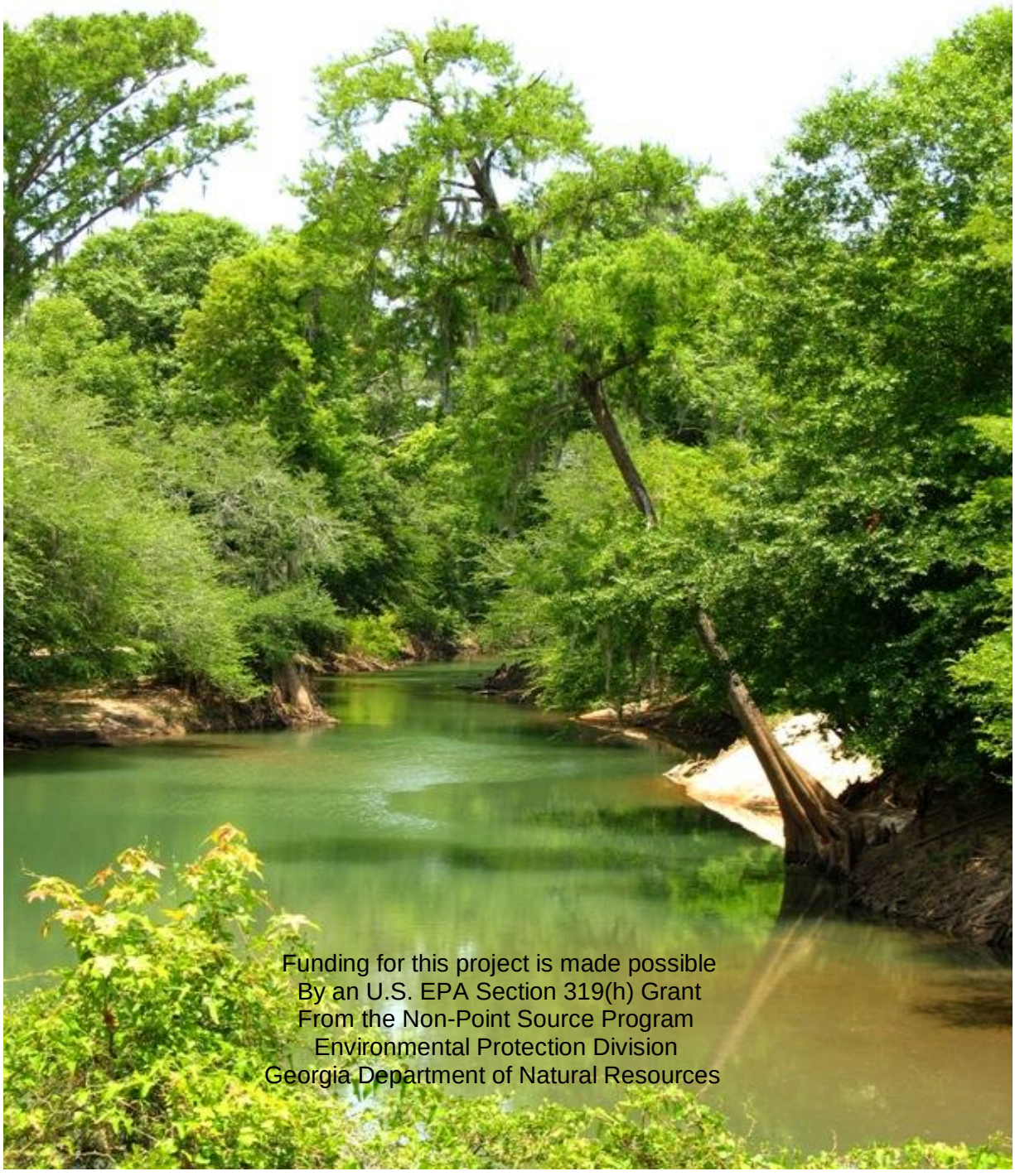
Little Ochlockonee Creek Watershed Management Plan



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Environmental Protection Division
Georgia Department of Natural Resources

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ACRONYM GLOSSARY

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

AAS- Georgia Adopt-A-Stream

LOCWP-Little Ochlockonee Creek 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 - 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

Little Ochlockonee River Watershed Management Plan

Executive Summary

Through a competitive application process, the Georgia Environmental Protection Division (GAEPD) executed a FY2013 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 Little Ochlockonee River Watershed and once approved by GAEPD implement to the extent possible the recommendations that were derived. 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.

The FY2013 Contract also has provisions for Golden Triangle RC&D Council to implement the management measures derived from stakeholder and community concerns, results of target water quality monitoring, and more current land use data. To update data shown in the 2002 TMDL Implementation Plan, Golden Triangle RC&D worked with partners and stakeholders whereby water quality monitoring data was collected and historic land use data was gathered to aid in identification of stressors. Water quality data was collected August 2014 through August 2015 from the three (3) stream segments listed on Georgia's 305(b)/303(d) list. These streams are Big Creek, Little Ochlockonee River, and Lost Creek and are listed for fecal coliform and low dissolved oxygen impairments.

The consensus of Golden Triangle RC&D and the Watershed Partnership is that the recommendations presented in the 2002 TMDL Implementation Plan are still valid based on the current data that was collected, which include:

- Critical Area Planting
- Grassed Waterways
- Riparian Buffers
- Better Back Road Installations
- Animal Feeding Operations Poultry Houses (AFOs) {excludes Concentrated Animal Feeding Operations}

Installation of the BMPs listed above should lead to at least a 20% or greater reduction of nutrient loading as described in the Scope of Services for this project. 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 solve the problems.

Golden Triangle RC&D established the Little Ochlockonee Creek Watershed Partnership, which includes: Mitchell County Government, City of Camilla, GA Stripling Irrigation and Research Center, Georgia Forestry Commission, U.S. Fish and Wildlife Service, Department of Natural Resources, Natural Resource Conservation Service, Thomas University, Ochlockonee River Water Trail, Bird Song Nature Center, Keep Counties Beautiful-Grady and Thomas, and the Water Policy and Planning Center Technical Support. Additional stakeholders participated through public community meetings held in Mitchell, Colquitt, and Thomas 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, to local businesses, public libraries, and was put on Golden Triangle's website. A total of 155 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 Little Ochlockonee River Watershed. The following are responses the public sees as concerns and/or potential stressors:

- Poultry Houses
- Agriculture and wildlife run-off
- Insufficient/Degraded agricultural buffers with the potential of sediment reaching the waterway
- Flow Obstruction – Habitat Alteration
- Trash
- Lack of Education

Of these responses, the top three concerns and/or issues are Flow Obstructions, Pollution/Run-off, and Trash. 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 Little Ochlockonee Creek 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 Little Ochlockonee 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 Little Ochlockonee Creek 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 Little Ochlockonee Creek Watershed Partnership.

2.0 Partnership/Stakeholder Committee

The Little Ochlockonee Watershed Partnership was formed in January 2015 as a result of Golden Triangle RC&D holding three public community listening sessions in Mitchell, Colquitt and Thomas counties from August 2014 to September 2014. The purpose of these meetings were to bring together local landowners, farmers, local government officials, and the general public to discuss issues of concerns pertaining to the Little Ochlockonee River Watershed. During these meetings 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 could providing technical and financial assistance or knowledge of existing programs that could be used along with the Best Management Practices
- 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

Stakeholders, community partners, local landowners, and other organization contributions within the listening session include the following:

Table 2.0

Organization	Name	Participation
Mitchell County Administrator	Clark Harrell	Stakeholder, Watershed Partner, and Community Partner
Stripling Irrigation and Research Center, Camilla , GA	Ivey Griner Calvin Perry	Stakeholder, Watershed Partner, and Community Partner, and Technical Assistance
Georgia Forestry Commission	Bert Early	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
Natural Resource Conservation Service	Jessica McGuire Brad Alexander	Watershed Partner, Technical Assistance
Thomas University	Dr. Christine Ambrose	Watershed Partnership, Technical Assistance, Community Outreach
Ochlockonee River Water Trail	Margaret Tyson Vickie Redden	Stakeholder, Watershed Partnership, Community Outreach
County Extension Office	Jennifer Grogan Thomas Sawyer	Watershed Partnership, Community Outreach
Bird Song Nature Center	Kathleen Brady	Stakeholder, Watershed Partnership, Community Outreach
Keep Counties Beautiful-Grady and Thomas	Celeste Tyler Ellen Bosman	Watershed Partnership, Community Outreach
Water Policy and Planning Center	Marty McKimmey	Technical Assistance

Community Input Survey

A community survey was created and distributed at the public meetings, local businesses, public libraries, and on the Golden Triangle website. A total of 155 people responded to the survey, who either live, work, or both within the Watershed area. The survey asked- What is the biggest problem facing the Little Ochlocknee River Watershed? There were multiple choice options, along with a fill in the blank section. The top three responses were Flow Obstructions, Pollution/Run-off and Trash (Figure 1).

The results of the Community Survey were shared with the partnership/stakeholders, along with the visual survey and report that was completed in the summer/fall of 2014. 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 Ochlockonee.

- Pollution from CAFO and AFO operations (Poultry Houses)
- Pollution from agriculture, livestock and wildlife run-off
- Insufficient /Degraded agricultural buffers with the potential of sedimentation reaching the waterway
- Flow Obstruction-Habitat Alteration
- Trash
- Lack of Education

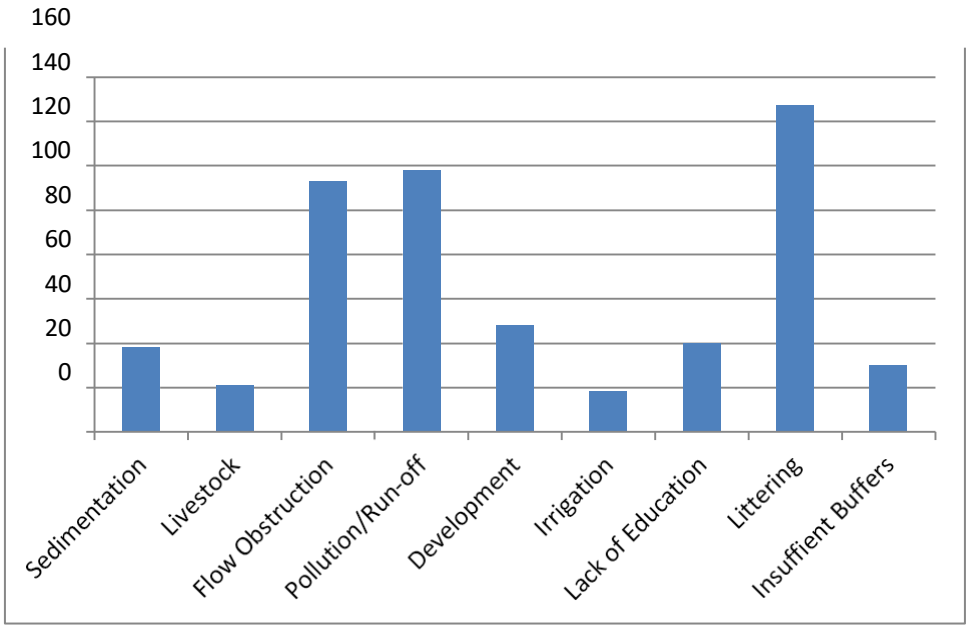


Figure 1

Project Area Assessment
3.0 Physical Features

Geographic Location

The Little Ochlockonee River Watershed (HUC (10) 0313000204) lies within the Ochlockonee River Basin in the lower southwestern region of Georgia. Map 1. The basin occupies an area of 2,416 square miles between Georgia and Florida, eventually draining into the Gulf of Mexico. Approximately 1,336 square miles are contained within the state of Georgia. The Little Ochlockonee Creek Watershed is approximately 925 square miles or 38% of the entire basin, and is located within the Southeastern Plain/Dougherty Plain ecoregion and covers five counties in southwest Georgia; Colquitt, Grady, Mitchell, Thomas and Worth. Although the watershed lies within five counties only three streams, Big Creek, Lost Creek, and Little Ochlockonee River are on the GAEPD 305(b)/303d list for non-supporting waters, which are located in Colquitt, Mitchell, and Thomas counties.

The impaired waters on GAEPD 305(b)/303(d) list encompasses Big Creek (12 miles, Headwaters to Little Creek near Meigs in Mitchell and Thomas county), Lost Creek (9 miles, Upstream of Ga. Hwy. 93 N.E. of Cotton to Little Ochlockonee River), and Little Ochlockonee River (9 miles, Slocumb Branch to downstream SR 111 near Moultrie). The impaired streams (Figure 2) are classified as not supporting their primary function of fishing due to criterion violations of Fecal Coliform bacteria and low Dissolved Oxygen. The potential causes and sources of nonpoint source pollutants are shown in Figure 2 with the impairment relative to the potential cause, which were derived from the 2002 TMDL Implementation Plan, recent water quality monitoring data, visual surveys, and stakeholder input.

Potential Causes Figure 2

Identified Impairment	Potential Source/Causes
Nutrient Loading	Agriculture Row Crop Run-off CAFO run-off (Poultry Houses) Fecal Matter from Wildlife
Low Dissolved Oxygen	Agriculture Row Crop Run-off Low Flow/High Temperatures Drought
Sediment	Non-vegetative banks/Agricultural run-off
Habitat Alteration	Trash and Debris from Illegal Dumping

Topography

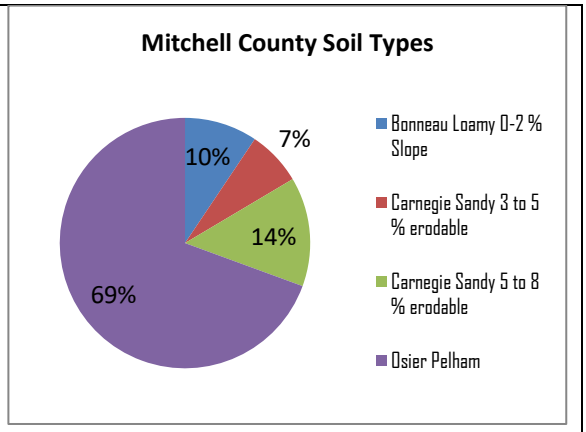
The Ochlockonee River Basin lies within the Coastal Plains region and due to the lack of riffles and shoals that dominate the Piedmont regions, create significant floodplain forest systems. This is due to the long expanse of contiguous habitat and the volume of water in the region. The river flows 162 miles from the headwaters in Worth County Georgia into Florida emptying into the Gulf of Mexico. The upper portions of the watershed are described as primarily sedimentary Blackwater streams carrying tannins and acids from the decaying plant materials. Many of the tributary streams that feed into the river are considered alluvial with sandy bottoms. (Ambrose and Coops 2007) They are predominantly composed of sands, clays, and gravels. The majority of the land surrounding the upper Ochlocknee River is primarily croplands while the lower portions are forested.

Soil Types

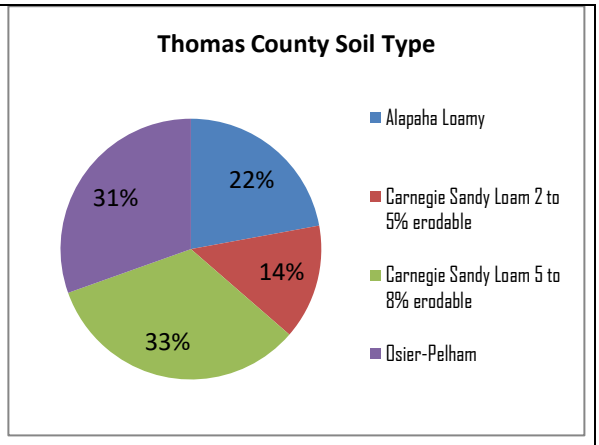
The watershed lies within the Southeastern Plain/Dougherty Plain ecoregion, which is dominated by ultisols (sandy/ loamy surface layers and clayey subsoils) this makes the soil very erosive. The soil types associated within the Little Ochlockonee River are characterized by nearly level to gently sloping, 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:

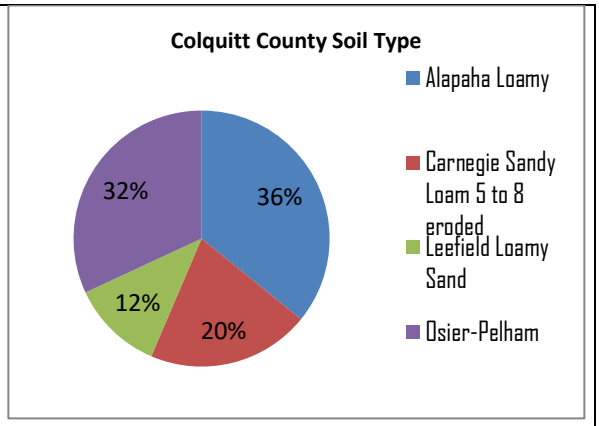
Mitchell and Thomas County Big Creek Soil Associations

Mitchell County Soil Associations	
Olser-Pelham: Main soil makeup- Poorly drained soils that are sandy throughout; have a sandy surface layer; a thick sandy subsurface layer; and a loamy subsoil	

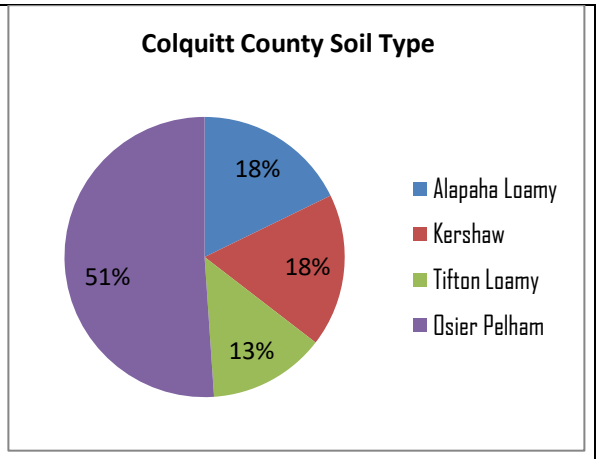
Mitchell and Thomas County Big Creek Soil Associations (cont.)

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 loamy subsoil	

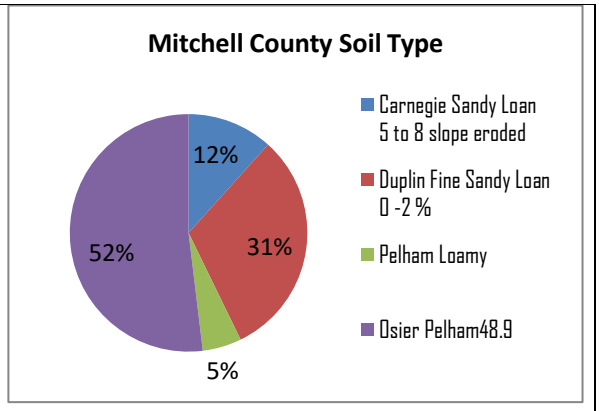
Colquitt County Little Ochlockonee Creek Soil Associations

Colquitt County Soil Associations	
Alapaha Soil and Osier-Pelham: Alapaha Soil : very deep, poorly drained, moderately slow to slowly permeable soils in small drainage ways, flats, seepage areas, and depressions Osier-Pelham: Poorly drained soils that are sandy throughout; have a sandy surface layer; a thick sandy subsurface layer; and a loamy subsoil	

Mitchell and Colquitt County Lost Creek Soil Associations

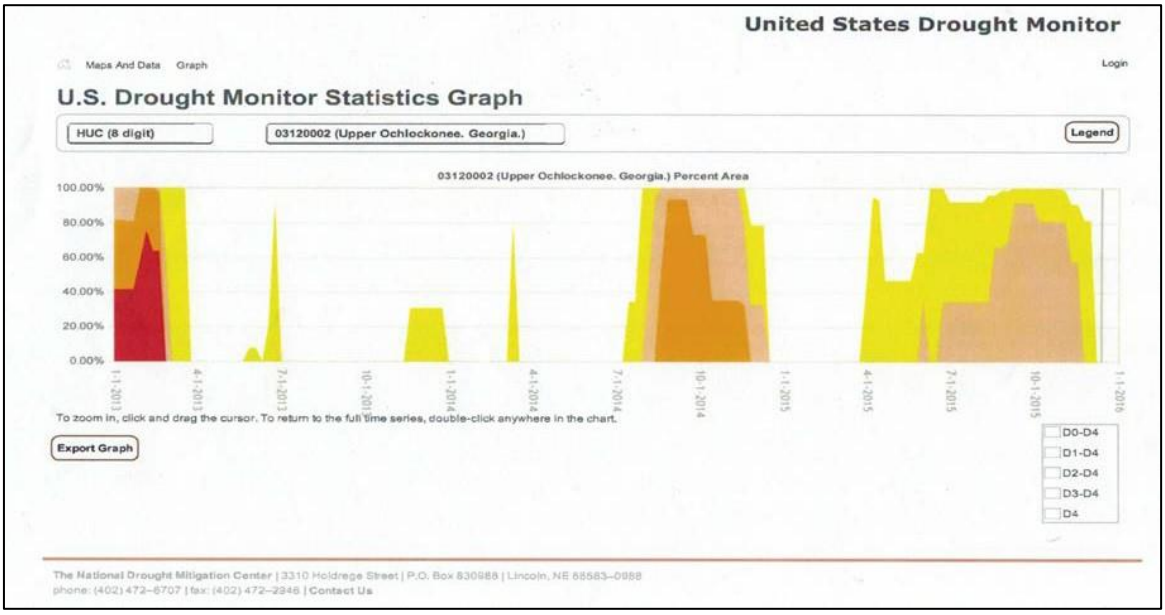
Colquitt County Soil Associations	
Olser-Pelham: Main soil makeup- Poorly drained soils that are sandy throughout; have a sandy surface layer; a thick sandy subsurface layer; and a loamy subsoil	

Mitchell and Colquitt County Lost Creek Soil Associations (cont)

Mitchell County Soil Associations	
Olser-Pelham: Main soil makeup- Poorly drained soils that are sandy throughout; have a sandy surface layer; a thick sandy subsurface layer; and a loamy subsoil	

Climate

Data from the National Oceanic and Atmospheric Administration (NOAA) shows that rainfall in Southwest Georgia from January 2013 to December 2014 increased from the previous 2012 drought year. Average rainfall amounts for 2013 was 57.59 inches, 2014 had an even higher increase to 61.46 inches, while 2015 shows a marked decrease to only 46.00 total inches for the year. The average overall temperature for the same time period January of 2013 to December of 2015 was 77.16 for all three (3) counties. The highest temperatures reflected in August at 98 degrees, while the largest rainfall amounts occur in December with an average of 3 to 5 inches. (See Appendix E for NOAA temperature and rainfall data, Table 5.1.4 NOAA Drought Monitor.)



Habitat

The Ochlockonee 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, 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 (E) Plants and Animals in the Little Ochlockonee River Watershed (Mitchell, Colquitt and Thomas Counties)				
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
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 Ochlockonee River are supplied by the Floridian aquifer system. The 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 and Colquitt Counties lie within the "Average" susceptibility zones.

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

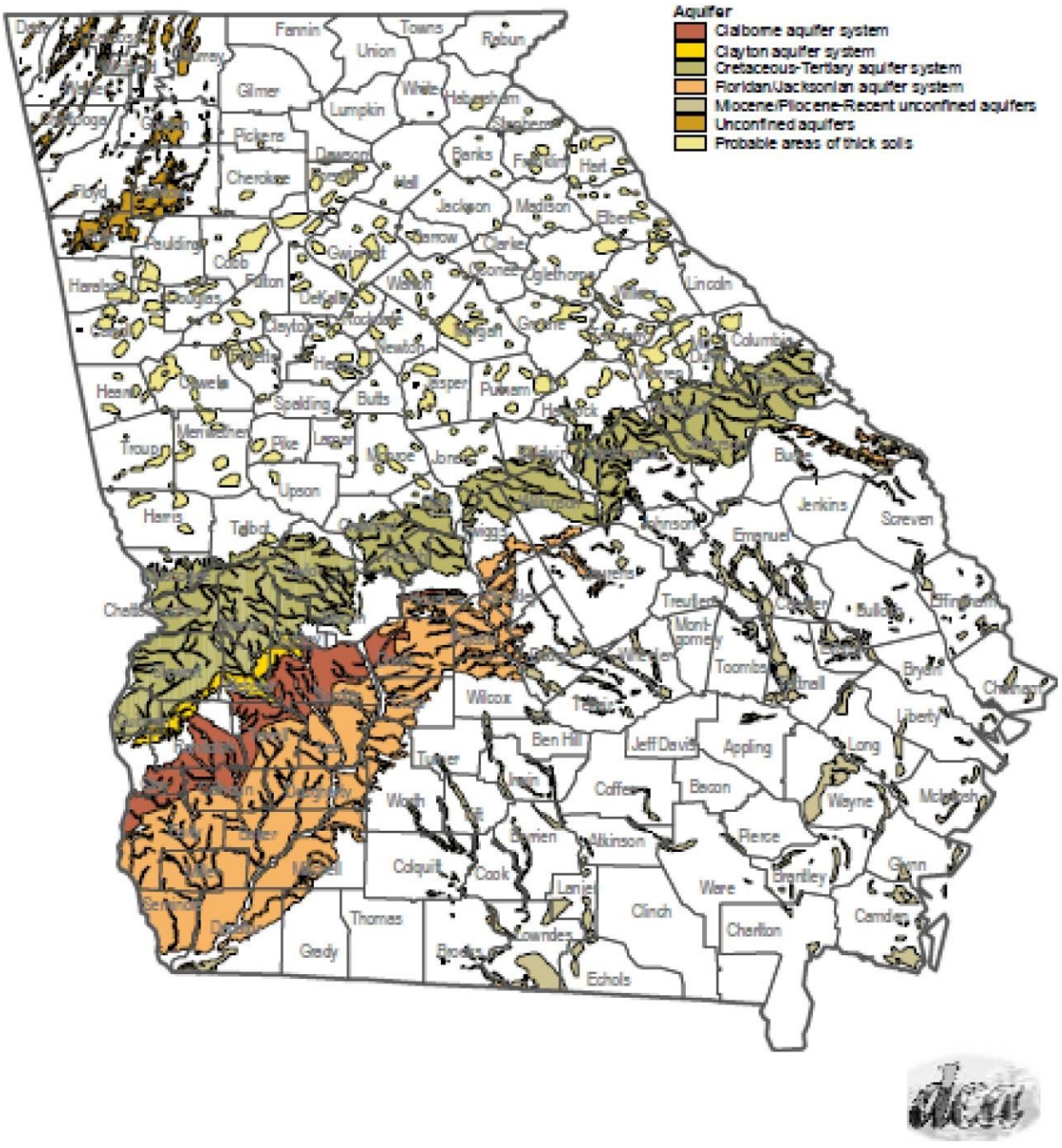
Flood Plains

The Little Ochlockonee 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 portions of Lost Creek within Meigs will overflow the banks and cover a dirt road. This issue will be addressed by Better Back Roads BMP's. See Attachment L Big Creek, Attachment M Little Ochlockonee and Lost Creek for FEMA Flood Plain Map.

Wetlands

The Little Ochlockonee River basin does contain wetland areas within the three (3) effected creeks. Big Creek was mapped having 475 acres as freshwater/forested shrub wetlands. Lost Creek was mapped having 549 acres as freshwater/forested shrub and Little Ochlockonee Creek was mapped having 409 acres as freshwater/forested shrub and wetland. See Attachment I Lost Creek, Attachment J for Big Creek, and Attachment K for Little Ochlockonee Creek USFWS 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 Cover Classification	Mitchell County Acreage	Colquitt County Acreage	Thomas County Acreage
Open Water	2,065	4,865	2,859
Low Intensity Residential	4,005	5,003	4,791
High Intensity Residential	180	588	595
Commercial/Ind/Trans	42,974	40,068	46,102
Barren Rock/Sand/Clay	190	185	145
Quarries/Mines and Transitional	0	0	365
Forest	93,598	82,199	134,820
Row Crops	120,179	115,390	73,659
Pasture/Hay	25,597	32,262	1,368
Urban/Recreational Grass	20,608	24,248	27,895
Woody Wetlands	22,409	32,069	52,719
Emergent Herbaceous Wetlands	612	247	1,104

Source USGS GAP Land Cover 2013

LAND USE

The larger Ochlokonee River Basin which includes the Little Ochlockonee River has a combined acreage totaling over 365,000 acres which has been subjected to varying degrees of forest-cover alteration. This forest-cover alteration within Little Ochlockonee River is due to agricultural production which makes up 40% of the land use. The high percentage of agriculture use within the watershed is one of the major contributing factors of non-point source pollutants. Due to the high percentage of agricultural lands that require pesticide and fertilizer Table shows the treated land areas. 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 and CAFO Poultry House run-off within the creeks was identified by the Watershed Partnership as one of the concerns of Non-Point Source pollutants entering the watershed. This information will be used to assist with the appropriate BMP recommendations, pollutant load reductions, and ensure measureable progress is being made. (Table 4.2 shows the 3 major agriculture crops within the watershed complied from the 2013/2014 Georgia Farm Gate Report by County and Crop) Table 4.3 shows the treated acres and Table 4.4 shows the number of livestock farms)

Table 4.2 Agriculture Production

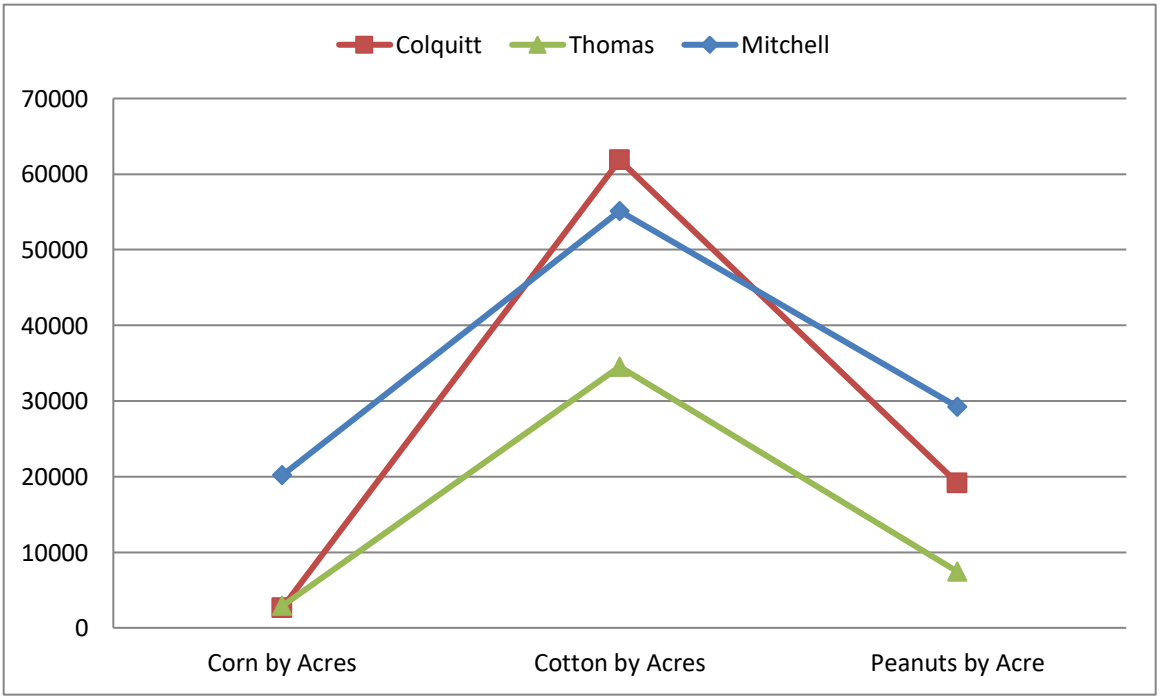


Table 4.3 USDA 2012 Agricultural Census by Watershed

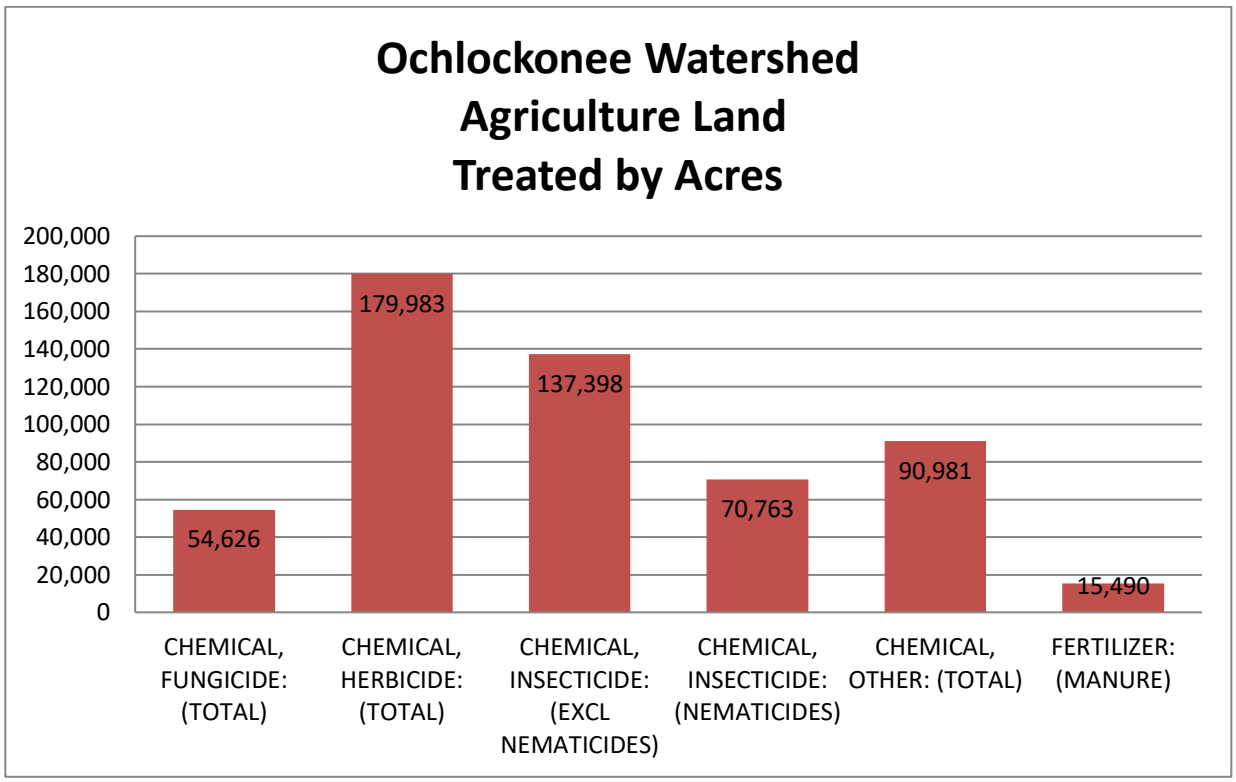


Table 4.4 Live Stock Farms

	Mitchell	Colquitt	Thomas
Poultry # of Houses	426	888	17
Poultry # of Birds	60,000	84,500	43,005
Beef Cattle # by Head	19,000	14,750	11,000
Dairy Cattle # by Head	4,236	500	650
Quail # by Head	10,000	200,000	75,000
Horses # by Head	845	950	1,200
Swine # by Head	0	2,260	135

USDA 2014 CENSUS OF AGRICULTURE - COUNTY DATA

River Uses

- Municipal and Industrial Uses
  - NPDES Discharges: As of 2008, there were approximately 19 facilities, including industries and municipalities, authorized to discharge wastewater into the Ochlockonee River Basin pursuant to NPDES permits.
- Agricultural Uses
  - As of 2013, the EPD had issued 1,213 agricultural water withdrawal permits in the Ochlockonee River Basin.
- Impoundments
  - In 2014, Grady County began construction of a dam on Tired Creek to create a fishing lake.

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 2014 US Census Bureau data shows a steady increase in overall population for Colquitt and Thomas counties and a decrease in Mitchell County. (Attachment E)

5.0 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^{o} F 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.	No effective standard in GA	Water body specific
Total Nitrogen	Macronutrient affects aquatic productivity and trophic state.	4.0 mg/l	GA water quality standards

Source Assessment

The Ochlockonee River watershed drains an area of 2,416 square miles of which 1,336 square miles or roughly 55% are located within the State of Georgia. 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
Big Creek Segment #2 (Headwaters to Little Creek near Meigs)	Mitchell and Thomas	FC	4a

Little Ochlockonee Creek Segment #7 (Slocumb Branch to downstream SR 111 near Moultrie)	Mitchell and Colquitt	FC,DO	4a
Lost Creek Segment #9 Upstream of Ga. Hwy. 93 N.E. of Cotton to Little Ochlockonee River	Mitchell and Colquitt	FC,DO	4a

The Original TMDL Implementation Plan for Little Ochlockonee Creek 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 farming and livestock operations, leaking septic systems and naturally occurring low flow. 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 Big Creek, Little Ochlockonee, and Lost Creek:

- If additional monitoring shows Fecal Coliform limits are being exceeded and agricultural uses are determined to be a contributor, implement appropriate Agricultural, Forestry BMPs.
- Implement measures to ensure the buffer currently in place along the creek is not significantly disturbed. Agricultural/Forestry BMPs should be followed.

Potential actions that could reduce the Fecal Coliform and Dissolved Oxygen Load in all three streams:

- Ensure Antidumping ordinances are in place
- Implementation of Erosion and Sedimentation Control Plans for land disturbing activities
- Identification of any malfunctioning Septic Systems
- Adoption of proper unpaved road maintenance practices
- Reduction of trash and dead animals on bridges and in creeks
- Extreme low flow due to High Temperatures

More recent data was collected on the three streams from July 2014 through August 2015.

Water sampling/monitoring, and visual surveys assessments were completed during this period.

A visual field survey was conducted July of 2014 to aid in the identification of the possible sources of Point/Non- Point Source pollution and to select water quality monitoring locations within the effected creeks.

The results of this survey showed the following:

Agricultural

Big Creek/Little Ochlockonee Creek/Lost Creek

- Large tracks of agricultural operations producing peanuts and cotton with limited/ and or degraded buffers and grassed waterway BMPs. Rill erosion in fields.

Livestock Operations

Big Creek/Lost Creek

- Poultry houses without sufficient buffer zones, no grass cover from houses, bare soil. This has allowed erosion sediment issues to run into both creeks.

Little Ochlockonee Creek

- Limited Livestock operations involving cattle. Some of the exclusion fencing is degraded which is allowing the livestock to have direct access to the creek.

Wildlife

Big Creek/Little Ochlockonee Creek/Lost Creek

- Large tracks of forested lands are along each creek. Abundant wildlife and migratory bird populations are evident.

Illegal Dumping

Big Creek/Little Ochlocknee Creek/Lost Creek

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

Dirt Roads

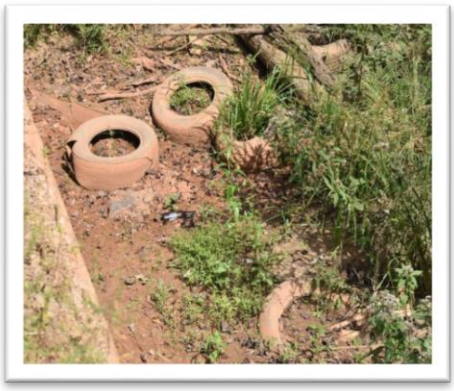
Big Creek/Lost Creek

- Sedimentation from run off of dirt roads within Big Creek and Lost Creek has been witnessed

Big Creek

Little Ochlockonee

Lost Creek



From the discussion with the Stakeholders and the visual surveys completed, the consensus is that there are ineffective/degraded riparian buffers, inadequate buffer sizes, illegal dumping, and sediment run-off from dirt roads contributing to the issues within the creeks.

Water Quality Monitoring

Water sampling/monitoring, and visual surveys assessments were completed from July 2014 to August 2015.

Attachment Q

6.0 Recommended Best Management Practices/Strategies

The consensus of Golden Triangle RC&D and the Watershed Partnership 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 Little Ochlocknee River 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 Little Ochlockonee 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 focuses on environmental, programmatic and social indicators in recommending the appropriate Best Management Practices for Big Creek (Headwaters to Little Creek near Meigs Mitchell and Thomas county), Lost Creek (Upstream of Ga. Hwy. 93 N.E. of Cotton to Little Ochlockonee River), and Little Ochlockonee River (Slocumb Branch to downstream SR 111 near Moultrie) addressing Fecal Coliform, Dissolved Oxygen, and Sedimentation.

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)

- Heavy use areas- Address Fecal Coliform/Dissolved Oxygen

  Proper installed heavy use areas can protect water quality by reducing sediment, nutrients, and runoff. BMPs for heavy use areas will include locations of water troughs, feeding areas and livestock concentration areas.

- 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.

6.1 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.

- Nutrient Management-Address Dissolved Oxygen/Fecal Coliform

  Reduces nutrient and pollutant loading to the surface water and improves and maintains soil conditions.

- 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

The Region 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. Mitchell County has an “R” value of 358, Colquitt has an “R” value of 350, and Thomas has an “R” value of 400. An “R” value of 369 will be used during the load reduction calculations to represent an average “R” value.

- 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 0.20 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 0.90 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

Site/Pollutant	Current Load	Projected Reduction
Big Creek Segment #2 FC		150 cfu/100 ml
Little Ochlockonee Segment #7 FC		150 cfu/100 ml
Lost Creek Segment #9 FC		150 cfu/100 ml
Little Ochlockonee Segment #7 DO		
Lost Creek Segment #9 DO		

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	Heavy Use Area	8 @ .25 acres per	N/A	9,251	N/A
Fecal Coliform/ Sediment	Grassed Waterways	25 acres @ 5 acres per	107	158	297
Fecal Coliform/ Sediment	Filter Strips	5 @ 1 acre per	661	1025	1931
Fecal Coliform/ Sediment	Filter Borders	5 @ 1 acre per	661	1025	1931
Fecal Coliform/ Sediment	Riparian Buffers	25 acres @ 5 acre per	661	1025	1931
Fecal Coliform/ Sediment	Better Back Roads	3 sites	661	1025	1931

Table 6.3.2 Estimated Cost

BMP Type	Critical Number	Estimated Costs
Heavy Use	8 sites	Avg. 0.25 acres each @ $900 $7200 total
Filter Strips	5 acres	$292.00 per acre=$1,460
Field Borders	5 acres	$340.00per acre=$1,700
Grassed Waterway	25 acres	$1130 per acre = $28,250
Riparian Buffers	25 acres	$946 per acre = $23,650
Better Back Roads	3 sites	$150,000

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. Willing landowners were identified during the public outreach and education element of the WMP. Therefore, Golden Triangle RC&D was able to start implementing the plan by July 2016.

To date, the cost of BMPS that have been implemented totals $ 59,000. The total cost of BMPs through completion of the project (Section 319(h) Contract expires on September 2017. With current landowners identified as willing participants in the watershed approximately 12 BMPs could be installed/implemented over the next 2 years.

Table 6.3.4

Landowner Name	Location	BMP	Total Cost
Adam Kurls	Lost Creek	Riparian Buffers	$8,600
Ben Jones	Lost Creek	Heavy Use area, critical area plantings, stabilization	$26,000
James Workman	Big Creek	Heavy Use area, critical area plantings, stabilization	$7,000
Dan Connell	Little Ochlockonee	Terraces, Grassed Waterways and Water Sensors	$15,216
Local gov't	Big Creek and Lost Creek	Better Back Roads	$150,000
			$206,816

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 subwatershed/creek name, and identifies potential stressors, recommended BMPs and estimated costs. Additionally, the chart identifies responsible organizations/partners to lead on implementation activities.

Table 6.3.5

Stream Name	Potential Stressors	Priority	BMPs	Estimated Cost	Responsible Organization
Big Creek	Dirt Roads and CAFO Sediments and fecal coliform	#1	Better Back Roads; Heavy use Area; Critical Area Planting	$60,000	GTRCD/FWS/Mitchell County
Little Ochlockonee	Agricultural Runoff-Fecal Coliform/dissolved oxygen	#1	Grassed Waterways; Riparian Buffers	$40,000	GTRCD/Landowners
Lost Creek	Dirt Roads and CAFO Sediments, fecal coliform and dissolved oxygen	#1	Better Back Roads; Heavy use Area; Critical Area Planting	$60,000	GTRCD/FWS/Mitchell County

Milestones

Table 6.3.6 Proposed Implementation Schedule for WMP

FY13 Ochlockonee Project Implementation and Drawn Down Schedule				
	2014	2015	2016	2017
Proejct Activites 1 Expand existing partnership/advisory to include Little Ochlockonee Creek Watershed				
Task 1: Recruit partner organizations to participate on partnership/advisory committee				
Task 2: Hold meetings to identify issues of concern and hold partnership/advisory committee meetings				
Project Activity 2 Characterize and conduct assessment of watershed				
Task 3: Conduct visual survey of watershed				
Task 4: USFWS threatened and endangered species; threat survey for unpaved roads				
Task 5: Georgia Water Planning and Policy Center to identify irrigated areas and agricultural land use				
Task 6: Gather and analyze existing data to refine water quality monitoring plan; research other funding sources; long-term monitoring				
Project Activity 3 Develop Targeted/BMP Water Quality Monitoring Plan				
Task 7: Write plan to conduct water quality monitoring based on visual survey and other informational resources				
Task 8: Conduct water quality monitoring according to approved plan				
Project Activity 4 Conduct outreach and education				
Task 9: Hold 3 Adopt-A-Stream Workshops				
Task 10: Hold 3 Rivers Alive Cleanups				
Task 11: Working with other partners hold 3 BMP field days				
Task 12: Develop and update website				
Project Activity 5 Develop Watershed Management Plan				
Task 13: Analyze and incorporate all data collected to develop the nine elements of the plan				
Task 14: After GAEPD/Stakeholder reviews, incorporate comments into the draft WMP				
Project Activity 6 Based recommended strategies in the WMP develop implementation plan				
Task 15: Create BMP implementation strategy				
Task 16: Identify landowners in priority areas according to final WMP				
Task 17: Execute contracts with landowners and install BMPS				
Project Activity 7 Evaluate and Report Progress				
Task 18: Estimate load reductions				
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 Little Ochlockonee 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 Little Ochlockonee Watershed
b) Appropriate BMPs and how they are used to reduce nonpoint source pollutants.
c) How farming and other land use practices affect the watershed
d) The endangered and protected species located with the Little Ochlockonee Creek 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 vast amount of land that is irrigated within the watershed and how farming practices affect 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 Little Ochlockonee 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 3 (three) 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 troups, and other organizations to bring awareness, education, and the importance of the watershed to the community.

d) Erect four (3) watershed education signs which will be posted on the major highways and roads entering the Little Ochlockonee Creek Watershed area. See Figure 6-1 for a picture of the watershed signs and see Figure 6-2 and Table 6-2 for a map and location of watershed sign.

e) Conduct three (3) Adopt-A-Stream training workshops.

f) Conduct three (3) Rivers Alive clean-up events.

g) Creation of brochure on Septic Tanks (what to dump what not to dump) for homeowners

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.

GAEPD's approval of this WMP will provide Golden Triangle RC&D with Section 319(h) grant funds to coordinate with landowners in the watershed for cost-share BMP projects during the implementation of the project. The NRCS also accepts landowner applications for installation of BMPs through its EQIP program, USFWS through their Partners for Fish and Wildlife Program, and CSP through Farm Service Agency). 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
Heavy Use Areas	8 sites	Avg. 0.25 acres each @ $900 $7200 total
Filter Strips	5 acres	$292.00 per acre=$1,460
Field Borders	5 acres	$340.00per acre=$1,700
Grassed Waterway	25 acres	$1130 per acre = $28,250
Riparian Buffers	25 acres	$946 per acre = $23,650
Better Back Roads	3 sites	$150,000

10.0 Implementation Milestones, Evaluation and Revision

Schedule and Milestones for Implementing Management Strategies

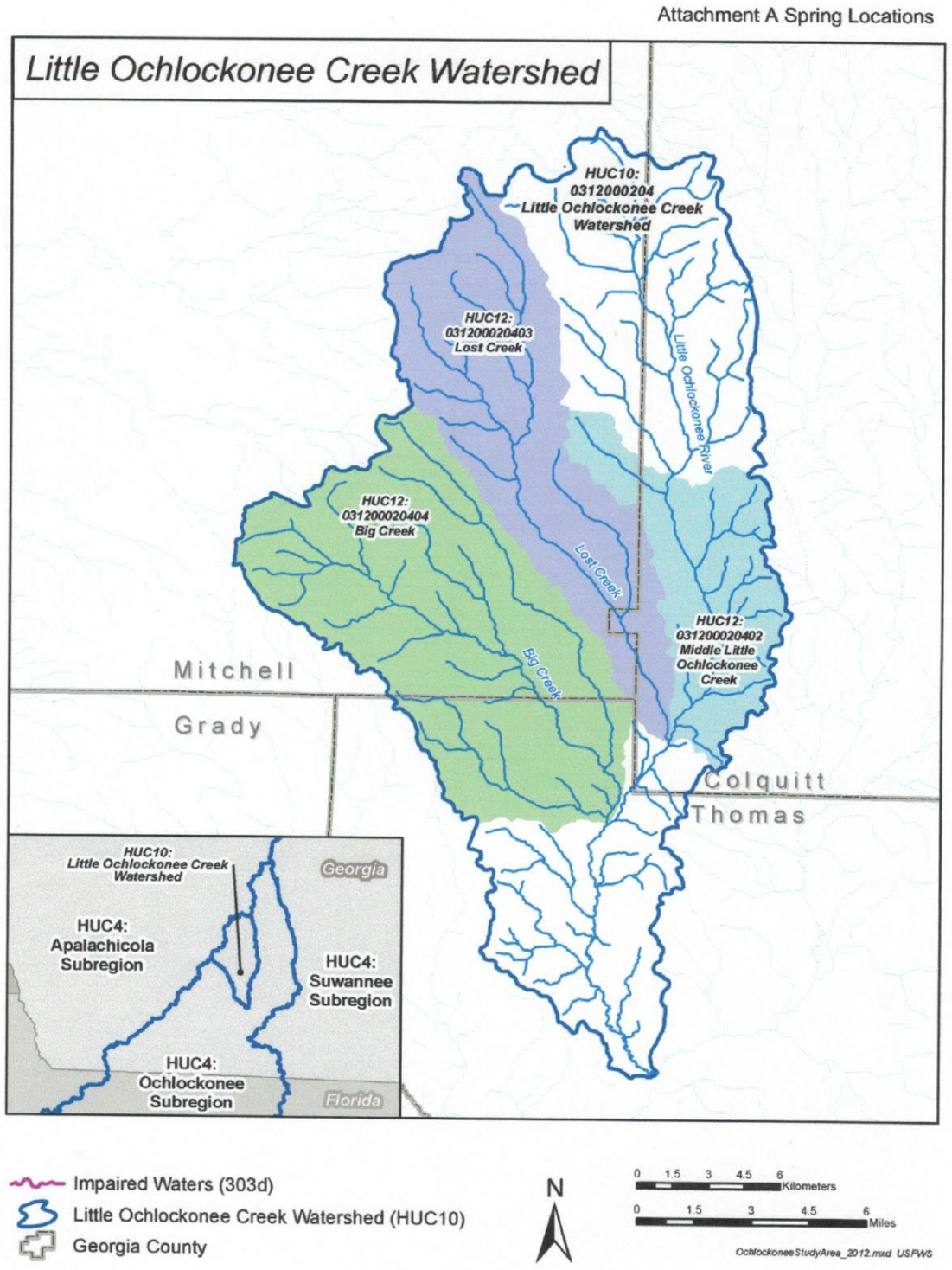
	2014	2015	2016	2017
Select identified high risk priority areas for BMPs	10/14	10/15	1/16-12/16	1/17-4/17
Contract with landowners for installation of BMPs		10/15	2/16-12/16	1/17-4/17
Install BMPs			4/16-12/16	1/17-4/17
Hold quarterly Ochlockonee Watershed Partnership meetings		1/15, 4/15	1/16, 4/16, 6/16,8/16 12/16	1/17, 4/17
Conduct field days		2/15 and 7/15	3/16 and 9/16	
Work with school groups and other organizations	7/14	1/15 and 6/16	6/16	2/17
Conduct water sampling	7/14,8/14,9/14 10/14, 11/14, 12/14	1/15,2/15,3/15 4/15,5/15,6/16 7/15,8/15	Once BMP installed	Once BMP installed
USFWS surveys		6/15	2/16	
Calculate load reductions for each completed BMP			Once BMP installed	Once BMP installed
Hold Adopt-A-Stream training courses		1/15	1/16 and 8/16	
Conduct Rivers Alive cleanups	10/14	10/15	10/16	
Continue with updates to the OCWP website	6/14	6/15	6/16	6/17

The effectiveness of the recommended BMPs for the Little Ochlockonee Creek Watershed Management Plan will be tracked by qualitative and quantitative measures.

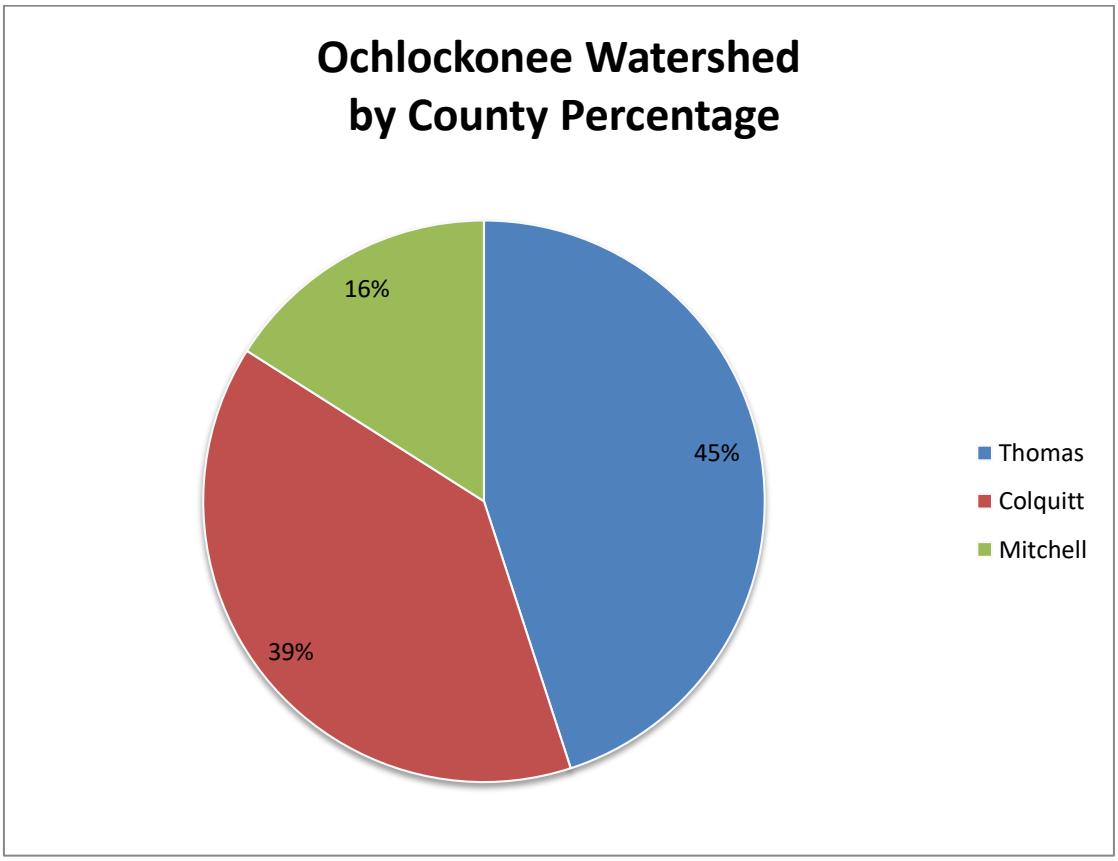
Qualitative Measures	Quantitative Measures
• Individual/Group Participation • Partnership Meeting • Workshops • BMP Field Days • Adopt-A-Stream Training • Clean-up Events • Education and Outreach Effectiveness • Pre-Post Surveys	• Watershed Monitoring Results • Adopt-A-Stream testing (including US Fish 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 Ochlocknee basin especially with Better Back Road implementation to relieve the sedimentation loads.

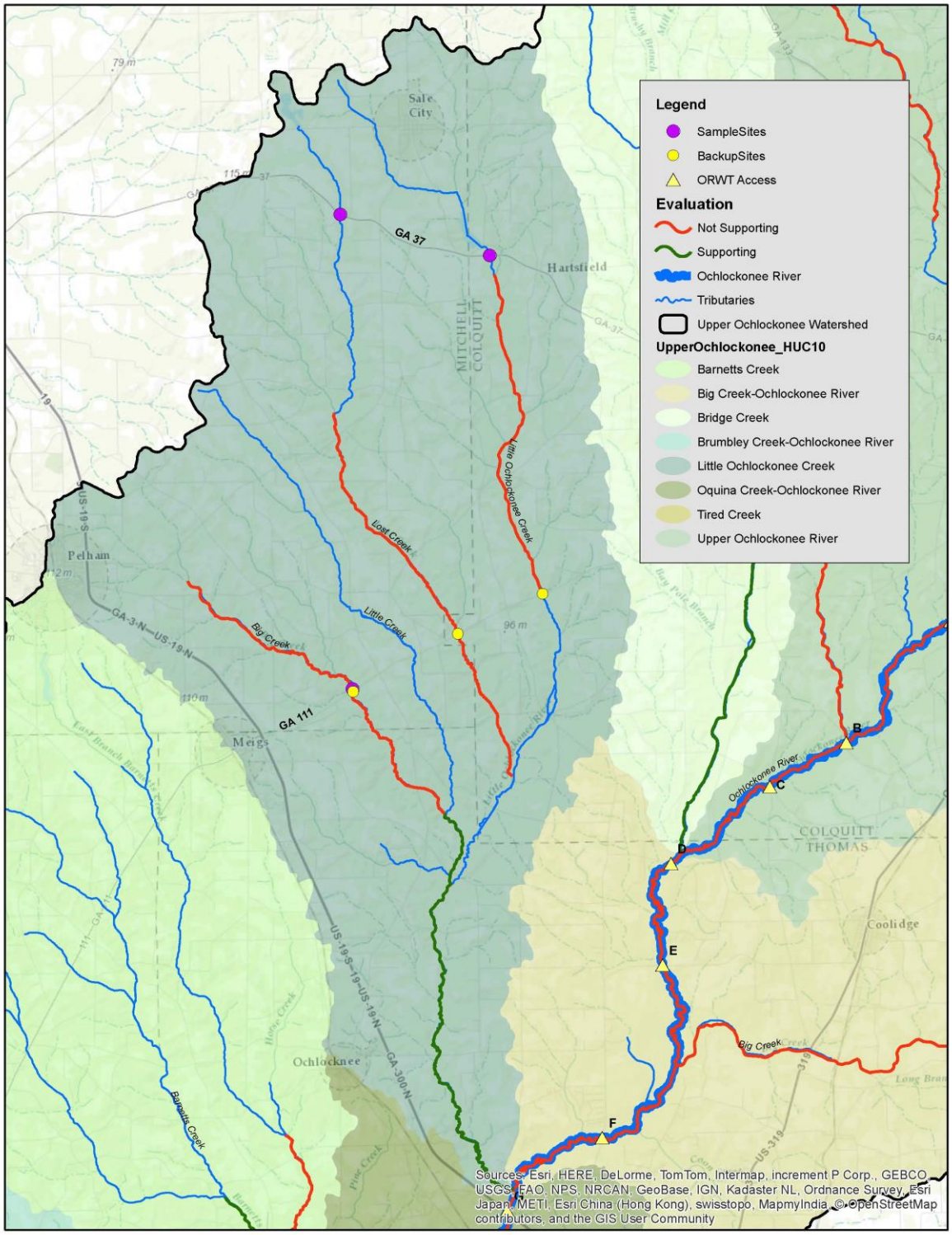
Map 1 Little Ochlockonee Creek Watershed Boundary



Attachment B Land Area Percentages by County



Appendix C Little Ochlockonee Creek Impairment



Appendix D

Population of Counties within Little Ochlockonee Watershed

Annual Estimates of the Resident Population: US Census Bureau 2014

Geography	July 2014 Census	Population Estimate (as of April 2010)	Percent Change
Thomas County	44,959	44,719	0.5%
Colquitt County	46,102	45,498	1.3%
Mitchell County	22,771	23,498	-3.1%

Appendix E Temperature and Precipitation Data

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

Annual Climatological Summary (2014)
Generated on 12/29/2015

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

Elev: 153 ft. Lat: 31.168° N Lon: 84.766° W
Station: **COLQUITT 2 W, GA US COOP:092153**

Date	Temperature (F)														Precipitation (inches)									
Elem->	MMXT	MMNT	MNTM	DPNT	HTDD	CLDD	EMXT		EMNT		DT90	DX32	DT32	DT00	TPCP	DPNP	EMXP		TSNW	MXSD		DP01	DP05	DP10
Month	Mean Max.	Mean Min.	Mean	Depart. from Normal	Heating Degree Days	Cooling Degree Days	Highest	High Date	Lowest	Low Date	Number Of Days				Total	Depart. from Normal	Greatest Observed		Snow, Sleet			Number Of Days		
											Max >=90	Max <=32	Min <=32	Min <=0			Day	Date	Total Fall	Max Depth	Max Date	>=.10	>=.50	>=1.0
1						0	70	28	17	13	0	0	11	0					0.0X	0				
2							77	05	31	04	0	0	5	0	3.94A		1.59	13	0.0X	0		4	2	2
3							78	12	32	05	0	0	3	0					0.0X	0				
4							86	25	38	16	0	0	0	0					0.0X	0				
5					0		94	27	51	19	2	0	0	0					0.0X	0				
6					0		95	30	66	09	12	0	0	0	3.50A		1.20	25	0.0X	0		2	1	1
7					0		96	30	63	30	16	0	0	0	3.07A		0.95	23	0.0X	0		6	3	0
8					0		98	14	61	06	17	0	0	0	3.13A		2.35	13	0.0X	0		3	1	1
9					0		96	03	60	29	10	0	0	0	6.37A		3.10	03	0.0X	0		2	1	1
10							89	14	43	31	0	0	0	0					0.0X	0				
11						0	82	03	21	19	0	0	6	0					0.0X	0				
12						0	76	29	28	12	0	0	4	0					0.0X	0				
Annual					0*	0	98	Aug	17	Jan	57*	0*	29*	0*	20.01		3.10*	Sep*	0.0*	0*	Dec*	17*	8*	5*

Notes

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T Trace of precipitation, snowfall, or snowdepth. The precipitation data value will equal zero.
Elem Element types are included to provide cross-reference for users of the NCDC CDO system.
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National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service

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

Elev: 340 ft. Lat: 31.177° N Lon: 83.749° W
Station: **MOULTRIE 2 ESE, GA US COOP:096087**

Date	Temperature (F)														Precipitation (inches)									
Elem->	MMXT	MMNT	MNTM	DPNT	HTDD	CLDD	EMXT		EMNT		DT90	DX32	DT32	DT00	TPCP	DPNP	EMXP		TSNW	MXSD		DP01	DP05	DP10
Month	Mean Max.	Mean Min.	Mean	Depart. from Normal	Heating Degree Days	Cooling Degree Days	Highest	High Date	Lowest	Low Date	Number Of Days				Total	Depart. from Normal	Greatest Observed		Snow, Sleet			Number Of Days		
											Max >=90	Max <=32	Min <=32	Min <=0			Day	Date	Total Fall	Max Depth	Max Date	>=.10	>=.50	>=1.0
1	57.0X	34.6X	45.8	-4.6		0	75	13	17	07	0	0	13	0	3.99X	-0.91	1.45	12	0.0			7	4	1
2	65.1X	42.0X	53.6	-0.3			81	21	30	28	0	0	2	0	2.70X	-1.82	0.79	22	0.0			9	1	0
3	67.7X	42.8X	55.2	-4.5		0	77	23	31	02	0	0	2	0	3.32X	-2.75	1.30	29	0.0			4	3	1
4	75.7	54.6	65.1	-0.7	86	98	85	25	37	16	0	0	0	0	7.35	4.33	2.12	19	0.0			7	5	3
5	84.7	62.1	73.4	0.0	12	279	92	29	50	18	7	0	0	0	6.56	4.03	2.90	15	0.0			8	4	1
6	90.0	70.5	80.2	0.9	0	467	94	30	65	04	21	0	0	0	2.09	-2.94	0.65	07	0.0			7	1	0
7	91.3	70.8	81.1	-0.4	0	505	96	31	66	31	23	0	0	0	4.54	-1.15	1.38	01	0.0			10	4	1
8	92.5	70.7	81.6	0.8	0	521	97	08	64	28	25	0	0	0	2.96	-1.94	1.05	20	0.0			5	2	1
9	85.9	68.3	77.1	0.5	1	370	94	03	59	25	9	0	0	0	9.80	6.16	3.10	03	0.0			9	4	4
10	78.8X	56.0X	67.4	-0.8			88	11	46	31	0	0	0	0	2.56X	-0.15	1.05	15	0.0			3	3	1
11	65.3		52.7	-6.9	358	8	78	07	26	19	0	0	4	0	6.73	3.61	2.19	23	0.0			5	5	3
12	65.1X	44.0X	54.6	2.1			78	31	33	12	0	0	0	0	9.86X	6.23	4.22	24	0.0			7	4	3
Annual	76.6*	56.0*	65.7	-1.2	457*	2248	97	Aug	17	Jan	85*	0*	21*	0*	62.46	12.70	4.22*	Dec*	0.0*			81*	40*	19*

Notes

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Annual Climatological Summary (2014)

Generated on 12/29/2015

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

Elev: 175 ft. Lat: 31.190° N Lon: 84.204° W
Station: **CAMILLA 3 SE, GA US COOP:091500**

Date	Temperature (F)															Precipitation (inches)										
Elem->	MMXT	MMNT	MNTM	DPNT	HTDD	CLDD	EMXT		EMNT		DT90	DX32	DT32	DT00		TPCP	DPNP	EMXP		TSNW	MXSD		DP01	DP05	DP10	
Month	Mean Max.	Mean Min.	Mean	Depart. from Normal	Heating Degree Days	Cooling Degree Days	Highest	High Date	Lowest	Low Date	Number Of Days					Total	Depart. from Normal	Greatest Observed		Snow, Sleet			Number Of Days			
											Max >=90	Max <=32	Min <=32	Min <=0				Day	Date	Total Fall	Max Depth	Max Date	>=.10	>=.50	>=1.0	
1	51.5	28.9	40.2	-8.1	763	0	68	28	14	08	0	2	22	0		2.68	-2.58	0.50	14	0.0	0		7	2	0	
2	62.7	37.7	50.2	-1.8	411	5	79	21	25	28	0	0	11	0		4.32	-0.49	1.80	13	0.0	0		8	3	1	
3	65.0	40.9	53.0	-4.7	363	0	77	23	26	01	0	0	6	0		7.04	1.23	2.90	17	0.0	0		8	4	2	
4	74.4	51.6	63.0	-1.7	126	71	85	29	34	16	0	0	0	0		10.26	6.76	3.55	08	0.0	0		7	5	4	
5	82.4	60.2	71.3	-1.4	25	227	91	26	46	16	3	0	0	0		5.00	2.38	1.24	15	0.0	0		7	5	3	
6	88.4	68.2	78.3	-0.5	0	406	93	22	63	04	14	0	0	0		3.22	-2.11	1.30	25	0.0	0		6	3	1	
7	88.9	68.4	78.7	-2.3	0	431	94	29	60	31	16	0	0	0		1.91	-4.01	0.80	22	0.0	0		5	1	0	
8	92.0	67.7	79.9	-0.6	0	470	98	24	61	29	23	0	0	0		1.27	-3.81	0.66	31	0.0	0		3	1	0	
9	85.1	65.9	75.5	-0.7	3	327	97	15	56	26	7	0	0	0		5.62	1.97	2.31	30	0.0	0		7	3	2	
10	79.3	51.6	65.4	-1.5	76	96	88	11	37	31	0	0	0	0		2.11	-0.62	1.51	15	0.0	0		3	1	1	
11	63.6	34.4	49.0	-9.2	472	0	79	07	19	20	0	0	14	0		8.30	4.88	2.22	18	0.0	0		6	5	5	
12	63.9	39.9	51.9	1.2	399	1	78	05	25	13	0	0	7	0		7.84	3.89	4.04	24	0.0	0		8	3	2	
Annual	74.8*	51.3*	63.0	-2.6	2638*	2034	98	Aug	14	Jan	63*	2*	60*	0*		59.57	7.49	4.04*	Dec*	0.0*	0*	Dec*	75*	36*	21*	

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Annual Climatological Summary (2014)

Generated on 12/29/2015

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

Elev: 240 ft. Lat: 30.914° N Lon: 83.861° W
Station: **THOMASVILLE 7 NE, GA US COOP:098666**

Date	Temperature (F)															Precipitation (inches)										
Elem->	MMXT	MMNT	MNTM	DPNT	HTDD	CLDD	EMXT		EMNT		DT90	DX32	DT32	DT00		TPCP	DPNP	EMXP		TSNW	MXSD		DP01	DP05	DP10	
Month	Mean Max.	Mean Min.	Mean	Depart. from Normal	Heating Degree Days	Cooling Degree Days	Highest	High Date	Lowest	Low Date	Number Of Days					Total	Depart. from Normal	Greatest Observed		Snow, Sleet			Number Of Days			
											Max >=90	Max <=32	Min <=32	Min <=0				Day	Date	Total Fall	Max Depth	Max Date	>=.10	>=.50	>=1.0	
1	55.4	33.9X	44.6	-6.5		0	72	28	19	07	0	2	15	0		3.50	-1.30	0.90	02	0.0			6	3	0	
2	66.1	44.3	55.2	0.3	287	17	82	05	30	28	0	0	3	0		4.13	-0.60	0.95	21	0.0			10	3	0	
3	67.9	45.1	56.5	-3.6	259	3	79	23	34	14	0	0	0	0		8.14	2.47	3.00	17	0.0			7	5	3	
4	77.9	54.5	66.2	0.1	73	119	87	28	34	18	0	0	0	0		9.63	6.55	2.00	08	0.0			8	6	5	
5	85.5	62.7	74.1	0.3	8	298	95	26	50	17	10	0	0	0		7.00	4.00	2.00	30	0.0			8	5	2	
6	90.8	70.1	80.5	1.0	0	471	95	30	64	04	21	0	0	0		4.09	-1.74	1.19	08	0.0			5	4	1	
7	91.2	71.1	81.1	-0.5	0	507	96	29	64	05	24	0	0	0		3.46	-2.22	1.10	13	0.0			5	3	2	
8	92.9	71.4	82.1	0.9	0	540	99	24	63	28	27	0	0	0		4.09	-1.62	1.35	31	0.0			5	3	2	
9	87.4	69.5	78.5	1.5	0	410	96	03	61	26	12	0	0	0		6.11	1.59	1.85	08	0.0			8	3	2	
10	81.0	56.3	68.7	-0.3	29	152	90	13	46	23	3	0	0	0		2.59	-0.43	0.98	15	0.0			3	3	0	
11	66.6X	42.4X	54.5	-6.4			80	07	23	19	0	0	4	0		5.95X	2.50	2.45	23	0.0			5	4	2	
12	66.4X	45.1X	55.8	2.8			78	29	31	12	0	0	1	0		6.89A	3.24	3.00	24	0.0			6	3	3	
Annual	77.4*	55.5*	66.5	-0.9	656*	2517	99	Aug	19	Jan	97*	2*	23*	0*		65.58	12.44	3.00*	Dec*	0.0*			76*	45*	22*	

Notes

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Asheville, North Carolina 28801

Elev: 175 ft. Lat: 31.190° N Lon: 84.204° W
Station: **CAMILLA 3 SE, GA US COOP:091500**

Date	Temperature (F)															Precipitation (inches)									
Elem->	MMXT	MMNT	MNTM	DPNT	HTDD	CLDD	EMXT		EMNT		DT90	DX32	DT32	DT00		TPCP	DPNP	EMXP		TSNW	MXSD		DP01	DP05	DP10
Month	Mean Max.	Mean Min.	Mean	Depart. from Normal	Heating Degree Days	Cooling Degree Days	Highest	High Date	Lowest	Low Date	Number Of Days					Total	Depart. from Normal	Greatest Observed		Snow, Sleet			Number Of Days		
											Max >=90	Max <=32	Min <=32	Min <=0				Day	Date	Total Fall	Max Depth	Max Date	>=.10	>=.50	>=1.0
1	57.0	34.0	45.5	-2.8	600	0	73	05	16	09	0	0	15	0		4.69	-0.56	1.66	05	0.0	0		4	3	3
2	55.6	32.7	44.2	-7.8	579	0	74	23	19	20	0	0	14	0		4.75	-0.06	1.80	26	0.0	0		7	3	2
3	71.0	48.6	59.8	2.1	187	32	83	18	31	07	0	0	1	0		1.67	-4.13	0.41	13	0.0	0		6	0	0
4	78.0	58.4	68.2	3.5	24	126	88	09	45	05	0	0	0	0		5.79	2.29	1.55	13	0.0	0		10	2	2
5	84.9	60.4	72.7	0.0	9	254	90	21	47	03	3	0	0	0		0.51	-2.11	0.20	27	0.0	0		3	0	0
6	89.4	68.7	79.0	0.2	0	429	96	23	64	04	14	0	0	0		6.75	1.42	2.85	04	0.0	0		8	3	2
7																									
8																									
9																									
10																									
11																									
12																									
Annual	72.7*	50.5*	61.6*		1399*	841*	96*	Jun*	16*	Jan*	17*	0*	30*	0*		24.16*		2.85*	Jun*	0.0*	0*	Jun*	38*	11*	9*

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Date	Temperature (F)															Precipitation (inches)									
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Month	Mean Max.	Mean Min.	Mean	Depart. from Normal	Heating Degree Days	Cooling Degree Days	Highest	High Date	Lowest	Low Date	Number Of Days					Total	Depart. from Normal	Greatest Observed		Snow, Sleet			Number Of Days		
											Max >=90	Max <=32	Min <=32	Min <=0				Day	Date	Total Fall	Max Depth	Max Date	>=.10	>=.50	>=1.0
1	60.2	39.1	49.6	-1.5	471	3	75	04	21	08	0	0	5	0		3.71	-1.09	1.20	24	0.0			6	3	1
2	59.0	38.1	48.6	-6.3	457	2	75	23	24	20	0	0	9	0		4.71	-0.02	1.55	26	0.0			6	5	1
3	73.5	52.5	63.0	2.9	132	79	85	18	36	08	0	0	0	0		3.84	-1.83	1.35	13	0.0			8	3	1
4	80.2X	61.8X	71.0	4.9			88	27	54	22	0	0	0	0		4.83X	1.75	1.23	20	0.0			10	3	1
5	87.5	63.2	75.4	1.6	3	334	94	20	48	02	12	0	0	0		0.83	-2.17	0.59	15	0.0			2	1	0
6	91.9	70.0	81.0	1.5	0	487	99	19	65	02	19	0	0	0		5.70	-0.14	1.55	25	0.0			11	5	1
7																									
8																									
9																									
10																									
11																									
12																									
Annual	75.4*	54.1*	64.8*		1063*	905*	99*	Jun*	21*	Jan*	31*	0*	14*	0*		23.62*		1.55*	Jun*	0.0*			43*	20*	5*

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151 Patton Avenue
Asheville, North Carolina 28801

Elev: 153 ft. Lat: 31.168° N Lon: 84.766° W
Station: **COLQUITT 2 W, GA US COOP:092153**

Date	Temperature (F)														Precipitation (inches)										
Elem->	MMXT	MMNT	MNTM	DPNT	HTDD	CLDD	EMXT		EMNT		DT90	DX32	DT32	DT00	TPCP	DPNP	EMXP		TSNW	MXSD		DP01	DP05	DP10
Month	Mean Max.	Mean Min.	Mean	Depart. from Normal	Heating Degree Days	Cooling Degree Days	Highest	High Date	Lowest	Low Date	Number Of Days				Total	Depart. from Normal	Greatest Observed		Snow, Sleet			Number Of Days			
											Max >=90	Max <=32	Min <=32	Min <=0			Day	Date	Total Fall	Max Depth	Max Date	>=.10	>=.50	>=1.0
1						0	76	05	17	08	0	0	6	0					0.0X	0				
2						0	69	04	24	20	0	0	7	0					0.0					
3							82	05	34	07	0	0	0	0					0.0					
4							89	09	50	06	0	0	0	0	4.98A		1.55	17	0.0			5	1	1
5					0		92	21	51	06	6	0	0	0	3.54A		0.77	28	0.0			2	1	0
6					0		98	18	65	01	10	0	0	0					0.0					
7																								
8																								
9																								
10																								
11																								
12																								
Annual					0*	0*	98*	Jun*	17*	Jan*	16*	0*	13*	0*	8.52*		1.55*	Apr*	0.0*	0*	Jan*	7*	2*	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. Used through December 1983 only.
A Accumulated amount. This value is a total that may include data from a previous month or months or year (for annual value).
B Adjusted total. Monthly value totals based on proportional available data across the entire month.
E An estimated monthly or annual total.
X Monthly means or totals based on incomplete time series. 1 to 9 days are missing. Annual means or totals include one or more months which had 1 to 9 days that were missing.
T Trace of precipitation, snowfall, or snowdepth. The precipitation data value will equal zero.
Elem Element types are included to provide cross-reference for users of the NCDC CDO system.
Station Station is identified by: COOP ID, Station Name, State
S Precipitation amount is continuing to be accumulated. Total will be included in a subsequent monthly or yearly value. Example: Days 1-20 had 1.35 inches of precipitation, then a period of accumulation began. The element TPCP would then be 00135S and the total accumulated amount value appears in a subsequent monthly value.
* Annual value missing; summary value computed from available month values.

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

Annual Climatological Summary (2015)

Generated on 12/29/2015

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

Elev: 340 ft. Lat: 31.177° N Lon: 83.749° W
Station: **MOULTRIE 2 ESE, GA US COOP:096087**

Date	Temperature (F)														Precipitation (inches)										
Elem->	MMXT	MMNT	MNTM	DPNT	HTDD	CLDD	EMXT		EMNT		DT90	DX32	DT32	DT00	TPCP	DPNP	EMXP		TSNW	MXSD		DP01	DP05	DP10
Month	Mean Max.	Mean Min.	Mean	Depart. from Normal	Heating Degree Days	Cooling Degree Days	Highest	High Date	Lowest	Low Date	Number Of Days				Total	Depart. from Normal	Greatest Observed		Snow, Sleet			Number Of Days			
											Max >=90	Max <=32	Min <=32	Min <=0			Day	Date	Total Fall	Max Depth	Max Date	>=.10	>=.50	>=1.0
1	59.0	37.4	48.2	-2.2	515	0	72	05	19	09	0	0	5	0	5.53	0.63	1.48	05	0.0X	0		7	4	3
2	58.6	36.1	47.3	-6.6	491	1	77	23	23	20	0	0	10	0	4.30	-0.22	1.98	26	0.0			6	2	1
3	72.6X	51.2X	61.9	2.2			84	18	36	08	0	0	0	0	1.24X	-4.83	0.47	13	0.0			4	0	0
4	78.6	61.5	70.0	4.2	10	166	87	10	53	30	0	0	0	0	5.92	2.90	2.18	13	0.0			8	4	2
5	86.2	62.7	74.5	1.1	3	306	92	12	50	02	10	0	0	0	0.46	-2.06	0.42	27	0.0			1	0	0
6	91.4	70.8	81.1	1.8	0	490	97	19	65	04	20	0	0	0	6.00	0.97	1.91	04	0.0			9	5	1
7																								
8																								
9																								
10																								
11																								
12																								
Annual	74.4*	53.3*	63.8*		1019*	963*	97*	Jun*	19*	Jan*	30*	0*	15*	0*	23.45*		2.18*	Apr*	0.0*	0*	Jan*	35*	15*	7*

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. Used through December 1983 only.
A Accumulated amount. This value is a total that may include data from a previous month or months or year (for annual value).
B Adjusted total. Monthly value totals based on proportional available data across the entire month.
E An estimated monthly or annual total.
X Monthly means or totals based on incomplete time series. 1 to 9 days are missing. Annual means or totals include one or more months which had 1 to 9 days that were missing.
T Trace of precipitation, snowfall, or snowdepth. The precipitation data value will equal zero.
Elem Element types are included to provide cross-reference for users of the NCDC CDO system.
Station Station is identified by: COOP ID, Station Name, State
S Precipitation amount is continuing to be accumulated. Total will be included in a subsequent monthly or yearly value. Example: Days 1-20 had 1.35 inches of precipitation, then a period of accumulation began. The element TPCP would then be 00135S and the total accumulated amount value appears in a subsequent monthly value.
* Annual value missing; summary value computed from available month values.

Attachment F Land Use/Cover Changes through MRLC

NLCD Evaluation, Visualization, and Analysis (EVA) Tool

Change From	Change To	Change	Subtotal	Total in Square Miles Change
Herbaceous				83.08
Grassland/Herbaceous			83.08	
Grassland/Herbaceous	Cultivated Crops	25.36		
Grassland/Herbaceous	Pasture/Hay	4.76		
Grassland/Herbaceous	Developed, High Intensity	2.80		
Grassland/Herbaceous	Developed, Medium Intensity	8.05		
Grassland/Herbaceous	Developed, Low Intensity	19.29		
Grassland/Herbaceous	Developed, Open Space	22.82		
Forest				377.18
Mixed Forest			25.02	
Mixed Forest	Cultivated Crops	4.64		
Mixed Forest	Pasture/Hay	3.88		
Mixed Forest	Developed, High Intensity	0.68		
Mixed Forest	Developed, Medium Intensity	2.34		
Mixed Forest	Developed, Low Intensity	5.05		
Mixed Forest	Developed, Open Space	8.43		
Evergreen Forest			169.99	
Evergreen Forest	Cultivated Crops	14.66		
Evergreen Forest	Pasture/Hay	17.06		
Evergreen Forest	Developed, High Intensity	6.15		
Evergreen Forest	Developed, Medium Intensity	22.40		
Evergreen Forest	Developed, Low Intensity	46.78		
Evergreen Forest	Developed, Open Space	62.94		
Deciduous Forest			182.17	
Deciduous Forest	Cultivated Crops	13.25		
Deciduous Forest	Pasture/Hay	12.98		
Deciduous Forest	Developed, High Intensity	5.65		
Deciduous Forest	Developed, Medium Intensity	21.02		
Deciduous Forest	Developed, Low Intensity	49.23		
Deciduous Forest	Developed, Open Space	80.04		

Attachment G

PERMIT_NAME	PERMIT_NO	COUNTY	RIVER_BASIN	PERMIT_TYPE	PERMIT_SUBTYPE
BOSTON WPCP	GA0033715	Thomas	Ochlockonee	NPDES	Municipal
CITY OF DOERUN WPCP	GA0021717	Colquitt	Ochlockonee	NPDES	Municipal
CITY OF MEIGS WPCP	GA0048178	Thomas	Ochlockonee	NPDES	Municipal
COOLIDGE	GA02-145	Thomas	Ochlockonee	Land Application System	Municipal
GENESIS PROJECT	GA0001279	Thomas	Ochlockonee	NPDES	Industrial
GLOVER REAL ESTATE, LLC (TWIN OAKS RENTAL COMM)	GA03-802	Thomas	Ochlockonee	Land Application System	Municipal
Messer Dairy Inc.	GAU700000	Thomas		Land Application System	Industrial
MOULTRIE WPCP	GA0024660	Colquitt	Ochlockonee	NPDES	Municipal
OIL-DRI CORP OF GA	GA0047511	Thomas	Ochlockonee	NPDES	Industrial
Pelham WPCP	GAJ020161	Mitchell	Ochlockonee	Land Application System	Municipal
SANDERSON FARMS INC	GA01-333	Colquitt	Ochlockonee	Land Application System	Industrial
Sparkman Dairy, LLC	GAU700000	Colquitt	Ochlockonee	Land Application System	Industrial
THOMASVILLE WPCP	GA0024082	Thomas	Ochlockonee	NPDES	Municipal
TOWN OF OCHLOCKNEE WPCP	GA0046370	Thomas	Ochlockonee	NPDES	Municipal
WAVERLY MINERALS, INC.	GA0032409	Thomas	Ochlockonee	NPDES	Industrial
Wynn Swine Farm	GAU700000	Colquitt	Ochlockonee	Land Application System	Industrial

Attachment G cont.

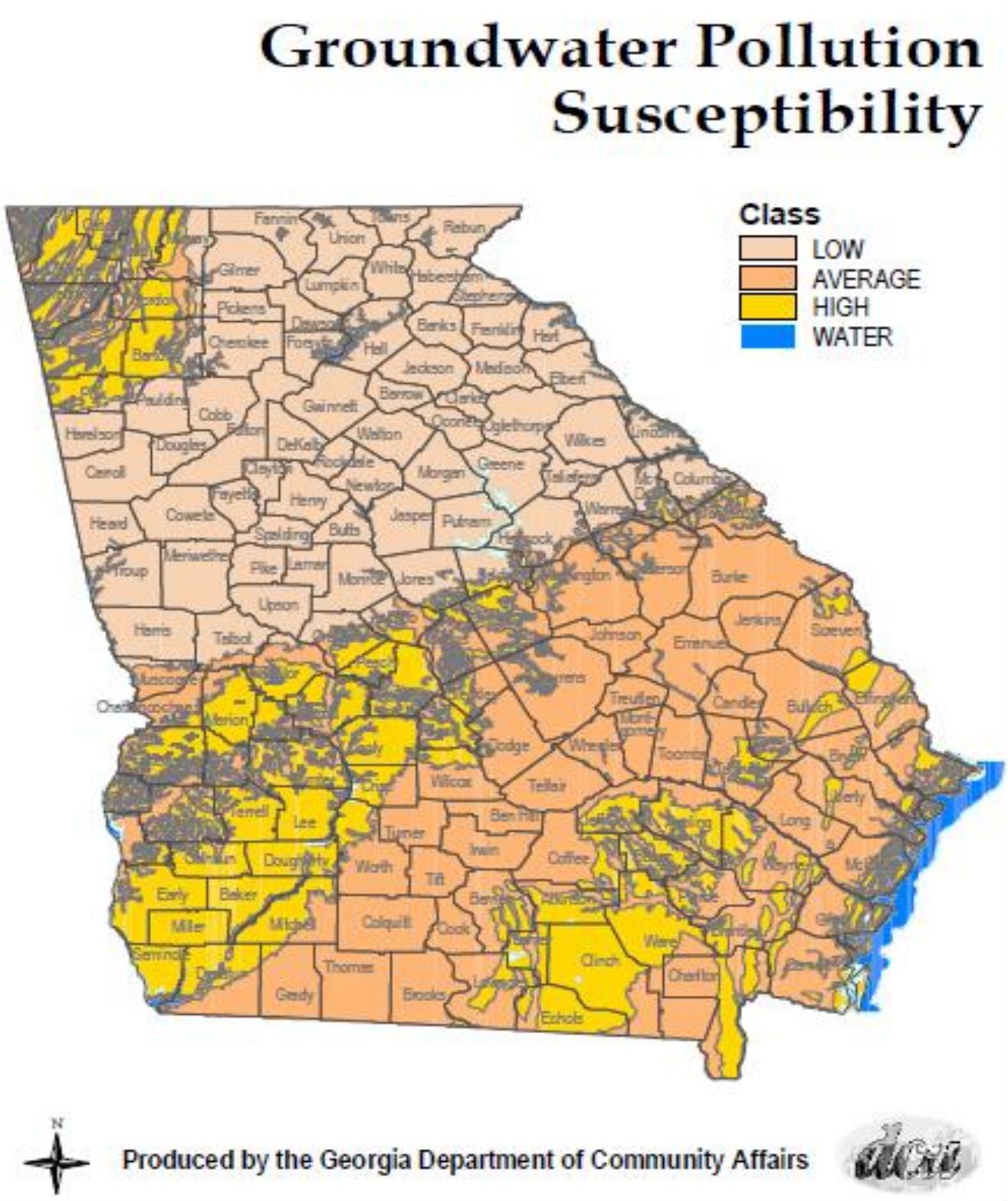
Upper Ochlockonee Watershed Agriculture Groundwater Permits				
County Name	*# of Groundwater Permits in Entire County*	*% of County Land Area in Watershed*	*Estimated # of Groundwater Permits in Watershed from% Land Area*	*Actual # of Groundwater Permits in Watershed*
Grady County	103	59.82%	62	48
Thomas County	122	49.00%	60	46
Colquitt County	159	43.46%	69	31
Mitchell County	626	16.20%	101	28
Worth County	242	8.13%	20	18
TOTALS			312	171

Upper Ochlockonee 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*
Grady County	63,916	59.82%	38,235	21,251
Thomas County	75,311	49.00%	36,902	24,938
Colquitt County	77,479	43.46%	33,672	16,350
Mitchell County	536,826	16.20%	86,966	14,965
Worth County	145,605	8.13%	11,838	9,265
TOTALS			207,613	86,769

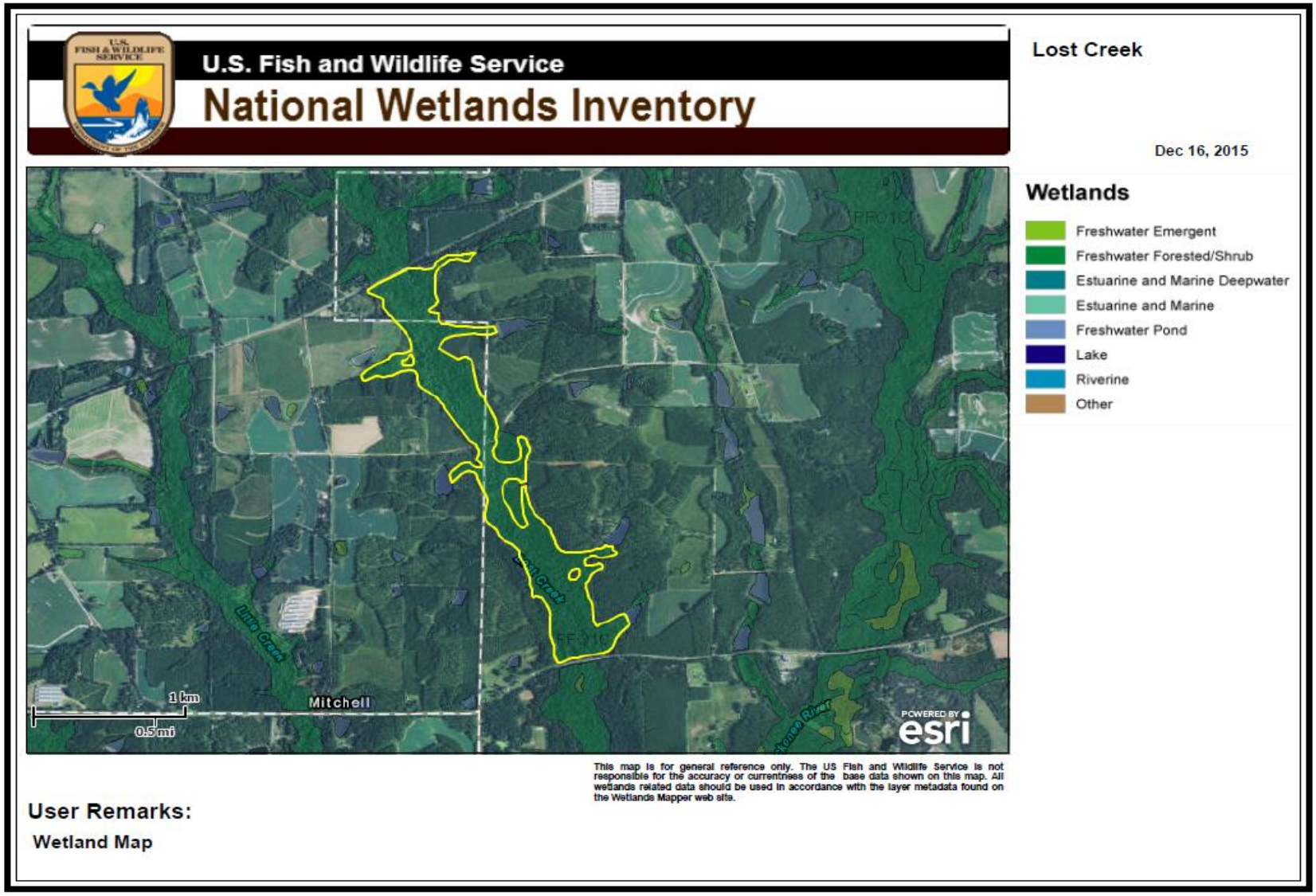
Attachment G cont.

Upper Ochlockonee Watershed County Shares							
County Name	*% of Watershed Land Area in County*	*% of Watershed GW Permits in County*	*% of Watershed GW Permitted Withdrawal in County*	*% of Watershed SW Permits in County*	*% of Watershed SW Permitted Withdrawal in County*	*% of Watershed GW+SW Permits in County*	*% of Watershed GW+SW Permitted Withdrawal in County*
Grady	30.06%	28.07%	24.49%	14.61%	13.38%	17.91%	15.04%
Thomas	29.57%	26.90%	28.74%	10.44%	11.57%	14.47%	14.13%
Colquitt	26.55%	18.13%	18.84%	50.28%	50.67%	42.41%	45.93%
Mitchell	9.12%	16.37%	17.25%	17.27%	17.43%	17.05%	17.41%
Worth	4.71%	10.53%	10.68%	7.40%	6.94%	8.17%	7.50%

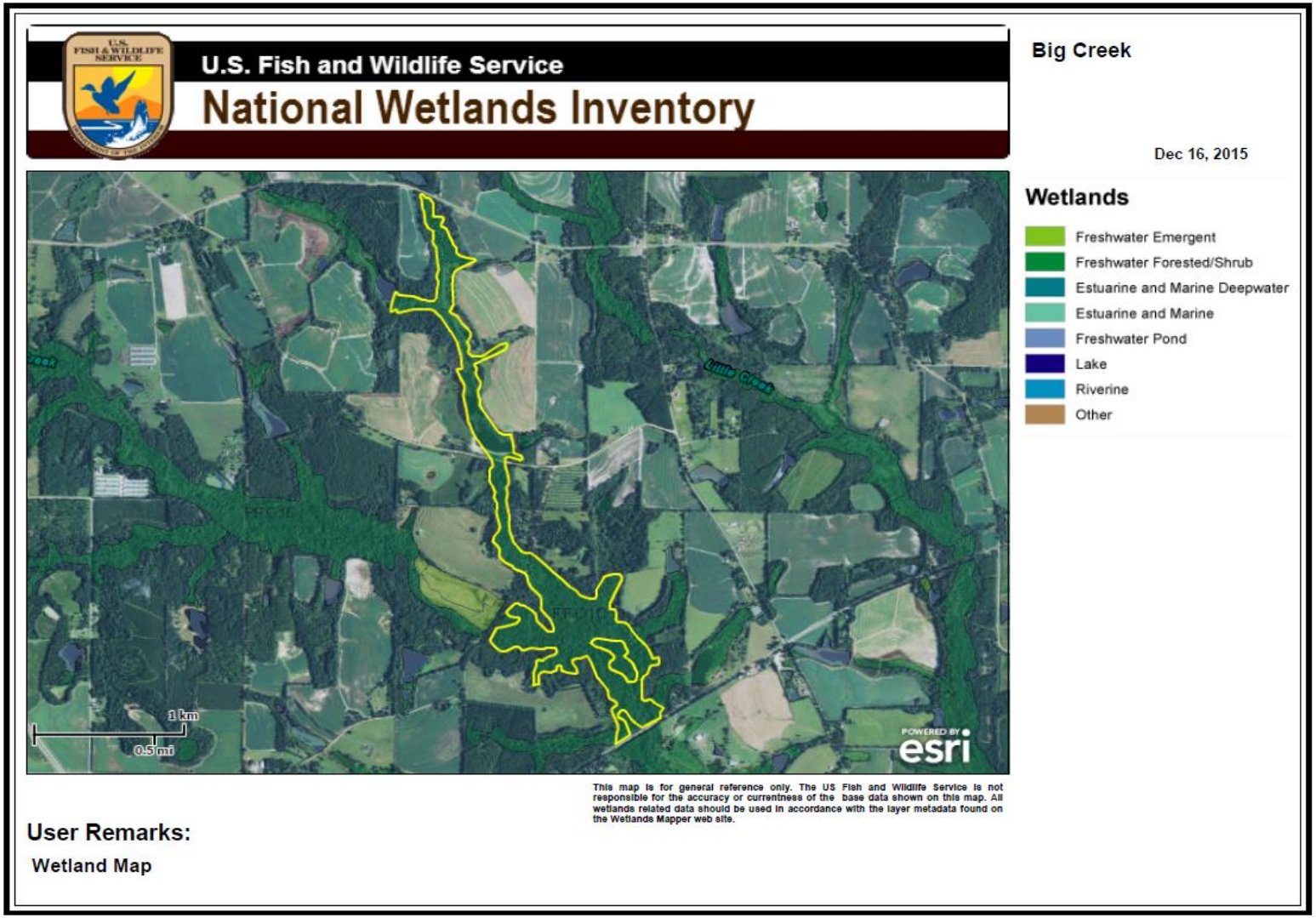
Attachment H Groundwater Map



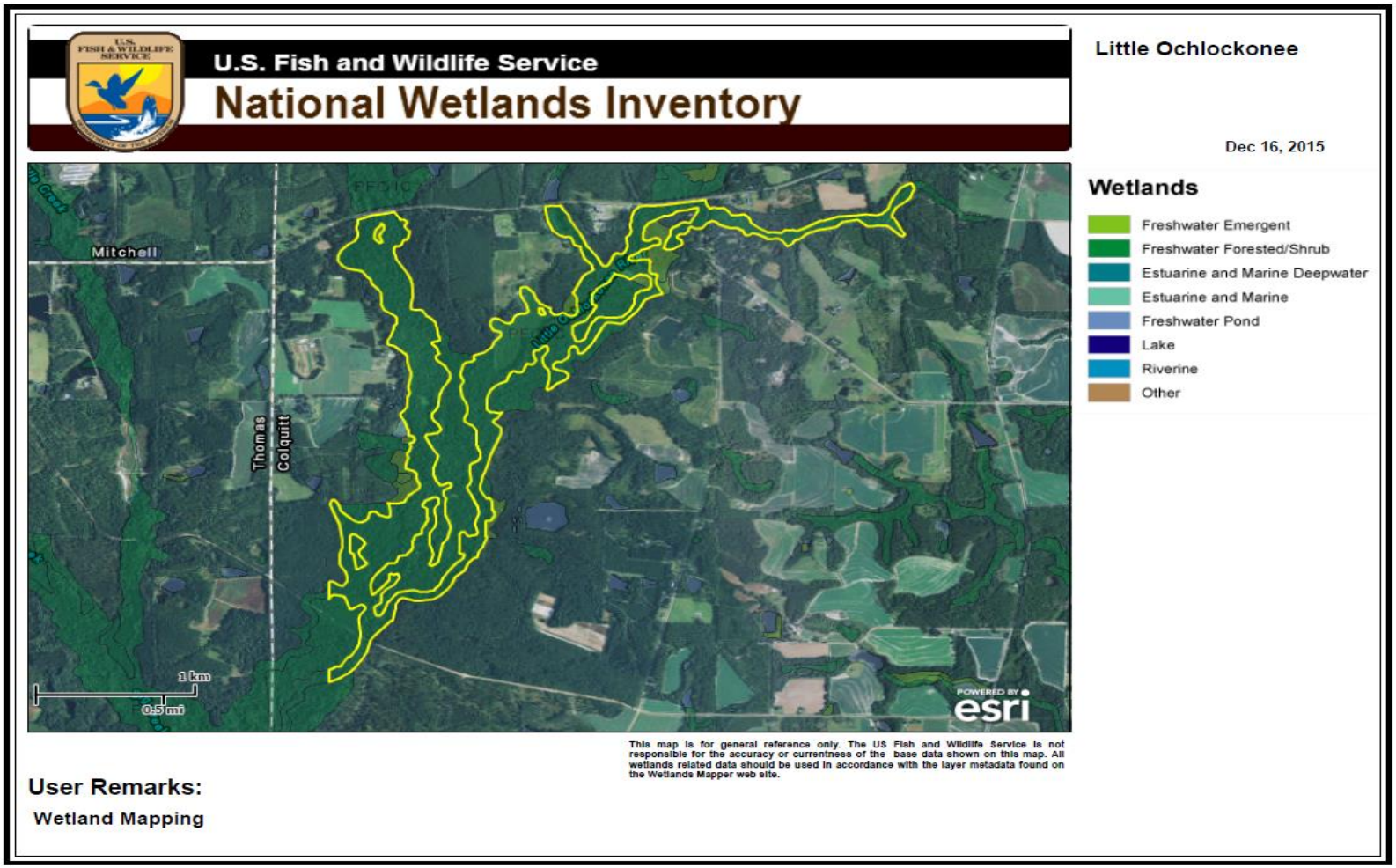
Attachment I Lost Creek Wetland Maps



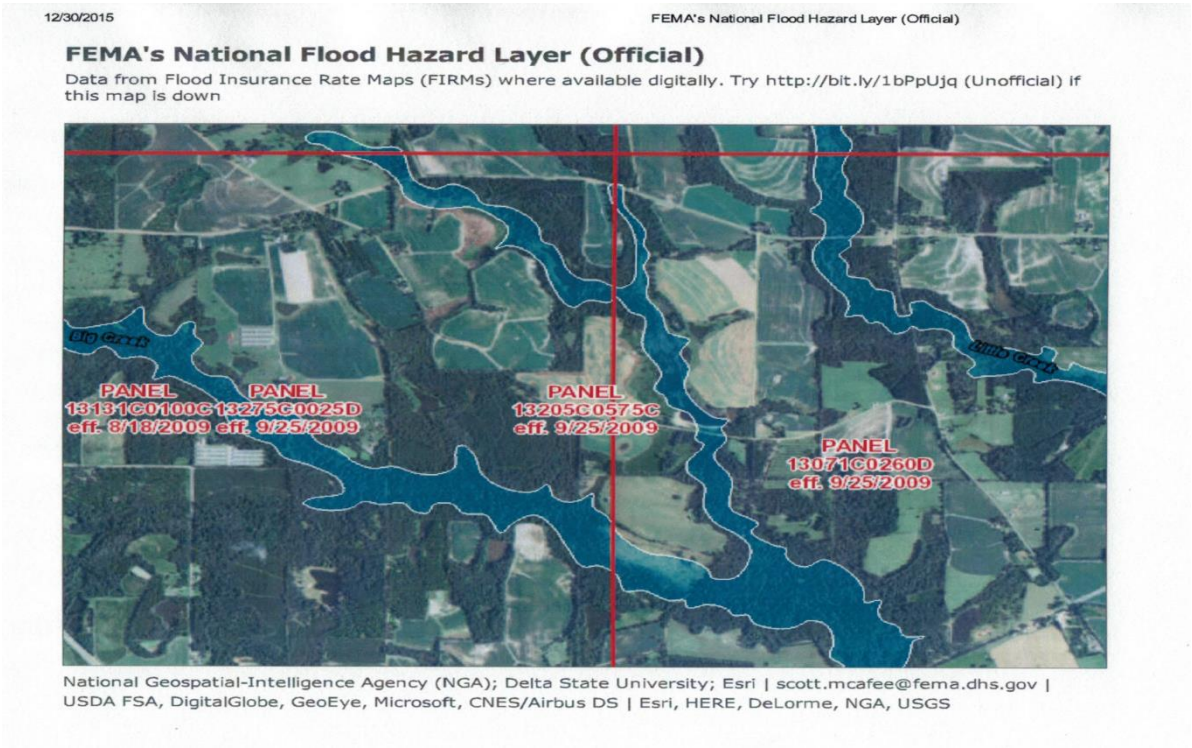
Attachment J Big Creek Wetland Map



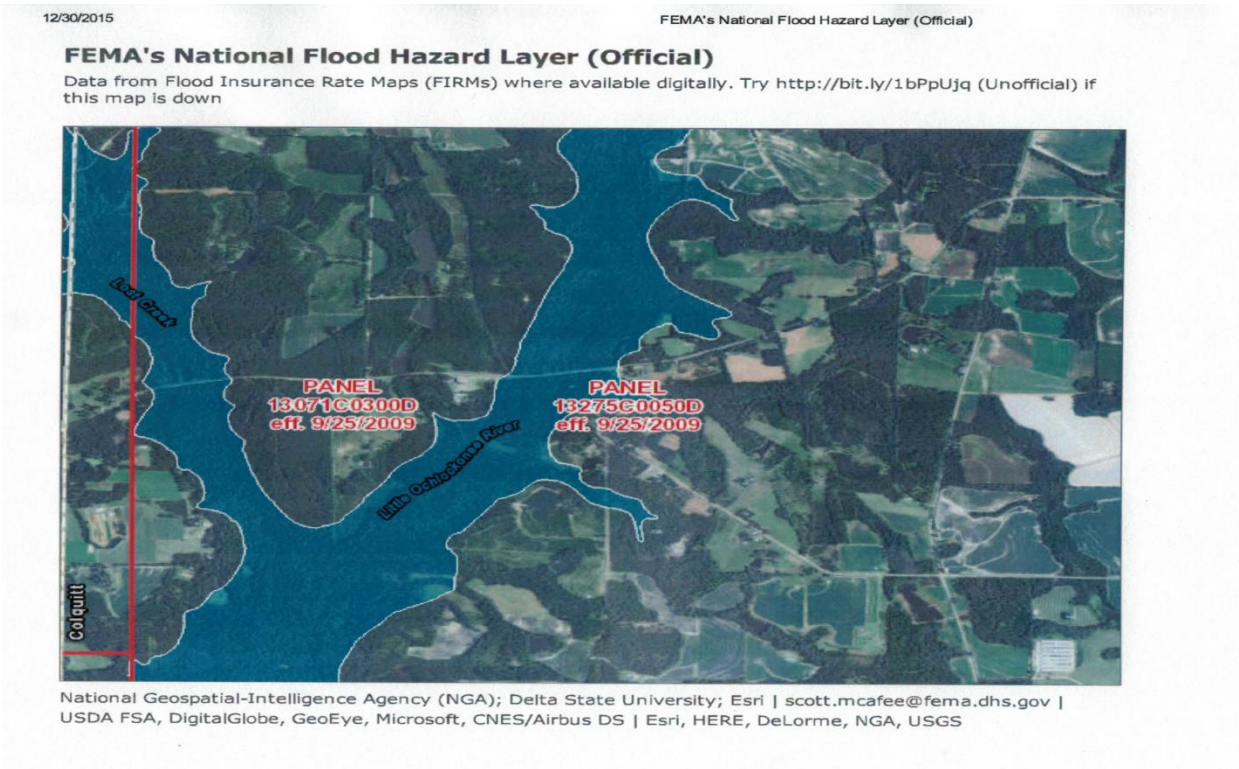
Attachment K Little Ochlockonee Creek Wetland Map



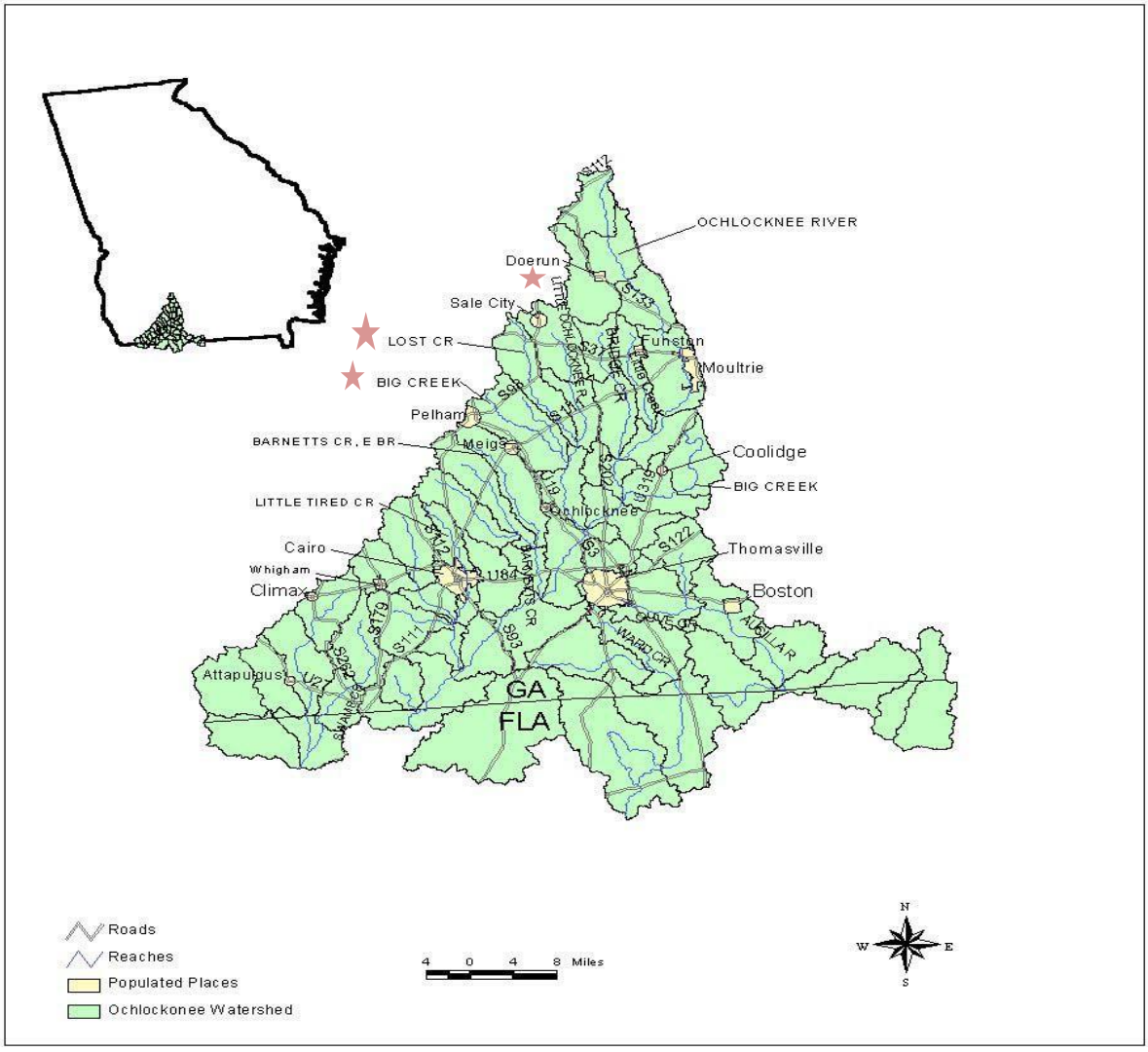
Attachment L FEMA Map Big Creek



Attachment M FEMA Map Little Ochlockonee and Lost Creek

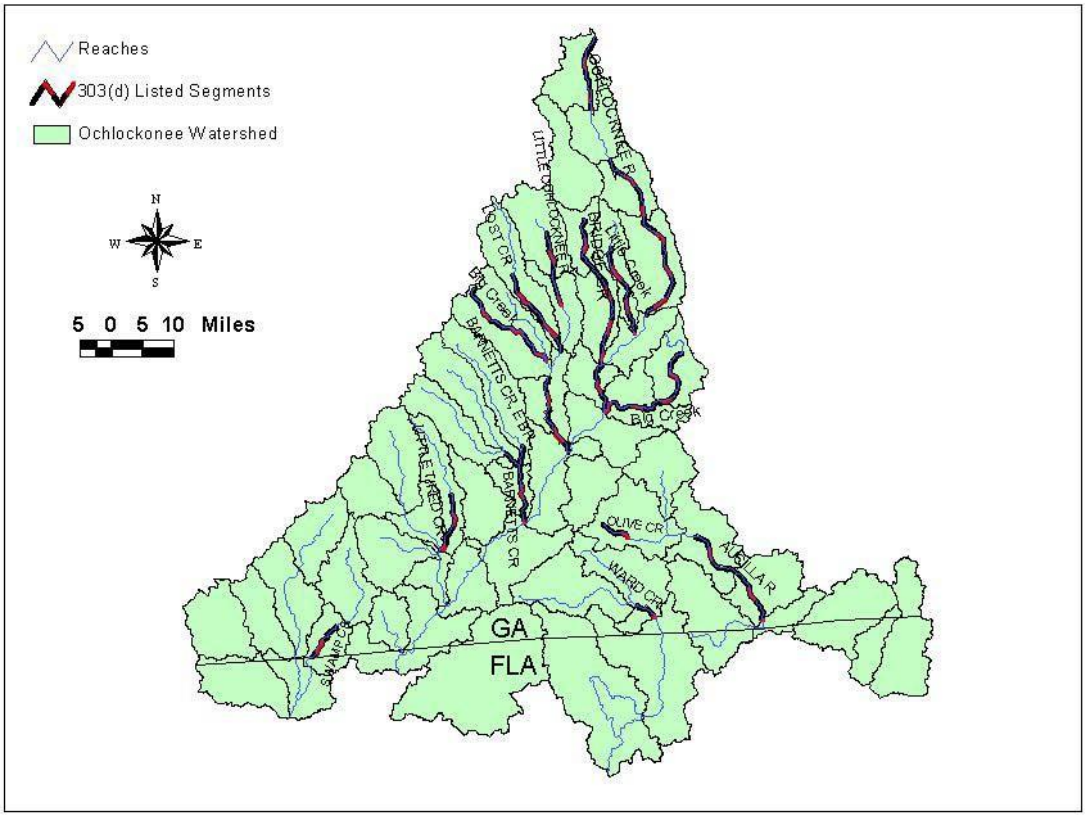


Attachment N Ochlockone DO Orginal TMDL Watershed Basin Map



Attachment O Ochlockonee 303d Listed Orginal TMDL Map

Ochlockonee River Basin Dissolved Oxygen TMDLs	Final

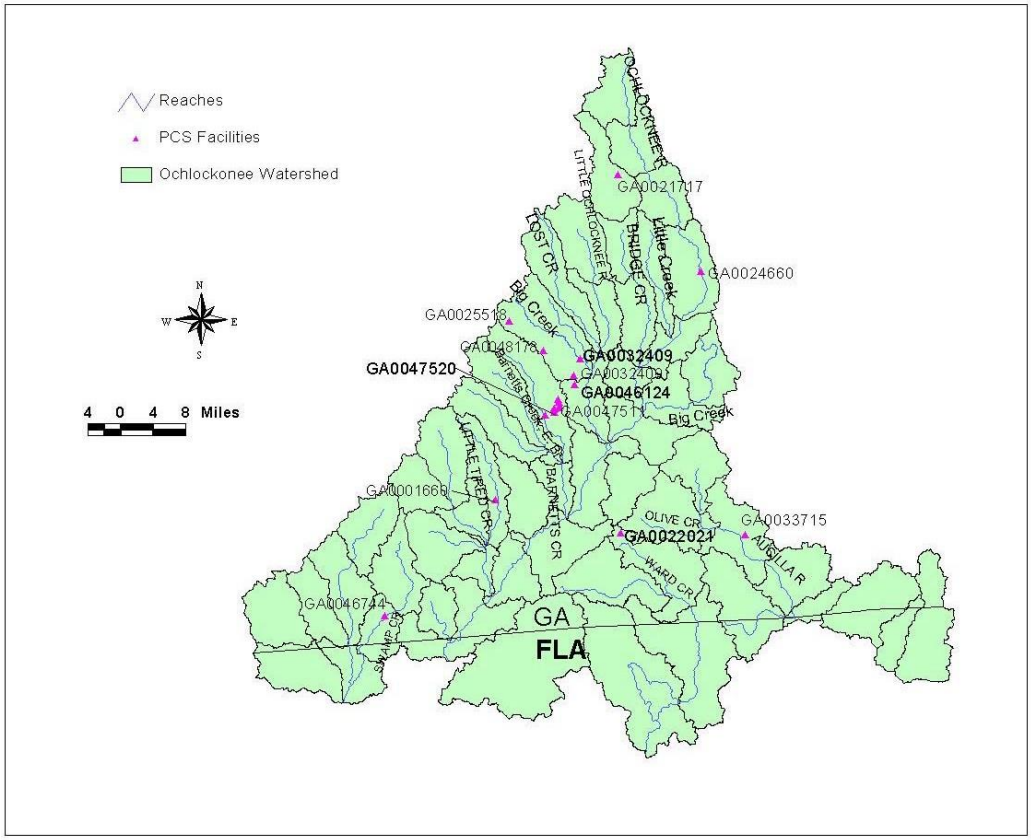


Attachment P DO Point Source Ochlockonee Orginal TMDL

Ochlockonee River Basin Dissolved Oxygen TMDLs	Final

Point Sources Contributing to Impaired Waterbodies in the Ochlockonee River Basin

PERMIT ID	Point Source	Receiving Water
GA0024660	Moultrie WPCP	Ochlockonee River
GA0025518	Pelham WPCP	Big Creek tributary
GA0048178	Meigs WPCP	Oakey Creek
GA0001660	W.B. Roddenberry - Cairo Pickle Division	Little Tired Creek
GA0022021	DHR Southwest State Hospital	Wards Creek
GA0033715	Boston WPCP	Aucilla Creek



Attachment Q Ochlockone DO Orginal TMDL Segment

Ochlockonee River Basin Dissolved Oxygen TMDLs Final

Segment Number	Name	Priority Ranking	Use Classification	Size (miles)	Location
Segment #1	**Aucilla River**	2	Fishing	10	Masse Branch to Brooks County line near Boston (Thomas County)
Segment #2	**Big Creek**	2	Fishing	12	Headwaters to Little Creek near Meigs (Mitchell/Thomas County)
Segment #3	**Big Creek**	2	Fishing	12	Woodhaven Rd. E. of Coolidge to Ochlockonee River (Thomas County)
Segment #4	**Bridge Creek**	2	Fishing	7	Mill Creek to upstream Georgia Hwy. 111 near Moultrie (Colquitt County)
Segment #5	**Bridge Creek**	2	Fishing	10	Upstream Georgia Hwy. 111 near Moultrie to Ochlockonee River (Colquitt/Thomas County)
Segment #6	**Little Creek**	2	Fishing	9	Georgia Hwy. 37 to Ochlockonee River near Moultrie (Colquitt County)
Segment #7	**Little Ochlockonee River**	2	Fishing	9	Slocumb Branch to downstream SR 111 near Moultrie (Colquitt County)
Segment #8	**Little Ochlockonee River**	2	Fishing	9	Big Cr. to Ochlockonee River near Ochlocknee (Thomas County)
Segment #9	**Lost Creek**	2	Fishing	9	Upstream Ga. Hwy. 93 N.E. of Cotton to Little Ochlockonee River (Mitchell/Colquitt County)
Segment #10	**Ochlockonee River**	2	Fishing	8	Headwaters, upstream Ga. Hwy. 112 near Sylvester to Bay Branch, E. of Bridgeboro (Worth County)
Segment #11	**Ochlockonee River**	2	Fishing	7	D/S Ga. Hwy. 270 to Wolf Pit Branch (d/s Giles Millpond) (Colquitt County)
Segment #12	**Ochlockonee River**	2	Fishing	11	SR 37 downstream Moultrie to upstream CR222 (Colquitt County)
Segment #13	**Ochlockonee River**	2	Fishing	7	Bridge Cr. to Big Cr. W. of Coolidge (Thomas County)
Segment #14	**Swamp Creek**	2	Fishing	4	SR 262 to Stateline (Decatur County)
Segment #15	**Wards Creek**	2	Fishing	3	Pine Cr. to McKeever Slough E. of Metcalf (Thomas County)
Segment #16	**Barnetts Creek**	2	Fishing	8	West Branch to Ochlockonee River, W. of Thomasville (Thomas/Grady County)
Segment #17	**E. Br. Barnetts Creek**	2	Fishing	3	Horse Cr. to Barnetts Cr. near Ochlocknee (Thomas County)
Segment #18	**Little Tired Creek**	2	Fishing	6	SR188 downstream Cairo to Tired Cr. (Grady County)
Segment #19	**Olive Creek**	2	Fishing	3	Headwaters to upstream U.S. Hwy. 19, Thomasville (Thomas County)

Attachment R Ochlockone DO Orginal TMDL

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
Big Creek- Segment #2	4,119,423	229,107	34,129
Big Creek - Segment #3	4,936,131	183,685	22,741
Bridge Creek - Segment #4	2,873,106	81,177	13,242
Bridge Creek - Segment #5	4,506,940	129,505	20,714
Little Creek- Segment #6	2,420,563	53,850	8,043
Little Ochlockonee River - Segment #7	4,049,766	116,487	18,614
Little Ochlockonee River- Segment #8	17,876,293	635,270	92,785
Lost Creek - Segment #9	3,190,761	80,315	12,322
Ochlockonee River - Segment #10	1,411,883	49,146	6,606
Ochlockonee River - Segment #11	3,864,883	136,366	18,382
Ochlockonee River - Segment #12	7,762,994	289,035	80,786
Ochlockonee River - Segment #13	17,503,442	572,933	123,392
Swamp Creek - Segment #14	2,884,396	112,552	10,124
Wards Creek - Segment #15	9,096,948	408,582	31,665
Barnetts Creek - Segment #16	13,102,036	555,888	84,678
E. Br. Barnetts Creek - Segment #17	4,317,639	216,253	31,724
Little Tired Creek - Segment #18	4,858,045	204,964	28,616
Olive Creek - Segment #19	2,216,476	142,903	9,447

Presents the Waste Load Allocations (WLAs) and the Load Allocations (LAs) as annual loads for the loads contributing to the dissolved oxygen in the impaired segments in the Ochlockonee River Basin.

Attachment S Ochlockone DO Orginal TMDL Subwatershed Contributing

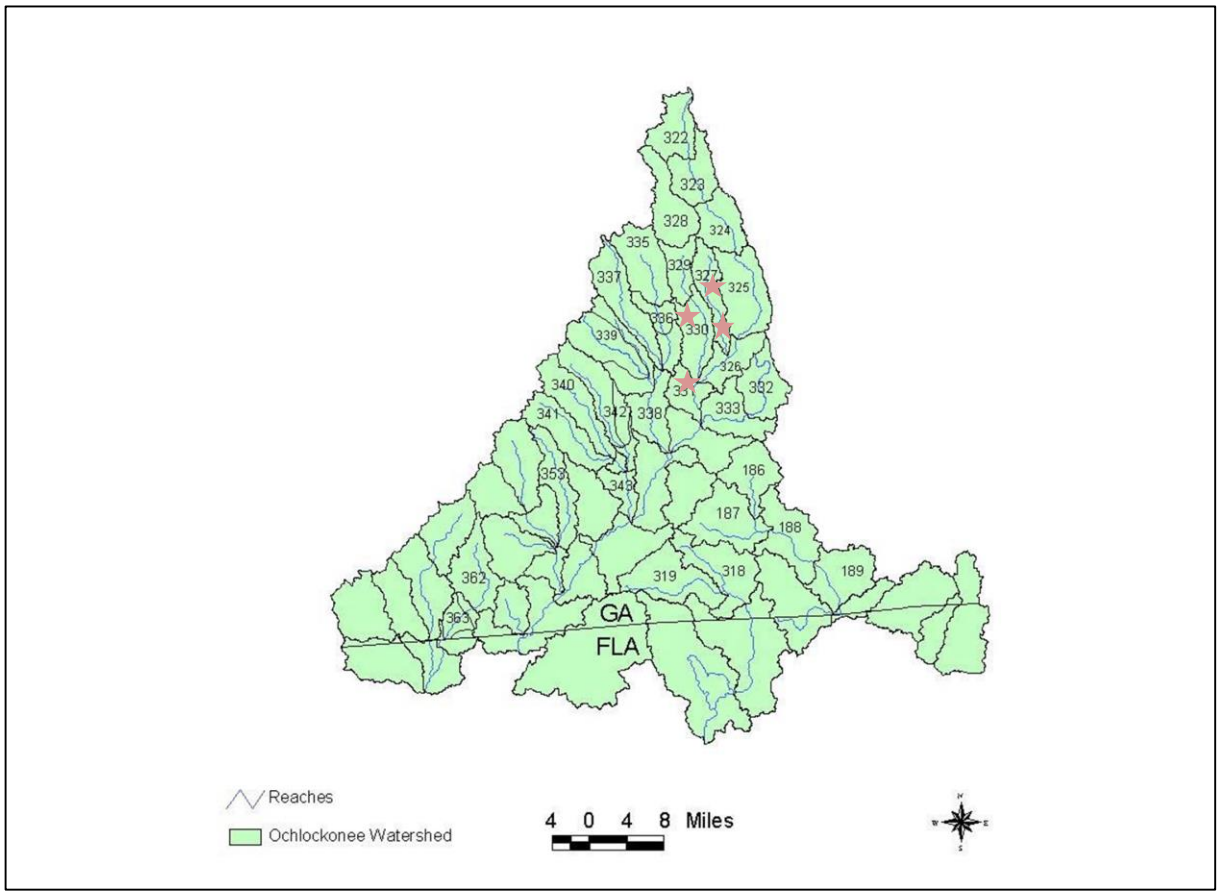
Ochlockonee River Basin Dissolved Oxygen TMDLs **Final**

Subwatersheds Contributing to Impaired Waterbodies

Name	Contributing Subwatersheds (GA 12-Digit)	Corresponding Watershed Model IDs
Aucilla River Segment #1	031101030101, 031101030102(a), 031101030102(b), 031101030102(c),	186, 1871, 1872, 1873, 188, 189
Big Creek Segment #2	031200020405	339
Big Creek Segment #3	031200020302, 031200020303	332, 333
Bridge Creek Segment #4	031200020201, 031200020202	328, 329
Bridge Creek Segment #5	031200020201, 031200020202, 031200020203	328, 329, 330
Little Creek Segment #6	031200020106	327
Little Ochlockonee River Segment #7	031200020401, 031200020402	335, 336
Little Ochlockonee River Segment #8	031200020401, 031200020402, 031200020403, 031200020404(a), 031200020404(b), 031200020405(b), 031200020405(c)	335, 336, 337, 3381, 3382, 3391, 3392, 3393
Lost Creek Segment #9	031200020403	337
Ochlockonee River Segment #10	031200020101	322
Ochlockonee River Segment #11	031200020101, 031200020102, 031200020103	322, 323, 324
Ochlockonee River Segment #12	031200020101, 031200020102, 031200020103, 031200020104, 031200020105(a)	322, 323, 324, 325, 3261
Ochlockonee River Segment #13	031200020101, 031200020102, 031200020103, 031200020104, 031200020105(a), 031200020106, 031200020201, 031200020202, 031200020203, 031200020301	322, 323, 324, 325, 3261, 3262, 327, 328, 329, 330, 331
Swamp Creek Segment #14	031200030205, 031200030206	362, 363
Wards Creek Segment #15	031200010101(a), 031200010101(b),	3181, 3182, 319
Barnetts Creek Segment #16	031200020501(a), 031200020501(b), 031200020502, 031200020503,	3401, 3402, 341, 342, 343
E. Br. Barnetts Creek Segment #17	031200020503	342
Little Tired Creek Segment #18	031200020805	353
Olive Creek Segment #19	031101030102(b)	1872

Note: Contributing Subwatersheds (GA 12-digit) and Corresponding Watershed Model Ids are listed in the same order for each segment. Model Ids are presented for the purpose of visually displaying the subwatersheds.

Attachment T Ochlockone DO Orginal TMDL Subwatersheds Contributing Map



Subwatersheds Used in the Watershed Modeling Process (Contributing to Listed Waterbodies) Note: Subwatersheds are labeled by their model IDs.

Some subwatersheds were further divided to support proper hydrologic representation.

Attachment U Ochlockone DO Orginal TMDL Reduction Requirements by Creek

Table D-2

Big Creek- Segment #2

TMDL = WLA + LA		
TOC(lb/yr)	TN(lb/yr)	TP(lb/yr)
4,119,423	229,107	34,129

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		
031200020405	4,866,427	181,922	28,272	3,516,691	131,465	20,431	27.74	27.74	27.74
Total	4,866,427	181,922	28,272	3,516,691	131,465	20,431	28	28	28
Point Sources (WLA)	Existing Loads			Allocation Loads (WLA)			% Reduction		
Pelham WPCP (GA0025518)	547,938	94,314	11,415	547,938	94,314	11,415	0.0	0.0	0.0
Meigs WPCP (GA0048178)	54,794	3,329	2,283	54,794	3,329	2,283	0.0	0.0	0.0
Total	602,732	97,643	13,698	602,732	97,643	13,698	0.00	0.00	0.00

Table D-7

Little Ochlockonee River - Segment #7

TMDL = WLA + LA		
TOC(lb/yr)	TN(lb/yr)	TP(lb/yr)
4,049,766	116,487	18,614

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		
031200020401	3,224,699	96,738	15,861	2,453,883	73,614	12,070	23.90	23.90	23.90
031200020402	2,036,103	54,699	8,350	1,595,883	42,872	6,544	21.62	21.62	21.62
Total	5,260,802	151,437	24,211	4,049,766	116,487	18,614	23	23	23

Table D-9

Lost Creek - Segment #9

TMDL = WLA + LA		
TOC(lb/yr)	TN(lb/yr)	TP(lb/yr)
3,190,761	80,315	12,322

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		
031200020403	3,959,350	99,661	15,290	3,190,761	80,315	12,322	19.41	19.41	19.41
Total	3,959,350	99,661	15,290	3,190,761	80,315	12,322	19	19	19

References

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

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