

# **Georgia's Statewide Nonpoint Source Management Plan**



**Georgia Department of Natural Resources  
Environmental Protection Division  
2014**

# **GEORGIA**

## ***Statewide Nonpoint Source Management Plan FFY 2014 Update***

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Cover page photo by Rob McDowell, University of Georgia

## **EXECUTIVE SUMMARY**

Nonpoint sources of water pollution are both diffuse in nature and difficult to define. Nonpoint source pollution can generally be defined as the pollution caused by rainfall or snowmelt moving over and through the ground. As water moves over or through the soil, it picks up and carries away natural and man-made pollutants finally depositing them in lakes, rivers, wetlands, coastal waters and ground waters. Habitat alteration (e.g., removal of riparian vegetation) and hydrological modification (e.g., channelization, bridge construction) can cause adverse effects on the biological and physical integrity of surface waters and are also treated as nonpoint sources of pollution.

The diffuse nature of nonpoint sources (e.g., agriculture, construction, mining, silviculture, urban runoff) and the variety of pollutants generated by them create a challenge for their effective control. Although progress has been made in the protection and enhancement of water quality, much work is still needed to identify nonpoint source management strategies that are both effective and economically achievable under a wide range of conditions and through a broad range of habitats.

The largest obstacle in regulating the nation's water quality is nonpoint source pollution. The Federal Clean Water Act National Pollutant Discharge Elimination System (NPDES) permitting program regulates discharges of pollutants from ***point sources***, which includes stormwater discharge and wastewater discharges from pipes, outlets and other discrete conveyances. The NPDES permitting program does not address ***nonpoint sources*** of pollution which transports sediment, nutrients, bacteria, metals, pesticides, organic compounds and other forms of pollution into the nation's rivers, lakes, estuaries and wetlands. The control of dominant point source problems has allowed the GAEPD to place increasing emphasis on the prevention, control, and abatement of nonpoint sources of pollution. This revision of the Statewide Nonpoint Source Management Plan presents stakeholders with exciting opportunities to solve the remaining nonpoint source pollution problems as well as to sustain good water quality.

Georgia's initial *Nonpoint Source Assessment Report* and *Nonpoint Source Management Program* were completed in compliance with the Clean Water Act of 1987 and approved by the U.S. Environmental Protection Agency in January 1990. The biennial reports, *Water Quality in Georgia*, as required by Section 305(b) of Public Law 92-500, serve as the current process for updating the *Nonpoint Source Assessment Report*.

The *Statewide Nonpoint Source Management Plan* combines regulatory and non-regulatory approaches, in cooperation with other State and Federal agencies, local and regional governments, State colleges and universities, businesses and industries, nonprofit organizations and individual citizens. This document represents a revision of the *Statewide Nonpoint Source Management Plan* last updated in 2000. This revision provides an update to reflect new priorities and practices of nonpoint source pollution control in Georgia. It represents Georgia's plan for making progress toward meeting the ultimate goal of the Clean Water Act of achievement of water quality standards for fishable and swimmable waters. The revision is also intended to meet the requirements for funding under Section 319(b) of the Clean Water Act and USEPA Section 319 program guidelines published April 2013. Revisions include short- and Long Term goals, implementation strategies, and measures of success. The Statewide Nonpoint Source Management Plan is designed to be an informative resource for all stakeholders across the State involved in the prevention, control and abatement of nonpoint

sources of pollution. It has been developed as an inventory of nonpoint source management (*regulatory* and *non-regulatory*) in Georgia, including activities which are currently underway or planned for the time period FFY15 through FFY2019.

These overarching goals create challenges for prioritization of implementation. Georgia EPD has begun implementation of a watershed approach to prioritize projects that will either most successfully contribute to the protection or restoration of a downstream receiving body or it will allow selection of waters with a high likelihood of localized restoration success. This prioritization tool has been integrated with the water quality models developed as part of Georgia's State-wide Water Planning Process. A pilot project for the Satilla basin is presented as part of this plan.

The *Statewide Nonpoint Source Management Plan* focuses on the comprehensive categories of nonpoint sources of pollution identified by the U.S. Environmental Protection Agency: *Agriculture, Silviculture, Construction, Urban Runoff, Resource Extraction, Land Disposal, and Other Nonpoint Sources*. The GAEPD solicited participation from State and Federal agencies, local and regional governments, State colleges and universities, businesses and industries, and nonprofit organizations with significant programs directed towards nonpoint source management. Additionally, this plan includes methods to help communities dealing with an increase in the frequency of severe and extreme weather occurrences and the associated impacts of nonpoint source pollution. Many practices to reduce nonpoint source pollution also increase community resiliency to extreme weather events from changes in climate.

The *Statewide Nonpoint Source Management Plan* comprehensively describes a framework for stakeholder coordination and cooperation. Additionally, it serves to implement a strategy for employing effective management measures and programs to control nonpoint source pollution Statewide. Further, it incorporates the eight key elements that are delineated in the April 2013 edition of the *National Section 319 Program Guidance*. The 2014 Statewide Nonpoint Source Management Plan contains 1) short and long term goals, 2) stakeholder partnerships, 3) efficient and effective projects, 4) descriptions of resource allocation, 5) water impairment identification methods, 6) 319 program implementation strategies, 7) effective NPS program management, and 8) formative NPS program strategies. By addressing these key elements, Georgia will continue to have an effective *Statewide Nonpoint Source Management Plan* designed to achieve and maintain beneficial uses of water.

In order to facilitate use by the interested public and regulated community, the plan is organized into functional areas. In this way, those interested in a particular aspect of nonpoint source management can read their appropriate section of interest. Plan sections include: Watershed Prioritization, Water Quality Monitoring, Agriculture, Urban, Coastal, 319 Grants, Outreach and Education, Statewide Water Plan, Regional Planning, Silviculture, Wetlands, Surface Mining, Dirt Roads, Land Acquisition and Green Space, Onsite Sewage Disposal Systems, New Tools for Nonpoint Source Management, Other Nonpoint Source Related Programs, and Regulatory Programs.



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**Picture 1: Reflections of Water, by Amy Wang, Shijun Art Studio, Lilburn**

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Picture 2: *Untitled*, by Alston Li, SKA Academy, Duluth



## **INTRODUCTION**

This revision of the Statewide Nonpoint Source Management Plan was developed through a collaborative process, incorporating input from stakeholders involved in nonpoint source pollution management activities throughout the State: local, regional, State and Federal agencies, non-governmental organizations, and technical experts from the University of Georgia most familiar with nonpoint source pollution in Georgia. This process encouraged intergovernmental resource sharing and increased stakeholder involvement. This revision of the Statewide Nonpoint Source Management Plan established new partnerships and strengthened existing partnerships in the development and implementation of both short and long term nonpoint source strategies to better manage statewide nonpoint source mitigation projects.

The GAEPD is responsible for administering and enforcing laws to protect the waters of the State, defined to include surface and groundwater. Consequently, the GAEPD has been designated as the administering or lead agency for implementing the State's *Nonpoint Source Management Program*. Regulatory responsibilities include establishing water quality use classifications and standards, assessing and reporting on water quality conditions, issuing point source discharge permits, issuing surface and groundwater withdrawal permits, and regulating land-disturbing activities. These regulatory programs are complemented by non-regulatory programs, including the Section 319 Nonpoint Source Implementation Grant Program, Clean Water State Revolving Fund, Georgia Project WET (Water Education for Teachers) Program, Georgia Adopt-A-Stream Program, Rivers Alive (waterway clean up) Program, and the Georgia Water Management Campaign.

State agencies are essential partners in efforts to implement the State's *Nonpoint Source Management Program*. These partners include the Coastal Resources Division and the Wildlife Resources Division in the Georgia Department of Natural Resource; the Georgia Department of Community Affairs; the Georgia Department of Human Resources Division of Public Health; Georgia Forestry Commission; and the Georgia Environmental Facilities Authority. Currently, several partners have been designated by GAEPD to assist in the efforts to reduce nonpoint source pollution: the Coastal Resources Division assists GAEPD in the development and implementation of the State's *Coastal Nonpoint Source Management Program*, the Georgia Soil and Water Conservation Commission (GSWCC) has been designated as the lead agency for implementing the agricultural component of , and the Georgia Forestry Commission (GFC) has been designated as the lead agency for implementing the silvicultural component. In addition, a Memorandum of Understanding between the U.S. Forest Service (USFS), GFC and the GAEPD, identifies the responsibilities of the participating agencies in implementing the State's *Nonpoint Source Management Program* as related to activities in the Chattahoochee and Oconee National Forest. Numerous State and Federal agencies and private, non-governmental organizations which continue to cooperate with the GAEPD, GSWCC and the GFC include: United States Environmental Protection Agency (USEPA), United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), Georgia Farm Bureau (GFB), Georgia Forestry Association (GFA), Georgia Agribusiness Council, University of Georgia (UGA) and the Georgia Department of Agriculture (GDA).

This revision encompasses and includes by reference all previous revisions of Georgia's Nonpoint Source Management Plan except were those revisions are superseded by sections of this plan with new goals and objectives.

## **Nonpoint Source Management Program Requirements**

Section 319 of the CWA (PL 100-4, February 4, 1987) directed the Governor of each State to prepare and submit a NPS Management Program for reduction and control of pollution from NPS sources to navigable waters in the State. The specific requirements of Section 319 are:

A. An identification of BMPs and measures which will be undertaken to reduce pollutant loading resulting from each category, subcategory, or particular nonpoint source designated under paragraph (1)(B), taking into account the impact of the practice of ground water quality.

B. An identification of programs (including, as appropriate, non-regulatory or regulatory programs for enforcement, technical assistance, financial assistance, education, training, technology, transfer, and demonstration projects) to achieve implementation of BMPs by categories, subcategories, and particular NPS sources designated under subparagraph (A).

C. A schedule containing annual milestones for (i) utilization of the program implementation methods identified in paragraph (B), and (ii) implementation of BMPs identified in subparagraph (A) by the categories, subcategories, or particular NPS designated under paragraph (1)(B). Such schedule shall provide for utilization of BMPs at the earliest practicable date.

D. A certification of the attorney general of the State (or the chief attorney of any state water pollution control agency which has independent legal counsel) that laws of the State or States, as the case may be, provide adequate authority to implement such management programs, or if there is not adequate authority, a list of such additional authorities as will be necessary to implement such management programs. A schedule and commitment by the State or States to seek such additional authorities as expeditiously as practicable.

E. Sources of Federal and other assistance and funding (other than assistance provided under subsections (h) and (i) which will be available in each of such fiscal year for supporting implementation of such practices and measures and the purposes for which such assistance will be used in each of such fiscal years.

F. An identification of Federal financial assistance programs and Federal development projects for which the State will review individual assistance applications or development projects for their effect on water quality pursuant to the procedures set forth in Executive Order 12372 as in effect on September 17, 1983, to determine whether such assistance applications or development projects would be consistent with the program prepared under this subsection; for the purposes of this subparagraph, identification shall not be limited to the assistance programs or development projects subject to Executive Order 12372 but may include any program listed to the assistance programs subject to Executive order 12372, but may include any programs listed in the most recent Catalog of Federal Domestic Assistance which may have an effect on the purposes and objectives of the State's NPS pollution management program.

## **USEPA Guidelines on Nonpoint Source Program**

USEPA provided national guidance documents to states since 1990, when Congress allocated Section 319 funds to implement NPS Programs. These guidance documents have been updated, revised, and re-issued several times. The 2013 NPS Guidance provided a set of eight key elements that all states should strive to incorporate into their updated NPS Programs.

### **USEPA's Eight Key Elements for Update of State NPS Management Programs**

1. The state program contains explicit short and long term goals, objectives and strategies to restore and protect surface water and ground water, as appropriate.
2. The state strengthens its working partnerships and linkages to appropriate state, interstate, tribal, regional, and local entities (including conservation districts), private sector groups, citizens groups, and federal agencies.
3. The state uses a combination of statewide programs and on-the-ground projects to achieve water quality benefits; efforts are well-integrated with other relevant state and federal programs.
4. The state program describes how resources will be allocated between (a) abating known water quality impairments from NPS pollution and (b) protecting threatened and high quality waters from significant threats caused by present and future NPS impacts.
5. The state program identifies waters and watersheds impaired by NPS pollution as well as priority unimpaired waters for protection. The state establishes a process to assign priority and to progressively address identified watersheds by conducting more detailed watershed assessments, developing watershed-based plans and implementing the plans.
6. The state implements all program components required by section 319(b) of the Clean Water Act, and establishes strategic approaches and adaptive management to achieve and maintain water quality standards as expeditiously as practicable. The state reviews and upgrades program components as appropriate. The state program includes a mix of regulatory, non-regulatory, financial and technical assistance, as needed.
7. The state manages and implements its NPS management program efficiently and effectively, including necessary financial management.
8. The state reviews and evaluates its NPS management program using environmental and functional measures of success, and revises its NPS management program at least every five years.

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## Mission Statement

The Environmental Protection Division (GAEPD) protects and restores Georgia's environment. We take the lead in ensuring clean air, water and land. With our partners, we pursue a sustainable environment that provides a foundation for a vibrant economy and healthy communities.

## Vision Statement

- Georgia's environment is healthy and sustainable. Natural resources are protected and managed to meet the needs of current and future generations.
- All Georgians understand the importance of a healthy and sustainable environment and act to protect and restore it.
- GAEPD is responsive, effective and efficient. Associates are valued and empowered to use their expertise and creativity as leaders in protecting Georgia's environment.

The overall goals of the Statewide Nonpoint Source Management Program are to protect and restore Georgia's waters and to manage grant funds effectively. These goals are encapsulated in the Key Components Section provided below. Long-term goals, short-term goals, and milestones are provided throughout the plan in the relevant functional area sections. These goals and milestones are repeated in a [tracking table](#).

These overarching goals create challenges for prioritization of implementation. Georgia EPD has implemented a watershed approach to prioritize projects that will either most successfully contribute to the protection or restoration of a downstream receiving body or it will allow selection of waters with a high likelihood of localized restoration success. This prioritization tool has been integrated with the water quality models developed as part of Georgia's State-wide Water Planning Process. A pilot project for the Satilla basin is presented as part of this plan.

## **Definitions**

**Basin:** refers to the land area that drains to one of the 14 river basins that cover all or parts of Georgia's mainland landmass.

**Functional Area:** determined by the major land use categories in Georgia, each functional area will have a State Program focused on that land use and the associated pollutants.

**GAEPD/EPD:** the Georgia Environmental Protection Division is the State agency responsible for environmental quality in Georgia. EPD is the developer and primary implementer of the *State Nonpoint Source Management Plan*.

**Green Infrastructure:** is an interconnected network of protected land, water, and other open spaces that supports native species, maintains natural ecological processes, sustains air and water resources, and contributes to the health and quality of life for Georgia's communities and people. In the context of stormwater management, green infrastructure also refers to those systems and practices that use or mimic natural processes to facilitate stormwater infiltration, evapotranspiration, or reuse on-site.

**Impervious surfaces:** means any surface such as pavement, roofs, roadways or other surface material that water does not readily permeate.

**Instream uses:** means all those human and ecological uses of water which occur within the banks of rivers and streams, including waste assimilation, hydropower production, recreation, maintenance of aquatic habitats, and support of biological integrity.

**Long-Term Goal:** a stated objective expected to take 5-7 years to complete, "big picture" direction for grantees, Functional Areas and State Programs

**Low impact development:** is a comprehensive land planning and engineering design approach to stormwater management that attempts to mimic a site's pre-development hydrology by using techniques that filter, store, and detain runoff close to its source and aid in infiltration and evaporation.

**Management practices:** are reasonable methods, considering available technology and economic factors, for managing water demand, water supply, return of water to water sources, and prevention and control of pollution of the waters of the state

**Milestone:** a targeted measure of success towards meeting a short term goal. These measures may or may not be numerical in nature.

**Moving Forward:** a series of State goals outside of the 319(h) plan, to help improve state programs or increase knowledge and understanding

**Non-point source pollution (NPS):** is diffuse contamination including sediment, litter, bacteria, nutrients, metals, oils, grease, chemicals and other pollutants entering bodies of water. Non-point source pollution may be transmitted by stormwater runoff, precipitation, atmospheric deposition, drainage, and/or seepage. Stormwater itself may also detrimentally alter a stream's hydrology, flow rate, temperature, and other physical and biological characteristics.



**On-site sewage management system(s):** means a sewage management system other than a public or community sewage treatment system that relies on natural processes and/or mechanical components to collect, treat, and disperse or reclaim wastewater from a single dwelling or building.

**Point source pollution:** is contamination that emanates from discharges of treated wastewater or stormwater regulated under the National Pollutant Discharge Elimination System (NPDES)

**Septage:** means the liquid or solid material removed from an on-site sewage management system, cesspool, portable toilet, type III marine sanitation device, or a similar system that receives only domestic sewage. Septage does not include liquid or solid material removed from an on-site sewage management system or similar treatment works that receives either commercial wastewater or industrial wastewater.

**Short-Term Goal:** steps and objectives used to build towards meeting a long term goal, not all long term goals will have short term goals.

**SP-12:** A waterbody with improved water quality conditions in impaired watersheds using the watershed approach

**Statewide Programs:** Tools used to address NPS sources throughout Georgia not focused on any one particular land use.

**Stormwater:** means stormwater runoff, snow melt runoff, and surface runoff and drainage.

**Sustainable:** means using water resources to meet current needs without unreasonably foreclosing the ability of future generations to meet their own water needs.

**Total Maximum Daily Load (TMDL):** is a calculation of the maximum amount of a pollutant that a water body can receive and still safely meet water quality standards.

**USEPA/EPA:** the Environmental Protection Agency is Federal entity responsible for pollution control and environmental quality nationwide. EPA awards the 319 grant to each state.

**Water Council:** is the coordinating committee composed of 14 individuals, established by O.C.G.A. §12-5-524, representing the Georgia Legislature, State officials, and the public, whose responsibility it is to recommend a comprehensive statewide water management plan to the General Assembly.

**Water planning region:** is a geo/politically defined area that includes one or more water quantity and/or quality resources

**Watershed:** means the land area tributary to a given point along a stream or river.

**Watershed approach:** is a coordinating process for focusing on priority water resource problems that; Is focused on hydrologically defined areas, Involves key stakeholders, Uses an iterative planning or adaptive management process to address priority water resource goals, and Uses an integrated set of tools and programs.

**WQ-10:** A waterbody that has a use that is initially impaired by more than one pollutant, but after restoration efforts meets the criteria for one or more (but not necessarily all) of those pollutants

## The Clean Water Act and Georgia Environmental Protection

The Clean Water Act (CWA) of 1972 is the overarching federal law for managing surface water quality in the United States. The CWA employs regulatory and non-regulatory tools to reduce point sources of pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. The CWA's goal is to "restore and maintain the chemical, physical and biological integrity of the Nation's waters" so as to improve "water quality which provides for the protection and propagation of fish, shellfish and wildlife and provides for recreation in and on the water", wherever attainable. The fundamental purpose of the CWA has been widely communicated as making the nation's waters "fishable and swimmable".

Georgia EPD has been delegated authority to administer the Clean Water Act requirements in Georgia. Figure 1 shows the process through which Georgia administers the act and the places where this nonpoint source plan interact with the stages of clean water act implementation identified above.

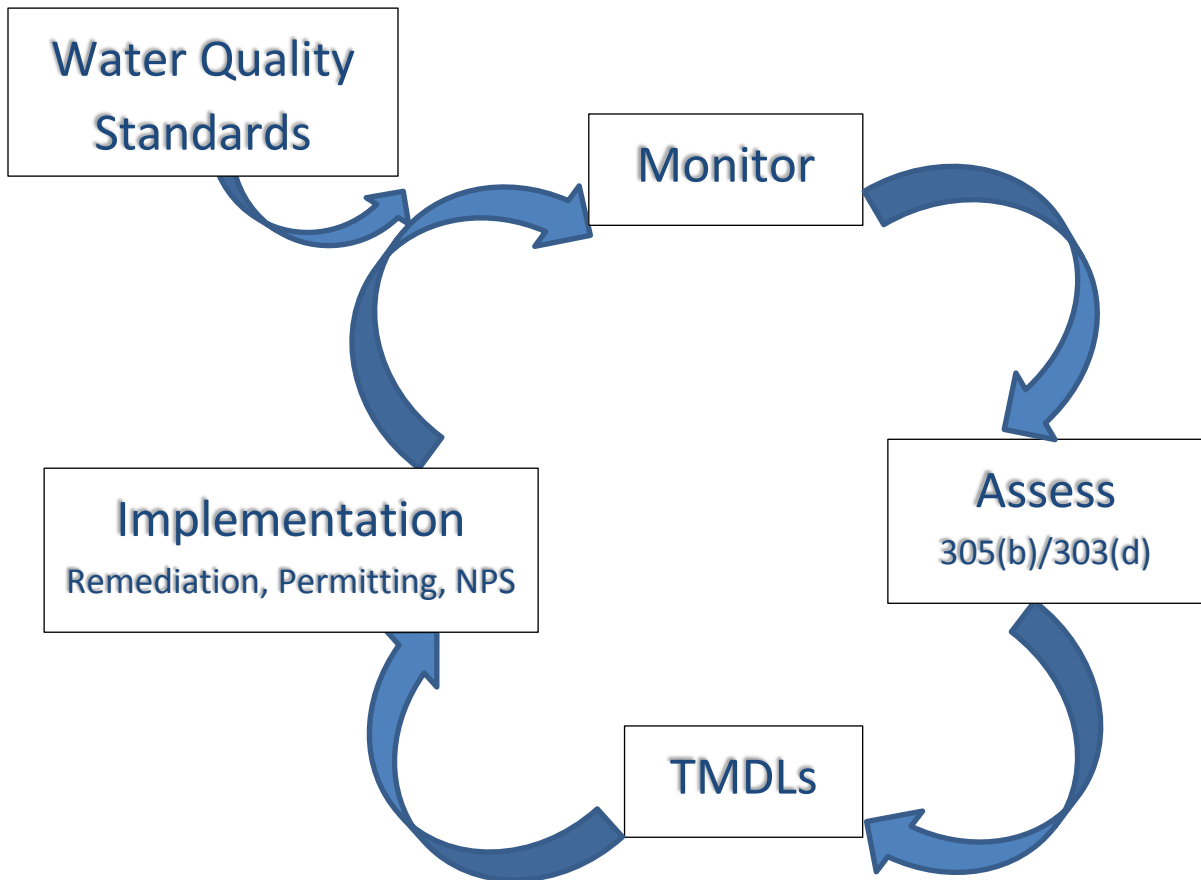
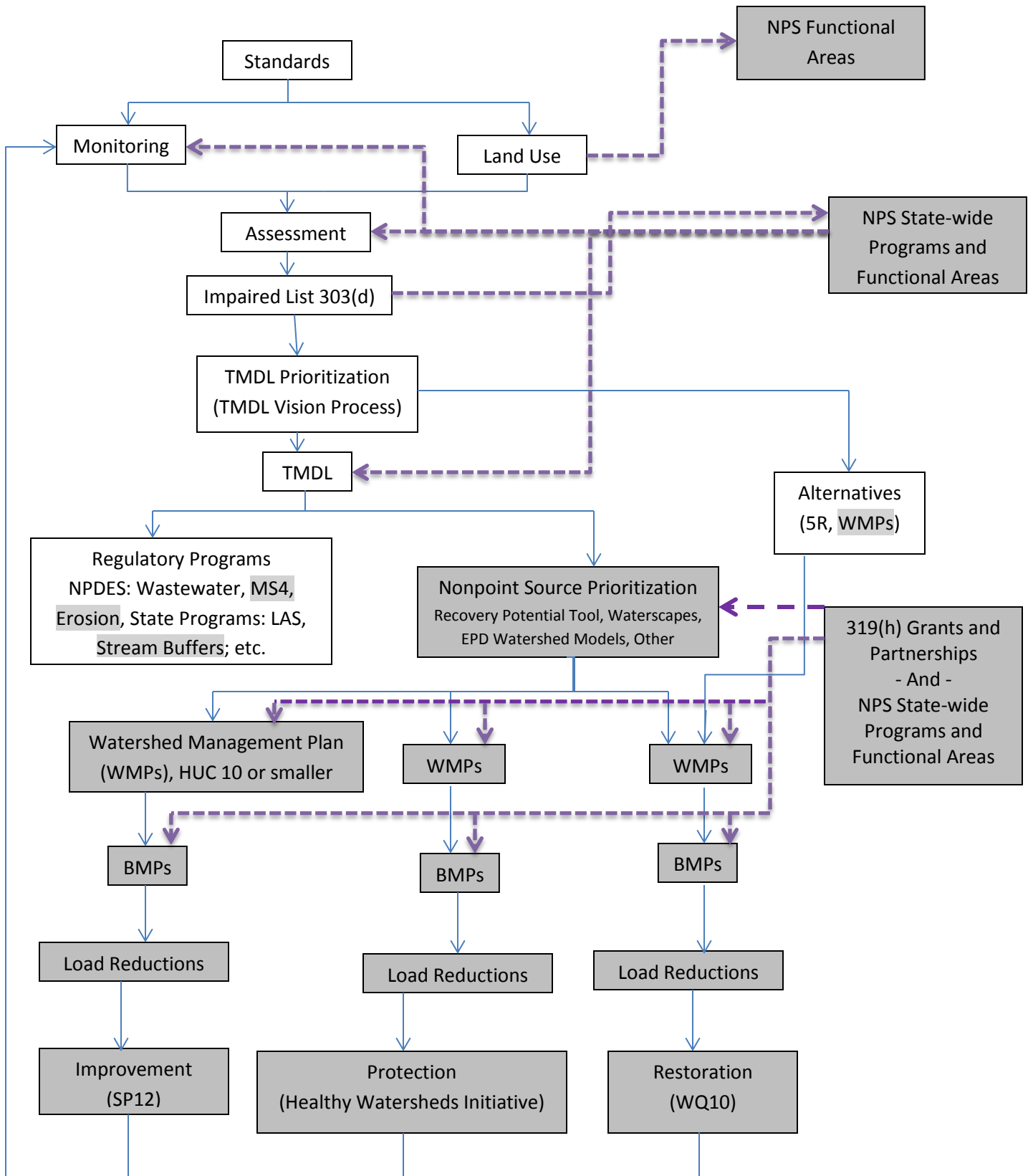


Figure 1: Clean Water Act Process



Clean Water Act Processes and Nonpoint Source (NPS) Interactions

## Water Quality Standards:

### **Background**

The river miles and lake acreage estimates are based on the U.S. Geological Survey (USGS) 1:100,000 Digital Line Graph (DLG), which provides a national database of hydrologic traces. The DLG in coordination with the USEPA River Reach File provides a consistent computerized methodology for summing river miles and lake acreage. The 1:100,000 scale map series is the most detailed scale available nationally in digital form and includes 75 to 90 percent of the hydrologic features on the USGS 1:24,000 scale topographic map series. Included in river mile estimates are perennial streams (streams that flow all year), intermittent streams (streams that stop flowing during dry weather), and ditches and canals (waterways constructed by man). The estimates for Georgia are 44,056 miles of perennial streams, 23,906 miles of intermittent streams, and 603 miles of ditches and canals for a total of 70,150 geological stream miles. The estimates for the number of lakes in Georgia are 11,813 with a total acreage of 425,382.

Georgia has 14 major river basins. These are the Altamaha, Chattahoochee, Coosa, Flint, Ochlockonee, Ocmulgee, Oconee, Ogeechee, St. Marys, Satilla, Savannah, Suwannee, Tallapoosa, and the Tennessee. The rivers in Georgia provide the water needed by aquatic life, animals and humans to sustain life. Water also provides significant recreational opportunities, is used for industrial purposes, drives turbines to provide electricity, and assimilates our wastes.

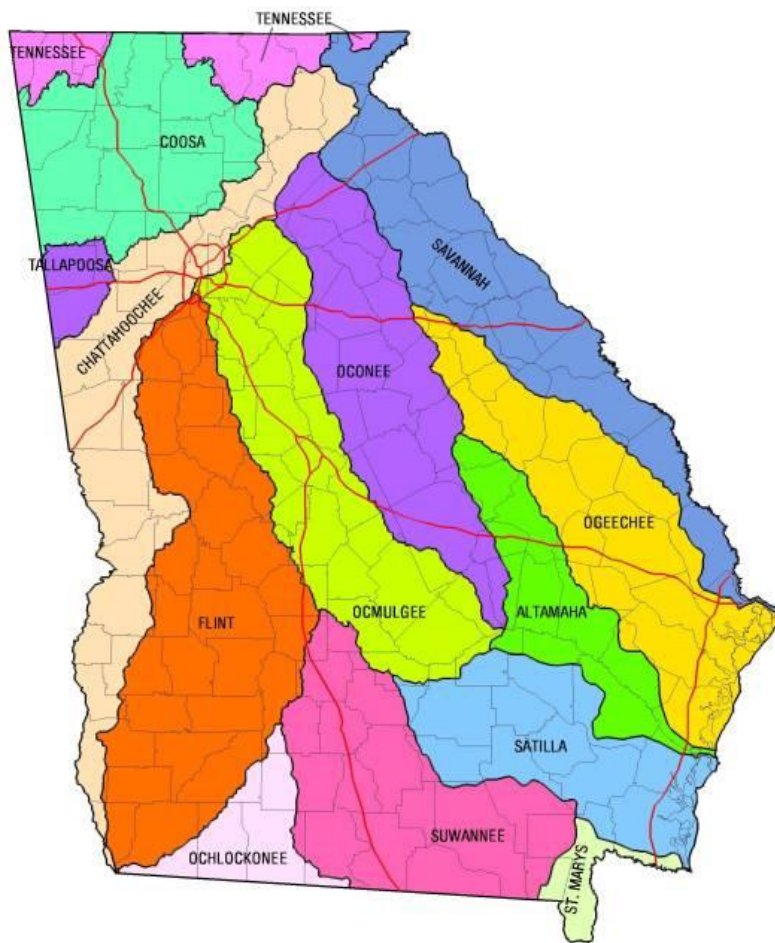


Figure 2: Georgia's 14 River Basins

## **Water Use Classifications and Water Quality Standards**

The Board of Natural Resources is authorized through the Rules and Regulations for Water Quality Control to establish water use classifications and water quality standards for the waters of the State.

For each water use classification, water quality standards or criteria have been developed, which establish the framework used by the Environmental Protection Division to make water use regulatory decisions. All of Georgia's waters are currently classified as fishing, recreation, drinking water, wild river, scenic river, or coastal fishing. A summary of water use classifications and criteria for each use can be found in the complete document: [Water Quality in Georgia 2012](#). Georgia's rules and regulations protect all waters for the use of primary contact recreation by having a fecal coliform bacteria standard of a geometric mean of 200 per 100 ml for all waters with the use designations of fishing or drinking water to apply during the months of May - October (the recreational season).

Georgia has also adopted 31 numeric standards for protection of aquatic life and 92 numeric standards for the protection of human health. Table 3-3 provides a summary of toxic substance standards that apply to all waters in Georgia.

Georgia has six large publicly owned lakes that have specific water quality standards. These lakes are West Point, Jackson, Walter F. George, Lanier, Allatoona, and Carter's. Standards were adopted for chlorophyll-a, pH, total nitrogen, phosphorus, fecal coliform bacteria, dissolved oxygen, and temperature. Standards for major tributary phosphorus loading were also established. The standards for the six lakes are summarized in Table 3-4.

## **Water Quality Monitoring:**

The goal of the watershed protection program in Georgia is to effectively manage, regulate, and allocate the water resources of Georgia. In order to achieve this goal, it is necessary to monitor the water resources of the State to establish baseline and trend data, document existing conditions, study impacts of specific discharges, determine improvements resulting from upgraded water pollution control plants, support enforcement actions, establish wasteload allocations for new and existing facilities, develop TMDLs, verify water pollution control plant compliance, collect data for criteria development, and document water use impairment and reasons for problems causing less than full support of designated water uses. Trend monitoring, intensive surveys, lake, estuary, biological, toxic substance monitoring, aquatic toxicity testing, and facility compliance sampling are some of the monitoring tools used by the GAEPD. More information on GAEPD's monitoring practices and quality assurance can be found [here](#).

## **Water Quality Assessment 305(b)/303(d):**

Water quality data are assessed to determine if standards are met and if the water body supports its designated or classified water use. If monitoring data show that standards are not achieved, the water body is said to be "not supporting" the designated use. The data reviewed included GAEPD monitoring data, and data from other State, Federal, local governments, and data from groups with approved QA/QC programs. Table 3-13 provides a list of agencies that contributed data for use in assessing water quality in this and in past reports.



### **Assessment of Causes of Nonsupport of Designated Uses**

There are many potential pollutants that may interfere with the designated use of rivers, streams, lakes, estuarine, and coastal waters. These can be termed the causes of use nonsupport. Based on information presented in [Appendix A](#), [Table 3-15](#) summarizes the parameters of concern or the causes which contributed to nonsupport of water quality standards or designated uses of a particular water body type.

### **Assessment of Potential Sources of Nonsupport of Designated Uses**

Pollutants that impact water bodies in Georgia may come from point or nonpoint sources. Point sources are discharges into waterways through discrete conveyances, such as pipes or channels. Municipal and industrial wastewater treatment facilities are the most common point sources. Point sources also include overflows of combined storm and sanitary sewers.

Nonpoint sources are diffuse sources of pollution primarily associated with run off from the land following a rainfall event. [Table 3-16](#) summarizes information presented in [Appendix A](#) concerning the sources of pollutants that prevent achievement of water quality standards and use support in various water bodies in Georgia.

The list of waters in [Appendix A](#) includes all waters for which available data was assessed against applicable water quality standards and designated uses were determined to be supported, not fully supported, or it was determined that more data was needed before an assessment was made “assessment pending”. This list of waters has become a comprehensive list of waters for Georgia incorporating the information requested by Sections 305(b), 303(d), 314, and 319 of the Federal CWA. Waters listed in [Appendix A](#) are active 305(b) waters. Lakes or reservoirs within these categories provide information requested in Section 314 of the CWA. Waters with nonpoint sources identified as a potential cause of a standards violation are considered to provide the information requested in the CWA Section 319 nonpoint assessment. The 303(d) list is made up of all waters within category 5 in [Appendix A](#). The proposed date for development of a TMDL for 303(d) waters is indicated within the priority column on the list of waters.

### **Total Maximum Daily Loads development:**

Georgia EPD and US EPA develop Total Maximum Daily Loads (TMDLs), for waters for which technology-based regulations and other required controls are not stringent enough to meet the water quality standards. A TMDL is a calculation of the maximum amount of a pollutant that a water body can receive and still safely meet water quality standards. The TMDL allocates that load to point sources, (Wasteload Allocation or WLA), and nonpoint sources (Load Allocation or LA) which include both anthropogenic and natural background sources of the pollutant. The GAEPD conducted a significant amount of modeling in 2010-2011 in support of the development of wasteload allocations and total maximum daily loads (TMDLs). In 2009, TMDLs were developed for segments on the Georgia 2008 303(d) list for the Ogeechee and Savannah River Basins and these TMDLs were finalized and submitted to EPA and approved in early 2010. In 2010, TMDLs were developed for segments on the Georgia 2010 303(d) list for the Ochlockonee, Satilla, St. Marys, and Suwannee River Basins. These TMDLs were finalized and submitted to EPA and approved in early 2011. In 2011, TMDLs were developed for segments on the 2010 303(d) list for the Altamaha, Ocmulgee, and Oconee River Basins. Over the 2010-2011 period, more than 46 TMDLs were developed. To date more than 1450 TMDLs have been developed for 303(d) listed waters in Georgia. This work is discussed in [Chapter 7](#) and on the [EPD TMDL Website](#).

## **TMDL Implementation.**

As TMDLs are developed, plans are needed to guide implementation of pollution reduction strategies. TMDLs are implemented through changes in NPDES permits to address needed point source improvements and/or implementation of best management practices to address nonpoint sources of pollution.

Changes in NPDES permits to address point source issues are made by the GAEPD in coordination with local governments and industries. Implementation of management practices and activities to address the nonpoint sources of pollution is being conducted through the development of various types of TMDL implementation plans. These types of plans include Tier 2 implementation plans, Watershed Improvement Plans (WIPs), updates to existing plans prepared through contracts with Regional Commissions (RCs) and other public contractors.

The Tier 2 implementation plans initiate public outreach, bring together local stakeholder groups to assess the sources and causes of the impairment, identify appropriate management practices and activities, and set forth a plan of action to monitor progress and achieve the TMDL for each segment impairment. As of 2010 GAEPD no longer completes Tier 2 plans.

The Watershed Improvement Plans build local capacity for watershed management within the State's Water Planning Regions as defined by the "Georgia Comprehensive State-wide Water Management Plan" and lead to the restoration of impaired stream segments. These plans, divided into two one-year contracted phases, fund development of local partnerships, identification of specific pollution sources, initial targeted monitoring and visual field surveys, prioritization of pollution sources and pollution reduction controls, development of schedules, and the final strategy for securing funds to implement restoration activities or BMPs. The final WIPs meet the US EPA 9-Key Elements of watershed planning and NRCS EQIP eligibility priorities, which can lead to additional funding from 319(h) grants and other resources. These plans are also intended to be more of a "road map" in addressing water quality concerns within small watersheds (HUC 10 & 12). The nine key elements provide a solid and consistent framework for watershed-based plans and cover plan components such as assessments, stakeholder involvement, outreach, implementation schedules, milestones and management measures.

During 2010-2011, eighteen two year Watershed Improvement Plans were completed and the first year of twelve additional plans was initiated. Each of the twelve Regional Commissions, Northwest Georgia, Georgia Mountains, Atlanta Regional Commission, Three Rivers, Northeast Georgia, Middle Georgia, Central Savannah River Area, River Valley, Heart of Georgia Altamaha, southwest Georgia, Southern Georgia, and Coastal participated in this program in 2010-2011. TMDL implementation is discussed in more detail in [Chapter 7](#)

When the TMDL for an impaired stream identifies point source discharge as the primary cause for water quality impairments, GAEPD has several regulatory programs:

## **Regulatory Programs: Point Source**

### **National Pollutant Discharge Elimination System (NPDES) Permit Program**

The Federal Clean Water Act requires NPDES permits for point source wastewater dischargers, compliance monitoring for those permits and appropriate enforcement action for violations of the permits. In 2010-2011, NPDES permits were issued, modified or reissued for 164 municipal and private discharges and for 148 industrial discharges. In addition to permits for point source wastewater discharges, the GAEPD has developed and implemented a permit system for land application systems. Land application systems are used as alternatives to surface water discharges when appropriate. A total of 64 (municipal and private) and 16 (industrial and Federal) permits for land application systems were issued, reissued or modified in 2010-2011.

### **Concentrated Animal Feeding Operations**

The Georgia rules require medium size animal feeding operations with more than 300 animal units (AU) but less than 1000 AU (1000 AU equals 1000 beef cows, 700 dairy cows, or 2500 swine) to apply for a wastewater permit under Georgia's Land Application System (LAS) permitting program. Large animal feeding operations with more than 1000 AU must apply for a wastewater permit under the Federal National Pollutant Discharge Elimination System (NPDES) program. GAEPD has been delegated authority to administer the NPDES program in Georgia by the U.S. Environmental Protection Agency (EPA). There are currently 812 farms which require general LAS or NPDES permits. That includes approximately 157 large farms with liquid manure handling systems. Of these, 43 have federal NPDES concentrated animal feeding operation (CAFO) permits and 114 have state LAS permits. These farms, with their liquid waste lagoons and spray fields, are important managers of water resources. Also included are 655 large dry manure (chicken litter) poultry farms which require NPDES CAFO permits. It has been deemed more efficient to redirect these regulatory activities to the Georgia Department of Agriculture Livestock/Poultry Section (GDA) where appropriate. Therefore, the GAEPD has contracted with the GDA for inspections, complaint investigations, nutrient management plan reviews, permit administrative support, and enforcement assistance.

### **Combined Sewer Overflows**

GAEPD has issued NPDES permits to the three cities in Georgia that have Combined Sewer Overflows (CSOs) in their wastewater collection systems (Albany, Atlanta and Columbus). A CSO is a sewer system that is designed to collect rainwater runoff, domestic sewage and industrial wastewater in the same pipe. The permits require that the CSO must not cause violations of Georgia Water Quality Control Standards.

## **Regulatory Programs: Nonpoint Source**

### **Erosion and Sedimentation Act**

The Erosion and Sedimentation Act was amended in 1980, 1985, and 1988 to strengthen GAEPD's regulatory overview and enforcement capability and to remove certain exemptions. Subsequent amendments authorized the GAEPD to grant variances for the conduct of land-disturbing activities within certain distances of a stream, established a buffer requirement for the construction of single family dwellings along certain trout streams, and provided for the

substitution of BMPs for numeric limits in permits for land disturbing activities. The Act provides that adherence to BMPs constitutes compliance with a land disturbance permit.

Georgia recently reissued three NPDES permits for discharges from construction activity. Changes in the permit will lead to better design, installation, and maintenance of BMPs on land-disturbing activities. The general storm water permit for construction provides an additional tool to address improper BMPs at construction sites and will enhance the State's ability to enforce water quality regulations.

Second, as directed by the 1996 amendments to the Georgia Water Quality Control Act, the Georgia Department of Natural Resources (GADNR) Board adopted a narrative in stream standard for turbidity in 1997. The new turbidity standard requires that there be no substantial visual increase in turbidity due to human activities. Consistent with the majority of other nonpoint source management programs in Georgia, the new standard emphasizes BMPs. Designing, installing, and maintaining BMPs and complying with any issued permits constitutes compliance with the new narrative standard. This standard provides an avenue for enforcement action under the Georgia Water Quality Control Act from construction activities.

GAEPD's oversight activities include overviews of local programs in areas with significant development underway. The purpose is to ensure that local issuing authorities are complying with their ordinances. Localities are selected for overviews based on relative growth rates and the number of complaints or requests from GAEPD District Offices.

## Construction

Construction sites are managed as nonpoint sources of pollution during land development due to soil disturbance. Construction activities disturbing the soil are prone to soil erosion if preventive measures are not taken. Management practices are intended to control erosion and off-site deposition of sediment (rather than Long Term control of stormwater quantity and quality). Preventing sediment from entering streams also decreases nutrients, heavy metals, pesticides, and toxic chemicals that often attach to soil particles washing into the streams with the eroding soil.



Figure 3: Construction of a stormwater retention pond, Athens-Clarke County.  
Photo by Rob McDowell, University of Georgia.

Management of nonpoint source impacts from construction activities in Georgia is primarily defined by the Erosion and Sedimentation Act. Signed into law in April 1975, the intent of the Act is to establish a comprehensive, Statewide program for erosion and sedimentation control to be accomplished through adoption and implementation of local ordinances and programs which regulate land

disturbing activities. The Act establishes a permit process

for land-disturbing activities, with some exemptions. To receive a permit, an applicant must submit an erosion and sedimentation control plan specifying best management practices.

### **Stormwater Discharge from Construction Activities**

As directed by the Federal Clean Water Act, GAEPD implements a permit program regulating stormwater discharges from construction activities. The program is implemented through a general NPDES permit providing for stormwater discharge from construction activities as a class. GAEPD sees this program as a crucial addition to its efforts to address nonpoint source impacts from sediment and it enhances the agency's ability to enforce State water quality regulations in areas affected by construction activities. A general NPDES permit provides an effective tool beyond existing State laws and regulations to control the discharge of soils and sediment to State waters.

### **Storm Water Management**

The Federal Clean Water Act Amendments of 1987 require NPDES permits to be issued for certain types of storm water discharges, with primary focus on storm water runoff from industrial operations and large urban areas. The USEPA promulgated the Phase I Storm Water Regulations on November 16, 1990. GAEPD has developed and implemented a storm water strategy which assures compliance with the Federal Regulations.

Phase I permit requirements currently apply to discharge of stormwater from large and medium municipal separate storm sewer systems (defined by population greater than 250,000 and population between 100,000 and 250,000, respectively). Forty-five Phase I Large MS4 permits were issued in June 1994 and 13 Phase I Medium MS4 permits were issued in April and May of 1995. These individual permits have a five-year duration and have been reissued several times since their initial issuance. Following EPA's Stated intent, these permits have become more prescriptive, and have contained more measurable and enforceable requirements, with each reissuance.

The Phase II regulations for smaller MS4s, with populations of less than 100,000, were issued in 1999 and Georgia issued the first of these permits in 2002. The Phase II regulations parallel the Phase I regulations in many aspects, but were intended to provide a more flexible approach to stormwater management for the small municipalities. The Phase II municipal stormwater management programs focus on six minimum control measures: public education and outreach, public participation and involvement, illicit discharge detection and elimination, construction site runoff control, post-construction runoff control, and pollution prevention and good housekeeping at municipal facilities. Phase II permits are general permits, issued for a 5-year period. Like the Phase I Large and Medium permits, these permits have been reissued several times since their initial issuance, and have become more prescriptive, and have contained more measurable and enforceable requirements, with each reissuance. Phase II permit requirements currently apply to 86 municipalities, 5 Department of Defense bases and the Georgia Department of Transportation.

Georgia made significant improvements in MS4 permits beginning in 2012, rewriting them to contain more measurable and enforceable requirements. This reduced the flexibility that permittees had previously had to determine their own requirements based on their resources and specific situations, but made the requirements of being an MS4 more consistent between MS4s and more measurable and enforceable. This series of MS4 permits also contained stepwise progress in relation to introduction of green infrastructure (GI)/ low impact



development (LID) alternatives to traditional stormwater control structures. As the next round of municipal MS4 permits is issued beginning in 2017, Georgia anticipates further implementation of GI/LID requirements. These will likely be introduced through the continued incorporation in MS4 permits of the Georgia Stormwater Management Manual (GSMM) to define post-construction performance standards. The GSMM is currently under revision to update the technical requirements of Volume Two and to incorporate certain planning elements of the Coastal Stormwater Supplement to the GSMM that rely heavily on GI/LID practices to create sustainable development and redevelopment and reduce the water quality impact of urbanization.

The Atlanta Regional Commission (ARC) facilitates the Atlanta Region Stormwater Management Task Force as a forum for cooperative management of stormwater in the Atlanta metro area and coordinates stormwater monitoring required for annual reports to GAEPD. The task force includes water managers from throughout the ten-county region and will help assist communities affected by Phase II regulations. Two model local ordinances and other guidance developed by ARC are available as a resource for affected communities in the Atlanta metropolitan area and in other regions. With funding from USEPA, GAEPD and the local governments, ARC is currently developing the *Georgia Stormwater Management and Urban Nonpoint Source Design Manual* and a regional stormwater/nonpoint source public education program.

### **Industrial Stormwater Management**

The Watershed Protection Branch of GAEPD currently has a permitting program, implemented under the NPDES Stormwater Permit Program, to manage discharge of stormwater from industrial facilities. Following Federal guidance, stormwater regulations emphasize source control and implementation of site-specific BMPs that are combined with benchmark monitoring of stormwater discharges for many industrial sectors. State regulations require reductions in stormwater loading by use of BMPs. A five-year general permit for stormwater discharge from industrial facilities was issued in 1993 and has reissued several times since its initial issuance. To date, approximately 2800 facilities have either submitted Notices of Intent (NOIs) to gain coverage under this general permit, or No Exposure Exemptions (NEEs) to be exempted from permit coverage.

The 2012 reissuance of the Industrial Stormwater General Permit (2012 IGP) represented significant tightening of permit requirements to better protect impaired water bodies. Permittees who have stormwater discharges that exceed the water quality standard for the impaired water body's pollutant of concern (POC) for two consecutive years are required to obtain coverage under an individual NPDES permit or can remain under the IGP and meet the water quality standard as an effluent limit within 36 months of notification. Previously it was a very time-consuming task to identify groups of permittees that did not meet certain permit requirement; however, in 2013, GAEPD implemented a web-based permit data management system that allows groups of permittees to be sorted based on the data entered from any computer connected to the internet, provided that individual is an authorized user. The web based systems will be used to further enhance protection of impaired water bodies by more easily identifying facilities with stormwater discharges that exceed the water quality standard for the POC for two consecutive years and the system will be used to identify permittees that have Federal effluent limits and have exceeded those limits.

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## **Moving Forward**

Even though part of the Nonpoint Source program, the regulatory programs described above are not eligible for Section 319(h) funds. However, these programs are valuable to GAEPD and are constantly evolving to adapt to changes both on the ground and technologically. GAEPD has set goals for the NPS regulatory programs to help Georgia plan and prepare for the future.

**Goal 1:** Develop a web based database for stream buffer variance applications by FY2018.

**Goal 2:** Conduct training about new permits, rules and lawmaking. When requested by permittees.

**Goal 3:** Develop the tools needed to support electronic entry of Notices of Intent (NOIs) and annual reporting data by both facilities covered under the IGP and MS4s by FY2020.

## Land Use in Georgia

Georgia is rich in water resources. The State has approximately 44,056 miles of perennial streams, 23,906 miles of intermittent streams, and 603 miles of ditches and canals for a total of 70,150 stream miles. The State also has 4.8 million acres of wetlands (9% tidally affected), 425,582 acres of public lakes and reservoirs, 854 square miles of estuaries, and 100 miles of coastline.

Since non-point source pollutants are driven by land use, understanding land-use activities in a given watershed is key in understanding nonpoint sources of pollution in Georgia. During the development of TMDLs and source loading assessments, land use is determined to help identify the potential sources of impairment for waters on the 303(d) list. Georgia's land use data was updated in the 2008 Georgia Land Use Trends (GLUT) coverage. Figure 4

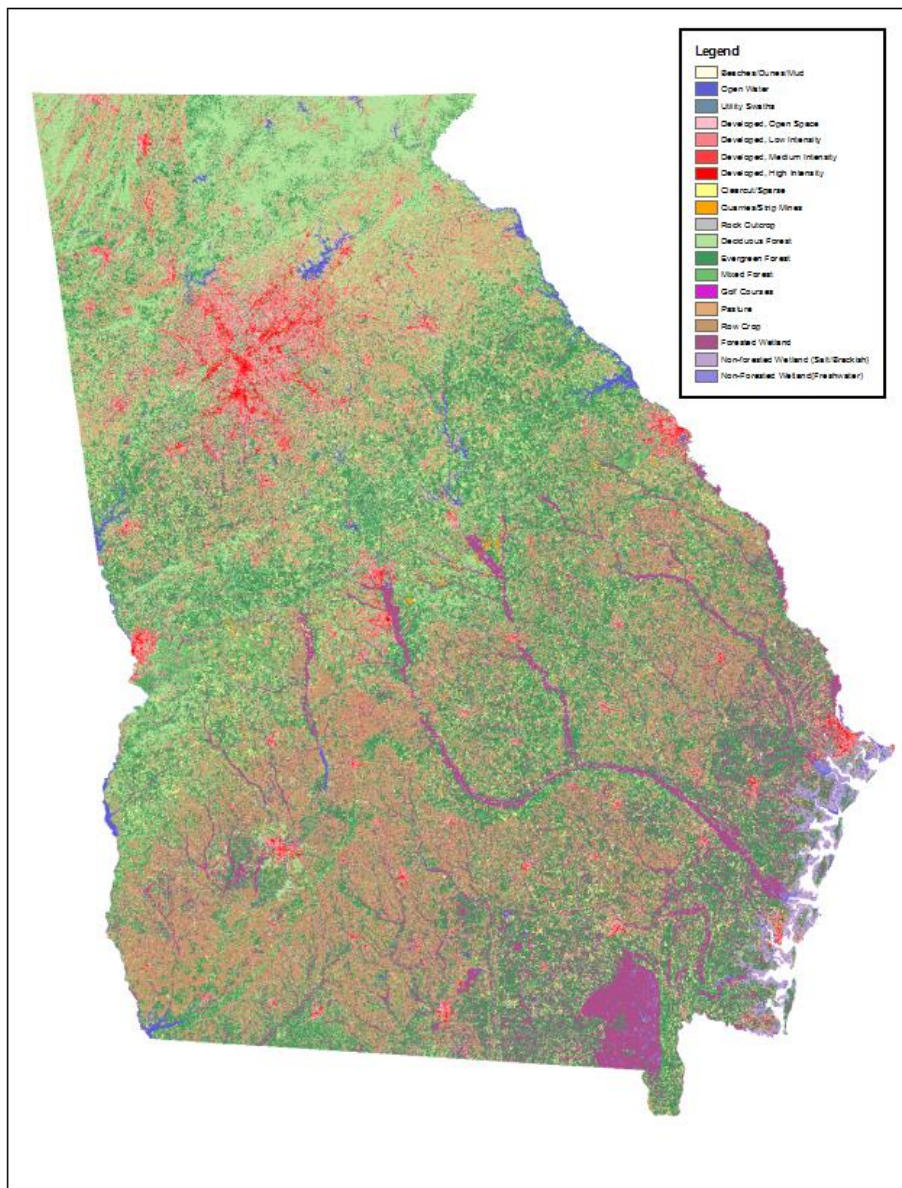


Figure 4: 2008 Georgia Land Use Trends (GLUT) coverage

Land use	Area (acres)	%
Forest	18,515,872	49.28%
Row Crop	4,598,783	12.24%
Pasture	3,017,275	8.03%
Wetland	5,181,052	13.79%
Urban	1,997,053	5.32%
Urban, Open Space	1,892,609	5.04%
Clearcut/Sparse	1,558,950	4.15%
Open Water	549,528	1.46%
Utility Swaths	120,702	0.32%
Beaches/Dunes/Mud	76,109	0.20%
Quarries/Strip Mines	50,523	0.13%
Golf Courses	7,450	0.02%
Rock Outcrop	3,175	0.01%
<b>Total</b>	<b>37,569,081</b>	<b>100.00%</b>

Table 1: 2008 GLUT coverage

By combining the information given in the 303(d) list, found below, with the 2008 GLUT coverage, and the source assessments found in the individual TMDLs, , some conjectures can be made about the impacts of urban vs. nonurban land use have on water quality. Georgia has approximately 2,236 stream miles with urban runoff listed as the source of impairment and approximately 6,403 stream miles with other nonpoint source runoff listed as a source. A complete list of impairments in Georgia's rivers and streams can be found here.

Urban		Non-Urban	
Pollutant	Extent	Pollutant	Extent
Bio	372 miles	Bio	2,016 miles
FC	943 miles	FC	1,971 miles
DO	64 miles	DO	369 miles
Total	1,379 miles	Total	4,356 miles

Table 2: Miles of 303(d) waters in Georgia in Urban vs. Non-Urban Landuse

This information can be used to generalize the extent that Georgia streams are impaired for Fecal Coliform (FC), Dissolved Oxygen (DO), and Biologic Integrity (Bio) in urban vs non-urban watersheds; non-urban land uses account for three times as many impaired miles than urban land uses. This distribution combined with the composition of the state's land use supports the distribution of work within the plan between forestry, agriculture, and urban BMPs. While all are important, emphasis is currently placed on forestry and agriculture. It is currently not known to what extent each land use in Georgia contributes to each pollutant listed on the 303(d) list of impaired waters. General extrapolations can be made in relation to the impaired water and the contributing watershed primary land use.

A TMDL is developed for each pollutant that contributes to a water body not meeting its designated use. As of 2014 Georgia has developed 1,599 TMDLs covering eighteen (18) different pollutants.

Pollutant	# of TMDLs
Fecal	805
Biota (sediment)	389
DO	213
PCB	62
Hg	48
Cu	21
Zn	10
Pb	8
Cd	3
pH	14
Toxicity	12
Temperature	2
Chlorophyll	4
Chlordane	2
Dieldrin	2
Toxaphene	2
Cyanide	1
DDE	1
<b>Total</b>	<b>1599</b>

Since the majority of listings are for Fecal, Biota (sediment), and DO (62% urban and 68% non-urban), and these pollutants account for almost 88% of the TMDLs that have been developed in Georgia, EPD plans to focus much of its pollutant reduction and restoration activities on these pollutants. Addressing these major pollutants may also address some of the metals listing associated with urban activity. Additionally, nutrient pollution is a national priority. Georgia has lake nutrient and chlorophyll standards for six major lakes and has a nutrient criteria development strategy outlining the strategy for developing nutrient standards for other waters like other lakes, estuaries, streams, rivers, and wetlands. Georgia has developed or is currently developing nutrient TMDLs for 4 waterbodies that use chlorophyll as the biological response indicator for the nutrient enrichment. These lake TMDLs address watershed contributions from stream tributaries to these lakes. Additionally, Georgia borders Florida, Tennessee, Alabama, South Carolina, and North Carolina, and is required to meet nutrient criteria for these states at the state line. This means that Georgia must determine nutrient load allocations to meet the other state's nutrient criteria and TMDLs. Thus, Georgia plans to focus pollutant reduction efforts on fecal (pathogens), biota (sediment), DO, metals, and nutrients.

Table 3: Number of different TMDLs, by pollutant, developed by GAEPD.

In order to provide a method of prioritization for land use based functional areas, Georgia plans to develop and implement a prioritization scheme based on expected state-wide pollutant contribution from each land use functional area type.

## Moving Forward

**Goal 4:** Develop a mechanism to prioritize levels of effort for functional areas based on land use. As new information becomes available, the prioritization may be further refined.

**Goal 4.1:** For TMDLs with the prioritized pollutant, divide TMDLs into listings that include significant nonpoint source impairment and load allocation for nonpoint source pollution

**Milestone 4.1:** A list of TMDLs with significant nonpoint source contributions.

**Goal 4.2:** For the prioritized TMDLs, add the land use percentages for each segment in order to generate a state-wide total land use for each pollutant. This land use summation will inform the decision for prioritization of functional areas.

**Milestone 4.2:** A list of land use totals in TMDL watersheds and a prioritized list of functional areas informed by this list.

## NONPOINT SOURCE POLLUTION PLAN – OVERVIEW

### Statewide Functional Areas

Functional Area
Forestry (Silviculture)
Agriculture
Wetlands
Urban
Dirt Roads
Coastal
Surface Mining

Georgia's 2014 Nonpoint Source Pollution Plan was developed to encompass Statewide NPS issues. In some cases this involved agencies or issues that are outside the sphere of influence of the Georgia Environmental Protection Division's Nonpoint Source Program and its Section 319 Grant Unit. Actions called for in this plan are regulatory or non-regulatory in nature, fall to programs within GAEPD or other state agencies and relies on the participation of partnering organizations. In all cases the actions called for in this plan are intended to reduce, remove, or protect waters in Georgia from the effects of NPS pollution.

This plan is organized into six functional areas; each functional area (FA) covers a large land use category. The Plan also contains Statewide Programs that cover a particular source of nonpoint source pollution or are a program to address nonpoint source pollution in Georgia. Each Functional Area or Statewide Program is organized to be useful independently of other FAs or State-wide program and as such contains the following information:

**Overview:** Background intended to provide context.

**Current Efforts:** A description of the current and on-going activities and programs.

**Program Issues:** Roadblocks to successful implementation and problems to be address.

**Resources Available:** A description of existing programs, manuals.

**Key Stakeholders:** A list of the organizations and State and Federal agencies involved.

**Education/Outreach:** A list of the educational materials.

**Funding:** A list of potential sources and mechanisms to help implement the FA or Program.



## **Forestry**

### ***Overview***

Of Georgia's 37 million acres of land area, 24.8 million acres is forestland. Of these 24.8 million acres, 23.6 million acres is timberland available for commercial use. This is more timberland acreage than any other State in the nation. Georgia's forestlands provide a myriad of benefits to citizens, including clean air and clean water. As of 2008, forest resources of Georgia contribute approximately \$27.2 billion and 118,423 jobs annually to the economy; making this Georgia's second largest employer. Covering such a large portion of the State, Georgia's forests are one of the most significant factors affecting Statewide water quality. Effective stewardship of Georgia's forestlands to preserve the quality of life and economic well-being of the State and its citizens cannot be overstated.

Of the nonpoint source pollution related to silvicultural activities, it is estimated that 90% originates from either poorly located existing roads or improperly constructed forest roads. Without the proper implementation of BMPs, the potential for increased sediment, stream temperature, and nutrient loading and decreased dissolved oxygen levels may occur. Forestry activities such as harvesting and road building can also affect hydrology of the watershed, therefore pre-harvest planning needs to be considered on the watershed and subwatershed scale. Without adequate controls, forestry operations may degrade several water quality characteristics in water bodies receiving drainage from forestlands. Sediment concentrations can increase due to accelerated erosion; water temperatures can increase due to removal of over story riparian shade; slash and other organic debris can accumulate in water bodies, depleting DO; and organic and inorganic chemical concentrations can increase due to harvesting and fertilizer and pesticide applications. Silviculture NPS pollution impacts depend on site characteristics, climatic conditions, and the forest practices employed.

### **Sediment**

Sediment is often the primary pollutant associated with forestry activities (USEPA, 2005). Sediment is often defined as mineral or organic solid material that is eroded from the land surface by water, ice, wind, or other processes, and is then transported or deposited away from its original location. Sediment transported from forests to water bodies can be particularly detrimental to benthic organisms and many fish species. When it settles, sediment fills interstitial spaces in lake bottoms or streambeds. This can eliminate essential habitat, covering food sources and spawning sites and smothering bottom-dwelling organisms. Suspended sediment often increases turbidity, thereby limiting the depth to which light can penetrate and adversely affect aquatic vegetation and photosynthesis. Suspended sediment can also damage the gills of some fish species, causing them to suffocate, and can limit the ability of sight-feeding fish to find and obtain food. Turbid waters tend to have higher temperatures and lower DO concentrations. A decrease in DO levels can kill aquatic vegetation, fish, and benthic invertebrates.

### **Nutrients**

Nutrients from forest fertilizers, such as nitrogen and phosphorus bonded to sediments, in solution, or transported by aerial deposition, can cause harmful effects in receiving waters. Sudden removal of large quantities of vegetation through harvesting can also increase leaching of nutrients from the soil system into surface waters and ground waters by disrupting the nitrogen cycle. Excessive amounts of nutrients may cause enrichment of water bodies, stimulating algae blooms. Large blooms limit light penetration into the water column, increase turbidity, and increase biological oxygen demand, resulting in reduced DO levels. This process,

termed eutrophication, drastically affects aquatic organisms by depleting oxygen these organisms need to survive.

### **Organic Debris Resulting from Forestry Activities**

Organic debris includes residual logs, slash, litter, and soil organic matter generated by forestry activities. Organic debris can adversely affect water quality by causing increased biochemical oxygen demand, resulting in decreased DO levels in watercourses. Logging slash and debris deposited in streams can alter stream flows by forming debris dams or rerouting streams, and can also redirect flow in the channel, increasing bank cutting and resulting sedimentation. In some ecosystems, small amounts of naturally occurring organic material can be beneficial to fish production. Naturally occurring large woody debris in streams can also create physical habitat diversity.

### **Temperature**

Increased temperatures in streams and water bodies can result from vegetation removal in the riparian zone from either harvesting or herbicide use. These temperature increases can be dramatic in smaller (lower order) streams, adversely affecting aquatic species and habitat. Increased water temperatures can also decrease the dissolved oxygen holding capacity of a water body, increasing biological oxygen demand levels and accelerating chemical processes.

### **Silviculture Nonpoint Source Program**

The Georgia Silviculture Nonpoint Source Management Program has its origins in a collaborative partnership initiated by the Governor's Silviculture Nonpoint Source Pollution Technical Task Force in 1977. This technical task force was developed as required by the Federal Water Pollution Control Act to assess the extent to which silvicultural activities and practices, primarily those contributing to soil erosion and sedimentation, were negatively contributing to water quality in the State. The task force developed guidelines for the protection and improvement of the physical, chemical, and biological integrity of the State's waters so that they remain "fishable" and "swimmable" for current citizens and future generations.

The initial task force involved collaborative partners for the Georgia Forestry Commission (GFC), GAEPD, Warnell School of Forest Resources at the University of Georgia (UGASFR), University of Georgia College of Agriculture and Environmental Sciences (UGACES), United States Forest Service (USFS), the Natural Resources Conservation Service (NRCS), Georgia Soil and Water Conservation Commission (GSWCC), Georgia Forestry Association (GFA), Georgia Farm Bureau Federation (GFBF), forestry industry, and the Georgia Conservancy.

At the conclusion of a three-year study, recommendations to minimize or eradicate water quality impacts were developed and published in 1981. These recommendations, labeled as best management practices (BMPs) were published in a manual entitled *Georgia's Best Management Practices for Forestry*. Since its initial publication, the manual has received key updates to reflect changes in technology and the need to reflect changes in rules and regulations. The current version of the manual was published in May 2009 as is available on GFC's website (<http://www.gfc.State.ga.us/forest-management/water-quality/bmps/>).

Beginning in 1991, the GFC has been conducting BMP Implementation and Compliance Surveys designed to assess the status of practices to reduce and eliminate negative water quality impacts as a result of silvicultural practices and activities. These survey efforts, couple with BMP assurance examinations conducted in the course of carrying out complaint resolution, provide tremendous insight into progress achieved in BMP implementation and compliance. With the release of the *Results of Georgia's 2013 Silvicultural Best Management Practices*

*Implementation and Compliance Survey*, it is observed that the Statewide average of BMP implementation has increased from 65% in the 1991 report to its current level of 89.9%; a notable improvement. While this indicates substantive progress from the onset of study efforts, it did represent a 5.3 percentage decrease from the previous surveying effort conducted in 2011. Along with this trend was an increase in the number of water quality risks which rose to 48 risks per site from its previous average of 13 in the 2011 survey.

While the vast majority of Georgia forestland is available for commercial utilization, eighty percent of Georgia’s timberland is owned by private non-industrial landowners. Corporate landowners own 12%, and land in public ownership represents 8% of the mix.

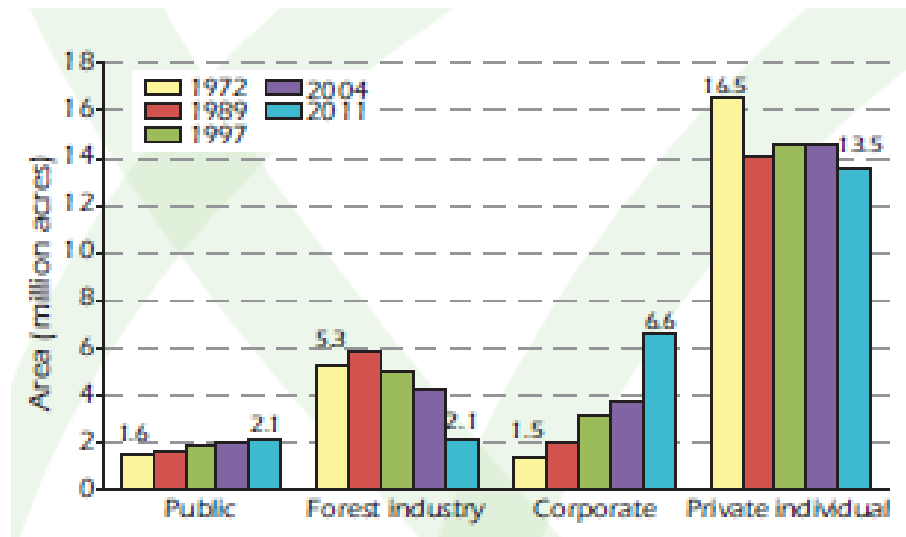


Figure 5: Area by Ownership and Survey Year (GFC factsheet 2011)

Major components of the Georgia NSMP include education of the commercial forestry community through workshops, demonstrations, presentations and direct communication; survey efforts to determine BMP implementation/ compliance; periodic evaluation and revision of BMPs; and maintenance of a Statewide network of foresters who investigate and review complaints, conduct special investigations, and when necessary, direct enforcement actions to resolve challenging or difficult problems.

The GFC also investigates and mediates complaints or concerns involving forestry operations on behalf of GAEDP and with the United States Army Corps of Engineers (US ACE) when wetlands are involved. GFC has no regulatory authority and works wherever possible to achieve voluntary compliance. In situations where compliance is not voluntarily resolved, cases are worked through the Sustainable Forestry Initiative’s (SFI) Inconsistent Practices Committee or are turned over to GAEPs, USACE, or USEPA for enforcement action.

### **Program Issues**

The GFC investigates and mediates complaints or concerns involving forestry operations on behalf of the GAEPD and, when wetlands are involved, US ACE. The GFC has no regulatory authority and in situations where satisfactory compliance is not voluntarily instituted, the case will be worked through the Sustainable Forestry Initiatives (SFI) Inconsistent Practices Committee process or be turned over to GAEPD, USACE, or USEPA for enforcement action.

### **Resources Available**

Major components of this program include: education of the commercial forestry community through workshops, demonstrations, presentations, and direct communication; periodic random surveys to evaluate the application of BMPs; periodic evaluation and revision of BMPs; and maintenance of a Statewide network of foresters who investigate and resolve complaints, conduct special investigations, and, where necessary, direct enforcement actions to resolve difficult or unusual problems.

### **Key Stakeholders**

- The Georgia Forestry Commission (GFC) – Primary Partner
- US Forest Service (USFS)
- Natural Resources and Conservation Service (NRCS)
- Georgia Forestry Association (GFA)
- University of Georgia D.B. Warnell School of Forest Resources (UGASFR)
- The Southeastern Wood Producers Association (SWPA)
- Sustainable Forestry Initiative (SFI) Program

### **Education/ Outreach**

- [Georgia's Best Management Practices for Forestry Manual](#)
- *Statewide Silvicultural BMP Implementation and Compliance Surveys*  
The objectives of the Silvicultural BMP Surveys are to determine the: rates of BMP implementation; acres in BMP compliance; effectiveness of BMPs for any needed modifications; actual miles of streams that may have forestry water quality impairments; and ownerships and regions to target for future training.
- *Georgia Master Timber Harvester Program*  
The Georgia Master Timber Harvester Program, a logger education program, with a component devoted to the protection of water resources and the implementation of best management practices.
- *Statewide Comprehensive Water Planning*  
GFC provides resource data and trend data on commercial forestry activities, acreage and ownership, and BMP compliance rates.
- *Reforestation Cost-sharing Programs*  
The NRCS provides cost-share funds for reforestation under several programs; Conservation Reserve Program, Wildlife Habitat Incentives Program, and Wetland Reserve Program.
- *Land Resources and Management Plan*  
This plan provides the USFS with direction for management of land in the National Forest System. Approximately 865,000 acres in Georgia are in the National Forest System.

### **Long Term Goals, Short Term Goals, and Milestones (In no particular order):**

**Long Term Goal 1:** Update and revise the Master Timber Harvester (MTH) Program to reflect results from the most current *Silvicultural BMP Implementation and Compliance Survey* in 2016, 2018, and 2020.

**Short Term Goal 1.1:** Offer more Continuing Logger Education (CLE) opportunities.

**Milestone 1.1.1:** Provide a minimum of 3 BMP demonstration Field Days available for CLE credit.

**Short Term Goal 1.2:** Update information and materials provided at MTH training to reflect the impact of stream crossings.

**Milestone 1.2.1:** Provide up to 6 Timber Bridges for logger use Statewide.

**Short Term Goal 1.3:** Meet with MTH program stakeholders; to determine if the current curriculum addresses the results of the BMP Survey.

**Milestone 1.3.1:** A minimum of 1 annual conference call or meeting.

**Long Term Goal 2:** Revise and update the “Georgia's Best Management Practices for Forestry Manual” to reflect changes in logging practices and BMPs by 2020.

**Long Term Goal 3:** Conduct biennial *Silvicultural BMP Implementation and Compliance Survey* in 2015, 2017, and 2019.

**Milestone 3.1.1:** Inspect a minimum of 150,000 acres for each *Silvicultural BMP Implementation and Compliance Survey*.

**Long Term Goal 4:** Expand the GFC NPS program with additional funding opportunities and partnerships by 2020.

**Short Term Goal 4.1:** As opportunities become available, build partnerships to leverage existing funds.

**Milestone 4.1.1:** Expand program’s influence through new partnership MOUs and contracts.

**Milestone 4.1.2:** Expand program’s influence through new partnership letters of support.

**Short Term Goal 4.2:** As opportunities become available, expand funding base for program.

**Milestone 4.2.1:** Expand program’s funding base through additional funding sources. These sources can include both Federal and local funding sources.

**Long Term Goal 5:** Conduct Statewide BMP assurance monitoring of active forestry operations in Biota (sediment) impaired TMDL watersheds annually.

**Short Term Goal 5.1:** Identify active forestry sites in impaired watersheds on Georgia’s 303(d) and 305(b) list of impaired waters.

**Milestone 5.1.1:** Identify a minimum of 120 active sites by air, on the ground observations, county records, and by requests.



**Long Term Goal 6:** Prepare the Silvicultural portion of the biennial report, Water Quality in Georgia, as required by Sections 303(d), 305(b), and 319(a) of the CWA.

**Milestone 6.1.1:** Produce the Silvicultural section of the Water Quality in Georgia report by September of FFY12, FFY14, FFY16, FFY18, and FFY20

**Long Term Goal 7:** Provide education and technical assistance to forest landowners regarding involvement in the State Wildlife Action Plan (SWAP).

**Short Term Goal 7.1:** Identify landowners in priority watersheds willing to participate in the SWAP.

**Milestone 7.1.1:** Provide technical assistants and education to 80% of identified landowners.

**Short Term Goal 7.2:** Provide Silvicultural BMP statistics for SWAP high priority watersheds.

**Milestone 7.2.1:** Provide an annual report for SWAP watersheds incorporating data from the BMP Survey and BMP assurance monitoring.

**Long Term Goal 8:** Achieve a minimum of 95% compliance of all recommended BMPs for silviculture Statewide by 2020.

**Short Term Goal 8.1:** Identify BMPs with lowest percentage of compliance.

**Milestone 8.1.1:** Provide list of compliance percentages (scores) to the BMP committee for review and comment.

**Short Term Goal 8.2:** Provide plan of action to address lowest percentage BMP categories for the following 2 year Survey cycle.

**Milestone 8.2.1:** Demonstrate an improvement in compliance for BMPs addressed in the plan of action.

**Short Term Goal 8.3:** Educate private landowners on forestry best management practices.

**Milestone 8.3.1:** Hold at least one meeting and make materials accessibly online.



Figure 6: forestry site - GFC publication



## **Agriculture**

### ***Overview***

Agriculture is the largest sector of Georgia's economy, contributing a total farm gate value of \$13.9 billion in FY2012 (UGA CAES Farm Gate value report). Beyond the farm gate, agriculture contributes a total of \$76.9 billion to Georgia's \$810 billion economy and nearly one in seven Georgians work in agriculture, forestry, or related fields. Georgia ranks first in the nation in the production of broilers (young chickens weighing less than two and a half pounds), peanuts, and pecans. In 2000, Georgia



Figure 7: Cattle with full access to a stream that lacks any livestock fencing. Photo by Rob McDowell, University of Georgia

ranked second in acreage of cotton and rye; third in production of peaches and tomatoes; and fifth in tobacco acreage and value of production. According to the 2007 Census of Agriculture, Georgia has 47,846 farms with 10.1 million acres of land devoted to farms and an average farm size of 212 acres. There were 3,390,000 acres of field crops harvested and 1,548,772 acres of irrigated farm land in 2000. The food and fiber sector is very diversified and includes the production and processing of a wide range of commodities.

While Georgia's agriculture is diverse, the largest segment of the industry is the production of poultry and eggs; contributing 41.2% of the farm gate value. This is followed by the production of row and forage crops (23.5%), livestock and aquaculture (10.8%), vegetables (6.7%), and ornamental horticulture (5.4%). The top crops produced are cotton, peanuts, and corn while the primary livestock commodities are broilers, eggs, beef, horses, and dairy. Geographically, agriculture is distributed throughout the State, however, most of the cropland is located in south Georgia while north Georgia counties account for a higher percentage of the poultry and livestock production.

Agriculture is a dominant land use in the State and can lead to degraded water quality if best management practices are not implemented. Nationally, agricultural nonpoint source pollution is the leading source of water quality impacts to surveyed rivers and lakes, the third largest source of impairments to surveyed estuaries, and a major contributor to ground water contamination and wetland degradation (National Water Quality Inventory, USEPA, 2004). Some agricultural activities that have been identified as contributors to nonpoint source pollution include animal waste runoff, land cultivation, irrigation, improper application of fertilizers and pesticides, livestock over grazing, and unconfined watering. The major agricultural nonpoint source pollutants that result from these activities are sediment, nutrients, pathogens, and agrichemicals.

## **Sediment**

Soil erosion is the detachment and movement of soil particles from the soil surface. Soil loss is equal to the tonnage of soil being moved by erosion and re-deposited in other locations, such as in ends of field rows, drainage ditches, adjacent land road ditches, and other locations. Frequently, some of these eroded soil materials, along with the undesirable chemicals dissolved in runoff water or attached to soil particles, are transported from land surfaces by the runoff water into bodies of water. The percentage of soil that moves into bodies of water from eroding lands is quite variable. Sediment yield depends on the size of soil particles being transported, slope of the land, and distance to the nearest water body, density of the vegetation the sediment has to move through, the shape of the drainage way, and the intensity of the rain event. The quantity of soil loss from cropland can be calculated by using the Revised Universal Soil Loss Equation (RUSLE), which was developed by the Agricultural Research Service (ARS) in cooperation with NRCS. This information along with land-use and climatological data can be used to predict potential water quality problems in a number of areas. Sediment affects water quality by smothering benthic organisms, interfering with photosynthesis by reducing light penetration, and filling in waterways, thereby hindering navigation and increasing flooding. Sediment particles may carry nutrients and pesticides and other organic compounds into water bodies.

## **Nutrients**

In general, runoff from watersheds under agricultural use has significantly higher nutrient concentrations than drainage waters from forested watersheds. Increased nutrient levels may result from fertilizer application and animal wastes. In a nationwide Environmental Protection Agency study, it was determined that nutrient concentrations are generally proportional to the percentage of land in agricultural use and inversely proportional to the percentage of land in forested use. Georgia has developed a [plan for the adoption of water quality standards](#) for nutrients. Nutrients are necessary to plant growth in a water body; however over-enrichment leads to excessive algae growth, an imbalance in natural nutrient cycles, changes in water quality and a decline in the number of desirable fish species. Factors influencing nutrient losses are precipitation, temperature, soil type, and kind of crop, type of conservation practices utilized, nutrient mineralization, and denitrification.

## **Nitrogen**

In addition to eutrophication, excessive nitrogen also results in other water quality problems. Dissolved ammonia at concentrations above 0.2 mg/L may be toxic to fish, especially trout. Nitrates in drinking water are potentially dangerous, especially to newborn infants. Nitrate is converted to nitrite in the digestive tract, which reduces the oxygen-carrying capacity of the blood, resulting in brain damage or even death. USEPA has set a limit of 10 mg/L nitrate-nitrogen in water used for human consumption (USEPA, 1989). Nitrogen is naturally present in soils within the organic matter but must be added to increase crop production. Nitrogen is added to the soil primarily by applying commercial fertilizers and manure, but also by growing legumes (biological nitrogen fixation) and incorporating crop residues. The most biologically important inorganic forms of nitrogen are ammonium (NH<sub>4</sub>-N), nitrate (NO<sub>3</sub>-N), and nitrite (NO<sub>2</sub>-N). Organic nitrogen occurs as particulate matter, in living organisms, and as detritus. It occurs in dissolved form in compounds such as amino acids, amines, purines, and urea. Nitrate-nitrogen is highly mobile and can move readily below the crop root zone, especially in sandy soils. It can also be transported with surface runoff, but not usually in large quantities. Ammonium, on the other hand, becomes adsorbed to the soil and is lost primarily with eroding sediment. Even if nitrogen is not in a readily available form as it leaves the field, it can be converted to an available form either during transport or after delivery to water bodies.

## **Phosphorus**

Phosphorus can also contribute to the eutrophication of both freshwater and estuarine systems. While phosphorus typically plays the controlling role in freshwater systems, in some estuarine systems both nitrogen and phosphorus can limit plant growth. Algae consume dissolved inorganic phosphorus and convert it to the organic form. Phosphorus is rarely found in concentrations high enough to be toxic to higher organisms. Manure and fertilizers increase the level of available phosphorus in the soil to promote plant growth. Phosphorus can be found in the soil in dissolved, colloidal, or particulate forms. Runoff and erosion can carry some of the applied phosphorus to nearby water bodies. Dissolved inorganic phosphorus (orthophosphate phosphorus) is probably the only form directly available to algae. Particulate and organic phosphorus delivered to water bodies may later be released and made available to algae when the bottom sediment of a stream becomes anaerobic, causing water quality problems.

## **Organic Material**

Animal waste and crop debris are the major organic pollutants which result from agricultural activities. These materials place an oxygen demand on receiving waters upon decomposition. If DO levels decrease and remain low, fish and other aquatic species may die. Often this occurs on a seasonal basis with NPS pollutant loading occurring during seasons of the year with high rainfall (i.e. high flow events), but the water quality effect occurring during seasons of the year associated with low flow and high temperature. This low flow, high temperature season is often defined as the “critical condition” for the water body and for the aquatic organisms, which reside in the water body.

## **Animal Wastes**

Disposal of animal wastes on land is a potential NPS of water degradation. Runoff and percolation could transport organic matter and nutrients to surface and ground water. Animal wastes applied to land come from wastes removed from feeding facilities, runoff from feeding areas, and waste from animals on pasture and rangeland. Proper application of animal wastes provides nutrients for crop production and also reduces surface runoff. Appropriate animal and land management practices should be followed. Animal waste (manure) includes fecal and urinary wastes of livestock and poultry; process water (such as from a milking parlor); and the feed, bedding, litter, and soil with which they become intermixed. The following pollutants may be contained in manure and associated bedding materials and could be transported by runoff water and process wastewater from confined animal facilities: Oxygen-demanding substances; Nitrogen, phosphorus, and many other major and minor nutrients or other deleterious materials; Organic solids; Bacteria, viruses, and other microorganisms; and Sediments. Fish kills may result from runoff, wastewater, or manure entering surface waters, due to ammonia or DO depletion. The decomposition of organic materials can deplete DO supplies in water, resulting in anoxic or anaerobic conditions. Runoff from fields receiving manure may contain extremely high numbers of bacteria if manure has not been incorporated. The method, timing, and rate of manure application are significant factors in determining likelihood of water quality contamination. Manure is generally more likely to be transported in runoff, when applied to the soil surface than when incorporated into the soil. The soil generally has capacity to adsorb phosphorus leached from manure applied on land. As previously mentioned, however, nitrates are easily leached through the soil to ground water or to return flows, and phosphorus can be transported by eroded soil. Conditions that cause a rapid die-off of bacteria are low soil moisture, low pH, high temperatures, and direct solar radiation. Manure storage generally promotes die-off, although pathogens can remain dormant at certain temperatures. Composting the wastes can be quite effective in decreasing the number of pathogens. USEPA’s new guidance documents for agricultural management measures are a good source of information

for types of actions that can be taken to reduce the amount of nutrients leaving agricultural fields and animal operations.

### ***Agricultural Nonpoint Source Program***

While agriculture is a dominant source of NPS pollution nationwide, there is very little monitoring data indicating the success or failure of specific agricultural NPS programs in Georgia. The Georgia Nonpoint Source Assessment Report from December 1989 indicated that major adverse impacts to State waters from agriculture or in rural environments included: elevated solids concentrations and turbidity, increases in sand habitats, elevated fecal coliform densities, and high nutrient loadings. However, the report concluded that monitoring data from agricultural watersheds was not sufficient to evaluate agriculture's contribution to water quality problems. A list of waters potentially impacted by agricultural nonpoint source pollution is delineated in the Georgia Watershed Agricultural Nonpoint Source Pollution Assessment, Cooperative River Basin Study (August 1993). In addition, this assessment presented a methodology that compared potential agricultural loadings on 549 NRCS designated watersheds within Georgia. While Georgia's integrated 303(d)/ 305(b) list provides an assessment of Georgia's waters, it can be difficult to directly attribute pollution to specific sources. This lack of clarity is the nature of many nonpoint source pollutants, and has led to some reluctance to address agricultural nonpoint source pollutant concerns in a more direct manner. This plan seeks to address this reluctance at least in part.

Routine water quality monitoring conducted by GAEPD is typically on larger water bodies with no identification of the particular sources. Modeling for the implementation of the regional water plans as well as for total maximum daily loads (TMDLs) and watershed management planning processes does often indicate that agricultural contributions are significant; yet, few of the regional water management plans specifically identified management practices for agriculture beyond continuation of the implementation of existing voluntary programs. Exceptions included the Coosa North Georgia region which recommended increased focus on nutrient management programs in agriculture along with investigations into establishment of nutrient credit trading programs and the Lower Flint-Ochlockonee regional plan that identified numerous management practices targeting the improvement of agricultural water conservation efforts, enforcement of permits and regulations on agricultural sources, and integration of more efficient irrigation technologies.

The University Of Georgia College Of Agricultural and Environmental Sciences (UGA CAES) and the United States Department of Agriculture's Agricultural Research Service (USDA ARS) also conduct numerous studies around the State on a variety of agricultural management practices and within some specific watersheds. The Southeast Watershed Research Lab in Tifton has long and short term monitoring programs designed to develop methodologies to direct optimal use of soil and water resources in the production of quality food and fiber while maintaining short and long term productivity requirements, ecosystem stability, and environmental quality. UGA CAES conducts studies of various watersheds and BMPs at a variety of locations around the State. Many of these studies are focused on evaluating the effectiveness of various best management practices (BMPs) and have been published in scientific literature and Extension bulletins.

The most important lesson learned was that an effective watershed management program requires many participants working in concert with input from key stakeholders, including farmers and others affected by water quality concern and the actions proposed to address it. Conservation practices that managers recommend must be based on solid science and economics with the potential to achieve water quality goals of stakeholders. Once science has



identified the needs, farmers, agency personnel, and private and nonprofit sectors must work together to get those practices on the ground in the right places ensuring that the practices are properly managed and maintained. This requires that all parties understand what farmers can and will accept and that practices be tailored to meet those demands while still achieving water quality goals. It also is critical that education, technical assistance, and financial assistance be consistent, well organized, and highly coordinated. Finally, correcting water quality problems and protecting water resources at the watershed scale are on-going processes that will require effective support and adaptive management to achieve true, long-lasting sustainability.

Created in 1937 by an Act of the Georgia Legislature, the Georgia Soil and Water Conservation Commission has been designated as the lead agency for agricultural NPS management in the State. GSWCC was formed to protect, conserve, and improve the soil and water resources of Georgia. Much of the GSWCC's work is completed through locally led soil and water conservation districts. In Georgia there are 159 counties, all of which are in one of forty Soil & Water Conservation Districts. Each district is comprised of one to nine counties and each county has at least two supervisor representatives on the District Board of Supervisors.

Serving as the coordinator and guide to all these efforts is a Commission Board appointed by the Governor and comprised of five supervisors from different regions of the State. The Commission Board and local district supervisors are a group of citizens who are interested in conserving natural resources and willingly volunteer their time for that purpose. The local Soil and Water Conservation Districts and NRCS provide technical assistance to local producers to plan and establish needed soil and water conservation practices. Supervisors also sponsor informative, educational programs and field days to encourage and demonstrate new or innovative conservation practices for landowners and citizens.

GSWCC and cooperating agencies conduct the Statewide non-regulatory program to promote the voluntary adoption of BMPs through educational programs and materials.

### **Program Issues**

Georgia's strategic plan for addressing agricultural NPS pollution can be broken down to the following four major goals:

- Improve communication and coordination on NPS pollution issues among Georgia's agricultural community.
- Establish methods to evaluate NPS pollution reduction efforts and activities.
- Facilitate activities to reduce NPS pollution.
- Target conservation and BMP implementation to address high profile activities and concerns

### **Resources Available**

The following section contains descriptions of programs and initiatives underway to assist with nonpoint source pollution concerns and compliance in Georgia's agriculture sector.

#### ***Georgia Soil and Water Conservation Commission (GSWCC) Programs***

GSWCC's agricultural metering program assists agricultural water users in conserving ground water and surface water by quantifying actual water use, conserving existing water through irrigation audits, and reducing dependence on ground water and surface water supplies through agricultural water catchments. Information on the 2012 Georgia Agricultural Water Conservation

and Metering Program is available [here](#). Individual permit water use data are not released to the public. The Metering Program is also doing community outreach to educate citizens on water issues and the metering program.

### ***Agriculture Best Management Practice (BMP) Manual***

The GSWCC and cooperating agencies developed the [Best Management Practices for Georgia Agriculture Manual](#) to promote the voluntary adoption of BMPs. This manual is designed to provide the agriculture community with knowledge of the best management practices (BMPs) that work to protect surface water quality as well as to help agency personnel educate farmers about BMPs and their usefulness. It is a compilation of conservation practices that address surface water quality and includes an estimate of the effectiveness and relative cost of each BMP. Georgia has developed a Small Farm Nutrient Management Primer. As Georgia develops sector specific BMP manuals, it is anticipated that the Small Farm Nutrient Management Primer can be used as a starting point for the nutrient management sections.

### ***Animal Feeding Operations***

The past several years have seen many changes in the way animal feeding operations are regulated in Georgia. These changes are largely driven by an increasing focus on agriculture as a source of NPS pollution. Since the U.S. Clean Water Act was passed in early 1970, tremendous resources have been put into cleaning up point source pollution from municipalities and industries through the National Pollutant Discharge Elimination System (NPDES). Large confined animal feeding operations (CAFOs) are regulated under the NPDES program.

### ***NRCS Programs***

The Natural Resource Conservation Service (NRCS) cooperates with the Federal, State, and local units of government to provide financial and technical assistance to landowners, cooperators, producers, and special interest groups. Standards and specifications regarding conservation practices, animal waste management systems, grazing activities, and plant materials are developed and upgraded by a staff of engineers, agronomists, biologists, soil scientists and plant material specialists.

### ***NRCS - National Water Quality Initiative***

Through the National Water Quality Initiative (NWQI), the NRCS is offering additional financial and technical assistance to farmers, ranchers, and forest landowners interested in improving water quality and aquatic habitats in priority watersheds with impaired streams. Georgia priority watersheds have been identified as Deep Creek, Middle Piscola and Lower Piscola Creek. These watersheds are all located in Thomas and Brooks counties in heavily agricultural areas of Southwest Georgia.

### ***Grazing Land Conservation Initiative***

The demand for grazing land has increased due to increased livestock production in Georgia. The Georgia Grazing Lands Conservation Coalition (GGLCC) was organized in 1996 in response to national activities emphasizing grazing land management. Following the footsteps of the National Grazing Lands Coalition (NatGLC), formerly known as the Grazing Land Conservation Initiative (GLCI), the GGLCC is a steering committee of livestock and forage producers that represent some of the strongest most active conservation and producer groups in Georgia. GGLCC is committed to providing grazers with information on grazing lands conservation, novel management practices to improve forage and livestock production, grazing land ecosystem health, and sustainability of grazing operations.



## **Key Stakeholders**

- GAEPD continues to collaborate, with our Federal and State agencies, to coordinate nonpoint source pollutant programs. Our primary partners include
  - Georgia Soil and Water Conservation Commission (GSWCC)
  - Georgia Forestry Commission (GFC)
  - Georgia Regional Commissions (GRC)
  - Georgia's Resource Conservation and Development Councils (RC&D)
  - Georgia Environmental Finance Authority (GEFA)
  - Georgia Department of Agriculture (GDA)
  - Farm Service Agency (FSA)
  - University of Georgia College of Agricultural and Environmental Sciences (UGA CAES)
- There are also agencies, which work indirectly with GAEPD but directly with some of our primary partners by providing them with technical assistance. These include:
- Georgia Wildlife Resources Division
  - U.S Fish and Wildlife Service (FWS)
  - USDA Natural Resource Conservation Service (NRCS)

## **Education**

These agencies also work closely with Georgia agricultural commodity commissions and organizations and include:

- Georgia Farm Bureau
- Georgia Agribusiness Council
- Georgia Cattleman's Association
- Milk Producers Association
- Pork Producers Association
- Poultry Federation
- Georgia Conservancy
- Georgia Organics
- Georgia River Network
- Georgia Wildlife Federation
- Key Watershed based groups such as Soque Watershed Association

## **Funding**

The Natural Resource Conservation Service (NRCS) cooperates with the Federal, State, and local units of government to provide financial and technical assistance to landowners, cooperators, producers, and special interest groups. Standards and specifications regarding conservation practices, animal waste management systems, grazing activities, and plant materials are developed and upgraded by a staff of engineers, agronomists, biologists, soil scientists and plant material specialists.

## **Long Term Goals, Short Term Goals, and Milestones (In no particular order):**

**Long Term Goal 1:** Improve communication and coordination on NPS pollution issues among Georgia's agricultural community by 2018.

All members of the agricultural community (farmers, ranchers, educators, agencies, and consumers alike) should be familiar with, and must feel comfortable discussing, NPS pollution issues as frequently as necessary. The agencies and partners must work together on a shared

vision that is supported by the agricultural community and that obtains the appropriate water resource improvements. The NPS Program will use a variety of tools to encourage open participation in efforts to reduce and prevent NPS pollution.

**Short Term Goal 1.1** Establish a State agricultural NPS working group that includes partner agencies, farm organizations, and other stakeholders to improve overall communication, planning and implementation of activities. The primary purpose of the working group will be to guide GAEPD in reducing NPS impacts of agriculture in Georgia through coordination of existing programs and implementation of appropriate education, technical assistance, BMP installation, and monitoring projects. The working group will consult with, implement, and revise and update the agricultural NPS plan. In the initial meetings, the working group will devise its own organization structure, leadership, and initial action plans to move forward.

**Milestone 1.1.1:** GAEPD will establish initial list of invitees to serve on the Georgia agricultural NPS task force. At a minimum, membership will include representatives of the following organizations: USEPA region 4, GASWCC, GANRCS, UGA EXT, GDA, Agricultural Industry group and commodity representatives, farmers, and conservation related NGO's.

**Milestone 1.1.2:** The working group will meet at least twice annually with various subcommittees working on individual components and tasks meeting on a more frequent basis.

**Milestone 1.1.3:** Long term vision would be to have an engaged, active agricultural NPS working group committed to working together to address priority and emerging issues in agriculture.

**Short Term Goal 1.2:** Improve coordination with State NRCS and local conservation districts through greater involvement in the State Technical Committee, EQIP committee and on local work groups through encouraging State or local watershed coordinators to work with conservation districts at the local level and help develop local ranking criteria for EQIP contracts that give more points for water quality benefits.

**Milestone 1.2.1:** GAEPD, and project partners, will attend NRCS State Technical Committee meetings and provide input to maximize the value of Federal NRCS funding to meet the goals of the State NPS plan and will serve on the NRCS EQIP subcommittee to bring ideas to the table which can further water quality goals, such as increasing the points awarded for watersheds that have 303 (d) listed water bodies in them, on EQIP scoring sheets.

**Milestone 1.2.2:** Long term vision is to be working cooperatively with Georgia NRCS to maximize the return on the Federal investment and ensuring that these efforts are coordinated with, and where appropriate, focused on addressing issues critical to implementation of the Agricultural NPS plan.

**Short Term Goal 1.3:** Expand involvement in existing commodity group efforts to increase education and communication to the agricultural sector.

**Milestone 1.3.1:** GAEPD, and workgroup partners, will actively participate in existing commodity group efforts to publicize and implement activities of the

agricultural NPS plan. Number of events, attendants, educational displays or presentations will be tracked annually.

**Short Term Goal 1.4:** Develop and promote clear, user-friendly educational information on Federal, State, and local government regulations and activities related to water quality laws, permitting requirements, cost-share opportunities, TMDLs, conservation initiatives, and other policies and programs.

**Milestone 1.4.1:** As funding and resources allow, GAEPD and workgroup partners will develop new educational materials, app, or website related to NPS regulations and programs. GAEPD will track the number of new resources developed annually.

**Long Term Goal 2:** Evaluate NPS pollution reduction efforts and activities by 2018.

Documentation of the impacts of agriculture and of BMP's being adopted as well as a baseline and documentation of BMP adoption in the agricultural community will assist Georgia's agricultural NPS Program in making a reasonable assessment of the State of agricultural Nonpoint Source Pollution in Georgia. This will be an ongoing process involving government agencies, citizens, and partner organizations.

**Short Term Goal 2.1:** Work with appropriate stakeholders to develop industry-specific best management practices and provisions for self-monitoring and enforcement, as resources allow. We anticipate that over time, we will update these BMP manuals as necessary, as practices change and new BMPs are developed.

**Milestone 2.1.1:** Working with the Ag NPS working group, one commodity group/target audience will be identified for a BMP pilot project. The BMP pilot project will:

- Develop a list of industry specific BMP's
- Compile existing resources, information, and data for development of an industry specific manual.
- Publish educational materials and training programs on these mutually agreed upon BMPs
- Include an nutrient management, water conservation, funding mechanisms, rules and laws, and specific contact information for each sector
- Provide a minimum of three (3) Statewide educational opportunities for Agricultural producers to provide comments.
- Develop and implement survey methods to identify industry wide adoption rates for the selected BMPs
- Monitor this adoption rate over time.

**Milestone 2.1.2:** If the pilot project is successful, expand this to at least three additional agricultural sectors.

**Short Term Goal 2.2:** Include monitoring and reporting requirements in agricultural NPS efforts and activities.

**Milestone 2.2.1:** Work with the Ag NPS working group to ensure that all agencies are encouraged to share BMP implementation data and to encourage collection and consolidation of water quality monitoring data.

**Milestone 2.2.2:** GAEPD will encourage monitoring of water quality on all agricultural projects implementing agricultural BMPs. A database will be established with a goal of entering water quality data on at least 3 agricultural based NPS projects per year.

**Long Term Goal 3:** Facilitate activities to reduce NPS pollution by 2016.

In order to implement on-the-ground activities to reduce NPS pollution, technical and financial assistance, effective programs and tools, and mutual support and encouragement must be present. Much of this is available but it needs to be continued and supplemented.

**Short Term Goal 3.1:** Continue working together to provide technical and financial assistance to individuals and groups seeking to reduce NPS pollution from agricultural sources.

**Milestone 3.1.1:** Through the Agricultural NPS Working group, establish a methodology for track technical and financial assistance provided through existing programs within NRCS, GAEPD, GASWCC and other partners on an annual basis. Through this tracking we hope to quantify other pollutant reduction efforts.

**Short Term Goal 3.2:** Provide Technical Assistance and Agricultural Expertise for the development and revision of Watershed Plans.

**Milestone 3.2.1:** When requested, the GSWCC or other Ag NPS working group partners will participate as a stakeholder in Watershed Management Plan development and revision and in Regional Water Planning Council meetings.

**Milestone 3.2.2:** When requested, the GSWCC or other Ag NPS working group partners will provide technical assistance with NPS loading and load reduction estimates for agricultural BMPs or for modeling Agricultural NPS pollutants.

**Short Term Goal 3.3:** Continue to provide funding to Statewide and watershed based agriculture programs.

**Milestone 3.3.1:** Work with the Ag NPS working group to identify high priority Ag projects in conjunction with watershed prioritization tool.

**Short Term Goal 3.4:** Ensure that education and information on BMP maintenance and operation is a significant part of all existing efforts.

**Milestone 3.4.1:** Encourage partner programs through 319 and other partner programs will be encouraged to include plans for outreach and education that will target a minimum of 80% of landowners within priority areas for education on agricultural resources.

**Short Term Goal 3.5:** Encourage State, Federal and private land managers to incorporate NPS pollution reduction BMPs in their management plans.

**Milestone 3.5.1:** Existing guidance documents for State and Federal land managers will be reviewed and opportunities for inclusion of additional NPS reduction activities on agricultural lands will be identified.

**Short Term Goal 3.6:** If selected by the group, work to have the existing State Agricultural cost share program funded through the State Legislature.

**Milestone 3.6.1:** The Ag NPS working group will develop a strategy and plan for working with the legislature.

**Short Term Goal 3.7:** Assess new water quality management tools, such as watershed permitting and pollutant allocation trading, to determine if they can be effectively applied to support the objectives of this plan and Georgia's water quality control program, as funds allows.

**Milestone 3.7.1:** The GAEPD will partner with State and local government agencies, regulated entities, and other appropriate stakeholders involved in land and water management to review the practice of watershed permitting to determine the potential for use of this tool in Georgia.

**Milestone 3.7.2:** The GAEPD will partner with State and local government agencies, regulated entities, and other appropriate stakeholders involved in land and water management to review the practice of pollutant allocation trading to determine the potential for use of this tool in Georgia.

**Long Term Goal 4:** Target conservation and BMP implementation to address high profile concerns by 2016.

Over the next 5 years, the NPS Program will focus on addressing three significant agricultural sources of NPS pollution. These three sources were chosen based on the magnitude of their NPS pollution contribution, the anticipated availability of resources, and the interest in and ability to address them.

**Short Term Goal 4.1:** Develop nutrient management plans and strategies to reduce nutrient loading from animal feeding operations in concentrated production regions, as funding allows. Ensure that these nutrient management efforts are align with the elements of the Facility Wastewater and Runoff from Confined Animal Facilities Management Measures for large and small units listed in EPA's 6217 (g) guidance.

**Milestone 4.1.1:** Initiate a pilot program proactively addressing agricultural NPS pollution by updating and revising nutrient management plans within the agricultural community.

**Milestone 4.1.2:** Complete NMP Generator software revisions leveraging GA Department of Agriculture funds. Revised software available online for public download, refresher course for Certified Nutrient Management Planners.

**Milestone 4.1.3:** Develop Farm Assessment tool to help producers identify conservation opportunities on their farm and revise NMP. Farm assessments and revised NMPs completed on 80% of landowners in target watershed.

**Milestone 4.1.4:** Based on results of a successful pilot program, establish a Statewide program to develop Nutrient Management Plans for farmers and ranchers.

**Short Term Goal 4.2:** Address irrigation water use and associated nutrient and sediment losses from crop fields in areas identified by regional water planning efforts, as resources allow.

**Milestone 4.2.1:** Use the results of existing efforts such as AWEPP, the Georgia Water Conservation Implementation Plan, and the Flint River Drought protection act to expand water conservation programs beyond the pilot watersheds.

**Milestone 4.2.2:** Develop methods for estimating the NPS load reductions associated with water use reductions in crop production.

**Milestone 4.2.3:** Establish a subcommittee of the Ag NPS working group to investigate the extent of and potential impacts of fertigation (the use of irrigation systems to apply plant nutrients) and to establish education programs or other efforts to address these issues.

**Short Term Goal 4.3:** Promote soil conservation and quality enhancement through conservation tillage systems, rotational/intensive grazing systems, organic production, and other sustainable production practices on small and large farms Statewide.

**Milestone 4.3.1:** Continue to annually support the conservation tillage systems and Georgia grazing workshops.

**Milestone 4.3.2:** Include representation from the UGA Sustainable agriculture program, the UGA J Phil Campbell Research and Education Center, and the National Sustainable Agriculture Production Lab, Georgia Organics and other appropriate entities in the agricultural NPS working group.

**Milestone 4.3.3:** Making use of existing resources, develop and implement educational programs on the importance of soil organic matter and soil quality on water and air resources. Share these materials with stakeholders at a minimum of three (3) education events per year.



## **Wetlands**

### **Overview**

Wetlands found in the United States fall into four general categories—marshes, swamps, bogs, and fens. Marshes are wetlands dominated by soft-stemmed vegetation, while swamps have mostly woody plants. Bogs are freshwater wetlands, often formed in old glacial lakes, characterized by spongy peat deposits, evergreen trees and shrubs, and a floor covered by a thick carpet of sphagnum moss. Fens are freshwater peat-forming wetlands covered mostly by grasses, sedges, reeds, and wildflowers. Often called “nurseries of life,” wetlands provide habitat for thousands of species of aquatic and terrestrial plants and animals. Although wetlands are best known for being home to water lilies, turtles, frogs, snakes, alligators, and crocodiles, they also provide important habitat for waterfowl, fish, and mammals. Migrating birds use wetlands to rest and feed during their cross-continental journeys and as nesting sites when they are at home. As a result, wetland loss has a serious impact on these species. Habitat degradation since the 1970s has been a leading cause of species extinction. ([USEPA – 2005 wetlands overview](#))

Wetlands do more than provide habitat for plants and animals in the watershed. When rivers overflow, wetlands help to absorb and slow floodwaters. This ability to control floods can alleviate property damage and loss and can even save lives. Wetlands also absorb excess nutrients, sediment, and other pollutants before they reach rivers, lakes, and other waterbodies. They are great spots for fishing, canoeing, hiking, and bird-watching, and they make wonderful outdoor classrooms for people of all ages. Despite all the benefits provided by wetlands, the United States loses about 60,000 acres of wetlands each year. The very runoff that wetlands help to clean can overload and contaminate these fragile ecosystems. In addition, nonnative species of plants and animals and global climate change contribute to wetland loss and degradation. ([USEPA – 2005 wetlands overview](#))

### **Water storage**

Wetlands function like natural tubs or sponges, storing water and slowly releasing it. This process slows the water’s momentum and erosive potential, reduces flood heights, and allows for ground water recharge, which contributes to base flow to surface water systems during dry periods. Although a small wetland might not store much water, a network of many small wetlands can store an enormous amount of water. The ability of wetlands to store floodwaters reduces the risk of costly property damage and loss of life—benefits that have economic value to us. For example, the U.S. Army Corps of Engineers found that protecting wetlands along the Charles River in Boston, Massachusetts, saved \$17 million in potential flood damage.

### **Water filtration**

After being slowed by a wetland, water moves around plants, allowing the suspended sediment to drop out and settle to the wetland floor. Nutrients from fertilizer application, manure, leaking septic tanks, and municipal sewage that are dissolved in the water are often absorbed by plant roots and microorganisms in the soil. Other pollutants stick to soil particles. In many cases, this filtration process removes much of the water’s nutrient and pollutant load by the time it leaves a wetland. Some types of wetlands are so good at this filtration function that environmental managers construct similar artificial wetlands to treat storm water and wastewater.

### **Biological productivity**

Wetlands are some of the most biologically productive natural ecosystems in the world, comparable to tropical rain forests and coral reefs in their productivity and the diversity of

species they support. Abundant vegetation and shallow water provide diverse habitats for fish and wildlife. Aquatic plant life flourishes in the nutrient-rich environment, and energy converted by the plants is passed up the food chain to fish, waterfowl, and other wildlife and to us as well. This function supports valuable commercial fish and shellfish industries

### ***Wetlands Nonpoint Source Program***

Conservation and protection of wetlands in Georgia is primarily implemented through a Federal program managed by the United States Army Corps of Engineers (COE). Under Section 404 of the Federal Clean Water Act and Section 10 of the Federal Rivers and Harbor Acts, the COE administers a permit program applicable to a range of activities in, on, or around waters of the United States, including wetlands. Activities regulated under Section 404 include excavating, dredging, or depositing fill materials in waters and wetlands across the nation. Section 404 permit review and issuance follows a sequence process that encourages permittees to avoid impacts to wetlands. If this is not possible, then permittees must make efforts to minimize impacts and, finally, should neither of the previous two options are possible, permittees are required to mitigate the aquatic environment. This sequence is described in the guidelines at Section 404(b)(1) of the Clean Water Act. A few activities have been historically exempt from permit requirements - exemptions include construction or maintenance of farm ponds and irrigation ditches, maintenance of drainage ditches, construction of temporary sedimentation basins, and construction or maintenance of farm, forest or temporary roads done in accordance with best management practices. Ongoing agricultural and silvicultural activities may also be exempt from Section 404 regulations.

### **Program Issues**

Under the Section 401 of the Clean Water Act, GAEPD considers water quality parameters and impacts for all activities requiring a Federal license or permit that may result in discharges to Federally jurisdictional waters, including wetlands. A 401 certification is issued to ensure the consistency of such activities with Georgia's water quality standards. The majority of projects GAEPD reviews are those that have applied for a Section 404 permit from the COE. GAEPD also considers the offset (or mitigation) for Section 404 stream and wetland impacts through GAEPD's work with an Interagency Review Team (IRT); the IRT's role is to ensure Federal compensatory mitigation requirements are met through a review and comment process often resulting in an approved mitigation bank. To date, more than 100 mitigation banks have been approved in Georgia.

### **Resources Available**

Although less significant than the Federal 404 program, local government ordinances offer protection to Georgia's wetlands. The Georgia Planning Act of 1989 establishes provisions for comprehensive planning by local governments and authorizes the Georgia Department of Natural Resources (GA DNR) to develop minimum planning standards for protection of critical natural resources, such as wetlands.

### **Key Stakeholders**

- UGA River Basin Center
- US Army Corp of Engineers

### **Education/ Outreach**

GAEPD worked with the UGA River Basin Center to develop a guidebook outlining regulatory and non-regulatory measures local governments can take to ensure protection of wetlands. For lands that qualify as environmentally sensitive due to the presence of wetlands,

## ***Funding***

### ***Conservation Use Valuation Assessment***

Georgia tax law provides favorable tax valuation to promote the protection of wetlands through a Conservation Use Valuation Assessment.

### ***Coastal 401 Water Quality Certification Review***

The Georgia coast is rapidly growing with growth predicted to continue and to accelerate in the near future (source). Section 319 funds enable the improved use of Section 401 Water Quality Certification for coastal area projects by providing support for a dedicated environmental specialist in the Coastal District office. This specialist has experience in nonpoint source pollution, stormwater, buffers, and erosion and sediment control issues in coastal Georgia. The 401 review conducted by this specialist ensures State water quality standards will be met, with emphasis on impaired or threatened coastal waters and habitats.

## **Long Term Goals, Short Term Goals, and Milestones (In no particular order):**

**Long Term Goal 1:** Enhance 401 Water Quality Certification reviews in 24-county coastal district by 2016.

**Short Term Goal 1.1:** Recommend issuance, conditional issuance or denial of coastal area applications for 401 Water Quality Certification

**Milestone 1.1.1:** Reviews applications, public notices, mitigation plans, site studies and correspondence for each project proposal

**Milestone 1.1.2:** Conduct field evaluations at a minimum of four proposed project sites each year, with emphasis on impaired or threatened coastal waters and habitats

**Short Term Goal 1.2:** Incorporate management measures to control, prevent or reduce coastal nonpoint source pollution in conducting 401 Water Quality Certification reviews, as appropriate.

**Milestone 1.2.1:** Documentation of coastal nonpoint management measures incorporated in the proposed project's design or required through 401 Water Quality Certification conditions

**Short Term Goal 1.3:** Provide relevant training to coastal 401 Water Quality Certification staff

**Milestone 1.3.1:** Staff attends a minimum of two training opportunities per year focused on 401 Water Quality Certification or coastal nonpoint source pollution topics

**Long Term Goal 2:** Enhancing 401 Water Quality Certification inspection efforts by 2020.

**Short Term Goal 2.1:** Implement follow-up site inspections to monitor compliance with 401 Water Quality Certification conditions, with priority given to project sites in impaired or threatened coastal waters and habitats, or to large-scale projects

**Milestone 2.1.1:** Conduct and document three (3) follow-up inspections per year  
Goal 3: As resources allow, consider supporting wetland restoration efforts to improve water quality and water availability

**Long Term Goal 3:** Restore degraded wetlands by 2020.

**Short Term Goal 3.1:** Seek partnerships with willing landowners and funders to conduct restoration of degraded wetlands through restoration of natural hydrology and vegetation, if warranted. Monitor and/or model the results of the work to determine water quality and quantity outcomes.

**Milestone 3.1.1:** Conduct wetland restoration with willing partners.

**Milestone 3.1.2:** Monitor or model the results of the restoration.



Figure 8: Wetlands - USFWS 2001 Correlation Report, Georgia

## **Urban**

### ***Overview***

Impaired water quality in urban water bodies is the result of both point source discharges and the impact of diverse nonpoint source activities in the watershed. A variety of activities and processes contribute to nonpoint source loading in urban streams, including sedimentation associated with land disturbing activities; stormwater runoff from developed residential, commercial, and industrial areas; combined sewer overflows; illicit discharges; spills; improper storage or disposal of deleterious substances; septic systems; and intermittent failure of sewage systems. Nonpoint source contamination can lead to particularly severe impairment in streams draining highly impervious land uses where increased stormwater runoff, unauthorized discharges, and accidental spills may contribute to pollutant loading. Hydrologic and habitat modification, including alternations in flow regime due to development, stream channelization, and clearing of riparian vegetation can further diminish the integrity of urban streams.

Georgia is a fast growing state. Georgia is expected to add more than 3 million people by 2030 (Georgia OPB). Many of these people will live in cities and urban areas. Georgia EPD did an evaluation of projected future land as part of the State-wide Water Plan, this evaluation shows potential areas increase in urbanization and impervious surface. Urbanization increases the variety and amount of pollutants carried into our nation's waters. In urban and suburban areas, much of the land surface is covered by buildings, pavement and compacted landscapes with impaired drainage. These surfaces do not allow precipitation to soak into the ground which greatly increases the volume and rate of stormwater runoff. In addition to these habitat-destroying impacts, pollutants from urban runoff can harm fish and wildlife populations, kill native vegetation, foul drinking water, and make recreational areas unsafe and unpleasant.

### **Sediment**

Heavy sediment deposition in low-velocity surface waters may result in smothered benthic communities, increased sedimentation of waterways, changes in composition of bottom substrate and degradation of aesthetic value. Additional chronic effects may occur where sediments rich in organic matter or clay are present. These enriched depositional sediments may present continued risk to aquatic and benthic life, especially where sediments are disturbed and re-suspended. Therefore, when additional sediment is added, they add to sediment oxygen demand (SOD) stored on the bottom of the stream channel. As temperatures increase during summer months, the water body is not able to maintain a sufficient amount of DO to meet water quality criteria. These same sediments clog urban drainage systems, creating more problems with flooding and increased costs for maintenance of urban drainages. Therefore storm water BMPs should always be designed to retain as much sediment as possible onsite.

### **Nutrients**

Problems resulting from elevated levels of phosphorus and nitrogen are well documented and were discussed in detail previously. Excessive nutrient loading to aquatic ecosystems can result in eutrophication and depressed DO levels due to elevated algae populations.

### **Oxygen-Demanding Substances**

Appropriate levels of DO are critical to maintaining water quality and aquatic life. Decomposition of organic matter by microorganisms may deplete DO levels and result in impairment of the water body. Data have shown that urban runoff with high concentrations of decaying organic matter can severely depress DO levels after storm events. The [NURP study](#) found that oxygen-



demanding substances could be present in urban runoff at concentrations similar to secondary treatment discharges.

### **Pathogens**

Urban runoff typically contains elevated levels of pathogenic organisms. The presence of pathogens in runoff may result in water body impairments such as closed beaches, contaminated drinking water sources, and shellfish bed closings. Pathogens from onsite disposal systems (OSDS) have been implicated in a number of watersheds. Pathogens from pets, sewer overflows, natural sources and community treatment systems all contribute to total bacteria loads entering waterbodies. Many waterbodies that drain urban areas are impaired and do not meet contact recreational uses for swimming.

### **Hydrocarbons**

Petroleum hydrocarbons are derived from oil products, and are primarily found in urban runoff as a result of automobile and truck engines that drip oil. Concentrations of petroleum-based hydrocarbons are often high enough to cause mortalities in aquatic organisms. Oil and grease contain a wide variety of hydrocarbon compounds. Some polynuclear aromatic hydrocarbons (PAHs) are known to be toxic to aquatic life at low concentrations. Hydrocarbons have a high affinity for sediment. They collect in bottom sediments where they may persist for long periods of time and result in adverse impacts on benthic communities. Lakes and estuaries are especially prone to this phenomenon.

### **Heavy Metals**

Heavy metals are typically found in urban runoff. Heavy metals are of concern because of toxic effects on aquatic life and potential for groundwater contamination. Copper, lead, and zinc are most prevalent NPS pollutants found in urban runoff. High metal concentrations may bioaccumulate in fish and shellfish and impact beneficial uses of affected water bodies.

### **Toxics**

Many different toxic compounds have been associated urban runoff. NURP studies ([USEPA, 1983](#)) indicated that at least 10 percent of urban runoff samples contained toxic pollutants. Urban NPS pollution has severely impacted many water bodies receiving runoff from major cities. Urban NPS pollution is not limited only to large communities. Rural areas with small communities also contribute urban NPS pollution to water bodies.

Studies show that runoff from nonpoint sources during and after storm events has surpassed point source discharges as the largest contributor of pollutants to the waters of the State. Streams and rivers are able to assimilate only a limited portion of the contaminants they receive, resulting in impairments caused by excessive nonpoint source pollution. As developed areas grow, polluted runoff delivered to Georgia's streams will likely increase, resulting in waters that exceed their assimilative capacity. Based on the FY2012 305(b)/303(d) list there are 342 stream reaches listed as Not Supporting Designated Uses due to Urban Runoff, for a total of 2,255 miles.

### **Urban Nonpoint Source Program - Stormwater**

Georgia's strategic plan for addressing urban NPS pollution consists of six primary goals.

- Research – Remain informed on the rapidly growing body of research on the performance and effectiveness of GI/LID practices, as well as collect performance data from Georgia projects in a range a locations and applications in order to ensure the highest levels of effectiveness.

- Outreach – Ensure that potential implementers of GI/LID practices are aware of and have access to the necessary information to successfully install, maintain and monitor their projects.
- Tools – Improve the tools available to potential implementers of GI/LID practices to improve the performance and effectiveness of their projects.
- Regulatory – Facilitate cooperation with existing and developing regulatory programs to enhance the implementation and effectiveness of GI/LID practices.
- Economics/Funding – Document and disseminate the costs and benefits of GI/LID practices, and ensure that adequate resources are available for their implementation.
- Partnerships – Leverage existing programs and stakeholders that contribute to the effectiveness of GI/LID practices in order to make best use of resources and gain more widespread acceptance of GI/LID.

States, Federal agencies, and jurisdictions throughout the country are shifting to a new paradigm for managing urban stormwater runoff. This new paradigm emphasizes using Environmental Site Design (ESD) and Green Infrastructure (GI) practices to mimic predevelopment (natural site conditions) hydrology. Reducing the volume of runoff leaving developed sites (Runoff Reduction) reduces the pollutant load in receiving waters accordingly. It also contributes to big-picture goals of protecting downstream channels, recharging groundwater, reducing overbank flooding, and replicating predevelopment hydrology.

Green Infrastructure can be broadly defined as “an interconnected network of natural areas and other open spaces that conserve natural ecosystem values and function, sustain clean air and water, and provide a wide array of benefits to people and wildlife (Benedict and McMahon, 2006).” The USEPA has adopted a more narrow definition when referring to green infrastructure specifically as a stormwater management strategy, stating that “green infrastructure is management approaches and technologies that utilize, enhance and/or mimic the natural hydrologic cycle processes of infiltration, evapotranspiration and reuse (EPA, 2009).” This definition has many similarities with the concept of Low Impact Development (LID).

Low Impact Development (LID) is a storm water management strategy based on maintaining or replicating natural, pre-development, drainage characteristics of a site with design techniques that minimize storm water runoff and allow infiltration of the runoff that does occur. In other words, LID mitigates the impacts of runoff and storm water by capturing runoff and promoting storm water infiltration, storage, filtering, and evapotranspiration on site as close to where storm water hits the ground as possible. This approach is in direct contrast to conventional stormwater management in the U.S. throughout the 20<sup>th</sup> century, which focused on moving water away from a site as quickly as possible through the use of engineered structures such as gutters, curbs, pipes, and canals. Curb-and-gutter and stormwater retention and detention ponds are the most common practices in Georgia; however, research suggests that in some cases ponds do not provide sufficient pollutant removal to address impaired water quality in urban streams (UGA MAREX, 2008).

LID-based site design can accomplish this through seven principle objectives (Odom, 2009):

- (1) Minimizing disturbance;
- (2) Preserving and recreating natural landscape features;
- (3) Reducing effective impervious cover;
- (4) Increasing hydrologic disconnects;
- (5) Lengthening drainage flow paths;

- (6) Enhancing off-line storage; and
- (7) Facilitating detention and infiltration opportunities

These objectives are met by using a collection of site design approaches that include: preservation of natural vegetation, reduction in impervious surface, lengthening the stormwater flow paths and time of concentration, various methods of infiltration and filtration, as well as stormwater retention and detention areas. These approaches effectively remove nutrients, pathogens, and metal from stormwater, and they reduce the volume and rate of stormwater flows. When LID strategies are successfully implemented, they can create a landscape that functions like the predevelopment conditions with less surface runoff, more groundwater recharge and less pollution damage to lakes, streams, and coastal waters (Odom, 2009). GI/LID has a number of environmental and economic benefits that have been widely recognized (MAREX, 2008; Odom, 2009; EPA, 2009; EPA, 2014). Additionally, these practices can increase community resilience to drought and extreme flooding brought about by local shifts in climate.

- Reduces the frequency and severity of floods by reducing peak flow volume and velocity.
- Reduces the frequency and volume of combined sewer overflows, where those systems exist.
- Protects streams and riparian habitats by reducing eroded sediment discharge into streams and lakes.
- Recharges groundwater which contributes to stream baseflow, vegetation needs and community water supply.



Figure 9: Green infrastructure and LID rain garden at the University of Georgia. Photo by Rob McDowell, University of Georgia.

Unlike traditional stormwater management, which involves hard infrastructure like curbs, gutters, and piping, LID strategies often employ the land's natural drainage capacity and use lower-cost engineered swales and other landscaped features. In many situations, initial infrastructure costs for GI/LID are less than traditional stormwater management practices, and reduce municipal infrastructure and utility maintenance costs by reduce land clearing and grading costs.

LID practices are also typically cheaper to maintain and last longer than traditional stormwater structures. GI/LID has been shown to increase property values by increasing aesthetics and thereby making property more desirable. Increased recreational opportunities in nearby protected riparian habitats and a cleaner environment can also increase property value. Many other benefits such as habitat improvement, health benefits, heat island mitigation, reduced raw material and energy use, and improved air quality.

In spite of environmental and economic benefits, LID faces significant barriers in many communities. For example, some communities have existing rules or ordinances that lack

flexibility (i.e. setback requirements and road width) and consequently limit GI/LID effectiveness. Additionally, some GI/LID techniques and tools require continued maintenance by either homeowners or local governments to function effectively. Stormwater infiltration and filtration practices can potentially threaten groundwater quality if high levels of contaminants are present or stormwater control measures are designed incorrectly (Odom, 2009).

By expanding GI/LID beyond a lot or neighborhood-scale approach, storm water management can truly become an integral function of green infrastructure. In the past, creation of green space consisted of establishing isolated parks and natural areas based on the presence of nearby population centers and proximity to an aesthetically pleasing feature such as mountains or a water body. More often than not, these areas are too small or disconnected to maintain valuable ecosystem functions such as stormwater management and habitat protection. By integrating green space conservation planning with new or re-developments utilizing Environmental Site Design (ESD), we can identify lands which are the best for development and lands that are the best for providing natural resource protection through interconnections of green infrastructure with various degrees of gray and developed areas. This interspersion of green and gray infrastructures allow communities to take advantage of the natural amenities that come from working landscapes and natural areas which can cost less than alternatives. Because connectivity is critical, green infrastructure must be thought of as an interconnected network of lands connected by corridors which can be used for recreation and transportation of people as well as allow the movement of water and wildlife through the landscape (NRSAL, 2014).

### **Current Efforts**

Georgia GAEPD's Watershed Protection Branch supervises solutions to urban runoff pollution through both regulatory and voluntary programs:

#### ***Regulatory***

- NPDES Wastewater Permits - Watershed Assessment, Monitoring, and Protection Plans
- NPDES Construction Stormwater Permits - Erosion & Sedimentation Pollution Control
- NPDES MS4 Phase I and II Permits - Stormwater Management Plans & Notices of Intent
- General NPDES Industrial Stormwater Permit
- General NPDES GDOT and DOD MS4 Stormwater Permits
- Regional Water Plans affiliated with the Georgia Comprehensive State-wide Water Management Plan

#### ***Voluntary***

- Section 319-Funded Low-Impact Development – Green Infrastructure
- Environmental Outreach - Adopt-A-Stream Volunteer Monitoring; Project WET (Water Education for Teachers); Rivers Alive Clean-Up
- Also, the Georgia Department of Community Affairs - Planning and Environmental Management currently offers a program in Water Resources Management to foster water stewardship in seven categories, culminating in a WaterFirst designation for communities that achieve and maintain a high level of water stewardship excellence.

### **Program Issues**

Both the regulatory landscape and the management paradigms to stormwater have evolved. This includes an increased focus on volume reduction as a method to better mimic predevelopment hydrology. It also includes a wider acceptance and usage of green

infrastructure and low impact development approaches. Finding the balance between regulatory and non-regulatory approaches to urban water quality issues will continue to evolve.

### **Resources Available**

[Georgia Stormwater Management Manual Volumes 1, 2, and 3](#)

[Georgia EPD - Coastal Stormwater Supplement to the Stormwater Management Manual Stormwater Utility Handbook](#)

### **Key Partners**

- GA DCA (Comprehensive Plans)
- GA Coastal Resources Division (Coastal Regional Development Plan)
- Georgia DHR (Environmental Health)
- GEFA (Green Projects Reserve, Land Conservation Program)
- Regional Commissions (Metro District Watershed Management Plans)
- US Army Corps of Engineers
- GA Regional Conservation & Development Councils
- Georgia Soil & Water Conservation Commission
- Georgia Association of Water Professionals

### **Education / Outreach**

- GA DCA (Community Planning Initiative Water Resources Management, Recycling & Disposal Guidance)
- GA Regional Conservation & Development Councils (Better Back Roads)
- American Rivers
- Riverkeepers

### **Funding / Implementation Resources**

- GEFA (State Revolving Fund)
- GA Coastal Resources Division (Coastal Incentives Grant)
- Georgia Soil & Water Conservation Commission (Green Book)
- GA Stormwater Management Manual – Vol. 1,2,&3 and Coastal Supplement

### **Long Term Goals, Short Term Goals, and Milestones (In no particular order):**

**Long Term Goal 1 – Research:** Remain informed on the rapidly growing body of research on the performance and effectiveness of GI/LID practices, as well as collect performance data from Georgia projects in a range a locations and applications in order to ensure the highest levels of effectiveness, ongoing.

While much published research has documented the effectiveness of GI/LID practices, there is a shortage of research on projects in Georgia. This lack of local data may contribute to a lack of confidence among some stakeholders that GI/LID is an appropriate strategy. A concerted effort to monitor and report on the effectiveness of GI/LID practices installed in a variety of physiographic, land-use and climatic contexts throughout the State is needed.

**Short Term Goal 1.1:** Encourage and support performance monitoring of installed GI/LID practices in order to provide local-specific data on BMP cost, performance, and installation and maintenance requirements.

**Milestone 1.1.1:** Publication and/or dissemination of monitoring results.



**Milestone 1.1.2:** As lessons are learned from monitoring activities, refinement of the BMP guidance as appropriate.

**Milestone 1.1.3:** Publication of case studies that show how GI/LID has been used to restore water quality.

**Short Term Goal 1.2:** Disseminate relevant green infrastructure research and best practices through partnerships with existing conferences, institutions and organizations. For example, the Georgia Water Resources Conference is an existing conference that could serve as a primary mechanism to collect, peer-review, present and publish green infrastructure research.

**Milestone 1.2.1:** GAEPD participation in the identified conference (and other opportunities) and establishment of a green infrastructure track or theme as appropriate.

**Long Term Goal 2 – Outreach:** Ensure that potential implementers of GI/LID practices are aware of and have access to the necessary information to successfully install, maintain and monitor their projects, ongoing.

As resources are developed a continued effort to connect users with those resources is needed. Attention to the range of stakeholders that influence urban NPS pollution is important and will require a multi-faceted and adaptive outreach effort. Stakeholders include: stormwater professionals (landscape architects, civil engineers, and planners.), elected officials, homeowners, small businesses, citizens, other government agencies, environmental groups, developers, and more. Questions to consider as this GI/LID outreach is conducted include: Is it cheaper and for whom? Is it popular? Does it benefit the development community? Does it allow us to house more people while benefiting the environment? Are there relevant case studies to support these positions?

**Short Term Goal 2.1:** Partner with an appropriate entity, to provide training on the Georgia Stormwater Management Manual (GSMM) once the update to the GSMM is complete.

**Milestone 2.1.1:** Support the continuation and updating of training opportunities for stormwater professionals.

**Milestone 2.1.2:** Minimum of three (3) workshops held by 2017.

**Short Term Goal 2.2:** As resources allow, partner with an appropriate entity, such as a university or utility, to sponsor a green infrastructure design competition. The competition guidelines should require documentation of the economic and environmental performance of the green infrastructure design and compare it to a more conventional grey infrastructure solution, by 2020. Examples of similar competitions are the Campus Water Works Challenge (EPA) and the Soak It Up Competition (Philadelphia Water Department, EPA, and Community Design Collaborative).

**Milestone 2.2.1:** Establishment of an appropriate partnership and creation of the design competition.

**Milestone 2.2.2:** Participation in the competition from a wide variety of stakeholders.

**Short Term Goal 2.3:** Consider, partnering with the construction industry to provide training and resources necessary to facilitate construction, maintenance and monitoring of GI/LID. Training of this sort should be targeted primarily towards contractors, but will also benefit designers and inspectors/regulatory personnel.

**Milestone 2.3.1:** Minimum of two workshops.

**Short Term Goal 2.4:** Create a State-wide educational and outreach campaign aimed at changing attitudes and improving behaviors affecting urban runoff. Coordinate with existing efforts by MS4 Communities in order to complement and amplify those efforts rather than duplicate them. Target different segments of the population (landowners, businesses, governments), especially those that are less likely to be reached by MS4 Community efforts, with information about consequences of urban runoff and options to reduce impacts. High-visibility demonstration projects are considered a form of outreach.

**Milestone 2.4.1:** Development and presentation of educational materials in a variety of user-friendly formats by 2020.

**Milestone 2.4.2:** Development of high-visibility, publically-accessible demonstration projects.

**Long Term Goal 3 – Tools:** Improve the tools available to potential implementers of GI/LID practices to improve the performance and effectiveness of their projects.

The Georgia Stormwater Management Manual (GSMM) was first released in 2001 and serves as the primary technical guidance document for stormwater management in Georgia. In 2009, the Coastal Stormwater Supplement was published and incorporates many advances in approach and practices. The GSMM is currently in the process of being updated (refer to the Regulatory Programs section of the Plan for a more detailed discussion of the GSMM). Tools are needed to expand the reach of GI/LID practices to projects that have not traditionally been subject to regulatory mandates. Additionally, predictive and evaluative models are needed to facilitate the effective siting and design of GI/LID practices throughout urban areas. Lessons learned from the development and implementation of the Coastal Supplement will be incorporated into the GSMM.

**Short Term Goal 3.1:** Participate in the update of the GSMM, and ensure implementation of the GSMM by MS4-permitted jurisdictions.

**Milestone 3.1.1:** Revised and consolidated GSMM by 2016.

**Milestone 3.1.2:** Number and/or percentage of MS4s Implementing the revised GSMM.

**Milestone 3.1.3:** Number of known non-MS4 cities and counties that incorporate the GI/LID provisions of the GSMM into their ordinances.

**Short Term Goal 3.2:** Establish a hierarchy of NPS management strategies in the GSMM such as.

- 1) Environmental Site Design to minimize impervious surfaces and soil disturbance.
- 2) Post construction Runoff Reduction to mimic natural site hydrology.
- 3) Post-construction treatment of runoff to remove NPS pollutants.

**Milestone 3.2.1:** Consultation with GSMM Technical Advisory Group.

**Milestone 3.2.2:** Adoption of a hierarchy into the GSMM, if warranted by stakeholder input.

**Short Term Goal 3.3:** After stakeholder input, consider establishing runoff reduction/onsite retention goals for all areas of the State, taking into account: stakeholder input, climate, and the predevelopment geology, slope and soil characteristics of different regions.

**Milestone 3.3.1:** Summary of stakeholder recommendations.

**Short Term Goal 3.4:** Consider post-construction stormwater management controls of runoff from single-family infill development and commercial projects less than 5,000 SF in MS4 Permitted Areas. The City of Atlanta has already created programs addressing both of these conditions (COA, 2012; COA, 2014)

**Milestone 3.4.1:** A manual or appropriate outreach material.

**Short Term Goal 3.5:** Encourage and/or incentivize green infrastructure retrofits to reduce NPS runoff from existing development in urban areas. Encourage stakeholder group participation to identify appropriate incentives.

**Milestone 3.5.1:** Minimum of three (3) outreach events targeting retrofits by 2018.

**Short Term Goal 3.6:** In partnership with the appropriate entity, consider developing a watershed based BMP evaluation model for use by GAEPD and the regulated community for the evaluation of urban stormwater BMPs. This model would allow designers and regulators to evaluate the expected impacts and reductions from particular BMPs within a particular watershed. The model would be an advance beyond the site specific scale spreadsheet models currently employed by allowing analysis of potential regional scale upstream and downstream impacts.

**Milestone 3.6.1:** Complete development of the watershed-based BMP evaluation model by 2022 per current 106 funding plan.

**Milestone 3.6.2:** Partner with local jurisdictions and other entities to ensure the availability of data needed as inputs for successful use of the model.

**Milestone 3.6.3:** Promote the training and use of the model through training and outreach opportunities (see Objective 2.2).

**Long Term Goal 4 – Regulatory:** Facilitate cooperation with existing and developing regulatory programs to enhance the implementation and effectiveness of GI/LID practices.

Existing and developing regulatory programs are discussed in detail in the Regulatory Programs section of this Plan. Opportunities to align GI/LID objectives and need with other regulatory programs should be identified and taken advantage of as appropriate.

**Short Term Goal 4.1:** As a part of the ongoing development of E-reporting tools, provide the capability for E-reporting of MS4 and Industrial Stormwater permits. Identify and take advantage of opportunities to capture important additional data for purposes beyond regulatory compliance, such as monitoring data to inform BMP design specifications, training and outreach activities. Performance data collected may be consistent with national databases such as the Center for Watershed Protection's National Pollutant Removal Database (CWP, 2007) in order to contribute to the expanding body of performance data.

**Milestone 4.1.1:** Development and use of E-reporting tools for MS4 and Industrial Stormwater permits.

**Milestone 4.1.2:** Development of database structure and data requirements to be maintained and reported by jurisdictions.

**Long Term Goal 5 – Economics/Funding:** Document and disseminate the costs and benefits of GI/LID practices, and promote resources that are available for their implementation.

One of the most frequently identified barriers to the implementation of GI/LID noted by stakeholders is the perception that it costs more and is not worth it. Real analyses of installed GI/LID practices are needed, with attention to installation costs, maintenance costs, performance, other costs/benefits and comparison to the same data from conventional grey infrastructure. Additionally, it is important to document and provide guidance to communities on strategies to overcome the lack of financial resources available for GI/LID implementation.

**Short Term Goal 5.1:** Compile existing research, collect local monitoring data as available, and disseminate findings as appropriate related to the economic cost-benefit of GI/LID, as available.

**Milestone 5.1.1:** Production of a fact sheet or white paper on the actual costs and benefits of GI/LID compared to conventional grey infrastructure, and distribution to elected officials, developers, regulators and other stakeholders.

**Short Term Goal 5.2:** Provide training opportunities on GI/LID costs, benefits and funding opportunities for local elected officials, public works staff, and local planning staff by 2017.

**Milestone 5.2.1:** Identify potential partners to provide training.

**Milestone 5.2.2:** Number of workshops.

**Long Term Goal 6 – Partnerships:** Leverage existing programs and stakeholders that contribute to the effectiveness of GI/LID practices in order to make best use of resources and gain more widespread acceptance of GI/LID.

Many diverse stakeholders are interested and knowledgeable about strategies to reduce NPS pollution from urban areas. Universities, professional organizations (American Society of Landscape Architects, American Society of Civil Engineers, US Green building Council, American Institute of Architects, and American Planning Association), environmental NGO's, and many more have contributed significantly to the advancement of our understanding of NPS pollution management. Partnering and leveraging existing/collaborative efforts is a best use of limited resources.

**Short Term Goal 6.1:** Convene a technical advisory group (TAG) for the update of the Georgia Stormwater Management Manual (GSMM).

**Milestone 6.1.1:** Establishment of and participation in the TAG. Participation should represent a cross-section of stakeholders throughout the State.

**Short Term Goal 6.2:** Consider partnerships as appropriate, to research, implement and promote GI/LID.

**Milestone 6.2.1:** Coordination with or support of training and outreach programs developed by partners (see Objectives 2.1 - 2.4).

**Short Term Goal 6.3:** If resources allow, coordinate urban runoff efforts throughout the State by convening NPS-Urban Runoff Working Groups throughout the State to address urban water quality concerns and providing appropriate training and outreach opportunities for managing NPS runoff in Urban Areas.

**Milestone 6.3.1:** Establishment of and participation in Working Groups as appropriate.

**Milestone 6.3.2:** Development of Training Components as appropriate.



Figure 10: Example of Stormwater Drain Stencil and Curb Marker - GSWMM Vol. 3



## **Urban Nonpoint Source Program – Dirt Roads**

### **Overview**

Due to Georgia's habitat diversity that ranges from cold headwater trout streams in the mountains to the unique environs of the coast, sediment pollution presents many challenges in protecting these diverse habitats. Sediment from roads and ditch banks contribute heavy loads to adjacent streams and has a detrimental effect on fish and other aquatic life by either smothering habitat or interfering with feeding and reproduction. Of the approximately 14,000 miles of impaired streams in Georgia, 2,300 miles are currently listed as biologically impaired due to habitat degradation caused by sediment.

### **Program Issues**

Nationally, there are more than 4 million miles of improved roads in the U.S., which include 44,000 miles in the interstate system. In Georgia, there are more than 88,000 miles of paved roads, and more than 28,000 miles of unpaved roads which does not include private driveways.

### **Resources Available**

Acknowledging that sediment not only affects habitat but also increases maintenance costs for local and State governments, GAEPD, in partnership with the Pine Country and Two Rivers Resource Conservation and Development Councils (RC&DC), developed the Georgia Better Back Roads Field Manual. Completed in July 2009, this is the first Georgia manual of standards which describes and illustrates cost effective best management practices (BMPs) that stabilize unpaved roadways while reducing sedimentation. Techniques such as reconstructive grading, storm water outlet transitioning, and culvert installations for stream crossings are detailed in the manual. The overall goal of the project was to provide local governments with cost effective actions that can be adopted by city and county road crews to realize Long Term economic savings and cleaner streams.

In addition to the Georgia Better Back Roads Field Manual, the State of Georgia has voluntary best management practices for forestry to prevent erosion and sediment associated with silviculture from entering surface waters. Compliance on such BMPs is widespread; however, complaints and concerns occasionally arise. GAEPD has designated the Georgia Forestry Commission (GFC) as the lead agency for silvicultural nonpoint source pollution control in Georgia. In 1982, GAEPD partnered with the Georgia Forestry Commission to develop, maintain and publish a manual of BMPs for forestry, which was updated in 2009. Along with other BMPs, the Forestry BMP manual provides recommendations and guidelines for constructing and maintaining logging roads. These permanent or temporary access roads are an essential part of any forest management operation and provide access to the site. In the last Statewide survey of forestry BMPs, the GFC found that 94.2% of all logging roads in Georgia meet voluntary BMP guidelines.

### **Key Stakeholders**

- Two Rivers Resource Conservation and Development Council
- Pine Country Resource Conservation and Development Council
- Georgia Department of Transportation (GDOT)
- Georgia Better Back Roads Field Manual
- Georgia's Best Management Practices for Forestry

### **Education/ Outreach**

- BBR Training funded with GDOT and or 319 Funds

## Funding

- Section 319 Nonpoint Source Implementation Grant
- GDOT

## Long Term Goals, Short Term Goals, and Milestones (In no particular order):

**Long Term Goal 1:** Recognizing the impact sediment has on Georgia's waterways and aquatic habitat, increase Georgia's involvement in reducing impacts from dirt roads.

**Short Term Goal 1.1:** Clean Water Act Section 319 Grant program will give higher priority to projects addressing sediment impairment. Reflect the importance of Sediment impairments to Georgia waters in the selection criteria for Section 319 Application Review, ongoing

**Milestone 1.1.1:** Incorporate sediment priority into the annual Fair and Open Grants Act (FOGA) rule

**Milestone 1.1.2:** Reflect NPS sediment impairments in Georgia's Watershed Prioritization Tool

**Milestone 1.1.3:** Reflect the importance of Sediment impairments to Georgia waters in the selection criteria for Section 319 Application Review

**Short Term Goal 2.1:** Provide Training and Educations Opportunities for Local City and County Road Managers, by 2016.

**Milestone 2.1.1:** Fund a minimum of 1 BBR Training Workshop in the Piedmont or Mountain Region of Georgia

**Milestone 2.1.2:** Fund a minimum of 1 BBR Training Workshop in the Coastal Plain Region of Georgia



## Coastal

### **Overview**

Although the coastline of Georgia is relatively small, extending for approximately one hundred miles, more than half of the State's land is drained by rivers that flow into the Atlantic Ocean. Additionally, the coast of Georgia contains almost one-third of the remaining tidal marsh in the eastern United States. The rare landscapes and ecosystems of coastal Georgia are threatened by increasing development in the 11 coastal counties, and by nonpoint source pollution carried in rivers and streams flowing into those counties.

The Coastal Nonpoint Source Management Plan for Georgia, (implementing the Coastal Zone Act Reauthorization Amendments (CZARA)) which will address NPS pollution in the 11 coastal counties, is currently being developed by the Georgia GAEPD, the Department of Community Affairs, and the Coastal Resources Division of the Georgia Department of Natural Resources . Once completed, the Coastal Nonpoint Source Management Plan will be included by reference in this document. The Statewide Nonpoint Source Pollution plan will focus on NPS pollution entering the coastal zone through upland watersheds, specifically those streams and rivers that drain the 13 counties inland from the 11 coastal counties. In those watersheds, surface waters are affected by agriculture, forestry, urban storm water, dirt roads, and other factors that affect dissolved oxygen levels, fecal coliform levels, and mercury in fish. In the 24 county coastal area, the main trunk rivers flowing into the Atlantic are the Savannah, Ogeechee, Altamaha, Satilla, and St. Marys Rivers (Fig. 4). Much of the eastern half of the Atlanta Metropolitan area is drained by the Oconee and Ocmulgee Rivers, which join to form the Altamaha. However, most of the NPS pollution derived from the Piedmont headwaters of the rivers that flow to the coast is diluted and mitigated by the time it reaches the lower Coastal Plain where local sources of NPS play a far greater role. In the watersheds, of the upland 13 counties, the most significant causes of stream impairment are low dissolved oxygen levels, mercury in fish, and high levels of fecal coliform bacteria (Table 1). By far, the biggest source of these impairments is nonpoint source pollution, but land use and stream hydrology in the upland 13 counties varies significantly, leading to the need for different approaches to managing NPS pollution depending on changes in land use.

The Altamaha River serves as a convenient dividing line that separates different land use patterns and natural stream hydrology in the northern and southern halves of the 24 county coastal zone. North of the Altamaha River, large segments of the Ogeechee, Canoochee, and Ochopee Rivers (Fig. 1) flow through rural areas with thousands of acres devoted to crop and livestock agriculture. Water quality models of assimilative capacity for the Statewide Water Plan suggest that these river basins have limited assimilative capacity due to low levels of dissolved oxygen. In addition, all three of these rivers have significant numbers of stream miles impaired by high levels of fecal coliform bacteria and mercury in fish tissue.

South of the Altamaha River there is less agricultural land and more forested land, although much of the Satilla and Little Satilla River basins in the upland 13 counties are under cultivation. Perhaps for this reason, the Satilla and Little Satilla basins contain a large number of stream miles impaired by fecal coliform bacteria. Assimilative capacity models based on dissolved oxygen indicate fewer stream miles with limited assimilative capacity in segments of the Satilla River Basin and much of the St. Marys River. In the case of the St. Marys River, its simulated limited or exceeded capacity is found along the segments of the river experiencing the most rapid development from nearby Jacksonville, FL, but also where the gradient of the river is extremely low and the effect of tides on water quality in the mixing zone is significant. As with

the three river basins described previously, the Satilla and St. Marys rivers contain significant numbers of stream miles impaired by mercury in fish tissues. In fact, mercury is the biggest cause of stream impairment in the St. Marys River basin. The Altamaha River Basin does not contain any stream segments impaired by mercury (Table 1; USEPA 2010 Georgia Water Quality Assessment Report).

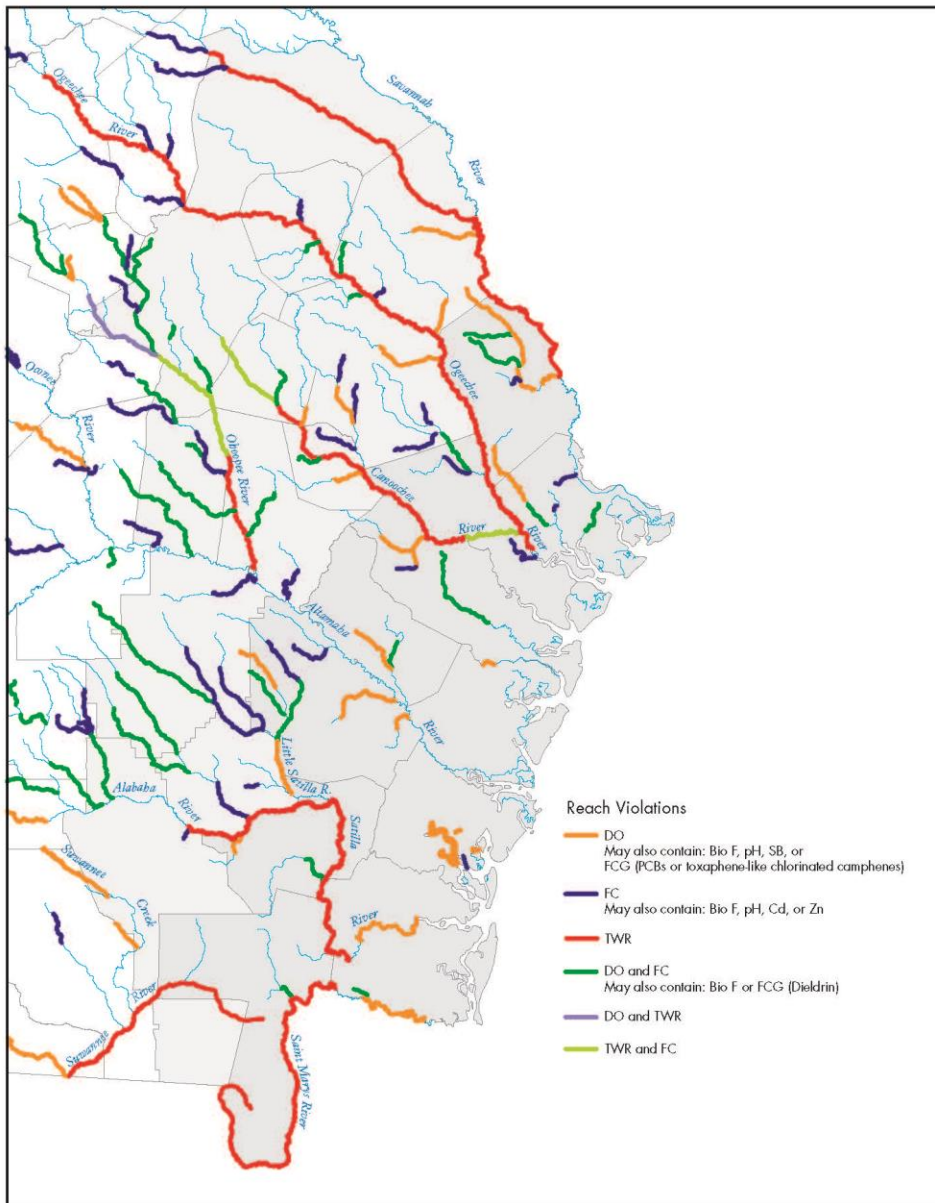


Figure 11: Stream impairments in the 24 coastal counties. Map by Jan Coyne, University of Georgia

Low dissolved oxygen in Coastal Plain streams is generally considered to be naturally occurring due to the rivers' low gradient, low velocity, high tannic acid levels, and mixing at the interface between salt water and fresh water. However, nutrient loading from surrounding agricultural lands can exacerbate low DO through the addition of biochemical oxygen demand to streams. Farm runoff may be contributing to elevated levels of fecal coliform bacteria in the Ogeechee, Canoochee, and Ohoopsee Rivers, as well as to the Satilla and Little Satilla Rivers. Interestingly, these same rivers also have high levels of stream impairment caused by mercury contamination in fish tissues.

Clearly, in addition to elevated fecal coliform bacteria levels and low DO levels, mercury pollution is a major NPS pollution problem in coastal Georgia. Coal-fired power plants, of which there are dozens in Georgia and the Southeast, are the largest single source of modern anthropogenic mercury emissions in the United States, followed by industrial boilers and electric arc furnaces (Driscoll et al, 2007). Chemical reactions in the atmosphere combine airborne mercury with water droplets, which fall as precipitation and cling to clay minerals in soils (a chemical phenomenon called "adsorption"). These mineral particles get washed into streams. Mercury was also used in agricultural chemicals such as fungicides, mildewcides, and pesticides (Smart, 1968). All food uses of mercury-containing pesticides were banned in 1969, and its use in all other pesticides was banned in 1995. However, high concentrations of mercury may still exist in intensely cultivated areas (Wang et al, 2004), and soil-disturbing activities such as farming and logging have the potential to re-release mercury into watersheds.

Mercury is extremely toxic and very mobile in the environment. In soils and stream sediments, adsorption is one of the most important ways by which methyl-mercury, the most toxic form of organic mercury, is removed from rainfall and surface water, but this tendency decreases with lower pH. In the naturally acidic rivers and streams of the Georgia Coastal Plain, methyl-mercury is not easily retained in the sediment but is transferred to aquatic plants and algae which are in turn eaten by fish. Trees and other land plants absorb airborne mercury through their foliage, which is then passed into watersheds through leaf fall (Wang et al, 2004; Federal Remediation Technologies Roundtable). Indeed, mercury concentration in the environment is actually enhanced by heavy forest cover (Driscoll et al, 2007) such as that found in the areas south of the Altamaha River and other parts of coastal Georgia.

In the soil, mercury is strongly attracted to organic matter such as in the dark humic soils of coastal wetlands and floodplains. It is also chemically attracted to inorganic iron minerals that give Georgia soils their red and yellowish colors. In summary, the soils, water chemistry, vegetation, and past and present land uses of coastal Georgia are ideal for the retention and re-release of mercury, and its concentration in fish.

### ***Coastal Nonpoint Source Program***

The Coastal Nonpoint Source Program is a part of the Georgia Coastal Management Program that addresses water quality. It was mandated to all coastal states by Section 6217 of the Coastal Zone Act Reauthorization Amendment, and is administered at the federal level by the National Oceanic and Atmospheric Administration (NOAA). Thus, it is also referred to as the 6217 Program. It is a non-regulatory program that seeks to reduce non-point source pollution by providing funding, program development, and technical assistance for a range of activities that implement non-point source management measures, such as modifying existing construction design standards, local ordinances, public works and contractor training programs, and existing water quality protection programs. These management measures were mandated by the US EPA guidance document 840-B-92-002 (1993) and are non-numeric directives that



seek to reduce non-point source pollution from sources that are exempt from regulation under federal or state environmental laws. That is, the 6217 management measures address pollution sources that were originally thought to be too insignificant to address by regulations. There are 56 of these measures.

### **Program Issues**

As long as there are sources of airborne mercury in Georgia and surrounding States, mercury will continue to be delivered to Georgia's watersheds and landscapes. However, standard management practices that address forestry, agriculture, and watershed management can mitigate high fecal coliform and low DO in coastal Georgia streams may also be effective in mitigating mercury contamination in fish tissue. Management practices designed to reduce runoff from disturbed land, reduce nutrient and potentially fecal-laden runoff from agricultural lands, restore natural drainage patterns, and minimize the impact of logging on watersheds should be encouraged or implemented in the 24 coastal counties of Georgia.

These standard management practices could include, but not be limited to, the following:

1. *Conservation tillage methods including no-till farming:* Conservation tillage and no-till cultivation reduce the extent and depth of soil disturbance before planting. They decrease water use and runoff from farm fields, retain nutrients in the soil, and require lower application of chemical fertilizers, thus decreasing potential nutrient runoff into streams. The tillage methods also minimize disturbance of potentially Hg-contaminated soils, which can re-release mercury into the environment through windblown dust and runoff from tilled fields.
2. *Expanded buffers to minimize runoff from the land surface.* Vegetated stream buffers are proven to be highly successful at reducing runoff and the introduction of nonpoint source pollution into surface waters. Depending on their design and width, buffers can be highly effective at capturing suspended solids, sediment, heavy metals, nutrients, and suspended organic matter such as fecal coliform bacteria. Stream buffers can also improve channel characteristics and improve in stream nutrient transformation and assimilation. All impaired stream segments in the upland 13 counties, including those impaired by mercury contamination in fish, would likely benefit from protected buffers.
3. *Protection of wetlands in order to decrease runoff and maintain natural flow regimes.* Currently, non-jurisdictional wetlands are commonly destroyed for agricultural purposes as well as for residential and commercial development. Wetlands act as natural stormwater management systems, and effectively capture a wide range of nonpoint source pollutants. Additionally, as mercury is strongly attracted to the organic soils of wetlands, wetland destruction could be a significant source of mercury re-mobilization.
4. *Restoration of wetlands in silviculture/agricultural lands to undo hydro modification.* In the past several decades, thousands of acres of privately owned land used for silviculture has been trenched and drained in order to improve conditions for forestry. This has decreased the residency times of surface waters, which flow more quickly through the forests and into streams and thus have reduced attenuation capacity for nonpoint source pollutants such as naturally sourced fecal coliform bacteria and tannic acid. Organic-rich forest soils may contain elevated amounts of mercury from tree litter, and pore waters in those soils likely contain elevated levels of methyl mercury from adsorption. Additionally, channeled wetlands and forest lands are believed to have a negative impact on natural flow regimes, causing downstream flooding and erosion. Restoration of natural drainage patterns in forested lands would reduce rapid discharge of waters from these forests, decrease transport of nonpoint source pollution into larger streams, and decrease mobilization of mercury from the highly organic soils through which shallow groundwater containing mercury percolates.

5. *Logging BMPs to reduce soil disturbance.* Most foresters in Georgia are excellent stewards of the environment, and the rate of BMP implementation is typically very high (>87%). However, in the areas of coastal Georgia these management practices should continue to be encouraged and monitored, as forested soils may have significantly elevated levels of mercury due to tree litter. Additionally, much of the now-forested land in coastal Georgia was once cultivated for row-crop agriculture, and may contain elevated levels of mercury from past usage of farm chemicals that contained mercury.
6. *Managing dirt roads such that sediment runoff is eliminated or reduced.* *Sediment washed into streams may cause impairment due to fish or macroinvertebrate bio-assessments: fish or macroinvertebrates may be choked by sediment or their habitats destroyed. Sediment from dirt roads adds other pollutants to streams, such as oil and heavy metals, including mercury which is preferentially concentrated in coastal Georgia's soils. Because so many of Georgia's small rural roads are unpaved, an effort should be made to reduce sediment runoff from unpaved roads through dirt road maintenance*
7. *Standard livestock BMPs to minimize fecal runoff from pastures and poultry farms.* Because fecal coliform contamination is a significant source of stream impairment in coastal Georgia, standard and well-documented management practices that minimize runoff from livestock operations, pastures, and row crop farming should be emphasized. In addition to low DO, fecal coliform, and mercury in fish tissue impairments, all river basins in the coastal 24 counties contained either stream miles or coastal shoreline miles that are impaired as a result of urban storm water (Table 1). As discussed in more detail elsewhere in this report, urban storm water contributes significantly to fecal coliform contamination, heavy metals, nutrients, elevated temperature, and other NPS pollutants. In all 24 coastal counties, urban storm water impairment occurs along 291 miles of stream miles, half of which occurs in the Satilla and Little Satilla watersheds (146 miles). Management practices described elsewhere in this report to address urban storm water, tailored for low stream gradients and relief of the Coastal Plain, would mitigate urban storm water impairment.

### **Resources Available**

[Georgia EPD - Coastal Stormwater Supplement to the Stormwater Management Manual Stormwater Utility Handbook](#)

### **Key Stakeholders**

Many partners are involved when dealing with water quality and the coastal nonpoint source plan. For a full list of partners, please reference the Partner Contact Section ([Appendix B](#)), [Silviculture](#), [Agriculture](#), and [Urban storm water](#) of this document.

### **Education/ Outreach**

Many programs and initiatives are underway to educate stakeholders on concerns and issues that arise when NPS pollution enters the coastal zone through upland watersheds, specifically those streams and rivers that drain the 13 counties inland from the 11 coastal counties. In those watersheds, surface waters are affected by agriculture, forestry, urban storm water, dirt roads, and other factors that affect dissolved oxygen levels, fecal coliform levels, and mercury in fish.

### **Funding**

- Section 319 Nonpoint Source Implementation Grant
- NOAA

## **Long Term Goals, Short Term Goals, and Milestones (In no particular order):**

**Long Term Goal 1:** Expand ambient water quality monitoring at nodes where upland rivers and streams enter the 11 coastal counties, by 2020.

**Short Term Goal 1.1:** Delineate upland-derived NPS pollution, as resources allow.

**Milestone 1.1.1:** Establish permanent water quality trend sampling sites on the Ogeechee, Canoochee, Altamaha, Satilla, and St. Marys Rivers at the locations shown in Figure 4.

**Long Term Goal 2:** Minimize runoff of storm water from developed and cultivated land, by 2018.

**Short Term 2.1:** Encourage protection and restoration of non-jurisdictional wetlands

**Milestone 2.1.1:** Encourage local ordinances that discourage destruction and filling of non-jurisdictional wetlands.

**Short Term Goal 2.2:** Reduce contamination of surface waters from fecal coliform bacteria and mercury, as funding allows.

**Milestone 2.2.1:** As part of the prioritization process, identification of streams currently impaired by fecal coliform bacteria that could benefit most from restored wetlands

**Long Term Goal 3:** Reduce runoff from farm fields to reduce contamination of surface waters from fecal coliform bacteria, sediment, and nutrients, by 2018.

**Short Term Goal 3.1:** Encourage conservation and no-till agriculture

**Milestone 3.1.1:** Increase the number of row crop acres using conservation or no-till agriculture in the upland counties.

**Long Term Goal 4:** Explore methods of increasing the number of miles of BMP implementation on rural roads

**Short Term Goal 4.1:** Minimize runoff of sediment into streams, as funding allows.

**Milestone 4.1.1:** Number of “Better Backroads” workshops held.

**Long Term Goal 5:** Through existing monitoring programs, promote expansion of stream buffers in agricultural and silviculture areas beyond minimum State requirements.

**Short Term Goal 5.1:** Reduce contamination of surface waters from fecal coliform bacteria, sediment, nutrients, and re-mobilized mercury, as funding allows.

**Milestone 5.1.1:** Identification of impaired streams most likely to receive direct and measurable benefits of expanded buffers through the prioritization tool

**Long Term Goal 6:** Manage coastal nonpoint source pollution through the continued development and implementation of the Coastal Nonpoint Source Plan, ongoing.

**Short Term Goal 6.1:** Continue the development and implementation of the Coastal NPS Plan. Obtain approval from NOAA and EPA.

**Milestone 6.1.1:** Approved Coastal Nonpoint Source Plan

**Table 4: Causes and sources of stream impairment in coastal rivers (from USEPA 2010 Georgia Water Quality Assessment Report).**

<b>ST. MARYS RIVER BASIN</b>				
<b>Cause of Impairment</b>	<b>Rivers and Streams (Miles)</b>	<b>Lakes, Reservoirs, and Ponds (Acres)</b>	<b>Bays and Estuaries (Square Miles)</b>	<b>Coastal Shoreline (Miles)</b>
<b>Fecal Coliform</b>	8.0			
<b>Dissolved Oxygen</b>	23.0			
<b>Mercury in Fish Tissue</b>	83.0			
<b>Probable Source</b>	<b>Rivers and Streams (Miles)</b>	<b>Lakes, Reservoirs, and Ponds (Acres)</b>	<b>Bays and Estuaries (Square Miles)</b>	<b>Coastal Shoreline (Miles)</b>
<b>Nonpoint Source</b>	102.0			
<b>Unspecified Urban Stormwater</b>	4.0			
<b>OHOOPEE RIVER BASIN</b>				
<b>Cause of Impairment</b>	<b>Rivers and Streams (Miles)</b>	<b>Lakes, Reservoirs, and Ponds (Acres)</b>	<b>Bays and Estuaries (Square Miles)</b>	<b>Coastal Shoreline (Miles)</b>
<b>Fish Bioassessments</b>	31.0			
<b>Fecal Coliform</b>	139.0			
<b>Dissolved Oxygen</b>	152.0			
<b>Mercury in Fish Tissue</b>	66.0	166.0		
<b>Probable Source</b>	<b>Rivers and Streams (Miles)</b>	<b>Lakes, Reservoirs, and Ponds (Acres)</b>	<b>Bays and Estuaries (Square Miles)</b>	<b>Coastal Shoreline (Miles)</b>
<b>Municipal Point Source Discharges</b>	10.0			
<b>Nonpoint Source</b>	232.0	166.0		
<b>Unspecified Urban Stormwater</b>	27.0			
<b>CANOCHEE RIVER BASIN</b>				

<b>Cause of Impairment</b>	<b>Rivers and Streams (Miles)</b>	<b>Lakes, Reservoirs, and Ponds (Acres)</b>	<b>Bays and Estuaries (Square Miles)</b>	<b>Coastal Shoreline (Miles)</b>
<b>Fish Bioassessments</b>	8.0			
<b>Fecal Coliform</b>	44.0			
<b>Dissolved Oxygen</b>	65.0			
<b>Mercury in Fish Tissue</b>	104.0			
<b>Probable Source</b>	<b>Rivers and Streams (Miles)</b>	<b>Lakes, Reservoirs, and Ponds (Acres)</b>	<b>Bays and Estuaries (Square Miles)</b>	<b>Coastal Shoreline (Miles)</b>
<b>Municipal Point Source Discharges</b>	8.0			
<b>Nonpoint Source</b>	123.0			
<b>Unspecified Urban Stormwater</b>	44.0			
<b>LOWER OGEECHEE RIVER BASIN</b>				
<b>Cause of Impairment</b>	<b>Rivers and Streams (Miles)</b>	<b>Lakes, Reservoirs, and Ponds (Acres)</b>	<b>Bays and Estuaries (Square Miles)</b>	<b>Coastal Shoreline (Miles)</b>
<b>Fecal Coliform</b>	33.0			9.0
<b>Dissolved Oxygen</b>	46.0			
<b>Mercury in Fish Tissue</b>	178.0			
<b>Probable Source</b>	<b>Rivers and Streams (Miles)</b>	<b>Lakes, Reservoirs, and Ponds (Acres)</b>	<b>Bays and Estuaries (Square Miles)</b>	<b>Coastal Shoreline (Miles)</b>
<b>Nonpoint Source</b>	245.0			
<b>Unspecified Urban Stormwater</b>				9.0
<b>SATILLA RIVER BASIN</b>				
<b>Cause of Impairment</b>	<b>Rivers and Streams (Miles)</b>	<b>Lakes, Reservoirs, and Ponds (Acres)</b>	<b>Bays and Estuaries (Square Miles)</b>	<b>Coastal Shoreline (Miles)</b>
<b>Fecal Coliform</b>	160.0			
<b>Dissolved Oxygen</b>	143.0			
<b>Mercury in Fish Tissue</b>	99.0			
<b>Probable Source</b>	<b>Rivers and Streams (Miles)</b>	<b>Lakes, Reservoirs, and Ponds (Acres)</b>	<b>Bays and Estuaries (Square Miles)</b>	<b>Coastal Shoreline (Miles)</b>
<b>Municipal Point</b>	8.0			



<b>Source Discharges</b>				
<b>Nonpoint Source</b>	248.0			
<b>Unspecified Urban Stormwater</b>	73.0			
<b>LITTLE SATILLA RIVER BASIN</b>				
<b>Cause of Impairment</b>	<b>Rivers and Streams (Miles)</b>	<b>Lakes, Reservoirs, and Ponds (Acres)</b>	<b>Bays and Estuaries (Square Miles)</b>	<b>Coastal Shoreline (Miles)</b>
<b>Fecal Coliform</b>	108.0			
<b>Dissolved Oxygen</b>	89.0			
<b>Probable Source</b>	<b>Rivers and Streams (Miles)</b>	<b>Lakes, Reservoirs, and Ponds (Acres)</b>	<b>Bays and Estuaries (Square Miles)</b>	<b>Coastal Shoreline (Miles)</b>
<b>Nonpoint Source</b>	55.0			
<b>Unspecified Urban Stormwater</b>	73.0			
<b>ALTAMAHA RIVER BASIN</b>				
<b>Cause of Impairment</b>	<b>Rivers and Streams (Miles)</b>	<b>Lakes, Reservoirs, and Ponds (Acres)</b>	<b>Bays and Estuaries (Square Miles)</b>	<b>Coastal Shoreline (Miles)</b>
<b>Fish Bioassessments</b>	50.0			
<b>Fecal Coliform</b>	48.0			
<b>Dissolved Oxygen</b>	69.0			
<b>Probable Source</b>	<b>Rivers and Streams (Miles)</b>	<b>Lakes, Reservoirs, and Ponds (Acres)</b>	<b>Bays and Estuaries (Square Miles)</b>	<b>Coastal Shoreline (Miles)</b>
<b>Nonpoint Source</b>	106.0			
<b>Unspecified Urban Stormwater</b>	30.0			
<b>OGEECHEE COASTAL BASIN</b>				
<b>Cause of Impairment</b>	<b>Rivers and Streams (Miles)</b>	<b>Lakes, Reservoirs, and Ponds (Acres)</b>	<b>Bays and Estuaries (Square Miles)</b>	<b>Coastal Shoreline (Miles)</b>
<b>Dieldrin</b>				3.0
<b>Fecal Coliform</b>	23.0			9.0
<b>Dissolved Oxygen</b>	40.0			8.0
<b>Probable Source</b>	<b>Rivers and Streams (Miles)</b>	<b>Lakes, Reservoirs, and Ponds (Acres)</b>	<b>Bays and Estuaries (Square Miles)</b>	<b>Coastal Shoreline (Miles)</b>
<b>Nonpoint Source</b>	3.0			1.0
<b>Unspecified</b>	37.0			9.0

<b>Urban Stormwater</b>				
<b>LOWER SAVANNAH RIVER BASIN</b>				
<b>Cause of Impairment</b>	<b>Rivers and Streams (Miles)</b>	<b>Lakes, Reservoirs, and Ponds (Acres)</b>	<b>Bays and Estuaries (Square Miles)</b>	<b>Coastal Shoreline (Miles)</b>
pH	6.0			
Fecal Coliform	23.0			4.0
Dissolved Oxygen	56.0		4.0	
Mercury in Fish Tissue	59.0			
<b>Probable Source</b>	<b>Rivers and Streams (Miles)</b>	<b>Lakes, Reservoirs, and Ponds (Acres)</b>	<b>Bays and Estuaries (Square Miles)</b>	<b>Coastal Shoreline (Miles)</b>
Industrial Point Source Discharge			4.0	
Municipal Point Source Discharges	12.0		4.0	
Nonpoint Source	103.0			
Unspecified Urban Stormwater	3.0		4.0	4.0
<b>SUMMARY OF IMPAIRMENTS</b>				
<b>Cause of Impairment</b>	<b>Rivers and Streams (Miles)</b>	<b>Lakes, Reservoirs, and Ponds (Acres)</b>	<b>Bays and Estuaries (Square Miles)</b>	<b>Coastal Shoreline (Miles)</b>
Dissolved Oxygen	683.0			8.0
Mercury in Fish Tissue	589.0	166.0		
Fecal Coliform	586.0			13.0
Fish Bioassessments	89.0			
pH	6.0			
Dieldrin				3.0
<b>Probable Source</b>	<b>Rivers and Streams (Miles)</b>	<b>Lakes, Reservoirs, and Ponds (Acres)</b>	<b>Bays and Estuaries (Square Miles)</b>	<b>Coastal Shoreline (Miles)</b>
Nonpoint Source	1217.0	166.0		1.0
Unspecified Urban Stormwater	291.0			22.0
Municipal Point Source Discharges	38.0			
Industrial Point Source Discharge	0.0		4.0	

## **Surface Mining**

### **Overview**

Surface mining is a billion dollar industry in Georgia; it contributes substantially to the overall economy of the State. As of January 1, 2014, the Surface Mining Unit regulated approximately 820 surface mines including quarries, clay mines, dredging operations, and borrow pits. Mining in Georgia is concentrated primarily in granite, limestone, slate or shale, clays, sand, gravel, and other construction and industrial materials. Surface mining in Georgia encompasses a variety of activities ranging from sand dredging to open pit clay mining to a hard rock aggregate quarry. Occurring mostly in rural areas, surface mining in Georgia, relatively speaking, affects very little of the State's land area. Surface mining involves two categories of potential threat to surface waters. One type is related to the actual removal of mined materials and concerns the releases of pump-out water from the mining pit and discharges from mineral processing. Both of these releases are processed through either sedimentation basins or detention ponds prior to discharge into streams. This type of threat, therefore, is considered a point source and is regulated by the issuance of an NPDES permit. The Surface Mining Unit also requires that sediment basins and detention ponds be included as part of an approvable mining land use plan and inspects these engineering controls to ensure they are functioning as designed.

The second type of threat of potential pollution related to surface mining is soil erosion and sedimentation due to overland flow on exposed, disturbed surfaces of the mine. Removal of vegetation, displacement of soils and other land disturbing activities are commonly associated with surface mining. These operations could result in adverse effects such as accelerated erosion, sterile soils, and sedimentation to surface waters. However, until the mine is re-vegetated during reclamation, best management practices, such as silt fence, the establishment of buffers and berms, and the construction of sediment ponds, keep sediment within the mining footprint and away from surface waters.

The issuance of a surface mining permit regulates pollution threats from nonpoint sources. The application for this permit includes a Mine Land Use Plan, reclamation strategies, and surety bond requirements to guarantee proper management and reclamation of surface mined areas. The Georgia Surface Mining Act does not apply to activities of the Department of Transportation (DOT) related to its efforts to construct, repair, and maintain the Georgia public road system nor to any firm under contract with the DOT.

### **Program Issues**

Section 402 of the Federal Clean Water Act requires an NPDES permit for surface mining operations. Permits are issued by the Watershed Protection Branch of GAEPD. One permit is applicable to an entire mining region; additional mines require only a modification to the existing permit. The NPDES permit includes pollution control practices such as on-site sedimentation basins, swales, siltation fences, and detention ponds for pump-out water from the mining pit and for water discharges from mineral processing.

### **Resources Available**

The Georgia Surface Mining Act provides for the issuance of a mining permit at the discretion of the Director of GAEPD. This permit program is administered by the GAEPD Land Protection Branch. An application for permit must be accompanied by a Mined Land Use Plan that is consistent with land use in the area of the mine. It includes information on the property to be mined, number of acres, length of time of mining operation, extent of reserves, and reclamation

of the affected land. The Director is empowered to deny or revoke permits, issue consent orders, initiate court actions, and/or forfeit funds to conduct reclamation.

A major part of the Mining Land Use Plan includes a detailed Soil and Erosion Control Plan. This plan includes engineering features and operational BMPs such as sedimentation ponds, erosion and sedimentation provisions, and construction controls.

### **Key Stakeholders**

The GAEPD has a primary role in managing mining activities. GAEPD is responsible for administering and enforcing the surface mining permit program and the industrial waste water discharge permit program. Five (5) District Offices and the Surface Mining Unit are responsible for monitoring and inspecting permit compliance.

- GAEPD Solid Waste Management Program of the Land Protection Branch
- GAEPD Wastewater Regulatory Program and Enforcement Program of the Watershed Protection Branch.
- The Georgia Mining Association an informal trade association of the mining industry in Georgia. This association works with GAEPD to monitor legislative developments, and coordinate industry response. It educates miners about laws and regulations that affect them and provides a forum for exchange of ideas
- Georgia Construction Aggregate Association an informal trade association of the mining industry in Georgia. This association works with GAEPD to monitor legislative developments, and coordinate industry response. It educates miners about laws and regulations that affect them and provides a forum for exchange of ideas.

### **Education/ Outreach**

The BMPs are drawn from the:

*Manual for Erosion and Sedimentation Control in Georgia,*  
*Georgia's Best Management Practices for Forestry,*

The mining industry is conducting informal discussions on the potential of formalizing industry-wide recommendations on mining BMPs. If industry-wide standards are adopted, the mining industry would likely conduct demonstration projects to gauge the effectiveness of those BMPs.

### **Funding**

The mine operator is responsible for completion of the Mined Land Use Plan and for filing a surety bond to ensure adequate funding for site reclamation. The surety bond is the main compliance device; to be released from the bond, the operator must demonstrate that reclamation was accomplished as outlined in the Mine Land Use Plan. During mining, however, compliance officers from the Surface Mining Unit inspect operations to ensure adherence to the Mined Land Use Plan including the application of specified BMPs.

### **Long Term Goals, Short Term Goals, and Milestones**

**Long Term Goal 1:** Encourage developing industry-wide standards for best management practices

**Short Term Goal 1.1:** Conduct informal discussions on the potential of formalizing industry-wide recommendations on mining BMPS.

**Milestone 1.1.1:** Identify consensus, if any, on mining BMP recommendations.

## **Implementation of Statewide Programs**

Statewide programs provide systematic efforts through policies, ordinances, educational programs, cost-share programs and regulations. These programs are administered by federal and state agencies that have authority and responsibilities to partner with private landowners or local governments. Statewide activities also involve organizations such as Georgia Forestry Commission, Georgia Soil and Water Conservation Commission, Georgia Department of Community Affairs, Georgia Department of Public Health, the University System of Georgia, Georgia Department of Agriculture, Georgia Wildlife Resources Division, and Georgia Coastal Resources Division all of which can provide training and guidance to private industries, local governments, private individuals that; harvest trees, construct and maintain dirt and gravel roads, manage Onsite Sewage Disposal Systems, maintain drainage and storm systems, harvest, grow or maintain agricultural products, etc throughout Georgia.

<b>State-wide Programs</b>
Water Quality Monitoring
319 Grants Program
Outreach and Education
Statewide Water Planning
Regional Water Planning
Land Acquisition and Greenspace
Onsite Sewerage Disposal (OSDS, Septic)
New Tools for Nonpoint Source Management including Alternative Projects
Healthy Watersheds
Safe Dams
Floodplain
Groundwater

**Table 5: Georgia's Statewide Programs**

These statewide programs are equal in importance to watershed programs. Through statewide programs, BMPs are concurrently implemented in all parts of the state rather than only in specific watersheds. Georgia EPD developed functional areas based on selected land use categories and developed Georgia's Nonpoint Source Statewide programs to address these land uses and sources of pollution.



## **Water Quality Monitoring**

### **Overview**

Georgia initiated water quality monitoring in the late 1960s to assess the impact of both point and nonpoint source pollutants to the State's water resources. Today, water quality monitoring is the foundation for measuring success of various State water protection programs, including the NPSP. The information gained from monitoring programs also supports development of long-range planning strategies designed to safeguard water quality and quantity. GAEPD conducts long term and targeted monitoring programs to establish baseline and trend data, document existing conditions, study impacts of specific discharges, support enforcement actions, establish wasteload allocations for new and existing facilities, develop TMDLs, verify wastewater treatment plant compliance, assess functionality of 319 grant projects, and document water use impairment and reasons for problems causing less than full support of designated uses (303(d) 305(b) list). Of Georgia's 44,056 miles of perennial streams, approximately 14,703 have been assessed as of 2014.

### **Current Efforts**

Long term monitoring of Georgia waters is conducted by GAEPD associates and through cooperative agreements with Federal, State, and local agencies who collect samples from groups of stations at specific, fixed locations throughout the year. GAEPD associates perform targeted monitoring in watersheds across the State every year, collecting monthly samples from a number of locations to assess field and chemical parameters. These efforts are guided by the agency's *GEORGIA SURFACE WATER AND GROUNDWATER QUALITY MONITORING AND ASSESSMENT STRATEGY* (Monitoring Strategy). The goals of the Monitoring Strategy are to:

- Measure the physical, chemical and biological conditions of waters in all river basins within Georgia and identify causes responsible for water quality impairments.
- Assess the impact from human and other activities within the watersheds and the effects these activities are having on the overall ecosystem.
- Identify and recommend corrective action measures to restore waters to meet designated uses.
- Report water quality assessment in support of the management program to customers and stakeholders.

This plan is intended to supplement, but not replace the Monitoring Strategy.

### **Program Issues**

There have been a number of changes to Georgia's approach to water quality monitoring since development of the 2000 NPS Management Plan. Many changes were prompted by adoption of the Comprehensive Statewide Water Management Plan in 2008. These included a switch from the rotating basin approach to chemical monitoring to a Statewide approach, the addition of seven new monitoring associates and forty-one new stream flow gages, and the adoption of ten regional water plans that contain monitoring recommendations that will be incorporated into future efforts. The regional water councils also provide regional forums that will be useful for engaging stakeholders in watershed-specific monitoring efforts.

Other significant changes to water quality monitoring since 2000 include the incorporation of biological monitoring into the trend monitoring program, the combining of the lakes/intensive surveys and stream/biological monitoring groups into one overarching monitoring group, the housing of monitoring staff in new field offices in the northern and southern portions of the State

(Atlanta and Cartersville and Brunswick and Tifton, respectively), development of a wetlands monitoring and assessment program (including appropriate monitoring methodology), development of a probabilistic monitoring program for streams and lakes, and a new tiered approach for listing waters in the 305(b)/303(d) report. This listing approach places waters into one of five tiers indicating whether they support their designated use or not, if more information is needed to make a determination, and if a TMDL is required. This provides a mechanism to track all waters of the State and provides more detailed information than the former supporting/not supporting listing designations.

Key NPS issues for Georgia's water quality monitoring program include: accurately identifying NPS sources to water quality impairments; assessing NPS impacts to ecosystems, particularly upstream impacts to coastal systems; identifying appropriate correction actions, including BMPs, to restore waters; expanding the database management system to adequately store, retrieve, and analyze data; coordinating and managing internal and external information and data gathering and assessment; and obtaining sufficient personnel to accomplish these activities. Each is discussed below, and these issues are addressed in the goals and objectives for this plan.

- *Accurately identifying NPS sources to water quality impacts.* The first step in remediating water quality pollution is identifying pollutant sources. This task is, however, often quite difficult for NPS pollution given its diffuse nature and the fact that it frequently comes from multiple sources. There are a number of methods available for NPS pollutant source identification, including land cover surveys, targeted sampling, and bacterial source tracking. Many methods are expensive, and utilizing resources in the most effective and efficient way possible is a constant effort.
- *Assessing NPS impacts to ecosystems, particularly upstream impacts to coastal systems.* Impacts of pollution to water resources are often difficult to comprehensively assess due to the transport of the pollutant(s) and their interaction with other substances in water and sediment. NPS impacts can be particularly problematic to assess because these pollutants are frequently naturally occurring, so it may be difficult to distinguish between natural processes and human-induced impacts that require remediation. In Georgia, where major river systems traverse eco-regions from the mountains to the coast and coastal waters protection is a significant goal, assessing how NPS pollutants entering inland waters impact coastal ecosystems is an important task.
- *Identifying appropriate corrective actions, including BMPs, to restore waters.* Because NPS pollutants are diffuse, often come from multiple sources, and are frequently naturally occurring, they can be quite difficult to remediate. In Georgia and other U.S. States, millions of dollars are spent on BMPs and other actions meant to address NPS pollution every year. It can, however, be difficult to accurately assess the effectiveness of BMPs and other activities, and in Georgia many assessments have not been conducted. Strategies are needed to ensure that monies spent on remediating NPS pollution are being well-spent, and targeted water quality monitoring is an important component here.
- *Expanding the database management system to adequately store, retrieve, and analyze data.* Water quality monitoring data usefulness is dependent upon a database management system that provides adequate storage, retrieval, and analysis capabilities. Database management is particularly important for NPS pollution monitoring because,

unlike point source discharges, the vast majority of NPS pollutant sources are not required to record and report discharge data.

- *Coordinating and managing internal and external information and data gathering and assessment.* Water quality data and other information pertinent to assessing human impacts on water resources (such as land use data) is collected and stored by a number of agencies and non-governmental entities across the State. Coordinating and managing this data and other information is a monumental task.
- *Obtaining sufficient personnel to achieve the abovementioned objectives.* Collecting and analyzing water quality data takes significant manpower. GAEPD has hired new monitoring associates in recent years, but more support is needed to meet program goals and objectives more substantially.

### Resources Available

The Monitoring Strategy encompasses development of: (1) monitoring objectives; (2) assessment tools for attainment of water quality standards; (3) evaluation measures for State-wide water quality; (4) procedures for establishing, reviewing and revising water quality standards; (5) measures to support other water management programs; (6) Quality Assurance protocols and procedures; and, (7) programmatic data management and reporting procedures. The Monitoring Strategy, along with the biennial report, "Water Quality in Georgia" (305(b)/303(d) Report) and annual State/USEPA Performance Partnership Agreements, provides the current process for communication of monitoring priorities to other State and Federal organizations and the public.

GAEPD uses a variety of monitoring approaches to collect information for water quality assessments to meet the objectives of the Monitoring Strategy. A brief description of each is below.

- **Statewide Trend Monitoring.** Long-term sampling of Statewide water bodies at fixed core or historic stations that provide an historic record of water quality. Sampling at these stations is repeated annually.
- **Assessment Monitoring.** Focused sampling of a select group of sites Statewide to measure the status of water quality. Monitoring Statewide over a long-term period allows for comparison of similar sites within basins during different hydrologic and climatological conditions (i.e., drought, normal and high rainfall years).
- **TMDL Monitoring.** Targeted sampling of water bodies on the 303(d) list.
- **Intensive Survey Monitoring.** Special sampling to assist with model development, in support of enforcement actions, impact studies, TMDL development, and/or monitoring in response to citizen input.
- **Probabilistic Monitoring.** Randomized sampling to make a statistically valid inference about the condition of various water types. Sites are selected annually and samples are collected monthly.
- **Lake/Reservoir Monitoring.** Fixed station sampling conducted during the growing season in major lakes, April through October.
- **Biological Monitoring.** Targeted sampling to assist with 305(b)/303(d) assessment of biological impairment, documentation for 319 grant funded restoration success, joint comparability studies for method analysis, support of standards development, and in support of NPDES compliance.
- **Coastal Monitoring.** Targeted and random sampling of beaches, estuarine, and coastal waters.

- **Fish Tissue Monitoring.** Contaminant monitoring to support *GEORGIA'S GUIDELINES FOR EATING FISH FROM GEORGIA WATERS*, assist with 305(b)/303(d) listing assessment, and GAEPD's mercury in fish trend network program.
- **Toxic Substance Monitoring.** Special sampling to assist with 305(b)/303(d) assessment, TMDL development, and evaluation of point and nonpoint source impacts.
- **Facilities Compliance Monitoring.** Sampling of major and minor municipal and industrial NPDES permitted facilities, industrial pretreatment systems, and land application systems for compliance with respective permits.

## Data Management

GAEPD uses several databases for housing water quality information gathered by the agency and other entities. A brief description of each is below.

- **GAEPD Water Resources Database (WRDB).** The GAEPD Water Resources Database contains data for common water quality parameters as measured in streams, rivers, and lakes across the State. Information from the WRDB is also placed into an online interface, available to the public through the GAEPD web site (<http://www.georgiaepd.org/dnr/wrdb/homePage.do>). The User Interface allows the user to enter search criteria by monitoring station number, water body name (stream name), geopolitical boundary (county, Water Plan Region), watershed boundary (HUC) and other parameters.
- **USEPA STOrage and RETrieval (STORET) Database.** GAEPD uploads trend and other data into USEPA's STORET Database; data are collected and stored using appropriate metadata and State/Federal geo-locational standards. Because STORET provides public access to data from all U.S. States, GAEPD can also use this database to assess waters beyond State boundaries (upstream and downstream); this information can inform planning, management decisions, and cooperative efforts with neighboring States to address water resource issues.
- **GAEPD Adopt-A-Stream (AAS) Online Database.** Developed and supported through a partnership with the UGA Marine and Cooperative Extension Service, and financed in part through a Clean Water Act Section 319 grant, the AAS Online Database is the online portal for water quality data collected by AAS groups. Users can search for data by county, city, watershed, and water planning region; data is also available specifically for coastal sites. Water quality data can be viewed in many different ways, including: site-specific graphs and tables for available parameters; annual and historical parameter average graphs, AAS groups, and mapped active sites for a county, city, watershed, or water planning region; maps, graphs, and tables of watershed survey data from groups such as Paddle Georgia; and Google Earth views that include site, HUC-8, and USGS topographic layers.
- **Georgia Online environmental Monitoring and Assessment System (GOMAS).** GOMAS is a new online database, currently under development and expected to be released soon. It will serve four purposes: (1) provide a repository for data and site-specific information collected by GAEPD Ambient and Facilities Monitoring Units and Wetland Program and data collected by local governments pursuant to requirements in their Watershed Protection Plans; (2) provide a conduit for uploading data into the USEPA STORET Database; (3) allow for intra-agency and general public access to data; and (4) provide a mechanism for editing and maintaining 305(b)/303(d) lists.

## **Data Quality Processing & Assurance**

All samples collected by GAEPD and its cooperators, as part of the Surface Water Quality Monitoring Program, are sent to laboratories operating under formalized Quality Assurance Programs (QAP) that are reviewed by GAEPD prior to sample submission. All laboratory tests are conducted in accordance with USEPA approved methods. These laboratories follow standard laboratory Quality Control procedures and participate in both internal and external blind proficiency sample programs. Accepted results reported are within the 95% confidence interval. Each laboratory is required to have a comprehensive QAP document on file with GAEPD. Sample integrity from time of collection to time of laboratory receipt is maintained through use of Chain of Custody documentation. Sample integrity is maintained within the laboratories through the use of extensive sample tracking and documentation procedures. All laboratory analyses are performed and reported in compliance with the comprehensive quality assurance plans of each laboratory.

Final sample results from each laboratory are maintained in validated database systems. These results are reported to GAEPD via hardcopy paper reports and electronic data transfer files. This data is ultimately combined and stored in an internal GAEPD database and/or the USEPA STORET system. A review and feedback system between GAEPD and the laboratories is maintained to ensure that data quality is maintained.

Georgia monitoring work is conducted in accordance with approved methods and documented in the Watershed Protection Branch Quality Assurance Manual. The manual provides the details of the quality assurance procedures employed by GAEPD. The standard quality assurance procedures used by GAEPD were developed to ensure and document the validity of measurements and analysis and the representativeness of samples collected. Enforcement activities by GAEPD require full documentation on particulars of data collection and the equipment used to collect it. All GAEPD field personnel who collect samples or field data are trained to implement the procedures.

USEPA requirements pertaining to specifics of sample collection for States receiving grant funds are specified in Federal regulations under the authority of the CWA and the NPDES permitting program. The most widely applicable guidance at this level is Title 40 of the Code of Federal Regulations (40 CFR). The procedures and techniques given in 40 CFR are updated periodically. In accordance with these regulations, Statewide water quality monitoring data collections are covered by an USEPA approved Quality Management Plan (QMP) and a Quality Assurance Project Plan (QAPP). These plans along with standard operating procedures (SOPs) are maintained in GAEPD files. Updates to the SOPs, QMP, and QAPP will be submitted to the USEPA by GAEPD when any changes in the documents occur (for example, monitoring site list revised, use of new sampling equipment, and changes in sampling parameters or analytical methods used.).

## **Key Stakeholders**

GAEPD has several major partners for its water quality monitoring program, including DNR WRD, USEPA, USGS, Columbus Water Works, and some Georgia universities. Full details for partnering agencies role(s) in monitoring and tracking can be found in the Partner Contact and Summary section (Appendix B).

- DNR Wildlife Resource Division (WRD)
- DNR Coastal Resources Division (CRD)
- US Environmental Protection Agency (EPA)
- US Geologic Survey (USGS)



- Columbus Water Works (CWW)
- University of Georgia Marine Extension Service (UGA MAREX)
- University of Georgia (UGA)
- Columbus State University (CSU)

### **Education/ Outreach**

The primary educational program for the GAEPD monitoring program is Adopt-A-Stream (AAS), which is housed in the NPS program and funded by a 319 grant. The goals of AAS are to (1) increase public awareness of the State's NPS pollution and water quality issues, (2) provide citizens with the tools and training to evaluate and protect their local waterways, (3) encourage partnerships between citizens and their local government, and (4) collect quality baseline water quality data. To accomplish these goals, Georgia AAS encourages individuals and communities to monitor and/or improve sections of streams, wetlands, lakes or estuaries. Manuals, training, and technical support are provided through GAEPD, AAS Regional Training Centers, and more than 50 established Community/Watershed AAS organizers. The AAS and Wetland Regional Training Centers are located at State Universities in Columbus, Milledgeville, Americus, and Savannah. These centers play a key role in providing training, technical support and organizational support to citizens throughout Georgia.

There are more than 50 Community/Watershed Programs that organize AAS groups in their watershed, county or city. These local AAS programs are funded by counties, cities and nonprofit organizations and use the Georgia AAS model, manuals and workshops to promote nonpoint source pollution education and data collection in their area. The State office works closely with these programs to ensure that volunteers are receiving appropriate support and training.

The AAS program offers different levels of involvement. At the most basic level, a new group informs their local government about their activities and creates partnerships with local schools, businesses and government agencies. A watershed survey and 4 visual surveys are conducted within a year's time. Volunteers create a "Who To Call List" so that if something unusual is sighted, the appropriate agencies can be notified. *Getting To Know Your Watershed* and *Visual Stream Survey* manuals provide guidance in these activities.

If volunteers wish to learn more about their adopted body of water, they are encouraged to conduct biological or chemical monitoring. *The Biological and Chemical Stream Monitoring Manual* guides volunteers through the monitoring process. Free workshops are provided at regular intervals in the Atlanta region and as needed in other areas of the State. These workshops are listed in the bimonthly AAS newsletter and on the AAS website. Volunteers can monitor their waterways without attending a workshop, but those who attend and pass a QA/QC test will then be considered quality data collectors under the Georgia AAS Quality Assurance Plan. QA/QC data is posted on the AAS database.

### **Funding**

The Georgia monitoring program depends primarily on funds from the State budget with some funding from Federal sources. USEPA provides some grant funding for monitoring projects in Georgia and the USGS provides some limited cooperative project matching funds for monitoring projects in Georgia. As a part of the ongoing planning process, monitoring needs are discussed with USEPA during the negotiation process for the State/EPA PPA that includes CWA Section 106 funds. USEPA also provides direct support for monitoring projects in Georgia through its Science and Ecosystem Support Division in Athens, Georgia. Each year Georgia and other States in the Region provide USEPA with a list of technical assistance needs for the following

year. USEPA reviews and prioritizes the State requests and supports the States as resources allow.

An assessment of current funding and staffing resources as opposed to the level of effort to achieve the goals of the State's monitoring strategy indicates the funding and staffing resources are minimal to what is needed to meet the goals and objectives of the strategy. Additional monitoring programs or enhancement/expansion of already implemented programs requires additional resources in manpower and laboratory analytical services.

### **Long Term Goals, Short Term Goals, and Milestones (In no particular order):**

**Long Term Goal 1:** Expand water quality datasets through cost-effective coordination and collection strategies

Reliable data is necessary for the NPS Program to track successes, identify issues, and efficiently focus efforts. Cost-effective strategies to collect, store, and use water quality data can result in more usable data without a significant expenditure of additional funds. Coordinating within GADNR and with other agencies can combine efforts to increase their value. Amassing data from various entities across the State can help GAEPD assess water quality trends, identify problem areas, prioritize monitoring and abatement efforts, and track the success of specific management practices and the NPS Program as a whole. Innovative funding sources, new partnerships, and internal audits can increase the amount of data usable for regulatory and other purposes, as can encouraging the use of the SQAP and economical sampling methodologies.

**Short Term Goal 1.1:** Improve data coordination within GAEPD/GADNR and with and among other agencies

**Milestone 1.1.1:** Reach out to GAEPD Branch and Program associates and GADNR associates to discuss monitoring practices, needs, and priorities.

**Milestone 1.1.2:** Where appropriate, explore opportunities for developing monitoring partnerships and/or cooperative agreements

**Short Term Goal 1.2:** As resources allow, coordinate the compilation of water quality monitoring data collected by other agencies across the State (universities, local governments (MS4), utilities/authorities, regional commissions, and grant projects.)

**Milestone 1.2.1:** Catalog data in appropriate databases (such as GOMAS or Adopt-a-Stream (AAS))

**Short Term Goal 1.3:** Enhance monitoring programs

**Milestone 1.3.1:** Investigate new monitoring funding sources including innovative funding mechanisms with GEFA and other organizations, by 2016

**Milestone 1.3.2:** Propose monitoring partnerships and/or cooperative agreements with agencies, universities, regional commissions, local governments, and corporations, by 2017.

**Milestone 1.3.3:** Conduct reviews of monitoring techniques to identify potential cost-saving measures, by 2017.

**Milestone 1.3.4:** Develop SQAP generator for monitoring projects, by 2016.

**Milestone 1.3.5:** Develop AAS Expert program for AAS trainers to identify volunteers qualified to generate and implement SQAPS, by 2016.

**Milestone 1.3.6:** Assist with the development of “listing SQAPs” for entities that would like to monitor streams for regulatory delisting purposes under NPDES watershed assessments, 319 grant projects, etc...

**Short Term Goal 1.4:** Investigate potential for incorporating cost-effective sampling methodologies that comport with 40 CFR 136.

**Milestone 1.4.1:** Investigate potential for expanding the use and acceptance of IDEX kit.

**Long Term Goal 2:** Target monitoring to address priority issues and watersheds.

NPS pollution is the leading cause of water quality impairments in Georgia, so monitoring efforts should be strategically focused. Prioritizing watersheds can help identify pollutant sources and remediation strategies. Establishing monitoring work groups can help establish partnerships to monitor watersheds where remediation of NPS pollutant sources has been implemented. Targeting potentially “unimpaired waters” for delisting monitoring can help focus NPS Program efforts and give a clearer picture of Statewide water quality. Sampling to assess BMP effectiveness can ensure that regulations, funding, and other program measures are focused on the most effective NPS pollution abatement practices exploring the linkages between inland NPS pollutant inputs and coastal impacts can help GAEPD and other entities effectively concentrate NPS reduction strategies to protect the State’s coast.

**Short Term Goal 2.1:** Prioritize monitoring to address the most pressing NPS issues in the State.

**Milestone 2.1.1:** Coordinate the prioritization procedures outlined above with TMDL Vision framework.

**Short Term Goal 2.2:** Engage stakeholders in monitoring work groups.

**Milestone 2.2.1:** Organize a pilot watershed monitoring work group to identify potential monitoring partnerships and monitoring sites, including those highlighted in Regional Water Plans, by 2016

**Milestone 2.2.2:** Assist work groups in developing and implementing watershed monitoring plans and creating a “lessons learned” document to guide future monitoring work groups, by 2018

**Milestone 2.2.3:** Organize watershed monitoring work groups and assist in the development and implementation of monitoring plans, by 2018.

**Short Term Goal 2.3:** As resources allow, conduct targeted sampling for de-listing of potentially “unimpaired” waters.

**Milestone 2.3.1:** Compile a list of potentially “unimpaired” waters or waters that were listed in watershed with relatively small loadings, by 2016.

**Milestone 2.3.2:** Monitor potentially “unimpaired” waters and delist, as appropriate.

**Short Term Goal 2.4** As appropriate and if resources are available conduct targeted sampling to assess BMP effectiveness.

**Milestone 2.4.1:** Conduct literature and project review of existing assessments in the region to identify usable data and recommendations and to define “effectiveness” (i.e., water quality results, runoff volume reduction, treated v. bypassed runoff, statistical differences in effluent quality compared to influent quality, distribution of effluent quality achieved, reduction of peak runoff rates, percent removal, or a combination of some or all of the above).

**Milestone 2.4.2:** Prioritize BMPs and other practices for assessment

**Milestone 2.4.3:** Work with partners to develop and implement sampling/assessment plan and procedures.

**Milestone 2.4.4:** Develop procedure for sampling of waters where BMP have been implemented.

**Short Term Goal 2.5** Conduct targeted sampling to assess inland NPS pollutant impacts to coastal systems, as discussed in the Coastal FA.

**Milestone 2.5.1:** Identify coastal issues for assessment including low dissolved oxygen, species decline, and pollutants likely contributing to these issues, and potential local and inland pollutant sources.

**Milestone 2.5.2:** Develop and implement monitoring plan, starting at coast and working inland and taking factors including sinks, instream transformations, etc... into consideration. The plan may include monitoring partnership with the Governors’ South Atlantic Alliance regional coastal monitoring network. Where possible, the monitoring plan should examine water quality improvements from BMPs.

**Milestone 2.5.3:** Coordinate modeling efforts using available water quality data.

**Long Term Goal 3:** Improve data accessibility to support NPS activities and inform citizens.

Data management and accessibility are a critical component of any water quality improvement program. A comprehensive water quality database will help GAEPD efficiently assess water quality trends related to NPS pollutants and develop NPS pollutant abatement strategies. Providing the general public with easily accessible data will increase citizen awareness of NPS pollution issues, spur involvement in protection and remediation activities, and help prevent

inappropriate uses of impaired waters (swimming in waters listed for fecal coliform, for example).

**Short Term Goal 3.1:** Develop a comprehensive water quality database enhancement for regulatory data.

**Milestone 3.1.1:** Complete development of GOMAS database

**Milestone 3.1.2 :** Continually update GOMAS

**Short Term Goal 3.2:** Improve accessibility of data to general public

**Milestone 3.2.1:** As resources allow, develop user-friendly interfaces for online and mobile viewing of water quality data in GOMAS, other databases, including GPS-linked apps for viewing data at specific locations

**Milestone 3.2.2:** Introduce GOMAS and other databases to organizations and general public through outreach campaigns

**Long Term Goal 4:** Improve use of data for additional monitoring and standard development and to inform regulatory requirements, policies, funding decisions, planning, and other activities.

Data is more valuable when used to inform decisions and activities. Protocols for the use of trend data can help GAEPD and its partners select suitable monitoring sites. Using BMP effectiveness and inland-coastal connection data to inform requirements, policies, and decisions, can improve the effectiveness of the NPS Program and, in turn, improve water quality. Using data to update water quality standards can create more efficient practices and create a more accurate picture of Statewide water quality issues.

**Short Term Goal 4.1:** As resources allow, update water quality standards to include major NPS pollutants. Account for natural conditions, where appropriate

**Milestone 4.1.1:** Amend bacterial water quality standards to use E. coli criteria in lieu of fecal coliform

**Milestone 4.1.2:** Revise DO standards to reflect systems in which the natural DO concentration is lower than current established standards

**Milestone 4.1.3:** Establish numeric water quality standards for nutrients as outlined in Georgia's Plan for the Adoption of Water Quality Standards for Nutrients



## **319 Grants**

### **Overview**

The *Georgia Nonpoint Source Management Program* was established through criteria required under Section 319 of the Clean Water Act by which the U.S. Environmental Protection Agency (USEPA) awards a Nonpoint Source Implementation Grant to the GAEPD. The Grant is used to fund eligible projects as described in Section 319 which support Georgia's *Nonpoint Source Management Program* goals and objectives of prevention, control, and/or abatement of nonpoint sources of pollution. USEPA awards the Grant annually, which GAEPD uses to administer the program and make funds available to public agencies in Georgia (e.g., cities, counties, local authorities operating local government delivery programs, regional development centers, local school systems, State colleges and universities, and State agencies). Local governments must have Qualified Local Government status, in compliance with the requirements of the Georgia Planning Act of 1989 and Service Delivery Strategy Law of 1997.

Section 319 Grants are the primary funding mechanism by which the State's NPS Management Program is updated and implemented. Historically, Georgia has received approximately \$3.5 million each year to address NPS pollution and implement its NPS Management Program. Local government and citizens have annually contributed approximately \$2.3 million in matching funds to these efforts. The core of Georgia's NPS Management Program includes the following elements:

- [Grants](#)
- [Silviculture](#)
- [Agriculture](#)
- [Coastal](#)
- [Water Quality Monitoring](#)
- [Wetlands](#)
- [Groundwater](#)
- [Education/ Outreach](#)

Roughly half of the 319 Grant is used to implement these core elements by providing resources for staff and other fundamentals needed to successfully carry out the program. The remaining funds are awarded through a competitive process based on priorities determined by GAEPD in conjunction with USEPA. These priorities are updated annually with each funding cycle to reflect the flexible and adaptive nature required of any effective NPS Management Program. Future priorities will be consistent with Georgia's updated NPS Management Framework (Section II) and other NPS management activities as appropriate.

### **Program Issues**

While some priorities will continue to change and evolve over time, the following general priorities will remain as foci for the foreseeable future:

- Small watersheds (HUC 10 and smaller)
- Restoration of impaired waters
- Protection of quality waters
- Implementation of TMDLs
- Supporting Georgia's Coastal NPS Program
- Preparation of watershed plans that address USEPA's 9-Key Elements

- Leveraging with other resources (financial, administrative) to address NPS pollution issues within Georgia's watersheds
- Achieving multiple benefits beyond water quality restoration/protection, such as recreation, air pollution reduction, improved community health (through parks), or education.

USEPA has required that States develop and implement watershed restoration action strategies in order to reduce and control nonpoint sources of pollution at the watershed level (USEPA Clean Water Action Plan). Nine key elements included in the watershed restoration action strategies provide an outline that should be followed to manage and restore water quality at the watershed level.

Restoration Action Strategies for each watershed should include the following elements:

1. Identification of measurable environmental and programmatic goals;
2. Identification of and relative contribution of nonpoint sources of pollution;
3. Implementation of nonpoint source pollution controls and natural restoration measures to achieve clean water and other natural resource goals;
4. Schedule for implementation of needed restoration measures and identification of appropriate lead agencies to oversee implementation, maintenance, monitoring and evaluation;
5. Implementation of TMDLs for nonpoint source pollutants exceeding State water quality standards;
6. Implementation of source water assessment and protection programs;
7. Needed monitoring and evaluation to assess the progress towards achieving environmental and programmatic goals;
8. Funding plans to support the implementation and maintenance of needed restoration measures;
9. Process for cross-agency (Federal, State, interState, tribal and local) coordination to help implement Watershed Restoration Action Strategies and a process for public involvement.

An updated, comprehensive NPS management program allows USEPA and Georgia to ensure that section 319 funding, technical support and other resources are directed in an effective and efficient manner to support State efforts to address water quality issues on a watershed level. Due to ever tightening State and Federal budgets and demands for quantifiable results, GAEPD will be developing a method of funding highly targeted 319 projects that address dissolved oxygen (DO) and fecal coliform impairment in priority watersheds only for the competitive portion of the 319 funding. These priorities will be determined using existing or newly developed tools intended to prioritize watersheds and best management practices (BMPs). By utilizing these tools, GAEPD can strategically focus resources on projects in watersheds that have a higher degree of restoration potential.

Georgia's determination of priority watersheds will be based on the following characteristics of a watershed:

- The existence of TMDLs
- Water quality "gaps" in assimilative capacity for Regional Water Plans
- The type and nature of existing water quality data
- Existing land use (including existing NPDES or MS4 permits)
- Future land-use projections if available
- Outcomes of past restoration activities
- Upstream or downstream inputs
- Levels of stakeholder and NPS partner interest
- The presence of endangered species and/or critical habitats

### **Resources Available**

Section 319(b) of the Clean Water Act requires the each State's Governor to submit a State NPS Management Program to USEPA detailing the State's plan for controlling nonpoint source pollution and improving water quality of impaired waters. Section 319(b) stipulates that these NPS management programs must include all of the following components:

- An identification of measures (i.e., systems of practices) that will be used to control NPS pollution,
- An identification of the key programs to achieve implementation of the measures
- A description of the processes used to coordinate and, where appropriate, integrate the various programs used to implement NPS pollution controls in the State
- A schedule with goals, objectives, and annual milestones for implementation at the earliest practicable date:
- Sources of funding from Federal (other than section 319), State, local, and private sources
- Federal land management programs, development projects and financial assistance programs
- A description of monitoring and other evaluation programs that the State will conduct to help determine short- and Long Term NPS management program effectiveness. (USEPA Section 319 Program Guidance, 2012).

### **Key Stakeholders**

GAEPD relies on numerous partners to ensure the NPS Management Program is implemented in the most effective and efficient manner possible. Below is a list of GAEPD's partners that administer components of and help support the implementation of Georgia NPS Management Program. Many of these partners are recipients and co-recipients of Section 319 Grants that address NPS pollution relevant to their group or agency. This list is not meant to be exhaustive. New partnerships are formed every time a new project is initiated through Section 319 Grants and GAEPD Outreach Programs. Each of these partnerships is an important component of Georgia's NPS Management Program and serves as a reminder of the far-reaching impacts of NPS activities throughout the State.

### **Federal**

- US Environmental Protection Agency (USEPA)
- Natural Resource Conservation Service (NRCS)
- US Forest Service (USFS)
- US Geological Survey (USGS)

- US Fish & Wildlife Service (USFWS)
- US Department of Agriculture (USDA)
- US Army Corps of Engineers (USACE)
- National Oceanic and Atmospheric Administration (NOAA)

#### **State**

- Georgia Soil & Water Conservation Commission (GSWCC)
- Georgia Forestry Commission (GFC)
- Georgia Department of Community Affairs (GADCA)
- Georgia Department of Agriculture (GDA)
- Georgia Department of Transportation (GDOT)
- Georgia Department of Natural Resources (GADNR)
- Wildlife Resources Division (GADNR-WRD)
- Coastal Resources Division (GADNR-CRD)
- Georgia Department of Public Health (GADPH)
- University System of Georgia (USG)
- Cooperative Extension Service (CES)
- University of Georgia Marine Extension Service (UGA MAREX)
- Georgia Environmental Finance Authority (GEFA)

#### **Regional**

- Resource Conservation & Development Councils (RC&D)
- Regional Commissions (RC)
- Soil & Water Conservation Districts (SWCD)
- Water Planning Councils (WPC)

#### **Local**

- City Governments
- County Governments
- Local Health Departments
- Metropolitan Planning Organizations (MPO)
- Private Citizens

#### **Other**

- Georgia Association of Water Professionals (GAWP)
- Georgia Municipal Association (GMA)
- Association of County Commissioners and Governments (ACCG)
- Southeastern Wood Producers Association (SWPA)

#### ***Education/ Outreach***

Although most 319 grants awarded by the GAEPD are applied to BMP implementation, a common component of projects is education and outreach. GAEPD will be developing guidance to assist applicants and contractors so they can structure education and outreach to be as effective as possible in achieving measurable results.

#### ***Funding***

The GAEPD uses a competitive process to ensure that the most appropriate projects are selected for funding. In accordance with the Fair and Open Grant Act, the GAEPD publishes a description of the Section 319 Nonpoint Source Implementation Grant Program with the

Secretary of State prior to disbursement of any grant funds. In accordance with the provisions of O.C.G.A. 28-5-122, the grant description filed with the Secretary of State includes information regarding general scope and purpose of grant program, general terms and conditions of the grant, eligible recipients of the grant, criteria for the award and directions and deadlines for applications.

In addition, priority is given to project proposals which encompass or support a watershed management approach and result in measurable improvements in water quality. A watershed management approach is a strategy for effectively protecting and restoring aquatic ecosystems and protecting human health. This strategy has a premise that many water quality and ecosystem problems are best solved at the watershed level rather than at the individual water body or discharge level. Major features of a watershed management approach are: 1) targeting priority problems and characterizing and making an assessment of these problems, 2) promoting a high level of stakeholder involvement, 3) integrated solutions that make use of the expertise and authority of multiple agencies, and 4) measuring success through monitoring and other data gathering.

In addition to developing new watershed prioritization tools and a more focused approach to eligible projects GAEPD will be evaluating 319 grant applications to determine if they meet the following priorities listed below. These priorities are designed to ensure that future funding is targeted to the watersheds at greatest risk of impairment due to NPS pollution, have the greatest possibility of being removed from the 303(d)/305(b) list, and meet Georgia's overall goals of reducing NPS pollution in priority watersheds.

1. *Link education and outreach to overall project goals:* Although most 319 grants awarded by the GAEPD are applied to BMP implementation, a common component of projects is education and outreach. GAEPD will be developing guidance to assist applicants and contractors so they can structure NPS education and outreach to be as effective as possible in achieving measurable results.
2. *Encourage "Above and Beyond" activities not covered by NPDES permits that emphasize Low-Impact Development (LID) and Green Infrastructure (GI).* Some activities recommended in a watershed-based plan may be considered eligible for funding or as match in a 319 grant project if they represent efforts, approaches or applications "above and beyond" any elements associated with, or required by, an NPDES permit. Following USEPA requirements, and in collaboration with the GAEPD Stormwater Unit, GAEPD will be developing guidance for applicants and contractors to develop and apply for "Above and Beyond" projects emphasizing LID and GI which are not permit requirements. These projects will be focused on storm water management and will not necessarily be limited to MS4 communities. As grant-funded activities may not be counted in any NPDES permit compliance report, an important aspect of GAEPD's guidance will be to clarify the distinction between permit required projects and projects that exceed permit requirement.
3. *Focusing 319 funded projects toward successful mitigation of fecal coliform and dissolved oxygen-related NPS pollution.* Fecal coliform bacteria and low levels of dissolved oxygen (DO) are the two most common reasons for stream impairment in Georgia. Additionally, the de-listing of streams most commonly occurs when impairment for those two reasons has been mitigated. By incorporating the watershed prioritization tool (discussed elsewhere in this report), and identifying those streams most likely to experience restoration and recovery, GAEPD intends to prioritize



proposed projects addressing fecal coliform and DO-related NPS pollution in scoring application to improve the likelihood of delisting streams. Projects addressing other NPS-related impairments would be considered, but would not be given the same priority as those addressing fecal coliform and DO impairment.

4. *Method of identifying projects that would benefit the State* (i.e. the non-competitive ones). It is important for GAEPD to have the ability to designate a portion of funding for projects of importance to the State. These projects can range from projects in watersheds that traverse State borders, to priority watershed implementation that were not submitted during the competitive application period. To accomplish this, GAEPD will utilize the watershed prioritization tool (outlined in this document) to assist with identifying watersheds in need of consideration. Coordination with bordering State will also be used to direct this funding as needed. Currently the work Georgia is doing with Tennessee in the Coahulla Creek Watershed is an example of potential future efforts.
5. *Encourage a water quality monitoring element to all funded projects.* As discussed in the Monitoring and Tracking section of this report, a key focus of GAEPD's 319 Program will be to track the progress and effectiveness of all funded projects to ensure that grants result in measurably improved water quality. More water quality data are needed to make better and more informed decisions about priority watersheds and up-to-date assessments of stream quality. To accomplish this, GAEPD will encourage all project proposals contain a water quality element that can clearly demonstrate the effectiveness of the proposed project. Progress in project execution, as well as water quality trends, will be tracked throughout the project's timeline and recorded in GAEPD's 319 project tracking database. This information will be used to evaluate similar projects in the future, direct projects to those watersheds where demonstrably successful projects are most needed, and inform USEPA of Georgia's progress in improving water quality.
6. *Develop method for assessing qualifications of Sub-grantees,* such as their qualifications and the number of partners they have. With limited funds being directed to on the ground projects it is important to identify potential contractors and their partners who have the knowledge and skill set to successfully implement a grant project. Therefore it is important that Georgia develops a method for requesting and assessing qualifications.

The NPS Management Program recognizes the 10 Regional Water Plans and the Metro District Plan as acceptable alternatives to watershed-based plans and will confirm with USEPA that they meet the 9 Elements of Watershed Planning. Proposals that combine multiple documents to produce an alternative to a watershed-based plan have also been accepted by the NPS Management Program for project funding through Section 319 grants. Both options are acceptable as long as the application for grant funds includes the following; description of each of the nine elements in list format (1-9), page number where each element can be found, and summarizes content of the plan elements being referenced in the Regional Water Plans or the assembled texts (citing documents, headings and page numbers) that fulfills each element's requirements.

### **319(h) Nonpoint Source Program Watershed Prioritization Process**

The Nonpoint Source Program prioritizes watersheds of focus to guide the allocation of 319(h) grants and the work of state-wide programs. When communities or other governmental agencies apply for 319(h) funds from Georgia EPD, they will be afforded additional points in the

grant scoring system when they operate in a priority watershed. Where appropriate, EPD will also direct our state-wide partners to focus efforts in priority watersheds to the extent that this makes sense for their program. For example, our forestry partners with the Georgia Forestry Commission could be directed to focus their BMP efforts on prioritized watersheds where appropriate. Some watersheds may not have significant forestry activity, so this may not make sense in some places.

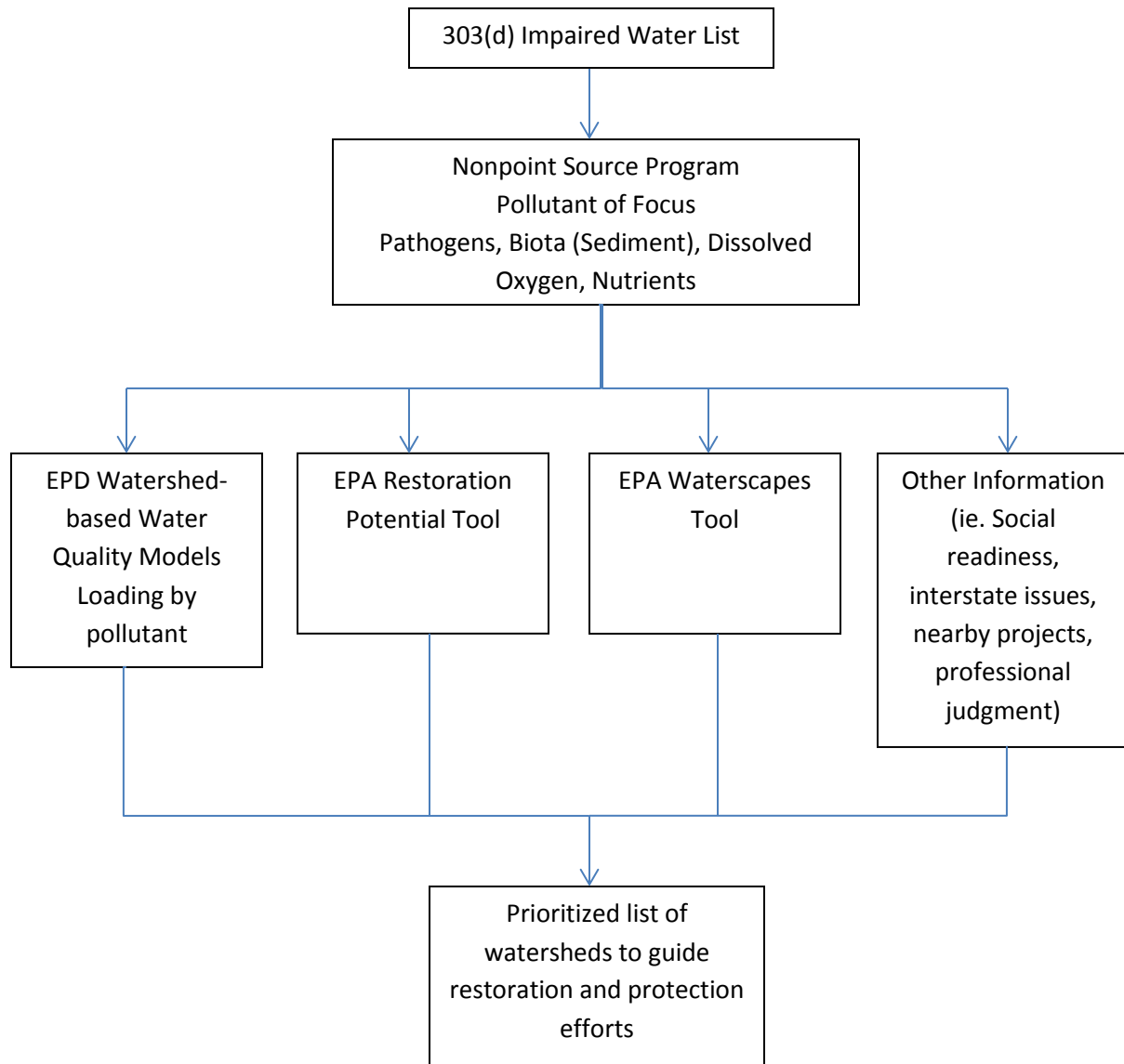
EPD has developed a more robust process for selecting priority watersheds. The watershed prioritization process begins with the 303(d) list of impaired waters. Then, the impaired waters list is screened for the pollutant(s) of focus. Our pollutants of focus have been pathogens, biota (sediment), DO, and nutrients. This list may be modified, but typically, these pollutants are most amiable to nonpoint source controls.

EPD then makes use of several tools in order to prioritize watersheds.

- The EPA restoration potential tool. It is expected by 2015 that EPD will make use of the recovery potential tool to screen watersheds to find those watersheds most restorable using various environmental, impact, and social screens.
- The EPA Waterscapes GIS tool has several layers that are not available in the restoration potential tool and can be used.
- The EPD Watershed-based water quality models. These models will be used to identify watershed loadings to find high loading watersheds that can provide the largest contribution to protect downstream sources or watersheds with low loading that may prove easier to restore. The models can be used for phosphorus, nitrogen, TSS and hydrology modeling. TSS modeling can be used as a surrogate for pathogen since many practices to reduce sediment will also reduce pathogens.
- EPD will also make use of other relevant information to select watersheds of focus. These may include presence of active watershed groups, interstate concerns (such as other state TMDLS), nearby successful projects, and the best professional judgment of the staff on the “readiness” of watersheds and people working in the watersheds for restoration efforts.

Using these tools, EPD will develop a refined list of priority watersheds. EPD expects to update the list annually using tools available for use. We expect to use the restoration potential tool and the Waterscapes tool for the FY2015 319(h) funds. EPD has watershed models available for much, but not all of the state. The Altamaha, Oconee and Ocmulgee is planned to be available in 2016, the Tennessee, and the Upper Savannah are planned to be available in 2018-20.

Although the primary focus of the program is on restoring impaired water bodies, the program may identify “healthy watersheds” that meet water quality standards for protection during this phase. Alternatively, applicants may propose projects within healthy watersheds that score well enough for funding, even without lying within a priority watershed.



## **Long Term Goals, Short Term Goals, and Milestones (In no particular order):**

**Long Term Goal 1:** Where appropriate, evaluate existing State programs to determine if they align with priorities by 2016.

**Short Term Goal 1.1:** Review Section 319 funded programs to determine what changes can be made to better align with new priorities

**Milestone 1.1.1:** Meet with key partners to make changes to programs as needed resulting in updated work plans and MOU's

**Short Term Goal 1.2:** Evaluate these programs within the context of the most current version of Georgia's NPS Management Program Plan, FA priorities.

**Milestone 1.2.1:** Report on programs progress

**Long Term Goal 2:** Develop more formalized tools to select priority watershed and other project areas by 2017

**Short Term Goal 2.1:** Assess and catalogue existing information and sources related to prioritization

**Milestone 2.1.1:** Catalogue relevant parameters and source

**Short Term Goal 2.2:** Explore existing tools that could be readily used or adapted for use to prioritize watersheds and / or projects

**Milestone 2.2.1:** Assessment report of existing tools and applicability to GA's prioritization

**Long Term Goal 3:** Develop a ranking procedure that qualifies proposals for Section 319 grant funds as acceptable projects to implement alternatives to watershed-based plans.

**Short Term Goal 3.1:** Consider establishing a scoring procedure will ensure a uniform approach to selecting proposals to implement alternatives to watershed-based plans.

**Milestone 3.1.1:** Apply a selection procedure to fund at least one project that will implement an alternative to a watershed-based plan.

**Long Term Goal 4:** As staffing allows, explore opportunities to develop a "watershed plan builder" for Georgia communities that do not have the resources to do technical background work. Although much of Georgia is experiencing economic and population growth, many other communities are not and may lack the technical and professional resources to develop watershed plans.

**Short Term Goal 4.1:** GAEPD will explore developing an online "watershed plan builder" similar to the plan builder tool created by USEPA, but with information and data specific to Georgia communities and watersheds. Georgia's plan builder will have basic information such as watershed delineations at different scales, withdrawal and point-source discharge locations, land use maps, and water resources forecasts.

**Milestone 4.1.1:** The tool will be easily accessibility and user friendliness.

**Long Term Goal 5:** Updating and developing GAEPD's internal Section 319 Grant Unit's standard operating procedures to reflect streamlining of procedures, new priorities, new scoring methodology, watershed prioritization, and other new methods of application review identified in this report. As GAEPD refocuses its 319 Program on those watersheds that are most impaired, vulnerable to NPS pollution, or are most likely to be de-listed.

**Short Term 5.1:** GAEPD staff to fully understand the changes in focus and review of grant applications.

**Milestone 5.1.1:** Grant applicants know and understand what is expected to be funded.

**Short Term Goal 5.2:** GAEPD will develop a comprehensive internal guidance document that contains these new procedures and matches internal understanding with applicant instructions.

**Milestone 5.2.1:** Completion of Guidance document.

**Long Term Goal 6:** Develop projects and create new funding packages by leveraging other sources of funding to implement projects that address multiple elements in addition to NPS pollution

**Short Term Goal 6.1:** Attempt to work with partnering organizations to develop projects that utilize multiple sources of funding

**Milestone 6.1.1:** Lists of projects and/or funding packages that utilize different sources, a minimum of 1 project

**Short Term Goal 6.2:** Develop projects that have benefits beyond water quality to create more comprehensive projects that are funded through multiple sources

**Milestone 6.2.1:** At least 1 project per year that demonstrates benefits above and beyond water quality

**Long Term Goal 7:** Carry out activities that assess impacts of implementation and other NPS management and related projects, by 2020.

**Short Term Goal 7.1:** Develop tools that assess the effects of Georgia's NPS Management program on water quality, local governments, and other stakeholders, as resources allow.

**Milestone 7.1.1:** Assess the impact of previously completed projects and/or NPS Management activities, tools, and/or programs

**Long Term Goal 8:** Continue restoring impaired waters and/or protecting healthy waters through the implementation of Georgia's NPS Management Program

**Short Term Goal 8.1:** Carry out projects that benefit water quality and overall waterbody health



**Milestone 8.1.1:** Submit, at minimum, one success story annually for USEPA's WQ-10 goals

**Milestone 8.1.2:** Submit, at minimum, one project annually for USEPA's SP-12 goals

**Long Term Goal 9:** Support those efforts of partnering agencies and organizations that work towards meeting the goals and objectives of Georgia's NPS Management Program, as needed.

**Short Term Goal 9.1:** Develop work plans to provide resources and/or technical assistance to partners in support of Georgia's NPS Management Program goals.

**Milestone 9.1.1:** As needed, submit workplan and / or MOU to USEPA outlining nature of resources and / or technical assistance.

**Short Term Goal 9.2:** Work with State Program partners to develop sector organized stakeholder groups, and hold regular meetings to understand stakeholder concerns and to educate stakeholders about the relevant State Program.

**Milestone 9.2.1:** Each State Program will have a standing stakeholder group by 2020.

**Short Term Goal 9.3:** GAEPD will reach out to each Regional Water Council with a capacity building and educational program to help the councils understand the nonpoint source issues that can be found in their area. This program will provide recommended actions for the Water Councils to consider including in their 2016 plan revision and update. Each Regional Water Council will be presented information on the 319(h) grant program and the benefits of partnering with GAEPD to implement the Statewide Nonpoint Source Management Plan.

**Short Term Goal 9.4:** As directed by the new prioritization tool: GAEPD's Adopt-a-stream program will continue to develop grassroots interest in local water quality issues and the formation of watershed groups who can form the foundation for successful WMP implementation and the restoration of water quality.

**Long Term Goal 10:** Improve non-regulatory monitoring of water quality, and find a way to incorporate water quality data from programs such as Adopt-A-Stream into decision making as resources allow: The GAEPD collects water quality data in a variety of ways, including data provided by Adopt A Stream volunteers and other 319-funded projects.

**Short Term Goal 10.1:** Encourage a water quality monitoring aspect of all future 319 projects.

**Milestone 10.1.1:** GAEPD will develop a method of increasing the volume of water quality data flowing into the national water quality databases (i.e. STORET) that originates from outside GAEPD. These organizations, including States, tribes, watershed groups, other Federal agencies, volunteer groups and universities, submit data to the STORET Warehouse in order to make their data publically accessible.

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**Long Term Goal 11:** Streamlining of GAEPD’s 319 grant application review process as staffing allows

**Short Term Goal 11.1:** Explore different methods for selecting projects and awarding grants in order to better target 319 funds towards critical watersheds.

**Milestone 11.1.1:** Developing a pre-application procedure similar to that used by other granting agencies and organizations such as NOAA and the National Science Foundation.

**Milestone 11.1.2:** Applicants will submit grant proposals to GAEPD, who conduct an initial review using an internal review panel. The panel will score the pre-applications, and those receiving the highest scores will either be invited to make a presentation to GAEPD or to submit a full proposal.

**Milestone 11.1.3:** Because this will represent a significant change in application review procedures, applicants will need to be clearly informed of the new procedures.

**Long Term Goal 12:** Implement Georgia’s Statewide Nonpoint Source Management Plan.

**Long Term Goal 13:** Effectively manage Section 319(h) grant funds.

## **Outreach and Education**

### ***Overview***

GAEPD Outreach Unit reaches a Statewide audience through a variety of programs and media ranging from classroom curriculum, to watershed poetry and art competitions, to citizen science monitoring programs, to an online presence. Each program serves its targeted stakeholders; yet all programs work collaboratively to make a larger impact in meeting the varied needs of Georgia's residents. Education on nonpoint source pollution, its causes, and its impacts is critical at all age levels if water quality is to improve.

In October 1996, the GAEPD selected the Project WET (Water Education for Teachers) curriculum as the most appropriate water science and nonpoint source education curriculum for the State. Recognized internationally and nationally, the Project WET curriculum is an interdisciplinary hands-on water science curriculum that can be integrated into the existing curriculum and programming of a school, museum, informal science education facility, university pre-service class, or a community organization. Project WET has a mission to reach children, parents, teachers and communities around the world with water education through published curricula, training workshops; community water events, and a worldwide network of educators, water resource professionals and scientists. As part of this larger program, the goals of the Georgia Project WET Program are to facilitate and to promote awareness, appreciation, knowledge and stewardship of water resources through the development and dissemination of classroom-ready teaching aids aligned to State classroom standards.

Since 1997, Georgia Project WET coordinators have certified over 850 facilitators who have in turn held workshops for approximately 15,000 educators across the State. In just the past 4 years, Georgia facilitators have conducted 166 Project WET workshops, certifying 3,754 educators with the water education curricula and hands-on, classroom-ready techniques.

The target audience for a Project WET workshop is any Kindergarten through 12<sup>th</sup> grade (K-12) educator; including classroom teachers, informal educators from museums, nature centers, science education facilities, zoos, aquariums, non-profits, scout and faith-based leaders, State and National Parks and Recreation staff, PTA volunteers, and water resource professionals. Media connections occur through various modes from a semi-annual electronic newsletter showcasing various water-related topics and activities distributed to over 4,000 citizens to a website with searchable educational standards correlations to a dynamic Facebook page.



Figure 12: *Reflections of Water*, by Amy Wang, Shijun Art Studio, Lilburn

The Georgia Project WET Program has been nationally recognized as a model program for its training strengths and techniques; specifically for the use of the arts in environmental education. The Georgia Project WET Program in conjunction with Georgia River of Words offers educators in Georgia the opportunity to participate in the International Rivers Network's *River of Words*, a free international poetry and art contest for K-12 students focused on the theme of watersheds. After an exploration of their own watershed, students describe their

experiences through art and poetry, and then enter their linguistic or visual art pieces in the national contest. National winners are selected by the former U.S. Poet Laureate, Robert Hass, and the International Children's Art Museum. Annually, only eight students are selected as national grand prize winners to be honored in Moraga California. Georgia boasts one of the top participation rates in the nation and in the last 5 years, the State has had 8,131 poetry and art submissions, 223 State award winners, 41 national finalists and 6 national grand prize winners. Through our partnership with the River of Words program, all Georgia entries are returned to the GAEPD office and are judged on a State level, where approximately 40 State winners are selected. Georgia students who have received State or national recognition are invited to an awards ceremony hosted in partnership with the Georgia Center for the Book.

The Georgia River of Words program provides educators across the State with a free Teacher's Guide, educational poster and a classroom set of bookmarks to help engage their students in the watershed study. Each year, all winning art and poetry pieces from Georgia are placed on an exhibit that travels throughout the State library system and to various conferences, schools, museums and non-profit organizations.

To engage those in and outside of the formal education sector, The Georgia Adopt-A-Stream Program is a citizen-based monitoring and stream protection program, targeting all waters in the State keeping a pulse on the health and use of streams, rivers, lakes, wetlands, and coastal waters. Established in 1992, the program encourages local governments, universities, and not for profit organizations to serve as coordinators and trainers of local Adopt-A-Stream Programs. Following the State's Adopt-A-Stream protocol for monitoring, these local coordinators and trainers ensure that volunteers are trained consistently and that the monitoring data is professionally assessed for quality assurance and quality control.

Currently, more than 10,000 volunteers are involved in monitoring 200 individual sites and participating in 60 community sponsored Adopt-A-Stream events. Volunteers conduct cleanups, stabilize stream banks, monitor streams using biological and chemical methods, and evaluate habitats and watersheds. These activities lead to a greater awareness of water quality and nonpoint source pollution, active cooperation between the public and local governments in protecting water resources, and the collection of basic water quality data. The Georgia Adopt-A-Stream Program focuses on what individuals and communities can do to protect Georgia's water resources from nonpoint sources of pollution.

Georgia Adopt-A-Stream Volunteers are offered different levels of involvement when adopting or joining a monitoring site. Each level involves an education and action component on a local water body. The introductory level consists of setting up a project (i.e., identifying a stream segment, lake or wetland, identifying partners, registering with the Georgia Adopt-A-Stream Program), evaluating land use and stream conditions during a "watershed walk," conducting quarterly visual evaluations and cleanups, and public outreach activities. Adopt-A-Stream staff creates a "Who to Call" list so that if something unusual is noted, volunteers can quickly obtain the appropriate professional attention. Volunteers wanting greater responsibility can opt in to an advanced level of involvement which includes chemical, bacterial or macro-invertebrate monitoring or habitat improvement project at their adopted site.

With assistance from University of Georgia Marine Extension Service (UGA MAREX)'s Adopt-A-Wetland program, Georgia Adopt-A-Stream created and hosts a database driven website that makes available all data and resources for the volunteers and the general public. In addition, all water quality data submitted by the volunteers is contained and displayed through this searchable online database. Data can be viewed through interactive graphs and matrixes, and

downloaded for further analysis. Basic GIS is used to display certain parameters for easy assessment of water quality conditions. Each monitoring group uploads their data thus allowing many groups to use the database driven maps and graphs for sharing successes of their group or the AAS program through presentations and to their constituents. A recent update to the Georgia Adopt-A-Stream database includes a complete overhaul and update on the volunteer monitoring online data entry forms. Most significantly, these updates include newly programmed quality assurance checks. The new online forms provide immediate feedback as data is being entered, notifying the volunteer of errors and warnings on data entered. Forms with errors (missing dates, missing a certified volunteer) cannot be entered. Forms with warnings (incubation times outside of the 24 +/- 1 hour QA/QC plan, dissolved levels above 14.6 mg/L) are accepted but flagged as being out of compliance with our quality assurance plan.

The online database driven website has dramatically changed the scope and impact of the program. Because of the ease with which volunteers can enter and access water quality data, the level of program involvement has increased dramatically. Now that volunteer groups can “see” their data, they are monitoring more sites and they are conducting more monitoring events at each site. Over the last several years, the program has seen a threefold increase in the number of reported monitoring events.

The Georgia Adopt-A-Stream database and website also houses all programmatic information, making it a valuable tool for our 60 local coordinators and trainers. All volunteer certifications are captured and managed by the database, with local trainers entering and managing training information for their citizens. The database provides automatic email notices to assist volunteer in maintaining up to date certification status in addition to links to local trainers for retraining and recertification opportunities. Local trainers and coordinators can then maintain all local program participation through the database.

With the addition of our database driven website, the Georgia Adopt-A-Stream Program has introduced internal quality assurance checks in the online data entry forms to ensure greater accuracy and precision in data reporting. Specifically, the changes include automated flagging of data, as it’s entered, to warn of possible problems or to inform the volunteer of errors. These data entry updates have further strengthened the viability and applicability of volunteer data as a tool for water quality assessment of stream conditions. These changes, combined with the ease with which Adopt-A-Stream data can be accessed, viewed and downloaded for analysis, further enhances the potential for volunteer data as a tool for laypeople and within the professional water quality community.

As the Georgia Adopt-A-Stream Program continues to grow, so too has the acceptance within the scientific community of the value of the data produced. Even with these advances, there is a strong justification for exploring the possibility of producing an “advanced” level volunteer monitor, a volunteer who would receive additional training to produce data using probes and lab level calibration techniques, following a State approved Sampling Quality Assurance Plan (SQAP). Examples of the types of data collected include dissolved oxygen, temperature, pH and clarity or fecal coliform tests with volunteers couriering samples to certified labs. There exists in the State a number of potential audiences that could function on this advanced sampling level, including university professors, district office partners, watershed groups, and retired scientist. Under such a scenario, limited 319 funds could be allocated to support advanced sampling, providing reimbursements for personal expenses (travel and gas) and providing monitoring equipment on loan for the volunteer. Training could be provided by the Georgia Adopt-A-Stream Program and GAEPD Ambient Monitoring Program.



To facilitate and encourage the submission of State approved data following the Sampling Quality Assurance Plan, steps could be taken to streamline the Georgia Adopt-A-Stream online group and site registration process to mirror the SQAP registration process. With these changes, the online database could generate a report, based on the registration information that could be filed for review with GAEPD Ambient Monitoring. If successful, this update could greatly expand the pool of candidates that can submit 303/305 level monitoring data in Georgia. Additionally, this tool would be of value to the GAEPD Ambient Monitoring Program, further facilitating the SQAP registration process.

Another avenue for generating SQAP approved water quality data is to capture data from 319 funded project plans that include a monitoring component. Many regional and watershed level programs are already sampling under a State approved SQAP and receiving training through the Georgia Adopt-A-Stream and GAEPD Ambient Monitoring Programs. Mandating that all such programs enter their water quality data through the online database is a simple way to capture more water quality data and to let 319 grant administrators monitor grant recipient's progress towards project completion.

Although Georgia Adopt-A-Stream primarily focuses on engaging volunteers through trend monitoring activities, the program also assists with one-time, snap-shot monitoring activities such as watershed assessments, one day clean-up events, or multiday paddling events. These synoptic and longitudinal monitoring activities usually involve teams of 15 to 50 volunteers spending one day to a week, taking multiple one time samples from 30 to 100 plus sites, conducting in situ and lab analysis to make a holistic assessment of water conditions within a watershed or river reach. The goal of these large scale monitoring events is to bolster the trend sampling data, helping set priorities and goals to assure the most effective monitoring strategies for each program.

Lastly, the GAEPD's Outreach Unit organizes an annual volunteer waterway cleanup called Rivers Alive, with over 25,000 volunteers cleaning up rivers, creeks, lakes and beaches in nearly 300 locations Statewide. The Rivers Alive program is a partnership between GAEPD, the 20 member Rivers Alive board, over 150 local cleanup organizers and a fiscal partner to process corporate funding in support of program activities. With the GAEPD Outreach Unit providing administrative support, the partners work together to produce the annual cleanup. The Board is divided into 3 committees focusing on fundraising, education and cleanup coordination. The partnership has proved successful, producing the second largest cleanup of its kind in the nation, removing 8.5 million pounds of trash from 24,000 miles of Georgia waters since its inception.

As GAEPD outreach moves forward, there are numerous considerations for further development of the programs to better encompass watershed protection activities. Considerations include changing the Outreach Unit name to Georgia Watershed Stewardship. While such a name change might seem insignificant, the name Watershed Stewardship would better capture the spirit and breadth of activities assumed by the program, all the while conveying the message that a holistic approach to stream protection is needed.

While stream monitoring and education workshops will continue to be the backbone of outreach activities, there are other watershed stewardship activities that the program has engaged in, such as stream stabilization workshops, rain garden projects, and publications. Offering community based stream and water stewardship activities like stream stabilization or rain barrel installation provides another level to the multi-tier approach of reducing nonpoint source pollution and improving water quality. To realize our stewardship potential, a more concerted



emphasis should be placed on promoting and encouraging this level of water protection, effectively empowering citizens to be proactive in mitigating stormwater impacts and reduce associated pollutants.

Reaching a wider audience with informational materials is important in outreach and education. Ten years ago the program created a document entitled, *Life at the Water's Edge: A Guide to Stream Care in Georgia*. The purpose of this document was to provide information on watersheds and to identify problems. The book contained pertinent information on how to address problems along with simple watershed stewardship practices anyone can implement on their property. Although still relevant, this document is in need of updates and the addition of a website to provide supporting information and reach a web savvy audience. With the updates, *Life at the Water's Edge* could be a valuable tool for expanding watershed stewardship activities and connecting the public with activities they can engage in to make a difference.

### **Key Stakeholders**

- University of Georgia Marine Extension Service (UGA MAREX)
- RiverKeepers

### **Education/ Outreach**

GAEPD's Outreach and Education is focused on a wide range of ages and incorporates varied modes of delivery and involvement as to reach the largest widest breath of Georgia's residents and stakeholders.

### **Funding**

As the Georgia Adopt-A-Stream Program continues to grow, so too has the acceptance within the scientific community of the value of the data produced. Even with these advances, there is a strong justification for exploring the possibility of producing an "advanced" level volunteer monitor, a volunteer who would receive additional training to produce data using probes and lab level calibration techniques, following a State approved Sampling Quality Assurance Plan (SQAP). Examples of the types of data collected include dissolved oxygen, temperature, pH and clarity or fecal coliform tests with volunteers couriering samples to certified labs. There exists in the State a number of potential audiences that could function on this advanced sampling level, including university professors, district office partners, watershed groups, and retired scientist. Under such a scenario, limited 319 funds could be allocated to support advanced sampling, providing reimbursements for personal expenses (travel and gas) and providing monitoring equipment on loan for the volunteer. Training could be provided by the Georgia Adopt-A-Stream Program and GAEPD Ambient Monitoring Program.

### **Long Term Goals, Short Term Goals, and Milestones (In no particular order):**

**Long Term Goal 1:** To facilitate and encourage the submission of State approved data following the Sampling Quality Assurance Plan as opportunities arise.

**Short Term Goal 1.1:** Modify the Georgia Adopt-A-Stream online group and site registration process to allow it to generate SQAP forms for submittal to EPD. If successful, this modification could greatly expand the amount of quality certified 303/305 level monitoring data in Georgia.

**Milestone 1.1.1:** Utilize the Georgia Adopt-A-Stream database to generate a report, which would form the basis for a SQAP to be submitted for review and approval by the GAEPD Ambient Monitoring Program.

**Short Term Goal 1.2:** Capture data from 319 funded project plans that include a monitoring component. Many regional and watershed level programs are already sampling under a State approved SQAP and receiving training through the Georgia Adopt-A-Stream and GAEPD Ambient Monitoring Programs.

**Milestone 1.2.1:** Mandating that all such programs enter their water quality data through the online database is a simple way to capture more water quality data and to let 319 grant administrators monitor grant recipient's progress towards project completion.

**Long Term Goal 2:** Offer additional large scale monitoring events, such as our partnership with Paddle Georgia, as resources permit.

**Short Term Goal 2.1:** Bolster the trend sampling data, as funding allows.

**Milestone 2.1.1:** Help set priorities and goals to assure the most effective monitoring strategies for each program.

**Long Term Goal 3:** Further develop the Rivers Alive Program to better encompass watershed protection activities as staff and funding permit.

**Short Term Goal 3.1:** Consider changing the Outreach Unit name to Georgia Watershed Stewardship.

**Milestone 3.1.1:** Better convey the message that a holistic approach to stream protection is needed.

**Short Term Goal 3.2:** Develop outreach videos to promote the Rivers Alive Program.

**Milestone 3.2.1:** Video successfully posted to the internet.

**Long Term Goal 4:** Realize stewardship potentials as the opportunities arise.

**Short Term Goal 4.1:** Offer additional rain barrel and stream stabilization projects, as funding allows. GAEPD has successfully partnered with several volunteers and organizations to offer such workshops in the past. Increasing these efforts offers a way to realize the pollution reduction and educational benefits for such efforts.

**Milestone 4.1.1:** Increased level of water protection and stewardship.

**Short Term Goal 4.2:** As funding allows, explore opportunities to tell the story of Nonpoint Source pollution including both negative impacts and potential for positive restoration. A possibility could be an interactive map of a River – a virtual tour ideally showing healthy sections, impacted sections, and potentially restoration.

**Milestone 4.1.1:** Production of appropriate educational material.

**Long Term Goal 5:** Reach a wider audience as staff and time allow.

**Short Term Goal 5.1:** Offer valuable tools for expanding watershed stewardship activities

**Milestone 5.1.1:** Updated historic publication, *Life at the Water's Edge: A Guide to Stream Care in Georgia*.



Figure 13: *A Friend I Met at the Lake*, by Stephanie Tian, 2014 River of Words Winner – Category III, Suwanee



## Statewide Water Planning

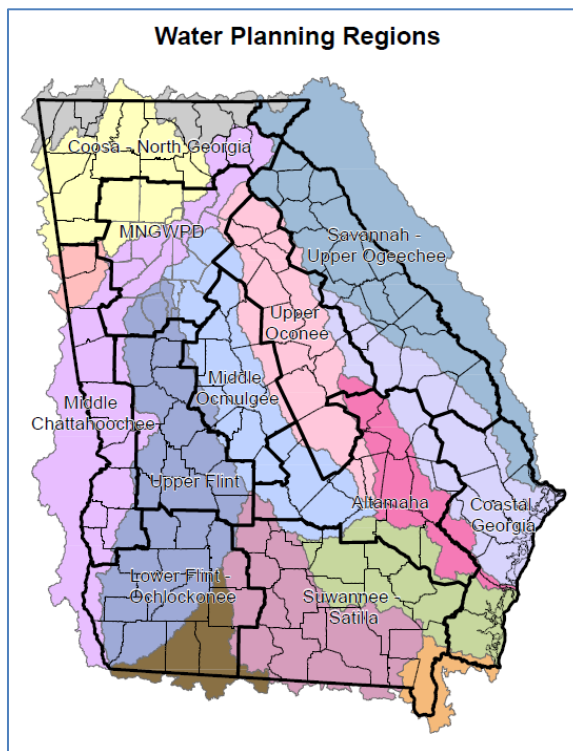
### Overview

In 2004, the Georgia General Assembly passed the 2004 Comprehensive State-wide Water Management Planning Act, which was signed into law by then-Governor Sonny Perdue. The Act required the Georgia GAEPD to develop a State Water Plan that would call for State-wide regional water planning to provide the necessary local and regional perspectives to ensure that Georgia's water resources are sustainably managed through at least 2050. The State Water Plan delineated the guiding policies and implementation actions by which Georgia's water resources should be managed. This included acknowledgement that the largest cause of stream impairment in Georgia is nonpoint source pollution, and that more than 60% of the impairments are caused by violations of fecal coliform standards.

Nonpoint source pollution may decrease a stream's assimilative capacity, the amount of treated wastewater a stream can absorb without causing a violation of water quality standards. Decreased assimilative capacity may affect an industry or municipality's ability to operate their wastewater treatment system, lead to expensive infrastructure upgrades, or result in limits on new surface water withdrawal or discharge permits. Thus, the effect of nonpoint source pollution may be direct and expensive. As Georgia's population grows, land use changes and increases in impervious surfaces may worsen nonpoint source pollution unless growth and development are accompanied by management practices specifically designed to reduce surface runoff from developed areas, farm fields, and other managed lands.

A key element of the State Water Plan was the creation of ten new water-planning regions in the State, with borders approximating river basin boundaries or aquifer boundaries. In each planning region, a regional water council of 25 local residents was appointed by the Governor, Lieutenant Governor, and Speaker of the House. Council members typically were local government officials, industry representatives, farmers, and engaged citizens. Over a period of two years, the regional water councils met on a regular basis, including meetings with upstream or downstream (or down-gradient) councils to assess the water resources of their region, and deliberate how they could address water management challenges.

Each water-planning region was provided with assessments of surface water, groundwater availability, and surface water quality (or assimilative capacity). Additionally, each council was provided with forecasts of municipal, industrial, agricultural, and energy-generation water demand. The water demand forecasts incorporated population and economic projections developed by the Governor's Office of Planning and Budget. In this way, regional water planning councils were able to identify "gaps" between their future water demands and water availability. This included an assessment of gaps between a region's assimilative capacity and



their future wastewater discharge needs. After identifying their region's water resource gaps, councils selected a suite of management practices designed to close those gaps and allow for sustainable use of water resources.

Water quality models were used to evaluate impacts of wastewater and industrial discharges and withdrawals, land use, and meteorological conditions on the assimilative capacity of lakes, streams, and some coastal waters. The models focused on dissolved oxygen, nutrients (specifically nitrogen and phosphorus), and chlorophyll-a (a proxy for nutrient levels). More than 7000 miles of streams were evaluated, as were Lake Allatoona, Lake Oconee, Lake Sinclair, Lake Jackson, and Brunswick Harbor. The results for the Water Quality Resource Assessment indicate that 76% of the river reaches evaluated have "Good" to "Very Good" assimilative capacity for dissolved oxygen. This means that many of these streams have greater than 0.5 mg/L of dissolved oxygen above the standard, or sufficient natural dissolved oxygen levels, and will be able to assimilate additional wastewater discharges in the future. Of the 24% of streams miles that have assimilative capacity levels of "Moderate", "Limited" or "None", which means these streams have 0.5 mg/L or less available dissolved oxygen, most are located in south Georgia below the fall line, where the topography is flat and re-aeration is low. This includes the Brunswick Harbor, whose model indicates there is no available dissolved oxygen assimilative capacity. Any new or expanded treatment facilities in these streams may require plant upgrades in the future. The Savannah Harbor and Coosa River at the Georgia-Alabama State line currently have exceeded their available dissolved oxygen assimilative capacity.

Water quality models that analyzed nutrient levels revealed that the Coosa River at the Georgia-Alabama State line exceeds its assimilative capacity for total phosphorus. Of the four lakes evaluated, only two, Lake Allatoona and Lake Jackson, have existing nutrient and chlorophyll-a standards. Four major tributaries of Lake Allatoona have criteria for annual total phosphorus loads: two of these tributaries exceed their criteria. Lake Jackson also has four tributaries with annual total phosphorus load criteria; however, none of these tributaries exceeded their criteria. Lake Allatoona exceeds its chlorophyll-a standard at four out of five stations; Lake Jackson did not show any chlorophyll-a exceedances. The lake models also indicate that both Lake Allatoona and Lake Jackson did not exceed their total phosphorus loading for the lake; however, they exceeded the total nitrogen standard in at least two years. The other two lakes in this assessment, Lake Oconee and Lake Sinclair, were compared to the Lake Jackson water quality standards. The Lake Sinclair model indicates that the lake was in good condition; however the lake may have chlorophyll-a issue that will need to be assessed further.

As mentioned, many of the stream segments such as the Ogeechee River with low dissolved oxygen are found below the Fall Line suggesting that their lack of assimilative capacity may be due, at least in part, to natural conditions. However, other stream segments, such as those near the headwaters of the Suwannee River Basin and those tributaries of Lake Allatoona that exceed their chlorophyll-a standard cannot be easily attributed to natural conditions. Furthermore, the large number of stream segments impaired due to fecal coliform, sediment, or other parameters are not entirely the result of natural environmental conditions and are impaired due to the effects of nonpoint source pollution. Therefore, in spite of the high number of stream miles with sufficient assimilative capacity identified in the State Water Plan Resource Assessments, nonpoint source pollution is still a major water challenge in Georgia.

To address assimilative capacity gaps for their water planning regions, each planning council identified a suite of best management practices intended to reduce nonpoint source

pollution. The State Water Plan made clear that implementation of all management practices proposed in regional water plans is the responsibility of local governments. Management practices proposed to address nonpoint source pollution are shown below, which may represent combinations of similar practices proposed by different planning councils. Note that most of these proposed actions reflect individual nonpoint source Functional Areas, and are addressed separately in this report.

### **Key Issues**

The nonpoint source management practices proposed by regional water councils are:

1. Nutrient management programs on farms
2. Implementation of best management practices for silviculture on private and public lands
3. Enforcement of erosion and sedimentation regulations for land-clearing activities
4. Maintenance of dirt roads, and encourage use of the Better Back Roads Field Manual
5. Education and outreach to local governments, businesses, and individuals on a regional basis
6. Regional solutions such as creation of greenways
7. Floodplain management and mapping to prohibit or minimize development in the floodplain.
8. Land use planning and environmental planning criteria, including protecting open space along riparian corridors, wetlands, and groundwater recharge areas to protect water resources.
9. Increased monitoring and sampling of surface water quality, especially in sensitive or high-risk areas
10. Promotion and implementation of low-impact development and green infrastructure
11. Creation of land conservation easements along waterways for the purpose of maintaining permanent stream buffers
12. Protection and restoration of wetlands for the purpose of naturally retaining storm water runoff
13. Protection of areas with steep slopes for the purpose of minimizing development and storm water runoff in these areas
14. Site plan review to prohibit or minimize development in floodplains or environmentally (especially hydrologically) sensitive areas in floodplains
15. Retrofitting of old or outdated storm water management structures
16. Creation or maintenance of reservoir buffers; reservoir use restrictions to minimize development around them
17. Lot size requirements to minimize impervious surfaces
18. Mandating or enforcing setbacks of septic systems from surface waters
19. Point to nonpoint water quality credit trading

### **Resources Available**

As per the 2004 Comprehensive State-wide Water Management Planning Act, regional water plans must be updated every five years. The second round of Statewide water planning must therefore be completed by the end of 2016. Terms of the regional water planning councils appointed for development of regional water plans expired at the end of 2011, after all regional plans were approved by the Georgia GAEPD. Using \$700,000 appropriated by the Georgia General Assembly in 2012, the regional water planning councils have met three times in 2013-2014 to gage the success of the measures proposed in 2011. In 2013, the Georgia General Assembly appropriated \$2.7 million for a second round of Statewide water planning. This money will be used for support of the regional water councils, and water supply modeling. New appointments and re-appointments to the Regional Water Councils by the Governor, Lieutenant Governor, and Speaker of the House will start in 2014.



## **Key Stakeholders**

GAEPD and its contractors have been engaging with regional councils from late 2013 to June 2014. GAEPD State Water Plan staff and Planning Council chairs are key partners in addressing NPS issues for Statewide water planning.

## **Education/ Outreach**

Implementation of the State Water Plan is the responsibility of local governments, individual county and municipal governments, many of which are represented on the planning councils, are likely partners for addressing NPS issues identified in the Water Plan. These local governments are supported in their many duties and responsibilities by the Georgia Municipal Association (GMA) and the Association County Commissioners of Georgia (ACCG).

## **Funding**

Although implementation of NPS management practices is the responsibility of local governments, no funding has been provided by the Georgia General Assembly for this purpose or any other State Water Plan activities. Local governments frequently cite low-levels of funding from all sources as a principal reason why environmental initiatives and activities are not more fully implemented. In spite of this, funding is available for a wide variety of practices that directly address nonpoint source pollution. These funding sources, which address issues such as nutrient management, forestry, land conservation, and others can be found in this report under “Sources of Funding”.

- GAEPD
- Association County Commissioners of Georgia (ACCG)
- The Georgia Municipal Association (GMA)
- Regional Planning Councils

## **Long Term Goals, Short Term Goals, and Milestones (In no particular order):**

**Long Term Goal 1:** Determine how many of the proposed nonpoint source pollution management practices identified in regional water plans have been implemented.

**Short Term Goal 1.1:** Determine effectiveness of State Water Plan process in addressing nonpoint source pollution on a regional basis by generating a database or spreadsheet of proposed versus implemented management practices.

**Milestone 1.1.1:** A significant number of proposed management practices have been implemented in a planning region per the planning councils’ recommendations.

**Long Term Goal 2:** In those planning regions where a significant number of BMPs have **not** been implemented, identify reasons why.

**Short Term Goal 2.1:** Identify barriers to BMP implementation ranked in terms of complexity or ability to overcome those barriers.

**Milestone 2.1.1:** A comprehensive list of the BMPs proposed for each planning region, reasons why they are not being implemented, and proposed strategies for implementing them.

**Long Term Goal 3:** In those planning regions where a significant number of BMPs have been implemented, evaluate surface water quality in those watersheds identified as having impairments related to nonpoint source pollution, as resources allow.

**Short Term Goal 3.1:** Determine if proposed management practices are having the intended effect on water quality.

**Milestone 3.1.1:** Surface water quality has measurably improved consistent with the implemented management practices. For example, nutrient management or septic system setbacks has resulted in lower levels of chlorophyll-a or fecal coliform in a water body.

**Long Term Goal 4:** Investigate opportunities for local or regional funding of BMP implementation, included but not limited to stormwater utilities, development utilities, TADs.

**Short Term Goal 4.1:** Encourage increased voluntary implementation of BMPs by regional water planning council member communities without the need for Federal or State funding.

**Milestone 4.1.1:** At least one economic/cost-benefit analysis of methods of local BMP funding

**Milestone 4.1.2:** For at least one regional water planning council to include a method for funding NPS management in their regional plans.



Figure 14: Autumn River, by Kimberly Shen, 2014 State Winner - Category II, Shijun Art Studio, Lilburn

## **Regional Planning**

### ***Overview***

In Georgia, land use is regulated by local governments. Land use plays a very direct role in managing NPS pollution; therefore, the decisions that local governments make regarding patterns of growth, zoning, stormwater management, housing density, green space development, and in many other areas will strongly affect the amount and nature of NPS pollution. For most communities in Georgia, local planning guidance is provided by the 12 Regional Commissions under the auspices of the Department of Community Affairs. The Georgia Planning Act of 1989 (O.C.G.A. 45-12-200 et seq.) established that the natural resources and environment of Georgia are of vital importance to the State and its citizens, and that there is “an essential public interest in establishing minimum standards for land use in order to protect and preserve Georgia’s natural resources and environment”. The Planning Act also provided for the Georgia Department of Community Affairs to serve these essential public interests in assisting local governments with developing, promoting, and establishing standards and procedures for coordinated and comprehensive planning, including preparation and implementation of comprehensive plans.

Comprehensive local planning for land use, growth, and development can help assure that development happens in areas best suited for it, and that vital natural resources can exist side by side with development in a manner that reflects community values and environmental quality. Poorly thought out development can result not only in incompatible land uses being adjacent to each other, but in greater impacts on natural resources through sprawl, expensive storm water management, increased nonpoint source pollution, a greater reliance on poorly-sited septic systems, and many other examples that can easily lead to a lower quality of life for community residents as well as a decline in the natural character of an area. For these reasons, Georgia communities are encouraged to develop comprehensive local or regional plans.

The Georgia Planning Act contains minimum standards and procedures generally known as the "Environmental Planning Criteria". To maintain eligibility for certain State grants, loans, and permits, local governments must implement regulations consistent with these criteria. Additionally, Rules for Environmental Planning Criteria (Chapter 391-3-16) were developed by the Georgia Department of Natural Resources and are part of local government planning standards. The Rules direct local governments to plan in ways to conserve critical environmental resources, and establish planning criteria for these broad categories of natural resources:

- Water Supply Watersheds
- Groundwater Recharge Areas
- Wetlands Protection
- River Corridor Protection
- Mountain Protection

***Water Supply Watersheds:*** These criteria for local land use plans are designed to allow development in a drinking water supply watershed without contaminating the water source to a point where it cannot be treated to meet Federal drinking water standards. The criteria do this by establishing buffer zones around streams, specifying allowable impervious surface densities within watersheds, and establishing buffer zones and management practices around reservoir. Since existing water supply sources as well as future sources must be protected, the criteria apply to both existing and future water supply watersheds. Watersheds are not identical;

consequently alternate criteria may be adopted by local governments to protect water supply watersheds.

**Groundwater Recharge Areas:** Georgia contains large areas where groundwater aquifers receive significant amounts of recharge, based on rock types, soil types, slope, and other factors. The Environmental Planning Criteria Rules establish criteria for protection of these significant recharge areas. They accomplish this by limiting permits for certain sanitary landfill designs, prohibiting land disposal of hazardous waste, requiring minimum lot sizes for homes on septic systems, require conservation design for land application systems of treated sewage and wastewater sludge, and limit construction of permanent storm water infiltration basins.

**Wetlands Protection:** Freshwater wetlands generally include swamps marshes, bogs, and similar areas. The Rules for Environmental Planning Criteria do not apply to coastal wetlands as defined by the State Coastal Marshlands Protection Act. Under current Federal policy, alternations or degradations of wetlands should be avoided unless it can be demonstrated that there will be no Long Term adverse impacts or net loss of wetlands. Land-use plans should address at least the following considerations with regards to wetlands classes identified in Georgia's Statewide wetlands database:

1. Whether impacts to an area would adversely affect the public health, safety, welfare, or the property of others;
2. Whether the area is unique or significant in the conservation of flora and fauna including threatened, rare or endangered species;
3. Whether alteration or impacts to wetlands will adversely affect the function, including the flow or quality of water, cause erosion or shoaling, or impact navigation;
4. Whether impacts or modification by a project would adversely affect fishing or recreational use of wetlands;
5. Whether an alteration or impact would be temporary in nature;
6. Whether the project contains significant State historical and archaeological resources, defined as "Properties On or Eligible for the National Register of Historic Places";
7. Whether alteration of wetlands would have measurable adverse impacts on adjacent sensitive natural areas.

Wetlands which have been created for mitigation purposes under Section 404 of the Clean Water Act, such shall also be considered for protection in local land-use plans.

**River Corridor Protection:** The Environmental Planning Criteria Rules define a "Protected river" as any perennial river or watercourse with an average annual flow of at least 400 cubic feet per second as determined by the U.S. Geological Survey. Those segments of river covered by the Metropolitan River Protection Act or the Coastal Marshlands Protection Act are specifically excluded from the definition of a protected river. In coastal areas, the seaward limit of any protected river shall be the inland limits of the jurisdiction of the Coastal Marshlands Protection Act. A "River Corridor" means all the land, including islands, within 100 feet horizontally on both sides of a Protected River as measured from the river banks. River Corridor Protection Plans require maintenance of vegetated buffers, septic tank setbacks, and appropriately designed and constructed stream crossings for roads. They allow for timber harvesting, agriculture, residential construction, and certain recreation construction (such as boat ramps) provided that these uses do not impair the Long Term functions of the protected river or the river corridor.

**Mountain Protection:** The mountains of north Georgia are characterized by steep slopes and thin soils, and because of their aesthetic value have become increasingly attractive for residential growth and development. The combination of their natural characteristics and

development pressures in the mountains, they require special protection. Land-disturbing activity in the mountains of Georgia potentially threatens the public health, safety, welfare, and economic progress of the State. Land-disturbing activity may endanger the quality of surface water by increasing erosion and stream sedimentation, and it has the potential to induce landslides. Increasing development has the potential to adversely affect ground water due to the difficulty in providing proper sewage disposal in areas of steep slope and high elevation, and may damage the habitat for some species of wildlife (both plants and animals). Poorly planned development may detract from the mountains' scenic and natural beauty, which is vital to the recreation and tourism industry of North Georgia.

A "Mountain Protection Plan" is that part of the local comprehensive plan dealing with mountainous areas as defined in the Rules. A "Protected mountain" means all land area above 2200 feet or more above mean sea level, having a slope of 25% or greater for at least 500 feet horizontally, and which includes the crests, summits and ridge tops that lie at elevations higher than 2200 ft above MSL. The Rules establish mountain protection criteria that include standards for land disturbing activity, water well construction, single-family and multi-family housing construction density, landscaping requirements for commercial construction, limits on tree removal, and standards for mining and logging activities.

Environmental Planning Criteria: DNR and the Georgia Department of Community Affairs (DCA) are responsible for ensuring that local governments comply with the Environmental Planning Criteria and adopt and enforce the necessary local ordinances. For those communities that have zoning or equivalent land development regulations subject to the Zoning Procedures Law,



comprehensive local plans must contain a Land Use Element, but Land Use Elements are encouraged for all local governments. Furthermore, during the process of preparing its comprehensive plan, each community must review the Regional Water Plan(s) covering its area and the Rules for Environmental Planning Criteria (established and administered by the Department of Natural Resources pursuant to O.C.G.A. 12-2-8) to determine if there is need to adapt local implementation practices or development regulations to address protection of these important natural resources. The community must certify that it has considered both the Regional Water Plan and the Rules for Environmental Planning Criteria when it transmits the plan to the Regional Commission for review.

Regional Plans are wider in scope than local plans, and deal with broader issues that involve a variety of entities, including State and Federal agencies, local governments and private organizations. Each of Georgia's twelve Regional Commissions is required to develop a region-specific plan, which must be adopted by its Regional Council. The Georgia Planning Act of 1989 authorizes the Department of Community Affairs (DCA) to



establish specific rules and procedures for the identification and planned protection of Regionally Important Resources (RIRs), which are any natural or cultural resource area identified for protection by a Regional Commission following the minimum requirements established by DCA. The rules require that the Regional Commissions prepare a comprehensive Regional Resource Plan for protection and management of the identified RIRs. This plan must include a Regional Resources map that includes all of the important natural and cultural resources and attempts to link these to form a continuous regional green infrastructure network, as well as providing guidance for appropriate development practices that should be utilized by local governments and private organizations for managing development located within one mile of Regionally Important Resources. The Regional Resource Plan is utilized in subsequent development of the Regional Plan and is actively promulgated by the Regional Commission in an effort to coordinate activities and planning of local governments, land trusts and conservation or environmental protection groups active in the region, and State agencies toward protection and management of the identified Regionally Important Resources. (SOURCE) Although Regional Plans are required by law, they have no regulatory authority and serve as guidance to local governments, developers, and private landowners.

Of the 12 Planning Regions in Georgia, 10 have completed Regional Resource Plans. Common themes emerge in the 10 Regional Resource Plans, but are given different emphasis in the regions depending on their existing natural resources.

These include measure such as:

- Maintaining or exceeding all applicable local, State and Federal regulations regarding wetlands and floodplains, river corridors, groundwater recharge areas, and mountain protection areas.
- Employing conservation design measures that minimize impervious surfaces, limit land disturbance and concentrates development away from sensitive resources
- Restoring disturbed landscape using appropriate, native vegetation in sustaining or expanding functional wetlands and along river corridors
- Ensuring local regulations meet or exceed State and Federal minimum standards
- Ensuring regulations encourage conservation design and promote best management practices
- Working with area stakeholders to consider and pursue land banks and other measures for conserving sensitive resources
- Pursuing development and implementation of local greenspace plan
- Where possible, restore disturbed landscape using appropriate, native vegetation
- Regularly review water testing data; Compare with land use and development activity to monitor possible causes of any contamination.
- Support local stakeholders like Riverkeepers and Adopt-a-Stream, reviewing reports about local waterways at least annually. Pursue the development of, and implementation of, Implementation Plans for all TMDL streams

### ***Resources Available***

As previously mentioned, Regional Plans and Regional Resource Plans principally serve as guidance to local governments, developers, and landowners for preservation of regionally important natural resources. Regional Commissions are not charged with any regulatory authority, nor are they responsible for monitoring water quality or tracking of BMP implementation. Consequently, effective land use practices that would decrease NPS pollution are left up to local governments if their regulatory authority includes land development codes. In



Georgia, most cities and counties have zoning ordinances, but there are many that do not. This does not necessarily reflect a community's impact on NPS pollution.

### **Key Stakeholders**

- Georgia Department of Community Affairs: Regional Commissions
- Georgia Association of Regional Commissions
- The Atlanta Regional Commission
- The Georgia Planning Association

### **Education/ Outreach**

- Regional plans

### **Long Term Goals, Short Term Goals, and Milestones (In no particular order):**

**Long Term Goal 1:** As resources are available, identify which water-related Regionally Important Resources (RIRs) identified in Regional Plans have experienced impairment due to NPS pollution, or may be at the greatest risk of impairment due to expected development. Focus shall be placed on the NPS prioritized watersheds.

**Short Term Goal 1.1:** Fine-tune priority watershed identification consistent with Regional Plans and the GAEPD prioritization tool, as resources allow.

**Milestone 1.1.1:** A listing and accompanying map of impaired or threatened RIRs in each region.

**Long Term Goal 2:** If resources are available, link aspects of Regional Resource Plans relating to water to Regional Water Plans

**Short Term Goal 2.1:** Coordinated regional efforts to protect water quality

**Milestone 2.1.1:** If resources are available, development of updated Regional Resource Plans and Regional Water Plans which cross reference each other and present similar NPS management goals.

**Long Term Goal 3:** Encourage incorporation of water quality data into Regional Resource Plans and local land use plans

**Short Term Goal 3.1:** Improved regional and local plans which incorporate specific recommendations or requirements targeting NPS pollution and impaired streams

**Milestone 3.1.1:** Listings of impaired streams and their reasons for impairment in all regional resource and local land use plans in Georgia through cooperation with DCA and Regional Commissions,

**Long Term Goal 4:** Identify which water-related RIRs will be most impacted by development, as resource allow.

**Short Term Goal 4.1:** Allow proposed BMPs in Regional Resource Plans and Regional Water Plans to be targeted to areas that may experience the greatest increase in NPS pollution

**Milestone 4.1.1:** A listing and accompanying map of water-related RIRs in fastest-growing regions.

**Long Term Goal 5:** Encourage local land use plans to specifically address impaired streams

**Short Term Goal 5.1:** Align planning efforts of GAEPD, DCA, and local governments in mitigating NPS pollution

**Milestone 5.1.1:** At least one local land use or regional resource plan that incorporates NPS BMPs.



Figure 15: *The Water of Ducks*, by Annie Wang, 2013 National Finalist, Shijun Art Studio, Lilburn

## **Land Acquisition and Green Space**

### ***Overview***

Georgia is the largest State east of the Mississippi River and contains a very diverse geology and geography: a small portion of the Cumberland Plateau in the northwestern corner of the State; the southern end of the Blue Ridge Mountains which extend across much of north Georgia; the Ridge and Valley province which includes the wide Cartersville Valley and the long parallel ridges in northwest Georgia; the rolling hills, granite outcrops, and red clay of the Piedmont; the Coastal Plain of South Georgia with its expanse of forests and farmlands; and the Coast, with its wide marshes, tidewaters, and barrier islands. This mix of land forms, coupled with a warm, moist climate, has caused Georgia to rank as one of the six most biologically diverse States in the nation (Stein 2002).

Georgia is also one of the fastest growing States in the nation. Between 2000 and 2010, the population increased by 3.1% (US Census). As of 2013, the population of Georgia was approximately 9,992,167 (US Census), making it the tenth largest State by population. However, the population growth is not evenly distributed. Nearly three-fourths of Georgia's residents live in the northern half of the State, primarily in the Piedmont and Ridge and Valley regions around metropolitan Atlanta. The second fastest growing region of Georgia is along the ecologically fragile coast. This population growth has created, and is driven by, local economic activity. Other parts of the State are losing population, but some of those still maintain vibrant agricultural economies.

### **Current Land Challenges**

Land challenges of today are different from those of the past, and they vary across the State. In rapidly growing areas, urban and suburban growth is converting land from biologically productive forests and farms to urban uses at an unprecedented rate. As recently as 2008, undeveloped land in Georgia was being converted to development at a rate of 106 acres per day. Every day, metropolitan Atlanta loses approximately 50 acres of trees and gains approximately 55 acres of impervious surface (Georgia Comprehensive Outdoor Recreation Plan 2008-2013). Although this is primarily occurring in the Atlanta region, it is also happening in cities and small towns across the State in those areas experiencing population growth. Rural Georgia faces a different and complex set of land conservation issues: many rural landowners have historically practiced conservation on their own lands, but economic pressures such as high commodity prices and land values are causing some landowners to fragment and sell off parts or all of their land. This is particularly true where there is a strong market for residential and commercial development, such as in the 11 coastal counties or in the north Georgia mountains where many people are building second homes for retirement or vacation.

If current trends continue, Georgia may find it difficult to sustain the high quality of life and natural beauty that attracts new residents. Indeed, Georgia has been called the "New California" (<http://www.timesfreepress.com/news/2011/nov/25/georgia-called-the-new-california/>). As the number of Georgians increases, demands placed on land, water, and air also increase, and the impact on natural systems becomes significantly greater.

For example:

- The expanding population requires more land for homes, schools, office buildings, commercial establishments, and shopping centers. A rule of thumb is that it takes about three-fourths of an acre of land per person to meet these needs with conventional development patterns. Land for these urban and suburban uses typically comes from

converting forest and agricultural lands. These dramatic land use changes reduce wildlife habitat and corridors; they decrease greenspace that meets aesthetic and recreational needs and provides valuable environmental services; and they greatly increase the amount of nonpoint-source pollution entering unfiltered into Georgia's surface waters.

- Water quality in streams and lakes becomes more difficult to maintain as we build out water-sheds and pave more land. Stormwater runoff from parking lots, rooftops, roads, and lawns will carry more pollutants to our streams. This increase in nonpoint sources of pollution coupled with increased wastewater from the expanding population will make it difficult to ensure water quality in our streams, rivers and lakes, and will likely result in loss of aquatic species as their habitat deteriorates.
- Demands for water increase along with population. Although Georgia is located in one of the wettest part of the country, our demands for water are already challenging supplies across the State. In addition to long-running conflict with neighboring States over shared water resources, controversies over water issues have emerged within Georgia between the metropolitan Atlanta region, southwest Georgia, and along the coast.
- The increasing number of people moving to coastal communities compounds the environmental impact on the marshes and other environmentally sensitive systems on which coastal tourism and the commercial seafood industry depend.
- Other States that are economically competitive with Georgia are taking dramatic steps to protect their land resources, recognizing that economic competitiveness is tied closely to quality of life.

Recognizing this growing and urgent need for land conservation in the State, in 2003 Governor Sonny Perdue created the Advisory Council for the Georgia Land Conservation Partnership (the Advisory Council or Council). Governor Perdue charged the Advisory Council to:

1. Oversee the development of the State's first comprehensive, State-wide land conservation plan;
2. Ensure that all interested parties have full opportunity for involvement and input into the Plan; and;
3. Advise the Governor concerning implementation of the Plan.

Governor Perdue envisioned that the Georgia Land Conservation Partnership Plan would focus on:

1. State acquisition of large, strategic parcels of land, including fee simple and less than fee simple interests;
2. State grants to counties and cities for greenspace acquisition and protection; and
3. State support and incentives to increase land conservation by private landowners, land trusts, and philanthropic organizations.

The Advisory Council adopted the following as its vision Statement:

"The Georgia Land Conservation Partnership envisions a State-wide network of natural, historic, and recreational areas and land and water corridors; a priceless legacy which enhances the health of ecosystems, encourages working landscapes, fosters natural resource stewardship, sustains a healthy economy, and promotes a sustainable high quality of life for current and future generations of Georgians." The resulting Georgia Land Conservation Partnership Plan

served as a road map for reaching the vision. Eight recommendations were developed that focus on crucial policy decisions to be made in order for the goals of the plan to be achieved. Specific action items which support implementation of the Plan and relate to each of the recommendations were also included. The eight recommendations put forth by the Plan were:

**Recommendation 1:** *Adopt a qualitative approach to land conservation so that the special benefits provided by land are used to prioritize lands for protection.*

**Recommendation 2:** *Amend the Georgia Greenspace statute to reflect the changes recommended in this Plan, including opening participation to all local governments; basing grants on competitive projects rather than on adoption of a greenspace plan; providing for a greenspace element in the local comprehensive plans; and expanding the definition of greenspace to include active recreation at a capped level. A significant percent of the land conservation funds recommended in Part III of this Plan should be earmarked for the Community Greenspace Program.*

**Recommendation 3:** *Promote creation of land conservation partner-ships among the State, the private sector, local governments, and other public institutions.*

**Recommendation 4:** *Reconstitute the Georgia Greenspace Commission as the Georgia Land Conservation Authority and staff it with a division within the Department of Natural Resources.*

**Recommendation 5:** *Support the development and use of a variety of land conservation tools*

**Recommendation 6:** *Support removing disincentives for land conservation and adopt new incentives to encourage conservation of land.*

**Recommendation 7:** *Secure a reliable and adequate source of funding and dedicate it for use in implementing the Land Conservation Partnership Plan.*

**Recommendation 8:** *The State should begin implementing the Plan immediately by focusing on those recommendations and action items that: (1) relate to creating the Land Conservation Authority, staffing the Authority and revising the Community Greenspace Program; (2) require little or no expenditure of funds; and (3) demonstrate the effectiveness of partnerships and the tools identified in the Plan.*

Action items to improve the State's toolbox should include the following:

1. Creating a public/private revolving fund that would allow land to be purchased, made subject to conservation restrictions, and resold;
2. Establishing an effective Purchase of Agricultural Conservation Easement program;
3. Requiring holders of conservation easements to report pertinent information to the Georgia Land Conservation Authority;
4. Clarifying the authority of the Attorney General to enforce conservation easements;
5. Encouraging the use of more flexible land use tools by local governments;
6. Creating a Mitigation Enhancement Program to direct wetlands- and stream-impact mitigation funds to acquisition of fee simple and development interests in priority lands;
7. Funding implementation of the Georgia Carbon Sequestration Registry Act;
8. Developing a comprehensive public information and outreach campaign; and
9. Developing a cooperative arrangement among State agencies and organizations with outreach programs designed for landowners to provide technical support on land conservation.



10. Providing a Georgia income tax credit for a donation or bargain sale of land or a permanent conservation easement;
11. Providing a standard methodology for valuation by tax assessors of land that is subject to a conservation easement;
12. Expanding the marketing and certification program for Georgia-grown products; and
13. Recognizing outstanding land stewards.

After the Georgia Land Conservation Partnership Advisory Council submitted their final report to Governor Perdue in 2004, in 2005 the Land Conservation Act (O.C.G.A. §12-6A) was passed by the General Assembly and signed into law. In the Act, the General Assembly recognized that “the State-wide network of land and water resources, the State's prime agricultural and forestry lands, and its natural, cultural, historic, and recreational areas are a priceless legacy that enhance the health of ecosystems, encourage working landscapes, foster natural resource stewardship, sustain a healthy economy, and promote a sustainable high quality of life for current and future generations of Georgians.” Significantly, for the purpose of addressing water quality, the Act defined "Conservation land" as meaning permanently protected land and water in its undeveloped, natural State or that has been developed only to the extent consistent with, or is restored to be consistent with, one or more of the following conservation purposes:

- Water quality protection for rivers, streams, and lakes;
- Flood protection;
- Wetlands protection;
- Reduction of erosion through protection of steep slopes, areas with erodible soils, and stream banks;
- Protection of riparian buffers and other areas that serve as natural habitat and corridors for native plant and animal species;
- Protection of prime agricultural and forestry lands;
- Protection of cultural sites, heritage corridors, and archeological and historic resources;
- Scenic protection;
- Provision of recreation in the form of boating, hiking, camping, fishing, hunting, running, jogging, biking, walking, or similar outdoor activities; and
- Connection of existing or planned areas contributing to the conservation goals of the Act.

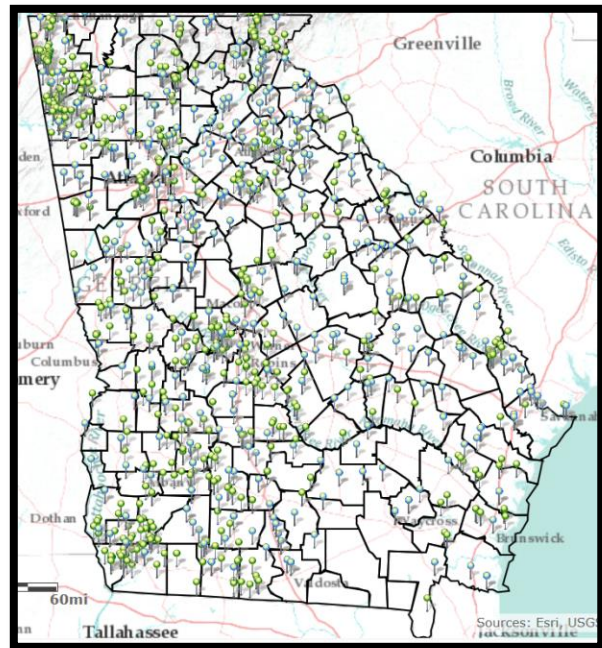


Figure 16: Map of conservation projects in Georgia

The Land Conservation Act also created and charged the Georgia Land Conservation Council to pursue these vision and mission Statements with staff support from the Georgia Environmental Finance Authority (GEFA). The Land Conservation Council consists of nine members: the State Property Officer, the Commissioner of the Department of Natural Resources, the director of the State Forestry Commission, the Executive Director of the State Soil and Water Conservation Commission, the Commissioner of the Department of Community Affairs, and four members to be appointed by and serve at the pleasure of the Governor of the State of Georgia.



Additionally, the Act established the Georgia Land Conservation Trust Fund and the Georgia Land Conservation Revolving Loan Fund, and declared that cities, counties, State agencies, State authority (such as the Jekyll Island Authority), or nongovernmental organizations are eligible to submit a land conservation project for approval, and that funds for the preservation of land or conservation easements on land shall be made available to those entities. It replaced the Georgia Greenspace Trust Fund with the Georgia Land Conservation Trust Fund and transferred all funds from the former into the latter.

To implement the Act, the Georgia Land Conservation Program (GLCP) was created. The primary function of the GLCP is to provide flexible financing to local governments, State agencies and conservation organizations for permanent land conservation projects that advance at least one of ten conservation purposes listed in the Land Conservation Act. The GLCP works to permanently protect Georgia's valuable land and water resources through public/private through administration of the [Georgia Conservation Tax Credit Program](#), which offers tax incentives for eligible donations of conservation lands and easements. The Georgia Conservation Tax Credit is a financial incentive for landowners to help protect our State's natural resources. Landowners who donate fee-title lands or permanent [Conservation Easements](#) to a government entity or [Qualified Organization](#) may apply for a credit against their State income taxes.

### **Key Issues**

While great strides have been taken, GAEPD will focus more on what works and how that can be directed towards protection watersheds and water quality. Consideration will be made toward innovative approaches such as the Clean Water Fund approach currently being developed in the Savannah River Basin (Savannah River 2014). This fund is set up by utilities and other permittees to fund land acquisition, research, and restoration activities in the basin.

### **Resources Available**

Since the Georgia Land Conservation Act was passed in 2005, *the GLCP has played a role in permanently protecting 304,703 acres of land*. The GLCP promotes permanent land conservation by offering flexible and cost-effective financing options to local governments, State agencies and conservation organizations. The program offers these financial tools:

**Competitive Grants:** The 2005 Land Conservation Act created the Land Conservation Trust Fund, which is supported by direct State appropriations. Grants were awarded on a competitive basis to State agencies and local governments. No funds were allocated to the Trust Fund in fiscal years 2009-2014, so the GLCP has suspended its grant program.

**Due Diligence Micro-Grants:** The GLCP provides micro-grants of up to \$50,000 to reimburse State agencies for legal and other expenses associated with accepting conservation donations. These micro-grants are funded by donations from taxpayers on their State income tax returns through the Checkoff Georgia program. Since 2010, \$313,838 in taxpayer donations have allowed the State to accept 29 new conservation easements. These lands cover 34,159 acres – three-times the acreage previously under State-held easement – and were permanently protected at the rate of *one acre per \$9 donated to the GLCP*. The GLCP received two more due diligence grant applications in 2013, which are being acted upon in 2014.

**Low-Interest Loans:** The GLCP offers loans to local governments and NGOs to complete land conservation projects. The Land Conservation Loan Fund is capitalized with \$55 million from the Federal Clean Water State Revolving Fund, which is jointly administered by

GEFA and GAEPD. More than \$17 million has been awarded from the loan fund since 2005 to protect almost 15,000 acres through 14 different projects. The GLCP awarded one loan in 2013 to the St. Simon's Land Trust for \$2.16 million to complete the protection of Fort Frederica in Glynn County.

**Conservation Tax Credits:** The GLCP jointly finances and administers the State's Conservation Tax Credit Program in partnership with DNR, SPC and DOR. Tax credits are available to donors of both fee-title lands and easement-restricted lands that are determined to have significant conservation values. Since 2007, the tax credit program has incentivized the protection of 206,328 acres through the certification of 499 conservation donations. In 2013, DNR certified 72 donations covering 33,560 acres. Additional information about the

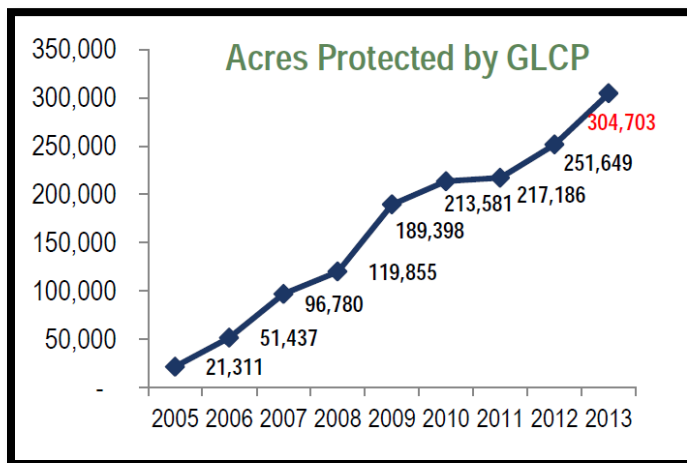


Figure 17: Total acres protected by GLCP. Of the total, more than 206,000 acres are protected using the Conservation Tax Credit.

Conservation Tax Credit Program is provided later in this report.

Project applications undergo thorough financial and environmental reviews by GEFA, The Department of Natural Resources (DNR), The Environmental Protection Division (GAEPD), The State Properties Commission (SPC), The Department of Revenue (DOR), The Land Conservation Council.

In 2013, GLCP staff implemented the following administrative changes that provide greater financial incentives to conserve land in Georgia:

Initiative to incentivize projects that conserve the State's energy, land and water resources. Land conservation projects are now eligible to receive an interest rate that is either 2.0 basis points below GEFA's benchmark rate (2.4 percent as of December 31, 2013), or 0.50 percent, whichever is higher.

**Lowered Interest Rates**

on all loans as part of GEFA's Conservation

During the 2014 legislative session, the Georgia Senate adopted Senate Resolution 896, which created the Joint Study Committee on the Georgia Legacy Program. This Resolution recognized that Georgia has "a moral imperative and economic incentive to conserve land and water; and the State of Georgia's land and water resources, prime agricultural and forestry lands, and natural, cultural, historic, and recreational areas are a priceless legacy that enhance the health of ecosystems, encourage working landscapes, foster natural resource stewardship, sustain a healthy economy, and promote a sustainable high quality of life for current and future generations of Georgians." To address this moral imperative and economic incentive, the Joint Study Committee on the Georgia Legacy Program will study the need for the State to provide funding options to acquire critical areas for conservation. The study committee will be composed of the Chairperson of the Natural

Resources and Environment Committees of the House of Representatives and Senate are formed by two members of the Natural Resources and Environment Committee of the House of Representatives, selected by the Speaker of the House; two members of the Senate Natural Resources and the Environment Committee, selected by the President of the Senate; the Director of the Georgia Forestry Commission; the Director of the Georgia Environmental

Finance Authority; the Commissioner of the Georgia Department of Agriculture; the Commissioner of the Department of Natural Resources; the Director of the GAEPD; and the Commissioner of the Department of Economic Development, or his or her designee.

### **Key Stakeholders**

- Georgia Land Conservation Council:
- State Property Officer
- Commissioner of the Department of Natural Resources
- Director of the State Forestry Commission
- Soil and Water Conservation Commission
- Department of Community Affairs
- GEFA Land Conservation Program
- Georgia Land Conservation Center
- Georgia Wildlife Resources Division
- Georgia Parks, Recreation, and Historic Sites
- Georgia Coastal Resources Division
- The Nature Conservancy
- The Georgia Conservancy
- Georgia Land Trust
- One Hundred Miles
- Regional Commissions (Metro District Watershed Management Plans)
- US Army Corps of Engineers
- GA Regional Conservation & Development Councils
- Georgia Soil & Water Conservation Commission
- Ducks Unlimited
- Trout Unlimited
- Georgia Wildlife Federation

### **Education/ Outreach**

- GA DCA (Community Planning Initiative Water Resources Management, Recycling & Disposal Guidance)
- GA Regional Conservation & Development Councils (Better Back Roads)

### **Funding**

- GEFA (State Revolving Fund)
- GA Coastal Resources Division (Coastal Incentives Grant)
- Georgia Soil & Water Conservation Commission (Green Book)
- GA Stormwater Management Manual – Vol. 1,2,&3 and Coastal Supplement

### **Long Term Goals, Short Term Goals, and Milestones (In no particular order):**

**Long Term Goal 1:** Focus land conservation efforts towards those watersheds experiencing the greatest impact from nonpoint source pollution, or that are most likely to be impacted in the future

Develop collaboration between GEFA/GLCP and GAEPD to investigate aligning the funding priorities of GCLP and other conservation organizations with prioritized watersheds identified by GAEPD.

**Short Term Goal 1.1:** Identify high-value conservation lands in prioritized watersheds; i.e. those lands that if put into conservation would have the greatest impact on mitigating nonpoint source pollution.

**Milestone 1.1.1:** List of characteristics needed for high-value conservation lands, e.g. agricultural, floodplain, and isolated wetlands.

**Milestone 1.1.2:** Map of lands in each prioritized watershed having those characteristics

**Short Term Goal 1.2:** Establish scoring mechanism that would include impact of proposed conservation land and its mitigating impact on nonpoint source pollution

**Milestone 1.2.1:** Develop a matrix or ranking of each proposed project that would assign points to each salient characteristic of that project

**Long Term Goal 2:** Create a network of linked landscape-scale green spaces Statewide

Establish the universe of conservation land in Georgia, including public and private lands and establish priority conservation areas in those gaps.

**Short Term Goal 2.1:** Identify geographic gaps where additional conservation land acquisition could be prioritized based on nonpoint source pollution problems.

**Milestone 2.1.1:** Create State-wide or water planning region (small-scale) map of lands in State conservation easements that protects anonymity of private landowners

**Milestone 2.1.2:** Tabulation or graphic presentation of acres preserved in each water planning region, county, or watershed.

**Short Term Goal 2.2:** Identify lands in priority watersheds that correspond to gaps in conservation lands

**Milestone 2.2.1:** Map of land areas to be targeted for acquisition for conservation

**Long Term Goal 3:** Increase total public and private funds used for land acquisition

Leverage new funding sources developed by the Joint Study Committee on the Georgia Legacy Project to conserve lands in prioritized watersheds.

**Short Term Goal 3.1:** If resources allow, acquire conservation lands that will have a specific nonpoint source mitigation goal, such as reduction in nutrients, and reduction in fecal coliform.

**Milestone 3.1.1:** Conservation easements in prioritized watersheds acquired with funding mechanisms developed by the Joint Study Committee

## **Onsite Sewage Disposal System (OSDS)**

### ***Overview***

Onsite Sewage Disposal Systems (OSDS), usually referred to as septic systems, are common ways of decentralized sewage management. About 40% of Georgia residents rely on OSDS for their wastewater treatment. Many of the decentralized systems in Georgia were installed during the real estate development boom that occurred between the 1980s and mid-2000s, and most of these are conventional septic systems. Although the exact number of OSDS in Georgia is unknown, some estimates place over 500,000 septic systems in the metro Atlanta region alone.

In Georgia, all decentralized systems that are designed to treat over 10,000 gallons per day (gpd) of wastewater are regulated by the Environmental Protection Division (GAEPD) of the Department of Natural Resources (DNR). The Department of Public Health (DPH) of the Department of Community Health (DCH) regulates decentralized systems that treat less than 10,000/gpd and discharge into an absorption field. Cluster OSDS systems, also called community systems, collect wastewater from two or more buildings and convey it to a treatment and dispersal system located on a nearby site. Community systems are often used when limited land is available for individual absorption fields. In some communities, local utilities own and operate cluster systems. They are sometimes used to facilitate specific community growth plans (Sheehan and Fowler, 2013).

A conventional septic system consists of a pipe from the home or business, a watertight tank, an absorption field (also known as a dispersal field or drain field), and the soil. Raw sewage from the home or business enters the watertight tank, which is usually constructed of pre-cast concrete, fiberglass reinforced plastic, or polyethylene and typically has a volume of 1000-2000 gallons. Older systems may have a capacity of 750 gallons. In Georgia, a house usually requires a 1000-1500 gallon tank (Risse, 2012). Septic tanks generally retain raw sewage for approximately two days, during which the sewage separates into floatable grease and fatty materials, sludge, and clarified sewage. In a properly functioning system bacteria partially decompose the solids. Baffles in the tank provide maximum retention of solids, help prevent inlet and outlet plugging, and prevent rapid flow of wastewater through the tank, which allows for improved treatment. The clarified sewage seeps into the drain field, which usually consists of a series of parallel trenches, each containing a distribution pipe or tile embedded in drain field gravel or rock. A larger gravel-filled “bed” with several distribution lines within the gravel, called an “absorption bed,” is also common. (Speir and Risse, 2013). The soil in the drain field naturally removes potentially harmful contaminants, including remaining minute solids. If a septic system is not properly managed and does not function properly, contaminant-laden effluent can either pond on the surface of the field, posing a public health threat, or drain into groundwater or surface waters, contaminating them with bacteria, viruses, nitrates, oils, detergents, and other household chemicals, potentially threatening public health.

The vast majority of residential OSDS are conventional septic systems (Sheehan and Fowler, 2013). Currently, the Rules of the Department of Community Health (O.C.G.A. 290-5-26) prohibit location of a septic tank within 50 ft of existing or proposed wells, springs, sink holes, or suction water lines, and the tanks must be located downgrade from wells or springs if physically possible. Septic tanks cannot be less than 25 ft from lakes, ponds, streams, water courses, and other impoundments; less than 10 ft from pressure water supply lines, or less than ten feet (10') from a property line. No septic tank can be installed less than fifteen feet (15') from a drainage ditch.



The entities responsible for most OSDS oversight in Georgia are County Boards of Health (CBH). Under current State law, CBHs regulate OSDS in six specific areas:

1. Specifying locations where OSDS can be used.
2. Specifying minimum lot sizes for OSDS use.
3. Specifying the types of residences, facilities and buildings that may be served by OSDS.
4. Issuing permits for the installation of systems.
5. Inspecting systems upon the completion of installation.
6. Provide for the ongoing maintenance of such systems, except for non-mechanical residential sewage management systems.

CBH responsibility for management of decentralized systems is limited in several significant ways. Second, unlike any other State, CBH are prohibited by Georgia law from establishing regulations requiring maintenance of the most common OSDS in the State – conventional septic systems. This is true even if there are documented impacts from poorly maintained systems (Sheehan and Fowler, 2013). In general, OSDS are more cost-effective than conventional sewer systems. However, post-installation management of OSDS is critical to maintaining environmental quality by helping keep pathogens, nutrients and other harmful substances out of groundwater and surface waters. Specifically, septic system tank, lines, and any mechanical components must be inspected periodically to ensure that they are working properly; they will eventually need replacement. The tank must be periodically pumped to ensure that septage does not build up and enter the absorption field, and the septage must be properly disposed of at a centralized plant or permitted land application site (Sheehan and Fowler, 2013). Unfortunately, many centralized wastewater treatment facilities will not accept septage because of its extremely high biochemical oxygen demand and concentrated organic load, which can overwhelm a plant's treatment capacity.

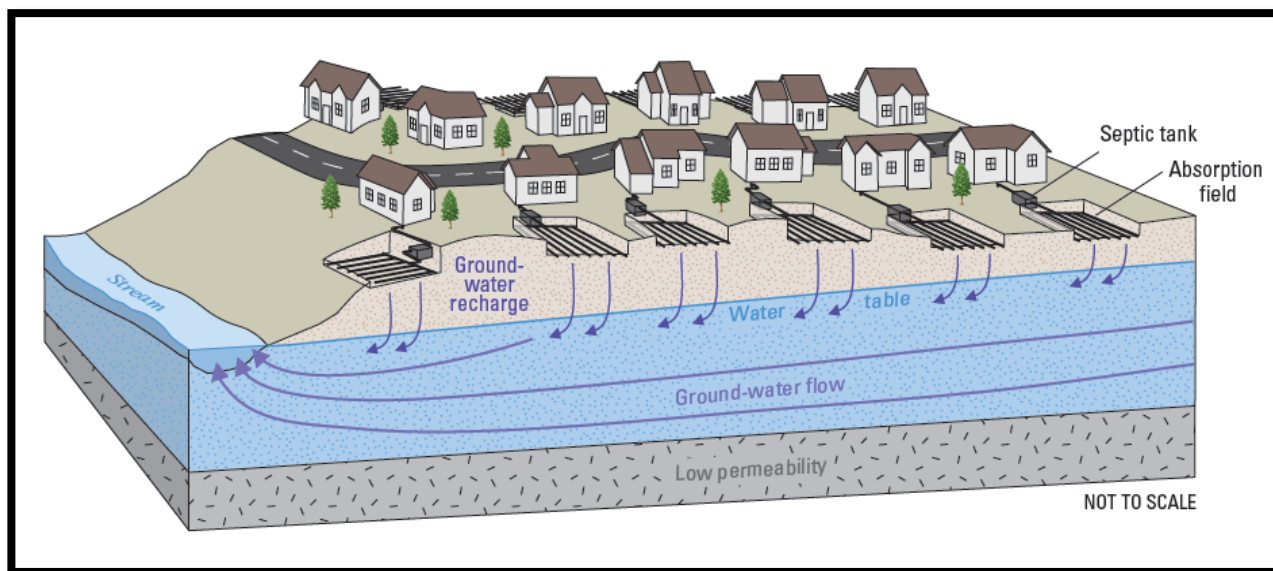


Figure 18: Groundwater recharge from OSDS (Lander and Ankorn, 2008)

## Key Issues

Septic tanks have become a source of controversy in recent decades in Georgia, principally because they are considered by many water managers to be a fully consumptive use

of water and because they are thought to be sources of ground and surface water contamination. These issues are of greatest concern in areas with a high density of OSDS, or in parts of the State with soils that may not be suitable for septic system drain fields. To investigate this, the US Geological Survey conducted a study of paired watersheds with high and low densities of residential OSDS in Gwinnett County (Landers and Ankcorn, 2008).

During the real estate boom of the mid-1980s to 2007, Gwinnett County was one of the fastest growing counties in the United States, and saw a rapid increase in the number and density of septic systems installed. The USGS evaluated stream flow and water quality in 24 watersheds, of which 12 had a high density of septic systems (226-965 systems per square mile) and 12 had a low density (22-96 per square mile). The mean base-flow yield, i.e. the amount of stream flow that comes from coming groundwater seeping into the streams, was 90% greater in the watersheds with a high density of OSDS compared to the low-density OSDS watersheds. This was determined during the extreme drought year of 2007, when runoff from rainfall was unusually low; therefore, whatever water was in the watersheds was coming from base flow. This indicated that septic systems in the high-density watersheds acted as significant sources of groundwater recharge in those watersheds in Gwinnett County. This is consistent with studies performed at the University of Georgia which calculated that about 91% of water discharged into soil by septic systems goes to groundwater for soil and weather conditions typical of the Atlanta area, and that as much as 70% or more of wastewater applied through OSDS and land-application systems should return to nearby streams (Radcliffe et al, 2006).

Water quality in the high-density and low-density OSDS watersheds did not show the same strong correlation as base flow: the specific conductance (a measure of how well water conducts electricity) was generally higher in the watersheds in high-density areas. This reflected the greater input from groundwater in those high-density watersheds. Specific conductance can be affected by contaminants in surface and groundwater, but it can also be affected by naturally occurring minerals in soil and bedrock as well as other urban features (Landers and Ankcorn, 2008). A more detailed analysis of water quality in these same watersheds indicated that, in addition to elevated electrical conductance, streams in high-density OSDS watersheds exhibited significantly higher levels of chloride, which reflects the presence of numerous OSDS. Interestingly, nitrogen concentrations (the amount of nitrogen in a specified quantity of water) were not significantly different for high-density OSDS watersheds when compared to low-density watersheds, but the *total* amount of nitrogen was higher in the high-density watersheds due to the higher number of OSDS supplying groundwater (as base-flow) to the streams (Oliver et al, 2013).

When properly sited, designed, installed, and maintained, OSDS effectively reduce or eliminate most human health or environmental threats posed by pollutants in wastewater (Radcliffe et al, 2006). However, not all OSDS meet these criteria. In the past, most OSDS were usually installed in rural areas with low housing density. In the last few decades, however, OSDS (usually septic) were used to support growth in denser suburban areas. Large numbers of systems were installed close to sensitive areas such as drinking water sources, freshwater wetlands, coastal marshlands, estuaries, and surface waters with high nutrient inputs. Some of these systems were installed under older, less rigorous regulations (Sheehan and Fowler, 2013).

In many places in Georgia, aging or improperly maintained systems contribute to water quality degradation including fecal coliform impairment. These substances can make people sick, degrade fish and wildlife habitat, impact recreational activities like swimming and fishing,

and increase drinking water treatment costs. For example, in the 16-county Metropolitan North Georgia Water Planning District (MNGWPD), where about 40% of the district's approximately 500,000 septic systems are at least 20 years old; many systems were installed under older, less rigorous standards; and some homes have been expanded without an expansion of system capacity. Of particular concern in the MNGWPD are systems adjacent to the area's major reservoirs: Lakes Allatoona and Lanier. In 2006, all of Allatoona and segments of Lanier were designated by DNR as having excessive levels of chlorophyll-a (algae) because of excessive nutrient inputs. In addition, a portion of Allatoona and tributaries of both lakes have excessive fecal coliform. Septic systems have been identified as a likely contributor to this contamination. (Sheehan and Fowler, 2013).

### **Resources Available**

In coastal Georgia, the University of Georgia Marine Extension Service (MAREX) has implemented a Section 319 grant project to conduct a comprehensive environmental regulatory program for officials of local governments and homeowners concerning the relationship between individual OSDS (septic systems) and surface and ground water quality. This program stresses the requirement for protection and prevention of septic contamination, thus calling for periodic inspection and maintenance by home owners. The primary step is to identify and locate existing OSDS and wells, with individual systems being visually inspected by local health department personnel. The location of existing OSDS and wells is being recorded with a handheld GPS to provide the geo-location within Camden, Chatham, Bryan, Effingham, Glynn, Liberty, Long and McIntosh counties. The project has produced GIS maps of OSDS and wells and utilizes the Southern Georgia Regional Commission's (SGRC) transferable geo-referenced and web accessible database (WeIStROM), a standardized method of recording all future OSDS installations for all of the coastal area health departments.

Building on results of the OSDS mapping project, MAREX is using funds from a NOAA Coastal Incentive Grant to conduct water quality analyses in areas of high OSDS density in Glynn County. By gathering water quality data in reference to OSDS geo-locations, this project will provide significant insight to pollution prevention and protection of water bodies facing potential impairment. Products developed by this project can be utilized by government officials, planners and scientists to better articulate and quantify water quality conditions in the watershed. The products can be used to assist in the identification of potential pollution sources and as an analytical tool to aid in establishing TMDL processes required for coastal waters. In October 2011, health departments in three coastal Georgia counties began receiving assistance from MAREX to update the electronic inventory of permits for OSDS in Bryan, Liberty and McIntosh Counties. Also funded by a Coastal Incentive Grant, this project involves reviewing the paper documents associated with existing septic tank permits and entering the information into "The Digital Health Department," an online database that is operated by the Georgia Division of Public Health and used by a majority of Georgia counties. Project work is now complete in Bryan and McIntosh Counties. Work in Liberty County is expected to be complete in mid-2014. (University of Georgia Marine Extension Service <http://marex.uga.edu>)

Elsewhere in Georgia, data is lacking on the number, age, location, and condition of septic systems. Newer community systems are typically well-maintained, but single-family septic systems, which comprise the large majority of OSDS in Georgia, represent a largely unregulated and poorly understood potential source of NPS pollution. As mentioned, State law prohibits CBH from mandating regular maintenance and inspection of domestic septic systems. This prohibition, combined with a lack of water quality data and the data uncertainties mentioned, make it difficult to adequately assess the impact of OSDS on NPS in Georgia. While it is clear that a high-density of septic systems in some areas causes significant

groundwater recharge revealed by elevated levels of certain constituents found in streams, these conclusions cannot be extrapolated to other areas of Georgia. Factors such as distance to surface waters, depth and characteristics of drain field soils, groundwater hydrology, slope and other site factors, and highly variable individual OSDS discharge rates vary widely across the State. Therefore, in order to fully understand the impact OSDS have on NPS in Georgia, more detailed studies of watershed hydrology and water quality need to be targeted at those watersheds with high densities of OSDS.

### **Key Stakeholders**

- Southeast Rural Community Assistance Project
- <http://www.sercap.org/georgia.htm>
- Department of Community Affairs, Community Development Block Grant (CDBG) Program
- <http://www.dca.State.ga.us/communities/CDBG/index.asp>
- Georgia Environmental Finance Authority
- <https://gefa.georgia.gov/water-and-sewer-financing>
- Georgia Department of Public Health (GADPH) inspects and permits Required On-Site Sewage Management Systems for septic tank design capacity of less than one thousand (1,000) gallons or greater than ten thousand (10,000) gallons <http://health.State.ga.us/programs/envservices/onsitemanual.asp>.
- Southern Georgia Regional Commission and University of Georgia Marine Extension (MAREX) have partnered to integrate septic systems data from 11 coastal counties into the WelSTROM mapping application.
- GADPH has offered to map data from Garrison, GADPH's data entry tool, into WelSTROM, providing Garrison with a solid mapping component to track septic systems in nearly every health district in Georgia.
- Metropolitan North Georgia Water Planning District's Wastewater Management Plan, Section 8. Septic Systems and Decentralized Systems require planning and policy frameworks to be established by local District governments and wastewater providers in coordination with the County Board of Health.
- [http://documents.northgeorgiawater.org/Sec8\\_Septic\\_WW\\_May2009.pdf](http://documents.northgeorgiawater.org/Sec8_Septic_WW_May2009.pdf)
- Regional Water Councils continue to consult with State agency partners on implementation priorities and five-year updates related to on-site sewage management recommendations in the ten Regional Water Plans. Georgia Onsite Wastewater Association
- Georgia Department of Public Health: Public Health Districts and County Health Departments
- Georgia Department of Public Health, Wastewater Management Program
- GAEPD Watershed Protection Branch - Wastewater Regulatory Program (regulation of LAS and larger OSDS >10,000 gallons):
- University of Georgia Marine Extension Service (MAREX)
- University of Georgia Department of Crop and Soil Sciences
- US Geological Survey

### **Education / Outreach**

- Metropolitan North Georgia Water Planning District (*Educational Septic Brochure* English / Spanish; *Septic System Maintenance Folder for Homeowners*)
- GADPH Environmental Services Land Use (On-site Sewage) Program (*Homeowner & Contractor / Environmentalist Guides, Courses, & Manuals; White Papers; & Technical, Certification, & Soil Classification Review Committees*)

- Georgia Regional Commissions (*Water Quality Education & Outreach*)
- UGA Cooperative Extension (*Septic System Brochure*)
- University of Georgia Marine Extension Service
- USEPA (*Septic (Onsite / Decentralized) Systems Education & Outreach*)

### **Funding**

- Section 319 cost-share grants continue to fund best management practices (BMP) that control septic sources.
- Georgia Environmental Facilities Authority administers loans and other financing vehicles to local governments for sewer system improvements and wastewater management projects.
- Georgia Department of Community Affairs awards Community Development Block Grants and grants that address environmental protection from a Catalog of State Financial Assistance Programs found on-line at [www.dca.State.ga.us](http://www.dca.State.ga.us).
- The Grants Management Division of the Acquisition and Grants Office of the National Oceanic & Atmospheric Administration (NOAA) awards funds to local governments for solutions to nonpoint source issues such as septic systems.
- Coastal Resources Division of the Georgia Department of Natural Resources, Coastal Incentive Grant (CIG)
- USDA Rural Development

### **Long Term Goals, Short Term Goals, and Milestones (In no particular order):**

**Long Term Goal 1:** Promote the use of the Well and Septic Tank Referencing and Online Mapping program (such as WelStrom) to non-participating health departments.

**Short Term Goal 1.1:** Georgia GAEPD and DPH will act as liaisons and promote the mapping program to non-participating health departments.

**Milestone 1.1.1:** Non-participating health departments will begin using mapping program.

**Short Term Goal 2.1:** Where appropriate, for 319 funded OSDS BMP projects, information regarding the OSDS will be entered into WelStrom.

**Milestone 2.1.1:** All information from 319 funded OSDS BMP projects will be entered into WelStrom.

**Long Term Goal 2:** Integrate WelSTROM into the Garrison database, as resources allow.

**Short Term Goal 2.1:** As funding allows, encourage all County Health Departments to fully map and geo-locate all OSDS's in jurisdiction

**Milestone 2.1.1:** County Health Departments have a full understanding of all known systems

**Short Term Goal 2.2:** Encourage County Health Departments to coordinate with local sewer authorities to identify properties missing from Garrison and not on local sewer.



**Milestone 2.2.1:** County Health Departments in conjunction with sewer authorities locate in inspect identified properties to determine if they are on OSDS, Strait Pipe, or connected to sewer.

**Milestone 2.2.2:** Identified properties are either connected to the sewer system or permitted for an OSDS

**Long Term Goal 3:** As resources allow, continue or initiate studies of septic density, water quality, and watershed hydrology in order to achieve a more comprehensive knowledge of the impacts of OSDS, if any, on water quality.

**Short Term Goal 3.1:** Identify parts of prioritized watersheds, if any, which have been impacted by OSDS, either due to high density or low function of septic systems, and assessment of any connection between OSDS impacts and the listing of streams as being impaired.

**Milestone 3.1.1:** If funded, generate a GIS-based map identifying watersheds most likely impacted by OSDS.

**Long Term Goal 4:** As resources allow, continue to fund research into the impacts of OSDS in the parts of the 11 coastal counties of Georgia most likely to experience rapid population growth. Determine a method of developing a watershed management plan to incorporate septic installation, repair, and maintenance and the impacts of OSDS on NPS Impaired Waters

**Short Term Goal 4.1:** Establish septic advisory stakeholders list to study impacts to water quality in Georgia's Physiographic regions.

**Milestone 4.1.1:** Hold meetings as necessary to identify OSDS issues and list of impaired waters.

**Milestone 4.1.2:** OSDS Study will attempt to quantify impact to water quality and study recommendations to address any source impacts identified.

**Short Term Goal 4.2:** As resources allow, develop a load model to determine the effectiveness of properly functioning systems and the impact of failing systems.

**Milestone 4.2.1:** Advisory group will develop the criteria and parameters for the model.

**Short Term Goal 5.3:** As resources allow, model septic tank Impacts to Water Quality including, but not limited to Nitrogen/Phosphorus/BOD/ pathogen loadings.

**Milestone 5.3.1:** Working production version the water quality model

**Short Term Goal 4.4:** Distribute results of model for Public use

**Milestone 4.4.1:** Report load reduction for repaired/ replaced OSDS to USEPA's GRTS database

**Long Term Goal 5:** Working with the Georgia Department of Public Health and the Georgia Onsite Wastewater Association, assist CBHs and local governments in development of OSDS post-installation management strategies that would include funding mechanisms for OSDS maintenance, inspection, and repair.

**Short Term Goal 5.1:** Encourage locally driven BMPs

**Milestone 5.1.1:** Development of at least two of the following measures in a high-density OSDS priority watershed in a community that does not currently employ them (from Sheehan and Fowler, 2013):

- Septic pump out rebates upon participation in OSDS maintenance educational program
- Free septic system inspections by town---approved service provider
- Water bill or storm water utility credit when septic system is pumped
- Low interest loans for OSDS and drain field repairs and replacements
- Grants for low---income homeowners for OSDS and drain field repair and replacement costs

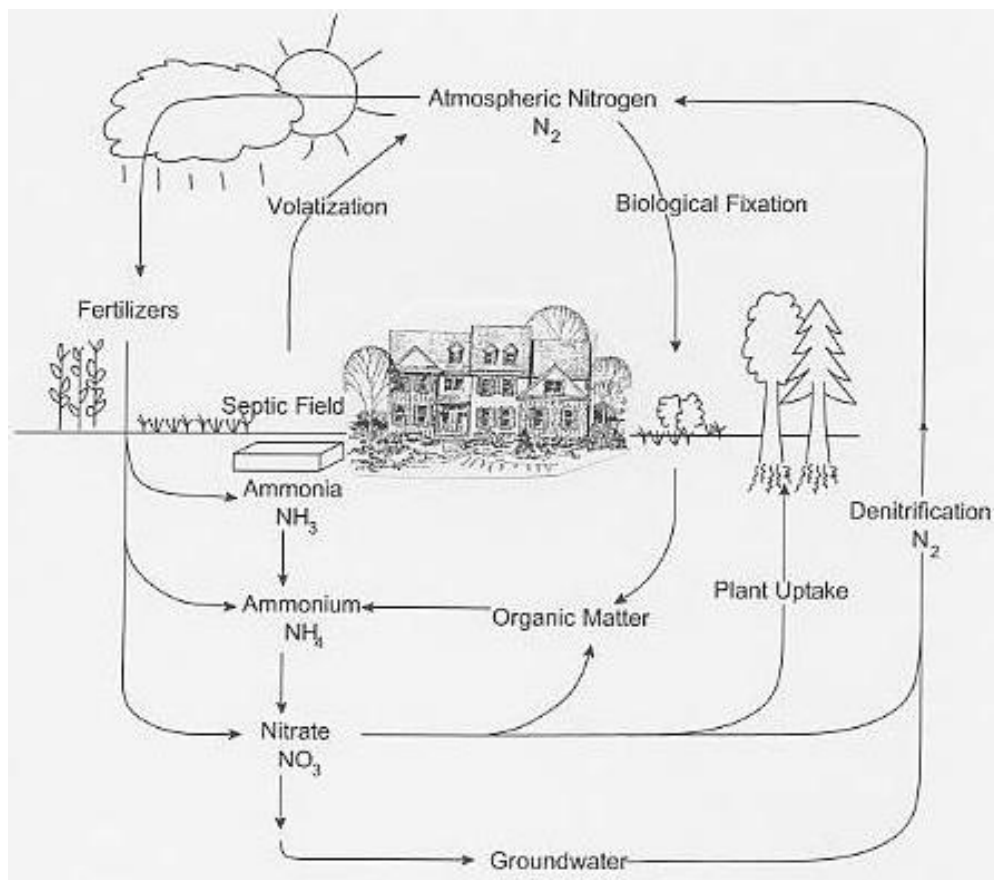


Figure 19: Nitrogen Cycle- Onsite Septic Systems, Georgia Department of Public Health

## **New Tools for Nonpoint Source Management**

### **Overview- Innovations, Advances, and Acceptable Alternative Projects (AAPs)**

As understanding of NPS pollution evolves and new technologies develop, GAEPD realizes that there may be innovative resources, new tools and advances in BMPs that can improve and protect water quality as effectively as traditional methods. The NPS Management Program intends to pursue and incorporate acceptable new resources and technologies as they become available and are applicable to water quality issues related to stormwater runoff.

### **Key Issues**

Upon examination of these and other publications, the NPS Management Program will identify appropriate criteria and develop selection procedures for assessing the feasibility of endorsing new techniques or implementing alternative BMPs.

#### **Direction of Functional Area**

The NPS Management Program will consider competitive grant funding for proposals that intend to implement AAPs that meet certain standards. These standards may include:

1. Not be part of a permit requirement
2. Must be widely accepted technology that has been previously proven to be successful
3. Not pose a threat to public health or safety
4. Not pose a threat to water quality in the event of its failure
5. Not pose a threat to in-stream or riparian biota
6. Not be prohibitively expensive or impose an undue financial burden on stakeholders or communities
7. Must be designed and intended to clearly address specific NPS pollution problem(s) in the watershed that impair its designated use
8. Must meet all State and local safety codes and use restrictions
9. Not violate any Federal laws such as the Endangered Species Act and the Clean Water Act.
10. If an interState project, must be compatible with all laws in the participating States, and responsibility for implementation must be shared by each State
11. Must meet all other requirements and conditions of the USEPA and GAEPD 319 programs.

### **Resources Available**

To assure that the alternative methods or BMPs meet certain standards, the NPS Management Program will analyze the following State water quality protection publications to become familiar with acceptable mechanisms for evaluating advances in BMPs or new technologies:

- *Field Manual for Erosion and Sediment Control in Georgia* (Green Book)
- *Georgia Better Back Roads Field Manual* (Red Book)
- *Georgia Stormwater Management Manual* (Blue Book)

### **Key Stakeholders**

- Georgia Soil and Water Conservation Commission
- Georgia Resource Conservation & Development Council, Inc.
- Georgia Regional Commissions
- Georgia State universities and colleges
- US Forestry Service

- Natural Resources Conservation Service
- Local governments (cities and counties)
- Local public utilities

### **Education/ Outreach**

The NPS Management Program will solicit local, State, regional and national partners to review and comment on the assessment standards and selection procedures in order to determine which approaches will produce maximum benefits and success. Guidance documents in electronic format and training in how to develop a proposal for Acceptable Alternative Projects will be available to the general public online and upon request.

### **Funding**

- Section 319 Nonpoint Source Implementation Grant

### **Long Term Goals, Short Term Goals, and Milestones (In no particular order):**

**Long Term Goal 1:** As resources allow, identify and adopt between 15 and 30 standards and management policies for alternative resources, innovative technologies or advances in BMPs to protect, improve or restore water quality.

**Short Term Goal 1.1:** As staffing allows, studying existing field manuals and green infrastructure publications will reveal proven design criteria and management policies that can be adapted by the NPS Management Program into tools for assessing the acceptability of new technologies and alternative BMPs.

**Milestone 1.1.1:** The NPS Management Program will adopt appropriate criteria and policies during the examination process to produce 15-to-30 acceptability standards for innovative methods and alternative technologies

**Long Term Goal 2:** Develop a ranking procedure to assess the feasibility of implementing Acceptable Alternative Projects to protect, improve or restore water quality, as resources allow.

**Short Term Goal 2.1:** Establishing a scoring procedure for the assessment standards acceptable to the NPS Management Program will ensure a uniform approach to evaluating and selecting AAP for implementation with Section 319 grant funds.

**Milestone 2.1.1:** Incorporate acceptable standards for innovative or alternative technologies into an evaluation procedure for selecting AAPs to fund.

**Long Term Goal 3:** Compose guidance and conduct training in how to develop a proposal for Acceptable Alternative Projects, as resources allow.

**Short Term Goal 3.1:** Guidance and training in how to implement Acceptable Alternative Projects will promote education to the general public about nonpoint source pollution as well as provide tools to interested applicants who want to qualify their project for a grant, as staffing allows.

**Milestone 3.1.1:** Produce a 5-to-15 page publication and a 5-to-15 slide PowerPoint presentation that serve as guides to qualifying proposals as AAPs and applying for Section 319 grant funds to implement the projects.

## **Other Nonpoint Source Related Programs**

### **Overview- Healthy Watersheds**

The Healthy Watershed Initiative (HWI) was introduced by USEPA in 2011 as an important approach in protecting the nation's remaining healthy watersheds through conservation, preventing water quality impairments, and accelerating restoration successes through proactive implementation programs. The HWI encourages States, local governments, watershed organizations, and others to take a holistic approach to protecting healthy watersheds by recognizing that preserved, undisturbed aquatic ecosystems promote healthy components of watersheds and help prevent additional water quality impairments in the future.

The key components of the HWI are:

- 1) Establish partnerships to identify and implement protection of healthy watersheds;
- 2) Identify healthy watersheds and intact components of altered watersheds State-wide through integrated assessments;
- 3) Implement State-wide strategic protection plans and programs based on vulnerability and other opportunities;
- 4) Implement local protection programs based on priorities from State and local assessments;
- 5) Provide information to inform ecological recoverability and help set priorities for restoration of impaired waters; and
- 6) Provide information to the public on healthy watersheds, including the socio-economic benefits of their protection.

### **Key Issues**

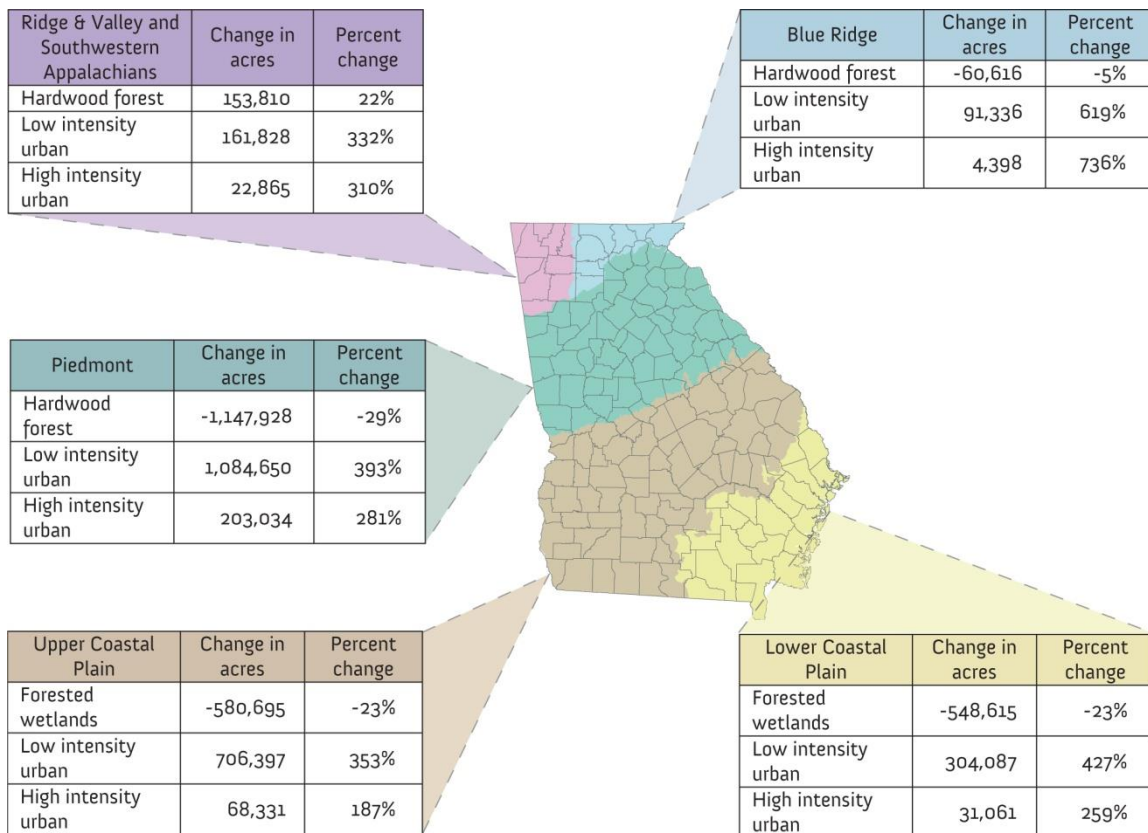
Over the past three decades (1974 to 2005), studies have shown that population and economic growth within the State has led to an increase in high/low urban land cover and decrease in forest and wetlands land cover. Georgia GAEPD's publication "The State of Georgia's Environment" published in 2009, documented these changes within the five major eco-regions found in Georgia. Almost all eco-regions show a significant decrease in hardwood forest and forested wetlands and increases in urban land cover from 1974 to 2005.

With the increase of urban land cover with impervious surface, the number of water bodies, with water quality impairments, have increased and been documented as "Not Supporting" on the 303(d) List of Waters. While point and nonpoint source programs have been in place for years to address the impaired water bodies and watershed, there has been minimum focus on watersheds with water bodies that are meeting water quality standards for designated uses.

Georgia has many ongoing nonpoint source efforts that can be used to for developing a HWI program. Georgia GAEPD maintains a list of water bodies that meet designated water uses such as fishing, Wild/Scenic, drinking water, and recreation. These water bodies are commonly known as "Supporting" and are found in the Georgia's Integrated 305(b)/303(d) List of Waters published in the biennial Water Quality in Georgia report. Those streams listed as Supporting indicates that waters are meeting their designated use(s) and ongoing water monitoring show no violations in water quality standards. In the Georgia report, these streams are listed in the first section of the 305(b)/303(d) list. The list of Support water bodies help prioritize HWI projects.



Another important effort is the 319 Grant funded Watershed Prioritization and Evaluation project (Described in the prioritization section of this plan). This project uses climatological data, hydrodynamic models, and other assessment information to determine priority sub-watersheds for implementation focus. A case study is being conducted on the Satilla River basin. Georgia also is charged with developing and implementing the State Wildlife Action Plan (SWAP). The Georgia DNR Wildlife Resources Division completed the State's Wildlife Action Plan in 2005. DNR made a commitment to review and revise its Wildlife Action Plan, better known as SWAP, within 10 years. The revision process began in 2010 and will be completed by 2015 and will include a reassessment of priority species, habitats and conservation actions, as well as more detailed mapping of priority conservation areas. It will also include an evaluation of potential impacts of climate change on priority species and habitats and identification of climate-change adaptation strategies. Further assessment of monitoring needs and performance measures for comprehensive wildlife conservation in Georgia will be part of the work.



The DNR Nongame Conservation Section staff will coordinate the SWAP revision process with input from others, including GAEPD staff and representatives of a wide variety of government agencies, non-governmental conservation organizations, landowner groups and private corporations. The product of this effort will be a strategic plan that reflects the most current information about wildlife conservation needs and opportunities in the State. One important part of the State Wildlife Action Plan is the identification of potential conservation opportunity areas in Georgia. Potential conservation opportunity areas may be significant to the conservation of biodiversity because they contain one or a combination of the following: a large area of natural vegetation within a watershed, predicted habitat for rare species, or a documented occurrence of a rare species. A wide array of conservation efforts could be directed at these areas and help prioritize HWI projects.

## Resources Available

For Georgia's Non Point Source Program, maintaining and keeping a Supporting stream from being polluted will be one of the Program's new foci. The State will identify geographic areas within the State's Priority Watersheds that contain supporting 305(b) listed segments, streams with Wild/Scenic designations, streams with Drinking Water designations, stream near Conservation Lands or streams identified in the Conservation Opportunity Areas of the State Wildlife Action Plan. Once potential priority areas are identified, the State will initiate HWI conservation and restoration programs within the healthy watersheds as resources allow.

## Key Partners

- Georgia Environmental Facilities Authority
- US Fish and Wildlife Service
- Georgia DNR Wildlife Resource Division
- FEMA National Flood Insurance Program
- US Forest Service
- Trust for Public Lands
- The Nature Conservancy
- Georgia Soil and Water Commission

## Education / Outreach

- Healthy Watershed Initiative Technical Steering Group

## Funding

- Section 319 Grant Fund – Georgia Environmental Protection Division  
<http://www.georgiaepd.org/Documents/GAEPDNonpointSourceGrant.html>
- Georgia Land Conservation Program - Georgia Environmental Facilities Authority  
<http://glcp.georgia.gov/>
- GLCP Georgia Conservation Tax Credit
- GLCP Loan Funds (CWSRF)
- Cooperative Endangered Species Conservation Fund (Endangered Species Act) - US Fish and Wildlife Service  
<http://www.fws.gov/endangered/grants/index.html>
- Recovery Land Acquisition Grants
- Habitat Conservation Planning Assistance Grants:
- HCP Land Acquisition Grants:
- Wildlife Action Plans – Georgia DNR Wildlife Resources Division  
<http://www.georgiawildlife.com/conservation/wildlife-action-plan>
- National Flood Insurance Program's Community Rating System - FEMA  
<http://www.fema.gov/national-flood-insurance-program-community-rating-system>
- Forest Legacy Program - U.S. Forest Service  
<http://www.fs.fed.us/spf/coop/programs/loa/flp.shtml>
- The Trust for Public Land's Center for Land and Water  
<http://www.tpl.org/georgia-advisory-council>

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**Long Term Goals, Short Term Goals, and Milestones (In no particular order):**

**Long Term Goal 1:** Initiate and fund Healthy Watershed Initiative Program within the Georgia GAEPD Nonpoint Source Program as funding allows.

**Short Term Goal 1.1:** Attempt to develop at least one Healthy Watershed Initiative Plan, using USEPA Key Components.

**Milestone 1.1.1:** Documentation of attempt or contract of HWI project in Annual Report to USEPA.

**Long Term Goal 2:** Once the Watershed Prioritization and Evaluation Project is successfully created for the State, create a framework to identify and document potential priority areas for HWI conservation and restoration programs, as resource allow.

**Short Term Goal 2.1:** Utilize State-wide Technical Steering Group to create a framework to identify and prioritize areas for HWI conservation and restoration programs. Members will be made up of Federal, State, and local partners.

**Milestone 2.1.1:** Documentation of priority areas in Annual Report to USEPA.

**Long Term Goal 3:** As staffing allows, implement Healthy Watershed Initiative Plans or other conservation plans.

**Short Term Goal 3.1:** Attempt to implement conservation and restoration BMPs documented in at least one (1) Healthy Watershed Initiative Plan or other conservation plan per year.

**Milestone 3.1.1:** Documentation of attempt or contract of HWI project in Annual Report to USEPA

**Long Term Goal 4:** Assist in revision of the Georgia State Wildlife Action Plan as time permits.

**Short Term Goal 4.1:** Georgia DNR Wildlife Resources Division along with Federal, State, Local, and private organizations will revise the Georgia Wildlife Action Plan. Georgia. Georgia GAEPD will participate on the Technical committee regarding priority HWI watersheds and other conservation projects.

**Milestone 4.1.1:** Participation on committee.

## **Overview- Safe Dams**

Georgia's Safe Dams Program began after the failure of the Kelly Barnes Lake Dam near Toccoa, Georgia on November 6, 1977. This dam failure resulted in 39 deaths and enormous property damage. In 1978, the Georgia General Assembly passed the Safe Dams Act. This Act provides for an inventory and classification system of all the dams in Georgia, and an inspection and permitting system.

## **Key Issues**

The Safe Dams Program regulates dams that if they were to fail would result in a probable loss of life. These dams are classified as Category I structures. Category II structures are those where a failure would likely not result in a loss of life situation if the dam were to fail. Category II dams are not regulated by the Safe Dams Act, however, they are re-inventoried every 5 years to see if new development in the downstream dam failure inundation area warrants changing the classification of the dam. Structures which are less than 6 feet tall, or which would impound less than 15 acre-feet of water if filled to the top of the dam, and structures which are both less than 25 feet tall and could impound less than 100 acre-feet of water are exempt, and are not legally considered dams. Classifiers conduct on-site inspections as well as reviewing other site information before making a determination of a dam's classification. If a dam meets the Act's definition of a dam and the classifier does not observe any structure in the potential breach zone, then the dam is classified as Category II. If any structure appears to be located in the breach zone of the dam, then the dam is evaluated by a staff engineer to determine if the dam is Category I or Category II.

Category I dams are required to meet certain design standards and be permitted by the Safe Dams Program. A compliance assessment report is developed when a dam's classification is rotated from Category II to Category I. The dam owner must submit plans addressing items from the compliance report to bring the dam into compliance. Owners of proposed dams must submit plans to be reviewed by the Safe Dams Program. Upon approval of the plans, a permit is issued for the construction and operation of the dam. Plans are also reviewed for any rehabilitation work on existing Category I dams. As a part of the review of these plans, the sediment and erosion control measures to be implemented are reviewed for adequacy. Category I dams also are inspected annually to ensure that the dam is being properly maintained, and that no serious safety issues have arisen.

## **Resources Available**

The Safe Dams Program does not currently have responsibilities directly related to NPDES. However, personnel could be cross-trained to identify and report nonpoint pollution discharges they see as they inspect and inventory the many dams throughout the State. The Safe Dams Program has identified in excess of 4,100 dams.

The Safe Dams Program regulates several of the coal ash ponds in the State. The staff is working with the power companies that own these coal ash ponds to prioritize which dams should be regulated. Additionally, a process is underway for many of the coal ash ponds to be taken out of service. It is estimated that over the next seven years somewhere around 15 coal ash ponds will be taken out of service. The program staff will be working with the power companies to ensure the ponds are eliminated in an environmentally safe process.

## **Key Partners**

- Association of Safe Dam Safety Officials
- FEMA National Dam Safety Program

- State Soil and Water Conservation Commission
- Natural Resources Conservation Service
- GAEPD Nonpoint Source Program

### **Education**

Since there is not a specific track for dam safety at any university, it is imperative that staff receive training through on site interaction and courses and seminars. The National Dam Safety grant provides funding to support the effort to send staff to various training. The following is a summary of some of the training available. It is anticipated that staff will be sent to most of the following.

- ASDSO annual conference
- ASDSO Southeast Regional Conference (held every third year)
- Three technical seminars per year on topics related to dam safety (e.g. Slope Stability, Dam Failures and Lessons Learned, Inspections and Assessments).

Additionally, staff will attend training on sediment and erosion control measures as presented by the State Soil and Water Conservation Commission.

The program also finds it very beneficial to educate the dam owners. Since 2010, the program has hosted five dam owner workshops with a total of over 200 owners attending. The program intends to host another workshop for dam owners in 2014 with two in 2015 and two more in 2016.

### **Funding**

- State Dam Safety Assistance Grants – FEMA <http://www.fema.gov/grant-assistance-States>

### **Long Term Goals, Short Term Goals, and Milestones (In no particular order):**

**Long Term Goal 1:** Initiate nonpoint source cross-training of Safe Dam personnel to identify and report nonpoint source pollution violations including violations to the Erosion and Sedimentation regulations and stream buffers.

**Short Term Goal 1.1:** Georgia GAEPD will promote nonpoint source cross-training of Safe Dam personnel including erosion and sedimentation certification and stream buffer violation determinations. Each individual Safe Dam employee will attend one cross-training when opportunities occur.

**Milestone 1.1.1:** Each individual Safe Dam employee will attempt to attend at least one cross-training when opportunities occur.



## **Overview- Groundwater**

Georgia has a groundwater protection program that includes wellhead protection planning, dedicated groundwater monitoring staff, computer Geographical Information System (GIS) technology related to groundwater, and a State Geologist. The Georgia GAEPD (GAEPD) also manages the legacy publications of the Georgia Geologic Survey group and makes these documents available for purchase.. Other functional areas of the NPS program that may impact groundwater include Onsite Septic and Disposal Systems (OSDS), greenspace, urban and agriculture. However, the GAEPD has also dedicated specific 319 funding toward targeted groundwater protection.

GAEPD maintains a trend monitoring network for groundwater quality State-wide in Georgia and the overall groundwater quality in Georgia is good. However, there are areas with existing or potential challenges. Two sources of these challenges in groundwater quality are Land Application Systems (LASs) and Animal Feeding Operations (AFOs). In some areas, LAS or AFO-impacted groundwater also may impact surface water, as the groundwater forms stream baseflow. Furthermore, these facilities, if improperly permitted or sited, may directly-impact surface water quality through spills, releases, or other unpermitted discharges.

GAEPD issues permits for the LASs and AFOs located within Georgia as these facilities are not subject to Federal permit requirements for National Pollutant Discharge Elimination System (NPDES) permits. Instead, State operational permits are issued under the authority of State law and rules. Permittees must adhere to their permit requirements, the Georgia Water Quality Control Act (O.C.G.A 12-5-20 et. Seq.), and Georgia Department of Natural Resources Rules (Chapter 391-3-6). The majority of these permitted operations, both LASs and AFOs, can be documented as being in compliance with permit requirements. However, approximately 30% of permitted LASs and AFOs are of undetermined compliance status or they are in non-compliance.

## **Key Issues**

GAEPD has hired a WPB staff Geologist using 319 funding who will conduct activities at these LAS and AFO sites, according to the following goals:

- 1) Assess groundwater contamination at State-permitted LASs and AFOs;
- 2) Assist Watershed Protection Branch (WPB) and District offices in evaluating permit-compliance at LASs and AFOs;
- 3) Create technical guidance on the proper assessment and necessary corrective actions for LASs and AFOs;
- 4) Engage in discourse with the regulated community, to facilitate the implementation of corrective actions for groundwater contamination at LASs and AFOs;
- 5) Perform technical-reviews of monitoring-data submittals from permitted LASs and AFOs; and
- 6) Complete technical-evaluations of Nutrient Management Plan (NMP)-implementation associated with AFOs.

## **Resources Available**

In the future, as GAEPD refines its watershed prioritization tool, the Georgia GAEPD may focus its groundwater-related work on prioritized watersheds. GAEPD could analyze a prioritized watershed using GIS technology, to determine whether the presence of potential pollution sources might warrant additional groundwater focus (e.g. LASs, AFOs, or Sludge Land Application sites). The WPB's staff Geologist will be able to provide assistance on a Statewide

basis, but if funding and resources allow, and if conditions warrant such an investigation, the staff geologist may be able to direct his activities toward the prioritized watersheds.

### **Key Stakeholders**

- Georgia Department of Agriculture (Georgia DoA)
- Georgia Soil and Water Conservation Commission
- Georgia Association of Water Professionals
- Municipalities, industry and agricultural producers (State Permittees)

### **Long Term Goals, Short Term Goals, and Milestones (In no particular order):**

**Long Term Goal 1:** Assess groundwater contamination at State-permitted LASs and and AFOs, as staff time permits.

**Short Term Goal 1.1:** Conduct site visits and assist with compliance inspections.

**Milestone 1.1.1:** Inspect at least 6 facilities per year.

**Long Term Goal 2:** Assist the WPB and District offices in evaluating compliance, as staff time permits.

**Short Term Goal 2.1:** Prepare and/or review memos for enforcement corrective actions, when violations of groundwater standards have been documented;

**Milestone 2.1.1:** Provide a completed corrective action memo within 90 days of the request.

**Long Term Goal 3:** Create technical guidance on the proper assessment and necessary corrective actions for LASs and AFOs;

**Short Term Goal 3.1:** Prepare guidance documentation for internal Georgia GAEPD use

**Milestone 3.1.1:** Completion of a guidance document by end of calendar year 2015.

**Long Term Goal 4:** Perform technical-reviews of monitoring-data submittals from Georgia GAEPD selected permitted facilities as staff time permits.

**Short Term Goal 4.1:** Review groundwater monitoring data submitted by LAS and AFOs

**Milestone 4.1.1:** Annually track corrective action reports for selected facilities for a minimum of 2 years after initiation of corrective action.

**Long Term Goal 5:** Complete technical-evaluations of NMP implementation at AFOs as requested.

**Short Term Goal 5.1:** Conduct technical reviews of permit applications and permit materials, such as NMPs and NMP amendments. Conduct thorough reviews of the groundwater monitoring portions of NMPs.

**Milestone 5.1.1:** Adequacy of memos delivered to the Georgia DoA, for use in permitting process on an as requested basis.

## **Overview- Floodplains**

Flooding is a natural process that forms and maintains floodplains and coastal zones. Periodic flows of water that overtop the banks of a river and that encroach upon coastal areas are the lifeblood of the riparian corridors, marshes, beaches, and other natural areas. Finding the delicate balance between human needs and environmental sustainability is a difficult undertaking. Successful, sustainable flood hazard reduction solutions need to be based on the forces at work in floodplains and coastal zones and also on the resources that these flood-prone areas provide.

The Georgia GAEPD Floodplain Management Unit provides a number of services relating to flood plain management within its watershed boundaries. The Unit's mandate is to reduce risk to life and property, reduce potential social disruption, and protect the environment from naturally occurring flooding and erosion.

The Georgia GAEPD Floodplain Management Unit as a Cooperative Technical Partner (CTP) has partnered with the Federal Emergency Management Agency (FEMA) to produce updated regulatory and non-regulatory flood risk products to help communities better identify, assess, and communicate their vulnerability to flood hazards. The objective of Georgia's Flood M.A.P (Mapping, Assessment & Planning) Program is to revise/update flood insurance maps based on engineering results performed on a watershed basis and incorporate a comprehensive re-study of the coastal flood risks for Georgia's coastal counties. Because of this mapping effort, local officials will have access to more current flood risk information to help make more informed decisions about reducing the community's flood risk, thereby resulting in safer, more resilient communities.

## **Key Issues**

One of the important tasks of Georgia Floodplain Management Unit is to encourage communities to participate The National Flood Insurance Program. NFIP was established with the passage of the National Flood Insurance Act of 1968. The NFIP is a Federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for State and community floodplain management regulations that reduce future flood damages. Over 20,000 communities participate in the Program.

To participate in the NFIP, a community must adopt and enforce floodplain management regulations that meet or exceed the minimum requirements of the Program. These requirements are intended to prevent loss of life and property and reduce taxpayer costs for disaster relief, as well as minimize economic and social hardships that result from flooding

In Georgia, there are 541 communities that participate in the NFIP. There are 102 communities do not participate. Floodplain Management Unit is working with those communities to join the NFIP.

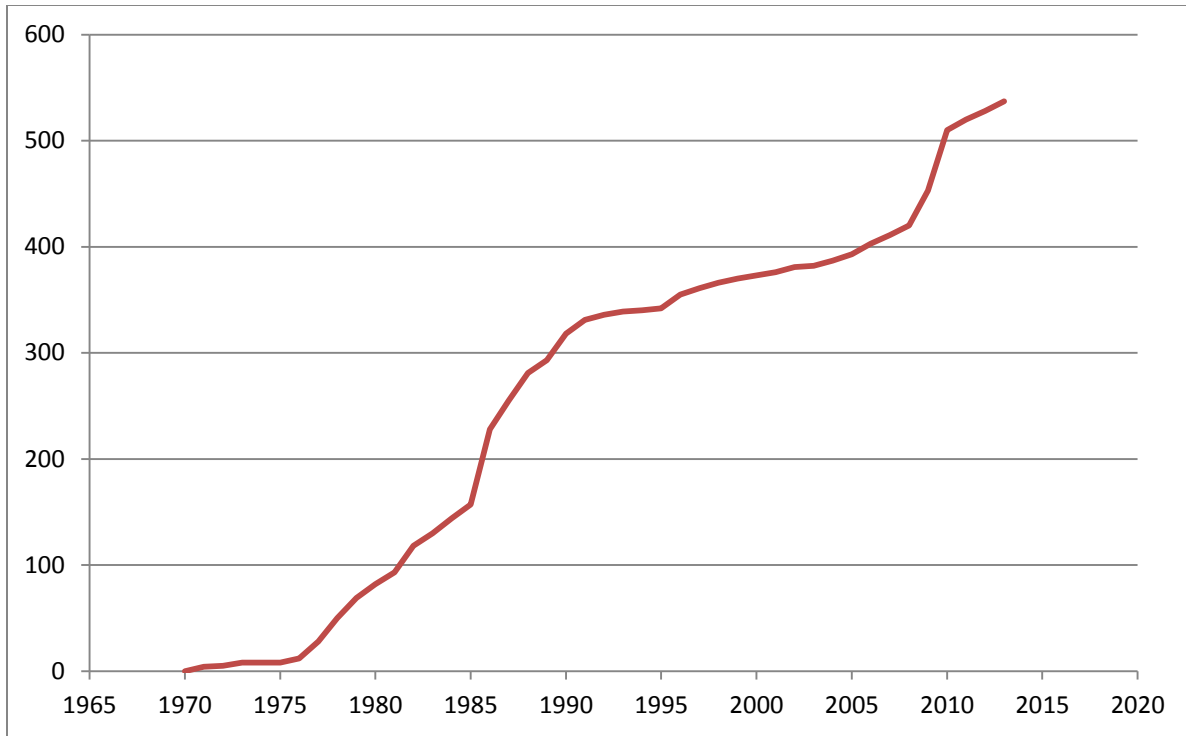


Figure 20: The number of communities (vertical axis) participating in the NFIP since 1970.

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: reduce flood damage to insurable property; strengthen and support the insurance aspects of the NFIP, and encourage a comprehensive approach to floodplain management. The CRS classes for local communities are based on 18 creditable activities, organized under four categories including Public Information, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness. Floodplain Management Unit is one of the best CTPs in the nation in supporting FEMA's NFIP and CRS programs. There are 45 communities participating CRS in Georgia.

### Resources Available

The Floodplain Management Unit (FMU) is not a regulatory entity. Rather the FMU's role is as a facilitator. This effort includes assisting communities to join the NFIP. This assistance includes working closely with the community to complete the NFIP application and to review the community's Flood Damage Prevention Ordinance. The objective of the review is to reduce the processing time at FEMA. After review and revision the FMU will submit the application package to FEMA. FMU maintains a database of applications and submittals and coordinates with FEMA regarding their application processing.

The FMU also coordinates with communities, FEMA and the ISO regarding the Community Rating System. After a given community submits a formal letter of interest in the CRS, FEMA will authorize a Community Assistance Visit (CAV) and a subsequent ISO verification visit. The FMU will coordinate with FEMA and schedule the CAV and handle the logistics. FMU will jointly conduct the CAV with FEMA. Either FEMA or FMU will prepare and

submit the summary letter. A “clean” CAV is prerequisite to a CRS submittal. If the CAV identifies deficiencies in the community’s implementation of the NFIP FMU will work with the community to implement a corrective action plan (CAP).

The majority of FMU’s work is the administration of flood plain mapping contracts. Three engineers are assigned to this effort full time. Much/most of the Unit head’s time is invested in this task.

One person is dedicated to the community assistance program and one person provides general technical assistance and environmental reviews for proposed **Key Partners**

- FEMA Region 4
- FEMA (HQ)
- Georgia Emergency Management Agency (GEMA)
- U.S. Army Corps of Engineers Savannah and Mobile Districts
- Silver Jackets
- Georgia Association of Floodplain Management
- Mapping contractors
- Association of State Floodplain Managers.
- Community officials throughout Georgia
- Georgia Dept of Community Affairs (DCA)
- GAEPD Nonpoint Source Program

#### **Education / Outreach**

- FMU conducts extensive and intensive outreach activities.
- PMCC meetings with elected officials and the general public. These meetings occur when the Preliminary Flood maps are published for a given community.
- Resilience meetings – A RM is held in each community as an element of a flood mapping project.
- FMU planned and implemented the class E-273, “Managing Floodplain Development through the National Flood Insurance Program”. This course was held over a week in early May at the Georgia Public Safety Training Center in Forsyth Georgia. FMU has offered this course at least once a year. A second E-273 class is planned for this fall near Augusta or the Coast.
- Best practices: Greenspace and flood protection guidebook posted in the Guidance for local officials on the Georgia Flood M.A.P. site. <http://www.georgiadfirm.com/>
- Conduct Watershed Discovery Meetings.
- Conduct Non-regulatory product overviews.
- Present Flood Risk Open Houses.
- Ongoing technical assistance to Georgia residents, business, and local governments concerning identifying and reducing flood risks.
- Provide technical assistance with ordinance enforcement, review, and revision.
- Provide floodplain determinations for educational facility projects.
- Provide comments concerning flood risk and floodplain management issues for Executive Order 12372 reviews and similar requests.
- Early coordination and environmental reviews for transportation projects pursuant to Executive Order 11988.
- Make presentations concerning natural and beneficial functions of floodplains to stakeholders such as Georgia Municipal Association, civic groups, K – 12 schools (career day, Earth Day, Geology Week), Hurricane Expos.
- Georgia Association of City and County Managers
- Georgia Association of Regional Commissions



- Georgia Association of Realtors
- Flood Policy and Planning: Education and Outreach Workshop. Carl Vinson Institute of Government, Georgia Sea Grant, Univ. of Georgia Sea Grant Svcs.
- [www.GeorgiaDFIRM.com](http://www.GeorgiaDFIRM.com) Flood map viewer.

### **Funding**

The two major outside sources of funds are:

1. CTP Risk MAP grants
2. CAP-SSSE Community Assistance grant. The FY 2014 grant was approximately \$140k

### **Long Term Goals, Short Term Goals, and Milestones (In no particular order):**

**Long Term Goal 1:** Continue administering and signing up new communities under NFIP

**Short Term Goal 1.1:** Georgia GAEPD will sign up at least 20 communities for the NFIP over the next 5 years.

**Milestone 1.1.1:** At least 20 communities signed up and documented in Annual (Quarterly) Report to FEMA

**Long Term Goal 2:** Conduct outreach meetings to Elected Government Officials to promote joining the NFIP and CRS

**Short Term Goal 2.1:** Georgia GAEPD will host meetings promoting the NFIP and CRS over the next 5 years

**Milestone 3.1.1:** At least 25 meetings hosted and documented.

**Long Term Goal 3:** Conduct Preliminary “Open House” Meetings with information tables to promote the NFIP and CRS directly to general public.

**Short Term Goal 3.1:** Georgia GAEPD will host “Open House” meetings promoting the NFIP and CRS over the next 5 years

**Milestone 3.1.1:** At least 25 meetings hosted and documented.

**Long Term Goal 4:** Promote the GEMA Severe Repetitive Loss Pilot Program to NFIP communities

**Short Term Goal 4.1:** Georgia GAEPD act as liaison and promote the GEMA Severe Repetitive Loss Pilot Program to NFIP communities with repetitive, flood damaged structures.

**Milestone 4.1.1:** All eligible NFIP Communities that contact Georgia GAEPD will be connected to the GEMA Severe Repetitive Loss Pilot Program.

## KEY COMPONENTS

1. The state program contains explicit short and long term goals, objectives and strategies to restore and protect surface water and ground water, as appropriate.

Statewide Milestones are the goals and objectives of the whole Georgia's Nonpoint Source Management Program, including the Seton 319(h) Grant. These State Goals are tracked and reported to USEPA in Georgia's NPS Annual Report. All sections of Georgia's 2014 NPS plan will contribute to meeting these Statewide Milestones.

<b>Statewide Milestones for Water Quality Improvement</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
<b>Water Quality Improvements From Nonpoint Source Controls</b>					
<b><u>Number of stream segments meeting designated use on Georgia's biannual 303(b) 305(d) list of waters:</u></b> Identify the number of streams meeting water quality standards and take appropriate actions to protect these waters.	-	1,000	-	1,030	-
<b><u>Additional number of stream segments meeting for one or more water quality standard on Georgia's biannual 303(b) 305(d) list of waters:</u></b> Identify the number of stream segments meeting one or more water quality standards and take appropriate actions to protect these waters	-	30	-	40	-
<b>Interim Progress Toward Restored Water Quality and Hydrology</b>					
<b><u>Number of water bodies identified in Georgia's 2000 303(d)/305(b) list of impaired waters or subsequent years as being primarily NPS impaired that are partially or fully restored (WQ-10):</u></b> Identify fully restored water bodies primarily impaired by NPS pollutants; review NPS related activities in watershed where water body was restored; write NPS success story	1	1	1	1	1
<b><u>Number of water bodies where in-stream concentrations of NPS parameters have been reduced (i.e. sediment, fecal coliform, and bacteria) (SP-12):</u></b> Annually review water quality data for data trends indicating reductions in sediment, fecal coliform bacteria and nutrients as a result of NPS activities; write NPS success story;	1	1	1	1	1
<b><u>Percentage of TMDL or WMP recommended BMPs implemented:</u></b> Implementing target percentage of recommended BMPs for each grant project implementing specific WMPs that meet EPA's nine elements.	50%	50%	50%	50%	50%
<b><u>Percentage of landowners in a watershed cooperating in the program by implementing targeted water quality practices:</u></b> Meeting landowner percentage cooperation goals for each grant project implementing WMPs that meet EPA's nine elements.	60%	60%	60%	60%	60%
<b>Statewide Milestones for Water Quality Improvement</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
<b><u>Tracking ambient water quality vs. stream water quality standards for Nitrogen, Phosphorus, Fecal Coliform, Dissolved Oxygen, and Biota:</u></b> Number of streams where water quality data were collected by Adopt-	50	50	50	50	50

a-Stream or GAEPD for use in meeting watershed based WQ targets.					
<b>Tracking target trophic status in lakes and estuaries:</b> Produce waterbody reports documenting trophic status in Georgia lakes and estuaries.	On-going	Report ; On-going	On-going	Report ; On-going	On-going
<b>Green infrastructure within watersheds:</b> Target number of grant projects implementing green infrastructure BMPs.	1	1	1	1	1
<b>Protection of High Quality Waters</b>					
<b>Attain specific load reduction or maintenance goals in protection oriented plans covering healthy watersheds:</b> Attaining specific load reduction goals (Nitrogen, Phosphorus, Sediment, Fecal Coliform) for grant projects implementing Healthy Watershed Initiative WMPs that meet EPA's nine elements.	1	-	1	-	1
<b>Number and type of BMPs implemented at critical areas:</b> Tracking the number and type of BMPs grant projects implemented in concurrence with Healthy Watershed Initiative WMPs that meet EPA's nine elements.	1	-	1	-	1
<b>Nonpoint Source Pollutant Load reduction</b>					
<b>Estimated annual reductions in thousands of pounds of nitrogen from NPS to water bodies (from Section 319 funded projects) (WQ-9a):</b> Annually review information from NPS staff and project stakeholders for NPS load reductions of nitrogen; and include information in NPS annual report and GRTS.	200	200	200	200	200
<b>Estimated annual reductions in thousands of pounds of phosphorus from NPS to water bodies (from Section 319 funded projects) (WQ-9a):</b> Annually review information from NPS staff and project stakeholders for NPS load reductions of phosphorus; and include information in NPS annual report and GRTS.	30	35	35	35	35
<b>Estimated annual reductions in hundreds of tons of sediment from NPS to water bodies (from Section 319 funded projects) (WQ-9a):</b> Annually review information from NPS staff and project stakeholders for NPS load reductions of sediment; and include information in NPS annual report and GRTS.	8	8	8	8	8
<b>Implementation of Nonpoint Source Controls</b>					
<b>Develop plan for Prioritization of TMDL development per the EPA303(d)/305(b) visioning process:</b> Plan for prioritizing TMDL or alternative development. This plan will be coordinated with the nonpoint source program's prioritization.	Plan	-	-	-	-
<b>Number of TMDLs or alternative plans developed for impaired watersheds:</b> Developing TMDLs or alternatives (ie 5R or WMP) for impaired waters	1	1	1	1	1
<b>Number of Lakes with Nutrient Criteria where none previously existed:</b> Number of lakes where new standards are developed per <a href="#">"Georgia's Plan for the Adoption of Water Quality Standards for</a>	-	-	-	-	15

<a href="#">Nutrients</a>					
<b>Statewide Milestones for Water Quality Improvement</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
<b><u>Statistically based survey of implementation rates:</u></b> Conduct the Biennial Silviculture and Agricultural NPS compliance and implementation survey.	1	1	1	1	1
<b>Public Education, Awareness, and Action</b>					
<b><u>Participation rates in citizen monitoring activities:</u></b> Maintain a database of Georgia Adopt A Stream participating volunteers to determine number of active monitoring sites annually.	300	300	300	300	300
<b><u>Participation rates in public awareness and education efforts:</u></b> Maintain a database of RiversAlive volunteers to determine number of active participants annually.	24000	24000	24000	24000	24000
<b><u>Calculate and track a “measure of local interest” to assess the geographic diversity and productivity of local watershed groups:</u></b> Maintain a database of Georgia Adopt A Stream participating volunteers to track productivity and diversity of local watershed groups. Number of active watershed groups annually.	150	150	150	150	150
<b>Program Measures of Success</b>					
<b><u>Track number and diversity of partners in statewide NPS plan:</u></b> Use Nonpoint Source Plan tracking form to annually track the number and diversity of partners participating in Statewide NPS plan goals.	5	5	5	5	5
<b><u>Track number and diversity of partners in watershed project implementation:</u></b> Use Grants Reporting and Tracking System to annually track the number and diversity of partners participating in watershed project implementation.	15	15	15	15	15
<b><u>Number of new nine element watershed based plans reviewed and accepted for funding:</u></b> Nine element watershed based plans, WMP, developed by NPS plan partners and reviewed and accepted by GAEPD or USEPA.	1	-	1	-	1
<b><u>Progress in reducing unliquidated obligations (ULO):</u></b> Percentage of ULO funds anticipated yearly GAEPD (total remaining funds/total awarded = percentage ULO).	25%	24%	23%	20%	19%

**2. The state strengthens its working partnerships and linkages to appropriate state, interstate, tribal, regional, and local entities (including conservation districts), private sector groups, citizens groups, and federal agencies.**

This revision of the State’s *Nonpoint Source Management Program* was developed through a consultation process, incorporating input from a wide range of stakeholders involved in nonpoint source management activities throughout the State. Effective nonpoint source pollution management requires cooperative partnerships between layers of government, private non-governmental organizations and the general public. Nonpoint source pollution management in Georgia has continued to evolve - in order to encourage and support these partnerships, the GAEPD maintains active in partnerships with State, Federal, Regional, and local organizations.

The Georgia Environmental Protection Division (GAEPD) is responsible for administering and enforcing laws to protect the waters of the State, defined to include surface and groundwater. Consequently, the GAEPD has been designated as the administering or lead agency for implementing the State's *Nonpoint Source Management Program*. Regulatory responsibilities include establishing water quality use classifications and standards, assessing and reporting on water quality conditions, issuing point source discharge permits, issuing surface and groundwater withdrawal permits, and regulating land-disturbing activities. These regulatory programs are complemented by non-regulatory programs, including the Section 319 Nonpoint Source Implementation Grant Program, Clean Water State Revolving Fund, Georgia Project WET (Water Education for Teachers) Program, and the Georgia Adopt-A-Stream Program.

State agencies are essential partners in efforts to implement the State's *Nonpoint Source Management Program* and include the Coastal Resources Division (CRD), Wildlife Resource Division (WRD) within the Georgia Department of Natural Resource; Department of Community Affairs (DCA); Department Public Health (DPH); and the Georgia Environmental Facilities Authority (GEFA). The GAEPD and CRD are developing and implementing the State's *Coastal Nonpoint Source Management Program*.

The Georgia Soil and Water Conservation Commission (GSWCC) has been designated by the GAEPD as the lead agency for implementing the agricultural component of the State's *Nonpoint Source Management Program*. Similarly, the Georgia Forestry Commission (GFC) has been designated by the GAEPD as the lead agency for implementing the silvicultural component of the State's *Nonpoint Source Management Program*. In addition, a Memorandum of Understanding between the U.S. Forest Service, GFC and the GAEPD, identifies the responsibilities of the participating agencies in implementing the State's *Nonpoint Source Management Program* as related to activities in the Chattahoochee and Oconee National Forest. Numerous State and Federal agencies and private, non- governmental organizations continuing to cooperate with the GAEPD, GSWCC and the GFC include: USDA Natural Resources Conservation Service, Georgia Farm Bureau, Georgia Forestry Association, Georgia Agribusiness Council, University of Georgia and the Georgia Department of Agriculture. Existing non-regulatory programs established for agriculture and silviculture have proven to be valuable.

As with other activities, the State's *Nonpoint Source Management Program* will be implemented in conjunction with the State's 2004 Comprehensive State-wide Water Management Planning Act. A key element of the State Water Plan was the creation of ten new water-planning regions in the State, with borders approximating river basin boundaries or aquifer boundaries. In each planning region, a regional water council of 25 local residents was appointed by the Governor, Lieutenant Governor, and Speaker of the House. Council members typically are local government officials, industry representatives, farmers, and engaged citizens. Each of the ten regional planning councils developed a plan form managing and protecting the waters in their individual councils while coordinating with hydrologically connected neighboring councils. Each council reconvenes every five years and reviews and updates their regional plan.

This revision of the State's *Nonpoint Source Management Program* established new partnerships and strengthened existing partnerships in the development and implementation of nonpoint source strategies. A full list of partners can be found in Appendix B of this document.

**3. The state uses a combination of statewide programs and on-the-ground projects to achieve water quality benefits; efforts are well-integrated with other relevant state and**



## **federal programs.**

GAEPD has developed an effective split of efforts between supporting state-wide program-related activities and implementing on-the-ground projects directed by nine-element watershed-based plans. While funding may vary each year, the split is 50:50 between program and project funds in compliance with EPA Guidelines.

GAEPD initially identified NPS water quality problems such as low dissolved oxygen, high turbidity and high bacterial counts as in-stream indicators to track progress in NPS implementation. GAEPD's ambient water monitoring staff and a contract with the US Geologic Survey assisted the TMDL program in identifying sources of NPS pollution. Demonstration projects and educational programs were developed to address specific NPS issues. Once cooperating agencies and the public were engaged in routine meetings on NPS concerns, then key practices were implemented.

The results of these watershed activities have been highlighted in the NPS Annual Reports and other forms of documentation to USEPA. This process continues to be utilized and refined to target problem areas in the watershed for BMP implementation. Georgia's biannual 303(d)/305(b) list of waters continued to document water quality improvement and delisting as a result of NPS program implementation.

### **4. The state program describes how resources will be allocated between (a) abating known water quality impairments from NPS pollution and (b) protecting threatened and high quality waters from significant threats caused by present and future NPS impacts.**

The majority of project funds are typically directed toward the restoration of impaired waters. GAEPD has committed to attempt to fund a Healthy Watershed Initiative each year.

The control of dominant point source problems has allowed the Georgia Environmental Protection Division to place increasing emphasis on the prevention, control and abatement of nonpoint sources of pollution. This revision of the State's *Nonpoint Source Management Program* presents stakeholders with exciting opportunities to solve the remaining nonpoint source pollution problems as well as to sustain good water quality.

The *Nonpoint Source Management Program* combines regulatory and non-regulatory approaches, in cooperation with other State and Federal agencies, local and regional governments, State colleges and universities, businesses and industries, private non-governmental organizations and individual citizens. This document represents a revision of the State's *Nonpoint Source Management Program*.

The State's *Nonpoint Source Management Program* identifies seven statewide functional areas of nonpoint sources of pollution as determined by combining; Georgia's Land use; NPS related TMDL streams; and the most pervasive NPS pollutants on the 303(d) list. The resulting functional areas are: *Silviculture, Agriculture, Wetlands, Urban, Dirt Roads, Coastal, and Surface Mining*.

Each functional area in the State's *Nonpoint Source Management Program* calls for or describes the framework or process for stakeholder coordination within that functional area and serves to implement a strategy for employing effective management measures (BMPS) and programs to control nonpoint source pollution statewide.

Although impaired waters still have a higher priority for resource allocations, a new national initiative, Healthy Watershed Initiative (HWI), may provide additional resources for protection of high quality waters. The intent of the HWI is to place equal emphasis on healthy waters as is placed on impaired waters. This will prevent these high quality waters from becoming impaired and encourage protective measures to be implemented in healthy watersheds.

**5. The state program identifies waters and watersheds impaired by NPS pollution as well as priority unimpaired waters for protection. The state establishes a process to assign priority and to progressively address identified watersheds by conducting more detailed watershed assessments, developing watershed-based plans and implementing the plans.**

The biennial reports, *Water Quality in Georgia* - as required by Section 305(b) of the Federal Clean Water Act, serve as the current process for updating the *Nonpoint Source Assessment Report*. Current nonpoint source pollution impacts are presented in the most recent report, *Water Quality in Georgia 2012 - 2014*.

For this revision of Georgia's *Nonpoint Source Management Program*, GAEPD developed a procedure to prioritize and evaluate watersheds or sub-watersheds using models and tools developed for the *Water Quality Resource Assessment* as part of the Georgia Comprehensive State-wide Water Management Plan. The prioritization was done based on specific parameters, including Dissolved Oxygen (DO), Total Nitrogen (TN), Total Phosphorus (TP), and Fecal Coliform (FC).

Nonpoint Source Grant fund priority will be given to projects which implement a comprehensive watershed management plan in an identified priority watershed to alleviate the criterion violations identified in the Section 305(b) and Section 303(d) lists of waters which are not supporting designated or beneficial use due to nonpoint sources of pollution.

In addition, special provisions have been established which require local governments to conduct watershed assessments prior to receiving an environmental permit from the State that facilitates growth and development, such as a wastewater permit or a water withdrawal permit.

The watershed assessment must address the entire service area managed by the local authority and include the following information: identification of and relative contribution of point and nonpoint sources of pollution; identification of measurable environmental and programmatic goals; and identification of pollution controls and natural restoration measures required to achieve clean water and other natural resource goals.

Project funds will be applied to watersheds identified by GAEPD using the following:

- 1) Using the methodology identified in the "Nonpoint Source Pollution Plan – Watershed Prioritization Tool" section of Georgia's Statewide NPS Plan. GAEPD will use modeling data to select a preliminary list of potential watersheds. These watersheds will be "low hanging fruit" for restoration of water quality impairments.
- 2) The preliminary list will be coordinated with CWA Section 303(d) "long-term vision for assessment, restoration, and protection..." The framework for the 303(d) prioritization list matches up with the 319(h) prioritization in several ways:

- a. "Identify the extent of impaired and healthy water in Georgia's priority watershed or waters through site-specific assessments."
  - b. "In addition to the traditional TMDL development priorities and schedules for waters in need of restoration, Georgia is to identify protection planning priorities and approaches along with schedules to help prevent impairments in healthy waters, in a manner consistent with Georgia's systematic prioritization."
  - c. "Georgia can use alternative approaches, in addition to TDMLs, that incorporate adaptive management and are tailored to specific circumstances where such approaches are better suited to implement priority watersheds or water actions that achieve the water goals Georgia, including identifying and reducing nonpoint sources of pollution."
  - d. "Georgia will actively engage the public and other stakeholders to improve and protect water quality, as demonstrated by documents, inclusive, transparent and consistent communication; requesting and sharing feedback on proposed approaches; and enhanced understanding of program objectives."
  - e. "Georgia and EPA will identify and coordinate implementation of key point source and nonpoint source control actions that foster effective integration across CWA programs, other statutory programs, and the water quality efforts of other Federal departments and agencies to achieve the water quality goals of Georgia."
  - f. Integration of the work of the Watershed Planning and Monitoring in setting TMDLS and standards more closely with the implementation work of the nonpoint source program.
- 3) GAEPD will narrow the list of potential watersheds using the framework established under the 303(d) long-term vision. Watersheds will need to have local stockholders, limited or addressed point sources of pollution (via the regulatory process), and a watershed based management plan that meets EPA's nine key elements.
  - 4) Additionally GAEPD will consider adding watersheds of concern to the list of prioritized watersheds. Watersheds of concern may not have a listed impairment in Georgia, but would be listed in a neighboring State's receiving waters.
  - 5) This final list of prioritized watersheds will be a limiting factor in projects implemented with CWA funds by GAEPD.

Program funds will be used to identify, target and manage the implantation of WMPs in priority watersheds. Program funds will not be limited to priority watersheds, but they will be focused towards them when applicable.

**6. The state implements all program components required by section 319(b) of the Clean Water Act, and establishes strategic approaches and adaptive management to achieve and maintain water quality standards as expeditiously as practicable. The state reviews and upgrades program components as appropriate. The state program includes a mix of regulatory, nonregulatory, financial and technical assistance, as needed.**

The State's *Nonpoint Source Management Program* combines regulatory and non-regulatory approaches, in cooperation with other State and Federal agencies, local and regional governments, State colleges and universities, business and industry, private non-governmental organizations and individual citizens. This revision delineates the short- and long-term goals

and implementation strategies. Just as important, it is also designed to be an informative resource for the wide range of stakeholders across the State who are involved in the prevention, control and abatement of nonpoint sources of pollution.

Traditional nonpoint source control mechanisms in Georgia include voluntary and technical assistance programs that emphasize voluntary best management practices - especially in agriculture and silviculture. Georgia, even though leading with non-regulatory strategies, has recourse to enforcement tools for some nonpoint sources pollution problems. While enforcement mechanisms are not the primary instrument used to address nonpoint source pollution, they are increasingly used to complement other mechanisms.

The “319 Grants” section of Georgia’s Statewide Nonpoint Source Management Plan details processes and strategic approaches to adapt the 319 grant program to meet the current NPS issues in Georgia. One such approach is to update the process for how GAEPD selects and awards competitive grant projects to local stakeholders, and focusing projects on priority watersheds.

Several Functional Areas of Georgia’s Statewide Nonpoint Source Management Plan provides a strategic approach to upgrade that section and the associated NPS issues. The Agriculture and Urban FAs are an example of the State’s strategic approach.

#### **7. The state manages and implements its NPS management program efficiently and effectively, including necessary financial management.**

In accordance with Section 319(b)(2)(F), the State reviews Federal financial assistance programs and Federal development projects for their effect on water quality and consistency with the *Georgia Nonpoint Source Management Program*. The State of Georgia has a Federal consistency review process pursuant to Executive Order 12372. Proposals for Federally assisted projects are distributed to the Georgia State Clearinghouse and subsequently forwarded to the appropriate State agency for review and comment in accordance with the State’s project notification and review system. Where appropriate, the State will seek USEPA assistance to help resolve issues.

In accordance with 40 CFR Part 31, §31.50 Closeout, the GAEPD will continue to submit all financial, performance and other reports required as a condition of the grant within 90 after the expiration of the grant

Federal agencies and the GAEPD continue to coordinate efforts through established partnerships - most frequently with the U.S. Department of Agriculture, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, U.S. Forest Service and the U.S. Geologic Survey. For example, the Memorandum of Understanding (MOU) between the U.S. Forest Service (USFS), the Georgia Forestry Commission and the GAEPD identifies the responsibilities and activities of the participating agencies in implementing the *Georgia Nonpoint Source Management Program* as related to activities in the Chattahoochee and Oconee National Forests.

The GAEPD Nonpoint Source Program has introduces several processes to reduce the Unliquidated Obligations (ULOs) for the Section 319(h) Grant program to 20% or below. Currently GAEPDs ULO is 15%. These internal processes have been widely successful and will be maintained for use in the future.



GAEPD as well as USEPA are aware that a States ULO will increase upon receipt of a new grant award. GAEPD is expecting to receive both is FY2014 and FY2015 grant awards with in very close proximity to each other and it is expected this will cause GAEPDs ULO to increase above the 20% threshold. It is GAEPDs desire to reduce the ULO back down below 20% within the next five years.

**8. The state reviews and evaluates its NPS management program using environmental and functional measures of success, and revises its NPS management program at least every five years.**

The last revision of Georgia's Nonpoint source Management Plan was completed in 2000. In subsequent years, GAEPD reviewed the document for consistency with current goals. This new document is intended to be a new revision to the plan. Consistent with new EPA Section 319 Guidance, GAEPD intends to review periodically and revise this document, as necessary, with the interval between revisions being a maximum of 5 years,

In accordance with Section 319(11), Reporting and Other Requirements, the GAEPD submits an annual report to the USEPA concerning its progress in meeting the *Nonpoint Source Management Program* milestones, reductions in nonpoint source pollution and improvements in water quality (*to the extent that appropriate information is available*)



Figure 21: *Heal the World*, by Eon Justin Hatter, 2000 River of Words National Grant Prize, Avondale High



# **NONPOINT SOURCE POLLUTION PLAN – WATERSHED PRIORITIZATION TOOL**

## **Introduction**

This is a report documenting the development of a procedure to prioritize and evaluate watersheds or subwatersheds using models and tools developed for the Water Quality Resource Assessment produced by Tetra Tech on behalf of GAEPD.

The prioritization was done based on specific parameters, including Biological Oxygen Demand (BOD), Total Nitrogen (TN), Total Phosphorus (TP), and Total Suspended Solids (TSS). BOD serves as an indicator for Dissolved Oxygen (DO) and TSS serves as an indicator for fecal coliform (FC) where there isn't a concentrated bacteria source such as an animal processor. The Satilla River Watershed was used as a case study to develop the procedure. A rainfall-runoff watershed model for the Satilla River Watershed was utilized to assist with non-point source management planning efforts.

It was determined that the watershed models and other tools developed for the Water Quality Resource Assessment as part of the Georgia Comprehensive State-wide Water Management Plan would provide useful information for inclusion into this plan. The results from these models were used to assist state and local entities within the 11 water planning regions in the development of plans for future assimilative capacity needs. These watershed models were also extremely useful in addressing a variety of other water quality issues, including, but not limited to, waste load allocations, land use change, non-point source loading estimates, wetland evaluations, and water quality standard evaluation and development. By incorporating these already developed and calibrated models GAEPD would help bridge the gap between different programs in the Watershed Protection Branch: NonPoint Source Program (NPSP), Watershed Planning and Monitoring Program (WPMP), and Water Supply Program (WSP).

## **Satilla River Watershed - *Model Set-up and Calibration***

The Satilla River Watershed is composed primarily of the Satilla River, Little Satilla River, and Turtle River. Some of the major waterways in the watershed include the Alabama River, Seventeen Mile Creek, and Hurricane Creek. The largest cities located in the basin are Waycross, Brunswick, and Douglas. In the northwestern portion of the watershed are the headwaters (the most extreme upstream areas of a watershed) of the Satilla River and the Little Satilla River. Little Satilla River connects to the Satilla River, which flows southeast and empties into the Atlantic Ocean (Tetra Tech 2014).

The Loading Simulation Program C++ (LSPC) was used to represent the hydrological and water quality conditions in the Satilla River Watershed. The Satilla River Watershed was delineated into 181 subwatersheds to provide appropriate hydrological connectivity and to ensure that observed and simulated comparison locations were at the pour point or most downstream point of the subwatershed stream network. Four Hydrologic Soil Groups (HSGs), namely, A (sandy), B (silty loam), C (sandy clayey loam), and D (clayey) (HSG 2014) were simulated in the Satilla River Watershed model (Tetra Tech 2014).

For the Satilla River Watershed model, 11 precipitation stations were utilized in the hydrologic simulation. One station was a Georgia Automated Environmental Monitoring Network (GAEMN) station. GAEMN stations are maintained and operated by the University of Georgia College of Agricultural and Environmental Sciences. The remaining ten stations were National Climate Data Center (NCDC) stations (Tetra Tech 2014).

The Satilla River Watershed model used land use data as the basis for representing hydrology and nonpoint source loadings. Land use data was provided by the University of Georgia and Georgia Land Use Trends (GLUT) coverage, and included the following 19 class categories: beaches/dunes/mud, open water, utility swaths, developed open space, developed low intensity, developed medium intensity, developed high intensity, clear-cut/sparse, quarries/strip mines, rock outcrop, deciduous forest, evergreen forest, mixed forest, golf courses, pasture, row crop, forested wetland, non-forested wetland (salt/brackish), and non-forested wetland (freshwater). The GLUT coverage represented land use conditions in the year 2008. For the model simulation, similar land use classes were grouped together into reduced modeling units (RMU), e.g., deciduous forest, evergreen forest and mixed forest were grouped together into an RMU called 'forest' (Tetra Tech 2014). Figure 1 shows the spatial coverage of the RMU's for the Satilla River Watershed.

Amendments were made to the GLUT land use in order to incorporate failing septic tanks, agricultural irrigation, and land application systems into the model. The acquired data sets were processed and incorporated as unique land uses. More detailed information on the land use processing can be found in "Watershed Hydrology and Water Quality Modeling Report for the Brunswick Harbor and Satilla River Watersheds, Georgia – REV2" report (Tetra Tech 2014).

The modeling effort only included point sources that were permitted with a discharge of greater than 0.1 MGD. Eighteen point sources were used in the Satilla River Watershed model. Of the eighteen point sources, ten were municipal facilities, seven were industrial, and one was a federal facility. Of the ten municipal facilities, five had discharges greater than 1 MGD. In addition to the NPDES permits, non-failing septic tanks were modeled as small individual point sources for each subwatershed with a total septic flow of 14.2 cfs to the Satilla River Watershed. The model also represented three municipal and industrial water withdrawals, twelve land application systems (LAS) representing about 6,820 acres, and agricultural irrigated areas coverage representing about 81,456 acres.

The statistical and visual summaries for each of the USGS flow gages and GAEPD water quality gages utilized in the Satilla River Watershed model indicated that the hydrology and water quality model performed very well for the intended purpose. More detailed information on the watershed model setup and calibration can be found in "Watershed Hydrology and Water Quality Modeling Report for the Brunswick Harbor and Satilla River Watersheds, Georgia – REV2" report (Tetra Tech 2014).

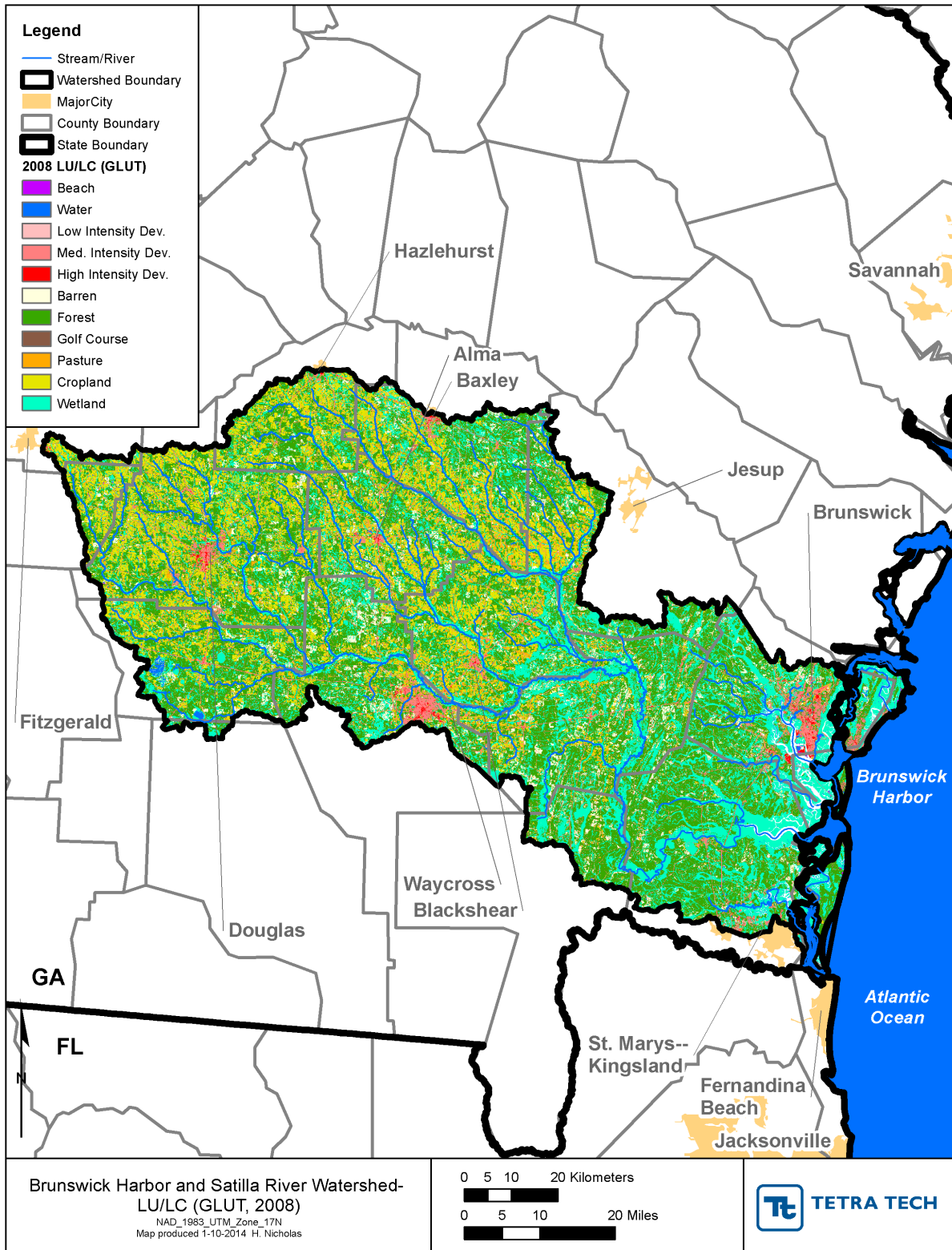


Figure 1 GLUT 2008 Coverage in Reduced Modeling Units of the Satilla River Watershed



## Watershed Prioritization

Watershed prioritization began with identifying the 12 digit Hydrologic Unit Code (HUC-12) watersheds present in the Satilla River Watershed (

Table 1). The 181 subwatersheds from the LSPC model were then grouped together to approximate the HUC-12 watersheds.

Table 1 HUC-12 Watersheds in the Satilla River Watershed

HUC-12 Watershed	HU-12 Watershed Name	HUC-12 Watershed	HU-12 Watershed Name
030701060504	Altamaha Sound-Frontal Atlantic Ocean	030702010904	Mill Branch-Little Hurricane Creek
030702010101	Hunters Creek-Satilla River	030702011001	Bear Branch-Hurricane Creek
030702010102	Sand Hill Branch	030702011002	Briar Creek-Hurricane Creek
030702010103	Wiggins Creek	030702011003	Tan Trough Creek-Alabaha River
030702010104	Little Creek-Satilla River	030702011004	Baxter Branch-Alabaha River
030702010201	Reedy Creek	030702011101	Raulerson Swamp-Satilla River
030702010202	Bear Creek	030702011102	Barbers Creek-Satilla River
030702010203	Indian Creek-Satilla River	030702011103	Upper Buffalo Creek
030702010204	Upper Pudding Creek	030702011104	Lower Buffalo Creek
030702010205	Lower Pudding Creek	030702011105	Baileys Branch-Satilla River
030702010301	Smut Branch-Satilla River	030702011201	White Oak Creek
030702010302	Little Red Bluff Creek	030702011202	Rose Creek-Satilla River
030702010303	Red Bluff Creek	030702020101	Upper Big Satilla Creek
030702010304	Perch Creek	030702020102	Bishop Creek
030702010401	Broxton Creek	030702020103	Bar O Ranch Lake-Big Satilla Creek
030702010402	Halls Creek	030702020104	Big Satilla Creek
030702010403	Rose Creek	030702020201	Upper Sweetwater Creek
030702010404	Twenty Mile Creek	030702020202	Lower Sweetwater Creek
030702010501	Otter Creek	030702020301	Fishing Creek
030702010502	Big Branch-Seventeen Mile River	030702020302	Upper Colemans Creek
030702010503	Twentynine Mile Creek	030702020303	Lower Colemans Creek
030702010504	Cat Creek-Seventeen Mile River	030702020304	Lower Big Satilla Creek
030702010601	Hurricane Creek	030702020401	Keene Bay Branch-Little Satilla Creek
030702010602	Upper Hog Creek	030702020402	Dry Branch-Little Satilla Creek
030702010603	Middle Hog Creek	030702020403	Boggy Creek
030702010604	Lower Hog Creek	030702020404	Reedy Creek
030702010701	Fullwood Creek-Satilla River	030702020501	Sixty Foot Branch
030702010702	Cox Creek-Satilla River	030702020502	Little Satilla River
030702010703	Kettle Creek-Satilla River	030702030101	Little Buffalo Creek
030702010704	Big Creek	030702030102	Turtle River
030702010705	Caney Branch-Satilla River	030702030201	Turtle River-South Brunswick River
030702010801	Burket Creek-Hurricane Creek	030702030203	Mackay River-Frontal Atlantic Ocean
030702010802	Whitehead Creek	030702030301	Laurel Grove Creek-Little Satilla River
030702010803	Little Creek-Hurricane Creek	030702030302	Jointer Creek-Little Satilla River
030702010901	Town Creek-Little Hurricane Creek	030702030401	Brickhill River
030702010902	Little Hurricane Creek	030702030402	Saint Andrew Sound-Frontal Atlantic Ocean
030702010903	Mill Branch	030702030501	Upper Crooked River
		030702030503	Cumberland Sound-Frontal Atlantic Ocean

Precipitation data was used to help select a representative dry, wet, and normal year for the model period. Instead of using a generalized dry, wet, and normal year based on the precipitation patterns for the entire state of Georgia, representative years were evaluated based on the precipitation patterns for the Satilla River Watershed. A total of 11 precipitation stations (the same stations that were used to drive the LSPC simulation) were utilized to represent the magnitude and frequency of rainfall events in the watershed. For each precipitation station, annual precipitation (sum) for the years 1998 through 2012, and average precipitation for the entire time period were computed. Deviations from the mean for each precipitation station were calculated to establish the excesses and deficits of precipitation, per year, per station. As shown in Figure 2, the deviations were plotted in a bar chart to help select representative dry, wet and normal years. The year 2004 recorded the highest positive statistical deviation from the means (exceednce), and the year 2012 recorded the highest negative statistical deviation (deficit) from

the means among the 11 stations. The year 2007 recorded the smallest deviation from zero and was picked as a normal year.

The LSPC model outputs for the three selected years were processed to derive normalized stormflow and baseflow volumes, yearly mass loading and average yearly concentrations for BOD, TN, TP, and TSS delivered to the stream.

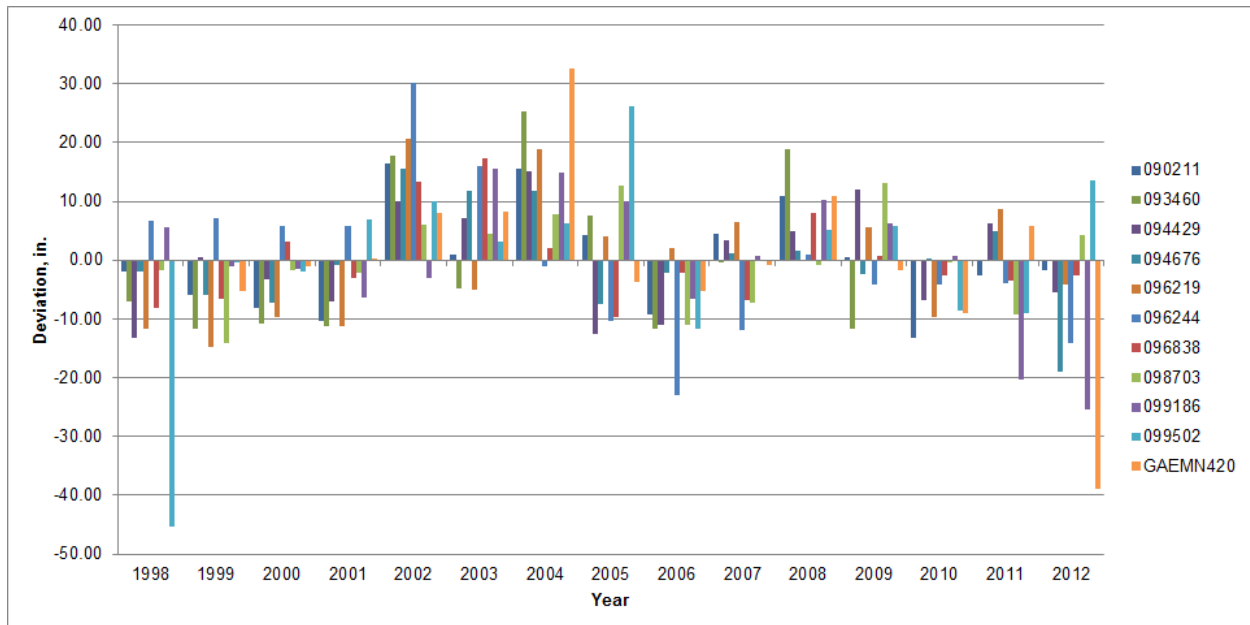


Figure 2 Deviation from the Average Precipitation per station

## Developing Heat Maps

Land inflow loads for the different constituents were retrieved from the calibrated Satilla River Watershed model's output for the 181 subwatersheds delineated in the Satilla River Watershed and were applied to develop the mass loading, concentration, and flow heat maps. The subwatershed loads, flows, and areas were aggregated based on the location of the HUC-12 watersheds. After appropriate unit conversions of the inflow loads, the annual inflow loads in lbs/year were divided by the area of the HUC-12 watershed to get the annual loading in lbs/acre/year. The aggregated land inflow loads for the different constituents were divided by the land inflow rate volume for the individual HUC-12 watershed to get yearly average concentration (mg/L).

Similar to the loads, annual surface water runoff/stormflow and groundwater outflow rate volumes for each subwatershed were processed. The LSPC watershed model simulates three flowpaths; surface flow, interflow (lateral flow through the upper layers of the soil profile above the water table) and groundwater outflow rate volumes. Surface and interflow flow rate volumes were grouped together to represent surface water runoff/stormflows, while the groundwater outflow rate volume was used to represent baseflows. The flow volumes were converted to cfs/year and divided by the area of the HUC-12 watershed to get flow volumes in cfs/acre/year.

The computations were performed for dry, wet, and normal years, for all 75 HUC-12 watersheds, and for all four constituents, BOD, TN, TP, and TSS, as well as flows. Heat maps showing the variation of loading constituents, the variation of concentration condition, and the



volume conditions were created for the representative dry, wet, and normal years. Figure 3 shows an example heat map for the annual TN load for a dry year (2012).

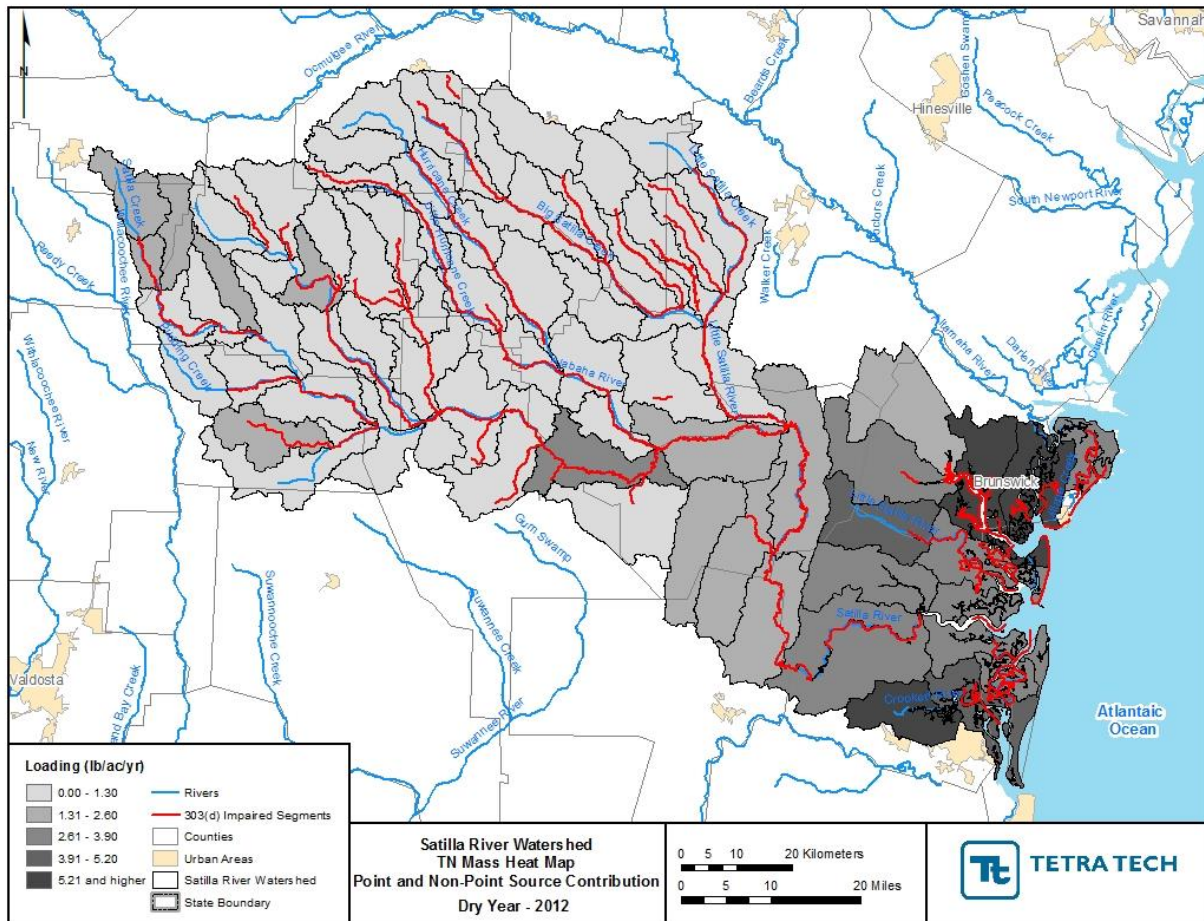


Figure 3 Mass Heat Map for TN for a Dry Year

### ***Determining Priority Watersheds***

The data used to create the heat maps for loads, concentrations and flow volumes for dry, wet and normal years were combined with the 305(b)/303(d) impaired segments in the watershed to determine a list of prioritized watersheds that show a reasonable demarcation of the impaired waterbodies to watershed conditions for loading, flow volume, and concentrations in the Satilla River Watershed. There are several ways in which the watersheds could be prioritized. For this exercise, the highest priority watershed represents the watershed with the highest overall loading, concentration and flow volumes with an identified 303(d) impaired segment. High priority was placed on segments impaired for nutrients/DO/FC.

The determination of the highest priority watershed is a multi-step process and was performed for each HUC-12 watershed in the Satilla River Watershed:

Step 1: Computed loads, concentrations and flows for dry, wet and normal years were individually sorted highest to lowest and ranked from 1 to 75. These ranks were called 'Precipitation Pattern Ranks'.

Step 2: The Precipitation Pattern Ranks were then individually summed at the HUC-12 watershed level by the analysis type (loading, concentration, and flow) and for each constituent

(BOD, TN, TP and TSS). The summed ranks were sorted from lowest to highest and ranked from 1 to 75. These ranks were called 'Analysis Ranks'. A HUC-12 watershed with the lowest Analysis Rank for individual constituents had the highest computed loading/concentration/flow. Step 3: The computed Analysis Ranks for loading, concentration and flow for each constituent were combined. Additionally, a 303(d) weighting factor for the streams within each HUC-12 watershed was applied (as shown in equation below) to develop a list of prioritized watersheds. The 303(d) weighting factors were based on six categories and are listed in **Error! Reference source not found.** The results of this ranking equation were called 'Constituent Ranks'. The Constituent Ranks were further sorted from lowest to highest and ranked from 1 to 75, lowest to highest. This was done for all 75 HUC-12 watersheds and for all four constituents.

$$\text{Constituent Rank} = \{\text{Loading Analysis Rank} + \text{Concentration Analysis Rank} + \text{Flow Analysis Rank}\} * 303(d) \text{ weighting factor}$$

For example, if a HUC-12 watershed has a loading rank of 1, a concentration rank of 18, and a flow rank of 5 with a 303(d) weighting factor of 10 (impaired for more than one constituent), the Constituent Rank would be 240  $((1+18+5)*10)$ .

Table 2 Weighting Factors applied to HUC-12 Watersheds in the Satilla River Watershed

Condition	Weighting Factor
Not supporting- more than one constituents	10
Not Supporting-one constituent	20
Not supporting- PCB's	30
Assessment Pending	40
No impaired segments	50
Supporting	60

Step 4: All four Constituent Ranks were averaged and sorted from lowest to highest. These ranks were then sorted from 1 to 75 and were called the 'Overall Priority Ranks'. Any HUC-12 watershed with the lowest rank had a combination of high loading, high concentration, high flow and the lowest 303(d) weighting factor (impaired for more than one constituent).

The ten lowest Overall Priority Ranks were identified as candidates for the highest priority watershed. From the list of highly prioritized watersheds, watershed planners have the flexibility to select a highest priority watershed based on various criteria. The priority can be based on Constituent Ranks for any constituent, Analysis Rank for any analysis type, or the type of impairment of the impaired segment. For this exercise, the lowest Overall Priority ranked watershed was picked. This highest priority watershed was further analyzed in detail (see Section 4.0 Watershed Evaluation).

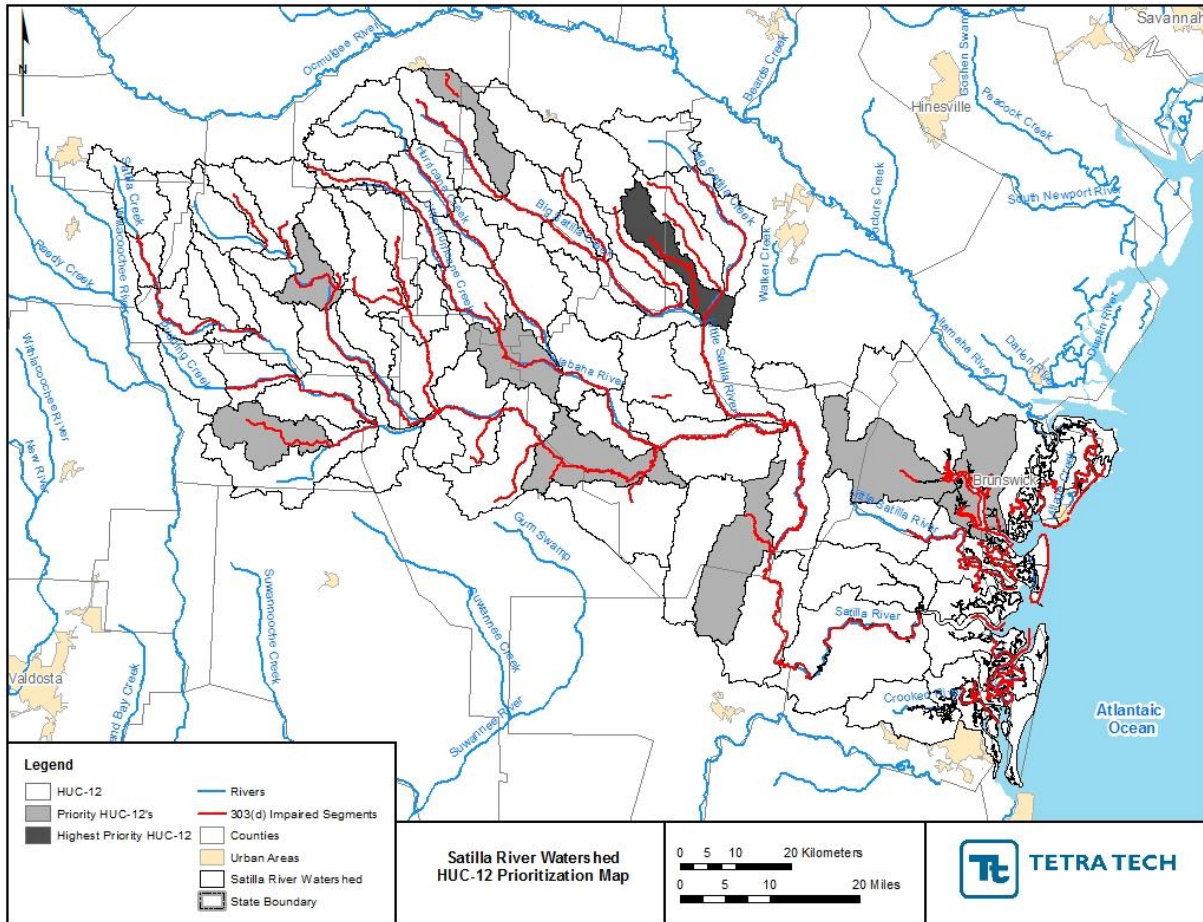


Figure 4 Top 10 Priority Watersheds along with the Highest Priority Watershed in the Satilla River Watershed

### Watershed Evaluation

Once all the HUC-12 watersheds in the Satilla River Watershed were prioritized (highest to lowest), the highest priority watershed, Reedy Creek (HUC-12 030702020404), was analyzed in further detail to provide specific information about the various sources of BOD, TN, TP and TSS contributing to nonpoint source pollution. The figures and tables from this analysis could assist decision makers in the selection of potential BMPs. Depending on the presence of point sources in the highest priority watershed, an evaluation of point source loadings can be carried out as well.

The land use area breakdown of the highest priority HUC-12 is presented in Figure 5 and tabulated in Table 3. The land use loading breakdown of BOD, TN, TP, and TSS loads, and the stormflow and baseflow volumes were calculated and are presented in Figure 6 and **Error! Reference source not found.**7 respectively, and also tabulated in Table . These pie charts help evaluate the land use contributions to the pollution of the streams.

A watershed-specific hydrograph (Figure 8) for the highest priority watershed were also generated.

Table 3 Land Use Area Breakdown of the Highest Priority Watershed in the Satilla River Watershed

Landuse	Area, ac	%
Beach	27	0%
Water	46	0%
Urban-Pervious	2096	6%
Urban-Impervious	340	1%
Barren	2204	6%
Forest	11571	33%
Golf	0	0%
Pasture	1318	4%
Crop	6747	19%
Wetland	8111	23%
LAS	108	0%
FailingSeptic	17	0%
Irrigated Landuse	2055	6%

Table 4 Loading Breakdown of the Highest Priority Watershed in the Satilla River Watershed (annual average loading)

Landuse	BOD		TN		TP		TSS	
	Load, lbs	%	Load, lbs	%	Load, lbs	%	Load, lbs	%
Beach	1,248	0%	774	0%	29	0%	80,839	0%
Water	0	0%	0	0%	0	0%	0	0%
Urban-Pervious	135,036	8%	65,874	10%	4,601	9%	4,363,346	6%
Urban-Impervious	191,446	11%	49,322	7%	9,979	19%	1,560,263	2%
Barren	225,835	13%	79,171	12%	8,160	15%	11,434,051	16%
Forest	163,469	10%	34,531	5%	5,043	9%	10,315,269	15%
Golf	0	0%	0	0%	0	0%	0	0%
Pasture	60,001	4%	44,681	7%	1,629	3%	1,560,491	2%
Crop	455,789	27%	209,464	31%	14,409	27%	25,573,801	36%
Wetland	133,107	8%	35,595	5%	2,157	4%	1,905,594	3%
LAS	8,982	1%	21,636	3%	78	0%	238,280	0%
FailingSeptic	207	0%	180	0%	4	0%	0	0%
Irrigated Landuse	305,076	18%	139,738	21%	7,210	14%	13,683,243	19%



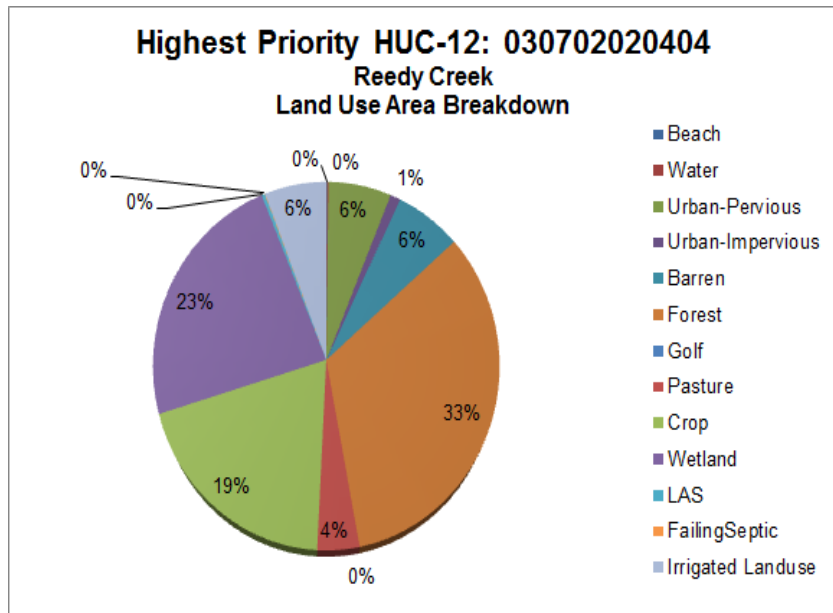


Figure 5 Land Use Area Breakdown of the Highest Priority Watershed: Reedy Creek

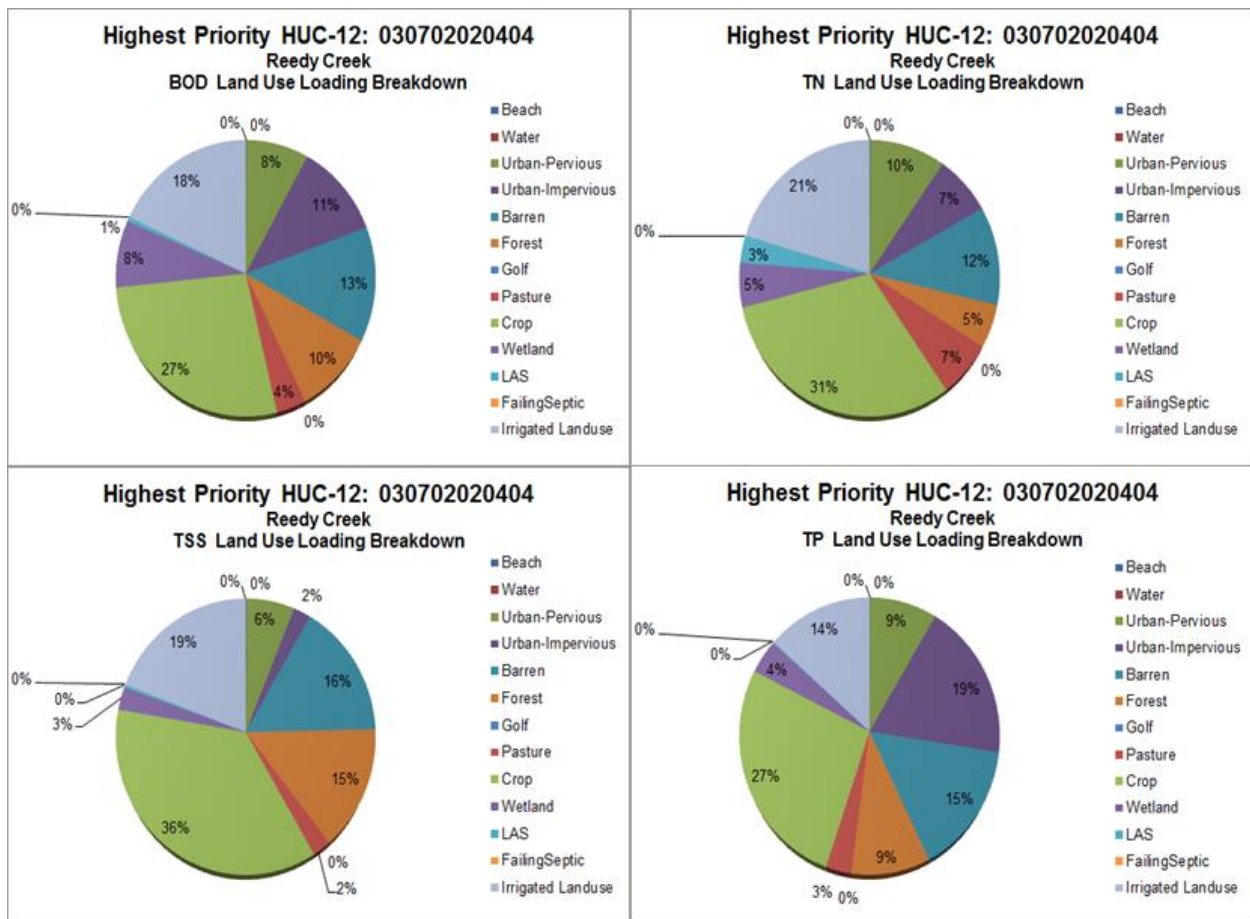


Figure 6 Loading Breakdown of the Highest Priority Watershed in the Satilla River Watershed



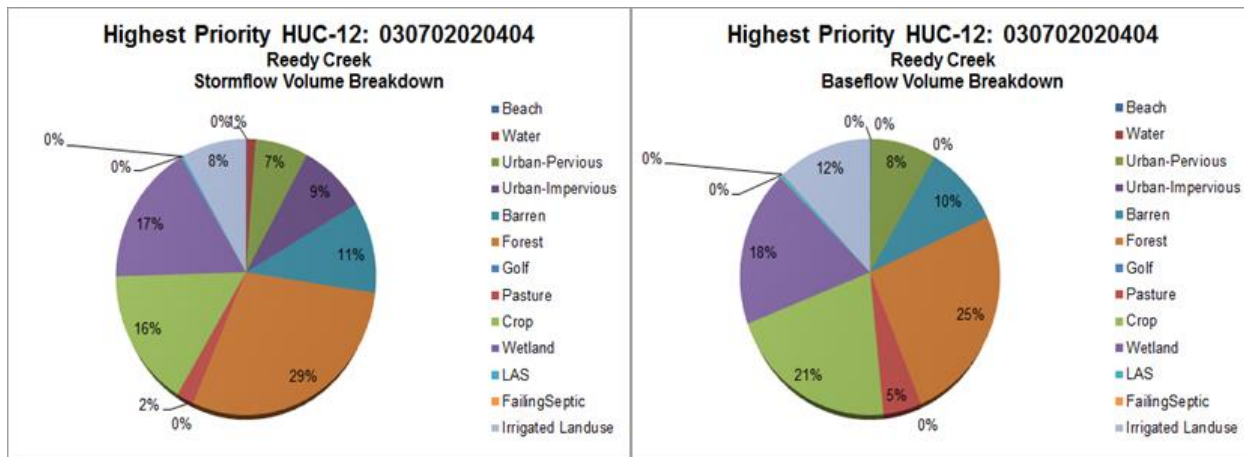


Figure 7 Flow Volume Breakdown of the Highest Priority Watershed: Reedy Creek

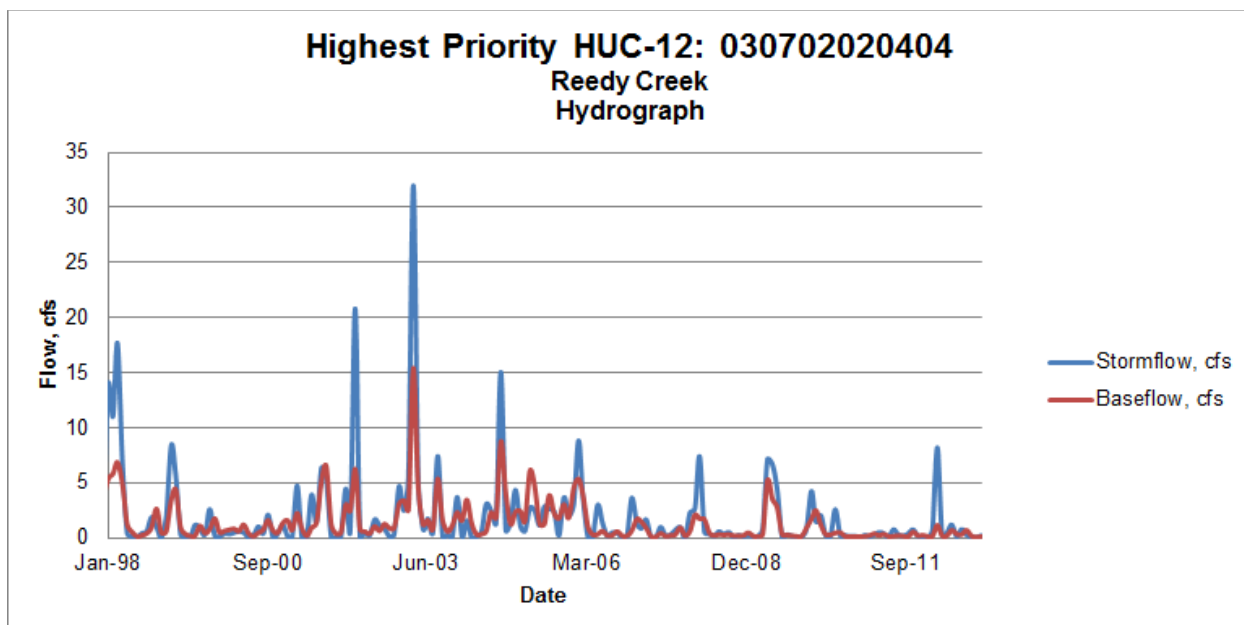


Figure 8 Hydrograph of the Highest Priority Watershed in the Satilla River Watershed

## References

- HSG, 2014. <https://engineering.purdue.edu/mapserve/LTHIA7/documentation/hsg.html>. Accessed on 06/18/2014.
- Tetra Tech, 2014. Watershed Hydrology and Water Quality Modeling Report for the Brunswick Harbor and Satilla River Watersheds, Georgia – REV2.

## Follow Up Discussion

In addition to the method identified, using the model data, multiple other means of prioritization are possible. Some examples of these prioritization targets could include: The protection of a downstream water body such as Brunswick Harbor Estuary or another downstream lake. Loadings for the pollutant of concern for the downstream water can be used

to target particular sub-watersheds for management practices. Additionally, the model results can be used to target watersheds that are close to compliance with water quality standards. These are watersheds with impaired waters that have relatively low pollutant loadings. It is possible that targeting limited resources to such watersheds may be more likely to result in full restoration of the water body to water quality standards than a watershed that had relative larger loading. Prioritization may also be made for preservation of baseflow to identify sub-watersheds most likely to contribute additional baseflow through targeted management practices.

In addition to the primary goals of the Georgia Comprehensive Statewide Water Management Plan, these modeling methods proved successful in addressing other water quality issues, including, but not limited to, land use change, wetland evaluations, and water quality standard assessment. The results from these models were used to assist State and local entities in the development of 11 regional water plans. It was also identified that these watershed models, and other tools, could provide useful criteria in developing procedures to select priority watersheds for the NPS Management Program.

The GAEPD has developed a procedure for prioritizing watersheds/sub-watersheds by incorporating models that have already been developed and calibrated. GAEPD is maximizing its investment in these tools while also bridging the gap between different programs in the Watershed Protection Branch: Nonpoint Source (NPSP), Watershed Planning and Monitoring (WPMP), and Water Supply (WSP). Additionally, the prioritized watersheds/sub-watershed list will be used by GAEPD to apply funding for Best Management Practices (BMPs), collect more data, or further evaluate the particular watersheds/sub-watershed for nonpoint source loading and impairment.

### **Moving Forward:**

**Goal 5:** GAEPD will continue to identify priority watersheds using the process identified in the Nonpoint Source Prioritization process. GAEPD will add to the list of priority watershed by modeling and identifying priority watershed in Georgia.

**Milestone 5.1:** initial list of priority waters statewide completed by 2016.

## **TRACKING MILESTONES, BENCHMARKS, AND TIMELINE**

### **Overview- Tracking**

GAEPD currently has three primary mechanisms for tracking the progress and successes of the NPS management program. These are:

1. EPA Grant Reporting and Tracking System (GRTS): GAEPD uses GRTS to document 319 project information, including reductions of NPS pollutant loadings and water quality improvements.
2. Annual 319 program reports: Annual reports to USEPA concerning GAEPD's 319 program delineate the State's progress and successes in meeting the NPS Program's milestones and goals. These reports contain information on 319 fund administration, project information, TMDLs, watershed planning, outreach and education, wetlands water quality certification, success stories, partners, and other topics.
3. Water Quality Integrated Report: This biennial report provides an assessment of the water quality conditions of surface and groundwater in Georgia and includes a description of the nature, extent, and causes of documented water quality problems. This assessment serves as the basis for lists required by Sections 303(d), 314, and 319 of the Clean Water Act, and includes a review and summary of ongoing Statewide water planning efforts; wetland, estuary, and coastal public health/aquatic life issues; and water protection, groundwater, and drinking water program summaries.

### **New Efforts**

With this plan, GAEPD introduces several new methods of measuring success that not only help the agency ensure it is on track for meeting NPSP goals, but also inform the general public about activities, issues, and successes in their watersheds.

### ***Water Quality Tracking Tables***

The ultimate goal of Georgia's NPS Pollution Management Plan is achievement of water quality standards, including full support of beneficial uses and non-degradation across the State. Georgia's progress towards this goal is cataloged in a number of ways, including the mechanisms listed above and other reports and documents. It can, however, be quite onerous to parse out basic information concerning water quality improvements to NPS-impacted waters from these documents and databases. In this plan, we introduce straightforward tracking tables designed to provide GAEPD, Federal and State agencies, local governments, nongovernmental organizations, and the general public with at-a-glance, basin-specific information on water quality improvements to NPS-impacted waters, plus related activities such as TMDL development that are the first steps towards improving water quality. With annual updates, these tracking tables will provide one metric for measuring successes of the NPS program. They will also provide stakeholders with information on water quality issues and activities in their communities, and as such should help augment water quality improvement efforts. These tables will be available on GAEPD's web site, and the agency will work with the GADCA and other organizations to encourage local governments and other groups to post links to the tables on their own web sites.

Table 1 provides a snapshot of 303(d)-listed waters with NPS water quality impairments, by basin (Altamaha is used here and in the next table as an example). The purpose of this table is to provide information, by basin, on water quality impairments and efforts to mitigate them (TMDLs, WIPs, and other restoration efforts). The best use of this table is to assess success in terms of impairment mitigation efforts (i.e., increases in the number of TMDL and WIP

completed annually would indicate program improvements while decreases would indicate otherwise).

**Table 1.** Status of 303(d)-Listed Waters with Nonpoint Source Related Water Quality Impairments, Altamaha River Basin

Designated Use and Reach Name	Impairments	Stream Miles	Reservoir Acres	TMDL	WIP 9-step	Other restoration activities (319, etc.)
Fishing						
Drinking Water Supply						
Recreation						
Coastal Fishing						
Wild River						
Scenic River						
TOTAL stream miles, res. acres, TMDLs, WIPs						
CHANGE from previous year						

Table 2 represents the next step in measuring program success after the analysis in Table 1. Here, we assess the implementation status of TMDLs. While Table 1 looks at whether TMDL and other efforts have been developed, Table 2 assesses whether these efforts have been effective. This can provide an overview of restoration of impaired streams in a basin, and also indicate where restoration efforts have stalled or proven ineffective (the former would be indicated where a significant amount of time has lapsed between development of the TMDL and restoration of the waterbody; the latter would be shown where a WIP or other effort was implemented with no improvement in water quality).

***Programmatic Indicator Tracking Tables***

The information contained in the water quality tracking tables is not the only arbiter of program success. The diffuse nature of NPS pollutants, variability of stormwater events, and long term realization of water quality improvements make sole reliance on monitoring data impractical for measuring NPS project success(es).

Development and implementation of other programmatic, site, and resource specific activities can demonstrate successes even if there is no monitoring that shows improvements to water quality. GAEPD will also track these programmatic activities – included as measures of success in this plan – to provide the agency, USEPA, and other entities with information concerning how

well the NPS program is working. Programmatic activities will be cataloged in new internal tracking tables that will be updated annually and indicate responsible parties for each action, completion information, and details on efforts to date. These tables, available in the section entitled “Milestones, Benchmarks, and Tables”, will provide GAEPD and other parties with a comprehensive snapshot of progress towards implementing critical programmatic endeavors for the NPSP and will help agency staff measure program success.

**Table 2.** Total Maximum Daily Load Implementation Status for NPS Related Water Quality Impairments, Altamaha River Basin\*

Designated Use and Reach Name	TMDL Year	Restoration Status**	Number and Type of Impairments Addressed	Stream Miles	Reservoir Acres
<b>Fishing</b>					
Oconee and Milligan Creeks Watershed Cluster		Underway	1 (FC)	22	
Goose Creek Watershed		Underway	1 (FC)	8	
Doctors Creek		Underway	1 (FC)	5	
Upper Ohoopsee River Watershed Cluster		Underway	1 (FC)	36	
Little Ohoopsee Watershed Cluster		Underway	1 (FC)	18	
Lower Ohoopsee Watershed Cluster		Underway	1 (FC)	35	
<b>Drinking Water Supply</b>					
<b>Recreation</b>					
<b>Coastal Fishing</b>					
<b>Wild River</b>					
<b>Scenic River</b>					
TOTAL Area Affected by TMDLs				[#]	[#]
TOTAL Area Restored				[#]	[#]
CHANGE from previous year				[#]	[#]

\* Does not include plans for point sources, fish consumption guidelines,

\*\* Options here are: underway, some improvement, significant improvement, and restored



## **Key Issues**

Parse out basic information concerning water quality improvements to NPS-impacted waters from these documents and databases

## **Resources Available**

- EPA Grant Reporting and Tracking System (GRTS)
- Annual 319 program reports
- Water Quality Integrated Report

## **Key Stakeholders**

- EPA

## **Education/ Outreach**

Various annual and biennial reports listed above can be found on GAEPD's website and provide pertinent programs, the State's progress and successes in meeting the NPS Program's milestones and goals. These reports contain information on 319 fund administration, project information, TMDLs, watershed planning, outreach and education, wetlands water quality certification, success stories, partners, and other topics.

## **Funding**

- Section 319 Nonpoint Source Implementation Grant

## **Long Term Goals, Short Term Goals, and Milestones (In no particular order):**

**Long Term Goal 1:** Encourage use of tracking tables as appropriate.

**Short Term Goal 1.1:** Provide GAEPD, Federal and State agencies, local governments, nongovernmental organizations, and the general public with at-a-glance, basin-specific information on water quality improvements to NPS-impacted waters

**Milestone 1.1.1:** Provide a metric for measuring successes of the NPS program.

**Milestone 1.1.2:** Provide stakeholders with information on water quality issues and activities in their communities

**Long Term Goal 2:** Make these tables available on the internet, as resources allow.

**Short Term Goal 2.1:** Work with the GADCA and other organizations to encourage local governments and other groups to post links to the tables on their own web sites.

**Milestone 2.1.1:** Tables posted on partners' websites

This section contains tables for tracking accomplishment of the long and short term goals and milestones discussed in each of the functional areas described above. These tables can be used as a quick reference for GAEPD and USEPA when charting plan progress.

<b>Regulatory Programs (pg 21) Goal</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
Develop a web based database for stream buffer variance applications	FY2018	<b>TBD</b>	Erosion and Sedimentation Unit	To be filled out as tasks are completed...
Conduct training about new permits, rules and lawmaking. When requested by permittees.	On-going		Erosion and Sedimentation Unit and Stormwater Unit	
Develop the tools needed to support electronic entry of Notices of Intent (NOIs) and annual reporting data by both facilities covered under the IGP and MS4s	FY2020		Stormwater Unit	

<b>Land Use (pg 28) Goal</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
Develop a mechanism to prioritize levels of effort for functional areas based on land use.	FY2016		Grants Unit	
For TMDLs with the prioritized pollutant, divide TMDLs into listings that include significant nonpoint source impairment and load allocation for	FY2016		TMDL Unit	

<b>Land Use (pg 28) Goal</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
nonpoint source pollution				
For the prioritized TMDLs, add the land use percentages for each segment in order to generate a state-wide total land use for each pollutant. This land use summation will inform the decision for prioritization of functional areas.	FY2016		TMDL Unit	

<b>Forestry (pg 30) Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
Update and revise the Master Timber Harvester (MTH) Program to reflect results from the most current <i>Silvicultural BMP Implementation and Compliance Survey</i>	Offer more Continuing Logger Education (CLE) opportunities	Provide a minimum of 3 BMP demonstration Field Days available for CLE credit	2016, 2018, and 2020		Georgia Forestry Commission (GFC)	To be filled out as tasks are completed...
	Update information	Provide up to 6 Timber	2018		GFC	

<b>Forestry (pg 30) Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
	and materials provided at MTH training to reflect the impact of stream crossings	Bridges for logger use Statewide				
	Meet with MTH program stakeholders; to determine if the current curriculum addresses the results of the BMP Survey	A minimum of 1 annual conference call or meeting	Annual		GFC	
Revise and update the "Georgia's Best Management Practices for Forestry Manual" to reflect changes in logging practices and BMPs			2020		GFC	
Conduct biannual <i>Silvicultural BMP Implementation and Compliance Survey</i>		Inspect a minimum of 150,000 acres for the <i>Silvicultural BMP Implementation and Compliance Survey</i>	2015, 2017, 2019		GFC	
Expand the GFC NPS program with additional funding opportunities and partnerships	As opportunities become available, build partnerships to leverage existing funds	Expand program's influence through new partnership MOUs and contracts	2020		GFC	

<b>Forestry (pg 30) Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
		Expand program's influence through new partnership letters of support			GFC	
	As opportunities become available, expand funding base for program	Expand program's funding base through additional funding sources. These sources can include both Federal and local funding sources			GFC	
Conduct Statewide BMP assurance monitoring of active forestry operations in Biota (sediment) impaired TMDL watersheds	Identify active forestry sites in impaired watersheds on Georgia's 303(d) and 305(b) list of impaired waters	Identify a minimum of 120 active sites by air, on the ground observations, county records, and by requests	annually		GFC	
Prepare the Silvicultural portion of the biennial report, Water Quality in Georgia, as required by Sections 303(d), 305(b), and 319(a) of the CWA	Collect required Silvicultural data for the biannual report	Produce the Silvicultural section of the Water Quality in Georgia report	FY2016, FY2018, and FY2020		EPD	
Provide education and technical assistance to forest landowners regarding	Identify landowners in priority watersheds willing to participate in the SWAP	Provide technical assistants and education to 80% of identified landowners	On going		GFC	



<b>Forestry (pg 30) Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
involvement in the State Wildlife Action Plan (SWAP)						
	Provide Silvicultural BMP statistics for SWAP high priority watersheds	Provide an annual report for SWAP watersheds incorporating data from the BMP Survey and BMP assurance monitoring	annual		GFC	
Achieve a minimum of 95% compliance of all recommended BMPs for silviculture Statewide	Identify BMPs with lowest percentage of compliance	Provide list of compliance percentages (scores) to the BMP committee for review and comment	2020		GFC	
	Provide plan of action to address lowest percentage BMP categories for the following 2 year Survey cycle	Demonstrate an improvement in compliance for BMPs addressed in the plan of action.	On going		GFC	
	Educate private landowners on forestry best management practices	Hold at least one meeting and make materials accessibly online	On going		GFC	

<b>Agriculture (pg 36) Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
Improve communication and coordination on NPS pollution issues among Georgia's agricultural community	Establish a State agricultural NPS working group that includes partner agencies, farm organizations, and other stakeholders to improve overall communication, planning and implementation of activities	By 2015, GAEPD will establish initial list of invitees to serve on the Georgia agricultural NPS task force	2015	TBD	Grants Unit	To be filled out as tasks are completed...
		The working group will meet at least twice annually with various subcommittees working on individual components and tasks	2015 – 2019		Grants Unit	
		Long term vision would be to have an engaged, active agricultural NPS working group committed to working together to address priority and emerging issues in agriculture	2020		Grants Unit	
	Improve coordination with State NRCS and local conservation districts	GAEPD, and project partners, will attend NRCS State Technical Committee meetings and provide input to maximize the value of Federal NRCS funding to meet the	On going		Grants Unit	

Agriculture (pg 36) Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
		goals of the State NPS plan				
		Long term vision is to be working cooperatively with Georgia NRCS to maximize the return on the Federal investment and insuring that these efforts are coordinated with, and where appropriate, focused on addressing issues critical to implementation of the Agricultural NPS plan			Grants Unit	
	Expand involvement in existing commodity group efforts to increase education and communication to the agricultural sector	GAEPD, and workgroup partners, will actively participate in existing commodity group efforts to publicize and implement activities of the agricultural NPS plan. Number of events, attendants, educational displays or presentations will be tracked annually	On going		Grants Unit	
	Develop and promote clear, user-friendly educational information on Federal, State, and local government regulations and activities related to water quality laws,	As funding and resources allow, GAEPD and workgroup partners will develop new educational materials, apps, or websites related to NPS regulations and programs. GAEPD will track the number of new resources developed annually	On going		Grants Unit	

<b>Agriculture (pg 36) Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
	permitting requirements, cost-share opportunities, TMDLs, conservation initiatives, and other policies and programs					
Evaluate NPS pollution reduction efforts and activities	Work with appropriate stakeholders to develop industry-specific best management practices and provisions for self-monitoring and enforcement, as resources allow. We anticipate that over time, we will update these BMP manuals as necessary, as practices change and new BMPs are developed	Working with the Ag NPS working group one commodity group/target audience will be identified for a BMP pilot project	2018		Grants Unit	
		If the pilot project is successful expand this to at least three additional agricultural sectors	2020		Grants Unit	

<b>Agriculture (pg 36) Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
	Include monitoring and reporting requirements in agricultural NPS efforts and activities	Work with the Ag NPS working group to ensure that all agencies are encouraged to share BMP implementation data and to encourage collection and consolidation of water quality monitoring data	On going		Grants Unit	
		GAEPD will encourage monitoring of water quality on all agricultural projects implementing agricultural BMPs. A database will be established with a goal of entering water quality data on at least 3 agricultural based NPS projects per year	On going		Grants Unit	
Facilitate activities to reduce NPS pollution	Continue working together to provide technical and financial assistance to individuals and groups seeking to reduce NPS pollution from agricultural sources.	Through the Agricultural NPS Working group, establish a methodology for track technical and financial assistance provided through existing programs	2016		Grants Unit	
	Provide Technical Assistance and Agricultural Expertise for the development and revision of	When requested, the GSWCC or other Ag NPS working group partners will participate as a stakeholder in Watershed Management Plan	On going		Grants Unit	



Agriculture (pg 36) Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
	Watershed Plans	development and revision and in Regional Water Planning Council meetings				
		When requested, the GSWCC or other Ag NPS working group partners will provide technical assistance with NPS loading and load reduction estimates for agricultural BMPs or for modeling Agricultural NPS pollutants	On going		Grants Unit	
	Continue to provide funding to Statewide and watershed based agriculture programs	Work with the Ag NPS working group to identify high priority Ag projects in conjunction with watershed prioritization tool	On going		Grants Unit	
	Ensure that education and information on BMP maintenance and operation is a significant part of all existing efforts	Encourage partner programs through 319 and other partner programs will be encouraged to include plans for outreach and education that will target a minimum of 80% of landowners within priority areas for education on agricultural resources	On going		Grants Unit	
	Encourage State, Federal, and private land managers to incorporate NPS	Existing guidance documents for State and Federal land managers will be reviewed and opportunities for inclusion	On going		Grants Unit	

Agriculture (pg 36) Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
	pollution reduction BMPs in their management plans	of additional NPS reduction activities on agricultural lands will be identified				
	If selected by the group, work to have the existing State Agricultural cost share program funded through the State Legislature	The Ag NPS working group will develop a strategy and plan for working with the legislature	2020		Grants Unit	
	Assess new water quality management tools, such as watershed permitting and pollutant allocation trading, to determine if they can be effectively applied to support the objectives of this plan and Georgia's water quality control program	The GAEPD will partner with State and local government agencies, regulated entities, and other appropriate stakeholders involved in land and water management to review the practice of watershed permitting to determine the potential for use of this tool in Georgia	If requested		Grants Unit	
		The GAEPD will partner with State and local government agencies, regulated entities, and other appropriate stakeholders involved in land and water management to review the practice of	If requested		Grants Unit	

<b>Agriculture (pg 36) Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
		pollutant allocation trading to determine the potential for use of this tool in Georgia				
Target conservation and BMP implementation to address high profile concerns	Develop nutrient management plans and strategies to reduce nutrient loading from animal feeding operations in concentrated production regions, as funding allows. Ensure that these nutrient management efforts are align with the elements of the Facility Wastewater and Runoff from Confined Animal Facilities Management Measures for large and small units listed in EPA's 6217 (g) guidance	Initiate a pilot program proactively addressing agricultural NPS pollution by updating and revising nutrient management plans within the agricultural community	2020		Grants Unit	
		Complete NMP Generator software revisions leveraging GA Department of Agriculture funds. Revised software available online for public	2020		Grants Unit	

Agriculture (pg 36) Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
		download, refresher course for Certified Nutrient Management Planners				
		Develop Farm Assessment tool to help producers identify conservation opportunities on their farm and revise NMP. Farm assessments and revised NMPs completed on 80% of landowners in target watershed	2020		Grants Unit	
		Based on results of a successful pilot program, establish a Statewide program to develop Nutrient Management Plans for farmers and ranchers	2020		Grants Unit	
	Address irrigation water use and associated nutrient and sediment losses from crop fields in areas identified by regional water planning efforts, as resources allow	Use the results of existing efforts such as AWEP, the Georgia Water Conservation Implementation Plan, and the Flint River Drought protection act to expand water conservation programs beyond the pilot watersheds	2020		Grants Unit	
		Develop methods for estimating the NPS load reductions associated with	2020		Grants Unit	

Agriculture (pg 36) Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
		water use reductions in crop production				
		Establish a subcommittee of the Ag NPS working group to investigate the extent of and potential impacts of fertigation (the use of irrigation systems to apply plant nutrients) and to establish education programs or other efforts to address these issues	2020		Grants Unit	
	Promote soil conservation and quality and other sustainable production practices on small and large farms Statewide	Continue to annually support the conservation tillage systems and Georgia grazing workshops	On going		Grants Unit	
		Include representation from the UGA Sustainable agriculture program, the UGA J Phil Campbell Research and Education Center, and the National Sustainable Agriculture Production Lab and Georgia Organics in the agricultural NPS working group	2015		Grants Unit	
		Making use of existing resources, develop and	On going		Grants Unit	

<b>Agriculture (pg 36) Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
		implement educational programs on the importance of soil organic matter and soil quality on water and air resources. Share these materials with stakeholders at a minimum of three (3) education events per year				

<b>Wetlands (pg 47) Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
Enhance 401 Water Quality Certification reviews in 24-county coastal district	Recommend issuance, conditional issuance or denial of coastal area applications for 401 Water Quality Certification	Reviews applications, public notices, mitigation plans, site studies and correspondence for each project proposal	2016		Wetlands Unit	
		Conduct field evaluations at a minimum of four proposed project sites each year, with emphasis on impaired or threatened coastal waters and habitats	2016		Wetlands Unit	
	Incorporate management measures to control, prevent or reduce	Documentation of coastal nonpoint management measures incorporated in the proposed project's design or	2016		Wetlands Unit	



<b>Wetlands (pg 47) Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
	coastal nonpoint source pollution in conducting 401 Water Quality Certification reviews	required through 401 Water Quality Certification conditions				
	Provide relevant training to coastal 401 Water Quality Certification staff	Staff attends a minimum of two training opportunities per year focused on 401 Water Quality Certification or coastal nonpoint source pollution topics	2016		Wetlands Unit	
Enhancing 401 Water Quality Certification inspection efforts	Implement follow-up site inspections to monitor compliance with 401 Water Quality Certification conditions, with priority given to project sites in impaired or threatened coastal waters and habitats, or to large-scale projects	Conduct and document three follow-up inspections per year	2020		Wetlands Unit	
Restore degraded wetlands	Seek partnerships with willing landowners and funders to conduct restoration of degraded wetlands	Conduct wetland restoration with willing partners	On going		Grants Unit	

<b>Wetlands (pg 47) Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
	through restoration of natural hydrology and vegetation, if warranted. Monitor and/or model the results of the work to determine water quality and quantity outcomes.					
		Monitor or model the results of the restoration	On going		Grants Unit	

<b>Urban (pg 52) Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
<b>Research:</b> Remain informed on the rapidly growing body of research on the performance and effectiveness of GI/LID practices, as well as collect performance data from Georgia projects in a range a locations and	Encourage and support performance monitoring of installed GI/LID	Publication and/or dissemination of monitoring results	On-going		Grants Unit	

Urban (pg 52) Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
applications in order to ensure the highest levels of effectiveness						
		Refinement of BMP guidance to reflect lessons learned from monitoring activities			Grants Unit	
		If resources are available, publication of case studies that show how GI/LID has been used to restore water quality			Nonpoint Source Program	
	Disseminate relevant green infrastructure research and best practices through partnerships with existing conferences, institutions and organizations	GAEPD participation in the identified conference (and other opportunities) and establishment of a green infrastructure track or theme as appropriate	2015 – on going		Nonpoint Source Program	
<b>Outreach:</b> Ensure that potential implementers of GI/LID practices are aware of and have access to the necessary information to successfully install, maintain and	Partner with an appropriate entity, to provide training on the Georgia Stormwater Management Manual (GSMM) once the update to the GSMM is complete	Support the continuation and updating of training opportunities for stormwater professionals	2017		ARC & Grants Unit	

Urban (pg 52) Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
monitor their projects, as funding allows						
		Three workshops held	2017		Grants Unit	
	Partner with an appropriate entity, such as a university or utility, to sponsor a green infrastructure design competition	Establishment of an appropriate partnership and creation of the design competition	2020		Nonpoint Source Program	
		Participation in the competition from a wide variety of stakeholders	2020		Nonpoint Source Program	
	Consider partnering with the construction industry to provide training and resources necessary to facilitate construction, maintenance and monitoring of GI/LID	Minimum of two workshops	2020		Grants Unit	
	Create a State-wide educational and outreach campaign aimed at changing attitudes and improving behaviors affecting urban runoff	Development and presentation of educational materials in a variety of user-friendly formats	2020		Nonpoint Source Program	

Urban (pg 52) Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
		Development of high-visibility, publically-accessible demonstration projects	2020		Nonpoint Source Program	
<b>Tools:</b> Improve the tools available to potential implementers of GI/LID practices to improve the performance and effectiveness of their projects	Participate in the update of the GSMM, and ensure implementation of the GSMM by MS4-permitted jurisdictions	Revised and consolidated GSMM	2016		ARC	
		Number and/or percentage of MS4s Implementing the revised GSMM	2018		Stormwater Unit	
		Number of known non-MS4 cities and counties that incorporate the GI/LID provisions of the GSMM into their ordinances	2018		Stormwater Unit	
	Establish a hierarchy of NPS management strategies in the GSMM	Consultation with GSMM Technical Advisory Group	2016		Nonpoint Source Program	
		Adoption of a hierarchy into the GSMM, if warranted	2016		Nonpoint Source Program	
	After stakeholder input, consider establishing runoff	Summary of stakeholder recommendations	2017		Nonpoint Source Program	

Urban (pg 52) Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
	reduction/onsite retention goals for all areas of the State, taking into account: stakeholder input, climate, and the predevelopment geology, slope and soil characteristics of different regions.					
	Consider post-construction stormwater management controls of runoff from single-family infill development and commercial projects less than 5,000 SF in MS4 Permitted Areas. The City of Atlanta has already created programs addressing both of these conditions (COA, 2012; COA, 2014)	A manual or appropriate outreach material	2020		Nonpoint Source Program	
	Encourage and/or incentivize green	If warranted by stakeholder input, minimum of 3 outreach	2018		Nonpoint Source	



Urban (pg 52) Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
	infrastructure retrofits to reduce NPS runoff from existing development in urban areas. Encourage stakeholder group participation to identify appropriate incentives	events targeting retrofits.			Program	
	In partnership with the appropriate entity and if resources allow, consider developing a watershed based BMP evaluation model for use by GAEPD and the regulated community for the evaluation of urban stormwater BMPs.	Complete development of the watershed-based BMP evaluation model	2022		Nonpoint Source Program	
		Partner with local jurisdictions and other entities to ensure the availability of data needed as inputs for successful use of the model	2022		Nonpoint Source Program	
		Promote the training and use of the model through training	2022		Nonpoint Source	

Urban (pg 52) Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
		and outreach opportunities			Program	
<b>Regulatory:</b> Facilitate cooperation with existing and developing regulatory programs to enhance the implementation and effectiveness of GI/LID practices	As a part of the ongoing development of E-reporting tools, provide the capability for E-reporting of MS4 and Industrial Stormwater permits	Development and use of E-reporting tools for MS4 and Industrial Stormwater permits	2020		Stormwater Unit	
		Development of database structure and data requirements to be maintained and reported by jurisdictions	2020		Stormwater Unit	
<b>Economics/Funding:</b> Document and disseminate the costs and benefits of GI/LID practices, and promote resources that are available for their implementation	Compile existing research, collect local monitoring data as available, and disseminate findings as appropriate related to the economic cost-benefit of GI/LID, as resources are available	Production of a fact sheet or white paper on the actual costs and benefits of GI/LID compared to conventional grey infrastructure, and distribution to elected officials, developers, regulators and other stakeholders	2017		Nonpoint Source Program	
	Provide training	Identify potential partners to	2017		Nonpoint	

Urban (pg 52) Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
	opportunities on GI/LID costs, benefits and funding opportunities for local elected officials, public works staff, and local planning staff	provide training			Source Program	
		Number of workshops	2017		Nonpoint Source Program	
<b>Partnerships:</b> Leverage existing programs and stakeholders that contribute to the effectiveness of GI/LID practices in order to make best use of resources and gain more widespread acceptance of GI/LID	Convene a technical advisory group (TAG) for the update of the Georgia Stormwater Management Manual (GSMM)	Establishment of and participation in the TAG	2015		ARC	
	Consider partnerships as appropriate, to research, implement and promote GI/LID	Coordination with or support of training and outreach programs developed by partners	On going		Nonpoint Source Program	
	If resources allow,	Establishment of and	2017		Nonpoint	

Urban (pg 52) Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
	coordinate urban runoff efforts throughout the State by convening NPS-Urban Runoff Working Groups throughout the State to address urban water quality concerns and providing appropriate training and outreach opportunities for managing NPS runoff in Urban Areas	participation in Working Groups as appropriate			Source Program	
		Development of Training Components as appropriate	2018		Nonpoint Source Program	

<b>Urban/Dirt Roads (pg 63) Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
Recognizing the impact sediment has on Georgia's waterways and aquatic habitat, increase Georgia's involvement in reducing impacts from dirt roads	Clean Water Act Section 319 Grant program will give higher priority to projects addressing sediment impairment	Incorporate sediment priority into the annual FOGA rule	On going		Grants Unit	
		Reflect NPS sediment impairments in Georgia's Watershed Prioritization Tool	2016		Grants Unit	
		Reflect the importance of Sediment impairments to Georgia waters in the selection criteria for Section 319 Application Review	2016		Grants Unit	
	Provide Training and Educations Opportunities for Local City and County Road Managers	As funding and resources allow, fund a minimum of 1 biennial BBR Training Workshop in the Piedmont or Mountain Region of Georgia	2016		Grants Unit	
		As funding and resources allow, fund a minimum of 1 biennial BBR Training Workshop in the Coastal Plain Region of Georgia	2016		Grants Unit	

<b>Coastal (pg 65) Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
Expand ambient water quality monitoring at nodes where upland rivers and streams enter the 11 coastal counties	Delineate upland-derived NPS pollution, as resources allow	Establish permanent water quality trend sampling sites on the Ogeechee, Canoochee, Altamaha, Satilla, and St. Marys Rivers	2020		Grants Unit	
Minimize runoff of storm water from developed and cultivated land	Encourage protection and restoration of non-jurisdictional wetlands	Encourage local ordinances that discourage destruction and filling of non-jurisdictional wetlands	2018		Grants Unit	
	Reduce contamination of surface waters from fecal coliform bacteria and mercury, as funding allows	Identification of streams currently impaired by fecal coliform bacteria that could benefit most from restored wetlands	2016		Grants Unit	
Minimize runoff from farm fields to reduce contamination of surface waters from fecal coliform bacteria, and nutrients	Encourage conservation and no-till agriculture	Increase the number of row crop acres using conservation or no-till agriculture in the upland counties.	2018			
Explore methods of increasing the	Minimize runoff of sediment into	Number of "Better Backroads" workshops held	2016			



<b>Coastal (pg 65) Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
number of miles of BMP implementation on rural roads	streams, as funding allows.					
Through existing programs, promote expansion of stream buffers in agricultural and silviculture areas beyond minimum State requirements.	Reduce contamination of surface waters from fecal coliform bacteria, sediment, nutrients, and re-mobilized mercury, as funding allows.	Identification of impaired streams most likely to receive direct and measurable benefits of expanded buffers through the prioritization tool	2016			
Manage coastal nonpoint source pollution through the continued development and implementation of the Coastal Nonpoint Source Plan.	Continue the development and implementation of the Coastal NPS Plan. Obtain approval from NOAA and EPA.	Approved Coastal Nonpoint Source Plan	On going			

<b>Surface Mining (pg 75) Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
Encourage developing industry-wide	Conduct informal discussions on the potential of	Identify consensus, if any, on mining BMP recommendations.	2020		Surface Mining Program	

<b>Surface Mining (pg 75) Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
standards for best management practices	formalizing industry-wide recommendations on mining BMPs					

<b><u>Water Quality Monitoring</u> Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
Expand water quality datasets through cost-effective coordination and collection strategies	Improve data coordination within GAEPD/GADNR and with and among other agencies	Reach out to GAEPD Branch and Program associates and GADNR associates to discuss monitoring practices, needs, and priorities	2015		Watershed Planning and Monitoring Program	
		Where appropriate, explore opportunities for developing monitoring partnerships and/or cooperative agreements	On-going		Watershed Planning and Monitoring Program	
	As resources allow, coordinate the compilation of water quality monitoring data collected by other agencies	Catalog data in appropriate databases (such as GOMAS or Adopt-a-Stream (AAS))	On going		Watershed Planning and Monitoring Program;	

<b><u>Water Quality Monitoring</u> Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
	across the State (universities, local governments (MS4), utilities/authorities, regional commissions, and grant projects.)				Outreach Unit	
	Enhance monitoring programs	Investigate new monitoring funding sources including innovative funding mechanisms with GEFA and other organizations	2016		Watershed Planning and Monitoring Program; Outreach Unit	
		Develop monitoring partnerships and/or cooperative agreements with agencies, universities, regional commissions, local governments, and corporations	2017		Watershed Planning and Monitoring Program; Outreach Unit	
		Conduct reviews of monitoring techniques to identify potential cost-saving measures	2017		Watershed Planning and Monitoring Program; Outreach	

<u>Water Quality Monitoring</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
					Unit	
		Develop SQAP generator for monitoring projects	2016		Outreach Unit	
		Develop AAS Expert program for AAS trainers to identify volunteers qualified to generate and implement SQAPS	2016		Outreach Unit	
		Assist with the development of “listing SQAPs” for entities that would like to monitor streams for regulatory delisting purposes under NPDES watershed assessments, 319 grant projects, etc...	On going		Watershed Planning and Monitoring	
	Investigate potential for incorporating cost-effective sampling methodologies that comport with 40 CFR 136	Investigate potential for expanding the use and acceptance of IDEX kit	2020		Watershed Planning and Monitoring Program; Outreach Unit	
Target monitoring to address priority issues and watersheds	Prioritize monitoring to address the most pressing NPS issues in the State	Develop prioritization procedures to identify watersheds and sub-watersheds most impacted by NPS pollutants	On going		Watershed Planning and Monitoring Program;	

<u>Water Quality Monitoring</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
					Grants Unit	
		Coordinate the prioritization procedures outlined above with TMDL Vision framework	2017		Watershed Planning and Monitoring Program; Grants Unit	
	Engage stakeholders in monitoring work groups	Organize a pilot watershed monitoring work group to identify potential monitoring partnerships and monitoring sites, including those highlighted in Regional Water Plans	2016		Outreach Unit	
		Assist work groups in developing and implementing watershed monitoring plans and creating a “lessons learned” document to guide future monitoring work groups	2018		Outreach Unit	
		Organize additional watershed monitoring work groups and assist in the development and implementation of monitoring plans	2018		Outreach Unit	
	As resources allow,	Compile a list of potentially	2016		Watershe	

<u>Water Quality Monitoring</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
	conduct targeted sampling for de-listing of potentially “unimpaired” waters	“unimpaired” waters or waters that were listed in watershed with relatively small loadings			d Planning and Monitoring Program	
		Monitor potentially “unimpaired” waters and delist, as appropriate			Watershed Planning and Monitoring Program	
	As appropriate and if resources are available conduct targeted sampling to assess BMP effectiveness	Conduct literature and project review of existing assessments in the region to identify usable data and recommendations and to define “effectiveness”	2020		Grants Unit	
		Prioritize BMPs and other practices for assessment	2020		Grants Unit	
		Work with partners to develop and implement sampling/assessment plan and procedures	On going		Grants Unit	
		Develop procedure for sampling of waters where BMP have been implemented	On going		Watershed Planning and Monitoring Program; Grants	



<u>Water Quality Monitoring</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
					Unit	
	Conduct targeted sampling to assess inland NPS pollutant impacts to coastal systems	Identify coastal issues for assessment including low dissolved oxygen, species decline, and pollutants likely contributing to these issues, and potential local and inland pollutant sources	2020		Watershed Planning and Monitoring Program	
		Develop and implement monitoring plan, starting at coast and working inland and taking factors including sinks, instream transformations, etc... into consideration. The plan may include monitoring partnership with the Governors' South Atlantic Alliance regional coastal monitoring network. Where possible, the monitoring plan should examine water quality improvements from BMPs	2020		Watershed Planning and Monitoring Program	
		Coordinate modeling efforts using available water quality data	2020		Watershed Planning and Monitoring Program	
Improve data accessibility to	Develop a comprehensive water	Complete development of GOMAS database	2016		Watershed	

<b><u>Water Quality Monitoring</u></b> <b>Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
support NPS activities and inform citizens	quality database				Planning and Monitoring Program	
		Continually update GOMAS	On going		Watershed Planning and Monitoring Program	
	Improve accessibility of data to general public	Develop user-friendly interfaces for online and mobile viewing of water quality data in GOMAS, other databases, including GPS-linked apps for viewing data at specific locations	2020		Watershed Planning and Monitoring Program	
		Introduce GOMAS and other databases to organizations and general public through outreach campaigns	2020		Watershed Planning and Monitoring Program	
Improve use of data for additional monitoring and standard development and to inform regulatory requirements,	As resources allow, update water quality standards to include major NPS pollutants. Account for natural conditions, where appropriate	Amend bacterial water quality standards to use E. coli criteria in lieu of fecal coliform	2017		Watershed Planning and Monitoring Program	

<u>Water Quality Monitoring</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
policies, funding decisions, planning, and other activities						
		Revise DO standards to reflect systems in which the natural DO concentration is lower than current established standards	2020		Watershed Planning and Monitoring Program	
		Establish numeric water quality standards for nutrients as outlined in Georgia's Plan for the Adoption of Water Quality Standards for Nutrients	2020 and beyond as in the plan		Watershed Planning and Monitoring Program	

<u>319 Grants</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
Where appropriate, evaluate existing State programs to determine if they align with priorities	Review Section 319 funded programs to determine what changes can be made to better align with priorities	Meet with key partners to make changes to programs as needed resulting in updated work plans and MOU's	2015		Grants Unit	
	Evaluate these programs within the	Report on programs progress	2015		Grants Unit	

<b><u>319 Grants</u></b> <b>Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
	context of the most current version of Georgia's NPS Management Program Plan					
Develop more formalized tools to select priority watershed and other project areas	Assess and catalogue existing information and sources related to prioritization	Catalogue relevant parameters and source	2017		Grants Unit	
	Explore existing tools that could be readily used or adapted for use to prioritize watersheds and / or projects	Assessment report of existing tools and applicability to GA's prioritization	2017		Grants Unit	
Develop a ranking procedure that qualifies proposals for Section 319 grant funds as acceptable projects to implement alternatives to watershed-based plans	Consider establishing a scoring procedure will ensure a uniform approach to selecting proposals to implement alternatives to watershed-based plans	Apply a selection procedure to fund at least one project that will implement an alternative to a watershed-based plan	2018		Grants Unit	
As staffing allows, explore opportunities to develop a	GAEPD will seek to develop an online "watershed plan builder" similar to the	The tool will be easily accessibility and user friendliness	2020		Grants Unit	

<b><u>319 Grants</u></b> <b>Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
“watershed plan builder” for Georgia communities that do not have the resources to do technical background work	plan builder tool created by USEPA					
Updating and developing GAEPD’s internal Section 319 Grant Unit’s standard operating procedures	GAEPD staff to fully understand the changes in focus and review of grant applications	Grant applicants know and understand what is expected to be funded	On going update		Grants Unit	
	GAEPD will develop a comprehensive internal guidance document that contains these new procedures and matches internal understanding with applicant instructions	Completion of Guidance document	2020		Grants Unit	
Develop projects and create new funding packages by leveraging other sources of funding to implement projects that	Attempt to work with partnering organizations to develop projects that utilize multiple sources of funding	Lists of projects and/or funding packages that utilize different sources, a minimum of 1 project	On going		Grants Unit	

<b><u>319 Grants</u></b> <b>Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
address multiple elements in addition to NPS pollution						
	Develop projects that have benefits beyond water quality to create more comprehensive projects that are funded through multiple sources	At least 1 project per year that demonstrates benefits above and beyond water quality	On going		Grants Unit	
Carry out activities that assess impacts of implementation and other NPS management and related projects	Develop tools that assess the effects of Georgia's NPS program, as resources allow	Assess the impact of previously completed projects and/or NPS Management activities, tools, and/or programs	2020		Grants Unit	
Continue restoring impaired waters and/or protecting healthy waters through the implementation of Georgia's NPS Management Program	Carry out projects that benefit water quality and overall water body health	Submit, at minimum, one success story annually for USEPA's WQ-10 goals	Annually		Grants Unit	
		Submit, at minimum, one project annually for USEPA's SP-12 goals	Annually		Grants Unit	



<b><u>319 Grants</u></b> <b>Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
Support those efforts of partnering agencies and organizations that work towards meeting the goals and objectives of Georgia's NPS Management Program, as needed	Develop work plans to provide resources and/or technical assistance to partners in support of Georgia's NPS Management Program goals	As needed, submit work plan and / or MOU to USEPA outlining nature of resources and / or technical assistance	On going		Grants Unit	
	Work with State Program partners to develop sector organized stakeholder groups, and hold regular meetings to understand stakeholder concerns and to educate stakeholders about the relevant State Program	Each State Program will have a standing stakeholder group	2020			
	Outreach to Regional Water Councils		2016			
	Develop grassroots interest in local water quality issues through Adopt-a-		On going			

<b><u>319 Grants</u></b> <b>Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
	Stream and RiversAlive in prioritized watersheds					
Improve non-regulatory monitoring of water quality, and find a way to incorporate water quality data from programs such as Adopt-A-Stream into decision making	Encourage a water quality monitoring aspect of all future 319 projects	GAEPD will develop a method of increasing the volume of water quality data flowing into the national water quality databases (i.e. STORET) that originates from outside GAEPD	2018		Grants Unit	
Streamlining of GAEPD's 319 grant application review process as staffing allows	Explore different methods for selecting projects and awarding grants In order to better target 319 funds towards critical watersheds	Developing a pre-application procedure similar to that used by other granting agencies	2018		Grants Unit	
		Applicants will submit grant proposals to GAEPD, who conduct an initial review using an internal review panel	2018		Grants Unit	
		Because this will represent a significant change in application review procedures, applicants will need to be clearly informed of	2018		Grants Unit	

<b><u>319 Grants</u></b> <b>Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
		the new procedures				
Implement Georgia's Statewide Nonpoint Source Management Plan.			On going		Nonpoint Source Program	
Effectively manage Section 319(h) grant funds.			On going		Grants Unit	

<b><u>Outreach and Education</u></b> <b>Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
To facilitate and encourage the submission of State approved data following the Sampling Quality Assurance Plan as opportunities arise	Modify the Georgia Adopt-A-Stream online group and site registration process to allow it to generate SQAP forms for submittal to EPD. If successful, this modification could greatly expand the amount of quality certified 303/305 level monitoring data in Georgia.	Utilize the Georgia Adopt-A-Stream database to generate a report, which would form the basis for a SQAP to be submitted for review and approval by the GAEPD Ambient Monitoring Program.	2016		Outreach Unit	
	Capture data from 319 funded project	Mandating that all such programs enter their water	2016		Outreach Unit	

<u>Outreach and Education</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
	plans that include a monitoring component	quality data through the online database is a simple way to capture more water quality data and to let 319 grant administrators monitor grant recipient's progress towards project completion				
Offer additional large scale monitoring events, such as Paddle GA partnership, as resources permit	Bolster the trend sampling data	Help set priorities and goals to assure the most effective monitoring strategies for each program	On going		Outreach Unit	
Further Develop Rivers Alive Program to better encompass watershed protection activities as staff and funding permit	Consider changing the Outreach Unit name to Georgia Watershed Stewardship	Better convey the message that a holistic approach to stream protection is needed			Outreach Unit	
	Develop outreach videos to promote the Rivers Alive Program	Video successfully posted to the internet	2016			
Realize our stewardship potential as the opportunities arise	Offer additional rain barrel and stream stabilization projects	Increased level of water protection and stewardship	2017		Outreach Unit	
	As funding allows,	Production of appropriate	On going			

<b><u>Outreach and Education</u> Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
	explore opportunities to tell the story of Nonpoint Source pollution including both negative impacts and potential for positive restoration	educational material				
Reach a wider audience as staff and time allow	Offer valuable tool for expanding watershed stewardship activities	Updated historic publication, Life at the Water's Edge: A Guide to Stream Care in Georgia	2017		Outreach Unit	

<b><u>Statewide Water Planning</u> Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
Determine how many of the proposed nonpoint source pollution management practices identified in regional water plans have been implemented	Determine effectiveness of State Water Plan process in addressing nonpoint source pollution on a regional basis by generating a database or spreadsheet of proposed versus implemented	A significant number of proposed management practices have been implemented in a planning region per the planning councils' recommendations	2016		Grants Unit	

<u>Statewide Water Planning</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
	management practices					
In those planning regions where a significant number of BMPs have <b>not</b> been implemented, identify reasons why	Identify barriers to BMP implementation ranked in terms of complexity or ability to overcome those barriers	A comprehensive list of the BMPs proposed for each planning region, reasons why they are not being implemented, and proposed strategies for implementing them	2016		Grants Unit	
In those planning regions where a significant number of BMPs have been implemented, evaluate surface water quality in those watersheds	Determine if proposed management practices are having the intended effect on water quality	Surface water quality has measurably improved consistent with the implemented management practices	2020		Grants Unit	
Investigate opportunities for local or regional funding of BMP implementation, included but not limited to stormwater utilities, development utilities, TADs	Increased voluntary implementation of BMPs by regional water planning council member communities without the need for Federal or State funding such as Section 319 grants	At least one economic/cost-benefit analysis of methods of local BMP funding	2020		Grants Unit	
		For at least one regional water planning council to	2021		Grants Unit	



<u>Statewide Water Planning</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
		include a method for funding NPS management in their regional plans.				

<u>Regional Planning</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
As resources are available, identify which water-related Regionally Important Resources (RIRs) identified in Regional Plans have experienced impairment due to NPS pollution, or may be at the greatest risk of impairment due to expected development. Focus shall be placed on the NPS prioritized watersheds	Fine-tune priority watershed identification consistent with Regional Plans and the GAEPD prioritization tool, as resources allow	A listing and accompanying map of impaired or threatened RIRs in each region	2017		Grants Unit- DCA	
As resources are available, link	Coordinated regional efforts to protect	If resources are available, development of updated	As requested		Grants Unit- DCA	

<b><u>Regional Planning</u> Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
aspects of Regional Resource Plans relating to water to Regional Water Plans	water quality	Regional Resource Plans and Regional Water Plans which cross reference each other and present similar NPS management goals				
Encourage incorporation of water quality data into Regional Resource Plans and local land use plans	Improved regional and local plans which incorporate specific recommendations or requirements targeting NPS pollution and impaired streams	Listings of impaired streams and their reasons for impairment in all regional resource and local land use plans	2017		Grants Unit- DCA	
Identify which water-related RIRs will be most impacted by development	Allow proposed BMPs in Regional Resource Plans and Regional Water Plans to be targeted to areas that may experience the greatest increase in NPS pollution	A listing and accompanying map of water-related RIRs in fastest-growing regions	2020		Grants Unit- DCA	
Encourage local land use plans to specifically address impaired streams	Align planning efforts in mitigating NPS pollution	At least one local land use or regional resource plan that incorporates NPS BMPs.	2020		Grants Unit- DCA	

<b><u>Land Acquisition and Green Space</u> Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
Focus land conservation efforts towards those watersheds experiencing the greatest impact from nonpoint source pollution, or that are most likely to be impacted in the future	Identify high-value conservation lands in prioritized watersheds	List of characteristics needed for high-value conservation lands	2016		Grants Unit	
		Map of lands in each prioritized watershed	2016		Grants Unit	
	Establish scoring mechanism that would include impact of proposed conservation land and its mitigating impact on nonpoint source pollution	Develop a matrix or ranking of each proposed project that would assign points to each salient characteristic of that project	2020		Grants Unit	
Create a network of linked landscape-scale green spaces Statewide	Identify geographic gaps where additional conservation land acquisition could be prioritized based on nonpoint source pollution problems	Create map of lands in State conservation easements that protects anonymity of private landowners	2016		Grants Unit	
		Tabulation or graphic	2016		Grants	

<u>Land Acquisition and Green Space</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
		presentation of acres preserved in each water planning region, county, or watershed			Unit	
	Identify lands in priority watersheds that correspond to gaps in conservation lands	Map of land areas to be targeted for acquisition for conservation	2020		Grants Unit	
Increase total public and private funds used for land acquisition	Acquire conservation lands that will have a specific NPS mitigation goal	Conservation easements in prioritized watersheds acquired with funding mechanisms developed by the Joint Study Committee	On-going		Grants Unit	

<u>Onsite Sewage Disposal System (OSDS)</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
Promote the use of the Well and Septic Tank Referencing and Online Mapping program to non-participating health departments	Georgia GAEPD and DPH will act as liaisons and promote the mapping program to non-participating health departments	Non-participating health departments will begin using mapping program	2020		Grants Unit	
	Where appropriate,	All information from 319	On going		Grants Unit	

<u>Onsite Sewage Disposal System (OSDS)</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
	for 319 funded OSDS BMP projects, information regarding the OSDS will be entered into WelStrom	funded OSDS BMP projects will be entered into WelStrom				
Integrate WelSTROM into the Garrison database	As funding allows, encourage all County Health Departments to fully map and geolocate all OSDS in jurisdiction	County Health Departments have a full understanding of all known systems	2020		Grants Unit	
	Encourage County Health Departments to coordinate with local sewer authorities to identify properties missing from Garrison and not on local sewer	County Health Departments in conjunction with sewer authorities locate in inspect identified properties to determine if they are on OSDS, Strait Pipe, or connected to sewer	2020		Grants Unit	
		County Health Departments in conjunction with sewer authorities determine best course of action for identified properties	2020		Grants Unit	
		Identified properties are either connected to the sewer system or permitted for an OSDS	2020		Grants Unit	

<u>Onsite Sewage Disposal System (OSDS)</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
As resources allow, outside of the 11 coastal counties in Georgia, in priority or impaired watersheds or areas with a high density of OSDS, continue or initiate studies of septic density, water quality, and watershed hydrology in order to achieve a more comprehensive knowledge of the impacts of OSDS, if any, on water quality	Identify parts of prioritized watersheds, if any, which have been impacted by OSDS, either due to high density or low function of septic systems, and assessment of any connection between OSDS impacts and the listing of streams as being impaired	If funded, generate a GIS-based map identifying watersheds most likely impacted by OSDS	2016		Grants Unit	
As resources allow, continue to fund research into the impacts of OSDS in the parts of the 11 coastal counties of Georgia most likely to experience rapid population growth.	Establish septic advisory stakeholders list to study impacts to water quality in Georgia's Physiographic regions	Hold meetings as necessary to identify OSDS issues and list of impaired waters	2020		Grants Unit	



<u>Onsite Sewage Disposal System (OSDS)</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
Determine a method of developing a watershed management plan to incorporate septic installation, repair, and maintenance and the impacts of OSDS on NPS Impaired Waters						
		OSDS Study will attempt to quantify impact to water quality and study recommendations to address any source impacts identified	2020		Grants Unit	
	As resources allow, develop a load model to determine the effectiveness of properly functioning systems and the impact of failing systems	Advisory group will develop the criteria and parameters for the model	2020		Grants Unit	
	As resources allow, model septic tank Impacts to Water Quality including, but	Working production version the septic model	2020		Grants Unit	

<u>Onsite Sewage Disposal System (OSDS)</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
	not limited to Nitrogen/Phosphorus /BOD/ pathogen loadings					
	Distribute results of model for public use	Report load reduction for repaired/ replaced OSDS to USEPA's GRTS database	On going		Grants Unit	
Working with the Georgia Department of Public Health and the Georgia Onsite Wastewater Association, assist CBHs and local governments in development of OSDS post-installation management strategies that would include funding mechanisms for OSDS maintenance, inspection, and repair	Encourage locally driven BMPs	<p>Development of at least two of the following measures in a high-density OSDS priority watershed in a community that does not currently employ them (from Sheehan and Fowler, 2013):</p> <ul style="list-style-type: none"> <li>• Septic pump out rebates upon participation in OSDS maintenance educational program</li> <li>• Free septic system inspections by town--- approved service provider</li> <li>• Water bill or storm water utility credit when septic system is pumped</li> <li>• Low interest loans for OSDS and drain field repairs and replacements</li> <li>• Grants for low---income</li> </ul>	2020		Grants Unit	

<u>Onsite Sewage Disposal System (OSDS)</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
		homeowners for OSDS and drain field repair and replacement costs				

<u>New Tools for Nonpoint Source Management</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
<b>Innovations, Advances, and AAPs</b>						
As resources allow, identify and adopt between 15 and 30 standards and management policies for alternative resources, innovative technologies or advances in BMPs to protect, improve or restore water quality	As staffing allows, studying existing field manuals and green infrastructure publications will reveal proven design criteria and management policies that can be adapted by the NPS Management Program into tools for assessing the acceptability of new technologies and alternative BMPs	The NPS Management Program will adapt appropriate criteria and policies during the examination process to produce 15-to-30 acceptability standards for innovative methods and alternative technologies	2020		Grants Unit	
Develop a ranking procedure to assess the	Establishing a scoring procedure for the assessment	Incorporate acceptable standards for innovative or alternative technologies into	2020		Grants Unit	

<a href="#"><u>New Tools for Nonpoint Source Management</u></a> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
feasibility of implementing Acceptable Alternative Projects to protect, improve or restore water quality	standards acceptable to the NPS Management Program will ensure a uniform approach to evaluating and selecting AAP for implementation with Section 319 grant funds	an evaluation procedure for selecting AAPs to fund				
Compose guidance and conduct training in how to develop a proposal for AAPs	Guidance and training in how to implement AAPs	Produce a 5-to-15 page publication and a 5-to-15 slide PowerPoint presentation that serve as guides to qualifying proposals as AAPs and applying for Section 319 grant funds to implement the projects	2020		Grants Unit	

<a href="#"><u>Other Nonpoint Source Related Programs</u></a> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
<a href="#"><u>Healthy Watersheds</u></a>						
Initiate and fund Healthy Watershed Initiative Program	Attempt to develop at least one Healthy Watershed Initiative	Documentation of attempt or contract of HWI project in Annual Report to USEPA	annually		Grants Unit	

<a href="#"><u>Other Nonpoint Source Related Programs</u></a> <b>Long Term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
within the Georgia GAEPD Nonpoint Source Program as funding allows	Plan, using USEPA Key Components					
Once the Watershed Prioritization and Evaluation Project is successfully created for the State, create a framework to identify and document potential priority areas for HWI conservation and restoration programs	Utilize State-wide Technical Steering Group to create a framework to identify and prioritize areas for HWI conservation and restoration programs. Members will be made up of Federal, State, and local partners	Documentation of priority areas in Annual Report to USEPA	2020		Grants Unit	
As staffing allows, implement Healthy Watershed Initiative Plans or other conservation plans	Attempt to implement conservation and restoration BMPs documented in at least one (1) Healthy Watershed Initiative Plan or other conservation plan per year	Documentation of attempt or contraction of HWI project in Annual Report to USEPA	annual		Grants Unit	
Assist in revision of the Georgia State	Georgia DNR Wildlife Resources Division	Participation on committee	2015		Grants Unit	

<u>Other Nonpoint Source Related Programs</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
Wildlife Action Plan as staffing permits	along with Federal, State, Local, and private organizations will revise the Georgia Wildlife Action Plan					
<u>Safe Dams</u>						
Initiate nonpoint source cross-training of Safe Dam personnel to identify and report nonpoint source pollution violations including violations to the Erosion and Sedimentation regulations and stream buffers	Georgia GAEPD will promote nonpoint source cross-training of Safe Dam personnel including erosion and sedimentation certification and stream buffer violation determinations	Each individual Safe Dam employee will attempt to attend at least one cross-training when opportunities occur	2016		Erosion & Sedimentation Unit	
<u>Groundwater</u>						
Assess groundwater contamination at State-permitted LASs and and AFOs	Conduct site visits and assist with compliance inspections	Inspect at least 6 facilities per year	Annual		Wastewater Regulatory Program	
Assist the WPB and District offices in	Prepare and/or review memos for	Provide a completed corrective action memo	On going		Wastewater	



<u>Other Nonpoint Source Related Programs</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
evaluating compliance as staff time permits	enforcement corrective actions, when violations of groundwater standards have been documented	within 90 days of the request			Regulatory Program	
Create technical guidance on the proper assessment and necessary corrective actions for LASs and AFOs	Prepare guidance documentation for internal Georgia GAEPD use	Completion of a guidance document by end of calendar year 2015	2015		Wastewater Regulatory Program	
Perform technical-reviews of monitoring-data submittals from Georgia GAEPD selected permitted facilities	Review groundwater monitoring data submitted by LAS and AFOs	Annually track corrective action reports for selected facilities for a minimum of 2 years after initiation of corrective action	On going		Wastewater Regulatory Program	
Complete technical-evaluations of NMP implementation at AFOs	Conduct technical reviews of permit applications and permit materials, such as NMPs and NMP amendments. Conduct thorough reviews of the groundwater monitoring portions	Adequacy of memos delivered to the Georgia DoA, for use in permitting process on an as requested basis	On going		Wastewater Regulatory Program	

<u>Other Nonpoint Source Related Programs</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
	of NMPs					
<b><u>Floodplain</u></b>						
Continue administering and signing up new communities under NFIP	Georgia GAEPD will sign up at least 20 communities for the NFIP over the next 5 years	At least 20 communities signed up and documented in Annual (Quarterly) Report to FEMA	2020		Floodplain Unit	
Conduct outreach meetings to Elected Government Officials to promote joining the NFIP and CRS	Georgia GAEPD will host meetings promoting the NFIP and CRS over the next 5 years	At least 25 meetings hosted and documented	2020		Floodplain Unit	
Conduct Preliminary "Open House" Meetings with information tables to promote the NFIP and CRS directly to general public	Georgia GAEPD will host "Open House" meetings promoting the NFIP and CRS over the next 5 years	At least 25 meetings hosted and documented	2020		Floodplain Unit	
Promote the GEMA Severe Repetitive Loss Pilot Program to NFIP communities	Georgia GAEPD act as liaison and promote the GEMA Severe Repetitive Loss Pilot Program to NFIP communities with repetitive, flood	All eligible NFIP Communities that contact Georgia GAEPD will be connected to the GEMA Severe Repetitive Loss Pilot Program	On going		Floodplain Unit	

<u>Other Nonpoint Source Related Programs</u> Long Term Goal	Short Term Goal	Milestone	Completion Date	Coastal Plan Reference	Responsible Party	Status
	damaged structures					

Watershed <u>Prioritization</u> Goal	Completion Date	Coastal Plan Reference	Responsible Party	Status
GAEPD will continue to identify priority watersheds using the process identified in the Nonpoint Source Prioritization process. GAEPD will add to the list of priority watershed by modeling and identifying priority watershed in Georgia.	2016		Grants Unit	

<b>Tracking (pg 169) Long-term Goal</b>	<b>Short Term Goal</b>	<b>Milestone</b>	<b>Completion Date</b>	<b>Coastal Plan Reference</b>	<b>Responsible Party</b>	<b>Status</b>
Encourage use of tracking tables as appropriate	Provide GAEPD, Federal and State agencies, local governments, nongovernmental organizations, and the general public with at-a-glance, basin-specific information on water quality improvements to NPS-impacted waters	Provide a metric for measuring successes of the NPS program	2020		Grants Unit	
		Provide stakeholders with information on water quality issues and activities in their communities	2020		Grants Unit	
Make these tables available on the internet, as resources allow	Work with the GADCA and other organizations to encourage local governments and other groups to post links to the tables on their own web sites	Tables posted on partners' websites	2020		Grants Unit	

## **SUMMARY**

Nonpoint source pollution is the largest source of water pollution in Georgia. It is derived from a wide variety of sources, all of which are related to land use patterns, agriculture, urban stormwater management, silviculture, and the many other human activities that define the economy of Georgia. Although Georgia has made great strides in managing point-source water pollution, nonpoint source pollution will require more creative, less regulatory approaches to mitigate it.

Regulation of non-point source pollution is challenging because of statutory limits that exempt many sources of it, such as agriculture and silviculture. Furthermore, by its diffuse nature nonpoint source pollution is typically very difficult to attribute to any one source and is usually caused by many inputs. This requires a greater understanding of its causes and behavioral changes on the part of Georgia's citizens and industries. This report highlights the need to mirror the diffuse nature of non-point source pollution by engaging the many stakeholder groups in Georgia who, through outreach and education, can bring about a higher quality of surface waters in Georgia with fewer impaired streams.

In addition to the fact that a non-regulatory approach to non-point source pollution is inherently difficult, budgetary constraints require a more focused approach towards addressing it. For this reason, and using this report as guidance, the GAEPD will be targeting those areas and stream segments that have been shown to be most impaired, most in need of best management practices, and most likely to respond to the implementation of best management practices. In other words, future mitigation projects will be determined more by the environmental needs of targeted, high-priority watersheds.

Environmental awareness among Georgia's policy makers is generally strong. This is evident in the laws, initiatives, and programs that have been implemented since the GAEPD submitted their last non-point source management plan. These include the Georgia Legacy Project, a land conservation initiative that States the "moral imperative" of preserving Georgia's land and water resources; the Georgia Comprehensive State-wide Water Management Plan; and a watershed approach to address impacts of agricultural land use practices. Also of growing importance has been the recognition that Georgia's assessment of surface water quality, stream impairment, and the causes of nonpoint source pollution would be far more accurate with more data collected more broadly. More water quality data would undoubtedly lead to better management practices targeted to specific stream segments rather than targeted solely to an economic sector.

Among Georgia's most precious natural resources are its coastal waters. While most of the nonpoint source pollution problems in the 11 coastal counties are locally derived, the connection between upland water quality and supply on coastal waters is becoming clearer. Streams entering the tidewater areas of Georgia, especially the smaller rivers, need to be protected in order to avoid adding to the pollutant loads in coastal waters. However, across Georgia the main sources of nonpoint source pollution continue to be agriculture and urban stormwater. As this report describes, Georgia will continue to direct its efforts toward working with stakeholders and communities to address these functional areas, and reduce the causes and impacts of nonpoint source pollution.

## **APPENDIX A: OTHER NONPOINT SOURCE FUNDING**

- [Georgia Environmental Finance Authority](https://gefa.georgia.gov/)- GEFA's program focus areas are water, wastewater, solid waste, recycling, land conservation, energy efficiency and fuel storage tanks for local governments, other State agencies and non-profit organizations. <https://gefa.georgia.gov/>
- [Clean Water State Revolving Fund](https://gefa.georgia.gov/clean-water-State-revolving-fund)- Programs cover the cost of engineering, planning, and design, construction, and contingencies. <https://gefa.georgia.gov/clean-water-State-revolving-fund>
- [US-EPA Funding Page](http://water.epa.gov/polwaste/nps/funding.cfm) - This page is maintained by USEPA and provides links to resources for State and local governments, non-profits, as well as many funding opportunities. <http://water.epa.gov/polwaste/nps/funding.cfm>
- [Southeastern Regional Water Quality Assistance Network](http://www.efc.sog.unc.edu/project/southeastern-regional-water-quality-assistance-network)- Can provide funding to assist communities in water quality and related projects. <http://www.efc.sog.unc.edu/project/southeastern-regional-water-quality-assistance-network>
- [Georgia Coastal Incentives Grant](http://coastalgadnr.org/cm/grants/cig/apply) - Information on grant available for the 11 Coastal Counties to improve water quality and promote the health of coastal waters. <http://coastalgadnr.org/cm/grants/cig/apply>
- [NRCS: Environmental Quality Incentives Program \(EQIP\)](http://www.nrcs.usda.gov/wps/portal/nrcs/main/ga/programs/financial/eqip/)- Page maintained by NRCS that contains information on this program that provides monetary and technical assistance. <http://www.nrcs.usda.gov/wps/portal/nrcs/main/ga/programs/financial/eqip/>
- [NRCS: Wildlife Habitat Incentives Program \(WHIP\)](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/whip/?cid=nr cs143_008423)- Page maintained by NRCS that contains information on this program that provided monetary and technical assistance for habitat conservation for fish and wildlife. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/whip/?cid=nr cs143\\_008423](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/whip/?cid=nr cs143_008423)
- [Community Action for Renewed Environment \(CARE\) Grants](http://www.epa.gov/care/basic.htm)- Projects to help communities reduce toxics in their environment and to solve environmental problems. <http://www.epa.gov/care/basic.htm>
- [5-Star Restoration Program](http://www.nfwf.org/fivestar/Pages/home.aspx#.U59kQ3aROul)- Must have five or more project partners. Provides environmental education through streambank and wetland restorations. <http://www.nfwf.org/fivestar/Pages/home.aspx#.U59kQ3aROul>
- [Catalog for Federal Funding](http://cfpub.epa.gov/fedfund/)- <http://cfpub.epa.gov/fedfund/>
- [Community Development Block Grant \(CDBG\)](https://www.dca.ga.gov/communities/CDBG/) The primary objective of is "the development of viable communities through improvement of living conditions, housing and the expansion of economic opportunities in cities and counties, principally for persons of low and moderate income. <https://www.dca.ga.gov/communities/CDBG/>



## **APPENDIX B: PARTNER SUMMARIES & CONTACT INFORMATION**

### **The Atlanta Regional Commission**

As the Atlanta area's Regional Development Center (ARC), under State law, ARC is the regional planning and intergovernmental coordination agency for the 10-county area including Cherokee, Clayton, Cobb, DeKalb, Douglas, Fayette, Fulton, Gwinnett, Henry and Rockdale counties, as well as the City of Atlanta. ARC promotes sustainable growth and efficient development patterns through its Land Use Division, which develops regional plans and policies that address key land use issues and needs of the Atlanta region. Additionally, the Natural Resources Division of the ARC Center for Livable Communities responsible for on-going implementation of the Metropolitan River Protection Act (MRPA); providing technical assistance for multi-jurisdictional watershed protection programs; facilitating, through the Metropolitan North Georgia Water Planning District, the Clean Water Campaign and My Drop Counts, two outreach campaigns to address stormwater issues and water efficiency and conservation; and providing the planning staff for the Metropolitan North Georgia Water Planning District.

#### Contact information

Atlanta Regional Commission  
40 Courtland Street, NE  
Atlanta, Georgia 30303-2538  
Phone: (404) 463-3100

### **Farm Service Agency (FSA)**

FSA is the lead agency in the administration of the Conservation Reserve Program (CRP). The CRP is a voluntary program that offers annual rental payments, incentive payments, and cost-share assistance to establish approved cover on eligible cropland. The duration of contracts is between 10 and 15 years. Annual rental payments and cost-share assistance for establishing eligible practices are approved by the County FSA Offices.

#### Contact Information

Check out their webpage for the office closest to you  
<http://offices.sc.egov.usda.gov/locator/app?State=us&agency=fsa>

### **Georgia Association of Regional Commissions**

The mission of the Georgia Association of Regional Commissions (GARC) is to advance the efforts of Georgia's twelve Regional Commissions as efficient and effective service provision organizations for local governments and related State and Federal programs in the areas of planning, economic development, transportation, information technology and human services. The Association exists to promote the regional efforts of the twelve Regional Commissions in Georgia, including coordinated and comprehensive planning efforts in the areas of land use, environment, transportation and historic preservation.

#### Contact Information

40 Courtland Street, NE  
Atlanta, Georgia 30303-2538  
Phone: (404) 463-3100  
Fax: (404) 463-3105  
[www.atlantaregional.com](http://www.atlantaregional.com)

### **GDA (Georgia Department of Agriculture)**

Enforces both State and Federal law regarding pesticide use, application, and registration in Georgia and works with animal feeding operations through on-farm inspections and review of nutrient management plans. The GDA maintains an extensive program to protect groundwater from pesticide contamination. The Pesticide Monitoring Network is a collaborative project with the GAEPD in which water samples are obtained from wells throughout the State. The samples are analyzed by the GDA for pesticides and/or pesticide metabolites. The GDA facilitates voluntary pesticide disposal collections. It also responds to and takes enforcement action on complaints, most of which are connected with misapplication of defoliant on landscape plants or farm pond fish kills resulting from aerial application of chemicals. In addition, the GDA conducts routine on-site inspections of animal feeding operations, maintains certification and training programs for animal feeding operators, manure haulers, and nutrient management planners.

### **Georgia Department of Community Affairs: Regional Commissions**

Georgia's twelve regional commissions were created by the Georgia State Planning Act in order to assist local governments on a regional basis and to develop, promote and assist in establishing coordinated and comprehensive planning in the State. The Department of Community Affairs contracts annually with the Regional Commissions to primarily foster effective local and regional planning and implementation of those plans.

#### Contact Information

Office of Planning and Environmental Management  
Georgia Department of Community Affairs  
60 Executive Park South, NE  
Atlanta, Georgia 30329-2231  
Phone: 404-679-5279

A directory of all 12 regional Commissions can be found at:

<http://www.dca.State.ga.us/development/PlanningQualityGrowth/DOCUMENTS/Publications/RegionalCommissions/RCDirectory.pdf>

### **Georgia Department of Public Health: Public Health Districts and County Health Departments**

The Georgia Department of Public Health (DPH) funds and collaborates with 18 separate public health districts throughout the State. Each public health district is comprised of one or more of Georgia's 159 counties and county health departments. County Health Departments in Georgia serve many purposes, including reducing and preventing diseases that may be transmitted through fecal contamination associated with improperly maintained septic systems. Most county health departments have Environmental Health or Land Use programs that issue permits for septic systems, septic system repair permits, perform existing system evaluations and site evaluations, and conduct subdivision plan reviews. Public health districts and individual county health departments may be contacted using the web address provided below.

#### Contact information:

Georgia Department of Public Health  
2 Peachtree Street, NW  
Atlanta, Georgia 30303-3186  
Phone: (404) 657-2700  
Website: <http://dph.georgia.gov/public-health-districts>

### **Georgia Department of Public Health, Wastewater Management Program**

This program in the Georgia DPH regulates septic tanks, on-site sewage disposal, and portable toilets. Its mission is to minimize health problems related to untreated human sewage through: regulation and inspection of new OSDs; investigation and inspection of repairs made annually to improperly functioning OSDs; education, training, and certification for environmentalists, septic tank installers, pumpers, soil scientists, geologists, and engineers involved in installing, maintaining, and repairing OSDs.

#### Contact information:

Georgia Department of Public Health  
Environmental Health Branch, Land Use Unit  
2 Peachtree Street, NW  
Atlanta, Georgia 30303-3186  
Phone: (404) 657-6534  
Website: <http://dph.georgia.gov/wastewater-management>

### **GEFA (Georgia Environmental Finance Authority)**

Administers the Georgia Land Conservation Program (GLCP), which provides Clean Water Act State Revolving loan funds to local governments and non-profits for the permanent protection of conservation lands. Lands acquired with these funds must comply with GAEPD Nonpoint Source Management Plan. GAEPD reviews landowners' applications to ensure lands proposed for acquisitions provide for water quality protection of rivers, streams, and lakes, wetlands and floodplains, riparian buffers from nonpoint source pollutants.

#### Contact Information:

233 Peachtree Street NE  
Harris Tower, Suite 900  
Atlanta, Georgia  
Phone: 404-584-1000  
Fax: 404-584-1069  
Website: <https://gefa.georgia.gov/>

### **GFC (Georgia Forestry Commission)**

GFC provides technical information and assistance relating to forestry practices such as reforestation, forest stewardship management, urban forest management, harvesting, marketing, utilization, incentive programs, forest water quality, and the general promotion of forestry through information and educational efforts. Services include the development of forest stewardship management plans, timber marking, loan or rental of certain forestry equipment, pre-suppression environmental firebreak plowing and sales of urban and forest tree seedlings. The GFC and the agriculture community have some conservation practices in common and share some projects, particularly those on the watershed level.

#### Contact Information:

5645 Riggins Mill Road  
Dry Branch, Georgia 31020  
P. O. Box 819  
Macon, Georgia 31202-0819  
Phone: 478-751-3500 OR 1-800-GA-TREES (428-7337)  
Fax: 478-751-3465  
Website: [www.gfc.State.ga.us](http://www.gfc.State.ga.us)

### **The Georgia Planning Association**

The Georgia Planning Association (GPA), an official Chapter of the American Planning Association, is a 1,000-plus member organization of professional planners and planning officials who provide resources and services to planners and communities. Its purpose is to encourage, promote and assist physical, economic, and human resources planning in Georgia. Many of its activities relate directly to land use and environmental planning.

#### Contact Information

A full directory of the 10 districts can be found at:

<https://georgiaplanning.org/about-gpa/board-members/>

### **Georgia Onsite Wastewater Association**

The Georgia Onsite Wastewater Association (GOWA) is a State-wide, non-profit trade association which represents individuals and companies engaged in the design, sale, installation, maintenance, service and repair, and regulation of individual onsite wastewater treatment systems for residential, commercial, industrial, governmental and institutional customers. GOWA also tracks legislation and regulations that affect its members.

#### Contact information:

Georgia Onsite Wastewater Association

P.O. Box 1928

Duluth, Georgia 30096

Phone: (678) 646-0379

Website: <http://www.onsitewastewater.org/>

### **GRC (Georgia Regional Commission)**

GAEPD provides non-competitive Section 319 funds, as part of its watershed management approach, to develop comprehensive watershed management plans (USEPA nine elements) for Georgia 303(d)/305(c) listed waters.

### **GSWCC (Georgia Soil and Water Conservation Commission)**

GAEPD provides non-competitive Section 319 funding to implement the Georgia Erosion and Sedimentation Control Education and Certification Program, the Nonpoint Source Control Program, Nutrient Management Planning, and one staff position (Nonpoint Source Specialist), which administers agricultural projects for GSWCC.

#### Contact Information:

4310 Lexington Road

P.O. Box 8024

Athens, GA

Phone: (706) 552-4470

### **GAEPD Watershed Protection Branch - Wastewater Regulatory Program**

[http://epd.georgia.gov/sites/epd.georgia.gov/files/related\\_files/site\\_page/Large Community Surface Design Guidance Y2013.doc](http://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/Large_Community_Surface_Design_Guidance_Y2013.doc)

[http://epd.georgia.gov/sites/epd.georgia.gov/files/related\\_files/site\\_page/GA General LAS Surface Permit GAG278000 Feb.pdf](http://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/GA_General_LAS_Surface_Permit_GAG278000_Feb.pdf)

Contact information:

Georgia Environmental Protection Division  
Wastewater Regulatory Program  
2 Martin Luther King, Jr. Drive  
Suite 1152  
Atlanta, GA 30334  
Phone: 404-656-4713  
<http://epd.georgia.gov/municipal-wastewater>

**NRCS (Natural Resources Conservation Service):** The NRCS works with Georgia landowners to protect the State's natural resources. They provide technical assistance on natural resources issues and assist individuals, groups, communities, and counties implement soil and water conservation practices to protect the 34 million acres of privately owned land in Georgia. The NRCS administers programs under the Farm Bill, which offer various conservation grants and financial assistance to private landowners.

Contact Information:

USDA - Natural Resources Conservation Service  
355 East Hancock Ave  
Stop Number 200  
Athens, Georgia 30601  
(706) 546-2272  
Fax: (706) 546-2120

**RC&D Councils (Resource Conservation and Development):** There are eleven RC&D Councils within the State that work closely with NRCS and local landowners. RC&D Councils are grass-roots community leaders working collectively on behalf of conservation and sustainable development. GAEPD offers competitive grants for approved agricultural projects, whereby the RC&Ds communicate with local private landowners to provide education and technical assistance about how improper land use practices impact water quality.

**UGA CAES (University of Georgia College of Agricultural and Environmental Science):** UGA CAES faculty, county cooperative extension agents, and technical specialists provide services in several key areas relating to agricultural impacts on water quality. These areas include: classroom instruction, basic and applied research, consultative assistance and information on nonpoint source impacts on water quality, application of Geographic Information Systems (GIS) and hydrologic modeling for the assessment of current and future water quality and quantity issues, and consultative assistance to agricultural clients with issues such as development of waste management systems and nutrient management plans. UGACAES participates on a variety of State committees such as the State Technical Committee and is actively involved in monitoring water quality in streams and groundwater impacted by agriculture activities. UGACAES publishes the Georgia Pest Control Handbook which lists approved pesticides, application rates, and methods.

**University of Georgia Marine Extension Service (MAREX):** The Marine Extension Service at UGA is conducting extensive research into the locations and impacts of OSDS in the coastal counties of Georgia. As discussed above, this research is being funded by grants from the National Oceanic and Atmospheric Administration (NOAA) and the USEPA. A significant outgrowth of this work has been development of the WelSTROM OSDS mapping project.

Contact information:

University of Georgia Marine Extension Service  
1180 E. Broad Street  
Athens, Georgia 30603-3636  
Phone: 706.542.8849  
Website: <http://marex.uga.edu/>

**For WelSTROM mapping information, visit:**

[http://marex.uga.edu/coastal\\_septic\\_system\\_mapping/](http://marex.uga.edu/coastal_septic_system_mapping/)

**University of Georgia Department of Crop and Soil Sciences:** The Department of Crop and Soil Sciences at UGA has a number of national and regional experts in the hydrological, ecological, and biological impacts of OSDS. Ongoing research at UGA will continue to add to our understanding of OSDS in Georgia.

Contact information:

Department of Crop and Soil Sciences  
3111 Miller Plant Sciences Building  
The University of Georgia  
Athens, GA 30602-7272  
Phone: (706) 542-2461  
Website: <http://www.cropsoil.uga.edu/>

**US Geological Survey:** The USGS has conducted several studies on the impact of OSDS on water quality and consumptive use. GAEPD has a cooperative agreement with USGS through which USGS conducts some of the State's Statewide trend monitoring. USGS also operates and maintains continuous monitors and conducts some laboratory work.

Contact information:

US Geological Survey  
Georgia Water Science Center  
1770 Corporate Drive  
Suite 500  
Norcross, GA 30093  
Phone: (678) 924-6700

**DNR Wildlife Resource Division**

The WRD Stream Survey Team (SST) is a small group of technicians, biologists, and seasonal workers who monitor the health of Georgia's wadeable streams by surveying fish communities. The SST provides input into the TMDL process by assessing the biotic integrity of streams using fish as indicators. Nearly 1,500 stream surveys have been completed and the Georgia Fish Index of Biotic Integrity has been developed for four of the State's five major eco-regions.

Contact Information:

Check out their website for information pertaining to your county.

[www.georgiawildlife.com](http://www.georgiawildlife.com)

**United States Environmental Protection Agency (USEPA)**

GAEPD partners with USEPA in a number of ways to further the monitoring program. USEPA oversees GAEPD's fulfillment of a number of regulatory requirements related to monitoring,



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including trend monitoring, report production, establishment of water quality standards, and other tasks. GAEPD takes advantage of USEPA sponsored training in all aspects of monitoring including field techniques, laboratory analysis, and data management and analysis. The agencies work together, often along with USGS, on a number of monitoring projects to maximize efficiency, and in some cases USEPA provides laboratory support to the monitoring program at its Athens facilities.

Contact Information:

US EPA, Region 4  
Sam Nunn Atlanta Federal Center  
61 Forsyth Street, SW  
Atlanta, GA 30303  
Phone: 404-562-9900  
Website: [www.epa.gov](http://www.epa.gov)

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