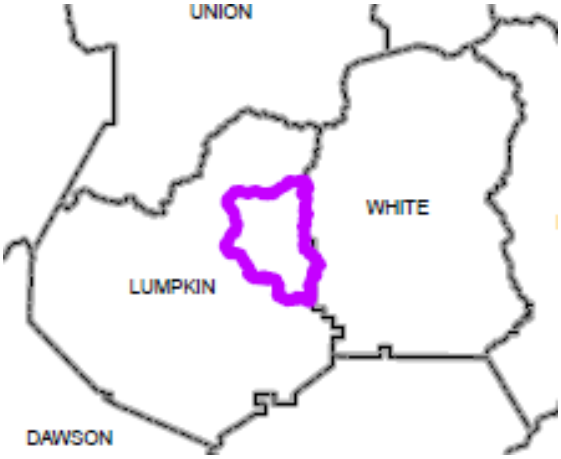
2014 WATERSHED MANAGEMENT PLAN

UPPER CHESTATEE WATERSHED



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2014 WATERSHED MANAGEMENT PLAN
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UPPER CHESTATEE WATERSHED

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INTRODUCTION

PURPOSE

This document is the Watershed Management Plan (WMP) for the identified segment of the Chestatee 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 Chestatee River has a beneficial water use classification of fishing 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 use and the TMDL for the Chestatee 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 a portion of the Chestatee River headwaters. 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 Chestatee River watershed.

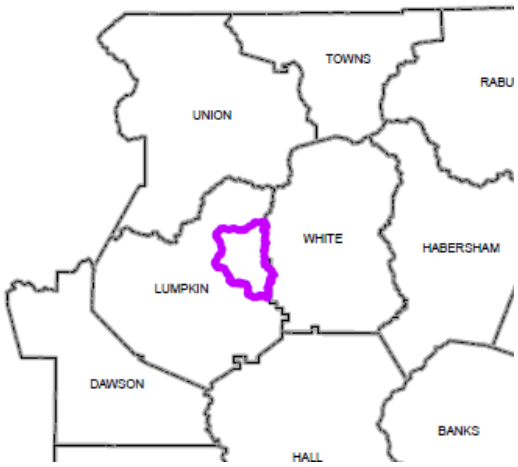
As part of the watershed planning directed by EPD, documents such as this are to include the *Nine Key Elements* (see below) as recommended by the U.S. Environmental Protection Agency (EPA). The nine elements are recommended to ensure the propriety of the assessment, a minimum of stakeholder involvement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

This project focuses on an 7 mile segment of the Chestatee River from its origins at Tate Creek to the confluence with Tesnatee Creek. The watershed that drains this area encompasses _____ and includes parts of Lumpkin County and White County. (Due to the small amount of White County featured, some of the discussion will simply reference Lumpkin County.) The mostly rural drainage area is a small part of the HUC 0313000105 watershed. Land use in the drainage is predominately low-density residential and agricultural activity. Small areas of commercial activity are located throughout.



This segment of the river was listed on the Georgia 303 (d) list of impaired water bodies due to high fecal coliform readings obtained during sampling events in 2002 and 2003. In 2013, the Georgia EPD revised TMDLs for select impaired stream segments in the Chattahoochee River Basin, including this stretch of the Chestatee River.

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 32 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;
- Perform water sampling to gauge the current level of contamination;
- Produce the final WMP.

Location Map

WATERSHED PROFILE

WATERSHED LOCATION AND GENERAL DESCRIPTION

The watershed for the part of the Chestatee River being reviewed in this report is located within Lumpkin and White Counties, GA. The stretch of the main artery of the Chestatee in this watershed runs roughly from the north to the south, approximately halfway between the cities of Dahlonega (to the west) and Cleveland. The particular drainage basin features various land uses and development types. Most of the watershed is considered rural, made up of forest and agricultural lands. It is also a predominantly hilly terrain and many small valleys with very steep slopes.

The Chestatee River is the second largest river feeding into Lake Lanier, the primary water resource for metropolitan Atlanta. To the north it is a popular watershed for fishing and scenic hikes, and south of Dahlonega it becomes a popular resource for recreation, including tubing and kayaking, swimming and scuba diving and occasionally gold mining.

Because of these roles and the size (annual average flow of 400 cubic feet per second (cfs) or more)of the river the Chestatee is one of several waters throughout the State designated as a Protected River by the Georgia Department of Natural Resources (DNR). The primary focus of this status concerns the river from its confluence with Yahoola Creek to its terminus at Lake Lanier. It is highly likely that the intended natural buffer along the Chestatee River protected river corridor can be retained and that only a few areas show the natural vegetation non-existent in the corridor.

However, retaining downstream water quality also entails proper management upstream, within the target watershed for this WMP. Both Counties and the EPD recognize that maintaining the health of the entire river and its ecosystem is best served by applying best practices throughout the entire watershed, especially in the headwaters as the smaller, more susceptible streams come together to form the river.

As part of this significance, and regarding the overall monitoring of the health of the Chestatee River, the primary testing site lies south of the target watershed near Dahlonega. This information is useful in gauging the overall profile of the river and the watershed as a whole.

USGS 02333500 - Chestatee River, near Dahlonega, Ga

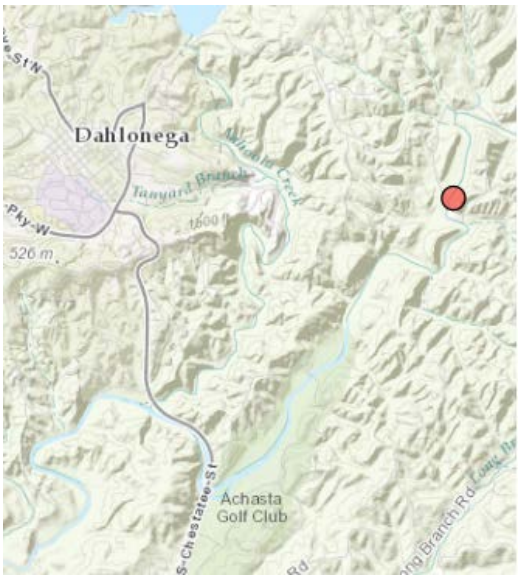
Chestatee River	Latitude:	34°31'41"		Percentile*:	42.69 %
Lumpkin County, Georgia	Longitude:	83°56'23"		Class symbol:	
Hydrologic Unit: **03130001**	Datum of gage:	1,128.60		% normal (median):	91.95 %
Drainage area: *153 mi²*	Discharge:	200.70 cfs		% normal (mean):	77
	Date:	Nov. 2014		NAD83	
	No. of days:	30		NGVD29	

According to the USGS web site, streamflow **percentile** is a value on a scale of one hundred that indicates the percent of a distribution that is equal to or below it. For example, on the map of daily streamflow conditions a river discharge at the 90th percentile is equal to or greater than 90 percent of the discharge values recorded on this day of the year during all years that measurements have been made. Generally speaking, streamflow percentiles are considered as follow:

- Greater than the 75th percetile is considered *above normal*
- Between 25th and 75th percentiles is considered *normal*
- Less than the 25 percentile is considered *below normal*

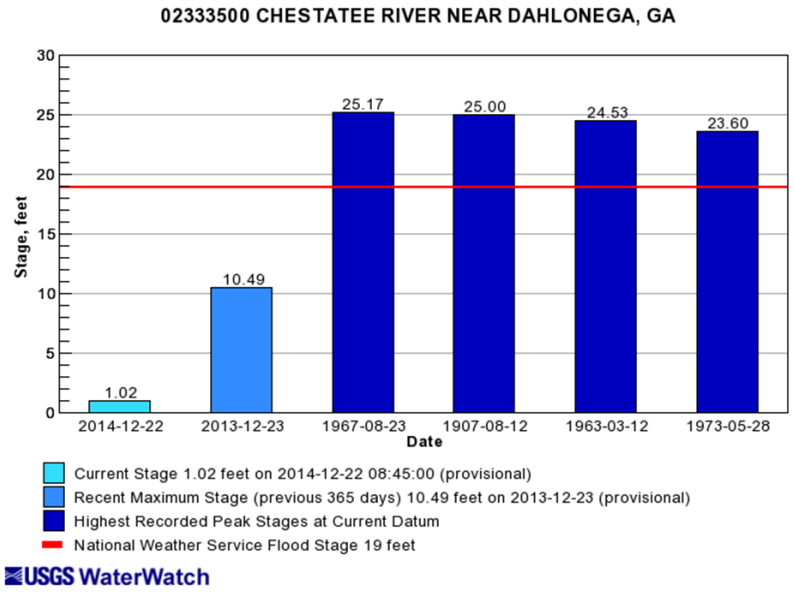
In some hydrological studies, particularly those related to floods, a variation of the percentile known as the "percent exceedance" is used. It is simply obtained by subtracting the percentile scale value from 100 percent. For example, a discharge at the 75th percentile is the same as a discharge at the 25th percent exceedance (100-75=25).

The flow category “Low” indicates that the estimated streamflow is the lowest value ever measured for the day of the year. Similarly, the flow category “High” indicates that the estimated streamflow is the highest value ever measured for the day of the year.



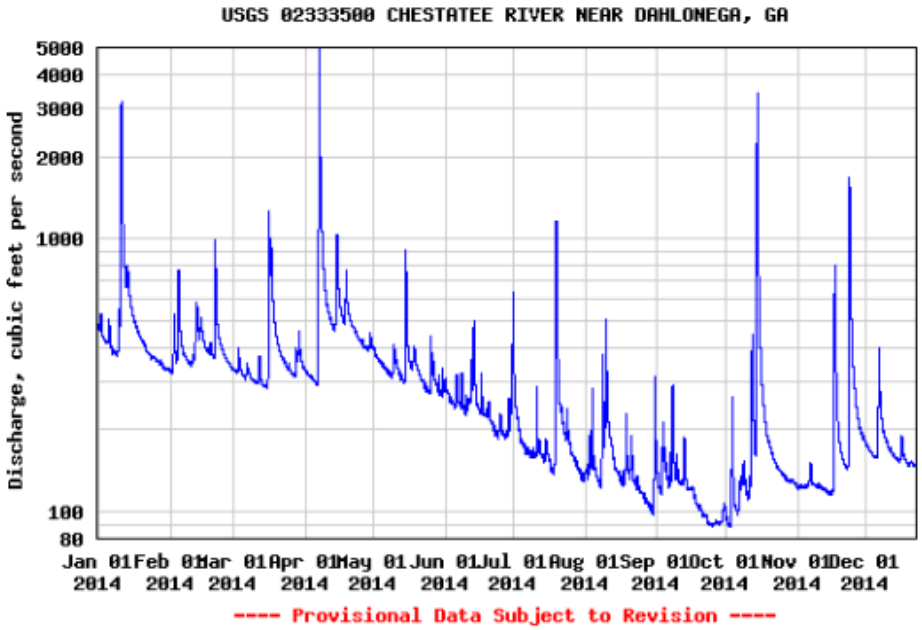
Because of the river’s location, elevation and topography, the Chestatee is a comparably cool river with a high volume of breaks and whitewater. This aids in how the stream will process silt and contaminants as well as aiding its scenic value. Even the smaller sections and tributaries within the headwaters tend to wind around hills and through smaller valleys and ravines reminiscent of larger, wilder mountain waters.

This also lends the Chestatee to easier contamination in some situations, however, as the sloping terrain and woody forests foster strong runoff conditions during even mild rainfalls. This means waste and other elements resting on topsoil are readily washed into the surface waters within the Appalachian Mountains and its foothills.



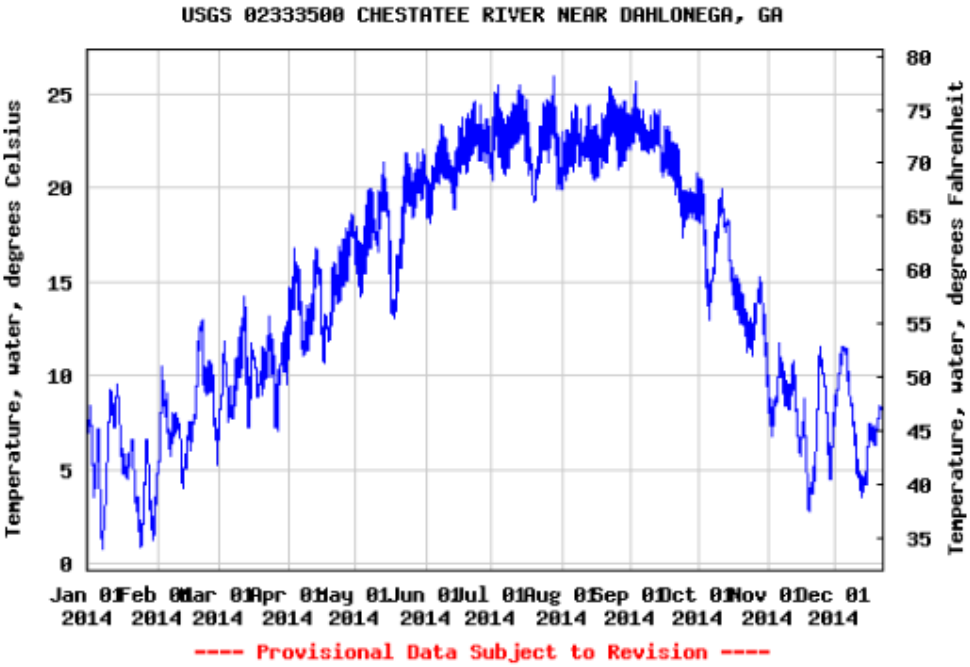
Discharge, cubic feet per second

Most recent instantaneous value: 147 12-22-2014 09:45 EST



Temperature, water, degrees Celsius

Most recent instantaneous value: 8.2 12-22-2014 09:45 EST



NATURAL FEATURES AND CONDITIONS

(Much of this material has been taken from, or referencing, the Lumpkin county Comprehensive Plan)

Weather and Climate

The climate of Lumpkin County is strongly influenced by the rugged mountainous terrain, meaning the summers are mild and winters are cold. Generous precipitation also occurs throughout the year with heavier amounts in winter and early spring.

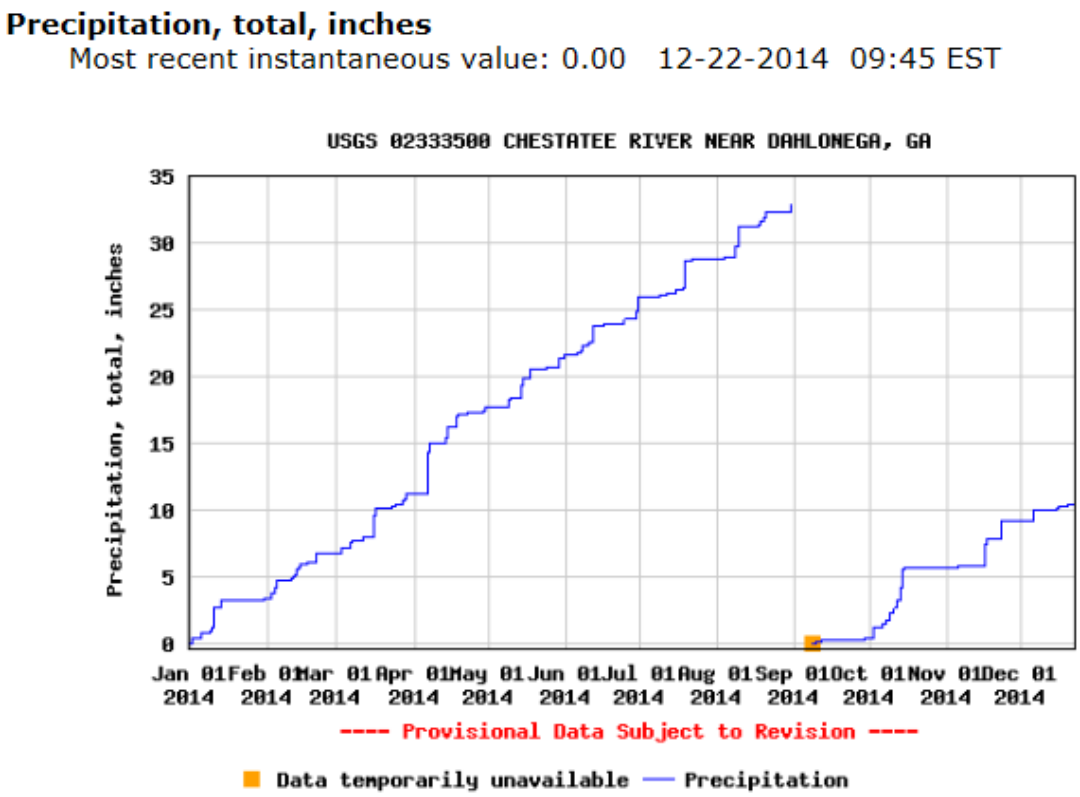
Summer temperatures are usually pleasant, with an average summer minimum is 63.6°F. Afternoon highs are normally in the mid 80's to near 90°F or higher on less than one-third of the days. Readings as high as 100°F, are very rare. The highest temperature of record is 103°F in July, 1952. The temperature drops sharply after sunset, reaching the mid to low 60's by early morning.

Winters are moderately cold but not severe. Early morning temperatures are below freezing on about 3 out of 5 days from December through February and on almost one-third of the days in November and March. Two years out of 3 have one or more days with a minimum under 10°F and an occasional strong cold wave will bring readings of zero, or below, for short periods. The lowest temperature of record is -11°F in February, 1899.

The mountainous terrain results in large differences in minimum temperatures over the area. On clear, still nights radiationally cooled air drains down the slopes and into the valleys to produce cold air pockets. Under extreme conditions, early morning temperatures may be 10°F to 15°F lower in the valleys than on nearby slopes. The orientation of a slope or hill may also influence its temperature regime. A south-facing slope receives more radiation than one facing north and may have a significantly warmer microclimate.

Except during the coldest weather, winter days normally warm to the 50's with some readings in the 60's each year. The average maximum for the three winter months is 51.8°F. The weather is quite variable in spring with several rainy periods likely, especially in March and early April. Sunny weather with mild days and cool nights are typical of fall. The average dates of the last spring and first fall freezing temperatures are April 8 and November 1, respectively, giving an average freeze-free growing season of 207 days. The last spring freeze has occurred as early as March 13, and as late as May 2. The date of the first fall freeze has ranged from September 30 to December 2.

Annual precipitation averages 62 inches but has varied from 86.12 inches in 1929 to only 39.22 inches in 1904. Winter and spring are the rainiest seasons with a secondary maximum in mid-summer of more than 5 inches. Autumn is normally the driest part of the year but even October, the driest month, averages almost 3.5 inches. Calendar month extremes for precipitation are 20.62 inches in December 1932 and zero in October 1963. Snowfall contributes to winter precipitation during more than half the years. One of the snowiest winters of record was 1935-36 when 21 inches fell from December through February.



Physiography

Lumpkin County lies within two physiographic provinces: the Blue Ridge Province, Southern Blue Ridge Section; and the Piedmont Province, Southern Piedmont Section, Upland Georgia Sub-section. The northern section of the County lies within the Blue Ridge Mountains District, which is characterized by a mass of rugged mountains, and ridges ranging in elevation from 3500-4700 feet in the north and east of the district to 3000-3500 feet in the southwest of the district. The southern boundary of the Blue Ridge abuts the Piedmont Province at approximately the 1700-foot elevation where a sharp change in regional slope occurs. The highest elevation in Lumpkin County is found at Blood Mountain, which is 4,400 feet high. The lowest elevation is found where the Etowah River leaves the county in the southeast corner.

Approximately three-quarters of Lumpkin County lies in three districts of the Piedmont Province. The majority of the county is found in the Dahlonega Upland District. This district is characterized as being rough and hilly in the northeastern portion with stands from 1500-1700 feet above sea level.

Land Cover

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 rainfall are principal natural factors controlling the vegetation of the area, giving shape to the local ecosystem and conditions impacting runoff.

The upper Chestatee River watershed is a heavily wooded area that includes part of the Chattahoochee National Forest. Much of the terrain 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 in areas 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.

Land Cover, 2008 – Chestatee River

89.10%	Forest
4.80%	Pasture, Hay
4.50%	Other Grasses (Urban, parks, lawns…)
0.60%	Transitional
0.40%	Low Intensity Residential
0.30%	Bare Rock, Sand, Clay
0.10%	Open Water
0.10%	Woody Wetlands
0.05%	High Intensity Residential
0.01%	High Intensity Commercial, Ind., Transp.
0.00%	Row Crops
0.00%	Emergent Herbaceous Wetlands
0.00%	Quarries, Strip Mines, Gravel Pits
40,141	***Total Acres***

This data comes from the updated TMDL and reflects the larger sub-watershed, stretching from the confluence with Testnatee Creek to all the headwaters of the Chestatee. At this scale the watershed includes a large swath of preserved forest land and only fractions of development or agricultural activity. Reviews of this data suggests wildlife will be a prominent contributor given the low volume of land marked for livestock or row crops and the relatively limited presence of septic systems.

Land Cover, 2013 – Chestatee River – HUC 19729.548267

67.55%	Deciduous Forest
9.53%	Pasture/Hay
7.16%	Other Grasses (Urban, parks, lawns…)
6.88%	Evergreen Forest
3.50%	Mixed Forest
3.46%	Grassland/Herbaceous
0.75%	Shrub/Scrub
0.60%	Developed, Low Intensity
0.28%	Open Water
0.16%	Barren Land (Rock, Sand, Clay)
0.10%	Developed, Medium Intensity
0.02%	Woody Wetlands
0.02%	Developed, High Intensity
24,614.5	***Total Acres***

This data set reflects the 24,000+ acre sub-watershed covering the Chestatee from Testnatee Creek upstream to the point near US 19 where the Chestatee merges with Boggs Creek. This encompasses the bulk of the watershed below the national forest, and as such the prevalence of any man-made development and activity. At this scale the volume of land given over to pasture and managed grasslands is significantly higher, denoting the concentration building as the river winds closer to Dahlonega. Overall developed land remains low, however, reinforcing the theme that urban runoff would be a less likely source of pollution.

Land Cover Map

Steep Slopes

Due to its location in both the Blue Ridge and Piedmont Physiographic Provinces, Lumpkin County has a number of steep sloped mountain ridges, which comprise the magnificent views of the region and pose limitations on development. About 32% of the county is in Chattahoochee National Forest ownership, and therefore about a third of the county's steep slopes receive protection from development. However, the remainder of the steep sloped mountain ridges and other prominent ridges in private ownership are susceptible to development and construction activity. Currently Lumpkin County's Subdivision Regulations are enforced and are designed to limit adverse impacts of development on steep slopes.

Steep slopes in Lumpkin County are illustrated using a digital elevation model (DEM) computer program. Much of the county is covered with steep slopes of more than 30% incline. As development continues in the county, general road construction and even minor subdivision road construction in these steep sloped areas need to follow if at all possible the original hydrological layout of the land to avoid damaging development and construction. Concerted efforts between public and private sectors will be needed in order to reach a practical balance between development activity and preservation of these unique and environmentally sensitive steep slopes.

Soil Types

An analysis of the types of soils in Lumpkin County and their suitability for certain land uses is an important component of managing resources and development. Lumpkin County has a broad range of silts, which are listed by symbol and name in the following table, along with the limitations of each soil type on dwelling foundations, septic tank utilization, and commercial structures.

Limitations of Soils in Development, 2006

Lumpkin County	Acres	Percentage of Total County Acreage
Total Hydric Soils	6,670	3.6%
Total Prime Agricultural Soils[1]	20,515	11%
Total Soils with 25% slope or more	65,340	35.1%
Total Soils Suitable for Septic Tanks[2]	28,415	15.3%
Total Soils Suitable for Commercial Structures[2]	24,755	13.3%

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 Lumpkin 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		
TdG	Tallapoosa soils	25-70	Se	Se	Se	14.5
HIE	Hayesville sandy loam		M to Se	Se	Se	11.4
FaE	Fannin fine sandy loam	10-25	M to Se	Se	Se	5.9
MCG	Musella cobbly loam	25-70	Se	Se	Se	5.2
WgD	Wickham fine sandy loam	10-25	M to Se	Se	M to Se	3.5
AEF	Ashe/Edneyville stony loam	25-60	Se	Se	Se	3.4
MCE	Musella cobbly loam		Se	Se	Se	3.4
RaE	Rabun loam	15-25	M	Se	Se	3.0
EPF	Edneyville/Porters loam	25-60	Se	Se	Se	2.9
FaC*	Fannin fine sandy loam	6-10	Sl	M	M	2.5
HLD	Hayesville/Rabun loams	10-15	M	Se	Se	2.4
AcG	Ashe stony loam	60-90	Se	Se	Se	2.3
RbE3	Rabun clay loam	15-25	Se	Se	Se	2.0
TlD	Tusquitee loam	10-25	M to Se	Se	M to Se	2.0
HIC*	Hayesville sandy loam	6-10	Sl	M	M	1.9
HJE3*	Hayesville sandy clay loam	10-25	Se	Se	Se	1.9
MuE2	Musella gravelly clay loam	10-25	M to Se	Se	Se	1.9
Toc*(**)	Toccoa soils	0-2	Se	Se	Se	1.7
RbD3	Rabun loam	15-25	M	Se	M	1.6
Cac**	Cartecay complex	0-2	Se	Se	Se	1.5
FbE2	Fannin sandy clay loam	10-25	Se	Se	Se	1.4
EPE	Edneyville/Porters loam	15-25	Se	Se	Se	1.3
HKC3	Hayesville/Rabun clay loam	6-10	Sl	M	M	1.3
TmF	Tusquitee stony loam	25-60	Se	Se	Se	1.3
HSD*	Hiwassee loam	10-15	M	M	M	1.2
TbE	Tallapoosa cobbly fine sandy loam	6-25	Se	Se	Se	1.2
TlF	Tusquitee loam	25-60	Se	Se	Se	1.2
HSF	Hiwassee loam	15-40	Se	Se	Se	1.1
TmE	Tusquitee stony loam	10-25	Se	Se	Se	1.1
HSC*	Hiwassee loam	2-10	Sl	M	Sl to M	1.0
TlC*	Tusquitee loam	6-10	Sl	M	Sl	.93
HLC*	Hayesville/Rabun loams	6-10	Sl	M	M	.92
AEE	Ashe/Edneyville stony loam	10-25	Se	Se	Se	.9
Con*	Conagree/Starr soils	0-2	Se	Se	Se	.83
EPG	Edneyville/Porters loam	60-80	Se	Se	Se	.82
FbC2	Fannin sandy clay loam	6-10	Sl	M	M	.80
WgF	Wickham fine sandy loam	25-50	Se	Se	Se	.79
WgF	Wickham fine sandy loam	25-50	Se	Se	Se	.79
EPD	Edneyville/Porters loam	10-15	M	Se	M	.727
CCF	Chandler loam	25-60	Se	Se	Se	.65

Symbol	Soil Name	(% Slope)	Foundation Suitability		Septic Suit-ability	% of County Acreage
			Housing	Commercial		
HJC3*	Hayesville sandy clay loam	6-10	Sl	M	M	.64
MoC2*	Masada fine sandy loam, eroded	6-10	Sl	M	Sl	.59
Roc	Rockland	15-90	*Not Rated*	*Not Rated*	*Not Rated*	.53
WgC*	Wickham fine sandy loam	6-10	Sl	M	Sl	.5
MoB*	Masada fine sandy loam	2-6	Sl	M	Sl	.46
Gul	Gullied land				*Not Rated*	.43
Sta*	Starr fine sandy loam	0-4	Se	Se	Se	.34
Bfs	Buncombe loamy sand	0-6	Se	Se	Se	.28
HLF	Hayesville/Rabun loams	25-60	Se	Se	Se	.26
MoB2*	Masada fine sandy loam, eroded	2-6	Sl	M	Sl	.25
AWB**	Augusta fine sandy loam	2-6	Se	Se	Se	.22
HIB*	Hayesville sandy loam	2-6	Sl	M	M	.19
MoD2*	Masada fine sandy loam, eroded	10-15	M	Se	M	.17
FaB*	Fannin fine sandy loam	2-6	Sl	M	M	.16
AwC	Augusta fine sandy loam	6-10	Se	Se	Se	.14
TcE	Tallapoosa fine sandy loam	10-25	M to Se	Se	Se	.13
Wed**	Wehadkee soils	0-2	Se	Se	Se	.13
BvF	Burton loam	15-50	Se	Se	Se	.05
FcF	Fannin soils	25-60	Se	Se	Se	.03
WnD3	Wickham sandy clay loam	10-15	M	Se	M	.02
WnD3	Wickham sandy clay loam	10-15	M	Se	M	.02
AmC2*	Appling sandy loam	6-10	Sl	M	M	.003

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 Prime Agricultural Lands, Row Crops and Forestry

Of the 59 soil types indicated in the Soil Survey, 18 soil types have been identified with an asterisk (*) as suitable for intensive crop cultivation. The soils most suitable for crop cultivation are found on the less steep slopes (2-10%). Most of the soils in Lumpkin County have limitations for intensive crop cultivation due to the 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 18 soil types are found suitable for intensive crop cultivation, other soil types can be and have been cultivated for crops. Furthermore, many of the soils identified as not being suitable for intensive crop cultivation are suitable for other agricultural uses such as pasture and woodlands (forestry).

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

The vast majority of land areas in Lumpkin County have soils that pose severe limitations to dwelling foundations and septic tank utilization. The Hayesville (HlB, HlC, HJC3, HKC3, HLC) and Masada (MoB, MoB2, MoC2) soil associations have slopes ranging from 2-10% and are most suitable for these uses. Approximately 39,430 acres, or 21.2% of the total County land area, have slight to moderate limitations on dwelling foundations and septic tank utilization. Even less of the County has soils suitable for commercial structures without extensive adjustments. Approximately 24,755 acres or 13.3% of the County has land displaying moderate characteristics of suitability for commercial structures.

Septic Tanks and On-Site Sewage Structures

Prior to the installation of new on-site sewage structures like septic tanks, a land owner/developer must obtain an On-Site Sewage Management Systems Construction Permit (O.C.G.A. 12-8-1, 31-2-2, 31-2-4, 31-2-7). In order to obtain the permit, the County Board of Health shall approve such construction and/or installation. In order for the Board to approve such a permit, a certified soil scientist must provide on-site characteristics (including soil types and capabilities). Currently, these regulations if enforced adequately protect soil and water resources in Lumpkin County.

Soil Erosion

Lumpkin 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.

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, 18 soils types have been identified as prime agricultural soils. There are scattered fragments of prime agricultural soils throughout the county, with one main cluster located in the southwest section of the county, west of SR 9.

Due to the topography of the upper Chestatee watershed and the difficulty in sustaining large water supplies, there has been little agricultural activity in northeast Lumpkin County. 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.

Steep Slopes

Mineral Resources

Lumpkin County contains a variety of mineral resources. Two main areas of the county contain granite and related outcrops: one area is a stretch of land in the southeast section of the county; and the other area is found in the northeast corner of the county, within the upper Chestatee watershed. A small section of granite and related outcrops is found in the northern portion of the county, east and west of SR 60, along the county's boundary.

Gold mining in Lumpkin County has diminished from a large profitable industry to a small industry focused on recreation and tourism. There are two major sites in existence in Lumpkin County for recreational gold mining: In the Etowah River watershed, situated within the physiographic gold belt of Dahlonega, there are approximately 130 acres of land identified for gold, and in the Yahoola Creek watershed, which drains into the Chestatee, is one the richest areas of the gold belt of Dahlonega near Crown Mountain. Similar to the Etowah, the Yahoola site is located on about a one-mile stretch of the Yahoola Creek and its tributaries, and gold mining practices have been shown to damage water quality in the local vicinity. In the Tesnatee/Chesatee River watershed, actually situated across the county line in White County, there are many acres of land used for recreational gold mining. Sedimentation from sites like these cause a visible difference in the turbidity between the upper Chestatee River and the Tesnatee Creek at their confluence inside Lumpkin County.

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.

Special Concern Natural Communities in Lumpkin County as of 2004.

Protection Status	Scientific Name	Common Name
Special concern only	*BARE ROCK/LICHENS, BR NONCALCAREOUS OUTCROP*	Noncalcareous (without calcium carbonate, calcium, or limestone) Outcrop Rock/lichens
Special concern only	*BR SHRUB BALD*	Shrub Bald, Heath Bald (tract of land overgrown with shrubs or coarse herbage)
Special concern only	*HERBACEOUS VEG., BR NONCALCAREOUS OUTCROP*	Noncalcareous Outcrop Herb Community
Special concern only	*SHRUB/SCRUB VEG., BR NONCALCAREOUS OUTCROP*	Noncalcareous Outcrop Shrub/scrub Community

Source: Georgia Department of Natural Resources, Wildlife Resources Division, Georgia Natural Heritage Program, 2004.

Protected Plant & Animal Species in Lumpkin County as of 2004.

Protection Status	Scientific Name	Common Name
	Plants	
GA	*Carex manhartii*	Manhart's Sedge
GA	*Cypripedium acaule*	Pink Ladyslipper
GA	*Cypripedium parviflorum var. pubescens*	Large-flowered Yellow Ladyslipper
GA	*Xerophyllum asphodeloides*	Eastern Turkeybeard
Special concern only	*Aster phlogifolius*	Phlox-leaved Aster
Special concern only	*Calycanthus brockiana*	Brock Sweetshrub
Special concern only	*Calystegia catesbeiana ssp. sericata*	Silky Bindweed
Special concern only	*Carex appalachica*	Appalachian Sedge
Special concern only	*Carex scabrata*	Sedge
Special concern only	*Corydalis sempervirens*	Pale Corydalis
Special concern only	*Herpetineuron toccoae*	A Moss
Special concern only	*Hypericum buckleii*	Blue Ridge St. Johnswort
Special concern only	*Juncus gymnocarpus*	Naked-fruit Rush
Special concern only	*Paronychia argyrocoma*	Silverling
Special concern only	*Penstemon smallii*	Small's Beardtongue
Special concern only	*Rhus typhina*	Staghorn Sumac
Special concern only	*Silene ovata*	Mountain Catchfly
Special concern only	*Trillium simile*	Sweet White Trillium
	Animals	
US	*Etheostoma etowahae*	Etowah Darter
US	*Etheostoma scotti*	Cherokee Darter
GA	*Cyprinella callitaenia*	Bluestripe Shiner
GA	*Etheostoma brevirostrum*	Holiday Darter
GA	*Notropis hypsilepis*	Highscale Shiner
GA	*Percina sp. cf. macrocephela*	Muscadine Darter
Special concern only	*Etheostoma rupestre*	Rock Darter
Special concern only	*Eumeces anthracinus*	Coal Skink
Special concern only	*Ichthyomyzon gagei*	Southern Brook Lamprey
Special concern only	*Micropterus cataractae*	Shoal Bass
Special concern only	*Neotoma floridana haematoreia*	So. Appalachian Woodrat
Special concern only	*Notropis chrosomus*	Rainbow Shiner
Special concern only	*Notropis stilbius*	Silverstripe Shiner
Special concern only	*Percina palmaris*	Bronze Darter
Special concern only	*Phenacobius catostomus*	Riffle Minnow
Special concern only	*Scartomyzon lachneri*	Greater Jumprock
Special concern only	*Sorex hoyi*	Pygmy Shrew

Source: Georgia Department of Natural Resources, Georgia Natural Heritage Program, 2004.

The following paragraphs describe other animals that were acknowledged in the previous Lumpkin County Comprehensive Plan. A summary is provided for each species along with its status.

The *Felis cougar*, commonly known as the Eastern cougar, panther and mountain lion, is a large spotted cat with a small, rounded head and long tail. The Eastern cougar is generally considered extinct while the habitat of the Western cougar has increased and may account for sparse Eastern cougar sightings in northern Georgia. Although the environment may be suitable for cougar habitat, no sightings have been reported in Lumpkin County. However, sightings have been reported in Towns County and within the Warwoman Management Area in Rabun County since 1977.

The Red-Cockaded Woodpecker (*Picoides borealis*) is an endangered species that feeds in the upper regions of large pine trees and nests in over mature pines. Although the species can occur statewide, no sightings have been made in Lumpkin County or in the Georgia Mountains Region. Although no sightings have been made of the woodpecker, the Chattahoochee National Forest management plan will provide habitat protection in the form of reducing habitat fragmentation in the forest.

The Southern Bald Eagle *(Haliaeetus leucocephalus)*, an endangered species, is a bird of inland waterways and estuarine systems. It requires wetland areas for hunting and has declined in population due to habitat destruction. No sightings have been made in Lumpkin County, but a few sightings have been made in the Georgia Mountains Region.

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 is a native species to the State of Georgia. Warm water species of fish, often found in lakes and larger, warmer streams, include largemouth and smallmouth bass, white bass, channel catfish, bluegill, and walleye.

Soils map

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. Lumpkin County contains four (4) 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, Lumpkin County entered the National Flood Insurance Program (NFIP) in 2002. Flood plains located in Lumpkin 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 Lumpkin County will be remapped and updated under a program called Map Modernization.

ESA MAP

ANTHROPOGENIC FEATURES

Governmental Boundaries

The watershed is almost exclusively within northeastern Lumpkin County, with much of the watershed boundary forming the County boundary, as well. A small portion (~ 2%) lies within southwestern White County, next to the equally-impaired Towns Creek/Testnatee Creek watershed.

The watershed does not feature any municipalities or any other geopolitical boundaries.

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 compared to other communities. Similarly, fields available for livestock are neither large nor available in volume.

A review of aerial imagery suggests there are 14 poultry houses within the watershed, 6 of which are clustered on one property on US 19 near Moose Creek. However at least three of these appear in disrepair and are not suspected to be in operation, nor was there any evidence found of concentrated dump sites for litter.

The most common structures, based on property records, are simple homes and supporting farm buildings, such as sheds and barns. There are several churches and a small variety of commercial structures, but few (no?) places with expansive parking lots or industrial-scale structures.

Land Use, 2014 – Chestatee River – HUC 19729.548267

54.93%	Vacant/ Undeveloped
17.21%	Agricultural
13.41%	Forested/Conservation
12.00%	Residential
1.76%	Unknown
0.68%	Commercial
24,614.5	***Total Acres***

Using the same sub-watershed as the 2013 Land Cover data, this land use dataset reflects the legal parcel allocation of development. Specifically, this suggests a higher share of land is reserved for agricultural and residential activity, even if not all that land is developed as such. This could indicate a higher volume of lawns, grasses and other fields that are not serving livestock but have been cut and are susceptible to runoff and erosion issues.

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

Utilities and Infrastructure

The upper Chestatee River watershed does not have access to any public sewer and limited access to public water. All of the properties within the watershed rely on a septic system 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.

The following USFS properties include at least some land within the upper Chestatee watershed:

National Park and Recreational Areas	Description/Location	Amenities
Chestatee Wildlife Management Area	Northeast corner of Lumpkin County	Hunting, Fishing, Camping, Hiking, Bird Watching, Picnicking, Horseback Riding
Desoto Falls National Forest	Rugged mountainous area with excellent views and many beautiful waterfalls. Two overlooks provide majestic views of the National Forest. Located approximately 16 mi. north of Dahlonega.	Fishing, hiking, camping
Dockery Lake	Located 11 1/2 mi. north on Georgia 60, then 3/4 mi. northeast on Forest Rd.	Fishing, hiking, camping, picnicking

As part of their involvement with the management of the Chestatee, the Georgia EPD routinely monitors stream data for the Chestatee at 4 points along the river. This does not always include bacterial monitoring but is used to gauge the relative flow, temperatures and clarity of the river, and to provide early indications of needs for additional testing.

Chestatee Watershed - Chattahoochee River Basin – HUC 31300010505

GA EPD Station No	Station Name	Lat./Long.
1201050201	Chestatee River - U.S. Highway 19	**34.6625 83.90111**
1201050202	Chestatee River At Frog Town Road	**34.631943 83.90583**
1201050204	Chestatee River at Town Creek Church Road near Dahlonega, GA	**34.57875 83.887985**
1201050205	Chestatee River - 0.3 Mile U/S Tesnatee Creek nr Dahlonega,	**34.562183 83.87048**

USGS sites

Lying within the Chattahoochee River Basin, the Chestatee is 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 Chestatee 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 Chestatee 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 Chestatee 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/Testnatee Creek watershed and is available to provide assistance within the upper Chestatee 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 Chestatee River is designated for Fishing within the upper watershed and Recreation downstream from its confluence with Yahoola Creek. Each stretch must meet the water quality standards defined for its respective designation.

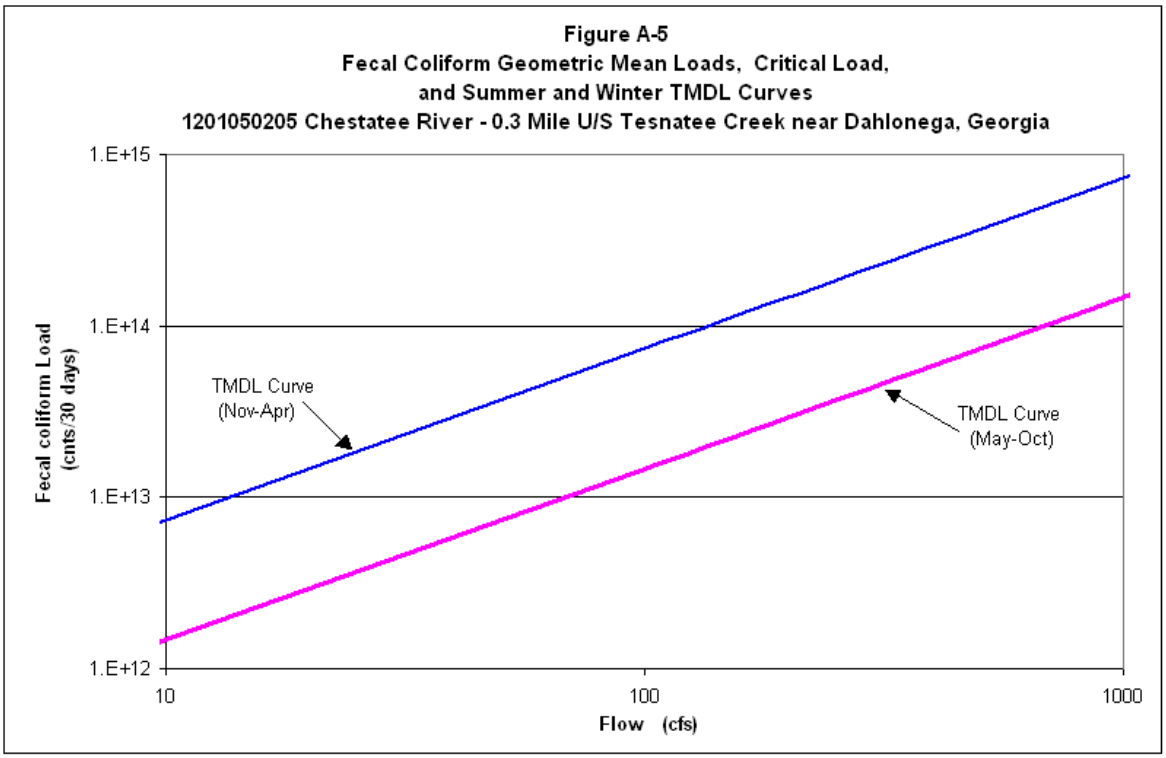
Once designations are made, the State of Georgia assesses its water bodies for compliance with water quality standards criteria established for their designated uses as required by the Federal Clean Water Act (CWA). Assessed water bodies are placed into one of three categories depending on water quality 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.

The upper Chestatee River watershed targeted here has been identified as impaired with regard to fecal colioform bacterial levels permissible under the standards for streams with a designated use of Fishing. A stream is placed on this list if more than 10% of the samples exceed the fecal coliform criteria. Water quality samples collected within a 30-day period that have a geometric mean in excess of 200 counts per 100 milliliters during the period May through October, or in excess of 1000 counts per 100 milliliters during the period November through April, are in violation of the bacteria water quality standard. There is also a single sample maximum criterion (4000 counts per 100 milliliters) for the months of November through April. The samples collected for the Chestatee included several large counts (spikes), including 2 in the 1,000's per 100ml, that triggered the threshold measure.

Figure A-5
Fecal Coliform Geometric Mean Loads, Critical Load, and Summer and Winter TMDL Curves
1201050205 Chestatee River - 0.3 Mile U/S Tesnatee Creek near Dahlonega, Georgia



Date	Observed Fecal Coliform (counts/100 ml)	Estimated Instantaneous Flow On Sample Day (cfs)	Geometric Mean (counts/100 ml)	Mean Flow (cfs)	Geometric Mean Fecal Coliform Loading (counts/30 days)	Geometric Mean TMDL Fecal Coliform Loading (counts/30 days)
Date	Fecal	Q	Geomean	Mean Flow	Current TMDL	TMDL
3/6/2002	20	92.4				
3/13/2002	800	133.7				
3/20/2002	40	89.9				
3/27/2002	700	114.4	145.5	107.6	1.15E+13	7.90E+13
6/5/2002	16000	96.9				
6/17/2002	70	49.5				
6/19/2002	90	46.6				
6/26/2002	20	45.0	211.9	59.5	9.25E+12	8.73E+12
9/9/2002	20	20.4				
9/16/2002	300	183.9				
9/23/2002	230	122.6				
9/30/2002	170	79.7	123.8	101.7	9.24E+12	1.49E+13
12/3/2002	20	83.4				
12/10/2002	20	119.4				
12/17/2002	20	138.6				
12/19/2002	50	127.5	25.1	117.2	2.16E+12	8.60E+13
3/20/2003	790	320.4				
3/26/2003	20	162.7				
4/9/2003	40	198.6				
4/17/2003	130	159.0	95.2	210.2	1.47E+13	1.54E+14
6/18/2003	230	416.9				
6/25/2003	70	163.9				
6/30/2003	300	154.1				
7/9/2003	80	194.6	140.2	232.4	2.39E+13	3.41E+13
9/15/2003	90	97.3				
9/22/2003	300	244.4				
10/1/2003	110	89.5				
10/6/2003	130	83.0	140.2	128.5	1.32E+13	1.89E+13
12/9/2003	20	101.4				
12/15/2003	80	165.9				
12/17/2003	5000	164.3				
12/22/2003	65	120.2	151.0	137.9	1.53E+13	1.01E+14
12/17/2003	5000	164.3	**5000.0**	**164.3**	**6.03E+14**	**1.21E+14**

Due to these scores the Chestatee has been placed onto the list of impaired waters and has been included within the streams for which EPD has developed a TMDL. According to that document, the critical stretch of the upper Chestatee requires a load reduction of approximately 80%. As this particular watershed also does not contain any known, permitted discharges into area streams the possible sources of bacterial infiltration must come from a variety of non-point sources.

Current Load (counts/ 30 days)	**TMDL Components**					**Percent Reduction**
	Counts/ 30 days)	**WLAsw (counts/ 30 days)**	**LA (counts/ 30 days)**	**MOS (counts/ 30 days)**	**TMDL (counts/ 30 days)**	
6.03E+14	**-**	**-**	**1.09E+14**	**1.21E+13**	**1.21E+14**	**80**

WATERSHED ASSESSMENT

VISUAL FIELD SURVEY

Assessment of the watershed was done throughout the 1.5 years of the project, involving GMRC staff touring the watershed, 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.

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, and there were a couple chicken houses seen, as well. This particular part of the state, nestled near the Chattahoochee National Forest, is also thick with wildlife, and there were several wooded properties marked to indicate the use as a hunting preserve.

Overall the river appeared in good condition. The slopes and desires for privacy in the area have apparently helped keep points of routine intrusion to a minimum, as the majority of the river itself looked undisturbed. Despite this being the start of the river, it is fed by many strong creeks that the main artery is considerably wide and strong, with many points of rapids and shoals and an abundance of tree cover. Litter here is at a minimum, and while there were some instances of homes built in close proximity to the river banks the general threat of encroachment seemed very low.

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>
Livestock & Leaking septic systems
Wildlife
Urban Dev/ Runoff

LAND USE

TARGETED MONITORING RESULTS

New rounds of water sampling is performed as part of any watershed assessment in order to obtain current water quality conditions for comparison to the original TMDL data, and to possibly identify variances across sampling points throughout the watershed. As part of this two-step planning process for the Chestatee, staff from the GMRC performed basic water sample collection and testing focusing exclusively on the targeted watershed. Using Adopt-A-Stream guidelines and recommended materials, GMRC staff performed in-house testing to monitor bacterial levels for each water sample.

Sampling locations were identified based on accessibility at road crossings and to represent points that could indicate the influence of the tributaries and various parts of the watershed. Specific sampling locations and GPS coordinates for each site are listed below. Only two of the sites noted featured any sign of regular access to the river at these points, but both spaces also featured "No Trespassing" signs and the access did not appear egregious or causing significant damage to the river banks.

Between May 1 and September 30, 2011, GMRC staff collected samples at 4 previously identified sampling sites within the Chestatee River watershed. Specific sampling locations and GPS coordinates for each site are listed below. Samples were collected on the upstream side of the bridges and road crossings.

Sampling Stations			
Station Number	**General Location**	**Sampling Site Coordinates**	**Sample Parameters**
2	Town Creek Church Road near Hemlock Dr.. (tributary)	X - -83.881433 Y – 34.588477	*E. coli*
3	Town Creek Church Road	X - -83.887984 Y – 34.578811	*E. coli*
4	Town Creek Church Rd, south of main artery (tributary)	X - -83.888981 Y – 34.57406	*E. coli*
5	Cavender Creek Rd. and Grindle Bridge Rd.	X - -83.870451 Y – 34.562249	*E. coli*

Sampling Dates and Conditions - 2011

	Date	**5/21/11**	**7/9/11**	**8/20/11**	**9/17/11**
	Time	10AM – 12PM	10AM – 12PM	10AM – 12PM	10AM – 12PM
	Temp				
1	***Air***	**77.2**	**78.3**	**81.4**	**59.6**
	Water	72.6	74.1	74.7	72.1
2	***Air***	**77.2**	**78.3**	**81.4**	**59.6**
	Water	71.9	73.7	74.1	71.2
3	***Air***	**77.3**	**78.5**	**81.3**	**59.7**
	Water	72.3	73.9	74.6	71.9
4	***Air***	**77.0**	**78.1**	**81.4**	**59.4**
	Water	71.7	73.5	73.9	70.0
	Conditions	Lt. clouds	Clear	Cloudy	Lt. clouds

A second round of sampling was done between February 1 and October 30, 2014, GMRC to provide additional information and to account for some different sampling points.

Sampling Stations			
Station Number	**General Location**	**Sampling Site Coordinates**	**Sample Parameters**
5	Damascus Church Road, Near Jim Crow Road.	X - -83.542116 Y – 34.375444	*E. coli*
1	Town Creek Church Road, near Hemlock Dr. (tributary)	X - -83.881433 Y – 34.588477	*E. coli*
2	Town Creek Church Road	X - -83.887984 Y – 34.578811	*E. coli*
3	Town Creek Church Rd, south of main artery (tributary)	X - -83.888981 Y – 34.57406	*E. coli*
4	Cavender Creek Rd. and Grindle Bridge Rd.	X - -83.870451 Y – 34.562249	*E. coli*

Sampling Dates and Conditions - 2014

	Date	**2/21/14**	**4/18/14**	**5/26/14**	**7/1/14**	**9/1/14**	**10/23/14**
	Time	12PM – 2PM	10AM – 12PM	12PM – 2PM	12PM – 2PM	12PM – 2PM	12PM – 2PM
	Temp						
1	***Air***	**53.1**	**52.7**	**73.0**	**82.2**	**83.6**	**58.4**
	Water	54.3	54.8	65.7	70.1	71.8	56.6
2	***Air***	**53.2**	**52.9**	**73.1**	**82.2**	**83.6**	**58.5**
	Water	54.3	54.9	65.9	70.2	71.9	56.7
3	***Air***	**53.4**	**53.1**	**73.2**	**82.4**	**83.8**	**58.6**
	Water	54.6	55.1	65.9	70.6	72.2	56.9
4	***Air***	**53.4**	**53.2**	**73.5**	**82.7**	**84.1**	**58.8**
	Water	54.4	55.0	66.0	70.5	72.1	56.9
5	***Air***	**53.6**	**53.5**	**73.7**	**83.0**	**84.2**	**59.0**
	Water	54.6	55.2	66.0	71.0	72.6	57.1
	Conditions	Cloudy	Lt. clouds	Lt. clouds	Lt. clouds	Lt. clouds	Lt. clouds

Precipitation notes: There was approximately 1” of rainfall that accumulated the 24 hours before the samples were taken on February 21. There was also less than .5” of rainfall each time within 24 hours before the samples were collected on July 1 and September 1.

The waters were noticeably colder during the 2014 sampling due to a much cooler and wetter winter. Two prominent snow storms at the beginning of January and February made an impact on residual ground moisture and temperature in addition to providing some cooler precipitation to feed the streams and rivers.

Sampling Locations

Raw Petrifilm Counts

Site #	Draw Date	Sample Number			Average
		1	2	3	
1	**5/21/11**	2	1	2	1.67
	7/9/11	3	1	1	1.67
	8/20/11	2	0	1	1.00
	9/17/11	1	3	1	1.67
	2/21/14	2	2	1	1.67
	4/18/14	1	2	1	1.33
	5/26/14	1	0	3	1.33
	7/1/14	1	1	2	1.33
	9/1/14	3	2	3	2.67
	10/23/14	1	1	2	1.33
2	**5/21/11**	3	3	2	2.67
	7/9/11	2	1	2	1.67
	8/20/11	5	3	2	3.33
	9/17/11	4	2	4	3.33
	2/21/14	3	1	2	2.00
	4/18/14	3	3	0	2.00
	5/26/14	4	5	2	3.67
	7/1/14	2	3	2	2.33
	9/1/14	4	3	1	2.67
	10/23/14	3	1	3	2.33
3	**5/21/11**	2	2	2	2.00
	7/9/11	3	1	3	2.33
	8/20/11	3	0	1	1.33
	9/17/11	0	2	1	1.00
	2/21/14	1	3	0	1.33
	4/18/14	0	1	2	1.00
	5/26/14	1	3	1	1.67
	7/1/14	3	0	4	2.33
	9/1/14	1	3	2	2.00
	10/23/14	1	2	2	1.67
4	**5/21/11**	4	1	4	3.00
	7/9/11	3	2	2	2.33
	8/20/11	6	4	5	5.00
	9/17/11	3	6	4	4.33
	2/21/14	1	2	3	2.00
	4/18/14	5	3	3	3.67
	5/26/14	3	3	3	3.00
	7/1/14	5	3	4	4.00
	9/1/14	2	4	1	2.33
	10/23/14	1	2	2	1.67

**=No Sample Collected*
TNTC=Too Numerous to Count

Site #	Draw Date	Sample Number			Average
		1	2	3	
5	*Not pulled in 2011*				
	2/21/14	3	2	3	2.67
	4/18/14	2	2	1	1.67
	5/26/14	3	1	3	2.33
	7/1/14	2	3	3	2.67
	9/1/14	2	0	4	2.00
	10/23/14	2	3	2	2.33

Summary	**Summary of Averages**			**Individual Counts**	
Site#	**Avg.**	**Low**	**High**	**High**	**# > 3**
1	**1.57**	1.00	2.67	3	0
2	**2.60**	1.67	3.67	5	6
3	**1.67**	1.00	2.33	4	1
4	**3.13**	1.67	5.00	6	11
5	**2.28**	1.67	2.67	4	1
Total	**2.25**				

Preliminary results of water sampling reveal no discerning trend in contaminant levels. The main arteries of the river appear to harbor higher levels of bacteria, but no specific spikes or high marks were noted during this early sampling.

Of the sampling sites involved Site # 4 featured the highest average and the highest individual counts as a result of this approach. However, niether of these figures were high enough to warrant serious concern based on results alone, as counts above 3 are considered cautionary and counts above 7 are considered more critical. Sample site #2 revealed the next highest scores but again nothing alarming or extraordinary. Overall the results did not reveal any hot-spots nor did they indicate that the streams were under severe contamination.

Of note also from these test results was the absence of any samples that produced tests of “Too Numerous to Count.” This is considered a good thing and perhaps an indication that with the absence of any large, outlying figures the overall health of the streams may be balancing out. This would support the notion that the original testing data was greatly influenced by 2 scores that likely coincided with 1-time events that dumped significant amounts of waste and/or bacteria into the streams, such as a septic leak or a severe rain washing over a heavily populated pasture.

It is possible that subsequent actions have since provided some remediation to the watershed, which is not atypical given the lag time between the development of a TMDL and the implementation of the resulting plan. For the past several years agricultural activity has been in decline throughout the watershed and much of the Georgia Mountains region, at least providing some relief from one prominent source of waste production.

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.

While both Counties currently provide a modicum of leadership and support to stakeholders in this area, there is no singular existing body designed to discuss and champion local environmental concerns within White or Lumpkin County. This means an advisory council to help guide efforts concerning the Chestatee River must be developed. The following names of people and organizations have been mentioned for participation in this capacity, and the exact make-up and format for the advisory council will be confirmed within the second year of the WMP development.

Specific measures regarding the Chestatee River will include regular communication and meetings with the Partnership Advisory Council (PAC) and other stakeholders. At least one formal meeting per year should be provided for this group, giving them updates on progress with implementation efforts and any water monitoring. Coordination of special implementation measures, such as stream bank clean ups, should be guided by PAC members. The PAC should also advise on how better to reach additional stakeholders in the future regarding soliciting public input or notifying area residents and businesses about the WMP.

During this planning process, public comment and input was solicited through a combination of email notifications to select stakeholders, distribution of notices and two open forums.

Once preliminary stakeholder groups were identified, GMRC staff reached out to those parties and invited further nominations for inclusion in general communications. This led to the creation of an email list used for announcements of the public forums and comment opportunities. Additional notices were distributed at select locations for posting in public locations or copying and handing out. These notices were provided to the offices for White County, Lumpkin County, the Cities of Cleveland and Dahlonega, the Upper Chestatee River Keeper, the Lake Lanier Stakeholders Committee, Keep Lumpkin Beautiful and other stakeholders. Notices were also provided to the GMRC Council at select council meetings.

The Stakeholder Committee met twice during the planning time frame and maintained a dialogue (via phone and email) throughout the process. An additional open public forum was also held in October inviting area residents to comment.

Public input focused on the nature of the watershed being predominantly natural, with marginal agricultural activity and a prevalence of wildlife. Suspicion was high that deer, smaller mammals and possibly boars were contributing to the pollution issues. What limited livestock activity occurred in the area, a blend of horses and cattle, did not feature any major operations or large-scale farms to indicate a singular, prominent source. It was also known there was no public sewer or prominent discharge points into area streams so there was also concern about aging septic systems having an impact.

NAME/ORG	ADDRESS	CITY	ZIP	PHONE	E-MAIL
Adam Hazell; GMRC	PO Box 1720	Gainesville	30503	770.538.2617	ahazell@gmrc.ga.gov
Barbara Stitt-Allen; EPD	4220 International Parkway, Suite 101	Atlanta	30354	404-675-1745	barbara_stittallen@dnr.state.ga.us
Ga. Water Coalition	817 W. Peachtree St.; Suite 200	Atlanta	30305	866-889-2837	sudvardy@gaconservancy.org; sbarmeyer@gwf.org
Frank Riley, CCRCD	Scoggins Drive	Demorest	30535	706-894-1591	Frank.ccrcd@gmail.com
Georgia Forest Watch	15 Tower Road	Ellijay	30540	706-635-8733	info@gafw.org
Chris Ernst; White Co. Info. Services	59A South Main Street	Cleveland	30528	706-865-3911	cernst@whitecounty.net
Harry Barton; White Co. Planning Dir.	59A South Main Street	Cleveland	30528	706-865-6768	hbarton@whitecounty.net
Larry Reiter; Lumpkin Co. Planning Dir.	25 Short Street	Dahlonega	30597	706-864-6894	lreiter@lumpkincounty.gov
Jason Ulseth; Upper Chatt. Riverkeeper	615F Oak Street, Suite 1000	Gainesville	30501	770-531-1064	julseth@riverkeeper.org
Stanley London, White County Farm Bureau	PO Box 849	Cleveland	30528	770-865-3177	c/o pramey@gfb.org
Bobby Gunter, Lumpkin County Farm Bureau	PO Box 538	Dahlonega	30597	706-864-2597	c/o jiburnett@gfb.org
Dr. Nancy Dalman	NGSU	Dahlonega	30597	706.867.2831	NADalman@ngcsu.edu
Ann Converse; Lumpkin Co. Env. Health		Dahlonega	30597	706-867-2729	avconverse@dhr.state.ga.us
Sean Sullivan; White Co. Environmental Health	1241 Helen Highway, Unit 210	Cleveland	30528	706-348-7698	
Anthony Grindle; Lumpkin Co. Cattlemen's Assoc.	376 Grindle Brothers Road	Murrayville	30564	706-300-6605	
Clark MacAllister, Lumpkin County Cooperative Extension	26 Johnson Street, Suite A	Dahlonega	30533	706-864-2275	clarkmac@uga.edu
Sheryl Dockery, NRCS		Cleveland	30528	706-865-2912	

It has been recommended the Counties also find a way to support a regular environmental advisory committee. The Chestatee River is a major water source for Lake Lanier and the region, but there is no standing body to regularly champion and monitor the health of the watershed within either county. A standing body that meets as they are able, with stakeholders from each government, the local Farm Bureau and others could assist in not only regularly communicating the needs and issues of the river but also help coordinate management measures among all involved.

MITIGATON PROGRAM

WATER QUALITY GOALS

The overarching goal for the upper Chestatee River is the same as that of the State's general standards for water quality. That is, to render the river 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 "Fishing" 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 upper Chestatee watershed, as pertaining to this WMP, are as follows:

Restoration of Measured Water Quality

As discussed above this targeted stretch of the Chestatee River remains listed among the State's impaired waters and requires an approximate 80% 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 the Chestatee River, so any and all actions done to improve conditions within the watershed must ultimately yield future water testing results that establish the Chestatee 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 river 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.

Current Load (counts/ 30 days)	TMDL Components					Percent Reduction
	Counts/ 30 days)	WLAsw (counts/ 30 days)	LA (counts/ 30 days)	MOS (counts/ 30 days)	TMDL (counts/ 30 days)	
6.03E+14	**-**	**-**	**1.09E+14**	**1.21E+13**	**1.21E+14**	**80**

Establishment of Watershed Maintenance Measures

As the water quality for the Chestatee 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 Chestatee 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 upper Chestatee 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 upper Chestatee;
- 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 Chestatee 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 no sewer lines or industrial sites within the watershed and no livestock operations large enough to warrant consideration as a point source. As of this completion through this WMP process there have not been any 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

Lumpkin and White Counties lie 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 comes 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 "*27 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 Chestatee 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 an increasing potential among 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.

Though the issue of feral hogs within the upper Chestatee is not as prominent as that with the deer, the problem is growing and it's possible that indeterminate numbers of hogs within the national forests and area woodlands are becoming a notable factor regarding area water quality.

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 turkey 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 Chestatee River 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
Lumpkin	2,549	-	-	82	20	158	140,000	12,672,000	36,000

Natural Resources Conservation Service - 2011

State records estimate agricultural livestock in Lumpkin and White Counties consists overwhelmingly of poultry, with some cattle and even less of other animal operations. Apart from the barely registered counts of sheep, horse and goats, Lumpkin County exhibited the lower counts among all animal categories, suggesting the upper Chestatee watershed is less likely to feature heavy livestock activity.

Records suggested the possibility of one large confined animal feeding operations (CAFOs) within the watershed, with the listing shown below. However, conversations among County staff indicate the operation is one that was never fulfilled and that the particular hog farm is no longer considered viable.

Facility	Number of Animals	Permit Number
TS Farms	125,000	NAI

NAI = Needs additional information for application

Field surveys did not identify many sizable farms that may qualify as commercial livestock operations. There were open fields on several properties but few animals seen. There was also a limited count of poultry houses (11 within the watershed), with only one property featuring more than 2 houses and 3 of the total structures appeared vacant and in disrepair.

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.

CAFOs

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 even fewer acres of row crops within the watershed compared to livestock operations. Some 2-3 fields identified that may harbor routine use for crops, but throughout various observations across 2014 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 of the upper Chestatee watershed belies the dependence on on-site septic systems. 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 Upper Chestatee. The soil make-up of each property is also a factor, with many parts of Lumpkin and White Counties exhibiting soil types unsuitable for some types of septic systems.

Septic Systems

County	Existing Systems (2006)[1]	Existing Systems (2011)	Systems Installed (2007 to 2011)	Systems Repaired (2007 to 2011)
Lumpkin	11,462	12,314	852	71
White	10,717	11,276	559	217

There are no sewer lines within the upper Chestatee watershed, which means every structure is dependent on septic systems for processing waste. Given the age of most properties it is estimated the majority of systems in the area are from 1995 or older, and likely in need of maintenance or possible replacement. Given the low rate of system repairs for Lumpkin between ’07 and ’11 it suggests the potential for leaking or faulty systems is fairly high.

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 upper Chestatee watershed is not heavily developed and there are limited opportunities for urban runoff. There are several concentrations of homes and structures that could produce aggravated runoff, as well as several arterial roadways running directly alongside and over streams or creeks, including several unpaved roads and driveways. While these conditions may not harbor large impacts on the Chestatee watershed, they should be monitored for any potential improvements through best management practices.

Ranking and Prioritizing of Sources of Impairment

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 upper Chestatee, with agricultural sources considered after that.

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

As demonstrated in the table the Stakeholder Priorities differ in ranking from the Estimated Contributions listed. This was a result of stakeholders considering which sources could be most readily improved through remediation, in this case the agricultural activities where homeowners are more receptive to hearing about best management practices and those practices are well established and successful. While repairing septic systems and managing wildlife are considered important elements of the strategy each will require large scale projects/participation rates to impact water quality levels.

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	4	High probable cause but limited options for mitigation
Runoff from concentrated animal operations	Low	Med	Y	Med	2	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	Med	N	Med	1	Few crop farms in watershed but high rate of return in BMP application
Failing septic systems	High	Med	Y	Med	3	Difficult to manage but a critical source to be 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

Both Lumpkin and White Counties maintain many policies and programs which illustrate their respective commitment to environmental stewardship in general. Many of these measures apply to the Chestatee 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 the Chestatee River.

Both 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. Both 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.

Both White County and Lumpkin County have also adopted five *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, which applies to the Chestatee downstream from this watershed. 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. In addition

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 Sservice	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
Lumpkin Co./ White Co. Environmental Health Offices	Regulations for On-site Wastewater Management	Permitting and inspection of new and repaired systems.	Urban/ Suburban Runoff
Lumpkin Co./ White Co. 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 Lumpkin County program is aided by Keep Lumpkin Beautiful. 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 Lumpkin and White Counties. The *North Georgia Technical College*, based in Clarkesville, has also supported watershed programs including staff and student involvement in the Soque River Watershed Partnership in neighboring 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 Chestatee 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 the Chestatee 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 the Chestatee 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 Chestatee 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.

- *Possible UNG/NGSU project - 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.

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	10%	$5,000	High	High
Targeted surveys and clean-up events	Diffuse runoff of animal waste	Low	10%	$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	Med	15%	$10,000	High	Med
Updated Wildlife Survey	Diffuse runoff of animal waste	Low	5%	$10,000	Med	Med
Watershed Monitoring and Survey	Diffuse runoff of animal waste; Failing septic systems	Low	5%	$10,000	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 Chestatee 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 Lumpkin and White 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 major stakeholder groups have been contacted about this notice and to have copies directly provided to the same.

Update of local Comprehensive Plans

The Lumpkin County and White County Comprehensive Plans are both due for updates within the next 2 years. The GMRC will work with the planning staff at each and ensure that the document reflects the impaired status of the upper Chestatee and move to incorporate the mitigation measures recommended in this WMP into the respective objectives and work programs. This will ensure the Counties 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, Lumpkin 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 Chestatee 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 Lumpkin 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 2016.

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 the WMP	GMRC	NA	NA	2015
Update map of septic systems by parcels, by year	GMRC	EPD – Water District planning funds	$1,000	2015
Survey of agricultural operations and BMPs within the watershed	NRCS, Ext. Service	NA	NA	2015
Targeted stream bank surveys and clean-ups	County, UNG, GMRC	319 grant program	$10,000	2016
Update local comp plans	GMRC	DCA	$1,000	2016
Watershed Monitoring and Survey	County, UNG, GMRC	319 grant program	$10,000	2016
319 Grant application	GMRC, CCRC&D	NA	NA	2016
Agricultural pond BMPs	CCRC&D, GMRC, NRCS	319 grant program	$25,000	2017
Septic maintenance/ repair campaign	CCRC&D, GMRC, NRCS	319 grant program	$10,000	2017
Crop soil BMP campaign	CCRC&D, GMRC, NRCS	319 grant program	$10,000	2017
Updated Wildlife Survey	TBD	319 grant program	$10,000	2017
Advisory Committee mtg.; Report of Progress	GMRC	NA	NA	2017
Targeted water sampling for delisting	County, UNG, GMRC	319 grant program	$20,000	2018

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 late 2016/early 2017, 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 Chestatee 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 Lumpkin 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 2017 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

B. Field Notes and Pictures

C. Notes from Public Input Process

D. Sampling Procedures

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 determined 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).

APPENDIX B – Field Notes and Pictures

Additional comments and survey observations have been included within the main text of the document.

Sample Site #1
Town Creek Church Road north of Frogtown Road. (tributary)

This is a major tributary that comes from a thickly wooded hillside to a small valley before shortly merging with the Chestatee River. The valley did not feature many animals, livestock or wild, but did feature some houses within 100' of the waterway. One property immediately north of the road had a small sitting area adjacent to the stream banks, but did not appear to have disturbed the vegetation.

Facing upstream

Facing downstream

Sample Site #2
Town Creek Church Road

This stretch of the river is flowing out of one of the taller hillsides, passing a series of mountain homes and undeveloped lots before coming into a lower part of the valley. There is a clearing to the northeast side to suggest regular access, but only for residents. The other side features a house built quite close to the river and approximately 30' above the riverbanks. Otherwise the tree canopy remains intact and appears strong, and the river does not exhibit and signs of prevalent silt intrusion or discoloration.

Facing Upstream

Facing Downstream

Sample Site #3
Town Creek Church Rd, south of main artery (tributary)

This is a smaller creek coming out of the hills before emptying into the river. The topography here is very steep but relatively open, with a sparsely wooded landscape and a few houses scattered throughout. The lack of underbrush and other plant growth suggests minimal wildlife activity, and no farms were found in the immediate area.

Facing Upstream

Facing Downstream

Sample Site #4
Cavender Creek Rd. and Grindle Bridge Rd.

This is the main artery of the Chestatee River shortly before merging with another major tributary, Testnatee Creek. It also marks the downstream terminus for the segment of the river studies for this plan.

Here the river is coming out of the hilly valley, passing a myriad of rustic residential properties and undeveloped lots, before heading into a more open valley. Most of the construction in the immediate area is newer, and the homes are much nicer than older farmhouses in the watershed.

The river is flowing considerably strong, a feature of both the water volume and topography. The river banks are intact but there have been some clearings along the corridor above the river to enable scenic views.

Facing Upstream

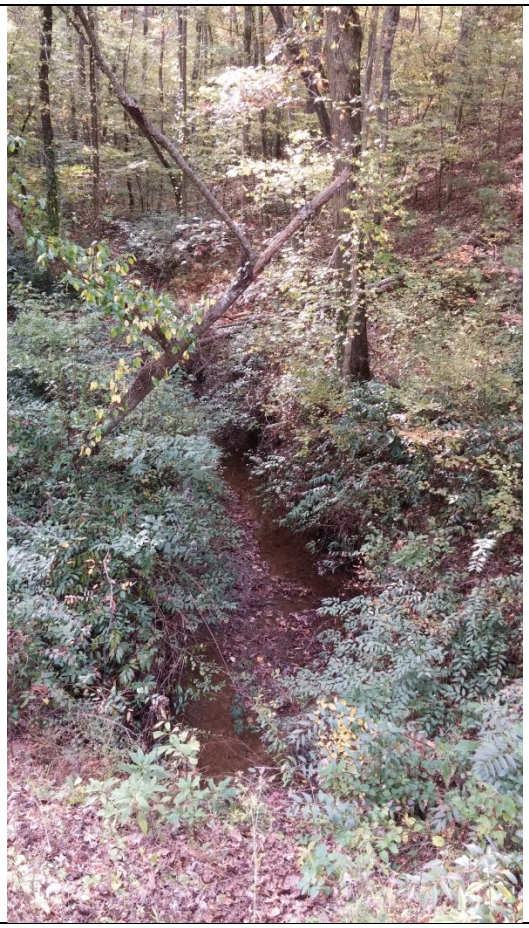
Facing Downstream

Sample Site #5
Damascus Church Road, Near Jim Crow Road.

This is a point further upstream from the other sampling points, providing an indicator of the water quality coming into the sub-watershed. The river is smaller and well covered by trees and shrubs, such that it's not readily seen from the roadway.

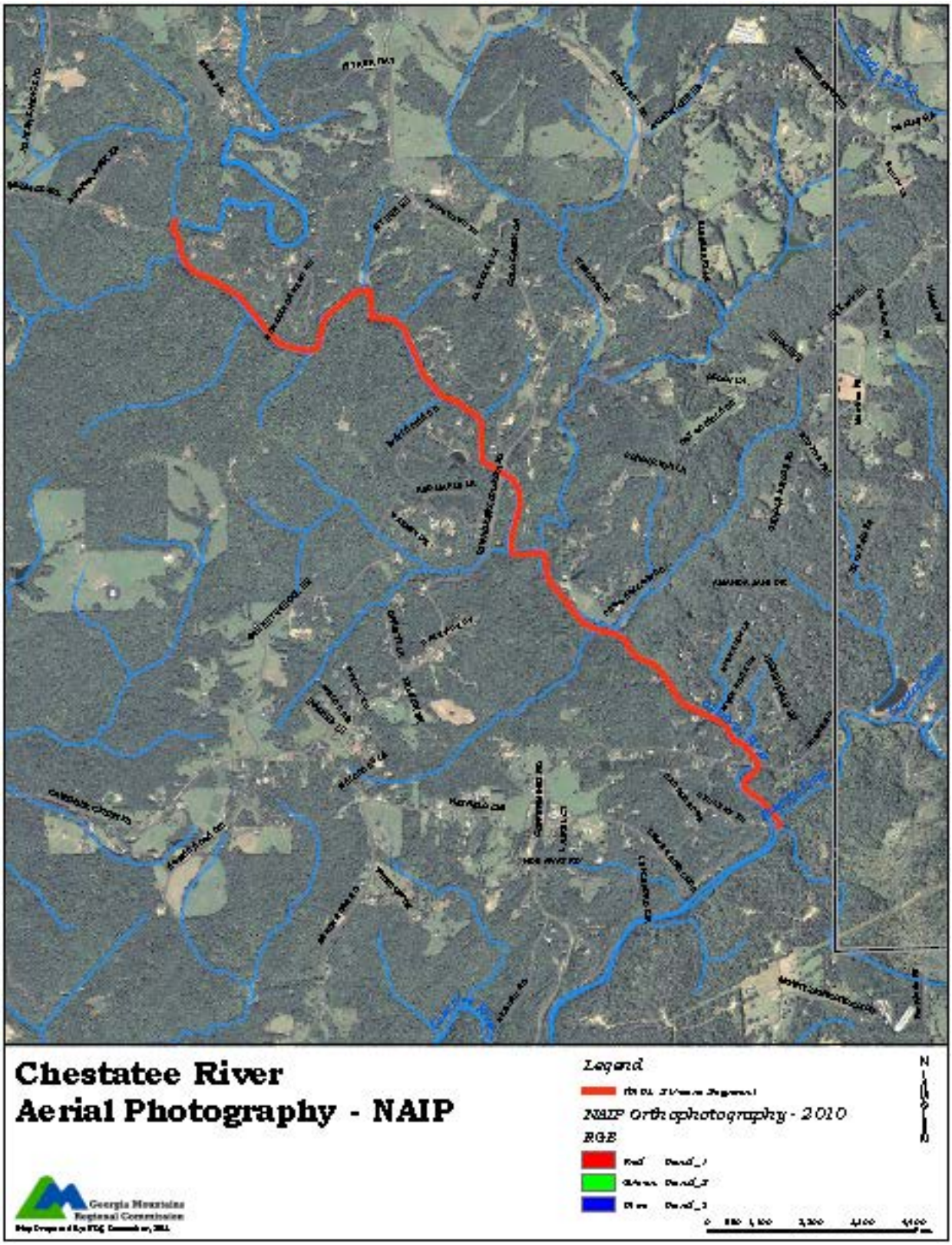
The stream banks here are untouched and the water is relatively clear save for some leaves and natural debris. Upstream at least one field (for pasture or future crops) is visible, but the terrain suggests this is not prominent activity for the area.

Downstream the river remains well covered and the area features more of the same rural residential activity with pockets of farming or animals.



Typical scenes from the watershed.

Most of the landscape is rural and featuring thick growth around smaller streams and tributaries. There are various fields which may harbor agricultural use but not showing activity at the time.


Chestatee River
Aerial Photography - NAIP
Legend
NAIP Orthophotography - 2010
RGB
Georgia Mountains
Regional Commission

APPENDIX C – Notes from Public Input Process

APPENDIX D – Sampling Procedures

Procedures for collecting and testing water samples for *E. Coli* Monitoring

1. Staff from the Georgia Mountains Regional Commission, who will collect *E. coli* samples, were trained by GA EPD Adopt-a-Stream personnel on January 7, 2009 in *E. coli* sampling and testing.

2. Equipment used for sampling and testing is as follows:

    a. 3M™ *E. coliform* Count Plates, product #6404, 3M Company, http://solutions.3m.com/wps/portal/3M/en_US/Microbiology/FoodSafety/products/petrifilm-plates/*e-coli*-count/
    b. Genesis Hova-Bator Incubator with circulation fan, product #1588, calibrated to 35° C. G.Q.F. Manufacturing, http://www.fqfmfg.com/store/comersus_viewItem.asp?idProduct=77
    c. Fixed-volume pipettor 1000uL, product #EW-21600-06. Cole Parmer, http://www.coleparmer.com/catalog/product_view.asp?sku=2160006
    d. Pipette tips, 200-1300uL, product #EW-25711-50, Cole Parmer, http://www.coleparmer.com/catalog/product_view.asp?sku=2571150
    e. MicroLite USB Temperature Data Logger, product #LITE5008. The Data Logger Store, http://www.microdaq.com/fourier/microlite_usb_logger.php
    f. Armored Thermometer, Lamotte, http://www.lamotte.com/pages/aqua/sampling.html
    g. Whirl-Pack® sterile sampling bag, 2 oz., product #EW-06499-60, Cole Parmer
    h. 90% Isopropyl Alcohol
    i. Latex Gloves
    j. Bleach

3. The following sampling protocol will be used for each sample:

    a. Prior to sample collection:
        1. 1 Whirl-Pak® bag per site.
        2. Using a Sharpie, label each bag as follows:
            a. Collection Site Number
            b. Date of Collection
            c. Collector

    b. Record the following information at each sample site:
        1. Current Weather Conditions
        2. Air Temperature
        3. Water Temperature
        4. Date and Time

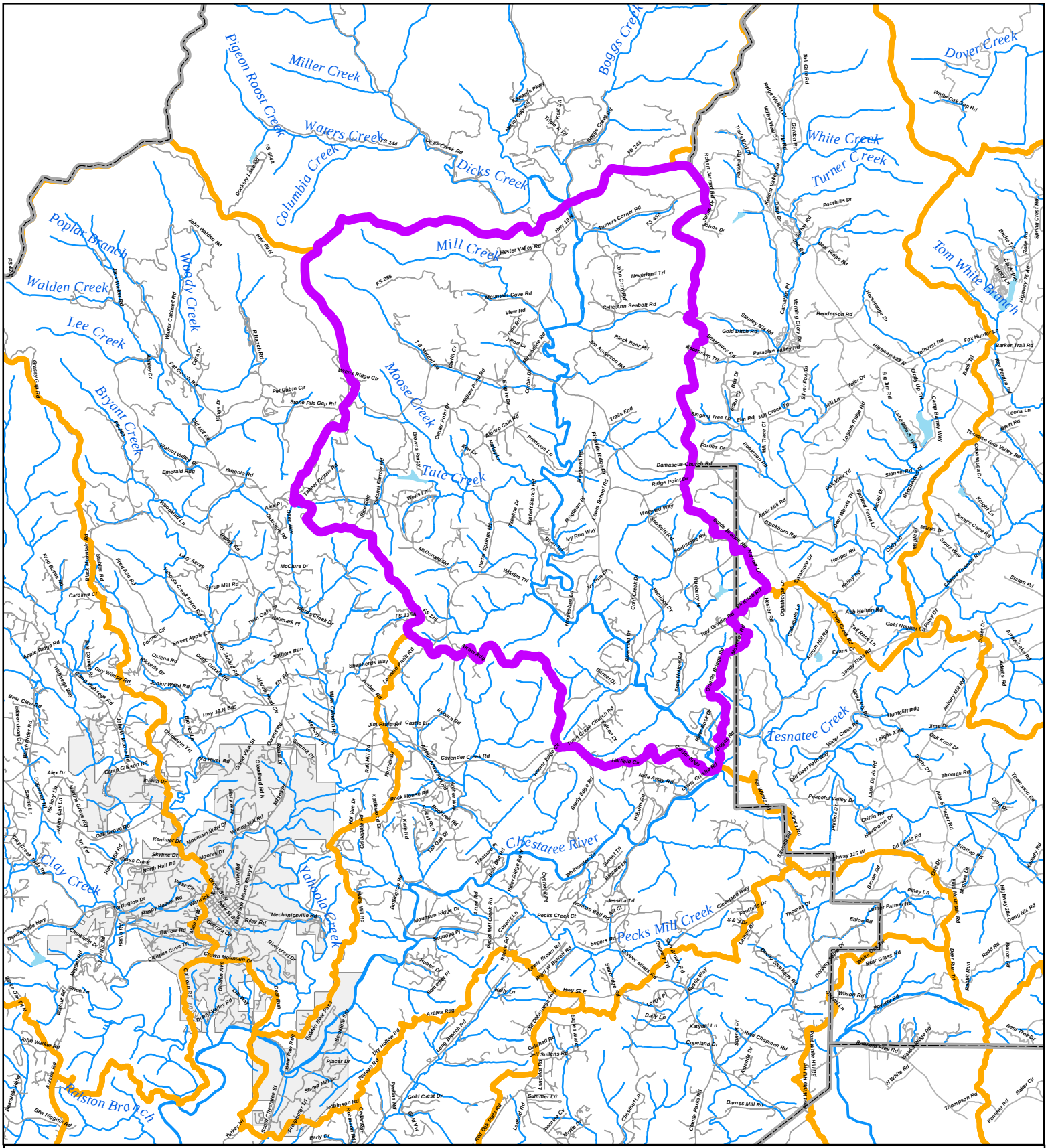
    c. Sample Collection
        1. Put on latex gloves for protection and to limit sample contamination.
        2. Tear off top of bag along perforation. Avoid touching the inside of the bag.
        3. Select a spot in the middle of the flow channel.

4. Open the Whirl-Pak® bag by taking hold of the white tabs on either side of the bag, one in each hand. If you accidentally touch the inside of the collection bag, use another one.
5. Keep the bag upright and use a scooping motion to submerge the top under the water.
6. At mid-depth, pull both white tabs apart to open the mouth. Allow water to pour into the mouth until the bag is ¾ full.
7. Pull the bag out of the water, take the yellow ties on either side, one in each hand, and flip or fold the top of the bag twice to wrap up the top.
8. Twist the yellow ties to seal the top and place the bag in a cooler with ice or frozen packs.

2. Sample Handling and Custody Requirements

a. *E. coli* samples will be stored for no longer than 24 hours after collection in a cooler with ice or frozen packs.
    1. Within 24 hours of collection, the Georgia Mountain Regional Commission staff will utilize the Adopt-a-Stream Bacterial Monitoring methods and procedures to process and analyze the samples.
    2. Petrifilm plates shall be labeled with a Sharpie pen as follows:
        a. Site number
        b. Date of collection
    3. Utilizing a fixed volume pipette, a sample from each site will be placed on 3 petrifilm plates according to the instructions on the GA EPD Adopt-a-Stream Bacterial Monitoring Manual.
    4. Plates will be stacked and placed in the Hova-Bator incubator calibrated to 35° C for 24 hours.
    5. 10% of the processed samples will be field blanks- petrifilm plates treated with distilled water. These plates should be labeled as "Blanks". These plates should be stacked and placed in the Hova-Bator incubator calibrated to 35° C for 24 hours.
    6. Incubator temperature will be monitored over a 24-hour period with a Microlite USB Temperature Data Logger.
    7. After 24 hours, plates (3 per site) will be removed from the incubator and *E. coli* colonies will be counted. The sum of the colonies found on 3 plates prepared for each site will be multiplied by 33 to calculate a total colony count per 100/mL per site.

b. Staff from the Georgia Mountains Regional Commission will collect the samples with equipment obtained by the Georgian Mountains Regional Commission. To ensure safety, collectors will choose a sample collection technique on site. If waters are safe for wading, collectors will use the "grab sampling while wading technique" for *E. coli* bacteria. However, if the water appears to be unsafe for wading, then the *E. coli* sample should be collected by lowering a sampling container from a bridge or culvert, or the grab sampling technique should be employed from the safety of the stream bank. If rainfall in the preceding 24 hours is between 1" and 2", then sampling should not occur until 48 hours after the rain event. Sampling is postponed however, if weather conditions make sampling unsafe for field personnel.



Chestatee - Tesnatee Watershed (HUC 12)
Project Location Map

Legend

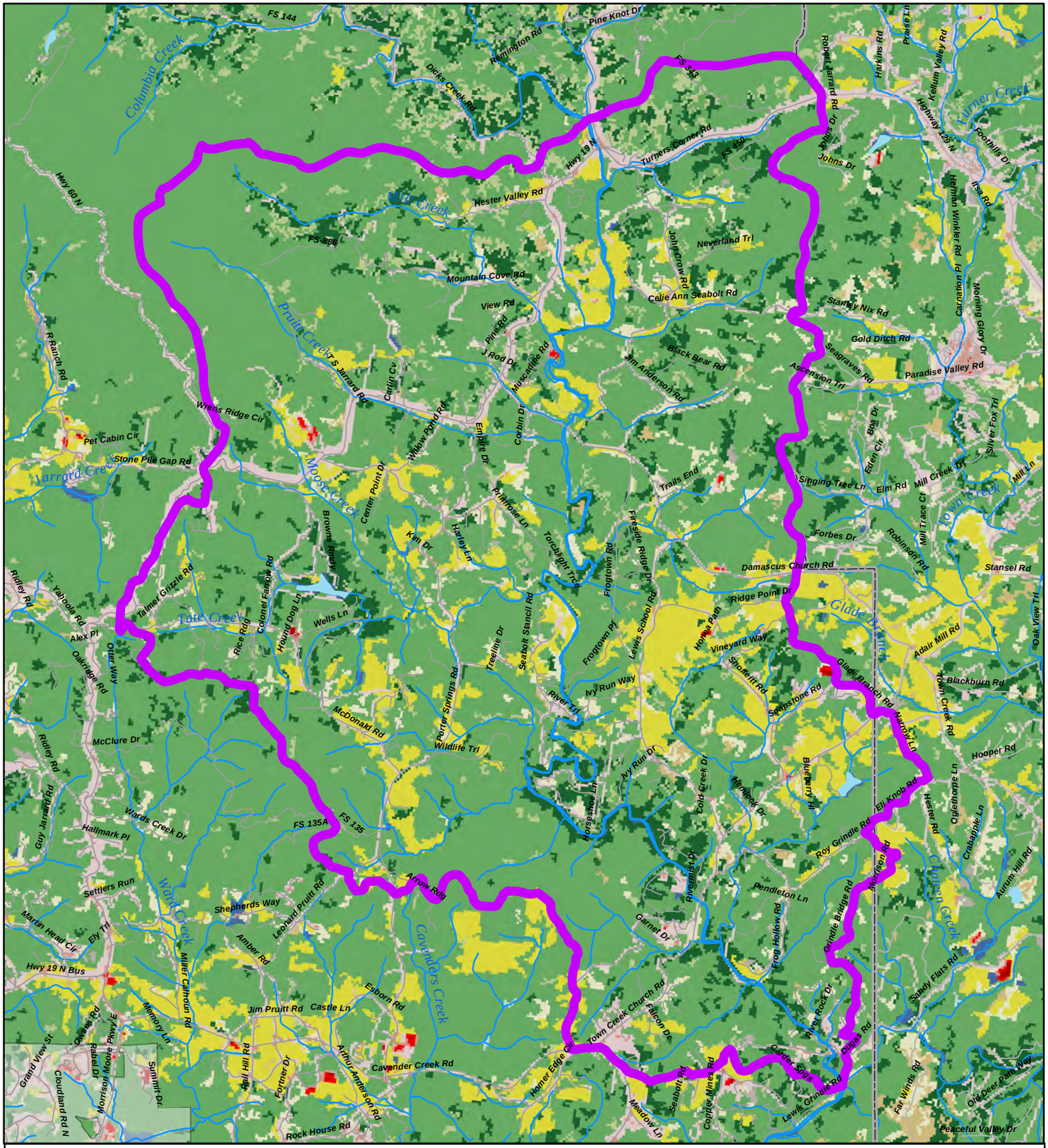
- Watershed
- HUC 12
- Lakes and Ponds
- Streams & Rivers

N
W E
S

Georgia Mountains Regional Commission

Map Prepared By: FDB, January, 2015

0 0.375 0.75 1.5 2.25 Miles



Chestatee - Tesnatee Watershed (HUC12)
National Land Cover - 2011

National Landcover Dataset - 2011

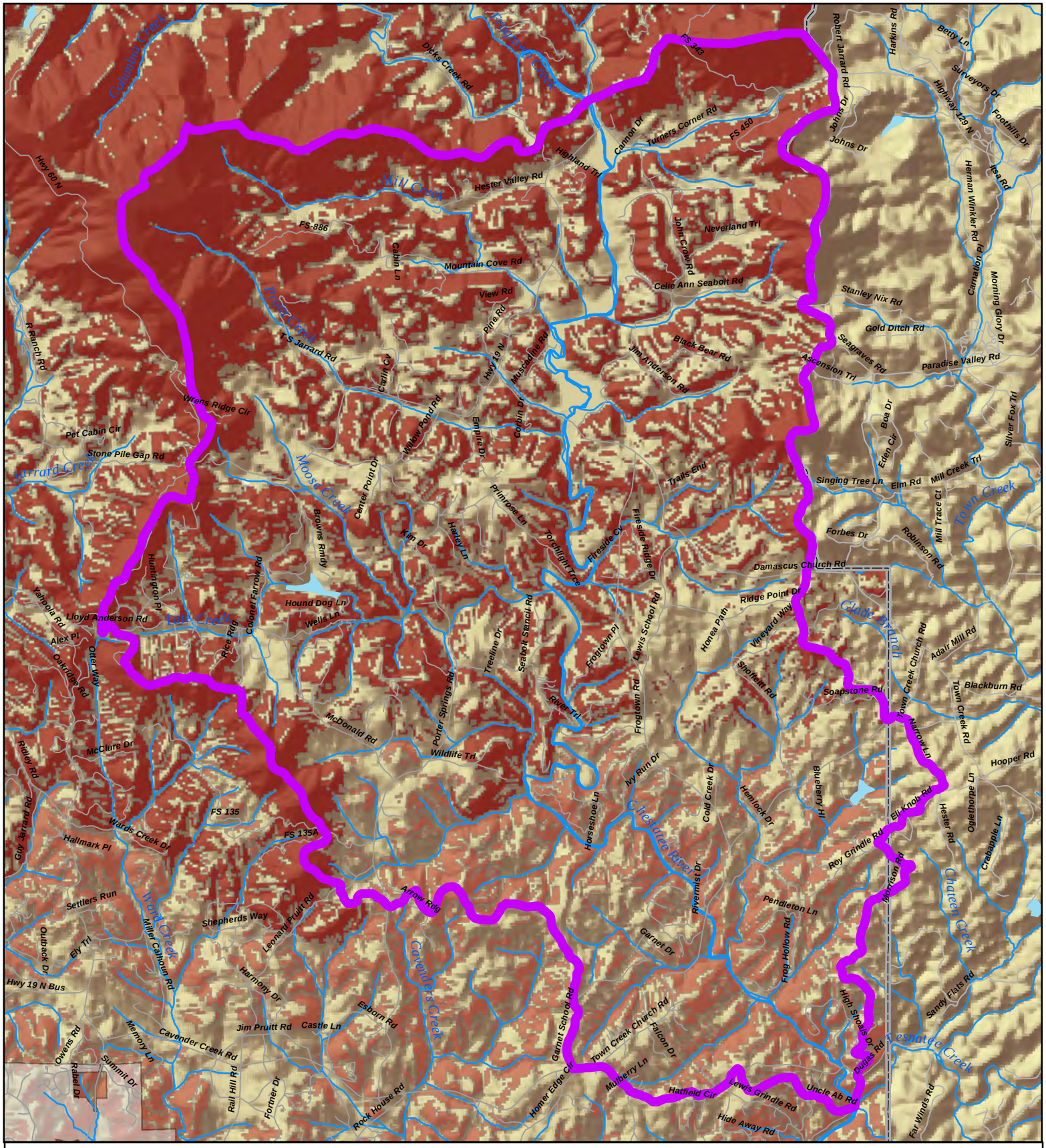
- Open Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land (Rock, Sand, Clay)
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Grassland/Herbaceous
- Pasture/Hay
- Woody Wetlands

N W E S

0 0.25 0.5 1 1.5 Miles

Georgia Mountains Regional Commission

Map Prepared By: FDB, January, 2015



Chestatee - Tesnatee Watershed (HUC 12)
Steep Slopes

N
W E
S

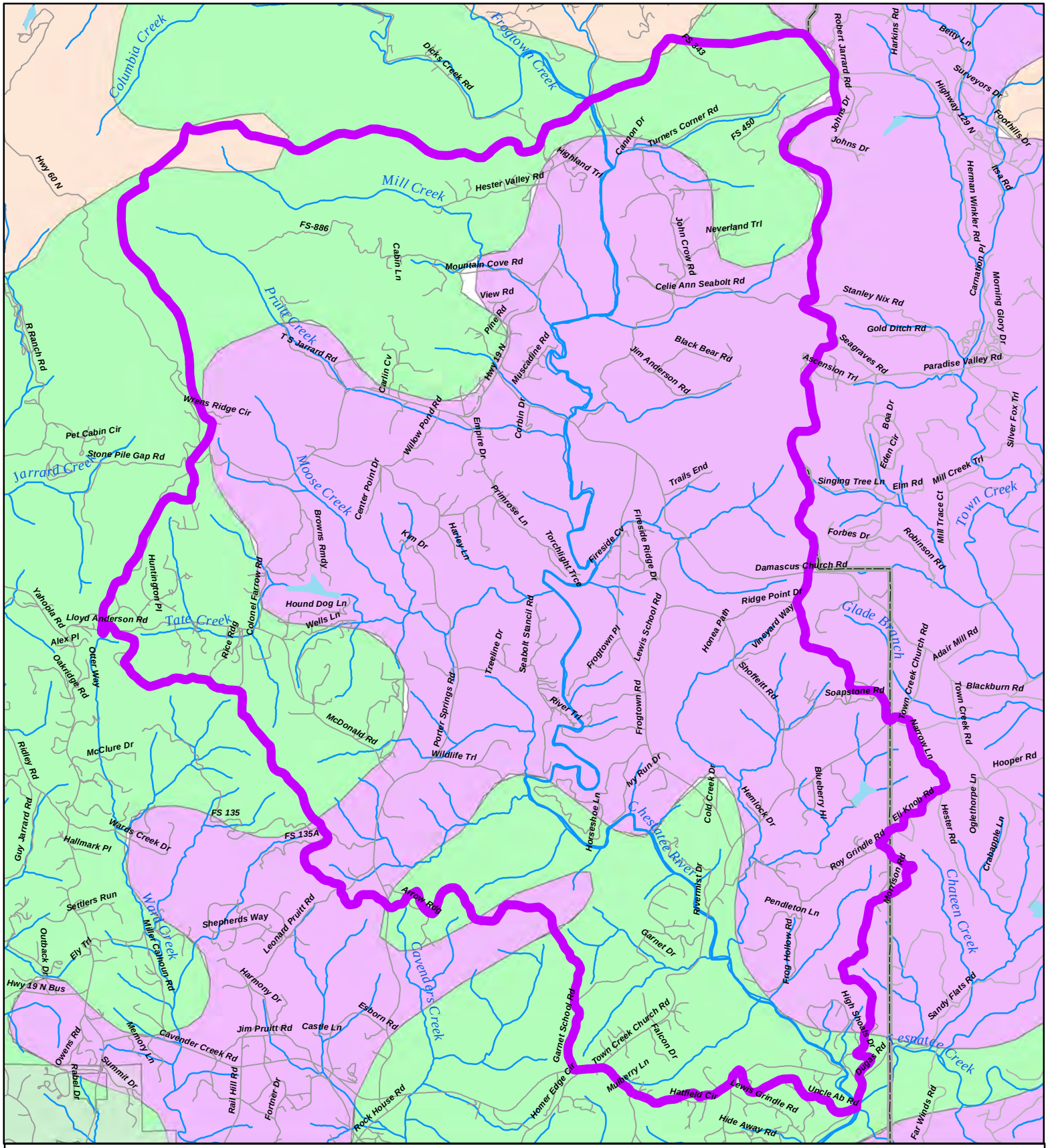
Legend

- Watershed
- Lakes and Ponds
- Streams & Rivers

Georgia Mountains Regional Commission

Map Prepared By: FDB, January, 2015

0 0.25 0.5 1 1.5 Miles



Chestatee - Tesnatee Watershed (HUC 12)
STATSGO Soils

Legend

- Watershed
- Lakes and Ponds
- Streams & Rivers

Soils Name

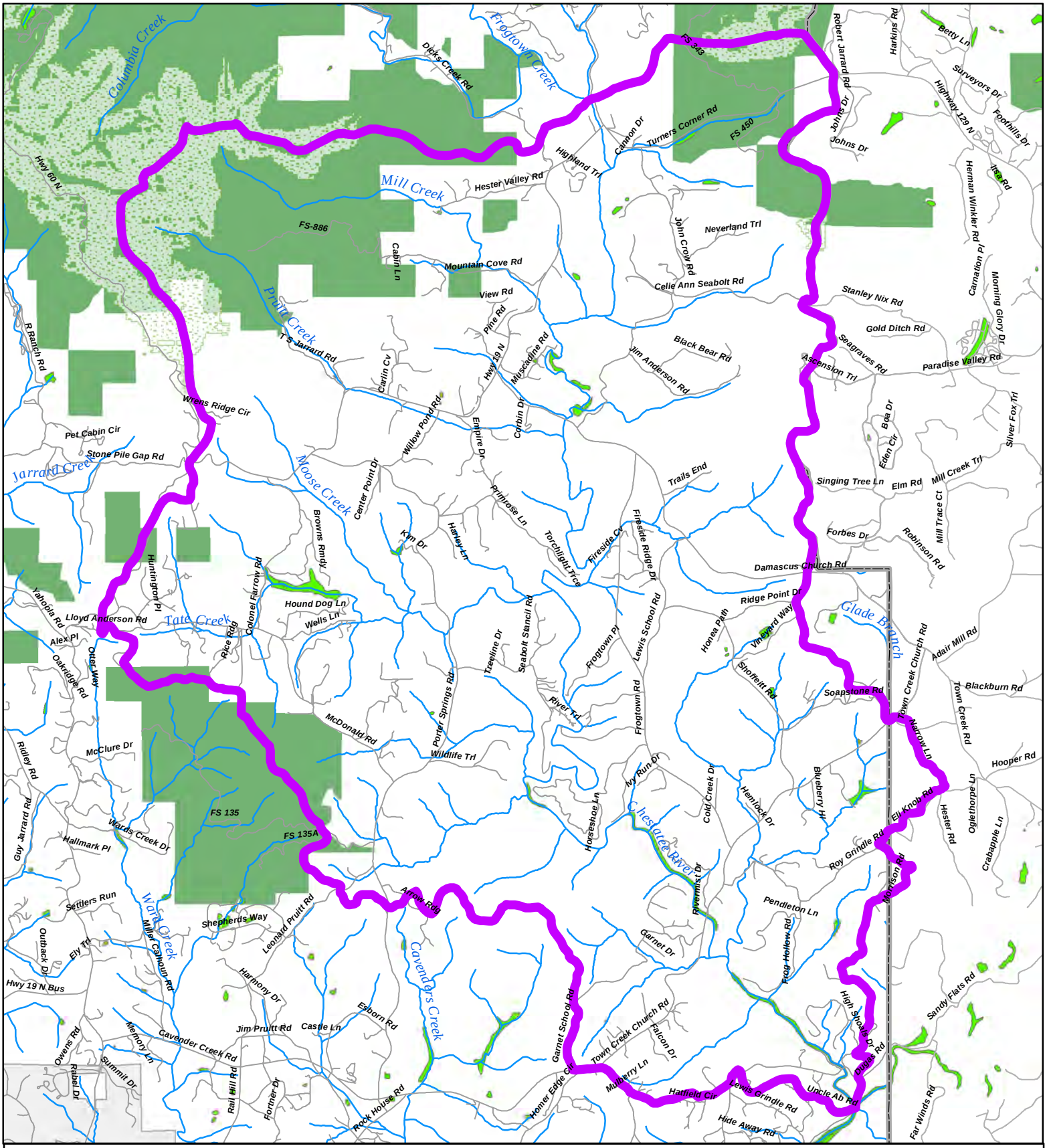
- MADISON
- PACOLET
- PORTERS
- TALLAPOOSA

N W E S

0 0.25 0.5 1 1.5 Miles

Georgia Mountains Regional Commission

Map Prepared By: FDB, January, 2015



Chestatee - Tesnatee Watershed (HUB 12) Environmentally Sensitive Areas

Legend

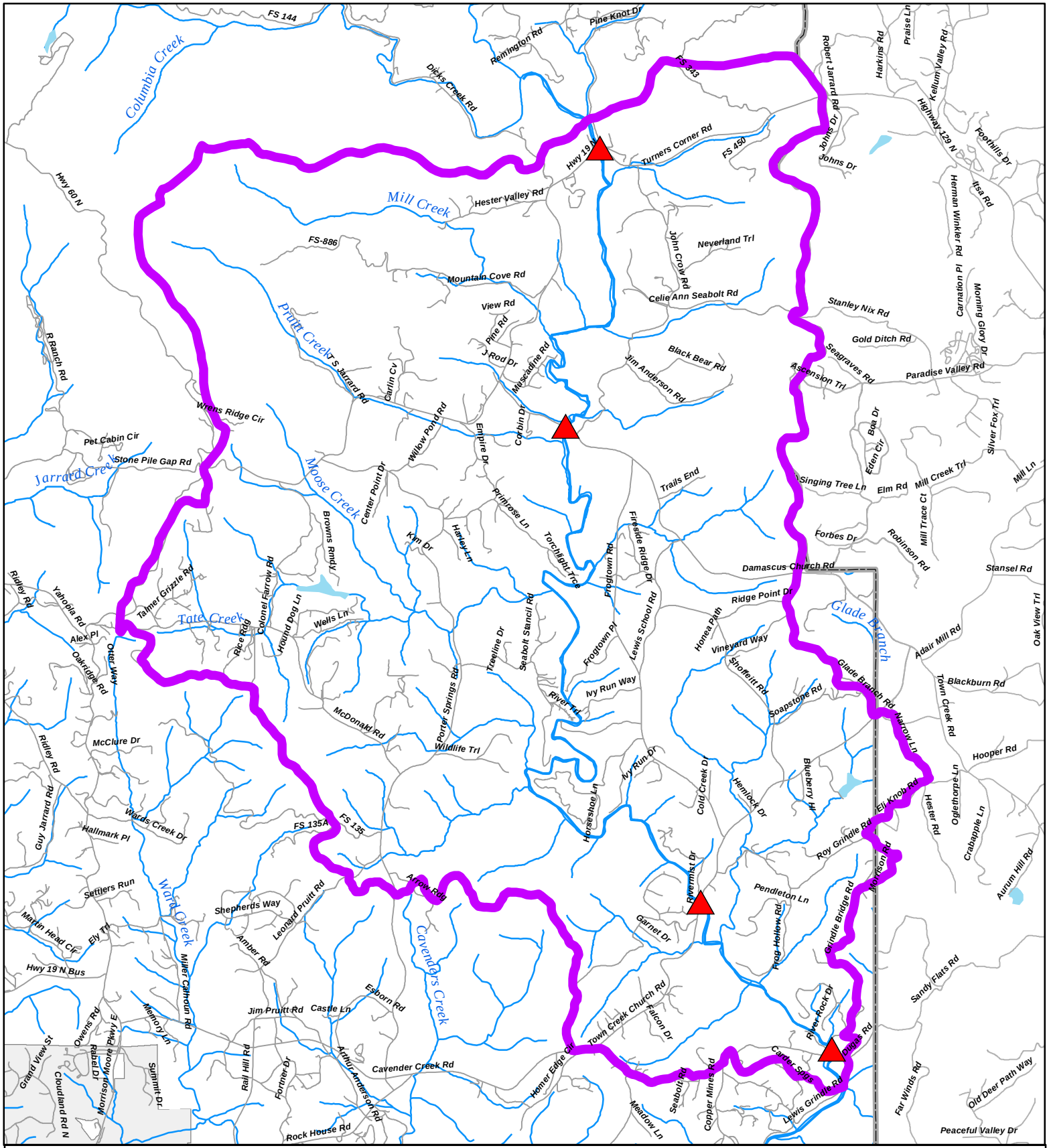
- Watershed
- Streams & Rivers
- Protected Rivers
- Major Lakes
- Protected Mountains
- Ground Water Recharge Areas
- National Wetlands Inventory
- Conservation Lands

N W E S

0 0.25 0.5 1 1.5 Miles

Georgia Mountains Regional Commission

Map Prepared By: FDB, January, 2015



Chestatee - Tesnatee Watershed (HUC 12)
USGS Testing Sites

Legend

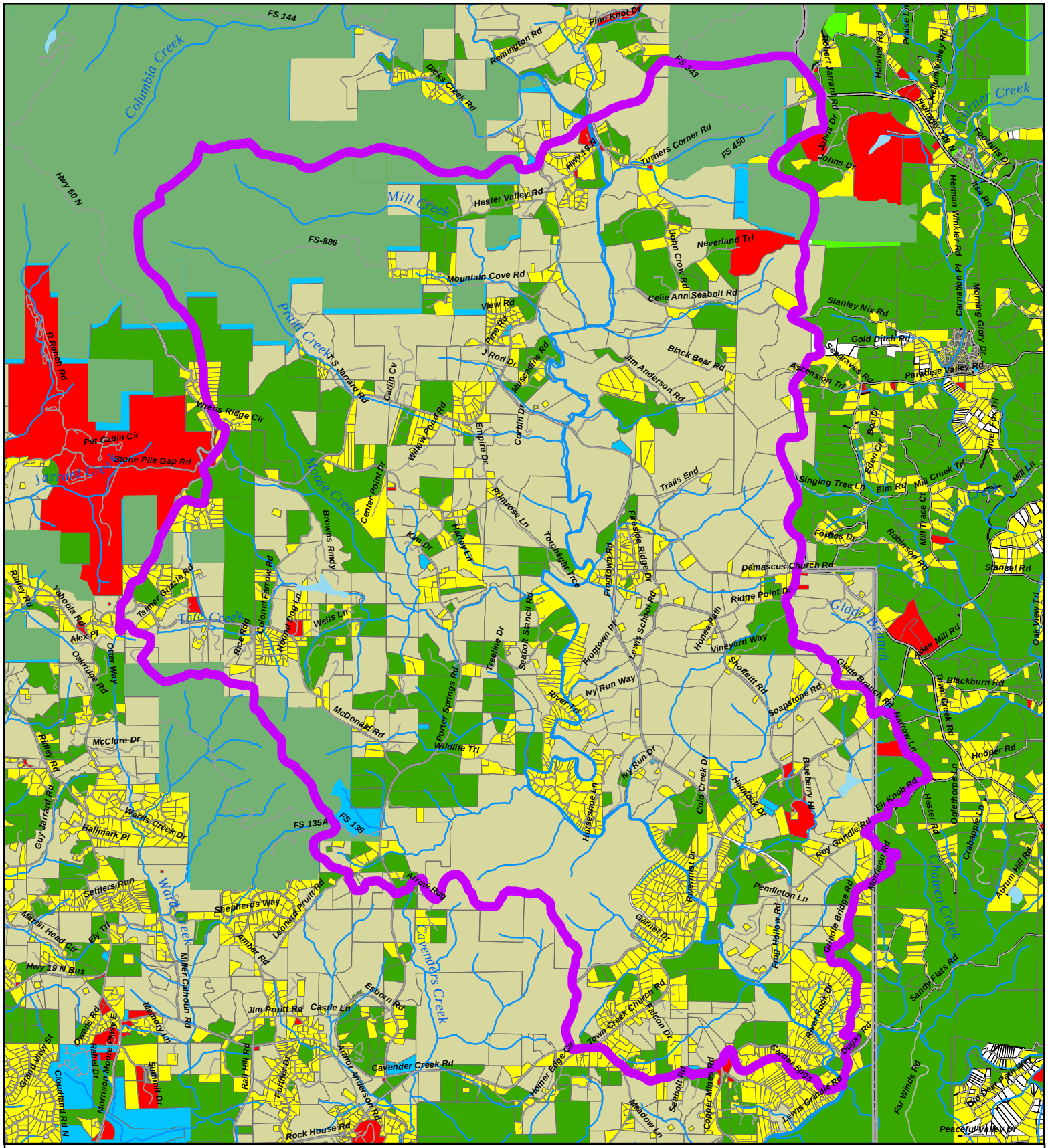
- Testing Sites
- Watershed
- Lakes and Ponds
- Streams & Rivers

N W E S

Georgia Mountains Regional Commission

Map Prepared By: FDB, January, 2015

0 0.25 0.5 1 1.5 Miles



Chestatee - Tesnatee Watershed (HUC 12)
Existing Land Use

N
W E
S

Legend

- Watershed
- Lakes and Ponds
- Streams & Rivers
- Conservation Lands

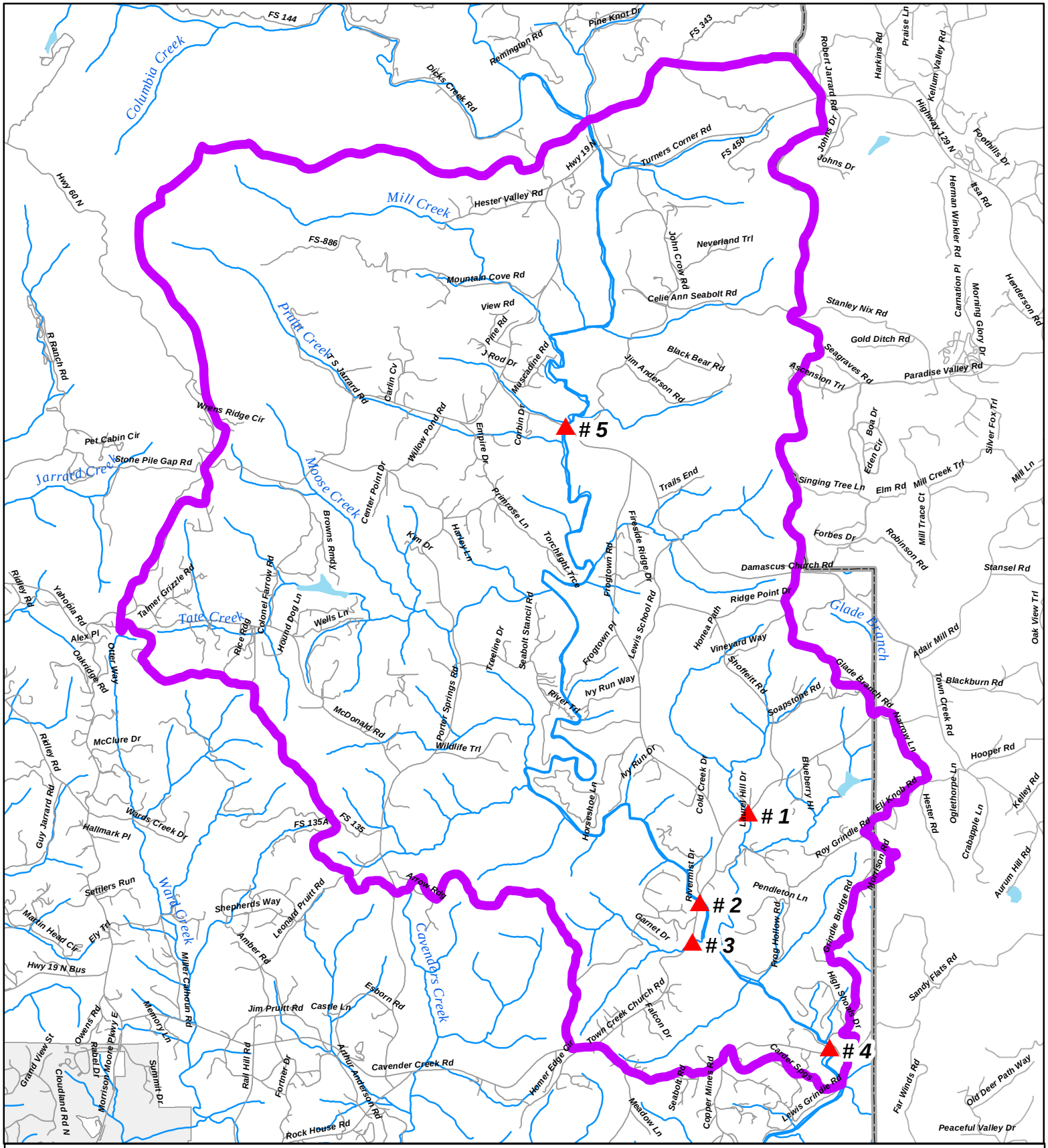
Existing Land Use

- Residential
- Commercial
- Exempt
- Industrial
- Agricultural
- Park/Recreation
- Undeveloped/Rural

0 0.2 0.4 0.8 1.2 Miles

Georgia Mountains Regional Commission

Map Prepared By: FDB, January, 2015



Chestatee - Tesnatee Watershed (HUC 12)
GMRC Testing Sites

Legend

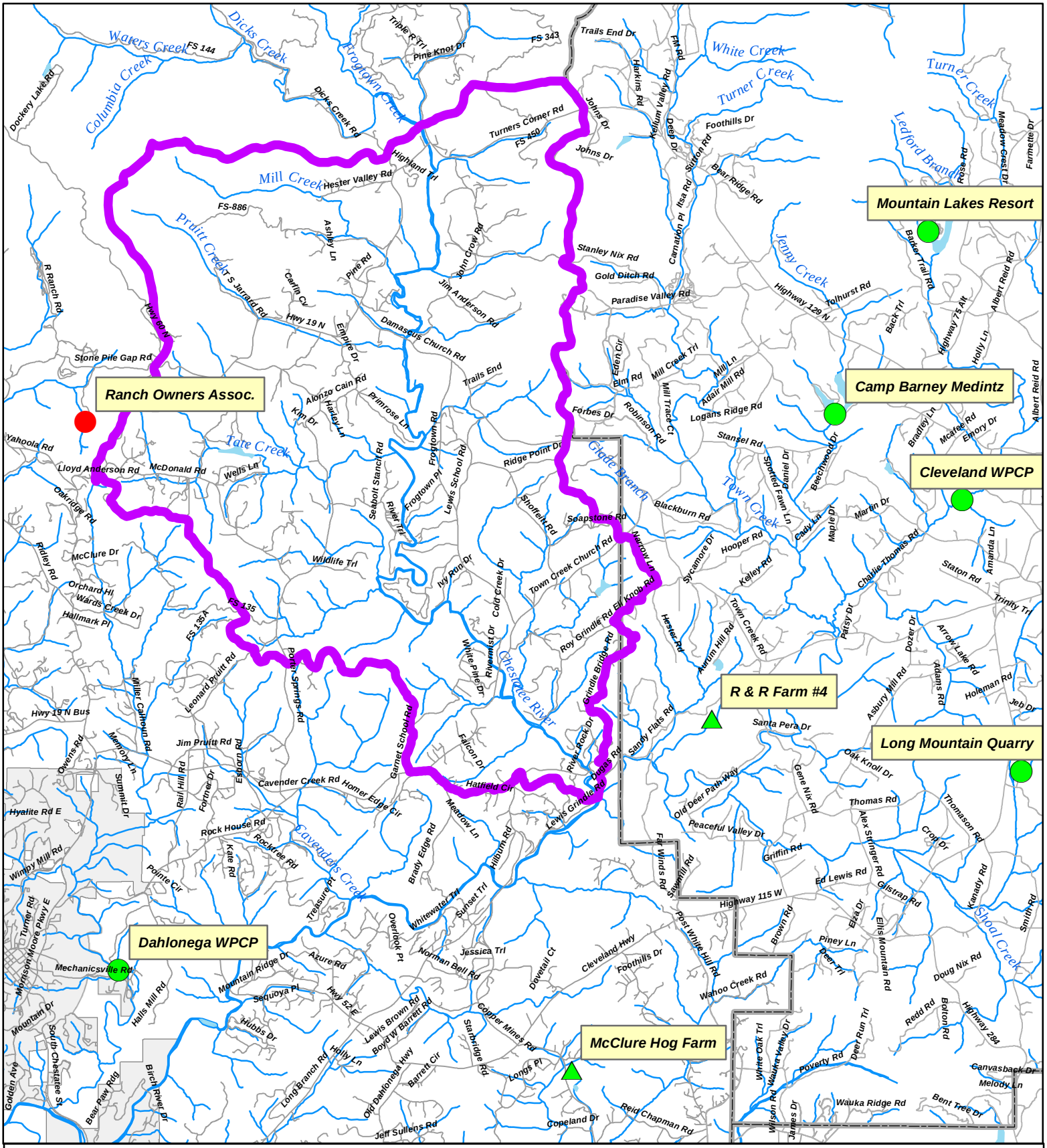
- GMRC Test Sites
- Watershed
- Lakes and Ponds
- Streams & Rivers

N W E S

Georgia Mountains Regional Commission

Map Prepared By: FDB, January, 2015

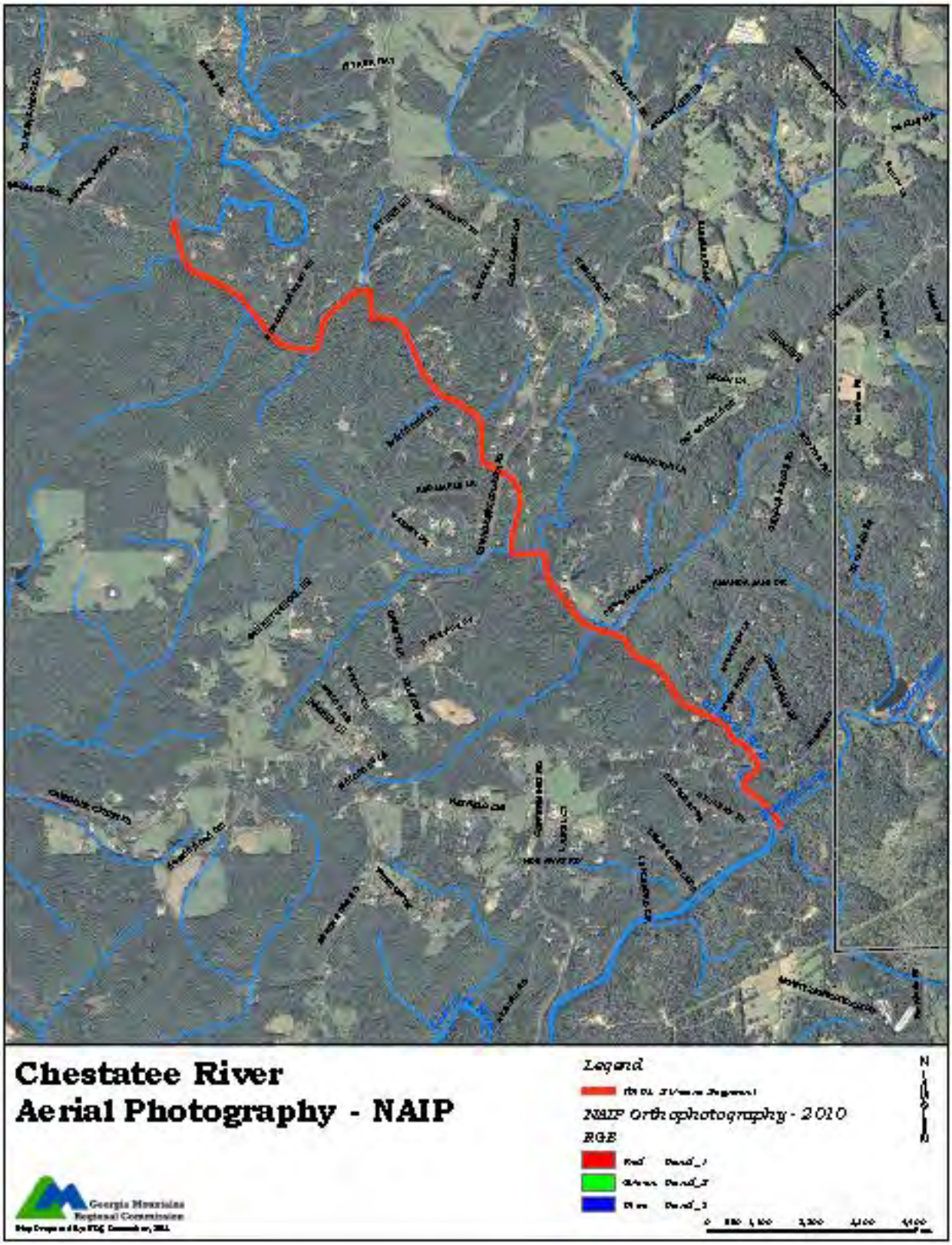
0 0.25 0.5 1 1.5 Miles



Chestatee - Tesnatee Watershed (HUC 12)
CAFO, LAS, NPDES Sites

Georgia Mountains Regional Commission

Map Prepared By: FDB, January, 2015


Chestatee River
Aerial Photography - NAIP
Legend
NAIP Orthophotography - 2010
RGB
Georgia Mountains
Regional Commission

Georgia Mountains Regional Commission

Meeting Notes
03/31/14
Chestatee River 319 Steering Committee

Attendance
(See attached sign in sheet)

Discussion Notes

Adam welcomed everyone and shared introductions. Attending members were reminded of the general scope of the effort, the status of the draft WMP and related elements and the tasks for the Committee throughout the remainder of the project.

Copies of the working draft WMP were shared with the Committee with the reminder that much of the information was still in development. The group walked through the document so that everyone could become familiar with the general format, the required elements and the 9 key elements. The group asked that copies of the original TMDL be distributed for reference, as well. Adam would work to provide that for everyone, as well as electronic copies of the maps.

When discussing the general description of the watershed and activities therein, it was asked what extent of the problem may arise from the recreational activity within the area. People continue to pan for gold in this region and many of the creeks are popular with local kids. This might aggravate pollution issues similar to those encountered on the Chattahoochee in Helen as people stir up the creek bottoms and traverse up and down the creek sides. No noticeable uptick in such activity has been noticed thus far but everyone was advised to make note of any locations that seemed frequently busy with people for future monitoring.

There was a question about the new reservoir for Dahlonega and whether or not that was adding to the siltration of the river. No one was sure but it would be examined the next time GMRC staff went out to the field.

Discussion turned to the topic of septic systems and the potential for requiring home sellers to ensure their systems had been recently inspected and/or maintained. It was noted this would require State law and local enforcement, otherwise the issue is voluntary. It could be recommended to realtors and other industry partners, however, as a best practice to be encouraged by home buyers. Adam discussed how other communities are working to build a database of their properties on septic systems so that they can keep track of the general ages and types of systems for casual monitoring or potential problems. A similar approach in Lumpkin and White Counties would allow local inspectors to gauge which systems might be the most susceptible to failures and contributing to pollution issues. In the meantime Adam would build a list of companies that treat and repair septic systems for possible future participation in the BMP installation phase.

Discussion shifted to wildlife in the area and addressing the extent of the cause from this element. It was noted that as recently as 5 years ago it could've been considered that the area was overpopulated

with deer. This has been relieved somewhat by an increase in the numbers of coyotes. There were no specific parts of the Chestatee watershed cited for deer but several pockets of deeper woodland near the headwaters are likely the most consistently populated.

Other small mammals are also prevalent in the watershed, including beaver. Some beaver dam sites were referenced along Shoal Creek and members agreed to be on the lookout for any dams and ponds. There has also been a growing issue with regards to wild hogs.

The wildlife population may be reacting in proportion to the decreasing agricultural activity. There is less and less row cropping practiced in the area, meaning fewer food sources for some of the animals. The terrain isn't conducive to larger, corporate scale farms so most of the fields managed in the Chestatee watershed are modest in size and with less tilling.

Among the livestock noted in the area are the usual varieties of beef cattle, horses and some chicken houses. A prominent hog farm in the area (near Sandy Flats) ceased operations about 6 years ago and there are no dairy farms of note within the watershed. Most of the operations are small. GMRC staff have not noticed any particular fields open to adjoining streams but there has been at least one instance of animals (horses) in a stream.

It was asked what's to come from the effort if the Adopt-a-Stream testing suggests the waters might be in compliance? Adam indicated that the stakeholders could recommend that formal lab testing could then be pursued to see if the stream could be de-listed, but that only certified lab results done in compliance with EPD standards could achieve that. When asked who would pay for that it was noted that EPD has grants available for such programs, or the local governments could pursue such measures if the removal of the stream from the list aids their overall compliance with State initiatives.

It was also brought up that there may be a prevalent issue with regards to dirt roads and unpaved driveways adding to the sedimentation of the waterways, adding to the problems for the Chestatee watershed. When asked Adam explained how the debris and dirt included in the runoff from unpaved roads can agitate bacterial levels within streams by both introducing more animal matter and also providing solids for bacterial colonies to grow in the water. Adam was working with both Counties to ensure the GMRC gets the latest data concerning unpaved roadways in the watershed and would see where and how the Better Back Roads program might be one solution for this watershed.

The next meeting was tentatively scheduled for late April/early May for a location TBD.

Meeting adjourned.

Georgia Mountains Regional Commission

3/31/14 Upper Chestatee Advisory Mtg.

Name	Org.	Contact
Larry Reiter	Lumpkin County	
Dick Rightmyer	USDA-Forest Service	drightmyer@fs.fed.us 770-297-3070
Mike Joyce	USDA Forest Service	mjoyce@fs.fed.us
Andy Baker	USDA Forest Service	albaker@fs.fed.us
Chris Ernst	White Co	cernst@whitecounty.net
Harry Barton	White Co	706-865-6768
Clark MacAllister	Lumpkin/Dawson Extension	clarkmac@uga.edu
Louise McPherson	USDA-NRCS	louise.mcpherson@ga.usda.gov
Mary Topa	Georgia Forest Watch	706-635-8733
Larry Rodgers	Dawsonville City PD	706-864-8224
Edward Horton	USDA FS Chattooga River Ranger District	706-754-6221
Carter Smith	Lumpkin Co	Parks Director
Kenneth Beasley	Lumpkin Co.	

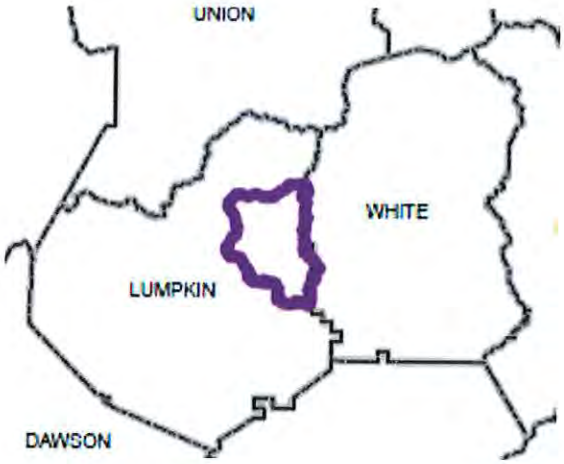
Georgia Mountains Regional Commission

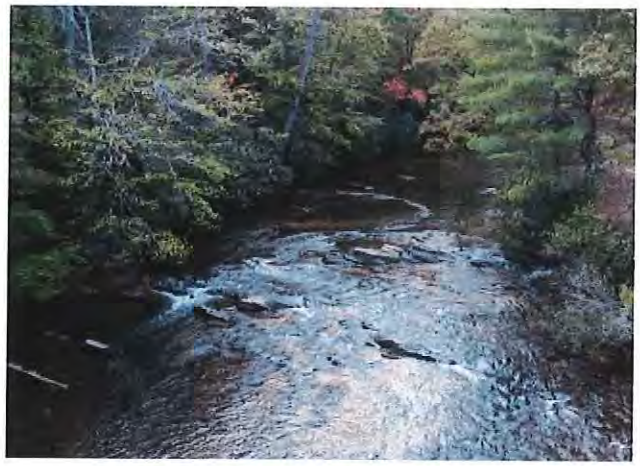
PUBLIC REVIEW AND HEARING OPPORTUNITY

Watershed Improvement Plan

~

for the Upper Chestatee River (White and Lumpkin County)





DATE

October 23, 2014

1-2 PM

LOCATION

Lumpkin County Library
342 Courthouse Hill, Dahlonega

As part of continuing efforts to sustain water quality in the above listed watersheds, the GMRC, the State and other stakeholders are assessing the area and updating knowledge of local conditions.

This session will be an open forum to discuss developments and conditions within the respective watersheds, focusing on the identification of any possible sources for bacterial pollution. Participants will have the opportunity to view material, provide comment, offer suggestions for updating documents and learn of other measures for future public input.

For additional information please contact

ahazell@gmrc.ga.gov

770.538.2617

Or visit www.gmrc.ga.gov for copies of material and directions to the GMRC offices

10/23/14

Chestatee WIP Meeting

Please Sign In

Name	Contact Info
NA	

Two inquiries, both outside watershed.

Georgia Mountains Regional Commission

Meeting Notes
12/23/14
Chestatee River 319 Steering Committee
Lumpkin County offices

Attendance
Larry Reiter
Clark MacAllister
Adam Hazell

Discussion Notes

Committee members have been given copies of the draft document and invited to comment on the findings and recommendations. General comments received by phone or email suggest the overall findings are good with no notable objections or requested changes.

Question remains about legacy contamination based on prior activities. Larry noted that there were some sine farms in the watershed in the past but not so much now. Possible that those facilities contributed to the listing but have since been removed from the equation.

Both attendees noted the presence of a large number of detention ponds and watering ponds throughout the watershed. Even though the identified number of livestock operations within the watershed is considered very low it's possible that these ponds harbor higher pollution levels and then overflow in storm situations. Larry did not have any records about dam breaks or significant overflow events in the area but noted that's the kind of thing not always reported to, or noticed by, County staff.

Tate Creek was discussed as a possible prime example of this. There are at least two ponds built by dams draining into Tate Creek, plus Whitner's Lake, which attracts a lot of wildlife. A number of smaller ponds can also be seen around the Town Creek Rd. and Frogtown Rd. areas. Larry noted that County inspectors and State inspectors have not reported any issues with dam maintenance or setbacks from ponds within the area (versus State requirements).

Another element of these ponds is the increased number of geese resting in the area. Larger numbers appear to stay every season due to the lack of predators chasing them away from local ponds and lakes. While individually geese are not likely a major culprit they can contribute to the overall problem.

When asked about the potential scope of impact from septic systems both attendees agreed it's a factor. Most of the systems within the watershed are older and records about maintenance or repairs is very thin. The County has distributed literature about treating tanks and having them pumped out in accordance with use and age but is not notified of activity. There haven't been any citations issued from septic spills or violations within the watershed for the past 7+ years.

APPENDIX D – Sampling Procedures

Procedures for collecting and testing water samples for *E. Coli* Monitoring

1. Staff from the Georgia Mountains Regional Commission, who will collect *E. coli* samples, were trained by GA EPD Adopt-a-Stream personnel on January 7, 2009 in *E. coli* sampling and testing.

2. Equipment used for sampling and testing is as follows:

   a. 3M™ *E. coliform* Count Plates, product #6404, 3M Company, http://solutions.3m.com/wps/portal/3M/en_US/Microbiology/FoodSafety/products/petrifilm-plates/*e-coli*-count/
   b. Genesis Hova-Bator Incubator with circulation fan, product #1588, calibrated to 35° C. G.Q.F. Manufacturing, http://www.fqfmfg.com/store/comersus_viewItem.asp?idProduct=77
   c. Fixed-volume pipettor 1000uL, product #EW-21600-06. Cole Parmer, http://www.coleparmer.com/catalog/product_view.asp?sku=2160006
   d. Pipette tips, 200-1300uL, product #EW-25711-50, Cole Parmer, http://www.coleparmer.com/catalog/product_view.asp?sku=2571150
   e. MicroLite USB Temperature Data Logger, product #LITE5008. The Data Logger Store, http://www.microdaq.com/fourier/microlite_usb_logger.php
   f. Armored Thermometer, Lamotte, http://www.lamotte.com/pages/aqua/sampling.html
   g. Whirl-Pack® sterile sampling bag, 2 oz., product #EW-06499-60, Cole Parmer
   h. 90% Isopropyl Alcohol
   i. Latex Gloves
   j. Bleach

3. The following sampling protocol will be used for each sample:

   a. Prior to sample collection:
      1. 1 Whirl-Pak® bag per site.
      2. Using a Sharpie, label each bag as follows:
         a. Collection Site Number
         b. Date of Collection
         c. Collector

   b. Record the following information at each sample site:
      1. Current Weather Conditions
      2. Air Temperature
      3. Water Temperature
      4. Date and Time

   c. Sample Collection
      1. Put on latex gloves for protection and to limit sample contamination.
      2. Tear off top of bag along perforation. Avoid touching the inside of the bag.
      3. Select a spot in the middle of the flow channel.

4. Open the Whirl-Pak® bag by taking hold of the white tabs on either side of the bag, one in each hand. If you accidentally touch the inside of the collection bag, use another one.
5. Keep the bag upright and use a scooping motion to submerge the top under the water.
6. At mid-depth, pull both white tabs apart to open the mouth. Allow water to pour into the mouth until the bag is ¾ full.
7. Pull the bag out of the water, take the yellow ties on either side, one in each hand, and flip or fold the top of the bag twice to wrap up the top.
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