

CHAPTER 2

DESCRIPTION OF THE LOWER TENNESSEE RIVER WATERSHED

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2.1. BACKGROUND. Chickamauga dam is located 20 miles northeast of Chattanooga. The dam completion in 1940--the fourth of TVA's main river projects--created Chickamauga Lake, named in honor of the Chickamauga tribe of native Americans who broke away from the main band of the Cherokee Nation. Chickamauga villages once lined the shores of present day Chickamauga Lake.

This Chapter describes the location and characteristics of the Group 3 portion of the Tennessee portion of the Lower Tennessee River Watershed.

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. The Group 3 portion of the Tennessee portion of the Lower Tennessee River Watershed is located in Tennessee, Georgia, and Alabama. The Group 3 portion of the Tennessee portion of the Lower Tennessee River Watershed (62.4% of the entire Tennessee portion; 40.5% of the entire watershed) includes parts of Bledsoe, Bradley, Hamilton, Loudon, McMinn, Meigs, Rhea, Roane, and Sequatchie Counties.

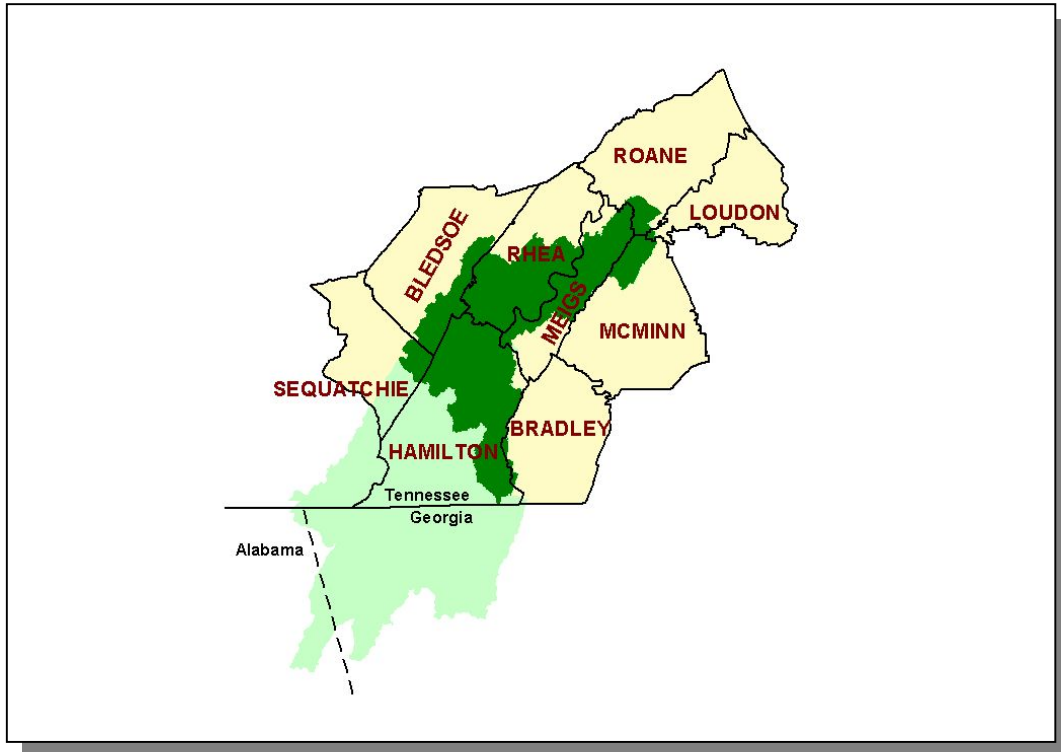


Figure 2-1. General Location of the Group 3 Portion of the Tennessee Portion of the Lower Tennessee River Watershed. Dark green, Group 3 portion of the Tennessee portion (757 square miles); light green, Group 4 (457 square miles), Georgia (612 square miles) and Alabama (57 square miles) portions.

COUNTY	% OF WATERSHED IN EACH COUNTY
Hamilton	37.6
Rhea	24.4
Meigs	18.4
Bledsoe	8.9
McMinn	5.1
Sequatchie	3.2
Roane	1.6
Bradley	0.5
Loudon	0.2

Table 2-1. The Lower Tennessee River Watershed Includes Parts of Nine East Tennessee Counties. Percentages are calculated for the Group 3 portion of the Tennessee portion of watershed.

2.2.B. Population Density Centers. Four state highways and one interstate serve the major communities in the Group 3 portion of the Tennessee portion of the Lower Tennessee River Watershed.



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

MUNICIPALITY	POPULATION	COUNTY
Collegedale	6,531	Hamilton
Dayton*	6,403	Rhea
Decatur*	1,671	Meigs
Graysville	1,538	Rhea

Table 2-2. Communities and Populations in the Group 3 Portion of the Tennessee Portion of the Lower Tennessee River Watershed. Population based on 1999 census (Tennessee 2001/2002 Blue Book). Asterisk (*) indicates county seat.

2.3. GENERAL HYDROLOGIC DESCRIPTION.

2.3.A. Hydrology. The Lower Tennessee River Watershed, designated 06020001 by the USGS, drains approximately 1,870 square miles, 1,201 square miles of which are in Tennessee. The Group 3 portion is 757 square miles.

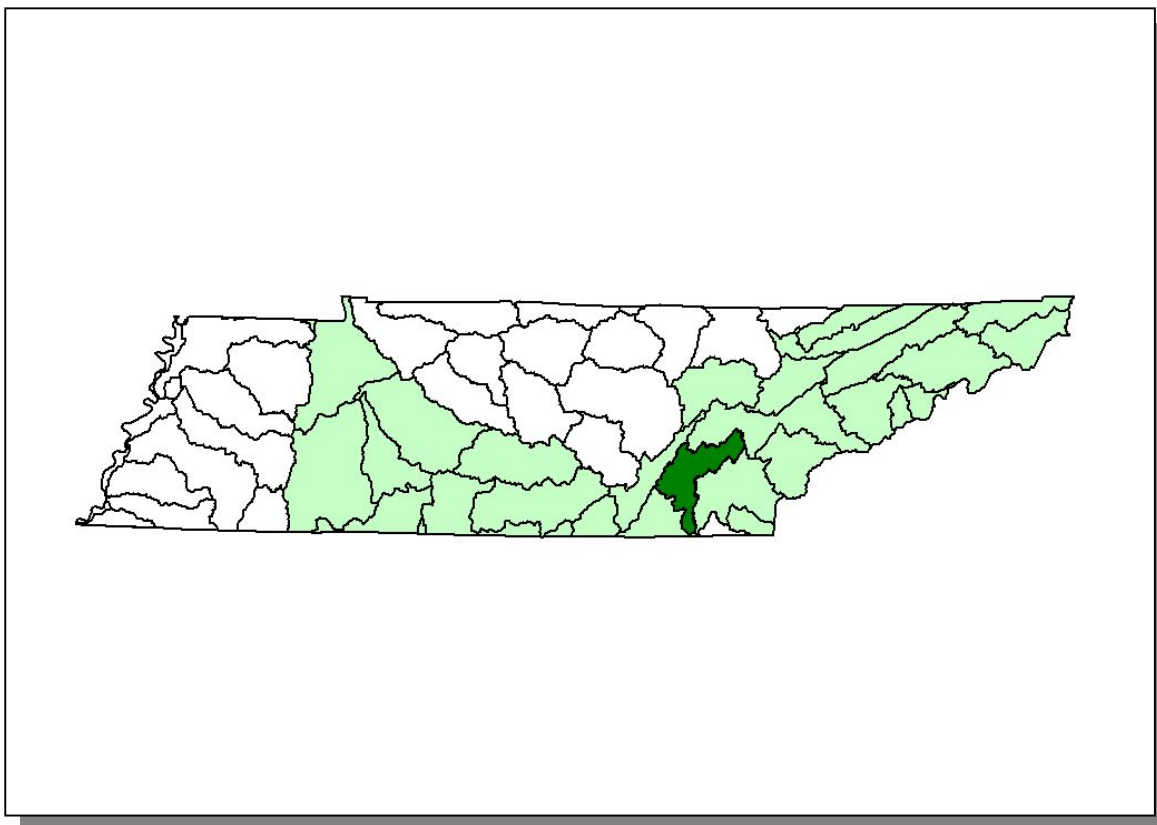


Figure 2-3. The Lower Tennessee River Watershed is Part of the Tennessee River Basin.
The Group 3 portion is shown in dark green.

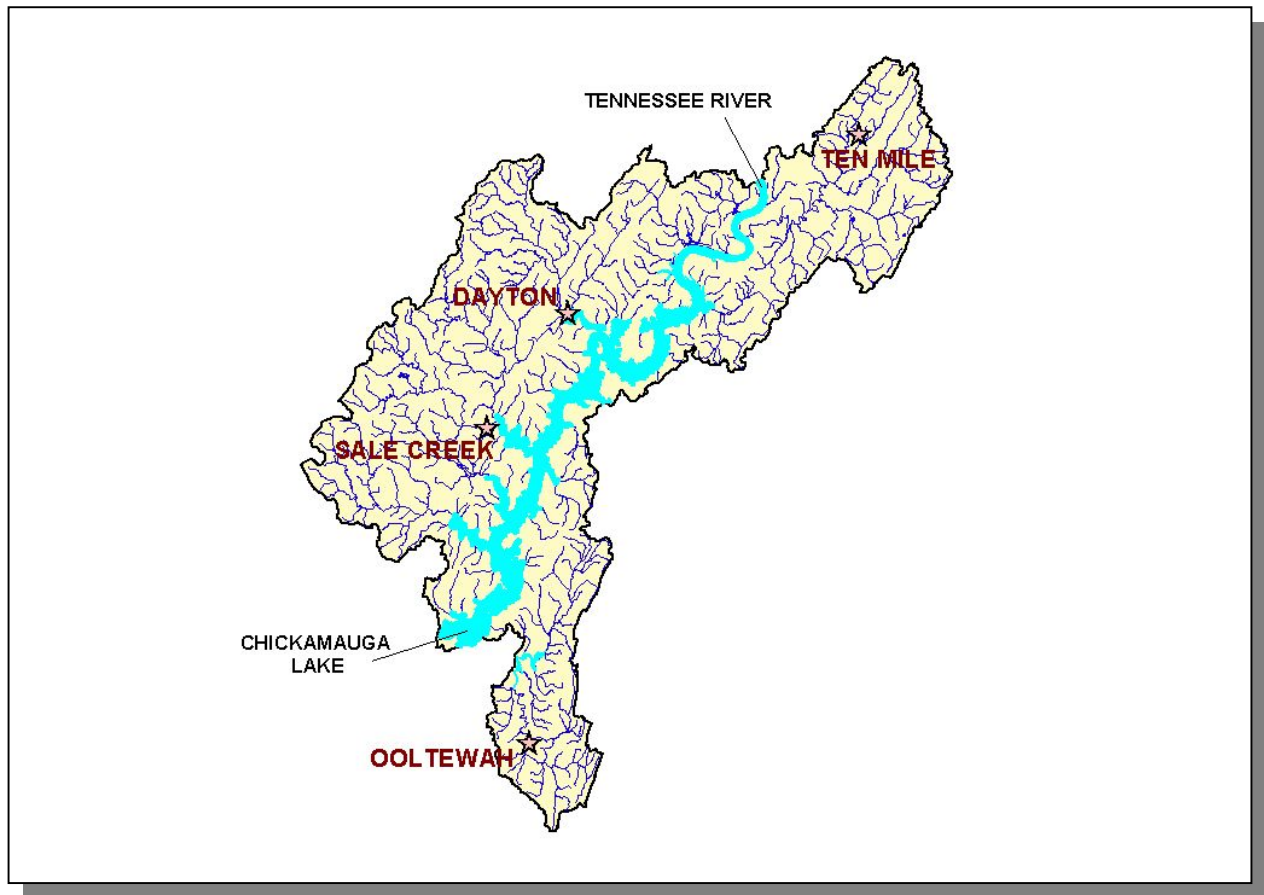


Figure 2-4. Hydrology in the Group 3 Portion of the Tennessee Portion of the Lower Tennessee River Watershed. There are 974 stream miles in the Group 3 portion of the Tennessee portion of the Lower Tennessee River Watershed as catalogued in the River Reach File 3 database. An additional 529 stream miles are located in the Group 4 portion of the Tennessee portion of the watershed, 976 stream miles are located in the Georgia portion of the watershed, and 82 stream miles are located in the Alabama portion of the watershed as catalogued in the River Reach File 3 database. 45,780 lake acres are located in the Tennessee portion of the entire watershed as catalogued in the assessment database. Location of the Tennessee River and Chickamauga Lake, and the cities of Dayton, Ooltewah, Sale Creek, and Ten Mile are shown for reference.

2.3.B. Dams. There are 9 dams inventoried by TDEC Division of Water Supply in the Group 3 Portion of the Tennessee Portion of the Lower Tennessee River Watershed. These dams either retain 30 acre-feet of water or have structures at least 20 feet high.

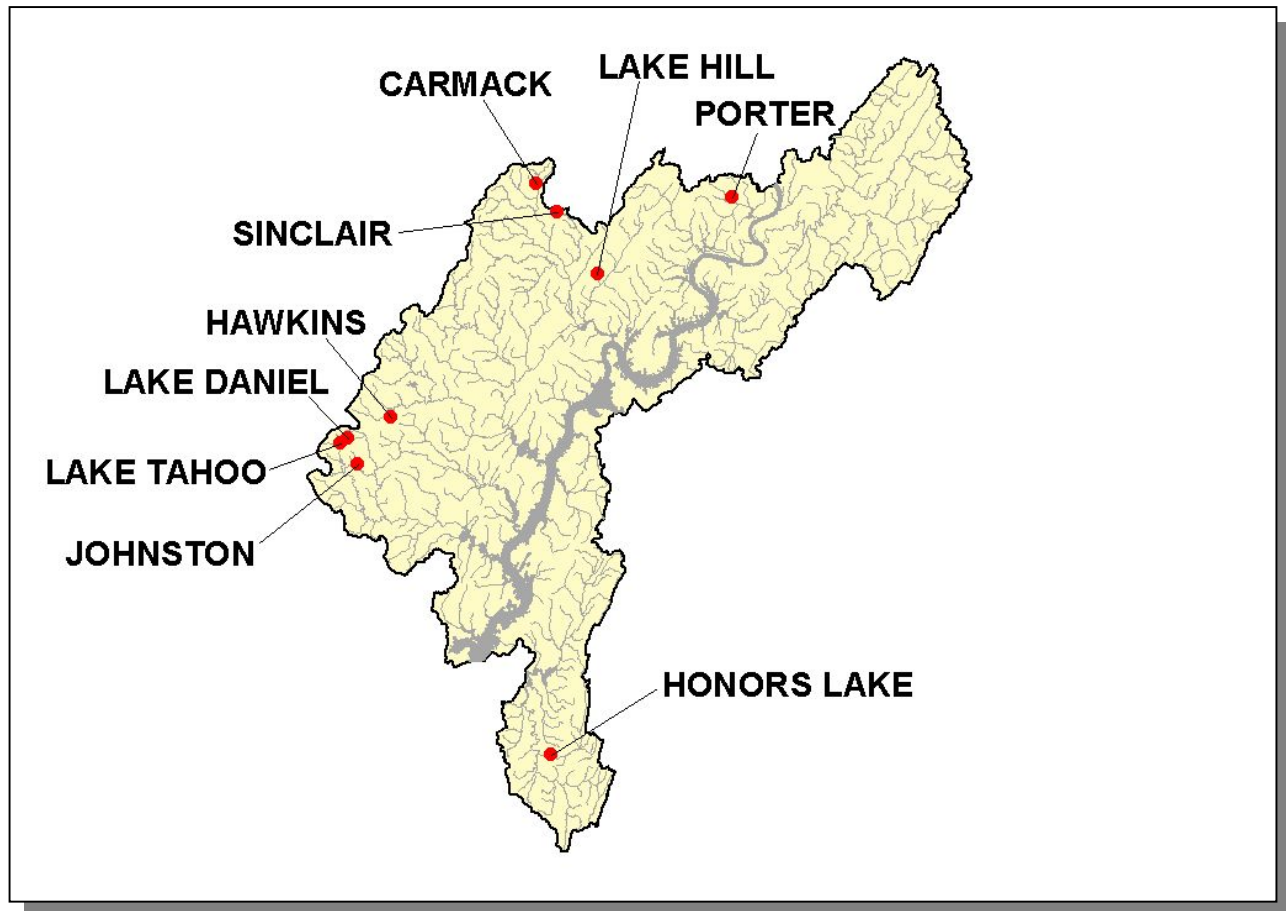


Figure 2-5. Location of Inventoried Dams in the Group 3 Portion of the Tennessee Portion of the Lower Tennessee River Watershed. More information is provided in Appendix II and on the TDEC homepage at <http://gwidc.memphis.edu/website/dws/>.

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.

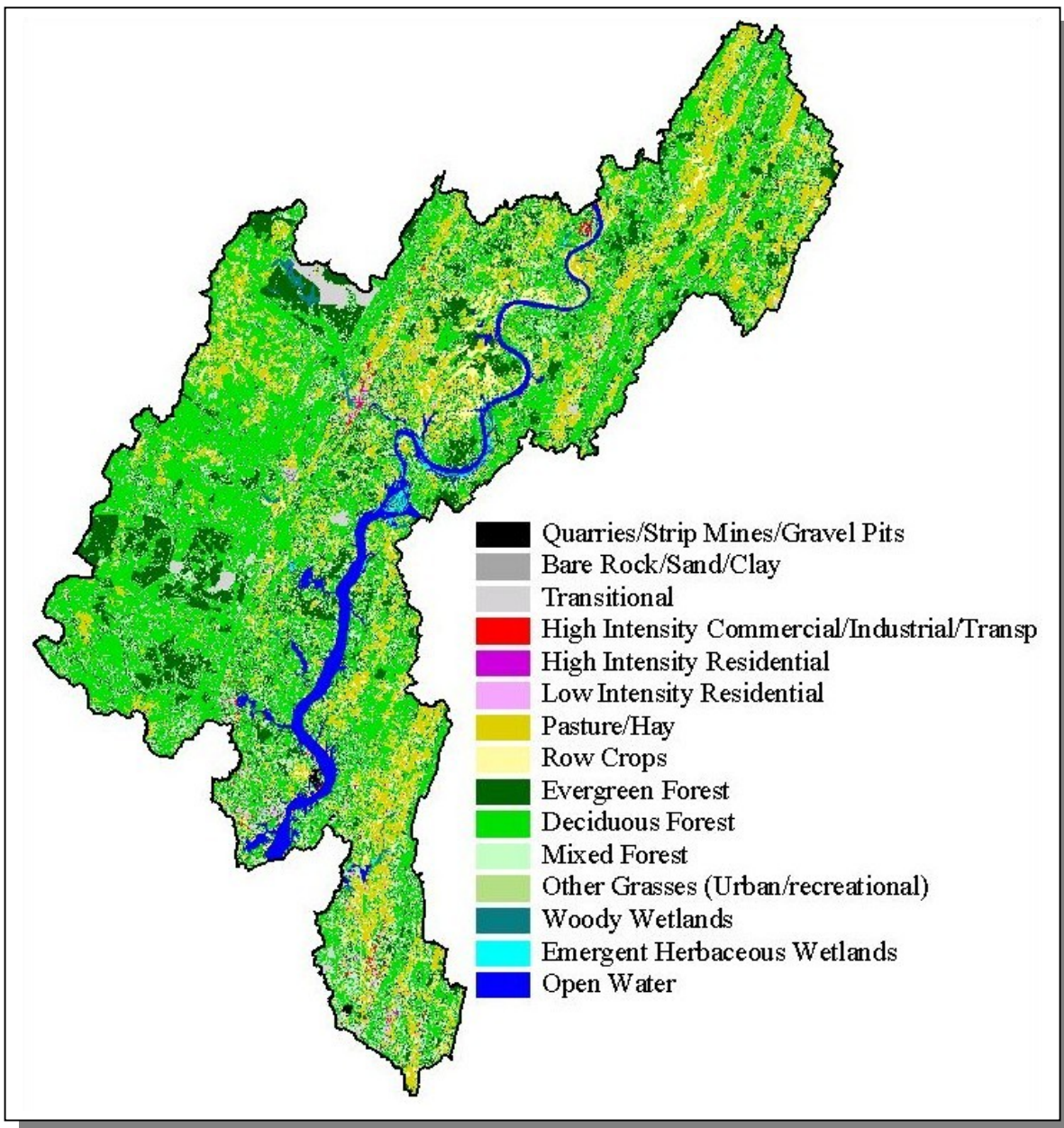


Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery in the Group 3 Portion of the Tennessee Portion of the Lower Tennessee River Watershed.

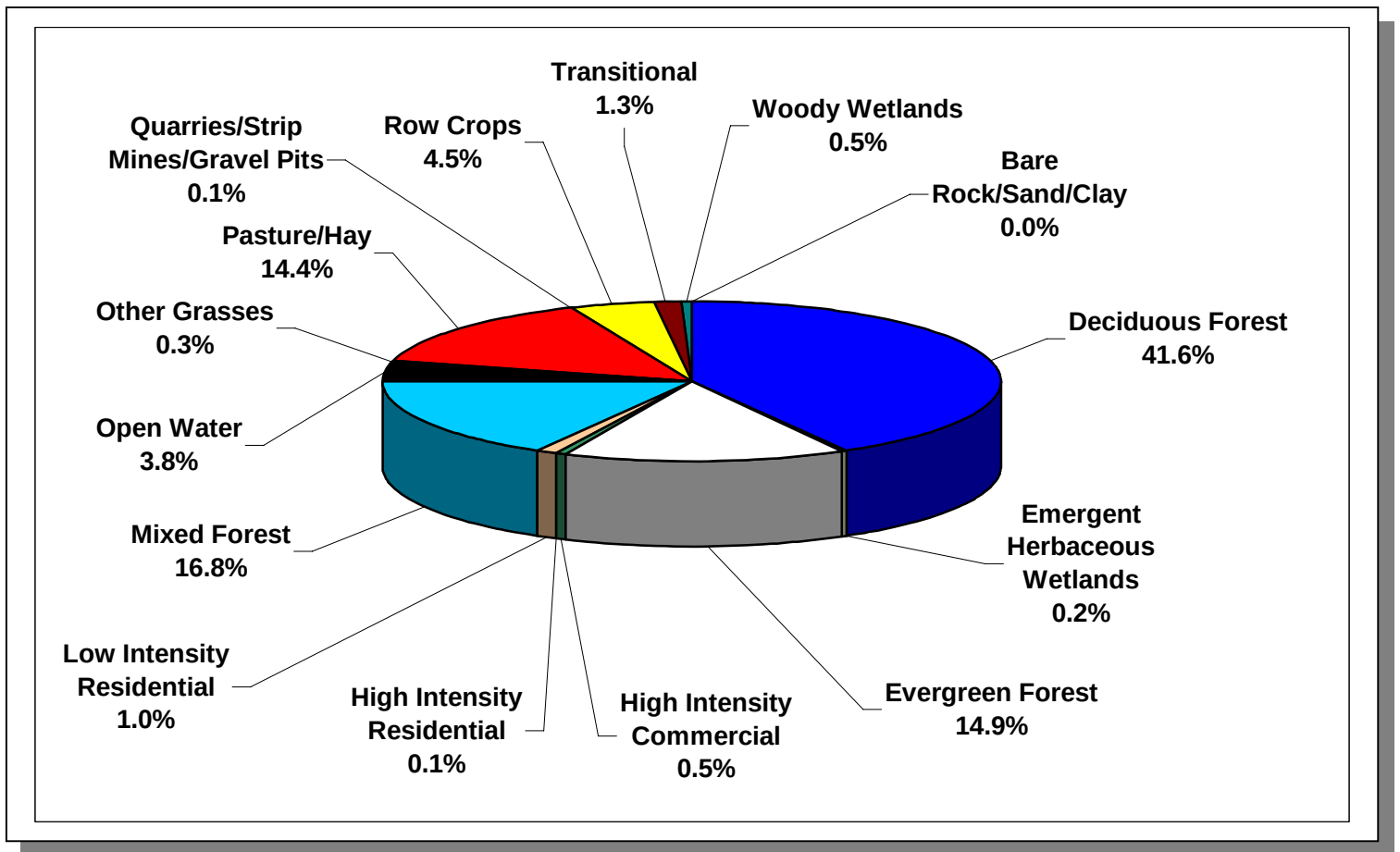


Figure 2-7. Land Use Distribution in the Group 3 Portion of the Tennessee Portion of the Lower Tennessee River Watershed. More information is provided in Appendix II.

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.

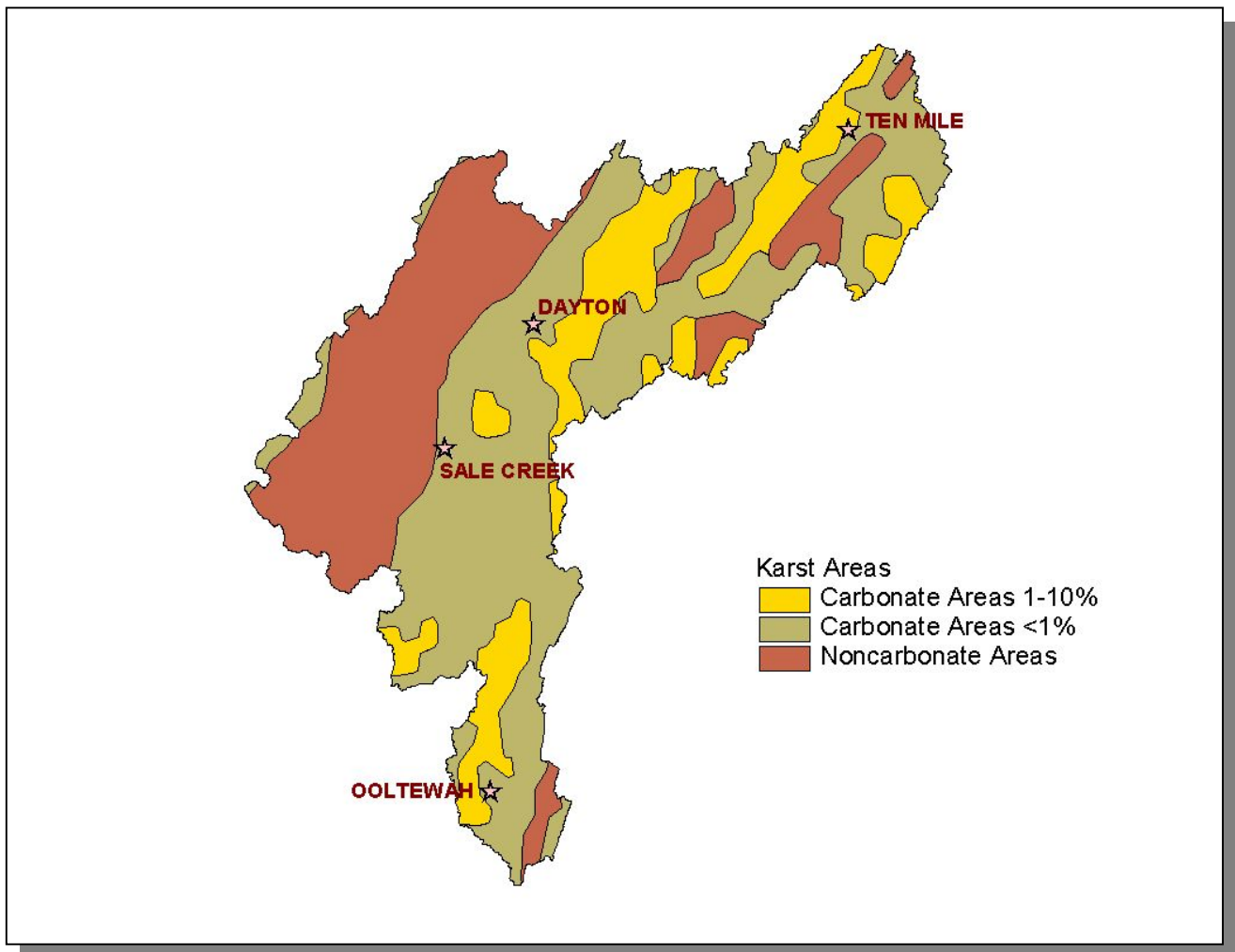


Figure 2-8. Illustration of Karst Areas in the Group 3 Portion of the Tennessee Portion of the Lower Tennessee River Watershed. Locations of Dayton, Ooltewah, Sale Creek, and Ten Mile are shown for reference.

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 Lower Tennessee River Watershed lies within 2 Level III ecoregions (Ridge and Valley and Southwestern Appalachians) and contains 6 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.

- **Cumberland Plateau (68a)** tablelands and open low mountains are about 1000 feet higher than the Eastern Highland Rim (71g) to the west, and receive slightly more precipitation with cooler annual temperatures than the surrounding lower-elevation ecoregions. The plateau surface is less dissected with lower relief compared to the Cumberland Mountains (69d) or the Plateau Escarpment (68c). Elevations are generally 1200-2000 feet, with the Crab Orchard Mountains reaching over 3000 feet. Pennsylvanian-age conglomerate, sandstone, siltstone, and shale is covered by well-drained, acid soils of low fertility. Bituminous coal that has been extensively surface and underground mined underlies the region. Acidification of first and second order streams is common. Stream siltation and mine spoil bedload deposits continue as long-term problems in these headwater systems. Pockets of severe acid mine drainage persist.
- **Plateau Escarpment (68c)** is characterized by steep, forested slopes and high velocity, high gradient streams. Local relief is often 1000 feet or more. The geologic strata include Mississippian-age limestone, sandstone, shale, and siltstone, and Pennsylvanian-age shale, siltstone, sandstone, and conglomerate. Streams have cut down into the limestone, but the gorge talus slopes are composed of colluvium with huge angular, slabby blocks of sandstone. Vegetation community types in the ravines and gorges include mixed oak and chestnut oak on the upper slopes, mesic forests on the middle and lower slopes (beech-tulip poplar, sugar maple-basswood-ash-buckeye), with hemlock along rocky streamsides and river birch along floodplain terraces.

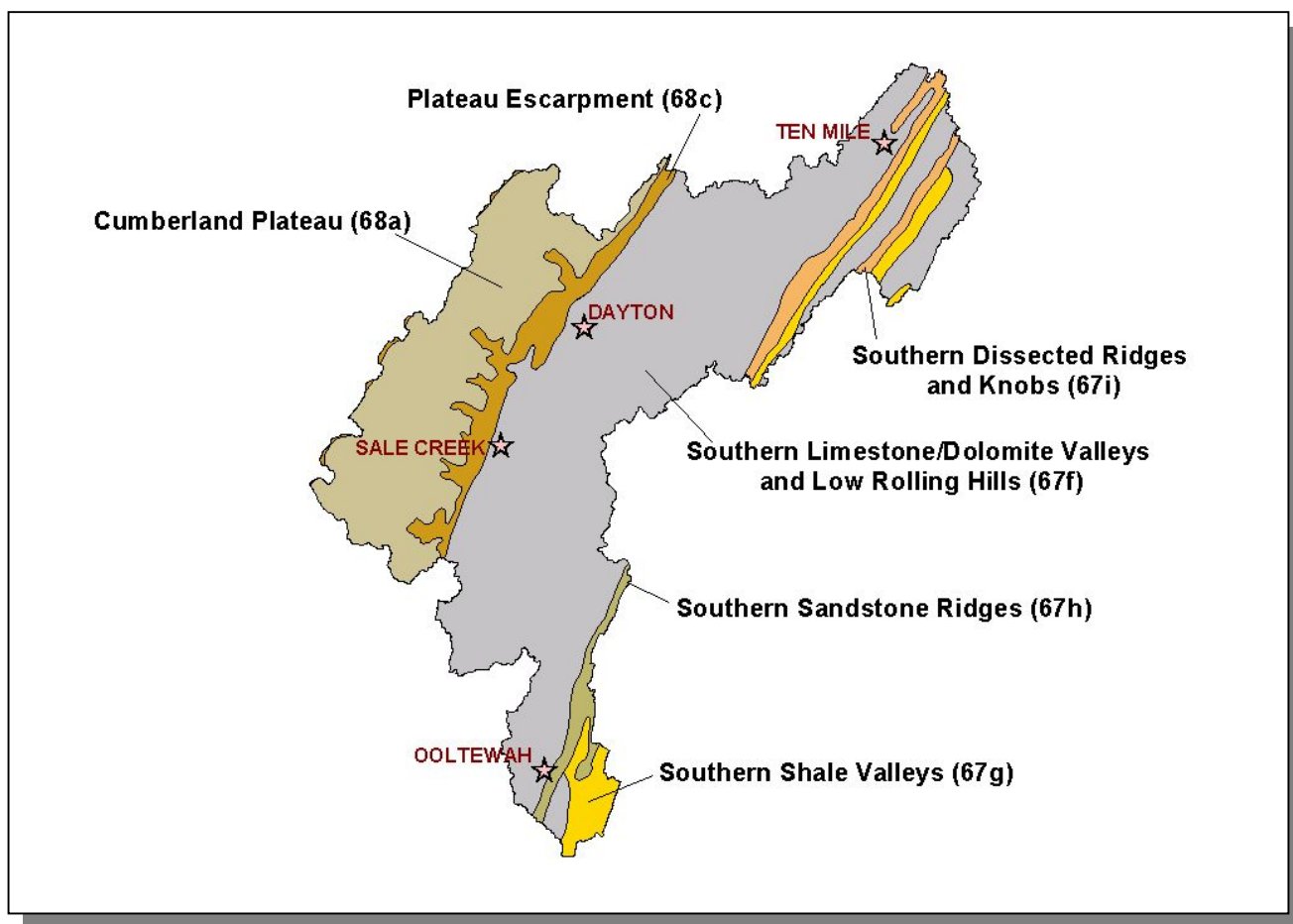


Figure 2-9. Level IV Ecoregions in the Group 3 Portion of the Tennessee Portion of the Lower Tennessee River Watershed Locations of Dayton, Ooltewah, Sale Creek, and Ten Mile are shown for reference.

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.

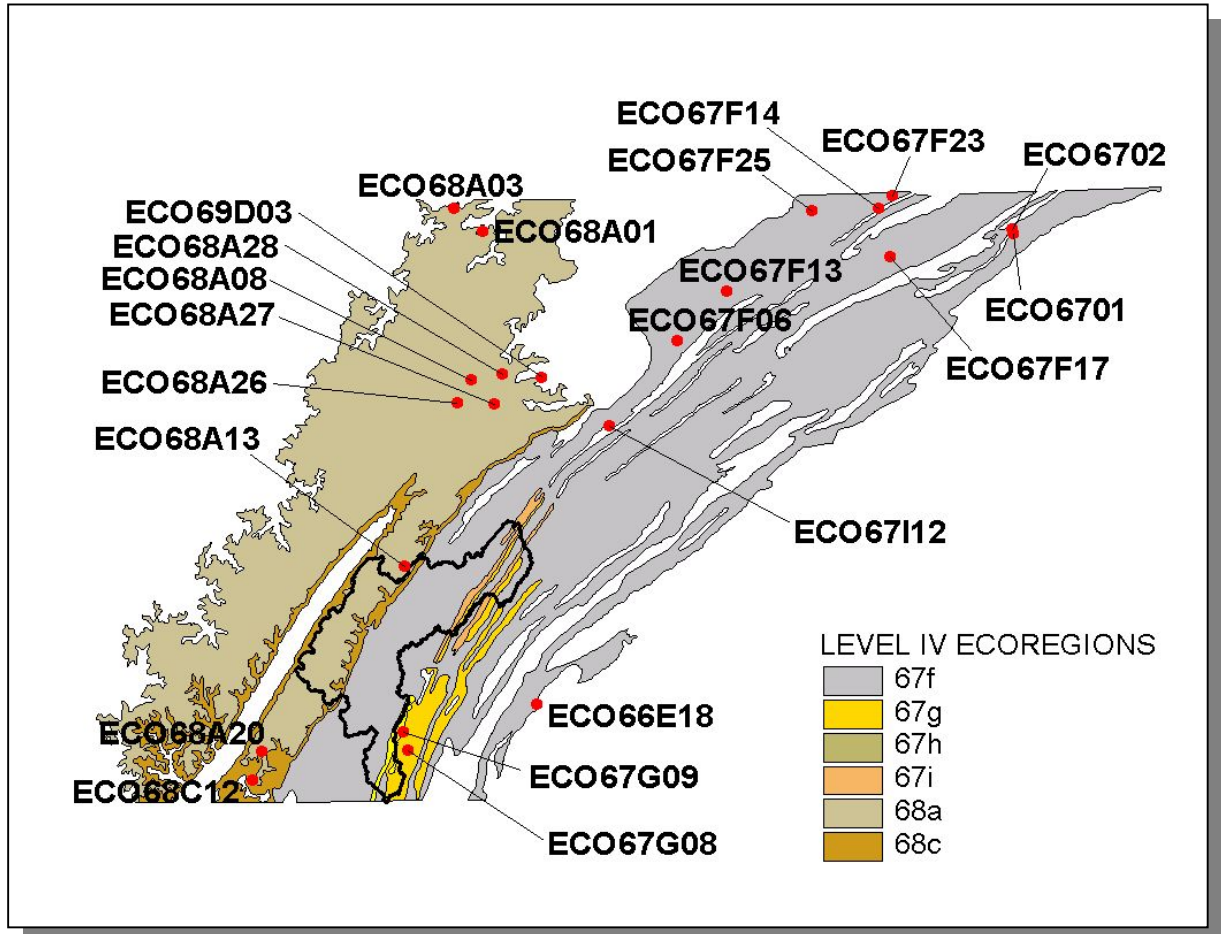


Figure 2-10. Ecoregion Monitoring Sites in Level IV Ecoregions 67f, 67g, 67h, 67i, 68a, 67h, and 68c in Tennessee. The Group 3 portion of the Tennessee portion of the Lower Tennessee River Watershed boundary is shown for reference. More information is provided in Appendix II.

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
Crustaceans	1
Insects and Spiders	5
Mussels	8
Snails	1
Other Invertebrates	2
Amphibians	5
Birds	11
Fish	6
Mammals	6
Reptiles	2
Plants	64
Total	111

Table 2-3. There are 111 Known Rare Plant and Animal Species in the Tennessee Portion (Groups 3 and 4) of the Lower Tennessee River Watershed.

In the Tennessee Portion of the Lower Tennessee River Watershed (Groups 3 and 4 portions), there are 7 rare fish species, 1 rare crustacean species, 9 rare mussel species, and 2 rare snail species.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
<i>Carpiodes velifer</i>	Highfin Carpsucker		D
<i>Hemitremia flammea</i>	Flame Chub	MC	D
<i>Percina tanasi</i>	Snail darter	LT	T
<i>Phoxinus saylori</i>	Laurel dace		E
<i>Phoxinus tennesseensis</i>	Tennessee Dace		D
<i>Typhlichthys subterraneus</i>	Southern Cavefish	MC	D
<i>Cambarus extraneus</i>	Chickamauga Crayfish	MC	T
<i>Cyprogenia irrorata</i>	Eastern Fantail Pearly Mussel	LE	E
<i>Dromus dromus</i>	Dromedary Pearly Mussel	LE	E
<i>Lampsilis abrupta</i>	Pink Mucket	LE	E
<i>Plethobasus cooperianus</i>	Orange-Foot Pimpleback	LE	E
<i>Pleurobema oviforme</i>	Tennessee Clubshell		
<i>Pleurobema plenum</i>	Rough Pigtoe	LE	E
<i>Pleurobema rubrum</i>	Pyramid Pigtoe		
<i>Quadrula intermedia</i>	Cumberland Monkeyface	LE	E
<i>Io fluvialis</i>	Spiny Riversnail		

Table 2-4. Rare Aquatic Species in the Tennessee Portion of the Lower Tennessee 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/>

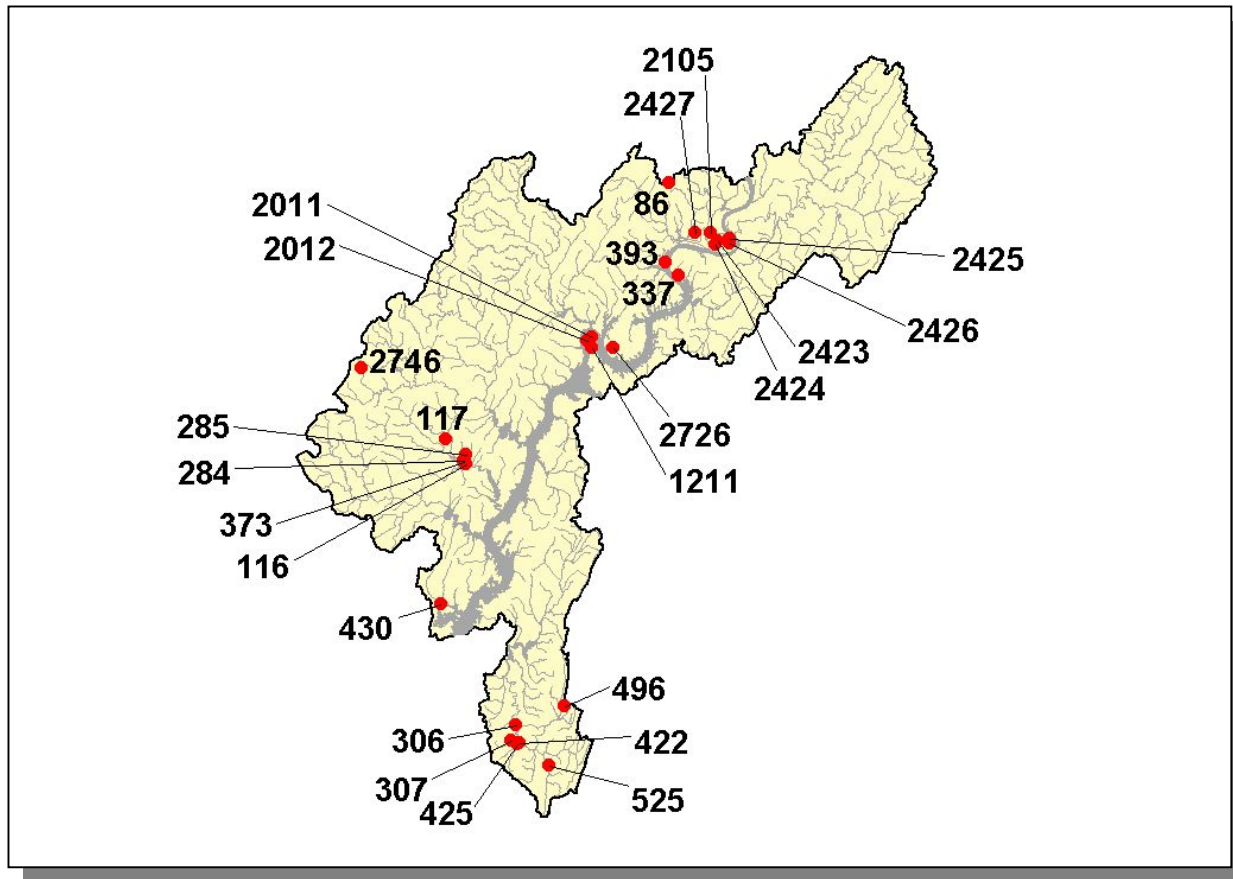


Figure 2-11. Location of Wetland Sites in TDEC Division of Natural Heritage Database in the Group 3 Portion of the Tennessee Portion of the Lower Tennessee River Watershed. This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands. More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

2.7. CULTURAL RESOURCES.

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

- Birchwood Elementary School Trail
- Sale Creek High School Trail
- Wolftever Creek Greenway

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 and cultural heritage are under state or federal protection:

- Hiwassee Wildlife Refuge has a platform area for viewing the up to 50,000 migrating greater sandhill cranes. The approximately 1,300 acres are managed for wildlife by TWRA.
- Watts Bar Dam Reservation features boating, fishing, swimming, and camping. The site is managed by TVA.
- Harrison Bay State Park was originally developed as a TVA recreation demonstration area in the 1930's. The 1,220-acre park has 40 miles of Chickamauga lake shoreline and is managed by the state of Tennessee.
- Booker T. Washington State Park is a 353-acre park along TVA's Chickamauga Lake. The Park is named in honor of Booker Taliaferro Washington, a former president of Tuskegee Institute.

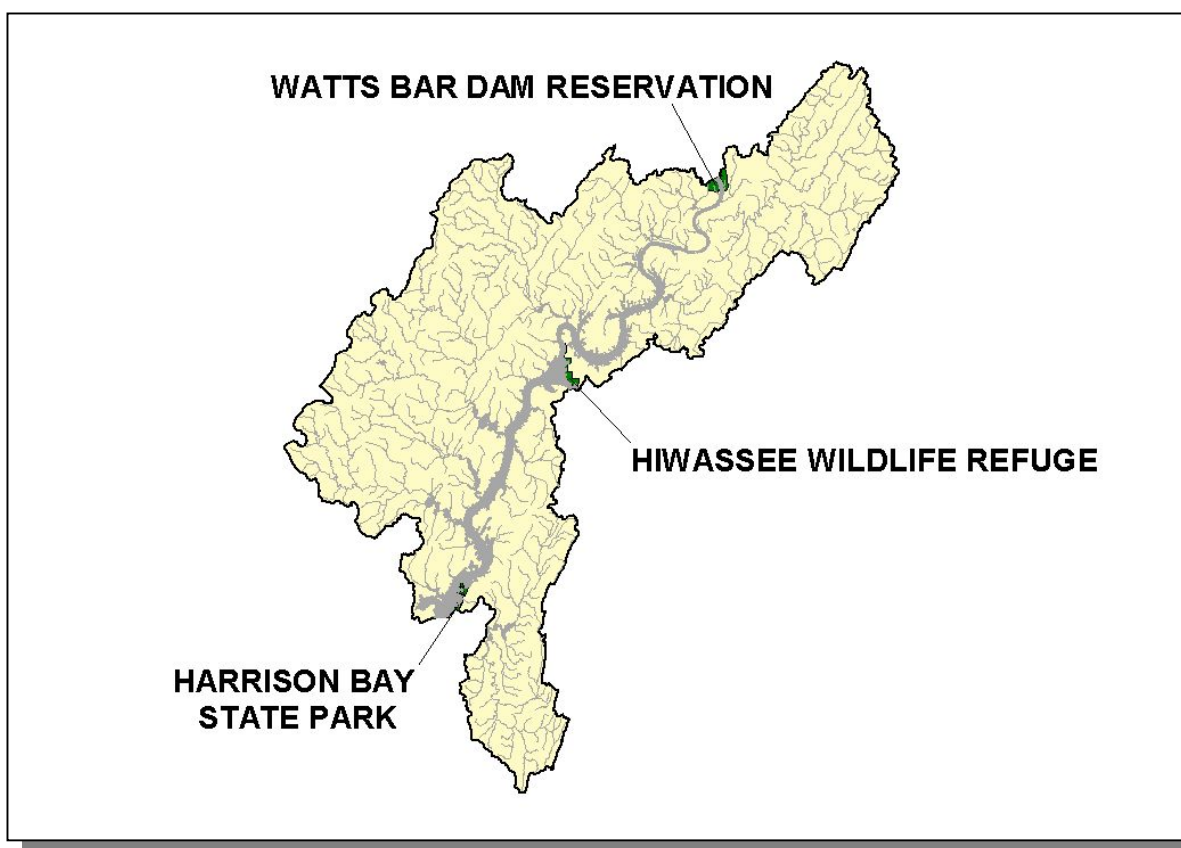


Figure 2-12. Locations of State- and Federally-Managed Lands in the Group 3 Portion of the Tennessee Portion of the Lower Tennessee River Watershed.

2.7.C. Wildlife Management Area. The Tennessee Wildlife Resources Agency manages two wildlife management areas in the Group 3 Portion of the Tennessee Portion of the Lower Tennessee River Watershed.

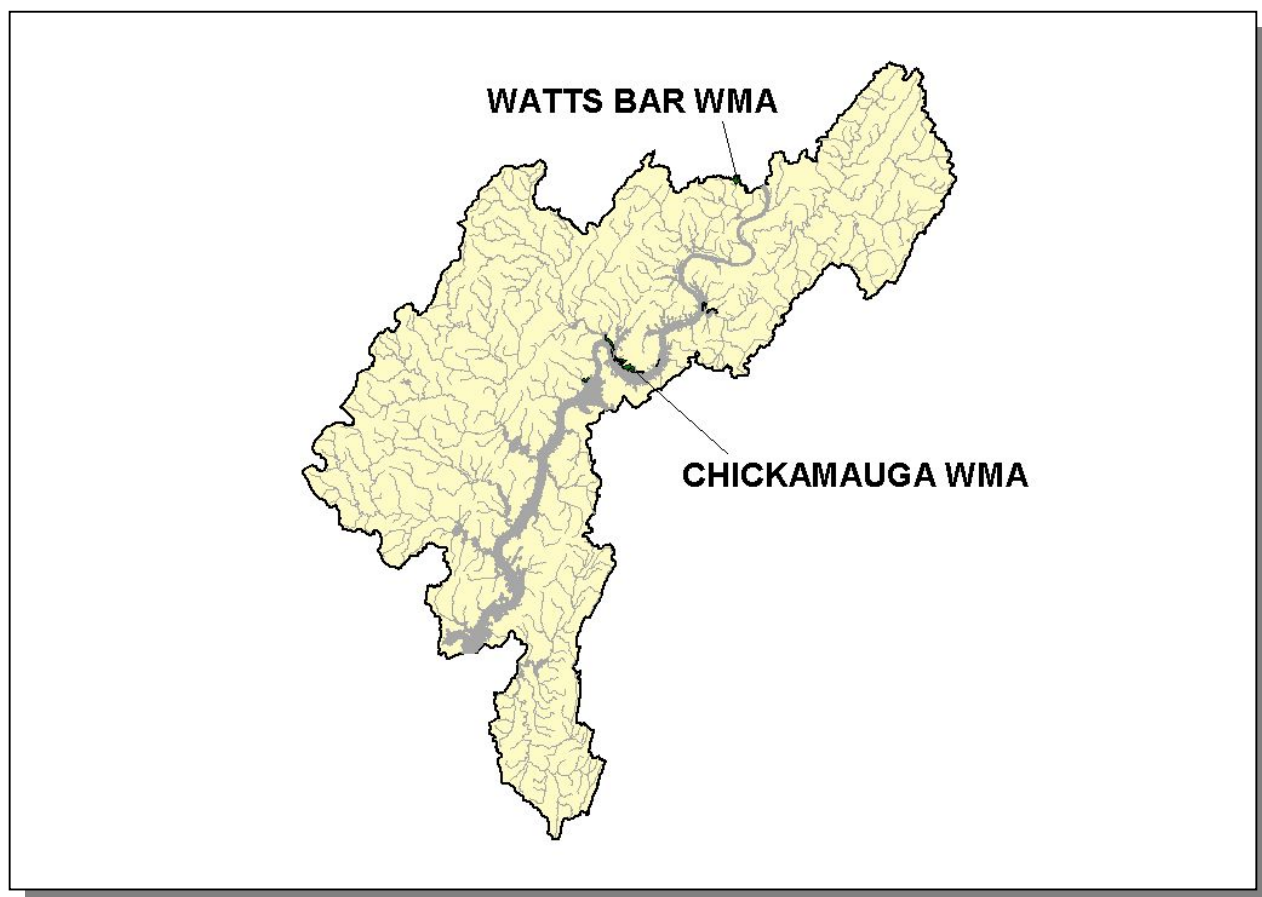


Figure 2-13. TWRA Manages Wildlife Management Areas in the Group 3 Portion of the Tennessee Portion of the Lowe Tennessee River Watershed.

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
Bear Branch Creek	2				McGill Creek	2	3	
Big Possum Creek	1				North Suck Creek	2	2,3	
Big Sewee Creek	2	2	3,4		Paine Creek	2		
Black Ankle Creek	3				Polebridge Creek	3		
Blue Springs Branch Creek	3				Possum Creek	2	2	
Broad Camp Creek	3				Richland Creek	1	2,3	
Brush Creek	1				Roaring Creek	1,2	2	
Clear Creek	3		3		Rock Creek	1	2	
Dry Fork Creek	3				Sale Creek	3		
Fork Creek	2				Soddy Creek	1	2	
Goodfield Creek	3				South Chickamauga Creek	3	2	
Gray Creek	1				South Fork Little Sewee Creek	2		
Henderson Creek	1	2			South Suck Creek	1		
Hurricane Creek	3				Suck Creek	2	2	
Little Ooltewah Creek	2				Sugar Creek	3		
Little Possum Creek	1	2			Tenmile Creek	3		3
Little Sewee Creek	3		3		Tigues Creek	3	2	
Little Woftever Creek	4				Woltever Creek	3		
Long Savannah Creek	3				Yellow Creek	4		

Table 2-5. Stream Scoring from the Tennessee Rivers Assessment Project in the Lower Tennessee River Watershed. Streams listed may be in the Group 3 or Group 4 portions of the 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