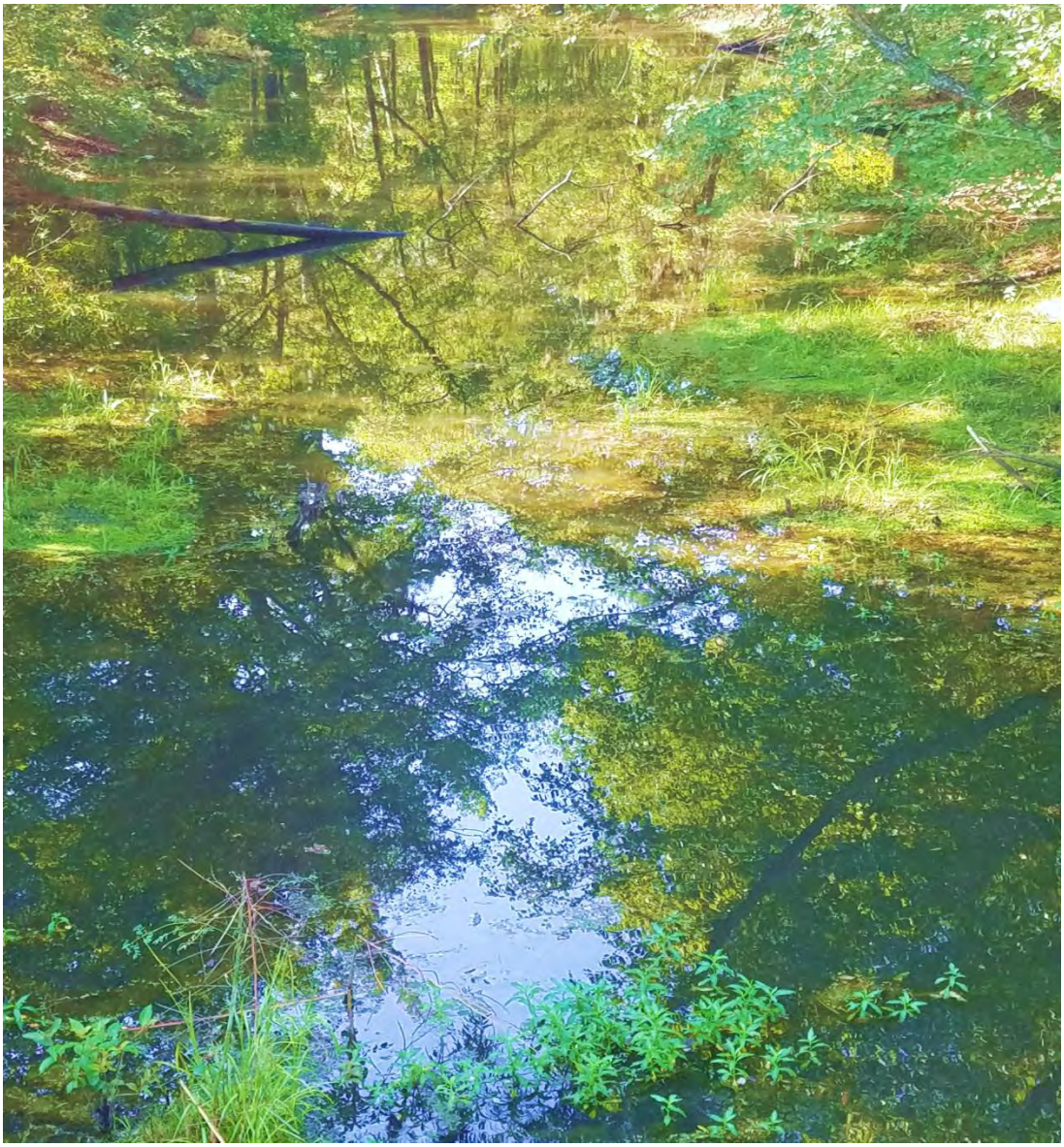
Development and Implementation of Aucilla River Watershed Management Plan



Funding for this project is made possible
By an U.S. EPA Section 319(h) Grant
From the Non-Point Source Program
Environmental Protection Division
Georgia Department of Natural Resources

Table of Contents

List of Tables

Appendices and Maps

ACRONYM GLOSSARY

319 (H) Clean Water Act (CWA) §319(h) Non-Point Source (NPS) Grant Program

AAS- Georgia Adopt-A-Stream

ARCWP-Aucilla River Watershed Partnership

BMP – Best Management Practice

BOD – Biochemical Oxygen Demand

CBOD – Carbonaceous Biochemical Oxygen Demand

CFU/ML- Colony Forming Unit per miller liter

CWA – Clean Water Act

CWP – Clean Water Partnership

DO – Dissolved Oxygen

E- Endangered Species

EPA- Environmental Protection Agency

FC- Fecal Coliform

FSA- Farm Services Agency

GAEPD- Georgia Environmental Protection Division

GFC-Georgia Forestry Commission

GWPPC-Georgia Water Planning and Policy Center at Albany State University

HUC – Hydrologic Unit Code

NBOD – Nitrogenous Biochemical Oxygen Demand

NLCD – National Land and Cover Database

NOAA – National Oceanic and Atmospheric Administration

NPDES – National Pollutant Discharge Elimination System

NPS – Nonpoint Source

NRCS – Natural Resource and Conservation Service

NTU – Nephelometric Turbidity Units

PPM- Parts per million

PS- Point Source

PS/NPS- Point and Nonpoint Source

RC&D -Resource Conservation and Development

Region 5 Model 5- Excel workbook that provides a gross estimate of sediment and nutrient load reductions

RUSLE- Revised Universal Soil Loss Equation

SOD – Sediment Oxygen Demand

STEPL- Spreadsheet Tool for Estimating Pollutant Load

T- Threatened Species

TDS – Total Dissolved Solids

TMDL – Total Maximum Daily Load

TN – Total Nitrogen

TP – Total Phosphorous

TSS – Total Suspended Solids

USDA- United State of Department of Agriculture

USEPA – United States Environmental Protection Agency

USFWS- United States Fish and Wildlife Services

USGS- US Geology Survey

WMP- Watershed Management Plan

Executive Summary

Through a competitive application process, the Georgia Environmental Protection Division (GAEPD) executed a FY2017 Section 319(h) Contract with the Golden Triangle Resource Conservation and Development (RC&D) Council to develop a 9-Element Watershed Management Plan (WMP) for the Aucilla River Watershed. Because the GAEPD 2002 Total Maximum Daily Load (TMDL) Implementation Plan did not meet the U.S. Environmental Protection Agency's guidelines for 9-Element watershed planning and the local community's interest in the watershed, it was necessary to develop a new watershed management plan. The components of this plan were prepared using USEPA *Handbook for Developing Watershed Plans to Restore and Protect Our Waters,* which provide guidelines for a watershed approach to restore impaired waters. The 9-Element criteria are:

1. Identification of causes and sources of pollution that need to be controlled.
2. Estimate pollutant load reductions needed.
3. Develop management measures needed to achieve goals, including restoration and protection measures, future impacts in the watershed, etc.
4. A schedule for implementing the management measures identified in the plan.
5. Interim milestones for determining whether nonpoint source management measures or other management control actions are being implemented.
6. A set of criteria, including water quality monitoring, that can be used to determine whether pollutant load reductions are being achieved over time.
7. A monitoring component that can be used to track the effectiveness of implementing the watershed management plan over time.
8. An information and education component that will be used to enhance public understanding of the project.
9. An estimate of the amount of technical and financial assistance needed to implement the plan.

Golden Triangle RC&D Council derived from stakeholder and community concerns, results of targeted water quality monitoring, current land use data, the 2002 TMDL Implementation Plan and the 2011 Watershed Improvement Plan (WIP) plan findings for Olive Creek and the Aucilla River to make the following recommendations on Best Management Practices installations and the potential causes which include and concur with the 2002 TMDL and the 2001 WIP

- Non-Point Source Urban
- Municipal Sewage
- Failing Septic Lines
- Riparian/Streamside Buffers
- Erosion
- Watershed Education

Installation of the BMPs listed above should lead to at least a 48% or greater reduction in Fecal Coliform for Olive Creek and a 59% reduction in the Aucilla. Dissolved oxygen reductions are stated for Olive Creek at 35% and the Aucilla at 38%. The estimated load reductions will be accomplished through the use of adaptive watershed management strategies, site specific location opportunities, and customized BMP installations using National Resources Conservation Services (NRCS) and Department of Forestry Conservation Practices.

Key measures that will lead to the success of this WMP will be the number of landowners willing to install appropriate BMPs for the listed impairment. Also, educational and outreach components will continue to play a key role in implementing this WMP, as was done prior to its completion through encouraging landowner participation and informing the public about the negative impacts of nonpoint source pollution and the importance of stewardship for water quality improvement. Education and outreach will continue to be carried out by:

- Holding Public Meetings
- Educational Workshops and Field Days
- Developing and Distributing Brochures
- Updates on Golden Triangle RC&D Website and Facebook page

1.0 Introduction

The purpose of developing this WMP is to provide a tool that demonstrates a holistic approach to water quality management by actively engaging stakeholders within the watershed and the selection of effective management strategies that will be implemented to correct the problems.

Golden Triangle RC&D established the Aucilla River Watershed Partnership, which includes: Thomas University, Ochlocknee River Water Trail, Bird Song Nature Center, Keep Thomas County Beautiful, U.S. Fish and Wildlife Service, Natural Resource Conservation Service, and the Water Policy and Planning Center. Additional stakeholders participated through public community meetings and events held in Thomas and Brooks's counties. These sessions brought together local landowners, farmers, and local government officials to discuss issues and gather community participation.

A community survey was created and distributed at public meetings, paddle events, University events, Glen Arveen Country Club, local businesses, public libraries, and was placed on Golden Triangle's website. A total of 85 surveys were distributed and 20 people responded to the survey that either live, work, or both within the watershed area. The survey included multiple choice options, along with a fill-in the blank section with questions inquiring about what the public sees as the biggest problems facing the Aucilla River. The following are responses the public sees as concerns and/or potential stressors:

- Housing Development
- Insufficient/Degraded buffers
- Creek/Streamside Erosion
- Trash/Pollution/Litter
- Lack of Education
- Urban sewage septic tank leaks

Of these responses, the top four concerns and/or issues are Housing Development, Insufficient /Degraded buffers, and Creek/Streamside Erosion. Golden Triangle addresses these primarily through evaluating water quality monitoring, evaluation of land use and characterization of physical features and habitats. Through interaction with the Aucilla River Watershed Partnership a combination of adaptive on the ground approaches were recommended, including long term management measures for the most effective BMPs to improve water quality in the Aucilla River Watershed.

The recommended BMPs described in this WMP would effectively reduce the amounts of Fecal Coliform bacteria and increase levels of Dissolved Oxygen. The implementation and/or installation sites will be selected based upon the potential effectiveness of the proposed BMP for the impairment.

During the first phase of implementing the WMP, Golden Triangle RC&D will administer and track the progress of the recommended management measures, monitor the effectiveness of BMPs and associated load reductions, and oversee the completion of tasks and milestones. The targeted BMP completion number for each type may be altered depending upon the type and number in a landowner's application. BMP completion is also greatly dependent on landowner and shareholder participation. Load reduction data will be made available to the Aucilla River Watershed Partnership. If the numbers of acreage for each BMP type is changed then the estimated load reduction numbers will be adjusted accordingly. Any changes to the BMP implementation schedule will be reported to GAEPD and the Aucilla River Watershed Partnership.

2.0 Partnership/Stakeholder Committee

The Aucilla River Watershed Partnership was formed in June 2017. The partnership/advisory board is comprised of local organizations and business, city planners, and public citizens. Four advisory meetings and three public town hall meeting. During the formation of the partnership it was important to identify individuals and/or groups that were and/or would be able to:

- make decisions on the Watershed Management Plan
- provide and/or gather data regarding the watershed
- partner by providing technical and financial assistance
- develop and conduct public outreach strategy
- develop web page on the existing Golden Triangle R&D website to list updates and events regarding the Watershed

Golden Triangle would like to acknowledge the following partners the City of Thomasville Planning and Zoning Department, the NRCS offices of Thomas and Brooks County for data gathering information, Advisory meeting input and participation. Their input allowed confirmation of City regulations and ordnance's and BMP practices are still being followed as per the 2002 TDML plan.

The full list of stakeholders, community partners, local landowners, and other organization contributions are listed in table 2.0 below.

Table 2.0

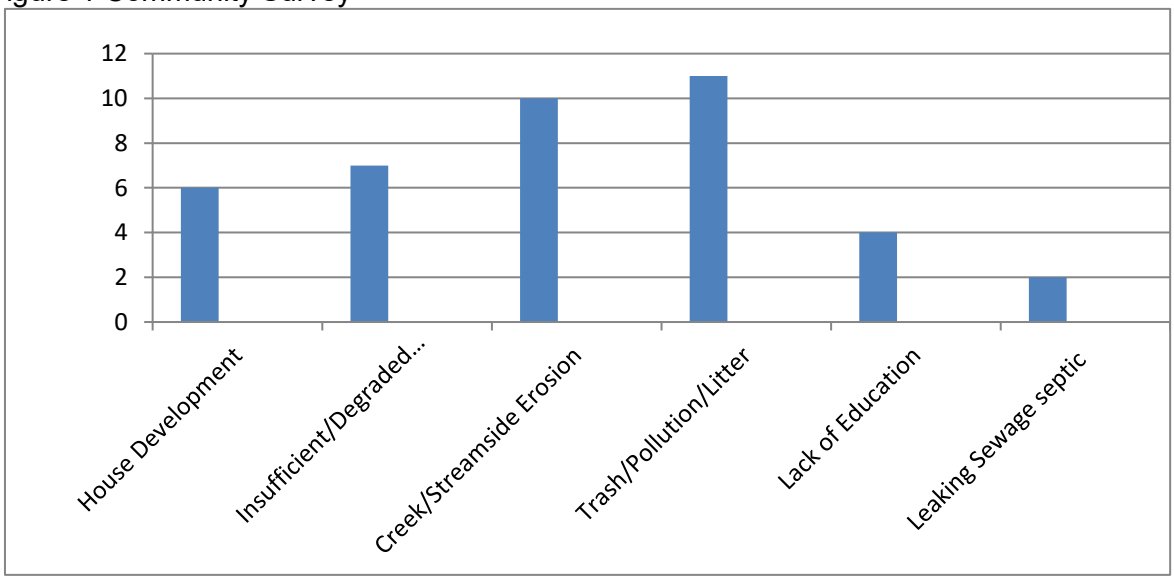
Organization	Name	Participation
Thomas University	Dr. Christine Ambrose	Watershed Partnership, Technical Assistance, Community Outreach
Ochlocknee River Water Trail	Margaret Tyson Vickie Redden	Stakeholder, Watershed Partnership, Community Outreach
Bird Song Nature Center	Kathleen Brady	Stakeholder, Watershed Partnership, Community Outreach
Keep Thomas County Beautiful/Hands on Thomas County	Julie McKenzie	Watershed Partnership, Community Outreach
Georgia Forestry Commission	Chuck Norvell	Watershed Partner, Technical Assistance
US Fish and Wildlife Service Panama City Field Office	Chris Metcalf	Watershed Partner, Technical Assistance
US Fish and Wildlife Service Fort Benning Field Office	Jim Bates	Watershed Partner, Technical Assistance
National Resource Conservation Service (NRCS)	Mollie Aldridge (Thomasville Office) Richard Coleman (Thomasville Office) Jimmy Heirs (Brooks Office) Zach Gibbs (Brooks Office)	Technical Assistance
Individual Citizen Participation	Bobby Brown Beth Grant Ruthie Pfaff John James Cornelia Jones	Community Outreach
Water Policy and Planning Center	Marty McKimmey	Technical Assistance

A community survey was created and distributed at the (3) three public meetings, local businesses, public libraries, and on the Golden Triangle website A total of 85 surveys were distributed and 20 people responded to the survey that either live, work, or both within the watershed area. The survey included multiple choice options, along with a fill-in the blank section with questions inquiring about what the public sees as the biggest problems facing the Aucilla River.
The following are responses the public sees as concerns and/or potential stressors:

- Housing Development
- Insufficient/Degraded buffers
- Creek/Streamside Erosion
- Trash/Pollution/Litter
- Lack of Education
- Urban sewage septic tank leaks

The top four concerns and/or issues are Housing Development, Insufficient /Degraded buffers, and Creek/Streamside Erosion. The results of the Community Survey were shared with the partnership/stakeholders, along with the visual survey and report that was completed in the spring of 2018. The results were compiled into 2 categories; A) those we can affect with the implementation of a Watershed Management Plan B) those we cannot affect due to time or cost constraints. The following are the top ranked issues/watershed stressors that the Partnership/Stakeholders/Community has identified within the Aucilla.

Figure 1 Community Survey



.

Project Area Assessment
3.0 Physical Features

Geographic Location

The Ochlockonee River Basin, from the headwaters in Worth County to the Gulf of Mexico, covers an area of approximately 2,448 square miles. The basin is divided into the Upper and Lower Ochlockonee, Apalachee Bay-St. Marks, and Aucilla River Basins as shown in Figure 1-1. The Aucilla River Watershed (HUC (10) 0311010301) and corresponding impaired waterbodies of the Aucilla River and Olive Creek lie within the Ochlockonee Basin in Thomas County, Georgia. Olive Creek is located in the southeast section of the City of Thomasville. The Aucilla River Masse Branch section is to the Brooks County line near Boston. The impaired waters on GAEPD 305(b)/303(d) list Olive Creek for 2(two) independent sections not supporting their water use classification of fishing. Section 1 Headwaters to upstream U.S. Hwy. 19, Thomasville are 3 miles long. Section 2 U.S. Highway 19 to Aucilla River (formerly Headwaters to Aucilla River) is 3 miles long. The Aucilla River Masse Branch to Brooks County line near Boston is also listed and is 10 miles long. The impaired streams (Figure 2) are classified as not supporting their primary function of fishing due to criterion violations of both sections of Olive Creek for Fecal Coliform and Dissolved Oxygen, while the Aucilla River is listed for a fair ranking for macroinvertebrates. The potential causes and sources of nonpoint source pollutants are shown in Table 3.0 with the impairment relative to the potential cause, which were derived stakeholder and community concerns, results of targeted water quality monitoring, current land use data, the 2002 TMDL Implementation Plan and the 2011 Watershed Improvement Plan (WIP)

Potential Causes Table 3.0

Identified Impairment	Potential Source/Causes
Low Dissolved Oxygen	Urban run-off (subdivisions and parks) Low Flow/High Temperatures Drought Limited Agriculture Row Crop Run-off Fecal Matter from Wildlife
Sediment	Non-vegetative banks Urban ditch erosion Limited Agricultural run-off
Fecal Coliform	Urban runoff subdivisions Fecal Matter from Wildlife

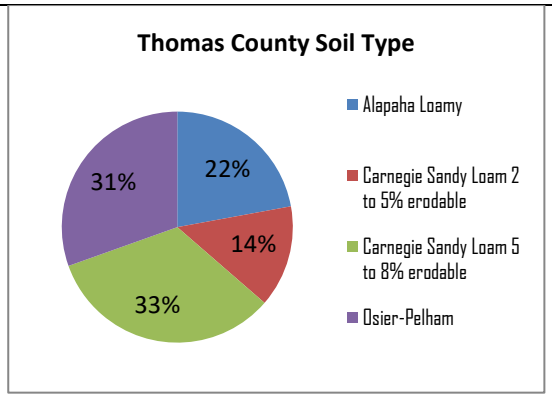
Topography

The Aucilla River Basin lies within the Coastal Plains region and due to the lack of riffles and shoals that dominate the Piedmont regions, create significant floodplain forest systems. This is due to the long expanse of contiguous habitat and the volume of water in the region. The Aucilla River Watershed is 91, 415 acres and contains 216 miles of stream, 294 acres of lakes and 18,852 acres of wetlands. Many of the tributary streams that feed into the river are considered alluvial with sandy bottoms. They are predominantly composed of sands, clays, and gravels. The land surrounding Olive Creek runs through both urban and residential neighborhoods before turning into a mixture of managed plantations and agriculture cropland, and livestock. The Aucilla River is primarily croplands while the lower portions are forested.

Soil Types

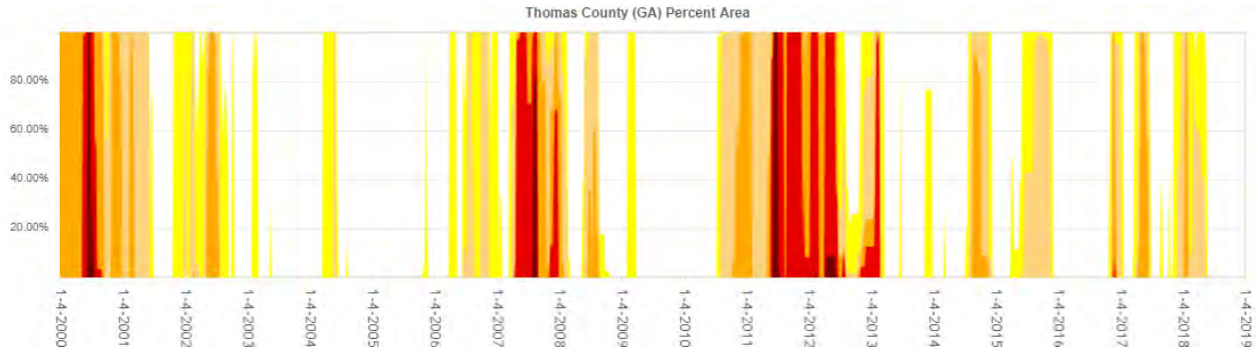
The watershed lies within the Southeastern Plain/Dougherty Plain ecoregion, which is dominated by ultisols (sandy/ loamy surface layers and clayey subsoils) this makes the soil very erosive. The soil types associated within the Aucilla River are characterized by nearly level to gently sloping, well drained upland soils that are dissected by nearly level, poorly drained soils along narrow drainage ways. Most of the soils are strongly acid, low in organic matter content, and low in natural fertility. It should also be noted that even within the same geographic land area that different soil types and slopes exist. These variables will be taken into account within the BMP recommendation process. The soil associations for the geographic area around each creek and county are broken out below:

Soil Types

Thomas County Soil Associations **Carnegie Sandy Loam and Osie-Pelham:** Carnegie Sandy Loam**: Erodible - sandy loam; weak fine granular structure; very friable; common nodules of ironstone 1/8 to 3/4 inch in diameter; many fine roots; strongly acid; abrupt wavy boundary** Osier-Pelham**: Poorly drained soils that are sandy throughout; have a sandy surface layer; a thick sandy subsurface layer; and a loam subsoil**	

Climate

Data from the National Oceanic and Atmospheric Administration (NOAA) shows that rainfall in Southwest Georgia has increased from the drought conditions of 2012.



The highest temperatures reflected are July at 90 degrees and August at 89. The largest rainfall amounts occurred in January at 5.39 inches and June at 8.39 inches. (See Appendix F for NOAA temperature and rainfall data, Table 5.1.4 NOAA Drought Monitor.)

Habitat

The Aucilla River supports a diverse and rich mix of aquatic and terrestrial communities. Wetlands and floodplains are an integral part of this system and can be impaired when a water resource is adversely affected by human activities such as land conversion, alteration and drainage due to silviculture, and fragmentation (GEPD, 2002). Aspects of urbanization, hydrologic alteration, impervious surfaces, and stream channelization can cause substantial degradation of the physical, chemical, and biological characteristics.

Previous watershed surveys and the original TMDL plan approved by EPD in 2002 show that there are federally threatened and endangered flora, fauna and aquatic life present, along with USFWS Critical Habitat Areas as shown below in Table 3.1.

Table 3.1

Threatened (T) and Endangered (Thomas County)				
Species	Federal Status	State Status	Habitat	Threats
Bird				
Wood Stork *Mycteria americana*	E	E	Primarily feed in fresh and brackish wetlands and nest in cypress or other wooded swamps	Decline due primarily to loss of suitable feeding in south Florida. Other factors include loss of nesting habitat, prolonged drought/flooding, raccoon predation on nest, and human disturbance of rookeries.
Red-cockaded woodpecker *Picoides borealis*	E	E	Nest in mature pine with low understory vegetation (<1.5m); forage in pine and pine hardwood stands > 30 years of age, preferably > 10" dbh	Reduction of older age pine stands and to encroachment of hardwood mid story in older age pine stands due to fire suppression
Reptile				
Gopher Tortoise *Gopherus polyphemus*	No Federal Status	T	Well-drained, sandy soils in forest and grassy areas, associated with pine over story, open understory with grass and sunny areas for nesting.	Habitat loss and conversion to closed canopy forest. Other threats include mortality on highways, and pet trade.
Invertebrate				
Oval Pigtoe *(Pleurobema pyriforme)*	E	E	River tributaries and main channels to slow to moderate currents over silty sand, muddy sand, and gravel substrates	Habitat modification, Sedimentation, and water quality degradation.
Invertebrate				
Purple bankclimber *(Elliptoideus sloatianus)*	T	T	Rivers and streams; usually found in moderate currents over sand, sand mixed with mud, or gravel substrates, swept free of silt by the current.	Habitat modification, Sedimentation, and water quality degradation

Invertebrate				
Gulf moccasinshell (Medionidus penicillatus)	E	E	Medium to large rivers; found in slight to moderate current over sand and gravel substrates; muddy sand substrates around tree roots.	Habitat modification, Sedimentation, and water quality degradation
Shinyrayed pocketbook *(Lampsilis subangulata*)	E	E	Rivers and streams; usually found in sand, sand mixed with mud, or gravel substrates in moderate currents.	Habitat modification, Sedimentation, and water quality degradation
Plant				
Cooley's meadowrue Thalictrum cooleyi	E	E	Fine sandy loam in open, seasonally wet mixed pine-hardwoods and in adjacent wet savannahs; restricted to roadsides and right- of-ways	Most extirpated populations were eliminated by fire suppression and/or silvi cultural or agricultural development.
American chaffseed *(Schwalbea americana)*	E	E	Fire-maintained wet savannahs in the Coastal Plain (with grass pinks, colic root, huckleberry and gall berry); grassy openings and swales of relict longleaf pine woods in the Piedmont	Fire suppression, habitat conversion, and incompatible agriculture and forestry practices

Recharge Areas

The ground water resources for the Aucilla River are supplied by the Floridian aquifer system. The recharge area lies within Mitchell County. The Floridian aquifer is characterized as a thick sequence of carbonate rocks (limestone and dolomite) that is easily permeated. According to the Department of Natural Resources Groundwater Pollution Susceptibility Map (Hydrologic Atlas 20) the area in Mitchell County lies within a “High” susceptibility zone for pollutants, while Thomas County lies within the “Average” susceptibility zones.

Pollutants can enter the re-charge areas through septic systems, agricultural waste, and run-off of fertilizers. See attachment J for Groundwater Pollution Susceptibility Map of Georgia and attachment K for Groundwater Recharge Area Map of Georgia (Hydrologic Atlas 18).

Flood Plains

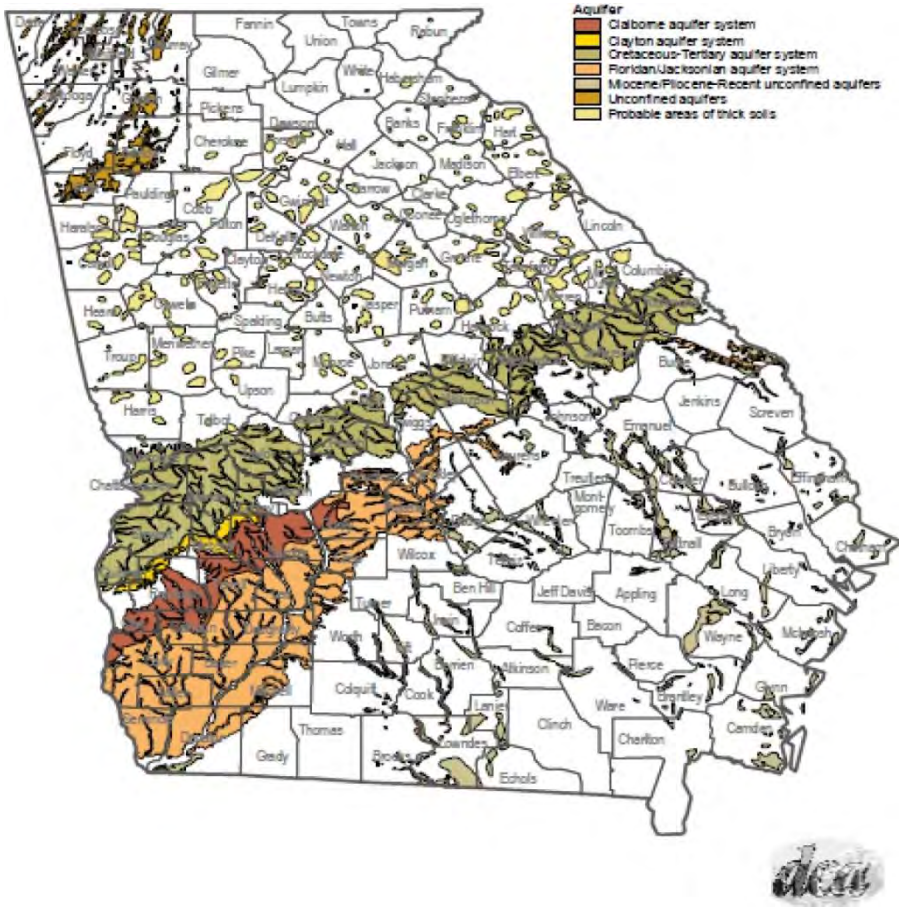
The Aucilla River does contain flood plain areas, but according to the Federal Emergency Management Agency (FEMA) mapping it is only a 1% flood hazard within the effected creeks. It is important to note that during heavy continuous rain events that Olive Creek will overflow its banks within Glen Arveen Country Club. See Attachment L for FEMA Flood Plain Map.

Wetlands

The Aucilla River basin contains 18,852 acres of wetland areas within the affected areas. See Attachment K for Wetland Map.

Georgia's Groundwater

Recharge Areas



4.0 LAND USE AND POPULATION CHARACTERISTICS

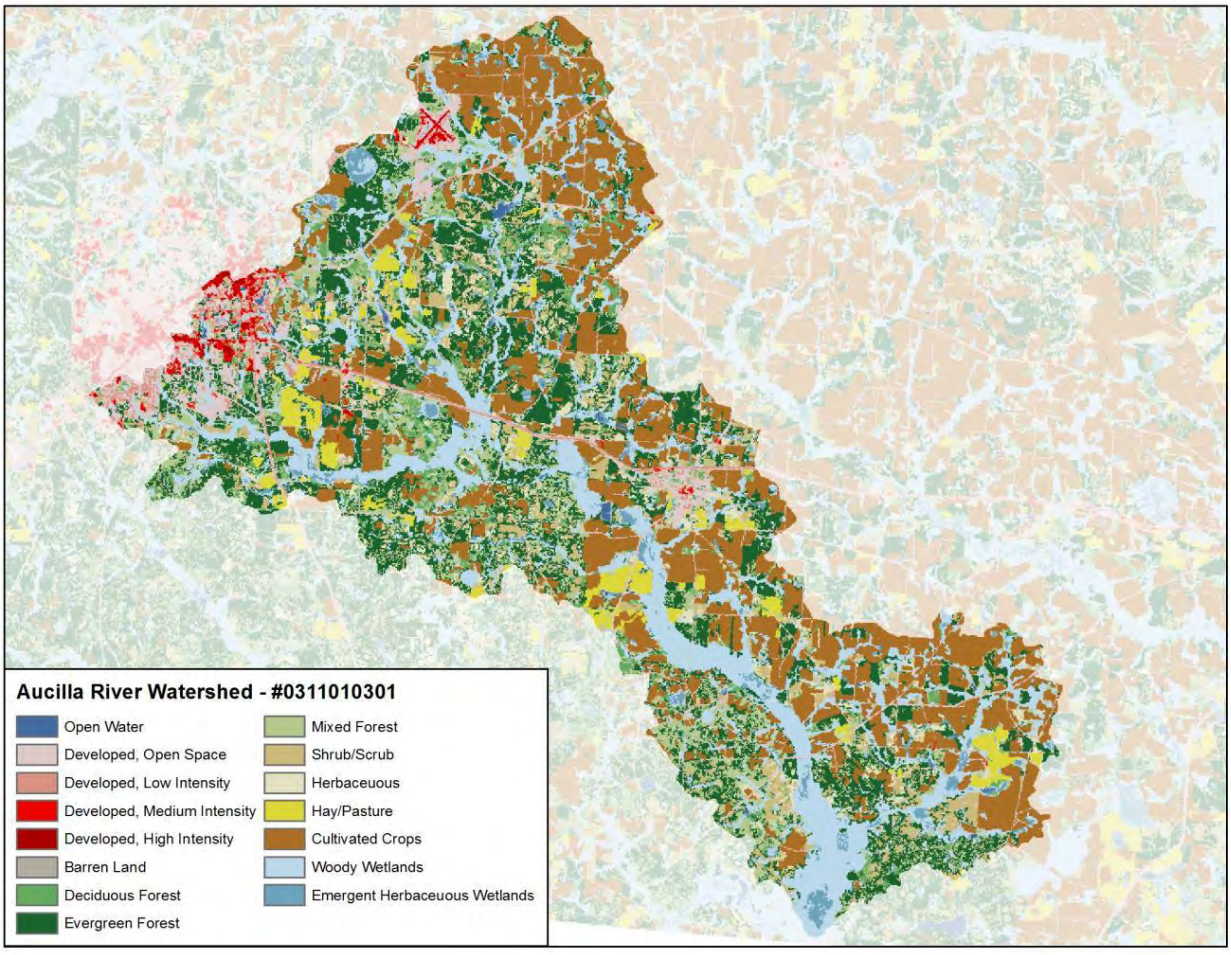
Land Cover

The health and stability of aquatic ecosystems is directly linked to the health and condition of the terrestrial ecosystems. Many factors can affect this balance:

- Land Use
- Deforestation
- Population Size

All land use has an effect on water quality, whether positive or negative. In forests and other areas with good vegetation cover and little disturbance, most rainfall soaks into the soil, collecting in recharge areas underground rather than runoff. In highly populated areas with pavement and buildings, little rainfall can soak into the soil, which can cause high runoff events.

Table 4.1 Land Cover



Land Use Type	Acres	Percent
Open Water	294	0.32
Developed, Open Space	5611	6.14
Developed, Low Intensity	1437	1.57
Developed, Medium Intensity	584	0.64
Developed, High Intensity	234	0.26
Barren Land	27	0.03
Deciduous Forest	3192	3.49
Evergreen Forest	18522	20.26
Mixed Forest	8055	8.81
Shrub/Scrub	6520	7.13
Herbaceuous	3233	3.54
Hay/Pasture	2878	3.15
Cultivated Crops	21976	24.04
Woody Wetlands	16333	17.87
Emergent Herbaceuous Wetlands	2519	2.76

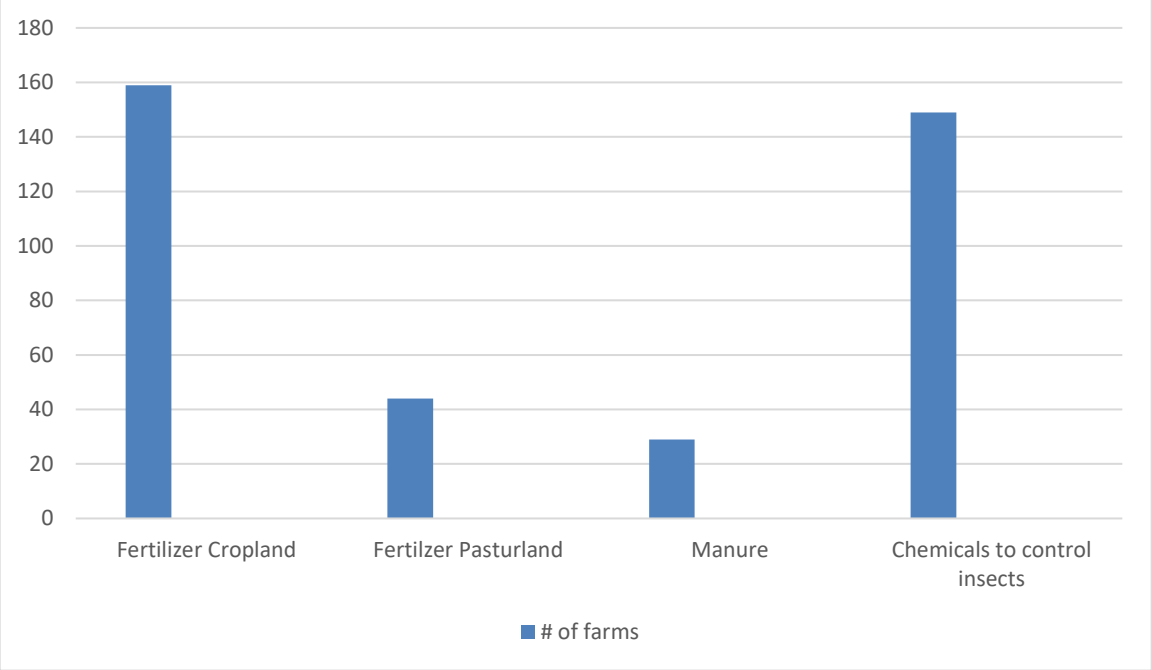
LAND USE

The larger Ochlokonee River Basin which includes the Aucilla River has a combined acreage totaling over 365,000 acres. The Aucilla watershed covers approximately 91,415 acres within the watershed basin. Agriculture production use is limited with only 407 farms total. Residential and urban land use are contributing issues due to greater amounts of impervious surfaces and storm water systems to convey oils, heavy metals, yard and pet waste. The run off of these pollutants does have a direct impact with the sources of pollutants entering the waterways. Recommendations for control of this will be made in section 6.0.

AGRICULTURE USE

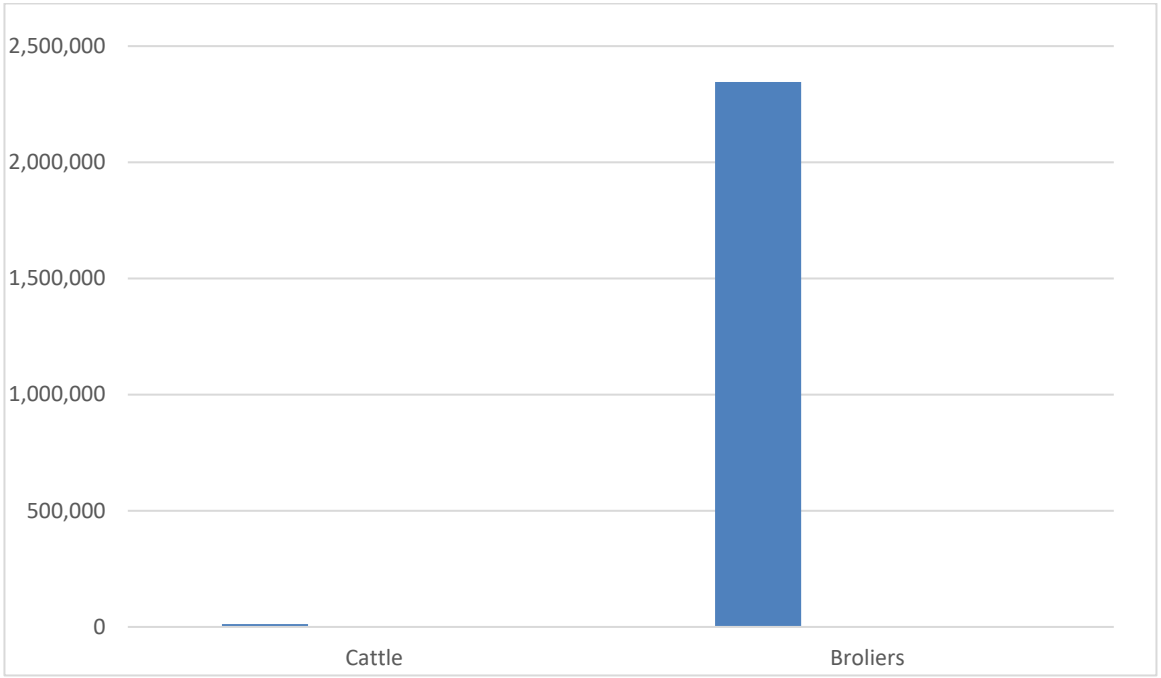
Agriculture use within the watershed is divided between row crop and livestock farms at a total of 407 farms totaling 173,208 acres with only 71 farms having irrigated land of 68,985 acres. This is a decrease from the 2007 data with the number of active farms and irrigated acres of land. This information was used to assist with the appropriate BMP recommendations, pollutant load reductions, and ensure measureable progress is being made. (Table 4.2 shows the applications of fertilizer and chemical applications within the watershed complied from the 2012 Georgia Farm Gate Report by County and Crop) and Table 4.3 shows the number of livestock farms)

Table 4.2 Agriculture Fertilizer and Chemical Applications



USDA 2012 Agricultural Cenus by County.

Table 4.3 Live Stock Farms



Total number of farms 188

River Uses Table 4.4

· Municipal and Industrial Uses

PERMIT_NAME	PERMIT_NO	COUNTY	RIVER_BASIN	PERMIT_TYPE	PERMIT_SUBTYPE
Boston (City of) WPCP	GA0033715	Thomas	Ochlockonee	NPDES	Municipal
Coolidge LAS	GAJ020145	Thomas	Ochlockonee	Land Application System	Municipal
Jones Septic Tank, Inc.	GAG620008	Thomas	Unknown	Domestic Septage	
Meigs WPCP	GA0048178	Thomas	Ochlockonee	NPDES	Municipal
Messer Dairy Inc.	GAG920024	Thomas	Ochlockonee	General LAS AFO (300 to 1000 AU)	Industrial
Ochlocknee WPCP	GA0046370	Thomas	Ochlockonee	NPDES	Municipal
Oil-Dri Corp of GA	GA0047511	Thomas	Ochlockonee	NPDES	Industrial
Thomasville (City of) - Oquina Creek WPCP	GA0024082	Thomas	Ochlockonee	NPDES	Municipal

Agricultural Uses

- o 122 ground water withdrawal permits have been issued for Thomas County

Demographics

Population size plays an important role in the watershed, as populations increase within both urban and rural communities this can affect, degrade, displace, alter or in worse cases eliminate natural habitats. These increases can lead to the potential for more urban and agricultural runoff. Watersheds with higher populations tend to exhibit greater impacts on waterways and habitats. The July 2017 US Census Bureau data shows a 1% increase in overall population for Thomas counties.
(Attachment E)

PEOPLE	
Population	
Population estimates, July 1, 2017, (V2017)	44,779
Population estimates base, April 1, 2010, (V2017)	44,719

5.3 Water Body and Watershed Conditions

Water Quality Standards

The Clean Water Act and USEPA's Water Quality Planning and Management Regulations (40 CFR Part 130) require states to develop total maximum daily loads (TMDLs) for their water bodies that are not meeting their designated uses due to pollutants. The TMDL process establishes the allowable loadings of pollutants or other quantifiable parameters for a water body based on the relationship between pollution sources and in- stream water quality conditions, so that states can establish water quality based controls to reduce pollution from both Point and Nonpoint Sources and restore and maintain the quality of their water resources *(USEPA, 1991).*

These Standards are established to provide and enhance the following:

- Water quality and prevention of pollution
- Protect the public health and welfare of drinking water supplies
- Conservation of fish, wildlife and other beneficial aquatic life
- Agricultural, industrial, recreational, and other reasonable and necessary uses to maintain and improve the biological integrity of the waters of the State

Table 5.3.1 below shows the recommended ranges approved by Georgia Environmental Protection Division (*391-3-6-.03 Water Use Classifications and Water Quality Standards)*

Water Quality Characteristic of Concern	Ecological or Health Effect	Standard	Notes
Dissolved Oxygen	High levels of Dissolved Oxygen are necessary for fish respiration	5.0 mg/l average 4.0 mg/l min	GA water quality standards
Temperature	Fish suffer metabolic stress at high temperatures.	90 c max	GA water quality standards
Fecal Coliform	Fecal Coliforms do not pose a health threat but serve as an indicator for bacteria that can cause illness in humans and aquatic life.	200 col/100ml(May-Oct) 1000 col/100 ml(Nov - April) 4000 col/100 ml(anytime)	GA water quality standards
Phosphorus	Macronutrient affects aquatic productivity and trophic state.	Less than 0.1 ppm	GA water quality standards
Total Nitrogen	Macronutrient affects aquatic productivity and trophic state.	Less than 1 ppm	GA water quality standards

Source Assessment

The Aucilla River Watershed is 91, 415 acres and contains 216 miles of stream, 294 acres of lakes and 18,852 acres of wetlands. The Georgia Environmental Protection Division (GAEPD) 305(b)/303d list (2010) identifies 30 miles of impaired streams. Table 5.3.2 provides the non-point source pollutant listed for each area.

Table 5.3.2

Water Body Segment Name	County Location(s)	Criterion Violated or Water Quality Concern	Listing Status Category 4a, 5 or 1
Olive Creek-Headwaters to Upstream US Hwy 19 (Section 1)	Thomas	FC,DO	4a
U.S. Highway 19 to Aucilla River (formerly Headwaters to Aucilla River) (Section 2)	Thomas	FC,DO	4a
Aucilla River- Masse Branch to Brooks County line near Boston	Thomas	Fair Ranking macroinvertebrate	Pending

The Original TMDL Implementation Plan for Aucilla River was completed in 2002. However, the Implementation Plan does not meet the USEPA nine element criteria, which was established much later. The 2002 TMDL Implementation Plan indicated that the Fecal Coliform and Dissolved Oxygen pollutant issues where a result of failures to control run-off from storm water runoff, failing septic tanks, urban runoff, and possibly historic lift station spills. The following summarizes the potential actions described in the 2002 TMDL Plan that could reduce Fecal Coliform and Dissolved Oxygen loading from nonpoint sources in the Aucilla and Olive Creek.

Potential actions that could reduce the Fecal Coliform and Dissolved Oxygen Load:

- Install/Maintain buffers including Bio Retention and Conservation
- Use of the Georgia Best Management Practices for land disturbing activities
- Identification of any malfunctioning Septic Systems
- Adoption of proper unpaved road maintenance practices
- Homeowner education- what not to dump down storm drains/bridges
- Reduction of trash and dead animals on bridges and in creeks
- Participation and Education on River education events

VISUAL SURVEY

A visual field survey was conducted July of 2017 and June of 2018 to aid in the identification of the possible sources of Point/Non- Point Source pollution, to select water quality monitoring sites and revisit the locations listed in the WIP from 2011.

The results of this survey showed the following:

Agricultural/Plantations

Aucilla Creek/Olive Creek

- Limited/ and or degraded buffers and riparian areas

Wildlife

Aucilla Creek/Olive Creek (Cherokoee Lake)

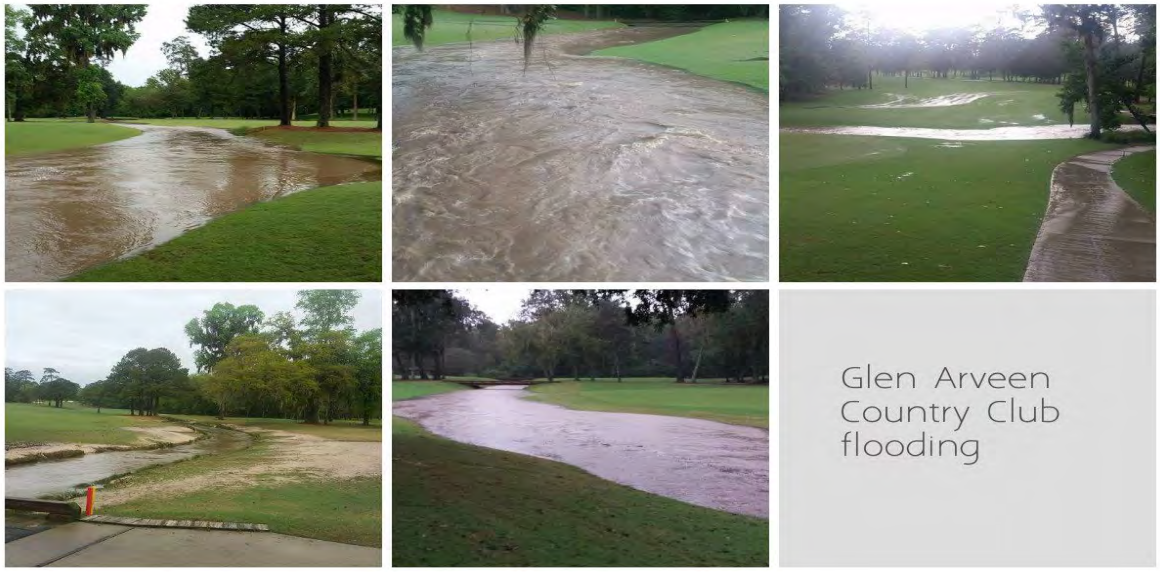
- Abundant wildlife and migratory bird populations are evident.

Illegal Dumping
Aucilla Creek/Olive Creek

- Signs of illegal dumping, and trash were observed within all creeks

Urban
Olive Creek
Cherokee Lake

Urban
Olive Creek
Glen Arveen Country Club



Golden Triangle RCD representative meet with Glen Arveen to gather data on Olive Creek. Representatives from Glen Arveen provided pictures of the flooding that occurs within the golf course. Once the waters recede they haul away all of the deposited dead sand onto other locations within the course. The streambank through the golf course has been restored with native grasses and flowers.

WIP Revisit

The Summer creek area is a small subdivision with mowed lawns, and cleared vegetation to the water's edge. Stream reaches in residential areas often do not have adequate stream buffers, and are vulnerable to runoff containing fertilizer and pesticides applied by homeowners to their lawns.

Another storm drain into Olive Creek additional subdivision housing and apartments

Lake Cherokee is formed by the dam just north of the roadway at Highway 84 (Smith Ave). There are frequently ducks and geese in and around the lake that contribute to fecal bacteria levels in Olive Creek. As of 2018 the enhancement project is ongoing at the lake.

Considerable sewer infrastructure exists around Olive Creek in the form of mains, force mains, and lift stations. These photos show a few of the sewage lift stations relatively close to Olive Creek. It should be noted that per the City of Thomasville Engineers Lift station upgrades have taken place since the 2011 WIP.

Natural vegetation cannot be established at this location at the listing site at East Club Drive because sand that washes downstream collects here and is routinely removed, leaving the bank vulnerable to soil erosion. It should be noted that there was re-establishment of vegetation at the site. The flow was very low and water color was brown.

Olive Creek where it passes through a residential area on Nottingham Way. The lack of streamside vegetation contributes to sediment and nutrient loading, and an increase in stream temperatures and a corresponding decrease in dissolved oxygen levels. It should be noted sedimentation deposit at this site have increased in many areas. Tree loss has occurred. Landowner has tried re-enforcing streambank but erosion is still occurring. Better Back Road BMP -Streambank restoration recommend for this site



YMCA Park across from the Summer Creek Subdivision –recommended rock lay infrastructure within outlays from ditches



Residential area on Tuxedo drive to alleviate storm water runoff. Installation of this BMP was not at correct slope level and caused more flooding in the home owner's property as well and the street. City of Thomasville Engineers were aware of the issue and were addressing.



Ditches downstream of Thomas University- recommended BMP-rocklay infrastructure within ditches to alleviate the erosion and collapse. The City Thomasville Engineers were alerted to this issue and are addressing.



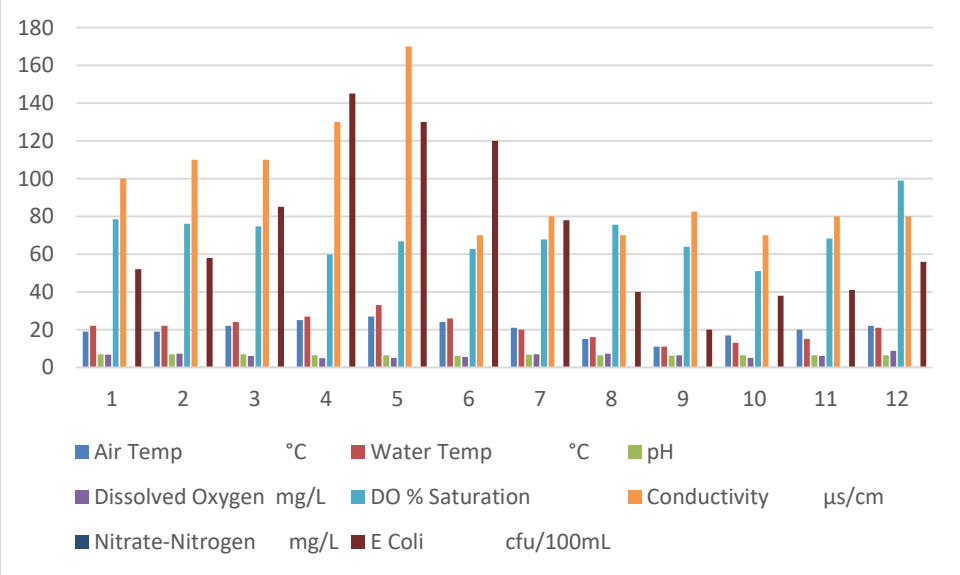
Collapse and blocked storm drain downstream of Thomas University 25 yards past above referenced issue opposite side of street- recommended – address and fix collapse, clear out plugged storm drain. The City Thomasville Engineers were aware of collapse due to working in the area, and send team to clear drain the following day. .

Water Quality Monitoring

Water sampling/monitoring, and visual surveys assessments were completed from April 2017 to April 2018.

Attachment Q

Date and Time	4/7	5/17	6/17	7/17	8/17	9/17	10/17	11/17	12/17	1/18	2/18	3/18
Air Temp °C	19	19	22	25	27	24	21	15	11	17	20	22
Water Temp °C	22	22	24	27	33	26	20	16	11	13	15	21
pH	7	7	7	6.46	6.5	6	6.75	6.5	6.3	6.5	6.5	6.5
Dissolved Oxygen mg/L	6.7	7.35	6.15	4.85	5	5.56	7	7.3	6.45	5.15	6	8.8
DO % Saturation	78.39	76.08	74.79	59.78	66.84	62.72	67.82	75.56	63.91	51.03	68.3	98.97
Conductivity µs/cm	100	110	110	130	170	70	80	70	82.5	70	80	80
Nitrate-Nitrogen mg/L	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
E Coli cfu/100mL	52	58	85	145	130	120	78	40	20	38	41	56



6.0 Recommended Best Management Practices/Strategies

The consensus of Golden Triangle RC&D and the Aucilla Creek Watershed Partnership (ACWP) is that through the recent water quality monitoring, visual surveys, and research of historical data, the 2002 recommendations are still valid and required for the creation of this WMP to identify appropriate BMPs that need to be implemented within the Aucilla Watershed to reduce the levels of Fecal Coliform, and Dissolved Oxygen. This Section discusses the proposed BMPs that were derived from Golden Triangle's investigations.

Golden Triangle RC&D and Watershed Partnership recommend implementing a combination of adaptive on the ground approaches, including long term management measures for the most effective BMPs to improve the overall water quality of the Aucilla River Watershed. The actual management measures to be implemented however are subject to modification based upon landowner participation, site specific need and opportunity, as well as future availability of funding.

The management strategies focus on environmental, programmatic and social indicators in recommending the appropriate Best Management Practices for Section 1 Headwaters to upstream U.S. Hwy. 19, Thomasville, Section 2 U.S. Highway 19 to Aucilla River (formerly Headwaters to Aucilla River) and the Aucilla River Masse Branch to Brooks County line near Boston.

BMP practices approved by NRCS, DNR, USFWS specifications will include both structural and non-structural approaches for agriculture, urban pollutant controls, and public educational and outreach activities throughout the entire watershed.

Implementation of Best Management Practices (BMPs)

6.1.2 Structural BMP Recommendations to Address Fecal Coliform/Dissolved Oxygen and Sedimentation, including but not limited to the following:

- Grass Swales
- Infiltration Basin
- Infiltration Trench
- LID*/Rain Barrel
- LID/Bioretention
- LID/Dry Well
- LID/Filter/Buffer Strip
- LID/Infiltration Swale
- LID/Infiltration Trench
- LID/Vegetated Swale
- LID/Wet Swale

- Sand Filter/Infiltration Basin
- Sand Filters
- Vegetated Filter Strips

- Better Back Road – Sedimentation and Transport Load of Fecal Coliform

  Installation of better back road practices for the transport of sedimentation and fecal coliform loading into streams and creeks.

- Better Back Road – Sedimentation and Streambank erosion

  Installation of better back road practices for the transport of sedimentation and fecal coliform loading into streams and creeks.

6.1.3 Non-Structural BMPs

- Riparian Buffers- Address Sedimentation/Dissolved Oxygen

  Protect water quality by slowing nutrient, pollutants, and sediment runoff. Buffers can either be herbaceous or forested. They can provide vegetation types, water quality protection, groundwater recharge, and wildlife habitat.

- Watershed debris and trash clean-up-address habitat alteration

  While conducting visual survey of the watershed, it was noted that illegal dumping of old furniture, tires, litter was observed within the creeks. Not only is litter in streams unsightly, but trash and other debris in streams negatively impact aquatic organisms.

6.2 Load Reduction Methodology Region 5 Model 5

The Region 5 Model 5 Load Reduction model will be used to estimate the load reducing effects created by the installation of planned BMPs. The model uses the pollutants controlled calculation and documentation for Section 319 watershed training manual. The program is segmented into five different BMP categories for estimation of load reductions. These categories are gully stabilization, bank stabilization, agricultural fields, feedlots and urban runoff. Many different subcategories are listed under each category. The program only gives an estimation of load reduction and makes many assumptions in doing so. Load reduction calculations are given for sedimentation, phosphorus, and nitrogen. Monitoring is the only true way to determine actual load reductions achieved by BMP installations.

Load Reduction Methodology

- The load reduction model requires the input of a soil rainfall/runoff erosive number of “R” value, for load reduction estimations. Within the three counties in the watershed there are three different soil erosive “R” values according to the RUSLE (Revised Universal Soil Loss Equation) values. Thomas has an “R” value of 400.

- The load reduction model requires that a soil erodibility factor, or “K” factor, is used to estimate load reductions. Soils within Georgia have “K” values that range from 0.05 to 0.43. The majorities of the soils within the watershed are sandy surfaces with loamy or clayey subsoil’s, and have “K” values from 0.13 to 0.15. An average “K” value of 0.14 will be used to calculate load reduction values.

- A length of slope and steepness factor, or “LS” factor, is required to calculate load reduction values. The “LS” value is a site specific value that must be calculated from each BMP site. Most crop lands in Georgia have slope lengths that range from 60 to 250 feet. For load reduction calculations an average of 150 feet for slope length and an average of 3% slope will be used. This will be a “LS” factor value of 0.32.

- The Region 5 Model requires a cover management factor, or “C” factor in order to calculate load reductions. The program automatically inserts a “C” value into the calculation based on the county in which the BMP is installed. “C” factor values range from 0.20 to 0.39 within the watershed. An average value of 0.29 will be used in the load reduction calculations.

- The Region 5 Model requires a support practice factor, or “P” factor, to calculate load reductions. The model automatically inserts a “P” factor based on the county/counties selected. The watershed has “P” factors that range from 0.83 to 0.98. A “P” value of 0.83 will be used to calculate load reductions.

- The Region 5 Model gives an estimated soil loss per year in ton/acre/yr. Each of the counties within the watershed has different soil loss estimations according to the model. The counties range from 2.56 to 4.62 tons/acre/yr for soil loss. A number of 3.79 will be used to calculate load reductions.

- The BMPs to be completed are an estimate based on applications that have been filled out by Landowners and Shareholders. The BMPs installation sites are subject to Landowner participation.

- Urban runoff calculations do not show estimation for sedimentation, phosphorous, and nitrogen. Urban runoff calculations are needed to calculate load reductions for rural area subdivisions and dirt roads. The Gully stabilization calculations will be used to estimate load reductions for these areas.

Table 6.2.1

Project Stream Name and 303(d) Location	Violation	TMDL Percent Reduction
Olive Creek Headwaters to Upstream U.S. Hwy. 19,	FC, DO	48% - 2006 (FC) 35% - 2001 (TOC, TN and TP each)
Aucilla River Masse Branch to Brooks County line near Boston	FC, DO	59% - 2006 (FC) 38% - 2001 (TOC and TN each) 39% - 2001 (TP)
Olive Creek U.S. Highway 19 to Aucilla River (formerly Headwaters to Aucilla River)	Fair for macroinvertebrate	Assessment Pending – 2016 Draft Integrated List

6.3 Recommended Best Management Strategies and Load Reductions

The following table is an estimation of the BMPs that will be completed within Phase 1 (Section 319(h) FY13 Contract). The table contains an estimated number of acres that will be affected or a number of livestock to be excluded. Completion of the BMPs will depend heavily on landowner participation and desires. Table 6.3.2 provides the type of BMP recommended and projected number for installation.

Table 6.3.1

Pollutant	BMP Type	Number of BMPs Installed	Sediment Reduction (tons/year	Phosphorous Reduction (lbs/year)	Nitrogen Reduction (lbs/year)
Fecal Coliform/ Dissolved Oxygen Sediment	Filter Strips	10 @ .25 acres per	236	36.7	5.4
	Critical Area Planting	5 acres			
Fecal Coliform/ Dissolved Oxygen Sediment	Riparian Buffers	25 acres	236	36.7	5.4
Fecal Coliform/ Dissolved Oxygen Sediment	Storm Water Runoff (combined BMP)	25 acres	236	36.7	5.4
Fecal Coliform/ Dissolved Oxygen Sediment	Better Back Roads- Stream Bank	1 site	236	36.7	5.4
Fecal Coliform/	Septic Tank Installation	2 site	236	36.7	5.4

Table 6.3.2 Estimated Cost

BMP Type	Critical Number	Estimated Costs
Filter Strips	50 acres	$292.00 per acre=$1,460
Critical Area Planting	50 acres	$535.98 per acre 2679.90
Riparian Buffers	50 acres	$946.00per acre=$23,650
Storm Water Runoff	50 acres	$537.15 per acre = $
Better Back Road(Stream Bank)	1 site	$95,000
Septic Tank Installation	2 sites	$10,000

As mentioned in the Executive Summary, this project was funded in part with a Section 319(h) Grant, whereby the recommendations derived in developing the WMP would be implemented after GAEPD approved the plan. Interested landowners and business developers were identified during the public outreach and education element of the data gathering for the WMP.

As part of this planning process, an implementation summary chart was created to recap the recommendations of this plan with project priority ranking and estimated costs. The chart is organized by sub watershed/creek name, and identifies potential stressors, recommended BMPs and estimated costs. Additionally, the chart identifies responsible organizations/partners to lead on implementation activities.

Table 6.3.3

Stream Name	Potential Stressors	Priority	BMPs	Estimated Cost	Responsible Organization
Olive Creek/Aucilla	Urban Runoff/Fecal Coliform/Dissolved Oxgyen/Sedimentation	#1	Grass Swales	$210,000	GTRCD/FWS/ Thomas County
			Infiltration Basin		
			Infiltration Trench		
			LID*/Rain Barrel		
			LID/Bioretention		
			LID/Dry Well		
			LID/Filter/Buffer Strip		
			LID/Infiltration Swale		
			LID/Infiltration Trench		
			LID/Vegetated Swale		
			LID/Wet Swale		
			Sand Filter/Infiltration Basin		
			Sand Filters		
			Vegetated Filter Strips		

Milestones

Table 6.3.4 : Proposed Implementation Schedule for WMP

	2019	2020	2021
Milestones/Tasks			
Execute Contract			
Project Activity 1: Develop criteria to identify and contact landowners/City of Thomasville for installation of BMPs			
Task #2: Implement Urban BMPs			
Task #3: Conduct two (2) BMP field days and workshops at selected sites (1 each year)			
Task #5: Continue with Aucilla Creek Partnership for advisement on implementing the WMP			
Task #7: Expand Aucilla Creek Partnership by recruiting new members			
Project Activity 2: Refine Better Back Road projects with County Administrators			
Project Activity 2: Refine Better Back Road projects with County Administrators			
Project Activity 3: Develop long-term water quality monitoring plan to measure BMP effectiveness			
Task #8: Prepare QA/QC water quality monitoring plan for post BMPs			
Task #9: Conduct two(2) Adopt-A-Stream Training (1 each year) to assist with water quality monitoring			
Task #10: Conduct post BMP water quality monitoring according to GAEPD approved QA/QC sampling plan			
Project Activity 4: Conduct public outreach and education through Rivers Alive Cleanup projects			
Task #13: Conduct two (2) Rivers Alive Clean-Up (1 each year) in targeted county			
Project Activity 5: Evaluate management strategies			
Task #14: Incorporate into the 2018 WMP results of installing BMPs, water quality monitoring, public education and outreach, and assessment of future needs to improve water quality			
Submit Quarterly Invoices & Status Reports			
Submit Final Close-Out Report			

7.0 Public Education and Outreach

Education and Outreach components are essential for this plan to reach wide and varied audiences on topics regarding Non-Point Source pollution, aquatic habitats, and the importance of protecting and improving water quality within the watershed. This will include landowner, homeowner, stakeholder, county and city administrators and workers, along with teacher and/student education.

Educating students on the value of Georgia's water resources and how they can help is pivotal in creating a sense of environmental stewardship. Environmental awareness is not meant to be short-lived, but rather when instilled at a young age, can persist throughout a lifetime. Children are the future and their knowledge of environmental impacts is pivotal to the preservation of our valuable natural resources.

Education and Outreach will be completed by utilizing the following:

Education Component	Target Audience
Adopt –A- Stream Monitoring	All
Rivers-A-Live Clean-up	All
Erosion and Sediment Control	Landowners, homeowners, city and county administration and workers
BMP demonstrations/field days	Landowners, homeowners, city and county administration and workers
Septic Tank /Dumping Awareness	Landowners, homeowners
Volunteering	All

1) Strategy:

The main strategy of the Aucilla River WMP is to eventually improve the water quality in the impaired sections of the watershed and protect the water quality in the remaining part of the watershed for the streams to become fully supporting of their designated use. This would allow the watershed to be removed from the EPD's 305(b)/303(d) lists. The education and outreach will be designed to increase the public's awareness of:

a) The ecological significance of the Aucilla Creek Watershed
b) Appropriate BMPs and how they are used to reduce nonpoint source pollutants.
c) How urban and storm water runoff, farming and other land use practices affect the watershed
d) The endangered and protected species located with the Aucilla River Watershed

2) Implementation:

Outlined below are the actions that will be taken to implement the education and outreach strategies of this WMP. Many of which the NRCS uses in its EQIP Program. Therefore, Golden Triangle RC&D will work closely with NRCS, Georgia DNR, Georgia Forestry Commission and USFWS personnel to carry out the following actions:

a) Promote the implementation of BMPs concerning type, cost, and effectiveness
b) Hold erosion and sedimentation control workshops
c) Educate a wide range of ages and audiences concerning water quality
d) Educate individuals about the urban runoff issues within the watershed
e) Erect signs to educate the public about the watershed and about water protection
f) Educate the public on how septic tanks, dumping of yard clippings, and oil and grease can affect the Aucilla River Watershed's water quality.

These educational and outreach actions will be implemented in the watershed through the following strategies:

Nine (9) Partnership meetings will be held. These meetings will be rotated between the counties involved in order to get more participation from each county. During these meetings, the Partnership will be updated about the plan and water quality protection efforts. Individuals will also have the opportunity to express any specific areas of concern within the watershed.

a) Conduct two (2) BMP field days where BMP projects will be reviewed and the importance of the BMPs and water quality will be discussed. Discussions could also include any ecological or endangered species concerns.
b) Produce Public Service Announcements through local newspapers and Golden Triangle website and Facebook page to promote activities and events related to the watershed.
c) Partner with school science teachers, County extension offices, local water trail organizations, Girl and Boy Scout troops, and other organizations to bring awareness, education, and the importance of the watershed to the community.
d) Erect two (2) watershed education signs which will be posted on the major highways and roads entering the Aucilla River Watershed area. See Figure 7-1 for a picture of the watershed signs.
e) Conduct two (2) Adopt-A-Stream training workshops.
f) Conduct two (2) Rivers Alive clean-up events.
g) Creation of brochure on Septic Tanks (what to dump what not to dump) for homeowners
h) Storm drain markers

Figure 7.1

YOU ARE ENTERING THE AUCILLA RIVER WATERSHED

Please Protect Our Waters

Paid for in part through a grant from the USEPA in partnership with Georgia Environmental Protection Division under the Provisions of Section 319(h) of the Clean Water Act.

8.0 Long Term Monitoring of the WMP and Water Quality

As shown in the Proposed Implementation Schedule, the WMP was written to cover a 10-year time period and interim milestones and measures of success of the plan are broken down into three phases; short-term, mid-term, and long-term. A summary of each interim milestones and success criteria for each phase of the WMP is included in Table 8.2

One of the elements of a 9-element plan is to include a process for long-term monitoring of water quality as well as the Plan itself. Golden Triangle RC&D personnel and volunteers with QA/QC certification from Georgia Adopt-A-Stream will conduct water quality monitoring over the next 3 years and recorded within the Adopt-A-Stream database.

The water quality monitoring will be designed to collect biological, chemical, and bacteriological data following the implementation of the recommended BMPs. Table 8.1 shows the type of monitoring and the parameter assessed.

Table 8.1

Water Quality Monitoring Type	Parameter Assessed
Biological	• Habitat
Chemical	• Temperature • Ph • Turbidity • Conductivity
Bacteriological	• Fecal Coliform

BMP Monitoring

For all structural BMPs implemented, a post construction inspection should be conducted. Post construction should occur immediately following installation of the BMPs and should include water quality monitoring of the targeted pollutant soon after and if possible over several years.

The long term monitoring data will be used to assess and measure the effectiveness of the BMPs by:

- Showing removal of material over the entire time period
- Showing relational periods for significant storms or dry periods and imports/exports of pollutants
- Accurately representing the entire total loads (pre and post) BMP implementation

Table 8.2

Phase	After Implementation	Milestones	Measure of Success
Short-term	3 months to 2 years	Implement management measures in WMP	List BMPs for this time period
	3 months to 2 years	Post BMP Success Monitoring	List measures
Mid-term	2 to 5 years		
Long-term	5 to 10 years		

Future Revisions and Plan Success

Public reviews should be conducted by the local stakeholder group of the implementation schedule, accomplishments, and monitoring results to determine whether or not the goals of the WMP are being met. The WMP is a "living" document, meaning the goals and objectives contained within can be modified, strengthened, and/or removed based upon water quality results and the needs of the stakeholders in the watershed. For long term success of the plan, it is recommended that the WMP be reviewed and evaluated on an annual basis to determine if milestones and associated success criteria are being accomplished. After the annual review, revisions should be made to the WMP.

9.0 Financial and Technical Assistance

Technical and financial assistance will be sought from many different organizations to protect water quality in the watershed. As previously discussed Golden Triangle RC&D has developed a very diverse partnership/stakeholder committee, which will be instrumental in providing technical assistance and financial support through their agency and/or government programs.

Funding for watershed monitoring and BMP implementation can be obtained from a 319 Nonpoint Source Implementation Grant from GA EPD Department of Natural Resources. Should funding be awarded, the staff of Golden Triangle RC&D would implement the Watershed Management Plan during the allowed contractual timeline. Match funds would be obtained through in-kind services. Golden Triangle RC&D will evaluate each land owner's request to find the most beneficial program to improve the water quality and reduce pollutants within the affected creeks. Listed below are the programs available through NRCS that are being utilized in the watershed.

The Farm Service Agency's Conservation Stewardship Program (CSP) – a voluntary conservation program that encourages producers to improve resource conditions such as soil quality, water quality, water quantity, air quality, habitat quality and energy in a comprehensive manner by:

- Undertaking and installing additional conservation activities
- Improving, maintaining, and managing existing conservation activities.
- Taking land in environmentally sensitive areas out of agriculture production and plant native vegetation, such as Long Leaf Pine, Honey Bee pollinator habitats, wildlife habitat, etc.

CSP offers participants two possible types of payments:

- Annual payment for installing and adopting additional activities, and improving, maintaining, and managing existing activities
- Supplemental payment for the adoption of resource-conserving crop rotations

Environmental Quality Incentives Program (EQIP) – a voluntary program that provides financial and technical assistance to agricultural producers to plan and implement conservation practices to improve soil, water, plant, animal, air and related natural resources on agricultural land and non-industrial private forestland.

Financial assistance payments through EQIP are made to eligible producers, to implement approved conservation practices on eligible land or to help producers develop Conservation Activity Plans (CAP) to address specific land use issues. Payments are made on completed practices or activities identified in an EQIP contract that meet NRCS standards. Payment rates are set each fiscal year and are attached to the EQIP contract when it is approved.

NRCS, DNR, or US Fish and Wildlife services will oversee the BMP projects to be certain that they are completed using the certified guidelines. An NRCS, DNR, or US Fish and Wildlife representative will provide a final approval after projects are completed.
Costs estimates for implementation during the Phase 1 of this WMP are shown in Table 9.1 below.

Table 9.1 Estimated Cost

BMP Type	Critical Number	Estimated Costs
Filter Strips	10 acres	$292.00 per acre=$1,460
Riparian Buffers	25 acres	$946.00per acre=$23,650
Storm Water Runoff	25 acres	$537.15 per acre = $16,114.50
Better Back Road	1 site	$60,000
Septic Tank Installation	2 sites	$10,000

10.0 Implementation Milestones, Evaluation and Revision

Schedule and Milestones for Implementing Management Strategies

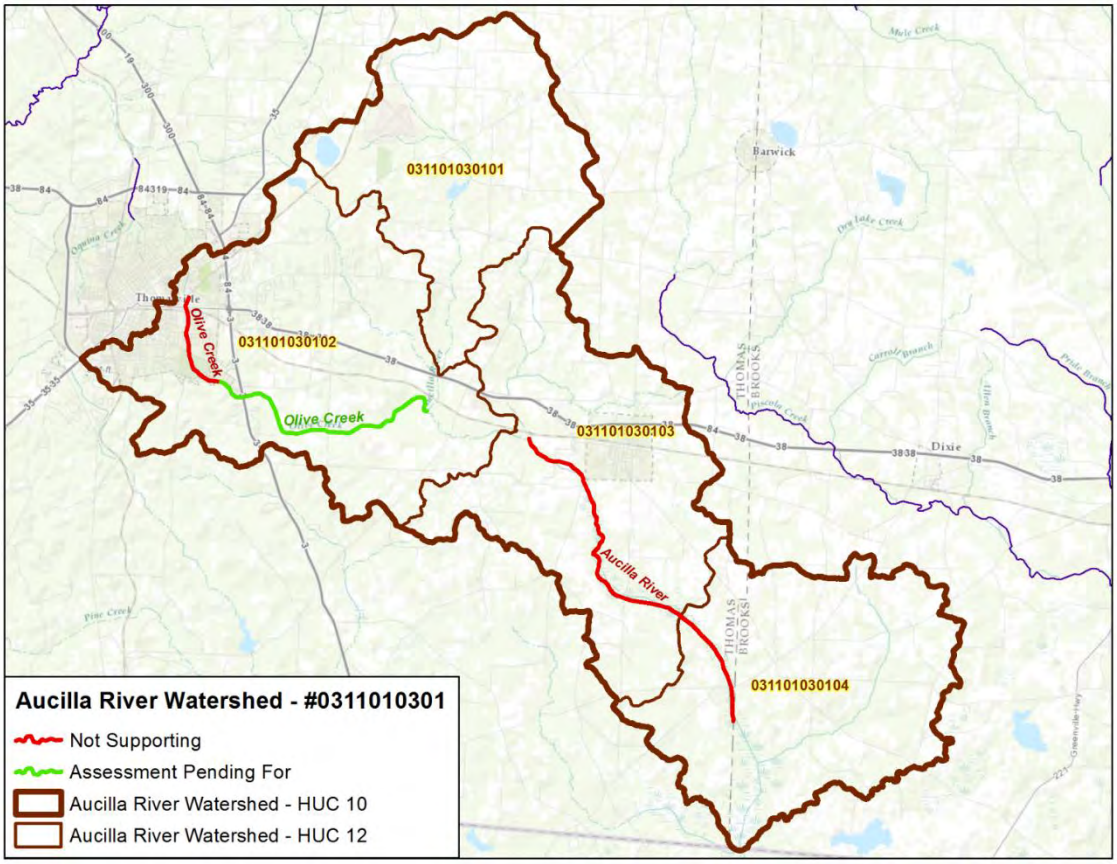
	2019	2020	2021
Select identified high risk priority areas for BMPs	1/19	1/20	1/21-6/21
Contract with landowners for installation of BMPs	3/19	3/20	1/21-6/21
Install BMPs	4/19	4/20	1/21-6/21
Hold quarterly Aucilla Watershed Partnership meetings	1/19, 4/19, 6/19,8/19 12/19	1/20, 4/20 6/20,8/20 12/20	1/21, 4/21, 6/21,8/21 12/21
Conduct field days		3/20	3/21
Work with school groups and other organizations	2/19	8/20	Through May 2021
Conduct water sampling	Once BMP installed	Once BMP installed	Once BMP installed
USFWS surveys	6/19	6/20	
Calculate load reductions for each completed BMP	Once BMP installed	Once BMP installed	Once BMP installed
Hold Adopt-A-Stream training courses	6/19	1/20	
Conduct Rivers Alive cleanups	10/19	10/20	
Continue with updates to the OCWP website	6/19	6/20	6/21

The effectiveness of the recommended BMPs for the Aucilla River Watershed Management Plan will be tracked by qualitative and quantitative measures.

Qualitative Measures	Quantitative Measures
• Individual/Group Participation • Partnership Meeting • Workshops • BMP Field Days • Adopt-A-Stream Training • Clean-up Events • Education and Outreach Effectiveness • Pre-Post Surveys	• Watershed Monitoring Results • Adopt-A-Stream testing (including US Fish and Wildlife biological monitoring/chemical testing) • Load Reduction Reporting (monitoring for BMP effectiveness

Golden Triangle RC&D final recommendations for this Watershed Management Plan is for additional funding and phases for continued work within the Aucilla basin and partnership with the City of Thomasville to install Better Back Road stream bank stabilization and specific Better Back Road practices in the Urban/Residential areas to relieve/reduce the sediment load and erosion issues.

Appendix A Watershed Boundary and Impairment



Appendix B

Population of within Aucilla River Watershed

PEOPLE	
Population	
Population estimates, July 1, 2017, (V2017)	44,779
Population estimates base, April 1, 2010, (V2017)	44,719
GEOGRAPHY	
Geography	
Population per square mile, 2010	82.1
Land area in square miles, 2010	544

Appendix C Temperature and Precipitation Data

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

Global Summary of the Month for 2017

Generated on 07/07/2018

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Current Location: Elev: 201 ft. Lat: 30.8696° N Lon: -84.2174° W

Station: **CAIRO, GA US USC00091463**

Date	Temperature (F)													Precipitation (Inches)								
Elem ->	TAVG	TMAX	TMIN	HTDD	CLDD	EMXT		EMNT		DX90	DX32	DT32	DT00	PRCP	EMXP		SNOW	EMSD		DP01	DP10	DP1X
Month	Mean	Mean Max.	Mean Min	Heating Degree Days	Cooling Degree Days	Highest	High Date	Lowest	Low Date	Number of Days				Total	Greatest Observed		Snow, Sleet			Number of Days		
										Max >= 90	Max <= 32	Min <= 32	Min <= 0		Amount	Date	Total Fall	Max Depth	Max Date	>=.01	>=.10	>=1.0
Jan	54.9	66.6	43.3	297	14	76	26	25	09	0	0	3	0	5.14	1.19	23				10	9	2
Feb	60.4	73.5	47.3	132	13	81	25	33	17	0	0	0	0	1.53	1.02	08				4	3	1
Mar	60.4	73.1	47.8	181	49	86	30	27	17	0	0	2	0	1.39	0.57	02				3	3	0
Apr	67.9	81.2	54.6	36	114	87	03	39	08	0	0	0	0	2.64	1.50	04				3	3	1
May	72.8	84.7	60.9	6	215	93	29	48	06	4	0	0	0	3.78	1.82	05				8	7	1
Jun	77.3	85.2	69.5	0	319	92	26	60	09	2	0	0	0	8.39	2.30	20				16	11	2
Jul	81.4	90.4	72.4	0	459	95	10	70	15	19	0	0	0	4.29	1.70	18				10	8	1
Aug	80.9	89.2	72.5	0	415	95	18	67	30	12	0	0	0	3.61	0.83	26				11	11	0
Sep	76.1	85.5	66.7	6	340	93	30	60	13	6	0	0	0	4.21	1.70	11				11	5	1
Oct	70.1	80.3	59.9	72	221	90	11	35	31	1	0	0	0	2.52	0.87	12				7	5	0
Nov	59.4	71.6	47.2	192	25	83	08	32	20	0	0	1	0	0.37	0.16	23				4	2	0
Dec	52.5	62.5	42.5	374	11	79	01	27	11	0	0	6	0	3.44	1.16	08				10	9	1

Notes

(Blank) Data element not reported or missing.

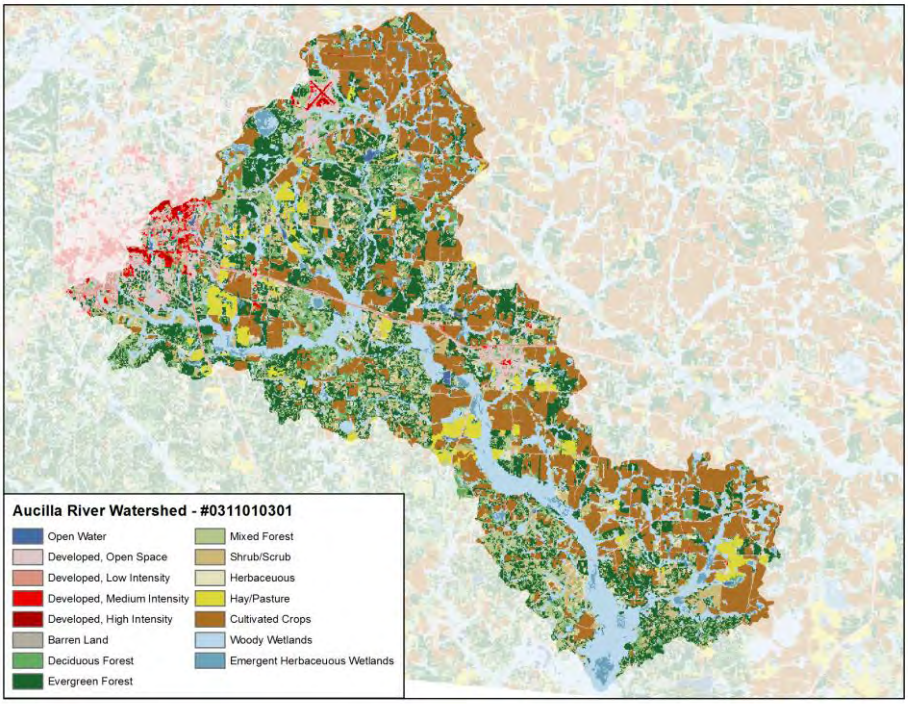
\+ Occurred on one or more previous dates during the month. The date in the Date field is the last day of occurrence.

A Accumulated amount.

X Monthly means or totals based on incomplete time series.

T Trace Amount.

Attachment D Land Use/Cover Changes through MRLC



Land Use Type	Acres	Percent
Open Water	294	0.32
Developed, Open Space	5611	6.14
Developed, Low Intensity	1437	1.57
Developed, Medium Intensity	584	0.64
Developed, High Intensity	234	0.26
Barren Land	27	0.03
Deciduous Forest	3192	3.49
Evergreen Forest	18522	20.26
Mixed Forest	8055	8.81
Shrub/Scrub	6520	7.13
Herbaceuous	3233	3.54
Hay/Pasture	2878	3.15
Cultivated Crops	21976	24.04
Woody Wetlands	16333	17.87
Emergent Herbaceuous Wetlands	2519	2.76

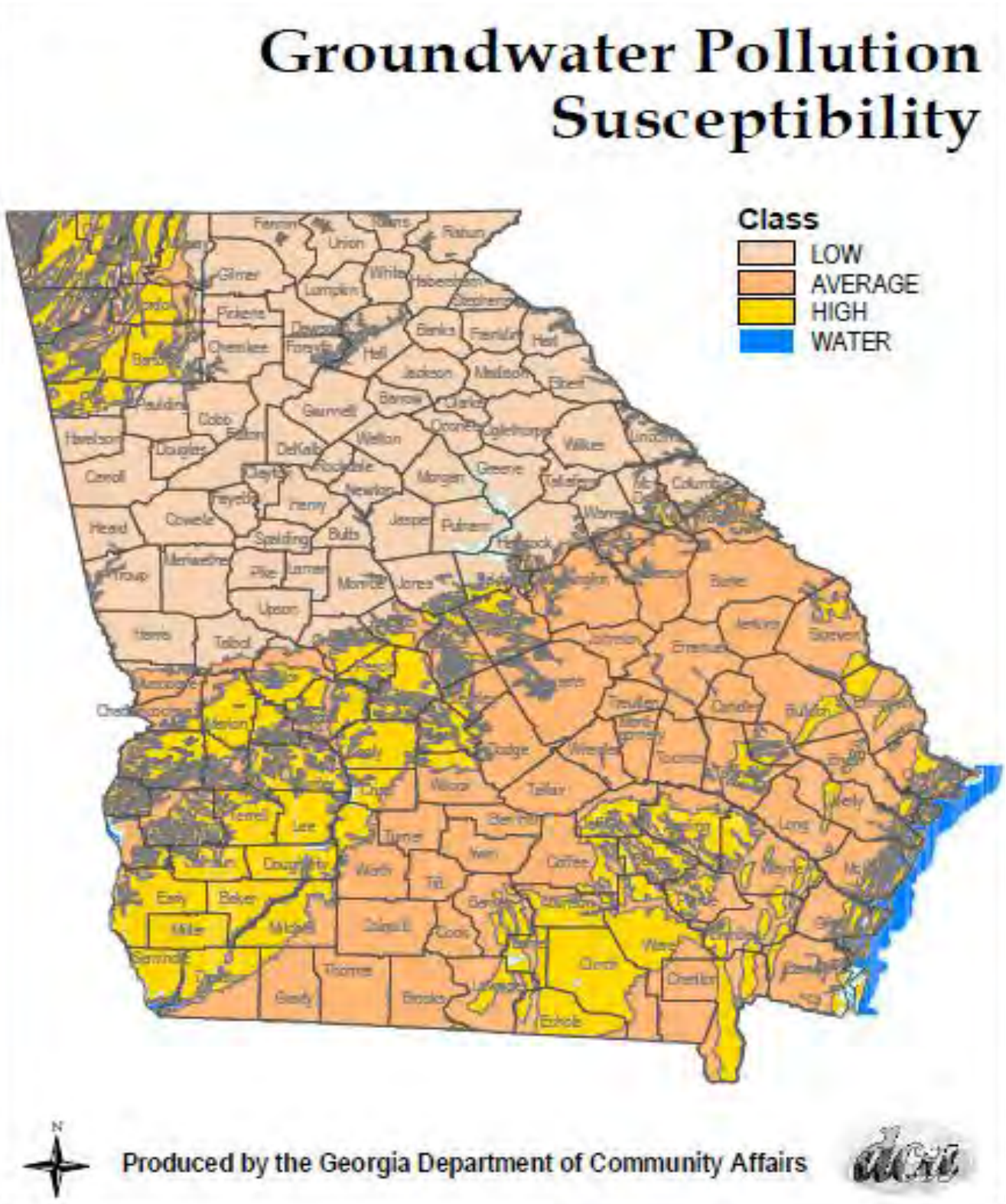
Source: National Land Cover Database 2011 (NLCD 2011) produced by Federal Multi-Resolution Land Characteristics (MRLC)

Attachment E

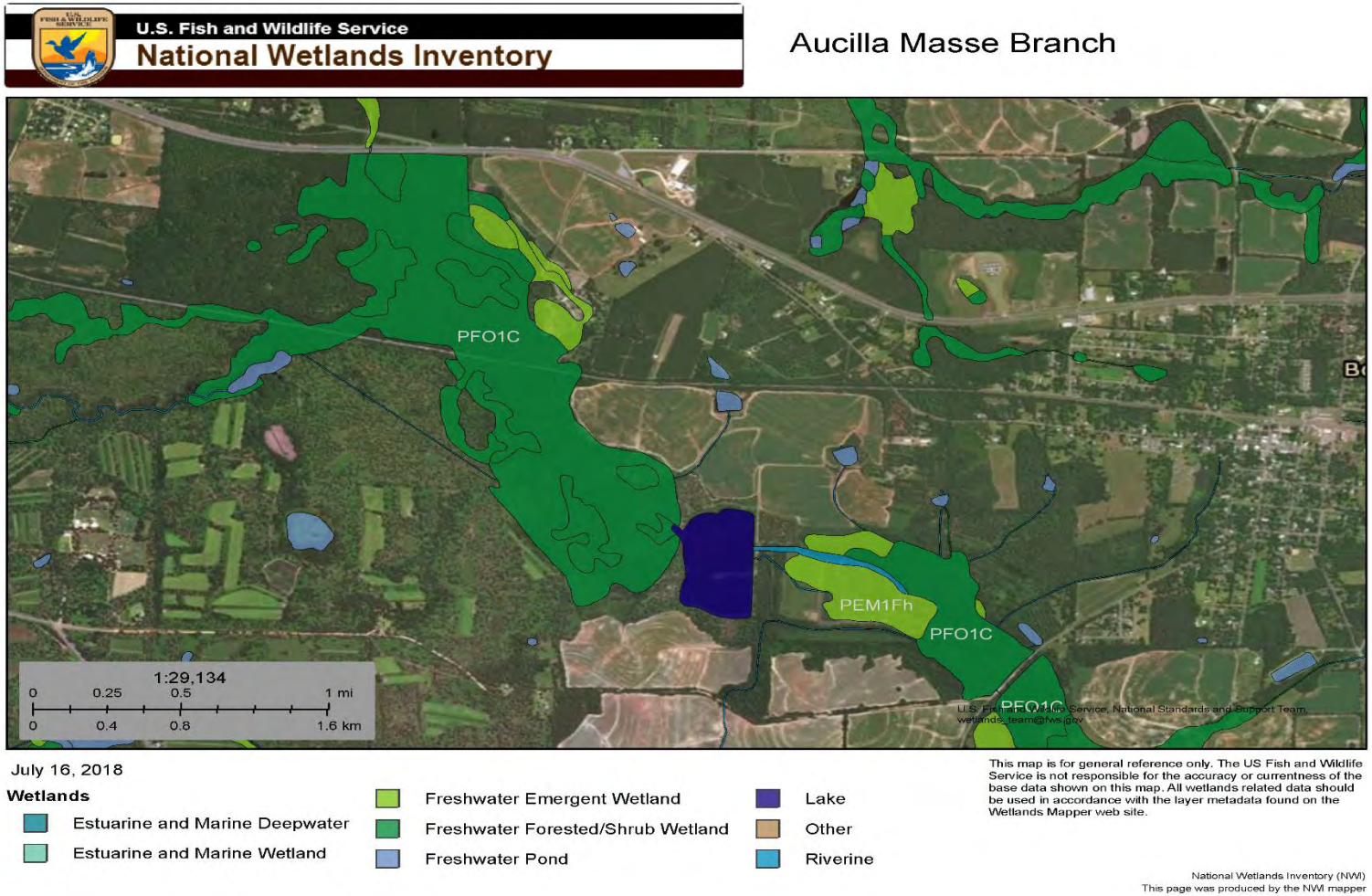
Upper Aucilla Watershed Agriculture Groundwater Permits				
County Name	*# of Groundwater Permits in Entire County*	*% of County Land Area in Watershed*	*Estimated # of Groundwater Permits in Watershed from% Land Area*	*Actual # of Groundwater Permits in Watershed*
Thomas County	122	49.00%	60	46

Upper Aucilla Watershed Agriculture Groundwater Permitted Withdrawals in Gallons per Minute (GPM)				
County Name	*Permitted Groundwater Withdrawals (GPM) in Entire County*	*% of County Land Area in Watershed*	*Estimated Permitted Groundwater Withdrawals (GPM) in Watershed from % Land Area*	*Actual Permitted Groundwater Withdrawals (GPM) in Watershed*
Thomas County	75,311	49.00%	36,902	24,938

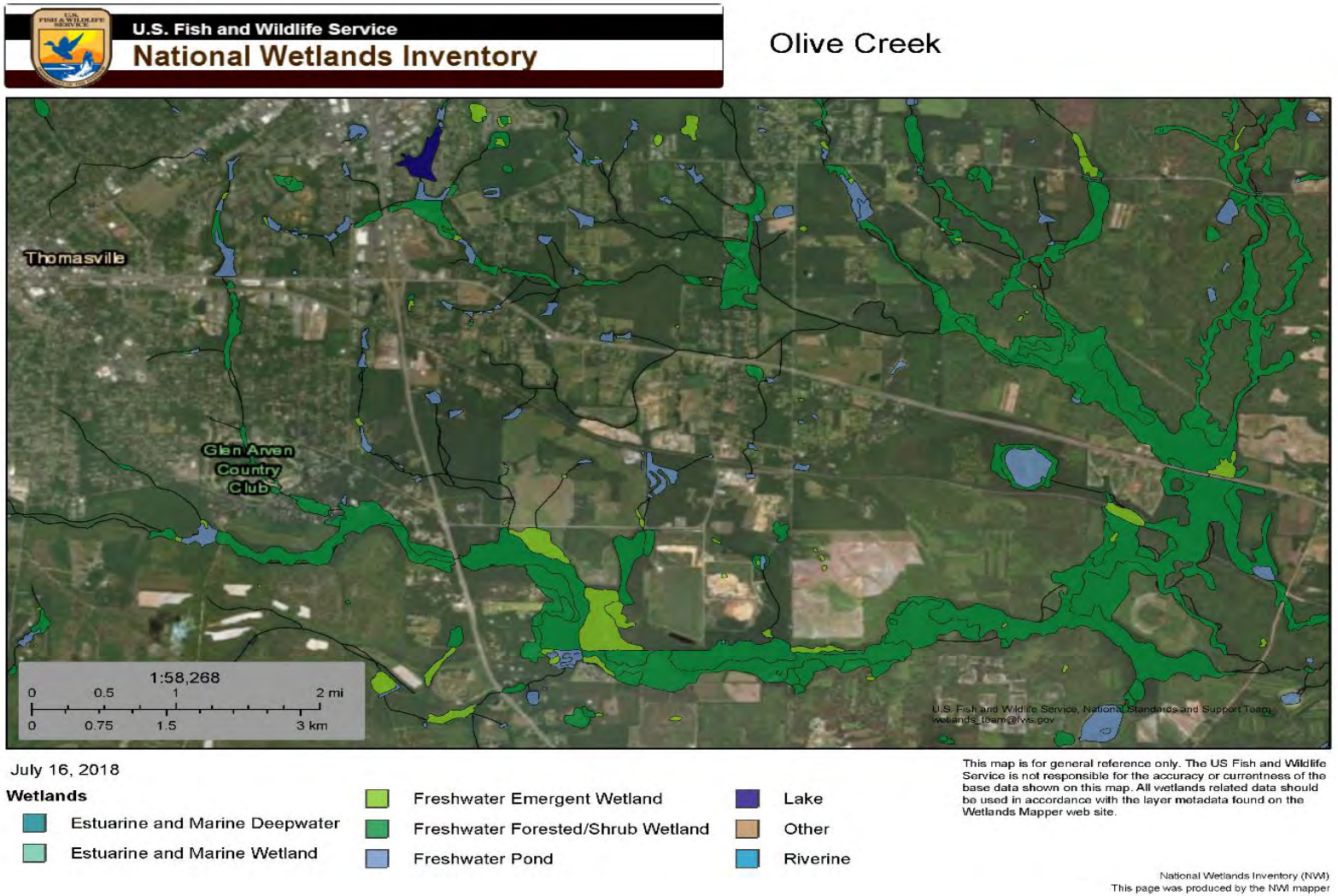
Attachment F Groundwater Map



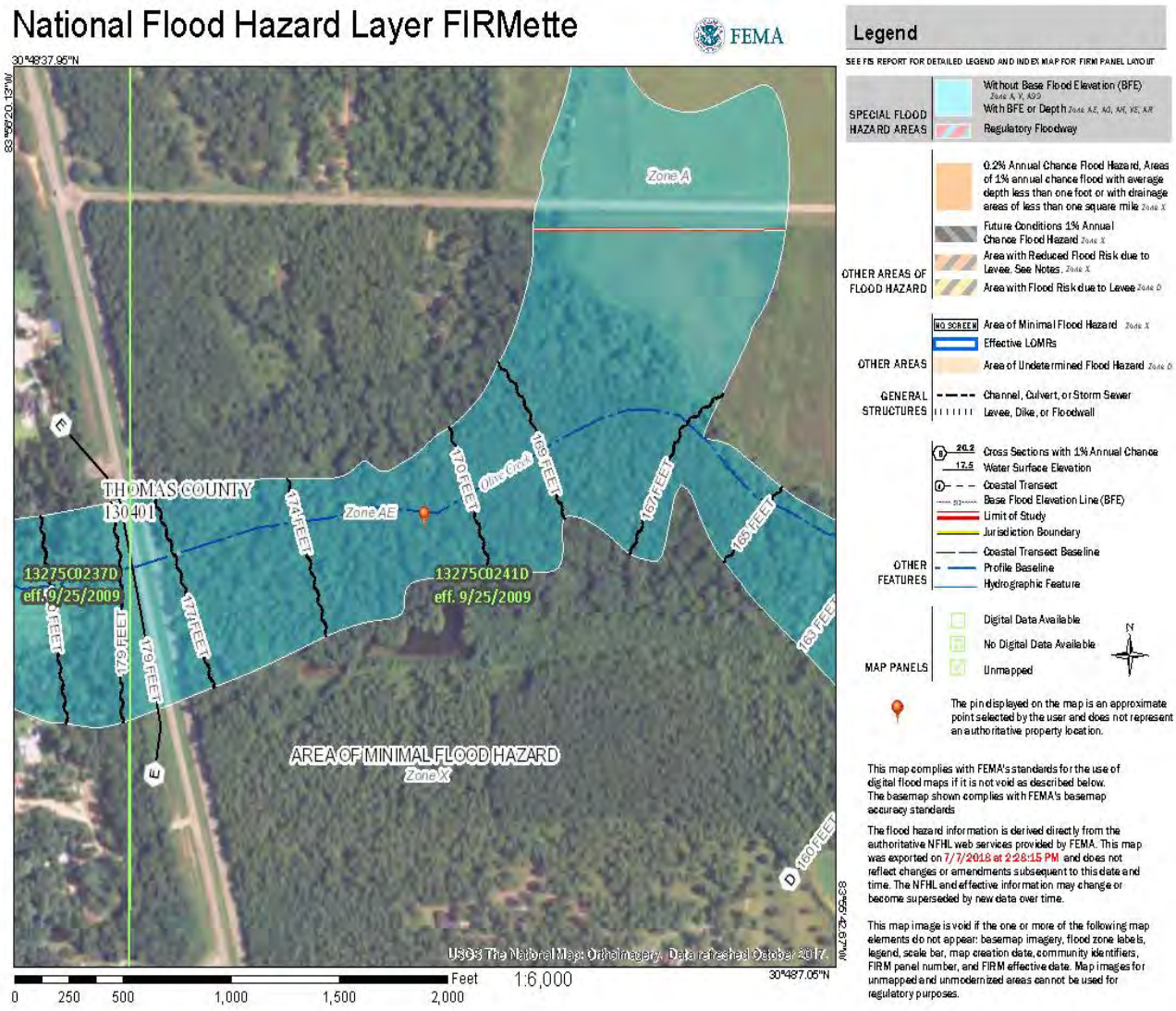
Attachment G Aucilla River Wetland Map



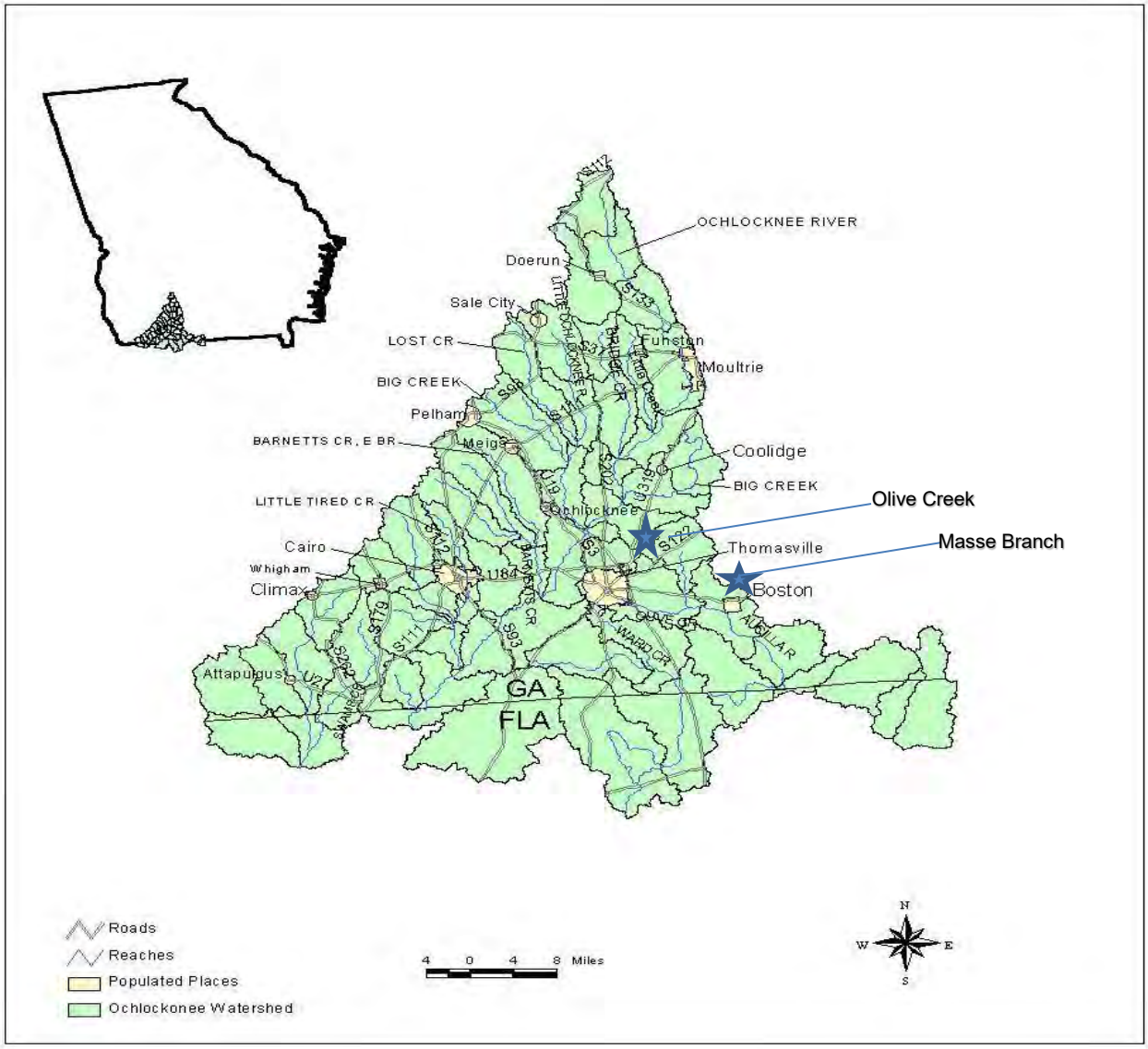
Attachment H Olive Creek Wetland Map



Attachment I FEMA Map Olive Creek



Attachment J Ochlockone DO Orginal TMDL Watershed Basin Map



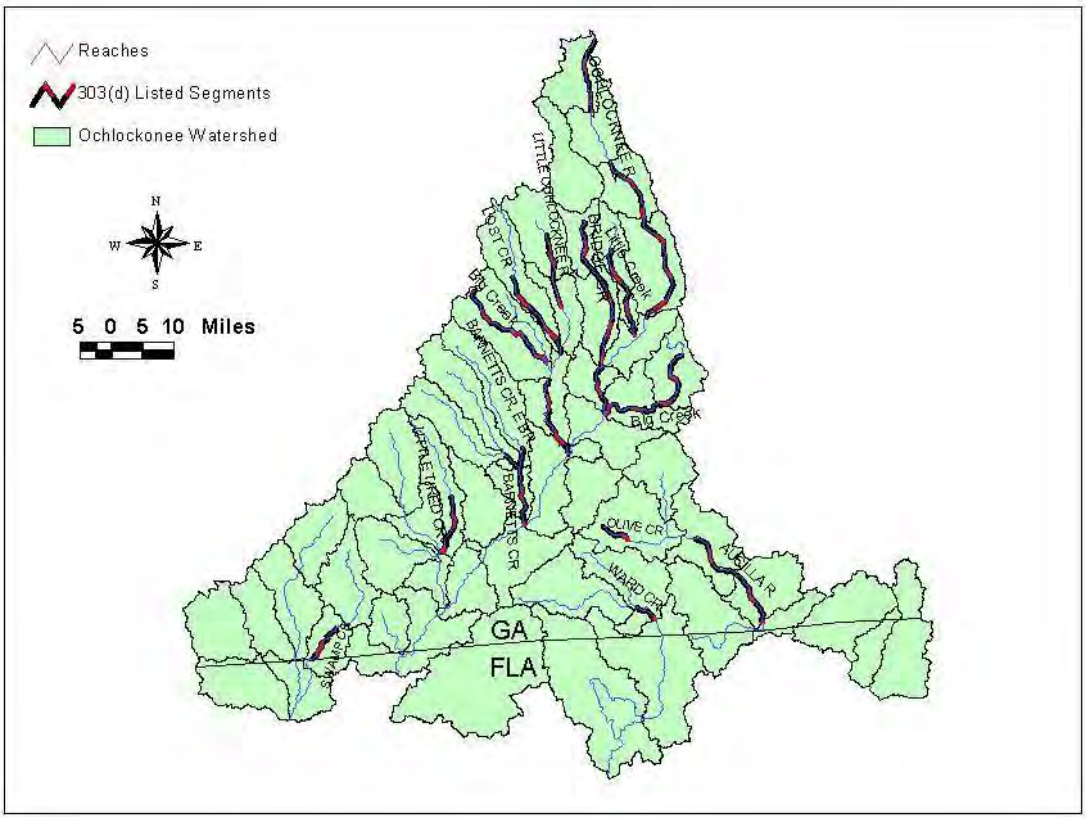


Figure 2-2. 303(d) Listed Segments for Dissolved Oxygen in the Aucilla River Basin

Table 4-1 Point Sources within Aucilla River Basin

PERMIT ID	Point Source	Receiving Water
GA0024660	Moultrie WPCP	Aucilla River
GA0033715	Boston WPCP	Aucilla Creek

			Permitted (MAX / AVG)				
NPDES	GA 12-Digit Watershed ID	Receiving Water	DO (mg/L)	BOD-5	Flow (mgd)	NH3	TSS
GA0033715	031101030103	Aucilla Creek	--	45 / 30 mg/L	0.27 / 0.21	--	120 / 90 mg/L

Note: -- Denotes situations where permitted data are not available.

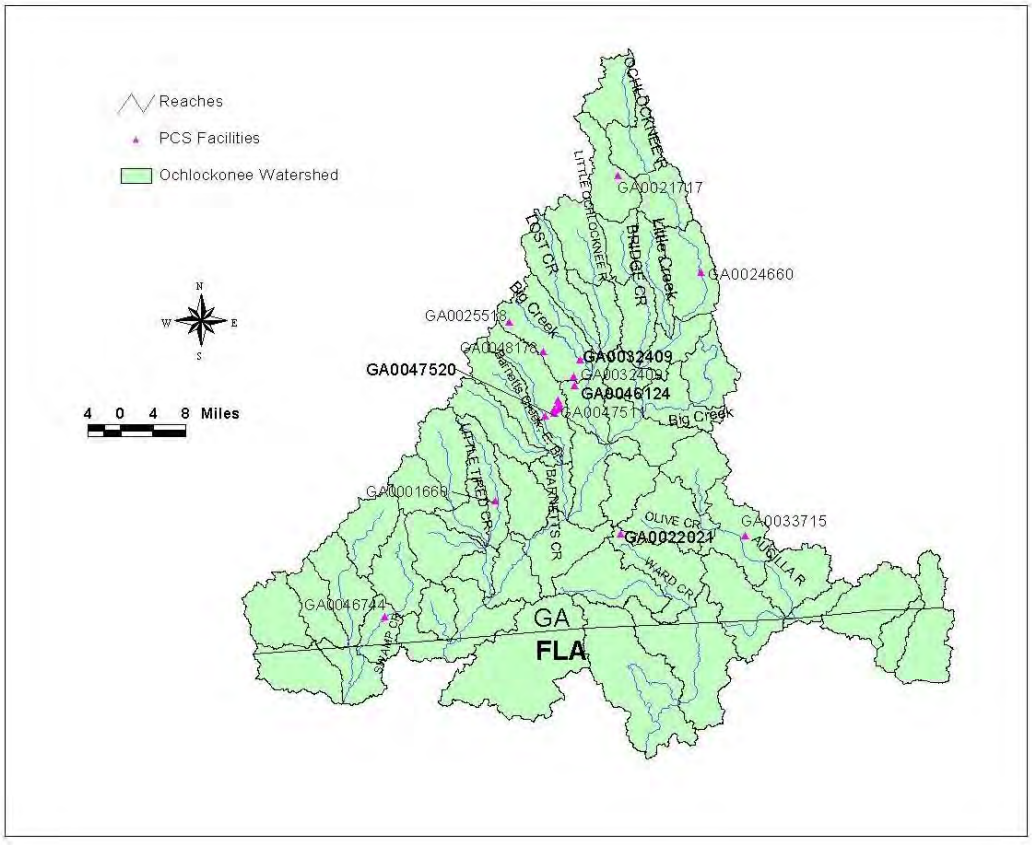


Figure 4-1. Point Sources within the Aucilla River Basin

Attachment M Ochlockone DO Orginal TMDL Segment

Ochlockonee River Basin Dissolved Oxygen TMDLs	Final

Segment Number	Name	Priority	Use Classification	Size (miles)	Location
Segment #1	Aucilla River	2	Fishing	10	Masse Branch to Brooks County line near Boston (Thomas County)
Segment #19	Olive Creek	2	Fishing	3	Headwaters to upstream U.S. Hwy. 19, Thomasville (Thomas County)

Attachment N Ochlockone DO Orginal TMDL

Ochlockonee River Basin Dissolved Oxygen TMDLs	Final

Table 2: Summary of TMDLs for Listed Segments

Listed Segments	**TMDL – TOC (lbs/yr)**	**TMDL – TN (lbs/yr)**	**TMDL – TP (lbs/yr)**
Aucilla River - Segment #1	12,763,374	612,245	67,419
Olive Creek - Segment #19	2,216,476	142,903	9,447

5

Attachment O Ochlockone DO Orginal TMDL Sub-watershed Contributing

Ochlockonee River Basin Dissolved Oxygen TMDLs	Final

Sub-watersheds Contributing to Impaired Waterbodies

Name	Contributing Sub-watersheds (GA 12-Digit)	Corresponding Watershed Model IDs
Aucilla River Segment #1	031101030101, 031101030102(a), 031101030102(b),	186, 1871, 1872, 1873, 188, 189
Olive Creek Segment #19	031101030102(b)	1872

Attachment P Ochlockone DO Orginal TMDL Reduction Requirements by Creek

Ochlockonee River Basin Dissolved Oxygen TMDLs **Final**

Table D-1

Aucilla River - Segment #1				TMDL = WLA + LA					
				TOC(lb/yr)	TN(lb/yr)	TP(lb/yr)			
				12,763,374	612,245	67,419			
Nonpoint Sources (LA)	TOC(lb/yr)	TN(lb/yr)	TP(lb/yr)	TOC(lb/yr)	TN(lb/yr)	TP(lb/yr)	TOC(lb/yr)	TN(lb/yr)	TP(lb/yr)
Contributing Subwatersheds	Existing Loads			Allocation Loads (LA)			% Reduction		
031101030101	4,357,954	181,430	23,531	2,801,623	116,637	15,128	35.71	35.71	35.71
031101030102(a)	373,475	10,087	920	281,206	7,595	693	24.71	24.71	24.71
031101030102(b)	3,413,310	220,066	14,547	2,216,476	142,903	9,447	35.06	35.06	35.06
031101030102(c)	2,741,844	128,731	11,921	1,763,503	82,798	7,667	35.68	35.68	35.68
031101030103	5,087,765	239,341	28,548	2,971,762	139,799	16,675	41.59	41.59	41.59
031101030104	4,422,682	210,571	25,038	2,573,190	122,513	14,567	41.82	41.82	41.82
Total	20,397,032	990,227	104,506	12,607,759	612,245	64,177	38	38	39
Point Sources (WLA)	Existing Loads			Allocation Loads (WLA)			% Reduction		
Boston WPCP (GA0033715)	155,614	0	3,242	155,614	0	3,242	0.00	0.00	0.00
Total	155,614	0	3,242	155,614	0	3,242	0.00	0.00	0.00

Table D-19

Olive Creek - Segment #19				TMDL = WLA + LA					
				TOC(lb/yr)	TN(lb/yr)	TP(lb/yr)			
				2,216,476	142,903	9,447			
Nonpoint Sources (LA)	TOC(lb/yr)	TN(lb/yr)	TP(lb/yr)	TOC(lb/yr)	TN(lb/yr)	TP(lb/yr)	TOC(lb/yr)	TN(lb/yr)	TP(lb/yr)
Contributing Subwatersheds	Existing Loads			Allocation Loads (LA)			% Reduction		
031101030102(b)	3,413,310	220,066	14,547	2,216,476	142,903	9,447	35.06	35.06	35.06
Total	3,413,310	220,066	14,547	2,216,476	142,903	9,447	35	35	35

References

USFWS 2015 Threatened and Endangered Species Mitchell, Colquitt and Thomas Counties

Georgia Department of Natural Resources Rare Species Mitchell, Colquitt, and Thomas Counties

USDA 2013 Farmers Bureau Crop Report

USDA/NRC Soil Report Mitchell, Colquitt and Thomas Counties

2001 DNR Georgia Ecoregion Descriptions

GEPD Watershed Protection Plan Development Guidebook

National Oceanic and Atmospheric Administration (NOAA) Climate Data

USGS

Thomas University, Georgia

Federal Emergency Management Agency (FEMA)