Browns Creek Watershed Management Plan

September 2017

Prepared by

TOP OF ALABAMA REGIONAL COUNCIL OF GOVERNMENTS
TARCOG

Funded by

ADEM
Alabama Department of Environmental Management

Browns Creek Watershed Table of Contents

Executive Summary…….....……..	Page 1.
Introduction ……..…….	Page 3.
Physical Conditions……..……	Page 3.
Location……..……	Page 3.
Climate……..……	Page 3.
Geology…….	Page 4.
Physiographic Features ……	Page 4.
Soils……..	Page 5.
Topography…….	Page 11.
Groundwater……...	Page 11.
Wetlands…….	Page 11.
Ecoregion…….	Page 12.
Aquifers ..……	Page 13.
Biological Resources…….	Page 15.
Hydrology…….	Page 19.
Farm Demographics……..	Page 20.
Cultural Resources……	Page 20.
Land Use……..……	Page 23.
Browns Creek ……	Page 23.
Fish & Wildlife Classifications……..……	Page 25.
Pollution Problems & Causes…….	Page 26.
Point Source Pollution……..	Page 27.
Non-Point Pollution……	Page 27.
CAFO's……	Page 28.
BMP Potential Implementation Sites……..	Page 30.
BMP Load Reduction Calculations…….	Page 39.
Budgetary Information……..……	Page 41.
Technical Assistance Information……...	Page 41.
Implementation Schedule……	Page 44.
Monitoring & Assessment…….	Page 45.
Evaluation……...	Page 46.
Browns Creek Water Monitoring Data……	Page 47.
Browns Creek Potential Land Use Map…….	Page 70.
Browns Creek BMP Location Map……..	Page 71.
Partnership Information…….	Page 72.

This project was fully or partially funded by the Alabama Department of Environmental Management through a Clean Water Act Section 604(b) grant provided by the U.S. Environmental Protection Agency - Region 4

Executive Summary

The Browns Creek watershed is an approximate 58 square mile area with headwaters located in Blount County, Alabama. The stream flows northward 11.86 miles into Marshall County, Alabama where it empties into the Tennessee River. This watershed plan will focus primarily on the Marshall County portion of the Browns Creek watershed that exists between the Blount/Marshall County line to its terminus with the Tennessee River. Browns Creek watershed (HUC – 060300010904) contains 37,248 acre located within the Tennessee River Basin drainage in southwest Marshall County. Based on the 2011 National Land Cover Database (NLCD), the predominant land uses in the watershed are forested (40%) and agriculture (33%); furthermore, less than 6% of the watershed has been developed. Browns Creek consists of two distinctly different waterbody types: a wade-able, free flowing stream and the tributary embayment segment of Lake Guntersville.

The free flowing, wade-able segment of Browns Creek originates south of the City of Arab and flows northeast approximately twelve miles before intersecting Lake Guntersville. This segment of Browns Creek is a riffle-run stream with the dominant substrate consisting primarily of gravel and sand. The use classification of the free flowing, wade-able segment of Browns Creek is Fish and Wildlife (F&W).

The Browns Creek tributary embayment segment is located west of the city of Guntersville. The embayment area consists of approximately 4,977 acres. The use classification of the tributary embayment segment of Browns Creek is Public Water Supply/Swimming/Fish and Wildlife (PWS/S/F&W).

In 2012, Browns Creek was first listed on Alabama's Clean Water Act Section 303(d) list of impaired waters. The 11.86-mile stretch of Browns Creek from its source to its terminus with the Tennessee River was identified as being impaired by Phosphorus and Total Dissolved Solids (TDS). Currently, Browns Creek has no approved TMDLs; the waterway segment has a noted impairment stemming from Phosphorus/Nutrients at this time. Available 2016 water sampling data for Browns Creek indicates that impairment for total dissolved solids does not currently exist.

The Browns Creek Watershed was selected as a priority by ADEM for the development of a watershed management plan in 2016. Utilization of funds under Section 604(b) of the Clean Water Act were requested by the Top of Alabama Regional Council of Governments (TARCOG) and used in the development of this document. Since 1968, TARCOG has worked cooperatively with federal, state and local government agencies to develop water quality assessments, assist landowners with the implementation of "Best Management Practices" (BMPs), support municipal officials with pollution reduction and coordinate environmental education programs.

The following Browns Creek Watershed Management Plan was written to provide an avenue for restoring Browns Creek, and to fully support its designated use. This document was developed cooperatively by the Marshall County Soil and Water Conservation District (MCWSD), the USDA -Natural Resources Conservation Service

(USDA-NCRS), the Marshall County Office of the Alabama Cooperative Extension System (ACES), ADEM, and with the assistance of multiple other local agencies. The Browns Creek Watershed Management Plan follows EPA's Section 319 watershed plan guidelines.

Estimated budget costs for implementation of this restoration plan are estimated to be $175,467.06 from Section 319 funding, with an additional $116,978.04 in non-federal match funding. Total costs for implementation are estimated to be a total of $292,445.10. Watershed partners, local advisory members and contacts, local government officials, and other stakeholders will be kept informed about this project through various education and outreach activities, including newsletters, newspaper articles, meetings and field visits.

Key funding to the project for implementation may be provided under Section 319 of the Clean Water Act. In order to be eligible for this funding the project must provide "An identification of the best management practices and measures which will be undertaken to reduce pollutant loadings" and identify "programs to achieve implementation of the best management practices." To best accomplish this, the plan followed the Section 319 EPA guidelines. These guidelines include the following key elements:

1. Identification of causes and sources for the pollution leading to the present impairment, as well as identifying potential pollution factors that should also be addressed.
2. Estimate of load reductions expected from the proposed management measures.
3. Description of management measures.
4. Sources and amounts of technical and financial assistance available.
5. Formulation of an information/education component.
6. Schedule for implementation of management measures.
7. A description of expected milestones.
8. Criteria that can be used to determine whether load reductions are being achieved over time.
9. A future monitoring component.

Browns Creek, Marshall County
Hydrologic Unit Code 060300010904
Waterbody ID (06030001-0904-101) Reservoir
Waterbody ID (06030001-0904-102) Rivers/Streams
Tennessee River Basin (Guntersville Lake)

Introduction: Browns Creek is located in Blount County and Marshall County, Alabama within the Guntersville Watershed of the Tennessee River Basin. Browns Creek first appeared on the 303(d) use impairment list in 2012 and had been on the list for Phosphorus. Currently, it has no approved TMDLs with an impairment length of 11.86 miles. Based on the 2011 National Land Cover Database (NLCD), the predominant land uses in the watershed are forested (40%) and agriculture (33%); furthermore, less than 6% of the watershed has been developed. Browns Creek consists of two distinctly different waterbody types: a wade-able, free flowing stream and the tributary embayment segment of Lake Guntersville.

Although no cause for contamination was listed by ADEM in 2012, a 2016 land use survey of the TMDL designated area has found non-irrigated crop production, feedlots, animal holding and management areas are likely to be the sources of impairment. The Browns Creek Watershed is approximately 58 square miles consisting primarily of a large embayment in total with little development in its drainage area. There is one major populated area (City of Guntersville) and few point sources within the watershed boundaries.

Physical Description of the Browns Creek Watershed

Location: The Browns Creek Watershed is located in the north central portion of Alabama south of the Guntersville Lake Reservoir. This Browns Creek Watershed Management Plan will focus on the portion of the impaired stream located within Marshall County that includes approximately 75% of the total stream length.

Climate/Precipitation: The average annual rainfall in this area is 56-inches. Short periods of very dry or very wet weather are common. Dry conditions prevail from mid-summer to late fall, but severe droughts over long periods are unusual. The driest month is October, with a mean precipitation of 2.57-inches. January is the wettest month, with a mean precipitation of 5.70-inches. The length of the growing season is approximately 200 days, with the last killing frost occurring in April and the first occurring in October. The average highs during wintertime are approximately 50 degrees Fahrenheit with average lows around 31 degrees Fahrenheit. During the summer months, the average highs are typically close to 90 degrees Fahrenheit with average lows around 69 degrees Fahrenheit. The area experiences four distinct seasons.

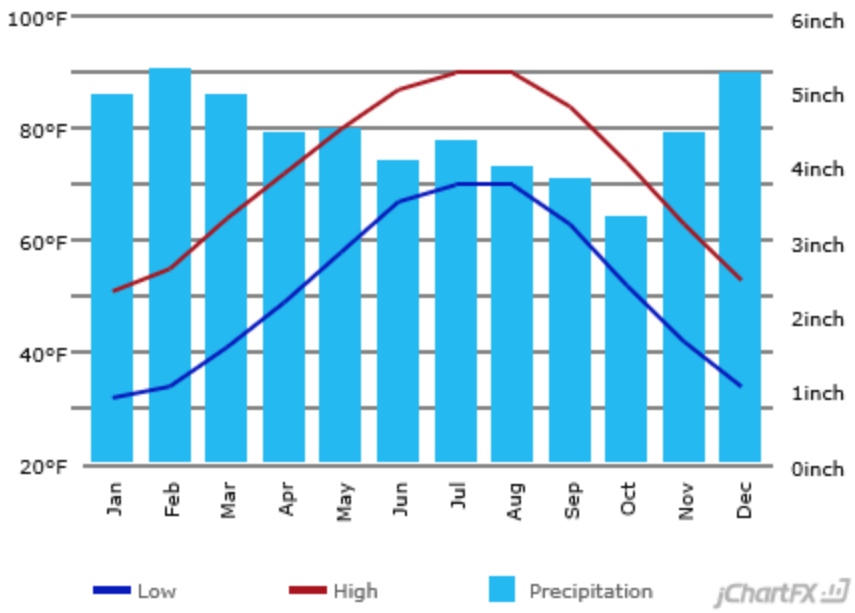


Figure 1: Climate Marshall County, AL

Geology: This region consists of both the Appalachian Plateau and the Interior Low Plateau. The upper part of the watershed consists of Limestone, Chert, and Stale and has the Fort Payne Chert Formation. The lower part of the watershed consists of the following rock types: Limestone and Chert. It also has a formation known as the Tuscumbia Limestone.

Physiographic Features: Over geologic time, roughly two-thirds of present-day Alabama was a shallow sea. Mountains have risen and nearly eroded away, and major rivers have changed courses. The resulting physiographic diversity has been a major force behind the natural selection processes that have created new wildlife species, driven others to extinction, and isolated some populations (Mettee et al. 1996). Alabama's physiographic features are among the most diverse of the southeastern states. Major provinces are the Interior Plateau (or Highland Rim), Southwestern Appalachians (or Cumberland Plateau), Ridge and Valley, Piedmont, and East Gulf Coastal Plain. Each major province is further differentiated into subdivisions representing a variety of physical areas. The Browns Creek watershed is located in the Cumberland Plateau section, specifically within the Willis Valley designation.

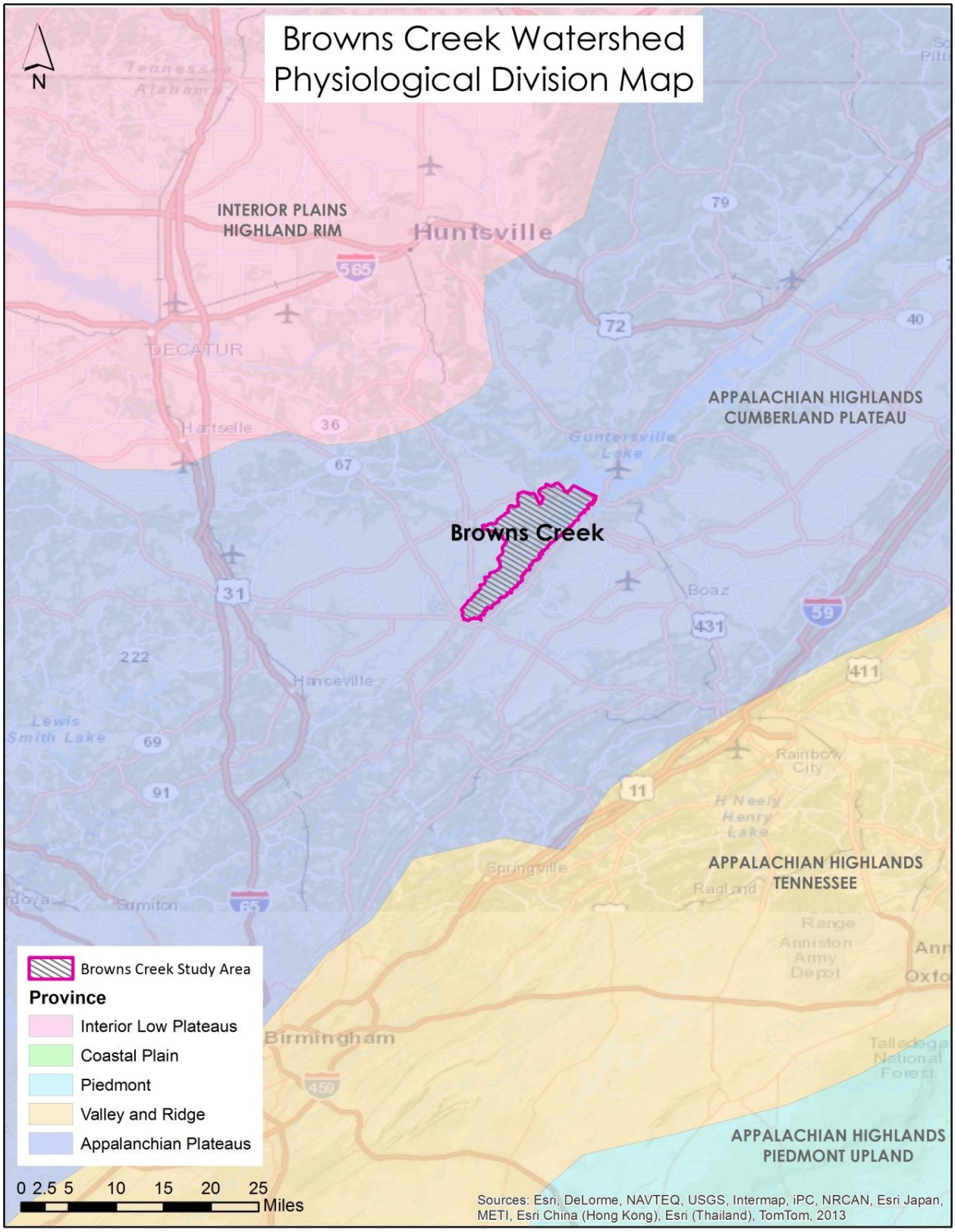


Figure 2: Physiographic Regions

Soils: Major soils on the upland areas occur in capability class and sub-class lie, Hie, and IVe. Predominant upland soils are: (1) Limestone Valleys and Uplands in addition to (2) Appalachian Plateau types.

Geologic units in Marshall County, Alabama Include:

- Monteagle Limestone (Mississippian) at surface, covers 15 % of this area.

  Monteagle Limestone - Light-gray oolitic limestone containing interbedded argillaceous, bioclastic, or dolomitic limestone, dolomite, and medium-gray shale. Lithology: limestone; dolostone (dolomite); shale.

- Pennington Formation (Mississippian) at surface, covers 11 % of this area.

  Pennington Formation - Medium-gray shale, containing interbedded limestone, dolomite, argillaceous sandstone, dusky-red and grayish-olive mudstone, and minor shaly coal. Mainly restricted to eastern part of Interior Low Plateaus province and where less than 100 feet thick the formation is included in the Bangor Limestone. Lithology: shale; limestone; dolostone (dolomite); sandstone; mudstone; mixed clastic/coal.

- Bangor Limestone (Mississippian) at surface, covers 8 % of this area.
  Bangor Limestone - Medium-gray bioclastic and oolitic limestone, containing interbeds of dusky-red and olive-green mudstone in the upper part. Lithology: limestone; mudstone.

- Pottsville Formation (Pennsylvanian) at surface, covers 7 % of this area.

  Pottsville Formation - Light-gray thin to thick-bedded quartzose sandstone and conglomerate containing interbedded dark-gray shale, siltstone, and coal. Mapped on Lookout Mountain, Blount and Chandler Mountains, and Sand Mountain northeast of Blount County, and on the mountains of Jackson, Marshall and Madison Counties north and west of the Tennessee River. Lithology: sandstone; conglomerate; shale; siltstone; coal.

- Tuscumbia Limestone and Fort Payne Chert undivided (Mississippian) at surface, covers 6 % of this area.

  Tuscumbia Limestone and Fort Payne Chert undivided - Tuscumbia Limestone -- light-gray partly oolitic limestone; very coarse bioclastic crinoidal limestone common; light-gray chert nodules and concretions locally abundant. Fort Payne Chert -- very light to light-olive-gray, thin to thick-bedded fine to coarse-grained bioclastic (abundant pelmatozoans) limestone containing abundant nodules, lenses and beds of light to dark-grey chert. Upper part of formation locally consists of light-bluish-gray laminated siltstone containing vugs lined or filled with quartz and scattered throughout the formation are interbeds of medium to

greenish-gray shale, shaly limestone and siltstone. Lenses of dark-gray siliceous shale occur locally at the base of the Fort Payne in Wills Valley. Commonly present below the Fort Payne is a ligh-olive-gray claystone or shale (Maury Formation) which is mapped with the Fort Payne. The Tuscumbia and Fort Payne are undifferentiated in Murphrees and Wills Valleys. Lithology: limestone; chert; siltstone; shale; claystone.

- Nashville and Stones River Groups undifferentiated (Ordovician) at surface, covers 5 % of this area

  Nashville and Stones River Groups undifferentiated - medium to dark-gray fossiliferous limestone, argillaceous in part; yellowish-gray laminated silty limestone in upper part. Contains one or more thin beds of bentonite and bentonitic shale. Lithology: limestone; bentonite; shale.

- Leipers Limestone (Ordovician) at surface, covers 4 % of this area.

  Leipers Limestone - Leipers Limestone -- medium to dark-gray thin to medium-bedded fossiliferous limestone containing interbeds of thin argillaceous limestone. Mapped in Sequatchie Valley. Inman Formation -- interbedded greenish-gray or moderate to dusky-red shale and light-gray peloidal limestone. Mapped in Sequatchie Valley. Lithology: limestone

- Red Mountain Formation (Silurian) at surface, covers 4 % of this area

  Red Mountain Formation - Interbedded yellowish-gray to moderate-red sandstone, siltstone and shale; greenish-gray to moderate-red fossiliferous partly silty and sandy limestone; few thin hematitic beds. Lithology: sandstone; shale; siltstone; limestone.

- Sequatchie Formation (Ordovician) at surface, covers 3 % of this area

  Sequatchie Formation - Grayish-red, grayish-green, and yellowish-gray thin-bedded calcareous shale and calcareous mudstone containing interbedded fossiliferous limestone, and medium-gray to moderate-red partly sandy and glauconitic, medium to coarse-grained bioclastic limestone. Lithology: shale; mudstone; limestone.

- Hartselle Sandstone (Mississippian) at surface, covers 2 % of this area

  Hartselle Sandstone - Light-colored thick-bedded to massive quartzose sandstone, containing interbeds of dark-gray shale. Lithology: sandstone; shale.

- Fort Payne Chert (Mississippian) at surface, covers 2 % of this area.

Fort Payne Chert - Very light to light-olive-gray, thin to thick-bedded fine to coarse-grained bioclastic (abundant pelmatozoans) limestone containing abundant nodules, lenses and beds of light to dark-grey chert. Upper part of formation locally consists of light-bluish-gray laminated siltstone containing vugs lined or filled with quartz and scattered throughout the formation are interbeds of medium to greenish-gray shale, shaly limestone and siltstone. Commonly present below the Fort Payne is a light-olive-gray claystone or shale (Maury Formation) which is mapped with the Fort Payne. The apparent thickness of the Fort Payne in this province varies due to differnetial dissolution of carbonate in the formation.Lithology: limestone; chert; siltstone; shale; claystone.

- Tuscumbia Limestone (Mississippian) at surface, covers 2 % of this area.

  Tuscumbia Limestone - Light-gray limestone, partly oolitic near top; fine to very coarse-grained bioclastic crinoidal limestone common; light-gray chert nodules and concretions are scattered throughout and are abundant locally. The apparent thickness of the formation in this province varies due to differential dissolution of the carbonate in the unit. Lithology: limestone; chert.

- Inman Formation (Ordovician) at surface, covers 2 % of this area.
  Inman Formation - interbedded greenish-gray or moderate to dusky-red shale and light-gray peloidal limestone. Mapped in Sequatchie Valley. Lithology: shale; limestone.

- Pottsville Formation (lower part) (Pennsylvanian) at surface, covers 0.5 % of this area.

  Pottsville Formation (lower part) - Light-gray thick-bedded to massive pebbly quartzose sandstone, containing varying amounts of interbedded dark-gray shale, siltstone, and thin discontinuos coal. The Boyles Sandstone Member is a formally named unit in the lower part of the formation. Top of unit is mapped at the Black Creek coal. Lithology: sandstone; shale; siltstone; coal.

- Pride Mountain Formation (Mississippian) at surface, covers 0.3 % of this area.

  Pride Mountain Formation - Medium to dark-gray shale, containing one to three units of a variable combination of sandstone and limestone in the lower part; locally contains rare interbeds of dusky-red and greenish-gray mudstone. Lithology: shale; limestone; sandstone; mudstone.

- Chattanooga Shale (Devonian) at surface, covers < 0.1 % of this area.

Chattanooga Shale - Brownish-black organic shale containing light to dark-gray sandstone and rare limestone interbeds near the base. Lithology: shale; sandstone; limestone.

- Parkwood and Pennington Formations undifferentiated (Pennsylvanian-Mississippian) at surface, covers < 0.1 % of this area.

  Parkwood and Pennington Formations undifferentiated - Interbedded medium to dark-gray shale and light to medium-gray sandstone, locally contains lithic conglomerate, dusky-red and grayish-green mudstone, argillaceous limestone, and clayey coal. Lithology: shale; sandstone; conglomerate; mudstone; limestone; clay or mud; mixed clastic/coal.

Capability Class and Sub Classes:

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Subclass "e" soils are limited in use because of erosion hazard.

Subclass "w" soils are limited in use because of wetness or drainage problems.

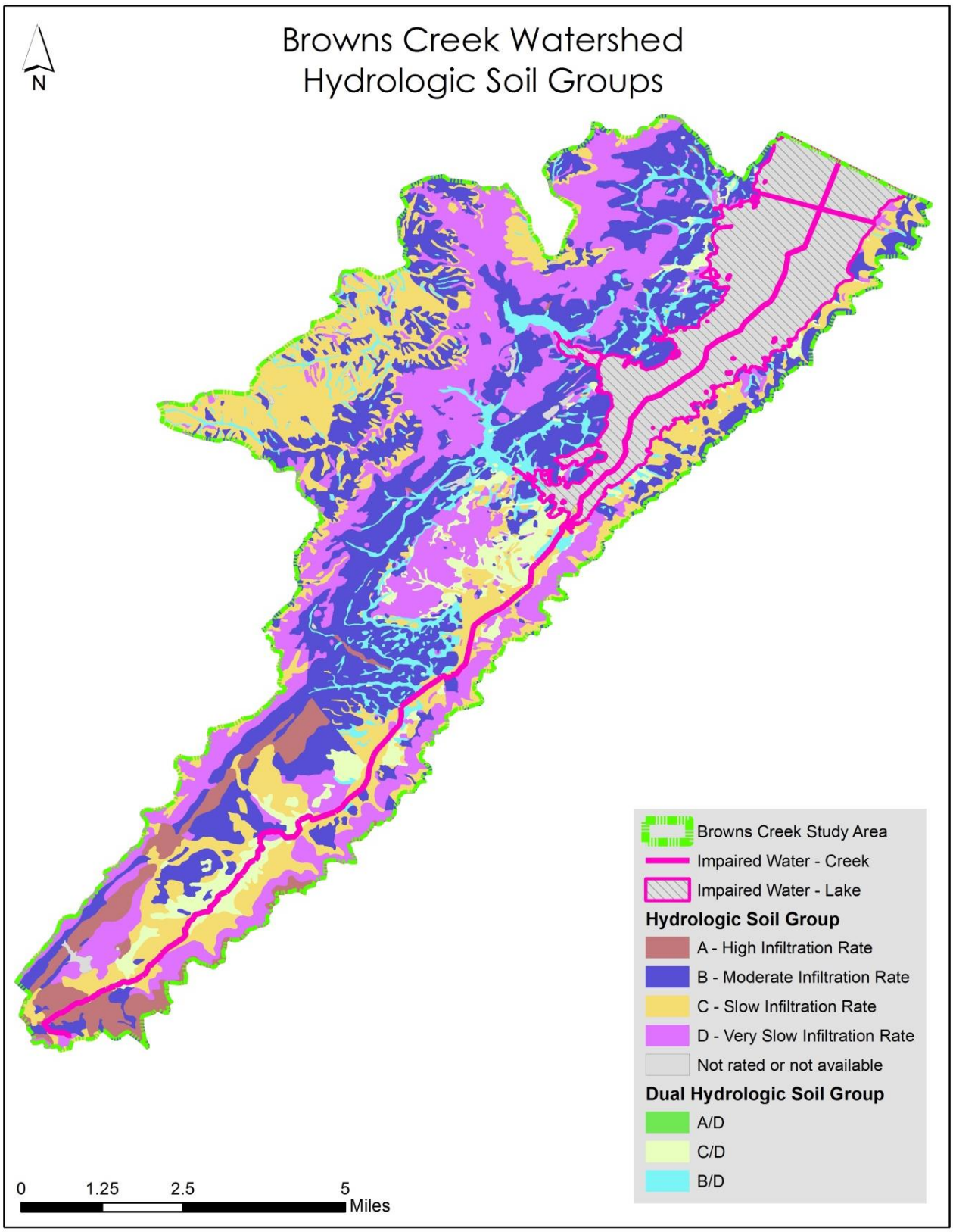


Figure 3: Soils for Browns Creek Watershed

Topography: The topography of the watershed ranges from gently sloping to steep. The segment of Browns Creek from the Blount/Marshall County line to its terminus in the Tennessee River is 303d listed as being impaired from impaired by Phosphorus and Total Dissolved Solids (TDS). The slope is consistent throughout the segment with an average slope of 13-feet. Browns Creek is located at the latitude and longitude coordinates of 34.284444, -86.388323 at an elevation of approximately 600 feet. The topological map of Browns Creek is drawn on and part of the United States Geological Service (USGS) area map of Salem.

Hydrology: Ground water in the area occurs primarily in Fort Payne Chert. It occurs in weathered, porous zones from which the calcareous material has been leeched, leaving an open skeletal network of chert. Ground water is abundant and of good quality but is moderately hard.

According to the Alabama Department of Economic and Community Affairs Office of Water Resources, Marshall County withdraws 10 – 50 million gallons of surface and groundwater per day. This indicates Marshall County is a moderate total water withdrawal county within the State of Alabama.

Wetlands: Wetlands are areas inundated by surface water or groundwater such that vegetation adapted to saturated soil conditions is prevalent. Examples include swamps, marshes, bogs, wet meadows, and shoreline fringes. Marshall County is located in the Southwestern Appalachians ecoregion. According to land use/land cover data compiled by the U.S. Geological Survey, wetlands comprise 0.70 percent of the total land use within this ecoregion (Drummond 2010). Wetlands in this region are typically associated with low-lying, poorly drained areas, or linear in feature and associated with the floodplain areas of streams, rivers, and the reservoir. Wetlands are relatively common along the margins of Guntersville Reservoir. Data analyzed for the 2004 Reservoir Operations Study indicated there were approximately 14,000-acres of wetlands located along the entire reservoir.

Sections 404 of the Clean Water Act forbids the unpermitted discharge of dredge or fill material into waters of the United States. Section 404 requires anyone seeking to ‘fill’ a wetland to first obtain a permit from the U.S. Army Corps of Engineers (COE). The COE §404 permits cannot be issued without water quality certification or a waiver of certification from ADEM.

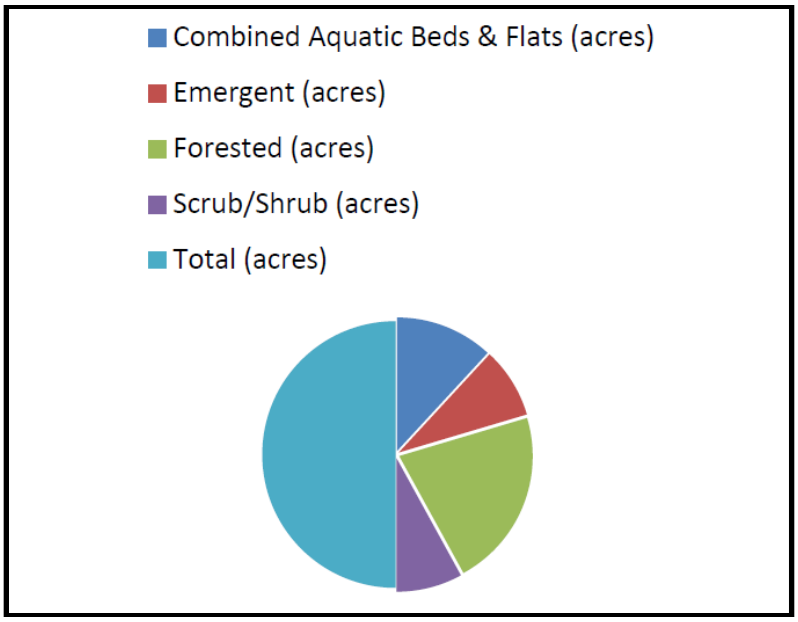


Figure 6: Wetland Types

Ecoregion: The Southwestern Appalachians is also known as the Appalachian Plateau and Cumberland Plateau. Subdivisions include the Cumberland Plateau, Sequatchie Valley, Plateau Escarpment, Southern Table Plateaus, Dissected Plateau, and Shale Hills. It is composed of plateaus, mountain ridges, hills, and valleys. Soils are derived from sandstone or shale. Elevations range from 600 feet to nearly 1,700 feet. Cities include Jasper, Cullman, and Scottsboro. Most of the Bankhead National Forest lies within the region. Dominant forests are pine-oak, and to a lesser extent, oak-hickory.

Most of the coal deposits in Alabama are in this region, and large areas have been altered by strip mining. Much of the Shale Hills (or Warrior Basin) and Dissected Plateau subdivisions are drained by the upper Black Warrior River and its tributaries: the Locust Fork, Sipsey Fork, and Mulberry Fork. Species endemic to this region include the Flattened Musk Turtle, Black Warrior Waterdog, Warrior, Tuscaloosa, Sipsey, and Rush Darters. Others, such as the Cerulean Warbler and Appalachian Cottontail, occur elsewhere but have their strongholds in the Bankhead National Forest.

The Cumberland Plateau and Plateau Escarpment subdivisions are best represented in Jackson County, and this region is referred to by some authors as the Jackson County Mountains. Here, flat sandstone mountaintops are separated by deep valleys cut into limestone. Ruffed Grouse and Pygmy Shrews are known only from this area of the state. Caves are abundant in the limestone valleys. An important stream is the Paint Rock River, which flows south into the Tennessee River and supports imperiled fishes and mollusks including the Snail Darter, Palezone Shiner, Alabama Lampshell, and Fine rayed Pig toe. Caves in this region are important habitat for the Gray Myotis, Allegheny Woodrat, and Tennessee Cave Salamander.

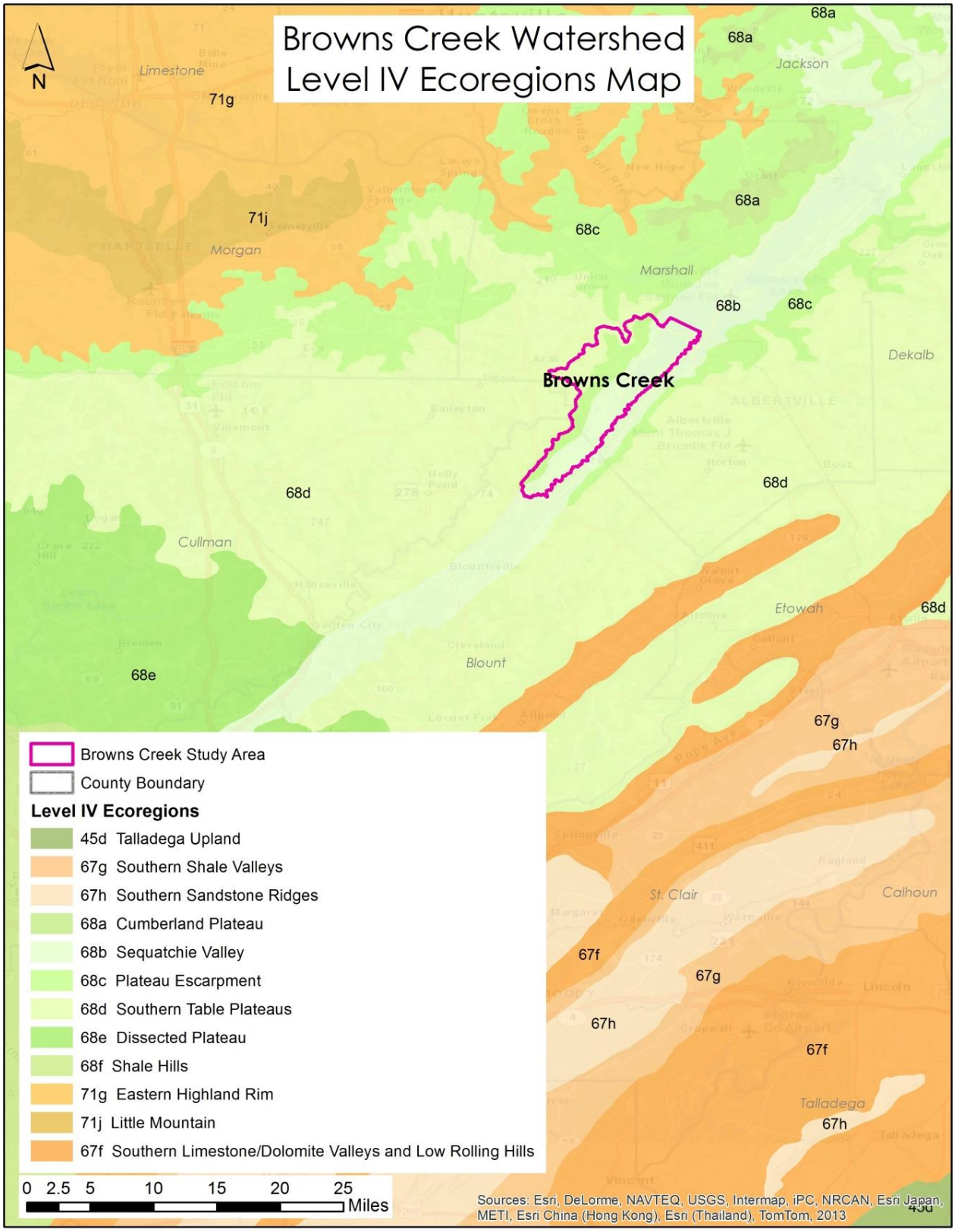


Figure 7: Browns Creek Ecoregion

Aquifers: Groundwater is a reliable source of water for many people in Alabama (roughly 44 percent of the population - Moore and Szabo, 1994), with several large cities and many smaller towns utilizing groundwater for water needs, particularly in south Alabama. Approximately seven inches of the state's 55 inches of annual rainfall enters the ground to become groundwater (GSA, 2001).

Fresh water in some areas of Alabama extends to 2,000 feet or more below land surface, however in a few areas fresh water extends to only 150 feet below land surface (GSA, 2001).

The Aquifer Recharge Map shows the aquifer recharge areas for the water-bearing aquifers in northeast Alabama. There are 17 water-bearing units within Alabama and the corresponding recharge areas for these aquifers. These water-bearing aquifers have characteristics that are controlled by various geologic factors, such as permeability, type, and structure of the rocks comprising the aquifer.

Two Geological Survey of Alabama investigations in Highland Rim karst terrain indicated that water moves underground through carbonate rocks at rates of 3,000 feet per day to 4,000 feet per hour. Large quantities of water may be found in these areas. However, short residence time may cause water-quality problems related to transport of surface contaminants.

Aquifer Recharge Areas of Alabama: The Mississippian aquifer system is roughly equivalent to the Tuscumbia-Fort Payne aquifer of Planert and Pritchett (1989) and to the combined Bangor, Hartselle, Monteagle, and Fort Payne-Tuscumbia aquifers of Moore (1998). The Mississippian aquifer system is found in the Cahaba, Birmingham-Big Canoe, Murphrees, and Coosa Valleys. Formations included in the Mississippian aquifer system are the Fort Payne Chert, Tuscumbia Limestone, Hartselle Sandstone, Bangor Limestone, and Monteagle Limestone of Mississippian age. The five formations listed are united in a single aquifer system for two reasons. First, they are not separated by impermeable strata on a regional scale; on lithologic grounds, they are inferred to contain a single interconnected ground water system. Second, further evidence for the unity of the Mississippian aquifer system is provided by ground-water level measurements, which define a single potentiometric surface in Area 4 for this group of aquifers. To illustrate the variability of the Fort Payne-Tuscumbia aquifer's potential, note the maximum yields for wells and springs, respectively, for the counties where the aquifer is used: Jefferson, 1,200 gpm and 0.2 mgd; and St. Clair, 250 gpm and 2.2 mgd (Planert and Pritchett, 1989).

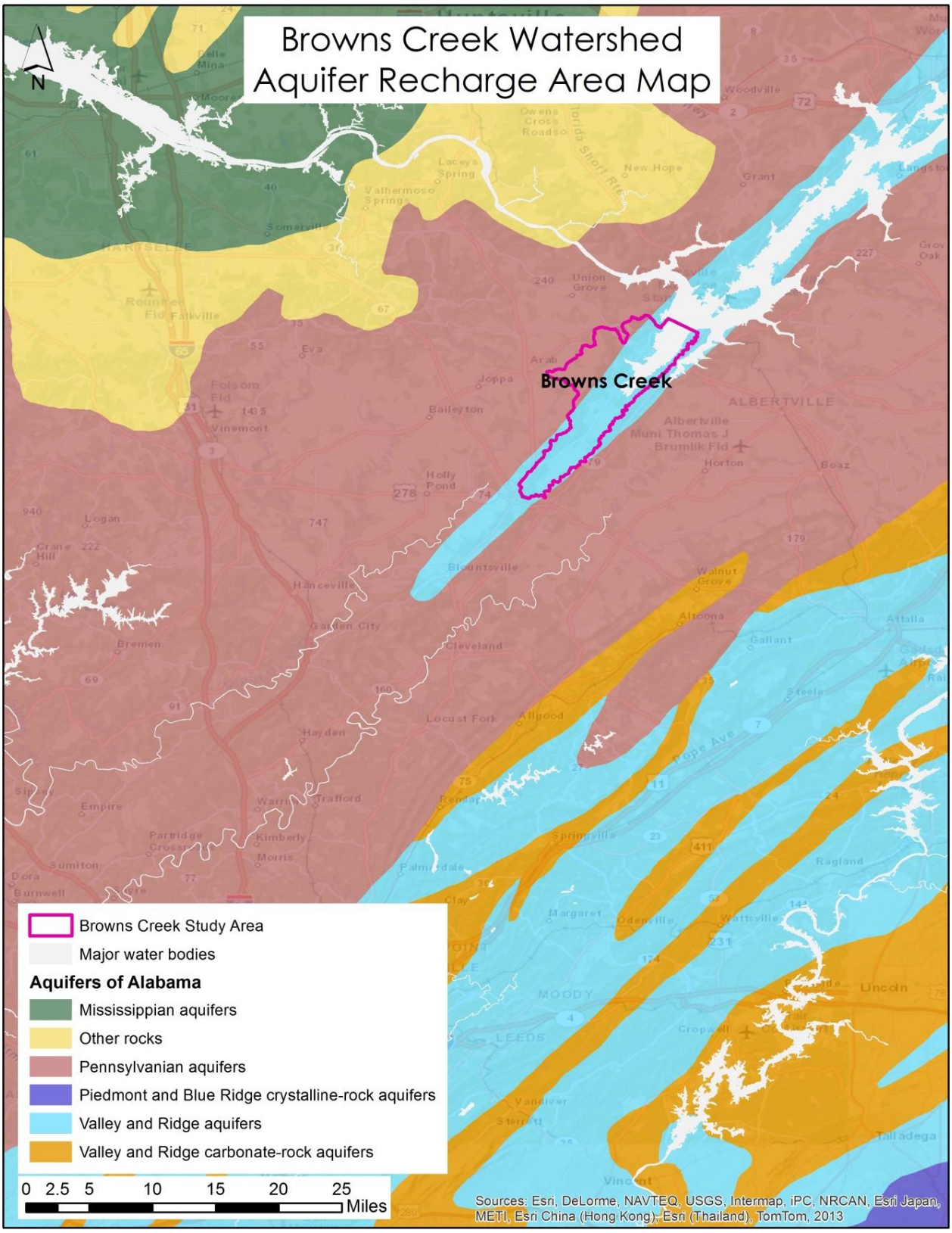


Figure 8: Aquifer Recharge Areas of Browns Creek Watershed

Biological Resources : This area supports mixed oak, hickory-pine, and oak hickory forests. The major over-story species include Shortleaf Pine, Loblolly Pine, Virginia Pine, Sweetgum, Yellow-Poplar, Hickory, American Beech, Red Oak, and White Oak as the major over story species. Dogwood and Redbud are the major mid-story species. Japanese Honeysuckle, Greenbrier, Low Panicums, Bluestems, and Native Lespedezas are the major under-story species. Some of the major wildlife species in this area include: White-tailed deer, Fox, Bobcat, Raccoon, Skunk, Opossum, Mink, Rabbit, Gray Squirrel, Quail, and Mourning Dove.

Threatened and Endangered Species: The Federal Endangered Species Act of 1973 (Act) describes two categories of declining species of plants and animals that need the Act's protections – endangered species and threatened species – and provides these definitions:

- Endangered - any species that is in danger of extinction throughout all or a significant portion of its range;
- Threatened - any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

In simple terms:

- Endangered species are at the brink of extinction now.
- Threatened species are likely to be at the brink in the near future.

All of the protections of the Act are provided to endangered species. Many, but not all, of those protections also are available to threatened species. However, the U.S. Fish and Wildlife Service (Service) has the authority to determine which protections should apply to each threatened species; in other words, we can select and fine tune the protections that best meet the species' recovery needs.

Threatened status benefits species and people in two situations: (1) it provides Federal protection before a species reaches the brink of extinction; and (2) in the case of species that were initially listed as endangered, threatened status also allows scaling back Federal protection as they recover and no longer need the maximum protections of the Act.

Marshall County is home to several species of rare, threatened, or endangered plants and animals including Gray Bat, Indiana Bat, Wood Stork, Slackwater Darter, Boulder Darter, Pink Mucket Mussel, Rough Pigtoe Mussel, Anthony’s Riversnail, Armored Snail, Cumberland Monkeyface, Slender Campeloma, Cracking Pearlymussel, and Ring Pink.

Hydrologic Unit Code 06030001 is home specifically to Gray Bat, Indiana Bat, Rough Pigotoe Mussel, Pink Mucket Mussel, Slender Campeloma (snail). The Browns Creek project area (Marshall County) potentially contains the following threatened or endangered species as noted by the United States Fish and Wildlife Service:

Marshall County Threatened and Endangered Species Include:

Group	*Common Name*	*Population*	*Status*	*Recovery Plan*
Amphibians	Black Warrior Waterdog	Wherever found	Pro. End.	
Birds	Bald eagle	lower 48 States	Recovery	Final
Birds	Bald eagle	lower 48 States	Recovery	Final Revision 1
Birds	Bald eagle	lower 48 States	Recovery	Final
Birds	Bald eagle	lower 48 States	Recovery	Final
Birds	Bald eagle	lower 48 States	Recovery	Final Revision 1
Clams	Alabama lampmussel	Wherever found	Endangered	Final
Clams	Pale lilliput (pearlymussel)	Wherever found	Endangered	Final
Clams	Pink mucket (pearlymussel)	Wherever found	Endangered	Final
Clams	Finerayed pigtoe	Wherever found	Endangered	Final
Clams	Rough pigtoe	Wherever found	Endangered	Final
Clams	Shiny pigtoe	Wherever found	Endangered	Final
Clams	Spectaclecase (mussel)	Wherever found	Endangered	
Clams	Orangenacre mucket	Wherever found	Threatened	Final
Clams	Slabside Pearlymussel	Wherever found	Endangered	
Clams	Upland combshell	Wherever found	Endangered	Final
Clams	Ovate clubshell	Wherever found	Endangered	Final
Clams	Triangular Kidneyshell	Wherever found	Endangered	Final
Clams	Alabama moccasinshell	Wherever found	Threatened	Final

Clams	Snuffbox mussel	Wherever found	Endangered	
Clams	Rabbitsfoot	Wherever found	Threatened	
Clams	Sheepnose Mussel	Wherever found	Endangered	
Crustaceans	Alabama cave shrimp	Wherever found	Endangered	Final
Ferns and Allies	American hart's-tongue fern	Wherever found	Threatened	Final
Fishes	Snail darter	Wherever found	Threatened	Final
Fishes	Spotfin Chub	Wherever found;	Threatened	Final
Fishes	Cahaba shiner	Wherever found	Endangered	Final
Fishes	Palezone shiner	Wherever found	Endangered	Final
Fishes	Rush Darter	Wherever found	Endangered	Outline
Flowering Plants	Price's potato-bean	Wherever found	Threatened	Final
Flowering Plants	Green pitcher-plant	Wherever found	Endangered	Final Revision 2
Flowering Plants	Harperella	Wherever found	Endangered	Final
Flowering Plants	Morefield's leather flower	Wherever found	Endangered	Final
Mammals	Indiana bat	Wherever found	Endangered	Draft Revision 1
Mammals	Gray bat	Wherever found	Endangered	Final
Mammals	Northern Long-Eared Bat	Wherever found	Threatened	
Reptiles	Flattened musk turtle	Black Warrior R. system	Threatened	Final

Data is taken from Natural Resources Conservation Services' GIS data and Threatened and Endangered Species of Alabama 4th Edition published by U.S. Fish and Wildlife Service (2008).

Hydrology: The Browns Creek Watershed encompasses approximately 43.6% of the Wheeler Lake watershed. Most of this area is in the Cumberland Plateau Section of the Appalachian Plateaus Province of the Appalachian Highlands.

This region is deeply dissected and consists mainly of a series of rather narrow valleys, steep escarpments, and broad plateaus that are underlain by consolidated bedrock. Elevation ranges from 330 to 2,300 feet (100 to 700 meters). Valley floors are commonly about 100 to 400 feet (30 to 120 meters) below the adjacent plateau summits, but local relief may be as much as 1,200 feet (365 meters). The largest portion of Browns Creek has a riparian forest buffer ranging from 20 feet to 200 feet.

The following figures are the estimated withdrawals of freshwater by use in this Major Land Resource Area:

Public supply— surface water, 8.3%; ground water, 2.5%.
Livestock— surface water, 0.8%; ground water, 0.7%.
Irrigation— surface water, 0.1%; ground water, 0.4%.
Other— surface water, 86.6%; ground water, 0.6%.

About 10% of the estimated withdrawals is from groundwater sources, and 90% is from surface water sources. In most years, precipitation is adequate for crops and pasture. Droughts are short and infrequent. Streams, springs, and ponds provide water for livestock. Most streams flow intermittently and are often dry in summer and autumn, except after rainstorms. The surface water is suitable for almost all uses.

Deep wells provide an adequate supply of water for most domestic, municipal, and industrial uses. Good-quality ground water occurs in solution channels in limestone and dolomite and in fractures and partings along bedding planes in shale and sandstone bedrock layers. The ground water is very hard, and the median level of total dissolved solids is about 150 parts per million (milligrams per liter). This Paleozoic aquifer system is susceptible to contamination from surface sources because of the vertical fractures and the cavernous limestone and dolomite layers. The median level of nitrates, 1.3 parts per million (milligrams per liter), is about four times greater than the median level in any other aquifer in this area.

Current concerns involving water quality and soil quantity within the Browns Creek watershed include:

- Excessive Sediment from Cropland
- Excessive Sediment from Roads / Road banks
- Inadequate Management of Animal Wastes
- Nutrients from Agriculture

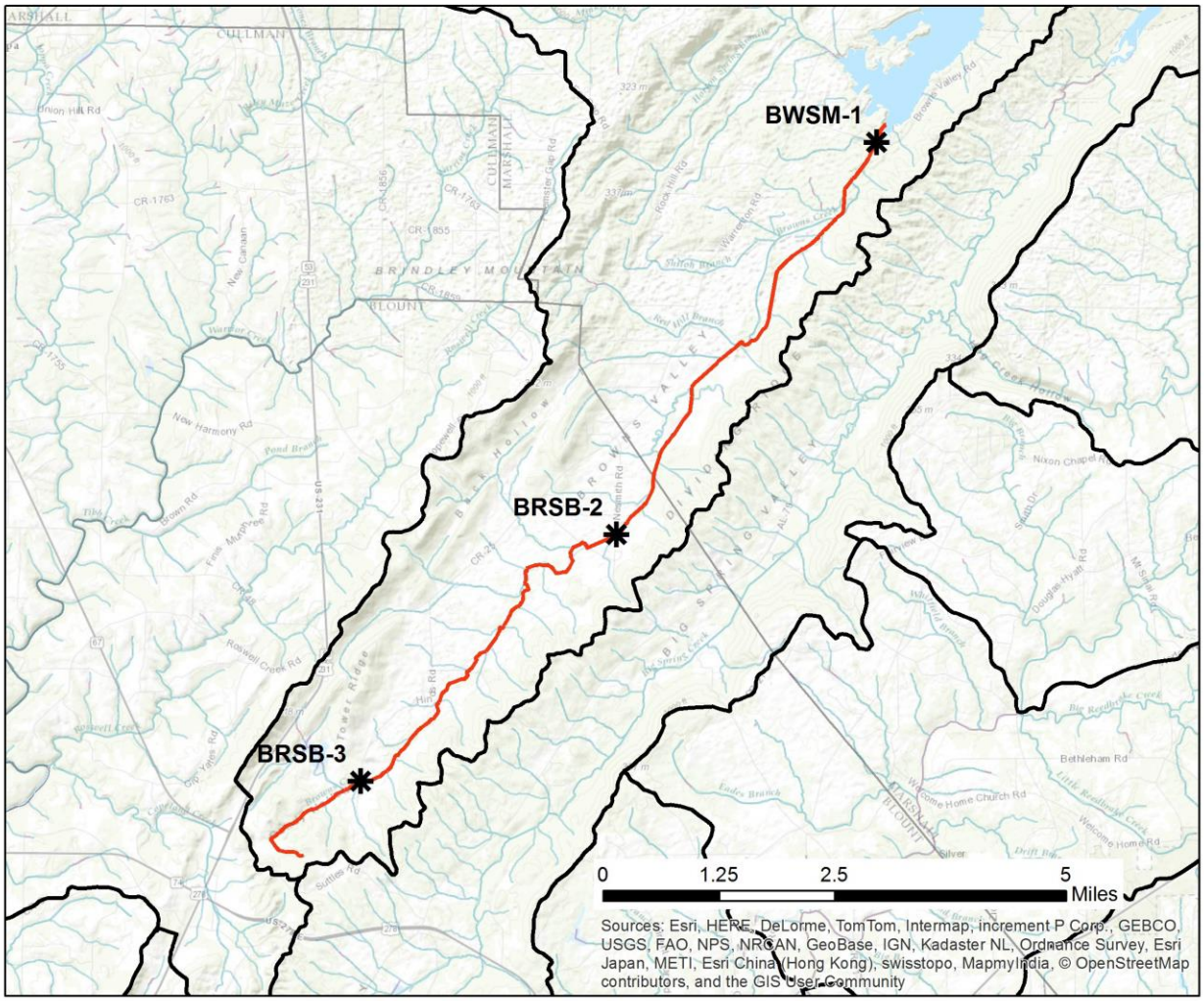


Figure 9: Hydrology of Browns Creek Watershed

Farm Demographics: The economy of the area is heavily dependent on agriculture. Poultry, beef cattle and row crops represent the major farm enterprises of the region. The area is typified by small diversified farm operations. The poultry industry, which produces broilers and eggs, is the major farm enterprise. Corn, soybeans, tomatoes, and potatoes are the major cash crops. Pastures are grazed mainly by beef cattle and are important disposal areas for poultry waste. Haying provides feed during the long winters.

In Marshall County, currently 1,505 farms exist according to the U.S. Agricultural Census of 2012 with an average size of 108 acres. According to the 2010 U.S. Census, Marshall County had a population of 93,019 with an average median income of $38,983.00.

Cultural Resources and History of Marshall County: Located in the Northeastern section of the state, Madison, Jackson, DeKalb, Etowah, Blount, Cullman and Morgan

Counties bound Marshall County. Marshall County was created by the Legislature, January 9, 1836. Claysville was the first County Seat and remained so until 1838, when Marshall (now Wyeth City) became the county seat, which in turn surrendered the honor to Warrenton in 1841. Seven years later it was changed to Guntersville where it still remains. Cherokees settled along the Creek Path and the Tennessee River as early as 1784 inhabiting the area. Most of the remains of these towns and villages can be identified. During the “War Between the States” Marshall County was the scene of several raids by Federal troops. It was unsuccessfully shelled by these troops on July 30, 1862 in an attempt to capture the town. It was again attacked on March 2, 1864, and again on August 24, 1864. It finally yielded to the invaders January 1865, and was burned and destroyed with the exception of six or seven buildings.

Near the present village of Red Hill, on the west bank of Brown Creek, there was a Cherokee town headed by Richard Brown, for whom the town was named. The Cherokees fought with Gen. Andrew Jackson at Talladega and Horseshoe Bend, and received Jackson's praise for their military aid. Brown's village was situated on two important Indian trails, one leading from Ditto's Landing, now Whitesburg, across the Brindley Mountains, and the other on the Creek Path. About fifteen miles below the village there was a branch trail leading to the Creek settlement in middle Alabama. Corn Silk Village, one-half miles southeast of Warrenton was a small Cherokee village, the Chief of which was Corn Silk, for which the village was named.

At the upper end of Pine Island on the Tennessee River, there was an Indian town, Coste, reached by Desoto on July 2, 1540. Near the head of the island were the remains and evidences of a town. Creek Path Town, the Indian name for which was Kusa-nunnahi, was located on the east bank of Brown Creek on the old Russell place about four mile southeast of Guntersville. This was a Cherokee town in 1785 and received its name from the fact that it was situated on the Creek Path which extended from Talladega Creek to the Tombigbee River. This was a very important Cherokee settlement having approximately four or five hundred inhabitants, one-third of the entire Cherokee population in Alabama at that time. One of the earliest mission schools was established there and called the Creek Path Mission School. Another Indian village in Marshall County was Gunter's Village, an important Cherokee town deriving its name from its Chief. John Gunter, a Scotsman who married an Indian woman and was admitted into the tribe. It was situated on the old Indian trail, known as Creek Path that extended from this town across Sand Mountain to Wills and Turkey Town, and thence to Coosa Old Town at the mouth of Talladega Creek. This trail was in most part the route used by Gen. Andrew Jackson during his campaign against the Creek during 1813-14.

At the site of the present old village ford, Melton Village was situated. This was an Upper Creek town, and was founded about 1813 by the Creeks with the permission of the Cherokees. The Chief was Charles Melton from whom the village derived its name. Tali was an ancient town visited by Desoto's expedition, on July 10, 1540. It was located on McKee's Island in the Tennessee River near present day Guntersville.

In Brown Valley, near the present line between Blount and Marshall Counties, there was a Creek and Cherokee village, situated on two trails, both leading to Ditto's Landing on the Tennessee River, one through Brown's Valley and the other in a course opening further to west. The name of the town was Massas, Near Rock Landing on the Tennessee River. There was a Cherokee fort on Beaird's Bluff overlooking the Tennessee River near Guntersville, which was the scene of a battle between the Cherokees and the Creeks in the latter part of the eighteenth century. The site was known as Cherokee Bluff. On the south bank of the Tennessee River, at the mouth of and on the east bank of Thompson's Creek, about eight miles northwest of Guntersville, was Fort Deposit. This fort was erected by Gen Andrew Jackson in October 1813, and was strongly fortified as he used it as a depositary of his military supplies and equipment. At the time, there was a good ferry at the point, which greatly expedited the transportation of troops and supplies across the Tennessee River during the Creek Indian War. There is a series of caves nearby which Gen. Jackson utilized for storing of his ammunition.

In 1939, the Tennessee Valley Authority completed the Guntersville Dam and its reservoir, filled with water and made Guntersville a peninsula city. Guntersville itself is an exciting, thriving community. The scenery is breathtaking, and with its 69,700-acre lake, every weekend is a vacation.

Land Use: Browns Creek HUC (06030001-0904-101) Reservoir, HUC (06030001-0904-102) Rivers/Streams drains a 4,977 acre watershed located within the Tennessee River Basin drainage in southwest Marshall County. The total drainage area of the Browns Creek watershed is 58 square miles. Only 9.25 square miles (77.99%) of the watershed are located in Marshall County, Alabama. The remaining 2.61 square miles (22.01%) are located in Blount County. Both portions of the Browns Creek watershed have basically the same land use characteristics. Approximately 40% of the land use within the watershed is forested, agriculture is at approximately 33% and less than approximately 6% has been developed. Based on these statistics, the Browns Creek watershed can be considered very rural. A large percentage of the land used for silviculture and agriculture can have significant nonpoint source impact if it is not managed properly.

The Browns Creek watershed has two main land uses: agriculture and forest. Pollutant loadings from forested areas tend to be low due to their filtering capabilities and will be considered as background conditions. The most likely sources of nutrient/phosphorus loadings in Browns Creek are from the agricultural land uses. It is not considered practicable to calculate individual components for nonpoint source loadings.

Land Use Areas for the Browns Creek Watershed

Browns Creek Watershed	
Tennessee River Basin	
Land use	Percent
Open Water	13%
Developed, Open Space	4%
Developed, Low Intensity	1%
Developed, Medium Intensity	1%
Barren Land (Rock/Sand/Clay)	1%
Deciduous Forest	29%
Evergreen Forest	4%
Mixed Forest	5%
Shrub/Scrub	5%
Grassland/Herbaceous	3%
Pasture/Hay	30%
Cultivated Crops	4%
Woody Wetlands	1%
Emergent Herbaceous Wetlands	1%
Total	**100%**
Agriculture	
Forest	
Other	
Total	**100%**

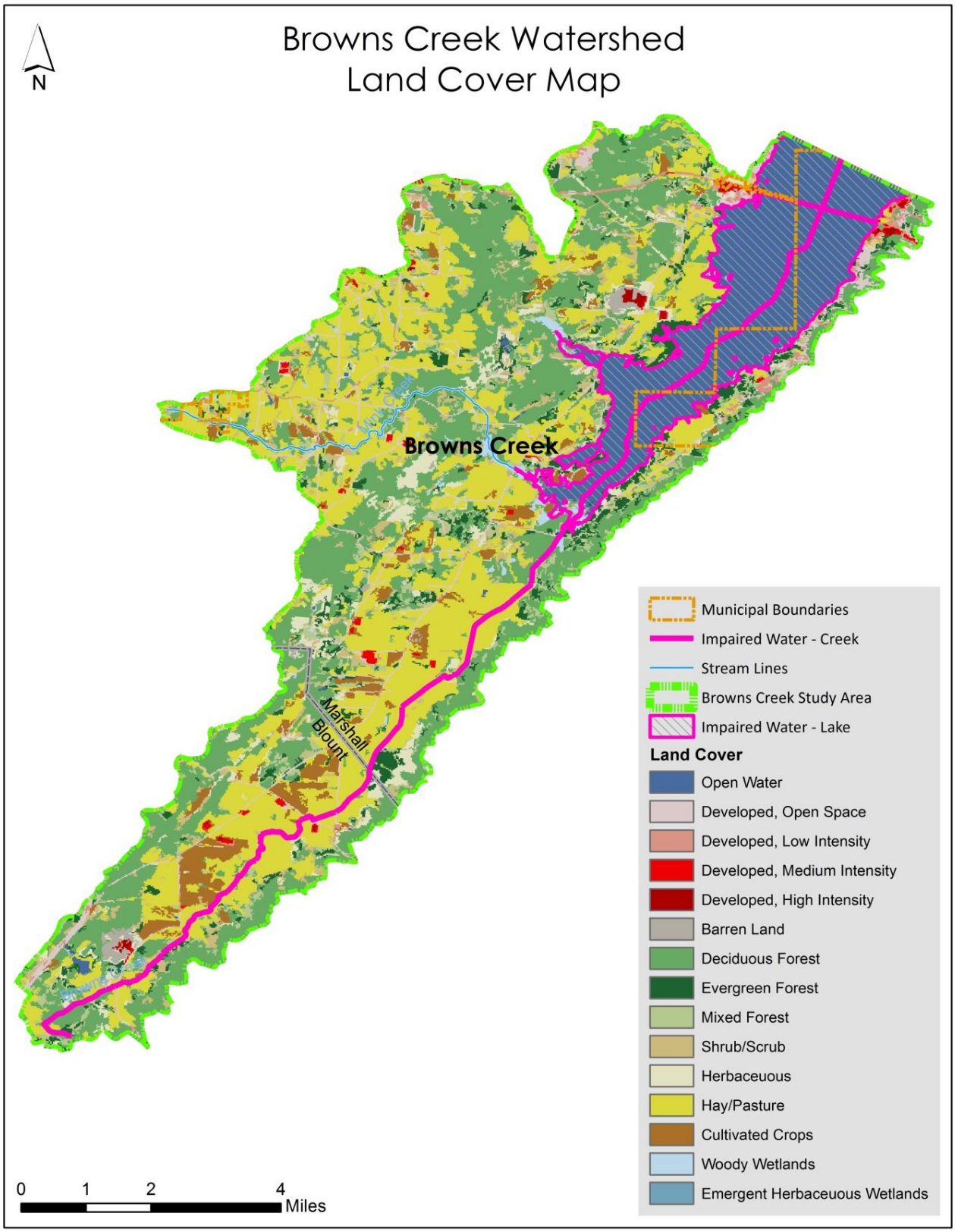


Figure 10: Land Cover Map for the Browns Creek Watershed

Fish and Wildlife & Public Water Supply Classification: The ADEM has classified the Browns Creek for use as Fish and Wildlife and a Public Water Supply. Usage of waters in this classification is described in ADEM Admin. Code R. 335-6-10-.09(5) (a), (b), (c), and (d).

(a) Best usage of waters: Fishing, propagation of fish, aquatic life, and wildlife, and any other usage except for swimming and water-contact sports or as a source of water supply for drinking or food processing purposes.

(b) Conditions related to best usage: The waters will be suitable for fish, aquatic life and wildlife propagation. The quality of salt and estuarine waters to which this classification is assigned will also be suitable for the propagation of shrimp and crabs.

(c) Other usage of waters: It is recognized that the waters may be used for incidental water contact and recreation during June through September, except that water contact is strongly discouraged in the vicinity of discharges or other conditions beyond the control of the Department or the Alabama Department of Public Health.

(d) Conditions related to other usage: The waters, under proper sanitary supervision by the controlling health authorities, will meet accepted standards of water quality for outdoor swimming places and will be considered satisfactory for swimming and other whole body water-contact sports. Fecal Coliform Loading Criteria: Alabama's water quality criterion document (ADEM Admin. Code R. 335-6-10-.09-(5)(e)(7.)) states "bacteria of the fecal coliform group shall not exceed a geometric mean of 1,000 per 100 ml; nor exceed a maximum of 2,000 per 100 ml in any sample. The geometric mean shall be calculated from no less than five samples collected at a given station over a 30-day period at intervals not less than 24 hours. For incidental water contact and recreation during June through September, the bacterial quality of water is acceptable when a sanitary survey by the controlling health authorities reveals no source of dangerous pollution and when the geometric mean fecal coliform organism density does not exceed 100 per 100 ml in coastal waters and 200 per 100 ml in other waters. The geometric mean shall be calculated from no less than five samples collected at a given station over a 30-day period at intervals not less than 24 hours. When the geometric mean fecal coliform organism density exceeds these levels, the bacterial water quality shall be considered acceptable only if a second detailed sanitary survey and evaluation discloses no significant public health risk in the use of the waters. Waters in the immediate vicinity of discharges of sewage or other wastes likely to contain bacteria harmful to humans, regardless of Browns Creek TMDL Fecal Coliform the degree of treatment afforded these wastes, are not acceptable for swimming or other whole body water-contact sports.

The free flowing, wade-able segment of Browns Creek (06030001-0904-102) originates south of the City of Arab and flows northeast approximately twelve miles before intersecting Lake Guntersville. This segment of Browns Creek is a riffle-run stream with the dominant substrate consisting primarily of gravel and sand. The use classification of the free flowing, wade-able segment of Browns Creek is Fish and Wildlife (F&W).

The Browns Creek tributary embayment segment is located west of the city of Guntersville. The embayment area consists of approximately 4,977 acres. The use classification of the tributary embayment segment of Browns Creek is Public Water Supply/Swimming/Fish and Wildlife (PWS/S/F&W).

Browns Creek Watershed Pollution Problems and Causes:

Browns Creek is located in North Central Blount County, and Southwest Marshall County Alabama within the Guntersville Lake Watershed of the Tennessee River Basin. Browns Creek first appeared on the 303(d) use impairment list in 2012 for Phosphorus/Nutrients and Total Dissolved Solids (TDS). Browns Creek was delisted from the 303(d) list for total dissolved solids in 2016. Currently, Browns Creek, has no approved TMDLs; the waterway segment also has a noted impairment stemming from Phosphorus/Nutrients and Total Dissolved Solids (TDS). Browns Creek HUC (06030001-0904-102) has an impairment length of 11.86 miles from 34.188222, -86.494109 to its terminus at 34.286291, -86.386255. Browns Creek HUC (06030001-0904-101) impairment area consists of a 4,976.97 acre embayment area reservoir.

Impairment runoff from agriculture and mining is on the top of the list as potential sources of impairment. The watershed is predominantly rural with agriculture, some mining and forest landuse. Its use designation is for surface water and swimming use (categorized as impaired) and Fish & Wildlife (categorized as impaired) for the entire segment.

The land use within the watershed is predominantly agriculture and forest acreage; the city of Guntersville is adjacent to this waterway.

In 2009, the Alabama Department of Environmental Management (ADEM) sampled several sites throughout the Tennessee River Basin as part of the Assessment of the Tennessee (TN) River Basin Project. The overall objective of this project was to assess the biological integrity of each sampling site with the hopes of estimating the overall water quality within the Tennessee River basin. The Browns Creek watershed was included in this project, and both biological and water quality monitoring was completed at station BRSB-2 during 2009. The findings from this project, described in further detail below, served as the original basis for adding Browns Creek to Alabama's 2012 §303(d) List of Impaired Waters.

During 2009, in-situ field parameter measurements and water quality samples were collected on a monthly basis from March – October. Furthermore, in order to identify possible stressors on the biological communities, metal samples were collected on a semi-monthly basis and pesticides, semi-volatile organics and atrazine were collected on a quarterly basis. The median total phosphorus concentration evaluated from the monthly samples dataset was0.064 mg/L and the maximum observed total phosphorus concentration was 0.481 mg/L. Furthermore, the July monthly water quality sample yielded a maximum observed total dissolved solids concentration of 1036 mg/L. In

addition to collecting water quality samples at station BRSB-2 in 2009, benthic macroinvertebrate communities were sampled using ADEM's Intensive Multi-habitat Bio assessment methodology (WMB-1). The WMB-I uses measures of taxonomic richness, community composition, and community tolerance to assess the overall health of the macroinvertebrate community.

The results from the assessment were analyzed using the Department's 2008 macroinvertebrate index and the resulting final score indicated the community to be in poor condition. Based on the elevated total phosphorus concentrations, the single sample maximum total dissolved solids concentration of 1036 mg/L and the poor macroinvertebrate community score, Browns Creek was added to the Department's 2012 §303(d) List with the causes of impairment being nutrients and total dissolved solids.

Point Sources in the Browns Creek Watershed:

Major/Minor	Status	Outfall #	Receiving Water	8-Digit HUC Name	Station 12 Digit HUC	Station Latitude	Station Longitude	County
Minor	In Effect	1	Browns Creek	Guntersville Lake	60300010904	34.3386	-86.36895	Marshall
Minor	In Effect	1	MINK CREEK	Guntersville Lake	60300010904	34.302083	-86.393056	Marshall
Minor	In Effect	6	Browns Creek	Guntersville Lake	60300010904	34.335278	-86.37	Marshall
Minor	In Effect	3	MINK CREEK	Guntersville Lake	60300010904	34.302083	-86.393056	Marshall
Minor	In Effect	8	MINK CREEK	Guntersville Lake	60300010904	34.302083	-86.393056	Marshall
Minor	In Effect	6	Browns Creek	Guntersville Lake	60300010904	34.3386	-86.36895	Marshall
Minor	In Effect	2	MINK CREEK	Guntersville Lake	60300010904	34.302083	-86.393056	Marshall
Minor	In Effect	1	Browns Creek	Guntersville Lake	60300010904	34.335278	-86.37	Marshall
Minor	In Effect	2	Browns Creek	Guntersville Lake	60300010904	34.335278	-86.37	Marshall
Minor	In Effect	5	Browns Creek	Guntersville Lake	60300010904	34.338889	-86.368889	Marshall
Minor	In Effect	1	Red Hill Branch	Guntersville Lake	60300010904	34.26357	-86.4432	Marshall
Minor	In Effect	1	LAKE GUNTERSVILLE	Guntersville Lake	60300010904	34.361389	-86.353056	Marshall
Minor	In Effect	1	Browns Creek	Guntersville Lake	60300010904	34.19	-86.481944	Blount
Minor	In Effect	6	Browns Creek	Guntersville Lake	60300010904	34.19	-86.481944	Blount
Minor	In Effect	1	Browns Creek	Guntersville Lake	60300010904	34.192222	-86.486667	Blount

Non-point Source Pollution in the Browns Creek Watershed: Non-point sources of pollution negatively impact the Browns Creek watershed. Non-point sources of pollution within the Browns Creek Watershed are mainly from agricultural areas. Beef cattle, horses, poultry and cropland areas contribute to the nutrient and bacterial loads. Sediment from eroding cropland, pastures, stream banks and poultry operations contribute to existing sediment loads. Due to the absence of point sources, nonpoint sources are believed to be the primary source of nutrients/phosphorus in the Browns Creek watershed. Land use in the Alabama portion of the Browns Creek watershed is rural consisting of 33% agriculture (pasture/hay and row crops) and 40% forested land use. Phosphorus is a chemical element found naturally in many types of minerals. It is widely used in artificial fertilizers, and is present in large amounts in organic waste like manure. When too much phosphorus gets into our lakes, rivers and waters, it overloads

them with too many nutrients. In Alabama, the main causes of phosphorus pollution are "nonpoint sources" like agricultural fields, where rain or melting snow carries phosphorus-rich waste into waterways. The excess nutrients cause plant and bacterial overgrowth, including potentially toxic algae blooms.

The following are examples of how different land uses can contribute to nutrient/phosphorus loading: agricultural land can be a source of phosphorus/nutrient pollution. Runoff from pastures, animal operations, improper land application of animal wastes, and animals with access to streams are all mechanisms that contribute phosphorus to waterbodies.

On the world's agricultural lands, nutrient transport by farming systems has overwhelmed natural nutrient cycles. Globally, more nutrients are added as fertilizers than are removed as produce. Fertilizers are moved from areas of manufacture to areas of crop production. They are partly incorporated into crops, which are then moved to localized areas of human consumption and livestock production. Thus, there is a net transport of P and N from sites of fertilizer manufacture to sites of fertilizer deposition and manure production. This flux creates a nutrient surplus on agricultural lands, the underlying cause of nonpoint pollution from agriculture. Nutrients in manure can be recycled by applying the manure to cropland. However, manure yields from concentrated livestock operations often exceed the capacity of croplands to sequester the nutrients. At typical stocking rates for feedlots, an area of cropland; 1000 times greater than the feedlot area is required to distribute manure nutrients at levels similar to crop demand (NRC 1993b). This much land may not be available, so manure is applied to excess. These nutrients build up in soil, run off or infiltrate to water supplies, or (in the case of N) can enter the atmosphere.

Browns Creek Watershed Animal Feeding Operations:

Animal Feeding Operations (AFOs) are agricultural operations where animals are kept and raised in confined situations. AFOs congregate animals, feed, manure and urine, dead animals, and production operations on a small land area. Feed is brought to the animals rather than the animals grazing or otherwise seeking feed in pastures, fields, or on rangeland.

AFOs may have to obtain an NPDES permit from ADEM if they meet the criteria for them to be considered a Concentrated Animal Feeding Operation (CAFO), according to the requirements of 40 CFR 122.23 and as generally described by EPA's Guide Manual on NPDES Regulations for Concentrated Animal Feeding Operations CAFOs).

According to the Marshall & Blount County USDA–NRCS, the following CAFOs located within the Browns Creek watershed.

ALA #	Master ID	Registrant	Facility Name	County	Animal Type	AUs	Nearest Surface Water	Issue Date
000131	15261	John P. Adcock	Adcock Farms	Blount	Broiler	1,040	Browns Creek	6-24-2015
000215	15720	Ashley Backstrom	Backstrom Farm	Blount	Broiler	1,120	Browns Creek	5-02-2016
000216	15721	Sharon Harrell	Faith Farm	Blount	Broiler	608	UT Browns Creek	10-19-2016
000578	26622	Sharon Harrell	SDH Farm	Blount	Broiler	920	Browns Creek	10-19-2016
000407	20158	Charles Conner	Conner & Son	Marshall	Broiler	2,080	UT Browns Creek	12-05-2016

Municipal Point Sources:

The U.S. Environmental Protection Agency (EPA) defines point source pollution as “any single identifiable source of pollution from which pollutants are discharged, such as a pipe, ditch, ship or factory smokestack” (Hill, 1997).

Factories and sewage treatment plants are two common types of point sources. Factories, including oil refineries, pulp and paper mills, and chemical, electronics and automobile manufacturers, typically discharge one or more pollutants in their discharged waters (called effluents). Some factories discharge their effluents directly into a waterbody. Others treat it themselves before it is released, and still others send their wastes to sewage treatment plants for treatment. Sewage treatment plants treat human wastes and send the treated effluent to a stream or river.

Another way that some factories and sewage treatment plants handle waste material is by mixing it with urban runoff in a combined sewer system. Runoff refers to storm water that flows over surfaces like driveways and lawns. As the water crosses these surfaces, it picks up chemicals and pollutants. This untreated, polluted water then runs directly into a sewer system.

There is one municipal facilities (wastewater treatment plant) permitted to discharge into the Browns Creek watershed.

Non-point Source Management Measures: By installing proven effective management measures at critical sites, the pollutant load to watersheds can be dramatically reduced. This will eventually improve the ecological health in the watershed and reduce the severity of water quality degradation in the future.

On the ground BMP sign-ups for grant funding will be advertised in accordance with established USDA program cost-share methodologies along with special target based advertising within the watershed.

Projected costs for installation of these practices include programs of the Soil and Water Conservation district (SWCD), ACES, USDA-Farm Services Agency, and the USDA-NRCS.

The BMP's and budgets are project guides and are estimates of some known watershed needs. Actual types and needs of BMP's to be implemented may change as:

- New nonpoint pollution sites, sources, and causes are identified, prioritized, and targeted.
- Additional water quality or resource assessment data or other information become available.
- Future watershed, natural resource, human health, and threatened and endangered species protection needs and priorities are assessed.
- Resource agency funding priorities and appropriations change or dictate.

Agricultural BMP's will consider those as presented in "Protecting Water Quality on Alabama's Farms" (Alabama Soil and Water Conservation Committee). Actual costs of BMP's as applicable and will be based on the latest cost-averaging per Title 120 of the USDA-NCRS General Manual. In general, non-federal match will come from participating landowners.

Potential Best Management Practice Implementation Sites For Non-Point Pollution Control Within Browns Creek Watershed Include:

Site #	Longitude Latitude	Possible BMP's for These Locations	Primary Current Usage
1	34.367831 -86.365233	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
2	34.349863 -86.354906	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
3	34.340629 -86.355716	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture

4	34.340848 -86.366483	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
5	34.342702 -86.375244	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
6	34.345216 -86.383545	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
7	34.344385 -86.392103	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
8	34.344105 -86.414011	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
9	34.330765 -86.410502	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture

10	34.335267 -86.425364	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
11	34.325393 -86.427996	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
12	34.330575, -86.432115	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
13	34.327751, -86.431820	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
14	34.312599, -86.403801	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture

15	34.311782, -86.383501	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
16	34.296973, -86.402061	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
17	34.301538, -86.435096	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
18	34.284720, -86.417455	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
19	34.314584, -86.430177	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture

20	34.293232, -86.439763	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
21	34.333894, -86.384197	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
22	34.311817, -86.421542	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
23	34.264051, -86.413609	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
24	34.269641, -86.428638	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture

25	34.262017, -86.429059	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
26	34.261169, -86.433224	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
27	34.260164, -86.428604	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
28	34.259827, -86.423468	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
29	34.251276, -86.423780	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture

30	34.246471, -86.420651	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
31	34.235080, -86.425566	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
32	34.237617, -86.434810	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
33	34.241841, -86.437674	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
34	34.238376, -86.435450	Pasture Planting Watering Facility Fence Out Blue Line Heavy Use Area Piping Tree Planting Stream Crossing	Pasture
35	34.334011, -86.364979	Waste Storage Facility Roofs and Covers Freezer Incinerator Composter	Poultry House

36	34.344910, -86.421094	Waste Storage Facility Roofs and Covers Freezer Incinerator Composter	Poultry House
37	34.338317, -86.417736	Waste Storage Facility Roofs and Covers Freezer Incinerator Composter	Poultry House
38	34.341059, -86.433962	Waste Storage Facility Roofs and Covers Freezer Incinerator Composter	Poultry House
39	34.322076, -86.449812	Waste Storage Facility Roofs and Covers Freezer Incinerator Composter	Poultry House
40	34.306573, -86.426547	Waste Storage Facility Roofs and Covers Freezer Incinerator Composter	Poultry House
41	34.305035, -86.422038	Waste Storage Facility Roofs and Covers Freezer Incinerator Composter	Poultry House
42	34.294483, -86.436502	Waste Storage Facility Roofs and Covers Freezer Incinerator Composter	Poultry House
43	34.295473, -86.405382	Waste Storage Facility Roofs and Covers Freezer Incinerator Composter	Poultry House
44	34.289834, -86.399107	Waste Storage Facility Roofs and Covers Freezer Incinerator Composter	Poultry House

45	34.282453, -86.422154	Waste Storage Facility Roofs and Covers Freezer Incinerator Composter	Poultry House
46	34.265860, -86.433250	Waste Storage Facility Roofs and Covers Freezer Incinerator Composter	Poultry House
47	34.256835, -86.429818	Waste Storage Facility Roofs and Covers Freezer Incinerator Composter	Poultry House
48	34.257615, -86.420121	Waste Storage Facility Roofs and Covers Freezer Incinerator Composter	Poultry House
49	34.256093, -86.416152	Waste Storage Facility Roofs and Covers Freezer Incinerator Composter	Poultry House
50	34.336403, -86.360715	Conservation Tillage Nutrient Management Cover Crops	Row Crop
51	34.331002, -86.369487	Conservation Tillage Nutrient Management Cover Crops	Row Crop
52	34.351054 -86.396177	Conservation Tillage Nutrient Management Cover Crops	Row Crop
53	34.340072, -86.421346	Conservation Tillage Nutrient Management Cover Crops	Row Crop
54	34.330675, -86.440707	Conservation Tillage Nutrient Management Cover Crops	Row Crop
55	34.311168, -86.453254	Conservation Tillage Nutrient Management Cover Crops	Row Crop

56	34.307467, -86.447541	Conservation Tillage Nutrient Management Cover Crops	Row Crop
57	34.306076, -86.441058	Conservation Tillage Nutrient Management Cover Crops	Row Crop
58	34.303783, -86.438660	Conservation Tillage Nutrient Management Cover Crops	Row Crop
59	34.293671, -86.396421	Conservation Tillage Nutrient Management Cover Crops	Row Crop
60	34.280786, -86.404409	Conservation Tillage Nutrient Management Cover Crops	Row Crop
61	34.248236, -86.417603	Conservation Tillage Nutrient Management Cover Crops	Row Crop
62	34.257958, -86.424697	Conservation Tillage Nutrient Management Cover Crops	Row Crop
63	34.243350, -86.425618	Conservation Tillage Nutrient Management Cover Crops	Row Crop
64	34.247224, -86.430383	Conservation Tillage Nutrient Management Cover Crops	Row Crop
65	34.252256, -86.437312	Conservation Tillage Nutrient Management Cover Crops	Row Crop
66	34.236352, -86.427558	Conservation Tillage Nutrient Management Cover Crops	Row Crop
67	34.336403, -86.360715	Conservation Tillage Nutrient Management Cover Crops	Row Crop

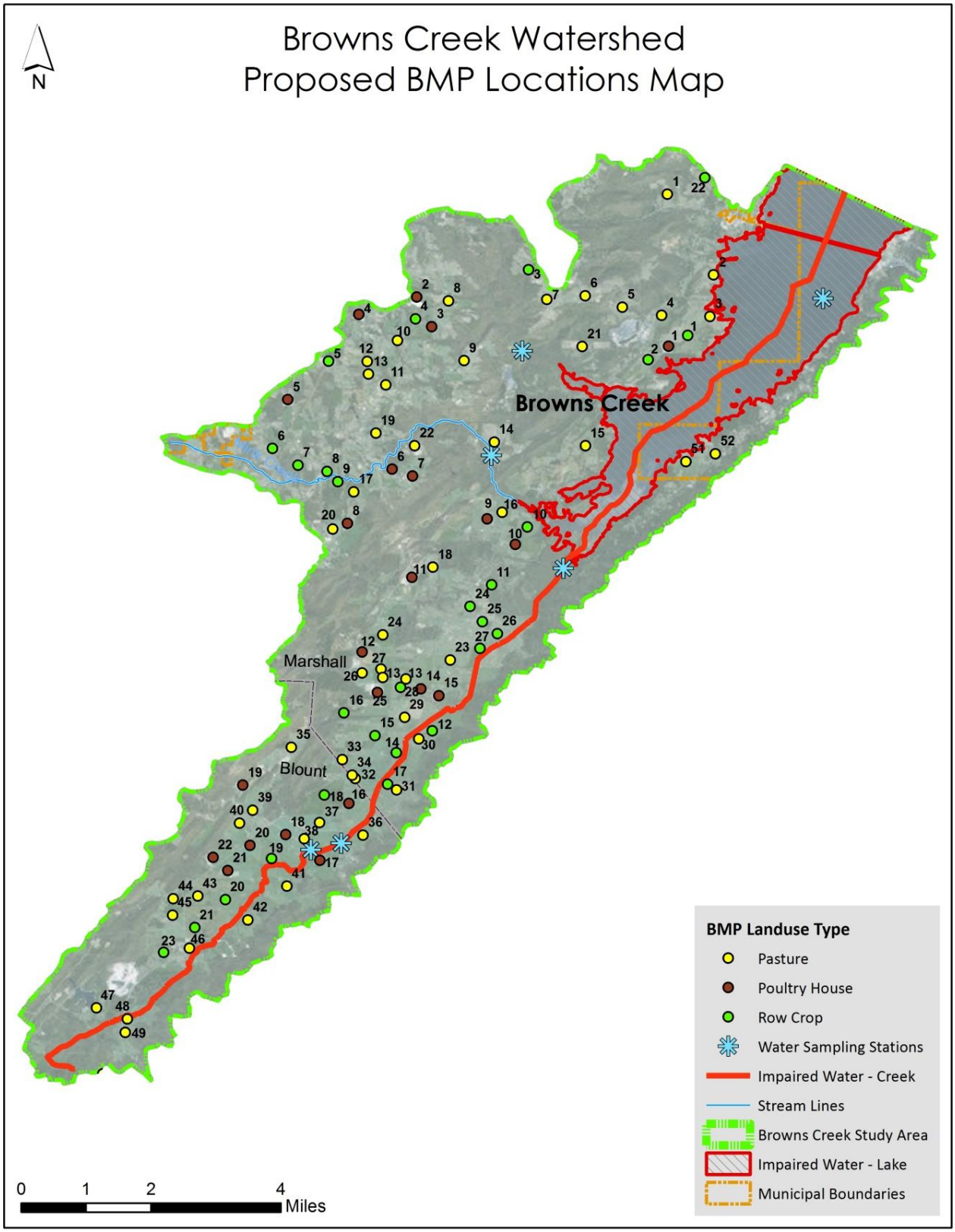


Figure 11: Proposed BMPs for Browns Creek Watershed Management Plan

1. Total load by subwatershed(s)

Watershed	N Load (no BMP)	P Load (no BMP)	BOD Load (no BMP)	Sediment Load (no BMP)
	lb/year	lb/year	lb/year	t/year
W1	460220.1	86016.7	788207.3	1718.1
Total	460220.1	86016.7	788207.3	1718.1

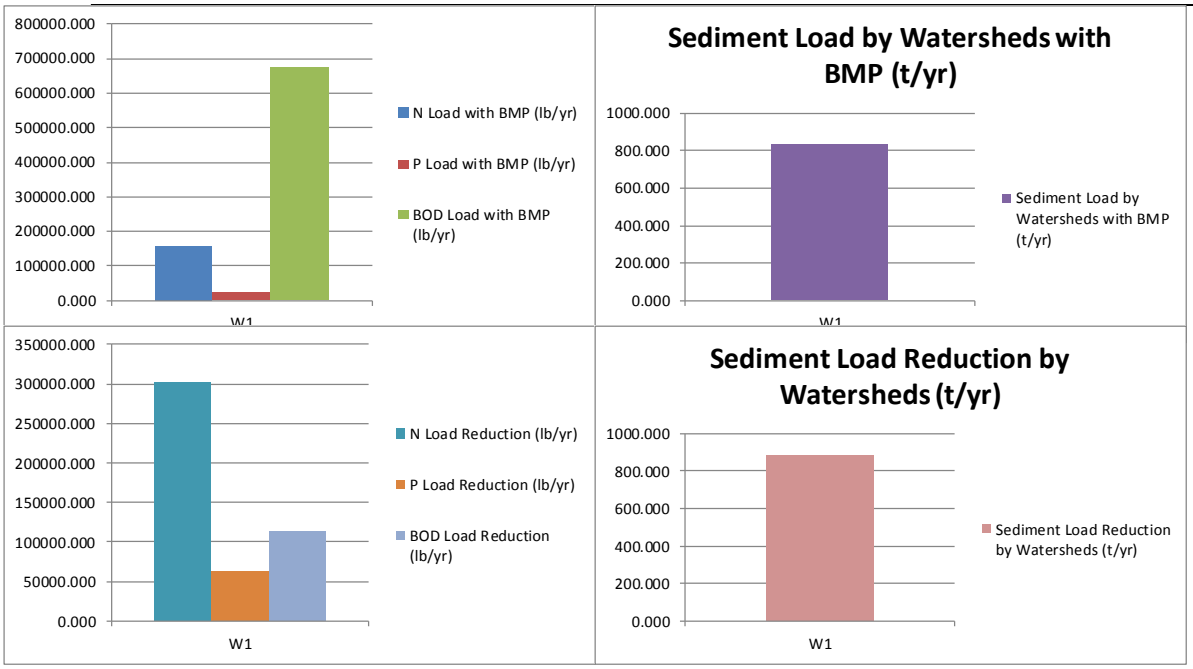
N Reduction	P Reduction	BOD Reduction	Sediment Reduction
lb/year	lb/year	lb/year	t/year
301993.8	62492.5	114334.7	885.9
301993.8	62492.5	114334.7	885.9

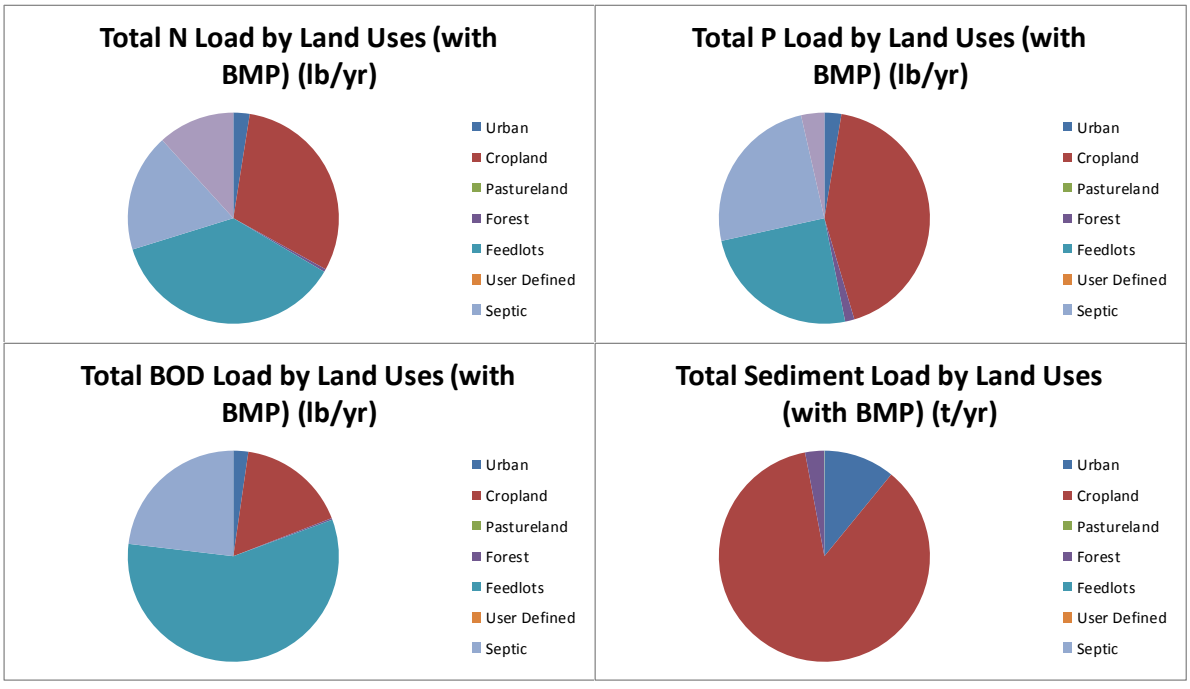
N Load (with BMP)	P Load (with BMP)	BOD (with BMP)	Sediment Load (with BMP)
lb/year	lb/year	lb/year	t/year
158226.2	23524.2	673872.6	832.2
158226.2	23524.2	673872.6	832.2

%N Reduction	%P Reduction	%BOD Reduction	%Sed Reduction
%	%	%	%
65.6	72.7	14.5	51.6
65.6	72.7	14.5	51.6

2. Total load by land uses (with BMP)

Sources	N Load (lb/yr)	P Load (lb/yr)	BOD Load (lb/yr)	Sediment Load (t/yr)
Urban	3962.98	610.81	15390.29	90.87
Cropland	48318.86	10072.78	113488.62	716.89
Pastureland	0.00	0.00	0.00	0.00
Forest	687.76	335.04	1680.94	24.03
Feedlots	58117.07	5811.71	387447.11	0.00
User Defined	0.00	0.00	0.00	0.00
Septic	28539.11	5856.79	155864.07	0.00
Gully	0.00	0.00	0.00	0.00
Streambank	0.77	0.30	1.55	0.42
Groundwater	18599.70	836.79	0.00	0.00
Total	158226.24	23524.20	673872.58	832.21


800000.000
700000.000
600000.000
500000.000
400000.000
300000.000
200000.000
100000.000
0.000
W1
N Load with BMP (lb/yr)
P Load with BMP (lb/yr)
BOD Load with BMP (lb/yr)
Sediment Load by Watersheds with BMP (t/yr)
1000.000
800.000
600.000
400.000
200.000
0.000
W1
Sediment Load by Watersheds with BMP (t/yr)
350000.000
300000.000
250000.000
200000.000
150000.000
100000.000
50000.000
0.000
W1
N Load Reduction (lb/yr)
P Load Reduction (lb/yr)
BOD Load Reduction (lb/yr)
Sediment Load Reduction by Watersheds (t/yr)
1000.000
800.000
600.000
400.000
200.000
0.000
W1
Sediment Load Reduction by Watersheds (t/yr)


Total N Load by Land Uses (with BMP) (lb/yr)
Urban
Cropland
Pastureland
Forest
Feedlots
User Defined
Septic
Total P Load by Land Uses (with BMP) (lb/yr)
Urban
Cropland
Pastureland
Forest
Feedlots
User Defined
Septic
Total BOD Load by Land Uses (with BMP) (lb/yr)
Urban
Cropland
Pastureland
Forest
Feedlots
User Defined
Septic
Total Sediment Load by Land Uses (with BMP) (t/yr)
Urban
Cropland
Pastureland
Forest
Feedlots
User Defined
Septic

Marshall County Soil and Water Conservation District Administrative Budget:

- $50,000.00 personnel/management services.
- $6,000.00 for monitoring mileage and bacteriological supplies (petri dishes, coolers, pipettes, growing media, etc.)
- $3,000.00 for mileage for farm visits/construction oversight.
- $2,500.00 for equipment and office supplies.
- $500.00 for the public meetings.

Practice Number	Item Description	Number	Average Cost *	Federal	Non Federal	Total
382	Fencing	35,000 feet	$2.00 per	$42,000.00	$28,000.00	$70,000.00
345	Residue and Tillage Management	200 Acres	$166.66 per	$19,999.20	$13,332.80	$33,332.00
367	Roofs and Covers	2	$22,430.00 per	$26,916.00	$17,944.00	$44,860.00
313	Waste Storage Facility	3	$4,776.00 per	$8,596.80	$5,731.20	$14,328.00
340	Cover Crops	400 Acres	92.10 per	$22,104.00	$14,736.00	$36,840.00
561	Heavy Use Area Protection Concrete Reinforced	10,000 feet	2.87 per sq. ft.	$17,220.00	$11,480.00	$28,700.00
578	Concrete Stream Crossing	12,000 feet	4.49 per sq. ft.	$32,328.00	$21,552.00	$53,880.00
614	2-ball freeze proof tank	15	700.34	$6,303.06	$4,202.04	$10,505.10
				$175,467.06	$116,978.04	$ 292,445.10

Details of Best Management Practices to Be Implemented: Additional non-federal dollars may go toward this project in the form of private non-cost shared BMPs that participating landowners may be doing within the watershed. These funds may be captured in future project reports as non-federal match.

Technical & Financial Assistance: The MCSWCD and the NCRS are potential providers of technical assistance related to "watershed" best management practices. The NCRS and LCSWCD will bear primary responsibility for installing "on-the-ground" practices previously mentioned.

Sources of funding (actual dollars and in-kind) include ADEM, MCSWCD, City of Guntersville, Marshall County Commission, private landowners, and the ACES.

Best management practices will include critical area vegetation treatments, fencing/livestock exclusion fencing, stream crossing, heavy use area protection installation with pipelines, pasture planting, alternative watering systems, conservation tillage, nutrient management, cover crop planting, tree planting, and installation of fire brakes.

The Marshall County NRCS will inform potential participants in the watershed about needed best management practices implementation, secure commitments from landowners and operators willing to install the above described best management practices, and will assist these participants in developing conservation plans and implementing best management practices.

The Marshall County NRCS can provide technical resources and education through a number of Federal cost-share programs, the natural Resource inventory, public service announcements, technical documents, and their website (http://www.al.nrcs.usda.gov). Information on some of these programs and resources is provided by contacting the:

USDA-NRCS
Marshall County USDA Service Center
1206 Gunter Avenue
Guntersville, Alabama 35976
Hours: Monday through Friday from 7:30 a.m. until 4:00 pm
Phone: 256-582-3923

NRCS programs provide technical and/or financial assistance to landowners for conservation of particular land uses and restoration of natural habitats. A list of these programs is listed below:

Conservation Reserve Program (CRP):
http://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-program/index

This USDA program was established as a conservation provision of the Farm Bill to encourage and assist farm producers willing to set aside highly erodible, riparian, and other environmentally sensitive lands from crop production for a 10 – 15 year period. Producers may enroll in the CRP program according to USDA program rules. If a landowners CRP bid is accepted, a Conservation Plan of operation is developed. In addition to an annual CRP payment, USDA will provide a 50% cost-share to establish

the selected conservation practice. Landowners may receive a maximum of $50,000 annually in CRP payments.

Agricultural Conservation Easement Program (ACEP):
http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/easements/acep/?cid=stelprdb1242695

The Agricultural Conservation Easement Program (ACEP) provides financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits. Under the Agricultural Land Easements component, NRCS helps Indian tribes, state and local governments and non-governmental organizations protect working agricultural lands and limit non-agricultural uses of the land. Under the Wetlands Reserve Easements component, NRCS helps to restore, protect and enhance enrolled wetlands.

Environmental Quality Incentives Program (EQIP):
http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/

This USDA program works primarily in locally identified conservation priority areas where there are significant problems with natural resources. High priority is given to areas where State and/or local governments offer financial, technical, or educational assistance and to areas where agricultural improvements will help meet water quality objectives. Landowners can apply to the program for assistance in solving problems related to animal waste management, erosion, and other environmental problems. EQIP will provide up to 60% cost-share for restoration. A landowner may receive up to $50,000 annually in EQIP payments.

Education and Outreach: This section will primarily be the responsibility of the Marshall County Soil and Water Conservation District. Project funding will be utilized to distribute public information/education via newsletters, hosting public meetings, publishing flyers, bulletins, news articles, conducting education programs in area schools, targeting teachers within the watershed area, and presenting courses as opportunities arise within local schools.

Objectives: The overall goal of the Browns Creek watershed plan is to improve and protect water quality in the watershed in an effort to meet or exceed Alabama water quality standards for the fish and Wildlife classification. Tasks will include the following:

- Increase public awareness of the value of clean water
- Increase public awareness of how land use and common everyday activities affect water quality
- Increase public awareness of how “Best Management Practices” improve and protect water quality and aquatic habitat
- Increase public awareness of the long-term environmental and economic advantages of protecting and improving water quality and habitat.

Activities: The following education and outreach activities will assure that effective stakeholder involvement is taking place and that adequate opportunities for making positive changes in attitudes and practices are presented. Increasing public awareness will involve community outreach meetings, presentations, volunteer events, farm tours, elected official tours, fact sheets, newspaper articles, and newsletters. Specific tasks may include:

- Educating citizens on local, state, and federal regulations governing water quality, enforcement options, and best management practices.
- Facilitating opportunities for education and training on sedimentation and erosion control for landowners, public works employees, contractors, developers and others.
- Organizing and conducting public watershed meetings to inform the public of ongoing watershed efforts, to emphasize the importance of community-based involvement, to allow the public to express concerns and ideas, and to provide the opportunity for public participation.
- Conducting community and stakeholder field trips to view and discuss water quality issues. Ecological values, potential conservation targets, and conservation strategies.
- Preparing press releases for local media.
- Creating and conducting presentations to civic organizations, professional groups, schools, and others focusing on water quality and conservation activities within the watershed.

Activities will address stakeholder awareness concerning water quality problems and issues, particularly the role resource agencies, landowners/users, businesses, community/civic/watershed groups, and private citizens can and must play in watershed protection. Activities will be designed so that long-term improvements in water quality can be realized and a cooperative long-term watershed planning and implementation partnership approach can be promoted and maintained.

These activities will assist stakeholders in assuming ownership for local watershed problems using reasonable and cost-effective management options that can be locally implemented and maintained. It is recognized that even after reasonable steps have been taken to enhance public understanding and participation in implementing nonpoint source pollution management practices, it may take a number of years to achieve project goals and objectives in an effort to realize water quality improvements.

Schedule for Nonpoint Pollution Management Measure Implementation:

Activities and Practices	Timeline	Lead Entities
Activity: Implement the watershed-based plan Interim Measures: • Identify impaired sites and types and number of BMP's needed to address impairments • Coordinate planning and implementation of project BMP's with appropriate partnership capabilities and expertise • Implement appropriate BMP's to address sediment load reductions	During the first 6 months of the 24 month project implementation period these three interim measures items will be executed.	Marshall County SWCD/ Local Watershed Coordinator
Activity: Conduct watershed project outreach campaign to inform citizens/landowners about the project and its benefits, to encourage input, and to build and sustain project support. Interim Measures: • Coordinate partnership education efforts and opportunities • Coordinate, develop, and produce appropriate materials for distribution • Provide quarterly updates to key stakeholders via email, website, newsletter, meetings, ect. • Document all communication with stakeholders, citizen/landowner information requests, records of meetings, ect.	During months 1 through 21 of the 24 month project implementation period these four interim measures items will be executed.	Marshall County SWCD / Local Watershed Coordinator

Activity: Conduct water quality monitoring and assessments of the watershed (pre-and post) BMP implementation. Interim Measures: • Compile and report analyses and results in user-friendly electronic reporting format.	During months 22 through 24 of the 24 month project implementation period this final interim measure item will be executed.	ADEM

Monitoring and Assessment: Monitoring will be coordinated with and reported to watershed stakeholders in Section 319 reports, at watershed meetings and in the ADEM basin assessment publications. The Watershed Project Coordinator also will distribute water quality data and information to stakeholders as the data becomes available. Monitoring sites will include historical ADEM watershed-scale monitoring stations and targeted BMP implementation sites. A scientifically based and statistically valid probabilistic water quality approach may be used.

Environmental indicators to measure BMP implementation success or failure will be developed in collaboration by watershed stakeholders and partnering agencies such as USDA and ADEM. Project deliverables will be based on the evaluation of water quality data and subsequent stakeholder perception and input. The BMP locations will be tracked using GIS. Watershed monitoring after BMP installation is expected to effectively determine pollutant load reductions. In turn, the load reductions will be compared to the TMDL recommendations.

Alabama Water Watch monitoring using standard chemical, physical, and biological water quality parameters may be used to assess water quality improvements as BMPs are progressively implemented. Water quality monitoring may be conducted by the project contractee.

Further, the ADEM Field Operations will collect post BMP monitoring data to assess the effectiveness of BMPs. All ADEM water quality samples will be collected and processed according to the EPA approved QAC plan. A watershed specific monitoring plan will be developed to address pre/post best management practice implementation and will be revised, as necessary, as the project continues to evolve.

Water quality monitoring, using standard chemical, physical, and biological water quality parameters, may be used to assess pre and post BMP practice implementation and pollutant load reductions. Water quality monitoring will be conducted by ADEM; however, the monitoring process and funding are tentative at this time.

All ADEM water quality samples will be collected and processed according to the EPA-approved QAC plan. A watershed specific monitoring plan will be developed to address

pre/post best management practice implementation and will be revised, as necessary, as the project continues to evolve.

Evaluation and Assessment of Progress:

Agencies responsible for implementing watershed activities will track best management practice implementation and provide semiannual or annual reports to the Watershed Project Coordinator. Annual management plan implementation success evaluations will be based on:

1. Achievements of milestones
2. Achieving state water quality standards
3. Achieving Fish and Wildlife water quality use classification

If the above noted criteria are not being incrementally achieved in a timely manner, or for the resources available/expended, an interagency/citizen review of the plan will be conducted. Any watershed stakeholder may request from the MCSWCD for a timely review of the management plan. Investigations of best management practice effectiveness may also be facilitated by the MCSWCD. The MCSWCD will receive public comments and recommendations and be responsible for updating/revising the management plan as needed.

The MCSWCD may revise the watershed management plan after public comments and requests are received and reconciled. If watershed plan evaluation criteria are being met, the watershed plan will not be revised. If evaluation criteria are not being achieved, the implementation approach will be revised. If a different watershed issue(s) is identified during plan implementation, this management plan will be revised within three months of issue discovery. Stakeholders will be advised of management plan revisions at meetings, on stakeholder/agency websites, and by using other media.

The Browns Creek Watershed Management Plan assessment and monitoring also will be designed to be flexible so that load reduction targets and BMPs can be easily revised if in-site monitoring or professional judgment indicates water quality standards are not being achieved. Citizen perception will also be considered as a feedback loop by water quality monitoring/collection entities.

Browns Creek Water Monitoring Data:

Station ID	Visit Date	Latitude	Longitude	Loc. Name	DO mgl	E Coli	Total P mgl	TKN mgl	TDS mgl	TSI	TSS mgl	Turbdc
BRSB-2	3/30/2009	34.223221	-86.437937	Browns Ck	10.21				161		20	NTU
BRSB-2	4/15/2009	34.223221	-86.437937	Browns Ck	9.9		0.06	0.47	224		15	NTU
BRSB-2	5/7/2009	34.223221	-86.437937	Browns Ck	7.88							
BRSB-2	5/7/2009	34.223221	-86.437937	Browns Ck	7.9				146		65	NTU
BRSB-2	6/4/2009	34.223221	-86.437937	Browns Ck	8.28							
BRSB-2	6/10/2009	34.223221	-86.437937	Browns Ck	8.58				157		30	NTU
BRSB-2	7/9/2009	34.223221	-86.437937	Browns Ck	8.26				1036		17	NTU
BRSB-2	8/12/2009	34.223221	-86.437937	Browns Ck	7.73	120.1	0.056	0.822	177		12	NTU
BRSB-2	9/10/2009	34.223221	-86.437937	Browns Ck	6.45		0.068	0.232	196		12	NTU
BRSB-2	10/14/2009	34.223221	-86.437937	Browns Ck	7.42		0.481	1.028	182		36	NTU
BRSB-2	10/22/2009	34.223221	-86.437937	Browns Ck	9.71							NTU
BRSB-2	3/26/2013	34.223221	-86.437937	Browns Ck	11.41		0.04	0.284	184		7	NTU
BRSB-2	4/23/2013	34.223221	-86.437937	Browns Ck	12.4		0.026	0.219	200		7	NTU
BRSB-2	5/9/2013	34.223221	-86.437937	Browns Ck	9.39		0.075	0.43	153		13	NTU
BRSB-2	6/24/2013	34.223221	-86.437937	Browns Ck	8.64							NTU
BRSB-2	6/26/2013	34.223221	-86.437937	Browns Ck	8.54		0.039	0.56	181		7	NTU
BRSB-2	7/11/2013	34.223221	-86.437	Browns Ck	7.11		0.39	1.3	164		16	NTU

Station ID	Visit Date	Latitude	Longitude	Loc. Name	DO mgl	E Coli	Total P mgl	TKN mgl	TDS mgl	TSI	TSS mgl	Turbdc
			937									
BRSB-2	8/15/2013	34.223221	-86.437937	Browns Ck	8.24		0.034	0.442	313		10	NTU
BRSB-2	9/10/2013	34.223221	-86.437937	Browns Ck	8.68		0.03	0.445	183		2	NTU
BRSB-2	10/2/2013	34.223221	-86.437937	Browns Ck	8.84		0.036	0.473	196		2	NTU
BRSB-2	3/9/2016	34.223221	-86.437937	Browns Ck	11.74	185	0.02	0.217	158		6	NTU
BRSB-2	4/5/2016	34.223221	-86.437937	Browns Ck	10.72	228.2	0.036	0.479	148		8	NTU
BRSB-2	4/22/2016	34.223221	-86.437937	Browns Ck	10.26							NTU
BRSB-2	4/27/2016	34.223221	-86.437937	Browns Ck	10.05							
BRSB-2	5/2/2016	34.223221	-86.437937	Browns Ck	10.12	866.4	0.047	0.422	144		27	NTU
BRSB-2	6/8/2016	34.223221	-86.437937	Browns Ck	10.38	461.1	0.046	0.37	237		23	NTU
BRSB-2	7/6/2016	34.223221	-86.437937	Browns Ck	9.57	727	0.083	0.276	130		17	NTU
BRSB-2	7/27/2016	34.223221	-86.437937	Browns Ck	7.97							NTU
BRSB-2	8/3/2016	34.223221	-86.437937	Browns Ck	8.2	248.9	0.079	0.853	189		29	NTU
BRSB-2	9/7/2016	34.223221	-86.437937	Browns Ck	9.8	185	0.052	1.18	185		16	NTU
BRSB-2	10/4/2016	34.223221	-86.437937	Browns Ck	9.81	435.2	0.049	0.292	154		9	NTU
BRSB-2	10/26/2016	34.223221	-86.437937	Browns Ck	10.22							NTU
BRSB-3	3/26/2013	34.1847	-86.486462	Browns Ck	11		0.036	0.304	176		3	NTU
BRSB-3	4/23/2013	34.1847	-86.486	Browns Ck	12.4		0.025	0.43	165		5	NTU

Station ID	Visit Date	Latitude	Longitude	Loc. Name	DO mgl	E Coli	Total P mgl	TKN mgl	TDS mgl	TSI	TSS mgl	Turbdc
			462									
BRSB-3	5/9/2013	34.1847	-86.486462	Browns Ck	8.59		0.073	0.52	147		10	NTU
BRSB-3	6/26/2013	34.1847	-86.486462	Browns Ck	6.56		0.043	1.11	145		16	NTU
BRSB-3	7/11/2013	34.1847	-86.486462	Browns Ck	7.08		0.089	0.52	180		62	NTU
BRSB-3	8/15/2013	34.1847	-86.486462	Browns Ck	7		0.038	0.689	165		8	NTU
BRSB-3	9/10/2013	34.1847	-86.486462	Browns Ck	7.03		0.03	0.797	152		3	NTU
BRSB-3	10/2/2013	34.1847	-86.486462	Browns Ck	8.38		0.039	0.631	154		7	NTU
BWSM-1	3/26/2013	34.284475	-86.388388	Browns Ck	10.89		0.059	0.442	168		10	NTU
BWSM-1	4/23/2013	34.284475	-86.388388	Browns Ck	8.8		0.034	0.5	174		7	NTU
BWSM-1	5/9/2013	34.284475	-86.388388	Browns Ck	8.39		0.094	0.74	155		22	NTU
BWSM-1	6/26/2013	34.284475	-86.388388	Browns Ck	6.64		0.047	0.628	180		12	NTU
BWSM-1	7/11/2013	34.284475	-86.388388	Browns Ck	6.36		0.49	1.1	182		61	NTU
BWSM-1	8/15/2013	34.284475	-86.388388	Browns Ck	7.21		0.049	0.528	278		9	NTU
BWSM-1	9/10/2013	34.284475	-86.388388	Browns Ck	6.72		0.039	0.404	199		4	NTU
BWSM-1	10/2/2013	34.284475	-86.388388	Browns Ck	7.09		0.042	0.409	192		10	NTU
GUNM-10	4/16/2003	34.34464	-86.33057	Browns Ck (Guntersville)	2.58							
GUNM-10	4/16/2003	34.34464	-86.33057	Browns Ck (Guntersville)	3.85							
GUNM-10	4/16/2003	34.34464	-86.330	Browns Ck (Guntersville)	6.85							

Station ID	Visit Date	Latitude	Longitude	Loc. Name	DO mgl	E Coli	Total P mgl	TKN mgl	TDS mgl	TSI	TSS mgl	Turbdc
			57									
GUNM-10	4/16/2003	34.34464	-86.33057	Browns Ck (Guntersville)	7.79							
GUNM-10	4/16/2003	34.34464	-86.33057	Browns Ck (Guntersville)	10.43							
GUNM-10	4/16/2003	34.34464	-86.33057	Browns Ck (Guntersville)	11.44							
GUNM-10	4/16/2003	34.34464	-86.33057	Browns Ck (Guntersville)	11.67							
GUNM-10	4/16/2003	34.34464	-86.33057	Browns Ck (Guntersville)	11.72							
GUNM-10	4/16/2003	34.34464	-86.33057	Browns Ck (Guntersville)	11.73							
GUNM-10	4/16/2003	34.34464	-86.33057	Browns Ck (Guntersville)	11.89		0.059	0.15	119	59	9	NTU
GUNM-10	5/21/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.11							
GUNM-10	5/21/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.14							
GUNM-10	5/21/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.15							
GUNM-10	5/21/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.18							
GUNM-10	5/21/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.19							
GUNM-10	5/21/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.21							
GUNM-10	5/21/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.22							
GUNM-10	5/21/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.24							
GUNM-10	5/21/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.26							
GUNM-10	5/21/2003	34.34464	-86.330	Browns Ck (Guntersville)	8.29							

Station ID	Visit Date	Latitude	Longitude	Loc. Name	DO mgl	E Coli	Total P mgl	TKN mgl	TDS mgl	TSI	TSS mgl	Turbdc
			57									
GUNM-10	5/21/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.33							
GUNM-10	5/21/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.37							
GUNM-10	5/21/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.38							
GUNM-10	5/21/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.41							
GUNM-10	5/21/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.49		0.03	0.15	71	63	8	NTU
GUNM-10	6/18/2003	34.34464	-86.33057	Browns Ck (Guntersville)	0.22							
GUNM-10	6/18/2003	34.34464	-86.33057	Browns Ck (Guntersville)	0.9							
GUNM-10	6/18/2003	34.34464	-86.33057	Browns Ck (Guntersville)	1.81							
GUNM-10	6/18/2003	34.34464	-86.33057	Browns Ck (Guntersville)	2.54							
GUNM-10	6/18/2003	34.34464	-86.33057	Browns Ck (Guntersville)	2.9							
GUNM-10	6/18/2003	34.34464	-86.33057	Browns Ck (Guntersville)	3.02							
GUNM-10	6/18/2003	34.34464	-86.33057	Browns Ck (Guntersville)	3.24							
GUNM-10	6/18/2003	34.34464	-86.33057	Browns Ck (Guntersville)	3.45							
GUNM-10	6/18/2003	34.34464	-86.33057	Browns Ck (Guntersville)	4.53							
GUNM-10	6/18/2003	34.34464	-86.33057	Browns Ck (Guntersville)	6.34							
GUNM-10	6/18/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.2							
GUNM-10	6/18/2003	34.34464	-86.330	Browns Ck (Guntersville)	9.03							

Station ID	Visit Date	Latitude	Longitude	Loc. Name	DO mgl	E Coli	Total P mgl	TKN mgl	TDS mgl	TSI	TSS mgl	Turbdc
			57									
GUNM-10	6/18/2003	34.34464	-86.33057	Browns Ck (Guntersville)	9.33							
GUNM-10	6/18/2003	34.34464	-86.33057	Browns Ck (Guntersville)	9.52							
GUNM-10	6/18/2003	34.34464	-86.33057	Browns Ck (Guntersville)	9.56		0.042	0.15	128	63	11	NTU
GUNM-10	7/16/2003	34.34464	-86.33057	Browns Ck (Guntersville)	1.07							
GUNM-10	7/16/2003	34.34464	-86.33057	Browns Ck (Guntersville)	1.53							
GUNM-10	7/16/2003	34.34464	-86.33057	Browns Ck (Guntersville)	3.69							
GUNM-10	7/16/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.93							
GUNM-10	7/16/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.97							
GUNM-10	7/16/2003	34.34464	-86.33057	Browns Ck (Guntersville)	9.35							
GUNM-10	7/16/2003	34.34464	-86.33057	Browns Ck (Guntersville)	9.43							
GUNM-10	7/16/2003	34.34464	-86.33057	Browns Ck (Guntersville)	9.44		0.082	0.15	170	65	15	NTU
GUNM-10	8/20/2003	34.34464	-86.33057	Browns Ck (Guntersville)	0.17							
GUNM-10	8/20/2003	34.34464	-86.33057	Browns Ck (Guntersville)	0.19							
GUNM-10	8/20/2003	34.34464	-86.33057	Browns Ck (Guntersville)	0.24							
GUNM-10	8/20/2003	34.34464	-86.33057	Browns Ck (Guntersville)	0.95							
GUNM-10	8/20/2003	34.34464	-86.33057	Browns Ck (Guntersville)	3.81							
GUNM-10	8/20/2003	34.34464	-86.330	Browns Ck (Guntersville)	10.63							

Station ID	Visit Date	Latitude	Longitude	Loc. Name	DO mgl	E Coli	Total P mgl	TKN mgl	TDS mgl	TSI	TSS mgl	Turbdc
			57									
GUNM-10	8/20/2003	34.34464	-86.33057	Browns Ck (Guntersville)	10.77							
GUNM-10	8/20/2003	34.34464	-86.33057	Browns Ck (Guntersville)	11.03							
GUNM-10	8/20/2003	34.34464	-86.33057	Browns Ck (Guntersville)	11.1		0.019	0.864	86	63	7	NTU
GUNM-10	9/17/2003	34.34464	-86.33057	Browns Ck (Guntersville)	6.86							
GUNM-10	9/17/2003	34.34464	-86.33057	Browns Ck (Guntersville)	6.99							
GUNM-10	9/17/2003	34.34464	-86.33057	Browns Ck (Guntersville)	7.16							
GUNM-10	9/17/2003	34.34464	-86.33057	Browns Ck (Guntersville)	7.26							
GUNM-10	9/17/2003	34.34464	-86.33057	Browns Ck (Guntersville)	7.32							
GUNM-10	9/17/2003	34.34464	-86.33057	Browns Ck (Guntersville)	7.44							
GUNM-10	9/17/2003	34.34464	-86.33057	Browns Ck (Guntersville)	7.49							
GUNM-10	9/17/2003	34.34464	-86.33057	Browns Ck (Guntersville)	7.7							
GUNM-10	9/17/2003	34.34464	-86.33057	Browns Ck (Guntersville)	7.81							
GUNM-10	9/17/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.14		0.04	0.15	92	68	9	NTU
GUNM-10	10/23/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.06							
GUNM-10	10/23/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.2							
GUNM-10	10/23/2003	34.34464	-86.33057	Browns Ck (Guntersville)	8.33							
GUNM-10	10/23/2003	34.34464	-86.330	Browns Ck (Guntersville)	8.73							

Station ID	Visit Date	Latitude	Longitude	Loc. Name	DO mgl	E Coli	Total P mgl	TKN mgl	TDS mgl	TSI	TSS mgl	Turbdc
			57									
GUNM-10	10/23/2003	34.34464	-86.33057	Browns Ck (Guntersville)	9.22							
GUNM-10	10/23/2003	34.34464	-86.33057	Browns Ck (Guntersville)	9.24							
GUNM-10	10/23/2003	34.34464	-86.33057	Browns Ck (Guntersville)	9.43							
GUNM-10	10/23/2003	34.34464	-86.33057	Browns Ck (Guntersville)	9.61							
GUNM-10	10/23/2003	34.34464	-86.33057	Browns Ck (Guntersville)	9.68		0.03	0.15	111	59	14	NTU
GUNM-10	4/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	9.38							
GUNM-10	4/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	9.42							
GUNM-10	4/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	9.43							
GUNM-10	4/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	9.47							
GUNM-10	4/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	9.5							
GUNM-10	4/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	9.51							
GUNM-10	4/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	9.55		0.041	0.55	160		6	NTU
GUNM-10	5/20/2009	34.34464	-86.33057	Browns Ck (Guntersville)	3.39							
GUNM-10	5/20/2009	34.34464	-86.33057	Browns Ck (Guntersville)	5.97							
GUNM-10	5/20/2009	34.34464	-86.33057	Browns Ck (Guntersville)	7.92							
GUNM-10	5/20/2009	34.34464	-86.33057	Browns Ck (Guntersville)	8.3							
GUNM-10	5/20/2009	34.34464	-86.330	Browns Ck (Guntersville)	8.49							

Station ID	Visit Date	Latitude	Longitude	Loc. Name	DO mgl	E Coli	Total P mgl	TKN mgl	TDS mgl	TSI	TSS mgl	Turbdc
			57									
GUNM-10	5/20/2009	34.34464	-86.33057	Browns Ck (Guntersville)	9.01							
GUNM-10	5/20/2009	34.34464	-86.33057	Browns Ck (Guntersville)	9.09							
GUNM-10	5/20/2009	34.34464	-86.33057	Browns Ck (Guntersville)	9.1							
GUNM-10	5/20/2009	34.34464	-86.33057	Browns Ck (Guntersville)	9.15							
GUNM-10	5/20/2009	34.34464	-86.33057	Browns Ck (Guntersville)	9.16		0.053	0.29	104		6	NTU
GUNM-10	6/17/2009	34.34464	-86.33057	Browns Ck (Guntersville)	0.81							
GUNM-10	6/17/2009	34.34464	-86.33057	Browns Ck (Guntersville)	3.06							
GUNM-10	6/17/2009	34.34464	-86.33057	Browns Ck (Guntersville)	6.41							
GUNM-10	6/17/2009	34.34464	-86.33057	Browns Ck (Guntersville)	7.11							
GUNM-10	6/17/2009	34.34464	-86.33057	Browns Ck (Guntersville)	8.87							
GUNM-10	6/17/2009	34.34464	-86.33057	Browns Ck (Guntersville)	10.34							
GUNM-10	6/17/2009	34.34464	-86.33057	Browns Ck (Guntersville)	10.57							
GUNM-10	6/17/2009	34.34464	-86.33057	Browns Ck (Guntersville)	10.6		0.032	0.663	18		2	NTU
GUNM-10	7/22/2009	34.34464	-86.33057	Browns Ck (Guntersville)			0.047	0.765	66		6	NTU
GUNM-10	8/4/2009	34.34464	-86.33057	Browns Ck (Guntersville)	1.1							
GUNM-10	8/4/2009	34.34464	-86.33057	Browns Ck (Guntersville)	1.82							
GUNM-10	8/4/2009	34.34464	-86.330	Browns Ck (Guntersville)	3.98							

Station ID	Visit Date	Latitude	Longitude	Loc. Name	DO mgl	E Coli	Total P mgl	TKN mgl	TDS mgl	TSI	TSS mgl	Turbdc
			57									
GUNM-10	8/4/2009	34.34464	-86.33057	Browns Ck (Guntersville)	5.56							
GUNM-10	8/4/2009	34.34464	-86.33057	Browns Ck (Guntersville)	8.25							
GUNM-10	8/4/2009	34.34464	-86.33057	Browns Ck (Guntersville)	9.63							
GUNM-10	8/4/2009	34.34464	-86.33057	Browns Ck (Guntersville)	12.14							
GUNM-10	8/4/2009	34.34464	-86.33057	Browns Ck (Guntersville)	12.6							
GUNM-10	8/4/2009	34.34464	-86.33057	Browns Ck (Guntersville)	12.72							
GUNM-10	8/18/2009	34.34464	-86.33057	Browns Ck (Guntersville)	1.54							
GUNM-10	8/18/2009	34.34464	-86.33057	Browns Ck (Guntersville)	5.69							
GUNM-10	8/18/2009	34.34464	-86.33057	Browns Ck (Guntersville)	6.28							
GUNM-10	8/18/2009	34.34464	-86.33057	Browns Ck (Guntersville)	6.33							
GUNM-10	8/18/2009	34.34464	-86.33057	Browns Ck (Guntersville)	6.37							
GUNM-10	8/18/2009	34.34464	-86.33057	Browns Ck (Guntersville)	6.38							
GUNM-10	8/18/2009	34.34464	-86.33057	Browns Ck (Guntersville)	6.41							
GUNM-10	8/18/2009	34.34464	-86.33057	Browns Ck (Guntersville)	6.48							
GUNM-10	8/18/2009	34.34464	-86.33057	Browns Ck (Guntersville)	6.57		0.047	0.757	144		5	NTU
GUNM-10	9/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	6.08							
GUNM-10	9/21/2009	34.34464	-86.330	Browns Ck (Guntersville)	6.76							

Station ID	Visit Date	Latitude	Longitude	Loc. Name	DO mgl	E Coli	Total P mgl	TKN mgl	TDS mgl	TSI	TSS mgl	Turbdc
			57									
GUNM-10	9/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	7.49							
GUNM-10	9/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	7.65							
GUNM-10	9/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	7.72							
GUNM-10	9/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	8.26							
GUNM-10	9/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	8.62							
GUNM-10	9/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	10.29							
GUNM-10	9/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	11.61		0.053	0.346	122		3	NTU
GUNM-10	10/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	6.87							
GUNM-10	10/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	8.65							
GUNM-10	10/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	8.9							
GUNM-10	10/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	8.96							
GUNM-10	10/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	9.11							
GUNM-10	10/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	9.12							
GUNM-10	10/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	9.13							
GUNM-10	10/21/2009	34.34464	-86.33057	Browns Ck (Guntersville)	9.2		0.043	0.657	128		4	NTU
GUNM-10	4/16/2013	34.34464	-86.33057	Browns Ck (Guntersville)	2.06							
GUNM-10	4/16/2013	34.34464	-86.330	Browns Ck (Guntersville)	6							

Station ID	Visit Date	Latitude	Longitude	Loc. Name	DO mgl	E Coli	Total P mgl	TKN mgl	TDS mgl	TSI	TSS mgl	Turbdc
			57									
GUNM-10	4/16/2013	34.34464	-86.33057	Browns Ck (Guntersville)	8.61							
GUNM-10	4/16/2013	34.34464	-86.33057	Browns Ck (Guntersville)	11.39							
GUNM-10	4/16/2013	34.34464	-86.33057	Browns Ck (Guntersville)	12.37							
GUNM-10	4/16/2013	34.34464	-86.33057	Browns Ck (Guntersville)	12.58							
GUNM-10	4/16/2013	34.34464	-86.33057	Browns Ck (Guntersville)	12.63							
GUNM-10	4/16/2013	34.34464	-86.33057	Browns Ck (Guntersville)	12.66							
GUNM-10	4/16/2013	34.34464	-86.33057	Browns Ck (Guntersville)	12.67		0.017	0.61	108		1	NTU
GUNM-10	5/15/2013	34.34464	-86.33057	Browns Ck (Guntersville)	0.55							
GUNM-10	5/15/2013	34.34464	-86.33057	Browns Ck (Guntersville)	1.91							
GUNM-10	5/15/2013	34.34464	-86.33057	Browns Ck (Guntersville)	4.02							
GUNM-10	5/15/2013	34.34464	-86.33057	Browns Ck (Guntersville)	8.28							
GUNM-10	5/15/2013	34.34464	-86.33057	Browns Ck (Guntersville)	10.69							
GUNM-10	5/15/2013	34.34464	-86.33057	Browns Ck (Guntersville)	10.83							
GUNM-10	5/15/2013	34.34464	-86.33057	Browns Ck (Guntersville)	10.88							
GUNM-10	5/15/2013	34.34464	-86.33057	Browns Ck (Guntersville)	10.9							
GUNM-10	5/15/2013	34.34464	-86.33057	Browns Ck (Guntersville)	10.93							
GUNM-10	5/15/2013	34.34464	-86.330	Browns Ck (Guntersville)	10.95	1	0.037	0.6	72		5	NTU

Station ID	Visit Date	Latitude	Longitude	Loc. Name	DO mgl	E Coli	Total P mgl	TKN mgl	TDS mgl	TSI	TSS mgl	Turbdc
			57									
GUNM-10	6/18/2013	34.34464	-86.33057	Browns Ck (Guntersville)	0.2							
GUNM-10	6/18/2013	34.34464	-86.33057	Browns Ck (Guntersville)	6.8							
GUNM-10	6/18/2013	34.34464	-86.33057	Browns Ck (Guntersville)	7.34							
GUNM-10	6/18/2013	34.34464	-86.33057	Browns Ck (Guntersville)	7.52							
GUNM-10	6/18/2013	34.34464	-86.33057	Browns Ck (Guntersville)	7.87							
GUNM-10	6/18/2013	34.34464	-86.33057	Browns Ck (Guntersville)	8.06							
GUNM-10	6/18/2013	34.34464	-86.33057	Browns Ck (Guntersville)	8.12							
GUNM-10	6/18/2013	34.34464	-86.33057	Browns Ck (Guntersville)	8.19							
GUNM-10	6/18/2013	34.34464	-86.33057	Browns Ck (Guntersville)	8.2		0.015	0.886	97		7	NTU
GUNM-10	7/24/2013	34.34464	-86.33057	Browns Ck (Guntersville)	1.64							
GUNM-10	7/24/2013	34.34464	-86.33057	Browns Ck (Guntersville)	3.45							
GUNM-10	7/24/2013	34.34464	-86.33057	Browns Ck (Guntersville)	6.55							
GUNM-10	7/24/2013	34.34464	-86.33057	Browns Ck (Guntersville)	7.06							
GUNM-10	7/24/2013	34.34464	-86.33057	Browns Ck (Guntersville)	7.95							
GUNM-10	7/24/2013	34.34464	-86.33057	Browns Ck (Guntersville)	8.46							
GUNM-10	7/24/2013	34.34464	-86.33057	Browns Ck (Guntersville)	9.63							
GUNM-10	7/24/2013	34.34464	-86.330	Browns Ck (Guntersville)	11.43							

Station ID	Visit Date	Latitude	Longitude	Loc. Name	DO mgl	E Coli	Total P mgl	TKN mgl	TDS mgl	TSI	TSS mgl	Turbdc
			57									
GUNM-10	7/24/2013	34.34464	-86.33057	Browns Ck (Guntersville)	11.62	1	0.034	0.805	76		5	NTU
GUNM-10	8/20/2013	34.34464	-86.33057	Browns Ck (Guntersville)	3.77							
GUNM-10	8/20/2013	34.34464	-86.33057	Browns Ck (Guntersville)	4.26							
GUNM-10	8/20/2013	34.34464	-86.33057	Browns Ck (Guntersville)	4.52							
GUNM-10	8/20/2013	34.34464	-86.33057	Browns Ck (Guntersville)	4.58							
GUNM-10	8/20/2013	34.34464	-86.33057	Browns Ck (Guntersville)	4.86							
GUNM-10	8/20/2013	34.34464	-86.33057	Browns Ck (Guntersville)	6.55							
GUNM-10	8/20/2013	34.34464	-86.33057	Browns Ck (Guntersville)	7.43							
GUNM-10	8/20/2013	34.34464	-86.33057	Browns Ck (Guntersville)	9.09							
GUNM-10	8/20/2013	34.34464	-86.33057	Browns Ck (Guntersville)	11.11							
GUNM-10	8/20/2013	34.34464	-86.33057	Browns Ck (Guntersville)	11.25		0.028	0.732	90		6	NTU
GUNM-10	9/17/2013	34.34464	-86.33057	Browns Ck (Guntersville)	1.32							
GUNM-10	9/17/2013	34.34464	-86.33057	Browns Ck (Guntersville)	1.65							
GUNM-10	9/17/2013	34.34464	-86.33057	Browns Ck (Guntersville)	3.68							
GUNM-10	9/17/2013	34.34464	-86.33057	Browns Ck (Guntersville)	5.77							
GUNM-10	9/17/2013	34.34464	-86.33057	Browns Ck (Guntersville)	5.79							
GUNM-10	9/17/2013	34.34464	-86.330	Browns Ck (Guntersville)	6.14							

Station ID	Visit Date	Latitude	Longitude	Loc. Name	DO mgl	E Coli	Total P mgl	TKN mgl	TDS mgl	TSI	TSS mgl	Turbdc
			57									
GUNM-10	9/17/2013	34.34464	-86.33057	Browns Ck (Guntersville)	6.49							
GUNM-10	9/17/2013	34.34464	-86.33057	Browns Ck (Guntersville)	7.5							
GUNM-10	9/17/2013	34.34464	-86.33057	Browns Ck (Guntersville)	8.18							
GUNM-10	9/17/2013	34.34464	-86.33057	Browns Ck (Guntersville)	8.41	1	0.032	1.03	97		9	NTU
GUNM-10	10/23/2013	34.34464	-86.33057	Browns Ck (Guntersville)	7.65							
GUNM-10	10/23/2013	34.34464	-86.33057	Browns Ck (Guntersville)	7.76							
GUNM-10	10/23/2013	34.34464	-86.33057	Browns Ck (Guntersville)	7.8							
GUNM-10	10/23/2013	34.34464	-86.33057	Browns Ck (Guntersville)	7.83							
GUNM-10	10/23/2013	34.34464	-86.33057	Browns Ck (Guntersville)	7.85							
GUNM-10	10/23/2013	34.34464	-86.33057	Browns Ck (Guntersville)	7.87							
GUNM-10	10/23/2013	34.34464	-86.33057	Browns Ck (Guntersville)	7.89							
GUNM-10	10/23/2013	34.34464	-86.33057	Browns Ck (Guntersville)	7.9							
GUNM-10	10/23/2013	34.34464	-86.33057	Browns Ck (Guntersville)	7.91							
GUNM-10	10/23/2013	34.34464	-86.33057	Browns Ck (Guntersville)	7.94		0.029	0.659	72		1	NTU
GUNM-10	4/22/2015	34.34464	-86.33057	Browns Ck (Guntersville)	8.5							
GUNM-10	4/22/2015	34.34464	-86.33057	Browns Ck (Guntersville)	8.97							
GUNM-10	4/22/2015	34.34464	-86.330	Browns Ck (Guntersville)	9							

Station ID	Visit Date	Latitude	Longitude	Loc. Name	DO mgl	E Coli	Total P mgl	TKN mgl	TDS mgl	TSI	TSS mgl	Turbdc
			57									
GUNM-10	4/22/2015	34.34464	-86.33057	Browns Ck (Guntersville)	9.07							
GUNM-10	4/22/2015	34.34464	-86.33057	Browns Ck (Guntersville)	9.15							
GUNM-10	4/22/2015	34.34464	-86.33057	Browns Ck (Guntersville)	9.19							
GUNM-10	4/22/2015	34.34464	-86.33057	Browns Ck (Guntersville)	9.23							
GUNM-10	4/22/2015	34.34464	-86.33057	Browns Ck (Guntersville)	9.24							
GUNM-10	4/22/2015	34.34464	-86.33057	Browns Ck (Guntersville)	9.25		0.015	0.325	105		1	NTU
GUNM-10	5/14/2015	34.34464	-86.33057	Browns Ck (Guntersville)	0.02							
GUNM-10	5/14/2015	34.34464	-86.33057	Browns Ck (Guntersville)	0.03							
GUNM-10	5/14/2015	34.34464	-86.33057	Browns Ck (Guntersville)	2.53							
GUNM-10	5/14/2015	34.34464	-86.33057	Browns Ck (Guntersville)	4.9							
GUNM-10	5/14/2015	34.34464	-86.33057	Browns Ck (Guntersville)	8.8							
GUNM-10	5/14/2015	34.34464	-86.33057	Browns Ck (Guntersville)	9.05							
GUNM-10	5/14/2015	34.34464	-86.33057	Browns Ck (Guntersville)	9.09							
GUNM-10	5/14/2015	34.34464	-86.33057	Browns Ck (Guntersville)	9.11							
GUNM-10	5/14/2015	34.34464	-86.33057	Browns Ck (Guntersville)	9.12							
GUNM-10	5/14/2015	34.34464	-86.33057	Browns Ck (Guntersville)	9.14	1	0.014	0.12	99		1	NTU
GUNM-10	6/11/2015	34.34464	-86.330	Browns Ck (Guntersville)	0.14							

Station ID	Visit Date	Latitude	Longitude	Loc. Name	DO mgl	E Coli	Total P mgl	TKN mgl	TDS mgl	TSI	TSS mgl	Turbdc
			57									
GUNM-10	6/11/2015	34.34464	-86.33057	Browns Ck (Guntersville)	2.13							
GUNM-10	6/11/2015	34.34464	-86.33057	Browns Ck (Guntersville)	5.63							
GUNM-10	6/11/2015	34.34464	-86.33057	Browns Ck (Guntersville)	8.65							
GUNM-10	6/11/2015	34.34464	-86.33057	Browns Ck (Guntersville)	9							
GUNM-10	6/11/2015	34.34464	-86.33057	Browns Ck (Guntersville)	9.08							
GUNM-10	6/11/2015	34.34464	-86.33057	Browns Ck (Guntersville)	9.33							
GUNM-10	6/11/2015	34.34464	-86.33057	Browns Ck (Guntersville)	9.42							
GUNM-10	6/11/2015	34.34464	-86.33057	Browns Ck (Guntersville)	9.43		0.015	0.072	114		3	NTU
GUNM-10	7/16/2015	34.34464	-86.33057	Browns Ck (Guntersville)	0							
GUNM-10	7/16/2015	34.34464	-86.33057	Browns Ck (Guntersville)	0.01							
GUNM-10	7/16/2015	34.34464	-86.33057	Browns Ck (Guntersville)	1.43							
GUNM-10	7/16/2015	34.34464	-86.33057	Browns Ck (Guntersville)	3.83							
GUNM-10	7/16/2015	34.34464	-86.33057	Browns Ck (Guntersville)	5.77							
GUNM-10	7/16/2015	34.34464	-86.33057	Browns Ck (Guntersville)	7.02							
GUNM-10	7/16/2015	34.34464	-86.33057	Browns Ck (Guntersville)	7.46							
GUNM-10	7/16/2015	34.34464	-86.33057	Browns Ck (Guntersville)	7.96							
GUNM-10	7/16/2015	34.34464	-86.330	Browns Ck (Guntersville)	7.98	1	0.021	0.604	105		3	NTU

Station ID	Visit Date	Latitude	Longitude	Loc. Name	DO mgl	E Coli	Total P mgl	TKN mgl	TDS mgl	TSI	TSS mgl	Turbdc
			57									
GUNM-10	8/19/2015	34.34464	-86.33057	Browns Ck (Guntersville)	5.41							
GUNM-10	8/19/2015	34.34464	-86.33057	Browns Ck (Guntersville)	6.51							
GUNM-10	8/19/2015	34.34464	-86.33057	Browns Ck (Guntersville)	6.53							
GUNM-10	8/19/2015	34.34464	-86.33057	Browns Ck (Guntersville)	6.58							
GUNM-10	8/19/2015	34.34464	-86.33057	Browns Ck (Guntersville)	6.59							
GUNM-10	8/19/2015	34.34464	-86.33057	Browns Ck (Guntersville)	6.63							
GUNM-10	8/19/2015	34.34464	-86.33057	Browns Ck (Guntersville)	6.65							
GUNM-10	8/19/2015	34.34464	-86.33057	Browns Ck (Guntersville)	6.69							
GUNM-10	8/19/2015	34.34464	-86.33057	Browns Ck (Guntersville)	6.72		0.026	1.23	84		9	NTU
GUNM-10	9/17/2015	34.34464	-86.33057	Browns Ck (Guntersville)	6.46							
GUNM-10	9/17/2015	34.34464	-86.33057	Browns Ck (Guntersville)	6.91							
GUNM-10	9/17/2015	34.34464	-86.33057	Browns Ck (Guntersville)	7.03							
GUNM-10	9/17/2015	34.34464	-86.33057	Browns Ck (Guntersville)	7.06							
GUNM-10	9/17/2015	34.34464	-86.33057	Browns Ck (Guntersville)	7.11							
GUNM-10	9/17/2015	34.34464	-86.33057	Browns Ck (Guntersville)	7.43							
GUNM-10	9/17/2015	34.34464	-86.33057	Browns Ck (Guntersville)	7.85							
GUNM-10	9/17/2015	34.34464	-86.330	Browns Ck (Guntersville)	7.94	1	0.036	0.716	102		7	NTU

Station ID	Visit Date	Latitude	Longitude	Loc. Name	DO mgl	E Coli	Total P mgl	TKN mgl	TDS mgl	TSI	TSS mgl	Turbdc
			57									
GUNM-10	10/21/2015	34.34464	-86.33057	Browns Ck (Guntersville)	8.19							
GUNM-10	10/21/2015	34.34464	-86.33057	Browns Ck (Guntersville)	8.34							
GUNM-10	10/21/2015	34.34464	-86.33057	Browns Ck (Guntersville)	8.38							
GUNM-10	10/21/2015	34.34464	-86.33057	Browns Ck (Guntersville)	8.39							
GUNM-10	10/21/2015	34.34464	-86.33057	Browns Ck (Guntersville)	8.54							
GUNM-10	10/21/2015	34.34464	-86.33057	Browns Ck (Guntersville)	8.77							
GUNM-10	10/21/2015	34.34464	-86.33057	Browns Ck (Guntersville)	8.81							
GUNM-10	10/21/2015	34.34464	-86.33057	Browns Ck (Guntersville)	8.82							
GUNM-10	10/21/2015	34.34464	-86.33057	Browns Ck (Guntersville)	8.85		0.022	0.572	104		6	NTU

Sites such as this one located off Browns Creek Road within the Browns Creek watershed can be improved with proper implementation of public education and outreach

The above and below noted photograph represents potential BMP implementation sites adjacent to Rocky Hollow Road. Livestock exclusion fencing for streams and ponds, HUA, water facility with piping, and stream crossing BMP's could potentially be implemented at similar locations to improve water quality.

The above photograph represents a potential BMP site with the Browns Creek Watershed adjacent to Marshall County Highway 25. Conservation tillage and nutrient management BMP's could potentially be implemented at this location to improve water quality.

The above photographs represent potential BMP sites adjacent to Rocky Hollow Road. Installation of livestock fencing to exclude animals from Browns Creek for example could potentially improve water quality within the Browns Creek watershed.

List of Partners for Browns Creek Watershed Management Plans (Marshall County, Alabama)

Agency	Contact	Title	Phone	Email
Marshall County SWCD	1. Jennifer Childers 2. Stanley Sumner 3. Jimmy Page 4. Ricky Cornutt 5. John Bevel 6. Mike Carnes	1. District Admin Coordinator 2. Chairman 3. Board 4. Board 5. Board 6. Board	256.582.3923	jchilders@etowahcounty.org
NRCS (Marshall Co. Service Center)	Shawn Manning Bucky Howe	District Conservationist Soil Cons. Tech	256. 582-3923	Shawn.Manning@al.usda.gov bucky.howe@al.usda.gov
Blount County SWCD	Polly Morris	District Admin Coordinator	205.274.2363	polly.morris@blountswcd.net
NRCS (Blount County Service Center)	Merry Gaines	District Conservationist		merry.gaines@al.usda.gov
State of Alabama NRCS	Greg Dansby	Asst. State Consv.		greg.dansby@al.usda.gov
Marshall Co. Cooperative Extension	Eddie Wheeler Hunter McBrayer	County Extension Coordinator Regional Extension Agent	256.582.2009	wheeled@aces.edu rhm0015@aces.edu
Auburn University / Alabama A&M Extension Center	Spenser Bradley	Regional Extension Agent I (Wildlife/Natural Resource Management)	256.773.2549	seb0043@aces.edu
Tennessee Valley Regional	Tyler Sandlin	Regional Extension Agent I (Agronomy)	256.353.8702	Tns0012@aces.edu

Agency	Contact	Title	Phone	Email
Resource & Extension Center				
Marshall County Health Department	Randell Ball	Environmental Office	256.582.4926	Randell.Ball@adph.state.al.us
Alabama A&M University	Karnita Golson-Garner, Ph.D	Extension Environmental Specialist, Forestry, Wildlife and Natural Resources Management, Alabama Cooperative Extension System	256-372-8331 or 256-372-4982	Karnita.golson@aamu.edu kfg0003@aces.edu
Nature Conservancy	Paul Freeman	Aquatic Ecologist	205.251.1155	pfreeman@tnc.org
TVA	Benjamin Bean	Guntersville Watershed Team/Natural Resource Management	256.386.2268	bjbean@tva.gov
The Alabama Mountains, Rivers & Valleys RC&D Council	Mike Roden	Exec. Director	256.773-8495	mike.roden@amrvrcd.com
Alabama Clean Water Partnership	Jay Grantland	Tennessee River Basin Facilitator	205.266.6285	jay.grantland@amrvrcd.com
Marshall Co. School System	Cindy Wigley	Superintendent	256.582.3171	
Arab City School System	John Mullins	Superintendent	256.586.6011	jmullins@arabcityschools.org
Guntersville City School System	Brett Stanton	Superintendent	256.582.3159	brettstanton@gcboe.net
Arab Water Works	Ted Hyatt	Manager	256.586.3159	hyatt@arabwaterworks.org
Guntersville Water & Sewer Board	Jerry Nabors Jack	Manager Chairman	256.582.5931	

Agency	Contact	Title	Phone	Email
	Swann			
Marshall County Commission	James Hutcheson Bill Stricklend	Chairman Commissioner	256.571.7701 256.753.2557	jhutcheson@marshallco.org commission@marshallco.org
Department of Agriculture and Industries	Tony Cofer	Division Director of Pesticide Mgmt	334.240.7237	Tony.cofer@agi.alabama.gov
City of Guntersville	Leigh Dollar	Mayor	256.571.7560	cityclerk@guntersvilleal.org
City of Arab	Bob Joslin	Mayor	256.586.3544	bjoslin@arabcity.org