Salacoa Creek Watershed Management Plan

A Local Stakeholder and Georgia EPD Approved Plan
that Outlines the Framework for Improving Water Quality
in the Salacoa Creek Watershed

Acknowledgements

Limestone Valley Resource Conservation and Development Council, Inc., would like to express its appreciation to the many organizations and individuals that assisted with the research and compilation of information presented in this plan. First and foremost, Limestone Valley wishes to thank the Environmental Protection Agency and the Georgia Environmental Protection Division for funding the preparation of this document. Additionally, the council would like to thank the many individuals associated with the Natural Resources Conservation Service and Calhoun Utilities that contributed many hours by providing resource information and guidance. Other organizations that contributed to this plan include the City of Calhoun, Coosa River Soil and Water Conservation District, Georgia Soil and Water Conservation Commission, Gordon County Commission, Gordon County Environmental Health Department, Kennesaw State University, New Echota Rivers Alliance, and The Nature Conservancy. It is the hope of Limestone Valley RC & D that the information presented here, as well as the cooperative partnerships formed during this process, will work to improve the water quality in the Salacoa Creek Watershed in Georgia.

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Several stream segments within the Salacoa Creek Watershed fail to meet criteria set by the State of Georgia for pathogens and biotic integrity, which respectively tend to be impairments that stem from excessive fecal contamination and sediment loading. Due to these impairments, load reductions of these nonpoint source pollutants are necessary in many areas within the watershed. The need for a further effort to identify consistent sources of these pollutants and work towards addressing the load reductions led to the creation of this Watershed Management Plan. The plan includes the Nine Elements as recommended by the Environmental Protection Agency, and outlines a process for implementing the load reductions necessary for watershed restoration. Development of the plan also featured a stakeholder-driven process to build momentum and partnerships with the local community that could assist in its implementation. The plan has been written by Limestone Valley Resource Conservation and Development Council as a deliverable associated with a Environmental Protection Agency Clean Water Act (§319) grant administered by the State of Georgia.

This Watershed Management Plan recommends a multi-faceted Salacoa Creek Watershed Initiative in order to focus on load reductions of fecal coliform bacteria and sediment from agricultural, residential, and urban sources. The idea was conceptualized in an effort to play on the strengths of the various project partners, and could complement existing conservation programs (e.g. Environmental Quality Incentives Program, etc.). Smaller projects, however, could be devised that address individual components of the recommended program should an organization seek funding. As part of the recommended program, agricultural lands were identified for targeting load reductions through cost-shares with landowners for the installation of Best Management Practices. The agricultural practices implemented will vary according to the interests of the farmers, but will likely include heavy use area protection, stream access control for cattle coupled with alternative watering systems, and stream buffer enhancement. Natural Resource Conservation Service will be a key contributor to the success of this program component. Residential lands could also be targeted to reduce the contributions of fecal coliform bacteria from human sources by addressing septic system issues. This will include cost-shares on septic system repairs focused near streams and intermittent conveyances, and elsewhere in the watershed to build further momentum. For this program component, it is anticipated that Northwest Georgia Health District will play a key role.

In addition to actual “on-the-ground” projects, this document outlines outreach activities for volunteers that were identified by the stakeholder group as having the potential to contribute toward the reduction of pollutant loads and/or further educate the community about watersheds and the importance of water

quality, as well as soil and water conservation. The success of outreach and education efforts will be maximized through effective partnerships with several groups. This Watershed Management Plan recommends that these educational and "on-the-ground" management measures be implemented collectively across several grants, with each grant also involving monitoring to reevaluate watershed conditions.

As part of the development process for this watershed management plan, estimates were prepared to consider the time and funding from 319 sources likely needed to accomplish restoration goals. These estimates were based on the assumption that the recommended multi-faceted watershed restoration effort would be pursued, as opposed to a piecemeal approach. Other sources of funding (mainly anticipated in the form of in-kind donations from stakeholders, agencies, and non-governmental organizations) were not estimated, but were assumed to contribute significantly to the program. In order to come up with a financial estimate, the extent of work within the watershed needed for complete watershed treatment was first conceptualized using Geographic Information Systems analysis and inspection of aerial photography. Next, the extent of the total watershed treatment that would likely be necessary to result in the de-listing of the majority of impaired stream segments was estimated. Finally, the stakeholder recommended projects that these funds would finance were arranged in an implementation schedule that spans several years (including grant proposal submission periods). The proposed implementation schedule includes all grant activities including water quality monitoring, education and outreach activities, and conservation activities (e.g., agricultural Best Management Practices, septic system repairs, etc). Each of these activities was assumed to continue through each grant implementation period. The stakeholders recommended three consecutive grant implementation periods to be pursued, with the belief that it may allow for significant improvements within the watershed. After this period of time, it is expected that some impaired stream reaches will have been de-listed and others will at least be improved and approaching compliance with state criteria. Success in this endeavor would depend on a number of variables, and priorities will be evaluated and altered throughout the multiple year periods to maximize results.

1. Plan Preparation and Implementation

The following section is intended to provide the impetus for this Watershed Management Plan, explain the approach for its development, describe how the creation of a broad-based stakeholder committee assisted in guiding the process, establish the ultimate goals of the plan, and provide an outline of the Watershed Management Plan.

The Salacoa Creek Watershed has several stream segments that fail to meet the state criteria for water quality. These impairments are the result of excessive fecal coliform bacteria counts and/or heavy sedimentation (as indicated by poor biotic survey results). In order to address these impairments, Total Maximum Daily Load (TMDL) Evaluations were written in 2003 and 2009. A TMDL Implementation Plan was also written in 2006 to evaluate and track water quality protection and restoration. Despite these efforts, little progress has been made over the years to ameliorate the water quality issues in the Salacoa Creek Watershed.

Figure 1.1.a. A historical bridge spanning Salacoa Creek in Cherokee County.

In recent years, Limestone Valley Resource Conservation and Development (RC&D) Council took an interest in implementing US Environmental Protection Agency (EPA) Clean Water Act (CWA) Section 319 grants to work toward improving the water quality in the Salacoa Creek Watershed. The first necessary step in this process was for Limestone Valley to develop this Watershed Management Plan (WMP; funded by a CWA Section 319 grant), which is now required by the Georgia Environmental Protection Division (EPD) to precede all "On-The-Ground" Section 319 watershed improvement efforts. This is the result of a state-wide effort to update all previous TMDL Implementation Plans to include the nine elements (described below), as recommended by the US EPA.

Specifically, the nine elements are as follows:

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.

The nine elements are meant to provide a better framework for planning successful long-term watershed improvement plans. Adhering to and adapting the plans and the strategies within them during "On-The-Ground" Section 319 watershed improvement efforts should ensure a high probability for success.

Limestone Valley set out to construct this WMP to not only include the nine elements, but also be a more conclusive and extensive update of the TMDL Implementation Plan from 2006 for the Salacoa Creek Watershed. For example, this WMP includes a number of watershed specific details related to the local geology, soils, climate, hydrology, wildlife, and fisheries. An extensive review of all accessible data (e.g., historical water quality and fish and macroinvertebrate sampling efforts, etc.) and NPS pollution reduction efforts relevant to the

watershed was also carried out. Those data and data summaries directly relevant have been included as appropriate.

Extensive water quality monitoring and Geographic Information Systems (GIS) analyses were also conducted in order to develop this WMP. The aggressive water quality monitoring effort was performed to assess current water quality conditions within the watershed, as well as serve as a baseline prior to significant watershed restoration efforts. This target specific approach will pinpoint the areas in the watershed most in need of improvement. Multiple analyses using GIS were also conducted exclusively to investigate likely sources of NPS pollutant loads. Specific areas of GIS research focused on land use percentages, housing densities, and the extent (or lack of) riparian buffers.

The creation of a Watershed Advisory Committee, consisting of local stakeholders, was another important aspect of WMP development. The intent of involving the group in the process was to utilize their expertise, build momentum within local communities, develop long-term partnerships, and help ensure the long-term NPS pollution reduction strategy detailed in the WMP was catered to the local area. The Watershed Advisory Committee was also needed to approve the WMP to ensure it was viewed as sufficient from the perspective of the local community. The Watershed Advisory Committee (Table 1.1.a.) for the Salacoa Creek Watershed was made up of environmental professionals, employees of government (local, state, and federal), and citizens of local communities with knowledge of previous watershed planning efforts. In addition, individuals from special interest groups and businesses with a presence in the watershed, as well as members of a motivated and concerned public were actively recruited, and some participated in the process.

Table 1.1.a. The Watershed Advisory Committee that approved the plan is depicted below.

Name	Position	Main Affiliation
Jerry Crawford	Manager	Calhoun Utilities
John Banks	Manager	Calhoun Utilities
John Loughridge	Regional Representative	GA Soil and Water Conservation Comm.
Judy Bailey	Commissioner	Gordon County
Alvin Long	Commissioner	Gordon County
Brian McCullum	Director GIS	Gordon County
Donna Reeve	Manager GIS	Gordon County
Christy Blair	Environmental Health Mgr.	Gordon County Environmental Health
Donald Baldridge	SWCD Supervisor	Limestone Valley RC&D Council
Doug Cabe	District Conservationist	Natural Resource Conservation Service
Sam Payne	County Representative	NW GA Regional Commission
Katie Owens	Program Director	The Nature Conservancy
Greg Bowman	UGA Extension Agent	University of Georgia Cooperative Ext.

A stakeholder process consisting of multiple public meetings allowed the Watershed Advisory Committee significant involvement in the WMP development process. Four public meetings with the Watershed Advisory Committee were held in 2013 to engage the public in the process of assisting in the design of an implementation plan. All members were informed of what was expected of them throughout the stakeholder process, and asked if they had resources that they could contribute to the WMP development and/or restoration process likely to follow. The extensive data collection efforts and the use of GIS provided the stakeholder committee with an enhanced understanding of the watershed to aid them in establishing restoration priorities. Meetings focused on gathering input about potential problems and solutions from the committee members, discussing sampling data, developing priorities, evaluating what BMP's may be received with favorable public reception, and obtaining insight on the WMP document itself. Several stakeholders were consulted more regularly due to their expertise and willingness to provide additional support in the process of developing the plan. It is also anticipated that some of the stakeholders may become long-term project partners and contribute significantly in the restoration process. Finally, approval was sought for the document to serve as the plan on which implementation efforts follow to restore the watershed to water quality standards and provide the framework for maintaining and improving the watershed in the long-term.

Education and outreach efforts within the community were another important component of the plan development and are expected to continue during the implementation process. These efforts attempted, and will continue to attempt, to make the public more knowledgeable regarding the issues in the Salacoa Creek Watershed, as well as try to make more aware of the role they can assume to reduce them. These events sought to energize the public in a number of ways with a number of different events all geared toward raising awareness. The events that were put together and are planned to continue are outlined in the Education and Outreach section of the document.

Ultimately, the intent of this Watershed Management Plan (WMP) was to develop a plan that outlines a feasible prescription and timeline on which to implement the restoration of the Salacoa Creek Watershed. The ultimate goals of the planning and restoration process are for impaired segments to eventually be and remain de-listed and for the integrity of other segments to be maintained so that they continue to meet the criteria for each designated use. Ultimately, a broader goal is to make stakeholders and landowners in the watershed more knowledgeable concerning watershed issues and how to go about managing the landscape to minimize water and soil resource concerns.

The plan implementation process will consist of several components designed to reduce factors contributing to water quality issues. These components will include the reduction of NPS pollution from failing septic systems and agricultural operations, as well as an educational component which will provide an overview of NPS pollution issues and what part the public can play in the restoration process. Special focus will be placed on landowners that may welcome additional conservation practices to reduce NPS pollution. Discussions with private landowners must be positive in nature and be based on an educational approach. Public discussions of NPS

pollution should be general in nature and applied to the entire watershed and must not be targeted to an individual landowner.

Corrective measures will be implemented as quickly as feasible to satisfy immediate water quality improvement needs, but the commitment and involvement of the community must continue in the long run. Long-term commitments from the community will include involvement in the Adopt-A-Stream program with coordinated monitoring of the entire watershed, planned Rivers Alive clean-up events, and quarterly visual stream surveys. It is suggested a yearly meeting be held inviting the entire community to review the status of the watershed, the water quality, and outreach programs, as well as to develop objectives to further the quality of the watershed in the coming year. Once the community embraces the concept of ownership and momentum has been developed, our hope is that restoration will carry forward and the watershed will continue to improve.

2. Salacoa Creek Watershed Description

The development of this Watershed Management Plan (WMP) required a thorough knowledge of the watershed characteristics, which will be discussed in detail in the following sections. The characteristics of the watershed that will be discussed are grouped into three general sections. Those sections in order of presentation are: 1) a description of the geography of the watershed, the geological aspects, as well as historic local climate conditions; 2) a review of forests, wildlife and fishes in the region; and 3) a presentation of resource uses, political boundaries, and active groups that have a presence in the watershed. The information in these sections was compiled utilizing the 2006 and 2009 TMDL Implementation Plans, as well as the Soil Survey of Gordon County. Georgia. Additional sources of information utilized are referenced within the text.

2.1 Landscape Features

Watershed Geography

The Salacoa Creek Watershed originates on Henderson Mountain in Southwest Pickens County, Georgia, continues into the Northwest segment of Cherokee County and the Northeast portion of Bartow County, and ultimately culminates in the middle of Gordon County at the confluence of Salacoa Creek and the Coosawattee River. The flow of the stream and general watershed shape could best be described as moving from Southeast to Northwest. The Salacoa Creek Watershed drains an area of approximately 84,852 acres or 133 $mi^{2,}$ when excluding the Pine Log Creek Watershed, which is characterized as a different "HUC 10" catchment despite its convergence with lower Salacoa Creek. This drainage area classifies the Salacoa Creek Watershed as a "HUC 10" with the specific Hydrologic Unit Code of #0315010206.

The area containing the majority of the watershed within Gordon and Bartow Counties exhibits land use that is predominantly forested with the developed land consisting mostly of agriculture. The only areas with significant population densities within the watershed are located in Eastern Gordon County.

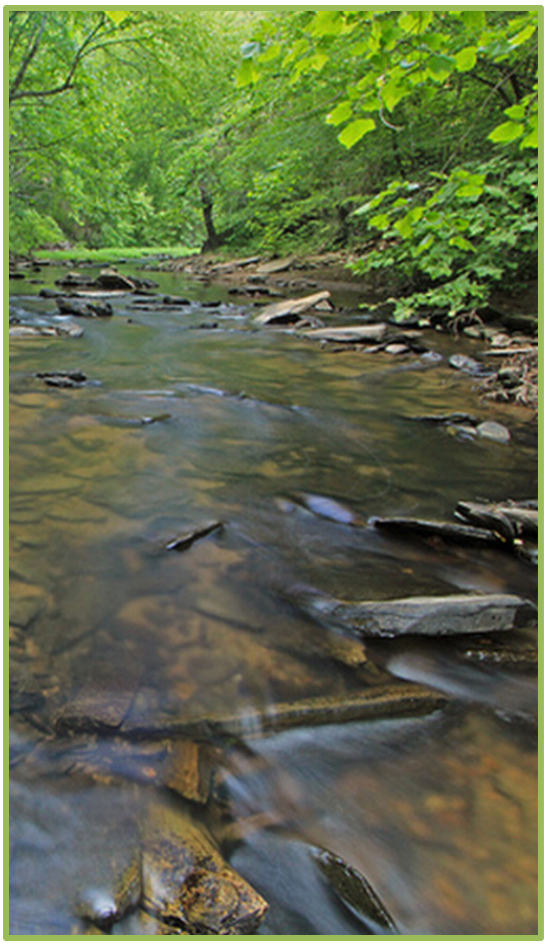


Figure 2.1.a: Upper Salacoa Creek in Summer.

The largest stream in the Salacoa Creek Watershed is Salacoa Creek, which begins on the western slope of Henderson Mountain in Pickens County. Other smaller tributaries in the watershed include Lick Creek, which begins in the northern section of the watershed just east of the Ranger community and meanders northeast to eventually meet Salacoa Creek near the Redbud Crossroads, and Redbud Creek, which originates in the northeast quadrant of the watershed and flows southeast meeting Salacoa Creek at Salacoa Lake. Major tributaries outside of the Salacoa Creek Watershed (HUC #0315010206) include Pine Log Creek, which flows north from Bartow County into the valley floor in Gordon County and intersects Salacoa Creek near the confluence with the Coosawattee River, and Spring Creek, which flows north from Bartow County until meeting Pine Log Creek near the termination point of Salacoa Creek.

Elevations in the Salacoa Creek Watershed range from a maximum of 1251 ft on Henderson Mountain at the headwaters of Salacoa Creek to a low of 637 ft at the confluence of Salacoa Creek and the Coosawattee River. The average elevation on the valley floor in Gordon County where the majority of the watershed is located is approximately 775 ft. After entering the valley floor, the tributaries tend to meander in a north to northeast direction until their intersection with Salacoa Creek.

Despite the range in elevations, the Cherokees referred to the flat valley lands of Gordon County as the big valley, or the land of the flat valley. The Cherokee Indians populated this region in the late 18th century until their forced removal by the Federal Government in 1837. All Cherokee lands were seized, and the Cherokees were forced to march for resettlement to Oklahoma. This march is referred to as the Trail of Tears due to the thousands of deaths as a result of their journey.

Watershed Geology and Soils

The Salacoa Creek Watershed is located in the Ridge and Valley Ecoregion of Northwest Georgia. This region is the westernmost physiographic province of the Appalachian Mountains, bounded to the east by the Blue Ridge Mountains, to the south by the Piedmont and the northwest by the Appalachian Plateau. The Ridge and Valley Region is characterized by long north-northeasterly trending ridges separated by fertile valleys. The topography of the region is the result of the erosion of alternating layers of hard and soft sedimentary rock that were folded and faulted during the building of the Appalachians. The ridges are developed on resistant layers of sandstone or chert, and valleys are underlain by shale or limestone. Sandstone and chert form thin acidic soils which support wooded areas on the ridges' steep slopes. By contrast, shale and especially limestone provide thicker, more fertile lowland soils. The soils of the watershed exhibit little profile development and continue to receive alluvial deposits. Additionally there are narrow strips of alluvium that have been little influenced by the soil-forming process.

The watershed is located in the Appalachian Valley which is a nearly flat surface or peneplain. The region is underlain by folded, faulted, and stratified sedimentary rocks of the Paleozoic era. These rocks have been classified as the following formations: Conasauga (shale and limestone),

Knox dolomite (limestone), Rome (shale and limestone), Floyd (shale), Fort Payne (limestone or cherty limestone), and Red Mountain (sandstone and shale).

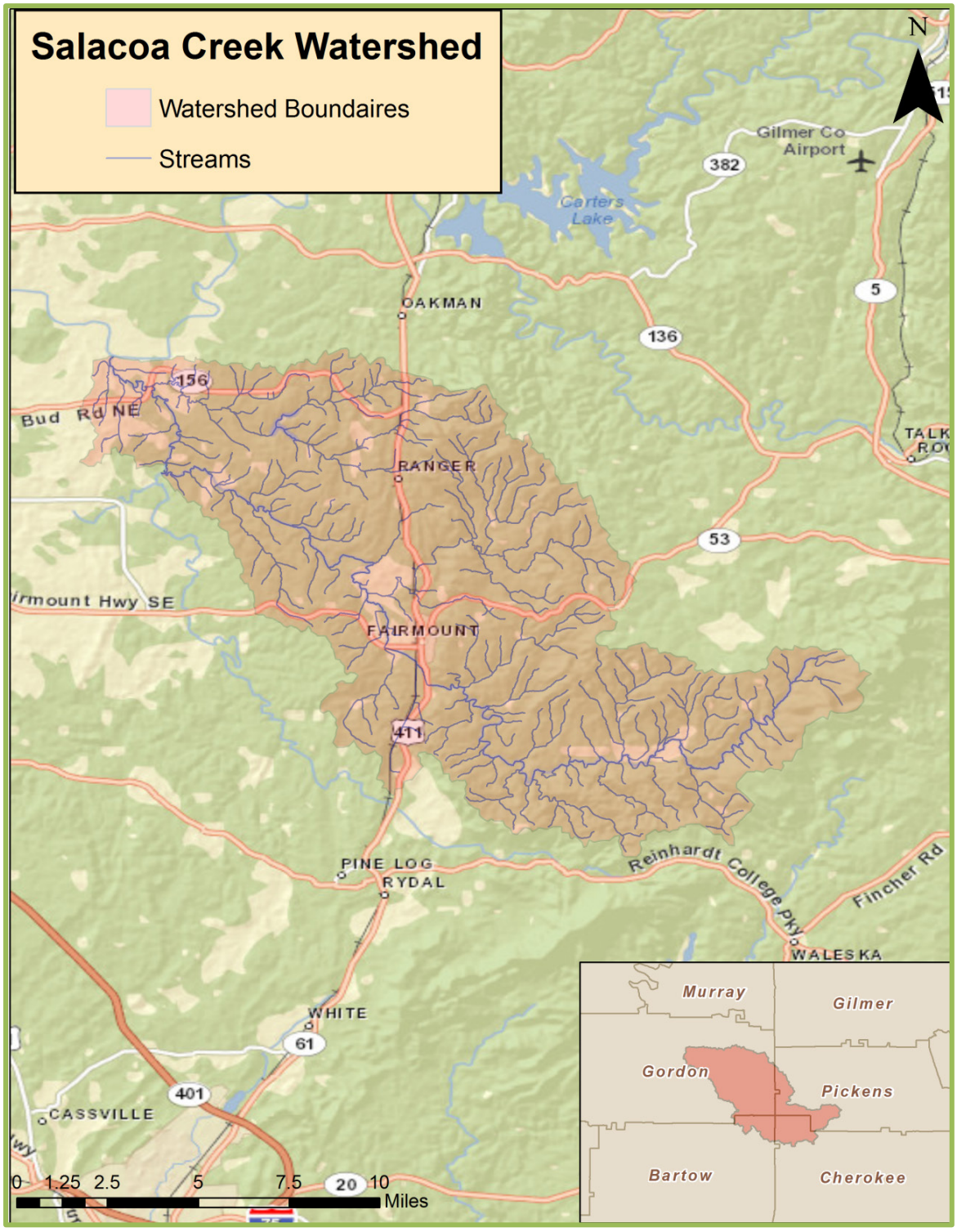


Figure 2.1.b. A general map of the Salacoa Creek Watershed of Northwest Georgia.

Local Climate

The climate of Gordon County, where the majority of Salacoa Creek Watershed is located, is influenced by its latitude and its proximity to the foothills of the Appalachian Mountains. Prolonged periods of extremely hot or extremely cold weather rarely occur. Summers are characterized by moderately warm days and mild to comfortably cool nights. Daytime temperatures reach 90°F on no more than one-half of the days during the June, July and August period. Temperatures exceeding 100°F occur less often than every other year. Winters may be relatively cold, but periods of cold are normally short in duration and are quickly followed by comparatively mild temperatures. Periods of cold with temperatures below 15°F can be expected each winter, and periods near zero are not uncommon. Due to the elevation changes within the watershed early morning temperatures may vary as much as 10 to 15°F from the mountains to the east and the valley to the west. The average yearly rainfall is 54 inches with snowfall averaging 1.4 inches. The region averages 99 days of precipitation per year with 210 days classified as sunny. The average July high is 89.2, and the average January low is 28.7.

Climate and water data is collected nationally by the United States Geological Service (USGS) utilizing a stream gage system. Unfortunately, there is no USGS stream gage located within the Salacoa Creek Watershed for data collection. Although not located within the watershed, there is a USGS Stream Gage #02383500 on the Coosawattee River near Pine Chapel, Georgia, located six miles from the western border, which will be utilized as a data collection point to represent the local precipitation and hydrological characteristics. The following graph displayed below in figure 2.1.b. displays precipitation data (cumulative) collected from 2008 through 2012.

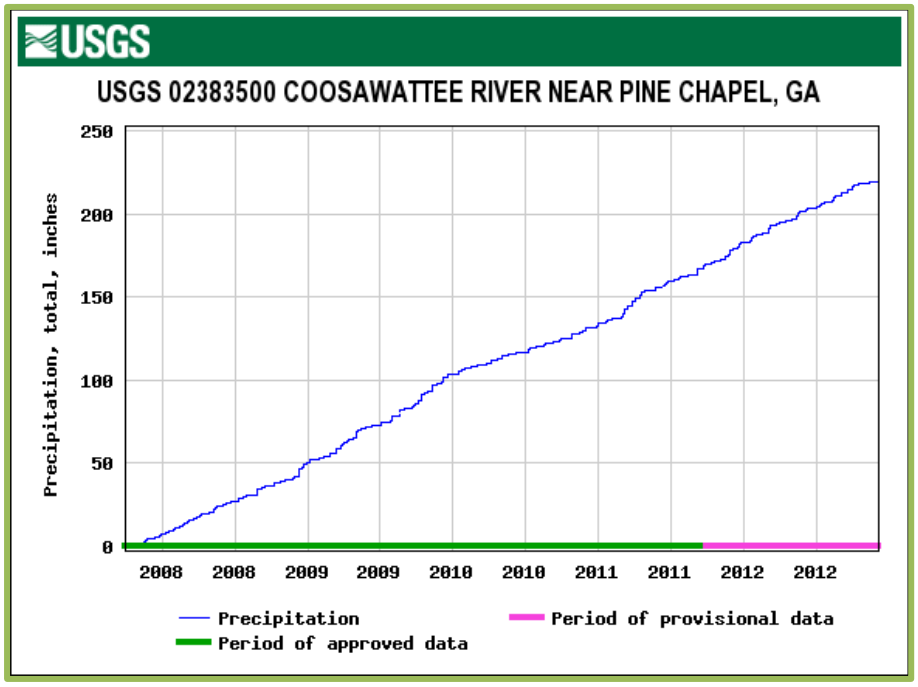


Figure 2.1.c. Precipitation data (in inches) recorded by USGS from 2008 to 2012 near Pine Chapel, Georgia, at a Coosawattee River Gage.

2.2 Important Flora and Fauna

Forest Ecosystems

According to the land use analysis conducted as part of this WMP development, forested land in the Salacoa Creek Watershed makes up approximately 60,123 acres and is the most common land use category (70.9%). Deciduous forest is the dominant forest type at 45.6%. Tree species in the watershed are comprised of loblolly-shortleaf pine forest, mixed oak, pine, and hickory.

Wildlife and Habitat

The topography of the Salacoa Creek Watershed provides an excellent habitat for a wide variety of species. The mountainous area in the eastern section is home to a substantial population of white-tailed deer (*Odocoileus virginianus*) and wild turkey (*Meleagris gallopavo*). Extensive well-watered woodlands and excellent cover provide the perfect habitat for these two species. The floodplain region of the watershed is home to a wide variety of wildlife which include bobwhite quail (*Colinus virginianus*), mourning dove (*Zenaida macroura*), gray squirrel (*Sciurus carolinensis*), Eastern cottontail (*Sylvilagus floridanus*), and various species of duck (*Anatidae* family). Due to the many lakes and ponds in the floodplain, an ever increasing population of Canadian geese *(Anatidae* family) can be found. With the extensive network of streams in the watershed, American Beaver (*Castor canadensis*) and Northern river otter (*Lontra canadensis*), and various species of heron (*Ardeidae* family) can often be found.

Listed and Sensitive Species

The Georgia Department of Natural Resources and NatureServe Explorer list one mollusk as Federally/State protected in the Salacoa Creek Watershed and one fish as a Georgia protected species. The Federally and State protected mollusk is the Southern Clubshell (*Pleurobema decisum*). The Southern Clubshell was historically found throughout most of the Upper Coosa River Basin in Georgia. Currently, the clubshell appears to be restricted to the Conasauga River drainage and Salacoa Creek. The major threat to these organisms is excessive sedimentation due to inadequate buffer zones, development, and eroding agricultural lands. Where present, excessive sediment covers suitable habitat and can potentially suffocate mussels.

Figure 2.2.a. The Southern Clubshell is a federally protected mussel species.

The Georgia protected fish is the trispot darter (*Etheostoma trisella*), reaching up to 59 mm in total length. It is pale yellow-brown in color, white on the belly and underside of the head, and has a dark suborbital bar (teardrop) and three dusky saddles across the dorsum. Breeding males develop orange to red color that is especially bright on the underside. The trispot darter is distinctive in appearance to other darters in the Upper Coosa River Basin having three dark saddles over a dusky brown body. The primary threat to the Trispot Darter is habitat loss and degradation. The Coosa River System harbors the only population of this darter.

Figure 2.2.a. The Trispot Darter is a protected species found in the Salacoa Creek Watershed.

Fisheries

The only listed trout stream in the project watershed is a portion of Salacoa Creek itself, located upstream from U.S. Highway 411. This is not a stocked stream with the only species available being the brook trout (*Salvelinus fontinalis*). The brook trout is the only trout native to Georgia waters with all other species being introduced to Georgia waters.

The only stream listed for non-trout fishing in the watershed is Lick Creek. The species known to inhabit Lick Creek are largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), and smallmouth bass (*Micropterus dolomieu*).

Salacoa Lake is a county-owned recreation area with a 126 acre lake suitable for fishing. Species inhabiting the lake are black crappie (*Pomoxis nigromaculatus*), bluegill, brown bullhead (*Ameiurus nebulosus*), common carp (*Cyprinus carpio*), gizzard shad (*Dorosoma cepedianum*), green sunfish (*Lepomis cyanellus*), largemouth bass, redbreast sunfish (*Lepomis auritus*), and redear sunfish (*Lepomis microlophus*).

2.3 Anthropogenic Features

Land and Resource Uses

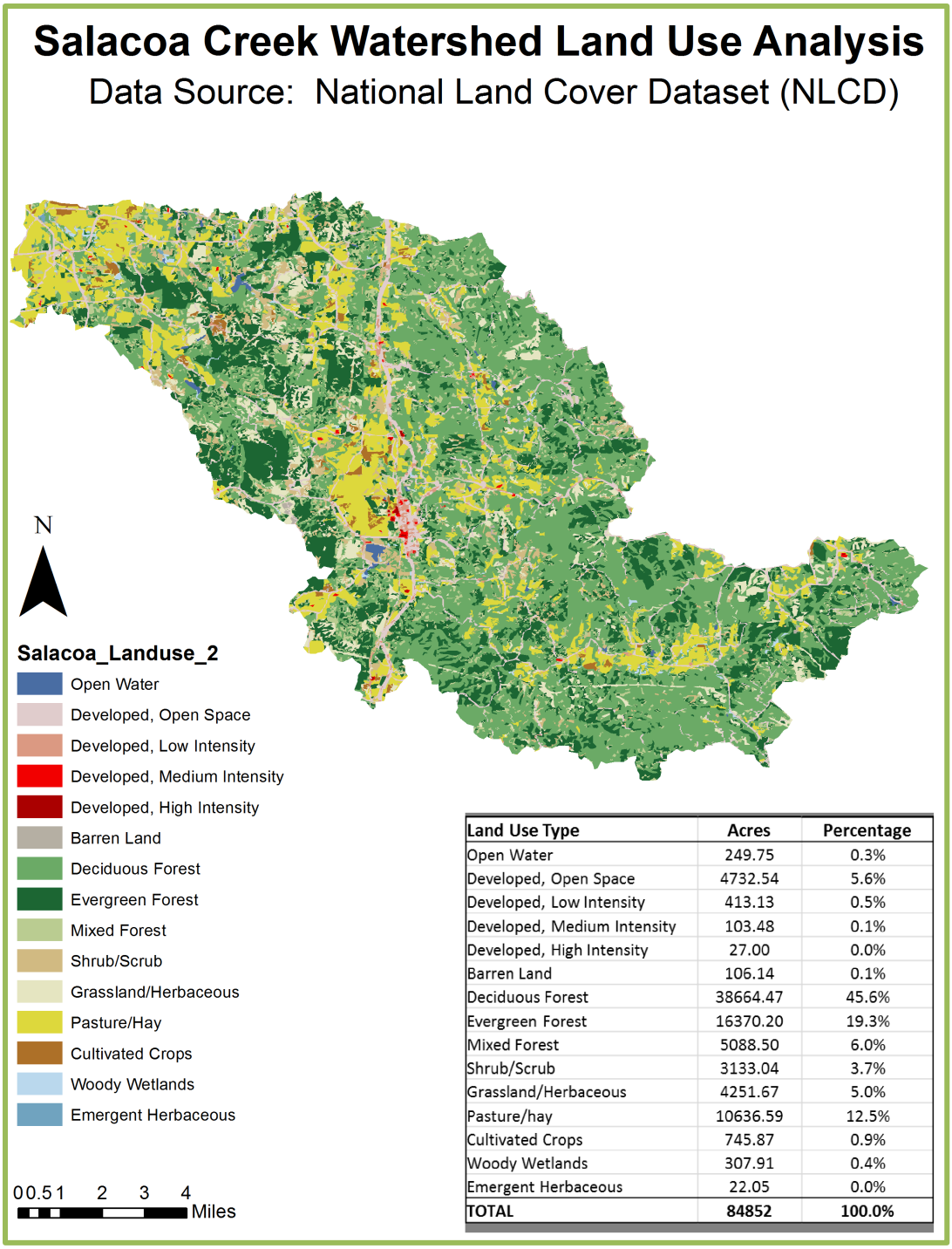
According to the land use analysis conducted as part of this WMP development and displayed in Figure 2.3.b., the major land uses in the Salacoa Creek Watershed are forest (70.9%; 60,123 acres) and pasture and hay (12.5%; 10,637 acres). Agricultural use in the watershed is comprised primarily of cow and horse grazing operations followed by chicken operations. Croplands make up only 0.9% (745 acres). The Gordon County Comprehensive Plan for the period 2007-2027 projects land use in the watershed to remain unchanged with forestry and agriculture the predominant use. Although the population of Gordon County is projected to expand at an increasing rate, the near-term expansion will mostly occur in the city of Calhoun and the Interstate 75 corridor, leaving the Salacoa Creek Watershed mostly rural. With little new home construction anticipated and the current land use to remain constant, few if any new water quality issues should be anticipated.

Figure 2.3.a. Upper Salacoa Creek in Winter.

Water resources in Gordon County are abundant with the Coosawattee River entering the county from the northeast and the Conasauga River entering from the north. Downstream of the confluence of these rivers, the water body is known as the Oostanaula River. Calhoun Utilities, the primary water provider in the county, maintains a withdrawal station on the Coosawattee River near the community of Pine Chapel.

In addition to an abundant river supply in the region, numerous freshwater springs provide additional water resources. One of those springs is located in the Salacoa Creek Watershed near Fairmount, Georgia. The Northwest Georgia Water Resources Partnership considers the site as a potential water resource. Operated for years as a quarry, the location has the potential to become a major water resource, not only for Gordon County, but for the entire northwest Georgia region including the City of Atlanta. Due to the significance of this resource, the availability could become a factor in the Georgia, Alabama, and Florida water discussions. The site is located adjacent to Salacoa Creek and contains substantial wetlands, which must be

constantly monitored for water quality issues now and certainly with future development. As a part of the current monitoring protocol associated with this project, a water quality sample site has been established Salacoa Creek immediately downstream from the site.



Land Use Type	Acres	Percentage
Open Water	249.75	0.3%
Developed, Open Space	4732.54	5.6%
Developed, Low Intensity	413.13	0.5%
Developed, Medium Intensity	103.48	0.1%
Developed, High Intensity	27.00	0.0%
Barren Land	106.14	0.1%
Deciduous Forest	38664.47	45.6%
Evergreen Forest	16370.20	19.3%
Mixed Forest	5088.50	6.0%
Shrub/Scrub	3133.04	3.7%
Grassland/Herbaceous	4251.67	5.0%
Pasture/hay	10636.59	12.5%
Cultivated Crops	745.87	0.9%
Woody Wetlands	307.91	0.4%
Emergent Herbaceous	22.05	0.0%
TOTAL	**84852**	**100.0%**

Figure 2.3.b. A map displaying the Salacoa Creek Watershed's more prominent land uses and percentages within the watershed.

Political Boundaries

The Salacoa Creek drainage area consists of acreage in southwest Pickens County, northeast Cherokee County, northern Bartow County, and the eastern half of Gordon County, all of which are located within the State of Georgia. The vast majority of the drainage acreage is located in Gordon County. Population densities in the watershed are low due to its rural nature with the exception of Fairmount, GA, whose limits encompass an area of 1.2 mi^2. This town has a population of 745 people, and a population density of 619.9/mi^2. One additional town known as Ranger, GA, is found within the watershed and encompasses an area of 0.8 mi^2. This town has a population of 131, and a population density of 104.2/mi^2.

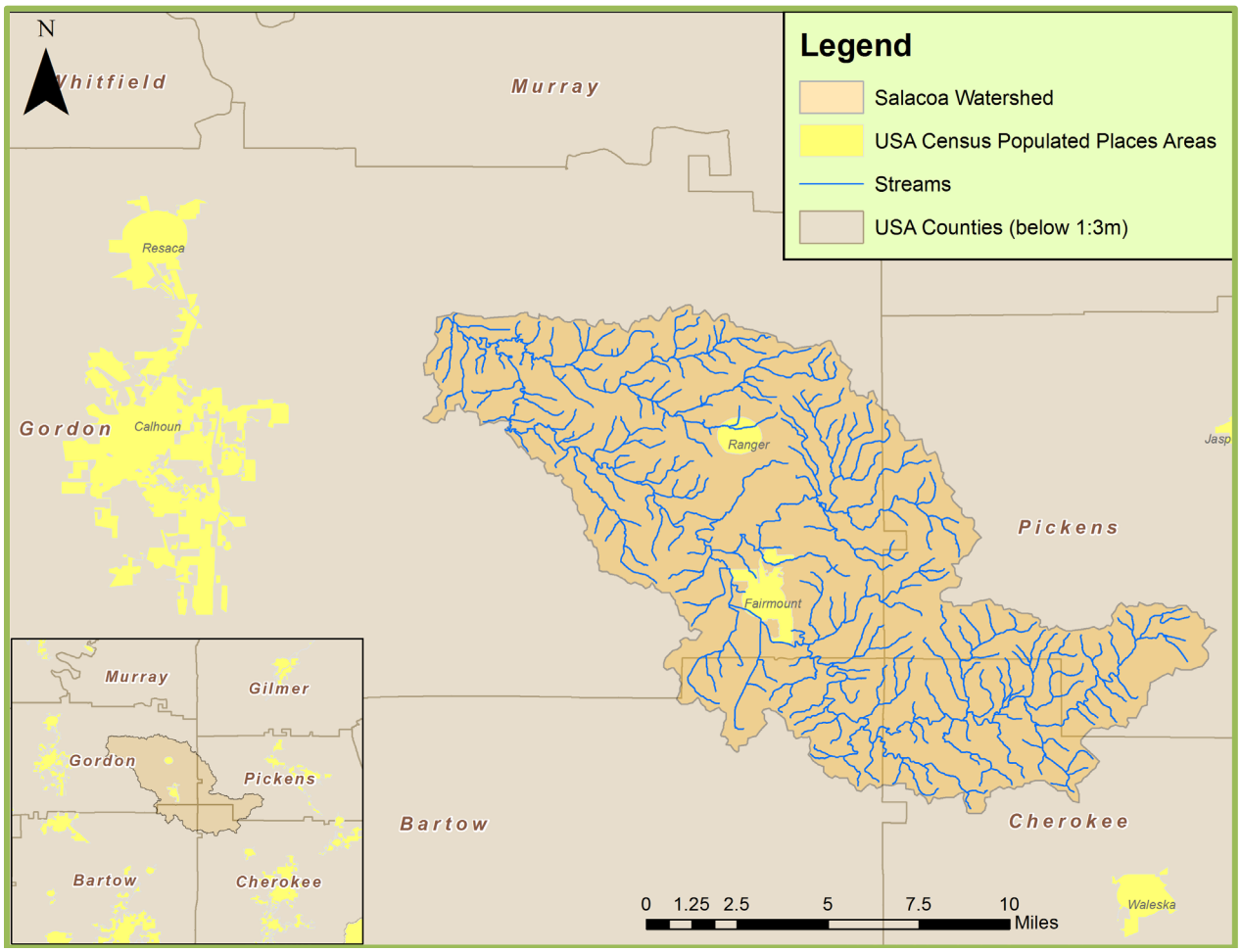


Figure 2.3.c. A map displaying the political boundaries for counties, and cities in the area surrounding the Salacoa Creek Watershed.

Active Groups within the Watershed

Federal entities that provided assistance in the preparation of the Salacoa Creek Watershed Management Plan, or have ongoing conservation efforts in the watershed, include the Farm Services Agency (FSA), National Resource Conservation Service (NRCS), the US EPA, and the United States Forest Service (USFS). State agencies that are pertinent to watershed restoration efforts include the Georgia EPD, Georgia Department of Natural Resources (DNR), Georgia Soil and Water Conservation Commission (GSWCC), and the Northwest Georgia Regional Commission. On the local level, active groups include Calhoun Utilities, the Gordon County Board of Commissioners, Limestone Valley RC&D Council, and New Echota Rivers Alliance (NERA). Groups involved in outreach programs, water quality education and monitoring or who will play a significant role in the implementation of this Watershed Management Plan will be discussed further within this document.

Figure 2.3.d. A view of the Salacoa Creek Watershed valley floor from west to east.

3. Watershed Conditions

Section 3 includes a description of the water quality standards for Georgia and their importance, the impairments and their locations on Salacoa Creek and Lick Creek, and sampling data utilized in determining placement on the Georgia Integrated 303(d)/305(b) List. Additionally, recent monitoring data will be provided to develop the current condition of the watershed.

3.1 Water Quality Standards and Impairments within the Salacoa Creek Watershed

Georgia Water Quality Criteria

The primary goal of the Federal Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of our waters. Water quality standards are a key tool used by Georgia to meet this goal and are a fundamental component of watershed management. Water quality standards in Georgia are the basis for numerous GA EPD programs which include development of TMDL's (Total Maximum Daily Loads), issuance of National Pollutant Discharge Elimination System (NPEDS) permits, and assessment of Georgia waters as a part of the 305(b)/303(d) listing process.

Water quality standards in Georgia are made up of three components:

1. Designated Uses: The six designated usages in Georgia are: (1) fishing, (2) drinking water supply, (3) recreation, (4) coastal fishing, (5) wild river and (6) scenic river.

2. Numeric and Narrative water quality criteria: Water quality criteria have been developed to protect the designated use of the waterway. Numeric quality standards have been developed for a number of parameters including dissolved oxygen, pH, temperature, bacteria and more. An example of narrative criteria would be the discharging of toxic materials in toxic amounts. Other narrative criteria are that the fish and macroinvertebrate communities are not significantly degraded.

3. Anti-degradation Policy or Loss of Quality: An anti-degragation policy and an implementation approach must be developed to protect and maintain water quality. A set of procedures is to be developed and followed when evaluating activities that may impact the water quality.

Table 3.1.a. A description of the quantitative water quality criteria for waters designated for the use of drinking water and fishing.

Fecal Coliform Bacteria	Dissolved Oxygen	pH	Temperature
May - October <200 CFU/100 mL as a geometric mean <4,000 CFU/100 mL as instantaneous max November - April <1000 CFU/100 mL as a geometric mean	> 5 mg/L as daily average > 4 mg/L at all times	Between 6.0 and 8.5	< 90°F

Impairments in the Salacoa Creek Watershed

In 2003, the US EPA Science and Support Division conducted field investigations to assess biological conditions and sediment/nutrient loading characteristics in Northwest Georgia. A macroinvertebrate assessment within Salacoa Creek led to the listing of an eight mile Salacoa Creek segment from Pinhook Creek to Pine Log Creek. Between 2001 through 2006, the Department of Natural Resources (DNR) Wildlife Resources Division (WRD) conducted fish population monitoring in the Coosa River Basin to determine if the streams and rivers sampled revealed negatively affected biota. As a result, two segments of Lick Creek in the Salacoa Creek Watershed were found to be impacted and listed on the Georgia Integrated 303(d)/305(b) list for failure to meet state criteria. Sampling of Salacoa Creek indicated water quality issues due to elevated fecal coliform bacteria counts. As a result, a six mile segment of Salacoa Creek was placed on the Georgia Integrated 303(d)/305(b) list for impaired water bodies.

Table 3.1.b. A table displaying the location and criterion violated for each impaired segment found within the Salacoa Creek Watershed.

Salacoa Creek Watershed Impairments		
Water body (Impaired Miles)	**County**	**Criterion Violated**
Salacoa Creek (6 miles)	Gordon	Fecal Coliform
Salacoa Creek (8 miles)	Pickens and Gordon	Biota (M)**
Lick Creek (7 miles)	Gordon	Biota (F)*
Lick Creek (4 miles)	Gordon	Biota (F)*

****Bio (F) = Impacted biota characterization resulting from fish sampling.***

*****Bio (M) = Impacted biota characterization resulting from macroinvertebrate sampling.***

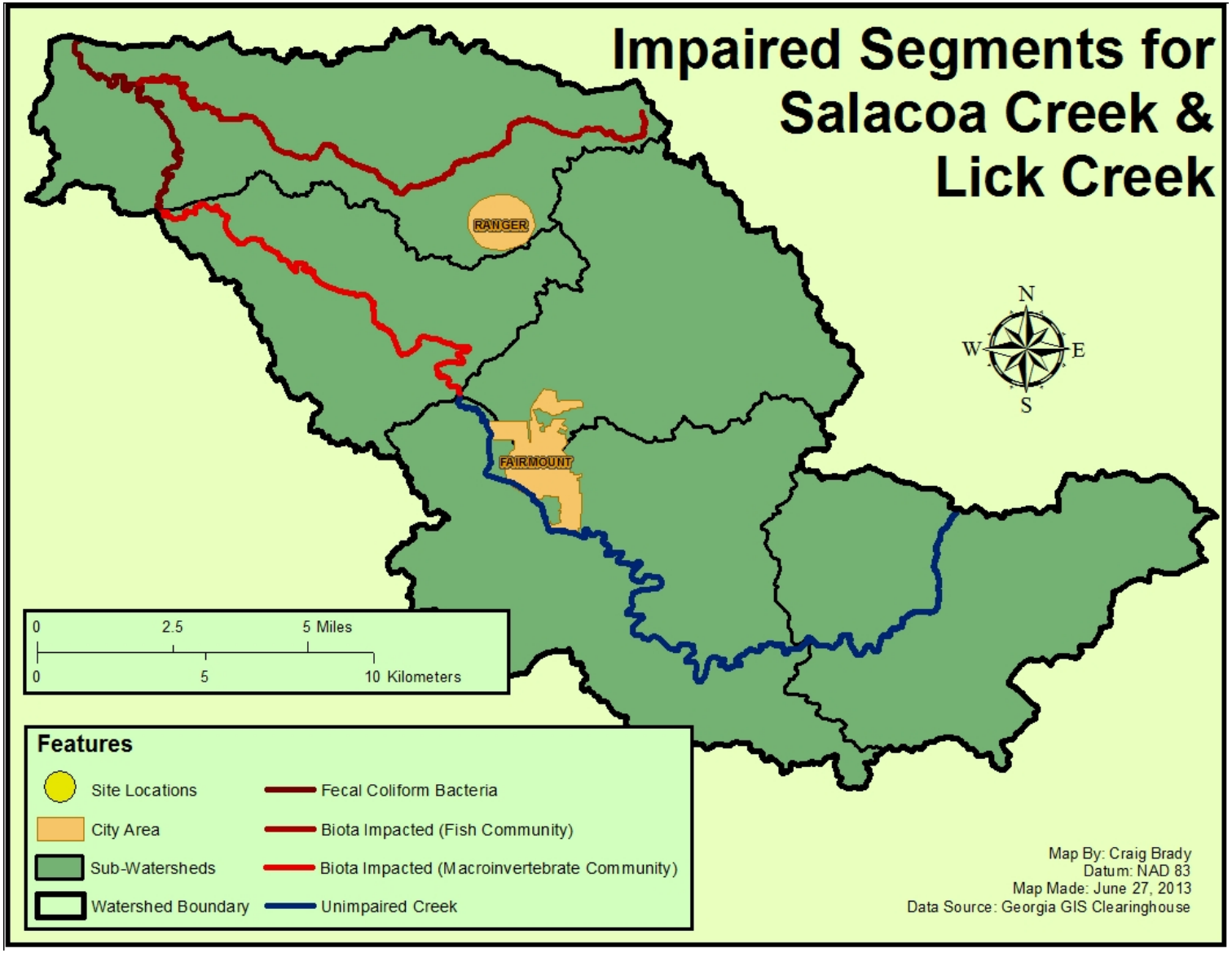


Figure 3.1.a. Fecal coliform and impacted biota impairments in the Salacoa Creek Watershed.

Fecal Coliform Impairments

As shown in the previous figure (3.1.a), there is only one stream segment in the Salacoa Creek Watershed listed as impaired for fecal coliform. This segment, designated for fishing, is impaired for six miles from its confluence with Pine Log Creek north to its confluence with the Coosawattee River. Although the Coosawattee River is not listed impaired for fecal coliform, it should be noted that Calhoun Utilities pumps the majority of 12.8 million gallons per day approximately 9.2 miles downstream from the confluence of Salacoa Creek and the Coosawattee River.

Bacteria are microscopic, single-celled organisms that are the most numerous life forms on our planet. Most bacteria are beneficial and responsible for important environmental processes such as decomposition, nutrient cycling, and the breakdown of environmental toxins. Other bacteria are pathogenic or disease-causing and result in human health problems. Coliform bacteria are members of the Enterobacteriaceae family. While some coliform bacteria can be found naturally occurring in soil, the particular type of coliform bacteria that lives in the intestinal tract of warm-bloodied animals and originates from animal and human waste is called fecal coliform bacteria. Fecal coliform is an indicator bacteria and when found indicates the possible presence of pathogens.

Bacteria in water can originate from the intestinal tracts of humans and other warm-bloodied animals such as livestock and wildlife. Human sources include failing septic systems, leaking sewer lines and sewer overflows. Possible animal sources of fecal coliform bacteria include cattle in streams, land application from livestock operations, and wildlife such as deer, geese, turkey and ducks. Agricultural operations can be a source of bacteria from either manure runoff due to inadequate stream buffers during heavy rains or from livestock entering the waterway to drink. Potential sources of fecal coliform in the Salacoa Creek Watershed would include animals grazing in pastures, dry manure storage facilities and lagoons, chicken litter storage facilities, and direct access of livestock to streams. Due to the amount of forested land in the watershed wildlife, in particular deer and waterfowl, should be listed as potential sources of fecal coliform.

The State of Georgia utilizes fecal coliform as the water quality standard for bacterial contamination. These standards were established to support the requirement by the US EPA to protect all waters for use of primary contact recreation or swimming. Fecal coliform levels are determined by use classification of freshwater bodies such as stream, rivers, lakes, and estuaries.

Health risks associated with excessive bacteria levels include gastroenteritis, a condition indicated by vomiting, diarrhea, fever, nausea, and stomachache; skin disease; and respiratory, eye, ear, nose, throat and skin infections. *E. coli*, *Escherichia coli*, is a species of fecal coliform and is estimated to be approximately 60-80% of the fecal coliform value. Excessive levels of *E. coli* can indicate the presence of pathogens such as *E. coli* 0157, *Salmonella* and *Shigella* (which can cause gastrointestinal illnesses), and *Psuedomonas aeruginosa* (which can cause swimmer's

ear or dermatitis); protozoans such as *Cryptosporidium* and *Giardia*, and viruses such as hepatitis A.

Impacted Biota Impairments

Macroinvertebrate sampling by the US EPA Science and Support Division in 2003 revealed impacted biota within Salacoa Creek and led to the listing of an eight mile Salacoa Creek segment from Pinhook Creek to Pine Log Creek. Fish sampling by Georgia Department of Natural Resources (DNR) Wildlife Resources Division (WRD) from 2001 to 2006 revealed poor negatively impacted fish assemblages that led to the impacted biota impairments in Lick Creek. The two stream segments in the Salacoa Creek Watershed listed were from the headwaters to Redbud Creek (7 miles) and from Redbud Creek to Salacoa Creek (4 miles).

The most common cause of impacted biota impairments is the lack of fish habitat due to stream sedimentation, although high levels of heavy metals, ammonia, chloride, low dissolved oxygen, or extreme levels of pH can also be a factor. Excessive input of sediment is considered to be the most prevalent form of pollution currently affecting streams and rivers in the United States. The major sources of sedimentation in streams are agriculture (especially row-crop cultivation in floodplains and livestock grazing in riparian zones), forestry (logging roads being the predominant factor), and residential development. Effects of sedimentation on stream channels include sediment filling the channel as well as increases in stream bank erosion, meandering, and flooding. With excessive sedimentation, the stream bed will evolve from a clean gravel bed to a muddy bottom that often leads to a loss of native fish and animals. Fine sediment particles cover spawning areas smothering fish eggs, aquatic insects, and oxygen producing plants. Increased turbidity levels (indicative of suspended sediment in the water column) in a stream reduces light penetration and plant growth, and affects the ability of fish to locate and capture prey by reducing visibility. Additional negative impacts of sedimentation are higher fecal coliform retention rates, clogging of drainage ditches and culverts, and loss of land productivity.

3.2 Historical / Recent Resource Data

Since 2001, two groups have undertaken water quality monitoring efforts in the Salacoa Creek Watershed. The Georgia Environmental Protection Division (GA EPD) conducted a monitoring program on Salacoa Creek at Lovebridge Road from February 2001 to October 2001 and again from July 2005 until September 2005. The monitoring data from 2001 are displayed in Table 3.2.a. The geometric means from the 2001 and 2005 efforts are displayed in Tables 3.2.b. and 3.2.c., respectively. The purpose of both monitoring events was to determine if Salacoa Creek was in compliance with water quality criteria as established for Georgia. Results of the monitoring led to the placement of Salacoa Creek on the Georgia 303(d) List for excessive fecal coliform counts. Water quality samples collected within a 30-day period that have a fecal coliform geometric mean in excess of 200 colony forming units (CFU) per 100 mL during the period May through October, or in excess of 1,000 CFU per 100 milliliters during the period

November through April, are in violation of the water quality standard. There is also a single sample maximum criterion (4,000 CFU per 100 mL) that cannot be exceeded for the months of November through April.

Table 3.2.a. A display of fecal coliform counts (in colony forming units/100 mL collected and analyzed by Georgia EPD in 2001 from Salacoa Creek at Lovebridge Road.

2001 Fecal Coliform Counts (CFU/mL) from Salacoa Creek at Lovebridge Road															
Sampling Dates and Associated Fecal Coliform Counts															
2/13	**2/26**	**2/27**	**3/6**	**4/17**	**4/19**	**4/24**	**4/26**	**7/16**	**7/23**	**7/30**	**8/7**	**10/1**	**10/9**	**10/17**	**10/23**
210	**2800**	**230**	**210**	**490**	**230**	**630**	**790**	**280**	**340**	**1700**	**460**	**1100**	**490**	**80**	**230**

Table 3.2.b A display of geometric means of fecal coliform counts (in colony forming units /100 mL) calculated from samples collected by Georgia EPD in 2001 from Salacoa Creek at Lovebridge Road.

FECAL COLIFORM GEOMETRIC MEANS				
Sampling Months	February/March	May/June	August/Sept.	October
Salacoa Creek @ Lovebridge Rd. (2001)	410.5	486.7*	522.3*	315.6

****These time periods had violations that resulted in impairment, in addition to a violation for exceeding the allowable maximum for a single event.***

Table 3.2.c. A display of geometric means of fecal coliform counts (in colony forming units/100mL) calculated from samples collected by Georgia EPD in 2005 from Salacoa Creek at Lovebridge Road.

FECAL COLIFORM GEOMETRIC MEANS		
Sampling Months	June/July	September/October
Salacoa Creek @ Lovebridge Rd. (2005)	369.1*	319.0*

****These time periods had violations that resulted in impairment.***

The second group to conduct water quality monitoring in the Salacoa Creek Watershed was New Echota Rivers Alliance, an all-volunteer non-profit environmental organization headquartered in Calhoun, Georgia. New Echota Rivers Alliance (NERA) conducted water sampling in Salacoa Lake in Gordon County, Georgia, from March of 2010 through February of 2011. The four locations monitored at Salacoa Lake were the inflows of Lick Creek and Red Bud Creek, mid-lake and the outflow of Lick Creek below the dam. All monitoring data collected was entered into the Georgia Adopt-A-Stream database. The data collected was general in

nature such as temperature, dissolved oxygen, and pH, and could not be utilized to determine if fecal coliform or total suspended solids exceeded water quality standards. For this reason, only the data collected by GA EPD and Limestone Valley RC&D for the purpose of developing this plan has been included in this plan.

3.3 Monitoring/Resource Data Collected for the WMP

Due to changes in the Salacoa Creek Watershed from factors such as population growth, land use, sewer line expansion, and other factors additional and current water quality data was needed for the development of this WMP. To obtain this additional data, a monitoring program was developed and implemented in June of 2012 for Salacoa Creek, as well as Lick Creek. This water quality monitoring program was incorporated into the *Targeted Water Quality Monitoring Plan (found in Appendix A).*

The *Targeted Water Quality Monitoring Plan* was developed to provide the stakeholder committee, as well as other interested parties, with a means to compare historical water quality data to current data in the watershed and to assist in the identification of areas of concern. Through this identification process, BMP's (Best Management Practices) will be discussed as potential remedies to address the water quality issues in the watershed with the ultimate goal being the de-listing of both Salacoa Creek and Lick Creek as impaired.

The sampling program consisted of determining fecal coliform counts and the total suspended solids (TSS) for eight locations on Salacoa Creek and two locations on Lick Creek (Figure 3.3.a.). The sampling locations on Lick Creek extend from the impaired section to Salacoa Lake in Gordon County. The sampling locations on Salacoa Creek not only include the length of creek listed as impaired but extend east of Fairmount, Georgia, into Bartow County, to allow us to infer the likely sources of fecal coliform and sediment in the watershed so that corrective measures can be targeted and eventually implemented.

All water samples were analyzed by Calhoun Utilities for fecal coliform and total suspended solids at their Wastewater Treatment Facility Lab located on West Line Street in Calhoun, Georgia. Fecal coliform counts were determined to Most Probable Number (MPN). On occasion, fecal coliform counts were observed as "Too Numerous To Count", and could not used to calculate geometric means. When no fecal coliform was found after the standard dilution, sites were given a "No Count" record, which we valued at 1 CFU/100 mL in order to give the event weight in the geometric mean.

Samples were collected once each month for one year from July of 2012 to June of 2013. We strived to sample during both dry and wet periods in both the summer and winter to develop a data set which would reveal runoff effects during wet periods and instream sources of NPS pollutants during dry periods. However, due to several dry months and the difficulty of planning around the weather, we ended up sampling during baseline conditions on ten of 12 occasions, which limits our ability to discuss in detail the impacts of runoff events. Still, all "Too

Numerous To Count" records were recorded during baseline conditions, rather than closely following significant precipitation events. These observations were recorded in January, August, and October.

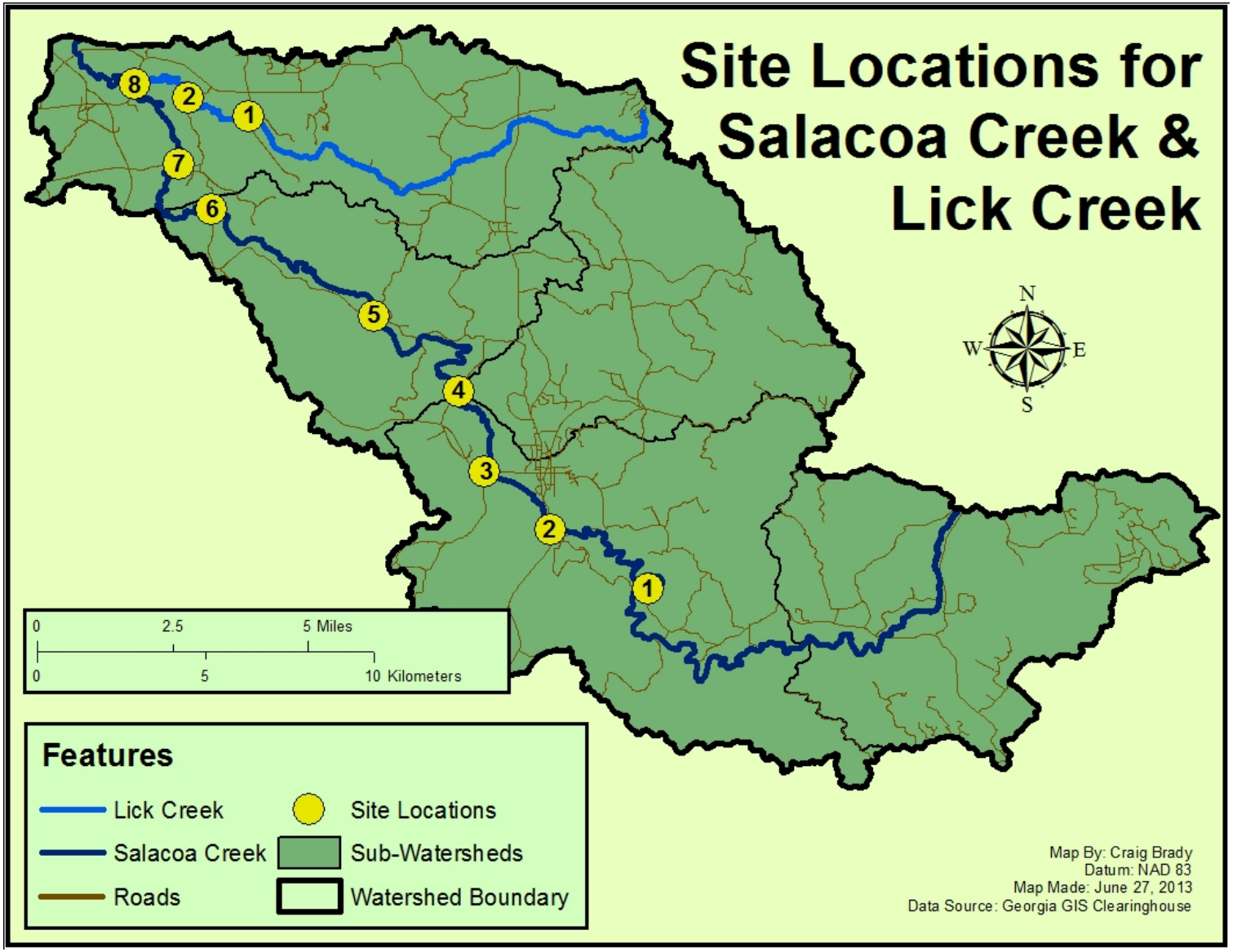


Figure 3.3.a. A display of the locations of the sample sites used during targeted monitoring in the Salacoa Creek Watershed.

Table 3.3.a. A display showing samples too numerous to count and geometric means of enumerated fecal coliform counts (in MPN) calculated from samples collected by Limestone Valley in the Salacoa Creek Watershed.

FECAL COLIFORM SAMPLING DATA (2012-2013)		
Site	**# of Samples Too Numerous To Count**	**Geometric Mean in MPN (and sample size)**
Salacoa Creek #1 - Salacoa Road	-	76.4 (12)
Salacoa Creek #2 - US 411	-	109.9 (12)
Salacoa Creek #3 - HWY 53	-	76.5 (12)
Salacoa Creek #4 - Sam Hunt Road	-	177.1 (12)
Salacoa Creek #5 - Covington Bridge	-	110.4 (12)
Salacoa Creek #6 - Knight Bottom Road	-	315.4 (12)
Salacoa Creek #7 - Lovebridge Road	-	215.7 (12)
Salacoa Creek #8 - HWY 156	1	310.5* (11)
Lick Creek #1 - Pleasant Hill Extension	2	64.3* (10)
Lick Creek #2 - Langford Road	1	112.0* (11)

Too numerous to count samples could not be used within geometric means, therefore these geometric means are less meaningful by themselves to indicate water quality issues.

Fecal coliform data from the eight sites on Salacoa Creek, numbered from upstream to downstream, appear generally to display greater geometric means moving downstream. However, Salacoa Creek Site #4 appears significantly higher than the sites surrounding it, possibly due to much of the Fairmount population's dependence on septic systems and the prevalence of agriculture in the vicinity. Downstream of Site #4, more elevated means appear evident at Site #6. Site #7, influenced by the contribution of Pine Log Creek from outside the hydrologic unit, appears to have slightly diluted counts, despite Pine Log Creek also being impaired for fecal coliform. The location of Salacoa Creek Site #8, just downstream of the confluence of Lick Creek in an area dominated by agriculture, likely led to a higher geometric mean and events in which fecal coliform bacteria was "Too Numerous To Count".

Although the Lick Creek data reveal lower geometric means than the lower Salacoa Creek sites, these data exhibited three of the four "Too Numerous To Count" observations during the monitoring effort. The cause of these counts could stem from the contributions of wildlife in Salacoa Lake, as well as agriculture in the lower Lick Creek subwatershed.
Due to lack of more discrete determination of "Too Numerous To Count" observations, it is difficult to say whether "Instantaneous Maximum" violations occurred during August and October when "Too Numerous To Count" observations were recorded at Salacoa Creek Site #8 and Lick Creek Site #1, respectively. These observations, in addition to the low frequency of wet weather events sampled, likely skew geometric means to lower values due to their lack of inclusion in these calculations. Regardless of these observations, it is apparent that the impairment for fecal coliform on Salacoa Creek is unlikely to have sufficiently low fecal coliform counts to be de-listed at this time. Also, three "Too Numerous To Count" observations from 24 samples from Lick Creek indicate the possibility of impairment for fecal coliform violations in the future.

Table 3.3.b. A display of geometric means (n=12) from samples collected by Limestone Valley in 2012 in the Salacoa Creek Watershed and analyzed for Total Suspended Solids (TSS).

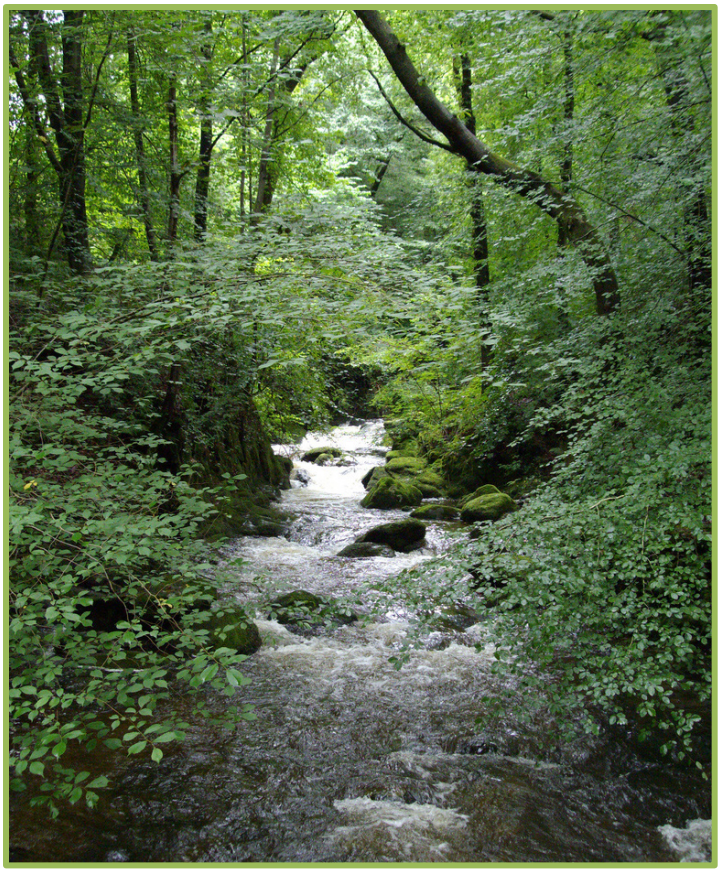
TOTAL SUSPENDED SOLIDS GEOMETRIC MEANS (2012)	
Site	**Total Suspended Solids**
Salacoa Creek #1 - Salacoa Road	8.73
Salacoa Creek #2 - US 411	8.98
Salacoa Creek #3 - HWY 53	10.39
Salacoa Creek #4 - Sam Hunt Road	9.69
Salacoa Creek #5 - Covington Bridge	14.19

Salacoa Creek #6 - Knight Bottom Road	17.91
Salacoa Creek #7 - Lovebridge Road	16.19
Salacoa Creek #8 - HWY 156	18.57
Lick Creek #1 - Pleasant Hill Extension	16.35
Lick Creek #2 - Langford Road	23.26

The TSS data (featured in Table 3.3.b above), used as an indicator of current sediment loading, reveal the greatest TSS levels are along lower Salacoa Creek (Sites 5 through 8) and Lick Creek (Sites 1 and 2). Extensive agriculture and often a lack of riparian buffers in the areas surrounding these sites likely explains greater values at these locations. Lick Creek Site #2 had the greatest geometric mean of all the sites. The site has extensive agriculture in the immediate area and contributes to the counts at Salacoa Creek #8 as well. Additional observations of the areas surrounding these segments suggest agriculture may be the greatest contributor of current sediment loads to the impacted biota impairments. Once erosive processes result in instream sedimentation, the low gradient of the valley floor and subsequent meandering of Salacoa and Lick creeks suggest sedimentation issues within these streams will take more time to attenuate than in higher gradient streams.

3.4 Buffer Analysis

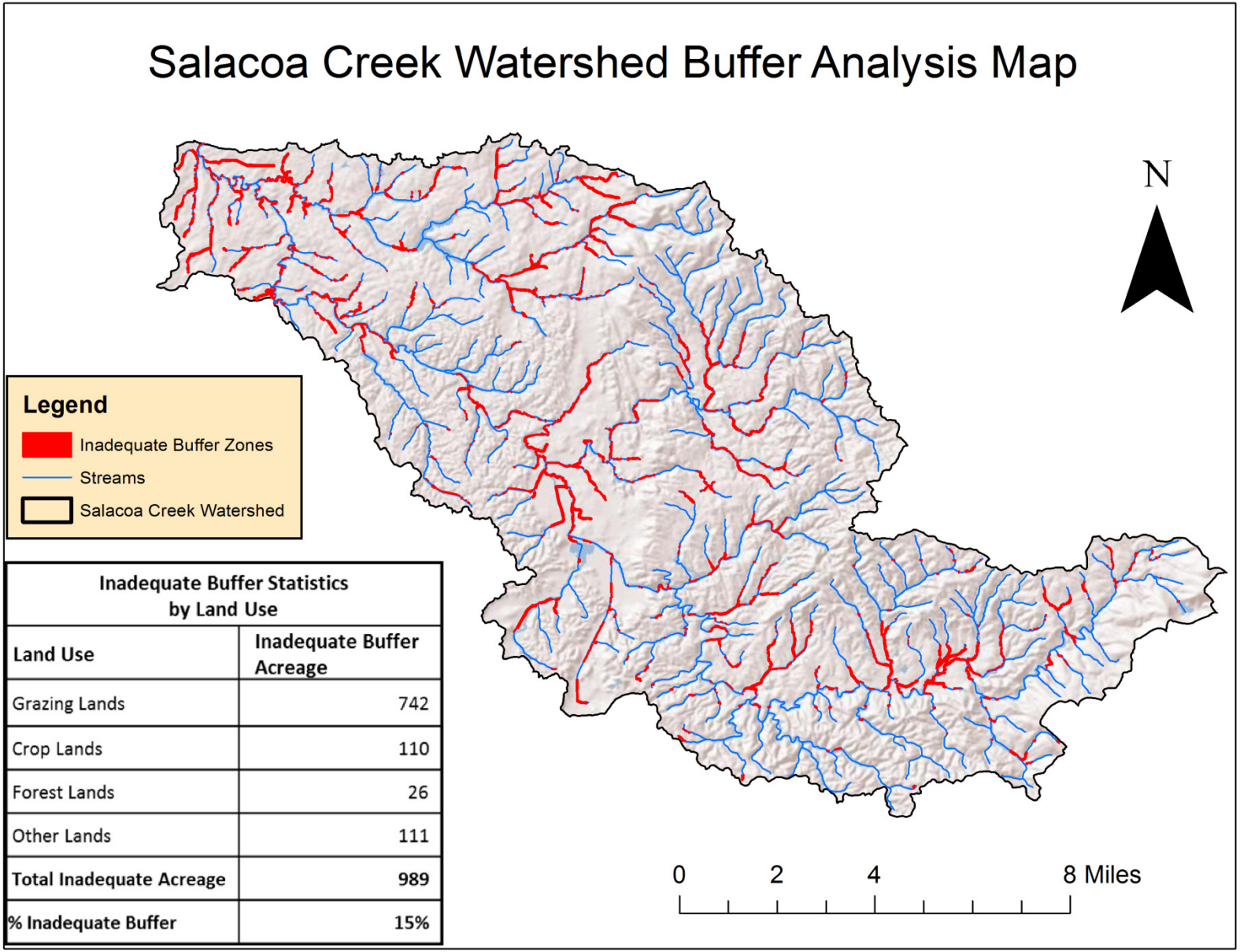
Riparian zones, riparian buffers, and vegetative buffers are simply vegetated areas along streams. In more ways than one, they are critical to the health of waterways. Extensive root systems stabilize the soils in close proximity to streams and, most importantly, the stream banks. Without these root systems, erosion is more prevalent and the banks often erode and collapse leading to sedimentation issues. Stream buffers also act as biotic filters, consuming water and nutrients (and often NPS pollutants). This filtration is especially important during runoff events, when flows and NPS pollution are reduced by vegetation. Buffers also act as physical barriers that slow the delivery of runoff and allow sediment deposition and bank building to occur during bankfull and flood events. Vegetative buffers also serve to shade streams, which buffer temperature increases, and deposit fallen trees, limbs, and leaves adjacent to and within the creek that respectively maintain moisture levels along streams and diversify habitats within them.



Stream buffers are regulated by the State of Georgia in Section 12-7-3 of the Georgia Erosion and Sedimentation Act of 1975. An amendment issued in May of 2009 states that a 25-foot buffer shall be established along the banks of all state waters. The Gordon County Unified Land Development Code, adopted on January 1, 2009 (and revised on December 7, 2010), also states that the minimum buffer width will be 25 feet. Designated trout streams in Georgia require a buffer of 50 feet.

Due to the importance of stream buffers on water quality, a buffer analysis was conducted on the Salacoa Creek Watershed as part of the development of this WMP. The stream buffer analysis was conducted utilizing GIS software and aerial photography conducted by Gordon County in 2012. The purpose of this analysis was to determine where stream buffers failed to meet the 25 foot standard and establish the percentage of inadequate buffers.

Salacoa Creek Watershed Buffer Analysis Map



Inadequate Buffer Statistics by Land Use	
Land Use	**Inadequate Buffer Acreage**
Grazing Lands	742
Crop Lands	110
Forest Lands	26
Other Lands	111
Total Inadequate Acreage	**989**
% Inadequate Buffer	**15%**

4. Types and Sources of Pollutants

In section 4, the two major types of pollutants, non-point source (NPS) and point source will be examined both geographically and by the severity of their effects. Nonpoint source pollution will be discussed in much greater detail due to the number of factors involved and the fact that NPS pollution is the predominant issue in the watershed. Information about nonpoint source pollution was gathered and analyzed from a variety of sources such as sampling, observation, GIS analysis including land use, and stakeholder feedback.

4.1 Nonpoint Sources

Nonpoint source pollution is generally present on the landscape and delivered to water bodies during runoff events via overland flow, but can also be deposited directly into water bodies. Examples of nonpoint source pollution are numerous and vary from one parcel to the next. NPS pollution includes everything from litter along highways to fluid leaks from vehicles to trace heavy metals and other wastes from households to historical mining pollution, sediment from construction sites, and non-regulated urban runoff. However, the NPS pollutants of concern in the Salacoa Creek Watershed are fecal coliform from human and animal waste on the landscape and sediment likely from lack of riparian buffers, forestry operations, row crops, and bank collapse from overgrazing and other causes. In addition to delivery during runoff events, direct delivery of these pollutants into the streams of the watershed is likely related to instream wildlife, grazing, and bank collapse resulting from overgrazing and poor riparian establishment.

Agriculture

The Salacoa Creek Watershed drains an area of approximately 84,852 acres or 132.6 square miles. Pasture and hay make up 10,637 acres or approximately 12.5% of the land in the watershed. Cultivated crops make up 746 acres or 0.9% of the watershed area. Poultry operations are also present although characterized as low intensity development within the NLCD land cover data set. When excluding forestlands with traditionally low NPS levels, overall farming lands (>13.4%) are the dominant land use in the watershed likely contributing significant nonpoint source pollution loads. Land in farms can be subdivided into use categories of cattle, horse, and chicken operations with each subgroup potentially contributing significantly to nonpoint source pollution loading. Although the numbers of each subgroup are not available for the discrete Salacoa Creek Watershed, livestock populations for Gordon County, displayed in Table 4.1.a., show the numbers of each subgroup relative to one another.

Table 4.1.a Estimated Livestock Populations in Gordon County (source: georgiastats.uga.edu 2007).

Livestock Populations in Gordon County				
Cattle	Horses	Sheep	Goats	Pigs
12,800	760	80	1,800	0

As detailed above, cattle predominate livestock farms within Gordon County. Beef cattle are generally maintained in pastures with the exception of winter feeding, while dairy cattle are more often than contained for production purposes. Both beef and dairy cattle (as well as other livestock) can contribute to raised levels of fecal coliform if feces left in pastures eventually washes into the streams during runoff events or becomes inundated in floodplains.

When livestock, particularly cattle, have continuous access to streams, they have the ability to directly deposit much of their waste into streams. In addition, the access leads to trampling of riparian vegetation, loss of bank stability, and often eventually collapse of stream banks. Bank instability issues often lead to continuous significant sediment loading into streams.

Figure 4.1.a. The confluence of a muddy Salacoa Creek with the Coosawattee River.

Chicken litter (manure) is often spread on pastures as a fertilizer, increasing the potential of nonpoint source pollution during runoff events. Improperly stored chicken waste is also a source of NPS pollution. Stack houses (when properly constructed) provide storage for chicken litter where it can be properly cured without the threat of runoff. The high level of nitrate/nitrites in chicken litter (when spread on pastures) is believed to be a contributing factor of excessive nitrate levels in Lake Weis in Alabama. The primary source for water in Lake Weis is the Coosa River Basin of which the Salacoa Creek Watershed is a contributor.

Furthermore, the U.S. EPA has mandated that nitrate levels in the Coosa River at the Alabama border be reduced by 30%. In response to the mandate the North Georgia Water Resources Partnership, a committee of the Northwest Georgia Regional Commission, has studied nutrient trading for the past year and in January of 2013 began a pilot program in Gordon County on Pole Cat Creek just outside the northern boundary of the Salacoa Creek Watershed. It is expected due to the reduction requirement of nitrogen more stringent measures concerning chicken litter may be enacted. Brown and Caldwell are the consultants of record for the project.

Although agricultural activity had been declining for several years in the region due to population growth and land development, the economic downturn of 2008 has brought stabilization to agriculture in Gordon County. Numbers of farms have decreased due to technological advances in breeding and production, yet livestock numbers have remained relatively the same. It is imperative that all current and potential sources of nonpoint source pollution be identified and remediated as quickly as possible. The nitrogen mandate for Lake Weis is a prime example of the need.

Wildlife

The impact of wildlife on fecal coliform bacteria levels can be significant. The heavily forested, headwaters area of Salacoa Creek is home to abundant deer and turkey. Despite these populations, stream sampling has not indicated especially high fecal coliform bacteria counts in the Salacoa Creek headwaters.

Wildlife on the valley floor, in particular geese and ducks, are present in significant numbers and may, however, have a more pronounced impact on water quality. The north-to-south orientation of the valley provides a natural flyway for both geese and ducks during migrations. In addition, there are numerous lakes pocketing the watershed providing excellent habitat for waterfowl. Waterfowl are considered significant contributors since they spend a large portion of their time on surface waters and deposit feces directly into the host water body. Of concern in the watershed is Salacoa Creek Park and in particular Salacoa Lake, a recreational lake maintained by Gordon County, and utilized for fishing, boating, and swimming. The ever increasing numbers of Canadian Geese not only populate the lake during migrations, but also spend increasing amounts of time on the lake throughout the year. The lake, due to shallow depth and a muddy bottom, is potentially becoming an incubator for feces left by the waterfowl.

Due to the threat of elevated fecal coliform bacteria, New Echota Rivers Alliance, an environmental advocacy and outreach nonprofit organization headquartered in Gordon County, adopted Salacoa Lake in 2013 under the Georgia Adopt-A-Lake Program. Beginning July 1st, a representative of New Echota Rivers Alliance will begin a sampling program for fecal coliform bacteria and total suspended solids with lab analysis conducted by certified technicians at Calhoun Utilities. Due to the recreational nature of the lake and extensive use of the swimming area, any alarming levels of fecal coliform will be reported directly to the Gordon County Health Department for further analysis and action if deemed necessary.

Urban/Suburban Runoff

Only two small towns known as Fairmount (population 720) and Ranger (population 131; US Census Bureau 2010) are located in the watershed. This suggests the more significant sources of sediment in the watershed are unlikely to be stormwater related. Instead, the major sources of sediment pollution likely originate from activities such as clear cutting forests and farming. The Comprehensive Land Use Plan of Gordon County, Georgia, (available online at www.gordoncounty.org) is specific in rules and regulations concerning mitigation of storm water runoff. Still, construction likely contributes some sediment to the streams in the watershed. During construction and other land disturbing activities, the vegetation is removed exposing the raw soil surface. With no vegetative root system anchoring the soil and silt fences associated with construction often left to collapse, even the most minor of rain events can result in runoff carrying sedimentation into the waterway.

Regarding fecal coliform loading, however, with the exception of the cities of Calhoun and Fairmount, Georgia, the entire Salacoa Creek Watershed is totally dependent on septic systems for wastewater removal. Fortunately, all new home construction and subsequent new septic system installations are tightly controlled and inspected by the Department of Public Health's Environmental Health Specialists. This suggests problem septic systems are likely those that were installed many years ago. A GIS analysis of housing density in the watershed was conducted (see Figure 4.1.b below) to illustrate the likely distribution of septic systems. This analysis revealed that there are approximately 2,336 houses on septic systems in the watershed, demonstrating the likelihood of their contribution to pathogen levels in the area.

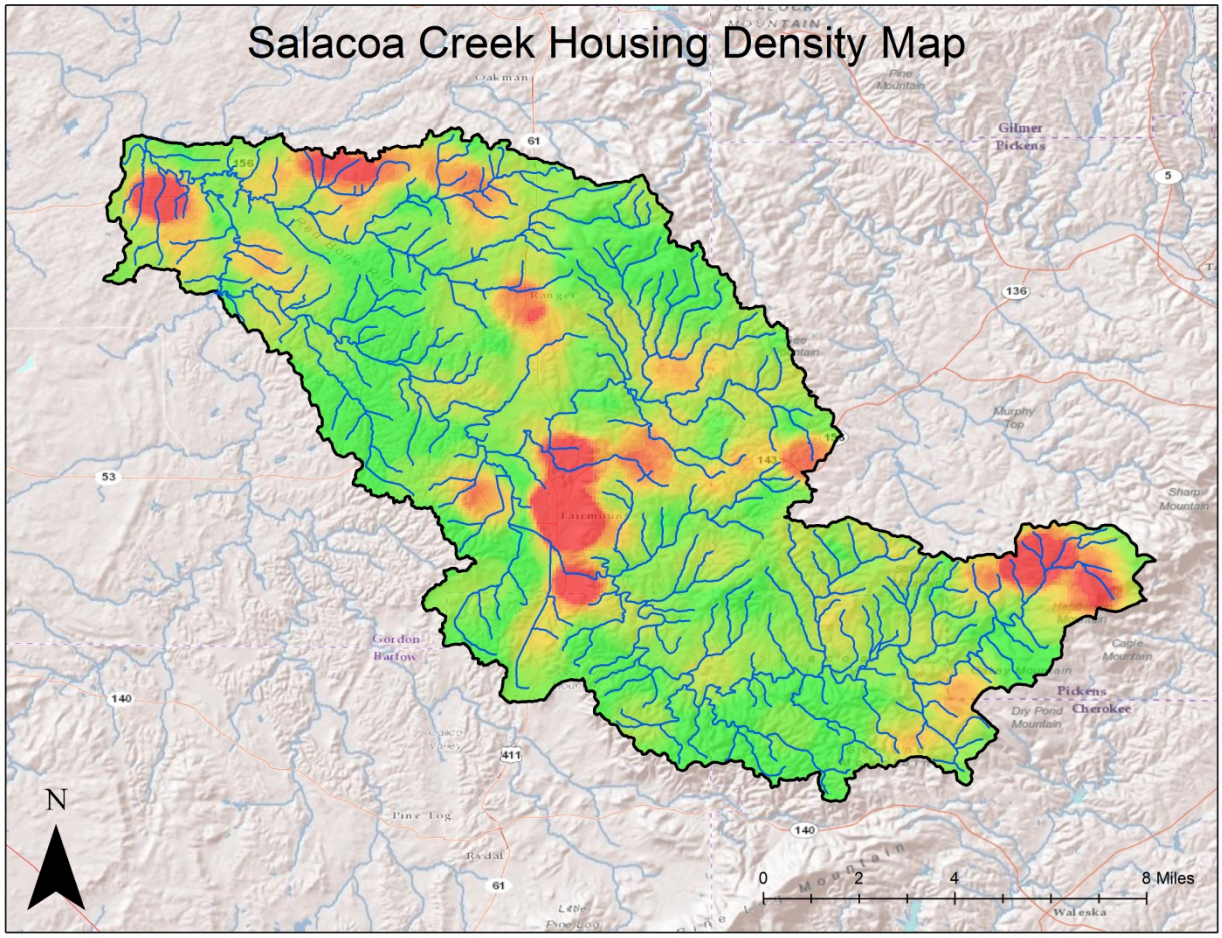


Figure 4.1.b. This figure illustrates housing densities in the watershed. Concentrated residential areas are highlighted in orange/red.

Silviculture

Of the 84,852 total acres in the Salacoa Creek Watershed, approximately 60,123 acres (70.9%) are characterized as forestland. Harvesting timber on forest parcels can cause erosion, especially when parcels are clear-cut, and contribute sediment to water bodies. The practice of clear cutting increases the amount of local runoff and often further exposes topsoil to erosion during rain events. Gullies form from increases in runoff and subsequent erosion carry carry topsoil into adjacent water bodies resulting in sedimentation. This sedimentation can contribute to the transformation of a stream from having predominantly rocky substrates to a stream-bed filled with sediment, which adversely affects aquatic health and can cause declining fish populations. Lick Creek and a segment of Salacoa Creek are both list for impacted biota which is caused in large part by sedimentation. The Gordon County Commission has mandated that Best Management Practices be implemented whenever and wherever clear cutting is taking place. Specific BMP's can be found in the Gordon County Land Use Plan (adopted January 1, 2009) in Section 3.06.00 titled Soil Erosion, Sedimentation, and Pollution Control.

4.2 Point Sources

Point source pollution sources are regulated by the NPDES permitting system and require a permit. These sources of pollution tend to be static and often significant, and are thus more readily identifiable than NPS pollution. Typically, point sources pollutants consist of industrial, factory farming, or large-scale stormwater or mining effluents. There are currently not any concentrated animal feeding operations (CAFOs), stormwater entities, or mines within the Salacoa Creek Watershed that require an NPDES permit. In fact, the only NPDES permit within the watershed is for a waste water treatment plant, located several miles upstream of the Salacoa fecal coliform impairment and described in detail below in Table 4.2.a. With only one relatively small discharge from an NPDES permitee within the watershed, point sources are not considered a likely source of any of the impairments.

Table 4.2.a: A display of NPDES Permits in the Salacoa Creek Watershed.

NPDES Waste Water Treatment Plant's – Salacoa Creek			
Facility Name	**Receiving Waterway**	**Type of Facility**	**Discharge (MGD)**
Fairmount WPCP	Salacoa Creek Tributary	Municipal / LAS	0.14

5. Watershed Improvement Goals

Section 5 of the Watershed Management Plan for the Salacoa Creek Watershed describes the overall objectives for plan implementation as well as the load reduction targets that have been estimated to be necessary in order to de-list the impairments.

5.1 Overall Objectives

Restoration

The overall objectives of this WMP are to identify the stream segments exceeding water quality standards, determine the likely causes of impairment, determine the load reductions necessary to bring them into compliance, and create programs that will work in the long-term (assuming additional funding is provided) to realize the reduction of pollutant loads. Previous plans written for other watersheds have included the idea of utilizing cost-share programs to incentivize landowners to address water quality issues on privately-owned lands. In addition to planning to incentivize such voluntary conservation, the stakeholder group viewed education as similarly important to assisting landowners with managing their lands in ways that conserve resources and improve water quality.

Figure 5.1.a. Effluent surfacing from a failing septic system.

The consistent opinion of the stakeholder group is that fecal coliform bacteria must be reduced, and any programs implemented should aim to reduce fecal coliform levels to meet the standard. An additional concern is the amount of sediment loading in the watershed and the effects on biotic integrity. Luckily, most agricultural projects planned as part of these programs often reduce both pollutants. However, a septic repair would focus almost completely on reducing fecal coliform loading. The success of these programs to improve the watershed will be determined by water quality sampling conducted by trained Georgia Adopt-A-Stream volunteers, as well as Georgia Department of Natural Resources Personnel. As sampling indicates reduced bacteria counts, state-designated protocols will be implemented in hopes of de-listing the stream segment currently impaired for fecal coliform violations. Additional sampling by the Georgia Environmental Protection Division will indicate, through fish and macroinvertebrate sampling efforts, when the biotic integrity of the stream segments listed for impacted biota has been restored.

Anti-degradation

Best Management Practices will be recommended to decrease fecal coliform as well as sedimentation, the major cause of biotic impairments. With a high likelihood that Salacoa Creek Watershed remains agricultural in nature, BMPs will be recommended to address livestock in streams, run-off concerns, etc., and ensure rotational grazing practices and cover crops become increasingly prevalent. Additional programs such as a septic system repair program will be recommended to further reduce fecal coliform in the impaired segments of Salacoa Creek.

Implementation of these nonpoint source pollution reduction strategies, as well as education and outreach in local communities (discussed further below), is not only meant to lead to the improvement of impaired segments but also ensure further degradation of water quality and stream habitats in the watershed does not occur.

Education

As discussed previously, public education and outreach are viewed as key to the reduction of fecal coliform and sediment loading in the watershed and improved land management and ethics. Public awareness of these issues will be improved through newspaper articles, town hall meetings, and presentations to service organizations such as the Rotary Club.

Additionally, a volunteer group will be established in the watershed to collect and analyze water samples on a monthly basis as part of the Georgia Adopt-A-Stream Program. These Adopt-A-Stream volunteers will also conduct a watershed observation twice a year and macroinvertebrate sampling in the fall and spring of each year.

Further public awareness will be created through the establishment of a "River Ranger" group at Fairmount Elementary School. This group will participate in river clean-ups, as well as

Figure 5.1.a. Volunteers monitor water quality using Adopt-A-Stream Techniques.

study the environment through the Project Wet curriculum. Special emphasis will b e placed on water pollution, its sources, and the impact it has on streams within the watershed. This group will be comprised of fourth grade students.

We also plan to present each year during the annual Memorial Day Festival for the City of Fairmount. This presentation will consist of a display exhibiting various types of pollution, their effects in the watershed, and strategies to reduce these types of pollution.

5.2 Load Reduction Targets

As mentioned previously, one six-mile segment along Salacoa Creek is currently listed as impaired due to fecal coliform count violations. A Total Maximum Daily Load (TMDL) document was completed in September of 2009 which detailed the estimated load reductions necessary in the contributing area to bring the segment into compliance. The TMDL established that a 62% reduction of fecal coliform bacteria was likely necessary to de-list the impaired segment.

Three segments in the Salacoa Creek Watershed are listed as impaired due to impacted biota. These segments include Salacoa Creek from the confluence with Pinhook Creek to that of Pine Log Creek (8 miles), Lick Creek from the headwaters to Redbud Creek (7 miles), as well as Lick Creek from Redbud Creek to Salacoa Creek (4 miles). Sediment is assumed to be the main factor leading to the poor biotic integrity found during biotic sampling that led to these impairments. The estimated sediment load reductions calculated for the impacted biota impairments are 92% for the Salacoa segment, and 0% for both Lick Creek segments. Zero percent reduction is typically indicative of "legacy" sediment issues in streams that stem from past land management practices. This is often the case when zero or only very small load reductions are called for. According to GA EPD, streams are viewed as likely to eventually recover from the effects of sedimentation, after load reductions are met and maintained for some time. When historical sedimentation issues are present, maintenance of reduced sediment loads are often necessary for a long period of time until the sedimentation issues are attenuated.

6. Pollution Reduction

Section 6 examines conservation programs currently in place in the Salacoa Creek Watershed, as well as to examine additional conservation programs that could contribute to further reductions in fecal coliform and/or sedimentation. A comprehensive review of current conservation programs and their status, in addition to the recommendation of conservation programs to be implemented, outlines the path needed for watershed restoration. Conservation efforts will include both short and long term measureable objectives and will involve government entities as well as both private groups and individuals for implementation.

6.1 Existing Conservation Programs

Currently, a number of conservation programs exist in the Salacoa Creek Watershed to assist land owners and managers in protecting and conserving soil, water, and natural resources. These conservation programs involve federal agencies as well as a variety of state and local government entities. Many of these conservation programs are utilized throughout the United States to conserve and protect natural resources. As a primary component of the Salacoa Creek Watershed Management Plan, only those conservation efforts specifically addressing fecal coliform and/or sedimentation reduction will be discussed in this section.

Current Structural Programs and Practices

With the majority of land use in the Salacoa Creek Watershed categorized as either forest or agriculture, it is felt management measures directed at these two land use categories will have the greatest overall impact on improving water quality in the watershed. The following description of structural management programs have proven to be effective in both forest and agriculture settings and have been generally well received by the landowner even though participation is voluntary and funding is on a cost share basis. These management measures which assist in controlling pollutant loads resulting in decreased levels of fecal coliform and/or sedimentation include reduction in the availability of pollutants from manure, fertilizer, and pesticides as well as the management of stormwater runoff which reduces erosion and sedimentation.

Figure 6.1.a. Livestock exclusion from streams can reduce fecal coliform loads.

A variety of programs are currently available to assist landowners in the Salacoa Creek Watershed with the development and implementation of voluntary conservation management plans. One such program is the Environmental Quality Incentives Program (EQIP) administered by the Natural Resources Conservation Service (NRCS), a division of the United States Department of Agriculture (USDA). EQIP is a conservation program for owners of private non-industrial forest land that promotes agricultural production, forest management, and environmental quality. Program objectives are achieved through the implementation of a conservation plan which includes structural, vegetative, and land management practices. Program practices and activities are implemented according to an EQIP plan of operations or contract. The contract provides financial assistance to help develop conservation plans and implement conservation practices. A partial listing of EQIP conservation practices which qualify would include waste storage facilities, pasture and hayland planting, terracing, and tree planting among others. EQIP conservation programs which target the reduction of fecal coliform would include livestock exclusion (fencing), alternative livestock watering facilities, and water storage facilities.

In general applications for EQIP funding are due by November for use during the following fiscal year. Information on NRCS conservation programs can be found at www.ga.nrcs.usda.gov under the heading of programs. For more information regarding EQIP, contact the NRCS Service Office serving Gordon County, Georgia at (706) 629-2582 .

A second source of funding for land conservation practices is the Conservation Reserve Program (CRP) which is administered by the Farm Service Agency (FSA); an agency of the USDA. The long-term goal of the CRP is to re-establish valuable land cover to prevent soil erosion, improve water quality, and reduce loss of wildlife habitat. Land conservation contracts are normally 10-15 years in length and provide for a yearly rental payment to the farmer for removal of environmentally sensitive land from agricultural production and the planting of species that will improve environmental health and quality. In general, sensitive land includes land prone to erosion, agricultural or pasture land that borders rivers and streams, or field margins. A key component of a Continuous CRP is riparian buffer mitigation. An overview of the CRP Program can be found on the internet at www.ga.fsa.usda.gov. The FSA office for Gordon County, can be contacted at (706) 629-2582 .

Figure 6.1.b. Septic system repairs can reduce fecal coliform loads.

Northwest Georgia Public Health, an agency of the Georgia Department of Human Resources, manages a variety of programs including community partnerships

and services, environmental health, and disease control in the 10-county Northwest Georgia region. Under the category of environmental health are detailed all requirements for the on-site sewage program as mandated by the State of Georgia; Rules and Regulations for On-Site Sewage Management Systems (Chapter 290-5-26). The requirements include septic system permits, existing system evaluations, repair permits, and site evaluations. As required by Georgia law all new septic systems as well as those systems requiring repair must be inspected and approved by a certified Environmental Health Specialist. The objective of the inspection process is to protect the groundwater, drinking water, and surface water from harmful organisms and bacteria. Information on this program can be found at www.nwgapublichealth.org/counties/gordon or by calling the Gordon County Health Department at (706) 624-1444.

In the Salacoa Creek Watershed the vast majority of homeowners are totally dependent on septic systems as there is no sewage service available from Calhoun Utilities, the primary provider of water and sewer service for Gordon County. Although new and repaired septic systems must meet Georgia standards, there remain systems installed prior to enactment of the standards which pose a threat to water quality. In the upcoming section of proposed conservation programs for the watershed a strategy will be discussed for those septic systems installed pre state regulations.

Limestone Valley Resource Conservation and Development (LVRC&D) serves eleven counties in Northwest Georgia with a focus on water quality improvement, conservation, sustainable agriculture, and natural resource education. One conservation program offered by Limestone Valley which has a direct impact on sedimentation issues is their no-till drill rental program. Benefits of no-till farming are improved soil quality, reduction in carbon loss, decomposition of crop residue, minimizing soil erosion, and the reduction of soil moisture loss. Soil compaction is also decreased with fewer equipment field passes utilizing no-till versus traditional tillage. In addition to the no-till drill offered for rental Limestone Valley RC&D has available aerators and sprayers in the same conservation program. Information for this program can be found at www.limestonevalley.org or by calling Joshua Smith at (423)309-2630.

Figure 6.1.c. Use of a "No-till" drill can conserve soil and water resources on agricultural lands.

Currently under construction by Gordon County Government on GA Hwy. 53 just west of Calhoun, GA is the Agricultural Service Center, a state of art facility that will consolidate the offices of several federal, state and local agricultural agencies. Locating to the new facility will be USDA, GA Soil and Water Conservation, and the University of Georgia Extension Service among others. The projected opening date of the facility is September of 2013.

Existing Non-Structural Programs and Practices

One theme that is consistent in both structural and non-structural conservation practices is education and information. Prior to implementation of a structural conservation practice, intangible motivators or non-structured practices must be implemented to summarize watershed concerns, recommend solutions, establish goals, alter behavior patterns, and to develop a feeling in ownership of the watershed by the entire community. Non-structural practices mold public opinion as well as creating the desire and commitment for implementation of structural conservation practices. The following examples are non-structural conservation programs currently available for watershed implementation.

The Farm and Ranch Lands Protection Program (FRPP) is administered by the Natural Resources Conservation Service (NRCS/USDA) and provides funds to help purchase development rights to keep productive farm and ranchland in agricultural use. NRCS/USDA partners with state and local governments as well as non-governmental organizations to purchase conservation easements from landowners. Traditionally NRCS/USDA will provide up to 50% of the fair market value of the conservation easement. One component of the FRPP qualification requirement is the farm must have a conservation plan for highly erodible land. This requirement is an example of a non-structural conservation program. Additional programs offered by NRCS/USDA containing non-structural conservation practices would include the Healthy Forest Reserve Program, Wetlands Reserve Program, and the Grasslands Reserve Program. Contact information for NRCS/USDA for these and other programs can be found in the proceeding section titled 6.1 Existing Conservation Programs.

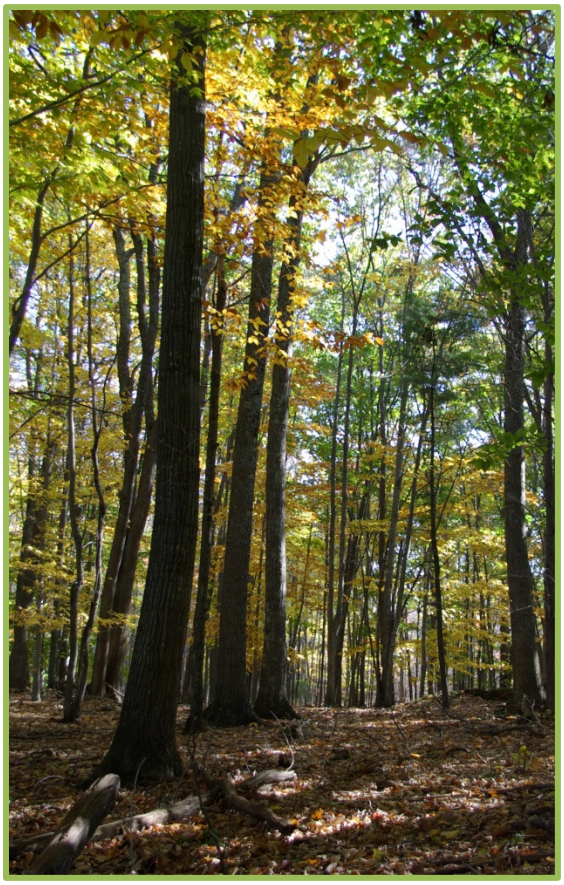


Figure 6.1.d. The GFC can help conserve resources on forest lands.

With the majority of the Salacoa Creek Watershed consisting of forested lands, conservation programs which address forest preservation are critical in the development of a comprehensive

Watershed Management Plan. One such non-structural conservation program is the Georgia Forest Commission's Forest Legacy Program which is administered through a grant from the USDA Forest Service. The goal of the program is to protect environmentally important working forests threatened by conversion to non-forest uses. The Forest Legacy Program provides for the purchase and/or donation of conservation easements or fee simple land transfers from owners who wish to keep the land forested. Land owners who donate a conservation easement are eligible for certain Federal and State income tax credits. The Georgia Forestry Commission (GFC) provides technical assistance on conservation practices to the landowner and is responsible statewide for development, education, implementation, and monitoring of forestry Best Management Practices (BMP's). The Gordon County unit of the GFC can be reached at (706) 624-1432 or by visiting their website at www.gfc.state.ga.us.

Locally the Gordon County Land Use Plan adopted in 2009 contains several non-structural components affecting water quality in the Salacoa Creek Watershed. A partial listing would include Flood Plain Delineation and Permitting (Section 3.01), Water Supply Watershed Protection (Sec. 3.02), Groundwater Recharge Area Protection (Sec. 3.03), River Corridor Protection (Sec. 3.04), Wetlands Protection (Sec. 3.05), and Soil Erosion, Sedimentation, and Pollution Control (Sec. 3.06). Additional non-structural components can be found in Section 4.07 Landscaping, Buffers, and Tree Protection, Section 6.02.02 On Site Sewage Management Systems, and Section 6.04 Requirements Regarding Drainage and Stormwater Management.

The Gordon County Planning and Zoning Commission reviews zoning and future land use for unincorporated areas of the county and makes recommendations to the Board of Commissioners. The Planning and Zoning Commission also makes decisions on variance requests. To view the Land Use Plan or for additional information on the Planning and Zoning Commission please visit www.gordoncounty.org .

6.2 Proposed Conservation Programs for the Salacoa Creek Watershed

Analysis of monitoring data from water samples collected on Salacoa Creek from 2012 to 2013 indicate levels of fecal coliform have increased over monitoring data collected in 2009 (TIER 2 TMDL Implementation Plan (Revision #01)). Although the TMDL submitted in 2009 correctly identified the impairments, listed the most probable cause for the impairments, and developed a BMP implementation plan for corrective measures to be taken, little if any progress has been made in the watershed to improve water quality. If compliance with state water quality standards is to be achieved the following proposed program, the Salacoa Creek Watershed Initiative (SCWI), must not only be approved but also implemented in a timely manner. This initiative would be a Clean Water Act (319) funded program to provide cost shares for those BMP implementations deemed necessary to improve water quality to required state standards. Community outreach programs have already began to create interest and a commitment to improving water quality will be further enhanced with direct involvement of hands on projects such as river clean-ups, river monitoring, and BMP installations.

In addressing which structural practices would be most effective in reducing fecal coliform to meet state water quality standards land use was examined to determine potential sources of pollution and how best those sources could be reduced through the implementation of selective BMP's. Although forest land is the predominant land use in the watershed it is believed both agriculture and septic systems are the primary contributors to fecal coliform loads. Agricultural BMP's currently in use nationwide would include fencing to prevent cattle access to adjacent water bodies as well as providing alternative watering resources. BMP's restricting river access also contributes to streambank stabilization with a corresponding reduction in erosion and sedimentation. This single BMP addresses both water quality issues of fecal coliform and sedimentation. Stack houses in poultry operations is an effective and proven measure in reducing fecal coliform as well as nitrogen loads and is another recommended BMP for the watershed. All BMP's are voluntary to the landowner and would include a cost share mechanism for funding.

Figure 6.2.a. Eroding streambanks contribute to sediment loads in the watershed.

Another structural program would include buffer repair and stabilization for existing buffers, and the reestablishment of buffers which have been eliminated as a result of vegetation removal and clear cutting. State of Georgia regulations mandate all state waterways must have a minimum twenty five foot buffer on both sides of the waterway with the exception of trout streams which require a minimum of a fifty foot buffer. Both buffer requirements of twenty five feet and fifty feet are consistent with the Gordon County Land Use Plan. In addition to being a mandate by the state buffers act as a filter for run-off reducing both sedimentation and pollution.

Although the State of Georgia regulates the installation and repair of private septic systems through local Department of Health agencies this program has only been active since 1969 (Original Rule entitled "Definitions" filed on December 1, 1969 as 270-5-25-01; effective December 20, 1969). Prior to this date there were no regulations or inspection procedures. There is no data available as to the number of septic systems installed prior to this date but the stakeholder group has concluded these older systems can be a significant factor in fecal

coliform impairments throughout the watershed. Due to the systems being on private land and underground it is difficult to determine when repairs are needed. Additional septic system concerns are poor soil conditions in the watershed resulting in percolation issues and the lack of a required pump out schedule for all systems.

A structured program is recommended that would provide a cost share incentive for septic system repair of older non-regulated systems, replacement of non-regulated systems, and development of a required pump out program for all systems. The cost share of this BMP would be weighted to at a minimum repair the older systems or ideally replace the older systems with new systems that meet state requirements. This BMP will also require an extensive non-structured component to build community support for watershed wide compliance and implementation. There have been recent discussions by the Regional Water Partnership for the development of a regional regulation that would require septic tank pumping on a set schedule with documentation as to what date the system was pumped, how many gallons were pumped, and the name of the company performing the pumping service. The penalty for failing to pump the system according to the schedule would result in water service termination. Although discussions among the Partnership are favorable for implementation of this requirement region wide as soon as next year, the impact on Salacoa Creek Watershed will be negligible as the majority of homes in the watershed have no access to utility provided water and must continue to use wells as their only water option. There is no compliance option in Salacoa Creek Watershed to discontinue water service which is why the non-structural component of this BMP is so critical for implementation.

Proposed Non-Structural Practices for the Salacoa Creek Initiative

Structural and non-structural practices are not stand alone programs but rather must be considered as two strategies which are dependent on the other for the ultimate success of the BMP installation. Implementation of non-structural practices for this watershed began in 2010 with an outreach program of education to all levels of the community. It is hoped that this program will continue during WMP implementation.

Outreach topics covered in this program have already included geography of the area, history of the area from the original settlers to present, an overview of natural resources within the region, and a general review of environmental issues currently confronting the region. This outreach program involved presentations to all levels of the community beginning with elementary students and continuing to social organizations as well as civic groups. The premise of the education component is whenever and wherever there is a gathering of people there is an opportunity to discuss the environment and water quality.

Additional outreach activities include newspaper articles and radio interviews on natural resources and the environment, implementation of an Adopt-A-Stream (and lake) volunteer water monitoring program, development of a county wide river clean-up program in conjunction with Rivers Alive, and a canoe paddle schedule which involved themed guided paddle trips on the forty seven miles of navigable rivers in Gordon County. The objective of the

guided paddle trips was to introduce or reintroduce the community to the rivers which flow though the county and to provide a platform for the discussion of the environment and what challenges face our natural resources. In just the last three years there have been over 1,000 participants in the paddle program which has resulted in community wide support for our rivers as well as concern for water quality in the region. The objective of this non-structured outreach program is to develop a baseline of environmental knowledge from which watershed impairments could be identified and corrective measures implemented. There is no timeline or completion date for this outreach program but rather there is the hope the program will continue to grow and evolve from generation to generation.

Figure 6.2.b. Stream cleanups are a non-structural outreach event that attracts many volunteers.

Phase II of the non-structural outreach program which is already in progress is to identify specific pollutants negatively impacting water quality, to develop programs which reduce the generation of pollutants at the source, and manage stormwater runoff to adjacent water bodies. Specific BMP's have been recommended by the stakeholder group among others that target both fecal coliform and sedimentation impairments within the watershed for reduction to state water quality standards. The non-structured component of this BMP implementation will build on the more general outreach program described above but will be targeted to the specific BMP implementation. Information will be disseminated through all channels describing specific causes of the impairment, a detailed evaluation as to what effect the impairment is having on water quality, specific steps to be taken to correct the impairment, and when as well as what will be the result of the BMP implementation.

7. Implementation Program Design

The objective of this WMP is to outline implementation efforts needed to result in the long-term goal of de-listing the two impaired stream segments on Salacoa Creek and Lick Creek. This section of the WMP outlines specific restoration activities, how they relate to implementation milestones, and estimated dates of completion. In addition, costs associated with the measures needed for watershed restoration are estimated.

7.1 Management Strategies

The basic strategy for implementation of this WMP is to create and manage a program that features both structural and non-structural controls within the watershed to address the fecal coliform and sediment issues. It is the intent of the Salacoa Creek Watershed Initiative (SCWI) to restore the watershed to the extent that impaired segments are eventually de-listed. We aim to accomplish this by increasing the available agricultural BMP cost-share opportunities, creating a septic system repair cost-share program, enhancing riparian zones, making available educational opportunities to encourage public participation in the watershed improvement process, and monitoring water quality to track improvements and/or de-list streams if possible. Septic system failures will be identified and addressed with the technical assistance provided by the Northwest Georgia Health District. The NRCS will assist with technical advisement with respect to agricultural projects. Calhoun Utilities and other stakeholders will assist with water quality sample analysis. Other agencies and non-governmental organizations will make key contributions to outreach efforts, as well as other riparian enhancement projects. All participation in grant programs will be voluntary in nature, and great care will be taken to respect private property rights.

In order to de-list several stream segments through implementation of a number of small projects, it is likely a long-term investment of time and significant funding will be necessary. Assuming the behaviors and land management practices improve over time, the benefits of clean water can last generations. It has been estimated that approximately 25% of the critical areas within the watershed can be treated with BMP installations to reduce NPS pollution through the implementation of four separate Clean Water Act §319 grants. The program, as outlined here, would cumulatively fund approximately $500,000 worth of projects and be implemented over the course of eleven years (including grant proposal submission periods). This proposed allocation of funds is similar to other restoration efforts that have been funded in the state, yet is to be focused on a smaller geographic scale, which should lead to more pronounced improvements. It is believed that multiple stream segments could be de-listed as a result of this effort, although it is possible more funding could be necessary to accomplish that goal.

7.2 Management Priorities

Project Fund Allocation

Cost-share programs are to be developed for agricultural BMP installations, septic repairs, and riparian enhancement projects. Stakeholders were solicited as to how to allocate the funds between these projects within the watershed. Stakeholder opinions were variable, but analysis of responses resulted in approximately 50% of the potential funds being allocated to septic system repair, 30% to agricultural BMPs, and 20% to riparian enhancement projects.

Variable Cost-Share Rates

Ideal projects for restoration of the watershed will be those significantly addressing the pollutants in close proximity to streams within or just upstream of impaired reaches. However, inclusion of landowners from the entire Salacoa Creek Watershed to be eligible for program cost-shares is necessary to maximize program participation by building important momentum within the local community. In addition, since the problem areas are often in the downstream reaches, all areas of the Salacoa Creek Watershed likely contribute to the impaired status of local stream segments, although to varying degrees.

Since certain projects may address resource concerns more than others, variable cost-share rates will be utilized to reflect the anticipated water quality improvement. For example, a septic system within 100 feet of an impaired stream will receive a higher cost-share rate than one located much farther away. This method of incentivizing participation will bring about the greatest load reductions while maximizing the overall number of participants.

7.3 Interim Milestones

The stakeholders recommended that this WMP should be implemented for multiple years over several grants, each of which may have its own updated objectives and milestones according to changes in watershed conditions and/or management strategies. This section, however, seeks to outline objectives and milestones that could be used by any group (in any combination) seeking funds for restoration efforts in the watershed.

OBJECTIVE #1: Create/revise a septic system repair cost-share program in the watershed.

MILESTONES:

- Identify local certified septic system contractors interested in participating in the program.
- Hold meetings with NGAHD representatives to design program.
- Identify septic systems as either pre or post implementation of state mandated standards.
- Establish cost-share criteria based on proximity to priority sub-watersheds and distance of system to state waters.
- Hold a septic system installer's workshop to explain program details, and ensure standards for participation are understood.
- Maintain the septic repair program throughout the implementation process.

The repair process will involve the submission of bids from locally-owned businesses. These businesses must attend an installer's workshop to participate in grant projects. Bids will be requested from a maximum of five contractors for each repair, and the specific businesses that receive the opportunity to bid will be determined by using a rotating list of approved contractors. The homeowner will be allowed to choose which bid to accept. The rate of cost-share will be on a sliding scale that will result in offering more assistance to projects that will likely result in the greatest load reductions.

OBJECTIVE #2: Create an agricultural BMP cost-share program in the watershed.

MILESTONES:

- Hold meetings with the NRCS to determine appropriate BMPs and cost-share rates.
- Advertise the available grant money through local media.
- Issue press releases for successful BMP installations.
- Maintain the agricultural BMP program throughout the implementation process.

Agricultural BMP installation will be on a strictly voluntary basis, and landowner confidence and satisfaction will be a primary focus. This will allow us to develop a positive reputation in the area, which is hoped to eventually garner more interest in the watershed.

OBJECTIVE #3: Implement BMPs to achieve load reductions specified in the TMDL.

MILESTONES:

- Identify farmers willing to cost-share on agricultural BMP projects.
- Identify property owners willing to address streambank issues and inadequate riparian zones.
- Identify homeowners within targeted sub-watersheds with failed or missing septic systems.
- Implement septic repairs and pump-outs in the watershed anticipated for each grant period as shown in Table 7.7.b.
- Implement agricultural BMPs in the watershed anticipated for each grant period as shown in Table 7.7.b.
- Create riparian enhancement projects to be completed with the help of volunteers from the community.
- Estimate load reductions from projects when possible.

BMPs that specifically address fecal coliform will be emphasized on agricultural lands. These include activities that restrict cattle access to the stream while providing alternative water sources, and enhancement of riparian zones that may prevent animal waste and sediment from entering the stream during runoff events. Failing septic systems and "straight-pipes" will be identified and repaired to reduce the contribution of fecal coliform originating from residential areas.

OBJECTIVE #5: Reduce pollution inputs from suburban and rural areas through education and outreach.

MILESTONES:

- Provide opportunities for the public to assist with stream restoration and cleanup efforts.
- Provide opportunities for the public to participate in Georgia's Adopt-A-Stream Program.
- Conduct presentations discussing watershed restoration efforts at local events.
- Submit press releases to inform the public of the restoration process and NPS pollution issues and solutions.

A key component of the education and outreach portion of this WMP is designed to raise the awareness of citizens in the area through local media and "hands-on" events. Stream cleanups, creek walks/floats, and rain barrel workshops are planned to be offered to interested citizens in the area throughout this plan's implementation. This ensures that the general public is provided the opportunity to not only learn about the watershed, but also participate in restoration events.

OBJECTIVE #6: Document changes in water quality throughout WMP implementation.

MILESTONES:

- Submit a targeted water quality monitoring plan for each grant received.
- Monitor several sites regularly, including at locations previously sampled by Georgia EPD.
- Conduct Pre- and Post-BMP monitoring for large agricultural BMP projects near significant streams.
- Sample to potentially de-list streams impaired for fecal coliform violations.
- Initiate WMP revisions.

Baseline data will be collected from available sources to determine the average concentrations of pollutants found at various locations within the watershed. This will allow for future comparisons when data is gathered to determine if improvements are measurable. Targeted monitoring (accompanied by a Targeted Water Quality Monitoring Plan) will occur once for each grant that is received. This type of monitoring will be used to determine if any improvements have been made and also to shift priority areas based on results.

When large agricultural BMP projects are implemented near significant streams, an effort will be made to sample for the pollutants of concern before and after project completion. This may allow for a determination as to what projects are most beneficial, as well as build local confidence on finding solutions to water quality issues.

A SQAP will be also written for each grant that is received. This will guide efforts to sample according to established procedures necessary to "de-list" stream segments should standards be met.

Biological monitoring will also be conducted as part of regular Georgia EPD rotations and will provide analytical data on whether the local biotic integrity in impaired stream segments is improving as watershed restoration activities take place in the watershed.

OBJECTIVE #7: Provide local community leaders with the knowledge to consider the effects management decisions may have on stream health in the watershed.

MILESTONES:

- Establish connections with local community leaders.
- Conduct presentations to community leaders discussing water quality issues and the solutions that BMPs can provide.
- Share water quality data and interpret the results with local community leaders for discussion purposes.

City and county personnel will be updated regularly through presentations at local meetings to promote involvement and/or awareness during the restoration process

7.4 Schedule of Activities

The following schedule provides the anticipated years for various objectives and milestones to be addressed in the WMP implementation process, assuming funding needs are met.

Table 7.4.a. A display of milestone activities and a timeline in which they will each be addressed throughout the implementation of the WMP.

IMPLEMENTATION SCHEDULE											
MILESTONE ACTIVITY	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Submit §319 Proposal to GA EPD	X			X			X				
Create septic cost-share program		X									
Create an agricultural BMP cost-share program		X									
Install Agricultural and Streambank BMPs		X	X	X	X	X	X	X	X	X	X
Install Septic System BMPs		X	X	X	X	X	X	X	X	X	X
Establish AAS Monitoring Group		X			X		X		X		X
Update County Commission/Press Releases		X	X		X		X		X		X
Conduct Education/Outreach Events		X	X	X	X	X	X	X	X	X	X
Conduct WQ Monitoring (Targeted)		X	X			X			X		
Conduct WQ Monitoring (De-listing)					X			X			X
Reevaluate Milestones				X			X				X
Initiate Reassessment of WMP						X					X

7.5 Indicators to Measure Progress

The numbers of agricultural and septic system projects completed and outreach event attendance will reveal progress that the implementation program is gaining momentum. Section 7.7 outlines the goals with respect to each BMP type throughout the anticipated implementation effort. Some may be ambitious due to differences in acceptance among BMPs to farmers; however, comparisons of completed "on-the-ground" projects with those anticipated within the watershed should indicate progress. Referencing these should also result in a determination of specific BMPs needing more focus, as will areas in the watershed where additional projects are necessary.

Landowner participation rates will be another useful tool in determining the success of grant implementation. It is hoped that the rate will increase through subsequent years of watershed restoration due to education and outreach efforts, as well as the gradual acceptance of BMPs within the watershed. Education and outreach participation rates will also be analyzed to help measure progress. It is anticipated that these rates will also increase through subsequent years as the events gain exposure within the watershed.

The primary importance in the long run will be to measure how these projects have evolved toward the goals of accomplishing the necessary load reductions and eventually de-listing the impaired segments within the watershed. For the stream segments impaired for high fecal coliform bacteria counts, tracking water quality improvements will best indicate progress toward reducing fecal contamination and eventually de-listing streams. Water quality improvements will be revealed using two water quality sampling regimes intermittently throughout the implementation process. Both types of water quality monitoring (targeted sampling and “de-listing” sampling) will be used to measure progress towards de-listing of segments impaired for exceeding fecal coliform standards.

For stream segments impaired for poor biotic diversity, progress may be more difficult to indicate. Targeted water quality monitoring may potentially reveal turbidity changes over time (revealing less sediment in the water column), but Georgia EPD will be relied upon to sample fish according to their scheduled rotations in order to determine whether biotic integrity has improved and to potentially de-list streams.

7.6 Technical Assistance and Roles of Contributing Organizations

This section will focus on the roles of various groups anticipated to contribute to make the restoration effort a success. Specifically, the SCWI will rely on technical expertise from the NRCS with respect to agricultural BMP implementation, and the Northwest Georgia Public Health with respect to septic system BMPs. The program also relies on in-kind assistance with logistics and education/outreach activities from other groups listed below (Table 7.6.a.).

Table 7.6.a. The following groups are anticipated to contribute to SCWI implementation by taking on the roles described below. While working towards accomplishing conservation goals, many of these activities will count towards non-federal match contributions associated with any funded 319 projects.

Organization Roles and Responsibilities		
Organization Name	**Organization Type**	**Description of Role in Salacoa Creek WMP Implementation**
New Echota River Alliance	Local Non-profit	Serve as a vehicle to promote the Salacoa Creek Restoration Initiative and assist in marketing its outreach efforts.
Gordon County Chamber of Commerce	Non-profit	Serve as a vehicle to promote the Salacoa Creek Restoration Initiative and assist in marketing its outreach efforts.
Calhoun Utilities	Local Utility	Provide in-kind services such as water quality sample analysis and technical assistance with streambank restoration efforts within their operating area.
Gordon County Development Authority	City/County Org.	Assist in long range land use planning in the Salacoa Creek Watershed.
Environmental Protection Agency	Federal Agency	Provide EPA Clean Water Act Section 319 funds to Georgia EPD to administer through the state 319 Grants Program.
Georgia Department of Natural Resources	State Agency	Conduct monitoring rotations to sample sites in the watershed for fecal coliform bacteria and biota that can reveal improvements or aid de-listing efforts.
Georgia Environmental Protection Division	State Agency	Administer Clean Water Act Section 319 Grants to provide funding for this restoration program.
Gordon County Parks and Recreation	Local Agency	Provide assistance with educational outreach in the watershed.
Limestone Valley Soil and Water Conservation District	State Agency	Assist with marketing for agricultural BMPs in the watershed. Potentially help identify willing landowners in the watershed that are interested in the program.
Limestone Valley RC & D Council	Quasi-Governmental Organization	Plans to lead implementation efforts including submitting grant applications, marketing program components, spearheading outreach efforts, managing finances, monitoring, and managing projects
Natural Resource Conservation Service	Federal Agency	Provide technical expertise for agricultural BMPs. This process will include multiple farm visits, the development of a conservation plan for the landowner, project supervision and project inspection. All projects will be installed according to NRCS specifications and standards.
North Georgia Public Health	State Agency	Provide technical expertise for septic system repairs. This process will include assessing, planning, permitting, and inspection of installed or repaired septic system components. Help may also be provided through identification of potential septic system repair projects.

Northwest Georgia Regional Commission	State Agency	Provide technical assistance for implementation efforts in the watershed. Serve as a vehicle to promote the Salacoa Creek Restoration Initiative and assist in marketing its outreach efforts.
Northwest Georgia Regional Commission / Water Resources Partnership	Standing Committee of Northwest Georgia Regional Commission	Provide technical assistance on watershed planning in conjunction with Coosa Water Planning Council.
The Nature Conservancy	Non-profit	Serve as a vehicle to promote the Salacoa Creek Restoration Initiative and assist in marketing its outreach efforts.
University of Georgia Cooperative Extension	State Agency	Assist in marketing efforts for program components and outreach events.
Gordon County	County Org.	Provide in-kind assistance to any grantee through donated office space, meeting space, and potentially equipment/labor for certain types of projects.

7.7 Estimates of Funding

As discussed in Section 6, many programs are already offered within the Salacoa Creek Watershed with the goal of reducing NPS pollution. Despite these projects, impairments persist in the area. The estimates for implementing the SCWI in this section are reliant on the 319 program as the main source of funding (despite key contributions from various groups as discussed above), and assume continuous consistent effort from the other programs previously mentioned in order for water quality improvements to occur.

In order to estimate the cost associated with the de-listing of impaired segments within the watershed, an estimate of total watershed treatment was first calculated (Table 7.7.a.). The Total Watershed Treatment Table is an estimate of the cost of a hypothetical instantaneous treatment for fecal coliform and sediment reduction at all critical sites (estimated through statistics, or identified remotely). **The high cost associated with total watershed treatment may be alarming at first glance; however, it is not anticipated that total watershed treatment is necessary in order to de-list the majority of impaired segments.** Despite this fact, it is important to estimate the maximum restoration effort in the watershed based on actual watershed conditions and the amount of money needed to accomplish such an effort, so that lower estimates can be developed that are necessary to meet state criteria.

Many of the BMPs needed to de-list the stream were chosen by the Watershed Advisory Committee based on their expertise and knowledge of the area. The quantities of BMP**s** estimated in the Total Watershed Treatment Table were calculated using a variety of techniques. The septic system BMP needs were estimated based on information obtained from Gordon County and failure statistics provided by the U.S. EPA. Agricultural BMP quantities were largely estimated through Geographic Information Systems analysis. Each tributary in the watershed was studied to determine the location of grazing lands. This information was coupled with an insufficient riparian buffer analysis to determine likely areas in need of BMPs. Many BMPs are often coupled with others, and the frequencies of these associations were calculated using conservative estimates.

Efforts to begin working towards the de-listing of impaired stream segments are recommended to begin soon after the approval of this WMP. **A goal of approximately 25% of total watershed treatment has been set to be accomplished by 2024, which is believed to potentially be enough to de-list multiple segments. In order to lay the framework to accomplish this, Table 7.7.b. was created to represent approximately 25% of the total watershed treatment costs excluding landowner contributions.** Goals were established for each BMP type to be accomplished by the years of 2018, 2021, and 2024. These years coordinate with the completion of each of the three planned §319 grant cycles (FY15, FY18, and FY21). Again, the costs associated with this table do not include landowner contributions to the project, and are displayed at 60% of the total cost in order to better describe federal funding needs.

Table 7.7.a. An estimate of the cost associated with a hypothetical instantaneous watershed-wide treatment for fecal coliform and sediment reduction at all critical sites.

TOTAL WATERSHED TREATMENT TABLE			
Agricultural BMPs (Name - Code)	**Quantity**	**Cost/Unit**	**Cost Estimate**
Fence - 382	728,346	$1.90/lin.ft.	$1,383,857
Heavy use area (pad – geotextile/gravel 50’ x 50’) - 561	87,500	$1.20/sq.ft.	$105,000
Pipeline - 516	70,000	$1.90/lin.ft.	$133,000
Riparian forest buffer -391	250	$180.00/ac	$45,000
Riparian herbaceous cover - 390	250	$228.50/ac	$57,125
Streambank and shoreline stabilization	7,283	$45/lin.ft.	$327,735
Water well - 642	45	$5,300 each	$238,500
Watering facility - 614	140	$712.50 each	$99,750
Septic System BMPs (Name - Code)	**Quantity**	**Cost/Unit**	**Cost Estimate**
Conventional system repair (~2,336 homes on septic)	250	$4000 each	$1,000,000
Experimental system installation	25	$7000 each	$175,000
TOTAL WATERSHED TREATMENT COST			**$3,237,232**
TOTAL TREATMENT COST EXCLUDING LANDOWNER CONTRIBUTIONS (60%)			**$1,942,339***

60% of Total Watershed Treatment Cost

Table 7.7.b. A display of goals set to measure progress towards watershed restoration. All SCWI funds will be sought from the 319 program to complement other existing programs.

	Septic System Funds	Agricultural Project Funds	TOTAL
Proposal 1 - 2014	$116,400	$38,600	**$155,000**
Proposal 2 - 2017	$112,000	$46,000	**$158,000**
Proposal 3 - 2020	$124,000	$46,000	**$170,000**

7.8 Getting Started

A goal of approximately 25% watershed treatment has been set to be accomplished by 2024 (assuming funding needs are met). This treatment strategy is believed to potentially be enough to de-list multiple segments, although it is possible more funding may be necessary to de-list all impaired streams. Efforts to begin working towards the de-listing of impaired stream segments will begin soon after the approval of this plan.

8. Education and Outreach Strategy

According to the recommendations from local stakeholders, the outreach associated with watershed restoration efforts should seek to put volunteers to work in ways that assist with cleaning up Salacoa Creek, enhancing the riparian buffer, reducing non-point source pollution, and sampling water quality parameters. These events have been recommended, since they aid in raising awareness of local nonpoint source issues, and lay the groundwork for implementation through the establishment of partnerships and identification of potential BMP projects. This idea is based on stakeholder opinions and Limestone Valley's past experience with implementing 319 grant projects, which revealed that the general public is one of the most valuable sources of information with respect to identifying both general and specific sources of pollutants. With each commitment from a citizen to volunteer their time, the likelihood of successful watershed restoration increases. The following descriptions are recommended events that could be held in and adjacent to the watershed. A value could be placed on many of these events through calculating volunteer labor, supplies, or other in-kind donations. This

value, with all supporting documentation, could then be reported as match to the federal funds distributed through any applicable 319 grant.

Riparian Tree Plantings

Riparian tree planting events with volunteers could be held on the banks of streams and creeks in the Salacoa Creek Watershed. It is anticipated that trees and the tools with which to plant them would be obtained through the use of grant funds or donations from non-federal sources. The volunteers to plant the trees could be acquired through newspaper articles and word-of-mouth. The primary purpose would be to utilize volunteer labor to plant trees in an effort to increase the riparian buffer within the watershed. Another purpose of this event would be to identify potential BMP projects through personal interaction with volunteers that encourage them to assist in "spreading the word" about grant funds and opportunities. These events could include a presentation about the Watershed Management Plan and the non-point source pollution issues that face Salacoa Creek. Other educational materials on septic system repairs and maintenance, and stormwater practices (rain barrels, rain gardens) should be made available. Donated materials and labor should be reported as match for any applicable 319 grant.

Rain Barrel Workshops

During past 319(h) grant implementation projects in Northwest Georgia, rainbarrel workshops have proven to be one of the more useful tools to garner public support for watershed restoration efforts. Through these past projects, the workshops not only develop a relationship with the local Coca-Cola plant that provides the barrels, but also assess the level of interest from the public. In the past, these events have generated overwhelming interest from local communities, and have attracted the most enthusiastic volunteers. Furthermore, rainbarrels are desired by a diverse array of citizens including both farmers and homeowners, which is the exact demographic that is needed to implement BMPs that address resource concerns on residential and agricultural lands.

There are several reasons why rain barrel workshops generate such a positive response for the area of Northwest Georgia. For many homeowners, these rain barrels provide an economic benefit since they do not pay for the water use and it can also help them avoid any watering restrictions during drought years. Many farmers claim that this technique (cisterns) was used on the farm when their parents and grandparents were running the operation, and thus have a nostalgic connection with the method. While these benefits work well for attracting volunteers to construct rain barrels, the most significant benefit of the practice is the improvement in stormwater runoff that results from rain barrel use. By functioning similar to a retention pond, these barrels can reduce the quantity of runoff leaving properties during storm events which can reduce the excessive flows that contribute to stream bank erosion in our smaller tributaries and streams. Sediment originating from erosion is a significant threat to the outstanding aquatic biodiversity found in the freshwater streams of our region, and many local volunteer citizens are

enthusiastically searching for ways that they can work to accomplish conservation through management of their own properties.

For the purposes of a new 319(h) grant project, this outreach activity should have the primary objective of incentivizing rain barrel construction and installation to reduce NPS pollution, but should also serve as the sounding board from which we can advertise available BMP funds. At these events, citizens should receive specific information about cost-share funds for projects that benefit both landowners and our natural resources, information about Salacoa Creek's water quality issues (with watershed map visual aids), and the opportunity to work to construct and take home a free rain barrel to affix to the guttering system of their home. Volunteers from these events should be encouraged to participate further in identifying potential BMP sites and assisting with other outreach events. Follow-up communications should be initiated to keep these interested citizens engaged throughout the implementation process. The barrels likely donated from Coca Cola, the parts supplied by The Rain Barrel Depot used to retrofit them, and the homeowners' labor and time spent constructing rain barrels are all values that should be calculated and compiled for matching purposes for any applicable 319 grant.

Adopt-A-Stream Workshops

These events should be designed to train volunteers in Gordon County on how to use AAS monitoring equipment to sample water quality parameters and inform them of non-point source pollution issues. At these workshops, volunteers should be informed of the basics of water quality sampling and watershed science, as well as how to use the AAS website to enter all collected data from the stream that they choose to adopt. The hours that volunteers spend in the training workshop, along with subsequent hours of actual sampling, should be used to calculate a match value that could be reported with supporting documentation to Georgia EPD. In addition, volunteers should be given information advertising potential available cost-share funds for both agricultural projects and septic system repairs that reduce non-point source pollution. Some workshop components may be featured in events that fall under a different category (e.g. Educational Canoe Float).

Salacoa Creek/Coosawattee River Cleanups

As part of the process to gain stakeholders from the local population (the greater Salacoa Creek Watershed) that ultimately receives the waters from Salacoa Creek, partnerships have been formed with the New Echota River Alliance (NERA), Girl Scouts, Boy and Cub Scouts, Gordon County Parks and Recreation, Gordon County Chamber of Commerce, United Way, The Nature Conservancy, and UGA Cooperative Extension (4H). New Echota Rivers Alliance could continue to provide the leadership role in the organization and implementation of river cleanups for volunteers in the greater Salacoa Creek Watershed. It should be planned that these river and lake cleanup events will occur annually, and (since many volunteers are from the watershed) should be used as sounding board for advertising available BMP project funds while providing opportunities for NPS education. Volunteer labor and donated

material values from sites within and near the Salacoa Creek Watershed should be recorded and reported for matching purposes.

Water Quality Monitoring and Stream Cleanup Canoe Floats

These events should be designed to attract members of the local community to volunteer to clean up our local waterways from a canoe and/or sample water quality during a training session on how to use Adopt-A-Stream equipment for water quality sampling. These volunteers could paddle while picking up all accessible trash within the stream and on the banks, and/or sample water quality at several sites, while learning about the importance of varying water quality parameters, agricultural and residential runoff issues and how they pertain to Salacoa Creek. Maps and handouts should be distributed at stops along the way to discuss pollution sources, BMPs, and steps they can take on their own property to reduce pollution. Special emphasis should be placed on buffer awareness and education. In addition local aquatic fauna will be a topic of discussion in order to convey what could be at stake should pollution problems continue. Volunteer labor and donated material values should be recorded and reported as matching funds for any applicable 319 grant.