDEC	KENDR1T0.2WN		UT To Kendrick Creek @ RM 0.2	0601010206
TDEC	WALKE000.1SU		Walker Fork @ RM 0.1	0601010206
TVA	475958		Horse Creek @ RM 0.8	0601010206
TVA	475619		Reedy Creek @ RM 0.06	0601010206
TVA	475620		Reedy Creek @ RM 12.2	0601010206
TVA	476246		South Fork Holston River @ RM 0.8	0601010206
TVA	476902		South Fork Holston River @ RM 0.9	0601010206
TVA	475918		South Fork Holston River @ RM 1.2	0601010206
TVA	475121		South Fork Holston River @ RM 1.24	0601010206
TVA	476258		South Fork Holston River @ RM 1.30	0601010206
TVA	475206		South Fork Holston River @ RM 10.6	0601010206
TVA	475857		South Fork Holston River @ RM 10.8	0601010206
TVA	476443		South Fork Holston River @ RM 11.0	0601010206
TVA	476660		South Fork Holston River @ RM 11.7	0601010206
TVA	477472		South Fork Holston River @ RM 12.5	0601010206
TVA	476444		South Fork Holston River @ RM 15.0	0601010206
TVA	475207		South Fork Holston River @ RM 16.6	0601010206
TVA	476439		South Fork Holston River @ RM 17.8	0601010206
TVA	476445		South Fork Holston River @ RM 18.1	0601010206
TVA	476438		South Fork Holston River @ RM 18.4	0601010206
TVA	477474		South Fork Holston River @ RM 18.5	0601010206
TVA	475151		South Fork Holston River @ RM 18.57	0601010206
TVA	475193		South Fork Holston River @ RM 2.2	0601010206
TVA	476883		South Fork Holston River @ RM 2.3	0601010206
TVA	475192		South Fork Holston River @ RM 2.6	0601010206
TVA	475191		South Fork Holston River @ RM 3.1	0601010206
TVA	475919		South Fork Holston River @ RM 3.4	0601010206
TVA	475190		South Fork Holston River @ RM 3.9	0601010206
TVA	475531		South Fork Holston River @ RM 3.9	0601010206
TVA	475189		South Fork Holston River @ RM 4.6	0601010206
TVA	475532		South Fork Holston River @ RM 4.6	0601010206
TVA	475188		South Fork Holston River @ RM 5.6	0601010206
TVA	476257		South Fork Holston River @ RM 5.7	0601010206
TVA	477469		South Fork Holston River @ RM 6.5	0601010206
TVA	475187		South Fork Holston River @ RM 7.3	0601010206
TVA	476437		South Fork Holston River @ RM 7.4	0601010206
TVA	476436		South Fork Holston River @ RM 7.96	0601010206
TVA	476435		South Fork Holston River @ RM 8.15	0601010206
TVA	476435C		South Fork Holston River @ RM 8.15	0601010206
TVA	475120		South Fork Holston River @ RM 8.17	0601010206
TVA	475710		South Fork Holston River @ RM 8.2	0601010206
TVA	475566		South Fork Holston River @ RM 8.5	0601010206

AGENCY	STATION	ALIAS	LOCATION	HUC-10
TVA	477509		South Fork Holston River @ RM 8.7	0601010206
TVA	475567		South Fork Holston River 11.8	0601010206
TVA	475568		South Fork Holston River 16.0	0601010206
USEPA	4704A1		Below Boone Dam on East Bank	0601010206
USEPA	3403		South Fork Holston River	0601010206

Table A4-4. STORET Water Quality Monitoring Stations in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed*. RM, River Mile; TDEC, Tennessee Department of Environment and Conservation; USEPA, United States Environmental Protection Agency; TVA, Tennessee Valley Authority. UT, Unnamed Tributary.*

FACILITY NUMBER	FACILITY NAME	SIC	SIC NAME	MADI	WATERBODY	HUC-10
TN0059641	Central Heights Elementary School	4952	Sewerage System	Minor	Reedy Creek @ RM 17.0	0601010206
TN0027391	TVA-Boone Hydro Plant	4911	Electric Service	Minor	South Fork Holston River @ RM 18.6	0601010206
TN0028789	Johnson City Regional Waste Water Treatment Plant	4952	Sewerage System	Major	South Fork Holston River @ RM 18.0	0601010206
TN0027448	TVA-Fort Patrick Henry Hydro Plant	4911	Electric Service	Major	Holston River @ RM 8.1	0601010206
TN0003905	AFG Industries	3211	Flat Glass	Minor	South Fork Holston River @ RM 2.3 (Outfall 001) and Madd Branch to South Fork Holston River @ RM 4.3 (Outfall 002)	0601010206
TN0003671	BAE Systems Ordinance Systems, Inc. (HAAP)	9711	National Security	Major	South Fork Holston River (Outfalls 001, 002, 007, and 101), Holston River (Outfalls 020, 023, 025, 026, 030, 031, and 161), and Madd Branch (Outfalls 011, 012, and 018)	0601010206
TN0073946	Eastman Chemical Company B-280 Office Complex	5541	Gasoline Service Station	Minor	Storm Sewer to South Fork Holston River @ RM 3.5	0601010206
TN0002640	Tennessee Eastman Division	2821	Plastic Materials, Synthetic Resins, Nonvulcanizable Elastomers	Major	South Fork Holston River @ RM 142.2, Big Sluice of South Fork Holston River, Horse Creek	0601010206
TN0003832	Quebecor Printing	2732	Book Printing	Minor	Storm Sewer to Reedy Creek @ RM 0.5	0601010206
TN0073342	CEMEX, Incorporated	5032	Brick, Stone, and Related Construction Material	Minor	Ditch to South Fork Holston River @ RM 2.5	0601010206
TN0001643	Weyerhaeuser Company	2621	Paper Mill	Major	South Fork Holston River @ RM 2.3	0601010206
TN0020095	Kingsport STP	4952	Sewerage System	Major	South Fork Holston River @ RM 2.2	0601010206
TN0064050	Portola Packaging, Inc.	3089	Plastic Products	Major	South Fork Holston River Sluice @ RM 0.4	0601010206
TN0025151	West Middle and Elementary School	4952	Sewerage System	Minor	Horse Creek @ RM 6.2	0601010206
TN0054941	Bays Mountain Park	4952	Sewerage System	Minor	Doland Branch @ RM 1.5	0601010206
TN0056898	Magic Wand Car Wash	7542	Sewerage System	Minor	Horse Creek @ RM 9.8	0601010206
TN0057118	Horse Creek Village S/D	4952	Sewerage System	Minor	UT @ RM 0.1 to Horse Creek @ RM 9.0	0601010206

Table A4-5. NPDES Permittees in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *RM, River Mile; SIC, Standard Industrial Classification; MADI, Major Discharge Indicator; UT, Unnamed Tributary.*

FACILITY NUMBER	PERMITEE	SIC	SIC NAME	WATERBODY	HUC-10
TN0054445	General Shale Products (Mine #3)	1459	Shale (Common) Quarrying-not for Manufacturing	South Fork Holson River	0601010206
TN0027588	Rinker Materials South Central (Tri-Cities Quarry)	1422	Limestone-Crushed and Broken	UT(s) to South Fork Holston River	0601010206

Table A4-6. Active Permitted Mining Sites in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *SIC, Standard Industrial Classification; UT(s), Unnamed Tributaries.*

FACILITY NUMBER	FACILITY NAME	WATERBODY	HUC-10
TN0062235	Bloomingdale Utility District WTP	Reedy Creek @ RM 10.6	0601010206
TN0004499	Kingsport WTP	South Fork Holston River @ RM 6.0	0601010206

Table A4-7. Water Treatment Plants in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *RM, River Mile.*

FACILITY NUMBER	FACILITY NAME	WATERBODY	HUC-10
TNG110249	Ross Prestressed Concrete	WWC to Back Creek	0601010206
TNG110145	Summers Taylor Concrete Plant	UT to South Fork Holston River	0601010206
TNG110140	Byerley Construction Co.	Brookside Creek @ RM 0.5	0601010206
TNG110123	Tri-Cities Concrete Co.	WWC to South Fork Holston River	0601010206
TNG110133	Loven Ready Mix	Holston River	0601010206

Table A4-8. Ready Mix Concrete Plants in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *RM, River Mile; UT, Unnamed Tributary; WWC, Wet Weather Conveyance.*

LOG NUMBER	COUNTY	DESCRIPTION	WATERBODY	HUC-10
NRS00.180	Sullivan	Spring relocation	Leslie Branch	0601010206
NRS00.347	Sullivan		Spring Drain to Leslie Branch	0601010206
NRS00.178	Sullivan	Channel Relocation	Leslie Branch	0601010206
NRS03.321	Sullivan	Sanitary Sewer Line	Straight Branch	0601010206
NRS03.005	Sullivan	Wetland Fill	Reedy Creek	0601010206
NRS00.032	Sullivan	Impoundment	UT to Russell Creek	0601010206
NRS00.004	Washington	Stream Alignment and Restoration	Onion Branch	0601010206
NRS00.074	Washington	Wetland Fill	Little Limestone Creek	0601010206
NRS02.014	Sullivan	Box Culvert	Straight Branch	0601010206
NRS02.084	Sullivan	Bridge Reapir	Holston River	0601010206
NRS01.335	Sullivan	Wetland Fill	Wetland to UT to Horse Creek	0601010206

Table A4-9. Individual ARAP Permits Issued January 2000 Through June 2004 in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *UT, Unnamed Tributary.*

FACILITY NUMBER	FACILITY NAME	SECTOR	RECEIVING STREAM	AREA*	HUC-10
TNR053049	S&S Used Parts	M	UT to Reedy Creek	7.8	0601010206
TNR054064	Bays Truck salvage	M	UT to Reedy Creek	3.5	0601010206
TNR051254	Waste Management of Tennessee	P	Russell Creek	5	0601010206
TNR051754	General Shale Products	E, P	Reedy Creek	30	0601010206
TNR056451	Auto Center of Tennessee	M	Reedy Creek @ RM 0.5	34.9	0601010206
TNR050052	Midway Auto Salvage	M	WWC to Cedar Creek	4.5	0601010206
TNR053459	APAC Kingsport	P	Not Provided	11.57	0601010206
TNR054599	Tex-Tenn Corporation	V	Ford Creek	14.51	0601010206
TNR053641	Hilltop Auto Salvage	M	Leslie Branch	4.5	0601010206
TNR050051	Brookside Used Auto Parts	M	Miller Branch	3.91	0601010206
TNR056388	FedEx Freight East	P	Kendrick Creek	1	0601010206
TNR051870	TPI Corporation	AC	UT to Ford Creek	90	0601010206
TNR050881	Land-O-Sun Dairies	U	South Fork Holston River	9.5	0601010206
TNR050062	A-1 Auto salvage	M	Holston River	20	0601010206
TNR053545	Chiquola Fabrics	V	Holston River	19	0601010206
TNR056402	CSX Intermodal Terminal	P	Storm Sewer to Madd Branch @ RM 0.4	10	0601010206
TNR053953	Enterprise Transportation Company	P	South Fork Holston River	3	0601010206
TNR053962	BAE Systems Ordinance Systems (HAAP)	C, L	Holston River, South Fork Holston River, Madd Branch, Arnott Branch	2,100	0601010206
TNR051682	General Shale Products	E, P	Storm Drain to Reedy Creek	112.7	0601010206
TNR050524	Quebecor World	X	Reedy Creek	22.73	0601010206
TNR054024	Weyerhaeuser Company	B, P	South Fork Holston River and Reedy Creek	78.1	0601010206
TNR050883	Airgas-Mid America	C, AD	Holston River	8	0601010206
TNR053070	Kingsport STP	T	Reedy Creek	18	0601010206
TNR056422	Kingsport Vehicle Maintenance	P	South Fork Holston River	3.5	0601010206
TNR050444	Portola Packaging	Y	South Fork Holston River	5.98	0601010206

Table A4-10. Active Permitted TMSP Facilities in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed. *Area, acres of property associated with industrial activity; RM, River Mile; WWC, Wet Weather Conveyance. Sector details may be found in Table A4-11.*

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

Table A4-11. TMSP Sectors and Descriptions.

APPENDIX V

NUTRIENT MANAGEMENT PLANS APPLIED	ACRES
Feed Management	0
Irrigation Management	0
Water Management	0
Nutrient Management	78
Waste Utilization	0

Table A5-1a. Nutrient Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the South Fork Holston River Watershed. *Data are from PRMS for October 1, 2003 through September 30, 2004 reporting period. Data represent practices in both the Group 2 and Group 3 portions of the watershed.*

PARAMETER	ACRES
Acres of Pest Management Systems Applied	935

Table A5-1b. Pest Management Conservation Practices in Partnership with NRCS in the Tennessee Portion of the South Fork Holston River Watershed. *Data are from PRMS for October 1, 2003 through September 30, 2004 reporting period. Data represent practices in both the Group 2 and Group 3 portions of the watershed.*

CONSERVATION PRACTICE	AMOUNT	
	Feet	Acres
Fence		
Firebreak		
Forest Harvest Management		
Heavy Use Area Protection		
Pasture and Hay Planting		
Prescribed Grazing		436
Range Planting		
Use Exclusion		
Pipeline		
Prescribed Burning		
Total		**436**

Table A5-1c. Grazing/Forages Conservation Practices in Partnership with NRCS in the Tennessee Portion of the South Fork Holston River Watershed. *Data are from PRMS for October 1, 2003 through September 30, 2004 reporting period. Data represent practices in both the Group 2 and Group 3 portions of the watershed.*

COMMUNITY	PROJECT DESCRIPTION	AWARD DATE	AWARD AMOUNT
Kingsport	Wastewater Collection System Inspection and Rehabilitation	03/28/1996	$6,600,000
Kingsport	Wastewater Collection System Repair, Replacement and Rehabilitation	07/13/2000	$1,220,000
Kingsport	Wastewater Collection System Repair, Replacement and Rehabilitation	01/28/1999	$2,418,650
Kingsport	Wastewater Collection System Repair, Replacement and Rehabilitation	06/28/1999	$2,781,000

Table A5-2. Communities in the Group 3 Portion of the Tennessee Portion of the South Fork Holston River Watershed Receiving SRF Grants or Loans.

PRACTICE	NRCS CODE	NUMBER OF BMPs
Critical Area Planting	342	1
Fence	382	5
Heavy Use Area	561	2
Pasture/Hay Planting	512	1
Pipeline	516	2
Pond	378	9
Stream Crossing	578	1
Watering Facility	614	7

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