CHAPTER 2

DESCRIPTION OF THE STONES RIVER WATERSHED

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2.1 BACKGROUND. The battle of Stones River, fought in 1862, was one of the bloodiest battles of the Civil War. The watershed contains Percy Priest Reservoir, which is popular for recreational boating and fishing.

The Stones River Watershed contains low to moderate gradient streams, with productive, nutrient-rich waters, which result in algae, rooted vegetation, and occasionally high densities of fish. Its streams flow over large expanses of limestone bedrock. Land in the Stones River Watershed is utilized by agriculture, industry, and urbanization.

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

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. The Stones River Watershed is located in Middle Tennessee and includes parts of Cannon, Davidson, Rutherford, and Wilson Counties.

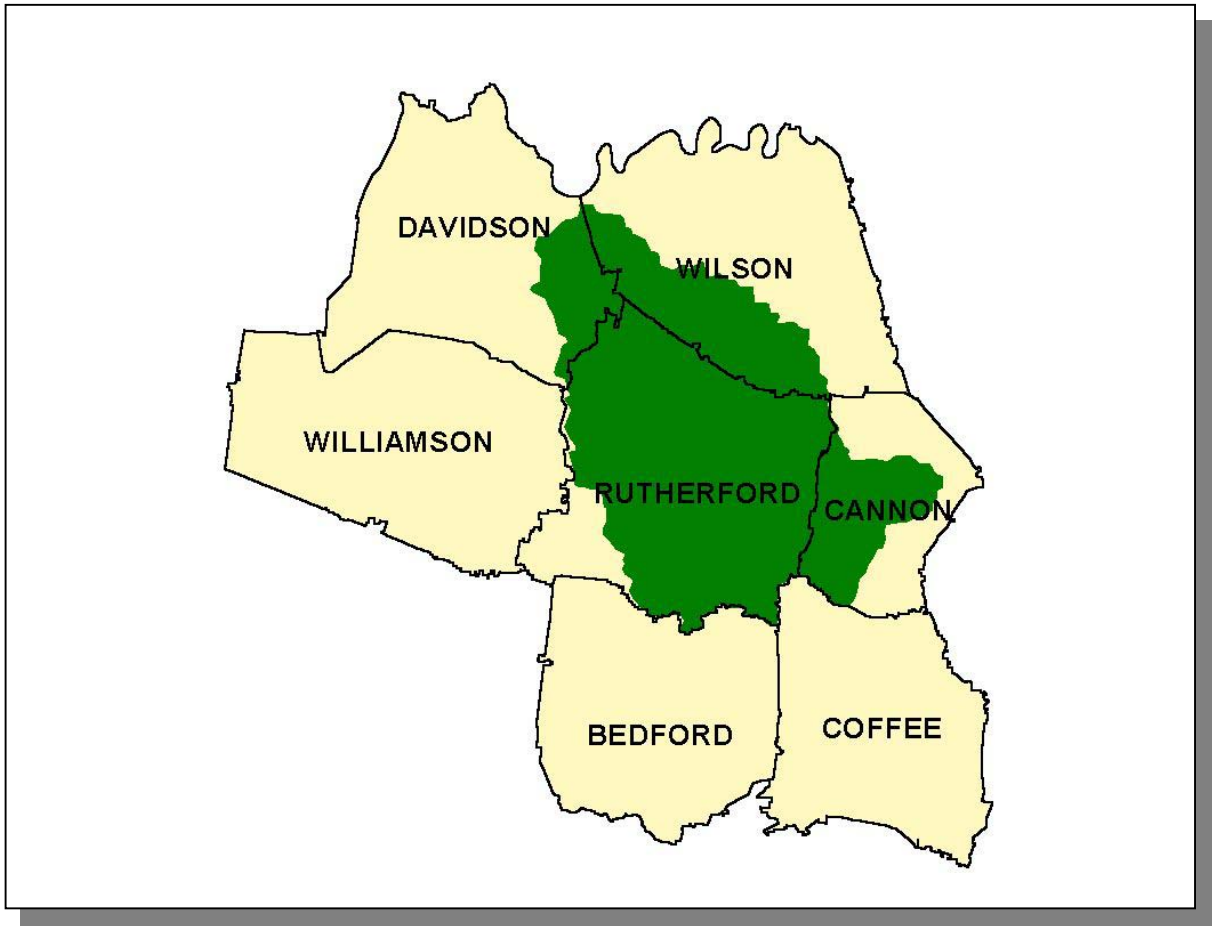

Figure 2-1. General Location of the Stones River Watershed.

COUNTY	% OF WATERSHED IN EACH COUNTY
Rutherford	59.6
Wilson	18.4
Cannon	13.7
Davidson	8.3

Table 2-1. The Stones River Watershed Includes Parts of Four Middle Tennessee Counties.

2.2.B. Population Density Centers. Two interstates (I-24, I-40) and five state highways serve the major communities in the Stones River Watershed.

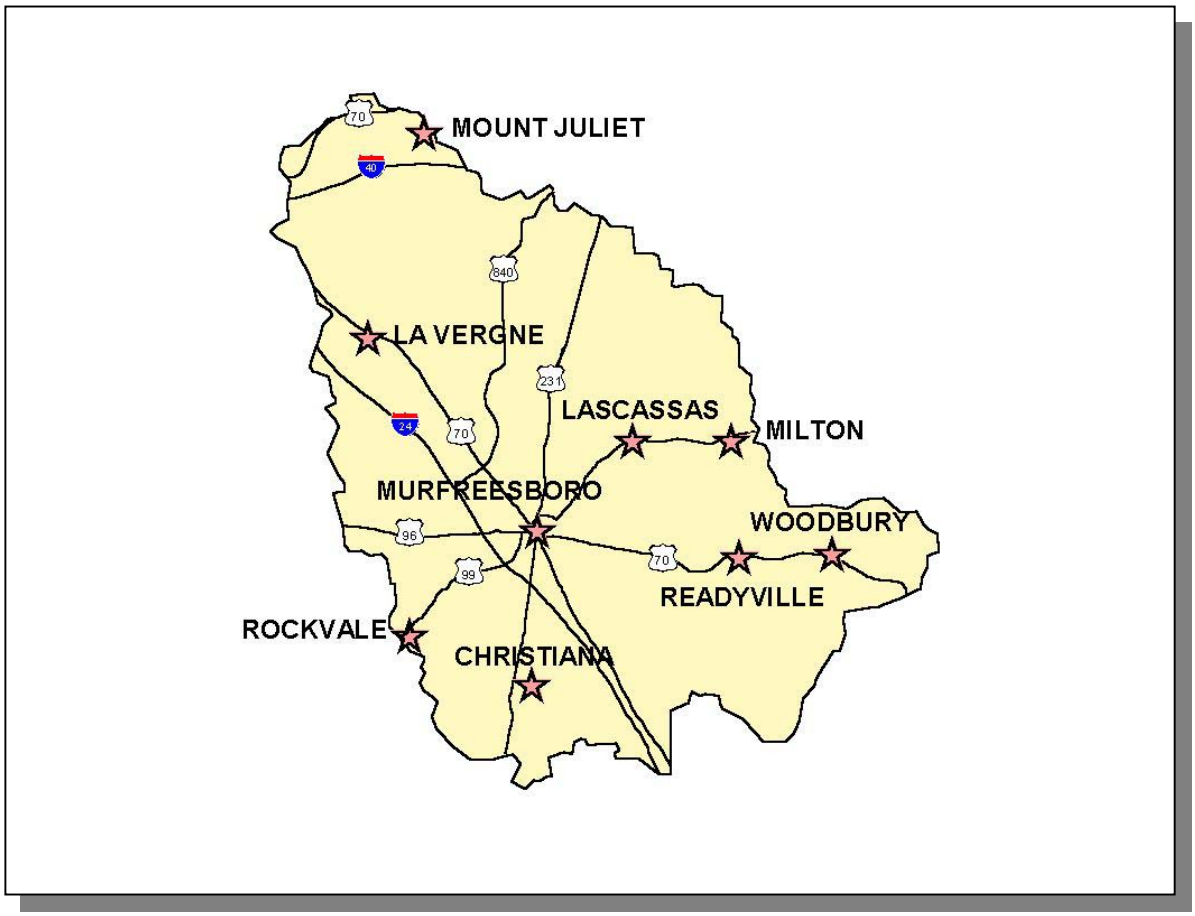

Figure 2-2. Municipalities and Roads in the Stones River Watershed.

MUNICIPALITY	POPULATION	COUNTY
Murfreesboro*	44,922	Rutherford
Smyrna	13,647	Rutherford
LaVergne	7,499	Rutherford
Mount Juliet	5,839	Wilson
Woodbury*	2,287	Cannon

Table 2-2. Municipalities in the Stones River Watershed. *Population based on 1990 census (Tennessee Blue Book). Asterisk (*) indicates county seat.*

2.3. GENERAL HYDROLOGIC DESCRIPTION.

2.3.A. Hydrology. The Stones River Watershed, designated the Hydrologic Unit Code 05130203 by the USGS, is approximately 921 square miles and drains to the Cumberland River.

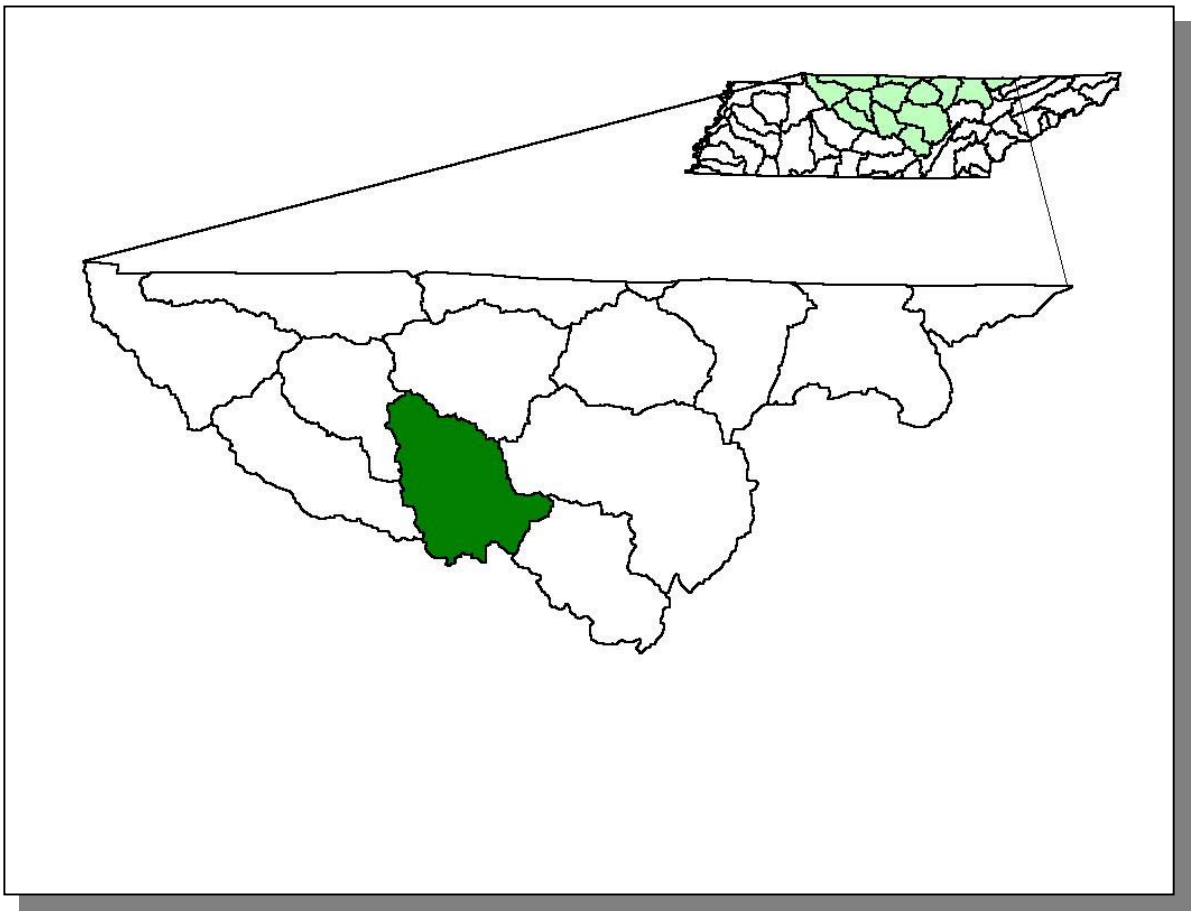

Figure 2-3. The Stones River Watershed is part of the Cumberland River Basin.

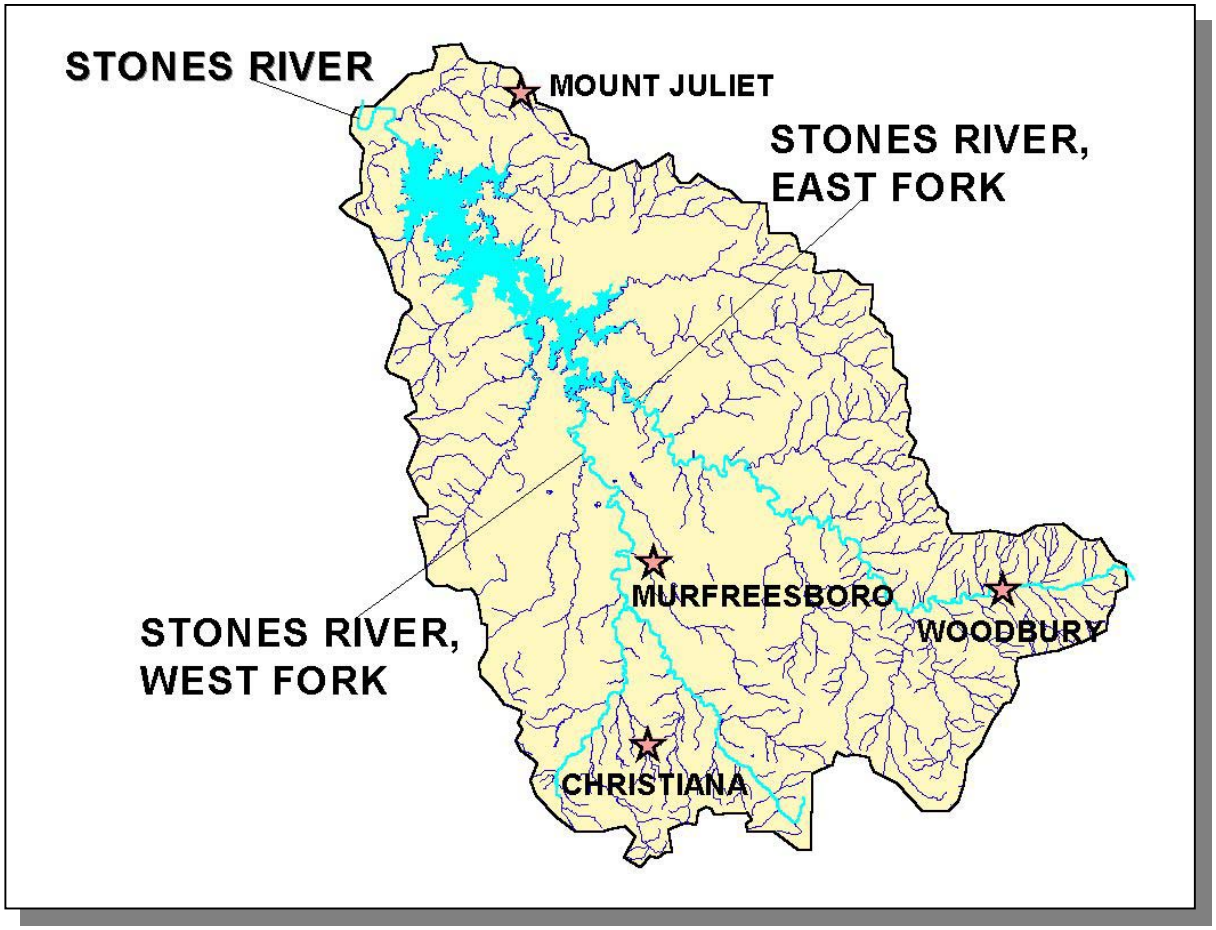

Figure 2-4. Hydrology in the Stones River Watershed. *There are 1,031 stream miles and 22,691 lake acres recorded in River Reach File 3 in the Stones River Watershed. Locations of Christiana, Mount Juliet, Murfreesboro, and Woodbury are shown for reference.*

2.3.B. Dams. There are 13 dams inventoried by TDEC Division of Water Supply in the Stones River Watershed. These dams either retain at least 30 acre-feet of water or have structures at least 20 feet high. Additional dams may be found in the watershed.

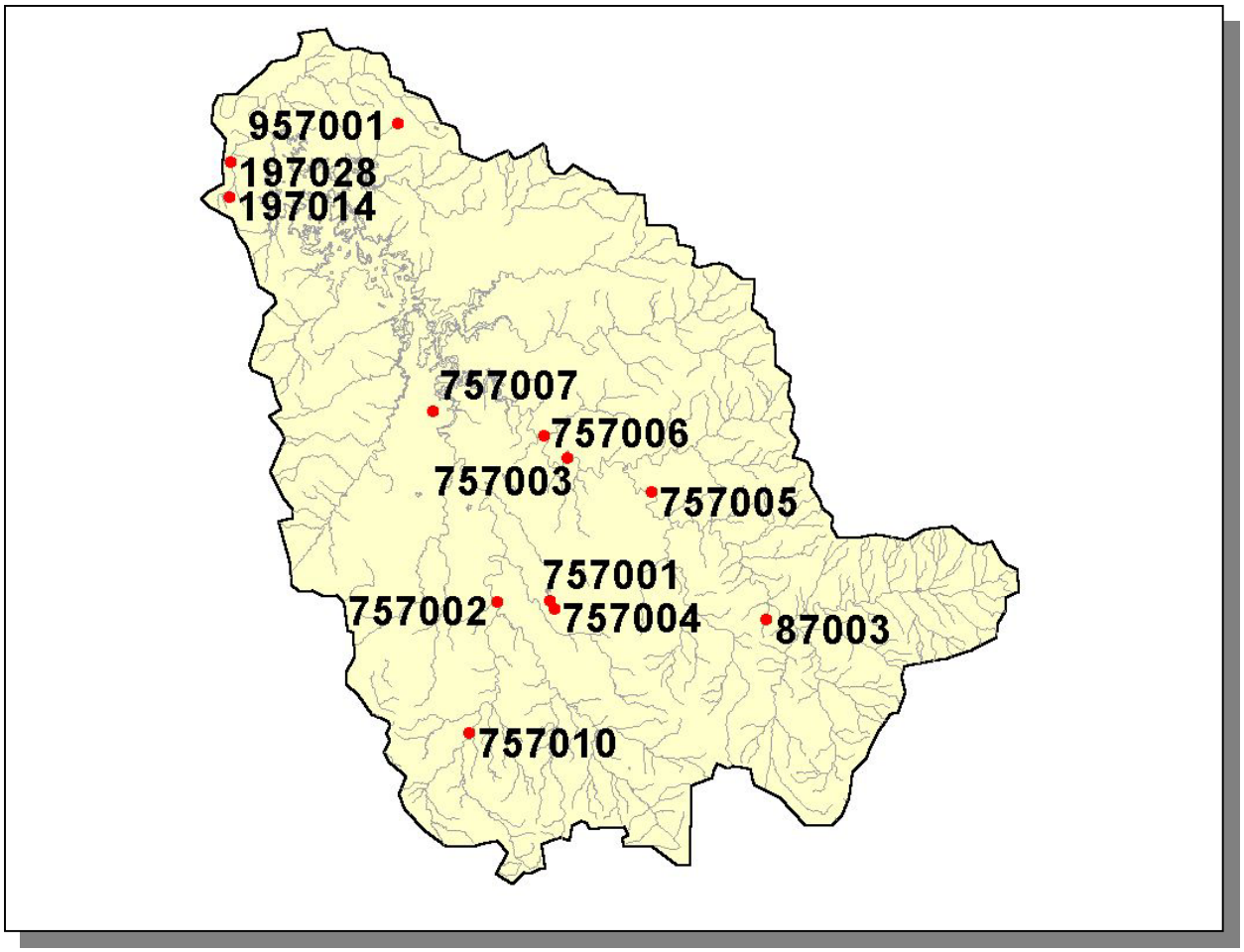

Figure 2-5. Location of Inventoried Dams in the Stones River Watershed. *More information is provided in Stones-Appendix II.*

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

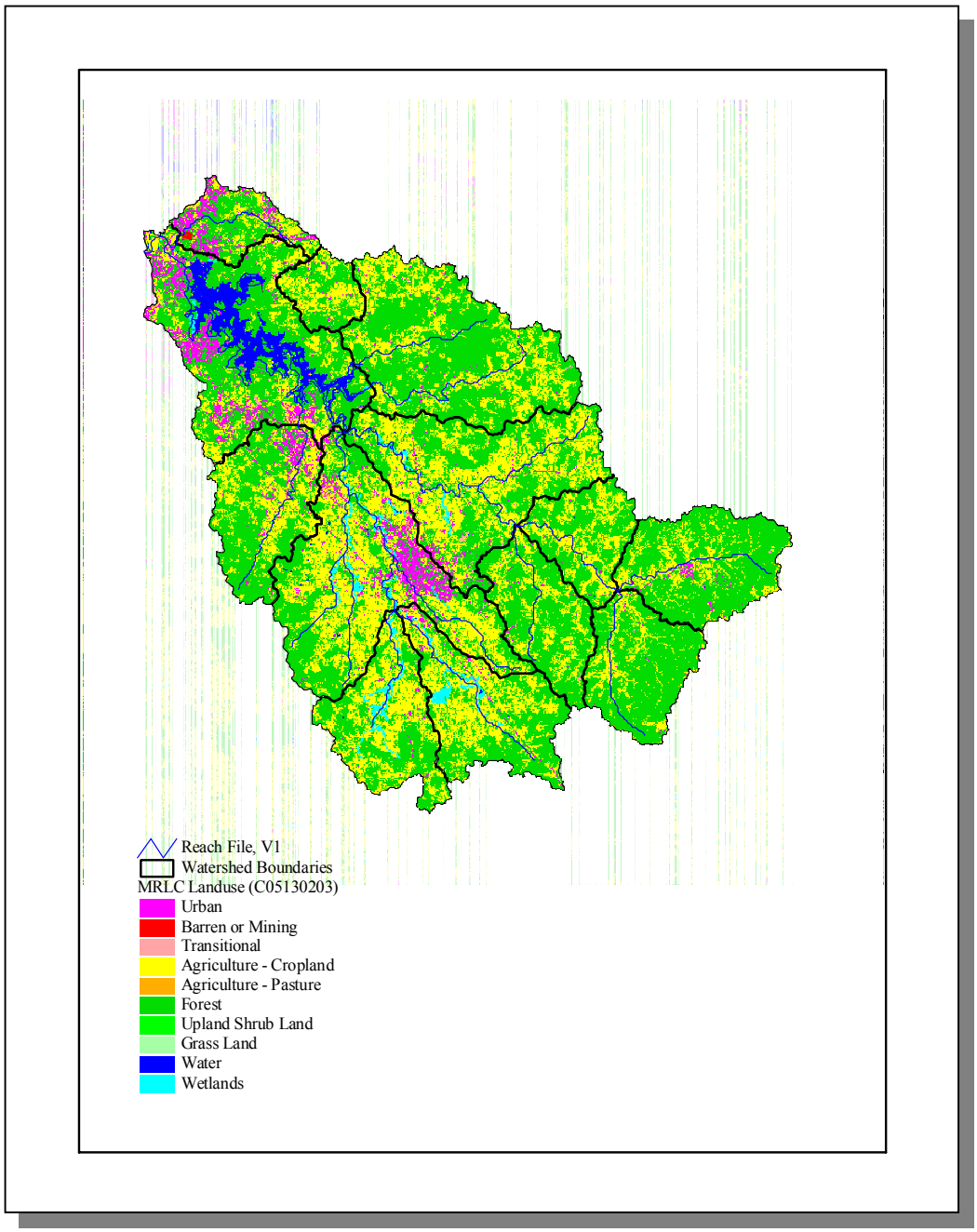

Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery.

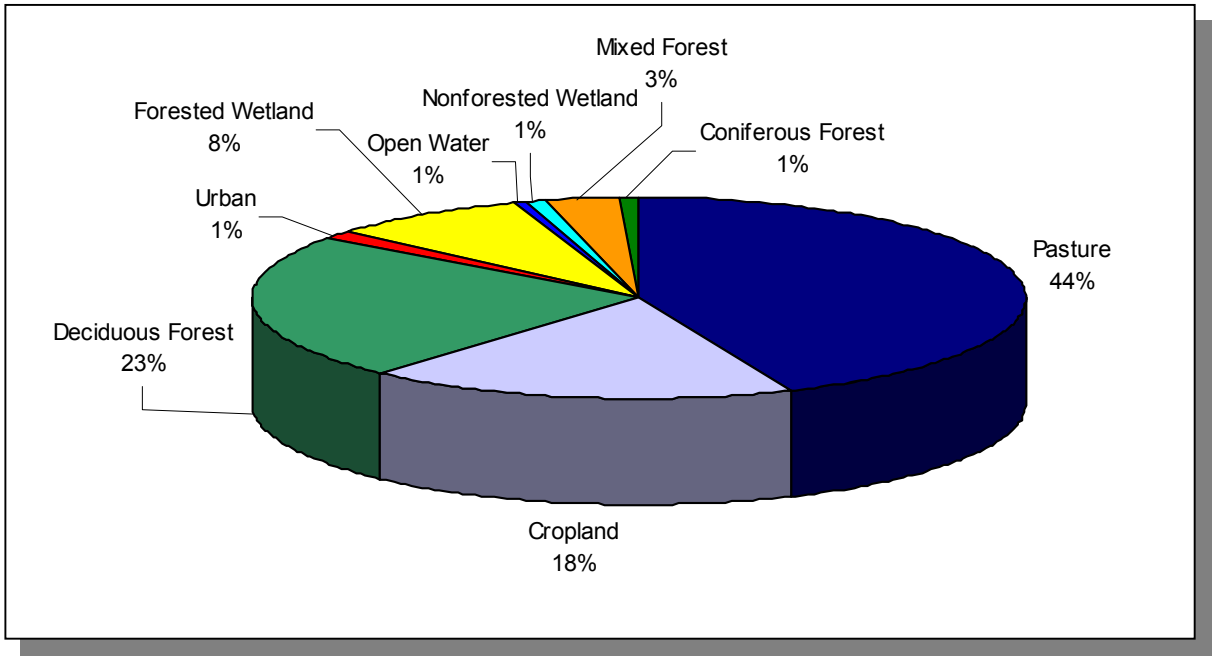

Figure 2-7. Land Use Distribution in the Stones River Watershed. *More information is provided in Stones-Appendix II.*

2.5 ECOREGIONS AND REFERENCE STREAMS. Ecoregions are defined as 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 include 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 Stones River Watershed lies within 1 Level III ecoregion (Interior Plateau) and contains 3 Level IV subecoregions (Griffen, Omernik, Azavedo, 1997):

- Eastern Highland Rim (71g) has more level terrain than the Western Highland Rim (71f), with landforms characterized as tablelands of moderate relief and irregular plains. Mississippian-age limestone, chert, shale, and dolomite predominate, and karst terrain sinkholes and depressions are especially noticable between Sparta and McMinnville. Numerous springs and spring-associated fish fauna also typify the region. Natural vegetation for the region is transitional between the oak-hickory type to the west and the mixed mesophytic forests of the Appalachian ecoregions (68, 69) to the east. Bottomland hardwoods forests were once abundant in some areas, although much of the original bottomland forest has been inundated by several large impoundments. Barrrens and former prairie areas are now mostly oak thickets or pasture and cropland.

- Outer Nashville Basin (71h) is a more heterogeneous region than the Inner Nashville Basin, with more rolling and hilly topography and slightly higher elevations. The region encompasses most all of the outer areas of the generally non-cherty Ordovician limestone bedrock. The higher hills and knobs are capped by the more cherty Mississippian-age formations, and some Devonian-age Chattanooga shale, remnants of the Highland Rim. The region's limestone rocks and soils are high in phosphorus, and commercial phosphate is mined. Deciduous forests with pasture and cropland are the dominant land covers. Streams are low to moderate gradient, with productive nutrient-rich waters, resulting in algae, rooted vegetation, and occasionally high densities of fish. The Nashville Basin as a whole has a distinctive fish fauna, notable for fish that avoid the region, as well as those that are present.

- Inner Nashville Basin (71i) is less hilly and lower than the Outer Nashville Basin. Outcrops of the Ordovician-age limestone are common, and the generally shallow soils are redder and lower in phosphorus than those of the Outer Basin. Streams are lower gradient than surrounding regions, often flowing over large expanses of limestone bedrock. The most characteristic hardwoods within the Inner Basin are a maple-oak-hickory-ash association. The limestone cedar glades of Tennessee, a unique mixed grassland/forest/cedar glades vegetation type with many endemic species, are located primarily on the limestone of the Inner Nashville Basin. The more xeric, open characteristics and shallow soils of the cedar glades also result in a distinct distribution of amphibian and reptile species.

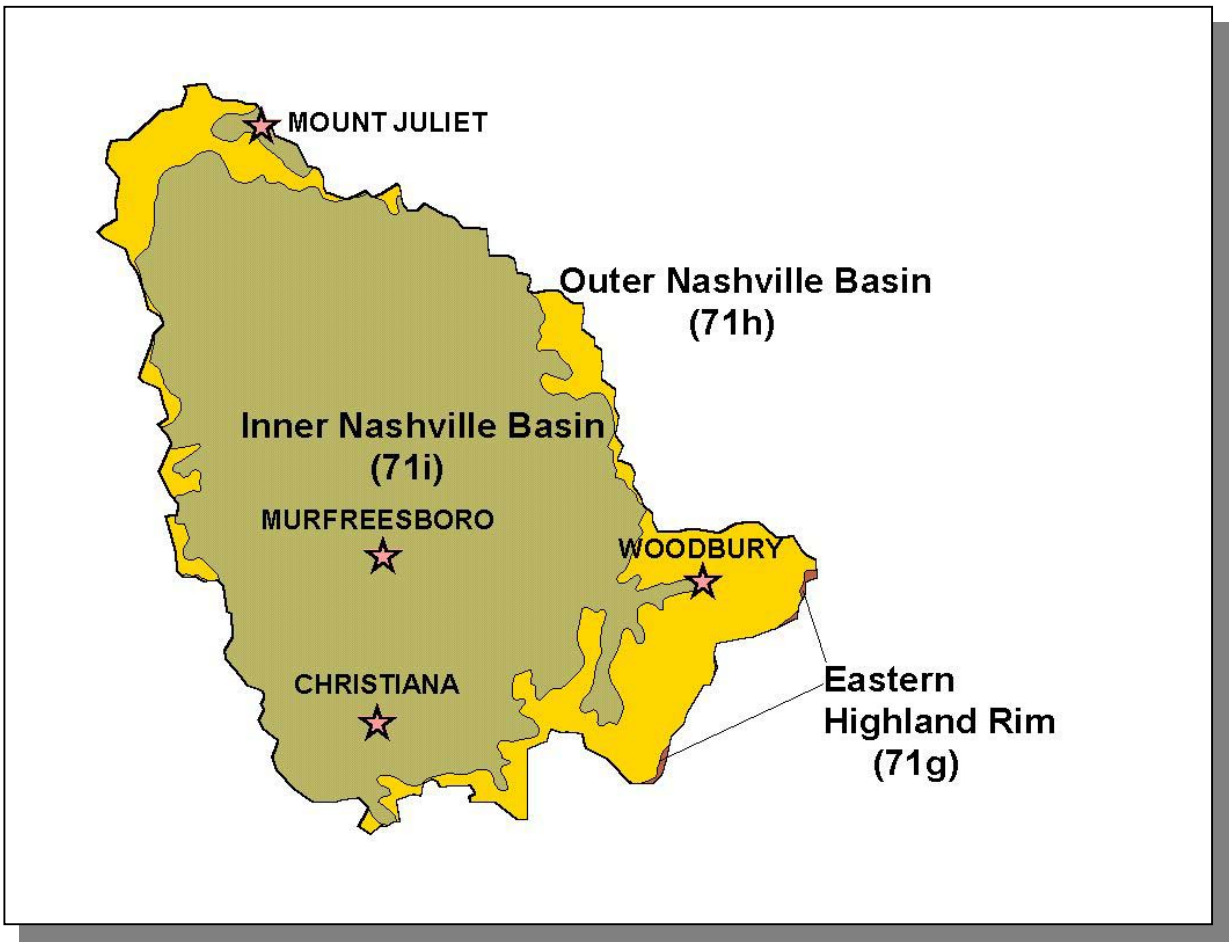

Figure 2-8. Level IV Ecoregions in the Stones River Watershed. *Locations of Christiana, Mount Juliet, Murfreesboro, and Woodbury are shown for reference.*

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

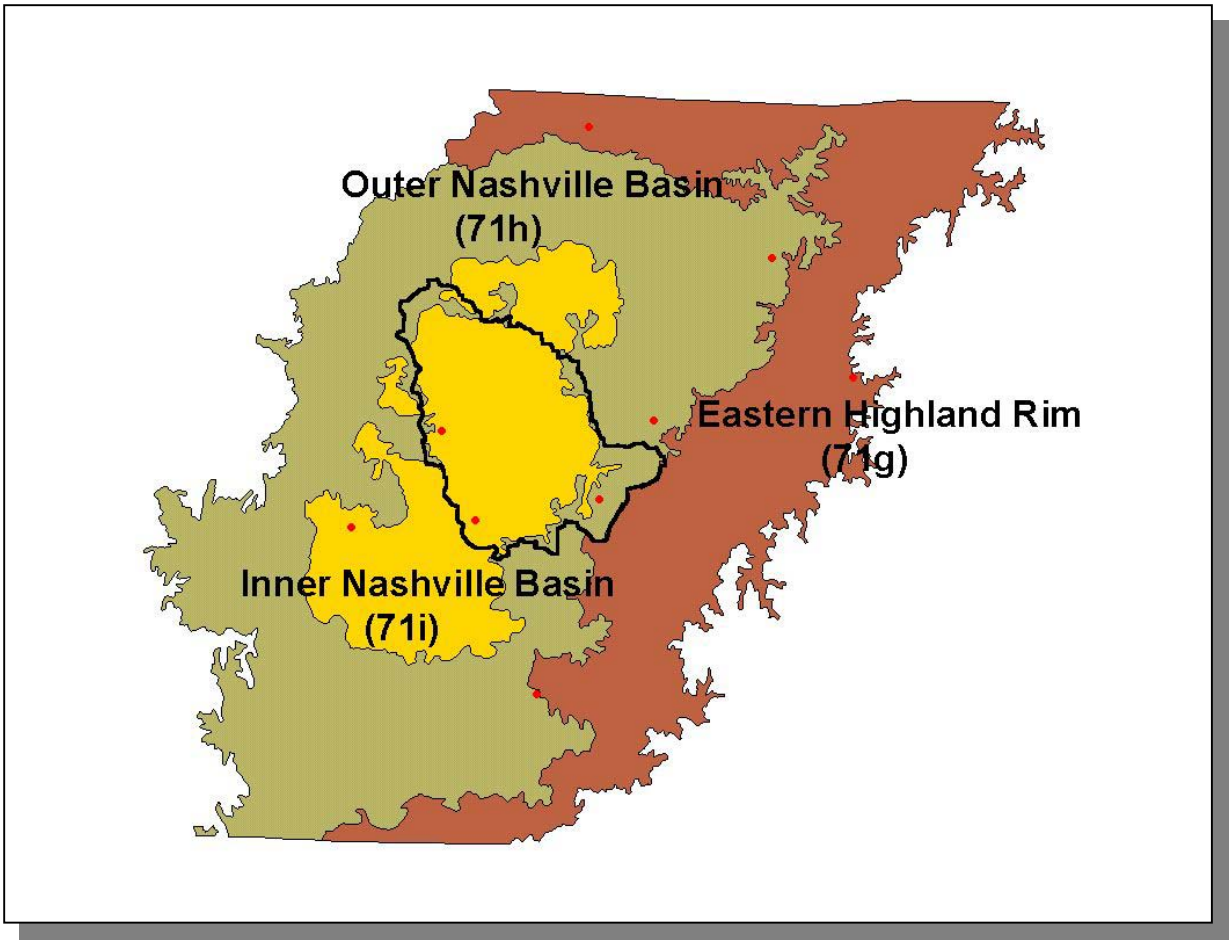

Figure 2-9. Ecoregion Monitoring Sites in Level IV Subecoregions 71g, 71h, 71i. *The Stones River Watershed is shown for reference. More information is presented in Stones-Appendix II.*

2.6. NATURAL RESOURCES.

2.6.A. Designated State Natural Areas. The Natural Areas Program was established in 1971 with the passage of the Natural Areas Preservation Act. The Stones River Watershed has 5 Designated Natural Areas:

Fate Sanders Barrens Designated State Natural Area is an isolated community that is populated by rare plant species such as the limestone fame-flower *(Talinum calcaricum)* and the Tennessee milk-vetch *(Astragalus tennesseensis).*

Flat Rock Cedar Glade is considered one of the most important plant conservation sites of its size in Middle Tennessee. Small creek tributaries of flat gravelly wash areas provide specialized habitat for rare plants.

Sunnybell Cedar Glade is a large undisturbed cedar glade named for the large population of sunnybells (*Schoenolirion croceum).*

Vesta Cedar Glade is a site adjacent to the Cedars of Lebanon State Forest containing grassy cedar barrens slopes as well as *Echinacea tennesseensis.*

Walterhill Floodplain, a 100-year-old deposit of silt loam soils, is habitat for the largest known population of the Stones River mustard/bladderpod (*Lesquerella Stonensis).*

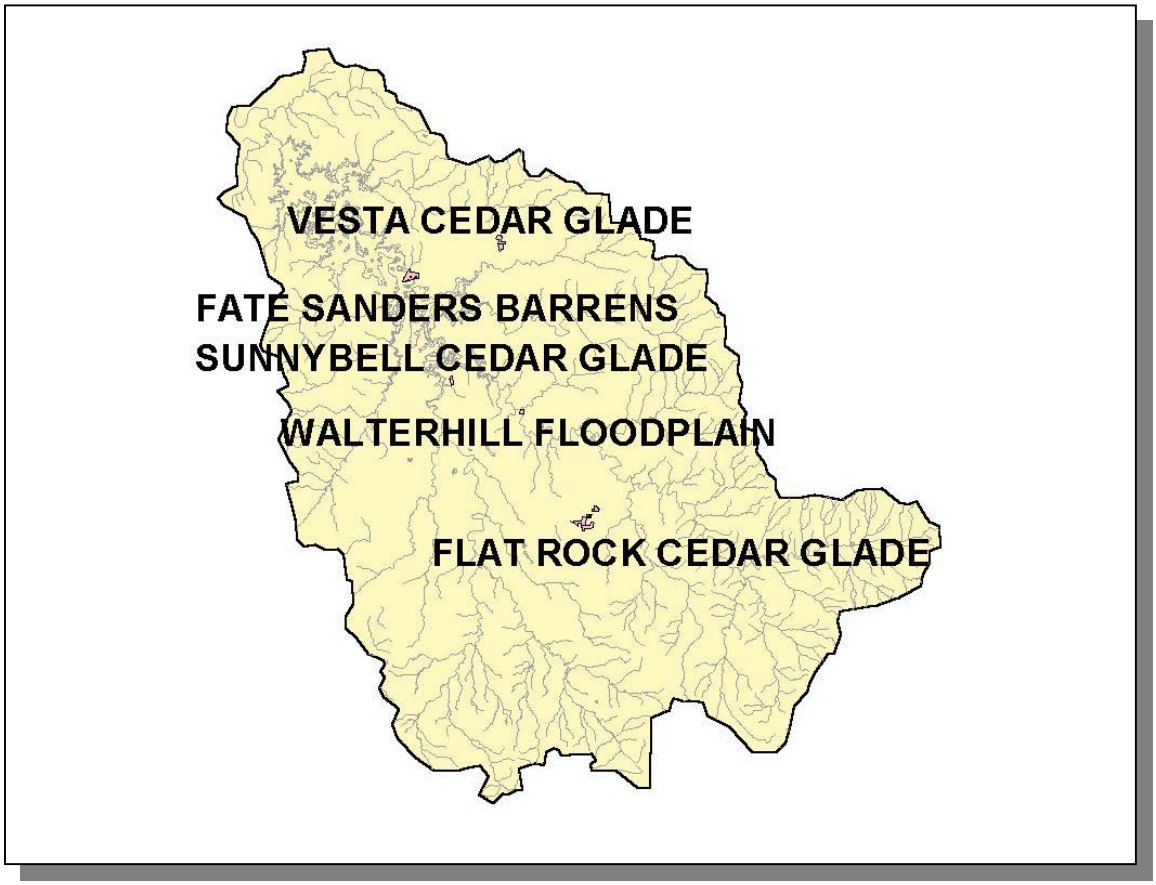

Figure 2-10. There are 5 Designated State Natural Areas in the Stones River Watershed.

2.6.B. 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	0
Mussels	3
Snails	1
Amphibians	2
Birds	6
Fish	8
Mammals	2
Reptiles	2
Plants	44
Total	**69**

Table 2-3. There are 69 Documented Rare Plant and Animal Species in the Stones River Watershed. Additional rare plant and animal species may be present.

Additionally, in the Stones River Watershed, there are 8 rare fish species, 1 rare snail species, 3 rare mussel species, and 1 rare crustacean species.

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS
Etheostoma cinercum	Ashey darter		D
Etheostoma luteovictum	Redband darter		D
Etheostoma microlepidum	Finescale darter		D
Etheostoma tippecanoe	Tippecanoe darter		D
Lagochila lacera	Harelip sucker		D
Notropis rupestris	Bedrock shiner		D
Percina phoxocephala	Slenderhead darter		D
Typhylichthys subterraneus	Southern cavefish		D
Leptoxis subglobosa umbilicata	Umbilicate rocksnail		
Epioblasma florentina florentina	Yellow blossom	E	E
Epioblasma florentina walkeri	Tan riffleshell	E	E
Pegias fabula	Little wing pearlymussel	E	E
Cambarus williami	Brawley's Fork crayfish		

Table 2-4. Rare Aquatic Species in the Stones River Watershed*. Federal Status: E, Listed Endangered by the U.S. Fish and Wildlife Service. State Status: E, Listed Endangered by the Tennessee Wildlife Resources Agency; D, Deemed in Need of Management by the Tennessee Wildlife Resources Agency.*

2.6.C. Wetlands. The Division of Natural Heritage maintains a database of wetland records in Tennessee. These records are a compilation of field data from wetland sites inventoried by various state and federal agencies. Maintaining this database is part of Tennessee's Wetland Strategy, which is described at http://www.state.tn.us/environment/epo/wetlands/strategy.zip.

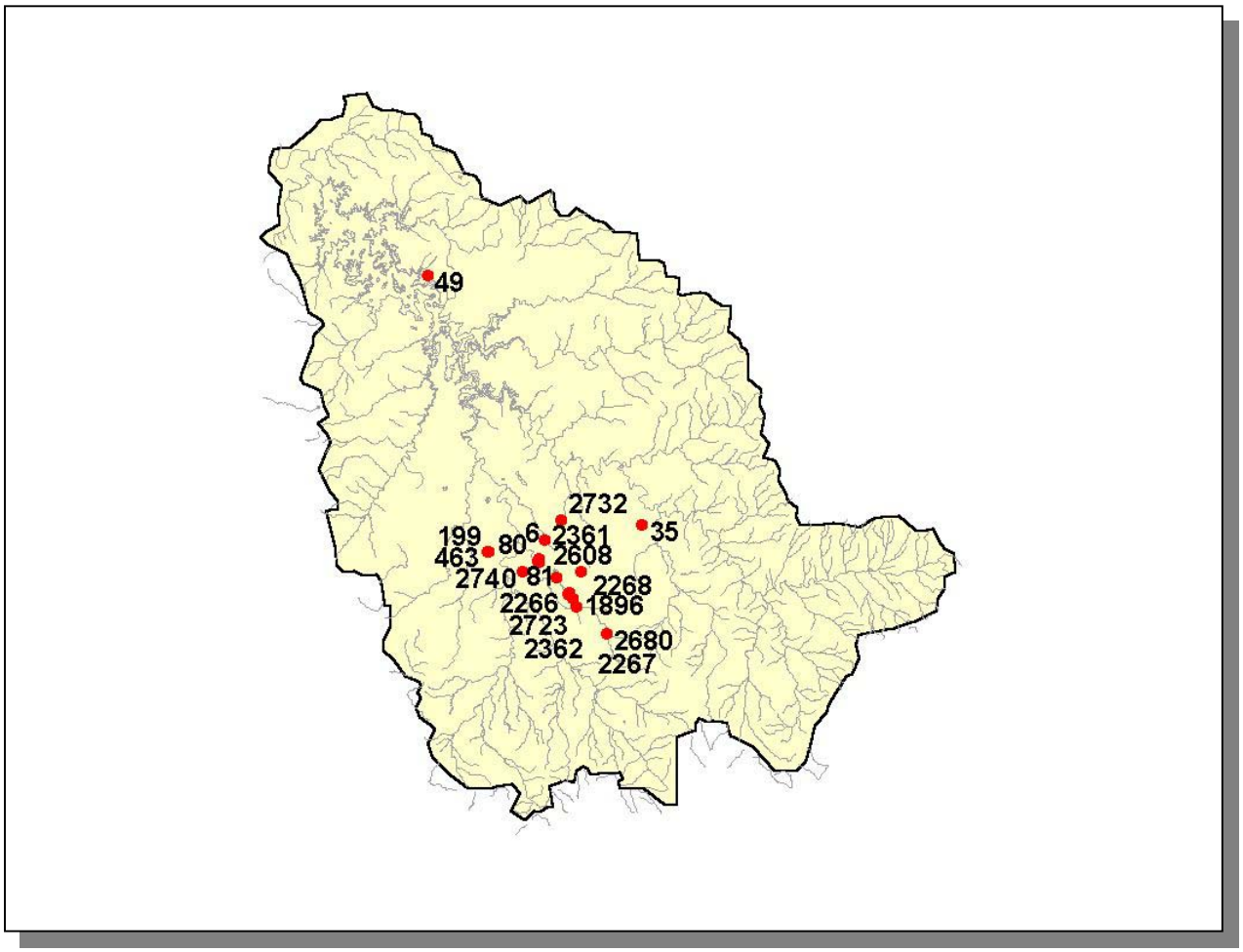

Figure 2-11. Location of Wetland Sites in TDEC Division of Natural Heritage Database in Stones River Watershed. There may be additional wetland sites in the watershed. *More information is provided in Stones-Appendix II.*

2.7. CULTURAL RESOURCES.

2.7.A. Nationwide Rivers Inventory. The Nationwide Rivers Inventory, required under the Federal Wild and Scenic Rivers Act of 1968, is a listing of free-flowing rivers that are believed to possess one or more outstanding natural or cultural values. Exceptional scenery, fishing or boating, unusual geologic formations, rare plant and animal life, cultural or historic artifacts that are judged to be of more than local or regional

significance are the values that qualify a river segment for listing. The Tennessee Department of Environment and Conservation and the Rivers and Trails Conservation Assistance branch of the National Park Service jointly compile the Nationwide Rivers Inventory from time to time (most recently in 1997). Under a 1980 directive from the President's Council on Environmental Quality, all Federal agencies must seek to avoid or mitigate actions that would have an adverse effect on Nationwide Rivers Inventory segments.

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

Cripple Creek. Popular rocky, scenic float stream.

Overall Creek. Popular canoe stream in rural setting supports game fishery.

Stones River. Excellent fishing stream in pastoral setting.

Stones River, East Fork. Excellent scenic canoeing stream, several recorded historical sites, limestone outcropping.

Stones River, Middle Fork. Pastoral float and fishing stream with forested banks.

Stones River, West Fork. Excellent scenic canoeing stream.

RIVER	SCENIC	RECREATION	GEOLOGIC	FISH	WILDLIFE	HISTORIC	CULTURAL
Cripple Creek	X	X	X		X		
Overall Creek		X		X	X		
Stones River	X	X		X	X	X	X
Stones River, East Fork	X	X	X	X	X	X	X
Stones River,Middle Fork	X	X		X	X	X	
Stones River, West Fork	X	X		X	X	X	

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

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

2.7.B. Greenways. Murfreesboro Parks and Recreation has completed an 10-mile extension of the Stones River Greenway, a tree-shaded trail for walking/cycling. This paved path runs alongside beautiful woods and winds along the river.

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

- Stones River National Battlefield, site of a Civil War battle, contains the Hazen Brigade Monument, the oldest Civil war monument still in its original position
- Cannonsburg Pioneer Village, a living museum of early Southern life, built to commemorate the U.S. Bicentennial in 1976

2.7.D. Wildlife Management Area.

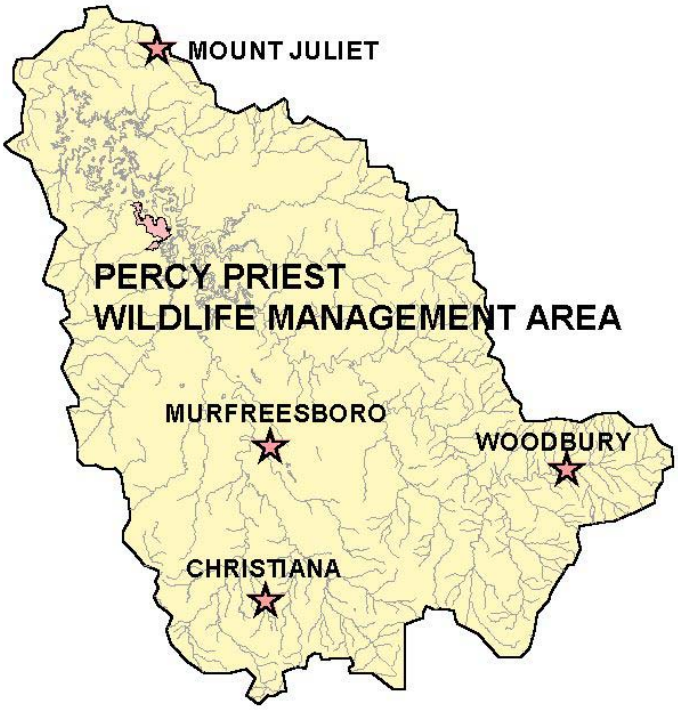

Figure 2-12. TWRA Manages Percy Priest Wildlife Management Area in the Stones River Watershed. *Locations of Christiana, Murfreesboro, Smyrna, and Woodbury are shown for reference.*

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/riv

STREAM	NSQ	RB	RF	STREAM	NSQ	RB	RF
Big Springs Creek	3			Long Creek	3		
Bradley Creek	3	3	2,3	Lytle Creek	3	3	
Brawleys Fork East Stones River	2		2	McCrory Creek	3		
Carson Fork East Stones River	3			Middle Fork Stones River	3	3	
Cripple Creek	2	3		Overall Creek	3	3	
Dry Creek (Hurricane)	3			Puckett Creek	3		
Dry Creek (Sinking)	4			Reed Creek	1		
Dry Fork West Stones River	1			Rock Springs Hart Branch Stones River			
Dry Fork Branch Bradley Creek	4			Rockhouse Branch East Fork Stones River	2		
East Fork Stones River	2,3	1,2,3	1	Short Creek	3		
Fall Creek	2			Sinking Creek	3		
Florida Creek	3			Stewart Creek	4		
Goat Creek	2			Stoners Creek	3		
Henry Creek	2			Stones River	1	2	
Hollis Creek	2			West Fork Stones River	2	2	
Hurricane Creek	3						

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

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

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