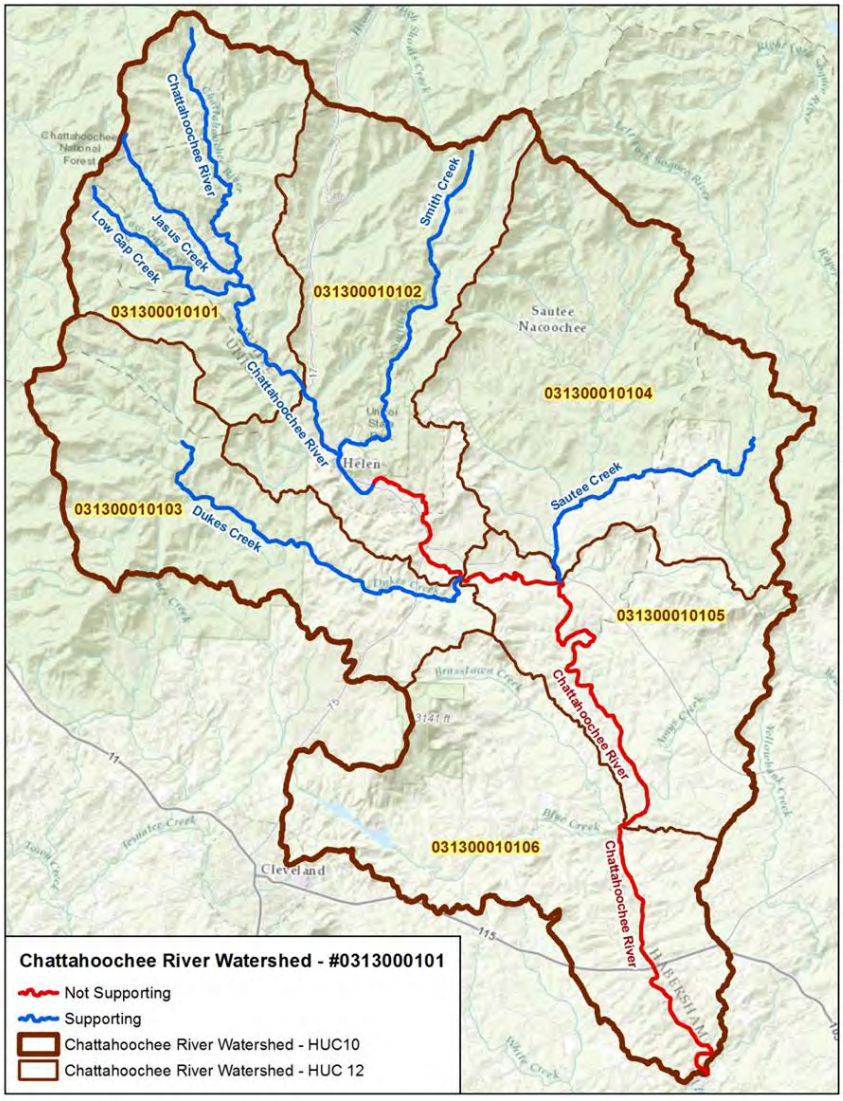
2018 WATERSHED MANAGEMENT PLAN
UPPER CHATTAHOOCHEE WATERSHED



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INTRODUCTION

PURPOSE

This document is the Watershed Management Plan (WMP) for the identified segment of the Upper Chattahoochee River. The objective of a WMP is to identify and prioritize significant sources of pollution causing impairment in a watershed, determine effective management practices that will reduce pollutant loads from those sources, and seek funds and other resources to install the pollution controls and restore water quality in the impaired water body.

The Upper Chattahoochee River (HUC10 #0313000101), which features the river's headwaters and prominent streams leading up to the top of Lake Lanier, has a beneficial water use classification of recreation and drinking and is currently listed as an impaired water body. The targeted segment has been identified as contaminated/partially contaminated by the Georgia Department of Natural Resources (DNR) and in need of remediation. The degree of impairment is classified as not supporting uses and the TMDL for this segment of the Chattahoochee River is set at a target level that will allow the water body to achieve water quality standards necessary for the beneficial use classification of fishing.

In this particular instance, the contamination stems from non-point sources and has been added to the list of streams for Total Maximum Daily Load (TMDL) planning and water quality restoration. An original TMDL assessment and Implementation Plan has already been developed and some progress made with regards to remediation measures by local stakeholders in restoring stream banks and promoting septic tank maintenance standards. This WMP will provide a summary of progress and of recent monitoring efforts, then produce an updated Implementation Plan for ultimately achieving water quality. The results of this WMP will be used to coordinate local and State assisted remediation measures for the next 5-10 years.

WATERSHED PLANNING IN GEORGIA

Georgia is home to nearly 10 million people and one of the most naturally diverse states in the country, featuring mountains and valleys to the north, thousands of acres of farmlands in the south and the marshlands along the coast. The Georgia Department of Natural Resources (DNR) is the State agency charged with management and protection these natural resources, and within the DNR structure the Environmental Protection Division (EPD) is responsible for protecting Georgia's air, land, and water resources through the authority of state and federal environmental statutes. These laws regulate public and private facilities in the areas of air quality, water quality, hazardous waste, water supply, solid waste, surface mining, underground storage tanks, and others. EPD also issues and enforces all state permits in these areas and has full delegation for federal environmental permits except Section 404 (wetland) permits.

As part of their approach to improved water resource protection, EPD employs a watershed-based approach to assessing and managing conditions that impact water quality. A watershed approach provides a comprehensive and effective means for examining the factors that affect all surface waters, including both point and nonpoint sources of pollution. To this end, the well-being of Georgia's streams, rivers, ponds and lakes are addressed through improvement plans and studies that consider the full context of drainage basins. This helps to account for historical activities, ongoing land uses, and future

growth that do/may impact Georgia's water quality, as well as providing a means for coordinating across stakeholders how to monitor, improve and sustain healthy water.

As a watershed management plan (WMP), this document will follow EPD guidelines and standards in addressing the water quality for the Chattahoochee River watersheds. It has been developed in response to previous TMDL assessments that established a violation concern but did not fully establish a source. By going through a watershed-based approach, this WMP provides an identification of likely causes as well as recommended remediation measures for restoring and sustaining water quality within the Chattahoochee River watershed.

As part of the watershed planning directed by EPD, documents such as this are to include the *Nine Key Elements* (see below) as recommended by the U.S. Environmental Protection Agency (EPA). The nine elements are recommended to ensure the propriety of the assessment, a minimum of stakeholder involvement and to ensure a program of action for attaining watershed restoration objectives.

EPA's Nine Key Elements for Watershed Plans

1. *An identification of the sources or groups of similar sources contributing to nonpoint source (NPS) pollution to be controlled to implement load allocations or achieve water quality standards.*
2. *An estimate of the load reductions needed to de-list impaired stream segments;*
3. *A description of the NPS management measures that will need to be implemented to achieve the load reductions established in the TMDL or to achieve water quality standards;*
4. *An estimate of the sources of funding needed, and/or authorities that will be relied upon, to implement the plan;*
5. *An information/education component that will be used to enhance public understanding of and participation in implementing the plan;*
6. *A schedule for implementing the management measures that is reasonably expeditious;*
7. *A description of interim, measurable milestones (e.g., amount of load reductions, improvement in biological or habitat parameters) for determining whether management measures or other control actions are being implemented;*
8. *A set of criteria that can be used to determine whether substantial progress is being made towards attaining water quality standards and, if not, the criteria for determining whether the plan needs to be revised; and;*
9. *A monitoring component to evaluate the effectiveness of the implementation efforts, measured against the criteria established under item (8) above.*

PROJECT SCOPE

The Upper Chattahoochee Watershed is located predominantly in White County, Georgia, within the upper Chattahoochee River Basin. Portions of the watershed feed into headwaters within Towns and unions county immediately north of White County, in the Chattahoochee National Forest. An additional

segment of the watershed lies to the east in Habersham County, encompassing the Soque Creek watershed.

The drainage area of the Upper Chattahoochee Watershed (HUC10 #0313000101) and is just under 100,000 acres and features 316 miles of perennial and intermittent streambeds plus almost 500 acres of lakebed. Significant tributaries include Smith Creek, which drains from Unicoi State Park downstream from Anna Ruby Falls, Dukes Creek just south of Helen, which receives water from the Smithgall Woods recreation area and traverses some agricultural land in the Nacoochee Valley, Blue Creek and Brasstown Creek, and the aforementioned the Soque River.

According to the GAEPD's 2014 Integrated 305(b)/303(d) List of Waters identifies one stream segment in the watershed as not meeting water quality standards for both biota impacted fish due to sediment (Bio F) and fecal coliform bacteria (FC), and a second segment as not meeting water quality standards for FC.

THE GMRC

This report was developed by the Georgia Mountains Regional Commission (GMRC). The GMRC is one of 12 regional government offices within Georgia working to foster economic development and to provide community planning and information services. The GMRC provides services and technical assistance directly to its 13 counties and 38 municipalities as well as developing regional initiatives and supporting the programs of various State Departments. Originally founded as the Georgia Mountains Area and Planning Development Center in 1962, the GMRC has evolved in the common services provided but continually works to assist its member governments in efforts that preserve local character, encourage sustainable resource management and progressive economies, and contribute to improving the overall well-being of the region and its communities.

Currently the GMRC employs 33 staff in the realms of planning, economic development, workforce development, information technology, human resources and general administration. The Council for the GMRC consists of two representatives from each county, one from the County Commission and one mayoral representative from all the cities within that county, as well as 5 appointees from the State legislature.

As the contractor for this project, the GMRC was responsible for carrying out the tasks and duties necessary to complete this document, including but not limited to the following:

- Outreach to local stakeholders;
- Survey the watershed to identify possible causes/sources of pollution, as well as opportunities for remediation;
- Produce the final WMP.

WATERSHED PROFILE

WATERSHED LOCATION AND GENERAL DESCRIPTION

The Upper Chattahoochee Watershed is located predominantly in White County, GA, located north of Gainesville and including the City of Helen and portion of the City of Cleveland. This watershed features the river's headwaters which begin in the Chattahoochee National Forest and includes Unicoi State Park, portions of Union and Towns Counties, and a segment of Habersham County to the east.

The headwaters come from the beginnings of the Appalachian Mountains, with the Chattahoochee River proper originating in Union County, northwest of Helen. Collecting runoff from the steeper slopes the myriad creeks and streams quickly come together such that within a couple miles it's wide enough to embody the river namesake near the Upper Chattahoochee River Campground. Here the terrain is mostly wooded hillsides and mountain slopes, and for another 2 miles downstream the river will receive the outflow from many other tributaries such as Wilks Creek and Low Gap Creek. Along this stretch runs Chattahoochee Road and there are a few small houses to be found.

Eventually the Chattahoochee River merges with Spoilcane Creek alongside SR 17 just north of Helen, at which point the river is typically 20+ feet wide and featuring varieties of low-grade whitewater, and less than another mile downstream the river merges with Smith Creek from the east. At this point the river is sometimes wider and noticeably stronger in current, but more importantly this is where the Chattahoochee first becomes a large scale public attraction. Just north of the merger with Smith Creek the river begins to host tourists riding tubes down into central Helen, with a variety of decks and public overlooks lining the shore. The river is often shrouded in tree canopy but the shoreline vegetation itself is typically broken by public access points and rocks designed to minimize erosion but maintain easy views to the water. Local roads will traverse close to the river on either side for the most part. The river will be like this through downtown Helen to the southern side of the city, where most tubers take out at a local water park before the river passes by the City's water treatment plant.

From here the river flows with less, but still some, interruption through the 2+ mile Nacoochee Valley where the last vestiges of agricultural uses persist in this part of White County. The river turns east flowing through the valley, picking up strength as more tributaries (namely Chickamauga Creek) contribute to the flow. This area features the only notable concentration of pastureland or row crops immediately adjacent to the river, though none of the operations in the valley are significant large scale commercial farms. The total livestock counted on any given day might broach 100-150 large animals across the valley, as most of the farms here are legacy properties, hobby farmers and residents keeping a few animals for their own.

By the time the Chattahoochee exits the valley the river is anywhere from 40-60 feet wide and the volume of whitewater has subsided for a spell. The river will wind through hillsides for the next several miles, with variety of residential housing uses dotting the landscape as the watershed gets closer to more suburban settings and the river is large enough to serve as an attraction to residents. Homes will line either side of the river from here until State Highway 255

NATURAL FEATURES AND CONDITIONS

(Much of this material has been taken from, or referencing, existing or past editions of the White County Comprehensive Plan)

Weather and Climate

The climate of White County is strongly influenced by mountainous terrain and the typically northeastern-flowing drafts that drive moisture from the west. Summers are mild and winters are quite cold. Generous precipitation occurs throughout the year with heavier amounts in winter and early spring, and typically gives the local streams a dynamic temperature range for water bodies not fueled by winter frost.

The complex terrain and contrasting elevations of White County creates highly variable weather conditions. High elevation mountain areas are commonly 5 to 10 degree colder during the day than valley bottoms. In the evening, cold air flows off of the high slopes into the valleys. In these bottom lands, early morning temperatures can be 10 to 15 degrees colder than surrounding areas. Precipitation varies as well. High elevations receive more rainfall and snow than lowlands, as air is forced to rise and cool as it pushed over mountains. Elevation changes alone can increase annual precipitation by 10 inches or more, when compared to nearby lowlands. Microclimates at high elevations are common, and lead to greater biodiversity than surrounding counties that have only low elevations.

The Southeast Regional Climate Center's Clarkesville and Helen stations have weather and climate records from 1961 to 2000. Maximum summer temperatures during this time averaged in the middle to high 80's. July is the warmest month, with the average highs of 86.5 degrees. Lows during the summer are comfortable, and average between the high 50's and low 60's.

Average high temperatures during the winter months are in the low to middle 50's. January is the coldest month with an average high temperature of 50.9, and an average low temperature of 29.4. Average low temperatures throughout the winter months range from the high 20's to the high 30's.
Precipitation in White County follows a winter maximum regime with a second peak of precipitation during summer months. In the Town of Cleveland, December through March are the wettest months, during which time the city receives between 5.71 and 6.94 inches of precipitation per month. July and August also see considerable rainfall. During these months, Cleveland receives a monthly average of 5.64 and 5.37 inches of rain. Snowfall can occur during winter months, especially at higher elevations. Cleveland averages 2.6 inches a year while Helen's average snowfall is 3.4 inches. The fall and early summer are the driest periods. During this time, monthly precipitation averages between 4.24 and 5.19 inches of rain.

Physiography

White County lies within two physiographic provinces: the Blue Ridge District and the Piedmont District. The north and northwest sections of the County are within the Blue Ridge Mountains District, which consists of rugged mountains and ridges ranging in elevation from 3,000-4,700 feet. The southern boundary of the Blue Ridge Province abuts the Piedmont Province at approximately the 1,700 ft. elevation where a sharp contrast in regional slope occurs.

The portion of White County that falls within the Piedmont Province can be subdivided into three different districts. A small middle-western portion of the County lies within the Dahlonega Upland District, which is a rough and hilly section standing 1,500 to 1,700 feet above sea level. Streams in this district flow south out of the Blue Ridge Mountains District and have cut deep, narrow valleys 500 to 600 feet below the surrounding surface. Running in a southwest to northeast direction in the southwest and central portions of White County, at a width of approximately five miles, is the Hightower-Ridges District. This district contains a series of low, linear, parallel ridges separated by narrow valleys. The Hightower Ridges range in elevation from 1,000 feet in the southwest to1,500 feet in the northeast. The remainder of White County (southern and eastern portions) lies within the Central Uplands District, which encompasses a series of low, linear ridges 1,300 to 1,500 feet above sea level separated by broad, open valleys. Streams flowing through this section occupy valleys 150 to 200 feet below the ridge crests. *(Source: Georgia Department of Natural Resources, Geologic and Water Resources Division. Physiographic Map of Georgia. 1976.)*

Land Cover

The mountain region of northeastern Georgia contains multiple climatic and soil conditions that stimulate the growth of many trees and plants. The slopes, soils, and annual rainfall are principal natural factors controlling the vegetation of the area, giving shape to the local ecosystem and conditions impacting runoff.

The Upper Chattahoochee River watershed is a heavily wooded area that features rolling-to-steep hills populated with varieties of pine, hickory, elm and other trees. Oak forests often predominate on the eastern faces of the mountains, which do not typically receive as much moisture, while pines and oaks may mix on some slopes. The northern facing slopes, which will be cool and moist, will be made up of mostly broadleaf deciduous forests. At higher elevations, the understory is less varied. Shrubs of mountain laurel and rhododendron form nearly impenetrable thickets that are densest where conditions are wettest. The large amount of forested land in this region provides wildlife with shelter from adverse weather and also gives protection from predators by providing screening or escape cover.

Within a forest community, how the plants grow in different layers is also an important type of arrangement called vertical layering. This is important because some wildlife species may use the ground layer vegetation (herbaceous) for food, but also need the tallest layer (tree canopy) for shelter. The middle layer between the tree canopy and herbaceous layer is comprised of shrubs (shrub layer). Every mature forest community has different vertical layering. Some may have a variety of layers comprised of grasses, broadleaf weeds (forbs), shrubs, small trees, and large trees; whereas, others may only have one distinct layer of tall trees. The latter would provide fewer habitats for wildlife compared to the forest stand with a variety of layers. The boundary where 2 or more different plant communities or successional stages (such as where a forest meets a pasture or cropland) meet is called edge.

There are also many areas that are open fields and pastureland as well. Small treeless openings that provide breaks in tree canopy and provide leafy trees, shrubs, grasses, and flowering plants which attract deer, rabbits, and mice. Berries and other fruits will draw birds and bears to the area, while dozens of wildlife species are known to feed on nuts such as acorns, which would be prevalent on the eastern faces of the mountains. The different species of herbivores will undoubtedly attract predators such as coyotes, wolves, cougars and bears, which prey on other animals.

Wildlife is attracted to the many water resources in the area and will settle near streams and rivers for drinking, bathing, and reproduction. Without a sufficient water source, wildlife must either leave the area or die. Wild animals will not inhabit areas too far from water, even if food and cover are abundant.

General Forest Types by Elevation.

Forest Type	Locale	Elevation
Oak Ridge	Along crests of Blue Ridge	3600-4000'
Open Oak Pine	Exposed north or south facing slopes	2100-3800'
Mixed Deciduous	Moist Valley Floors	1800-2000'
Oak-Hickory-Pine	Dry ridge slopes of Piedmont	1800-2000'

Source: Institute of Community and Area Development, University of Georgia, The Atlas of Georgia. 1986.

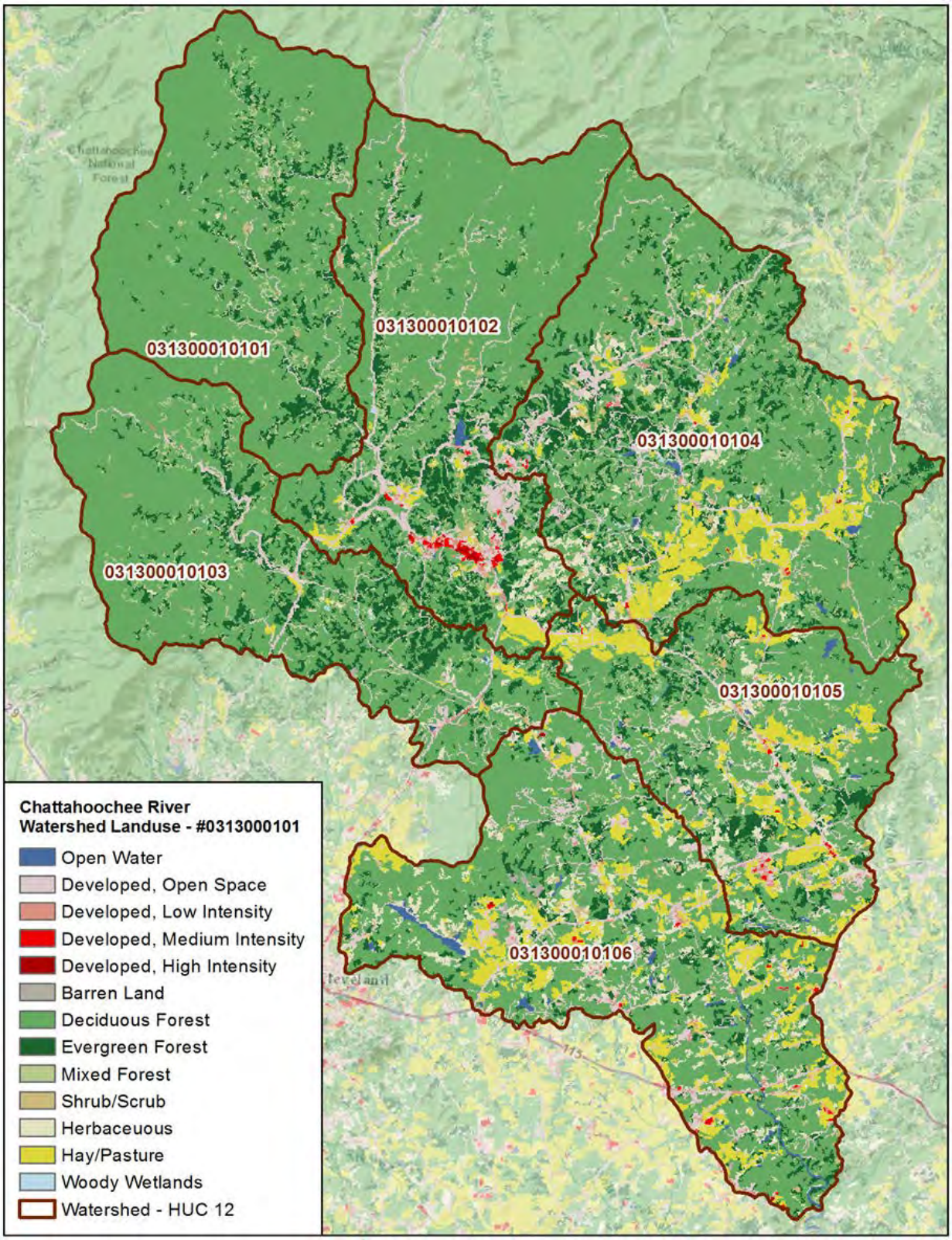
Steep Slopes

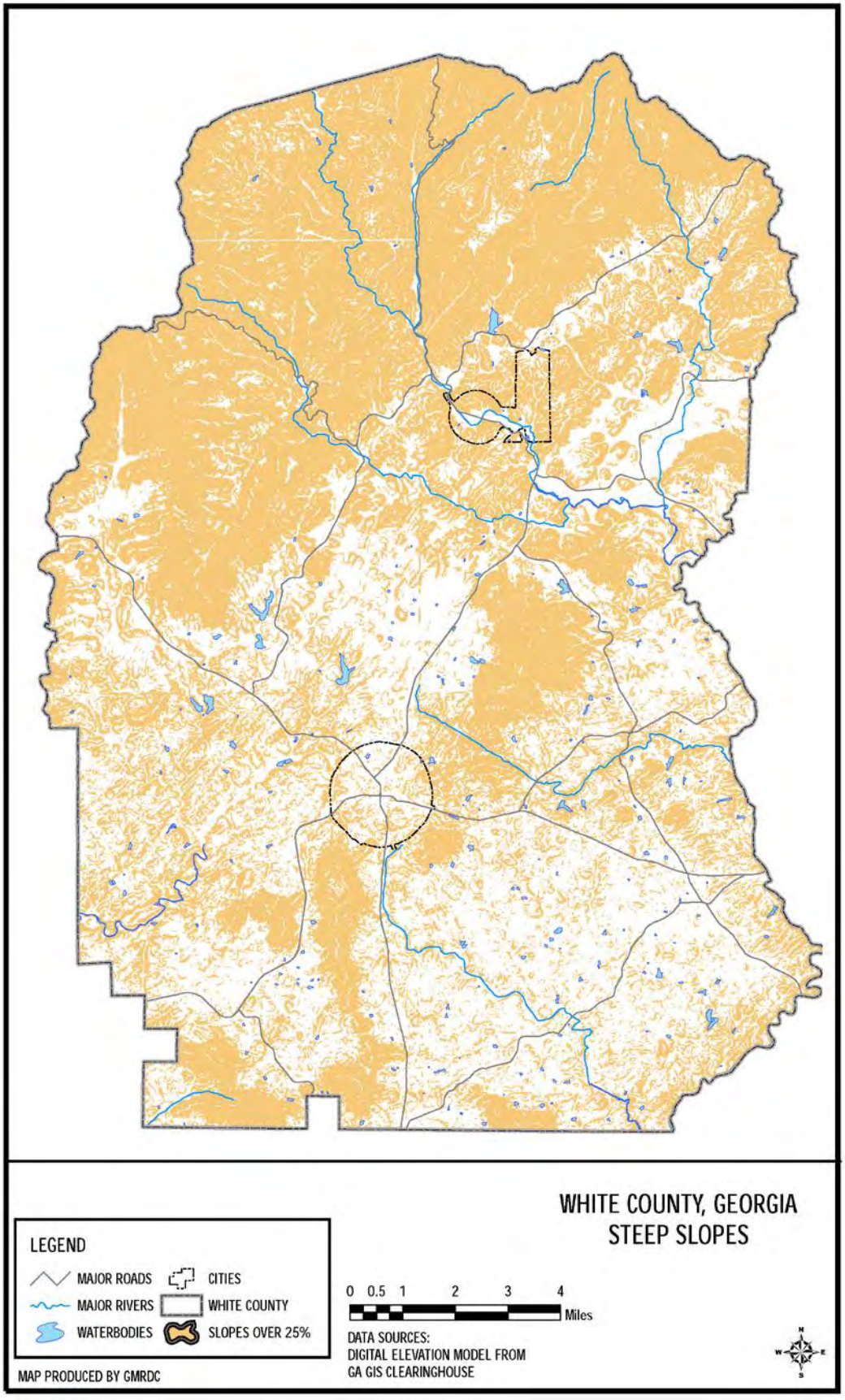
Due to its location in the Blue Ridge and Piedmont Physiographic provinces, White County has a number of mountains which pose limitations on development. A total of 34.87 percent (54,225 acres) of the County area qualifies as steep slopes. The highest elevations in White County are located along the northern county boundary with Lumpkin, Union, Towns, and Habersham Counties. This county line also forms the Tennessee Valley Divide, which separates the Chattahoochee River Basin from the Tennessee River Basin. The Tennessee Valley Divide contains some of the highest elevations in North Georgia, with 15 mountains in White County surpassing 3,000 feet.

The complex terrain of White County results in a significant area that is impacted by steep slopes. As noted earlier, the greatest occurrence of steep slopes is found in the northern portion of White County. The U.S. Forest Service's Chattahoochee National Forest and a number of Wildlife Management Areas already protect much of this area. Despite large areas of already protected land, steep slopes are located throughout the area and need special consideration. Development on steep slopes can be problematic because of issues relating to environmental quality and public health and safety. Steep slope are generally composed of thin soils that are easily eroded. If development occurs on steep slopes, eroded sediment enters streams and impacts surface water quality and aquatic habitat. Steep slopes commonly contain distinctive natural settings because of high elevations, unique aspect to sun angles, and other others that lend themselves to particular habitats of threatened or endangered species. Environmental reasons aside, excessively steep slopes are also not suited for development. Development has the potential to induce landslides, and the operational capability of septic drainfields is reduced, and may create health and safety concerns for local residents. To some extent, a septic system can overcome issues associated to steep slopes, but the system must be designed with slope considerations in mind. The building permitting process is a useful measure in maintaining citizen's general welfare during development periods, and it should address septic placement on steep slopes. Further, development on steep slopes creates accessibility problems for emergency vehicles and places increased demands on infrastructure. For example, considerably larger pumps are mandatory to overcome gravitational forces in order to supply water to sites located on steep slopes.

White County has worked to minimize development along mountain sides but some still occurs due to the high demand (and subsequent political pressure) for housing with scenic views. Most of this development has occurred around the Helen and Suatee areas, with dozens of legacy structures along the slopes within the national forest.

Land Cover Map




WHITE COUNTY, GEORGIA
STEEP SLOPES
LEGEND
MAJOR ROADS
CITIES
MAJOR RIVERS
WHITE COUNTY
WATERBODIES
SLOPES OVER 25%
0 0.5 1 2 3 4
Miles
DATA SOURCES:
DIGITAL ELEVATION MODEL FROM
GA GIS CLEARINGHOUSE
MAP PRODUCED BY GMRDC

Soil Types

An analysis of the types of soils in White County and their suitability for certain land uses is an important component of the Comprehensive Plan. White County has a broad range of soils, which are listed by symbol and name in Table 2-2, along with the limitations of each soil type on crop cultivation, dwelling foundations, septic tank utilization, and commercial structures.

Of the 55 soil types in White County there are 17 soil types which have been identified (*) as suitable for intensive crop cultivation. The soils most suitable for crop cultivation are found on lesser slopes (2-10%). Most of the soils in White County have limitations for intensive crop cultivation because of steep slopes, severe erosion hazards, flooding, low natural fertility, low organic matter content, shallow depth of rooting zone, rock outcrops, and/or surface stones. Although only 17 soil types are found suitable for intensive crop cultivation, other soil types can be and are cultivated for crops. Furthermore, many of the soils not identified as suitable for intensive crop cultivation are suitable for other agricultural uses such as pasture and woodlands. The vast majority of land areas in White County have soils which pose severe limitations on dwelling foundations and septic tank utilization. The Masada soil association (MoB, MoB2, MoC2, MoD2) is the most suitable soil for these uses. Approximately 28,190 acres, or 18% of the total County land area, have only slight to moderate limitations on dwelling foundations and septic tank utilization. Even less of the County land area has soils suited for commercial and light industrial uses without extensive adjustments; approximately 26,365 acres, or 17% of the total County land area, contain soils with only moderate limitations on commercial structures.

White County lies within the Upper Chattahoochee River Soil and Water Conservation District along with Dawson, Forsyth, Hall, Habersham and Lumpkin Counties. Soil and water conservation districts were formed in Georgia by 1957 with the purpose of providing local direction to federal conservation efforts. In addition to basic duties such as coordinating programs and developing annual and long range plans, the districts sponsor demonstration projects and conservation workshops. *(Source: Georgia Soil and Water Conservation Committee, Georgia Resource Conservation Program and Action Plan, 1982.)*

Limitations of Soils in Development, 2006

White County	Acres	Percentage of Total County Acreage
Total Hydric Soils	8,385	5.39 %
Total Prime Agricultural Soils[1]	28,655	18.43 %
Total Soils with 25% slope or more	54,225	34.87 %
Total Soils Suitable for Septic Tanks[2]	28,190	18.13 %
Total Soils Suitable for Commercial Structures[2]	26,365	16.95 %

Notes: 1. Excludes the Cartecay Complex and Toccoa soil types, which is considered a hydric soil and, therefore; not included as a prime agricultural soil.
2. With only slight or moderate limitations. Can be used with special management.

Source: U.S. Department of Agriculture, Soil Conservation Service. Soil Survey of Dawson, Lumpkin and White Counties, Georgia. 1972.

Soil Types in White County as Identified in the USDA Soil Conservation Service Soil Survey

Symbol	Soil Name	(% Slope)	Foundation Suitability		Septic Suit-ability	% of County Acreage
			Housing	Commercial		
AcG	As he stony loam	(60-90)	Se	Se	Se	
AEE	Ashe/Edneyville stony loam	(10-25)	Se	Se	Se	
AEF	Ashe/Edneyville stony loam	(25-60)	Se	Se	Se	
AmC2*	Appling sandy loam	(6-10)	Sl	M	M	
AWB**	Augusta fine sandy loamy	(2-6)	Se	Se	Se	
AwC	Augusta fine sandy loam	(6-10)	Se	Se	Se	
Bfs	Buncombe loamy sand		Se	Se	Se	
BvF	Burton loam	(15-50)	Se	Se	Se	
Cac**	Cartecay complex		Se	Se	Se	
CCF	Chandler loam	(25-60)	Se	Se	Se	
Con*	Conagree/Starr soils		Se	Se	Se	
EPD	Edneyville/Porters loams	(10-15)	M	Se	M	
EPE	Edneyville/Porters loams	(15-25)	Se	Se	Se	
EPF	Edneyville/Porters loams	(25-60)	Se	Se	Se	
EPG	Edneyville/Porters loams	(60-80)	Se	Se	Se	
FaB*	Fannin fine sandy loam	(2-6)	Sl	M	M	
FaC*	Fan n in fine sandy loam	(6-10)	Sl	M	M	
FaE	Fannin fine sandy loam	(10-25)	MtoSe	Se	Se	
FbC2*	Fannin sandy clay loam	(6-10)	Sl	M	M	
FbE2	Fannin sandy clay loam	(10-25)	Se	Se	Se	
FcF	Fannin soils	(25-60)	Se	Se	Se	
Gut	Gullied land				Not Rated	
HIB*	Hayesville sandy loam	(2-6)	Sl	M	M	
HIC*	Hayesville sandy loam	(6-10)	Sl	M	M	
HIE	Hayesville sandy loam	(10-25)	MtoSe	Se	Se	
HJC3*	Hayesville sandy clay loam	(6-10)	Sl	M	M	
HJE3	Hayesville sandy clay loam	(10-25)	Se	Se	Se	
HKC3	Hayesville/Rabun clay loam	(6-10)	Sl	M	M	
HLC*	Hayesville/Rabun loams	(6-10)	Sl	M	M	
HLD	Hayesville/Rabun loams	(10-15)	M	Se	Se	
HLF	Hayesville/Rabun loams	(25-60)	Se	Se	Se	
HSC*	Hiwassee loam	(2-10)	Sl	M	SItoM	
HSD*	Hiwassee loam	(10-15)	M	M	M	
HSF	Hiwassee loam	(15-40)	Se	Se	Se	
MCE	Musella cobbly loam	(6-25)	Se	Se	Se	
MCG	Musella cobbly loam	(25-70)	Se	Se	Se	
MoB*	Masada fine sandy loam	(2-6)	Sl	M	Sl	
MoB2*	Masada fine sandy loam	(2-6)	Sl	M	Sl	
MoC2*	Masada fine sandy loam	(6-10)	Sl	M	Sl	

Symbol	Soil Name	(% Slope)	Foundation Suitability		Septic Suit-ability	% of County Acreage
			Housing	Commercial		
MoD2*	Masada fine sandy loam	(10-15)	M	Se	M	
MuE2	Musella gravelly clay loam	(10-25)	MtoSe	Se	Se	
RaE	Rabun loam	(15-25)	M	Se	Se	
RbD3	Rabun clay loam	(10-15)	M	Se	M	
RbE3	Rabun clay loam	(15-25)	Se	Se	Se	
Sta*	Starr fine sandy loam		Se	Se	Se	
TbE	Tallapoosa cobbly fine sandy loam	(6-25)	Se	Se	Se	
TcE	Tallapoosa fine sandy loam	(10-25)	MtoSe	Se	Se	
TdG	Tallapoosa soils	(25-70)	Se	Se	Se	
TIC*	Tusquitee loam	(6-10)	Sl	M	Sl	
TID	Tusquitee loam	(10-25)	MtoSe	Se	MtoSe	
TIF	Tusquitee loam	(25-60)	Se	Se	Se	
TmE	Tusquitee stony loam	(10-25)	Se	Se	Se	
TmF	Tusquitee stony loam	(25-60)	Se	Se	Se	
Toe* (**)	Toccoa soils	(0-2)	Se	Se	Se	
Wed**	Wehadkee soils	(0-2)	Se	Se	Se	
WgC*	Wickham fine sandy loam	(6-10)	Sl	M	Sl	
WgD	Wickham fine sandy loam	(10-25)	MtoSe	Se	MtoSe	
WgF	Wickham fine sandy loam	(25-50)	Se	Se	Se	
WnD3	Wickham sandy clay loam	(10-15)	M	Se	M	

Notes: * Suitable for farming (cultivated crops).
** Hydric soils, according to Soil Conservation Service.
Se Severe limitations, extensive adjustments are needed before suitable for purpose.
M Moderate limitations, some adjustment needed for use.
Sl Slight limitations, little or no adjustments needed for use.

Soil Suitability for Dwelling Foundations, Septic Tank Absorption Fields and Commercial Structures

White County has limited opportunity for most structure types due to the steep terrain, but even more restrictions apply in areas with unsuitable soil and substrata. As a result the county's basins and bottom lands tend to be in full use where possible. The Chattahoochee River watershed exhibits some comparably mild topography and some agricultural activity as a result, but there are not many places ideal for large scale, heavy construction due to soil and other factors. Most of the commercial and industrial activity has thus been directed toward hill tops in and around Cleveland.

Septic Tanks and On-Site Sewage Structures

Of primary concern to the area is the environmental sensitivity to on-site septic systems, particularly older models or those that have not been properly maintained. Less than 20% of White County is categorized as suitable for handling septic waste filtration, yet even where the soils are conducive to this use the general topography and/or proximity to surface water may curtail that option. *Soil Erosion*

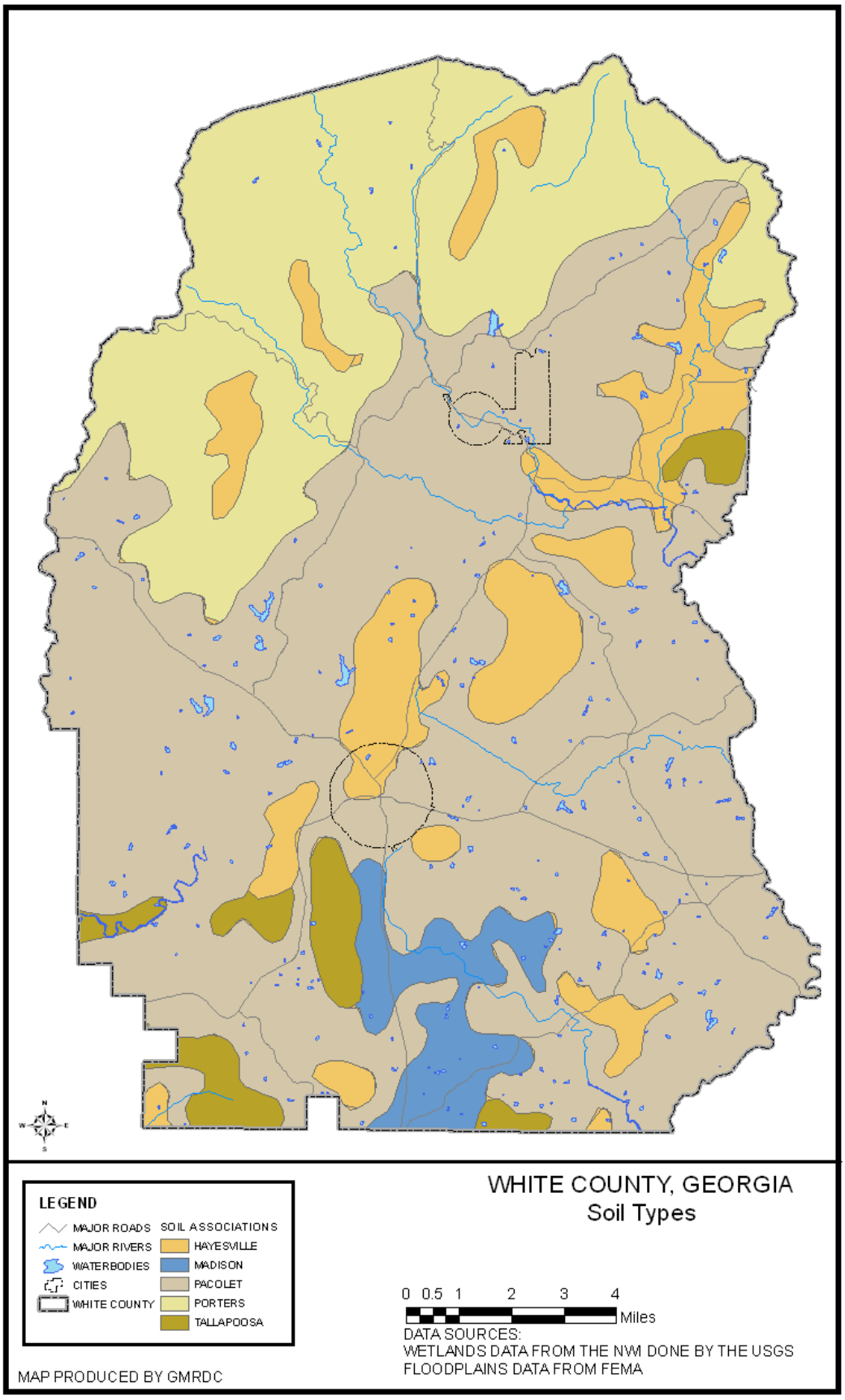
White County has adopted ordinances which reflect the required provisions of the Georgia Erosion and Sedimentation Act of 1974 dealing with construction and development site soil erosion and sedimentation. In order for any local government to become or remain a certified local issuing authority for an erosion and sedimentation control permit (also known as a grading permit), the local government must first adopt an ordinance, which demonstrates compliance with the provisions in O.C.G.A. 12-7-1.

The County does not keep records that track total septic tank service repairs or replacements, and calls about possible violations are sometimes only made when neighboring property owners discover the leaky or faulty system. With many houses in the area older than 1990 it is presumed a significant portion of septic systems in the county are not only not matching modern performance standards but in need of maintenance in their own right, if not outright replacement. Compounding the matter might also be the number of systems that are subject to higher-then-normal volumes during tourist seasons when many properties host larger gatherings, as some tanks and drain lines are not equipped to handle seasonal fluctuations. Such issues may place undue burdens on the local soils to receive and treat septic wastewater.

Prime Agricultural and Forested Lands

"Prime farmland" in Georgia is land which is best suited for producing food, feed, forage, fiber, and oilseed crops, and also available for these uses. It has the soil quality, growing season, and moisture supply necessary to produce sustained good yields of crops economically if treated and managed, including water management according to modern farm methods.

From the list of soils found in Lumpkin County, 17 soils types have been identified as prime agricultural soils. There are scattered fragments of prime agricultural soils throughout the county but, due to the prevailing topography of the area limited concentrations of such soils in lands conducive to farming. There are no major commercial farming operations for livestock or row crops, and with the growing popularity of the mountains for forest-based recreation and scenery, the area has not been reserved or designated as prime agricultural territory.


LEGEND
MAJOR ROADS
MAJOR RIVERS
WATERBODIES
CITIES
WHITE COUNTY
SOIL ASSOCIATIONS
HAYESVILLE
MADISON
PACOLET
PORTERS
TALLAPOOSA
WHITE COUNTY, GEORGIA
Soil Types
0 0.5 1 2 3 4
Miles
DATA SOURCES:
WETLANDS DATA FROM THE NWI DONE BY THE USGS
FLOODPLAINS DATA FROM FEMA
MAP PRODUCED BY GMRDC

Mineral Resources

White County has a variety of mineral resources. Two areas within the County contain granite and related rock outcrops: One area in the mid-northwest section; and one area in the extreme northeast portion of the County. An area of gold deposits, approximately four miles wide by fifteen miles long, bisects the central portion of White County running southwest to northeast in the same general pattern as the Hightower Ridge. This area is known as the "Dahlonega Belt". Paralleling the span of gold deposits to the south is a broken concentration of granite and related rocks. There is also a concentration of mica (colored or transparent mineral silicates that separate into thin leaves and used dry in roofing materials, joint cement, well drilling compounds and paint) located east of SR 75 and north of SR 254.

Other mineral resources found in lesser quantities in White County are: corundum (a very hard mineral that consists of aluminum oxide and which is used as an abrasive); feldspar (crystalline minerals consisting of aluminum silicates which is ground and used in the manufacture of glass, pottery, enamels and abrasives); iron and manganese; sulfide deposits (iron, copper, etc.); talc (a soft mineral that is a basic magnesium silicate and which is used as a filler in rubber); asbestos (a mineral supposed to be inextinguishable when set on fire, used for chemical filters and plastics); sillimanite (a mineral consisting of aluminum silicate which has uses in the production of high temperature refractories); quartzite (a compact granular rock composed of quartz and derived from sandstone); and soapstone (a soft stone having a soapy feel and composed of talc, chlorite and magnetite). *(Sources: Georgia Department of Mines, Mining and Geology, The Common Rocks and Minerals of Georgia. Information Circular No. 5,1934, Revised 1964. Georgia Department of Natural Resources, Georgia Geologic Survey, Mineral Resources Map. 1969.)*

A deposit study of mineral deposits in White County was completed in 1964. This study concluded, among other things, that the "volume and grade of gravels in the Nacoochee Valley, Sautee Creek, Bean Creek and Dukes Creek warrant a dredging operation," and that "other economic materials which might be worked are asbestos, mica and soapstone."

Although there are a variety of mineral resources located in White County, mining and quarrying operations are limited to fill material, gold and sand-construction commodities.

Plant and Animal Habitats

Georgia's Protected Species Program began in 1973 with the enactment of two state laws: the Endangered Wildlife Act and the Wildflower Preservation Act. These laws provide protection for certain species of plants and animals. Under the Natural Heritage Inventory Program, the Georgia Department of Natural Resources is continuously in the process of completing an inventory of rare plants, animals and natural habitats in Georgia warranting state and federal protection.

According to a report by the Georgia Department of Natural Resources, the natural environment of White County is conducive to three (3) species of protected wildlife and eight species of concern.

Threatened Species:

- Bluestripe Shiner (Cyprinella callitaenia)- This threatened fish is found only in the Chattahoochee Watershed and prefers flowing areas in large creeks and medium sized rivers over rocky substrates.

- Highscale Shiner (Notropis hypsilepis)- This threatened shiner prefers habitats of streams flowing over sand or bedrock substrates.
- Northern Pine Snake (Pituophis melanoleucus melanoleucus)- This threatened snake grows to between 48 and 68 inches and is identified by its black and dull white to yellowish or light grey color. It is found in dry pine or pine-hardwood forests.

Species of Concern:

- Coal Skink (Eumeces anthracinus)- This lizard grows from 5 to 7 in. in length and can be found in mesic forests near streams, springs or bogs.
- Blue Ridge Two-lined Salamander (Eurycea wilderae)- This small salamander is distinctive because of its two stripes that run the length of its body, but break apart into spots that cover its tail. The Blue Ridge Two-lined Salamander is found in high elevation springs and seeps that are adjacent to hardwood forests.
- Four-toed Salamander (Hemidactylium scutatum)- This salamander, as the name implies, has four toes instead of the common five toes on the hind feet. The four toed salamander is found in swamps and boggy streams and ponds, located near hardwood forests.
- Greater Jumprock (Scartomyzon lachneri)- The Greater Jumprock is a sucker that can be found in small to large streams in swift current over rocky substrate.
- Masked Shrew (Sorex cinereus)- This shrew has a dark gray coat, with lighter gray underbelly. The Masked Shrew can be found in high elevation mesic forests, field edges, swamps, or mountain bogs.
- Pygmy Shrew (Sorex hoyi)- The Pygmy Shrew's habitat includes mountain bogs and grassy openings in high elevation forests. It is an insectivore that grows up to two inches in length.
- Red Squirel (Tamiasciurus hudsonicus)-
- The Diana Fritillary (Speyeria Diana)- is a colorful butterfly whose habitat includes openings and fields in wet, rich, forested valleys and mountainsides.

Fish are also an important part of wildlife in the mountains. The cold-water streams support rainbow, brown and brook trout, of which only the brook trout species is native to the State of Georgia. The Department of Natural Resources maintains listings of primary and secondary trout streams. Primary trout streams have environmental conditions that are most favorable for trout, and the trout are able to both survive and reproduce in these waters. In secondary trout streams, trout are able to survive without assistance but are unable to reproduce naturally, and thus require stocking to maintain their populations. Trout are commonly used as indicator species because of their sensitivity to environmental changes such as sedimentation, insect populations, and water temperature. The State of Georgia protects trout streams through the Erosion and Sedimentation Act, which provides a 50-foot stream buffer on all trout streams with an average annual discharge of greater than 25 gallons per minute. A 25 foot buffer is applied to all streams with an annual discharge of less than 25 gallons per minute. In White County, primary trout streams include: the Cathey Creek watershed upstream from the Arrowhead Campground Lake, the Chattahoochee River watershed upstream from Georgia Hwy.255 Bridge, and the Town Creek watershed upstream from the mouth of Jenny Creek. Secondary trout streams include: the Chattahoochee River watershed upstream from the Georgia Hwy.115 to the

Georgia Hwy.255 Bridge, the Little Chestatee River watershed upstream from the mouth of Turner Creek, and the Turner Creek watershed (except those sections listed as primary trout streams).

The mountain region of North Georgia contains a multiplicity of climatic and soil conditions that stimulate the growth of many trees and plants. The slopes, soils, and annual average rainfall are principal natural factors controlling the vegetation of the area. These varied natural conditions have led to habitat for numerous plant species with federal or state protection which include:

- Biltmore Sedge (Carex biltmoreana)- This perennial grass like herb is found at high elevations on seepy cliff crevices in partial shade to full sun at high elevations. Notable features include its stout, britte, scaly stolons and its narrowly tapered, bluish green drooping leaves.
- Manhart's Sedge (Carex manhartii)- This perennial grass like herb can be fouind in loose clumps with leafy shoots. Commonly found at elevations ranging from 2,000 to 4,000 ft, this plant prefers the acidic soils of cove hardwoods.
- Pink Ladyslipper (Cypripedium acaule)- The Pink Ladyslipper is a perennial herb that is known for its showy flower and pair of basal leaves, and is found acidic soils of pinelands, rhododendron thickets, and mountain bogs.
- Large-flowered Yellow Ladyslipper (Cypripedium parviflorum var. pubescens)- This small perennial has small white leafy stems and elliptic leaves with 1 to 2 yellow flowers. This Yellow Ladyslipper prefers upland oak-hickory-pine forests and mixed hardwood forests.
- Florida Torreya (Torreya taxifolia)- This small evergreen tree can be found beneath magnolia forests and mixed hardwood forests on middle to steep slopes with permanent seepage.

Species of Concern:

Sweet-fern (Comptonia peregrina)
Butternut (Juglans cinerea)
Minniebush (Menziesia pilosa)
Naked-fruit Rush (Juncus gymnocarpus)
Climbing Fern (Lygodium palmatum)
Wild Coffee (Triosteum aurantiacum)
A Moss (Hypnum cupressiformen var. filiforme)
Broadleaf Bunchflower (Melanthium latifolium)
American Ginseng (Panax quinquefolius)
Dwarf Ginseng (Panax trifolius)
Staghorn Sumac (Rhus typhina)
Woodland Bulrush (Scirpus expansus)

Habitats of Concern:

The Georgia DNR has also identified the Shrub Bald and Heath Bald as threatened natural communities. These areas are located on the highest of peaks in Georgia including Tray Mountain, Brasstown Bald, Standing Indian, and Blood Mountains. These balds are composed of a wide variety of plants including Catawba rhododendron, mountain ash, and dwarf willow. A GAP analysis performed by the US Geological Survey Biological Resources Division identified only 281 acres of Heath Bald in Georgia *(Source: Georgia Department of Natural Resources, Game and Fish Division. Georgia's Protected Species.)*

Efforts are being made to protect the rare, endangered and protected species of plants in Georgia. Public and private groups such as the University of Georgia and the Georgia Plant Conservation Alliance are studying and attempting to preserve rare plants and attempting to return them to their original landscapes. Even with these efforts though, rare species continue to be lost for many reasons, including

the drying of wetlands and heavy growth of rhododendrons, mountain laurel and other shrubby plants that shut out light and inhibit reproduction (*Source: Georgia Conservation Alliance*).

Wetlands and Floodplains

Wetlands are those areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas. The ecological parameters for designating wetlands include hydric soils, hydrophytic vegetation and hydrological conditions that involve a temporary or permanent source of water to cause soil saturation. Fresh water wetlands and aquatic habitats are classified into the following categories:

- *Open water* - Areas of open water, primarily reservoirs, ponds, lakes, rivers, and estuaries.
- *Non-Forested Emergent Wetlands* - freshwater marshes dominated by a variety of grasses, sedges, rushes, and broad leaved aquatics associated with streams, ponded areas, and tidally-influenced non-saline waters.
- *Scrub/Shrub Wetlands* - non-forested areas dominated by woody shrubs, seedlings, and saplings averaging less than 20 feet in height, these wetlands may intergrade with forested wetlands, non-forested emergent wetlands, and open water.
- *Forested Wetlands* - natural or planted forested areas having a dominant tree crown closure or hardwoods, pines, gums, cypress, or any combination of these types. These areas are usually in stream or river floodplains, isolated depressions, and drainways, and contain standing or flowing water for a portion of the year.
- *Altered Wetlands* - areas with hydric soils that have been denuded of natural vegetation and put to other uses, such as pastures, row crops, etc., but that retain certain wetland functions and values.

Major Wetland Values.

Socio-Economic Values	Environmental Quality Values
• Flood Control	• Water Quality Maintenance
• Wave Damage Protection	• Pollution Filter
• Erosion Control	• Sediment Removal
• Groundwater Recharge & Water Supply	• Oxygen Production
• Timber & Other Natural Resources	• Nutrient Recycling
• Energy Source (peak)	• Chemical & Nutrient Absorption
• Livestock Grazing	• Aquatic Productivity
• Fishing & Shellfishing	• Microclimate Regulator
• Hunting & Trapping	• World Climate (ozone layer)
• Recreation	• Fish & Shellfish Habitat
• Aesthetics	• Waterfowl & Other Bird Habitat
• Education & Scientific Research	• Other Wildlife Habitats

Source: American Planning Association, Planning Advisory Service. 1988. Protection of Non-Tidal Wetlands. (Report Number 412/413).

Vegetation Common to Non-Tidal Wetlands.

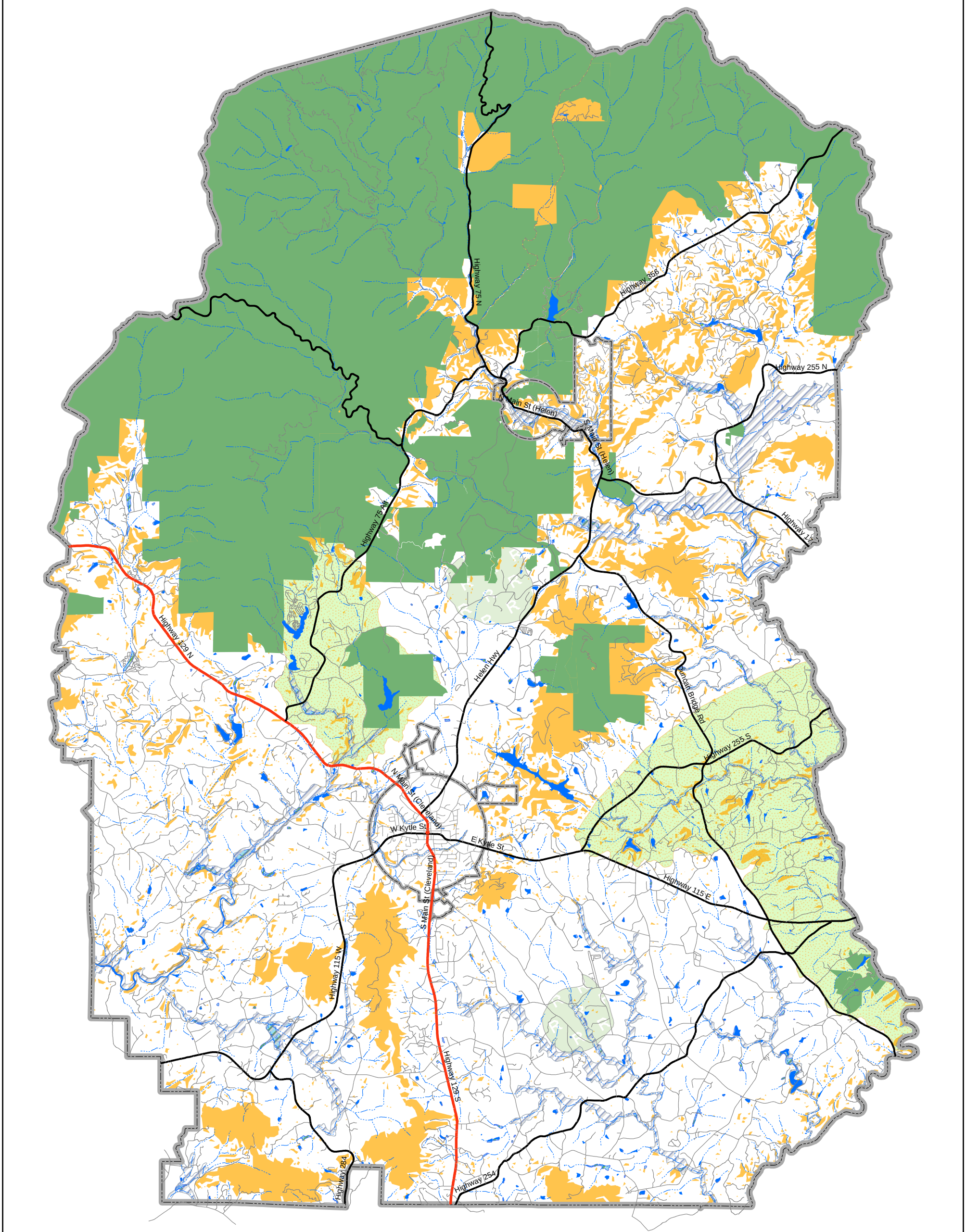
Type of Wetland	Vegetation
Emergent Wetlands: Freshwater	cattails, wild rice, sedges, rushes, bulrushes, spikerushes, burreeds, rice cutgrass, maidencane, reed, arrowheads, pickerelweed, smartweeds, bluejoint, whitetop, reed cannary grass,manna grass, asters, goldenrod, marsh fern
Pocosins	Pond pine, sweet bay, inkberry, fetterbush, titi, red bay, was myrtle
Others	Buttenbush, alders, willows, dogwoods, red maple sapplings, cottonwood sapplings

Source: American Planning Association, Planning Advisory Service. 1988. Protection of Non-Tidal Wetlands. (Report Number 412/413).

There exist three sources for determining the location of wetlands, one of which is the identification of "hydric" soils. Hydric soils are a key indicator of potential wetlands. White County contains 5 hydric soils, which are found throughout the county.

If the wetlands identified in the future land use plan are retained as open space and are protected in accordance with the Environmental Planning Criteria, then no adverse effects are anticipated on the public health, safety and welfare, or the property of others; no known unique or significant flora or fauna, including threatened, rare or endangered species will be impacted; no adverse effects will occur on the flow or quality of water or cause substantial additional soil erosion; no adverse impacts on adjacent natural areas are likely to occur.

According to Federal Emergency Management Agency (FEMA) records, White County entered the National Flood Insurance Program (NFIP) in 2000. Flood plains located in White County are illustrated on the following map and on the Future Land Use Map as parks, recreation and conservation. Currently the local Floodplain Protection Ordinance applies to all FEMA-mapped flood plains and structures located in flood plains. In the near future, flood plains in White County will be remapped and updated under a program called Map Modernization.



Data Sources: Wetlands: US FWS- National Wetlands Inventory; Water Supply Watershed: GA DNR/EPD- Water Supply Watershed Maps;
Flood Hazard Areas: FEMA- 2002 FIRM; Groundwater Recharge Areas: GA DNR/EPD- Digital Environmental Atlas of Georgia; Mountain and Hillside Protection Areas: White County Mapping Dept.

White County Environmentally Sensitive Areas

Legend

- Wetlands
- Water Supply Watersheds
- Flood Hazard Areas
- Groundwater Recharge Areas
- Mountain and Hillside Protection Areas
- Public Lands
- Streams
- Lakes
- City Limits
- County Boundary
- US Hwy
- State Hwy
- County Roads
- City Roads
- Private Roads
- Forest Service

Prepared by White County Mapping
October 16, 2007

0 1 2 3 4 5 Miles

ANTHROPOGENIC FEATURES

Governmental Boundaries

The watershed is almost exclusively within White County. Minor portions of the headwater basin lie within Union and Towns County to the north, with almost no development in these portions due to the National Forest conditions and limited accessibility. Another sliver of the watershed, almost exclusively within the Sautee Creek portion, is within western Habersham County. The rest of the watershed encompasses almost the whole northern and eastern portions of White County, including all of the City of Helen and parts of the City of Cleveland.

Land Use and Development

As discussed in the land cover and physiography sections, this watershed is predominantly undeveloped and covered with varieties of forests and wooded areas. The vast extent of development within this part of the region is sparsely populated, rural agrarian homesteads and some supporting uses. Farms are prevalent but the terrain and slopes make commercial scale agriculture a difficult proposition. Similarly, fields available for livestock are neither large nor available in volume.

A review of aerial imagery suggests there are possibly as many as 30+ poultry houses within the watershed, though it is considered likely some of those structures are in disrepair and/or not in operation. There is one property along GA 255 near the southern end of the watershed that appears to have as many as 20 poultry structures, including some within 500' of the river. Observations from outside the property did not find evidence of concentrated dump sites for litter, nor has anyone suggested the property has had pollution issues in the past.

There were several small farms in the area harboring (predominantly) cattle, horses, or goats. Only two cattle farms, one near Helen and the other near 255 and Sautee Creek, had the volume of livestock to suggest an active commercial operation. Both of these farms appeared to have fencing around local streams and some drinkers were found on site, but there were portions of the farm fields that were not visible from main roadways. Neither of these farms has been cited in the recent past for concerns over violations according to local officials.

The most common structures within the Upper Chattahoochee watershed are homes and supporting farm buildings, such as sheds and barns. In some of the more tourist oriented areas such as Helen and Sautee these homes can be densely packed and close to the river or streams. As you move southward the homes become more suburban and rural in density and form, with more and more properties taking on larger, rustic settings for households looking for a country lifestyle. Topography does tend to keep some houses near stream banks, and in portions of the Sautee valley some rural roads and driveways will often follow along streams in an effort to minimize grading and clearing.

The population and location of the area does feature some urbanized and heavier commercial areas. There are a dozen or more churches and a small variety of commercial structures of differing sizes. Most are modest in scale and with limited impervious surfaces. Within the cities, however, are true urban areas with densely packed structures and surface parking. Particularly around Helen this level of development is growing as the City and the Sautee Nacoochee areas grow in popularity.

Upper Chattahoochee Watershed Land Cover		
	Acres	Percent
Deciduous Forest	65,858	66.20 %
Evergreen Forest	11,145	11.20 %
Hay/Pasture	6,264	6.30 %
Developed, Open Space	6,195	6.23 %
Mixed Forest	4,029	4.05 %
Herbaceuous	3,591	3.61 %
Shrub/Scrub	783	0.79 %
Developed, Low Intensity	574	0.58 %
Open Water	498	0.50 %
Barren Land	242	0.24 %
Developed, Medium Intensity	187	0.19 %
Woody Wetlands	78	0.08 %
Developed, High Intensity	36	0.04 %
Total Acres	***45,722***	***17,888***

Based on the preliminary review of land use and development, suggested possible causes of increased levels of fecal coliform into the water include: human waste from sewage leaks or septic tank leaks, development activities, logging activities, domestic animals, urban wildlife, livestock, or rural wildlife.

**=Urban, recreational; e.g. parks, lawns*

Utilities and Infrastructure

Limited portions of the Upper Chestatee Watershed, mainly those in and around the cities or Helen and Cleveland, have access to public sewer and public water. The two seasonal residential developments that provide package systems of their own are adjacent to Helen. All of the remaining properties within the Upper Chattahoochee watershed rely on wells and septic systems of some kind.

Environmental Interests and Other Organizations

The US Forest Service (UFSF) manages the Chattahoochee National Forest within Georgia, which includes the Chestatee Wildlife Management Area and the Desoto Falls National Forest areas within Lumpkin County. Combined these represent the bulk of the preserved woodland in the northeastern part of the county, and are addressed within the USFS' *2004 Land and Resource Management Plan for the Chattahoochee and Oconee National Forests*. This document guides the federal efforts to protect the local ecology and environmental resources as well as providing visitor access to area camp sites, hiking trails and scenic areas. This document is currently undergoing an update and is routinely shared with local governments as well as being made available to citizens on the USFS web site.

As part of their involvement with the management of the Chattahoochee the Georgia EPD has monitored stream data for the river and other tributaries via their own sampling stations. The sites have changed over the years and the data for each does not always include bacterial monitoring, as it may be used to gauge the relative flow, temperatures and clarity of the river, and to provide early indications of needs for additional testing.

Upper Chattahoochee River Basin

Name	Station Id	HUC	Latitude Longitude
Chatahoochee River nr Chattahoochee River Rd nr Helen, GA	RV_12_4286	31300010101	34.733893 -83.77755
Chattahoochee River Georgia Highway 356	RV_12_3982	31300010102	34.712778 -83.746111
Chattahoochee River at State Roads 17/75 near Nacooche, GA	RV_12_3984	31300010102	34.6872 -83.710278
Smith Creek Road Upstream From Lake, Unicoi Park	RV_12_3981	31300010102	34.735 -83.7225
Smith Creek Georgia Highways 17 and 75	RV_12_3983	31300010102	34.709722 -83.740556
Dukes Creek nr R B Russel Scenic Hwy (SR348) nr Helen	RV_12_4294	31300010103	34.69374 -83.777643
Dukes Creek Georgia Highway 75	RV_12_3986	31300010103	34.671944 -83.713889
Sautee Creek at SR17/255 (Sky Lake Rd.) near Helen, GA	RV_12_3987	31300010104	34.678889 -83.668333
Chattahoochee River at Bottom Road near Helen, GA	RV_12_3985	31300010105	34.678217 -83.685579
Chattahoochee River Georgia Highway 225	RV_12_3988	31300010105	34.6275 -83.642222
Chattahoochee River at State Road 115 near Leaf, GA	RV_12_3989	31300010106	34.576944 -83.635833

None of the records from these stations show fecal coliform monitoring more recent than 2010. Much of the data suggests a possible link between rain flows and bacterial counts based on the occassional spikes far beyond normal levels, with most of the data from the early 2000's. Some of this information has contributed to the the original TMDL and subsequent TMDL Implementation Plans.

Lying within the Chattahoochee River Basin, the watershed also part of the stream netowrk monitored by the ***Chattahoochee Riverkeeper***. As stated on their web site, the "*Chattahoochee Riverkeeper's mission is to advocate and secure the protection and stewardship of the Chattahoochee River, its tributaries and watershed, in order to restore and preserve their ecological health for the people and wildlife that depend on the river system. Established in 1994, Chattahoochee Riverkeeper is an environmental advocacy organization with more than 7,000 members dedicated solely to protecting and restoring the Chattahoochee River Basin — drinking water source for nearly four million Georgians. Chattahoochee Riverkeeper was the 11th licensed program in the international Waterkeeper Alliance, now close to 200 organizations strong*."

As the foremost advocacy organization in the Chatthoochee basin, the Riverkeeper has supported monitoring exercises, educational forums and water quality grants for various streams within the basin. According to interviews with Riverkeeper staff they have not done any recent on-the-ground projects within the upper Testnatee watershed within the past several years but would be available to assist in the future.

A recent advisory group with similar interest is the ***Lake Lanier Stakeholder Group***, an advisory committee recently convened in 2013 to provide a forum for local governments and water and sewer service permit holders to review, discuss and advise EPD regarding forthcoming issues about Lake Lanier and all the waters upstream. This effort war particularly driven in response to pending TMDL assessments regarding nutrient loads, specifically phosphorous, and how that might impact discharge permits both now and in the future. This group included representatives from Lumpkin and White County as well as various industry and citizen representatives.

This group met several times over a two year period to learn about EPD's assessments and advised EPD staff about modeling scenarios for pending studies. They also evaluated options for approaching forthcoming TMDLs for the watershed and how communities and permit holders can address remediation measures for restoring water quality as a result.

An additional committee providing a forum for assessing the Upper Chattahoochee watershed is the ***Coosa-North Georgia Watershed Council*** and the ***North Georgia Water Resources Partnership***. Both organizations represent an 18 county area stretching from the Alabama border to Lumpkin and White Counties. The former represents the EPD-appointed body that developed and will maintain the Coosa-North Georgia Watershed Plan, the latter, which consists of many of the same organizations and people, is the established independent organization that oversees the implementation of various water quality projects. The upper Testnatee is only a small part of their service areas but they do support educational and improvement programs as well as providing another forum for discussing issues and possible mitigation measures.

The ***Chestatee-Chattahoochee Resource Conservation and Development District*** (CCRCD)is another resource service the area. This advisory council and their related staff work to promote environmental stewardship in the region, including educational activites and administration of implementation grants. The CCRCD will be developing a Watershed management plan for the adjacent Towns/Chattahoochee River watershed and is available to provide assistance within the upper Testnatee watershed.

WATER QUALITY IMPAIRMENTS AND TMDLS

Georgia employs two tiers of water quality standards for environmental planning purposes: A general criteria applicable to all waters, and more detailed, specific criteria for each of six designated uses.

The general criteria (shown below) are qualitative and reflect the goals form Georgia's streams, rivers, ponds and lakes. These are established to ensure consistency across resource initiatives and to keep a comprehensive perspective in everything EPD does for maintain water quality.

- Waters shall be free of materials, oils, and scum associated with municipal or domestic sewage, industrial waste or any other waste which will settle to form sludge deposits, produce turbidity, color, or odor, or that may otherwise interfere with legitimate water uses.

- Waters shall be free from toxic, corrosive, acidic, and caustic substances in amounts which are harmful to humans, animals, or aquatic life.

Beyond this, waters within Georgia are given one of six designated, which can vary in strictness of individual standards. This allows for more contextually sensitive policies and guidelines with regards to

managing each type of resources, respecting the differences across types of water bodies. These six designations are:

Drinking Water Supply
Fishing
Wild River
Recreation
Coastal Fishing
Scenic River

The main course of the Chattahoochee River within the targeted watershed is designated for recreation but several tributaries within the Upper Chattahoochee watershed are designated for fishing. The river eventually feeds the Lake Lanier reservoir approximately 15 miles south of White County, providing a critical drinking water supply for much of north metro Atlanta.

Once designations are made, the State of Georgia assesses its water bodies for compliance with water quality standards criteria established for their designated uses as required by the Federal Clean Water Act (CWA). Assessed water bodies are placed into one of three categories depending on water quality assessment results: supporting designated use, not supporting designated use, or assessment pending. These water bodies are found on Georgia's 305(b) list as required by that section of the CWA that addresses the assessment process, and are published in Water Quality in Georgia (GA EPD, 2010 – 2011).

A subset of the water bodies that do not meet designated uses, those in Category 5 on the 305(b) list are assigned to Georgia's 303(d) list, named after that section of the CWA. Water bodies included in the 303(d) list are required to have a Total Maximum Daily Load (TMDL) evaluation for the water quality constituent(s) in violation of the water quality criteria. The TMDL process establishes the allowable loading of pollutants or other quantifiable parameters for a water body based on the relationship between pollution sources and in-stream water quality conditions. This allows water quality based controls to be developed to reduce pollution and restore and maintain water quality.

A TMDL is a calculation of the maximum amount of a pollutant, from both point and non-point sources, that a waterbody can receive and still meet water quality standards. The Clean Water Act, section 303, establishes the water quality standards and the TMDL programs. TMDLs are simply the implementation of rules included in Section 303(d) of the Clean Water Act of 1972. The resulting inventory of impaired streams and water bodies provides a basis for decisions related to restoring water quality. Although some TMDLs are aimed at managing all sources of pollution which affect beneficial uses of water, the focus of the implementation plan discussed here relates primarily to nonpoint water sources including contamination from diffuse sources such as agricultural and urban runoff.

TMDL History

The GAEPD's 2014 Integrated 305(b)/303(d) List of Waters identifies one stream segment in the watershed as not meeting water quality standards for both biota impacted fish due to sediment (Bio F) and fecal coliform bacteria (FC), and a second segment as not meeting water quality standards for FC. The List of Waters also identifies seven stream segments meeting water quality standards:

Not Supporting:

- Chattahoochee River (Ga. Hwy. 17, Helen to SR255), 8 miles in White and Habersham counties;
- Chattahoochee River (SR255 to Soquee River), 11 miles in White and Habersham counties;

Supporting:

- Chattahoochee River (Jasus Creek to Ga. Hwy. 17, Helen), 8 miles in White County;
- Chattahoochee River (Upstream Jasus Creek), 7 miles in Union and White counties;
- Dukes Creek (Headwaters Hwy. 348 to Chattahoochee River), 10 miles in White County;
- Jasus Creek (Headwaters to the Chattahoochee River, Northwest of Helen), 3 miles in White County;
- Low Gap Creek (Headwaters to the Chattahoochee River, Northwest of Helen), 4 miles in White County;
- Sautee Creek (U/S Chattahoochee River), 5 miles in White and Habersham counties;
- Smith Creek (Headwaters to Chattahoochee River near Helen), 6 miles in White County.

A Total Daily Maximum Load (TMDL) for FC was approved in 1998 for the 11 mile Chattahoochee River segment from SR255 to Soquee River which was listed as Not Supporting. Later a new TMDL for FC was completed in 2003 and revised in 2008 for the 8 mile upstream segment of Chattahoochee River, from Ga. Hwy. 17, Helen to SR255 when that segment evaluation was changed from Partially Supporting to Not Supporting.

In 2001 a Revised TMDL Implementation Plan for FC was originally developed to address the 11 mile segment of the Chattahoochee River from SR255 to Soque River.

In 2004, a Revised TMDL Implementation Plan for Partially Supporting Streams due to Fecal Coliform Bacteria was developed and included the 8 mile segment of the Chattahoochee River, from Ga. Hwy. 17, Helen to SR255.

In 2011, a Watershed Improvement Plan (WIP) funded by the Georgia TMDL Implementation Program was developed by Georgia Mountains Regional Commission focused on the FC violation for the 8 mile segment of Chattahoochee River, Ga. Hwy. 17, Helen to SR255 which had the newer 2008 TMDL and evaluation changed to Non Supporting. The 2011 WIP refined the list of sources to emphasize diffuse runoff of animal waste, both from wildlife and livestock, as well as continued focus of septic systems and the agricultural application of animal waste for crops and fields. Illicit discharges and faulty sewer lines were also included but regarded as having minimal impact due to limited extent of urban activity within the watershed.

Management practices recommended in the Revised TMDL Implementation Plan and Watershed Improvement Plan include:

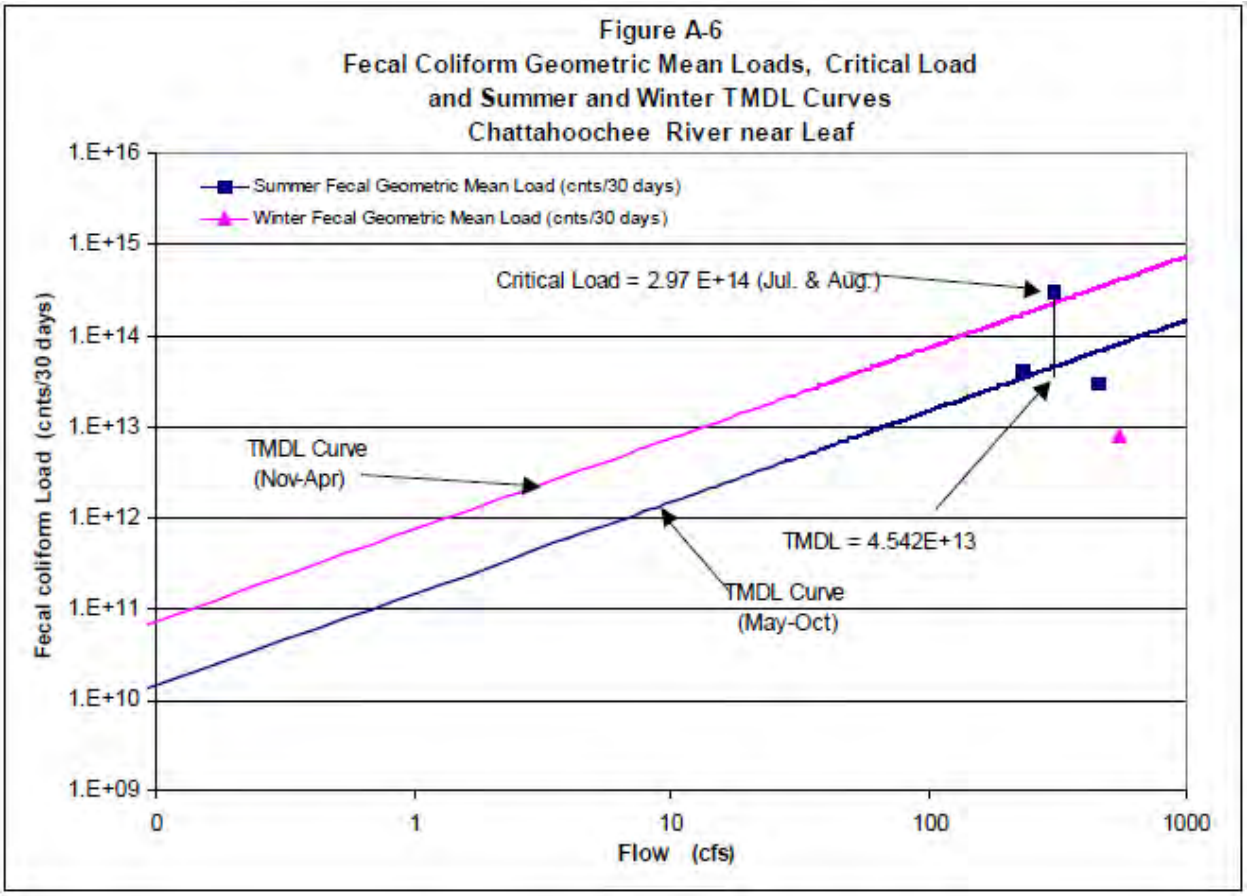
- Detailed Inventory of Septic Systems: The White County Health Department should conduct a septic tank survey to identify those locations with septic tanks maintenance problems.

- Survey Application of Agricultural BMPs: A coordinated effort involving the County, local Farm Bureau and other stakeholders to increase promotion and awareness of watershed stewardship, while simultaneously confirming the volume of livestock present within the watershed and the level of vulnerability.

- Targeted river bank surveys and clean-ups: A concentrated effort to walk as much of the river as possible at least once per year would help confirm the integrity of the stream banks and identify possible points of animal intrusion.

- A comprehensive review and update of education programs and materials, engaging area residents, employers and developers on the rules and efforts behind maintaining local water quality.

- Continued/ Improved Application of Stormwater BMPs in urban areas.



Data for Figure A-6, including: observed fecal coliform, instantaneous flow fecal coliform load, fecal coliform geometric mean, mean flow, fecal coliform geometric mean load.

Date	Observed Fecal Coliform (counts/100 ml)	Estimated Instantaneous Flow On Sample Day (cfs)	Estimated Fecal Coliform Loading on Sample Day (cnts/30 days)	Geometric Mean (cnts/100 ml)	Mean Flow (cfs)	Fecal Coliform Loading (cnts/30 days)
19-Jan-00	20	553.00	8.11E+12			
3-Feb-00	20	539.00	7.91E+12			
8-Feb-00	20	484.00	7.10E+12			
17-Feb-00	20	627.00	9.20E+12	20	550.75	8.08E+12
16-May-00	110	476.00	3.84E+13			
18-May-00	50	497.00	1.82E+13			
22-May-00	20	468.00	6.87E+12			
5-Jun-00	490	396.00	1.42E+14	86	459.25	2.89E+13
17-Jul-00	330	237.00	5.74E+13			
24-Jul-00	790	296.00	1.72E+14			
31-Jul-00	16,000	429.00	5.03E+15			
8-Aug-00	700	275.00	1.41E+14	1,307	309.25	2.97E+14
11-Sep-00	330	210.00	5.08E+13			
18-Sep-00	50	166.00	6.09E+12			
25-Sep-00	490	371.00	1.33E+14			
4-Oct-00	330	195.00	4.72E+13	227	235.50	3.93E+13

WATERSHED ASSESSMENT

VISUAL FIELD SURVEY

Assessment of the watershed was conducted from the spring of 2017 through the winter of 2018, with some key areas selected for surveying based on prior concerns from the 2011 Chattahoochee project. Field surveys were conducted by GMRC staff touring the watershed along public roadways, identifying and noting land use and development trends and surveying the river and stream banks for general integrity. Where possible, GMRC staff also walked the river and stream banks for closer examination of the water clarity and quality. Throughout the process, sites and land uses suspected of contributing to the impairment of the river were noted.

The watershed is in the burgeoning foothills of Appalachia, with an abundance of scenic vistas and narrow valleys winding among the many steep slopes. The topography has ensured this area is predominantly rural, with a variety of residential styles playing off the large farmstead, small country house and rustic wooded cabin theme. Most of the houses are on larger lots and built into the hillsides either to take advantage of the vistas or to seek out privacy. There are no conventional subdivisions within this particular watershed and the only distinct changes in development character is the occasional church or independent commercial use, such as an auto repair shop or fruit stand.

Overall the river and main tributaries appeared in good condition. The slopes and desires for privacy among residents in the area has curtailed some points of intrusion, but further down stream and near populated areas there are spots where the Chatthoochee River, Suatee Creek, and Chickimauga Creek have been routinely accessed by people seeking recreational opportunities. Most of this has occurred where roadways cross the streams, such as where SR 255 cross the Chattahoochee. Some of this is formally intended, such as with SR 255 at the Chickamauga. Litter is minimal at these sites but there are clear signs of bank erosion as visitors seek to create private beaches for lounging, or where people tread through the brush to reach the water's edge.

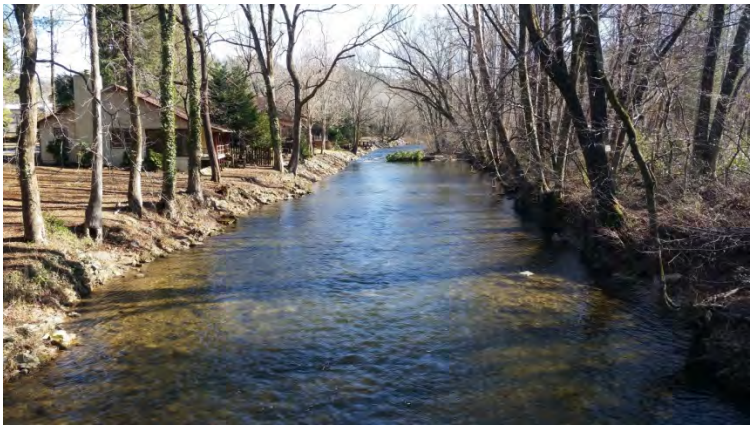
SR 255 @ the Chattahoochee River

There is some agricultural activity, including a couple of livestock operations where terrain allowed. A good number of houses exhibited small yards set aside as pastures for horses or goats, indicative of hobby farming and rural households who keep animals for personal use. Many homes featured 1-3 horses for personal riding and there are at least two operating stables in the watershed. There were also many chicken houses seen, though only two farms operating at larger commercial scales with more than 3 poultry houses. The extent of row crops was minimal and almost exclusive to the Sautee Valley. Again, many households had small fields where they would grow corn and vegetables for personal consumption but only a few farms featured large fields primed for commercial crops. This would suggest limited to minimal amounts of soil amendment from agricultural activity within the watershed.

This particular part of the state, featuring portions of the Chattahoochee National Forest, is also thick with wildlife. The increasing development has chased away many predators, allowing deer, foul and small mammals to thrive. There has also been heavy discussion about growing populations of wild boar, which routinely wreak havoc on local farm fields or forage through trash bins and camp sites. While the volume of this activity is not extensive it is considered a significant factor given the abundance of woodland. There were several properties in the area marked to indicate the use as a hunting preserve.

Some of the smaller tributaries run through the valleys with much less vegetative cover and at least in one instance was directly accessible by the livestock kept on one property. In many instances these streams form the boundary between properties and are covered by only the minimal amount of grass and shrubs. A couple of houses have made seating areas near the creeks, but did not appear to damage the banks save for trimming vegetation so as to view the water.

<u>Preliminary ranking of possible sources:</u>
Wildlife
Leaking` septic systems
Livestock
Urban Dev/ Runoff

Chattahoochee River at Hamby Street, Helen	
Here the river enters the urban portion of the city, with more houses and small commercial structures lining the banks. Many feature clearings or overlooks enabling prime viewing access to the river through the trees. In summer months this area will teem with visitors and tubers riding downstream. For this stretch the river banks are mostly shallow, aided over time as development in the city has cleared the land. Various points of entry can be found along the banks as property owners forge their own path to the water.	 Facing upstream  Facing downstream

Chattahoochee River at Brucken Strasse, Helen	
As the river winds through Helen the bulk of the banks are lined with vacation cottages, viewing decks, and other structures. Sometimes these infringe directly upon the bank, sometimes the structures are built beyond the initial tree line and some vegetation remains. The banks are for the most part stable but with modest erosion issues in some spots. Rock and broken concrete can be found in places where the City or landowners have looked to shore up the banks. Upstream from this spot is a popular public access park along Edelweiss Strasse that becomes full with visitors on many summer days, who will frequently traverse up and down the banks as they look to play and lounge in the river as tubers float by.	 Facing upstream  Facing downstream

Chattahoochee River at SR 75, near Nacoochee Village	
View of the Helen-to-Hardman trail under construction. This paved pathway would link the historic Hardman Farms property, which has undergone significant restorations over recent years to become a more prominent tourist attraction, with the southern edge of Helen. Now complete and open, this trail will invite more pedestrians to visit the area and walk alongside the river for about a ¼ mile.	

Chattahoochee River at SR 75, south of Helen

At this point the river is giving way from the urbanized setting of Helen and entering the Suatee Valley, where it will move more passively through some farm fields and collect strength from several tributaries feeding into the main river.

There aren't many (any?) access points visible along this stretch, and for much of this run it will be lined with heavy vegetation on the banks save for select areas.

Facing upstream

Facing downstream

Chickamauga Creek at SR 255, east of Sautee
Here this major tributary winds through passive rural lands before emptying into the Chattahoochee not far from this spot. It's not easily accessible at this point but there are some farm fields on the downstream side that will be adjacent to the creek. SR 255 is a busy arterial roadway at this point and notable amounts of litter is found alongside the road.

Facing upstream

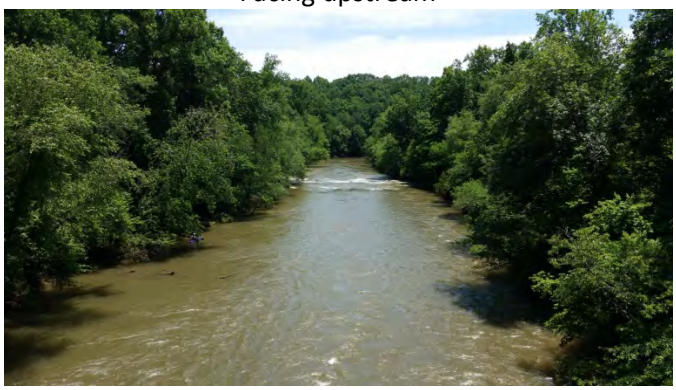
Facing downstream

Chattahoochee River at SR 115

This is another area with riverside access for putting in/ taking out boats or for the occasional fisherman. The roadway is pretty busy but the bridge is about 30 feet above the waterline.

Here the river banks are in fair to good condition, though there is the expected wear and tear of the south side access areas.

Facing upstream



Facing downstream

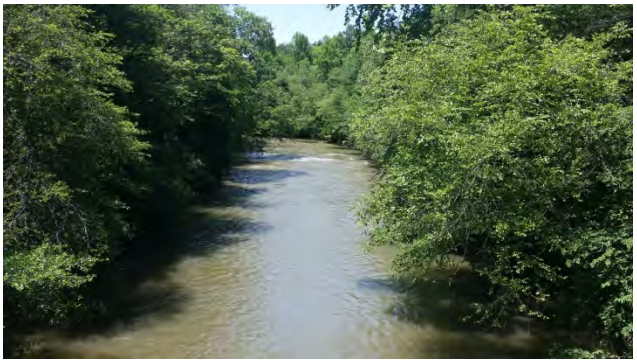
Chattahoochee River at SR 255 S

River Access

Poultry farm on SR 255 S near the Chattahoochee River

The southern section of the watershed sees the Chattahoochee leave the valleys and hills of northern white County for more pastoral lands with combinations of suburban development and larger farms. The intensity of development and variety of commercial uses will grow as it exits the watershed and gets closer to Hall County.

Where the river crosses under SR 255 S is a popular spot for people accessing the river, both for lounging by the water's edge and for putting in or taking out their tubes or kayaks. The northern side of the bridge is lined with worn parking areas capable of hosting several vehicles, and paths have been worn down to the river bank. Compared to other access points this is considered comparably clean.



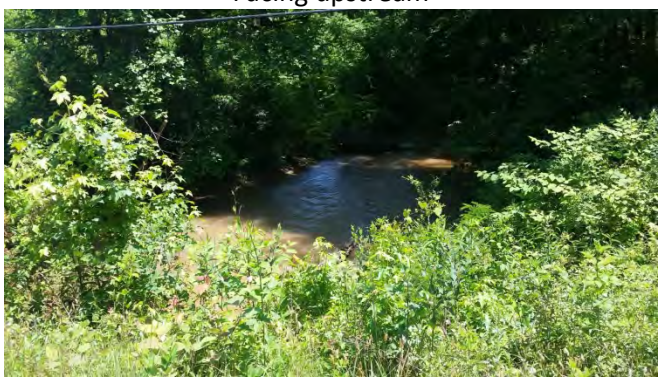
Facing upstream

Facing downstream

Bean Creek at SR 255

This spot typifies the many smaller stream crossings that occur in the watershed. One of the minor tributaries that eventually feeds Chickamauga Creek, this stream passes through a rural area north of Sautee, winding through various small farm lots and rural homesteads. For this stream the bulk of the banks are intact and well vegetated, such that the casual driver likely doesn't notice the culvert.

Facing upstream



Facing downstream

Chickamauga Creek at SR 255 and the Stovall Covered Bridge

Facing upstream

This is a small but popular area for visitors which features parking and designated picnic areas on both sides of the creek. A small covered bridge is available for pedestrians to cross over, but the spot is extremely popular with families and teenagers looking to play in the creek and lounge on some of the rocks just beyond the roadway. The banks are moderately covered with vegetation but the points where the covered bridge is anchored on either side are very worn and show evidence of erosion and runoff channeling.

Facing downstream

There are many other spots where people look to access the area's creeks and rivers for recreation, tubing, and fishing. Most are informal spots established for convenience by locals who know how to reach the streams from a crossing road.

Development samples in the watershed

Most of the Upper Chattahoochee is either forest land or rural settings. The rolling hills south of the National Forest tend to match the image shown above with varieties of large lot residential uses or outright agricultural uses. Of the cattle farms found in the area most appeared to have less than 30-40 head, but there were 2 or 3 farms with possible 100 head or more. Most of the farms with livestock had horses or goats.

Cattle farm on SR 255S near Old Blue Creek Rd

TARGETED MONITORING RESULTS

As part of this planning process GMRC conducted water sampling and testing over the course of 6 months to gauge the current state of local waters. This was done using Adopt-A-Stream methods with Whirl-Pak® bags and Petrifilm sheets that provided raw bacterial colony counts after 24 hours of incubation. The watershed assessment and monitoring data results will be used to determine the impact of newly implemented local land use regulations, newly installed BMP's, and water/wastewater infrastructure improvements as well as to influence the type of management practices that will be proposed for implementation by land and resource managers if additional loading reduction is deemed appropriate.

Sampling locations coincided with 6 of the locations used in previous monitoring back in 2010/2011. (An additional site used at that time was inaccessible for portions of this planning process.)

Sampling Stations			
Station Number	**General Location**	**Sampling Site Coordinates**	**Sample Parameters**
1	Chattahoochee River @ Hamby St	34.7016600474 -83.736254385	*E. coli*
2	Chattahoochee River @ South Main St (Helen)	34.6872912407 -83.7102306912	*E. coli*
3	Chattahoochee River @ Bottom Rd	34.6782717157 -83.6852822548	*E. coli*
4	Chickamauga Creek @ Highway 17	34.679101306 -83.668085725	*E. coli*
5	Chattahoochee River @ River Bridge Trl	34.6701748481 -83.6637502292	*E. coli*
6	Chattahoochee River @ Highway 255 S	34.6276899804 -83.6419213445	*E. coli*

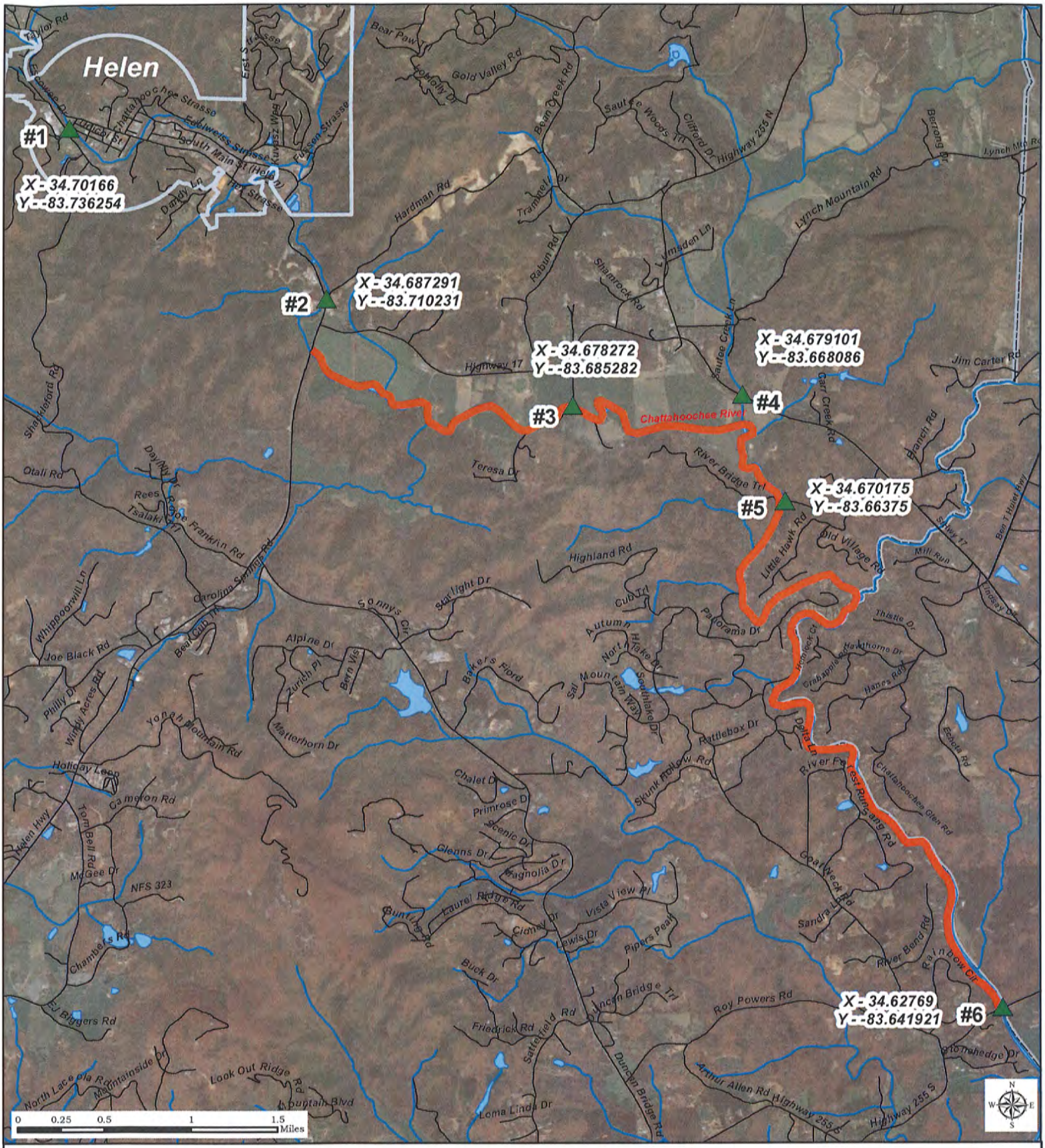
Air and Water Temperatures

	Date	**7/22/17**	**9/23/17**	**11/24/17**	**1/23/18**
	Time	10-2 pm	10-2 pm	9 – 12 pm	11-2 pm
	Temp				
1	***Air***	**84'**	**81'**	**62'**	**49'**
	Water	71.2	67.5	49.1	47.3
2	***Air***	**84'**	**81'**	**62'**	**49'**
	Water	71.2	67.5	49.0	47.2
3	***Air***	**84'**	**81'**	**62'**	**50'**
	Water	71.0	67.4	49.1	47.2
4	***Air***	**85'**	**81'**	**62'**	**50'**
	Water	71.0	67.3	49.0	47.2
5	***Air***	**85'**	**82'**	**62'**	**50'**
	Water	69.9	67.3	48.9	47.2
6	***Air***	**87'**	**83'**	**63'**	**50'**
	Water	70.0	67.3	49.1	47.2
	Conditions	Clear	Clear, some clouds	Clear, some clouds	Cloudy

Samples collected during this period failed to find a consistent violation. Some individual tests did surpass the 7 count regarded as the critical mark for raw samples, with more coming close to that figure. Part of the reason behind the numbers may be reflective of the dry weather experienced during the time frame, part may be natural error margins for such sampling methods, while increased application of best management practices over the years is also considered a factor. For areas in the upper half of the watershed, where people routinely wade into the river and streams, it is expected the bacterial counts might be higher in later daytime hours as the soils and sediments within the water are stirred up and legacy bacteria pollution is more likely. For the true headwaters, however, the early morning hours may feature more of an impact from wildlife as many mammals visit the waters before daylight.

RAW PETRIFILM BACTERIAL COUNTS - CHATTAHOOCHEE RIVER

Site #	Draw Date	Sample Number			Average
		1	2	3	
1	**07/22/17**	*2*	*4*	*2*	*2.66*
	09/23/17	*1*	*0*	*2*	*1.00*
	11/24/17	*2*	*1*	*2*	*1.67*
	01/23/18	*1*	*1*	*3*	*1.67*
2	**07/22/17**	*3*	*1*	*2*	*2.00*
	09/23/17	*3*	*2*	*2*	*2.33*
	11/24/17	*5*	*4*	*2*	*3.67*
	01/23/18	*2*	*5*	*2*	*3.00*
3	**07/22/17**	*1*	*4*	*1*	*2.00*
	09/23/17	*3*	*3*	*1*	*2.33*
	11/24/17	*3*	*5*	*3*	*3.67*
	01/23/18	*3*	*4*	*2*	*3.00*
4	**07/22/17**	*2*	*5*	*4*	*3.67*
	09/23/17	*4*	*4*	*3*	*3.67*
	11/24/17	*2*	*4*	*1*	*2.33*
	01/23/18	*0*	*3*	*3*	*2.00*
5	**07/22/17**	*1*	*3*	*0*	*1.33*
	09/23/17	*3*	*1*	*3*	*2.33*
	11/24/17	*4*	*3*	*7*	*4.67*
	01/23/18	*1*	*3*	*1*	*1.67*
6	**07/22/17**	*2*	*2*	*0*	*1.33*
	09/23/17	*3*	*1*	*2*	*2.00*
	11/24/17	*1*	*4*	*4*	*3.00*
	01/23/18	*3*	*1*	*3*	*2.33*



Sampling Site Locations
HUC 0313000101
Chattahoochee River - White County

Legend

- Sampling Site
- TMDL Stream
- Roads
- Lakes and Ponds
- Rivers and Streams

Georgia Mountains Regional Commission

ADVISORY COUNCIL AND PUBLIC INVOLVEMENT

Any successful environmental protection and mitigation program requires a level of public outreach, education and involvement. This ensures the community is receiving the most information possible to correctly assess the situations and make wise decisions. This also ensures the widest number and variety of stakeholders and potential contaminant contributors are being presented with the information necessary to implement any improvement measures.

Local stakeholders and prospective members of the advisory committee were contacted early in the planning process to offer their thoughts on key issues and possible hot spots for sampling sites. The committee then met several times in 2018 at the Cleveland City Hall Annex after the initial field surveys and targeted sampling results were available for consideration. Their comments and input shaped further field study and the overall evaluation of potential sources and mitigation strategies.

This committee, which was comprised of various local government staff, natural resources advocates, and members of the local agricultural community, was in general consensus regarding some of the most likely contributing factors to the prevailing causes of bacteria and sediment pollution issues. Few suspected any prominent impact from agricultural operations in general, with only one or two properties considered suspect in livestock management and neither of them feature large volumes of animals. While individual properties may still struggle in keeping animals from stream banks those cases are considered few and far between, with all major local organizations championing best management practices and an assumption that over time these practices become more and more readily employed. Local farmers are well aware of programs like EQIP and other resources that can assist them with improving the stewardship of their properties.

There was expressed concern over the effect of local wildlife, which while not considered extensive throughout the watershed there are distinct pockets near the less developed areas that feature volumes of deer, small mammals, and wild hogs. There is also a growing abundance of larger water fowl within the many lakes and ponds. These animals are all drawn to area water resources and combined may be having a larger impact than originally intended.

Popular picnic area north of Helen

The committee did suspect the Helen area was of prime concern, where the summer months feature so many people in the water and along the shoreline. North of the city is a very popular picnic and gathering area where Smith Creek empties into the Chattahoochee. This occurs right alongside the Unicoi Turnpike and on its busiest days the peninsula can harbor dozens, if not hundreds of visitors, while immediately next door are a variety of shops, a tubing center and other commercial operations that are parked alongside the water and with limited space for septic drain lines. In times of flooding this area can easily be covered

and wash everything into the water.

The committee also encouraged White County to explore a regular local environmental advisory committee. Habersham County has the Soque River Watershed Association to champion their environmental causes and there is a presence from the Chattahoochee Riverkeeper, however a standing body made of locally recognized stakeholders could champion addressing the watershed's needs and help coordinate management measures among all involved.

Additionally, 2 of the advisory committee meetings were made open to the general public and copies of the draft Watershed Management Plan have been made available for public review and comment.

2018 Upper Chattahoochee WMP Advisory Committee

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Tom O'Bryant, City of Cleveland	85 South Main St.	Cleveland	30528	706-865-2017	tobryant@cityofclevelandga.org
Harry Barton; White Co. Planning Dir.	59A South Main Street	Cleveland	30528	706-865-6768	hbarton@whitecounty.net
Darrel Westmoreland City of Helen	25 Alpenrosen Strasse	Helen	30545	706-878-2733	dwestmoreland@cityofhelen.org
Duncan Hughes, SRWA	1387 Washington Street	Clarkesville	30523	706-754-9382	soqueriver@windstream.net
Frank Riley, CCRCD	Scoggins Drive	Demorest	30535	706-894-1591	Frank.ccrcd@gmail.com
Brandy Daniel, White Co. Farmer's Exchange	951 South Main Street	Cleveland	30528	706-865-2831	brandy@wcfecoop.com
Dale Caldwell; Upper Chatt. Riverkeeper	104 Washington Street SE	Gainesville	30501	678-696-8866	dcaldwell@chattahoochee.org
Stanley London, White County Farm Bureau	PO Box 849	Cleveland	30528	770-865-3177	c/o pramey@gfb.org
Nathan Eason White Co. Extension		Cleveland	30528	706-865-2832	neason@uga.edu
Sean Sullivan; White Co. Env. Health	1241 Helen Highway, Unit 210	Cleveland	30528	706-348-7698	
Steven Patrick, Habersham Extension	555 Monroe St, Unit 50	Clarkesville	30523	706-839-0255	stevep@uga.edu
Ga. Water Coalition	817 W. Peachtree St.; Suite 200	Atlanta	30305	866-889-2837	sudvardy@gaconservancy.org; sbarmeyer@gwf.org
Georgia Forest Watch	15 Tower Road	Ellijay	30540	706-635-8733	info@gafw.org

MITIGATON PROGRAM

WATER QUALITY GOALS

The overarching goal for Chattahoochee River is the same as that of the State's general standards for water quality. That is, to render the creek and all of its streams free of contaminants, healthy for its ecology and fully compliant with the measurable standards for water bodies with the State's designation. Optimally, this would also entail restoration of any deteriorating stream banks and the mitigation of any critical sources of erosion and sedimentation from developed areas, so as to better sustain the quality of the watershed going forward.

Broken into individual elements, the practical goals for the Testnatee watershed, as pertaining to this WMP, are as follows:

Restoration of Measured Water Quality

As discussed above Chattahoochee River remains listed among the State's impaired waters and requires an approximate 37% reduction in pollution levels in order to restore water quality to designated standards. This represents the summation of everything discussed throughout this WMP and the original TMDL for Chattahoochee River, so any and all actions done to improve conditions within the watershed must ultimately yield future water testing results that establish Chattahoochee River has once again come into compliance with the appropriate State standards.

This means that even if a variety of measures are implemented and the clinical testing still reveals impaired water quality levels, then the priority goal of this WMP process and document have not been achieved. However, if testing reveals the creek has come into compliance even if not all of the recommendations have been implemented then remaining measures should still be pursued but the goal of restored water quality would have been met.

Impairment Sources and Recommended Loading Reduction			
Stream	**Impairment**	**Possible Sources of Contamination**	**Recommended Reduction**
Chattahoochee River	Fecal Coliform	Human-induced pollution sources: agricultural land uses located too close to streams, faulty septic tanks located too close to streams, and nonpoint source storm water pollution.	85%

Establishment of Watershed Maintenance Measures

As the water quality for Chattahoochee River is restored and the overall health of the watershed is improved, a key supplemental component of this WMP is to create and employ an ongoing program that will help sustain the environmental integrity of the Testnatee and its supporting tributaries. Many of the elements required for this are in place or readily available, so it is hoped that with minimal effort and coordination all of the stakeholders involved can help monitor conditions, educate others and do their part to keep the Testnatee watershed healthy.

Achievement of this goal will require, at a minimum, the following elements:

- Acknowledgment of the impairment listing and remediation plans within the Lumpkin and White County Comprehensive Plans;
- Establishment of/Maintaining local policies and programs regarding code enforcement, with special attention paid to watersheds with impaired streams;
- Development of a long-term water sampling and testing program to routinely monitor the bacteria levels within the Testnatee;
- Regular communication among stakeholders concerning updated information about the watershed, possibly via an annual status report;
- Establishment of an overall watershed education strategy for area stakeholders.

IMPAIRMENT SOURCE ASSESSMENT

This element includes an accounting of the significant point and nonpoint sources in the watershed, in addition to the natural background levels that make up the pollutant loads causing problems in the watershed. The analytical methods did include mapping, modeling, monitoring, and field assessments to make the link between the sources of pollution and the extent to which they cause the water to exceed relevant water quality standards.

Point Sources

Point sources are singular, clear places where an outside element is being introduced to a water body, one which may or may not be carrying contaminants and thus polluting the stream or lake. These are typically things like industrial pipes, spillways, storm sewer drains or other controlled means for directing flows toward a surface water or holding pond. Most of these require special permitting and management to ensure protection against contamination, but occasionally point sources can escape detection through oversight or mal intent.

As previously mentioned there are no known point-sources within the Upper Chattahoochee River watershed that require registration and permitting. There are some small culverts and storm drains that direct immediate runoff into stream channels but none that are part of larger municipal systems. There are some sewer lines within the watershed but no major violations or concerns emanating from that system to date. As of this completion through this WMP process there have not been any other point sources identified within the watershed.

Non-Point Sources

Non-point sources refers to how various areas within a watershed may contain polluting elements that are then introduced into a water body through storm water runoff, flooding or other means. As sources they may be inconsistent and obviously difficult to identify, but through investigation and a process of elimination it is possible to identify geographic sources of contamination and then analyze the local conditions that are conducive to producing pollutants.

Wildlife

White County and the rest of the watershed lies within a heavily wooded and rugged part of the state, complete with National Forests, wildlife management areas and parks that allow all manner of wildlife to thrive. The area is a known destination for hunters and hikers who come to see the scenic beauty and encounter wild animals in their native habitat, including bears, beavers and more.

Of special attention to this WMP is the prevalence of larger mammals, from large rodents to deer, coyotes and even bears. Mammals produce the type of warm waste that is particularly harmful when introduced to surface waters, so concentrations of these animals within close proximity to the streams and rivers is of crucial concern to water quality interests.

The most abundant manner of wildlife in the region warranting concern is the deer. Wild deer have become abundant in much of Georgia as human development displaces their natural predators. According to the State DNR, within the *Georgia Deer Management Plan 2005-2014*, Lumpkin and White Counties are within the northernmost Deer Management Unit, a section of the state with defined traits and compatibility for deer populations. The plan estimates that the population within this region is approximately "*25 deer per square mile of forested acreage*." At the time projections indicated the potential for that figure to increase, even considering additional human development, due to the presence of deer-friendly habitats.

Pending updated figures from DNR it is possible the region now harbors a population of near 35 deer per forested mile, the approximately maximum for stability projected by the State. This is due in part to the limited change in measures to control the population locally and the increased tenor of comments received from the public as received by DNR and other natural resource offices. If suspected then it's probable that deer are among the prominent causes of contamination of the Testnatee as their herds gather near watering spots and seek shelter and food within the many woods and fields.

In addition to deer discussion among Advisory Committee members and other stakeholders suggests there is likely a strong impact from feral hogs within the watershed. As with deer, the population of these animals has thrived as their natural predators are driven out by human activities. Particularly in areas with some row crop production to supplement natural food sources, feral hogs have grown in presence within the Georgia Mountains region. Because these animals can grow to substantial size (175+ pounds for adults), produce sizable litters over multiple years, will gather near watering sources and typically travel as a small herd, feral hogs are capable of producing copious amounts of waste that would severely impair area streams.

Other animals within the watershed are sparse in numbers or small enough that they're considered as a collective of other mammals in the region. This would include larger predators such as black bears,

coyotes, bobcats and (possibly) eastern timber wolves. It would also include large rodents such as beavers, opossum and groundhogs. None of these alone measures significantly enough within the watershed to be considered a major contributor to bacteria contamination levels, however taken as a whole in this predominantly wooded area they are regarded a factor.

Lastly, there is a notable presence of foul within the area that can likewise add to the pollution levels. Wild turkeys are found throughout the region and the abundance of various ponds in the region has drawn numbers of geese and ducks.

Agriculture - Livestock

Agricultural livestock refers to the animals retained on farmsteads for the production of young and/or milk, including cattle, pigs, horses, goats and poultry. Some livestock farms are large commercial operations (even requiring special permitting), while others are small and oriented around production only for the owners. At any scale, the animals produce wastes that can severely impair waters, and often this waste is left in fields or stalls where storm water runoff can wash the waste into open streams, ponds and lakes. It's also not uncommon to see livestock wading within perennial streams for drinking and to cool off, while in the process directly dropping their feces within the water. Because of these factors, management of livestock is considered a critical component to water quality health.

As noted before, the Upper Chattahoochee watershed is predominantly rural but agricultural activity is only seen in modest amounts. This is due largely to the sloping topography that minimizes the opportunity for large fields and pastures. What activity is present, though, is that much more conducive to aggravated issues due to the runoff conditions created by the steeper slopes. This increases the streams sensitivity to runoff pollution, and makes livestock management all the more critical.

Estimated Agricultural Livestock - 2009

	Beef	Dairy					Poultry		
County	**Cattle**	**Cattle**	**Swine**	**Sheep**	**Horse**	**Goats**	**Layers**	**Broilers**	
White	5,200	300				140	400,000	26,752,000	150,000

Natural Resources Conservation Service - 2011

State records estimate agricultural livestock in White County consists overwhelmingly of poultry, with some cattle and even less of other animal operations. Older records suggests that there were about 2,500 head of cattle within the HUC basin, but it is suspected that some of those operations have died or moved on as the county has seen increased development. There are also listings for two Confined Animal Feeding Operations (CAFOS) in White County but they are outside the watershed.

Of the farms and livestock observed a few properties had only topography and natural brush to prevent animals from open access to streams. Of note were the variety of small ponds on many of these properties, used to retain water for animals to drink and in which to wade. It is assumed any of these ponds within active farms would harbor high bacterial counts do to animal wastes and limited water refreshment or agitation. It's not unlikely that some of these ponds may experience flooding and the runoff could make its way into nearby streams and rivers.

Agriculture – Row Crops

Agricultural row crops refer to the planted and harvested vegetation associated with large scale farming. These are a factor in considering bacterial infiltration into waterways as many soil fertilization practices employ significant amounts of manure and animal wastes to improve the nutrient make-up for growing various plants. Depending on the overall soil management plan and the method for applying such fertilizers, storm water runoff can transmit the topsoil and freshly spread manure into adjoining creeks and streams.

Land cover and field survey information indicate minimal acres of row crops within the watershed. Some3-5 fields identified that may harbor routine use for crops, but throughout various observations there was limited indication of large scale land disturbance or soil turnover. While the topography limits the volume of large crop fields, it also provides an element that raises the potency of any runoff as it reaches the surface water, meaning fields may be that much more likely to contribute to runoff if located along a slope just above a stream or creek.

Septic Systems

Septic systems are a type of on-site wastewater treatment facility, involving an underground receiving tank and an outflow line laid into a leach or drainfield. Wastewater enters the tank, allowing solids to settle and scum to float. The settled solids are digested in an anaerobic bacterial environment while the excess liquid then drains into the leach field. Due the potential of waste by products to enter the soil in the drainfields, percolation tests are required to establish the porosity of the local soil conditions.

The rural nature and hilly topography of the Chattahoochee watershed demands a dependence on on-site septic systems, which is a critical issue given the relatively limited amount of soil conditions ideally suited for septic applications.. The same issues with steep slopes exacerbating runoff concerns from animal wastes also raises the stakes for leaking septic systems. Especially for those properties where the tank or drainfield may be in close proximity or directly upslope from a surface water body, the potential for contamination from faulting systems is considerably high within such watersheds as the Chattahoochee. The soil make-up of each property is also a factor, with many parts of Habersham and White Counties exhibiting soil types unsuitable for some types of septic systems.

What concerns that do exist concerning septic systems will be concentrated within upper White County and in the Soque Creek basin of Habersham County, due to the volume of houses and the proximity of some older homes to the streams as they were built within the valleys and lowlands of the Appalachian foothills. There is no considerable volume or presence of septic systems within the Union and Towns portions of the watershed due to the terrain and National Forest.

Septic Systems

County	Existing Systems (2006)	Existing Systems (2011)	Systems Installed (2007 to 2011)	Systems Repaired (2007 to 2011)
White	10,717	11,276	559	217
County	**Existing Systems (2000)**	**Existing Systems (1990)**	**Systems Installed (1991 to 2000)**	**Systems Repaired (1990 to 2000)**
Habersham	13508	7934	5,574	272

Urban/Suburban Runoff

General stormwater runoff from developed areas is considered its own category of potential non-point source pollution. This refers to runoff from storm sewers and impervious surfaces such as parking lots, roads and larger structures, and while these waters are not typically contaminated with animal waste they can contribute to stream impairment through erosion and sedimentation that activates legacy wastes in soils, as well as provided additional solids that disrupt water clarity and nutrient balances.

The overwhelming amount of urbanized area within the Upper Chattahoochee River watershed occurs in and around the City of Helen. Here the amount of impervious surface is in line with most major cities, it simply occurs on a smaller overall footprint. However it also occurs within a narrow valley so all the stormwater is rushed directly to the river. The City does employ several mitigation measures to buffer and filter stormwater where possible but the sheer volume of area that drains openly to the river is too vast to manage effectively.

While the volume of runoff stemming from urban conditions is not expected to change greatly, there should be a concerted effort by the governments to ensure new development coming into the area does employ proper buffering and mitigation measures to minimize the impact.

Ranking and Prioritizing of Sources of Impairment

As part of the planning process EPD asks that the potential sources be assessed based on the perceived extent and magnitude of their contribution, with additional reflection based upon public input. The matrix below has been developed as a means for indicating these relative assessments, using the following definitions:

Extent	Refers to the scope and range to which this source is present throughout the watershed
Magnitude	Refers to the perceived potency or volume of contribution resulting from this source
Permit	Indicates whether there is a State or local permit required for this activity
Estimated Contribution	Indicates the comparable degree for which this source is responsible for current pollution levels
Stakeholder Priority	Indicates which sources are of most importance to stakeholders involved in the process

After consideration of the various potential sources of impairment through field surveys, research and discussion among stakeholders and the general public, it's considered that of the regular possible non-point sources that runoff from wildlife and failing septic systems are the most prominent sources of pollution for the Testnatee, with agricultural sources considered after that.

Source	Extent	Magnitude	Permit (Y/N)	Estimated Contribution	Stakeholder Priority (Rank 1-5)	Comments
Agriculture						
Diffuse runoff of animal waste associated with erosion	Med	Med	N	Med	1	Moderate probable cause and limited control measures in place
Runoff from concentrated animal operations	Low	Med	Y	Med	3	No large scale operations in watershed means more smaller projects in order to yield benefits
Spreading of animal waste or municipal sludge on fields	Low	Low	N	Low	5	Few crop farms in watershed but high rate of return in BMP application
Failing septic systems	High	High	Y	Med	4	Difficult to manage but a critical source to be addressed
Runoff from urban development	Low	Med	N	Low	2	Minimal impact but easily monitored and addressed

EXISTING AND RECOMMENDED MANAGEMENT MEASURES

This element describes the management measures that need to be implemented to achieve the load reductions estimated above, as well as to achieve any additional pollution prevention goals called out in the watershed plan (e.g., habitat conservation and protection). Pollutant loads will vary even within land use types, so the plan should also identify the critical areas in which those measures will be needed to implement the plan.

Local Codes and State Laws

All four Counties maintain many policies and programs which illustrate their respective commitment to environmental stewardship in general. Many of these measures apply to the Chattahoochee River watershed, though the specific activity may not have occurred during this planning time frame. However, as these actions benefit all of the County and its properties they are being presented to demonstrate the type of watershed management already in place with each government and Chattahoochee River.

All jurisdictions employ an *Erosion Control and Sedimentation Ordinance* to help control pollution along surface streams. Both local governments adopted the State of Georgia model ordinance that established stream protection measures for certain construction sites. The County governments also rely on their respective Health Departments, through rules and regulations established the Georgia Department of Human Resources, to administer the review and placement of septic systems for residential, commercial and industrial land uses.

All four Counties have also adopted the applicable *environmental protection ordinances* required for State-designated vital areas. Combined these minimum standards ensure that environmentally sensitive areas are protected from the impacts of poor, inappropriate or overly intensive development. Most regulate development scale, type and location within proximity of these vital areas, ultimately retaining the integrity of stormwater runoff draining into each condition.

- The *water supply watershed ordinance* will limit types and density of development that would impair the water supply or watershed. This ordinance will allow for the establishment of protective buffers around streams where septic tanks are not allowed to be placed. This ordinance will also limit impervious surface adjacent to streams.

- The *river corridor protection* ordinance protects land within 100 feet horizontally on both sides of a river at the point when it becomes 400 cfs. New construction is prohibited in the river corridor except for single family houses on two-acre or larger lots. Septic tanks and septic tank drainfields are prohibited in the river corridor, as are hazardous waste and solid waste landfills. These provisions help to keep pollution flowing into the river at a minimum. Potential for fecal coliform bacteria caused by leaking septic tanks is decreased by this ordinance.

- The *wetlands protection ordinance* protects land alterations within or near wetlands that will significantly affect or reduce their primary functions for water quality control, floodplain and erosion control, groundwater recharge, aesthetic nature, and wildlife habitat. The floodplain control measures also serve to indirectly control fecal coliform bacteria levels because of the direct correlation between fecal coliform bacteria levels and flow rates. Less unnatural flooding and water diversion means lower flow rates, and therefore, lower fecal coliform levels.

- The *mountain protection ordinance* protects land above 2,200 feet elevation by limiting lot sizes and density of land uses. Also included in this ordinance is that no more than fifty percent of a lot can be cleared or timbered.

- The *ground water recharge ordinance* regulates lot sizes and density of land uses in areas designated as a significant recharge area. This ordinance also prohibits a number of uses that handle hazardous materials and requires liners for agricultural lagoons.

Dedicated Environmental Management Resources

There are several organizations designated throughout the State to assist communities with local management of natural resources, often provided layers of education, mitigation programs and other means to ensure landowners are applying sound stewardship practices. Combined these agencies provide a variety of resources that can assist with implementing the WMP and maintaining the overall quality of the watershed.

Agency	Program		Impairment Addressed
Georgia EPD	Georgia Water Quality Control Act (OCGA 12-5-20)	Regulates discharge of pollutants into waters of the state to protect public health, safety, and welfare, and to preserve stream habitats for animals and aquatic life.	All
	Georgia Erosion and Sedimentation Act	Requires permits and standards regarding undisturbed buffers on state waters.	All
	NPDES regulations for CAFOs over 1,000 animal units	Permitting program created to protect and improve water quality by regulating CAFOs.	Agriculture
Georgia Department of Agriculture	Georgia Regulations for CAFOs 301 to 1,000 animal units	Outlines requirements for Feeding Operation and Land Application System (LAS) permits.	Agriculture
Natural Resource Conservation Service	Environmental Quality Incentives Program (EQIP)	A cost-share program to assist landowners seeking to implement BMPs.	Agriculture
	Conservation Reserve Program	Costs shared with FSA for conversion of sensitive farmland acreage to vegetative buffers along waterways.	Agriculture
	Conservation Technical Assistance Program	Assists landowners with creating management plans for their lands, including but not limited to Farm and Forest Conservation Plans and Comprehensive Nutrient Management Plans (CNMPs).	Agriculture
Chest-Chat Resource Conservation & Dev. Council	BMP education and grant assistance	Support arm of the NRCS providing educational forums and assisting landowners and communities with grant applications and administration	All
Local Environmental Health Offices	Regulations for On-site Wastewater Management	Permitting and inspection of new and repaired systems.	Urban/ Suburban Runoff
Local Extension Offices	UGA Cooperative Extension Program	Assists agricultural operations with soil and water conservation.	Agriculture

Voluntary environmental stewardship efforts within the counties include active *Adopt-A-Stream* programs. The White County program is assisted by two community groups, Preserve White County and the Sautee Nacoochee Community Association (SNCA). The SNCA has organized an environmental concerns committee that focuses on public education through a series of community forums. The Chattahoochee Riverkeeper is another resource available to assist with volunteer related efforts including educational programs, organization of events, and monitoring as time and resources permit.

Two members of the University System of Georgia are also available to provide assistance where possible. The *University of North Georgia*, based in Dahlonega, has used students and class work to perform various water sampling projects and stream bank assessments in White County. The *North Georgia Technical College*, based in Clarkesville, has also supported watershed programs including staff and student involvement in the Soque River Watershed Association in Habersham County.

Recommendations for Additional Management Measures

On the basis of the existing source loads estimated above, this element discusses various management measures that will help to reduce the pollutant loads and estimate the load reductions expected as a result of these management measures to be implemented, recognizing the difficulty in precisely predicting the performance of management measures over time. The estimate should account for reductions in pollutant loads from point and nonpoint sources identified in the TMDL as necessary to attain the applicable water quality standards.

The recommended load reductions with this WMP are representative of the projected share each potential source contributes to the overall impairment. It has also been selected based on the probable impact of remediation measures.

- *Detailed Inventory of Septic Systems*
  This particular watershed is completely reliant upon on-site septic systems to treat wastewater, and many of these systems are aging and/or within close proximity to a surface water. To the best extent possible, both jurisdictions should work to develop an accurate, up-to-date parcel map that can be codified based on the presence, age, and proximity to the stream of each septic tank and drainfield. As new testing can be used to identify hot spots within the river and tributaries, this information could aid in identifying any correlating concentrations of septic systems that may be candidates for failures or leaks. Where possible, information about system repairs should also be accounted for, providing the most accurate portrait possible of the viability of on-site systems within the watershed.

- *Survey Application of Agricultural BMPs*
  While this watershed is not the most populated with regards to livestock, there are enough farms in the area to warrant consideration. More importantly, the terrain and general accessibility seen for some streams suggests this remains a possible source of contamination. A coordinated effort involving the Counties, local Farm Bureaus and other stakeholders could serve to increase promotion and awareness of watershed stewardship, while simultaneously confirming the volume of livestock present within the watershed and the level of vulnerability.

  The three separate actions entailed would begin with a detailed accounting of livestock operations within the watershed, complete with visual field surveys of conditions and written

surveys for property owners to determine the extent of BMP applications. The second action would be the distribution of promotional material about agricultural BMPs in general and information about specifically about the Chattahoochee River. Lastly, a follow up effort for remediation should be developed for any incidents of livestock operations with severe conditions that are strongly suspected of causing water pollution.

- *Targeted river bank surveys and clean-ups*
  In addition to routine observation and surveys of the watershed, a concentrated effort to walk as much of the river as possible at least once per year would help confirm the integrity of the stream banks and identify possible points of animal intrusion. This could coincide with efforts to maintain the cleanliness of the watershed, and would increase public awareness of the need to sustain healthier watersheds. These could be coordinated with Adopt-A-Stream to both benefit the communities and also provide an additional opportunity for volunteer training and participation.

- *Review and update of education programs and materials*
  Both White County and Lumpkin County currently employ several methods to engage area residents, employers and developers on the rules and efforts behind maintaining local water quality. A specialized approach for Chattahoochee River could aid in this effort by providing targeted information to critical stakeholders, building a stronger sense of vested interest among property owners and business owners and hopefully increasing awareness and support for BMPs and mitigation measures. This could include promotional material illustrating the health of Chattahoochee River watershed and special guidance about WMP related activities and issues.

- *BMP promotional campaign – Agricultural ponds*
  Many properties within the watershed feature ponds of various sizes, something readily possible given the sloping terrain and directed rain channels. Of these ponds several are surely provided as a watering source for livestock, making them highly likely to contain high bacteria levels. To ensure these ponds are being properly managed against overflow draining directly into perennial streams, a promotional campaign should be established to ensure landowners area aware of available BMPs. This could be the focus of a 319 grant that would endow funding support for landowners pursuing major improvements or shifting to high ground drinking facilities.

- *BMP promotional campaign – Septic system maintenance/repair*
  Many residents are unaware of the recommended standards regarding when and how to perform maintenance and repair for aging septic systems. Given the prevalence of these systems within the watershed and the relatively low figures regarding repair rates, a promotional campaign should be pursued that would educate owners of recommended practices and encourage the routine maintenance of their tanks. This could be the focus of a 319 grant program that would endow funding support for landowners pursuing tank repairs and maintenance treatments.

- *BMP promotional campaign – Topsoil management for row crops*
  Due to the nature of the TMDL data suggesting the Testnatee was listed due possibly to singular events, there should be consideration to the impact of seasonal applications of manure and

fertilizers on area farms. While this will likely also be covered within the above mention educational campaign and survey of BMPs, an additional round of targeted promotional material and support regarding management of crop soil is advised.

- *Updated wildlife survey*
  While there are suspicions of large numbers of wildlife within the watershed it is difficult to properly assess the situation without a detailed approach by knowledgeable persons. An effort should be pursued that would coordinate USFS staff, local code enforcement officials and other wildlife experts to perform a more detailed survey of wildlife within the watershed that tracks conditions over a full year. This may require outside experts searching through area woodlands as well as a possible comprehensive survey of landowners to gauge their perceptions. An updated assessment of estimated counts and prominent habitats would allow for the WMP to properly refine the extent and magnitude of impairment from area wildlife.

- *Watershed monitoring and survey*
  An updated round of watershed monitoring could be pursued that includes more frequent sampling and/or many more sampling points. Additionally, more and regular field surveys of the watershed and its many streams would assist in refining the information used to assess the sources of impairment. An effort should be made to work with either area collegiate institution about utilizing their environmental studies programs to assist with such an effort.

- *Introduction of more formal access points*
  The committee suggested an organized effort to create more formal access points to area waters might lead to a reduction in the number of informal access points. Formal beach areas and points for boating access would mean such facilities would be managed with a degree of environmental stewardship, and hopefully curtail the urge of others to damage stream banks elsewhere in the area.

  This could entail high up-front costs pending available sites, and should be done in concert with local tourism organizations to ensure such facilities are done effectively. Depending on the locations the various governments would also have to provide support through property management, law enforcement, etc.

- *Animal control measures*
  There is no specific recommendation in how this should be handled above and beyond current hunting policies, but the committee wanted to note the possibility of having additional outside animal control experts brought in to help address the local issues with feral hogs and wild fowl. This might entail a specific one-time effort, or a possible evolution in other existing policies and programs. However, the need to reduce the likely impact of wildlife on water quality is a concern going forward.

BMP	Pollutant Source	Estimated Effectiveness	Estimated Load Reduction (%)	Cost Estimate	Public Support	Install Priority
Survey Application of Agricultural BMPs	Diffuse runoff of animal waste	High	5%	$5,000	Med	High
Education Materials	Diffuse runoff of animal waste; Failing septic systems	Med	5%	$5,000	High	High
Inventory of Septic Systems	Failing septic systems	Med	5%	$5,000	High	High
Targeted surveys and clean-up events	Diffuse runoff of animal waste	Low	5%	$10,000	Low	Low
Agricultural Pond BMPs	Diffuse runoff of animal waste	Med	20%	$25,000	Med	High
Septic Maintenance/ Repair	Failing septic systems	Med	20%	$10,000	Med	High
Crop Soil BMP campaign	Diffuse runoff of animal waste	Low	10%	$10,000	High	Med
Updated Wildlife Survey	Diffuse runoff of animal waste	Low	10%	$10,000	Med	Med
Watershed Monitoring and Survey	Diffuse runoff of animal waste; Failing septic systems	Low	5%	$10,000	Med	Med
New Access Points	Urban runoff	Low	5%	TBD	High	Med
Animal Control Measures	Diffuse runoff of animal waste	Low	10%	TBD	Med	Med

POTENTIAL FUNDING SOURCES

Some of the above measures can be implemented easily and cheaply through special application and coordination of existing programs and work at each County government. Reviews of permits and updating of GIS information are regular facets of County operations at select departments, and provided the time frame is permissible the County's would only need to make special notice of efforts related to the Testnatee to ensure the collected/developed information is shared with stakeholders. Specifically, if the efforts related to GIS mapping of information and the reviews of septic tank records are compiled through routine workloads, those materials could be developed at marginal cost.

Where some projects may entail the need for critical investment, some outside funding sources should be called upon to assist local efforts. The following list identifies potential funding sources that the Counties or other stakeholders could pursue to assist with financing special projects and efforts, paying for materials, manpower or specialized lab testing. As the stakeholders begin to address specific tasks, each potential outside funding source should be considered for support. Further, the GMRC and local stakeholders should routinely consult EPA and other organization to learn about other opportunities or funding resources not listed here.

Georgia Environmental Facilities Authority - GEFA's program focus areas are water, wastewater, solid waste, recycling, land conservation, energy efficiency and fuel storage tanks for local governments, other state agencies and non-profit organizations.

Clean Water State Revolving Fund - Programs cover the cost of engineering, planning, and design, construction, and contingencies.

Southeastern Regional Water Quality Assistance Network - Can provide funding to assist communities in water quality and related projects.

NRCS: Environmental Quality Incentives Program (EQIP) - Page maintained by NRCS that contains information on this program that provides monetary and technical assistance.

NRCS: Wildlife Habitat Incentives Program (WHIP) - Page maintained by NRCS that contains information on this program that provided monetary and technical assistance for habitat conservation for fish and wildlife.

US EPA Section 319 Grant Program - Under Section 319, states, territories and tribes receive grant money that supports a wide variety of activities including technical assistance, financial assistance, education, training, technology transfer, demonstration projects and monitoring to assess the success of specific nonpoint source implementation projects.

Community Action for Renewed Environment (CARE) Grants - Projects to help communities reduce toxics in their environment and to solve environmental problems.

5-Star Restoration Program - Must have five or more project partners. Provides environmental education through streambank and wetland restorations.

PROPOSED EDUCATION AND OUTREACH

Promulgation of the WMP

The GMRC, with support from the Counties, will post/share the WMP and distribute material (emails and flyers) indicating the document's purpose and availability. The goal will be to ensure all stakeholder groups have been contacted about this notice and to have copies directly provided to the same.

Update of local Comprehensive Plans

As each local Comprehensive Plans becomes due for updates, the GMRC will work with the planning staff at each and ensure that the document reflects the impaired status of the Chattahoochee watershed and move to incorporate the mitigation measures recommended in this WMP into the respective objectives and work programs. This will ensure the Counties and Cities are fully aware of watershed's conditions as they develop new future development strategies, and keep the issue of watershed management within the related public discussions.

Establishment of a local Environmental Advisory Council

A spin off from the committee used in this process, White County should establish a Council to meet once a year and to remain in routine contact with County and GMRC staff to review the progress with

implementation of the Chattahoochee WMP, improve coordination among various stakeholder groups and organizations, and advise the County and others on actions needed to address watershed management. This Council could serve in this capacity for other environmental issues throughout White County to help coordinate interests and activities.

Review and update of education materials

The various agencies discussed throughout the document have many resources available for sharing with landowners to improve awareness of environmental stewardship, including in the form of educational resources, promotional brochures, web resources and more. With the possible sources prioritized and an overall mitigation strategy established, the GMRC and Advisory Committee should review these materials as relate to the issues identified herein and establish recommendations for preferred materials to be used, possible improvements needed of these resources, and suggest a coordinated approach to distribution. This should be done over the course of 2019.

IMPLEMENTATION SCHEDULE

The following table presents the recommended implementation schedule for to-be-completed actions or newly proposed remediation measures. This assumes the Counties and other stakeholders are continuing with existing and ongoing measures already discussed in this WMP.

Action	Responsible	Possible Funding	Estimated Cost	Year
Promulgation of WMP	GMRC	NA	NA	2018
Update map of septic systems by parcels, by year	GMRC	EPD – Water District planning funds	$1,000	2019
Survey of agricultural operations and BMPs within the watershed	NRCS, Ext. Service	NA	NA	2019
Targeted stream bank surveys and clean-ups	County, GMRC	319 grant program	$10,000	2019
Update local comp plans	GMRC	DCA	$1,000	2019-20
Watershed Monitoring and Survey	County, GMRC	319 grant program	$10,000	2020
319 Grant application	GMRC, CCRC&D	NA	NA	2020
Agricultural pond BMPs	CCRC&D, GMRC, NRCS	319 grant program	$25,000	2020
Septic maintenance/ repair campaign	CCRC&D, GMRC, NRCS	319 grant program	$10,000	2020
Crop soil BMP campaign	CCRC&D, GMRC, NRCS	319 grant program	$10,000	2020
Updated Wildlife Survey	TBD	319 grant program	$10,000	2021
Advisory Committee mtg.; Report of Progress	GMRC	NA	NA	2021
Targeted water sampling for delisting	County, GMRC	319 grant program	$20,000	2022

PROGRAM MONITORING, CRITERIA AND MILESTONES

Watershed management plans must include a monitoring component to determine whether progress is being made toward attaining or maintaining the applicable water quality standards. There must be water quality benchmarks to track progress, and the monitoring program should ideally be integrated with the established schedule and interim milestone criteria.

The following have been identified as the general criteria by which progress with the mitigation program shall be measured: *(List presented in no particular order)*

- *Number of Septic Systems Repaired/ Replaced* - Any number of septic systems repaired/ replaced within the watershed is considered positive, with a 5-year goal to see a 25% service rate of those tanks older than/not maintained since 1995.

- *Number of BMPs installed* - This project is dependent on individual participation and likely outside funding assistance, however, any and all projects that do install stormwater runoff-related BMPs within the watershed, particularly among agricultural properties, would be considered a positive. Pending survey results of existing BMPs employed, the ambition will be to see 5 improvement projects within 5 years.

- *Material distributed* - Once appropriate education material has been identified the objective will be to have a coordinated distribution push of the WMP, education material, and promotion of the EQIP program as a bundle. This measurable will be evaluated based upon the number of stakeholder groups contacted and the number of events reached for promotion.

- *Field observation results* – In 2020, an additional comprehensive field survey will be conducted to review any possible changes within the watershed. Those observations will be compared with notes from this planning process to determine if amendments are needed to the WMP or for any visible progress in watershed conditions.

- *Water quality testing* - As the penultimate goal remains restoration of water quality, sampling and testing will be done after implementation of the mitigation program to determine the updated status of the Chattahoochee watershed.

Part of this planning process also includes the development of interim, measurable milestones to gauge progress in implementing the mitigation program for the watershed. Each of these will represent the completion of a significant phase in the mitigation program, meaning one of the program elements can be considered “tied off” and remaining efforts may focus on other tasks.

- ✓ Complete promulgation of WMP/ Distribution of educational materials
- ✓ Complete and share updated septic system map and database
- ✓ Establishment of White County Environmental Advisory Council
- ✓ Successful for 319 grant funding
- ✓ Progress Report delivered to Counties and EPD annually

The methodology used in monitoring progress against these criteria and milestones will be a combination tasks performed by the GMRC, with support from the Counties and the Advisory Committee members, followed by the eventual water sampling and testing to be done between 3 and 5 years out from completion of the WMP.

In addition to performing several action items directly, the GMRC staff will follow up, at least annually, with the various parties responsible for implementing the recommended mitigation measures. The results of these communications will be provided to the Advisory Committee for consideration and comment. If new action is needed that will be added to the WMP mitigation program, and the summary of each annual review will be shared with the Counties and EPD.

Additionally, the GMRC and the County will seek reconvene the Advisory Committee by fall of 2020 to consider an application for 319 grant funding (and other outside assistance). At this time the initial round of milestones should have been completed and the Advisory Committee can review the results of the septic system inventory and BMP survey, and explore in more detail the proposed work scope for the grant as well as new sampling methodology.

Lastly, the GMRC will work with the Advisory Committee in developing a Sample Quality Assurance Plan (SQAP) and general monitoring strategy both for updated bacterial conditions and with plans for possible delisting. This will be pursued at the recommendation of the Advisory Committee, when they feel enough progress has been made to warrant new samples.

APPENDICES

A. USEPA Guidelines for Watershed Planning

APPENDIX A - USEPA Guidelines for Watershed Planning

GA EPD recommends that the Watershed management plan include the following elements to comply with USEPA Guidelines (9 Key Elements):

1) An identification of the sources or groups of similar sources contributing to nonpoint source pollution to be controlled to implement load allocations or achieve water quality standards. Sources should be identified at the subcategory level (with estimates of the extent to which they are present in the watershed;

2) An estimate of the load reductions expected for the management measures described under paragraph (3) below;

3) A description of the NPS management measures that will need to be implemented to achieve the load reductions established in the TMDL or to achieve water quality standards;

4) An estimate of the sources of funding needed, and/or authorities that will be relied upon, to implement the plan;

5) An information/education component that will be used to enhance public understanding of and participation in implementing the plan;

6) A schedule for implementing the management measures that is reasonably expeditious;

7) A description of interim, measurable milestones (e.g., amount of load reductions, improvement in biological or habitat parameters) for determining whether management measures or other control actions are being implemented;

8) A set of criteria that can be used to determine whether substantial progress is being made towards attaining water quality standards and, if not, the criteria for determining whether the plan needs to be revised; and;

9) A monitoring component to evaluate the effectiveness of the implementation efforts, measured against the criteria established under item (8).