WATERSHED IMPROVEMENT PLAN

CHATTAHOOCHEE RIVER

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PO Box 1720
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INTRODUCTION

PURPOSE

This document is the 2011 edition of a Watershed Improvement Plan (WIP) for the identified segment of the Chattahoochee River. The objective of a WIP 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 Chattahoochee 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 Chattahoochee River is set at a target level of 175 cfu/100 ml of water, a 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 WIP 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 WIP will be used to coordinate local and State assisted remediation measures for the next 5-10 years.

PROJECT SCOPE AND REQUIREMENTS

This project focuses on an 8 mile segment of the Chattahoochee River (GA Hwy 17, Helen to SR 255) located within White County. The watershed that drains this area encompasses 550 sq/mi and includes the jurisdictions of White County and the City of Helen. The mostly rural drainage area is a small part of the HUC 0313000101 watershed. Land use in the drainage is predominately national forest land, state parkland, low-density residential and agricultural. Small areas of commercial are located within the City of Helen.

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 1998. In 2003, the Georgia EPD revised total maximum daily loads (TMDLs) for impaired stream segments addressed in the 2002 Chattahoochee River Basin Fecal Coliform TMDLs and in Fecal Coliform TMDLs developed by USEPA prior to 2002 which includes the GA Hwy 17 to SR 255 segment. A total maximum daily load (TMDL) was developed by the USEPA in 2002 to address pollutant loads in the watershed. A TMDL is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. Sources of impairment for this segment and recommended reduction in the fecal coliform loading are noted in Table 1.1. The 2003 TMDL implementation plan document states that this reach only partially supports its designated use of recreation due to fecal coliform impairment, and the river remained on the 2010 list of impaired waters.

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 13 staff in the realms of planning, economic 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 WIP.

WATERSHED IMPROVEMENT PLAN

WATERSHED LOCATION & DESCRIPTION

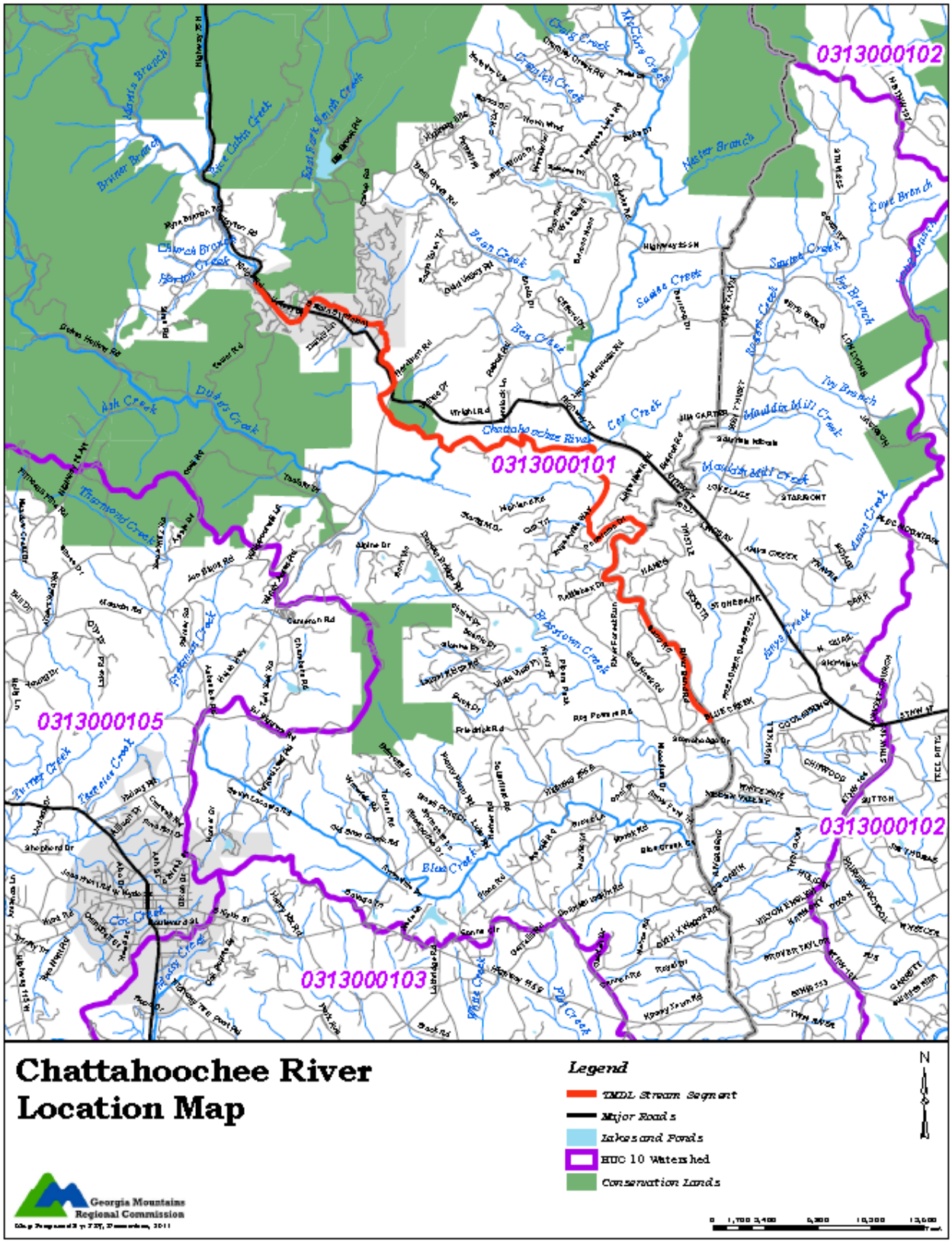
The segment of the Chattahoochee River being reviewed as part of this report is located wholly within White County, GA. The stretch runs from the City of Helen downstream to the east of the city of Cleveland. The particular drainage basin features various land uses and development types. Most of the watershed is considered rural, made up of forest and agricultural lands. The only urban area is around the City of Helen, which is about 197 acres.

Based on the 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.

Land Cover* – Chattahoochee River

	%
Forest	96.2
Pasture, Hay	2.6
Row Crops	0.5
Transitional	0.4
Other Grasses (Urban, Rec, Parks, Etc)	0.1
High Intensity Residential	0.1
Open Water	0.1
High Intensity Commercial, Ind, trans	0.1
Low Intensity Residential	0.0
Bare Rock, sand, clay	0.0
Woody Wetlands	0.0
Quarries, Strip Mines, Gravel Pits	0.0
Emergent Herbacious Wetlands	0.0
Total (acres)	***102,254***

**=The land use characteristics shown above were pulled from the Revised TMDL for the Upper Chattahoochee River, and were determined using data from Georgia's Multiple Resolution Land Coverage (MRLC). This coverage was produced from Landsat Thematic Mapper digital images developed in 1995.*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0313000101
0313000105
0313000103
0313000102
Chattahoochee River
Location Map
Legend
TMDL Stream Segment
Major Roads
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WATER QUALITY IMPAIRMENTS AND TMDLS

A Total Maximum Daily Load (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 – called the 305(b)/303(d) list – 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.

Table 1.1 Impairment Sources and Recommended Loading Reduction

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

EXISTING LOAD (1999)	TARGET TMDL	NEEDED REDUCTION
2.97E+14	4.54E+13	85%

VISUAL FIELD SURVEYS AND TARGETED MONITORING RESULTS

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 target segment of the Chattahoochee is located in two distinct character areas. The most upstream portion winds its way through the dense development of Helen, subject to high volumes of stormwater runoff and intense activity and intrusion by people. During the summer months the river is popular with thousands of tubers, many of which spend time walking within the river, kicking up the river bottom and disturbing sediment.

The remaining portion of the river runs through more rural portions of the county, with a variety of agricultural uses and residential development alongside the river. There are some animal farms and wooded areas known to harbor larger wildlife such as deer, bear and more.

Overall the river appeared in modest condition. Signs of intrusion along the banks were evident throughout, suggesting the Chattahoochee remained a popular destination for locals and visitors. None of the livestock operations showed signs of encroachment into the river, but on several occasions grazing lands were within close proximity of the banks. Most of the residential properties south of Helen also rely on septic systems, including some lots that lie close to the riverbanks. Early indications

suggest wildlife may only be a small portion of the contributing cause at this point, given the relative openness of the valley area and the denser development along the Habersham County boundary. So while wildlife will certainly remain a possible factor, the initial premise is that a variety of man-made sources and livestock might be the more prominent contributors based on proximity to the river.

Preliminary ranking of possible sources:
Livestock & Leaking septic systems
Wildlife
Urban Dev/ Runoff

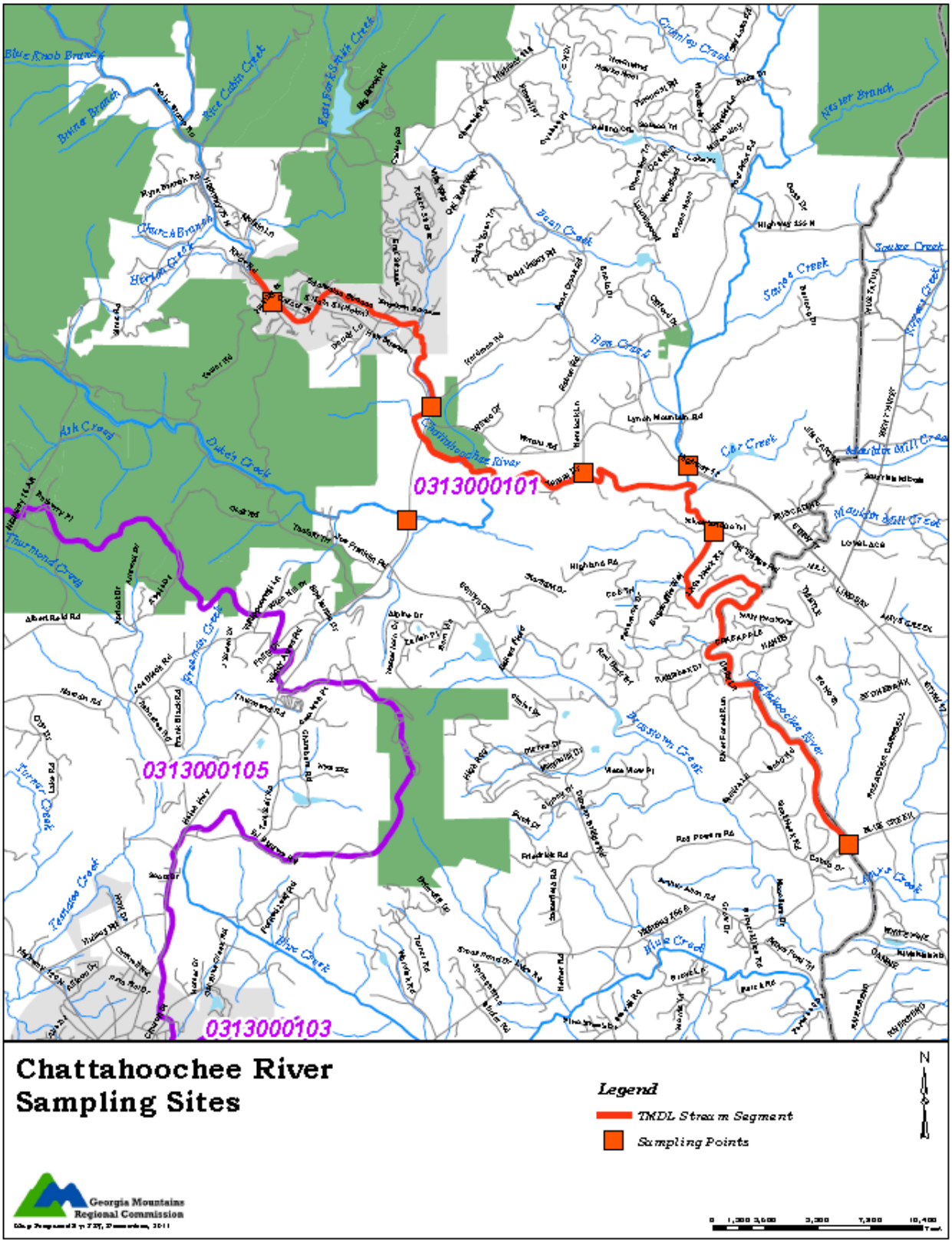
Targeted Monitoring Results

Between June 1, 2010, and September 30, 2011, GMRC staff collected samples at six previously identified sampling sites within the Chattahoochee River watershed. Using Adopt-A-Stream guidelines and recommended materials, GMRC staff performed in-house testing to monitor bacterial levels for each water sample. They also performed updated field surveys of the watershed and discussed the preliminary results of the data with local stakeholders.

Sampling locations were identified with the assistance of the White County Community Development Department. Specific sampling locations and GPS coordinates for each site are listed below. Each site featured access to the river banks adjacent to a road crossing, and most involved a point of regular access used by local residents and visitors. The locations also represented a distribution along the watershed that would represent the potential impact of the various land uses throughout the watershed, as the stream passes through the urban corridor of Helen and into the agrarian countryside of rural White County.

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**
1	Chattahoochee River @ Hamby St	34.7016600474 -83.736254385	*E. coli*
2	Chattahoochee River @ South Main St (Helen)	34.6872912407 -83.7102306912	*E. coli*
3	Chattahoochee River @ Bottom Rd	34.6782717157 -83.6852822548	*E. coli*
4	Chickamauga Creek @ Highway 17	34.679101306 -83.668085725	*E. coli*
5	Chattahoochee River @ River Bridge Trl	34.6701748481 -83.6637502292	*E. coli*
6	Chattahoochee River @ Highway 255 S	34.6276899804 -83.6419213445	*E. coli*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0313000105
0313000103
Chattahoochee River
Sampling Sites
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As could be expected, the results after/during the rain event on September 27, 2010 yielded the highest normal figures for all sampling sites. Given the amount and proximity to the river of septic tanks, agricultural activity and various wildlife within the narrow drainage basin, it stands to reason strong runoff conditions would produce significantly higher bacterial counts.

The high figures for sites 4 and 5 taken on July 16, 2010 remain an anomaly. Clearly something had occurred to introduce a high bacterial load into the river sometime before the samples were collected, but had been essentially resolved in time for the second sampling. No significant rainfall was recorded for the watershed in the 3 days leading up to that first sample collection, and to date no other probable, singular source for the pollution has been identified.

The other stand out incident are the numbers for the most-downstream point for August 24, 2011. The bacterial counts for these samples were very high compared to the norms for the rest of the year, even for the other sites for that day. Obviously a particular contamination had occurred between that site and the previous sampling site to impair the water, but no discernable source was identified.

In general the numbers have appeared pretty favorable, suggesting an improvement over the conditions that lead to the river's original placement on the 303(d) list. The counts also suggested a relative consistency of water quality. Though the susceptibility to sporadically high counts remains strong due to the dynamic use of the river and the environment of the watershed, the river's water quality may have stabilized if all the man-made influences have been brought under control.

Sampling Dates and Conditions - 2010

	Date	**7/16/10**	**7/27/10**	**8/12/10**	**9/2/10**	**9/16/10**	**9/27/10**
	Time	2-6pm	11-3pm	9 - 4pm	1-3 pm	10-2pm	12-4pm
	Temp						
1	***Air***	**77.5**	**81.1**	**88.7**	**81.7**	**77.0**	**64.9**
	Water	70.5	73.2	74.1	68.9	66.7	65.1
2	***Air***	**77.5**	**81.6**	**88.9**	**82.3**	**78.4**	**65.4**
	Water	70.7	73.6	74.6	69.2	66.9	65.4
3	***Air***	**77.9**	**83.1**	**89.2**	**83.5**	**79.1**	**66.7**
	Water	70.1	73.2	74.2	69.0	66.7	65.2
4	***Air***	**78.1**	**84.7**	**89.9**	**85.2**	**80.9**	**68.0**
	Water	70.4	73.3	74.2	68.9	66.8	65.2
5	***Air***	**78.2**	**86.3**	**90.7**	**87.4**	**83.7**	**68.6**
	Water	69.7	73.0	73.9	68.8	66.6	65.0
6	***Air***	**78.5**	**89.3**	**92.3**	**91.2**	**86.1**	**72.4**
	Water	69.9	69.1	73.8	68.6	66.3	64.8
	Conditions	Clear	Clouds	Building clouds	Clear	Light clouds	Rain - 1.5" yest. 1.2" today

For 2011, sampling site # 3 was dropped due to recent closure of the access by property owners. Future testing can occur at this site with the acquisition of a drop bucket and line to pull water from the bridge, but for this year remaining samples at this location were suspended.

Sampling Dates and Conditions - 2011

	Date	5/14/11	6/10/11	7/6/11	7/26/11	8/24/11
	Time	10AM-12PM	4-6PM	12-2PM	12-2PM	12-2PM
	Temp					
1	***Air***	63.1	85.0	75.6	85.3	80.5
	Water	69.4	71.9	73.1	74.1	78.5
2	***Air***	63.2	85.2	75.9	85.3	80.6
	Water	69.1	71.2	72.3	72.5	73.8
4	***Air***	63.6	85.6	76.1	85.6	80.9
	Water	69.8	72.2	73.1	74.3	75.0
5	***Air***	64.2	85.9	76.5	85.7	81.0
	Water	69.6	72.0	72.7	75.1	73.2
6	***Air***	66.1	86.7	77.2	86.4	81.7
	Water	69.9	73.1	73.6	76.5	75.8
	Conditions					

Raw Petrifilm Counts

Site #	Draw Date	Sample Number			Average
		1	2	3	
1	**7/16/10**	*1*	*0*	*0*	*0.33*
	7/27/10	*0*	*0*	*1*	*0.33*
	8/12/10	*1*	*1*	*1*	*1.00*
	9/2/10	*1*	*0*	*0*	*0.33*
	9/16/10	*1*	*2*	*1*	*1.33*
	9/27/10	*29*	*24*	*21*	*24.67*
	5/14/11	*0*	*1*	*1*	*0.67*
	6/10/11	*3*	*1*	*1*	*1.67*
	7/6/11	*2*	*2*	*0*	*1.33*
	7/26/11	*1*	*1*	*2*	*1.33*
	8/26/11	*0*	*1*	*0*	*0.33*

Raw Petrifilm Counts (cont'd)

2	**7/16/10**	*2*	*0*	*2*	*1.33*
	7/27/10	*2*	*2*	*2*	*2.00*
	8/12/10	*7*	*8*	*6*	*7.00*
	9/2/10	*3*	*3*	*2*	*2.67*
	9/16/10	*0*	*1*	*3*	*1.33*
	9/27/10	*31*	*27*	*22*	*26.67*
	5/14/11	*5*	*1*	*2*	*2.67*
	6/10/11	*1*	*3*	*4*	*2.67*
	7/6/11	*3*	*2*	*3*	*2.67*
	7/26/11	*7*	*7*	*3*	*5.67*
	8/26/11	*1*	*5*	*0*	*2.00*
3	**7/16/10**	*	*	*	
	7/27/10	*2*	*2*	*4*	*2.67*
	8/12/10	*3*	*1*	*4*	*2.67*
	9/2/10	*2*	*4*	*1*	*2.33*
	9/16/10	*1*	*0*	*4*	*1.67*
	9/27/10	*15*	*20*	*23*	*19.33*
	NA				
4	**7/16/10**	*TNTC*	*TNTC*	*TNTC*	
	7/27/10	*3*	*6*	*1*	*3.33*
	8/12/10	*3*	*5*	*4*	*4.00*
	9/2/10	*3*	*4*	*6*	*4.33*
	9/16/10	*2*	*7*	*6*	*5.00*
	9/27/10	*31*	*42*	*37*	*36.67*
	5/14/11	*5*	*4*	*4*	*4.33*
	6/10/11	*6*	*5*	*6*	*5.67*
	7/6/11	*6*	*2*	*5*	*4.33*
	7/26/11	*7*	*7*	*4*	*6.00*
	8/26/11	*6*	*6*	*3*	*5.00*
5	**7/16/10**	*TNTC*	*TNTC*	*TNTC*	
	7/27/10	*2*	*2*	*3*	*2.33*
	8/12/10	*5*	*4*	*5*	*4.67*
	9/2/10	*2*	*2*	*3*	*2.33*
	9/16/10	*4*	*4*	*2*	*3.33*
	9/27/10	*16*	*10*	*17*	*14.33*
	5/14/11	*3*	*3*	*1*	*2.33*
	6/10/11	*1*	*4*	*2*	*2.33*
	7/6/11	*3*	*4*	*2*	*3.00*
	7/26/11	*5*	*2*	*6*	*4.33*
	8/26/11	*4*	*3*	*7*	*4.67*

Raw Petrifilm Counts (cont'd)

6	**7/16/10**	*	*	*	
	7/27/10	*1*	*2*	*1*	*1.33*
	8/12/10	*1*	*0*	*7*	*2.67*
	9/2/10	*3*	*2*	*1*	*2.00*
	9/16/10	*8*	*10*	*6*	*8.00*
	9/27/10	*22*	*23*	*25*	*23.33*
	5/14/11	*2*	*2*	*4*	*2.67*
	6/10/11	*5*	*1*	*2*	*2.67*
	7/6/11	*3*	*3*	*3*	*3.00*
	7/26/11	*23*	*20*	*19*	*20.67*
	8/26/11	*2*	*3*	*5*	*3.33*

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

RANKING AND PRIORITIZING OF SOURCES OF IMPAIRMENT

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.

The original TMDL listed contributions to impairment coming from variants of agricultural activity and as a result of urban runoff. These were based in part due to a macro-scale assessment done for the watershed using older land cover maps and aerial imagery. The particular contributing factors as defined in the TMDL are shown below.

Source	Extent	Magnitude	Permit (Y/N)	Estimated Contribution (Rank 1-5)	Stakeholder Priority (Rank 1-5)	Comments
Agriculture						
Diffuse runoff of animal waste associated with erosion	Med	Med	N	3	4	See Below
Runoff from concentrated animal operations	Low	Med	Y	2	1	See Below
Spreading of animal waste or municipal sludge on fields	Med	Low	N	1	2	See Below
Failing septic systems	Med	Med	Y	3	3	See Below
Urban Runoff						
Intense urban land uses with impervious surfaces	Low	High	N	2	2	See Below
Illicit discharges	Low	Med	Y	1	1	See Below
Leaking sanitary sewer lines	Low	Med	Y	2	3	See Below
Failing septic systems	Low	Low	Y	2	3	See Below

The extent of any urban related issues will come from Helen and its dense urban core around a 1 mile stretch of the river that features high levels of impervious surface, buildings and walkways along the river banks, and the thousands of tourists riding tubes in the river during the summer months. The City also has a water treatment facility on the city's south side. The volume of sewer piping in the area is comparably low, but prevalent nonetheless.

The remainder of the watershed is decidedly rural in character, with some subdivisions harboring a more suburban density of about 1-acre lots. Most of these residences, businesses and churches are reliant on septic systems for the treatment of wastewater, and some older structures are built in tight hillsides within close proximity to the streams and river banks. There are some farms in the area, including some cattle operations large enough to be considered commercial, as well as some stables with several or more horses. There are also properties exhibiting row crops and commercial agriculture.

Septic Systems in White County

Total Systems - 2000	Total Systems- 1990	# of Systems Repaired 1990 - 2000
10046	5031	216

The area is heavily wooded and considered thick with wildlife. While recent DNR population estimates for deer in White County rate pretty low, this portion of the county, which includes some of the Chattahoochee National Forest, has a much larger deer presences. Other animals, including beaver, black bear and more, are also readily found in this watershed.

Estimated Agricultural Livestock in White County - 2000

Dairy Cattle	Swine	Sheep	Horse	Goats	Chickens Layers	Chickens Broilers Sold
448	3000	20	550	50	303818	18135126

Natural Resources Conservation Service - 2008

Another feature to consider among possible sources are the land application systems for the City of Helen and Unicoi State Park Lodge. These wastewater treatment facilities are permitted by the State, and were recognized as potential pollution sources within the original TMDL. However, these facilities are also readily monitored in accordance with State regulations and have not been recently cited for violations or concern within the past few years.

Existing LAS Permits within White County

Name	Permit #	Type
Helen LAS	GAU020157	Municipal
Unicoi State Park Lodge	GAU020066	Municipal

Few other prominent potential sources have been identified during this process. There is one closed landfill location within White County (Duke's Creek, ID# 154003D). This was a sanitary landfill within the Chattahoochee Basin, but it has not been cited as having issues or liability concerns in the past 5 years and is not considered a strong source of pollution.

IDENTIFICATION OF APPLICABLE EXISTING 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.

White County and the City of Helen maintain many policies and programs which illustrate their respective commitment to environmental stewardship in general. Many of these measures apply to the

Chattahoochee River, 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 Chattahoochee River.

One of the pollutant control tools that exists in White County and in the Cities of Helen and Cleveland is the Erosion Control and Sedimentation Ordinance. All of these local governments adopted the State of Georgia model ordinance that established stream protection measures for certain construction sites. White County has adopted the Turner Creek Reservoir Water Supply Watershed Protection Ordinance. This ordinance establishes stream buffers within the watershed and prohibits certain land uses within the watershed. This ordinance also prohibits the usage of septic tanks and drainfield lines within the stream buffer. Both the City of Helen and City of Cleveland administer zoning ordinances.

The White County Health Department, through rules and regulations established the Georgia Department of Human Resources administers the review and placement of septic systems for residential, commercial and industrial land uses.

In February of 2002, White County adopted five environmental protection ordinances required by the State: Water Supply/ Watershed Protection, River Corridor Protection Ordinance, Mountain Protection, Ground Water Recharge Area Protection and Wetlands Protection Ordinance. 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 the River at the point when it becomes 400 cfs. New construction is prohibited in the river corridor except for single family houses on two-acre or larger lots. Septic tanks and septic tank drainfields are prohibited in the river corridor, as are hazardous waste and solid waste landfills. These provisions help to keep pollution flowing into the river at a minimum. Potential for fecal coliform bacteria caused by leaking septic tanks is decreased by this ordinance. The state minimum standard for this ordinance is at the 400 cfs location, however, the protection measures should be extended upstream to the boundary of the Chattahoochee National Forest.

The Wetlands Protection Ordinance protects wetlands alterations that will significantly affect or reduce their primary functions for water quality control, floodplain and erosion control, groundwater recharge, aesthetic nature, and wildlife habitat. This protection is achieved through land use controls on lands surrounding wetlands. The floodplain control measures contained in the ordinance 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 that 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.

Voluntary environmental stewardship programs within the County include an active White County Adopt-A-Stream effort begun in 1999. The County is assisted in the program 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. This group pays particular attention to the valley through which the Chattahoochee River runs, and has a vested interest in the rural beauty and tourist appeal of the watershed.

The City of Helen has also supported volunteer efforts by partnering with the Upper Chattahoochee Riverkeeper and the local tubing outfitters to hold semi-annual river cleanup days, as well as supporting water sampling efforts done intermittently through North Georgia Technical College.

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 WIP 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.

BMP	Pollutant Source	Estimated Effectiveness	Estimated Load Reduction (%)	Cost Estimate	Public Support (1-5)	Install Priority	Comment
Survey Application of Agricultural BMPs	Diffuse runoff of animal waste	High	20%	$5,000	3	4	See Below
Education Materials	Diffuse runoff of animal waste; Failing septic systems	Med	10%	$3,000	5	5	See Below
Inventory of Septic Systems	Failing septic systems	Med	20%	$5,000	4	4	See Below
Targeted surveys and clean-up events	Diffuse runoff of animal waste	Low	10%	$5,000	3	4	See Below
Application of Stormwater BMPs							

- *Detailed Inventory of Septic Systems*
  The White County Health Department should conduct a septic tank survey to identify those locations with septic tanks maintenance problems. Once the location of the septic tanks are determined, and if they are within or in close proximity to a municipal waste treatment system, a "Septic to Sewer" incentive program should be implemented to encourage conversion from the use of a septic tank to the use of the two cities sewer systems. An educational program teaching citizens about the importance of septic tank repair and maintenance could help reduce leaks from septic tanks.

- *Survey Application of Agricultural BMPs*
  The presence of any livestock operations in the valleys suggests these 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 County, local Farm Bureau 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 Chatahoochee 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 the City of Helen 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 Chattahoochee River could aid in this effort by providing targeted information to critical stakeholders, building a stronger sense of vested interest among property owners and business owners and hopefully increasing awareness and support for BMPs and mitigation measures. This could include promotional material illustrating the health of the Chestatee River watershed and special guidance about WIP related activities and issues.

- *Application of Stormwater BMPs*
  The development of a program and system to treat stormwater runoff before it enters the river should be adopted by the county and both cities. This treatment may be in the form of physical

structures like ponds or devices installed in the storm water traps to facilitate the fallout of pollution before it enters into the river. The use of any chemicals that may be harmful to wildlife in the area should be avoided.

Some of the above measures can be implemented easily and cheaply through special application and coordination of existing programs and work at each government. Reviews of permits and updating of GIS information are regular facets of County operations, and provided the time frame is permissible the County's would only need to make special notice of efforts related to the Chattahoochee 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 County, City 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.

PARTNERSHIP ADVISORY COUNCIL AND PARTNER ORGANIZATIONS

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 governments 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 County. This means an advisory council to help guide efforts concerning the Chattahoochee 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 WIP development.

Specific measures regarding the Chattahoochee 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 WIP.

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
Georgia Forest Watch	15 Tower Road	Ellijay	30540	706-635-8733	info@gafw.org
Chris Ernst; White Co.	59 South main Street	Cleveland	30528	706-865-3911	cernst@whitecounty.net
Duncan Hughes; SWRA	NGT, PO Box 65	Clarkesville	30523	706-754-7872	dhughes@northgatech.edu
Jason Ulseth; Upper Chatt. Riverkeeper	615F Oak Street, Suite 1000	Gainesville	30501	770-531-1064	julseth@riverkeeper.org
Denise, White County Farm Bureau	PO Box 849	Cleveland	30528	706-865-3177	
Sherrill Dockery, NRCS		Cleveland	30528	706-865-2912	
Unicoi State Park Lodge	1788 Highway 356	Helen	30545	706.878.2201	

SCHEDULE OF SEQUENTIAL MILESTONES

The following table presents the recommended implementation schedule for to-be-completed actions or newly proposed remediation measures. This assumes the County, City and other stakeholders are continuing with existing and ongoing measures already discussed in this WIP and/or all previous TMDL plans and reports for the Chattahoochee River.

	Timeline	
Action Item	**Begin**	**End**
Promulgation of the WIP	1/12	NA
Update map of septic systems by parcels (As needed)	1/12	6/12
Review of agricultural BMPs within the watershed	3/12	9/12
Convene PAC; Review progress with implementation (1x per year)	6/12	NA
Review and update maintenance of the sewer lines within the watershed	6/12	6/13
Targeted stream bank surveys and clean-ups (2 x per year)	2012	2017
Targeted water sampling for delisting	2014	TBD

Interim Measureable Milestones

Part of this process included the development of interim, measurable milestones to gauge progress in implementing the management measures for the watershed. These milestones will measure the implementation of the management measures, such as whether they are being implemented on schedule, as identified and without difficulty.

Action Item	**Date**	**Milestone**
Promulgation of the WIP	NA	Summary memo re: distribution
Update map of septic systems	6/12	Copy of latest map for files
Review of agricultural BMPs	9/12	Summary of discussions w/ utilities
Convene PAC	NA	Copy of minutes
Review/ update maintenance of sewer lines	6/13	Summary memo of effort
Targeted stream bank surveys and clean-ups	2017	Copies of promotional material
Targeted water sampling for delisting	TBD	Application for assistance

In addition to the identified milestones, the GMRC and White County could collaborate in producing a simple, annual memorandum identifying progress with implementation measures for use in reporting to the PAC, EPD and other stakeholders.

PUBLIC INVOLVEMENT

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 White County, the City of Helen, Upper Chattahoochee River Keeper, and other stakeholders. Notices were also provided to the GMRC Council at select council meetings.

A total of 4 comments/questions were received as part of this process, listed as follows:

- *Is the City of Helen (in compliance) with their rules regarding wastewater? That's the biggest concentration of sewer lines around the river, and previous testing by students from North Georgia Technical College have indicated bacteria levels are agitated by the foot traffic of tubers in the river.*

- *Previous efforts to engage the local Farm Bureau said they're doing "all they can" to promote good fencing for animals and to keep manure from running into the waters. There are still some farms with cattle or horses that can get pretty close to the river.*

  There's also a great deal of wildlife in the area. A lot of wooded areas harbor deer, bear and other creatures. Chances are they're contributing to any problems.

- *The City of Helen is supposed to be working on any problems from their end of the river. What about septic systems? How many are in the watershed? Do any of them get real close to the river? There are a good number of older homes in the valley that might have older septic tanks that need to be flushed. Not sure how you force people to do that, though. Can the County or State help people pay for that kind of stuff?*

- *Not really sure of sources. Plenty of farm animals and wildlife in the area.*

Future public involvement will be more aggressively encouraged through specialized promotional and educational material, as well as efforts to include water sampling and monitoring within proposed training and outreach programs for Adopt-A-Stream. Classes from North Georgia Technical College will also be invited to participate in remediation and monitoring projects. Notices about efforts to pursue delisting of the Chattahoochee River will be featured within environmental notices shared by White County, raising awareness about both the river and the overall stewardship programs of local stakeholders.

It has been recommended the County also find a way to support a regular environmental advisory committee. The Chattahoochee River is a prominent water resource for the entire State, but there is no standing body to regularly champion and monitor the health of the watershed within White County, which is the river's headwaters and a critical resource to the County and both municipalities. 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.

RECOMMENDATIONS FOR MONITORING AND CRITERIA FOR MEASURING SUCCESS

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.

One facet of criteria should be the confirmation of data and conditions through County and City programs, utilities or efforts. This can hopefully be done at little to no extra cost by the verification and update of select of records and special actions for the Chattahoochee River as part of routine maintenance. This would include the following items:

- Accurate and current inventory of septic systems within the watershed, with as much detail about age and repair history as possible;
- Confirmation of agricultural operations within the watershed and the extent of BMP application;
- Confirmation of no suspected illicit discharges within the watershed;
- Confirmation of no leaks from sewer lines and pump station within the watershed;
- Confirmation of no suspected illicit discharges within the watershed;
- Confirmation that all applicable BMPs are being practiced by the City, business and property owners and the utility managers.

These actions can be scheduled for the convenience of County and City staff where applicable. Any activities requiring additional financial support or additional manpower can be pursued as grant opportunities or the governments can ask other partners (GMRC) to assist. Achievement of the above will at least rule out the probability that any lingering pollution would stem from those sources, and allow the stakeholders to concentrate on animal waste within runoff. Such measures would also ensure the long-term integrity of the stream is more secure due to the overall vigilance and increased knowledge available to the County and City.

The next foremost criteria for monitoring progress would be the eventual development of a SQAP and pursuit of formal testing to have the Chattahoochee River officially removed from the 303(d) list. Should this be performed and the delisting accomplished, then the watershed efforts for the Chattahoochee can focus on maintenance. Should the effort reveal a continuing problem, the new data can be used to further isolate the probable cause.

All other measures and criteria can be pulled from the list included within the **SCHEDULE OF SEQUENTIAL MILESTONES**.

APPENDICES

A. **USEPA Guidelines for Watershed Planning**
B. **Watershed Maps**
C. **Land Use Maps**
D. **Field Notes and Pictures**
E. **Copies of Public Notices and Other Literature**
F. **Meeting Minutes**
G. **Targeted Monitoring Program**

APPENDIX A - USEPA Guidelines for Watershed Planning

GA EPD recommends that the Watershed Improvement 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;

   Addressed in "Ranking and Sources of Impairment," pages 10-11.

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

   Addressed in "Recommendations for Management Measures," pages 14-18

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;

   Addressed in "Recommendations for Management Measures," pages 14-18

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

   Addressed in "Recommendations for Management Measures," pages 14-18

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

   Addressed in "Public Involvement," page 21

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

   Addressed in "Schedule and Sequential Milestones," page 20

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;

   Addressed in "Schedule and Sequential Milestones," page 20

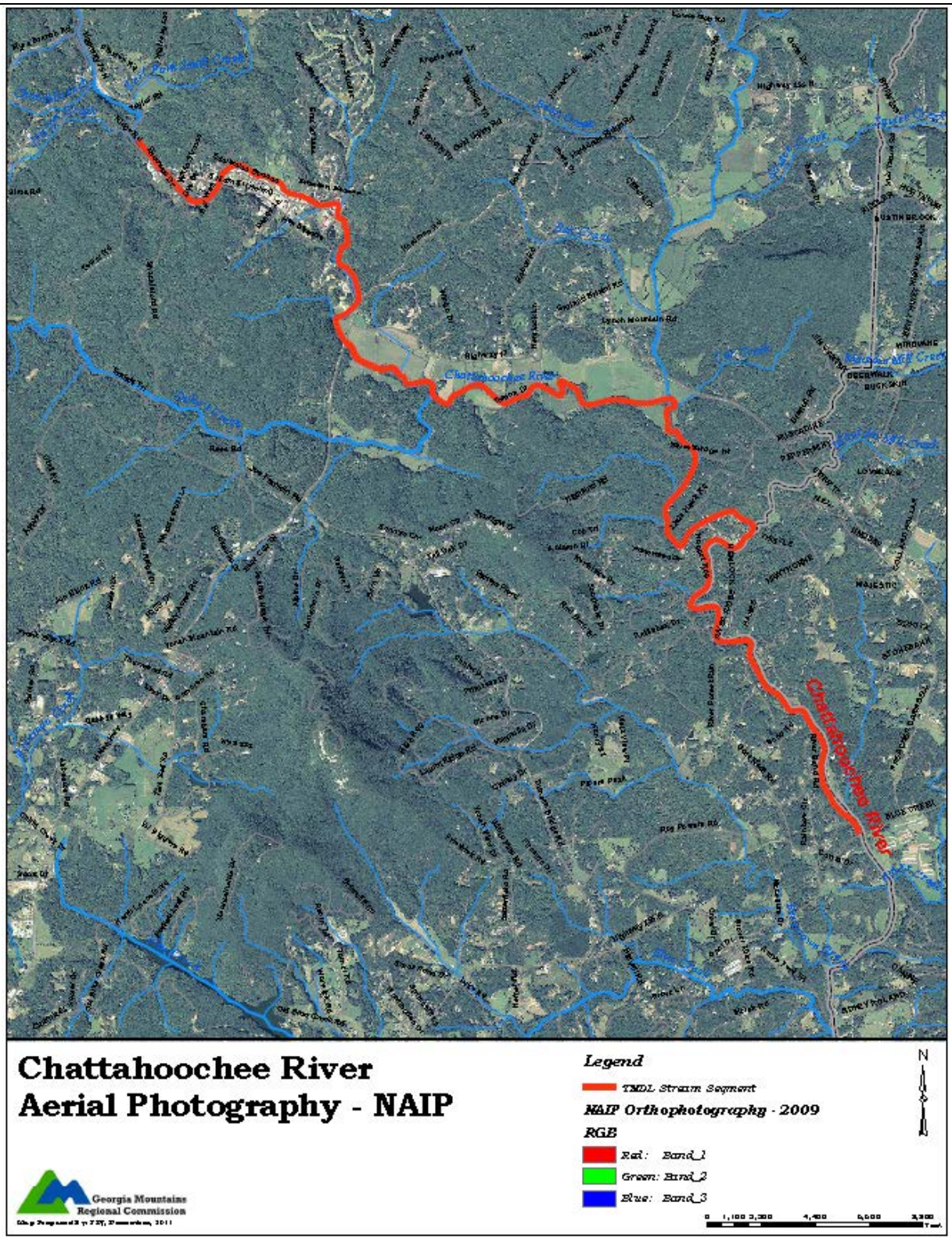
8) A set of criteria that can be used to determined whether substantial progress is being made towards attaining water quality standards and, if not, the criteria for determining whether the plan needs to be revised; and;

   Addressed in "Recommendations for Monitoring and Criteria for Measuring Success," pages 21, 22

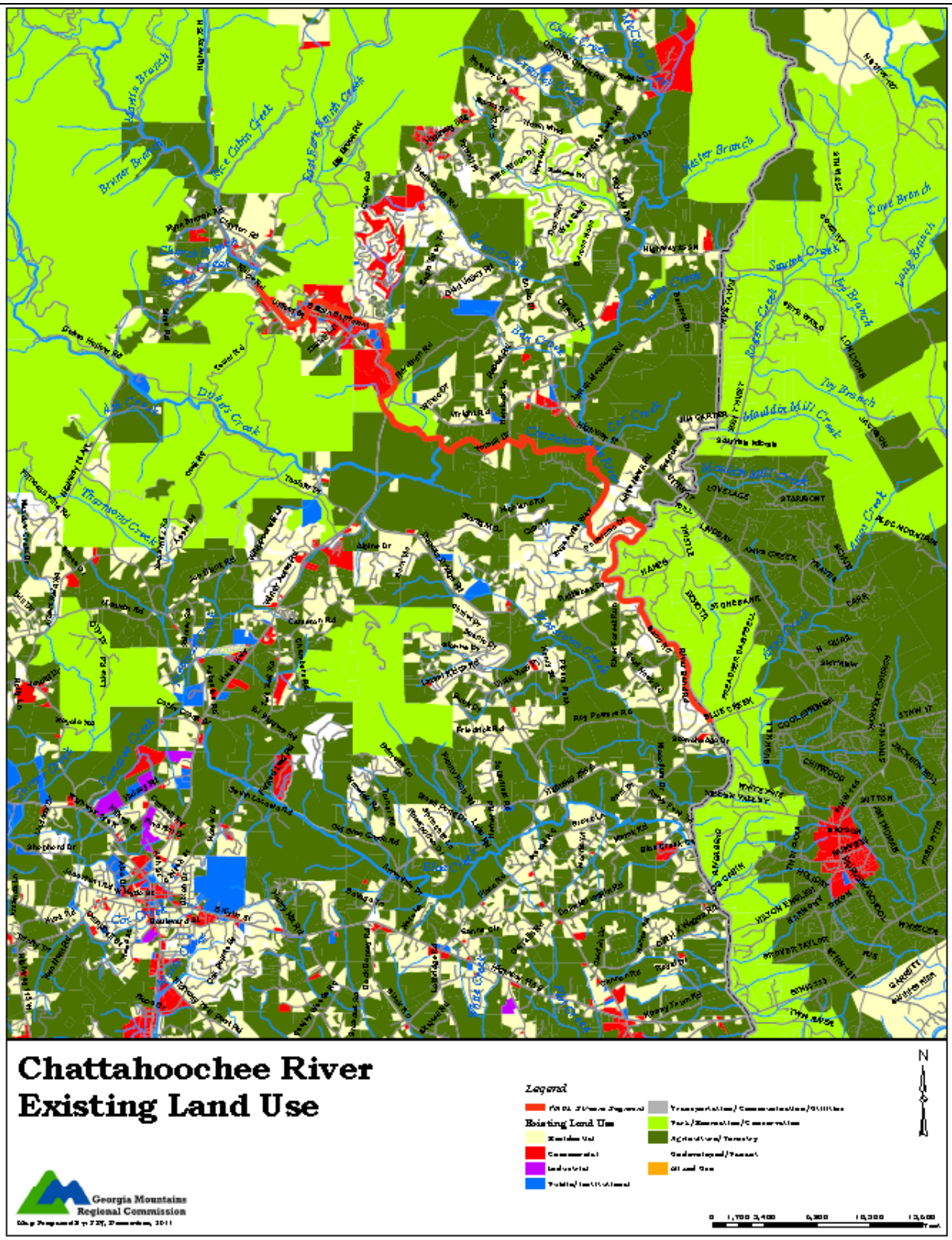
9) A monitoring component to evaluate the effectiveness of the implementation efforts, measured against the criteria established under item (8).

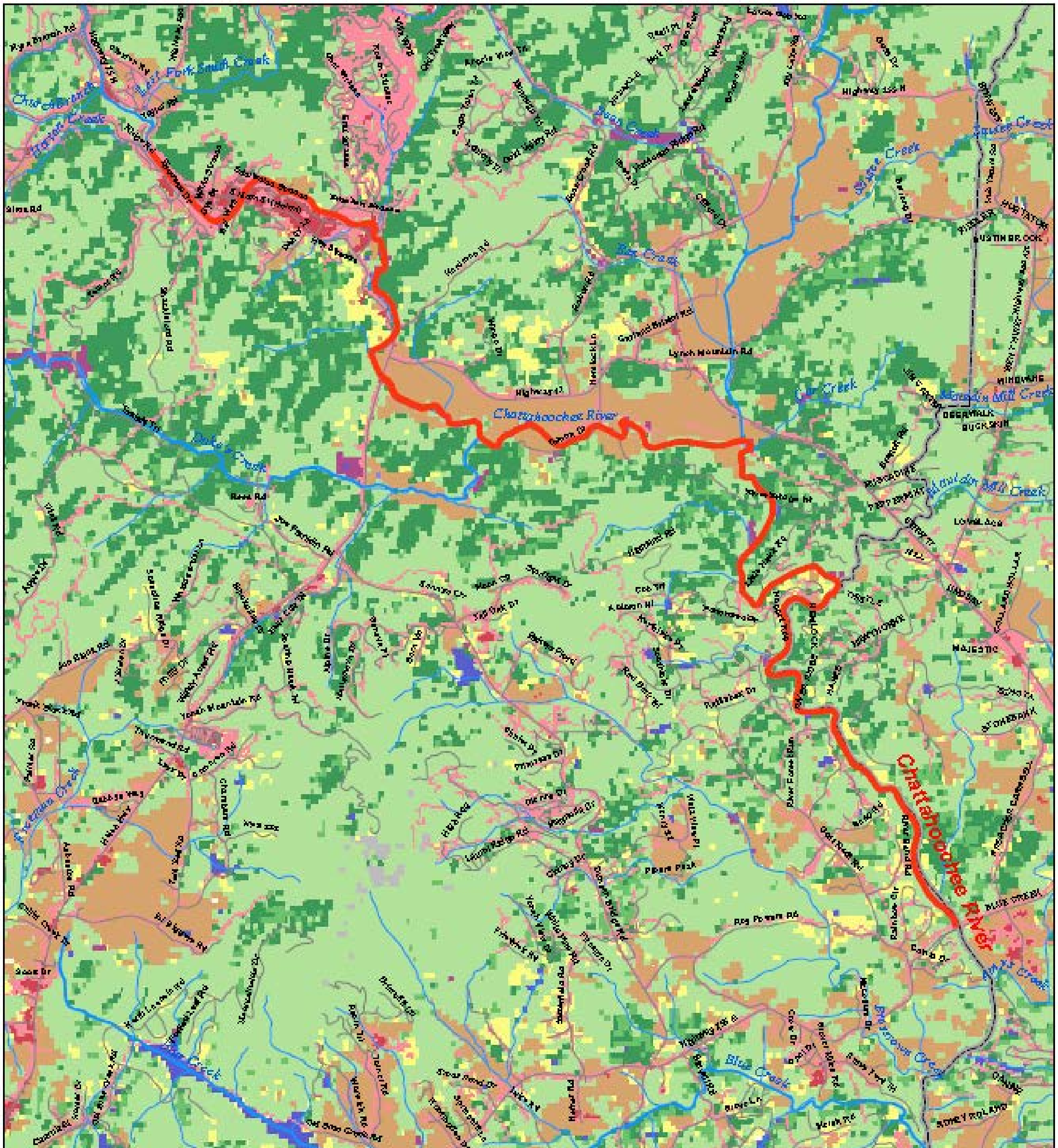
Addressed in "Recommendations for Monitoring and Criteria for Measuring Success," pages 21, 22

APPENDIX B - Watershed Map



APPENDIX C - Land Use Maps





Chattahoochee River
Georgia Land Use Trends -
Land Cover of Georgia 2008

Legend

TMDL Stream Segment

N

Georgia Mountains
Regional Commission

APPENDIX D - Field Notes, Maps And Pictures

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

Blue Creek Road – This is a very nice part of the river with high banks and gurgling shoals at the bridge crossing. Wooded slopes with mixed pine and hardwood are predominant. Some erosion is occurring along the banks.

Bottom Road – Gravel Road with timber bridge crossing. This testing site is located in a section of the river containing a large amount of rock and debris. Area is surrounding by agricultural fields and grazing land. Rocky outcrops extend outward from bank into the run of the river complimenting shoals and creating waterfalls. Upstream of this crossing is large accumulations of alluvial deposits associated with bank erosion and run off from surrounding fields.

Helen Highway Bridge – This section of the river is bounded on the south by steep slopes while the north bank is exposed to agriculture and livestock grazing. The upstream section is defined by thick stands of mixed hardwood and overhanging privet. Bank erosion appears to be from moderate to high. Discoloration appears on river bottom and rocks.

Hardeman Road – Northeast of this road crossing lies the Old Hardeman Road (closed). This area is subject to heavy erosion and sediment accumulation due to the erosion of surrounding slopes. These slopes have been cleared cut and scraped. Banks have numerous rock outcrops. Septic tanks and ag/livestock runoff pose an impact to water purity in this area.

APPENDIX E - Copies of Public Notices And Other Literature

The following announcement was shared via email and posted in various locations around the watershed.

PUBLIC REVIEW AND HEARING OPPORTUNITY

to discuss

WATERSHED IMPROVEMENT PLANS

~

for ET Creek (Hall County) and the Chattahoochee River (White County)

DATE	**LOCATION**
6/28/11 – Tuesday	GMRC offices
1-3 PM	1720 West Ridge Road, Gainesville, GA 30503

The above listed water bodies have been the target of recent remediation efforts to remediate previous concerns regarding possible bacterial contamination. As part of continuing efforts to ensure progress is being made to sustain water quality, the State and other stakeholders are now updating surveys and knowledge about the watersheds.

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

APPENDIX F - Meeting Minutes

There were no appearances at either public comment opportunity. Comments provided by stakeholders identified within the plan (as received during phone and personal communications with GMRC staff throughout the planning period) have been included within the general text.

APPENDIX G - Targeted Monitoring Program

Targeted Monitoring Plan

Chattahoochee River (GA Hwy 17, Helen to SR 255) HUC#0313000101

September 2009

Prepared and Submitted by the

Georgia Mountain Regional Commission
Planning Department
www.gmrdc.org/Planning.htm

Table of Contents

I. Introduction and Study Objectives

A. General Watershed Conditions

The Chattahoochee River (GA Hwy 17, Helen to SR 255) segment is 8 miles in length and is located within White County. The watershed that drains this area encompasses 550 sq/mi and includes the jurisdictions of White County and the City of Helen. The mostly rural drainage area is a small part of the HUC 0313000101 watershed. Land use in the drainage is predominately national forest land, state parkland, low-density residential and agricultural. Small areas of commercial are located within the City of Helen.

The stream segment was listed on the Georgia 303 (d) list of impaired water bodies due to high fecal coliform readings obtained during sampling events in 1998. In 2003, the Georgia EPD revised total maximum daily loads (TMDLs) for impaired stream segments addressed in the 2002 Chattahoochee River Basin Fecal Coliform TMDLs and in Fecal Coliform TMDLs developed by USEPA prior to 2002 which includes the GA Hwy 17 to SR 255 segment. A total maximum daily load (TMDL) was developed by the USEPA in 2002 to address pollutant loads in the watershed. A TMDL is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. Sources of impairment for this segment and recommended reduction in the fecal coliform loading are noted in Table 1.1. The 2003 TMDL implementation plan document states that this reach only partially supports its designated use of recreation due to fecal coliform impairment.

Table 1.1 Impairment Sources and Recommended Loading Reduction

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

B. Monitoring Objectives

Georgia EPD and Georgia Mountains Regional Commission are partners in a contract to track potential pollutant sources in the watershed. White County is providing technical assistance to GA EPD and GMRC through contribution of land use data, oversight of sample site selection, and through the input of local knowledge of the watershed.

The watershed assessment and monitoring data results will be used to determine the impact of newly implemented local land use regulations, newly installed BMP's, and water/wastewater infrastructure improvements as well as to influence the type of management practices that will be proposed for implementation by land and resource managers if additional loading reduction is deemed appropriate.

II. Sampling Locations

Sampling locations were identified with the assistance of the White County Community Development Department. Specific sampling locations and GPS coordinates for each site are listed below in Table 2.1. A map of the sampling locations may be found in Figure 1. Samples will be collected on the upstream side of the bridges at road crossings.

Table 2.1 Sampling Stations

Station Number	General Location	Sampling Site Coordinates	Sample Parameters
1	Chattahoochee River @ Hamby St	34.7016600474 -83.736254385	*E. coli*
2	Chattahoochee River @ South Main St (Helen)	34.6872912407 -83.7102306912	*E. coli*
3	Dukes Creek @ Helen Hwy	34.6719916158 -83.7141143054	*E. coli*
4	Chattahoochee River @ Bottom Rd	34.6782717157 -83.6852822548	*E. coli*
5	Chickamauga Creek @ Highway 17	34.679101306 -83.668085725	*E. coli*
6	Chattahoochee River @ River Bridge Trl	34.6701748481 -83.6637502292	*E. coli*
7	Chattahoochee River @ Highway 255 S	34.6276899804 -83.6419213445	*E. coli*

(2011 Editor's Note – Sample Site #3 was abandoned due to lack of access to private property)

III. Procedures for *E. Coli* Monitoring

A. *E. Coli*

1. 6 sites will be monitored.

   a. Sites are sampled once a month in November 2009, December 2009, January 2010, February 2010, March 2010, April 2010, May 2010, June 2010, July 2010 and August 2010.
   b. 1 sample will be collected per site per month over a 10-month period.
   c. There will be a total of 7 samples per month and 70 samples over a 10-month period.

   Samples will be collected by EPD-trained staff from the Georgia Mountains Regional Commission.

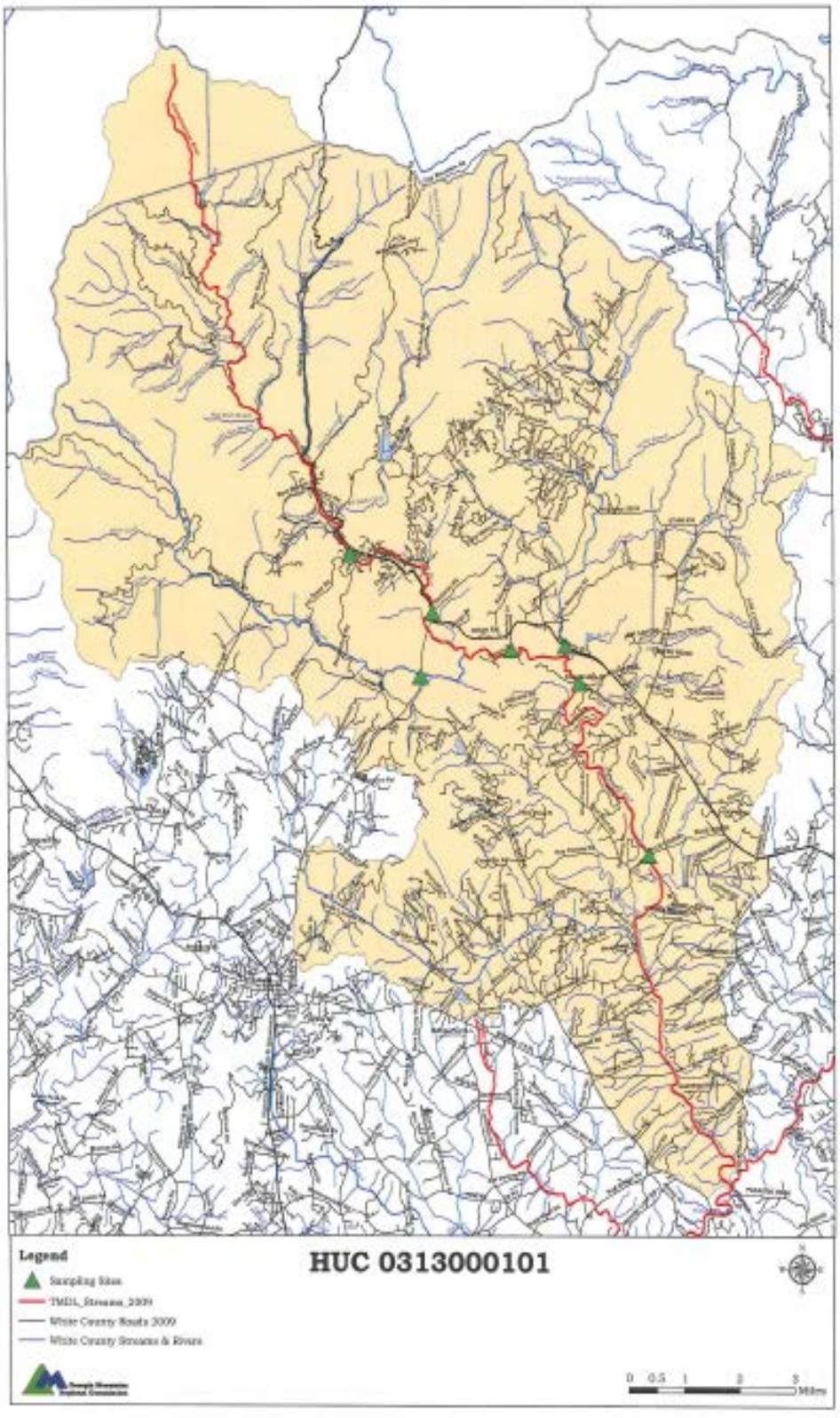
2. Staff from the Georgia Mountains Regional Commission, who will collect *E. coli* samples, were trained by GA EPD Adopt-a-Stream personnel on January 7, 2009 in *E. coli* sampling and testing. Volunteers from the stakeholder list will also collect *E. coli* samples. These volunteers were trained by GA EPD Adopt-a-Stream personnel on _____, 2009.

3. 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

Figure 1



4. Documents and Records

a. Georgia Adopt-a-Stream *E. coli* Data Form- to record official field notes for current weather, air and water temperature, previous 48 hours rainfall (yes or no), date and time.

IV. Schedule

Month	Sampling Site	Parameter
November	1-7	*E. coli*
December	1-7	*E. coli*
January	1-7	*E. coli*
February	1-7	*E. coli*
March	1-7	*E. coli*
April	1-7	*E. coli*
May	1-7	*E. coli*
June	1-7	*E. coli*
July	1-7	*E. coli*
August	1-7	*E. coli*

One sample for *E. coli* will be collected at each station once a month from November 2009-August 2010.

V. Quality Assurance

A. Georgia EPD, Georgia Mountains Regional Commission are partners in a contract to track potential pollutant sources in the watershed. White County participated in sampling site selection based on where they wanted to screen for water quality, development patterns and confluence of tributaries. The watershed assessment and monitoring data results will influence what actions the local governments can take to reduce pollutant loadings.

B. Field Quality Assurance

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

   a. The Grab samples for quantification of *E. coli* bacteria will be collected at 6 stations on the Chattahoochee River between GA Hwy 17 in Helen and SR 255.

   b. Prior to sample collection:
      1. 1 Whirl-Pak® bag per site.
      2. Using a Sharpie, label each bag as follows:
      3. Stream Name
      4. Collection Site Number
      5. Date of Collection
      6. Time of Collection
      7. Collector

   c. Record the following on the Georgia Adopt-a-Stream *E. coli* Data Form at each sample site:
      1. Current Weather Conditions
      2. Overcast
      3. Partly Cloudy
      4. Clear/Sunny
      5. Air Temperature
      6. Water Temperature

7. Date and Time

d. 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. Stream name
        b. Site number
        c. Date of collection
        d. Collector
    3. The Georgia Adopt-a-Stream *E. coli* Data Form found in the Appendix will be completed by Georgia Mountain Regional Commission staff for petrifilm results.
    4. 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.
    5. Plates will be stacked and placed in the Hova-Bator incubator calibrated to 35° C for 24 hours.
    6. 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.
    7. Incubator temperature will be monitored over a 24-hour period with a Microlite USB Temperature Data Logger.
    8. 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. Volunteers from the stakeholder list, as well as staff from the Georgia Mountains Regional Commission will collect the samples with equipment obtained by the Georgian Mountains Regional Commission. Volunteers will be trained by GA EPD staff prior to any collection.

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" (determined by whom and where?), 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.

VI. Records Retention

Records will be maintained by the Planning Department of the Georgia Mountains Regional Commission located at 1310 West Ridge Road, Gainesville, GA 30501 for a period of three (3) years from the conclusion of the project and will be available for review.

Appendix

Water Quality Data from GA EPD for the Chattahoochee River

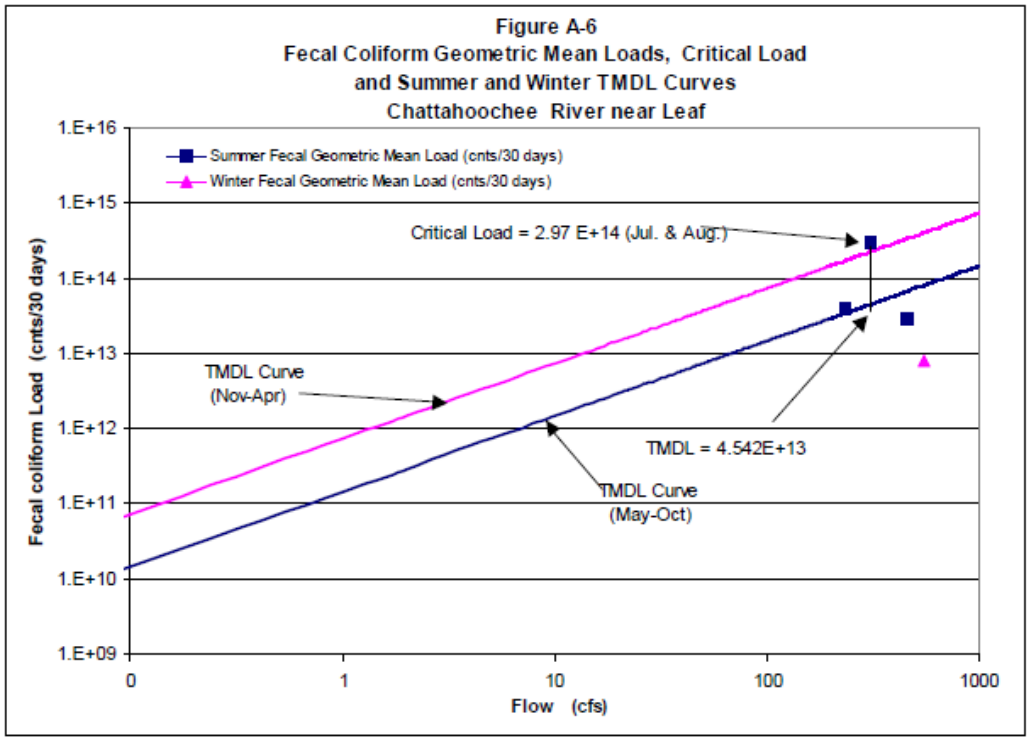


Table A-6. Data for Figure A-6, including: observed fecal coliform, instantaneous flow fecal coliform load, fecal coliform geometric mean, mean flow, fecal coliform geometric mean load.

Date	Observed Fecal Coliform (counts/100 ml)	Estimated Instantaneous Flow On Sample Day (cfs)	Estimated Fecal Coliform Loading on Sample Day (cnts/30 days)	Geometric Mean (cnts/100 ml)	Mean Flow (cfs)	Geometric Mean Fecal Coliform Loading (cnts/30 days)
19-Jan-00	20	553.00	8.11E+12			
3-Feb-00	20	539.00	7.91E+12			
8-Feb-00	20	484.00	7.10E+12			
17-Feb-00	20	627.00	9.20E+12	20	550.75	8.08E+12
16-May-00	110	476.00	3.84E+13			
18-May-00	50	497.00	1.82E+13			
22-May-00	20	468.00	6.87E+12			
5-Jun-00	490	396.00	1.42E+14	86	459.25	2.89E+13
17-Jul-00	330	237.00	5.74E+13			
24-Jul-00	790	296.00	1.72E+14			
31-Jul-00	16000	429.00	5.03E+15			
8-Aug-00	700	275.00	1.41E+14	1,307	309.25	2.97E+14
11-Sep-00	330	210.00	5.08E+13			
18-Sep-00	50	166.00	6.09E+12			
25-Sep-00	490	371.00	1.33E+14			
4-Oct-00	330	195.00	4.72E+13	227	235.50	3.93E+13

Copy to: Georgia Mountains RDC
1310 West Ridge Road

To be conducted every month (triplicate samples)

NOTE: Georgia Mountains RDC contract volunteers – To be conducted every scheduled sampling period/ event/ season/ quarter

Use this form and the Adopt-A-Stream methods to record important information about the health of your stream. By keeping accurate and consistent records of your bacterial (*Escherichia coli*) tests, you can document current conditions and changes in water quality.

AAS group name:		**County:**	
Group ID number:			
Investigators:			
Stream name:			
Date:	**Time:**	**Time Spent Monitoring (min):**	**Photo Documentation?** yes/no
Site/location Description:			

Run 3 tests plus one blank (0) for each site:

	Site ID	Air Temp	Water Temp	Plate 0	1	2	3	Total # colonies	CFU/ 100ml	Comments:
1								x 33.33		
2								x 33.33		
3								x 33.33		
4								x 33.33		
5								x 33.33		
6								x 33.33		
7								x 33.33		
8								x 33.33		
9								x 33.33		
10								x 33.33		

Rain in last 24 hours: ☐ heavy rain ☐ steady rain ☐ intermittent rain ☐ none

Present conditions: ☐ heavy rain ☐ steady rain ☐ intermittent rain ☐ overcast ☐ partly cloudy ☐ clear/sunny

Amount of rain, if known? _____ inches in last _____ hours/days

Incubator Type	**Time In**	**Start Temperature**	**End Time**	**End Temperature**
Comments:				

Note: *E. coli* must be incubated for 24 hours at 35 degrees Celsius, +/- 1 degree

Chain of Custody Record

Additional Copy to: Georgia Adopt--Stream

4220 International Parkway

Feed & Environmental Watr Laboratory
2300 College Station Road; Athens, GA 30602
ATTN: Laura Daniel

Client Name: Northeast Georgia Regional Development Center	**Client's Address:** 305 Research Drive Athens, GA 30605
Contact's Name: Lee Carmon	
Contact's Phone Number: 706.369.5650	**Submitting County (if applicable):**
Fax Number: 706.369.5792	**Site Location:**
Samplers:	**E-mail address:** lcarmon@negplanning.org

Sample Type	Sample Identification	Date Sampled	Time Sampled	Analysis	FEW Lab #

Sent by: (signature)	**Preservation Method: packed in cooler with frozen ice bags.**	**Received by: (signature)**
Date Sent:	**Time Sent:**	**Title:** **Date:**